

# The National Rangeland Judging Contest

## Judging Rangeland for Livestock and Wildlife Values

*9<sup>th</sup> Edition*

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## INTRODUCTION

Rangeland is a kind of land, not a land use, on which the native vegetation is predominately herbaceous plants and shrubs. Rangeland is the most extensive kind of land in the world, comprising more than 47 percent of the earth's land surface. In the contiguous 48 states, rangeland makes up 45 percent of the land surface. Although some of Oklahoma's rangelands have been destroyed by farming or conversion to introduced plants, 40 percent of the state (more than 17 million acres) remains in native rangeland, making it the most extensive kind of land in the state.

The rangeland **ecosystem**\* is characterized by many organisms. Mixtures of native **grasses, forbs** or **shrubs** exist as unique native **plant communities**. These plant communities include tallgrass prairie, shortgrass prairie, mixed grass prairie, sandsage grassland, shinnery oak grassland, mesquite grassland and cross timbers. The cross timbers is a mixture of vegetation that includes post oak and blackjack oak forests, oak **mottes** and oak **savannas** interspersed with tallgrass prairie. Many plants that occur in rangeland also occur in the forests of eastern Oklahoma in forest openings or in the forest understory.

Rangeland provides habitat for many native plants and animals as well as domestic livestock. Rangeland provides **biological diversity**, high quality watersheds and scenic vistas. Rangeland is the major contributor to Oklahoma's multi-billion dollar-a-year livestock industry and billion dollar-a-year recreational industry.

Oklahoma is the third most botanically diverse state in the contiguous 48 states. Native vascular plant communities contain more than 2,600 species, 824 genera and 154 families. Animal diversity is also high with more than 735 species of vertebrates and countless invertebrates. This biological diversity is the result of thousands of years of interactions among precipitation, temperature, elevation, topography, soils, herbivory, fire and Native Americans. Relocation of Native Americans and settlement by Europeans during the past 170 years has significantly altered historical landscape patterns and biological diversity in Oklahoma.

## HISTORY OF THE NATIONAL CONTEST

Oklahoma has the distinction of having hosted the National Rangeland Judging Contest annually since 1955. Thousands of youth and young adults qualify for the National Contest by participating in local, regional, and state contests throughout the country. Traditionally the contest has only considered managing cattle on rangeland and introduced pasture. However, this manual, *Judging Rangeland for Livestock and Wildlife Values*, initiates a more realistic, contemporary and scientifically based view of rangeland ecosystems.

## PHILOSOPHY AND OBJECTIVES

As greater pressure is placed on our limited natural resources by a growing human population desiring a higher standard of living, stewardship of the land must not be overlooked. A part of **land stewardship** is conserving and restoring native plant communities, ecosystems and **landscapes**. Managing the total ecosystem rather than one or two parts is complicated and offers a great challenge to our society.

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\* Words in boldface are defined in the Glossary of Terms on page 37.

Within the ecosystem, the key components are physical attributes such as **biotic** and **abiotic components** (structure) and processes, such as **energy flow** and **nutrient cycling** (function). When an ecosystem is healthy, its components are intact, sustainable and available for future generations to use.

Since the **extirpation** of bison, prairie dogs, elk, and antelope, and the associated suppression of fire, natural ecosystems have declined in health (i.e., biological diversity); we can begin to restore rangeland ecosystems to their former biological diversity by restoring fire and grazing/browsing animals to fill the vacant ecological **niche**.

The contest will provide insight into the basic tools that are used in land stewardship, which is the application of **ecological principles** and historically significant disturbances, such as fire and grazing. The objectives of the contest are to teach participants some of the principles of ecology including soil/plant relationships, plant/animal relationships and plant succession as applied to management of the land resource. We have chosen beef cattle and bobwhite quail to demonstrate the concept of habitat evaluation. Both species are ecologically and economically important and their relationship to different stages of plant succession is well known.

**Habitat evaluation guides** will be used for determining the value of the site for bobwhite quail and beef cattle. These guides provide a systematic and objective approach to determining the kind, amount, condition and interspersions of various habitat components.

## HOW THE CONTEST IS CONDUCTED

Judging rangeland is combined into a four-part program. Contestants are asked to:

1. Determine the ecological site and similarity index.
2. Determine the value of the ecological site for beef cattle and bobwhite quail.
3. Identify plants and give their value for beef cattle and bobwhite quail.
4. Make management recommendations based on the resource value ratings stated in the objectives.

### Other Contest Information

- *Spend 20 minutes at each location.*
- *Use 10 minutes at the end of the contest to make sure the scoresheet is properly filled out.*
- For the national contest, use five contestant groups. Groups 1-4 for students and group 5 for coaches and individuals.
- The contest is designed to evaluate both beef cattle and bobwhite quail on the same location to facilitate learning the principle of integrated management.
- The contest is divided into two phases (1) Resource Inventory and (2) Resource Management.
- Use quail management practices for quail and cattle management practices for cattle.
- Start by making the resource inventory of present or bench mark conditions. The limiting factors revealed during this process are those to be marked. Then move to the management decisions for cattle and quail. Do not return to marked items on resource inventory.
- If more than one limiting factor occurs (two or more limiting factors with the same value), then make sure all factors with the lowest value are marked.
- The contest committee should carefully evaluate each location before deciding on the management scenario and numerical objective(s).
- Assume that if a management practice is checked to correct a limiting factor for a criteria, then the value for the component is raised to 40. However, if the component has more than one criteria, use the lowest number. Keep raising limiting factors by checking management practices until the lowest number meets or exceeds the stated objective.

## CONTEST SET-UP

Select Five Locations — Ecological sites should be about 50 feet x 50 feet.

**Location 1** - Determine the ecological site.  
Determine the similarity index for the site.  
Determine the resource value rating of the site for beef cattle.  
Determine the resource value rating of the site for bobwhite quail.  
Make management recommendations based on the stated objective(s).

**Location 2** - Determine the ecological site.  
Determine the similarity index for the site.  
Determine the resource value rating of the site for beef cattle.  
Determine the resource value rating of the site for bobwhite quail.  
Make management recommendations based on the stated objective(s).

**Location 3** - Determine the ecological site.  
Determine the similarity index for the site.  
Determine the resource value rating of the site for beef cattle.  
Determine the resource value rating of the site for bobwhite quail.  
Make management recommendations based on the stated objective(s).

**Location 4** - Identify the plants and give their characteristics.

**Location 5** - Identify the plants and give their characteristics.

For Locations 1 to 3—Ecological Sites, mark the site boundary with flags and:

- Mark a selected plant with a *labeled flag* close to the edge of the site boundary for judging utilization by beef cattle. Write cattle on this flag.
- Mark a selected plant with a *labeled flag* close to the edge of the site boundary for judging utilization by quail for nesting cover. Write quail on this flag. The same plant can be used for both.
- Mark protective cover for judging canopy closure.
- Place the soil judging pit outside the site boundary.

For Location 4, Plant Identification Site, flag 10 plants.

For Location 5, Plant Identification Site, flag 10 plants.

***The contestant is given the following:***

1. One or more written management scenarios and objectives for each ecological site
2. Appropriate Ecological Site Guides
3. One Beef Cattle Habitat Evaluation Form
4. One Bobwhite Quail Habitat Evaluation Form
5. One score card

**Scoring.** A team consists of four individuals, with scores of the top three combined for the total team score. Individuals can compete in a separate category. The total possible score for each ecological site is 200 points (three sites times 200 points = 600 points) and 400 points for the plant identification. Total possible points equals 1,000.

*In the case of a tie* in the team score, use the score of the 4th place individual. If one team has only three members, the team with the 4th member is the winner. If a tie still exists, use the scores from the Plant Identification part of the contest. The team with the first largest score can be declared the winner. If this does not break the tie, the score from various components of the contest can be used as tie breakers. An alternative is to place all team names in a box and draw for placing. This same procedure can be used to break individual tied scores.

**Grading.** For ecological sites, similarity index and habitat rating there is only one answer. For habitat limiting factors and recommended management practices there are multiple answers with each having assigned points.



# National Rangeland Judging Contest Plant Identification Form

- GRAMINOIDS**  
 001. Alkali Sacaton\*  
 002. Annual Threewain  
 003. Bermudagrass  
 004. Big or Sand Bluestem  
 005. Blue Grama  
 006. Broadleaved Uniola\*  
 007. Brome  
 008. Bromsedge Bluestem  
 009. Buffalograss  
 010. Canada Wildrye  
 011. Eastern Gamagrass  
 012. Fall Witchgrass\*  
 013. Florida Paspalum\*  
 014. Hairy Grama  
 015. Indiangrass  
 016. Inland Saltgrass\*  
 017. Johnsongrass  
 018. Little Barley  
 019. Little Bluestem  
 020. Old World Bluestem  
 021. Perennial Threewain  
 022. Plains Lovegrass\*  
 023. Prairie Cordgrass\*  
 024. Purpletop  
 025. Rescuegrass\*  
 026. Sand Dropseed  
 027. Sand Lovegrass  
 028. Scribner Panicum  
 029. Sedge  
 030. Sideoats Grama  
 031. Silver Bluestem  
 032. Splitbeard Bluestem  
 033. Switchgrass  
 034. Tall Dropseed  
 035. Tall Fescue  
 036. Texas Bluegrass  
 037. Vine Mesquite\*  
 038. Weeping Lovegrass\*  
 039. Western Wheatgrass
- LEGUMES**  
 040. Catclaw Sensitivebriar  
 041. Groundplum  
 042. Hairy Vetch  
 043. Illinois Bundlesflower  
 044. Leadplant  
 045. Prairie Acacia  
 046. Purple Prairie Clover  
 047. Roundhead Lespedeza  
 048. Scurfpea  
 049. Sericea Lespedeza  
 050. Slender Dalea  
 051. Slender Lespedeza  
 052. Tephrosia\*  
 053. Tickclover  
 054. Trailing Wildbean  
 055. White Clover\*  
 056. Wild Indigo  
 057. Woolly Loco  
 058. Yellow Neptune
- FORBS**  
 059. Annual Sunflower  
 060. Antelopehorn Milkweed  
 061. Ashy Sunflower  
 062. Basketflower\*  
 063. Bitter Sneezeweed\*  
 064. Blackeyed Susan  
 065. Blacksamson
- WOODIES**  
 100. American Beautyberry\*  
 101. American Elm  
 102. Black Locust\*  
 103. Blackjack Oak  
 104. Buckbrush  
 105. Buttonbush  
 106. Chittamwood  
 107. Eastern Cottonwood  
 108. Eastern Redcedar  
 109. False Indigo  
 110. Fragrant Sumac  
 111. Greenbrier  
 112. Hackberry  
 113. Hawthorn\*  
 114. Honey locust  
 115. Mesquite\*  
 116. Oklahoma Blackberry  
 117. Osage Orange  
 118. Persimmon\*  
 119. Plum  
 120. Poison-ivy  
 121. Post Oak  
 122. Redbud  
 123. Rough-leaf Dogwood  
 124. Saltcedar\*  
 125. Sand Sagebrush\*  
 126. Shinnery Oak\*  
 127. Soapberry  
 128. Sumac  
 129. Virginia Creeper  
 130. Winged Elm

\* Not used on the National Contest.

- GRAMANOIDS**  
 001. Alkali Sacaton\*  
 002. Annual Threewain  
 003. Bermudagrass  
 004. Big or Sand Bluestem  
 005. Blue Grama  
 006. Broadleaved Uniola\*  
 007. Brome  
 008. Bromsedge Bluestem  
 009. Buffalograss  
 010. Canada Wildrye  
 011. Eastern Gamagrass  
 012. Fall Witchgrass\*  
 013. Florida Paspalum\*  
 014. Hairy Grama  
 015. Indiangrass  
 016. Inland Saltgrass\*  
 017. Johnsongrass  
 018. Little Barley  
 019. Little Bluestem  
 020. Old World Bluestem  
 021. Perennial Threewain  
 022. Plains Lovegrass\*  
 023. Prairie Cordgrass\*  
 024. Purpletop  
 025. Rescuegrass\*  
 026. Sand Dropseed  
 027. Sand Lovegrass  
 028. Scribner Panicum  
 029. Sedge  
 030. Sideoats Grama  
 031. Silver Bluestem  
 032. Splitbeard Bluestem  
 033. Switchgrass  
 034. Tall Dropseed  
 035. Tall Fescue  
 036. Texas Bluegrass  
 037. Vine Mesquite\*  
 038. Weeping Lovegrass\*  
 039. Western Wheatgrass
- LEGUMES**  
 040. Catclaw Sensitivebriar  
 041. Groundplum  
 042. Hairy Vetch  
 043. Illinois Bundlesflower  
 044. Leadplant  
 045. Prairie Acacia  
 046. Purple Prairie Clover  
 047. Roundhead Lespedeza  
 048. Scurfpea  
 049. Sericea Lespedeza  
 050. Slender Dalea  
 051. Slender Lespedeza  
 052. Tephrosia\*  
 053. Tickclover  
 054. Trailing Wildbean  
 055. White Clover\*  
 056. Wild Indigo  
 057. Woolly Loco  
 058. Yellow Neptune
- FORBS**  
 059. Annual Sunflower  
 060. Antelopehorn Milkweed  
 061. Ashy Sunflower  
 062. Basketflower\*  
 063. Bitter Sneezeweed\*  
 064. Blackeyed Susan  
 065. Blacksamson

Plant ID Tag	Plant Number			Habitat	Season of Growth		Origin			Ecological and Resource Rating			
	First Digit	Second Digit	Third Digit		Perennial	Cool	Warm	Native	Introduced	Invasive	Food	Cover	Cattle
Example	0	2	8										
1	0	1	2	P(A)	C(W)		N(I)				De(Un)	De(Un)	De(Un)
2	0	1	2	P(A)	C(W)		N(I)				De(Un)	De(Un)	De(Un)
3	0	1	2	P(A)	C(W)		N(I)				De(Un)	De(Un)	De(Un)
4	0	1	2	P(A)	C(W)		N(I)				De(Un)	De(Un)	De(Un)
5	0	1	2	P(A)	C(W)		N(I)				De(Un)	De(Un)	De(Un)
6	0	1	2	P(A)	C(W)		N(I)				De(Un)	De(Un)	De(Un)
7	0	1	2	P(A)	C(W)		N(I)				De(Un)	De(Un)	De(Un)
8	0	1	2	P(A)	C(W)		N(I)				De(Un)	De(Un)	De(Un)
9	0	1	2	P(A)	C(W)		N(I)				De(Un)	De(Un)	De(Un)
10	0	1	2	P(A)	C(W)		N(I)				De(Un)	De(Un)	De(Un)
11	0	1	2	P(A)	C(W)		N(I)				De(Un)	De(Un)	De(Un)
12	0	1	2	P(A)	C(W)		N(I)				De(Un)	De(Un)	De(Un)
13	0	1	2	P(A)	C(W)		N(I)				De(Un)	De(Un)	De(Un)
14	0	1	2	P(A)	C(W)		N(I)				De(Un)	De(Un)	De(Un)
15	0	1	2	P(A)	C(W)		N(I)				De(Un)	De(Un)	De(Un)
16	0	1	2	P(A)	C(W)		N(I)				De(Un)	De(Un)	De(Un)
17	0	1	2	P(A)	C(W)		N(I)				De(Un)	De(Un)	De(Un)
18	0	1	2	P(A)	C(W)		N(I)				De(Un)	De(Un)	De(Un)
19	0	1	2	P(A)	C(W)		N(I)				De(Un)	De(Un)	De(Un)
20	0	1	2	P(A)	C(W)		N(I)				De(Un)	De(Un)	De(Un)



