

Saskatchewan Rangeland Ecosystems
Publication 4

Communities on the Loam Ecosite

Version 2

A project of the Saskatchewan Prairie Conservation Action Plan



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Saskatchewan Research Council
2014 (revised)

Canada 



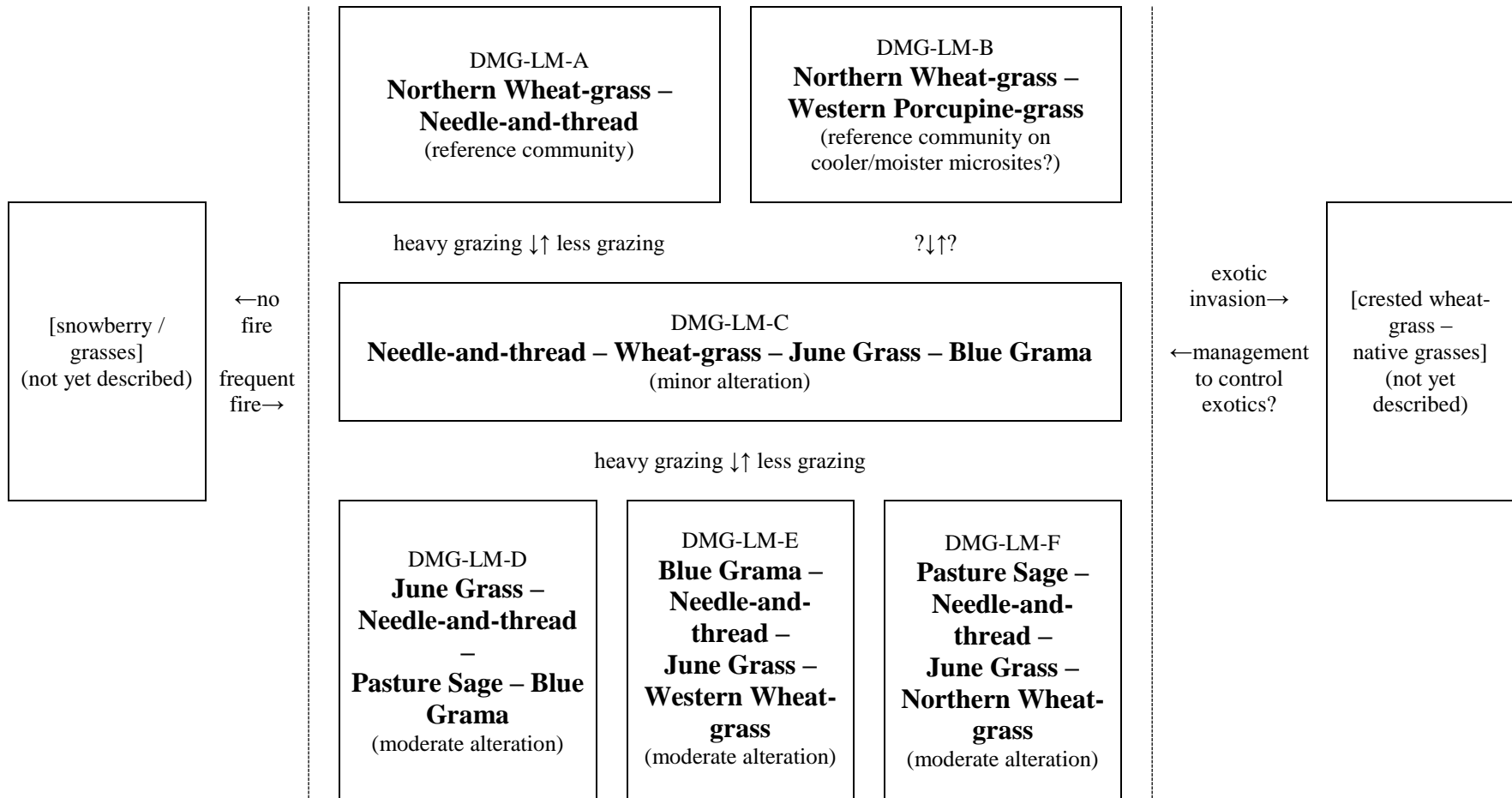
NOTES

- This publication describes native rangeland communities found on the Loam Ecosite in the Dry Mixed Grassland, Mixed Grassland, Aspen Parkland, and Cypress Upland regions of Saskatchewan.
- More data are needed on differentiation of microsites within this large Ecosite, especially on rolling terrain. Different aspects and slope positions create differences in species composition and productivity, but data were insufficient to distinguish these in the classification.
- In each region, a reference community, typical of ungrazed to lightly grazed areas, and a series of other communities related to increasing grazing impact, are described.
- In assessing rangeland health, this information can be used to pick the community that best fits the area being assessed. The degree of alteration of that community from the reference community can be used to answer Question 1 of the Saskatchewan Rangeland Health Assessment. This may require interpretation, because the area being assessed may not exactly match any of the described types.
- Another approach is to calculate the percent similarity between the area being assessed and the reference community, as a measure of the degree of alteration due to grazing impact. This measure is similar in both concept and result to the traditional range condition scale.
- State-and-transition diagrams are used to show that there may also be transitions related to factors such as exotic invasion or fire regime. These transitions should not be confused with grazing impacts.
- More detailed discussion of the above points can be found in *Publication 1: Ecoregions and Ecosites*.

PHOTO CREDITS: Front cover and Page 16 – Mixed grassland on morainal deposits in the Missouri Coteau (Bob Godwin); Page 28 – fescue grassland on Loam in the Aspen Parkland (Jeff Thorpe); Page 32 – Kentucky blue-grass on Loam in the Aspen Parkland (Jeff Thorpe); Page 34 – aspen / saskatoon stand on Loam in the Aspen Parkland (Bob Godwin); Page 36 – aspen / snowberry stand on Loam in the Aspen Parkland (Bob Godwin); Page 38 – aspen / Kentucky blue-grass stand on Loam in the Aspen Parkland (Bob Godwin); Page 40 – snowberry invading grassland in the Aspen Parkland (Jeff Thorpe); Page 42 – fescue in the Cypress Upland (Bob Godwin).

STATE-AND-TRANSITION DIAGRAMS

Dry Mixed Grassland: Loam Ecosite



[snowberry /
grasses]
(not yet described)

← no
fire
frequent
fire →

DMG-LM-A
**Northern Wheat-grass –
Needle-and-thread**
(reference community)

DMG-LM-B
**Northern Wheat-grass –
Western Porcupine-grass**
(reference community on
cooler/moister microsites?)

DMG-LM-C
Needle-and-thread – Wheat-grass – June Grass – Blue Grama
(minor alteration)

DMG-LM-D
**June Grass –
Needle-and-thread**
–
**Pasture Sage – Blue
Grama**
(moderate alteration)

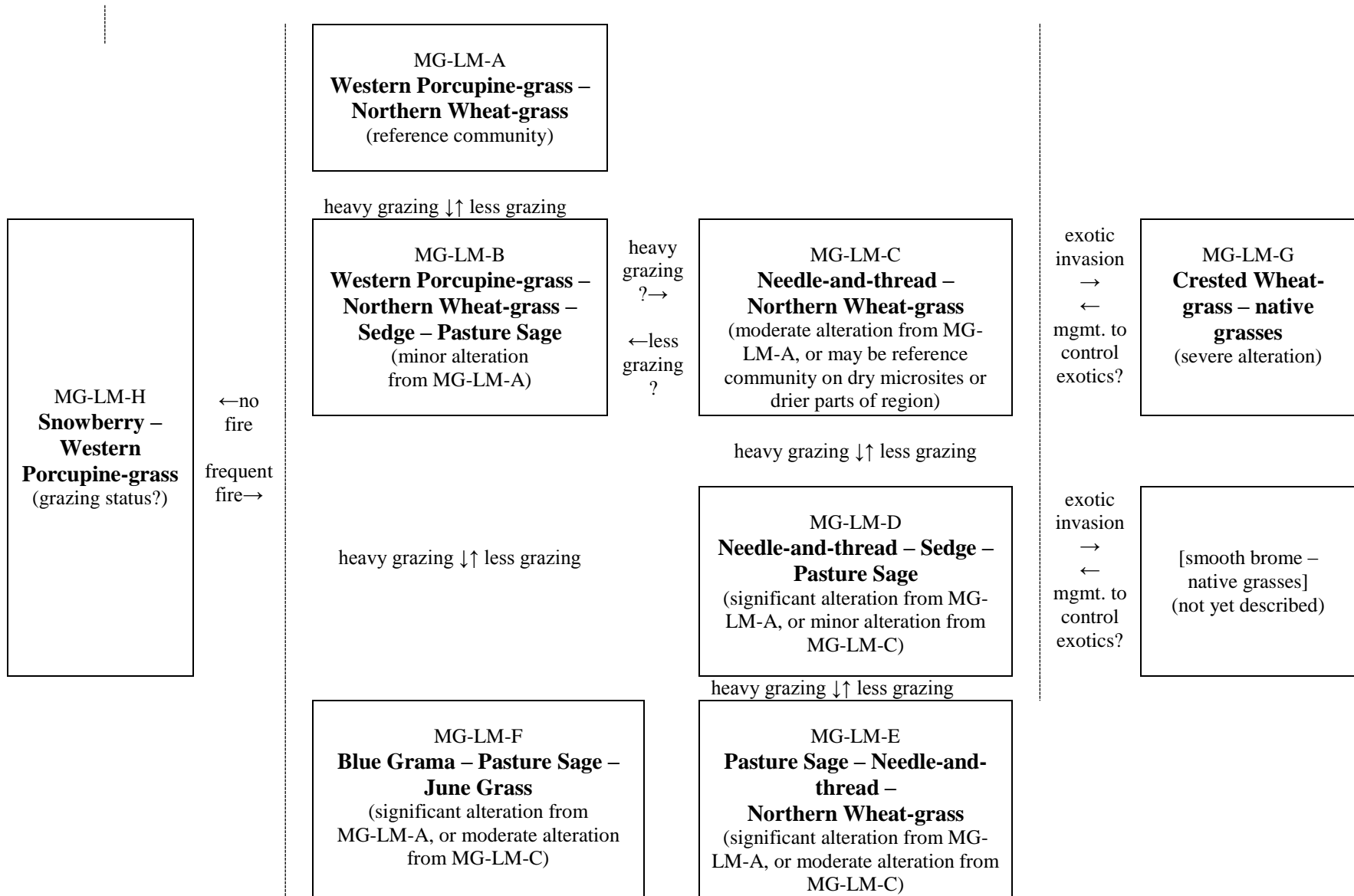
DMG-LM-E
**Blue Grama –
Needle-and-
thread –
June Grass –
Western Wheat-
grass**
(moderate alteration)

DMG-LM-F
**Pasture Sage –
Needle-and-
thread –
June Grass –
Northern Wheat-
grass**
(moderate alteration)

exotic
invasion →
← management
to control
exotics?

[crested wheat-
grass –
native grasses]
(not yet
described)

Mixed Grassland: Loam Ecosite
(also applies to lower slopes of Cypress Upland)



Aspen Parkland: Loam Ecosite Drier Microsites

AP-LM-A
**Plains Rough Fescue – Northern Wheat-grass –
Western Porcupine-grass**
(reference community)

heavy grazing ↓↑ less grazing

AP-LM-B
**Western Porcupine-grass - Northern Wheat-grass –
Sedge – Pasture Sage**
(moderate alteration)

heavy grazing ↓↑ less grazing

AP-LM-C
**Sedge – Pasture Sage –
Western Porcupine-grass –
Northern Wheat-grass**
(moderate alteration)

AP-LM-D
**Needle-and-thread –
Wheat-grass – Pasture Sage**
(significant alteration)

heavy grazing and exotic invasion ↓↑ management to control exotics?

AP-LM-E
Kentucky Blue-grass – Sedge
(severe alteration)

AP-LM-I
**Snowberry – Wolf-
willow / Western
Porcupine-grass –
Sedge**
(grazing status?)

no fire
←
→
frequent
fire

exotic invasion
→
←
mgmt. to
control exotics

[smooth brome – native
grasses]
(not yet described)

Aspen Parkland: Loam Ecosite (continued)
Moister Microsites

(for woodlands in Moose Mountain Upland, see descriptions in McLaughlan et al. 2010).

woodlands

AP-LM-F
Aspen / Saskatoon / Rose
reference community

heavy grazing↓
↑less grazing

AP-LM-G
Aspen / Snowberry – Rose
(significant alteration)

heavy grazing, exotic invasion↓
↑mgmt. to control exotics?

