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EC84-109-F Range Judging Handbook for Nebraska

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RANGE JUDGING HANDBOOK

For Nebraska

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RANGE JUDGING

HANDBOOK for Nebraska

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Introduction

There are more acres of rangeland than any other land category in Nebraska. Rangeland totals 24 million acres (10 million hectares) with an additional 1.5 million acres (0.6 million hectares) that have been seeded to introduced pasture grasses. Together, these grasslands (range and pasture) occupy 52 percent of the state.

Rangeland is one of Nebraska's most important and valuable natural resources—not only because of its sheer magnitude but also because rangeland:

- produces forage for livestock which is the major forage component supporting the beef cattle and sheep industry.
- provides a varied habitat for many species of wildlife.
- protects our soil from wind and water erosion.
- preserves a “germplasm bank” for many plant species that may become important for as yet unknown uses.
- purifies and enhances our environment by cleansing the air, filtering runoff to streams, increasing the intake of precipitation and aiding the recharge of groundwater.
- perseveres in the face of adversity and renews itself when provided the opportunity by those who use and sometimes abuse it.
- pleases those who have learned to appreciate the beauty and aesthetic qualities of rangeland.

These are the “7-P's” of rangeland. Hopefully, they will help us remember the importance of rangeland and stimulate our sense of appreciation for this vast natural resource.

Range judging contests can be a challenging and effective learning tool for everyone—youth, adults, beginners, professionals—whether from rural or ur-

ban areas. This circular was written to provide information about Nebraska range resources. It is designed to help individuals and teams prepare for range judging contests and to learn more about rangeland and its management. To be successful in range judging, knowledge of the six sections in this circular is necessary. Each section corresponds to a section on the range judging scorecard used in contests. Sample scorecards are provided in the back of this publication.

Section I

Range Plant Identification and Classification

The starting point for most range management decisions is knowing range plants by name and knowing their growth habits, response to grazing, and other characteristics. This is also the first knowledge required to compete in range judging.

Table 1 lists the 150 most important range and pasture plants found in Nebraska. This is only a small portion of the more than 1,700 different plants that grow in Nebraska. Plants can be important because they are desirable as well as undesirable. Table 1 lists both kinds. Asterisks on plant names in Table 1 suggest plants that should be learned first. Important plant characteristics are defined and listed. Scientific names are included because confusion can exist when there are several common names for a particular plant. There is only one correct scientific name which is used world-wide.

For help in plant identification and to learn more about range plants, obtain copies of publications listed at the end of this circular.

Plants can be classified or grouped in many different ways. The following groupings and definitions will help in learning important characteristics of range plants.

Major Types of Range Plants

Grasses are plants with jointed stems. The stems are normally hollow between the joints (nodes). Leaves are in two rows on the stem. Veins in the leaves are parallel. Grasses are the most important and abundant kind of range plant.

Forbs are broadleaved plants with topgrowth that dies back each year. Most forbs have net-like or branching veins in the leaves, but a few, such as bracted spiderwort, have parallel veins. Broadleaf weeds and wild flowers are kinds of forbs. Some forbs are classified as weeds because they grow where they are not wanted. Native legumes are also a special kind of forb that can add nitrogen to the soil with the aid of bacteria on the roots. This nitrogen becomes available for plant growth and to enrich the soil.

Grass-like plants look like grasses, but have solid stems (not hollow) without joints. Stems are often triangular. Veins in the leaves are parallel. In this group are the sedges and rushes.

Shrubs are woody plants with stems that live from one year to the next. Stems branch from near the base. Shrubs are similar to trees, but smaller and without a definite trunk. Tree branches are higher above the ground. Woody plants grazed by livestock are called browse.

Life Span

Annual plants live only one growing season. They do not grow the second season from roots or crowns, but must start from seed.

Biennial plants live two growing seasons. Normally these plants form a basal cluster of leaves the first year and send up a seed stalk the second year.

Perennial plants live from one year to the next, producing leaves and stems for more than two years from the same crown.

Season of Growth

Cool Season plants make their principal growth during the cool weather in the spring and set seed in late spring or early summer. New growth can appear in the fall if moisture is adequate.

Warm Season plants make most of their growth during late spring and summer. Seed develops in mid summer to early fall.

Response to Grazing

Plants are classified according to how they respond to grazing pressure. Some plants become more abundant under grazing pressure, while others are reduced in number. How a plant responds to grazing pressure may be different for different range sites. For example, a plant that decreases on one range site may increase on another range site. Plants listed in Table 1 are classified according to grazing response. Although the classification of plants as decreasers, increasers, and invaders is not used in determining range condition, it is important to know how plants respond to grazing pressure and how this affects the

composition of the plant community.

Decreaser plants are the most desirable group of range plants. They generally produce the greatest amount of good quality, palatable forage. Decreaser plants are the first to die out under continued heavy grazing or mismanaged range. Less and less of these plants survive as range declines from "excellent" to "poor" condition.

Increaser plants are usually smaller, less palatable plants that are well adapted to increase their numbers as decreaser plants are reduced. Many avoid grazing damage because they grow close to the ground or because they are grazed less intensively by livestock. These plants should be watched with caution because they can increase in number and abundance beyond what is desirable in response to intensive grazing. Forage quality may be excellent, but other characteristics are not as desirable as decreaser plants. If over use continues, even increaser plants may not survive.

Invader plants occupy range where decreaser and increaser plants have been destroyed or seriously weakened by excessive grazing. Invaders are commonly annuals and become established because the desirable vegetation has been weakened to allow less desirable plants to grow. They are not dependable producers, are often unpalatable and are not considered a desirable kind of vegetation.

Section II Rangeland and Range Sites

Land areas of the world can be classified in many ways, such as forestland, cultivated land, or rangeland. Rangeland is a specific kind of land that produces native grasses and other plants and is best used for grazing livestock. It is also a home for many kinds of wild animals. Most rangeland is not suited for farming because of roughness of terrain, soil factors, and sometimes climatic conditions that make it unsuitable for cultivation. Therefore, rangeland should remain as natural vegetation providing many products of value on a sustained self-renewing basis.

Rangeland in Nebraska may appear as a monotonous expanse of grassland that is very similar throughout. However, it actually consists of many different kinds or groups of plants (called plant communities) which are different enough to be given a specific name.

These differences in vegetation are associated with differences in soils, climate, and localized soil moisture conditions. For example, sandy soils produce a different vegetation than clay soils. Vegetation also changes with the amount and distribution of rainfall. The natural vegetation of eastern Nebraska is not the same as western Nebraska because of decreasing precipitation to the west and differences in soils. Areas which receive extra water from "run in" or from subirrigation support different vegetation than drier sites. These sub-units, or plant communities within a larger expanse of rangeland, are called range sites. They are the basic vegetation units used in range management.

Table 1. List of important range plants in Nebraska.

Key to grass characteristics: Annual = A, Biennial = B, Perennial = P, Cool = C, Warm = W, Decreaser = Dec, Increaser = Inc, Invader = Inv, B = Bunch, S = Stoloniferous, R = Rhizomatous. *Plants to be learned first.

Common name	Grasses Scientific or Latin name	Life Span	Season of growth	Grazing response	Growth Form
1. *Alkali sacaton	<i>Sporobolus airoides</i>	P	W	Dec	B
2. *Big bluestem	<i>Andropogon gerardii</i> var. <i>gerardii</i>	P	W	Dec	R
3. *Blowoutgrass	<i>Redfieldia flexuosa</i>	P	W	Dec	R
4. *Blue grama	<i>Bouteloua gracilis</i>	P	W	Inc	B
5. *Bluejoint reedgrass	<i>Calamagrostis canadensis</i>	P	C	Dec	R
6. Bristlegrasses	<i>Setaria</i> spp.	A	W	Inv	B
7. *Buffalograss	<i>Buchloe dactyloides</i>	P	W	Inc	S
8. *Canada wildrye	<i>Elymus canadensis</i>	P	C	Dec	B
9. *Downy brome	<i>Bromus tectorum</i>	A	C	Inv	B
10. *Foxtail barley	<i>Hordeum jubatum</i>	P	C	Inv	B
11. *Green muhly	<i>Muhlenbergia racemosa</i>	P	W	Inc	R
12. *Green needlegrass	<i>Stipa viridula</i>	P	C	Dec	B
13. *Hairy grama	<i>Bouteloua hirsuta</i>	P	W	Inc	B
14. *Indiangrass	<i>Sorghastrum nutans</i>	P	W	Dec	R
15. *Indian ricegrass	<i>Oryzopsis hymenoides</i>	P	C	Dec-Inc	B
16. *Inland saltgrass	<i>Distichlis spicata</i>	P	W	Inc	R
17. *Japanese brome	<i>Bromus japonicus</i>	A	C	Inv	B
18. *Kentucky bluegrass	<i>Poa pratensis</i>	P	C	Inc	R
19. Little barley	<i>Hordeum pusillum</i>	A	C	Inv	B
20. *Little bluestem	<i>Schizachyrium scoparium</i>	P	W	Dec-Inc	B
21. *Needleandthread	<i>Stipa comata</i>	P	C	Dec-Inc	B
22. *Northern reedgrass	<i>Calamagrostis neglecta</i>	P	C	Dec	R
23. *Perennial threeawns	<i>Aristida</i> spp.	P	W	Inc	B
24. *Plains muhly	<i>Muhlenbergia cuspidata</i>	P	W	Dec	B
25. *Plains bluegrass	<i>Poa arida</i>	P	C	Inc	B
26. *Porcupinegrass	<i>Stipa spartea</i>	P	C	Dec	B
27. *Prairie cordgrass	<i>Spartina pectinata</i>	P	W	Dec	R
28. *Prairie dropseed	<i>Sporobolus heterolepis</i>	P	W	Dec	B
29. *Prairie junegrass	<i>Koeleria pyramidata</i>	P	C	Dec	B
30. *Prairie sandreed	<i>Calamovilfa longifolia</i>	P	W	Dec-Inc	R
31. Prairie threeawn	<i>Aristida oligantha</i>	A	W	Inv	B
32. *Purple lovegrass	<i>Eragrostis spectabilis</i>	P	W	Inc	B
33. *Sandberg bluegrass	<i>Poa sandbergii</i>	P	C	Inc	B
34. *Sand bluestem	<i>Andropogon gerardii</i> var. <i>paucipilus</i>	P	W	Dec	R
35. Sandbur	<i>Cenchrus pauciflorus</i>	A	W	Inv	B
36. *Sand dropseed	<i>Sporobolus cryptandrus</i>	P	W	Inc	B
37. *Sandhill muhly	<i>Muhlenbergia pungens</i>	P	W	Inc	R
38. *Sand lovegrass	<i>Eragrostis trichodes</i>	P	W	Dec	B
39. *Sand paspalum	<i>Paspalum stramineum</i>	P	W	Inc	B
40. *Scribner panicum	<i>Dichanthelium oligosanthes</i> var. <i>scribnerianum</i>	P	C	Inc	B
41. *Sideoats grama	<i>Bouteloua curtipendula</i>	P	W	Dec-Inc	R
42. *Sixweeks fescue	<i>Vulpia octoflora</i>	A	C	Inv	B
43. *Slender wheatgrass	<i>Agropyron caninum</i>	P	C	Dec	B
44. Squirreltail	<i>Sitanion hystrix</i>	P	C	Inc	B
45. *Switchgrass	<i>Panicum virgatum</i>	P	W	Dec	R
46. *Tall dropseed	<i>Sporobolus asper</i>	P	W	Inc	B
47. Tumblegrass	<i>Schedonnardus paniculatus</i>	P	W	Inc-Inv	B
48. *Western wheatgrass	<i>Agropyron smithii</i>	P	C	Dec-Inc	R
49. *Wilcox panicum	<i>Dichanthelium oligosanthes</i> var. <i>wilcoxianum</i>	P	C	Inc	B
50. Windmillgrass	<i>Chloris verticillata</i>	P	W	Inv	B