# National Rangeland Judging Contest Team Summary Score Card

STATE: \_\_\_\_\_ NO: \_\_\_\_\_

CHAPTER NAME: \_\_\_\_\_

ADVISOR NAME: \_\_\_\_\_

REGION: \_\_\_\_\_

TEAM MEMBERS:

NAME: \_\_\_\_\_ SCORE \_\_\_\_\_

NAME: \_\_\_\_\_ SCORE \_\_\_\_\_

NAME: \_\_\_\_\_ SCORE \_\_\_\_\_

NAME: \_\_\_\_\_ SCORE \_\_\_\_\_

Team Score: (Drop Lowest score) \_\_\_\_\_

# National Rangeland Judging Contest Team Summary Score Card

STATE: \_\_\_\_\_ NO: \_\_\_\_\_

CHAPTER NAME: \_\_\_\_\_

ADVISOR NAME: \_\_\_\_\_

REGION: \_\_\_\_\_

TEAM MEMBERS:

NAME: \_\_\_\_\_ SCORE \_\_\_\_\_

NAME: \_\_\_\_\_ SCORE \_\_\_\_\_

NAME: \_\_\_\_\_ SCORE \_\_\_\_\_

NAME: \_\_\_\_\_ SCORE \_\_\_\_\_

Team Score: (Drop Lowest score) \_\_\_\_\_

## ECOLOGICAL SITES

An ecological site (Figure 1) is an area of land with a combination of soil, climatic, topographic and natural vegetation features that set it apart significantly from adjacent areas. Ecological sites are expressed in terms of soil depth, topography, slope, plant production and plant composition. Vegetation on a particular site will vary in composition and production from one geographical region to another and from year-to-year because of changes in precipitation. The following descriptions of plant composition represent the assumed pre-European settlement conditions under the influence of periodic fire followed by herbivory.

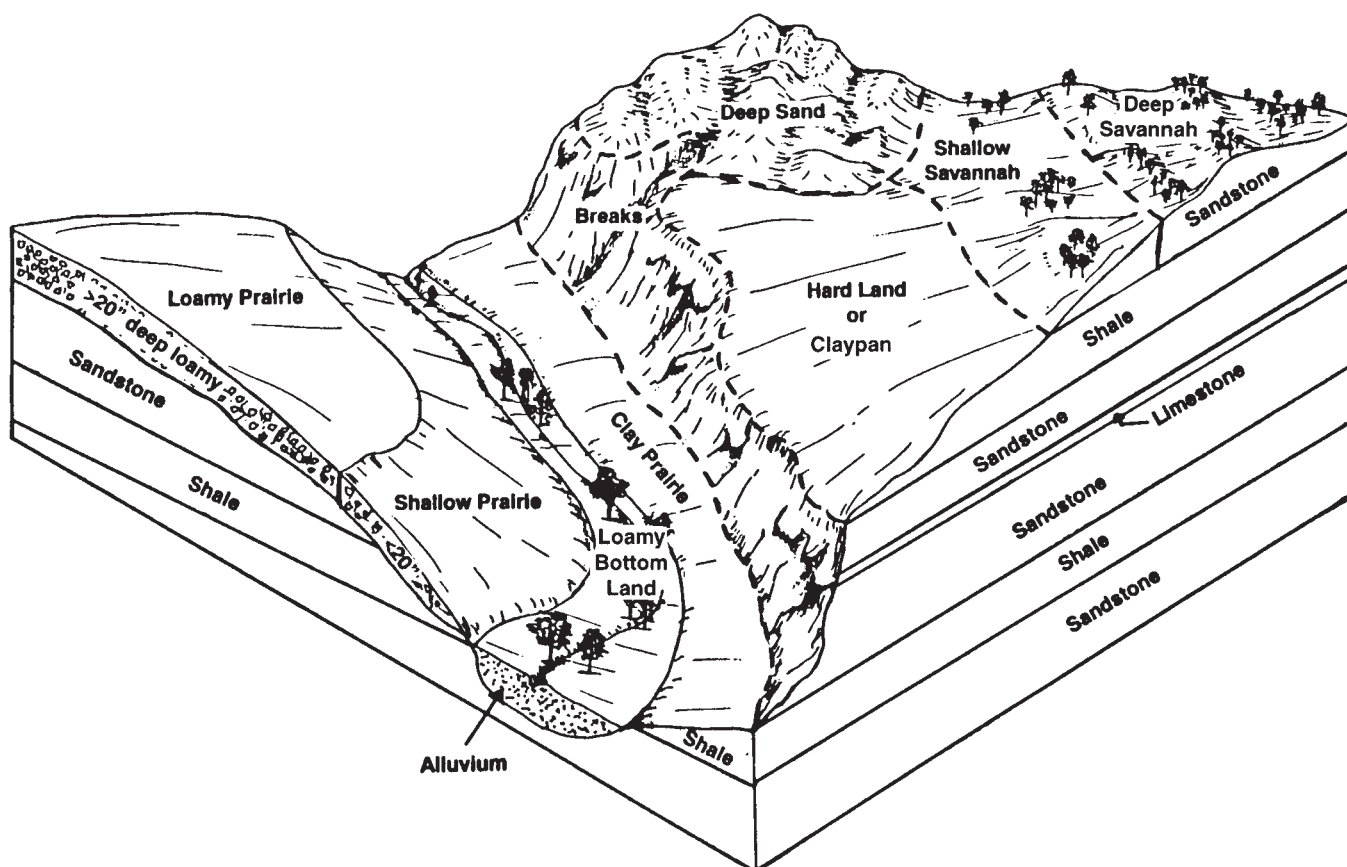


Figure 1. Ecological sites.

**LOAMY BOTTOMLAND.** Alluvial soils that are subject to flooding and include riparian zones and overflow areas. The site is composed of deep productive soils subject to frequent or occasional overflow from the streams and runoff from hillsides. The site contains combinations of grasses, forbs, legumes, shrubs and trees, depending on the region. The soils are very productive and have the potential to produce large amounts of biomass. The vegetation was formed under migratory grazing and heavy impact from bison and other native wildlife, with fires in both the dormant and growing season.

Vegetation	Site Composition Maximum	Observed Composition			Percent Counted Toward SI		
		Site 1	Site 2	Site 3	Site 1	Site 2	Site 3
<b>Grasses</b>	<b>70%</b>						
eastern gamagrass } Florida paspalum }	10	_____	_____	_____	_____	_____	_____
big bluestem } switchgrass }	40	_____	_____	_____	_____	_____	_____
Indiangrass }							
little bluestem	5	_____	_____	_____	_____	_____	_____
broadleaf uniola } dropseed }	15	_____	_____	_____	_____	_____	_____
Scribner panicum } purpletop }							
other natives							
invasives	0	_____	_____	_____	0	0	0
<hr/>							
<b>Forbs and Legumes</b>	<b>10%</b>						
leadplant		_____	_____	_____	_____	_____	_____
tickclover		_____	_____	_____	_____	_____	_____
Illinois bundleflower		_____	_____	_____	_____	_____	_____
slender lespedeza		_____	_____	_____	_____	_____	_____
roundhead lespedeza		_____	_____	_____	_____	_____	_____
compass plant		_____	_____	_____	_____	_____	_____
dotted gayfeather		_____	_____	_____	_____	_____	_____
perennial sunflower		_____	_____	_____	_____	_____	_____
wild indigo		_____	_____	_____	_____	_____	_____
scurfpea		_____	_____	_____	_____	_____	_____
goldenrod		_____	_____	_____	_____	_____	_____
sagewort		_____	_____	_____	_____	_____	_____
milkweed		_____	_____	_____	_____	_____	_____
ragweed		_____	_____	_____	_____	_____	_____
dalea		_____	_____	_____	_____	_____	_____
prairie clover		_____	_____	_____	_____	_____	_____
other natives		_____	_____	_____	_____	_____	_____
invasives	0	_____	_____	_____	0	0	0
<hr/>							
<b>Woodies</b>	<b>20%</b>						
poison ivy		_____	_____	_____	_____	_____	_____
American elm		_____	_____	_____	_____	_____	_____
sumac		_____	_____	_____	_____	_____	_____
chittamwood		_____	_____	_____	_____	_____	_____
greenbrier		_____	_____	_____	_____	_____	_____
buckbrush		_____	_____	_____	_____	_____	_____
hackberry		_____	_____	_____	_____	_____	_____
buttonbush		_____	_____	_____	_____	_____	_____
rough-leaf dogwood		_____	_____	_____	_____	_____	_____
eastern cottonwood		_____	_____	_____	_____	_____	_____
other natives		_____	_____	_____	_____	_____	_____
invasives	0	_____	_____	_____	0	0	0
	<u>100%</u>	<u>100%</u>	<u>100%</u>	<u>100%</u>	<u>0</u>	<u>0</u>	<u>0</u>

**LOAMY PRAIRIE.** Upland soils more than 20 inches deep, with a loamy texture and permeable subsoils. The site is composed of deep loamy upland soils with slopes up to 20 percent that are gentle to steeply rolling. The site contains combinations of forbs, grasses, legumes and shrubs. Root growth is unrestricted through the soil profile. The vegetation was formed under migratory grazing and heavy impact from bison and other native wildlife, with fires in both the dormant and growing season.

<i>Vegetation</i>	Site	Observed			Percent Counted		
	Composition Maximum	Site 1	Site 2	Site 3	Site 1	Site 2	Site 3
<b>Grasses</b>	<b>84%</b>						
big bluestem } switchgrass } Indiangrass }	49	_____	_____	_____	_____	_____	_____
little bluestem	20	_____	_____	_____	_____	_____	_____
eastern gamagrass } Florida paspalum }	5	_____	_____	_____	_____	_____	_____
prairie cordgrass } Canada wild rye } dropseed } blue grama } sideoats grama } Scribner panicum } purpletop }	10	_____	_____	_____	_____	_____	_____
other natives							
invasives	0	_____	_____	_____	0	0	0
<hr/>							
<b>Forbs and Legumes</b>	<b>15%</b>						
catclaw sensitivebrier		_____	_____	_____	_____	_____	_____
tickclover		_____	_____	_____	_____	_____	_____
Illinois bundleflower		_____	_____	_____	_____	_____	_____
prairie acacia		_____	_____	_____	_____	_____	_____
slender lespedeza		_____	_____	_____	_____	_____	_____
roundhead lespedeza		_____	_____	_____	_____	_____	_____
compass plant		_____	_____	_____	_____	_____	_____
halfshrub sundrop		_____	_____	_____	_____	_____	_____
dotted gayfeather		_____	_____	_____	_____	_____	_____
Pitcher sage		_____	_____	_____	_____	_____	_____
perennial sunflower		_____	_____	_____	_____	_____	_____
wild indigo		_____	_____	_____	_____	_____	_____
prairie scurfpea		_____	_____	_____	_____	_____	_____
Mexican hat		_____	_____	_____	_____	_____	_____
milkweed		_____	_____	_____	_____	_____	_____
goldenrod		_____	_____	_____	_____	_____	_____
sagewort		_____	_____	_____	_____	_____	_____
ragweed		_____	_____	_____	_____	_____	_____
purple prairie clover		_____	_____	_____	_____	_____	_____
dalea		_____	_____	_____	_____	_____	_____
other natives		_____	_____	_____	_____	_____	_____
invasives	0	_____	_____	_____	0	0	0
<hr/>							
<b>Woodies</b>	<b>1%</b>						
sumac		_____	_____	_____	_____	_____	_____
sand plum		_____	_____	_____	_____	_____	_____
winged elm		_____	_____	_____	_____	_____	_____
buckbrush		_____	_____	_____	_____	_____	_____
other natives		_____	_____	_____	_____	_____	_____
invasives	0	_____	_____	_____	0	0	0
	<b>100%</b>	<b>100%</b>	<b>100%</b>	<b>100%</b>			

**DEEP SAVANNA.** Upland soils greater than 20 inches in depth, with a coarse (sandy or gravelly) texture. The site is composed of soils that support mid and tall grasses mixed with post oak, blackjack oak or shortleaf pine and other native, non-invasive woody vegetation with greater than 10 percent cover more than 6 feet tall. The vegetation was formed under migratory grazing and heavy impact from bison and other native wildlife, with fires in both the dormant and growing season.

<i>Vegetation</i>	Site	Observed			Percent Counted		
	Composition Maximum	Site 1	Site 2	Site 3	Site 1	Site 2	Site 3
<b>Grasses</b>	<b>70%</b>						
big bluestem } switchgrass } Indiangrass }	35	_____	_____	_____	_____	_____	_____
little bluestem	15	_____	_____	_____	_____	_____	_____
Canada wild rye } sideoats grama } purpletop } dropseed } Scribner panicum } Florida paspalum } blue grama } other natives }	20	_____	_____	_____	_____	_____	_____
invasives	0	_____	_____	_____	0	0	0
<hr/>							
<b>Forbs and Legumes</b>	<b>10%</b>						
tickclover		_____	_____	_____	_____	_____	_____
purple prairie clover		_____	_____	_____	_____	_____	_____
catclaw sensitivebrier		_____	_____	_____	_____	_____	_____
leadplant		_____	_____	_____	_____	_____	_____
wild indigo		_____	_____	_____	_____	_____	_____
scurfpea		_____	_____	_____	_____	_____	_____
blacksamson		_____	_____	_____	_____	_____	_____
perennial sunflower		_____	_____	_____	_____	_____	_____
Pitcher sage		_____	_____	_____	_____	_____	_____
heath aster		_____	_____	_____	_____	_____	_____
goldenrod		_____	_____	_____	_____	_____	_____
sagewort		_____	_____	_____	_____	_____	_____
ragweed		_____	_____	_____	_____	_____	_____
other natives		_____	_____	_____	_____	_____	_____
invasives	0	_____	_____	_____	0	0	0
<hr/>							
<b>Woodies</b>	<b>20%</b>						
post oak		_____	_____	_____	_____	_____	_____
blackjack oak		_____	_____	_____	_____	_____	_____
sumac		_____	_____	_____	_____	_____	_____
greenbrier		_____	_____	_____	_____	_____	_____
buckbrush		_____	_____	_____	_____	_____	_____
redbud		_____	_____	_____	_____	_____	_____
poison ivy		_____	_____	_____	_____	_____	_____
other natives		_____	_____	_____	_____	_____	_____
invasives	0	_____	_____	_____	0	0	0
	<b>100%</b>	<b>100%</b>	<b>100%</b>	<b>100%</b>			

**SHALLOW SAVANNA.** Upland soil less than 20 inches deep, with a coarse (sandy or gravelly) texture. The shallow savanna is composed of soils that support mid and tall grass. The oaks, shortleaf pine and other native, non-invasive woody vegetation have generally increased on deeper soils and are greater than 10 percent cover more than 6 feet tall. Today, there are very few locations where open savanna conditions exist. Exceptions are along the rocky, very shallow areas where scattered oaks grow along rock crevices. The vegetation was formed under migratory grazing and heavy impact from bison and other native wildlife, with fires in both the dormant and growing season.