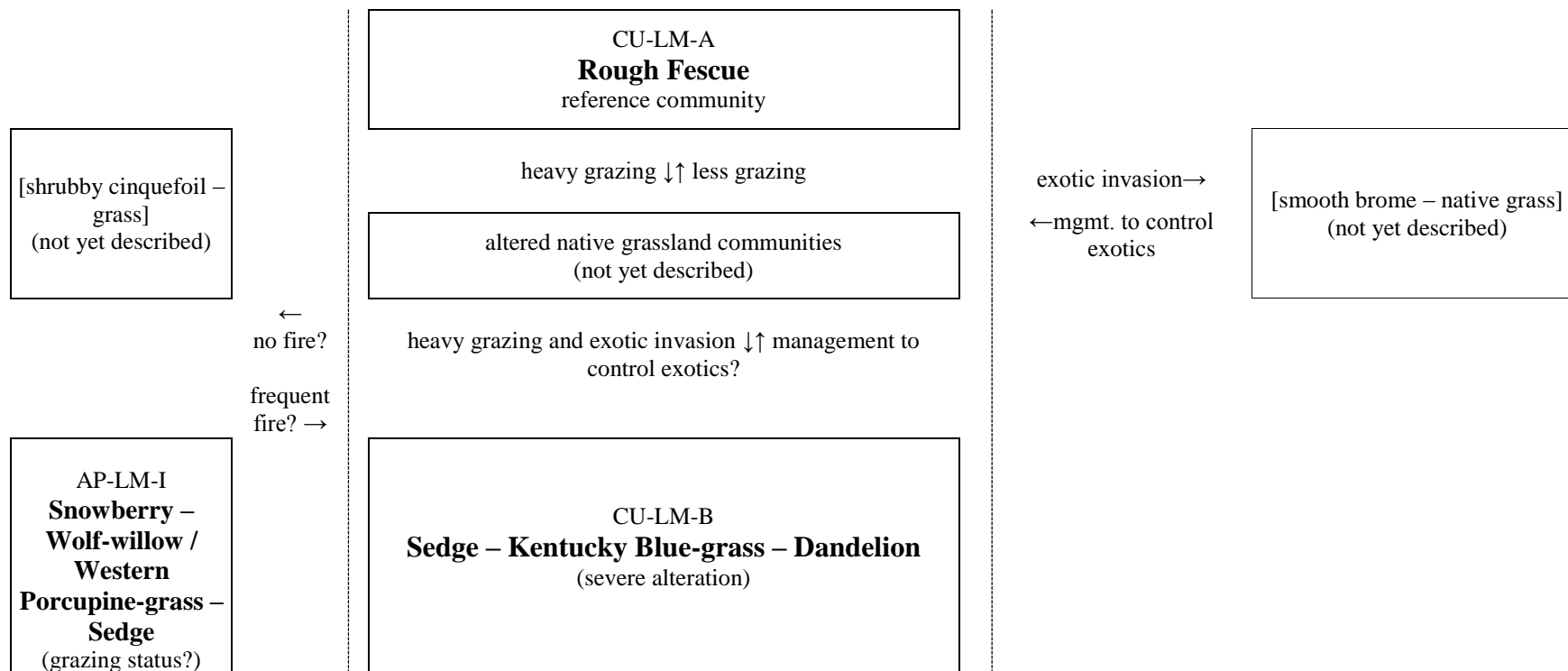
AP-LM-H
**Aspen / Snowberry - Rose /
Kentucky Blue-grass**
(significant alteration)

tall shrublands

[choke-cherry – saskatoon]
not yet described

Cypress Upland: Loam Ecosite (fescue grassland at higher elevations)

Drier Microsites



Moister Microsites

For woodlands in the Cypress Upland, see descriptions in McLaughlan et al. (2010).

COMMUNITY DESCRIPTIONS

DMG-LM-A

Northern Wheat-grass - Needle-and-thread

Dry Mixed Grassland: Loam Ecosite

GENERAL DESCRIPTION: Mixed prairie strongly dominated by midgrasses, with lesser amounts of shortgrasses, forbs, and half-shrubs. Shrub cover usually low. **Reference community** for most areas of Loam Ecosite in the Dry Mixed Grassland.

STRUCTURE

herbaceous cover (n=25)	38% (27 - 67)	clubmoss cover (n=25)	40% (24 - 56)
- midgrasses	approx. 25%	litter cover (n=25)	32% (18 - 50)
- shortgrasses	approx. 5%	bare soil (n=25)	1% (0 - 6)
- half-shrubs	approx. 2%		
- forbs	approx. 3%		

SPECIES COMPOSITION

% biomass (n=37)

Major graminoids	
northern wheat-grass (<i>Elymus lanceolatus</i>)	35% (22 - 53)
needle-and-thread (<i>Hesperostipa comata</i>)	19% (10 - 31)
june grass (<i>Koeleria macrantha</i>)	7% (2 - 13)
blue grama (<i>Bouteloua gracilis</i>)	6% (1 - 11)
sedge (<i>Carex spp.</i>)	6% (1 - 12)
plains reed grass (<i>Calamagrostis montanensis</i>)	5% (0 - 12)
western wheat-grass (<i>Pascopyrum smithii</i>)	5% (0 - 12)
western porcupine-grass (<i>Hesperostipa curtiseta</i>)	3% (0 - 8)

Major forbs and half-shrubs	
pasture sage (<i>Artemisia frigida</i>)	6% (1 - 12)
scarlet mallow (<i>Sphaeralcea coccinea</i>)	2% (0 - 6)
American vetch (<i>Vicia americana</i>)	1% (0 - 5)
winter fat (<i>Krascheninnikovia lanata</i>)	1% (0 - 0)

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

SIMILARITY TO REFERENCE COMMUNITY	ref. comm.
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FORAGE PRODUCTION	insufficient data	
RECOMMENDED STOCKING RATE	0.49 AUM/ha	0.20 AUM/ac

DMG-LM-B
Northern Wheat-grass - Western Porcupine-grass
Dry Mixed Grassland: Loam Ecosite

GENERAL DESCRIPTION: Mixed prairie strongly dominated by midgrasses, with lesser amounts of shortgrasses, forbs, and half-shrubs. Shrub cover usually low. This community is similar to the reference community in the Mixed Grassland. In the Dry Mixed Grassland, it is probably limited to cooler/moister microsites such as north-facing slopes, where it could be considered the **reference community**. However, more research is needed on the status of this community.

STRUCTURE

herbaceous cover (n=19) 35% (26 - 50) - midgrasses approx. 25% - shortgrasses approx. 5% - half-shrubs approx. 2% - forbs approx. 3%	clubmoss cover (n=19) 31% (14 - 47) litter cover (n=19) 37% (17 - 51) bare soil (n=19) 1% (0 - 2)
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SPECIES COMPOSITION

% biomass (n=20)

Major graminoids	
northern wheat-grass (<i>Elymus lanceolatus</i>)	23% (12 - 36)
western porcupine-grass (<i>Hesperostipa curtiseta</i>)	21% (11 - 41)
needle-and-thread (<i>Hesperostipa comata</i>)	8% (2 - 15)
blue grama (<i>Bouteloua gracilis</i>)	8% (4 - 11)
june grass (<i>Koeleria macrantha</i>)	6% (3 - 11)
plains reed grass (<i>Calamagrostis montanensis</i>)	6% (1 - 12)
sedge (<i>Carex spp.</i>)	5% (2 - 11)
western wheat-grass (<i>Pascopyrum smithii</i>)	5% (1 - 9)
green needle grass (<i>Nassella viridula</i>)	1% (0 - 3)

Major forbs and half-shrubs	
pasture sage (<i>Artemisia frigida</i>)	6% (2 - 11)
scarlet mallow (<i>Sphaeralcea coccinea</i>)	2% (0 - 5)
goldenrod (<i>Solidago spp.</i>)	1% (0 - 3)
woolly yarrow (<i>Achillea millefolium</i>)	1% (0 - 2)
hairy golden-aster (<i>Heterotheca villosa</i>)	1% (0 - 2)
golden bean (<i>Thermopsis rhombifolia</i>)	1% (0 - 0)
dotted blazingstar (<i>Liatrix punctata</i>)	1% (0 - 2)
Indian breadroot (<i>Pedimelum esculentum</i>)	1% (0 - 2)

Minor graminoids	1%
Minor forbs and half-shrubs	4%

SIMILARITY TO REFERENCE COMMUNITY	ref. comm.?
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FORAGE PRODUCTION	graminoids 900 kg/ha
RECOMMENDED STOCKING RATE	0.49 AUM/ha 0.20 AUM/ac

DMG-LM-C
Needle-and-thread - Wheat-grass - June Grass - Blue Grama
Dry Mixed Grassland: Loam Ecosite

GENERAL DESCRIPTION: Mixed prairie dominated by midgrasses, with significant amounts of shortgrasses and lesser amounts of half-shrubs and forbs. Probably develops from DMG-LM-A by decrease in northern wheat-grass and increase in western wheat-grass, june grass, and blue grama. Interpreted as showing **minor alteration** from the reference community as a result of grazing impact.

STRUCTURE

herbaceous cover (n=17)	48% (23 - 72)	clubmoss cover (n=17)	52% (33 - 68)
- midgrasses	approx. 25%	litter cover (n=17)	21% (14 - 30)
- shortgrasses	approx. 15%	bare soil (n=17)	6% (0 - 13)
- half-shrubs	approx. 4%		
- forbs	approx. 5%		

SPECIES COMPOSITION

% biomass (n=61)

Major short shrubs

silver sagebrush (*Artemisia cana*) 1% (0 - 0)

Major graminoids

needle-and-thread (*Hesperostipa comata*) 21% (11 - 33)
 june grass (*Koeleria macrantha*) 13% (4 - 22)
 northern wheat-grass (*Elymus lanceolatus*) 12% (1 - 22)
 blue grama (*Bouteloua gracilis*) 10% (2 - 18)
 western wheat-grass (*Pascopyrum smithii*) 9% (1 - 19)
 sedge (*Carex spp.*) 6% (1 - 11)
 plains reed grass (*Calamagrostis montanensis*) 6% (0 - 13)
 green needle grass (*Nassella viridula*) 1% (0 - 6)
 western porcupine-grass (*Hesperostipa curtiseta*) 1% (0 - 3)
 Sandberg's blue-grass (*Poa secunda*) 1% (0 - 2)

Major forbs and half-shrubs

pasture sage (*Artemisia frigida*) 8% (1 - 15)
 scarlet mallow (*Sphaeralcea coccinea*) 3% (0 - 7)
 winter fat (*Krascheninnikovia lanata*) 1% (0 - 3)
 American vetch (*Vicia americana*) 1% (0 - 3)

Minor graminoids

1%

Minor forbs and half-shrubs

6%

SIMILARITY TO REFERENCE COMMUNITY

72%

FORAGE PRODUCTION

graminoids 800 kg/ha

RECOMMENDED STOCKING RATE

0.49 AUM/ha 0.20 AUM/ac

DMG-LM-D
June Grass - Needle-and-thread - Pasture Sage - Blue Grama
Dry Mixed Grassland: Loam Ecosite

GENERAL DESCRIPTION: Mixed prairie dominated by shortgrasses, with midgrasses codominant, and with lesser amounts of forbs and half-shrubs. Shrub cover usually low. Probably develops from DMG-LM-C by decrease in wheat-grasses and increase in june grass and pasture sage. Interpreted as showing **moderate alteration** from the reference community as a result of grazing impact.

