

Ecological site R043BY474WY **Subirrigated (Sb) 15-19" Northern Plains Precipitation Zone**

Accessed: 05/11/2025

General information

Provisional. A provisional ecological site description has undergone quality control and quality assurance review. It contains a working state and transition model and enough information to identify the ecological site.

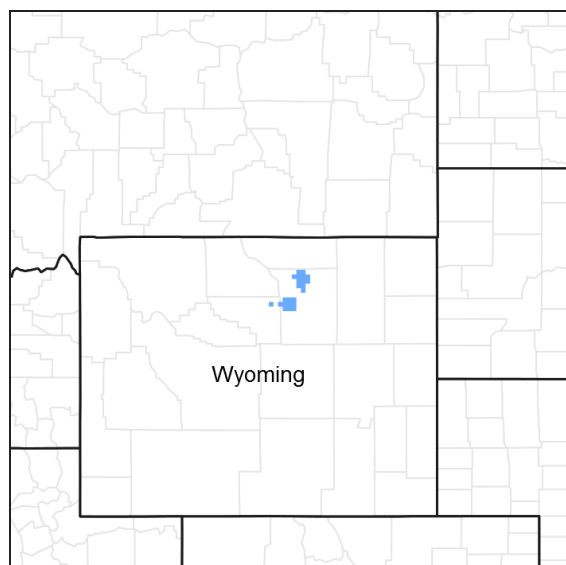


Figure 1. Mapped extent

Areas shown in blue indicate the maximum mapped extent of this ecological site. Other ecological sites likely occur within the highlighted areas. It is also possible for this ecological site to occur outside of highlighted areas if detailed soil survey has not been completed or recently updated.

Associated sites

R043BY428WY	Lowland (LL) 15-19" Northern Plains Precipitation Zone
R043BY430WY	Overflow (Ov) 15-19" Northern Plains Precipitation Zone
R043BY478WY	Wetland (WL) 15-19" Northern Plains Precipitation Zone

Similar sites

R058BY174WY	Subirrigated (Sb) 10-17" PZ Subirrigated 10-14" Northern Plains P.Z., has lower production.
-------------	---

Table 1. Dominant plant species

Tree	Not specified
Shrub	Not specified
Herbaceous	Not specified

Physiographic features

This site normally occurs on nearly level bottomlands and adjacent to perennial streams, springs and ponds.

Table 2. Representative physiographic features

Landforms	(1) Alluvial fan (2) Stream terrace
Flooding duration	Brief (2 to 7 days) to very brief (4 to 48 hours)
Flooding frequency	Rare to occasional
Ponding frequency	None
Elevation	3,700–7,500 ft
Slope	0–6%
Ponding depth	0 in
Water table depth	12–40 in
Aspect	Aspect is not a significant factor

Climatic features

Annual precipitation ranges from 15" to 19" per year. May is generally the wettest month. July, August and September are somewhat drier with daily amounts rarely exceeding one inch. Snowfall is quite heavy in the mountainous area. Annual snowfall averages close to 70 inches.

Sunshine is abundant in the latter part of the summer, the greatest amount being in July and August. Sunshine possibility during these two months averages 70 to 75% possibility with only a 65% possibility for June and September. Winter averages about 40% sunshine.

Because of the varied topography, the wind will vary considerably for different parts of the area. The wind is usually much lighter at the lower elevations and in the valleys as compared with the higher terrain. The average winter wind velocity is 8.5 mph, while the summer wind velocity averages 7.5 mph. Winds during storms and on ridges may exceed 45 mph.

Temperatures show a wide range between summer and winter, and between daily maximums and minimums. Summer nights are cool and temperatures drop into the forties at most places before sunrise. Summer daytime temperatures are usually in the seventies and occasionally reach eighty, but rarely reach the mid nineties. Winters are cold with daily lows below freezing most of the time. January has the coldest temperatures with a range of near 10 deg. F at night to the mid thirties in the afternoon. Temperatures of well below zero to –30 deg. F are not uncommon in the winter months.

The growing season for the cool season plants will generally start about April 15 to May 1 and continue to about October 10.

The following information is from the "Sheridan Airport" climate station:

Frost-free period (32 °F): 95-156 days; (5 yrs. out of 10, these days will occur between May 21 – September 19)

Freeze-free period 28 °F): 116-187 days; (5 yrs. out of 10, these days will occur between May 4 – September 29)

Mean annual precipitation: 14.7 inches

Mean annual air temperature: 45.0 °F (31.2 °F Avg. Min. – 58.8 °F Avg. Max.)