<i>Vegetation</i>	Site Composition Maximum	Observed Composition			Percent Counted Toward SI		
		<i>Site 1</i>	<i>Site 2</i>	<i>Site 3</i>	<i>Site 1</i>	<i>Site 2</i>	<i>Site 3</i>
<b>Grasses</b>	<b>70%</b>						
big bluestem } switchgrass }	25	_____	_____	_____	_____	_____	_____
Indiangrass	15	_____	_____	_____	_____	_____	_____
little bluestem } Canada wild rye } sideoats grama } purpletop } dropseed } Scribner panicum } blue grama } other natives }	30	_____	_____	_____	_____	_____	_____
invasives	0	_____	_____	_____	0	0	0
<hr/>							
<b>Forbs and Legumes</b>	<b>10%</b>						
tickclover		_____	_____	_____	_____	_____	_____
purple prairie clover		_____	_____	_____	_____	_____	_____
catclaw sensitivebrier		_____	_____	_____	_____	_____	_____
leadplant		_____	_____	_____	_____	_____	_____
wild indigo		_____	_____	_____	_____	_____	_____
scurfpea		_____	_____	_____	_____	_____	_____
blacksamson		_____	_____	_____	_____	_____	_____
perennial sunflower		_____	_____	_____	_____	_____	_____
Pitcher sage		_____	_____	_____	_____	_____	_____
heath aster		_____	_____	_____	_____	_____	_____
goldenrod		_____	_____	_____	_____	_____	_____
sagewort		_____	_____	_____	_____	_____	_____
western ragweed		_____	_____	_____	_____	_____	_____
other natives		_____	_____	_____	_____	_____	_____
invasives	0	_____	_____	_____	0	0	0
<hr/>							
<b>Woodies</b>	<b>20%</b>						
post oak		_____	_____	_____	_____	_____	_____
blackjack oak		_____	_____	_____	_____	_____	_____
sumac		_____	_____	_____	_____	_____	_____
greenbrier		_____	_____	_____	_____	_____	_____
buckbrush		_____	_____	_____	_____	_____	_____
redbud		_____	_____	_____	_____	_____	_____
poison ivy		_____	_____	_____	_____	_____	_____
other natives		_____	_____	_____	_____	_____	_____
invasives	0	_____	_____	_____	0	0	0
	<b>100%</b>	<b>100%</b>	<b>100%</b>	<b>100%</b>			

**DEEP SAND.** Sandy, coarse textured, rapidly permeable, soils greater than 20 inches deep. This site is predominately a tall grass site with some woodies and a variety of forbs and legumes, occurring as gently undulating, low hummocky or steep rolling uplands. The vegetation was formed under migratory grazing and heavy impact from bison and other native wildlife, with fires in both the dormant and growing season.

<i>Vegetation</i>	Site	Observed			Percent Counted		
	Composition Maximum	Site 1	Site 2	Site 3	Site 1	Site 2	Site 3
<b>Grasses</b>	<b>70%</b>						
little bluestem	10	_____	_____	_____	_____	_____	_____
big bluestem	35	_____	_____	_____	_____	_____	_____
switchgrass							
Indiangrass	25	_____	_____	_____	_____	_____	_____
sand lovegrass							
Canada wild rye							
Texas bluegrass							
sideoats grama							
blue grama							
tall dropseed							
sand dropseed							
purpletop							
Scribner panicum							
other natives	0	_____	_____	_____	0	0	0
invasives							
<hr/>							
<b>Forbs and Legumes</b>	<b>20%</b>						
prairie acacia		_____	_____	_____	_____	_____	_____
groundplum		_____	_____	_____	_____	_____	_____
tickclover		_____	_____	_____	_____	_____	_____
roundhead lespedeza		_____	_____	_____	_____	_____	_____
scurfpea		_____	_____	_____	_____	_____	_____
catclaw sensitivebrier		_____	_____	_____	_____	_____	_____
trailing wildbean		_____	_____	_____	_____	_____	_____
western ragweed		_____	_____	_____	_____	_____	_____
sagewort		_____	_____	_____	_____	_____	_____
croton		_____	_____	_____	_____	_____	_____
snow-on-the-mountain		_____	_____	_____	_____	_____	_____
halfshrub sundrop		_____	_____	_____	_____	_____	_____
other natives		_____	_____	_____	_____	_____	_____
invasives	0	_____	_____	_____	0	0	0
<hr/>							
<b>Woodies</b>	<b>10%</b>						
sand sagebrush		_____	_____	_____	_____	_____	_____
hackberry		_____	_____	_____	_____	_____	_____
sand plum		_____	_____	_____	_____	_____	_____
fragrant sumac		_____	_____	_____	_____	_____	_____
other natives		_____	_____	_____	_____	_____	_____
invasives	0	_____	_____	_____	0	0	0
	<b>100%</b>	<b>100%</b>	<b>100%</b>	<b>100%</b>			

**HARDLAND OR CLAYPAN PRAIRIE.** Nearly level to gently sloping upland soils with fine or medium-textured topsoils and moderately deep impervious subsoils within 20 inches of the surface. This site is a mid and short grass dominant vegetation on gentle slopes. The site contains forbs, legumes and grasses. Roots seldom penetrate the claypan. The vegetation was formed under migratory grazing and heavy impact from bison and other native wildlife, with fires in both the dormant and growing season.

<i>Vegetation</i>	Site Composition Maximum	Observed Composition			Percent Counted Toward SI		
		<i>Site 1</i>	<i>Site 2</i>	<i>Site 3</i>	<i>Site 1</i>	<i>Site 2</i>	<i>Site 3</i>
<b>Grasses</b>	<b>85%</b>						
sideoats grama	25	_____	_____	_____	_____	_____	_____
blue grama	20	_____	_____	_____	_____	_____	_____
buffalograss	10	_____	_____	_____	_____	_____	_____
dropseed	5	_____	_____	_____	_____	_____	_____
big bluestem } Indiangrass }	5	_____	_____	_____	_____	_____	_____
little bluestem	5	_____	_____	_____	_____	_____	_____
western wheatgrass } vine mesquite } Scribner panicum } fall witchgrass }	15	_____	_____	_____	_____	_____	_____
other natives							
invasives	0	_____	_____	_____	0	0	0
<hr/>							
<b>Forbs and Legumes</b>	<b>14%</b>						
leadplant		_____	_____	_____	_____	_____	_____
tickclover		_____	_____	_____	_____	_____	_____
purple prairie clover		_____	_____	_____	_____	_____	_____
groundplum		_____	_____	_____	_____	_____	_____
catclaw sensitivebrier		_____	_____	_____	_____	_____	_____
Illinois bundleflower		_____	_____	_____	_____	_____	_____
wild indigo		_____	_____	_____	_____	_____	_____
milkweed		_____	_____	_____	_____	_____	_____
sagewort		_____	_____	_____	_____	_____	_____
dotted gayfeather		_____	_____	_____	_____	_____	_____
prairie coneflower		_____	_____	_____	_____	_____	_____
halfshrub sundrop		_____	_____	_____	_____	_____	_____
goldenrod		_____	_____	_____	_____	_____	_____
other natives		_____	_____	_____	_____	_____	_____
invasives	0	_____	_____	_____	0	0	0
<hr/>							
<b>Woodies</b>	<b>1%</b>						
mesquite		_____	_____	_____	_____	_____	_____
other natives		_____	_____	_____	_____	_____	_____
invasives	0	_____	_____	_____	0	0	0
	<b>100%</b>	<b>100%</b>	<b>100%</b>	<b>100%</b>			



**SHALLOW OR ROCKY PRAIRIE.** An upland soil less than 20 inches deep and often very rocky and rough but less than 20 percent slope. Gentle sloping to moderately steep shallow prairie soils. The site contains combinations of forbs, legumes, grasses and some shrubs. Rock usually appears on the surface, often over 15 to 20 percent of the area, and occurs in the profile. The site occurs along ridges or ledges, often adjacent to loamy or clay prairie sites. The vegetation was formed under migratory grazing and heavy impact from bison and other native wildlife, with fires in both the dormant and growing season.

<i>Vegetation</i>	Site Composition Maximum	Observed Composition			Percent Counted Toward SI		
		<i>Site 1</i>	<i>Site 2</i>	<i>Site 3</i>	<i>Site 1</i>	<i>Site 2</i>	<i>Site 3</i>
<b>Grasses</b>	<b>80%</b>						
big bluestem } switchgrass } Indiangrass }	25	_____	_____	_____	_____	_____	_____
little bluestem	20	_____	_____	_____	_____	_____	_____
sideoats grama	20	_____	_____	_____	_____	_____	_____
Canada wild rye } dropseed } hairy grama } blue grama } Scribner panicum }	15	_____	_____	_____	_____	_____	_____
other natives		_____	_____	_____	_____	_____	_____
invasives	0	_____	_____	_____	0	0	0
<hr/>							
<b>Forbs and Legumes</b>	<b>19%</b>						
Illinois bundleflower		_____	_____	_____	_____	_____	_____
catclaw sensitivebrier		_____	_____	_____	_____	_____	_____
blacksampson		_____	_____	_____	_____	_____	_____
leadplant		_____	_____	_____	_____	_____	_____
tickclover		_____	_____	_____	_____	_____	_____
purple prairie clover		_____	_____	_____	_____	_____	_____
slender lespedeza		_____	_____	_____	_____	_____	_____
wild indigo		_____	_____	_____	_____	_____	_____
scurfpea		_____	_____	_____	_____	_____	_____
dotted gayfeather		_____	_____	_____	_____	_____	_____
compass plant		_____	_____	_____	_____	_____	_____
halfshrub sundrop		_____	_____	_____	_____	_____	_____
Pitcher sage		_____	_____	_____	_____	_____	_____
heath aster		_____	_____	_____	_____	_____	_____
sagewort		_____	_____	_____	_____	_____	_____
Mexican hat		_____	_____	_____	_____	_____	_____
milkweed		_____	_____	_____	_____	_____	_____
other natives		_____	_____	_____	_____	_____	_____
invasives	0	_____	_____	_____	0	0	0
<hr/>							
<b>Woodies</b>	<b>1%</b>						
sumac		_____	_____	_____	_____	_____	_____
sand plum		_____	_____	_____	_____	_____	_____
buckbrush		_____	_____	_____	_____	_____	_____
other natives		_____	_____	_____	_____	_____	_____
invasives	0	_____	_____	_____	0	0	0
	<b>100%</b>	<b>100%</b>	<b>100%</b>	<b>100%</b>			

**CLAY PRAIRIE.** Upland clay soils greater than 20 inches deep, on rolling and broken topography with some gentle slopes. This site is moderately productive and generally has a midgrass or short grass aspect. The site contains forbs, grasses and legumes. This site has little or no woody vegetation on it. The vegetation was formed under migratory grazing and heavy impact from bison and other native wildlife, with fires in both the dormant and growing season.

<i>Vegetation</i>	Site		Observed			Percent Counted		
	Composition Maximum		Composition			Toward SI		
			<i>Site 1</i>	<i>Site 2</i>	<i>Site 3</i>	<i>Site 1</i>	<i>Site 2</i>	<i>Site 3</i>
<b>Grasses</b>	<b>85%</b>							
little bluestem	25		_____	_____	_____	_____	_____	_____
sideoats grama	25		_____	_____	_____	_____	_____	_____
buffalograss } blue grama }	10		_____	_____	_____	_____	_____	_____
big bluestem } Indiangrass }	10		_____	_____	_____	_____	_____	_____
tall dropseed } hairy grama } other natives }	15		_____	_____	_____	_____	_____	_____
invasives	0		_____	_____	_____	<u>0</u>	<u>0</u>	<u>0</u>
<hr/>								
<b>Forbs and Legumes</b>	<b>14%</b>							
purple prairie clover			_____	_____	_____	_____	_____	_____
catclaw sensitivebrier			_____	_____	_____	_____	_____	_____
scurfpea			_____	_____	_____	_____	_____	_____
Illinois bundleflower			_____	_____	_____	_____	_____	_____
tephrosia			_____	_____	_____	_____	_____	_____
wild indigo			_____	_____	_____	_____	_____	_____
groundplum			_____	_____	_____	_____	_____	_____
sagewort			_____	_____	_____	_____	_____	_____
blacksamson			_____	_____	_____	_____	_____	_____
dotted gayfeather			_____	_____	_____	_____	_____	_____
croton			_____	_____	_____	_____	_____	_____
compass plant			_____	_____	_____	_____	_____	_____
halfshrub sundrop			_____	_____	_____	_____	_____	_____
blackeyed susan			_____	_____	_____	_____	_____	_____
other natives			_____	_____	_____	_____	_____	_____
invasives	0		_____	_____	_____	<u>0</u>	<u>0</u>	<u>0</u>
<hr/>								
<b>Woodies</b>	<b>1%</b>							
buckbrush			_____	_____	_____	_____	_____	_____
other natives			_____	_____	_____	_____	_____	_____
invasives	0		_____	_____	_____	<u>0</u>	<u>0</u>	<u>0</u>
	<u>100%</u>	<u>100%</u>	<u>100%</u>	<u>100%</u>		<u>0</u>	<u>0</u>	<u>0</u>

**BREAKS.** Upland soils with more than 20 percent slopes and broken by canyons or gullies. This site is found on steep escarpments and canyon-like areas. The slopes may have occasional benches. The slope profile consists of rock outcrops and deep soils that occur between the rock outcrops. Runoff is high. The site contains forbs, grasses, legumes, shrubs and scattered trees. The vegetation was formed under migratory grazing and heavy impact from bison and other native wildlife, with fires in both the dormant and growing season.