STRUCTURE: insufficient data

SPECIES COMPOSITION **% biomass (n=21)**

Major short shrubs

silver sagebrush (*Artemisia cana*) 1% (0 - 2)

Major graminoids

june grass (*Koeleria macrantha*) 24% (16 - 33)

needle-and-thread (*Hesperostipa comata*) 19% (7 - 29)

blue grama (*Bouteloua gracilis*) 11% (5 - 18)

northern wheat-grass (*Elymus lanceolatus*) 6% (2 - 10)

plains reed grass (*Calamagrostis montanensis*) 5% (0 - 13)

sedge (*Carex spp.*) 4% (1 - 7)

western wheat-grass (*Pascopyrum smithii*) 4% (0 - 9)

Sandberg's blue-grass (*Poa secunda*) 2% (0 - 7)

western porcupine-grass (*Hesperostipa curtiseta*) 1% (0 - 0)

green needle grass (*Nassella viridula*) 1% (0 - 0)

Major forbs and half-shrubs

pasture sage (*Artemisia frigida*) 13% (8 - 20)

scarlet mallow (*Sphaeralcea coccinea*) 3% (0 - 6)

hairy golden-aster (*Heterotheca villosa*) 2% (0 - 6)

winter fat (*Krascheninnikovia lanata*) 1% (0 - 2)

fleabane (*Erigeron spp.*) 1% (0 - 0)

Minor graminoids 1%

Minor forbs and half-shrubs 6%

SIMILARITY TO REFERENCE COMMUNITY 62%

FORAGE PRODUCTION insufficient data

RECOMMENDED STOCKING RATE 0.40 AUM/ha 0.16 AUM/ac

DMG-LM-E
Blue Grama - Needle-and-thread - June Grass - Western Wheat-grass
Dry Mixed Grassland: Loam Ecosite

GENERAL DESCRIPTION: Mixed prairie dominated by shortgrasses, with midgrasses codominant, and with lesser amounts of forbs and half-shrubs. Shrub cover usually low. Probably develops from DMG-LM-C by decrease of midgrasses and increase of blue grama. Interpreted as showing **moderate alteration** from the reference community as a result of grazing impact.

STRUCTURE

herbaceous cover (n=7) 62% (47 - 77) - midgrasses approx. 20% - shortgrasses approx. 25% - half-shrubs approx. 5% - forbs approx. 10%	clubmoss cover (n=7) 31% (18 - 49) litter cover (n=7) 27% (15 - 41) bare soil (n=7) 12% (8 - 18)
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SPECIES COMPOSITION

% biomass (n=18)

Major short shrubs	
silver sagebrush (<i>Artemisia cana</i>)	1% (0 - 3)

Major graminoids	
blue grama (<i>Bouteloua gracilis</i>)	22% (14 - 30)
needle-and-thread (<i>Hesperostipa comata</i>)	16% (6 - 29)
june grass (<i>Koeleria macrantha</i>)	10% (3 - 19)
western wheat-grass (<i>Pascopyrum smithii</i>)	10% (2 - 22)
sedge (<i>Carex spp.</i>)	8% (2 - 18)
northern wheat-grass (<i>Elymus lanceolatus</i>)	5% (0 - 13)
plains reed grass (<i>Calamagrostis montanensis</i>)	4% (0 - 8)
Sandberg's blue-grass (<i>Poa secunda</i>)	1% (0 - 3)
green needle grass (<i>Nassella viridula</i>)	1% (0 - 2)

Major forbs and half-shrubs	
pasture sage (<i>Artemisia frigida</i>)	8% (0 - 14)
scarlet mallow (<i>Sphaeralcea coccinea</i>)	5% (0 - 10)
American vetch (<i>Vicia americana</i>)	1% (0 - 3)
prairie sage (<i>Artemisia ludoviciana</i>)	1% (0 - 2)
pale comandra (<i>Comandra umbellata</i>)	1% (0 - 2)
dotted blazingstar (<i>Liatris punctata</i>)	1% (0 - 2)

Minor graminoids	1%
Minor forbs and half-shrubs	6%

SIMILARITY TO REFERENCE COMMUNITY	60%
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FORAGE PRODUCTION	insufficient data	
RECOMMENDED STOCKING RATE	0.40 AUM/ha	0.16 AUM/ac

DMG-LM-F
Pasture Sage - Needle-and-thread - June Grass - Northern Wheat-grass
Dry Mixed Grassland: Loam Ecosite

GENERAL DESCRIPTION: Mixed prairie dominated by midgrasses, with significant amounts of shortgrasses and half-shrubs and lesser amounts of forbs. Shrub cover usually low. Probably develops from DMG-LM-C by increase in pasture sage. Interpreted as showing **moderate alteration** from the reference community as a result of grazing impact.

STRUCTURE: insufficient data

SPECIES COMPOSITION	% biomass (n=14)
Major graminoids	
needle-and-thread (<i>Hesperostipa comata</i>)	22% (6 - 40)
june grass (<i>Koeleria macrantha</i>)	13% (3 - 19)
northern wheat-grass (<i>Elymus lanceolatus</i>)	11% (1 - 19)
blue grama (<i>Bouteloua gracilis</i>)	8% (2 - 13)
sedge (<i>Carex spp.</i>)	6% (2 - 11)
plains reed grass (<i>Calamagrostis montanensis</i>)	2% (0 - 7)
western wheat-grass (<i>Pascopyrum smithii</i>)	2% (0 - 4)

Major forbs and half-shrubs	
pasture sage (<i>Artemisia frigida</i>)	23% (18 - 28)
scarlet mallow (<i>Sphaeralcea coccinea</i>)	1% (0 - 4)
moss phlox (<i>Phlox hoodii</i>)	1% (0 - 2)

Minor graminoids	1%
Minor forbs and half-shrubs	11%

SIMILARITY TO REFERENCE COMMUNITY	61%
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FORAGE PRODUCTION	insufficient data	
RECOMMENDED STOCKING RATE	0.40 AUM/ha	0.16 AUM/ac

MG-LM-A
Western Porcupine-grass - Northern Wheat-grass
Mixed Grassland: Loam Ecosite

GENERAL DESCRIPTION: Mixed prairie strongly dominated by midgrasses, with lesser amounts of shortgrasses, half-shrubs, and forbs. Shrub cover usually low. **Reference community** for most areas of Loam Ecosite in the Mixed Grassland. However, warmer and drier microsites may have a higher proportion of needle-and-thread, while cooler or finer-textured microsites may have a higher proportion of northern wheat-grass.

STRUCTURE

herbaceous cover (n=40)	51% (28 - 74)	clubmoss cover (n=47)	16% (0 - 34)
- midgrasses	approx. 40%	litter cover (n=43)	74% (50 - 94)
- shortgrasses	approx. 5%	bare soil (n=46)	0% (0 - 2)
- half-shrubs	approx. 2%		
- forbs	approx. 3%		

SPECIES COMPOSITION

	% biomass (n=83)	% foliar cover (n=6)
Major graminoids		
western porcupine-grass (<i>Hesperostipa curtiseta</i>)	38% (19 - 53)	31% (7 - 63)
northern wheat-grass (<i>Elymus lanceolatus</i>)	26% (10 - 40)	4% (0 - 8)
sedge (<i>Carex spp.</i>)	7% (0 - 14)	4% (2 - 6)
needle-and-thread (<i>Hesperostipa comata</i>)	4% (0 - 13)	0% (0 - 0)
june grass (<i>Koeleria macrantha</i>)	4% (0 - 10)	1% (0 - 3)
western wheat-grass (<i>Pascopyrum smithii</i>)	3% (0 - 9)	1% (0 - 3)
plains rough fescue (<i>Festuca altaica var. hallii</i>)	2% (0 - 5)	10% (0 - 21)
blue grama (<i>Bouteloua gracilis</i>)	2% (0 - 5)	0% (0 - 0)
green needle grass (<i>Nassella viridula</i>)	2% (0 - 5)	0% (0 - 0)
Hooker's oat-grass (<i>Avenula hookeri</i>)	1% (0 - 2)	1% (0 - 2)
awned wheat-grass (<i>Elymus trachycaulus ssp. subsecundus</i>)	0% (0 - 0)	1% (0 - 2)
Major forbs and half-shrubs		
pasture sage (<i>Artemisia frigida</i>)	3% (0 - 6)	2% (1 - 3)
crocus anemone (<i>Pulsatilla patens</i>)	1% (0 - 3)	1% (0 - 2)
moss phlox (<i>Phlox hoodii</i>)	1% (0 - 3)	0% (0 - 0)
scarlet mallow (<i>Sphaeralcea coccinea</i>)	1% (0 - 2)	0% (0 - 0)
Minor graminoids		
	2%	1%
Minor forbs and half-shrubs		
	3%	3%
Minor shrubs		
	1%	

SIMILARITY TO REFERENCE COMMUNITY

ref. comm.

FORAGE PRODUCTION

graminoids 1200 kg/ha; forbs 100 kg/ha

RECOMMENDED STOCKING RATE

0.72 AUM/ha 0.29 AUM/ac

MG-LM-B
Western Porcupine-grass - Northern Wheat-grass - Sedge - Pasture Sage
Mixed Grassland: Loam Ecosite

GENERAL DESCRIPTION: Mixed prairie dominated by midgrasses but with significant amounts of shortgrasses and lesser amounts of half-shrubs and forbs. Shrub cover usually low. Probably develops from MG-LM-A by decrease of western porcupine-grass and northern wheat-grass and increase of pasture sage, sedges, and june grass. Interpreted as showing **minor alteration** from the reference community as a result of grazing impact.

STRUCTURE

herbaceous cover (n=23)	61% (47 - 78)	clubmoss cover (n=47)	12% (0 - 28)
- midgrasses	approx. 35%	lichen cover (n=22)	2% (0 - 3)
- shortgrasses	approx. 15%	litter cover (n=26)	61% (37 - 87)
- half-shrubs	approx. 5%	bare soil (n=47)	1% (0 - 3)
- forbs	approx. 5%		

SPECIES COMPOSITION

% biomass (n=166)

% foliar cover (n=23)

	% biomass (n=166)	% foliar cover (n=23)
Major short shrubs		
western snowberry (<i>Symphoricarpos occidentalis</i>)	2% (0 - 6)	1% (0 - 2)
rose (<i>Rosa spp.</i>)	0% (0 - 0)	1% (0 - 2)

Major graminoids		
western porcupine-grass (<i>Hesperostipa curtiseta</i>)	24% (15 - 35)	19% (5 - 38)
northern wheat-grass (<i>Elymus lanceolatus</i>)	16% (2 - 30)	3% (0 - 3)
sedge (<i>Carex spp.</i>)	10% (3 - 17)	3% (0 - 10)
june grass (<i>Koeleria macrantha</i>)	8% (1 - 15)	2% (0 - 3)
western wheat-grass (<i>Pascopyrum smithii</i>)	6% (0 - 16)	0% (0 - 1)
blue grama (<i>Bouteloua gracilis</i>)	4% (0 - 11)	1% (0 - 2)
needle-and-thread (<i>Hesperostipa comata</i>)	4% (0 - 11)	1% (0 - 1)
green needle grass (<i>Nassella viridula</i>)	2% (0 - 6)	1% (0 - 0)
plains reed grass (<i>Calamagrostis montanensis</i>)	1% (0 - 5)	0% (0 - 0)
blue-grass (<i>Poa spp.</i>)	1% (0 - 5)	0% (0 - 0)
Hooker's oat-grass (<i>Avenula hookeri</i>)	1% (0 - 4)	2% (0 - 0)
plains rough fescue (<i>Festuca altaica var. hallii</i>)	1% (0 - 1)	1% (0 - 0)
plains muhly (<i>Muhlenbergia cuspidata</i>)	0% (0 - 0)	1% (0 - 3)

Major forbs and half-shrubs		
pasture sage (<i>Artemisia frigida</i>)	10% (3 - 20)	4% (0 - 15)
crocus anemone (<i>Pulsatilla patens</i>)	2% (0 - 4)	3% (0 - 13)
woolly yarrow (<i>Achillea millefolium</i>)	1% (0 - 2)	0% (0 - 0)
scarlet mallow (<i>Sphaeralcea coccinea</i>)	1% (0 - 2)	0% (0 - 0)
hairy golden-aster (<i>Heterotheca villosa</i>)	1% (0 - 1)	0% (0 - 0)
moss phlox (<i>Phlox hoodii</i>)	0% (0 - 1)	1% (0 - 3)
slender milk-vetch (<i>Astragalus flexuosus</i>)	0% (0 - 0)	1% (0 - 3)

Minor graminoids	2%	2%
Minor forbs and half-shrubs	5%	5%

SIMILARITY TO REFERENCE COMMUNITY	71%
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FORAGE PRODUCTION	graminoids 800 kg/ha; forbs 200 kg/ha
RECOMMENDED STOCKING RATE	0.72 AUM/ha 0.29 AUM/ac



MG-LM-C
Needle-and-thread – Northern Wheat-grass
 Mixed Grassland: Loam Ecosite

GENERAL DESCRIPTION: Mixed prairie dominated by midgrasses, but with significant amounts of shortgrasses and lesser amounts of half-shrubs and forbs. Shrub cover usually low. Probably develops from MG-LM-B by decrease of western porcupine-grass and increase of needle-and-thread. Interpreted as showing **moderate alteration** from the reference community as a result of grazing impact. However, this community is similar to the reference community in the Dry Mixed Grassland. In the Mixed Grassland, it could be a reference community on dry microsites, or in drier parts of the region adjacent to the Dry Mixed Grassland.