For detailed information visit the Natural Resources Conservation Service National Water and Climate Center at <http://www.wcc.nrcs.usda.gov/> website. Other climate station(s) representative of this precipitation zone include: "Parkman 5 WNW"

Table 3. Representative climatic features

Frost-free period (average)	156 days
Freeze-free period (average)	187 days
Precipitation total (average)	19 in

Influencing water features

Stream type: C (Rosgen)

Soil features

These are subirrigated soils of various depths and textures where nonsaline and/or nonalkaline water tables are within reach of the herbaceous species (usually less than three feet) throughout most of the growing season.

Table 4. Representative soil features

Surface texture	(1) Loam (2) Clay loam (3) Silt loam
Family particle size	(1) Loamy
Drainage class	Poorly drained to moderately well drained
Permeability class	Moderately slow to moderately rapid
Soil depth	20–60 in
Surface fragment cover ≤3"	0%
Surface fragment cover >3"	0%
Available water capacity (0–40in)	2.8–6.2 in
Calcium carbonate equivalent (0–40in)	0–10%
Electrical conductivity (0–40in)	0–8 mmhos/cm
Sodium adsorption ratio (0–40in)	0–10
Soil reaction (1:1 water) (0–40in)	6.6–9
Subsurface fragment volume ≤3" (Depth not specified)	0%
Subsurface fragment volume >3" (Depth not specified)	0%

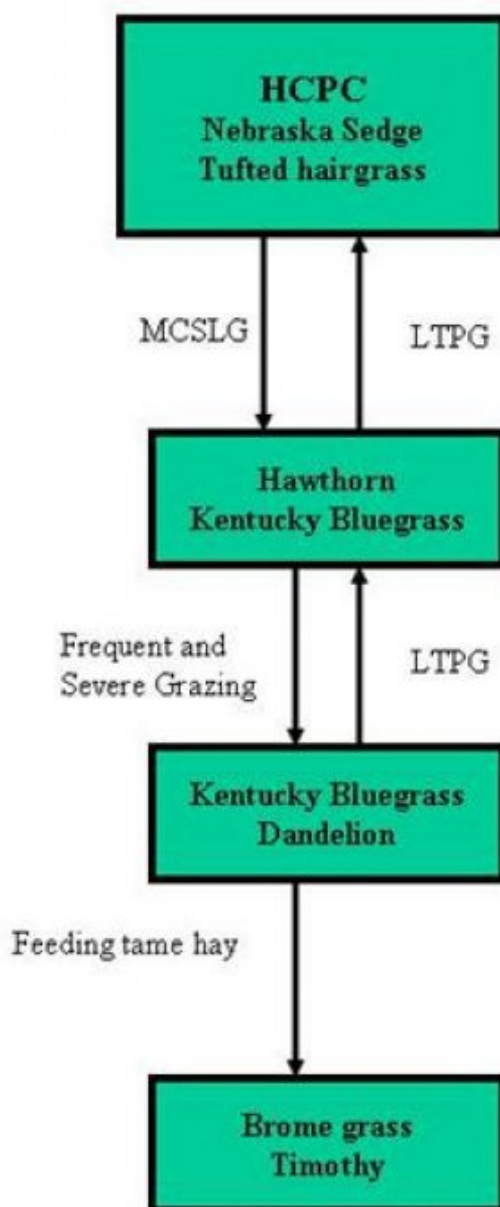
Ecological dynamics

As this site deteriorates from improper grazing management, species such as spike sedge and Baltic rush increase. Species such as Kentucky bluegrass invade. Grasses such as tufted hairgrass, Nebraska sedge and northern and blue-joint reedgrass will decrease in frequency and production.

The Historic Climax Plant Community (description follows the plant community diagram) has been determined by study of rangeland relic areas, or areas protected from excessive disturbance. Trends in plant communities going from heavily grazed areas to lightly grazed areas, seasonal use pastures, and historical accounts have also been used.

The following is a State and Transition Model Diagram that illustrates the common plant communities (states) that can occur on the site and the transitions between these communities. The ecological processes will be discussed in more detail in the plant community narratives following the diagram.