<i>Vegetation</i>	Site Composition Maximum	Observed Composition			Percent Counted Toward SI		
		<i>Site 1</i>	<i>Site 2</i>	<i>Site 3</i>	<i>Site 1</i>	<i>Site 2</i>	<i>Site 3</i>
<b>Grasses</b>	<b>75%</b>						
big bluestem } Indiangrass } switchgrass }	25	_____	_____	_____	_____	_____	_____
little bluestem	10	_____	_____	_____	_____	_____	_____
sideoats grama } blue grama } buffalograss } hairy grama } tall dropseed } perennial threeawn } Canada wild rye } other natives }	40	_____	_____	_____	_____	_____	_____
invasives	0				0	0	0
<hr/>							
<b>Forbs and Legumes</b>	<b>20%</b>						
prairie acacia		_____	_____	_____	_____	_____	_____
groundplum		_____	_____	_____	_____	_____	_____
Illinois bundleflower		_____	_____	_____	_____	_____	_____
tickclover		_____	_____	_____	_____	_____	_____
purple prairie clover		_____	_____	_____	_____	_____	_____
scurfpea		_____	_____	_____	_____	_____	_____
catclaw sensitivebrier		_____	_____	_____	_____	_____	_____
trailing wildbean		_____	_____	_____	_____	_____	_____
tephrosia		_____	_____	_____	_____	_____	_____
perennial sunflower		_____	_____	_____	_____	_____	_____
sagewort		_____	_____	_____	_____	_____	_____
blacksamson		_____	_____	_____	_____	_____	_____
dotted gayfeather		_____	_____	_____	_____	_____	_____
halfshrub sundrop		_____	_____	_____	_____	_____	_____
compass plant		_____	_____	_____	_____	_____	_____
other natives		_____	_____	_____	_____	_____	_____
invasives	0	_____	_____	_____	0	0	0
<hr/>							
<b>Woodies</b>	<b>5%</b>						
hackberry		_____	_____	_____	_____	_____	_____
sumac		_____	_____	_____	_____	_____	_____
greenbrier		_____	_____	_____	_____	_____	_____
fragrant sumac		_____	_____	_____	_____	_____	_____
plum		_____	_____	_____	_____	_____	_____
other natives		_____	_____	_____	_____	_____	_____
invasives	0	_____	_____	_____	0	0	0
	<b>100%</b>	<b>100%</b>	<b>100%</b>	<b>100%</b>			

## SIMILARITY INDEX

The **SIMILARITY INDEX (SI)** of the ecological site is dictated by many factors. Historically, herbivory by mammals and invertebrates above and below the soil surface, extensive fires and periods of drought were major disturbances to the land. The kinds of plants that are present on an ecological site may be desirable or undesirable for a particular use. For example, if cattle have been grazed at a heavy stocking rate on a site for a long period of time, some of the plants that have increased over that period of time are not preferred by cattle. Plants preferred by cattle have decreased over this period of time. Any disturbance of the ecological site will affect the SI. Disturbances are a natural occurrence on all sites and are necessary to maintain ecological structure and function.

For contest purposes, the SI will be determined by comparing the present vegetation (species composition by weight at the end of the growing season in an ungrazed condition) to the presumed original dominant plants on that site historically and before European settlement. Specific ecological site descriptions can be obtained from the Natural Resource Conservation Service (NRCS).

For example, if we were judging the SI for a Shallow Savanna Site, we would determine the composition of plant species. By convention, however, we can count no more than the percent allowable on the Ecological Site Guide. The SI is expressed as a percentage from 0 to 100 percent. Plants native to the site count in percent composition toward the SIMILARITY INDEX (SI). Plants native to the site but not specifically listed in categories on similarity index are counted as "other natives." Plants on the site that are not on main plant list will be considered native and not invasive, unless labeled otherwise.

### Judging the SI of a Shallow Savanna Site:

Dominant Plants	Site Composition Maximum	Observed Composition			Percent Counted Toward SI		
		Site 1	Site 2	Site 3	Site 1	Site 2	Site 3
<b>Grasses</b>	<b>70%</b>						
big bluestem } switchgrass }	25	10			10		
Indiangrass							
little bluestem	15	10			10		
Canada wild rye } sideoats grama } purpletop } dropseed } Scribner panicum } blue grama } other natives }	30	15			15		
invasives		10			0		
<b>Forbs &amp; Legumes</b>	<b>10%</b>						
tickclover							
purple prairie clover		2			2		
catclaw sensitivebrier		2			2		
leadplant							
wild indigo							
scurfpea							
blacksamson							
perennial sunflower							
Pitcher sage							
heath aster							
goldenrod							
sagewort							
western ragweed							
other natives							
invasives	0	20			0		
<b>Woodies</b>	<b>20%</b>						
post oak		5			5		
blackjack oak		5			5		
sumac		2			2		
greenbrier		2			2		
buckbrush		1			1		
redbud							
poison-ivy							
other natives		12			5		
invasives	0	4			0		
	<b>100%</b>	<b>100%</b>			<b>59%</b>		

For this example the SI for this site is 59 percent. This is not a grazing value rating, only the Similarity Index of the present plant community to the presumed original plant community.

## RESOURCE VALUE RATING

The **DESIRED PLANT COMMUNITY** is the Similarity Index (SI) that meets the land manager's objective(s). For example, a land manager may want parts of the management unit to have an SI of 30 to 40 percent to provide food (annual forbs and legumes) for bobwhite quail. Other parts of the management unit may need to be in an SI of 60 to 70 percent for bobwhite quail nesting cover and forage for cattle. Estimating the percent composition of grasses, grasslike plants, forbs, legumes and shrubs/trees should be done at the end of the growing season. However, since the contest is held in the spring, the contestants must be able to visualize what the plants would look like at the end of the growing season. For contest purposes, the contribution of woody plants (shrubs and trees) will be evaluated as percent canopy cover.

Resource value ratings for cattle and bobwhite quail will be determined by comparing the habitat requirements of the animal to the plant community existing on the ecological site. Management guidelines will be used to move the SI to attain the objective(s).

Introduced plants, those that did not evolve with the native ecosystems, will count toward the resource value rating for domestic livestock and bobwhite quail, if their value rating is **desirable**. Introduced plants were not introduced to replace native plants, but to provide complementary forage for domestic livestock. Some exotic plant introductions threaten the integrity of native plant communities because they spread from where they were planted. Some examples of invasive plants that invade native plant communities in Oklahoma include bermudagrass, tall fescue, Old World bluestem, sericea lespedeza, Johnsongrass, musk thistle, scotch thistle and salt cedar.

Some native plants have also become major problems because of removal of natural influences such as fire and are classified as invasive. These include eastern redcedar, ashe juniper and mesquite.

# BEEF CATTLE HABITAT EVALUATION

## Introduction

Cattle can graze or browse many different kinds of plants (herbaceous and woody) depending on plant preference, plant availability and nutritional status of the animal. Cattle grazing in native plant communities, rangeland or forestland, is compatible with land stewardship provided that it is done in a proper manner. Proper grazing management means balancing the needs of the plant community with the needs of the grazing animal. The elements of proper grazing management include maintaining the herd at or below carrying capacity and using prescribed grazing. Some rangelands and forestlands are more suited to managing for wildlife or other grazing or browsing animals than cattle because of the economic and environmental costs of changing the habitat to make it suitable for cattle production.

The purpose of this evaluation guide is to systematically evaluate habitat on the site for its value to cattle. The evaluation guide is designed to assist in inventorying and analyzing existing habitat conditions and to determine an overall habitat value, and identify the limiting factor for cattle. These values will indicate the overall quality of habitat that rangeland or forestland provides in its existing condition. The evaluation guide also will identify weak or missing elements (limiting factors) that are limiting cattle numbers so management alternatives can be developed to improve the habitat for cattle. In an actual situation, both economic and ecological considerations must be evaluated.

## Background Information on the Habitat Evaluation Guide Components

Beef cattle restrict their home range to an area that provides their needs of food, water and shelter, or that is controlled by fencing. The actual size and shape of the home range is controlled by how far the animal can travel and the quality of the various habitat elements within the home range. Actual home ranges are not marked by permanent boundaries (except for fencing) nor are they the same from season to season. Beef cattle prefer open areas that provide good air flow and thermal cover (either shade in warm weather or windbreaks during cold weather). However, they will use shrub or forested areas if that is all that is available or if environmental conditions are favorable.

## Habitat Requirements

**Forage factors:** The diet of beef cattle consists of grasses, forbs, legumes, woody browse and mast. Food preference is acquired through grazing experience and nutritional status of the animal. Beef cattle are opportunistic foragers and adapt to a wide variety of conditions. Because they are ruminants, they can digest lower quality forages than monogastrics. In general, diet requirements are higher for young grazing animals and declines as the animal matures except, in certain reproductive stages.

### A. Forage Criteria

*A.1. Forage Condition for Cattle:* Beef cattle prefer certain grasses, forbs, legumes, woody browse, and mast. These preferred plants decline in vigor and dominance over time if they are not properly grazed.

*A.2. Forage Diversity:* Beef cattle will eat many different plants during the year. Grazing preferences change with season of the year and stage of plant growth. Having a variety of grasses, forbs, legumes and woody plants available makes it more likely that the diet is properly balanced.

*A.3. Forage Utilization:* In general, diet quality is highest at the beginning of the growing season and declines as the season progresses because of plant maturity. However, forage quality is also related to forage utilization. As a plant is grazed from leaves to stem, quality declines. Thus over-utilization of forage causes a decline in quality and intake. If herbaceous plants are lightly to moderately grazed and then rested to allow regrowth, the regrowth will be of higher quality than ungrazed plants. Utilization on cool season plants is judged on current growth during the spring. Utilization on warm season plants is judged on prior years growth before May 15 for contests held during the spring.

**Distribution factors:** Beef cattle move within their home range based on many interacting factors. The main factors include slope of the land, brush and tree cover, availability of water, wind direction, and shade or windbreaks. Cattle movements and grazing patterns can be especially damaging to the soil and vegetation depending on the extent and severity of disturbance by hoof action, trailing, rubbing, and grazing.

## **B. Distribution Criteria**

*B.1. Forage Accessibility:* Beef cattle prefer to graze on level ground. As the slope increases or the surface of the ground becomes rough from rocks, grazing use declines.

*B.2. Grazing Restraint:* Beef cattle prefer to graze in open areas that allow easy movement and comfortable environmental conditions (e.g., summer conditions of air temperature, air movement, relatively low fly numbers). Increasing brush canopy cover tends to restrict movements, reduce air movement, and increase fly populations. Evaluate the brush cover at 6 feet and below. Woody plants found on the site but not included on the main plant list will still be considered for grazing restraint.

*B.3. Water:* Beef cattle prefer to graze around water if forage is available. They move away from water for thermal protection (shade - summer, windbreak - winter) or when forage becomes unavailable. They seldom will move over 2 miles to meet their forage requirements.

## **C. Site Integrity**

*C.1. Check for invasive plants on the ecological site.*

## **Instructions For Completing The Beef Cattle Habitat Evaluation Form**

**General Instructions.** An overall habitat quality value and an overall limiting factor for beef cattle can be calculated from the values assigned to each habitat requirement. A formula uses the requirement values to derive an overall habitat quality value. The overall limiting factor value is determined by selecting the lowest limiting factor value assigned to any of the requirements. These values represent the general quality of habitat and the factor that is limiting the beef cattle population within the home range.

The following procedures describe the method for inventorying existing habitat conditions, rating the habitat criteria and calculating the habitat quality and limiting factor values. The system is based primarily on the kinds, amounts, condition and arrangement of plants.

**Ratings.** Ratings for the various habitat criteria range from 0 (poor) to 40 (excellent). The number of ratings per criteria depend on the number of variables that can be practically measured and levels of management that can be practically applied.

# GUIDE TO MANAGEMENT PRACTICES FOR BEEF CATTLE

1. **CONTINUE PRESENT MANAGEMENT** — Use when the current management objective is met by the present condition of the site.
2. **BEGIN A PLANNED GRAZING SYSTEM** — Use when forage production and/or forage diversity is the limiting factor.
3. **APPLY FORB, LEGUME OR GRASS CONTROL** — Use when forage production is the limiting factor and undesirable forbs or grasses exceed 50 percent (by weight) of the plant community.
4. **APPLY WOODY PLANT CONTROL** — Use when forage production or grazing restraint is the limiting factor and woody plants exceed 30 percent (canopy cover) of the plant community.
5. **DECREASE STOCKING RATE FOR BEEF CATTLE** — Use when forage utilization is the limiting factor because of overuse.
6. **INCREASE STOCKING RATE FOR BEEF CATTLE** — Use when forage utilization is the limiting factor because of lack of use.
7. **CHANGE THE KIND OF GRAZING/BROWSING ANIMAL** — Use when grazing accessibility or grazing restraint is the limiting factor because of terrain or woody cover.
8. **DEVELOP WATER FOR BEEF CATTLE** — Use when water is the limiting factor because of distance to water.
9. **APPLY INVASIVE PLANT CONTROL** — Use when invasive plants are the limiting factor because of their presence on the site. Use to maintain the integrity of the ecological site when any invasive herbaceous or woody plant occurs. Invasive plants include locally exotic (e.g. eastern redcedar, etc.) or introduced plants (e.g. tall fescue, Old World bluestem, sericea lespedeza, bermudagrass, musk thistle, etc.). Control may be in the form of prescribed fire, herbicide, biological, mechanical or grazing/browsing. Often, combinations of the above treatments are required. Some invasive plants are difficult to control with existing technology. If more than one invasive plant occurs on the site, choose the plant with the lowest resource value rating.
10. **PLANT ADAPTED FORAGE SPECIES** — Use when forage production is the limiting factor and the Similarity Index is 10 percent or less. This usually occurs on land that has been farmed and not reseeded. Defer grazing until the Desired Plant Community is established. Control competitive plants and invasive species with fire, grazing or herbicide.

**Note:** Distance to water will be given.



# BEEF CATTLE HABITAT EVALUATION FORM

**Habitat Requirements:** Essential habitat components needed for survival and propagation of the species. For beef cattle, evaluate (A) forage and (B) distribution factors.