STRUCTURE

herbaceous cover (n=11)	36% (17 - 76)	short shrub cover (n=11)	1% (0 - 3)
- midgrasses	approx. 20%	clubmoss cover (n=32)	13% (0 - 37)
- shortgrasses	approx. 10%	lichen cover (n=25)	2% (0 - 4)
- half-shrubs	approx. 3%	litter cover (n=7)	31% (10 - 62)
- forbs	approx. 3%	bare soil (n=21)	1% (0 - 3)

SPECIES COMPOSITION

	% biomass (n=122)	% foliar cover (n=21)
Major graminoids		
needle-and-thread (<i>Hesperostipa comata</i>)	26% (11 - 43)	20% (3 - 38)
northern wheat-grass (<i>Elymus lanceolatus</i>)	21% (7 - 35)	13% (0 - 38)
june grass (<i>Koeleria macrantha</i>)	9% (1 - 18)	3% (0 - 3)
sedge (<i>Carex spp.</i>)	9% (2 - 17)	4% (0 - 15)
blue grama (<i>Bouteloua gracilis</i>)	7% (0 - 15)	1% (0 - 3)
western wheat-grass (<i>Pascopyrum smithii</i>)	5% (0 - 15)	4% (0 - 15)
plains reed grass (<i>Calamagrostis montanensis</i>)	2% (0 - 7)	0% (0 - 0)
western porcupine-grass (<i>Hesperostipa curtiseta</i>)	2% (0 - 8)	0% (0 - 0)
green needle grass (<i>Nassella viridula</i>)	1% (0 - 1)	0% (0 - 0)
plains rough fescue (<i>Festuca altaica var. hallii</i>)	1% (0 - 0)	0% (0 - 0)
blue-grass (<i>Poa spp.</i>)	1% (0 - 1)	0% (0 - 0)
Hooker's oat-grass (<i>Avenula hookeri</i>)	1% (0 - 1)	0% (0 - 0)

Major forbs and half-shrubs

pasture sage (<i>Artemisia frigida</i>)	8% (1 - 16)	2% (0 - 3)
scarlet mallow (<i>Sphaeralcea coccinea</i>)	1% (0 - 4)	0% (0 - 1)
American vetch (<i>Vicia americana</i>)	1% (0 - 2)	0% (0 - 0)
crocus anemone (<i>Pulsatilla patens</i>)	0% (0 - 2)	1% (0 - 3)
silver-leaved psoralea (<i>Pedimelum argophyllum</i>)	0% (0 - 1)	1% (0 - 0)
moss phlox (<i>Phlox hoodii</i>)	0% (0 - 0)	1% (0 - 3)

Minor shrubs

Minor shrubs	1%	
Minor graminoids	1%	1%
Minor forbs and half-shrubs	4%	4%

SIMILARITY TO REFERENCE COMMUNITY

52%

FORAGE PRODUCTION

graminoids 1000 kg/ha; forbs 200 kg/ha

RECOMMENDED STOCKING RATE

0.57 AUM/ha 0.23 AUM/ac

MG-LM-D
Needle-and-thread - Sedge - Pasture Sage
 Mixed Grassland - Loam Ecosite

GENERAL DESCRIPTION: Mixed prairie dominated by midgrasses, but with significant amounts of shortgrasses and forbs and lesser amounts of half-shrubs. Shrub cover usually low. Probably develops from MG-LM-C by decrease of northern wheat-grass and increase of forbs. Interpreted as showing **significant alteration** from the reference community as a result of grazing impact.

STRUCTURE

herbaceous cover (n=9)	80% (58 – 93)	clubmoss cover (n=34)	14% (0 – 38)
- midgrasses	approx. 35%	lichen cover (n=26)	6% (0 – 15)
- shortgrasses	approx. 20%	litter cover (n=9)	53% (32 – 72)
- half-shrubs	approx. 10%	bare soil (n=33)	1% (0 – 3)
- forbs	approx. 15%		

SPECIES COMPOSITION

% biomass (n=26)

% foliar cover (n=25)

Major short shrubs

western snowberry (<i>Symphoricarpos occidentalis</i>)	2% (0 - 7)	
rose (<i>Rosa spp.</i>)	1% (0 - 4)	

Major graminoids

needle-and-thread (<i>Hesperostipa comata</i>)	28% (20 - 40)	25% (15 - 38)
sedge (<i>Carex spp.</i>)	10% (4 - 17)	3% (0 - 6)
blue grama (<i>Bouteloua gracilis</i>)	8% (2 - 20)	2% (0 - 3)
june grass (<i>Koeleria macrantha</i>)	7% (0 - 17)	3% (0 - 10)
northern wheat-grass (<i>Elymus lanceolatus</i>)	5% (0 - 15)	3% (0 - 15)
western wheat-grass (<i>Pascopyrum smithii</i>)	4% (0 - 12)	
Kentucky blue-grass (<i>Poa pratensis</i>)	2% (0 - 8)	
green needle grass (<i>Nassella viridula</i>)	1% (0 - 6)	
western porcupine-grass (<i>Hesperostipa curtiseta</i>)	1% (0 - 4)	
awned wheat-grass (<i>Elymus trachycaulus ssp. subsecundus</i>)	1% (0 - 3)	
plains reed grass (<i>Calamagrostis montanensis</i>)	1% (0 - 0)	
sand grass (<i>Calamovilfa longifolia</i>)	1% (0 - 2)	
plains muhly (<i>Muhlenbergia cuspidata</i>)		1% (0 - 3)
Rocky Mountain fescue (<i>Festuca saximontana</i>)		1% (0 - 2)
Hooker's oat-grass (<i>Avenula hookeri</i>)		1% (0 - 3)
bluebunch fescue (<i>Festuca idahoensis</i>)		1% (0 - 0)

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	% biomass	% foliar cover
Major forbs and half-shrubs		
pasture sage (<i>Artemisia frigida</i>)	10% (3 - 20)	9% (0 - 15)
silver-leaved psoralea (<i>Pediomelum argophyllum</i>)	2% (0 - 7)	
crocus anemone (<i>Pulsatilla patens</i>)	1% (0 - 4)	3% (0 - 10)
prairie sage (<i>Artemisia ludoviciana</i>)	1% (0 - 3)	
low goldenrod (<i>Solidago missouriensis</i>)	1% (0 - 3)	
Missouri milk-vetch (<i>Astragalus missouriensis</i>)	1% (0 - 4)	
many-flowered aster (<i>Symphotrichum ericoides</i> var. <i>pansum</i>)	1% (0 - 3)	
yellow coneflower (<i>Ratibida columnifera</i>)	1% (0 - 3)	
golden bean (<i>Thermopsis rhombifolia</i>)	1% (0 - 2)	
woolly yarrow (<i>Achillea millefolium</i>)	1% (0 - 2)	1% (0 - 0)
scarlet mallow (<i>Sphaeralcea coccinea</i>)	1% (0 - 1)	
moss phlox (<i>Phlox hoodii</i>)		6% (0 - 29)
slender milk-vetch (<i>Astragalus flexuosus</i>)		2% (0 - 3)
three-flowered avens (<i>Geum triflorum</i>)		1% (0 - 3)
everlasting (<i>Antennaria</i> spp.)		1% (0 - 2)
Minor graminoids		
	2%	
Minor forbs and half-shrubs		
	5%	3%
SIMILARITY TO REFERENCE COMMUNITY		36%
FORAGE PRODUCTION		
	insufficient data	
RECOMMENDED STOCKING RATE		
	0.43 AUM/ha	0.17 AUM/ac

MG-LM-E
Pasture Sage - Needle-and-thread - Northern Wheat-grass
Mixed Grassland - Loam Ecosite

GENERAL DESCRIPTION: Mixed prairie codominated by midgrasses, shortgrasses, and half-shrubs. Shrub cover usually low. May develop from MG-LM-B or MG-LM-D by decrease of midgrasses and increase of pasture sage. Interpreted as showing **significant alteration** from the reference community as a result of grazing impact.

STRUCTURE

clubmoss cover (n=35)	13% (0 - 38)	bare soil (n=35)	2% (0 - 3)
lichen cover (n=35)	13% (0 - 38)		

SPECIES COMPOSITION	% biomass (n=20)	% foliar cover (n=34)
Major short shrubs		
rose (<i>Rosa spp.</i>)	1% (0 - 2)	

Major graminoids		
needle-and-thread (<i>Hesperostipa comata</i>)	13% (5 - 24)	4% (0 - 15)
northern wheat-grass (<i>Elymus lanceolatus</i>)	11% (4 - 19)	2% (0 - 3)
june grass (<i>Koeleria macrantha</i>)	10% (2 - 17)	3% (0 - 11)
western porcupine-grass (<i>Hesperostipa curtiseta</i>)	7% (0 - 13)	
sedge (<i>Carex spp.</i>)	7% (2 - 11)	1% (0 - 3)
blue grama (<i>Bouteloua gracilis</i>)	7% (1 - 12)	1% (0 - 3)
western wheat-grass (<i>Pascopyrum smithii</i>)	3% (0 - 6)	
plains reed grass (<i>Calamagrostis montanensis</i>)	2% (0 - 6)	

Major forbs and half-shrubs		
pasture sage (<i>Artemisia frigida</i>)	29% (20 - 36)	15% (3 - 38)
pale comandra (<i>Comandra umbellata</i>)	2% (0 - 5)	
broomweed (<i>Gutierrezia sarothrae</i>)	1% (0 - 4)	1% (0 - 3)
cut-leaved anemone (<i>Anemone multifida</i>)	1% (0 - 6)	
moss phlox (<i>Phlox hoodii</i>)		12% (1 - 31)
winter fat (<i>Krascheninnikovia lanata</i>)		1% (0 - 0)

Minor shrubs	1%	
Minor graminoids	1%	1%
Minor forbs and half-shrubs	5%	4%

SIMILARITY TO REFERENCE COMMUNITY	43%
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FORAGE PRODUCTION	insufficient data	
RECOMMENDED STOCKING RATE	0.43 AUM/ha	0.17 AUM/ac

MG-LM-F
Blue Grama - Pasture Sage - June Grass
Mixed Grassland: Loam Ecosite

GENERAL DESCRIPTION: Mixed prairie dominated by shortgrasses but with significant amounts of midgrasses and lesser amounts of half-shrubs and forbs. Shrub cover usually low. May develop from MG-LM-B or MG-LM-D by decrease of midgrasses and increase of blue grama. Interpreted as showing **significant alteration** from the reference community as a result of grazing impact.