Table 1. Continued

Common name	Forbs Scientific or Latin name	Life Span	Grazing response
1. American deervetch	<i>Lotus purshianus</i>	A	Inv
2. American licorice	<i>Glycyrrhiza lepidota</i>	P	Inc
3. *Annual eriogonum	<i>Eriogonum annuum</i>	A	Inv
4. *Annual sunflowers	<i>Helianthus spp.</i>	A	Inv
5. Baldwin ironweed	<i>Veronia baldwinii</i>	P	Inv
6. Beebalm	<i>Monarda spp.</i>	A	Inv
7. *Black samson	<i>Echinacea angustifolia</i>	P	Dec
8. Bush morningglory	<i>Ipomoea leptophylla</i>	P	Dec
9. Common eveningprimrose	<i>Oenothera biennis</i>	B	Inv
10. *Common ragweed	<i>Ambrosia artemisiifolia</i>	A	Inv
11. Crazyweeds	<i>Oxytropis spp.</i>	P	Inc
12. *Cudweed sagewort	<i>Artemisia ludoviciana</i>	P	Inc
13. *Curlycup gumweed	<i>Grindelia squarrosa</i>	B	Inv
14. *Daisy fleabane	<i>Erigeron strigosus</i>	A	Inv
15. Daleas	<i>Dalea spp.</i>	P	Inc
16. Dandelion	<i>Taraxacum officinale</i>	P	Inv
17. Deathcamas	<i>Zygadenus spp.</i>	P	Inc
18. Falseboneset	<i>Kuhnia eupatorioides</i>	P	Inc
19. *Gayfeathers	<i>Liatris spp.</i>	P	Inc-Dec
20. *Goldenrods	<i>Solidago spp.</i>	P	Inc
21. *Green sageworts	<i>Artemisia spp.</i>	P or B	Inv
22. Greenthread	<i>Thelesperma megapoitamicum</i>	P	Inc
23. Gromwells	<i>Lithospermum spp.</i>	P	Inc
24. Groundcherries	<i>Physalis spp.</i>	P	Inc
25. *Hairy goldaster	<i>Heterotheca villosa</i>	P	Inc
26. Heath aster	<i>Aster ericoides</i>	P	Inc
27. Horsetails	<i>Equisetum spp.</i>	P	Inc
28. Illinois bundleflower	<i>Desmanthus illinoensis</i>	P	Dec
29. Ironplant	<i>Haplopappus spinulosus</i>	P	Inv
30. *Kochia	<i>Kochia scoparia</i>	A	Inv
31. Lambsquarters	<i>Chenopodium album</i>	A	Inv
32. Leafy spurge	<i>Euphorbia esula</i>	P	Inv
33. *Lemon scurfpea	<i>Psoralea lanceolata</i>	P	Inc
34. *Locoweeds or milkvetches	<i>Astragalus spp.</i>	P	Inc-Dec
35. Marestalk	<i>Conyza canadensis</i>	A	Inv
36. Milkweeds	<i>Asclepias spp.</i>	P	Inv-Dec
37. Penstemons	<i>Penstemon spp.</i>	P	Inc
38. Pepperweed	<i>Lepidium densiflorum</i>	A	Inv
39. Pricklypears	<i>Opuntia spp.</i>	P	Inc
40. Pricklypoppy	<i>Argemone intermedia</i>	A	Inv
41. *Purple prairieclover	<i>Petalostemon purpureum</i>	P	Dec
42. Pussytoes	<i>Antennaria spp.</i>	P	Inc
43. *Riddell groundsel	<i>Senecio riddellii</i>	P	Inc
44. Rocky Mountain beeplant	<i>Cleome serrulata</i>	A	Inv
45. Roundhead lespedeza	<i>Lespedeza capitata</i>	P	Inc-Dec
46. Rush skeletonplant	<i>Lygodesmia juncea</i>	P	Inc
47. Russianthistle	<i>Salsola kali</i>	A	Inv
48. *Scarlet gaura	<i>Gaura coccinea</i>	P	Inc
49. Scarlet globemallow	<i>Sphaeraleca coccinea</i>	P	Inc
50. Serrateleaf eveningprimrose	<i>Oenothera serrulata</i>	P	Dec
51. Showy peavine	<i>Lathyrus polymorphus</i>	P	Inc
52. *Silky prairieclover	<i>Petalostemum villosum</i>	P	Inc
53. *Silverleaf scurfpea	<i>Psoralea argophylla</i>	P	Inc
54. *Slimflower scurfpea	<i>Psoralea tenuiflora</i>	P	Inc
55. *Snow-on-the-mountain	<i>Euphorbia marginata</i>	A	Inv
56. *Spiderwort	<i>Tradescantia bracteata</i>	P	Inc
57. *Stiff sunflower	<i>Helianthus rigidus</i>	P	Dec
58. *Tenpetal mentzelia	<i>Mentzelia decapetala</i>	P	Inc
59. *Texas croton	<i>Croton texensis</i>	A	Inv
60. Thistles	<i>Cirsium spp.</i>	P	Inv-Inc

Table 1. Continued

Common name	Forbs Scientific or Latin name	Life Span	Grazing response	
61. Trailing wildbean	<i>Strophostyles helvola</i>	A	Inv	
62. Upright prairiecone-flower	<i>Ratibida columnifera</i>	P	Inc	
63. Verbenas	<i>Verbena spp.</i>	A or P	Inv-Inc	
64. Western ragweed	<i>Ambrosia psilostachya</i>	P	Inc	
65. *White prairieclover	<i>Petalostemon candidum</i>	P	Dec	
66. *Woolly plantain	<i>Plantago patagonica</i>	A	Inv	
67. Woolly white hymenopappus	<i>Hymenopappus tenuifolius</i>	P	Inc	
68. *Yarrows	<i>Achillea spp.</i>	P	Inc	
Common name	Shrubs Scientific or Latin name	Life Span	Grazing response	
1. *Broom snakeweed	<i>Xanthocephalum sarothrae</i>	P	Inc	
2. *Fringed sagewort	<i>Artemisia frigida</i>	P	Inc	
3. Inland ceanothus	<i>Ceanothus ovatus</i>	P	Dec	
4. *Leadplant	<i>Amorpha canescens</i>	P	Dec	
5. Roses	<i>Rosa spp.</i>	P	Inc	
6. *Sand sagebrush	<i>Artemisia filifolia</i>	P	Inc	
7. Skunkbush sumac	<i>Rhus trilobata</i>	P	Inc	
8. *Small soapweed	<i>Yucca glauca</i>	P	Inc	
9. Smooth sumac	<i>Rhus glabra</i>	P	Inc	
10. *Snowberries, buckbrush	<i>Symphoricarpos spp.</i>	P	Inc	
11. Western sandcherry	<i>Prunus besseyi</i>	P	Dec	
Introduced Seeded Pasture and Hay Plants ¹				
		Life Span	Season growth	Growth Form
1. Alfalfa	<i>Medicago sativa</i>	P	W	
2. Alsike clover	<i>Trifolium hybridum</i>	B-P	W	
3. Black medic	<i>Medicago lupulina</i>	A	W	
4. Cicer milkvetch	<i>Astragalus cicer</i>	P	W	
5. Crested wheatgrass	<i>Agropyron cristatum</i>	P	C	B
6. Garrison creeping foxtail	<i>Alopecurus arundinaceus</i>	P	C	R
7. Intermediate wheatgrass	<i>Agropyron intermedium</i>	P	C	R
8. Orchardgrass	<i>Dactylis glomerata</i>	P	C	B
9. Red clover	<i>Trifolium pratense</i>	B-P	W	
10. Redtop	<i>Agrostis stolonifera</i>	P	C	R
11. Reed canarygrass	<i>Phalaris arundinacea</i>	P	C	R
12. Russian wildrye	<i>Elymus junceus</i>	P	C	B
13. Slender wheatgrass	<i>Agropyron trachycaulum</i>	P	C	B
14. Smooth brome	<i>Bromus inermis</i>	P	C	R
15. Tall fescue	<i>Festuca arundinacea</i>	P	C	B
16. Tall wheatgrass	<i>Agropyron elongatum</i>	P	C	B
17. Timothy	<i>Phleum pratense</i>	P	C	B

¹This group of plants are all introduced species that may be found growing in association with native plants. They are important because they can contribute to the productivity of the site for haying or grazing.