**A. Forage Components:** Forage of annual and perennial grass, forbs, legumes, and woody plants.

**Circle Correct Value**

**Site**

**1    2    3**

**1. Forage Production** - How abundant (composition by weight) are the desirable food producing plants?

Site has 76 to 100 percent by weight of desirable forage plants for beef cattle	<u>40</u>	<u>40</u>	<u>40</u>
Site has 51 to 75 percent by weight of desirable forage plants for beef cattle	<u>30</u>	<u>30</u>	<u>30</u>
Site has 26 to 50 percent by weight of desirable forage plants for beef cattle	<u>20</u>	<u>20</u>	<u>20</u>
Site has 0 to 25 percent by weight of desirable forage plants for beef cattle	<u>10</u>	<u>10</u>	<u>10</u>

**2. Forage Diversity** - How diverse is the desirable food producing plant community? (plant types = grasses, forbs, legumes and woodies.)

Food plants represented by 4 of the 4 major plant types	<u>40</u>	<u>40</u>	<u>40</u>
Food plants represented by 3 of the 4 major plant types	<u>30</u>	<u>30</u>	<u>30</u>
Food plants represented by 2 of the 4 major plant types	<u>20</u>	<u>20</u>	<u>20</u>
Food plants represented by 1 of the 4 major plant types	<u>10</u>	<u>10</u>	<u>10</u>

**3. Forage Utilization** - How long are the leaves of key (marked) utilization plants?

	Tallgrass (>8 inches)	Midgrass (>5 inches)	Shortgrass (>4 inches)			
Light Use	(>8 inches)	(>5 inches)	(>4 inches)	<u>30</u>	<u>30</u>	<u>30</u>
Moderate Use	(>5 to 8 inches)	(4 to 5 inches)	(3 to 4 inches)	<u>40</u>	<u>40</u>	<u>40</u>
Heavy Use	(4 to 5 inches)	(2 to 3 inches)	(1 to 2 inches)	<u>20</u>	<u>20</u>	<u>20</u>
Severe Use	(<4 inches)	(<2 inches)	(<1 inch)	<u>10</u>	<u>10</u>	<u>10</u>

Lowest score of 3 rated criteria = Limiting Factor for Forage Factors

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**B. Distribution Components - Physical factors that limit the grazing animal**

**Circle Correct Value**

	<b>Site</b>		
	<b>1</b>	<b>2</b>	<b>3</b>
<b>1. Grazing Accessibility -</b> How accessible are the forage plants to grazing animals?			
Slope less than 5 percent	<u>40</u>	<u>40</u>	<u>40</u>
Slope 5 to 10 percent and smooth	<u>35</u>	<u>35</u>	<u>35</u>
Slope 5 to 10 percent and rough (exposed surface rock)	<u>25</u>	<u>25</u>	<u>25</u>
Slope 11 to 15 percent and smooth	<u>30</u>	<u>30</u>	<u>30</u>
Slope 11 to 15 percent and rough (exposed surface rock)	<u>20</u>	<u>20</u>	<u>20</u>
Slope greater than 15 percent and smooth	<u>15</u>	<u>15</u>	<u>15</u>
Slope greater than 15 percent and rough (exposed surface rock)	<u>10</u>	<u>10</u>	<u>10</u>
<b>2. Grazing Restraint -</b> How much woody cover is there below 6 feet?			
Brush canopy cover less than 30 percent	<u>40</u>	<u>40</u>	<u>40</u>
Brush canopy cover 30 to 50 percent	<u>30</u>	<u>30</u>	<u>30</u>
Brush canopy cover 51 to 80 percent	<u>20</u>	<u>20</u>	<u>20</u>
Brush canopy cover greater than 80 percent	<u>10</u>	<u>10</u>	<u>10</u>
<b>3. Water -</b> How far is water from the grazing site? (Given)			
Distance less than or equal to 1/2 mile	<u>40</u>	<u>40</u>	<u>40</u>
Distance greater than 1/2 up to 1 mile	<u>30</u>	<u>30</u>	<u>30</u>
Distance greater than 1 up to 1 1/2 miles	<u>20</u>	<u>20</u>	<u>20</u>
Distance greater than 1 1/2 up to 2 miles	<u>10</u>	<u>10</u>	<u>10</u>
Distance greater than 2 miles or not available in the grazing unit	<u>0</u>	<u>0</u>	<u>0</u>

Lowest score of 3 rated criteria for Distribution Factors

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**C. Site Integrity - Invasive plants.**

<b>1. Do invasive (living) plants exceed 5 percent?</b>			
No - total percentage does not exceed 5 percent	<u>40</u>	<u>40</u>	<u>40</u>
Yes	<u>10</u>	<u>10</u>	<u>10</u>

Lowest score of 1 rated criteria = Limiting Factor for Site Integrity

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**Site 1. Summary**

(A) Forage Components	(B) Distribution Components	(C) Site Integrity
<input style="width: 40px; height: 30px;" type="text"/>	<input style="width: 40px; height: 30px;" type="text"/>	<input style="width: 40px; height: 30px;" type="text"/>

Habitat Rating Based on the Limiting Factor (lowest value)

Excellent_____	Good_____	Fair_____	Poor_____
(31 to 40)	(21 to 30)	(11 to 20)	(<11)

**Site 2. Summary**

(A) Forage  
Components

(B) Distribution  
Components

(C) Site  
Integrity

Habitat Rating Based on the Limiting Factor (lowest value)

Excellent\_\_\_\_\_  
(31 to 40)

Good\_\_\_\_\_  
(21 to 30)

Fair\_\_\_\_\_  
(11 to 20)

Poor\_\_\_\_\_  
(<11)

**Site 3. Summary**

(A) Forage  
Components

(B) Distribution  
Components

(C) Site  
Integrity

Habitat Rating Based on the Limiting Factor (lowest value)

Excellent\_\_\_\_\_  
(31 to 40)

Good\_\_\_\_\_  
(21 to 30)

Fair\_\_\_\_\_  
(11 to 20)

Poor\_\_\_\_\_  
(<11)

# BOBWHITE QUAIL HABITAT EVALUATION

## Introduction

The Northern Bobwhite Quail (*Colinus virginianus*) is the most well known and popular upland game bird in Oklahoma. The bobwhite occurs statewide and its numbers are directly related to land use and management practices. The main influence on Oklahoma's landscape and subsequently bobwhite quail habitat has been farming. Farming has directly eliminated bobwhite quail habitat. In addition, plowing rangeland and replacing it with introduced plants such as Bermudagrass, Old World bluestems, fescue or other introduced plants has greatly reduced the quality of the bobwhite's habitat. The major influences on rangeland, which is the bobwhite's natural habitat, are grazing and fire. Cattle grazing at light stocking rates with spot grazing is beneficial, and in many areas necessary to maintain high quality bobwhite quail habitat on clay or loam soils. In general, sandy soils produce better quail habitat than clay or loam soils. Much of the state's land provides habitat for the bobwhite quail; however, the quality of habitat varies from poor to excellent depending on land use and site factors. Weather and predators also influence bobwhite quail populations.

The purpose of this appraisal guide is to provide a tool for systematically evaluating suitability of any tract of land for bobwhite quail. The guide is designed to inventory and analyze existing habitat conditions, then determine an overall habitat value and a limiting factor value for bobwhite quail habitat. These values will indicate the overall quality that rangeland or forestland provides in its existing condition. Also, these values will allow the user to identify weak or missing elements that are limiting quail habitat so management alternatives can be developed to rectify those needs.

This appraisal guide allows the user to appraise habitat quality on all lands. The user must identify a conceptual home range and evaluate the habitat elements that are required by the bobwhite within its home range. The guide is based on the premise that habitat elements providing the requirements for a species occur within the home range in various amounts, kinds, conditions and arrangements. Appraisal of the conceptual home range is based upon the measurement of these variables within the home range.

## Background Information on the Habitat Evaluation Guide Components

The bobwhite quail restricts its activities to a home range that varies in size depending on the kind, amount, condition, and interspersed of the required habitat components. The size of this area, within limits, is approximately the same for all individuals within the species. Within this area or actual home range, all the requirements for the animal's livelihood must be found. The actual size and shape of the home range is determined by the inherent limits of how far the animal can travel and the quality of various habitat elements within the home range. Actual home ranges are not marked by permanent boundaries nor are they the same from year to year or season to season. A conceptual home range sets fixed boundaries which approximate the ordinary limits of movement for a species and provides a convenient area of planning within which habitat elements can be measured.

The bobwhite is a species of diverse native plant communities and a mixture of early (annual forbs and woody shrubs) and late stages (perennial tall grasses) of plant succession resulting from some type of disturbance to the plant community or on sites that inherently have those characteristics (i.e. sandy sites). The bobwhite is most abundant where grasses, forbs and woody plants are closely interspersed.

## Home Range and Carrying Capacity

The size and shapes of the bobwhite's home range varies according to the quality of habitat within the home range. Home range seldom exceeds 80 acres and averages between 20 and 40 acres. An individual quail covey can occupy as little as 4 acres, however, the average density on intensively managed areas is one covey per 15 acres. Carrying capacity for quail rarely exceeds one bird per acre averaged over several years. However, some birds may move over 30 miles during the fall dispersal.

## Habitat Requirements

**Food:** The diet of adult bobwhite quail consists of seeds and fruits of cultivated crops, wild herbaceous plants, or woody plants. Seeds are eaten throughout the year. Insects are high in protein and are eaten during the spring, summer, and fall, especially by adult females. Because of their high dietary protein requirement, insects are the primary food for quail broods during their first few weeks of life.

## Food Criteria

*Food Quantity:* A single adult bobwhite quail consumes an average of 0.05 pounds of food per day. Applying that consumption rate to the average size covey (14.3 birds) results in a daily consumption rate of 0.72 pounds per covey per day. Enough food must be produced in the fall to last through the winter until the critical month of March. This means that at least 130 pounds of food (0.72 pounds per covey per day times 182 days = 131 pounds) needs to be produced and available for this period. Generally this amount can be produced easily in 0.25 acre food plots, if soil fertility and weather conditions are ideal. However, naturally occurring foods do not always produce this amount and an area greater than 0.25 acres may be required to provide adequate amounts of food. Forty to 60 percent of the bobwhite's home range should be rangeland in a stage of early plant succession (dominated by annual forbs). By applying 40 percent to the minimum quail home range size limit (15 acres), 6 acres or more of naturally occurring forbs would be needed to optimize the bobwhite's food requirements.

*Food Variety:* More than 100 different quail food plants have been recorded in the diets of Oklahoma quail. The importance of variety of foods to animal populations has been well documented. Variety provides fulfillment of nutritional requirements, increases selectivity, ensures more stable production and distributes the period of use.

*Food Accessibility:* Bobwhites secure most of their food on the ground or from the layer of leaves and stems on the soil surface. If seeds are to be found by quail, they must be seen on bare ground or in litter that is sparse and can be moved easily. If seeds drop on a thick mat of stems and leaves, they fall to the bottom and become inaccessible to quail. Bobwhite quail require approximately 25 percent or more bare ground. Sandy soils (coarse textured) provide better interspersions of plant canopies and bare ground than clay soils (fine textured).

*Nesting Cover:* Bobwhites build their nests on the ground in grassy areas. The nest is usually located in dead warm-season grass clumps left from the previous growing season. Little bluestem and other grasses of similar growth habit make up the majority of nest sites. Weeping lovegrass is also used for nesting cover, when it is available close to other habitat requirements. Broomsedge bluestem is a primary nesting cover throughout much of the eastern part of the state. Warm-season native short grasses such as buffalograss, blue and hairy grama and introduced grasses are seldom used for nesting. Cool-season grasses such as tall fescue, smooth brome, tall wheatgrass, annual bromes and wild ryes are seldom used for nesting.

## **Nesting Cover Criteria**

*Nesting Cover Quantity:* The optimum percentage of grassland is 30 to 40 percent within the bobwhite's home range. Taking the lowest percentage (30 percent) and applying it to the minimum home range size (15 acres) suggests 4.5 acres or more of grassland is needed to optimize the nesting cover.

*Nesting Cover Use:* Bobwhites begin nesting in Oklahoma after covey break up in April. Tall and mid-height warm season grasses from the previous season (last year's growth) must be available in the proper condition for nesting at that time. Height of the grasses must be tall enough (6 to 8 inches) to conceal quail, thus requiring light to moderate use of the grasses by livestock.

*Brood Habitat:* Insect availability for food is required for nesting hens and quail broods. Open areas of herbaceous plants or grain and seed crops are used for feeding. Areas that have been burned produce green forage early, will attract high concentrations of insects, and are often called "bugging grounds."

## **Brood Habitat Criteria**

*Brood Habitat Quantity:* Thirty to 40 percent of the bobwhite's home range should be open grassy areas and 40 to 60 percent food producing plants such as forbs or planted crops. Applying the common percentage (40 percent) to the minimum home range size limit, results in a six acre or larger area, of either native grasses, native forbs or crops for optimum brood habitat value.

*Forage Accessibility:* Quail chicks prefer brood areas to be open enough to permit travel. Dense, tangled vegetation presents obstacles for the movement of young chicks and restricts food accessibility.

*Protective, Screening and Loafing Cover:* Protective cover is used for loafing and is necessary for escaping from predators. Low-growing woody plants and upright growing forbs are used for this type of cover because they provide dense overhead screening and persist during cold weather when thermal protection is most needed.

## **Protective Cover Criteria**

*Protective Cover Quantity:* Five to 20 percent of the bobwhite's home range should be brush or shrub cover. The least percentage (5 percent) of the minimum home range size limit (15 acres) requires 0.75 acres or more to optimize the quantity of low growing woody plants for protection.

*Protective Cover Composition:* Living, low-growing woody plants such as plums, blackberries, sumacs and buckbrush provide the best protection because they are persistent over a number of years. Brush piles are more temporary protection although they last longer than dense herbaceous plants such as common broomweed, sunflower or snow-on-the-mountain.

*Overhead Protection:* Protective cover should completely conceal quail from aerial predators. Protective cover should be thick, several feet above the ground, but relatively open at ground level to permit quail movement.

*Interspersion:* It is assumed that protective cover is distributed in a patchwork fashion throughout the home range.

## **Water Requirements**

Surface water is not essential for bobwhites, although it may be used if provided. Water needs are usually met by succulent herbs, insects, dew and snow. Also, metabolic water is produced during digestion and provides an additional source of water. Surface water such as ponds, creeks and overflow from windmills produce micro-habitats which can provide green, succulent vegetation and insects during dry or unfavorable weather conditions.

**General Instructions.** For bobwhite quail an overall habitat quality value and an overall limiting factor can be calculated from the values assigned to each habitat requirement. A formula has been developed that uses the requirement values to derive an overall habitat quality value for the species. The overall limiting factor value is determined by selecting the lowest limiting factor value assigned to any of the requirements. These values represent the general quality of habitat and the factor that is limiting the bobwhite quail population within the home range.