STRUCTURE

herbaceous cover (n=5)	22% (18 - 28)	clubmoss cover (n=15)	14% (0 - 38)
- midgrasses	approx. 5%	lichen cover (n=14)	4% (0 - 4)
- shortgrasses	approx. 10%	bare soil (n=9)	1% (0 - 1)
- half-shrubs	approx. 3%		
- forbs	approx. 2%		

SPECIES COMPOSITION

% biomass (n=15)

% foliar cover (n=11)

Major shrubs	% biomass (n=15)	% foliar cover (n=11)
silver sagebrush (<i>Artemisia cana</i>)	2% (0 - 5)	0% (0 - 0)
Major graminoids		
blue grama (<i>Bouteloua gracilis</i>)	31% (20 - 51)	22% (9 - 38)
june grass (<i>Koeleria macrantha</i>)	10% (4 - 19)	4% (0 - 15)
needle-and-thread (<i>Hesperostipa comata</i>)	8% (0 - 18)	3% (0 - 15)
northern wheat-grass (<i>Elymus lanceolatus</i>)	8% (0 - 19)	2% (0 - 3)
western wheat-grass (<i>Pascopyrum smithii</i>)	5% (0 - 11)	2% (0 - 3)
sedge (<i>Carex spp.</i>)	4% (0 - 10)	2% (0 - 3)
western porcupine-grass (<i>Hesperostipa curtiseta</i>)	4% (0 - 12)	1% (0 - 3)
green needle grass (<i>Nassella viridula</i>)	1% (0 - 2)	2% (0 - 3)
plains reed grass (<i>Calamagrostis montanensis</i>)	1% (0 - 1)	
mat muhly (<i>Muhlenbergia richardsonis</i>)		1% (0 - 3)
Major forbs and half-shrubs		
pasture sage (<i>Artemisia frigida</i>)	12% (1 - 19)	10% (0 - 15)
hairy golden-aster (<i>Heterotheca villosa</i>)	2% (0 - 8)	
scarlet mallow (<i>Sphaeralcea coccinea</i>)	1% (0 - 3)	
moss phlox (<i>Phlox hoodii</i>)	1% (0 - 3)	3% (0 - 15)
broomweed (<i>Gutierrezia sarothrae</i>)	1% (0 - 0)	
woolly yarrow (<i>Achillea millefolium</i>)	1% (0 - 2)	2% (0 - 0)
prairie sage (<i>Artemisia ludoviciana</i>)	1% (0 - 0)	
woolly plantain (<i>Plantago patagonica</i>)	1% (0 - 3)	
crocus anemone (<i>Pulsatilla patens</i>)		2% (0 - 3)
Minor graminoids	1%	
Minor forbs and half-shrubs	3%	4%

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SIMILARITY TO REFERENCE COMMUNITY	37%
FORAGE PRODUCTION	graminoids 500 kg/ha
RECOMMENDED STOCKING RATE	0.43 AUM/ha 0.17 AUM/ac

MG-LM-G
Crested Wheat-grass – native grasses
 Mixed Grassland – Loam Ecosite

GENERAL DESCRIPTION: Grassland dominated by exotic grasses. Interpreted as showing **severe alteration** from the reference community as a result of exotic invasion, often adjacent to seeded forage stands. This community represents one end of a continuum, starting with native grasslands with a few scattered crested wheat-grass plants, and ending with stands dominated by crested wheat-grass.

STRUCTURE - insufficient data

SPECIES COMPOSITION **% biomass (n=10)**

Major short shrubs

silver sagebrush (*Artemisia cana*) 2% (0 - 2)

Major graminoids

crested wheat-grass (<i>Agropyron cristatum</i>)	52% (39 - 72)
sedge (<i>Carex spp.</i>)	6% (0 - 20)
smooth brome (<i>Bromus inermis</i>)	4% (0 - 16)
blue grama (<i>Bouteloua gracilis</i>)	3% (0 - 6)
Kentucky blue-grass (<i>Poa pratensis</i>)	3% (0 - 8)
foxtail barley (<i>Hordeum jubatum</i>)	2% (0 - 5)
needle-and-thread (<i>Hesperostipa comata</i>)	1% (0 - 3)
june grass (<i>Koeleria macrantha</i>)	1% (0 - 4)
slender wheat-grass (<i>Elymus trachycaulus ssp. trachycaulus</i>)	1% (0 - 0)

Major forbs and half-shrubs

pasture sage (<i>Artemisia frigida</i>)	6% (0 - 16)
alfalfa (<i>Medicago sativa</i>)	6% (0 - 18)
broomweed (<i>Gutierrezia sarothrae</i>)	3% (0 - 13)
gumweed (<i>Grindelia squarrosa</i>)	2% (0 - 5)
sweet-clover (<i>Melilotus spp.</i>)	1% (0 - 5)
hairy golden-aster (<i>Heterotheca villosa</i>)	1% (0 - 2)
cinquefoil (<i>Potentilla spp.</i>)	1% (0 - 1)

Minor shrubs 1%

Minor graminoids 1%

Minor forbs and half-shrubs 3%

SIMILARITY TO REFERENCE COMMUNITY 16%

FORAGE PRODUCTION insufficient data

RECOMMENDED STOCKING RATE insufficient data

MG-LM-H
Snowberry – Western Porcupine-grass
 Mixed Grassland – Loam Ecosite

GENERAL DESCRIPTION: The most widespread short-shrub type on the Loam Ecosite in the Mixed Grassland. The extent of snowberry is affected mainly by fire regime rather than by grazing. Snowberry patches tend to expand in the absence of fire, although they do not become as dominant in the Mixed Grassland as in the Aspen Parkland. The status of this community with respect to grazing is uncertain. Snowberry patches are often invaded by exotic species such as Kentucky blue-grass and smooth brome, which benefit from the partial shade. The grazing capacity of this community for livestock is low, particularly if the shrub cover is high.

STRUCTURE (n=6)

tree cover	1% (0 - 3)	herbaceous cover	46% (19 - 75)
short shrub cover	41% (25 - 58)		

SPECIES COMPOSITION (% foliar cover, n=6)

Major trees		Major graminoids	
trembling aspen (<i>Populus tremuloides</i>)	1% (0 - 3)	western porcupine-grass (<i>Hesperostipa curtisetata</i>)	11% (0 - 23)
Major short shrubs		Kentucky blue-grass (<i>Poa pratensis</i>)	6% (0 - 15)
western snowberry (<i>Symphoricarpos occidentalis</i>)	29% (17 - 44)	sedge (<i>Carex</i> spp.)	5% (0 - 15)
wolf-willow (<i>Elaeagnus commutata</i>)	4% (0 - 10)	green needle-grass (<i>Nassella viridula</i>)	3% (0 - 10)
silver sagebrush (<i>Artemisia cana</i>)	1% (0 - 4)	blue grama (<i>Bouteloua gracilis</i>)	3% (0 - 8)
rose (<i>Rosa</i> spp.)	1% (0 - 4)	little bluestem (<i>Schizachyrium scoparium</i>)	2% (0 - 6)
Major forbs and half-shrubs		wheat-grass (<i>Agropyron</i> spp.)	2% (0 - 5)
prairie sage (<i>Artemisia ludoviciana</i>)	1% (0 - 3)	sand-grass (<i>Calamovilfa longifolia</i>)	2% (0 - 5)
curly-cup gum-weed (<i>Grindelia squarrosa</i>)	1% (0 - 3)	crested wheat-grass (<i>Agropyron cristatum</i>)	1% (0 - 4)
prairie coneflower (<i>Ratibida columnifera</i>)	1% (0 - 3)	western wheat-grass (<i>Pascopyrum smithii</i>)	1% (0 - 4)
wild blue lettuce (<i>Mulgedium pulchellum</i>)	1% (0 - 2)	plains rough fescue (<i>Festuca altaica</i> ssp. <i>hallii</i>)	1% (0 - 3)
Pennsylvania pellitory (<i>Parietaria pensylvanica</i>)	1% (0 - 2)	slender wheat-grass (<i>Elymus trachycaulus</i> ssp. <i>trachycaulus</i>)	1% (0 - 3)
pasture sage (<i>Artemisia frigida</i>)	2% (0 - 5)	needle-and-thread (<i>Hesperostipa comata</i>)	1% (0 - 3)
		Minor graminoids	1%
		Minor forbs and half-shrubs	1%

SIMILARITY TO REFERENCE COMMUNITY unknown

RECOMMENDED STOCKING RATE 0.36 AUM/ha 0.15 AUM/ac

AP-LM-A

Plains Rough Fescue - Northern Wheat-grass - Western Porcupine-grass

Aspen Parkland: Loam Ecosite

GENERAL DESCRIPTION: Fescue prairie strongly dominated by midgrasses, with lesser amounts of shortgrasses, half-shrubs, and forbs. Shrub cover low in many of the sampled areas, but lack of disturbances such as fire can lead to expansion of snowberry cover. Interpreted as being the **reference community** in most areas of the Loam Ecosite in the Aspen Parkland. Because the dominant rough fescue decreases rapidly with grazing pressure, altered communities show relatively low percent similarity to the reference community.

STRUCTURE

herbaceous cover (n=17)	36% (21 - 56)	clubmoss cover (n=19)	3% (0 - 8)
- midgrasses	approx. 25%	litter cover (n=10)	74% (39 - 95)
- shortgrasses	approx. 5%	bare soil (n=10)	1% (0 - 2)
- half-shrubs	approx. 1%		
- forbs	approx. 3%		

SPECIES COMPOSITION

% biomass (n=18)

% foliar cover (n=9)

	% biomass (n=18)	% foliar cover (n=9)
Major graminoids		
plains rough fescue (<i>Festuca altaica</i> var. <i>hallii</i>)	46% (22 - 71)	22% (15 - 37)
northern wheat-grass (<i>Elymus lanceolatus</i>)	11% (2 - 20)	4% (0 - 9)
western porcupine-grass (<i>Hesperostipa curtiseta</i>)	11% (0 - 23)	3% (2 - 5)
sedge (<i>Carex</i> spp.)	9% (3 - 19)	3% (0 - 7)
june grass (<i>Koeleria macrantha</i>)	3% (0 - 7)	
awned wheat-grass (<i>Elymus trachycaulus</i> ssp. <i>subsecundus</i>)	1% (0 - 5)	1% (0 - 3)
needle-and-thread (<i>Hesperostipa comata</i>)	1% (0 - 4)	
mat muhly (<i>Muhlenbergia richardsonis</i>)	1% (0 - 4)	
western wheat-grass (<i>Pascopyrum smithii</i>)	1% (0 - 3)	
Kentucky blue-grass (<i>Poa pratensis</i>)	1% (0 - 3)	1% (0 - 2)
Hooker's oat-grass (<i>Avenula hookeri</i>)	1% (0 - 2)	1% (0 - 2)
salt grass (<i>Distichlis spicata</i> var. <i>stricta</i>)	1% (0 - 0)	

Major forbs and half-shrubs

pasture sage (<i>Artemisia frigida</i>)	4% (0 - 13)	
three-flowered avens (<i>Geum triflorum</i>)	1% (0 - 3)	
crocus anemone (<i>Pulsatilla patens</i>)	1% (0 - 1)	0% (0 - 1)
everlasting (<i>Antennaria</i> spp.)		4% (0 - 15)

Minor shrubs

1%

Minor graminoids

1%

Minor forbs and half-shrubs

6%

2%

SIMILARITY TO REFERENCE COMMUNITY

ref. comm.

FORAGE PRODUCTION

graminoids 1400 kg/ha; forbs 200 kg/ha

RECOMMENDED STOCKING RATE

drier part of region	1.10 AUM/ha	0.44 AUM/ac
moister part of region	1.67 AUM/ha	0.68 AUM/ac

AP-LM-B

Western Porcupine-grass - Northern Wheat-grass - Sedge - Pasture Sage
Aspen Parkland: Loam Ecosite

GENERAL DESCRIPTION: Mixed prairie dominant by midgrasses, with significant amounts of shortgrasses and lesser amounts of half-shrubs and forbs. Shrub cover low in many of the sampled areas, but absence of disturbances such as fire can lead to expansion of snowberry cover. Probably develops from AP-LM-A by decrease in rough fescue and increase in western porcupine-grass, northern wheat-grass, june grass, and pasture sage. Interpreted as showing **moderate alteration** from the reference community as a result of grazing impact.

STRUCTURE: insufficient data

SPECIES COMPOSITION **% biomass (n=26)**

Major short shrubs

wolf-willow (<i>Elaeagnus commutata</i>)	1% (0 - 0)
western snowberry (<i>Symphoricarpos occidentalis</i>)	1% (0 - 2)

Major graminoids

western porcupine-grass (<i>Hesperostipa curtisetata</i>)	22% (11 - 36)
northern wheat-grass (<i>Elymus lanceolatus</i>)	21% (10 - 39)
sedge (<i>Carex spp.</i>)	11% (5 - 24)
june grass (<i>Koeleria macrantha</i>)	8% (0 - 15)
plains rough fescue (<i>Festuca altaica var. hallii</i>)	7% (0 - 13)
needle-and-thread (<i>Hesperostipa comata</i>)	4% (0 - 9)
western wheat-grass (<i>Pascopyrum smithii</i>)	2% (0 - 5)
Hooker's oat-grass (<i>Avenula hookeri</i>)	1% (0 - 4)
blue grama (<i>Bouteloua gracilis</i>)	1% (0 - 3)
Kentucky blue-grass (<i>Poa pratensis</i>)	1% (0 - 2)
mat muhly (<i>Muhlenbergia richardsonis</i>)	1% (0 - 0)

Major forbs and half-shrubs

pasture sage (<i>Artemisia frigida</i>)	11% (0 - 23)
crocus anemone (<i>Pulsatilla patens</i>)	2% (0 - 5)
broomweed (<i>Gutierrezia sarothrae</i>)	1% (0 - 2)

Minor graminoids

1%

Minor forbs and half-shrubs

5%

SIMILARITY TO REFERENCE COMMUNITY

53%

FORAGE PRODUCTION

graminoids 900 kg/ha

RECOMMENDED STOCKING RATE

drier part of region	1.10 AUM/ha	0.44 AUM/ac
moister part of region	1.67 AUM/ha	0.68 AUM/ac

AP-LM-C

Sedge - Pasture Sage - Western Porcupine-grass - Northern Wheat-grass
Aspen Parkland: Loam Ecosite

GENERAL DESCRIPTION: Mixed prairie codominated by midgrasses and shortgrasses, with lesser amounts of half-shrubs and forbs. Shrub cover low in many of the sampled areas, but lack of disturbance can lead to expansion of shrubs such as snowberry. Probably develops from AP-LM-B by decrease in western porcupine-grass and northern wheat-grass and increase in sedges. Interpreted as showing **moderate alteration** from the reference community as a result of grazing impact.

