

Ecological site R049XA174WY Subirrigated (Foothills and Mountains Southeast)

Accessed: 05/07/2024

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.

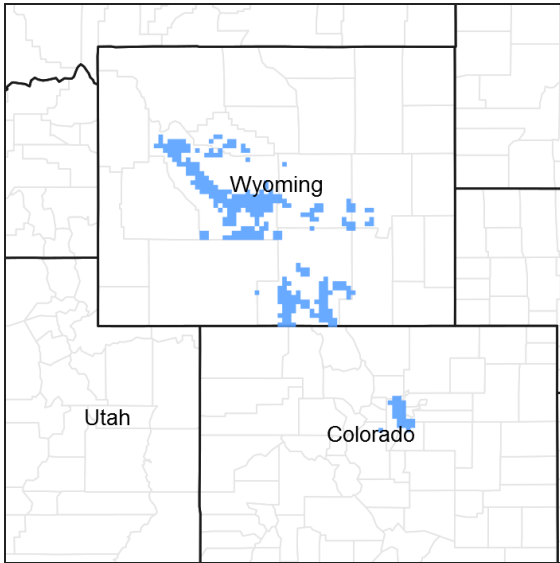


Figure 1. Mapped extent

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

R049XA126WY	Loamy Overflow (Foothills and Mountains Southeast) Loamy Overflow
R049XA178WY	Wetland (Foothills and Mountains Southeast) Wetland

Similar sites

R049XA178WY	Wetland (Foothills and Mountains Southeast) Wetland, R049XA178WY has higher production
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Table 1. Dominant plant species

Tree	Not specified
Shrub	Not specified
Herbaceous	Not specified

Physiographic features

This site will usually occur on nearly level lands adjacent to perennial or intermittent streams and near springs,

seeps, and sloughs.

Table 2. Representative physiographic features

Landforms	(1) Alluvial fan (2) Stream terrace
Flooding duration	Very brief (4 to 48 hours)
Flooding frequency	Rare to occasional
Ponding frequency	None
Elevation	1,981–2,591 m
Slope	0–6%
Ponding depth	0 cm
Water table depth	30–102 cm
Aspect	Aspect is not a significant factor

Climatic features

Annual precipitation ranges from 15-19 inches per year. Wide fluctuations may occur in yearly precipitation and result in more dry years than those with more than normal precipitation. Temperatures show a wide range between summer and winter and between daily maximums and minimums. This is predominantly due to the high elevation and dry air, which permits rapid incoming and outgoing radiation. Cold air outbreaks in winter move rapidly from northwest to southeast and account for extreme minimum temperatures. Extreme storms may occur during the winter, but most severely affect ranch operations during late winter and spring.

Prevailing winds are from the southwest and strong winds are less frequent than over other areas of Wyoming. Occasional storms, however, can bring brief periods of high winds with gusts exceeding 50 mph.

Growth of native cool season plants begins about May 1 and continues to about August 1.

The following information is from the “Hecla 1E” climate station:

Minimum Maximum 5 yrs. out of 10 between
 Frost-free period (days): 93 151 May 20 – September 14
 Freeze-free period (days): 106 184 May 9 – September 26
 Annual Precipitation (inches): 9.56 24.23

Mean annual precipitation: 16.04 inches
 Mean annual air temperature: 44.7F (32.1F Avg. Min. to 57.2F 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 “Glenrock 14 SSE”, “Foxpark” and “Horse Creek 2 NW”.

Table 3. Representative climatic features

Frost-free period (average)	151 days
Freeze-free period (average)	184 days
Precipitation total (average)	483 mm

Influencing water features

Soil features

The soils of this site are deep to very deep (greater than 20"to bedrock) moderately well drained soils formed in alluvium. These soils have water tables below the surface for all of the growing season. The water table is non-saline and non-alkaline. These areas may have water over the surface from run-in but only for short periods of time. Layers of the soil most influential to the plant community vary from 3 to 6 inches thick.