State and transition model



BM - Brush Management (fire, chemical, mechanical)

Freq. & Severe Grazing - Frequent and Severe Utilization of the Cool-season Mid-grasses during the Growing Season

GLMT - Grazing Land Mechanical Treatment

LTPG - Long-term Prescribed Grazing

MCSLG - Moderate, Continuous Season-long Grazing

NU, NF - No Use and No Fire

PG - Prescribed Grazing (proper stocking rates with adequate recovery periods during the growing season)

VLTPG - Very Long-term Prescribed Grazing (could possibly take generations)

Na - Moderate Sodium in Soil

State 1
Nebraska Sedge, Tufted Hairgrass Plant Community

Community 1.1
Nebraska Sedge, Tufted Hairgrass Plant Community

The interpretive plant community for this site is the Historic Climax Plant Community. This site evolved with grazing by large herbivores and is well suited for grazing by domestic livestock. Potential vegetation is about 75% grasses or grass-like plants, 15% forbs and 10% woody plants. The major grasses include Nebraska sedge, tufted hairgrass and spike sedge. Grasses of lesser importance are western wheatgrass, bearded wheatgrass, Canada wildrye, basin wildrye, prairie cordgrass, bluejoint reedgrass and northern reedgrass. Woody plants are mainly snowberry, chokecherry, hawthorn, boxelder, American plum, wild rose and willows. This state produces between 3500 and 6000 pounds annually, depending on the growing conditions. The state is extremely resilient and well adapted to the Northern Great Plains climatic conditions. The diversity in plant species allow for high drought resistance. This is a healthy and sustainable plant community (site/soil stability, watershed function, and biologic integrity). Transitions or pathways leading to other plant communities are as follows: • Moderate, continuous season-long grazing will convert this plant community to the Hawthorn/Kentucky bluegrass Vegetation State. • Heavy, continuous, improper grazing will convert this plant community to Kentucky bluegrass/Dandelion Vegetation State. • Feeding tame hay on this state will convert this site to Brome/Timothy Vegetation state.

Figure 3. Plant community growth curve (percent production by month).
WY1303, 15-19NP Free water sites - WL, Sb, SS.

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
0	0	0	5	10	35	30	10	10	0	0	0

State 2
Hawthorn/Kentucky Bluegrass Plant Community

Community 2.1
Hawthorn/Kentucky Bluegrass Plant Community

This plant community is the result of moderate season long grazing by domestic livestock. Dominant grasses include rhizomatous wheatgrasses, Kentucky bluegrass, spike sedge and Baltic rush Forbs, commonly found in this plant community, include Louisiana sagewort (cudweed), cinquefoil, and scarlet globemallow. Hawthorn, snowberry, wild rose, boxelder, American plum and willows are common in the overstory. This state produces between 1800 and 3500 pounds annually, depending on the growing conditions. When compared to the Historical Climax Plant Community, tufted hairgrass, Nebraska sedge and northern and bluejoint reedgrass have decreased. Spike sedge and cinquefoil have increased. Kentucky bluegrass and curlycup gumweed have invaded, The abundant production and proximity to water make this state important for livestock and wildlife such as birds, mule deer and antelope. The state is stable and protected from excessive erosion. The biotic integrity of this plant community is usually intact. The watershed is usually functioning. Transitions or pathways leading to other plant communities are as follows: • Prescribed grazing over the long-term will result in a plant community very similar to the Historic Climax Plant Community except that Kentucky bluegrass will persist. • Heavy, continuous, improper grazing will convert this plant community to the Kentucky bluegrass/Dandelion Vegetation State.

Figure 4. Plant community growth curve (percent production by month).
WY1303, 15-19NP Free water sites - WL, Sb, SS.

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
0	0	0	5	10	35	30	10	10	0	0	0

State 3
Kentucky Bluegrass/Dandelion Plant Community

Community 3.1
Kentucky Bluegrass/Dandelion Plant Community

This plant community is the result of long-term improper grazing use. This state is dominated by Kentucky bluegrass, dandelion, curlycup gumweed, hawthorn and cheatgrass. The site has been invaded by American licorice and Russian olive. Leafy spurge may invade this state. Willows are reduced. Production ranges from 900 to 1500 pounds. Bare ground has increased. The soil of this state is not well protected. Degraded stream banks may erode. The watershed is functioning but may produce excessive runoff. The biotic community is at risk due to invasive plants. Transitions or pathways leading to other plant communities are as follows: • Proper grazing use over the long-term may eventually return this state to near historic climax plant community plant community except that Kentucky bluegrass will persist. • Feeding tame hay on this state will convert the site to Brome/Timothy vegetation state.