STRUCTURE

herbaceous cover (n=8)	26% (5 - 45)	clubmoss cover (n=8)	9% (0 - 26)
- midgrasses	approx. 10%		
- shortgrasses	approx. 10%		
- half-shrubs	approx. 3%		
- forbs	approx. 4%		

SPECIES COMPOSITION (% biomass, n=16)

Major short shrubs		Major graminoids	
western snowberry (<i>Symphoricarpos occidentalis</i>)	1% (0 - 4)	sedge (<i>Carex spp.</i>)	24% (12 - 38)
rose (<i>Rosa spp.</i>)	1% (0 - 2)	western porcupine-grass (<i>Hesperostipa curtisetata</i>)	11% (0 - 22)
		northern wheat-grass (<i>Elymus lanceolatus</i>)	10% (1 - 21)
		june grass (<i>Koeleria macrantha</i>)	6% (2 - 12)
		plains rough fescue (<i>Festuca altaica</i> var. <i>hallii</i>)	4% (0 - 12)
		needle-and-thread (<i>Hesperostipa comata</i>)	4% (0 - 11)
		western wheat-grass (<i>Pascopyrum smithii</i>)	4% (0 - 8)
		salt grass (<i>Distichlis spicata</i> var. <i>stricta</i>)	2% (0 - 8)
		Kentucky blue-grass (<i>Poa pratensis</i>)	2% (0 - 6)
		blue grama (<i>Bouteloua gracilis</i>)	2% (0 - 3)
		plains reed grass (<i>Calamagrostis montanensis</i>)	1% (0 - 1)
		Hooker's oat-grass (<i>Avenula hookeri</i>)	1% (0 - 2)
		awned wheat-grass (<i>Elymus trachycaulus</i> ssp. <i>subsecundus</i>)	1% (0 - 0)
		Canby's blue-grass (<i>Poa secunda</i>)	1% (0 - 2)
Major forbs and half-shrubs		Minor graminoids	
pasture sage (<i>Artemisia frigida</i>)	11% (2 - 21)		2%
anemone (<i>Anemone spp.</i>)	2% (0 - 2)	Minor forbs and half-shrubs	
goldenrod (<i>Solidago spp.</i>)	1% (0 - 4)		5%
northern bedstraw (<i>Galium boreale</i>)	1% (0 - 3)		
three-flowered avens (<i>Geum triflorum</i>)	1% (0 - 3)		
woolly yarrow (<i>Achillea millefolium</i>)	1% (0 - 2)		
crocus anemone (<i>Pulsatilla patens</i>)	1% (0 - 3)		
everlasting (<i>Antennaria spp.</i>)	1% (0 - 1)		
golden bean (<i>Thermopsis rhombifolia</i>)	1% (0 - 3)		
gumweed (<i>Grindelia squarrosa</i>)	1% (0 - 2)		
pale comandra (<i>Comandra umbellata</i>)	1% (0 - 2)		
plantain (<i>Plantago spp.</i>)	1% (0 - 0)		

SIMILARITY TO REFERENCE COMMUNITY	52%	
FORAGE PRODUCTION	insufficient data	
RECOMMENDED STOCKING RATE		
drier part of region	0.88 AUM/ha	0.36 AUM/ac
moister part of region	1.34 AUM/ha	0.54 AUM/ac



AP-LM-D
Needle-and-thread - Wheat-grass - Pasture Sage
Aspen Parkland: Loam Ecosite

GENERAL DESCRIPTION: Mixed prairie dominated by midgrasses, with significant amounts of forbs and lesser amounts of shortgrasses and half-shrubs. Sometimes with significant patches of short shrubs. Probably develops from AP-LM-C by decrease in western porcupine-grass, northern wheat-grass, and plains rough fescue and increase in needle-and-thread. Interpreted as showing **significant alteration** from the reference community as a result of grazing impact.

STRUCTURE

<table style="width: 100%; border-collapse: collapse;"> <tr> <td style="width: 30%;">herbaceous cover (n=14)</td> <td style="width: 70%;">78% (42 - 91)</td> </tr> <tr> <td>- midgrasses</td> <td>approx. 40%</td> </tr> <tr> <td>- shortgrasses</td> <td>approx. 15%</td> </tr> <tr> <td>- half-shrubs</td> <td>approx. 10%</td> </tr> <tr> <td>- forbs</td> <td>approx. 20%</td> </tr> </table>	herbaceous cover (n=14)	78% (42 - 91)	- midgrasses	approx. 40%	- shortgrasses	approx. 15%	- half-shrubs	approx. 10%	- forbs	approx. 20%	<table style="width: 100%; border-collapse: collapse;"> <tr> <td style="width: 30%;">clubmoss cover (n=14)</td> <td style="width: 70%;">0% (0 - 1)</td> </tr> <tr> <td>litter cover (n=11)</td> <td>59% (35 - 81)</td> </tr> <tr> <td>bare soil (n=11)</td> <td>3% (0 - 9)</td> </tr> </table>	clubmoss cover (n=14)	0% (0 - 1)	litter cover (n=11)	59% (35 - 81)	bare soil (n=11)	3% (0 - 9)
herbaceous cover (n=14)	78% (42 - 91)																
- midgrasses	approx. 40%																
- shortgrasses	approx. 15%																
- half-shrubs	approx. 10%																
- forbs	approx. 20%																
clubmoss cover (n=14)	0% (0 - 1)																
litter cover (n=11)	59% (35 - 81)																
bare soil (n=11)	3% (0 - 9)																

SPECIES COMPOSITION

% biomass (n=16)

Major short shrubs

western snowberry (<i>Symphoricarpos occidentalis</i>)	5% (0 - 10)
rose (<i>Rosa spp.</i>)	1% (0 - 3)

Major graminoids

needle-and-thread (<i>Hesperostipa comata</i>)	18% (10 - 31)
western wheat-grass (<i>Pascopyrum smithii</i>)	6% (1 - 11)
northern wheat-grass (<i>Elymus lanceolatus</i>)	6% (0 - 20)
sedge (<i>Carex spp.</i>)	6% (2 - 9)
blue grama (<i>Bouteloua gracilis</i>)	6% (0 - 13)
june grass (<i>Koeleria macrantha</i>)	5% (1 - 10)
Kentucky blue-grass (<i>Poa pratensis</i>)	4% (0 - 9)
Hooker's oat-grass (<i>Avenula hookeri</i>)	3% (0 - 8)
western porcupine-grass (<i>Hesperostipa curtiseta</i>)	2% (0 - 7)
awned wheat-grass (<i>Elymus trachycaulus ssp. subsecundus</i>)	2% (0 - 7)
sand grass (<i>Calamovilfa longifolia</i>)	2% (0 - 7)
plains rough fescue (<i>Festuca altaica var. hallii</i>)	1% (0 - 3)
plains reed grass (<i>Calamagrostis montanensis</i>)	1% (0 - 3)

Major forbs and half-shrubs	
pasture sage (<i>Artemisia frigida</i>)	9% (5 - 18)
Indian breadroot (<i>Pediomelum esculentum</i>)	3% (0 - 7)
three-flowered avens (<i>Geum triflorum</i>)	2% (0 - 5)
milk-vetch (<i>Astragalus spp.</i>)	2% (0 - 5)
hairy golden-aster (<i>Heterotheca villosa</i>)	2% (0 - 5)
woolly yarrow (<i>Achillea millefolium</i>)	1% (0 - 3)
everlasting (<i>Antennaria spp.</i>)	1% (0 - 3)
common blue-eyed grass (<i>Sisyrinchium angustifolium</i>)	1% (0 - 2)
pygmy-flower (<i>Androsace septentrionalis</i>)	1% (0 - 3)
prairie sage (<i>Artemisia ludoviciana</i>)	1% (0 - 3)
tufted fleabane (<i>Erigeron caespitosus</i>)	1% (0 - 2)
gumweed (<i>Grindelia squarrosa</i>)	1% (0 - 2)
hawk's-beard (<i>Crepis spp.</i>)	1% (0 - 0)
cinquefoil (<i>Potentilla spp.</i>)	1% (0 - 2)
American vetch (<i>Vicia americana</i>)	1% (0 - 2)

Minor graminoids	1%
Minor forbs and half-shrubs	6%

SIMILARITY TO REFERENCE COMMUNITY	31%
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FORAGE PRODUCTION	insufficient data	
RECOMMENDED STOCKING RATE		
drier part of region	0.66 AUM/ha	0.27 AUM/ac
moister part of region	1.00 AUM/ha	0.41 AUM/ac

AP-LM-E
Kentucky Blue-grass - Sedge
 Aspen Parkland: Loam Ecosite

GENERAL DESCRIPTION: Exotic grassland dominated by midgrasses, with significant amounts of shortgrasses and forbs and lesser amounts of half-shrubs. Sometimes with significant patches of short shrubs. Interpreted as showing **significant to severe alteration** from the reference community as a result of grazing impact coupled with exotic invasion.

STRUCTURE

herbaceous cover (n=42)	65% (29 – 90)	short shrub cover (n=5)	11% (3 – 17)
- midgrasses	approx. 30%	clubmoss cover (n=40)	1% (0 – 4)
- shortgrasses	approx. 15%	litter cover (n=37)	46% (23 – 73)
- half-shrubs	approx. 2%	bare soil (n=37)	5% (0 – 13)
- forbs	approx. 15%		

SPECIES COMPOSITION

% biomass (n=63)

Major short shrubs

western snowberry (<i>Symphoricarpos occidentalis</i>)	4% (0 - 14)
rose (<i>Rosa</i> spp.)	1% (0 - 3)
wolf-willow (<i>Elaeagnus commutata</i>)	1% (0 - 2)

Major graminoids

Kentucky blue-grass (<i>Poa pratensis</i>)	22% (11 - 37)
sedge (<i>Carex</i> spp.)	10% (0 - 25)
smooth brome (<i>Bromus inermis</i>)	4% (0 - 20)
western porcupine-grass (<i>Hesperostipa curtiseta</i>)	4% (0 - 16)
northern wheat-grass (<i>Elymus lanceolatus</i>)	4% (0 - 11)
western wheat-grass (<i>Pascopyrum smithii</i>)	4% (0 - 15)
needle-and-thread (<i>Hesperostipa comata</i>)	3% (0 - 12)
plains rough fescue (<i>Festuca altaica</i> var. <i>hallii</i>)	3% (0 - 9)
awned wheat-grass (<i>Elymus trachycaulus</i> ssp. <i>subsecundus</i>)	3% (0 - 8)
june grass (<i>Koeleria macrantha</i>)	2% (0 - 6)
mat muhly (<i>Muhlenbergia richardsonis</i>)	1% (0 - 4)
blue grama (<i>Bouteloua gracilis</i>)	1% (0 - 3)
slender wheat-grass (<i>Elymus trachycaulus</i> ssp. <i>trachycaulus</i>)	1% (0 - 1)
green needle grass (<i>Nassella viridula</i>)	1% (0 - 5)
Hooker's oat-grass (<i>Avenula hookeri</i>)	1% (0 - 2)
rough hair grass (<i>Agrostis scabra</i>)	1% (0 - 3)