Major Soil Series correlated to this site include:

Other Soil Series correlated to this site include:

Table 4. Representative soil features

Surface texture	(1) Loam (2) Clay loam (3) Sandy loam
Family particle size	(1) Loamy
Drainage class	Poorly drained to moderately well drained
Permeability class	Moderately slow to moderately rapid
Soil depth	51–152 cm
Surface fragment cover <=3"	0%
Surface fragment cover >3"	0%
Available water capacity (0-101.6cm)	7.11–15.75 cm
Calcium carbonate equivalent (0-101.6cm)	0–10%
Electrical conductivity (0-101.6cm)	0–8 mmhos/cm
Sodium adsorption ratio (0-101.6cm)	0–10
Soil reaction (1:1 water) (0-101.6cm)	6.6–9
Subsurface fragment volume <=3" (Depth not specified)	0%
Subsurface fragment volume >3" (Depth not specified)	0%

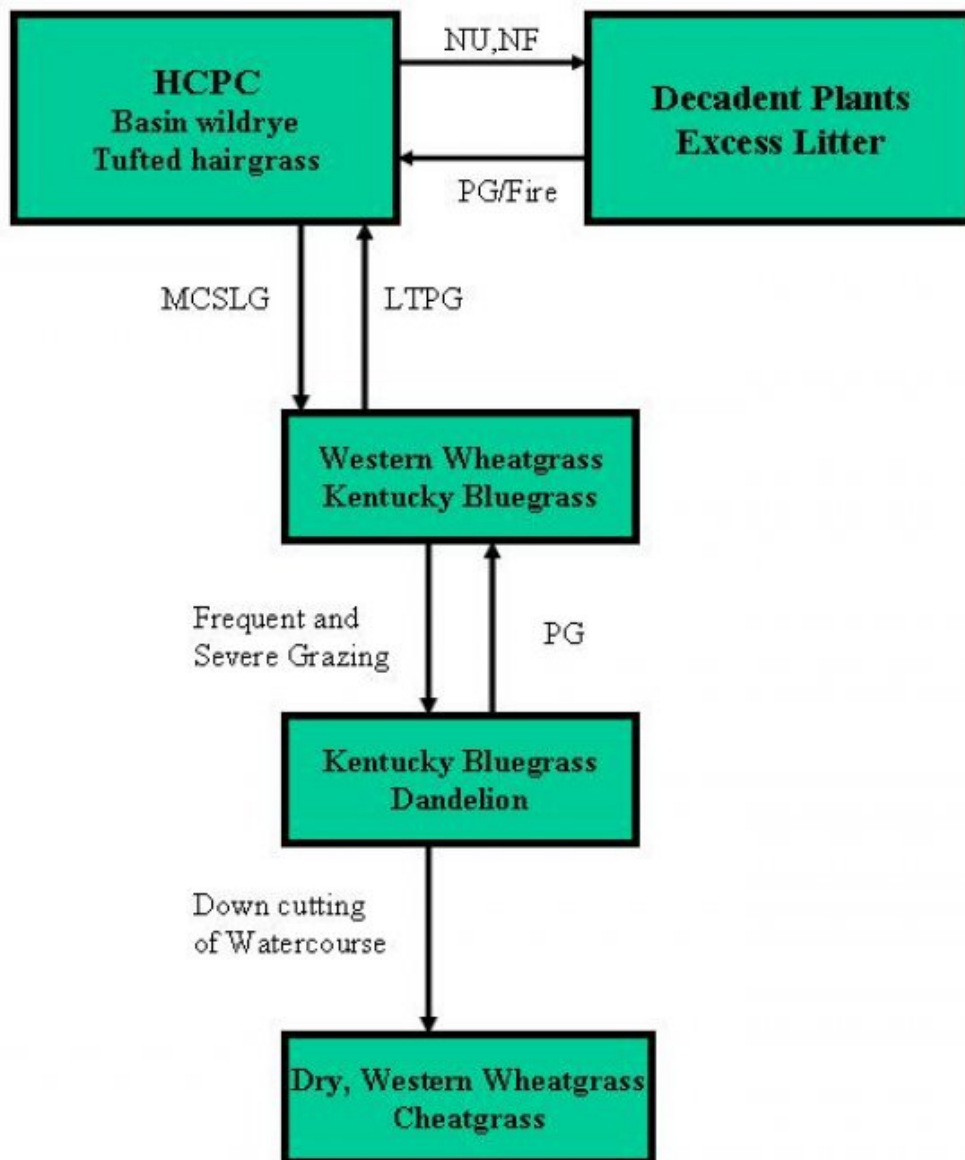
Ecological dynamics

As this site deteriorates from frequent and severe grazing, grasses such as basin wildrye and tufted hairgrass will decrease in frequency and production. Western wheatgrass tends to increase. Under continued frequent and severe defoliation, the plant community will eventually become sod-bound. Over the long-term this sod will ultimately become broken with areas of bare ground developing and species such as Kentucky bluegrass and annuals invading.