Figure 5. Plant community growth curve (percent production by month).
WY1303, 15-19NP Free water sites - WL, Sb, SS.

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
0	0	0	5	10	35	30	10	10	0	0	0

State 4 Brome/Timothy Plant Community

Community 4.1 Brome/Timothy Plant Community

This state has been changed to a site dominated by tame grasses. The main species are smooth brome, timothy, Kentucky bluegrass and cheatgrass. Production for domestic animal grazing is comparable to Climax conditions. The state is often invaded by noxious weeds such as leafy spurge and Canada thistle. Production ranges from 1200 to 5000 pounds, depending on climatic conditions. Bare ground has increased. The soil of this state is not well protected. Degraded stream banks may erode. The watershed is functioning but may produce excessive runoff. The biotic community is at risk due to invasive plants. Transitions or pathways leading to other plant communities are as follows: • Changing this state to the Historical Climax Plant Community may be difficult due to the dominance of tame species.

Figure 6. Plant community growth curve (percent production by month).
WY1303, 15-19NP Free water sites - WL, Sb, SS.

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
0	0	0	5	10	35	30	10	10	0	0	0

Additional community tables

Table 5. Community 1.1 plant community composition

Group	Common Name	Symbol	Scientific Name	Annual Production (Lb/Acre)	Foliar Cover (%)
Grass/Grasslike					
1				500–1250	
	Nebraska sedge	CANE2	<i>Carex nebrascensis</i>	500–1250	–
2				500–1250	
	reedgrass	CALAM	<i>Calamagrostis</i>	500–1250	–
3				500–1000	
4				500–1000	
	spike sedge	CANA2	<i>Carex nardina</i>	500–1000	–
5				500–1000	
	Grass, perennial	2GP	<i>Grass, perennial</i>	0–250	–
	Pumpelly's brome	BRINP5	<i>Bromus inermis</i> ssp. <i>pumpellianus</i> var. <i>pumpellianus</i>	0–250	–

	Macoun's reedgrass	CACAM	<i>Calamagrostis canadensis</i> var. <i>macouniana</i>	0–250	–
	northern reedgrass	CASTI3	<i>Calamagrostis stricta</i> ssp. <i>inexpansa</i>	0–250	–
	bearded wheatgrass	ELCA11	<i>Elymus caninus</i>	0–250	–
	Canada wildrye	ELCA4	<i>Elymus canadensis</i>	0–250	–
	Idaho fescue	FEID	<i>Festuca idahoensis</i>	0–250	–
	basin wildrye	LECI4	<i>Leymus cinereus</i>	0–250	–
	western wheatgrass	PASM	<i>Pascopyrum smithii</i>	0–250	–
	alpine timothy	PHAL2	<i>Phleum alpinum</i>	0–250	–
	fowl bluegrass	POPA2	<i>Poa palustris</i>	0–250	–
	prairie cordgrass	SPPE	<i>Spartina pectinata</i>	0–250	–
Forb					
6				250–750	
	Forb, perennial	2FP	<i>Forb, perennial</i>	0–250	–
	yarrow	ACHIL	<i>Achillea</i>	0–250	–
	western white clematis	CLLI2	<i>Clematis ligusticifolia</i>	0–250	–
	sticky purple geranium	GEVI2	<i>Geranium viscosissimum</i>	0–250	–
	American licorice	GLLE3	<i>Glycyrrhiza lepidota</i>	0–250	–
	mint	MENTH	<i>Mentha</i>	0–250	–
	cinquefoil	POTEN	<i>Potentilla</i>	0–250	–
	upright prairie coneflower	RACO3	<i>Ratibida columnifera</i>	0–250	–
	blue-eyed grass	SISYR	<i>Sisyrinchium</i>	0–250	–
Shrub/Vine					
7				250–500	
	Shrub (>.5m)	2SHRUB	<i>Shrub (>.5m)</i>	0–250	–
	boxelder	ACNEI2	<i>Acer negundo</i> var. <i>interius</i>	0–250	–
	hawthorn	CRATA	<i>Crataegus</i>	0–250	–
	American plum	PRAM	<i>Prunus americana</i>	0–250	–
	chokecherry	PRVIV	<i>Prunus virginiana</i> var. <i>virginiana</i>	0–250	–
	Woods' rose	ROWOW	<i>Rosa woodsii</i> var. <i>woodsii</i>	0–250	–
	willow	SALIX	<i>Salix</i>	0–250	–
	western snowberry	SYOC	<i>Symphoricarpos occidentalis</i>	0–250	–