Grass-Like Plants (Sedges and Rushes)				
		Life Span	Season growth	Grazing response
1. Sedges	<i>Carex spp. Cyperus spp.</i>	P	C	Dec-Inc
2. *Threadleaf sedge	<i>Carex filifolia</i>	P	C	Inc
3. Needleleaf sedge	<i>Carex eleocharis</i>	P	C	Inc
4. Rushes	<i>Juncus spp.</i>	P	C	Inc

Range sites are given different names if the vegetation differs from the surrounding range in the following ways: (1) kinds of plants; (2) proportions of kinds of plants; and/or (3) total yield of plants. **NOTE**—these conditions are evaluated and standards set on range that has not been disturbed by intensive grazing, farming, or other disturbances which would alter the vegetation. This is often referred to as “climax” or natural vegetation which is considered the highest development of plants for that particular soil and climate. These natural areas or climax vegetation become the “bench mark” or standard by which rangeland is judged. Excellent condition rangelands closely approximate climax vegetation. The farther vegetation deviates from climax vegetation, the lower the range condition class. Study Figure 13 for a better understanding of this concept.

There are 24 range site names recognized in Nebraska. But, in fact, there are 81 range sites, because to complete the range site name the vegetative zone must be added to compensate for the differences in plant communities in range sites across the state. Example: sands, vegetative zone II; sands, vegetative zone III; etc. Figure 14 illustrates the four vegetative zones in Nebraska. Twelve of the most important range site names are illustrated in Figures 2 through 12. Range sites are the basic working units for the science and art of range management. It is important to learn something about the plants, soils, and their interrelationships for these sites. Figure 1 illustrates the position of range sites in relation to one another and to topographic features. By studying this diagram and the photograph of each range site, you can develop a better understanding of where different range sites occur.

Wet Land Site (Figure 2)

This site occurs mainly on level bottom lands or in depressions. The land is somewhat marshy from sub-irrigation. The water table is within three feet (.9m) of the soil surface during most of the year, and is generally above the surface during the early growing season. Soils range from sand to silty clay and in places are limy at the surface. The topsoil is dark and high in organic matter. This site is too wet for cultivated crops but is too dry for common reed and cattails.

Principal forage plants on the wet land site are prairie cordgrass, reedgrasses, reed canarygrass, sedges and rushes. Native forbs make up less than 5 percent of the plant composition. Shrubs, except willows, are uncommon. Invader type vegetation includes foxtail barley, dandelion, and Canada thistle.

Hay production is the most common use of this site. Haying operations often must be delayed until the water table drops and the soil becomes firm enough to support equipment. Interseeding of Garrison creeping foxtail, reed canarygrass, and alsike and red clover is often practiced to increase hay production and quality where soil conditions permit early cutting. Wet land sites are not normally grazed during the

growing season but can be used for fall grazing of aftermath and hay feeding during the winter.

Subirrigated Site (Figures 2 and 3)

This site occurs on nearly level bottom lands, upland basins, foot slopes and stream terraces. The water table is between a depth of 10 to 60 inches (25 to 152 cm) during the major part of the growing season. The soils range from fine sand to silty clay loam in the surface layer and subsoil. In most places, soils are limy at the surface. The surface layer is high in organic matter.

Principal forage plants are big bluestem, switchgrass, indiangrass and prairie cordgrass. Other forage plants common on this site are little bluestem, Canada wildrye, slender wheatgrass, Kentucky bluegrass, green muhly, and sedges. Foxtail barley is a troublesome invader. Undesirable broadleaf plants that tend to invade or increase are western ragweed, American licorice, dandelion, verbenas, and thistles.

The subirrigated site is noted for its high quality bluestem hay. This site can be grazed in the summer every second or third year with satisfactory livestock gains and without damage to the plants or soil.

Saline Subirrigated Site (Figure 4)

This site occurs on nearly level bottom lands, upland basins, foot slopes, and stream terraces. This land has a water table within a depth of 10 to 60 inches (25 to 152 cm) during the major part of the growing season. Soils are strongly saline and/or alkaline near the surface, often appearing as a whitish-gray deposit. Soils vary widely in texture and depth and are often limy in places.

Ground cover varies from barren to a variety of forage plants, depending upon the amount of salt in the soil. Where the salt content is low, many of the same species common to the subirrigated site will grow. Soils that are high in salt content support only salt tolerant plants such as inland saltgrass, alkali sacaton, switchgrass, alkali cordgrass, western wheatgrass, sedges and rushes. Invader type vegetation includes foxtail barley, dandelion, and kochia. These lands are usually grazed rather than hayed. Livestock death loss can result from arrowgrass, a poisonous plant common on this site.

Silty Overflow Site (Figure 5)

This site occurs on bottom lands which receive additional water from periodic overflow or run-in from higher elevations. The water table is more than 60 inches (152 cm) below the surface. The soils range from silty clay loam to silt loam in the surface layer and from very fine sandy loam to clay subsoil.

Principal forage plants on a silty overflow site are big bluestem, switchgrass, sideoats grama, and western wheatgrass. Other forage plants include Kentucky bluegrass, Canada wildrye, indiangrass, green muhly, needleandthread, blue grama, and buffalograss. Low value plants, often associated with range deterioration, include skunkbush sumac, snowberries, western

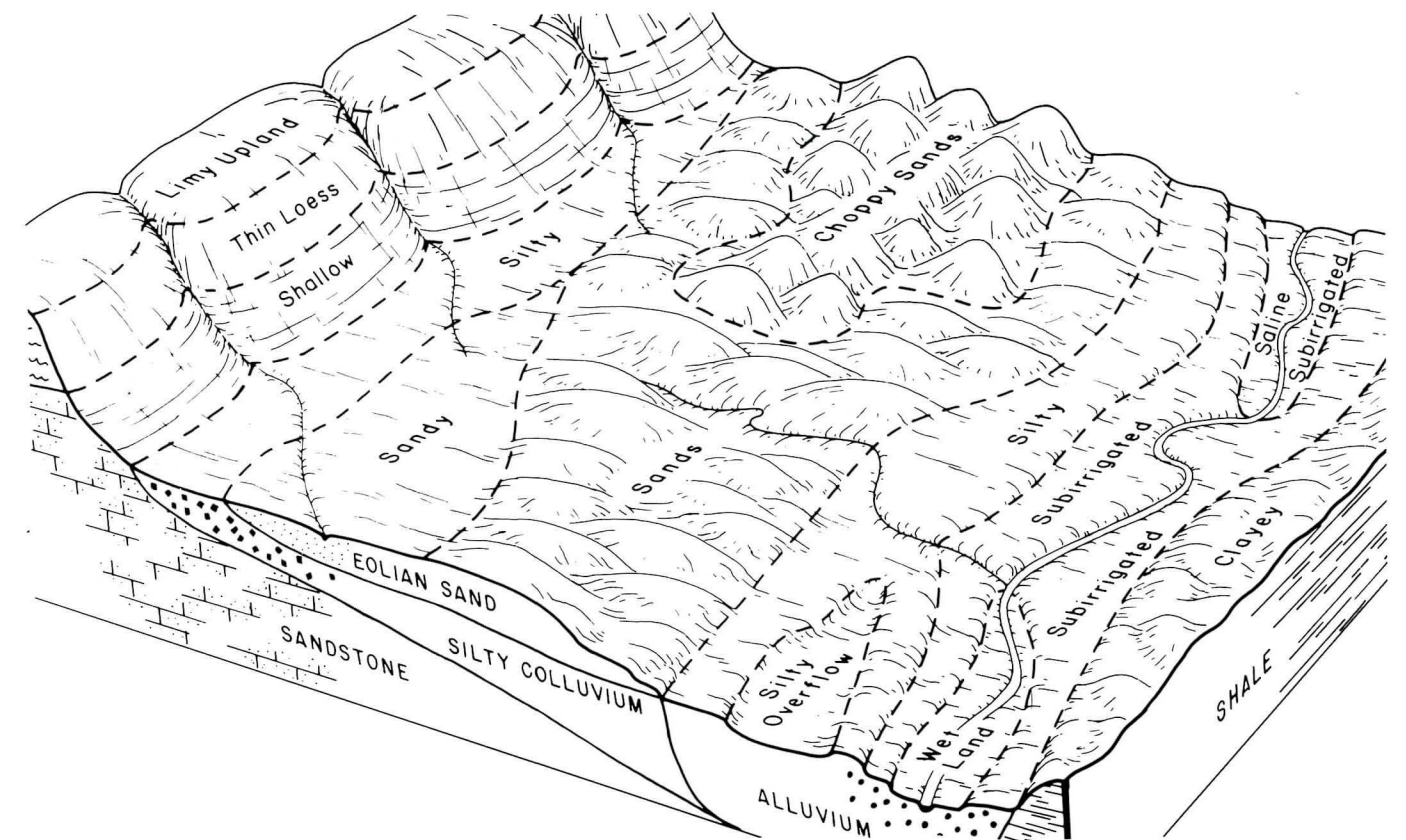


Figure 1. This diagram illustrates the position of range sites in relation to one another and to topographic features.

ragweed, ironweed, annual bromes, and various other annuals.