The following procedures describe the method for inventorying existing habitat conditions, rating the habitat criteria and calculating the habitat quality and limiting factor values. The system is based primarily on the kinds, amounts, condition and arrangement of plants.

**Ratings.** Ratings for the various habitat criteria range from 0 (poor) to 40 (excellent). The number of ratings per criteria depend on the number of variables that can be practically measured and levels of management that can be practically applied.

## **Instructions for Completing the Bobwhite Quail Habitat Evaluation Form**

Bobwhite Quail Home Range: 15 to 80 Acres

Habitat Requirements: Nesting cover, brood habitat, protective cover, food and interspersions

### **A. Nesting Cover Criteria**

**A.1. Nesting Cover Quantity.** Nesting cover quantity is defined as any open grassy area where at least 10 percent of the plant community is composed of perennial native warm-season bunch grasses, such as little bluestem. Nesting cover does not include cool-season grasses (e.g., bromes, fescue and wild ryes); single-stemmed grasses (e.g., uniolas); tall thick stemmed grasses (e.g., Johnsongrass); short warm season grasses (e.g., buffalograss, blue grama, vine mesquite and Bermudagrass); annual grasses (e.g., crabgrass and sprangletops) or introduced plants.

**NOTE:** Quail nest in the dead growth of preferred grasses left from the previous growing season. Areas will not qualify as nesting cover unless at least some of the previous season's growth of preferred grass species remain before nesting (April 1 to June 30).

The same area that provides food may also qualify for nesting cover, provided that the criteria for each requirement are met.

**A.2. Nesting Cover Height** (loss by grazing, mowing, or burning). Rated for the nesting season (April 1 to June 30) and last year's growth.

Light or none — less than 25 percent (by weight) of the years growth removed. Only part of the tops of grasses and other plants used (more than 8 inches stubble height).

Moderate — 26 to 50 percent (by weight) of the years growth removed (>5 to 8 inches stubble height for tall grasses).

Heavy — 51 to 75 percent (by weight) of the years growth is removed (4 to 5 inches stubble height for tall grasses).

Severe — more than 75 percent (by weight) of the years growth is removed (less than 4 inches for tall grasses).

## **B. Brood Habitat Criteria**

**B.1. Brood Habitat Quantity.** Brood habitat is defined as any area that provides lush green forage and associated insects during the time of brood rearing (June 30 to September 1). These are generally open areas consisting of the new growth of warm-season forbs, grasses or crops.

**B.2. Screening Cover.** Screening cover is defined as the canopy provided by warm season herbaceous plants (forbs, grasses or crops) formed at a height above which the brood is foraging (6 inches).

**B.3. Forage Accessibility.** Open conditions beneath indicate that the brood can move freely beneath the herbaceous canopy, or that the vegetation is less than 6 inches tall and contains continuous trails or openings throughout the plant community.

Moderately open conditions indicate that the brood can move through the near-ground vegetation only with some difficulty, or the vegetation is less than 6 inches tall and contains trails or openings, but are not continuous throughout the plant community.

Rank vegetative growth indicates that the brood can move through the near-ground vegetation only with a great deal of difficulty, or the vegetation is less than 6 inches and is matted and thick with few or no trails or openings.

**NOTE:** Interpolations can be made if existing conditions do not neatly fit the criteria.

## **C. Protective Cover Criteria**

**C.1. Protective Cover Quantity.** Protective cover quality is defined as any woody plants or brush piles arranged densely enough to form a canopy which provides protection from the elements and predators. Woody plants found on the site, but not included on the main plant list, will be considered for all protective cover criteria.

**C.2. Protective Cover Composition.** *Living woody plants* include live vascular plants whose woody stems are persistent throughout the winter. Examples include trees with low limbs, half cut trees, shrub thickets and brambles. These clumps of woody plants are also called mottes.

*Brush piles* may be included only if the pile forms overhead protection and the ground beneath the canopy is open to movement through, out of, and into the pile. Dozed timber or piles of dead trees made without creating an open condition beneath will not qualify for this criteria.

**C.3. Canopy Closure.** Canopy closure should be measured by selecting a representative area of protective cover. This may be a single low-growing tree or shrub, but is usually a thicket or clump of woody plants. All measurements should be made at a height of 2 to 3 feet. Canopy closures above that height do not provide adequate protection from predators or inclement winter weather. Measurements will be made on representative flagged plants.



## **D. Food Criteria**

**D.1. Food Production Potential.** Determine the percentage of the site that is in a food producing plant community. A food producing plant community is one that contains any of the desirable quail food plants listed in the Plant List. A native plant community has a desirable food plants if severely disturbed.

**D.2. Food Abundance.** Food is defined as the seeds of any of the desirable quail food plants (DQFP) listed in the Plant List.

*Very abundant* is defined as the DQFP making up more than 50 percent by weight of the plant community.

*Abundant* is defined as the DQFP making up 30 to 49 percent by weight of the plant community.

*Moderately abundant* is defined as the DQFP making up 10 to 29 percent by weight of the plant community.

*Sparse* is defined as the DQFP making up less than 10 percent of the plant community.

**D.3. Food Plant Diversity.** The major food groupings; grasses, forbs, legumes, and woodies, are provided by species in the Plant List. Food plants are represented in this criteria when:

1. It is not difficult to observe the presence of important food plants listed in the Plant List in a casual examination of the home range, and
2. The abundance of those plants appears great enough to contribute to quail food needs.

**D.4. Food Availability.** Light plant litter is defined as less than 50 percent coverage of the soil surface with dead leaves and stems from the previous season's growth.

*Moderately light plant litter* is defined as 51 to 70 percent coverage of the soil surface with dead leaves and stems from the previous season's growth.

*Moderately heavy plant litter* is defined as 71 to 90 percent coverage of the soil surface with dead leaves and stems from the previous season's growth.

*Heavy plant litter* is defined as more than 91 percent coverage of the soil surface with dead leaves and stems from the previous season's growth.

## **E. Site Integrity**

**E.1.** Check for invasive plants on the ecological site.

# GUIDE TO MANAGEMENT PRACTICES FOR BOBWHITE QUAIL

- 1. CONTINUE PRESENT MANAGEMENT** — Use when the current management objective is met by the present conditions of the site.
- 2. IMPROVE OR DEVELOP NESTING COVER** — Use when nesting cover quantity or height is the limiting factor. Do not burn, mow, intensively graze or otherwise remove needed nesting cover (previous years growth) for quail (needed from April through July). Protect nesting cover from severe or heavy grazing. Protect nesting cover from burning by choosing an appropriate fire prescription. Note that fires seldom completely burn an area, even in wildfire situations.
- 3. IMPROVE OR DEVELOP BROOD HABITAT** — Use when brood habitat quantity, screening cover, or accessibility is the limiting factor. Spot or intensively graze, with prescribed fire to stimulate a canopy of tall annual forbs (umbrella-like growth form) that produce open and bare conditions on the ground. The edges of protective cover may also provide this element.
- 4. IMPROVE OR DEVELOP PROTECTIVE COVER** — Use when protective cover quantity, composition, or canopy is the limiting factor. Increase woody plants such as sand plum, chittamwood, roughleaf dogwood, sumac, fragrant sumac or other low growing shrubs or small trees if they are native to the site.
- 5. IMPROVE OR DEVELOP FOOD** — Use when food quantity, abundance or diversity is the limiting factor. Provide a Similarity Index (SI) that contains seed producing forbs and grasses. This can be accomplished by discing native plant communities that are not shaded by woody plants or small burns (< 10 acres), followed by spot grazing by cattle to encourage the development of annual forbs. Cultivated food plots and/or feeders are expensive, may concentrate or attract predators, may increase disease problems, may reduce reproductive success and do not provide the balanced diet that is afforded by a diversity of native plant community.
- 6. INCREASE THE AMOUNT OF BARE GROUND** — Use when food accessibility is the limiting factor. Use heavy spot or patch grazing combined with prescribed fire and/or discing to increase bare ground.
- 7. APPLY INVASIVE PLANT CONTROL** — Use when invasive plants are the limiting factor. Invasive plants include locally exotic (e.g., eastern redcedar, etc.) or introduced plants (e.g., tall fescue, Old World bluestem, sericea lespedeza, bermudagrass, musk thistle, etc.). Control may be in the form of prescribed fire, herbicide, mechanical, biological or grazing/browsing. Some invasive plants are difficult to control with existing technology. If more than one plant occurs on the site, choose the plant with the lowest resource value rating.

# BOBWHITE QUAIL HABITAT EVALUATION FORM

**Habitat Requirements:** Essential habitat components needed for survival and propagation of the species. For bobwhite quail these components include (A) nesting cover, (B) brood habitat, (C) protective cove and (D) food.

**A. Nesting Cover Components:** Warm-season bunchgrasses. Last year's growth must be available during nesting season (April 1 to July 30).

## Rating Criteria for Nesting Cover:

	Circle Correct Value		
	Site		
	1	2	3
<b>1. Nesting Cover Quantity - How much nesting cover is there?</b>			
30 percent or more of site is a plant community with preferred grasses	<u>40</u>	<u>40</u>	<u>40</u>
20 to 29 percent of site is a plant community with preferred grasses	<u>30</u>	<u>30</u>	<u>30</u>
10 to 19 percent of site is a plant community with preferred grasses	<u>20</u>	<u>20</u>	<u>20</u>
1 to 9 percent of site is a plant community with preferred grasses	<u>10</u>	<u>10</u>	<u>10</u>
Site does not have plant community with preferred grasses	<u>0</u>	<u>0</u>	<u>0</u>
<b>2. Nesting Cover Height - How tall is the nesting cover?*</b>			
Degree of utilization Light or None (>8 inches)	<u>40</u>	<u>40</u>	<u>40</u>
Degree of utilization Moderate (>5 to 8 inches)	<u>30</u>	<u>30</u>	<u>30</u>
Degree of utilization Heavy (4 to 5 inches)	<u>10</u>	<u>10</u>	<u>10</u>
Degree of utilization Severe (<4 inches) (check the appropriate box)	<u>0</u>	<u>0</u>	<u>0</u>

\* Nesting cover that is burned or mowed during nesting season will be treated the same as severe utilization caused by grazing.  
 Lowest score of 2 rated criteria = Limiting Factor for Nesting Cover

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**B. Brood Habitat Components:** Native herbaceous plants and introduced crops during brood rearing (June 30 to Sept. 1).

## Rating Criteria for Brood Habitat:

	Circle Correct Value		
	Site		
	1	2	3
<b>1. Brood Habitat Quantity - How much brood habitat is there?</b>			
40 percent or more of site is plant community with warm season grasses, forbs, shrubs or crops	<u>40</u>	<u>40</u>	<u>40</u>
30 to 39 percent of site is plant community with warm-season grasses, forbs, shrubs or crops	<u>30</u>	<u>30</u>	<u>30</u>
20 to 29 percent of site is plant community with warm-season grasses, forbs, shrubs or crops	<u>20</u>	<u>20</u>	<u>20</u>
10 to 19 percent of site is plant community with warm-season grasses, forbs, shrubs or crops	<u>10</u>	<u>10</u>	<u>10</u>

1 to 9 percent of site is plant community with warm-season grasses, forbs, shrubs or crops	<u>  5  </u>	<u>  5  </u>	<u>  5  </u>
None of the site is plant community with warm-season grasses, forbs, shrubs or crops	<u>  0  </u>	<u>  0  </u>	<u>  0  </u>

**2. Screening Cover -** How much herbaceous screening cover is there?

Canopy cover 50 percent or greater above height of 6 inches	<u> 40 </u>	<u> 40 </u>	<u> 40 </u>
Canopy cover 30 to 49 percent above height of 6 inches	<u> 30 </u>	<u> 30 </u>	<u> 30 </u>
Canopy cover 10 to 29 percent above height of 6 inches	<u> 20 </u>	<u> 20 </u>	<u> 20 </u>
Canopy cover 1 to 9 percent above height of 6 inches	<u>  5  </u>	<u>  5  </u>	<u>  5  </u>
No canopy cover above height of 6 inches	<u>  0  </u>	<u>  0  </u>	<u>  0  </u>

**3. Screening Cover Accessibility -** Of the cover rated in 2, how open is the herbaceous cover?

Open condition below a height of 6 inches	<u> 40 </u>	<u> 40 </u>	<u> 40 </u>
Moderately open condition below a height of 6 inches	<u> 20 </u>	<u> 20 </u>	<u> 20 </u>
Closed or rank condition below a height of 6 inches	<u>  5  </u>	<u>  5  </u>	<u>  5  </u>

Lowest score of 3 rated criteria = Limiting Factor for Brood Habitat

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**C. Protective Cover Components:** Escape and loafing cover made up of native woody shrubs, low-growing trees or artificially created brush piles interspersed throughout the home range.