Major forbs and half-shrubs

pasture sage (<i>Artemisia frigida</i>)	2% (0 - 7)
goldenrod (<i>Solidago</i> spp.)	2% (0 - 7)
woolly yarrow (<i>Achillea millefolium</i>)	2% (0 - 5)
milk-vetch (<i>Astragalus</i> spp.)	1% (0 - 5)
smooth wild strawberry (<i>Fragaria virginiana</i>)	1% (0 - 4)
many-flowered aster (<i>Symphyotrichum ericoides</i> var. <i>pansum</i>)	1% (0 - 2)
common dandelion (<i>Taraxacum officinale</i>)	1% (0 - 4)
northern bedstraw (<i>Galium boreale</i>)	1% (0 - 3)

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Major forbs and half-shrubs (continued)

prairie sage (<i>Artemisia ludoviciana</i>)	1% (0 - 3)
three-flowered avens (<i>Geum triflorum</i>)	1% (0 - 3)
American vetch (<i>Vicia americana</i>)	1% (0 - 3)
pale comandra (<i>Comandra umbellata</i>)	1% (0 - 2)
everlasting (<i>Antennaria</i> spp.)	1% (0 - 3)
crocus anemone (<i>Pulsatilla patens</i>)	1% (0 - 1)

Minor graminoids	3%
Minor forbs and half-shrubs	9%

SIMILARITY TO REFERENCE COMMUNITY	35%
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FORAGE PRODUCTION	insufficient data
RECOMMENDED STOCKING RATE	insufficient data



AP-LM-F
Aspen / Saskatoon / Rose
 Aspen Parkland: Loam Ecosite

GENERAL DESCRIPTION: Reference community for aspen stands on the Loam Ecosite in the Aspen Parkland. This reference community is **tentative** because of the small number of plots available for characterizing it. Stands with a dense hazelnut understory are also found on this ecosite, especially in the moister parts of the Aspen Parkland, but data were insufficient to describe a community of this type. Recommended stocking rates are based on average yields in open and closed hardwood stands. Recommended stocking rates would be lower in stands with a dense hazelnut stratum (approximately 0.12 AUM/ac).

This community was originally described by Thorpe and Godwin (2008). Aspen stands in the Moose Mountain Upland, which is mapped within the Aspen Parkland Ecoregion, are more boreal in character than the type described here, and may have an understory of green ash. For classification of these stands, refer to: “PR5 Trembling aspen / beaked hazel / sarsaparilla” (McLaughlan et al. 2010).

STRUCTURE

tall shrub cover (n=6)	13% (3 – 24)	moss cover (n=5)	0% (0 – 1)
short shrub cover (n=6)	22% (7 – 46)	LFH thickness (n=4)	6 cm (4 – 8)
herbaceous cover (n=6)	38% (7 – 62)	bare soil (n=5)	0% (0 – 0)

SPECIES COMPOSITION (% foliar cover)

Major trees (n=3)		Major forbs (n=6)	
trembling aspen (<i>Populus tremuloides</i>)	41% (12 - 72)	violet (<i>Viola</i> spp.)	4% (0 - 9)
balsam poplar (<i>Populus balsamifera</i>)	13% (0 - 32)	smooth wild strawberry (<i>Fragaria virginiana</i>)	4% (0 - 8)
		spreading dogbane (<i>Apocynum androsaemifolium</i>)	2% (0 - 7)
		wild sarsaparilla (<i>Aralia nudicaulis</i>)	2% (0 - 7)
		wild peavine (<i>Lathyrus venosus</i>)	2% (0 - 4)
		Lindley's aster (<i>Symphotrichum ciliolatum</i>)	1% (0 - 4)
		common dandelion (<i>Taraxacum officinale</i>)	1% (0 - 3)
		fireweed (<i>Chamerion angustifolium</i>)	1% (0 - 3)
		cream-colored vetchling (<i>Lathyrus ochroleucus</i>)	1% (0 - 3)
		showy aster (<i>Eurybia conspicua</i>)	1% (0 - 2)
		American vetch (<i>Vicia americana</i>)	1% (0 - 2)
		two-leaved solomon's seal (<i>Maianthemum canadense</i>)	1% (0 - 2)
		star-flowered solomon's-seal (<i>Maianthemum stellatum</i>)	1% (0 - 2)
		fairybells (<i>Prosartes trachycarpum</i>)	1% (0 - 2)
		veiny meadow-rue (<i>Thalictrum venulosum</i>)	1% (0 - 1)
		northern bedstraw (<i>Galium boreale</i>)	1% (0 - 1)
Major tall shrubs (n=6)			
saskatoon (<i>Amelanchier alnifolia</i>)	9% (2 - 18)		
beaked hazelnut (<i>Corylus cornuta</i>)	3% (0 - 9)		
choke-cherry (<i>Prunus virginiana</i>)	2% (0 - 4)		
willow (<i>Salix</i> spp.)	2% (0 - 5)		
red-osier dogwood (<i>Cornus stolonifera</i>)	1% (0 - 4)		
Major short shrubs (n=6)			
rose (<i>Rosa</i> spp.)	9% (3 - 19)		
western snowberry (<i>Symphoricarpos occidentalis</i>)	4% (0 - 10)		
wild red raspberry (<i>Rubus idaeus</i>)	2% (0 - 7)		
currant (<i>Ribes</i> spp.)	1% (0 - 2)		

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Major graminoids (n=6)		Minor tall shrubs (n=6)	1%
rough-leaved rice-grass (<i>Oryzopsis asperifolia</i>)	4% (0 - 12)	Minor graminoids (n=6)	1%
hay sedge (<i>Carex siccata</i>)	2% (0 - 6)	Minor forbs (n=6)	2%
Kentucky blue-grass (<i>Poa pratensis</i>)	2% (0 - 6)		
awned wheat-grass (<i>Elymus trachycaulus ssp. subsecundus</i>)	1% (0 - 3)		
hairy wild rye (<i>Elymus innovatus</i>)	1% (0 - 2)		
purple oat-grass (<i>Schizachne purpurascens</i>)	1% (0 - 2)		

SIMILARITY TO REFERENCE COMMUNITY	ref. comm.
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RECOMMENDED STOCKING RATES		
closed stands (>50% canopy closure)	0.42 AUM/ha	0.17 AUM/ac
open stands (<50% canopy closure)	0.62 AUM/ha	0.25 AUM/ac



AP-LM-G
Aspen / Snowberry – Rose
 Aspen Parkland: Loam Ecosite

GENERAL DESCRIPTION: Grazed community occurring in aspen stands on the Loam Ecosite in the Aspen Parkland. This community is interpreted as showing **significant alteration** from the reference community (AP-LM-A) as a result of grazing impact. The main changes are decreases in tall shrubs, including the palatable saskatoon, choke-cherry, pincherry, and dogwood, and a large increase in snowberry. Data were limited for this ecosite. One anomaly is the appearance of European buckthorn as a major tall shrub. This is an uncommon exotic invader, which happened to appear in a few of the plots for which data were available. However, it should not be expected in most areas. Recommended stocking rates are based on average yields in closed shrubby stands that have been altered by grazing; rates in open stands are estimated. The transition to a low shrub type results in lower recommended stocking rates compared to the reference community.

This community was originally described by Thorpe and Godwin (2008).

STRUCTURE

tree cover (n=9)	47% (15 – 69)	short shrub cover (n=9)	58% (34 – 76)
tall shrub cover (n=9)	4% (0 – 7)	herbaceous cover (n=9)	11% (2 – 22)

SPECIES COMPOSITION

% foliar cover

Major trees (n=9)	
trembling aspen (<i>Populus tremuloides</i>)	46% (15 - 67)
balsam poplar (<i>Populus balsamifera</i>)	1% (0 - 2)

Major tall shrubs (n=9)	
willow (<i>Salix spp.</i>)	3% (0 - 5)
European buckthorn (<i>Rhamnus cathartica</i>)	1% (0 - 3)

Major short shrubs (n=9)	
western snowberry (<i>Symphoricarpos occidentalis</i>)	48% (32 - 63)
rose (<i>Rosa spp.</i>)	8% (0 - 20)
narrow-leaved meadowsweet (<i>Spiraea alba</i>)	1% (0 - 3)

Major graminoids (n=9)	
rough-leaved rice-grass (<i>Oryzopsis asperifolia</i>)	2% (0 - 4)
hay sedge (<i>Carex siccata</i>)	2% (0 - 3)
Kentucky blue-grass (<i>Poa pratensis</i>)	1% (0 - 3)

Major forbs (n=9)	
nodding stickseed (<i>Hackelia americana</i>)	3% (0 - 5)
smooth wild strawberry (<i>Fragaria virginiana</i>)	1% (0 - 2)
star-flowered solomon's-seal (<i>Maianthemum stellatum</i>)	1% (0 - 2)
veiny meadow-rue (<i>Thalictrum venulosum</i>)	1% (0 - 1)

Minor short shrubs (n=9)	1%
Minor forbs (n=9)	2%

SIMILARITY TO REFERENCE COMMUNITY	32%
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RECOMMENDED STOCKING RATES		
closed stands (>50% canopy closure)	0.22 AUM/ha	0.09 AUM/ac
open stands (<50% canopy closure)	(0.32 AUM/ha)	(0.13 AUM/ac)



AP-LM-H
Aspen / Snowberry - Rose / Kentucky Blue-grass
 Aspen Parkland: Loam Ecosite

GENERAL DESCRIPTION: Grazed community occurring in aspen stands on the Loam Ecosite in the Aspen Parkland. Interpreted as showing **significant alteration** from the reference community (AP-LM-A) as a result of grazing impact. This community includes stands in which exotic herbs have become dominant. Kentucky blue-grass and other exotics invade stands in which the native species have been weakened by heavy grazing. Production of palatable forage appears to be higher than in the reference community, mainly because of the increased grass cover. Recommended stocking rates are based on average yields in open grassy stands that have been altered by grazing; rates in closed stands are estimated. While the ecological status of this community is low, reducing stocking rates will probably not reverse the invasion of exotic herbs. Therefore, recommended stocking rates are higher than for the reference community. Fire may kill exotic herbs and encourage resprouting of native shrubs, so may aid the transition back to a native community.

This community was originally described by Thorpe and Godwin (2008).

STRUCTURE

tree cover (n=10)	64% (7 – 100)	tall shrub cover (n=12)	11% (1 – 21)
short shrub cover (n=12)	24% (8 – 40)	litter cover (n=8)	58% (35 – 95)
herbaceous cover (n=12)	54% (29 – 79)	bare soil (n=10)	1% (0 – 1)

SPECIES COMPOSITION

% foliar cover

Major trees (n=10)	
trembling aspen (<i>Populus tremuloides</i>)	54% (6 - 86)
balsam poplar (<i>Populus balsamifera</i>)	13% (0 - 31)
Major tall shrubs (n=12)	
willow (<i>Salix spp.</i>)	6% (0 - 19)
beaked hazelnut (<i>Corylus cornuta</i>)	2% (0 - 4)
saskatoon (<i>Amelanchier alnifolia</i>)	1% (0 - 4)
choke-cherry (<i>Prunus virginiana</i>)	1% (0 - 1)
red-osier dogwood (<i>Cornus stolonifera</i>)	1% (0 - 2)
Major short shrubs (n=12)	
western snowberry (<i>Symphoricarpos occidentalis</i>)	12% (2 - 28)
rose (<i>Rosa spp.</i>)	9% (0 - 20)
currant (<i>Ribes spp.</i>)	1% (0 - 2)
wild red raspberry (<i>Rubus idaeus</i>)	1% (0 - 1)
Major graminoids (n=12)	
Kentucky blue-grass (<i>Poa pratensis</i>)	17% (8 - 32)
rough-leaved rice-grass (<i>Oryzopsis asperifolia</i>)	6% (0 - 16)
Major forbs (n=12)	
common dandelion (<i>Taraxacum officinale</i>)	4% (0 - 7)
smooth wild strawberry (<i>Fragaria virginiana</i>)	3% (0 - 9)
wild peavine (<i>Lathyrus venosus</i>)	3% (0 - 7)
star-flowered solomon's-seal (<i>Maianthemum stellatum</i>)	2% (0 - 8)

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violet (<i>Viola spp.</i>)	2% (0 - 12)
veiny meadow-rue (<i>Thalictrum venulosum</i>)	2% (0 - 3)
northern bedstraw (<i>Galium boreale</i>)	2% (0 - 4)
tall meadow-rue (<i>Thalictrum dasycarpum</i>)	1% (0 - 5)
American vetch (<i>Vicia americana</i>)	1% (0 - 3)
Canada anemone (<i>Anemone canadensis</i>)	1% (0 - 2)

Minor short shrubs (n=12)	1%
Minor graminoids (n=12)	2%
Minor forbs (n=12)	5%

SIMILARITY TO REFERENCE COMMUNITY	54%
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RECOMMENDED STOCKING RATES		
closed stands (>50% canopy closure)	(0.50 AUM/ha)	(0.20 AUM/ac)
open stands (<50% canopy closure)	0.74 AUM/ha	0.30 AUM/ac



AP-LM-I
Snowberry – Wolf-willow / Western Porcupine-grass - Sedge
 Aspen Parkland: Loam Ecosite

GENERAL DESCRIPTION: The most widespread short-shrub type on the Loam Ecosite in the Aspen Parkland. May also be found on the Loam Ecosite in the Cypress Upland. The extent of snowberry patches is affected mainly by fire regime rather than by grazing. Snowberry patches tend to expand in the absence of fire, in some cases completely covering grassland patches, while regular burning controls snowberry. The status of this community with respect to grazing is uncertain. Snowberry stands are often invaded by exotic species such as Kentucky blue-grass and smooth brome, which benefit from the partial shade. The grazing capacity of this community for livestock is low, particularly if the shrub cover is high.