Forage production for grazing or hay is normally greater for this site than associated range sites because of extra moisture received by overflow or run-in. Hay is commonly cut on overflow pockets. Livestock prefer grazing overflow sites because of the succulence of the forage and easy access. This frequently results in excessive use of these areas in relation to the surrounding vegetation.

Thin Loess Site (Figure 6)

This site occurs on steep to very steep uplands that contain many catsteps and land slips. The soils are deep and have a silt loam surface layer. Subsoils are limy. Thin loess sites are typically on canyon or hill sides associated with the major drainageways south and east of the Sandhills, but are not restricted to these areas. These sites are common in areas where farming predominates on the more level areas and the rougher terrain remains in native grass.

The thin loess site normally occurs in association with silty, limy upland, and silty overflow sites and has essentially the same vegetation as associated with these sites. However, the irregular land relief commonly creates a favorable micro-environment that supports more mid and tall grasses.

Principal forage species are little bluestem, sideoats grama, blue grama, western wheatgrass, big bluestem, and needleandthread. Other important forage plants are switchgrass, prairie sandreed, plains muhly,

threadleaf sedge, prairie junegrass, and Canada wildrye.

Since the thin loess site is rough, and often irregular in shape, good distribution of livestock grazing is difficult. Proper use of this site without over-using the associated sites is always a problem. Since thin loess sites are subject to severe water erosion, care must be taken to prevent overgrazing.

Sands Site (Figure 7)

This site occurs mainly on gentle to rolling upland slopes, but also may be found on stream terraces and bottom lands. The soils are deep, excessively drained and are subject to severe wind erosion when the protective vegetation cover is destroyed. The soils range from loamy sand to sand in the surface layer and from loamy sand to coarse sand in the subsoil. The upper part of the soil profile with dark color due to organic matter is usually less than 6 inches (15 cm) deep. The sands site is the most widespread range site in the Sandhills.

Principal forage plants on a sands site are sand bluestem, little bluestem, prairie sandreed, switchgrass, and needleandthread. Other common forage plants are sand lovegrass, indiangrass, porcupinegrass, prairie junegrass, sand dropseed, blue grama, hairy grama, scribner panicum, sand paspalum, purple lovegrass, Canada wildrye, blowoutgrass, sedges, and leadplant.

Low value plants associated with range deteriora-

tion include sixweeks fescue, lemon scurfpea, green sageworts, woolly plantain, sandhill muhly, prickly-pears, and small soapweed. Sand sagebrush occurs on large acreages of this site in the western Sandhills and in southwest Nebraska.

Sands range sites are used primarily for grazing although some haying is done on these sites where ranches do not have other hay sources. Forage production is moderately stable since moisture penetrates the soil rapidly and is available for longer periods of time than on sandy or silty sites. Weed control is often required for western ragweed, sand sagebrush, green sageworts, and sometimes for small soapweed, roses and leafy spurge. Two poisonous plants, riddell groundsel and lambert crazyweed, are fairly common.

Sandy Site (Figure 8)

This site occurs on nearly level to moderately steep slopes, mainly on uplands but may also occur on stream terraces. Typically, sandy sites occur on dry, flat valleys between choppy or rolling sandhills. The soils are well drained and have fine sandy loam to fine sand in the surface layer, or excessively drained with fine sandy loam to fine sand in the subsoil. The underlying soil material varies widely. The upper 8-12 inches (20-30 cm) off the soil profile is often of darker color due to organic matter accumulation.

Principal forage plants on a sandy site are prairie sandreed, sand bluestem, blue grama, needleandthread, switchgrass, sand dropseed, little bluestem, and sedges. Other common forage plants are western wheatgrass, prairie junegrass, scribner panicum, purple lovegrass, and leadplant. Low value plants associated with range deterioration include western ragweed, common ragweed, sixweeks fescue, annual bromes, woolly plantain, and roses.

Livestock tend to concentrate on this site because of nearly level topography. This frequently causes low range condition. A considerable amount of formerly cultivated "go-back" land is found on sandy sites.

Choppy Sands Site (Figure 9)

This site occurs on very steep, irregular slopes of greater than 20 percent. The soils are deep, loose, excessively drained with a fine sand surface layer and subsoil. Wind erosion and blowouts are common where vegetation is denuded or absent. Narrow ridges and broken surfaces (catsteps) are characteristic of this site. Ground cover and soil profile development is even less than on a sands site. Dark coloring from organic matter in the surface soil is at a minimum and seldom over 2 to 3 inches (5-8 cm) deep.

The vegetation on choppy sands sites is similar to that of the sands site. However, there is an increase of blowoutgrass, lemon scurfpea, hairy grama, and sandhill muhly on unstabilized areas. Shrubs, such as small soapweed and wild roses, are common. Grasses such as blue grama, sand dropseed, and needleandthread are less common than on sands sites.

Preventing blowouts and maintaining good livestock distribution is difficult because of the roughness

of the terrain. Small soapweed may be a problem on this site, but can be controlled by winter grazing.

Silty Site (Figure 10)

This site occurs on nearly level to steep uplands and stream terraces. The soils are well drained but not to the extent of sands and sandy sites. Soil textures range from very fine sandy loam to silty clay loam in the surface layer and subsoil. This is the most common range site outside of the Sandhills region and includes the loess plains and hills south and east of the Sandhills, along the Republican River, and on the upland plains and gentle slopes of southwestern Nebraska and the Panhandle. Since the amount of moisture penetration into the soil is less and the water held unavailable to plants is more, deep rooted grasses on a silty site are somewhat more susceptible to drought than on coarser textured soils.

Principal forage plants on a silty site are blue grama, sideoats grama, needleandthread, threadleaf sedge, and western wheatgrass. Big and little bluestem are very important grasses in the 20 to 24 inches (50 to 61 cm) and higher precipitation zones but are less important in the Nebraska Panhandle and southwest Nebraska. Blue grama, buffalograss, and western wheatgrass tend to dominate on hilltops and areas receiving less than 20 inches (50 cm) of annual precipitation. Other common forage plants are switchgrass, plains muhly, prairie junegrass, sand dropseed, scribner panicum, sandberg bluegrass, and squirreltail.

Common forbs include upright parietaconeflower, dotted gayfeather, scarlet globemallow, goldenrods, and a large number of other species.

Low value plants associated with range deterioration include annual bromes, prairie threawn, perennial threawns, common pricklypear, sixweeks fescue, and woolly plantain.

Most silty sites ideally suited to cultivation have been converted to crop production. However, many smaller units in the southern and eastern part of the state and larger units in the west are still in native grass cover. Many unproductive and eroded croplands on this site have been planted back to a mixture of native grasses.

Limy Upland Site (Figure 6)

This site occurs on nearly level to steep uplands, footslopes, and stream terraces. The soils are deep or moderately deep and range from fine sandy loam to clay loam in the surface layer and subsoil. The soils have an abundance of lime in the surface layer.

The plant community on limy upland sites includes most of the same species found on silty and clayey sites. However, limy upland sites support more little bluestem and sideoats grama and less big bluestem and switchgrass. Principal forage plants are little bluestem, sideoats grama, big bluestem, blue grama, western wheatgrass, plains muhly and needleandthread.

Clayey Site (Figure 11)

This site occurs on nearly level to strongly sloping



Figure 2. Zonation of vegetation showing *wet land* and *subirrigated* range sites near a marshy lake in Arthur County. From the center of photo toward the lower right are the following: (1) marshy lake (non-range) with cattails, bulrushes and reed grasses; (2) narrow zone of wet land range site recently hayed; and (3) subirrigated range site with bales on the ground.



Figure 3. *Subirrigated* range site along Platte River near North Platte showing regrowth of grasses after haying due to water within rooting depth of the plants. Grasses are mostly tall, warm season grasses on this high condition meadow.



Figure 4. *Saline subirrigated* range site near Broadwater showing whitish-gray deposit on the soil surface during the dormant season. The vegetation must be tolerant to the high soil salt content to grow on this site. The principal grasses in this photo are inland saltgrass and alkali sacaton which are highly tolerant to wet, saline/alkaline soil conditions. This site is a poor site because of the soil condition and vegetation present.



Figure 5. *Silty overflow* range site in valley bottom south of North Platte which receives additional water from surrounding hills. Upland areas in photo are primarily *silty* range sites and *limy upland*.

Figure 6. *Thin Loess* range site in Keith County on steep upland showing catsteps and land slips. *Limy upland* range sites are on the gently sloping more stable areas with a denser vegetation cover.



Figure 7. *Sands* range site in Cherry County on rolling terrain. This is the most extensive range site in the Sandhills region.



Figure 10. *Silty* range site in Furnas County which is in low range condition as indicated by the predominance of short grasses, threeawn and thistles. Cultivation is common for these soils on more level terrain.



Figure 8. *Sandy* range site in Holt County showing gently sloping terrain and differences in vegetation cover due to grazing practices. The range on the right side of the fence has been depleted by over use.



Figure 11. *Clayey* range site in Dawes County showing a mixed vegetation of short grasses (buffalograss and blue grama) and mid-grasses (western wheatgrass and green needlegrass) which is typical for this site in western Nebraska. This vegetation is not typical of a clayey site in the eastern part of the state.



Figure 9. *Choppy sands* range site near Dismal River in Thomas County showing steep slopes and loose, sandy soils resulting in irregular soil surface and damage from livestock trampling along fenceline.



Figure 12. *Shallow* range site in Sheridan County showing restricted rooting depth of plants due to underlying soil materials. The vegetation is climax or excellent condition for this site and precipitation zone and is made up of mostly bluestem grasses.

uplands. Soil texture ranges from silt loam to clay in the surface layer and silty clay or clay in the subsoil. Soils are deep but water penetration and movement in the soil is restricted. When wet, soils are sticky but become very hard when dry. Clayey sites in Nebraska occur primarily along the White and Niobrara Rivers in Sioux, Dawes, Sheridan, Keya Paha, and Boyd Counties. Some are also present in Eastern Nebraska.