**1. Protective Cover Quantity -** How much protective cover is there?

Greater than 20 percent or more of site is composed of woody plants or brush piles	<u> 40 </u>	<u> 40 </u>	<u> 40 </u>
10 to 19 percent of site is composed of woody plants or brush piles	<u> 30 </u>	<u> 30 </u>	<u> 30 </u>
5 to 9 percent of site is composed of woody plants or brush piles	<u> 10 </u>	<u> 10 </u>	<u> 10 </u>
Less than 5 percent of site is composed of woody plants	<u>  0  </u>	<u>  0  </u>	<u>  0  </u>

**2. Protective Cover Composition -** Of the cover rated in 1, what makes up the protective cover?

Living woody shrubs or low growing trees	<u> 40 </u>	<u> 40 </u>	<u> 40 </u>
Artificial cover including brush piles or shelters	<u> 20 </u>	<u> 20 </u>	<u> 20 </u>
Larger trees without extensive low growing stems	<u>  5  </u>	<u>  5  </u>	<u>  5  </u>
No woody plants within the site	<u>  0  </u>	<u>  0  </u>	<u>  0  </u>

**3. Protective Cover Canopy -** Of the designated area flagged, how much canopy cover is there?

80 percent or greater canopy cover at 2 to 3 feet high	<u> 40 </u>	<u> 40 </u>	<u> 40 </u>
60 to 79 percent canopy cover at 2 to 3 feet high	<u> 30 </u>	<u> 30 </u>	<u> 30 </u>
40 to 59 percent canopy cover at 2 to 3 feet high	<u> 20 </u>	<u> 20 </u>	<u> 20 </u>
20 to 39 percent canopy cover at 2 to 3 feet high	<u> 10 </u>	<u> 10 </u>	<u> 10 </u>
Less than 20 percent canopy cover at 2 to 3 feet high	<u>  5  </u>	<u>  5  </u>	<u>  5  </u>

Lowest score of 3 rated criteria = Limiting Factor for Protective Cover

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**D. Food Components: Seeds of native herbaceous or woody plants.**

Circle Correct Value  
Site

1 2 3

**Rating Criteria for Food:**

**1. Food Production Potential** - How much food production potential is there?

40 percent or more of site is a food producing plant community	<u>40</u>	<u>40</u>	<u>40</u>
30 to 39 percent of site is a food producing plant community	<u>30</u>	<u>30</u>	<u>30</u>
20 to 29 percent of site is a food producing plant community	<u>20</u>	<u>20</u>	<u>20</u>
10 to 19 percent of site is a food producing plant community	<u>10</u>	<u>10</u>	<u>10</u>
1 to 9 percent of site is a food producing plant community	<u>5</u>	<u>5</u>	<u>5</u>
None of site is a food producing plant community	<u>0</u>	<u>0</u>	<u>0</u>

**2. Food Abundance** - How abundant (composition by weight) are the desirable food producing plants?

Food plants are very abundant and comprise 50 percent or more of plants in the site	<u>40</u>	<u>40</u>	<u>40</u>
Food plants are abundant and comprise 30 to 49 percent of plants in the site	<u>30</u>	<u>30</u>	<u>30</u>
Food plants are moderately abundant and comprise 10 to 29 percent of the site	<u>20</u>	<u>20</u>	<u>20</u>
Food plants are sparse and comprise 1 to 9 percent of plants in the site	<u>10</u>	<u>10</u>	<u>10</u>
Food plants do not occur within site	<u>0</u>	<u>0</u>	<u>0</u>

**3. Food Diversity** - How many food groups with desirable plants are there? (forbs, legumes, grasses and woody plants)

Food plants represented by all four of the major food groups	<u>40</u>	<u>40</u>	<u>40</u>
Food plants represented by three of the four major food groups	<u>30</u>	<u>30</u>	<u>30</u>
Food plants represented by two of the four major food groups	<u>10</u>	<u>10</u>	<u>10</u>
Food plants represented by one of the four major food groups	<u>5</u>	<u>5</u>	<u>5</u>

**4. Food Accessibility** - How much bare ground is there?

50 percent or more of soil surface is bare	<u>40</u>	<u>40</u>	<u>40</u>
30 to 49 percent of soil surface is bare	<u>30</u>	<u>30</u>	<u>30</u>
10 to 29 percent of soil surface is bare	<u>10</u>	<u>10</u>	<u>10</u>
Less than 10 percent of soil surface is bare	<u>5</u>	<u>5</u>	<u>5</u>

Lowest score of 4 rated criteria = Limiting Factor for Food

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**E. Site Integrity: Invasive Plants**

1. Do invasive (living) plants exceed 5 percent?

No – total percentage does not exceed 5 percent

Yes

40   40   40  
5   5   5

Lowest score of 1 rated criteria = Limiting Factor for Site Integrity

**Site 1. Summary**

(A) Nesting Cover   (B) Brood Habitat   (C) Protective Cover   (D) Food   (E) Site Integrity

Habitat Rating Based on the Limiting Factor (lowest value)

Excellent\_\_\_\_\_   Good\_\_\_\_\_   Fair\_\_\_\_\_   Poor\_\_\_\_\_

(31 to 40)   (21 to 30)   (11 to 20)   (<11)

**Site 2. Summary**

(A) Nesting Cover   (B) Brood Habitat   (C) Protective Cover   (D) Food   (E) Site Integrity

Habitat Rating Based on the Limiting Factor (lowest value)

Excellent\_\_\_\_\_   Good\_\_\_\_\_   Fair\_\_\_\_\_   Poor\_\_\_\_\_

(31 to 40)   (21 to 30)   (11 to 20)   (<11)

**Site 3. Summary**

(A) Nesting Cover   (B) Brood Habitat   (C) Protective Cover   (D) Food   (E) Site Integrity

Habitat Rating Based on the Limiting Factor (lowest value)

Excellent\_\_\_\_\_   Good\_\_\_\_\_   Fair\_\_\_\_\_   Poor\_\_\_\_\_

(31 to 40)   (21 to 30)   (11 to 20)   (<11)

## GLOSSARY OF TERMS

**Abiotic component** — Basic inorganic and organic compounds of the environment.

**Annual plant** — A plant that completes its life cycle in one year.

**Biennial Plant** — Life cycle completed in two years.

**Biotic component** — Living organisms.

**Biological diversity** — The richness, abundance, and variability of the native plant and animal species and communities and the ecological processes that link them with one another and with soil, air and water. Human quality of life and survival depend on the conservation of biological diversity.

**Carrying capacity** — The number of animals that a given area of land can sustain over a long period of time without damage to the environment.

**Complementary forage** — A forage (usually introduced) that is planted to make up for deficiencies in the main forage base.

**Cool season plant** — A plant that begins its growing season in the fall and ends in the spring (C3 photosynthetic pathway).

**Desirable** — Provides positive functions and values throughout most of its life cycle.

**Disturbance** — Removal of biomass, or physical movement of soil.

**Ecological principle** — Recognitions of the mutual relationships among organisms and between the organisms and their environment.

**Ecosystem** — The basic functional unit in ecology, it includes both organisms (biotic community) and abiotic environment, each influencing the properties of the other. Both are necessary for maintenance of life as we have it on the earth.

**Energy flow** — Movement of energy from one trophic level (e.g. green plants) to another (e.g. white-tailed deer).

**Extirpation** — Locally extinct.

**Forb** — A herbaceous plant that has broad leaves. Flowers are usually large, colored, and showy.

**Graminoid** — A grasslike herbaceous plant that resembles grass but generally has solid stems without elongated internodes. Leaf veins are parallel, but the leaves are three-ranked. Stems are often triangular, and the flowers are small and inconspicuous.

**Grass** — A herbaceous plant that has both hollow and solid stems with nodes. Leaves are two-ranked and have parallel veins, which are typical of monocots. Flowers are small and inconspicuous.

**Habitat evaluation guide** — A systematic approach to evaluating habitat.

**Introduced plant** — A plant that has been brought in from another region. Usually from overseas and a weed in an ecological sense.

**Invasive plant** — A plant that was not native to the ecological site under pre-European settlement conditions. A weed in an ecological sense.

**Landscape** — An expanse of land that can be viewed from one vantage point.

**Land stewardship** — Taking care of the land including all of its components; soil, plants, animals, water and air.

**Limiting factor** — The habitat component that limits the population from becoming larger.

**Mast** — Fruits from trees and shrubs usually referred to as hard mast such as acorns or soft mast such as persimmons.

**Mid-grass** — Generally plants one to three feet tall at maturity.

**Monogastric** — A mammal with a simple stomach, such as a coyote.

**Motte** — A grouping of woody plants.

**Native plant** — A plant that naturally occurred on the site under pre-European settlement conditions.

**Niche** — An organism's place and function in the environment.

**Nutrient cycling** — The movement of nutrients through biotic and abiotic components of the ecosystem.

**Perennial plant** — A plant that lives for more than one year.

**Plant community** — An assemblage of plants.

**Prescribed fire** — A fire burning under a prescribed set of weather (air temperature, relative humidity and wind speed) and fuel conditions (fuel moisture, fuel load and fuel architecture).

**Prescribed grazing** — Animals grazing under a prescribed stocking rate, density (for rotational grazing) and time interval.

**Riparian zone** — A corridor along a stream with distinct soils and vegetation. Historical riparian vegetation may be prairie, shrubland or forest.

**Ruminant** — A mammal with a compartmentalized stomach (more than one compartment) such as bison or cattle.

**Savanna** — A native grassland characterized by scattered trees and mottes.

**Short-grass** — Generally plants less than one foot tall at maturity.

**Shrub** — A woody plant with secondary growth originating from aerial stems which live throughout the year, although they may be dormant part of the time. Leaves are often broad and net veined. Flowers are often showy.

**Tall-grass** — Generally, plants more than three feet tall at maturity.

**Warm season plant** — A plant that begins its growing season in the spring and ends in the fall (C4 photosynthetic pathway).

**Undesirable** — May provide short-term functions and values, but overall not a plant suited for the intended purpose.



## RANGELAND CONTEST EXAMPLE

The contestant observes the Ecological Site and determines that it is Loamy Prairie.

Using the Ecological Site Guide for Loamy Prairie, the contestant determines the percent plant composition by weight and marks the left-hand side of the card. In this example, the Similarity Index is 60 percent.

The contestant uses the Bobwhite Quail Evaluation Guide to rate the Ecological Site for Bobwhite Quail and marks the left-hand side of the card.

The contestant uses the Beef Cattle Habitat Evaluation Guide to rate the Ecological Site for Beef Cattle and marks the left-hand side of the card.

### 1. The present conditions for **Bobwhite Quail** are:

A1 = 10      A2=30      B1 = 20      B2 = 40      B3 = 40      C1 = 40  
C2= 40      C3 = 40      D1 = 40      D2 = 40      D3 = 30      D4 = 10  
E1 = 40.

Taking the lowest value of A (nesting cover), B (brood habitat), C (protective cover), D (food), and E (site integrity) we have the limiting factor for the site. The contestant would mark Limiting Factor A (nesting cover), Limiting Factor D (food) because they are tied for the lowest score (10), and Poor (<11) because of the habitat rating of 10.

### 2. The present conditions for **Beef Cattle** are:

A1 = 10      A2 = 20      A3 = 40      B1 = 40      B2 = 40      B3 = 0  
C1 = 40.

Taking the lowest value of A (forage factors), B (distributions factors), and C (site integrity) we have the limiting factor for the site. The contestant would mark Limiting Factor B (distribution factors) because of the lowest score (0) and Poor (<11) because of the habitat rating of 0.

Once the left-hand side of the card, Resource Inventory - Present Conditions, has been marked. Do not change any of the marks on this side of the card. As you proceed to the right-hand side of the card, Recommended Management Practices, you will use the Resource Inventory - Present Conditions and the Beef Cattle and Bobwhite Quail Habitat Evaluation Guides to help make the Recommended Management Practices.

The contestant should observe the Posted Material for the contest. This includes any special information such as distance to water and the land managers objectives

In this example, the Habitat Rating Objective given by the Land Manager was 30 for Bobwhite Quail and 20 for Beef Cattle.

### **For Bobwhite Quail:**

The land manager's objective is 30.

The Present Condition for Bobwhite Quail is 10 because of the rating for both Nesting Cover and Food Components is 10 in the Summary. The contestant must find the limiting factor(s) and mark management practices to address all criteria within each component with value ratings lower than the management objective. Nesting Cover Quality (A1) is raised from 10 to 40 by checking Improve or Develop Nesting Cover, but Nesting Cover Height (A2) is 30 so the score in the Summary is raised from 10 to 30, since 30 now represents the lowest value (limiting factor) for Nesting Cover Components.

Food Availability (D4) is raised from 10 to 40 by checking Increase the Amount of Bare Ground, but Food Diversity (D3) is 30 so the score in the Summary is raised from 10 to 30, since 30 represents the lowest value (limiting factor) for Food Components.

Now the lowest value in the Summary is 20 for Brood Habitat, specifically Brood Habitat Quantity (B1). Brood Habitat is raised from 20 to 40 by checking Improve or Develop Brood Habitat, since under Brood Habitat Components the next lowest value is 40.

The land manager's objective is 30, and the lowest value in the Summary is 30. Therefore, the objective has been met.

Under Recommended Management Practices, the contestant would mark Improve or Develop Nesting Cover, Increase the Amount of Bare Ground, and Improve or Develop Brood Habitat.

### **For Beef Cattle:**

The land manager's objective is 20.

The Present Condition for Beef Cattle is 0 because of the rating for Distribution Components is 0 in the Summary. The contestant must find the limiting factor(s) and mark management practices to address all criteria within each component with value ratings lower than the management objective. Water (B3) is raised from 0 to 40 by checking Develop Water. Since the other components are also 40, 40 represents the lowest value (limiting factor) and thus the score in the Summary is 40.

Forage Production (A1) is raised from 10 to 40 by checking Apply Forb or Grass Control and Begin a Planned Grazing System, but Forage Diversity (A2) is 20 so the score in the Summary is raised from 10 to 20, since 20 represents the lowest value (limiting factor) for the Forage Components.

The land manager's objective is 20, and the lowest value in the Summary is 20. Therefore, the objective has been met.

Under Recommended Management Practices, the contestant would mark Develop Water for Beef Cattle, Begin a Planned Grazing System and Apply Forb or Grass Control.

## PLANT LIST

The plants selected for the contest are dominants in their respective regions. Plant characteristics and their ratings for bobwhite quail and beef cattle are based on ecological criteria and value to the particular animal. Native plants that are classified as invasive are those that did not occur historically on the ecological site under the influences of fire, drought and herbivory. Introduced plants that escape from where they are planted are also classified as invasive.

### ***Field Guide to Oklahoma Plants* Book Availability** **Second Edition**

Commonly Encountered Prairie, Shrubland, and Forest Species

Authors: R.J. Tysl  
T.G. Bidwell  
R.M. Masters  
R. Dwayne Elmore

This book comprises synopses of 271 species. Each synopsis includes information about the taxon's (1) morphology, (2) taxonomy and nomenclature, (3) geographic distribution, (4) ecology, and (5) economic and/or wildlife significance. A full-page illustration by noted botanical artist Bellamy Parks Jansen accompanies each synopsis. Also included are two chapters that give an overview of the vegetation of Oklahoma and contributing eco-geographical factors. An illustrated glossary of the common botanical and ecological terms used to describe the taxa and vegetation, and a comprehensive index is included. As the title of the book implies, the objective of the authors was to write a guide that facilitates the identification of commonly encountered, ecologically distinctive, or biologically/economically important plants. They envision the book's users to be anyone interested in the plants of Oklahoma, whether students, scientists, or individuals who simply enjoy the beauty of the state's plants. In addition, this book serves as the official guide for the National Rangeland Judging Contest: Judging Rangeland for Livestock and Wildlife Values.