The historic climax plant community (description follows the State and Transition Model 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 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



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

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

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)

Community 1.1

Basin wildrye, Tufted hairgrass Plant Community

The interpretive plant community for this site is the Historic Climax Plant Community. This state evolved with grazing by large herbivores and is well suited for grazing by domestic livestock. Potential vegetation is about 80% grasses or grass-like plants, 10% forbs and 10% woody plants. The major grasses include basin wildrye, tufted hairgrass, slender wheatgrass and western wheatgrass. Grasses of lesser importance are big bluegrass, bluejoint reedgrass, northern reedgrass, and Canada wildrye. Woody plants are mainly shrubby cinquefoil and willows. The total annual production (air-dry weight) of this state is about 4000 pounds per acre, but it can range from about 3500 lbs./acre in unfavorable years to about 4500 lbs./acre in above average years. The following is the growth curve of this plant community expected during a normal year: Growth curve number: Growth curve name: Growth curve description: JAN FEB MAR APR MAY JUN JUL AUG SEP OCT NOV DEC 0 0 0 0 15 30 35 10 5 5 0 0 (Monthly percentages of total annual growth) The state is stable and well adapted to the climatic conditions. The diversity in plant species and the reliable water table, allow for high drought resistance. This is a 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 Western wheatgrass/Kentucky bluegrass Vegetation State. • Frequent and Severe grazing will convert this plant community to Kentucky bluegrass/Dandelion Vegetation State. • Dncutting the watercourse will convert this state to a Dry Western wheatgrass/Annuals Plant Community. • Non-use and no fire will convert this plant community to the Decadent Plants, Excessive Litter Plant Community. Initially, excess litter begins to build-up. Eventually native plants can show signs of mortality and decadence.

Figure 4. Plant community growth curve (percent production by month). WY1003, 15-19SE free water sites.

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
0	0	0	5	10	20	30	25	10	0	0	0

State 2

Western wheatgrass/Kentucky bluegrass Plant Community

Community 2.1

Western wheatgrass/Kentucky bluegrass Plant Community

This plant community evolved under moderate grazing by domestic livestock. Dominant grasses include rhizomatous wheatgrasses and Kentucky bluegrass. Forbs commonly found in this plant community include cudweed sagewort, cinquefoil, and western yarrow. Willows are common in the overstory. The total annual production (air-dry weight) of this state is about 2100 pounds per acre, but it can range from about 1800 lbs./acre in unfavorable years to about 2500 lbs./acre in above average years. When compared to the Historical Climax Plant Community, basin wildrye and tufted hairgrass have decreased. Kentucky bluegrass has invaded and western wheatgrass has increased. 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. The following is the growth curve expected during a normal year: Growth curve number: Growth curve name: Growth curve description: JAN FEB MAR APR MAY JUN JUL AUG SEP OCT NOV DEC 0 0 0 0 20 35 25 10 5 5 0 0 Transitional 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 although Kentucky bluegrass will remain a part of the plant community. • Frequent and Severe grazing will convert this plant community to the Kentucky bluegrass/Dandelion Vegetation State. • Dncutting of the watercourse will convert this state to a Dry Western wheatgrass/Cheatgrass Plant Community.

Figure 5. Plant community growth curve (percent production by month). WY1003, 15-19SE free water sites.