STRUCTURE (n=11)

tree cover	2% (0 - 5)	prostrate shrub cover	1% (0 - 0)
tall shrub cover	1% (0 - 2)	herbaceous cover	69% (22 - 100)
short shrub cover	54% (36 - 80)		

SPECIES COMPOSITION (% foliar cover, n=11)

Major trees		Major tall shrubs	
trembling aspen (<i>Populus tremuloides</i>)	2% (0 - 5)	choke-cherry (<i>Prunus virginiana</i>)	1% (0 - 2)
Major short shrubs		Major prostrate shrubs	
western snowberry (<i>Symphoricarpos occidentalis</i>)	38% (25 - 50)	creeping juniper (<i>Juniperus horizontalis</i>)	1% (0 - 0)
wolf-willow (<i>Elaeagnus commutata</i>)	13% (0 - 35)		
rose (<i>Rosa</i> spp.)	3% (0 - 10)	Major graminoids	
Major forbs and half-shrubs		western porcupine-grass (<i>Hesperostipa curtisetata</i>)	12% (0 - 35)
prairie sage (<i>Artemisia ludoviciana</i>)	3% (0 - 5)	sedge (<i>Carex</i> spp.)	10% (0 - 20)
pussytoes (<i>Antennaria</i> spp.)	2% (0 - 0)	Kentucky blue-grass (<i>Poa pratensis</i>)	9% (0 - 20)
bedstraw (<i>Galium</i> spp.)	2% (0 - 5)	needle-and-thread (<i>Hesperostipa comata</i>)	5% (0 - 15)
common yarrow (<i>Achillea millefolium</i>)	1% (0 - 5)	plains rough fescue (<i>Festuca altaica</i> ssp. <i>hallii</i>)	4% (0 - 15)
American vetch (<i>Vicia americana</i>)	1% (0 - 1)	fox-tail barley (<i>Hordeum jubatum</i>)	2% (0 - 0)
purple prairie-clover (<i>Dalea purpurea</i>)	1% (0 - 5)	Hooker's oat-grass (<i>Avenula hookeri</i>)	2% (0 - 1)
meadow-rue (<i>Thalictrum</i> spp.)	1% (0 - 0)	June grass (<i>Koeleria macrantha</i>)	2% (0 - 0)
pasture sage (<i>Artemisia frigida</i>)	1% (0 - 0)	needle-grass (<i>Hesperostipa</i> spp.)	2% (0 - 0)
cinquefoil (<i>Potentilla</i> spp.)	1% (0 - 1)	awned wheat-grass (<i>Elymus trachycaulus</i> ssp. <i>subsecundus</i>)	2% (0 - 5)
		sand dropseed (<i>Sporobolus cryptandrus</i>)	1% (0 - 0)
		sand-grass (<i>Calamovilfa longifolia</i>)	1% (0 - 0)

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Minor graminoids	1%	Minor forbs and half-shrubs	3%
SIMILARITY TO REFERENCE COMMUNITY		unknown	
RECOMMENDED STOCKING RATE			
drier part of region		0.55 AUM/ha	0.22 AUM/ac
moister part of region		0.84 AUM/ha	0.34 AUM/ac



CU-LM-A
Rough Fescue
 Cypress Upland: Loam Ecosite

GENERAL DESCRIPTION: Fescue prairie, strongly dominated by midgrasses (especially rough fescue), but with significant amounts of forbs. Lesser amounts of shortgrasses and half-shrubs. Usually with scattered short shrubs (especially shrubby cinquefoil). **Reference community** for the Loam Ecosite at higher elevations in the Cypress Upland. Note that the dominant species in this community may include both plains rough fescue (*Festuca altaica* var. *hallii*) and mountain rough fescue (*Festuca altaica* var. *major*), or hybrids between them. The distribution of these two species in the Cypress Hills requires further research.

This community is equivalent to “PR1 Plains rough fescue – timber oat-grass grassland” in McLaughlan et al. (2010).

STRUCTURE

herbaceous cover (n=23)	49% (33 – 61)	short shrub cover (n=24)	2% (0 – 6)
- midgrasses	approx. 30%	prostrate shrub cover	2% (0 – 2)
- shortgrasses	approx. 5%	clubmoss cover (n=21)	2% (0 – 7)
- half-shrubs	approx. 1%	litter cover (n=12)	38% (10 – 67)
- forbs	approx. 10%	bare soil (n=12)	0% (0 – 0)

SPECIES COMPOSITION

% biomass (n=14)

% foliar cover (n=12)

Major short shrubs		
shrubby cinquefoil (<i>Dasiphora fruticosa</i>)	4% (0 - 10)	
rose (<i>Rosa</i> spp.)	1% (0 - 2)	

Major prostrate shrubs		
creeping juniper (<i>Juniperus horizontalis</i>)		1% (0 - 2)
bearberry (<i>Arctostaphylos uva-ursi</i>)		1% (0 - 1)

Major graminoids		
rough fescue (<i>Festuca altaica</i> var. <i>hallii</i> , <i>F. a.</i> var. <i>major</i>)	30% (16 - 47)	20% (7 - 30)
western porcupine-grass (<i>Hesperostipa curti</i>)	7% (0 - 17)	1% (0 - 1)
northern wheat-grass (<i>Elymus lanceolatus</i>)	7% (0 - 9)	
timber oat-grass (<i>Danthonia intermedia</i>)	6% (0 - 14)	3% (1 - 7)
sedge (<i>Carex</i> spp.)	5% (0 - 10)	2% (0 - 5)
Kentucky blue-grass (<i>Poa pratensis</i>)	4% (0 - 12)	1% (0 - 3)
June grass (<i>Koeleria macrantha</i>)	3% (0 - 7)	
awned wheat-grass (<i>Elymus trachycaulus</i> ssp. <i>subsecundus</i>)	1% (0 - 2)	
Rocky Mountain fescue (<i>Festuca saximontana</i>)	1% (0 - 1)	
Hooker's oat-grass (<i>Avenula hookeri</i>)	1% (0 - 1)	

Major forbs and half-shrubs		
northern bedstraw (<i>Galium boreale</i>)	3% (0 - 6)	1% (0 - 2)
fleabane (<i>Erigeron</i> spp.)	2% (0 - 7)	
golden bean (<i>Thermopsis rhombifolia</i>)	2% (0 - 4)	1% (0 - 4)
false-dandelion (<i>Agoseris</i> spp.)	2% (0 - 4)	1% (0 - 1)
crocus anemone (<i>Pulsatilla patens</i>)	1% (0 - 3)	
pasture sage (<i>Artemisia frigida</i>)	1% (0 - 5)	
aster (<i>Symphyotrichum</i> spp.)	1% (0 - 2)	
three-flowered avens (<i>Geum triflorum</i>)	1% (0 - 2)	1% (0 - 1)
lupine (<i>Lupinus</i> spp.)	1% (0 - 2)	

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milk-vetch (<i>Astragalus</i> spp.)	1% (0 - 2)	
woolly yarrow (<i>Achillea millefolium</i>)	1% (0 - 1)	2% (1 - 2)
low goldenrod (<i>Solidago missouriensis</i>)	1% (0 - 2)	
moss-phlox (<i>Phlox hoodii</i>)	1% (0 - 1)	
bellflower (<i>Campanula</i> spp.)		1% (1 - 1)
dandelion (<i>Taraxacum officinale</i>)		1% (1 - 1)
shining arnica (<i>Arnica fulgens</i>)		1% (0 - 1)

Minor graminoids	2%	2%
Minor forbs and half-shrubs	5%	14%

SIMILARITY TO REFERENCE COMMUNITY	reference community
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FORAGE PRODUCTION	graminoids 1900 kg/ha
RECOMMENDED STOCKING RATE	1.37 AUM/ha 0.56 AUM/ac



CU-LM-B
Sedge – Kentucky Blue-grass – Dandelion
 Cypress Upland: Loam Ecosite

GENERAL DESCRIPTION: Community with significant proportion of exotic herbs. High cover of forbs, exceeding that of grasses. Significant cover of short shrubs, with occasional tall shrubs and trees. Interpreted as showing **severe alteration** from the reference community as a result of grazing impact and exotic invasion.

STRUCTURE – insufficient data

SPECIES COMPOSITION (% foliar cover, n=4)

Major trees

trembling aspen (*Populus tremuloides*) 2% (0 - 5)

Major tall shrubs

saskatoon (*Amelanchier alnifolia*) 1% (0 - 3)

Major short shrubs

dwarf bilberry (*Vaccinium caespitosum*) 2% (0 - 5)

rose (*Rosa* spp.) 1% (0 - 2)

few-flowered snowberry (*Symphoricarpos albus*) 1% (0 - 2)

northern gooseberry (*Ribes oxycanthoides*) 1% (0 - 2)

Major graminoids

sedge (*Carex* spp.) 7% (1 - 14)

Kentucky blue-grass (*Poa pratensis*) 2% (0 - 4)

bluebunch wheat-grass (*Pseudoroegneria spicata*) 1% (0 - 4)

rough hair grass (*Agrostis scabra*) 1% (0 - 4)

timothy (*Phleum pratense*) 1% (0 - 1)

Canada wild rye (*Elymus canadensis*) 1% (0 - 1)

Major forbs and half-shrubs

dandelion (*Taraxacum officinale*) 3% (1 - 6)

northern bedstraw (*Galium boreale*) 2% (1 - 3)

meadow-rue (*Thalictrum* spp.) 1% (0 - 3)

Lindley's aster (*Symphyotrichum ciliolatum*) 1% (0 - 4)

wild white geranium (*Geranium richardsonii*) 1% (0 - 3)

woolly yarrow (*Achillea millefolium*) 1% (0 - 2)

smooth wild strawberry (*Fragaria virginiana*) 1% (1 - 1)

false-dandelion (*Agoseris* spp.) 1% (0 - 1)

pygmyflower (*Androsace septentrionalis*) 1% (0 - 1)

Minor shrubs and trees

1%

Minor graminoids

2%

Minor forbs and half-shrubs

8%

SIMILARITY TO REFERENCE COMMUNITY

27%

RECOMMENDED STOCKING RATE

insufficient data

Cypress Hills Forests

Cypress Upland: Loam Ecosite

Forest communities in the Cypress Upland have been classified by McLaughlan et al. (2010). Please refer to that publication for descriptions of the following types:

- PR2 Lodgepole pine / grass
- PR3 Trembling aspen – lodgepole pine / bearberry
- PR4 Trembling aspen / bearberry / strawberry
- PR6 White spruce / grass / other mosses
- PR7 Trembling aspen – white spruce / western snowberry

SUGGESTED CITATION

Thorpe, J. 2014. Saskatchewan Rangeland Ecosystems, Publication 4: Communities on the Loam Ecosite. Version 2. Saskatchewan Prairie Conservation Action Plan. Saskatchewan Research Council Pub. No. 11881-4E14.

OBTAINING PUBLICATIONS: *Saskatchewan Rangeland Ecosystems* publications are available on the Prairie Conservation Action Plan website (http://www.pcap-sk.org/?s=9.resources_literature).



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