To receive a copy of the *Field Guide to Oklahoma Plants*, please contact:

Contact: Dr. Laura Goodman  
Rangeland Ecology and Management  
Department of Natural Resource Ecology and Management  
008C AGH, Oklahoma State University  
Stillwater, OK 74078  
405-744-2061  
laura.goodman@okstate.edu  
<http://nrem.okstate.edu>

PLANT CHARACTERISTIC, ECOLOGICAL AND RESOURCE RATING GUIDE					RESOURCE VALUE RATING		
<b>ST = Stature</b> Short = S Mid = M Tall = T	<b>LH = Life History</b> Annual = A Biennial = B Perennial = P	<b>SG = Season of Growth</b> Warm Season = W Cool Season = C	<b>OR = Origin</b> Native = N Introduced = IN Invasive = IV	Desirable = De		Undesirable = Un	
				BW Quail		Cattle	
				Food	Cover	Food	

**GRASSES**

	ST	LH	SG	OR	Food	Cover	Food
1 Alkali Sacaton ( <i>Sporobolus airoides</i> )*	M	P	W	N	UN	DE	DE
2 Annual Threeawn ( <i>Aristida oligantha</i> )	S	A	W	N	UN	UN	UN
3 Bermudagrass ( <i>Cynodon dactylon</i> )	S	P	W	IN, IV	UN	UN	DE
4 Big or Sand Bluestem ( <i>Andropogon gerardii</i> )	T	P	W	N	UN	DE	DE
5 Blue Grama ( <i>Bouteloua gracilis</i> )	S	P	W	N	UN	UN	DE
6 Broadleaved Uniola ( <i>Chasmanthium latifolium</i> )*	T	P	C	N	UN	DE	UN
7 Brome ( <i>Bromus spp.</i> )	S	A	C	IN, IV	UN	UN	UN
8 Broomsedge Bluestem ( <i>Andropogon virginicus</i> )	T	P	W	N	UN	DE	UN
9 Buffalograss ( <i>Buchloe dactyloides</i> )	S	P	W	N	UN	UN	DE
10 Canada Wild rye ( <i>Elymus canadensis</i> )	M	P	C	N	UN	DE	DE
11 Eastern Gamagrass ( <i>Tripsacum dactyloides</i> )	T	P	W	N	DE	DE	DE
12 Fall Witchgrass ( <i>Leptoloma cognatum</i> )*	S	P	W	N	DE	UN	DE
13 Florida Paspalum ( <i>Paspalum floridanum</i> )*	T	P	W	N	DE	DE	DE
14 Hairy Grama ( <i>Bouteloua hirsuta</i> )	S	P	W	N	UN	UN	DE
15 Indiangrass ( <i>Sorghastrum nutans</i> )	T	P	W	N	UN	DE	DE
16 Inland Saltgrass ( <i>Distichlis spicata</i> )*	S	P	W	N	UN	UN	UN
17 Johnsongrass ( <i>Sorghum halepense</i> )	T	P	W	IN, IV	DE	DE	DE
18 Little Barley ( <i>Hordeum pusillum</i> )	S	A	C	IN, IV	UN	UN	UN
19 Little Bluestem ( <i>Schizachyrium scoparium</i> )	T	P	W	N	UN	DE	DE
20 Old World Bluestem ( <i>Bothriochloa ischaemum</i> )	M	P	W	IN, IV	UN	UN	DE
21 Perennial Threeawn ( <i>Aristida spp.</i> )	M	P	W	N	UN	UN	UN
22 Plains Lovegrass ( <i>Eragrostis lugens</i> )*	M	P	W	N	UN	UN	DE
23 Prairie Cordgrass ( <i>Spartina pectinata</i> )*	T	P	W	N	UN	DE	DE
24 Purpletop ( <i>Tridens flavus</i> )	T	P	W	N	UN	DE	UN
25 Rescuegrass ( <i>Bromus catharticus</i> )*	S	A	C	IN, IV	UN	UN	UN
26 Sand Dropseed ( <i>Sporobolus cryptandrus</i> )	M	P	W	N	DE	DE	DE
27 Sand Lovegrass ( <i>Eragrostis trichodes</i> )	M	P	W	N	UN	UN	DE
28 Scribner Panicum ( <i>Panicum oligosanthes</i> )	S	P	C	N	DE	UN	DE
29 Sedge ( <i>Carex spp.</i> )	S	P	C	N	DE	UN	DE
30 Sideoats Grama ( <i>Bouteloua curtipendula</i> )	M	P	W	N	UN	DE	DE
31 Silver Bluestem ( <i>Bothriochloa laguroides</i> )	M	P	W	N	UN	DE	UN
32 Splitbeard Bluestem ( <i>Andropogon ternarius</i> )	M	P	W	N	UN	DE	UN
33 Switchgrass ( <i>Panicum virgatum</i> )	T	P	W	N	DE	DE	DE
34 Tall Dropseed ( <i>Sporobolus spp.</i> )	T	P	W	N	DE	DE	DE
35 Tall Fescue ( <i>Festuca arundinacea</i> )	M	P	C	IN, IV	UN	UN	DE
36 Texas Bluegrass ( <i>Poa arachnifera</i> )	M	P	C	N	UN	UN	DE
37 Vine Mesquite ( <i>Panicum obtusum</i> )*	M	P	W	N	DE	DE	DE
38 Weeping Lovegrass ( <i>Eragrostis curvula</i> )*	M	P	W	IN	UN	DE	DE
39 Western Wheatgrass ( <i>Elymus smithii</i> )	M	P	C	N	UN	DE	DE

**LEGUMES**

	ST	LH	SG	OR	Food	Cover	Food
40 Catclaw Sensitivebriar ( <i>Mimosa quadrivalis</i> )		P	W	N	DE	DE	DE
41 Groundplum ( <i>Astragalus crassicaerpus</i> )		P	C	N	UN	UN	DE
42 Hairy Vetch ( <i>Vicia villosa</i> )		A	C	IN	DE	UN	DE
43 Illinois Bundleflower ( <i>Desmanthus illinoensis</i> )		P	W	N	DE	DE	DE
44 Leadplant ( <i>Amorpha canescens</i> )		P	W	N	UN	DE	DE
45 Prairie Acacia ( <i>Acacia angustissima</i> )		P	W	N	DE	DE	DE
46 Purple Prairie Clover ( <i>Delea purpurea</i> )		P	W	N	DE	DE	DE
47 Roundhead Lespedeza ( <i>Lespedeza capitata</i> )		P	W	N	DE	DE	DE
48 Scurfpea ( <i>Psoraleidium tenuiflorum</i> )		P	C	N	DE	DE	UN

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				BW Quail		Cattle	
				Food	Cover	Food	
49	Sericea Lespedeza ( <i>Lespedeza cuneata</i> )	P	W	IN, IV	UN	UN	UN
50	Slender Dalea ( <i>Dalea enneandra</i> )	P	W	N	DE	DE	DE
51	Slender Lespedeza ( <i>Lespedeza virginica</i> )	P	W	N	DE	DE	DE
52	Tephrosia ( <i>Tephrosia virginiana</i> )*	P	W	N	UN	DE	DE
53	Tickclover ( <i>Desmodium</i> spp.)	P	W	N	DE	DE	DE
54	Trailing Wildbean ( <i>Strophostyles helvula</i> )	P	W	N	DE	DE	DE
55	White Clover ( <i>Trifolium repens</i> )*	P	C	IN	UN	UN	DE
56	Wild Indigo ( <i>Baptisia</i> spp.)	P	C	N	UN	DE	UN
57	Woolly Loco ( <i>Astragalus mollissimus</i> )	P	C	N	UN	UN	UN
58	Yellow Neptune ( <i>Neptunia lutea</i> )	P	W	N	DE	DE	DE

#### FORBS

59	Annual Sunflower ( <i>Helianthus annuus</i> )	A	W	N	DE	DE	DE
60	Antelopehorn Milkweed ( <i>Asclepias viridis</i> )	P	C	N	UN	DE	UN
61	Ashy Sunflower ( <i>Helianthus mollis</i> )	P	W	N	DE	DE	DE
62	Basketflower ( <i>Centaurea americana</i> )*	A	W	N	UN	DE	UN
63	Bitter Sneezeweed ( <i>Helenium amarum</i> )*	A	W	N	UN	DE	UN
64	Blackeyed Susan ( <i>Rudbeckia hirta</i> )	A	W	N	DE	DE	UN
65	Blacksamson ( <i>Echinacea angustifolia</i> )	P	W	N	UN	DE	UN
66	Broom Snakeweed ( <i>Gutierrezia sarothrae</i> )*	P	W	N	UN	DE	UN
67	Common Broomweed ( <i>Gutierrezia dracunculoides</i> )	A	W	N	UN	DE	UN
68	Compass Plant ( <i>Silphium laciniatum</i> )	P	W	N	DE	DE	DE
69	Croton ( <i>Croton</i> spp.)	A	W	N	DE	DE	UN
70	Curlycup Gumweed ( <i>Grindelia squarrosa</i> )*	P	W	N	DE	DE	UN
71	Daisy Fleabane ( <i>Erigeron strigosus</i> )	A	C	N	UN	DE	UN
72	Dotted Gayfeather ( <i>Liatris punctata</i> )	P	W	N	UN	DE	UN
73	Engelmann Daisy ( <i>Engelmannia peristenia</i> )*	P	C	N	DE	DE	DE
74	Giant Ragweed ( <i>Ambrosia trifida</i> )	A	W	N	DE	DE	UN
75	Goat's Beard ( <i>Tragopogon pratensis</i> )	A	C	IN	DE	UN	UN
76	Goldenrod ( <i>Solidago</i> spp.)	P	W	N	UN	DE	UN
77	Halfshrub Sundrop ( <i>Calyophus serrulatus</i> )	P	W	N	UN	DE	UN
78	Heath Aster ( <i>Aster ericoides</i> )	P	W	N	UN	DE	UN
79	Horseweed ( <i>Conyza canadensis</i> )	A	W	N	UN	DE	UN
80	Indian Blanket ( <i>Gaillardia pulchella</i> )*	A	C	N	UN	DE	UN
81	Lanceleaf Ragweed ( <i>Ambrosia bidentata</i> )*	A	W	N	DE	UN	UN
82	Maximilian Sunflower ( <i>Helianthus maximiliani</i> )	P	W	N	DE	DE	DE
83	Mexican Hat ( <i>Ratibida columnifera</i> )	P	W	N	UN	DE	UN
84	Pepperweed ( <i>Lepidium virginicum</i> )	A	C	N	DE	UN	DE
85	Pitcher Sage ( <i>Salvia azurea</i> )	P	W	N	UN	UN	DE
86	Plains Yucca ( <i>Yucca glauca</i> )	P	C	N	UN	DE	UN
87	Prickly Pear Cactus ( <i>Opuntia macrorhiza</i> )	P	W	N, IV	UN	DE	UN
88	Sagewort ( <i>Artemisia ludoviciana</i> )	P	W	N	UN	DE	UN
89	Silverleaf Nightshade ( <i>Solanum elaeagnifolium</i> )*	P	W	N	UN	UN	UN
90	Snow-on-the-mountain ( <i>Euphorbia marginata</i> )	A	W	N	DE	DE	UN
91	Sumpweed ( <i>Iva annua</i> )*	A	W	N	UN	DE	UN
92	Threadleaf Groundsel ( <i>Senecio flaccidus</i> )*	P	W	N	UN	UN	UN
93	Wax Goldenweed ( <i>Haplopappus ciliatus</i> )	A	W	N	DE	DE	UN
94	Western Ironweed ( <i>Vernonia baldwinii</i> )	P	W	N	UN	DE	UN
95	Western Ragweed ( <i>Ambrosia psilostachya</i> )	P	W	N	DE	DE	UN
96	White Snakeroot ( <i>Eupatorium rugosum</i> )	P	W	N	UN	DE	UN
97	Wood Sorrel ( <i>Oxalis</i> spp.)	A	C	N	DE	UN	UN
98	Yarrow ( <i>Achillea millefolium</i> )	P	C	N	UN	UN	UN
99	Yellow Puccoon ( <i>Lithospermum incisum</i> )	P	C	N	DE	DE	UN

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				BW Quail		Cattle	
				Food	Cover	Food	

**WOODIES**

100 American Beautyberry ( <i>Callicarpa americana</i> )*		P	W	N	DE	DE	UN
101 American Elm ( <i>Ulmus americana</i> )		P	W	N	UN	UN	DE
102 Black Locust ( <i>Robinia pseudoacacia</i> )*		P	W	N, IV	DE	DE	UN
103 Blackjack Oak ( <i>Quercus marilandica</i> )		P	W	N	DE	DE	UN
104 Buckbrush ( <i>Symphoricarpos orbiculatus</i> )		P	W	N	UN	DE	UN
105 Buttonbush ( <i>Cephalanthus occidentalis</i> )		P	W	N	UN	DE	UN
106 Chittamwood ( <i>Bumelia lanuginosa</i> )		P	W	N	DE	DE	DE
107 Eastern Cottonwood ( <i>Populus deltoides</i> )		P	W	N	UN	UN	DE
108 Eastern Redcedar ( <i>Juniperus virginiana</i> )		P	C	N, IV	UN	UN	UN
109 False Indigo ( <i>Amorpha fruticosa</i> )		P	W	N	UN	DE	UN
110 Fragrant Sumac ( <i>Rhus aromatica</i> )		P	W	N	DE	DE	UN
111 Greenbrier ( <i>Smilax bona-nox</i> )		P	W	N	DE	DE	DE
112 Hackberry ( <i>Celtis spp.</i> )		P	W	N	DE	DE	DE
113 Hawthorn ( <i>Crataegus viridis</i> )*		P	W	N, IV	UN	DE	UN
114 Honey locust ( <i>Gleditsia triacanthos</i> )		P	W	N, IV	DE	DE	UN
115 Mesquite ( <i>Prosopis glandulosa</i> )*		P	W	N, IV	UN	DE	UN
116 Oklahoma Blackberry ( <i>Rubus oklahomus</i> )		P	W	N, IV	DE	DE	UN
117 Osage Orange ( <i>Maclura pomifera</i> )		P	W	N	UN	DE	UN
118 Persimmon ( <i>Diospyros virginiana</i> )*		P	W	N	DE	DE	UN
119 Plum ( <i>Prunus spp.</i> )		P	W	N	UN	DE	UN
120 Poison ivy ( <i>Toxicodendron radicans</i> )		P	W	N	DE	DE	UN
121 Post Oak ( <i>Quercus stellata</i> )		P	W	N	DE	DE	UN
122 Redbud ( <i>Cercis canadensis</i> )		P	W	N	DE	DE	DE
123 Rough-leaf Dogwood ( <i>Cornus drummondii</i> )		P	W	N	DE	DE	UN
124 Saltcedar ( <i>Tamarix chinensis</i> )*		P	W	IN, IV	UN	UN	UN
125 Sand Sagebrush ( <i>Artemisia filifolia</i> )*		P	W	N	UN	DE	UN
126 Shinnery Oak ( <i>Quercus havardii</i> )*		P	W	N	DE	DE	UN
127 Soapberry ( <i>Sapindus drummondii</i> )		P	W	N	UN	DE	UN
128 Sumac ( <i>Rhus spp.</i> )		P	W	N	DE	DE	UN
129 Virginia Creeper ( <i>Parthenocissus quinquefolia</i> )		P	W	N	DE	DE	DE
130 Winged Elm ( <i>Ulmus alata</i> )		P	W	N, IV	UN	DE	DE

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