New Mexico Rangeland Judging Contest

Judging Rangeland for Livestock Values

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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% of the earth's land surface. In the contiguous 48 states, rangeland makes up 45% of the land surface. About 80 percent of the land in New Mexico is rangeland, consisting primarily of native shrubs, grasses, forbs, and open stands of trees. .

The rangeland **ecosystem*** is characterized by many organisms. Mixtures of native **grasses, forbs,** or **shrubs** exist as unique native **plant communities.** These plant communities occur on ecological sites such as swales, bottomlands, loamy, stony, salt meadows, malpais, limy hills, meadows, shallow sandy, deep sand, sodic slopes, salt flats, shale hills, cobbly hills, high limes, clay loams, very shallow, sandy plains, sandy loams, shallow sandstone, sandstone breaks, saline, loamy sand, draws, limestone hills, mesa breaks, gyps, and many other types of plant communities.

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 land type for almost all ranching operations in New Mexico, which are family owned, and the socio economic baseline for many communities in the state. There are approximately 6,800 beef and sheep producers in New Mexico. In almost 25 percent of the counties in New Mexico, beef cattle production is the largest economic output of all private industries. Statewide, the direct economic output of the beef and sheep industry is an estimated $977 million, with over 8,200 people, with an additional 9,650 jobs within the industries that service cattle and sheep enterprises. Proper rangeland management is very important because ranching has been a relatively stable economic and cultural foundation for the majority of New Mexico communities. By its very nature, ranching is a long term commitment of investment capital and personal devotion that provides economic stability to the state.

New Mexico's rangeland can generally be divided into grasslands, shrub lands, woodlands, and forests. Eastern New Mexico is gently rolling in topography, while the central, northern and western portions are characterized by rugged mountain terrain. These topographic variations result in diverse patterns of precipitation, temperature, and vegetation. In the southern portion of the state, there are deserts, with annual precipitation that is less than ten inches, but in areas of higher elevation there can be as much as twenty inches of precipitation.

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, the manual, *Judging Rangeland for Livestock and Wildlife Values*, initiates a more realistic, contemporary, and scientifically based view of rangeland ecosystems.

HISTORY OF THE NEW MEXICO RANGE CONTEST

The New Mexico Range contest originally started as a plant identification contest during the 1960s. Since that time the New Mexico Range Contest has evolved to become the contest that is a realistic, field exercise that is focused on management of rangelands.

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.

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 to demonstrate the concept of habitat evaluation. This species is ecologically and economically important and its relationship to different stages of plant succession is well known.

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

CONDUCTING THE CONTEST

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.
3. Identify plants and give their value for beef cattle.
4. Make management recommendations based on the resource value ratings stated in the objectives.

Other Contest Information

- *Spend 10 minutes* at each location.
- *Use 5 minutes* at the end of the contest to make sure the score sheet is properly filled out.
- For the contest, use five contestant groups. Groups 1-4 will be for the students and group 5 will be for the coaches and other individuals.
- The contest is designed to evaluate beef cattle on the location in order to facilitate learning the principles of management.

• The contest is divided into two phases (1) Resource Inventory, and (2) Resource Management.
• Use 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. 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 that all factors with the lowest value are marked.
• There is careful evaluation of 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 criteria, then the value for the component is raised to 40. However, if the component has more than one criterion, 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 100' x 100'.
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 utilization category for the appropriate flagged plant.
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 utilization category for the appropriate flagged plant.
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 utilization category for the appropriate flagged plant.
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 *white flags* and:
- Mark a selected plant with a *red flag* close to the edge of the site boundary for judging utilization by beef cattle. Write cattle on this flag.
For Location 4, Plant Identification Site, flag 13 plants.
For Location 5, Plant Identification Site, flag 12 plants.
The contestant is given the following:
1. A written management scenarios and objectives for each location or site.
2. Appropriate Ecological Site Guides
3. One Beef Cattle Habitat Evaluation Form
4. One score card

Scoring.