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
0	0	0	5	10	20	30	25	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. Kentucky bluegrass, dandelion, and cheatgrass dominate this state. Noxious weeds may invade. Willows are reduced. The total annual production (air-dry weight) of this state is about 1050 pounds per acre, but it can range from about 900 lbs./acre in unfavorable years to about 1200 lbs./acre in above average years. The following is the growth curve expected during an average year. Growth curve number: Growth curve name: Growth curve description: JAN FEB MAR APR MAY JUN JUL AUG SEP OCT NOV DEC 0 0 0 0 20 35 25 10 5 5 0 0 (Monthly percentages of total annual growth) 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. Transitional pathways leading to other plant communities are as follows: • Prescribed grazing over the long-term will return this state to near Historic Climax Plant Community. • Dencutting of the watercourse will convert this state to a Dry Western wheatgrass/Annuals Plant Community.

Figure 6. Plant community growth curve (percent production by month). WY1003, 15-19SE free water sites.

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
0	0	0	5	10	20	30	25	10	0	0	0

State 4
Dry, Western wheatgrass/ Cheatgrass

Community 4.1
Dry, Western wheatgrass/ Cheatgrass

This plant community is the result of down cutting of watercourses adjacent to the site. This results in a lowering of the water table to the point it is no longer available to grass plants. Compared to the Historic Climax Plant Community this state has changed drastically. The water table is lowered and production is decreased. Basin wildrye and tufted hairgrass have decreased. Western wheatgrass has increased. Annuals have invaded. Noxious weeds also may invade the state. The soil is being eroded by severe bank erosion. The total annual production (air-dry weight) of this state is about 750 pounds per acre, but it can range from about 600 lbs./acre in unfavorable years to about 900 lbs./acre in above average years. The following is the growth curve of this plant community expected during a normal year: Growth curve number: Growth curve name: Growth curve description: JAN FEB MAR APR MAY JUN JUL AUG SEP OCT NOV DEC 0 0 0 15 30 30 10 5 5 5 0 0 (Monthly percentages of total annual growth) The watershed is not functional due to erosion and bare ground. The biotic community has lost much of its value due to the loss of the water table. Transitional pathways leading to other plant communities are as follows: • Changing this state to the Historical Climax Plant Community is not practical due to the loss of the water table.

Figure 7. Plant community growth curve (percent production by month). WY1003, 15-19SE free water sites.

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
0	0	0	5	10	20	30	25	10	0	0	0

State 5
Decadent Plants, Excessive Litter Plant Community

Community 5.1
Decadent Plants, Excessive Litter Plant Community

This plant community occurs after an extended period of non-use, and where fire has been eliminated. The

dominant plants tend to be similar to those found in the Historic Climax Plant Community, however in advanced stages, frequency and production can be lower. Litter amounts have increased causing plants to become decadent. Much of the plant nutrients are tied up in excessive litter. Organic matter oxidizes in the air rather than being incorporated into the soil due to the absence of animal impact. Typically, bunchgrasses (basin wildrye) develop dead centers and rhizomatous grasses (western wheatgrass) form small colonies because of a lack of tiller stimulation. Total annual production (air-dry weight) is about 3,800 pounds per acre during an average year, but it can range from about 3,400 pounds per acre in unfavorable years to about 4,200 pounds per acre in above average years. The following is the growth curve of this plant community expected during an average year: Growth curve number: Growth curve name: Growth curve description: JAN FEB MAR APR MAY JUN JUL AUG SEP OCT NOV DEC 0 0 0 0 10 30 35 15 5 5 0 0 (monthly percentages of total annual growth) This plant community is not resistant to change. Grazing or fire can easily move it toward the HCPC. Soil erosion is not a concern due to increased litter levels and landscape position. Transitions or pathways leading to other plant communities are as follows: • Prescribed grazing or fire will shift this plant community towards the Basin wildrye, Tufted hairgrass Plant Community (HCPC).

Figure 8. Plant community growth curve (percent production by month). WY1003, 15-19SE free water sites.