Animal community

Animal Community – Wildlife Interpretations

Nebraska Sedge, Tufted Hairgrass Plant Community (HCPC): The predominance of grasses in this plant community favors grazers and mixed-feeders, such as bison, elk, and antelope. Woody vegetation provides thermal cover and habitat for migratory birds when found adjacent to sagebrush dominated states, this plant community may provide brood rearing/foraging areas for sage grouse, as well as lek sites. Other birds that would frequent this plant community include western meadowlarks, horned larks, migratory song birds, and golden eagles. Many grassland obligate small mammals would occur here.

Hawthorn/Kentucky Bluegrass Plant Community:

This plant community may be useful for the same large grazers that would use the Historic Climax Plant Community. Hawthorn trees will provide habitat for migratory song birds. However, the plant community

composition is less diverse, and thus, less apt to meet the seasonal needs of grazing animals. It may provide some foraging opportunities for sage grouse when it occurs proximal to woody cover. Good grasshopper habitat equals good foraging for birds.

Kentucky Bluegrass/Dandelion Plant Community:

This plant community may be useful for the same large grazers that would use the Historic Climax Plant Community. However, the plant community composition is less diverse, and thus, less apt to meet the seasonal needs of these animals. It may provide some foraging opportunities for sage grouse when it occurs proximal to woody cover. Good grasshopper habitat equals good foraging for birds.

Brome/Timothy Plant Community: This plant community may be useful for the same large grazers that would use the Historic Climax Plant Community. However, the plant community composition is less diverse, and thus, less apt to meet the seasonal needs of these animals. It may provide some foraging opportunities for sage grouse when it occurs proximal to woody cover. Good grasshopper habitat equals good foraging for birds.

Animal Community – Grazing Interpretations

The following table lists suggested stocking rates for cattle under continuous season-long grazing under normal growing conditions. These are conservative estimates that should be used only as guidelines in the initial stages of the conservation planning process. Often, the current plant composition does not entirely match any particular plant community (as described in this ecological site description). Because of this, a field visit is recommended, in all cases, to document plant composition and production. More precise carrying capacity estimates should eventually be calculated using this information along with animal preference data, particularly when grazers other than cattle are involved. Under more intensive grazing management, improved harvest efficiencies can result in an increased carrying capacity. If distribution problems occur, stocking rates must be reduced to maintain plant health and vigor.

Plant Community Production Carrying Capacity*

(Lb./ac) (AUM/ac)

Nebraska sedge, Tufted hairgrass 3500-6000 2.0

Hawthorne/Kentucky bluegrass 1800-3500 1.5

Kentucky bluegrass/Dandelion 900-1500 1.0

Brome/Timothy 1200-5000 2.0

* - Continuous, season-long grazing by cattle under average growing conditions.

Grazing by domestic livestock is one of the major income-producing industries in the area. Rangeland in this area may provide yearlong forage for cattle, sheep, or horses. During the dormant period, the forage for livestock use needs to be supplemented with protein because the quality does not meet minimum livestock requirements.

Hydrological functions

Climate is the principal factor limiting forage production on this site. This site is dominated by soils in hydrologic group B and C, with localized areas in hydrologic group D. Infiltration ranges from moderately slow to moderately rapid. Runoff potential for this site varies from moderate to high depending on soil hydrologic group and ground cover. In many cases, areas with greater than 75% ground cover have the greatest potential for high infiltration and lower runoff. An example of an exception would be where short-grasses form a strong sod and dominate the site. Areas where ground cover is less than 50% have the greatest potential to have reduced infiltration and higher runoff (refer to Part 630, NRCS National Engineering Handbook for detailed hydrology information).

Rills and gullies should not typically be present. Water flow patterns should be barely distinguishable if at all present. Pedestals are only slightly present in association with bunchgrasses. Litter typically falls in place, and signs of movement are not common. Chemical and physical crusts are rare to non-existent. Cryptogamic crusts are present, but only cover 1-2% of the soil surface.