Principal forage grasses on a clayey site are western wheatgrass, green needlegrass, needleandthread, blue grama, sideoats grama, buffalograss, and prairie junegrass. In the higher precipitation zones, big bluestem, little bluestem, switchgrass, and indiangrass may produce considerable forage. Annual bromes and common pricklypear are often problems on depleted rangeland in western Nebraska.

Limited ground water supplies require special emphasis on reservoirs and dugouts for stockwater. Soils on some clayey sites are high in selenium which can be taken up by certain plants and may be highly toxic to livestock.

Shallow Site (Figure 12)

This site occurs on nearly level to steep uplands. The soils are less than 20 inches (51 cm) deep over underlying material consisting of shale, mixed sand and gravel, limestone, siltstone, or caliche. They have a loamy fine sand to clay surface layer. The effective root zone of plants is restricted to 20 inches (51 cm) or less.

The vegetation varies on shallow sites depending upon soil depth, soil texture, and topographic features. Principal forage plants found on this site include little bluestem, big bluestem, sand bluestem, sideoats grama, blue grama, hairy grama, plains muhly, western wheatgrass, and needleandthread. There may be scattered eastern redcedar and ponderosa pine associated with this site along the Niobrara River and in the Pine Ridge area of Nebraska.

Soils of this site are not adapted to cultivation. Steep terrain, difficult livestock access, and shortage of groundwater for stockwater are common characteristics of this site.

Section III Range Condition

Ecological Basis for Range Condition

Plant succession is an important ecological concept. It is essential to understand this concept if you are to apply ecological principles to rangeland management. Range condition does not become a meaningful term unless you understand the ecological basis for its application.

Climax vegetation is the end product of primary successional processes starting from soil parent material and low plant forms, successively changing over long periods of time to higher plant forms and a better developed soil. This process takes place over an extended period of time usually described as geologic

time. When a certain degree of vegetation stability is attained whereby the plants and soils are somewhat in equilibrium with the climate, the vegetation is described as climax vegetation. Over much of the Great Plains the climax vegetation is grassland. The process just described is called **primary succession**. When climax vegetation is depleted, (over-grazed, drought stress, tilled, etc.) the process whereby it changes back toward climax vegetation is called **secondary succession** (see Figure 13). In range management, we are primarily concerned with secondary succession.

Climax vegetation is used as a standard in applying the concept of range condition to range management. Determining range condition then becomes a technique of estimating how far the vegetation of a particular range site deviates from climax grassland vegetation. A percentage value is assigned that indicates the percentage of climax vegetation. Range condition declines as the abundance of climax plants decline on a particular range site. It follows then, that the more climax plants present, the higher the range condition. The concept of range condition is of value to range management because climax plants are often the most productive vegetation for grazing use. Consequently, levels of range condition are highly correlated with potential livestock production.

Management and/or weather related changes that take place in the composition of vegetation can be described by two terms. If the vegetation is changing from high range condition (climax vegetation) to a lower condition class, it is called **regression**. If it is changing from poor condition to a higher condition class, it is called **secondary plant succession**. Improvement in range condition depends upon the processes of plant succession.

Two ecological principles have been used to describe forces that take place in nature. Recognizing and understanding these can explain a lot about ecology and how it applies to range management.

1. "Nature does not permit a vacuum" (areas devoid of plant life). This says that some kind of plant life will be growing on a site—what it is depends on how we treat the land. The vegetation can vary from climax grassland to weedy plants. We can influence what it will be by our grazing management.

2. "Nature is always trying to put back the original vegetation (climax vegetation)." This will happen providing we help the process by applying sound management practices. Plant succession will change the vegetation to the desired high condition range or climax vegetation over a period of time, providing the vegetation has not been completely destroyed.

An understanding of these ecological principles will help explain why range vegetation will respond favorably to good range management.

The vegetation of any range site can change, depending on how it is grazed. These changes are in the kinds and amounts of plants present. Range condition is often referred to as range health. If vigorous, productive, palatable plants are present on a particular range site, then that range is in high range condition or in a good state of health. Most of these plants

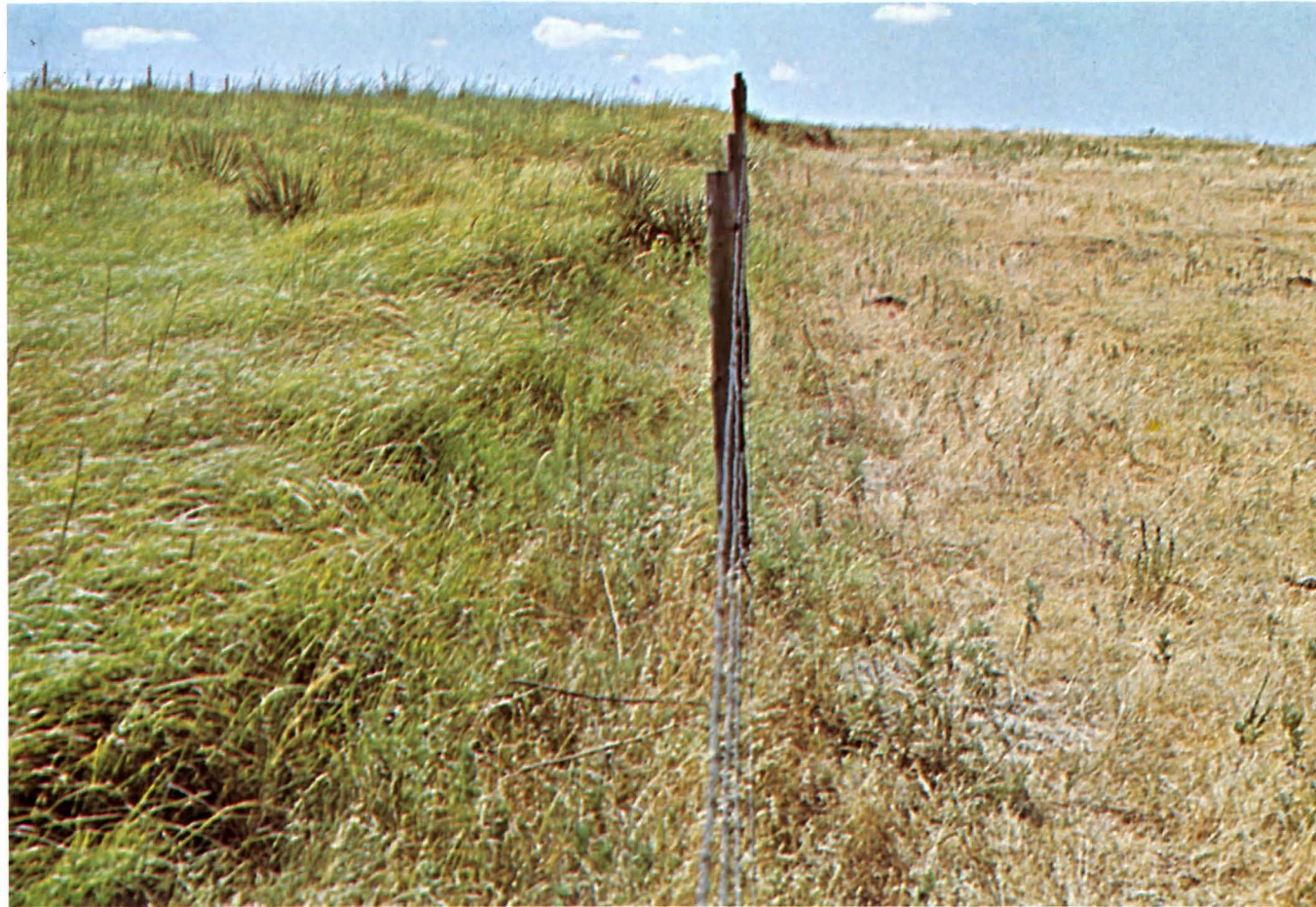


Figure 13. Contrasting vegetation separated by only a fence line is a common sight on rangeland. This represents a difference in use over many years. Vegetation on the left has not been grazed to any extent since homestead days and consists primarily of tall grasses such as big bluestem, indiagrass, and other high producing, palatable grasses. It represents an area that is the highest expression of vegetation for that soil type and climate. This is called "climax vegetation" and corresponds to excellent condition range. Without these areas that have not been altered by grazing it would be difficult to know the potential production and composition for a particular range site. Vegetation on the right has been changed by excessive grazing and poor range management to a different vegetation composition and a much lower level of productiveness. The vegetation consists of short grasses (blue grama, buffalograss), annual brome, and numerous weedy plants. It is in fair to poor range condition. It is not possible to manage rangeland to maintain the lush vegetation as illustrated on the left side of this photo; but it is not necessary to be satisfied with the production and composition illustrated on the right. Proper range management can make a difference. The soils and rainfall are the same for both sides of the fence—only grazing management is different.

would be of the "decreaser" group (see plant list, Table 1, and definitions). If weedy, low producing, unpalatable plants are present for this same range site, then that range is in poor condition or a low state of health. These plants would be primarily "invaders" and some "increasers." Study Figure 13 as an example of how the production, ground cover, and appearance of an excellent condition range contrasts with fair to poor condition range.

Four categories are used to describe range condition. The percent condition is used to indicate the amount of vegetation considered climax vegetation for this site.

1. Excellent: 76-100% condition.
2. Good: 51-75% condition.
3. Fair: 26-50% condition.
4. Poor: 0-25% condition.

Determining Range Condition

The procedures for determining range condition follow guidelines used by the Soil Conservation Service. To determine range condition, the following procedures and information must be known or be available.