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
0	0	0	5	10	20	30	25	10	0	0	0

Additional community tables

Table 5. Community 1.1 plant community composition

Group	Common Name	Symbol	Scientific Name	Annual Production (Kg/Hectare)	Foliar Cover (%)
Grass/Grasslike					
1				2466–3363	
	basin wildrye	LECI4	<i>Leymus cinereus</i>	1121–1793	–
	slender wheatgrass	ELTR7	<i>Elymus trachycaulus</i>	224–448	–
	western wheatgrass	PASM	<i>Pascopyrum smithii</i>	224–448	–
2				448–1121	
	Grass, perennial	2GP	<i>Grass, perennial</i>	0–224	–
	wheat sedge	CAAT2	<i>Carex atherodes</i>	0–224	–
	bluejoint	CACA4	<i>Calamagrostis canadensis</i>	0–224	–
	Nebraska sedge	CANE2	<i>Carex nebrascensis</i>	0–224	–
	slimstem reedgrass	CAST36	<i>Calamagrostis stricta</i>	0–224	–
	Canada wildrye	ELCA4	<i>Elymus canadensis</i>	0–224	–
	mat muhly	MURI	<i>Muhlenbergia richardsonis</i>	0–224	–
Forb					
3				224–448	
	Forb, perennial	2FP	<i>Forb, perennial</i>	0–224	–
	textile onion	ALTE	<i>Allium textile</i>	0–224	–
	Indian paintbrush	CASTI2	<i>Castilleja</i>	0–224	–
	horsetail	EQUIS	<i>Equisetum</i>	0–224	–
	waterleaf	HYDRO4	<i>Hydrophyllum</i>	0–224	–
	iris	IRIS	<i>Iris</i>	0–224	–
	American bistort	POBI6	<i>Polygonum bistortoides</i>	0–224	–
	cinquefoil	POTEN	<i>Potentilla</i>	0–224	–
	clover	TRIFO	<i>Trifolium</i>	0–224	–
	arrowgrass	TRIGL	<i>Triglochin</i>	0–224	–
Shrub/Vine					
4				224–673	
	rubber rabbitbrush	ERNA10	<i>Ericameria nauseosa</i>	0–224	–
	Woods' rose	ROWOW	<i>Rosa woodsii var. woodsii</i>	0–224	–
	willow	SALIX	<i>Salix</i>	0–224	–

Animal community

Animal Community – Wildlife Interpretations

Historic Climax Plant Community: The predominance of grasses in this plant community favors grazers and mixed-feeders, such as bison, elk, and antelope. Suitable thermal and escape cover for deer may be limited due to the low quantities of woody plants. However, topographical variations could provide some escape cover. Birds that would frequent this plant community include western meadowlarks, horned larks, and golden eagles. Many grassland obligate small mammals would occur here.

Western wheatgrass/Kentucky bluegrass: 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. Good grasshopper habitat equals good foraging for birds.

Kentucky bluegrass/dandelion: 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. Good grasshopper habitat equals good foraging for birds.

Dry wheatgrass/Cheatgrass: 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. Good grasshopper habitat equals good foraging for birds.

Decadent Plants, Excess Litter Community: This community has low habitat value for most wildlife species.

Animal Community – Grazing Interpretations

The following tables list suggested initial stocking rates for cattle under continuous grazing (year long grazing or growing season long grazing) under normal growing conditions; however, continuous grazing is not typically recommended. 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 the following stocking rate 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.

Plant Community Production Carrying

15-19" Precipitation Capacity

(lbs./acre) (AUM/acre)

Basin wildrye, Tufted hairgrass 4000 2.0

Western wheatgrass/Kentucky bluegrass 2100 1.2

Kentucky bluegrass/dandelion 1050 1.0

Dry, western wheatgrass/Cheatgrass 750 .25

Decadent Plants, Excess Litter 3800 1.30

Grazing by domestic livestock is one of the major income-producing industries in the area. Rangelands in this area provide seasonal forage under prescribed grazing for cattle, sheep, horses and other herbivores. During the dormant period, livestock may need supplementation based on reliable forage analysis.

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, hiking, photography, bird watching and other opportunities. The wide varieties of plants that 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 were also used.

Inventory Data References

Data Source Number of Records Sample Period State County

SCS-RANGE-417 24 1963 -1987 WY Albany & others

Other references

Other sources used as references include: High Plains Regional Climate Center, USDA NRCS Water and Climate Center, USDA NRCS National Range and Pasture Handbook, and USDA NRCS Soil Surveys from various counties.

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	03/01/2005
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.
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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 Cool Season Grasses > Short stature Grasses/Grasslike >Shrubs> Forbs
-
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):** 4000 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, Baltic Rush, Dandelion and Species found on Noxious Weed List

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