Recreational uses

This site provides hunting opportunities for upland game species. The wide variety of plants which bloom from spring until fall have an esthetic value that appeals to visitors.

Wood products

No appreciable wood products are present on the site.

Other products

None noted.

Inventory data references

Inventory Data References (narrative)

Information presented here has been derived from NRCS clipping data and other inventory data. Field observations from range trained personnel was also used. Other sources used as references include USDA NRCS Water and Climate Center, USDA NRCS National Range and Pasture Handbook, and USDA NRCS Soil Surveys from various counties.

Inventory Data References

Data Source Number of Records Sample Period State County

SCS-RANGE-417 1971-1994 WY

Ocular estimates 1990-1999 WY

Contributors

G. Mitchell

Rangeland health reference sheet

Interpreting Indicators of Rangeland Health is a qualitative assessment protocol used to determine ecosystem condition based on benchmark characteristics described in the Reference Sheet. A suite of 17 (or more) indicators are typically considered in an assessment. The ecological site(s) representative of an assessment location must be known prior to applying the protocol and must be verified based on soils and climate. Current plant community cannot be used to identify the ecological site.

Author(s)/participant(s)	
Contact for lead author	
Date	04/01/2005
Approved by	E. Bainter
Approval date	
Composition (Indicators 10 and 12) based on	Annual Production

Indicators

1. **Number and extent of rills:** Rills should not be present

2. **Presence of water flow patterns:** Barely observable

3. **Number and height of erosional pedestals or terracettes:** Essentially non-existent

4. **Bare ground from Ecological Site Description or other studies (rock, litter, lichen, moss, plant canopy are not**

bare ground): Bare ground is less than 5%

5. **Number of gullies and erosion associated with gullies:** Active gullies should not be present
-

6. **Extent of wind scoured, blowouts and/or depositional areas:** None
-

7. **Amount of litter movement (describe size and distance expected to travel):** Little to no plant litter movement. Plant litter remains in place and is not moved by erosional forces.
-

8. **Soil surface (top few mm) resistance to erosion (stability values are averages - most sites will show a range of values):** Plant cover and litter is at 95% or greater of soil surface and maintains soil surface integrity. Soil Stability class is anticipated to be 5 or greater.
-

9. **Soil surface structure and SOM content (include type of structure and A-horizon color and thickness):** Use Soil Series description for depth and color of A-horizon
-

10. **Effect of community phase composition (relative proportion of different functional groups) and spatial distribution on infiltration and runoff:** Grass canopy and basal cover should reduce raindrop impact and slow overland flow providing increased time for infiltration to occur. Healthy deep rooted native grasses enhance infiltration and reduce runoff. Infiltration is moderately slow to moderately rapid.
-

11. **Presence and thickness of compaction layer (usually none; describe soil profile features which may be mistaken for compaction on this site):** No compaction layer or soil surface crusting should be present.
-

12. **Functional/Structural Groups (list in order of descending dominance by above-ground annual-production or live foliar cover using symbols: >>, >, = to indicate much greater than, greater than, and equal to):**

Dominant:

Sub-dominant:

Other:

Additional: Tall and Mid stature Grasses/grasslikes > Forbs > Shrubs > Short stature Grasses/Grasslikes

13. **Amount of plant mortality and decadence (include which functional groups are expected to show mortality or decadence):** Very Low
-

14. **Average percent litter cover (%) and depth (in):** Average litter cover is 50-55% with depths of 0.75 to 1.5 inches

15. **Expected annual annual-production (this is TOTAL above-ground annual-production, not just forage annual-production):** 5000 lbs/ac

16. **Potential invasive (including noxious) species (native and non-native). List species which BOTH characterize degraded states and have the potential to become a dominant or co-dominant species on the ecological site if their future establishment and growth is not actively controlled by management interventions. Species that become dominant for only one to several years (e.g., short-term response to drought or wildfire) are not invasive plants. Note that unlike other indicators, we are describing what is NOT expected in the reference state for the ecological site:** Kentucky Bluegrass, Spike sedge, Baltic rush, Dandelion, Hawthorn, and Species found on Noxious Weed List

17. **Perennial plant reproductive capability:** All species are capable of reproducing