1. Identify and list the plants that are present (see plant list and characteristics, Table 1).
2. Name the range site which is being considered (see range site descriptions).
3. Determine the percent of each plant which can be counted toward the condition class from Tables 2-5. Be sure to use the proper precipitation zone for the range site you have identified (see Figure 14 for proper vegetative zone).

A work sheet for determining range condition is provided at the back of the circular which shows the steps necessary to arrive at a range condition rating.

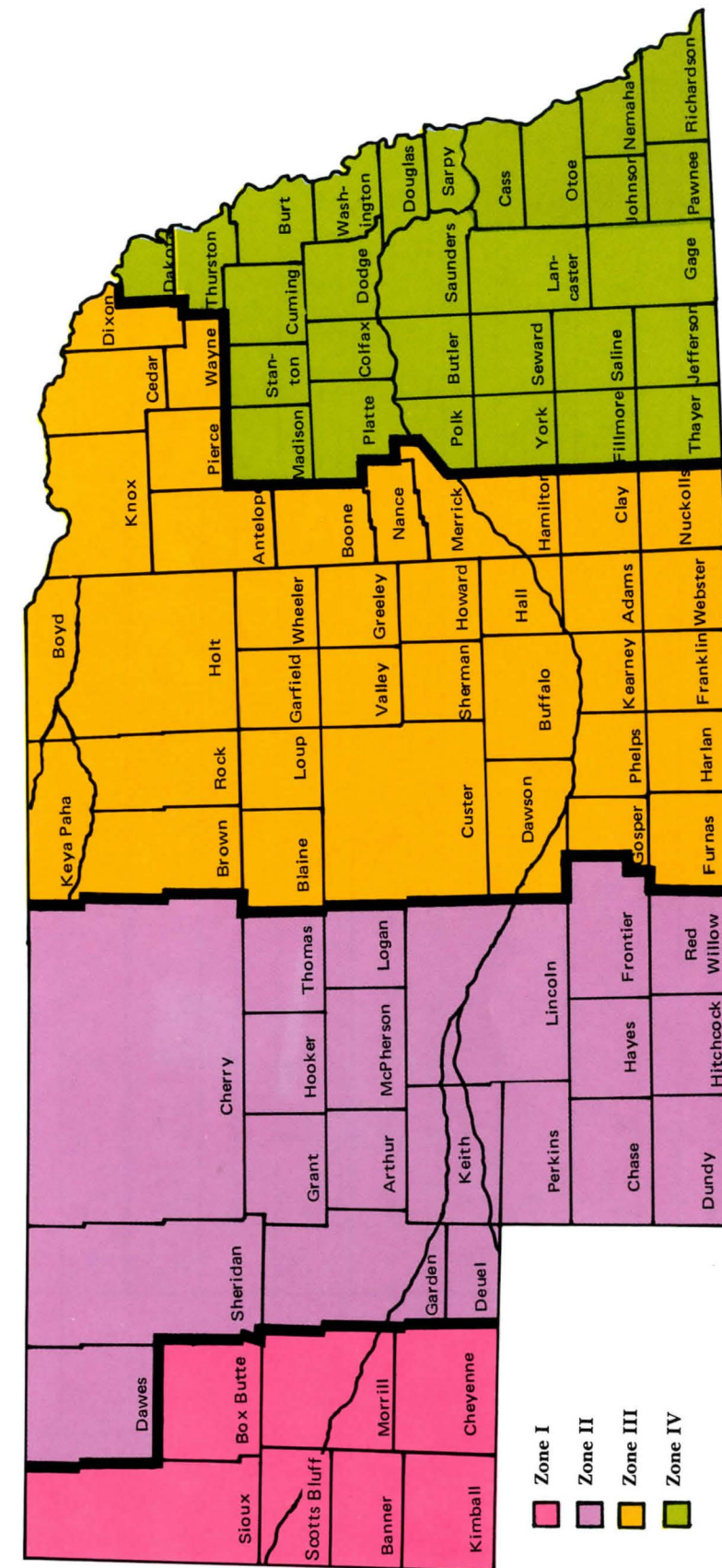


Figure 14. Nebraska vegetative zone map used for determining range condition (adapted from USDA-Soil Conservation Service map). Precipitation increases from west (Zone I, 14-16") to east (Zone IV, 30-34") which has an effect on the vegetation. A particular range site that occurs in different zones will differ in the potential production and composition. This makes it necessary to consider the proper vegetative zone when determining range condition.

Table 2. Guide for determining range condition (Zone I).

Maximum Percent in Climax by Range Sites

	Wet Land	Subirrigated	Saline Subirrigated	Silty Overflow	Sandy	Sands	Choppy Sands	Clayey	Silty	Limy Upland	Shallow
GRASSES:											
Alkali sacaton			45	10					5	5	5
Big bluestem		25									
Blowoutgrass			5	15	20	15	5	20	25	35	30
Blue grama											
Bluejoint reedgrass	15										
Buffalograss			5	5				10	10	15	10
Foxtail barley	5	5	10								
Green muhly	5	5									
Green needlegrass				5				20	10	5	5
Hairy grama						5	10			5	5
Indian ricegrass					10	5					
Indiangrass		20					5				
Inland saltgrass			20								
Little bluestem		30	5	10	15	20	15		5	20	20
Needleandthread		10		20	20	20	15		30	20	15
Northern reedgrass	15										
Perennial threeawn					5	5			5		5
Plains bluegrass	10	5	15						5	15	5
Plains muhly					5				5		
Prairie cordgrass	60	20									
Prairie junegrass		5		5	5	5	5		5	10	5
Prairie sandreed					35	40	35			10	5
Reed canarygrass	5	5									
Sand bluestem					15	25	30				5
Sand dropseed			10	5	5	10	5	5	5	5	
Sand lovegrass						5	10				
Sand paspalum					5	5	5				
Sandberg bluegrass				5				5	5	5	5
Sandhill muhly							5				
Scribner panicum		5			5	5	5				
Sideoats grama		5		5	5				5	20	10
Slender wheatgrass	10	5	10								
Switchgrass		10	5		5	10	15				
Western wheatgrass		5	20	35	5			60	25	15	15
Other Perennial Native Grasses	5	5	5	5	10	10	10	5	10	10	10
GRASSLIKE:											
Sedge Family (other)	15	10	15	5	5	5	5	5	5	5	5
Threadleaf sedge				10	10			10	10	15	15
FORBS:											
Native Perennial Forbs	5	10	5	10	10	10	10	10	10	15	10
SHRUBS:											
Native Shrubs		5			5	5	10	5	10	10	5

Table 3. Guide for determining range condition (Zone II).

Maximum Percent in Climax by Range Sites

	Wet Land	Subirrigated	Saline Subirrigated	Silty Overflow	Sandy	Sands	Choppy Sands	Clayey	Silty	Limy Upland	Shallow	Thin Loess
GRASSES:												
Alkali sacaton			35	25					5	15	15	15
Big bluestem		35										
Blowoutgrass							10	5	15	15	15	15
Blue grama			5	10	15	15	10	20	20	25	20	10
Bluejoint reedgrass	15											
Buffalograss			5	5								
Foxtail barley	5	5	5									
Green muhly	5	5										
Green needlegrass												
Hairy grama						5	5	5	15	10	5	10
Indian ricegrass												
Indiangrass					5	5						
Inland saltgrass		20			5	5	10		5	5	5	
Kentucky bluegrass			15									
Little bluestem		5	5	5								5
Needleandthread												
Northern reedgrass	15	10										
Perennial threeawn												
Plains bluegrass	10	5	10									
Plains muhly												
Porcupinegrass												
Prairie cordgrass	45	15										
Prairie junegrass		5		5	5	5	5		5	5	5	5
Prairie sandreed					30	35	30					10
Purple lovegrass		5			5	5						
Reed canarygrass	5	5										
Sand bluestem					30	40	35				15	
Sand dropseed					5	5	5	5	5	5	5	5
Sand lovegrass					5	10	15					
Sand paspalum					5	5	5					
Sandberg bluegrass												
Sandhill muhly												
Scribner panicum		5			5	5	5					
Sideoats grama		10										
Slender wheatgrass	10	5	10									
Switchgrass		15	15	10	10	15	20		5	5		
Western wheatgrass		5	15	40	5			50	20	15	10	10
Other Perennial Native Grasses	10	10	10	10	10	10	10	10	10	10	10	10
GRASSLIKE:												
Sedge Family (other)	15	10	15	5	5	5	5	5	5	5	5	5
Threadleaf sedge				10				10	10	10	10	10
FORBS:												
Native Perennial Forbs	5	10	5	10	10	10	10	10	10	10	10	10
SHRUBS:												
Native Shrubs		5			5	5	10	5	10	10	10	10

Table 4. Guide for determining range condition (Zone III).

Maximum Percent in Climax by Range Sites

	Wet Land	Subirrigated	Saline Subirrigated	Silty Overflow	Sandy	Sands	Choppy Sands	Clayey	Silty	Limy Upland	Shallow	Thin Loess
GRASSES:												
Alkali sacaton			25									
Big bluestem		40		35				20	25	30	20	20
Blowoutgrass							10					
Blue grama			5		10	10	5	10	10	10	5	5
Bluejoint reedgrass	20											
Buffalograss								5	5	5		
Foxtail barley	5	5	5									
Green muhly	5	5										
Green needlegrass				5				10	5	5	20	
Hairy grama					5	5	5			5		5
Indiangrass		20		10	5	5	10	5	10	10		5
Inland saltgrass			10									
Kentucky bluegrass		5	10	5	5			5	5	5		5
Little bluestem		25		25	25	25	25	25	25	30	15	35
Needleandthread		5			15	10	10	10	10	10	10	5
Northern reedgrass	20											
Perennial threeawn					5				5		5	
Plains bluegrass	10	5	10									
Plains muhly								5	5	5		10
Porcupinegrass		5			5	10	10	5	5	5		5
Prairie cordgrass	40	10										
Prairie junegrass		5		5	5	5	5	5	5	5		5
Prairie sandreed					25	30	25			5		5
Purple lovegrass		5			5	5				5		5
Reed canarygrass	5	5										
Sand bluestem					35	35	40					
Sand dropseed			5		5	5	5	5	5			
Sand lovegrass					10	15	20					
Sand paspalum					5	5	5					
Sandberg bluegrass										5		
Sandhill muhly						5	10					
Scribner panicum		5		5	5	5	5	5	5	5	5	5
Sideoats grama		10		10	5	5	5	10	15	15	20	20
Slender wheatgrass	10	5	10	15	15	20	25	5	10	5		5
Switchgrass		15	15	15	15	20	25					
Western wheatgrass		5	15	25	5			30	15	10	5	5
Other Perennial Native Grasses	10	10	10	10	10	10	10	10	10	10	5	10
GRASSLIKE:												
Sedge Family (other)	15	10	15	10	5	5	5	5	10	5	5	5
Threadleaf sedge										10	15	10
FORBS:												
Native Perennial Forbs	5	10	5	5	10	10	5	10	10	10	10	10
SHRUBS:												
Native Shrubs		5		5	5	5	5	10	10	10	5	10

Table 5. Guide for determining range condition (Zone IV).

Maximum Percent in Climax by Range Sites

	Wet Land	Subirrigated	Saline Subirrigated	Silty Overflow	Sandy	Sands	Clayey	Silty	Limy Upland	Shallow	Thin Loess
GRASSES:											
Big bluestem		45		50							
Blue grama			10		5	5	35	35	35	30	25
Bluejoint reedgrass	20						5	5	5	5	
Foxtail barley	5	5	5								
Green muhly	5	5									
Hairy grama							5		5	5	5
Indiangrass		20		10	10	10	10	10	10	10	10
Inland saltgrass			10								
Kentucky bluegrass		5	10	5	5	5	5	5	5	5	5
Little bluestem		20		20	25	20	30	30	40	35	30
Northern reedgrass	20										
Plains bluegrass	10	5	10								
Porcupinegrass		5			10	15	10	15	10		5
Prairie cordgrass	25	10									
Prairie dropseed							5	5			
Prairie junegrass		5		5	5	5	5	5	5	5	5
Prairie sandreed					15	20					
Purple lovegrass		5			5	5	5	5		5	
Reed canarygrass	5	5									
Sand bluestem											
Sand dropseed					5	5					
Sand lovegrass					10	10					
Sand paspalum					5	5					
Scribner panicum		5		5	5	5	5	5	5	5	5
Sideoats grama		10		5	5	5	5	10	10	10	10
Slender wheatgrass	15	5	10								
Switchgrass		10	15	15	10	15	10	10	10	10	5
Tall dropseed				5			10	5	5	5	5
Western wheatgrass		5	25	15				5	5	5	5
Other Perennial Native Grasses	10	10	10	10	10	10	10	10	10	10	10
GRASSLIKE:											
Sedge Family (other)	15	10	15	10	5	5	5	10	5	5	5
FORBS:											
Native Perennial Forbs	5	10	5	10	10	10	10	10	10	10	10
SHRUBS:											
Native Shrubs		5		5	5	5	10	10	10	5	10

Section IV Degree of Use

To remain productive, rangeland must receive the proper degree of use each grazing season. This means that the correct amount of forage should be grazed—not too little and not too much. If range is grazed too intensively for an extended period of time, range condition is lowered and production reduced. On the other hand, if the available forage is not used, the potential benefits of grazing capacity and animal gains are wasted. A proper degree of use is accomplished by grazing the proper number of livestock on a given pasture for the right number of days. The proper degree of use may vary according to the time of year, weather conditions, range condition, and system of grazing.

Key species are often designated for a particular range site. These species serve as indicators of grazing use and are watched more closely than the total vegetation to indicate whether the proper degree of use is being achieved. If range improvement is a primary goal because the range condition is low, the degree of use on the key species should be monitored closely to make sure that over utilization does not occur and range recovery can take place. For example, sand bluestem and little bluestem could be designated as key species for a sands range site and watched closely for degree of use to insure that over utilization was not occurring.

Table 6 lists different classes of use and describes the appearance of each. Full use is considered proper use when range is in high range condition. Less than full use may be desirable when range improvement is planned.

Table 6. Description of degree of use classes. Degree of use is based on the current year forage production for the entire pasture. The primary forage species or "key species" are the main forage on that range site in their present class of range condition.

Unused	No livestock use evident.
Slight	Practically undisturbed. Only select areas and the most palatable plants grazed. Less than 20% of the primary forage plants or "key species" grazed.
Moderate	Most of the range being grazed with little or no use of poor forage plants, with 21 to 40% of primary forage plants or "key species" grazed.
Full	All accessible areas are grazed with little or no use of poor forage plants, with 41-60% of the primary forage plants or "key species" grazed. Closely used areas are less than 10% of the pasture area.
Close	All accessible range grazed with major areas closely grazed. Livestock forced to use much poor forage, with 61-80% use of primary forage plants or "key species" grazed.
Severe	Primary forage plants of "key species" almost completely used and the poor forage plants carrying the grazing load, with 81-100% of the primary forage plants grazed. Trampling damage widespread in accessible areas.
Extreme	Range appears stripped of vegetation, including poor forage plants. Livestock forced to trail great distances for forage.

Section V Ranch Plan for Range Improvement

Grazing capacity and income can be greatly influenced by using a range management plan that will make the best use of available resources.

Knowledge of range plants, range sites, range condition, and other points discussed in this circular is of little value to the livestock producer unless it can be applied for better range management. Every ranch can benefit from an inventory of resources and a sound range plan. One of the easiest ways to identify and plan for range improvement is to make a range map. Every complete range plan should answer three questions: (1) what are the present resources and problems; (2) what alternative ways are there to solve the problems; and (3) what is the best alternative and most practical ranch plan. A good range map can help answer these questions.

Figure 15 is a sample range plan which shows several conditions that could be improved. The management practices considered the most practical are listed below the map. Note that these practices correspond to the alternatives listed on the sample scorecard.

In range judging, the range plan can test your knowledge in applying some of the practical aspects learned about range management from this circular.

Section VI Questions on Range Management

To evaluate the knowledge acquired from this circular and from participating in range judging contests, a simple written test is suggested as part of range judging contests. These questions can be in place of the ranch plan (Section V) or as an additional part of the contest. These questions will be developed by the contest committee from the material covered in this circular. The questions can be given to all contestants or only to the adult and professional categories. Up to 10 questions are suggested, either true or false or multiple choice, which can be answered as a single letter or number in the spaces provided on the scorecard.

Examples of the type of questions that could be used are:

1. "Climax Vegetation" and poor condition range are comparable. Answer = False.
2. Blue grama is a cool season grass. Answer = False.
3. There are several scientific names for a single plant. Answer = False.
4. Choppy sands range sites are on steeper slopes than sandy range sites. Answer = True.
5. "Full use" is: A. overgrazing, B. proper use, C. undergrazing. Answer = B.
6. Range sites differ in: A. yield, B. kinds of plants, C. proportion of kinds of plants, D. all of these, E. none of these. Answer = D.

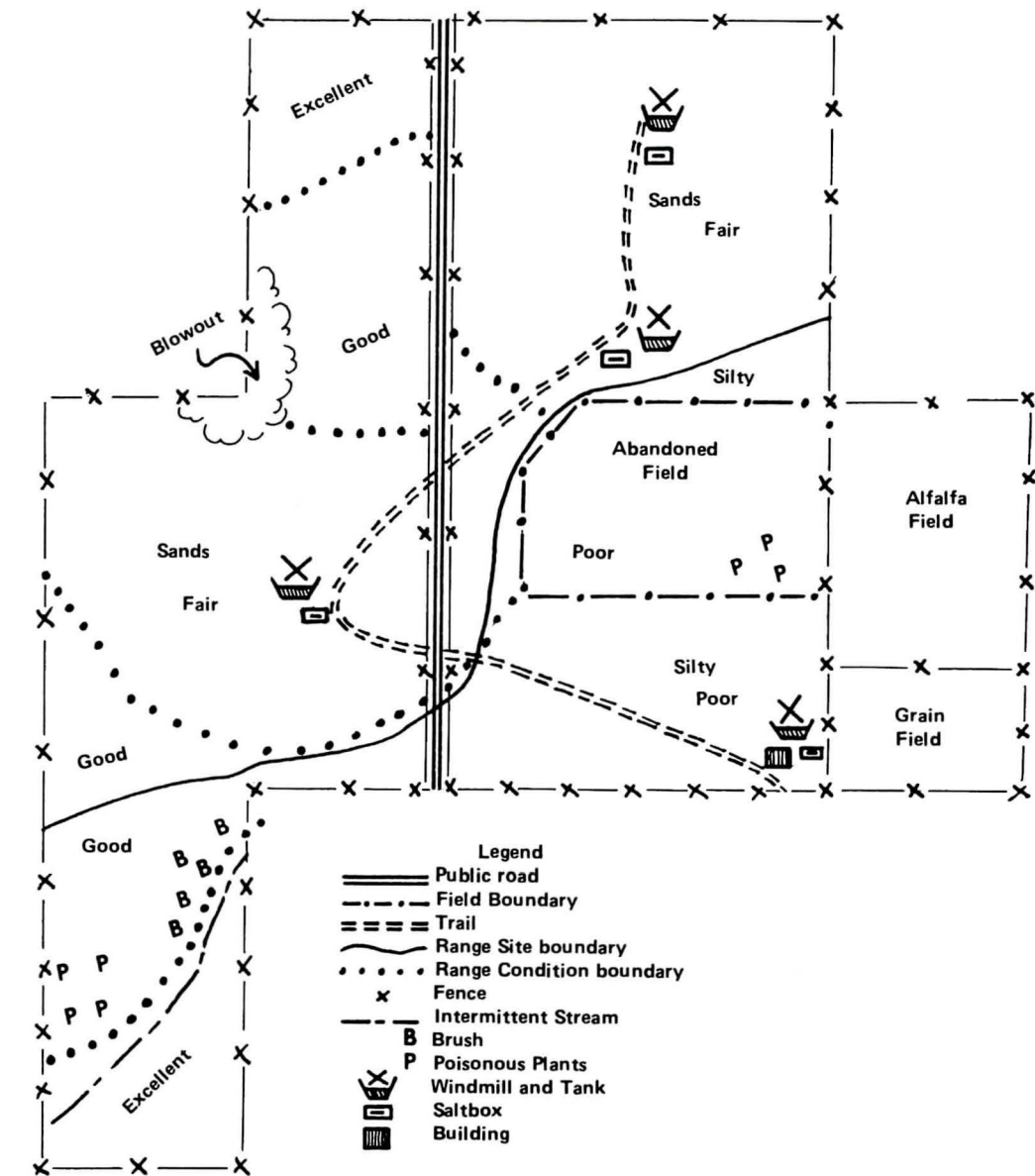


Figure 15. Example of range map and suggested range improvements which can be used in range judging contests. See Section V. Ranch is 2640 A, grazed with 475 yearling steers from June 1-Oct. 1. Total Animal Unit Months (AUM) of range forage = 1240. One yearling steer = .65 AUM.

Suggested improvement practices from scorecard:

1. Keep stocking rate the same.
2. Build livestock dam.
3. Install well.
4. Divide pasture (cross fence) and defer part of the growing season.
5. Change salt locations.
6. Reseed specific areas and defer 2 or more growing seasons.
7. Control blowout and defer 2 or more growing seasons.
8. Control brush and poisonous plants and defer for one growing season.

7. If little bluestem, sand bluestem and blue grama contribute equally to the total production of a Sands Range Site (Vegetation Zone I), the condition class would be: A. excellent, B. good, C. fair, D. poor. Answer = B.

8. The process by which range changes from poor condition to good condition due to good grazing management is called: A. regression, B. ecology, C. range planning, D. secondary plant succession. Answer = D.

9. Sand sagebrush is a forb. Answer = False.

10. Overgrazed range is used as the standard for judging range condition. Answer = False.

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1. Johnson, James R. and James T. Nichols. 1982. Plants of South Dakota Grasslands, A Photographic Study. Agr. Exp. Sta. Bull. 566. South Dakota State University, Brookings.
2. Lommasson, Robert C. 1973. Nebraska Wildflowers. Univ. of Nebraska Press. Lincoln.
3. Phillips Petroleum Company. 1963. Pasture and Range Plants. Bartlesville, Oklahoma.

4. Stubbendieck, J., James T. Nichols, and Kelly K. Roberts. 1985. Nebraska Range and Pasture Grasses. Univ. of Nebraska Ext. Ser. Pub. E.C. 85-170, Lincoln.
5. Stubbendieck, J., Stephan L. Hatch, and Kathie J. Kjar. 1982. North American Range Plants. Univ. of Nebraska Press. Lincoln. 464p.

Publications for Further Study of Range Management

1. Bell, Hershel M. 1973. Rangeland Management for Livestock Production. Univ. of Okla. Press, 1005 Aspen Ave., Norman Okla. 303p.
2. Heady, Harold F. 1975. Rangeland Management. McGraw-Hill Book Co., Box 402 Hightstown, N.J. 460p.
3. Stubbendieck, J. and Patrick E. Reece. 1985. Nebraska Handbook of Range Management. Univ. of Nebraska Ext. Ser. Pub. E.C. 85-131. Lincoln.
4. Stoddart, Laurence A., Arthur D. Smith, and Thadis W. Box. 1975. Range Management. McGraw-Hill Book Co., Box 402 Hightstown, N.J. 532p.
5. Vallentine, John F. 1980. Range Development and Improvements. Brigham Young Univ. Press, Provo, Utah 545p.

Work Sheet for Determining Range Condition

<i>Range Site _____</i>	<i>Percent of each species in total forage yield</i>	<i>Percent allowed toward condition score (from Tables 2 through 5)</i>	<i>Percent applied toward condition</i>
<i>Vegetative Zone _____</i>			
<i>List of plants present</i>			
TOTAL			

Excellent = 76-100% Good = 51-75% Fair = 26-50% Poor = 0-25%

Total possible points* _____

Contestants number _____

RANGE JUDGING CARD I—PLANT IDENTIFICATION

Points lost _____

Contestants Name _____

Score _____

Plant Characteristics (1 point for each correct answer)

Plant Names (5 points for each complete and correct name)	A Life Form	B Life Span	C Season of Growth	D Grazing Response	E Other Characteristics
	1 = Grass 2 = Forb 3 = Grass-like 4 = Shrub	1 = Annual 2 = Biennial 3 = Perennial	1 = Cool Season 2 = Warm Season	1 = Decreaser 2 = Increaser 3 = Invader	1 = Introduced 2 = Native 3 = Bunch 4 = Stoliferous 5 = Rhizomatous
Place the number for the appropriate terms from above in the space below for each plant identified. For columns A, B, C, & D, use only one (1) number for each blank. For column E use as many as apply.					
Example—Big bluestem	1	3	2	1	2, 5
Station 1					
1					
2					
3					
4					
5					
6					
Station 2					
7					
8					
9					
10					
11					
12					
Station 3					
13					
14					
15					
16					
17					
18					
Station 4					
19					
20					
21					
22					
23					
24					

*Total possible points for Card I determined by field contest officials for official grading of scorecards only.

RANGE JUDGING CARD II—RANGE SITES, RANCH MAP AND RANGE QUESTIONS

Contestant Number _____

Total possible points* _____

Contestant's Name _____

Points lost _____

Score _____

Note: See back side of card for Range Site, Range Condition and Degree of Use information.

Station 5—Range Site

Range Site Name _____ (20 points)	
Range Condition (Percent) _____ (20 points)	
Degree of Use (Percent) _____ (10 points)	

Station 6—Range Site

Range Site Name _____ (20 points)	
Range Condition (Percent) _____ (20 points)	
Degree of Use (Percent) _____ (10 points)	

Station 7—Range Site

Range Site Name _____ (20 points)	
Range Condition (Percent) _____ (20 points)	
Degree of Use (Percent) _____ (10 points)	

Station 8—Ranch Map

Part 1. For proper stocking rate: Decrease stocking rate _____ (check one—20 points)			
Increase stocking rate _____			
Keep stocking rate the same _____			
Part 2. For more uniform use and range improvement check as many as apply (5 points for each correct answer). Total possible points* _____	Part 3. Check the appropriate deferment practice pertaining to the range improvement on the left (5 points for each correct answer). Total possible points* _____		
	Defer part of growing season	Defer one full growing season	Defer two or more growing seasons
a. Install or relocate well or pipeline			
b. Build livestock dam or dugout			
c. Relocate fence			
d. Divide pasture (cross fence)			
e. Change salting locations			
f. Reseed specific areas			
g. Control blowouts			
h. Control brush or weeds			
i. Initiate planned grazing system			
j. Initiate none of the above			

Station 9—Questions on Range

Questions will be handed out at Contest Site (5 points for each correct answer).									
Question									
1	2	3	4	5	6	7	8	9	10

*Total possible points for Card II determined by field contest officials for official grading of scorecards only. For parts 2 & 3 the points lost by a contestant cannot exceed the total possible points for that part.

Range Site Descriptions

1. WET LAND—Poorly drained. Water table within 36 inches of soil surface.
2. SUBIRRIGATED—Water table within 10-60 inches of surface during major part of growing season.
3. SALINE SUBIRRIGATED—Subirrigated lands affected by salt accumulations.
4. SILTY OVERFLOW—Receive additional water from stream overflow or run-in.
5. SANDS—Loamy sands and sands on nearly level to rolling slopes.
6. SANDY—Fine sandy loams to loamy sands on nearly level to gently rolling slopes.
7. SILTY—Loams, silt loess, and silts on nearly level to rolling slopes.
8. CLAYEY—Clay loams, silty clay loams, and clays.
9. CHOPPY SANDS—Sands on steep, irregular slopes.
10. LIMY UPLAND—Sandy loams, silt loams, loams and silty clay loams. Calcareous (limy) in the surface soil.
11. SHALLOW—All soils 0-20 inches deep over rock, shale, or coarse gravel.
12. THIN LOESS—Silt loam on very steep, rough broken slopes.

Range Conditions

1. EXCELLENT—76-100% climax vegetation, mostly decreaser plants.
2. GOOD—51-75% climax vegetation, some decreaser plants with increaser plants more common.
3. FAIR—26-50% climax vegetation, mostly increaser plants, some invaders.
4. POOR—0-25% climax vegetation, mostly low growing plants and invaders.

Degree of Use

1. UNUSED—No livestock use.
2. SLIGHT—1 to 20% of primary forage plants grazed. Practically undisturbed.
3. MODERATE—21 to 40% use of primary forage plants. Most of the range being grazed. Little or no use of poor plants.
4. FULL—41 to 60% use of primary forage plants. All of the range being grazed. Little or no use of poor plants.
5. CLOSE—61 to 80% use of primary forage plants. All of the range shows use and major sections are closely grazed. Some use of low value plants.
6. SEVERE—81 to 100% use of primary forage plants. Low value plants carrying the grazing load.
7. EXTREME—Appears stripped of all vegetation.

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