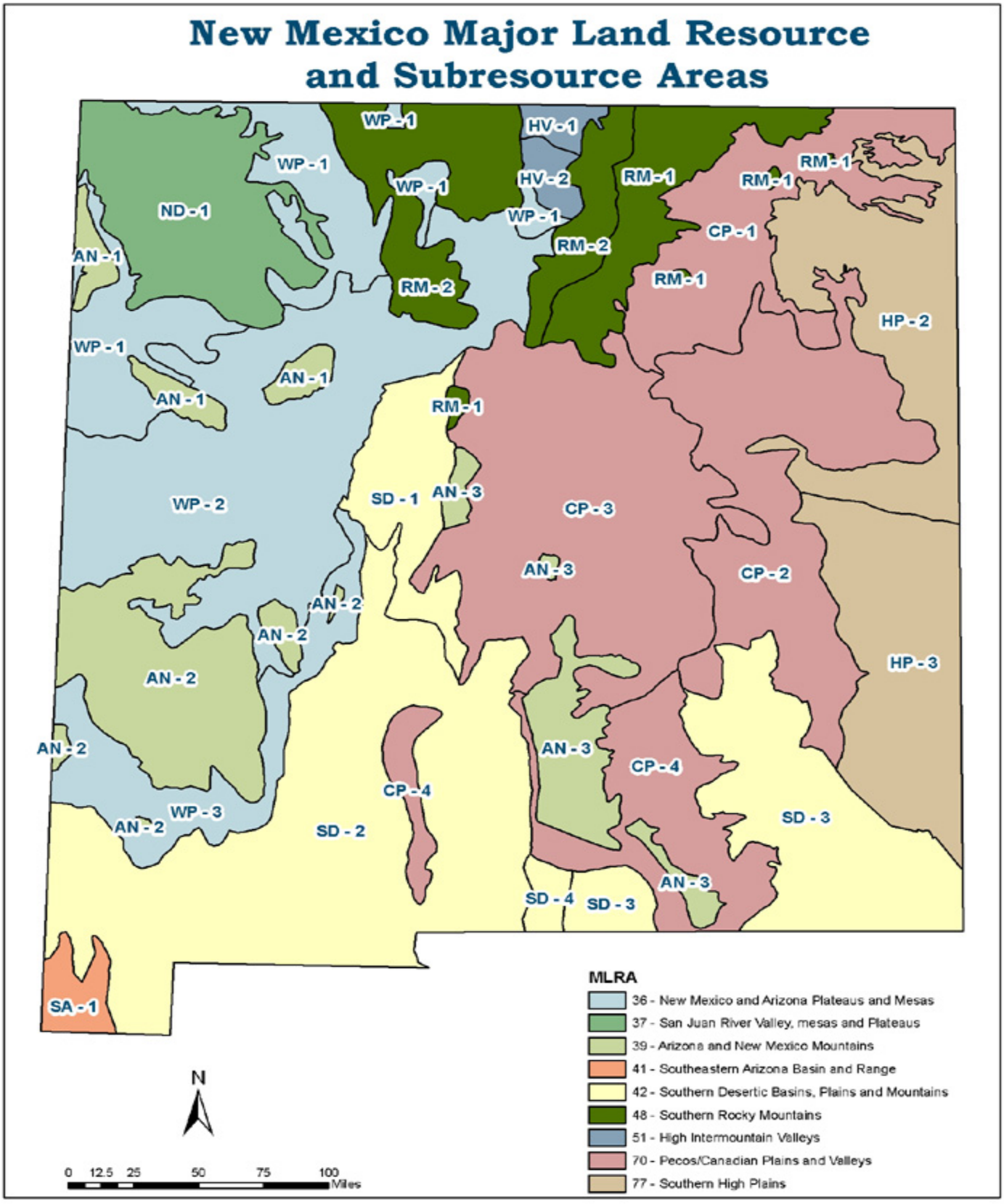
The total possible score for each ecological site is 100 points (3 sites times 100 points = 300 points) and 250 points for the plant identification. The total possible points for the contest equal 550.

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. The ecological site is 25 points per site, similarity index is 25 points per site, the habitat rating is 20 points per site, the habitat limiting factor is 5 points per site, and the recommended management practice is 25 points per site. Each plant identification is worth ten points total. The plant identification is 6 points, longevity, season of growth, origin, and desirability are all worth 1 point each. These points are awarded only if the plant is identified correctly.

ECOLOGICAL SITES

An ecological site 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.

Selected ecological sites listed in this publication are for the major land resource areas (MLRA) SD-2 (see map). This is the resource area near New Mexico State University. **These ecological sites apply only to that area: SD-2.** If the contest is conducted in other areas of New Mexico, ecological sites for the appropriate MLRA shall be used. For example, a range contest conducted in Torrance County will use ecological site descriptions for that area (possibly CP-3). It is critical that this be done for the contest to be meaningful and applicable.


New Mexico Major Land Resource and Subresource Areas
WP - 1
HV - 1
WP - 1
HV - 2
RM - 1
RM - 1
RM - 1
WP - 1
ND - 1
WP - 1
CP - 1
AN - 1
RM - 2
RM - 2
RM - 1
HP - 2
WP - 1
AN - 1
AN - 1
RM - 1
WP - 2
SD - 1
AN - 3
CP - 3
AN - 3
CP - 2
AN - 2
AN - 2
HP - 3
AN - 2
AN - 2
AN - 3
CP - 4
CP - 4
WP - 3
AN - 2
SD - 2
SD - 3
AN - 3
SD - 4
SD - 3
SA - 1
N
0 12.5 25 50 75 100
Miles
MLRA
36 - New Mexico and Arizona Plateaus and Mesas
37 - San Juan River Valley, mesas and Plateaus
39 - Arizona and New Mexico Mountains
41 - Southeastern Arizona Basin and Range
42 - Southern Desertic Basins, Plains and Mountains
48 - Southern Rocky Mountains
51 - High Intermountain Valleys
70 - Pecos/Canadian Plains and Valleys
77 - Southern High Plains

The following ecological site descriptions are nine of the most common sites in SD-2. There are many other sites described in this MLRA. The ones included in this publication are selected for the contest only.

SD-2
Gravelly Range

This site is a soil limiting, mixed shrub-grassland ecosystem dominated by short and occasionally mid-grasses and drought-tolerant desert shrub such as creosotebush and tarbush. The vegetation occurs naturally in thin stands with somewhat depressed "micro-sites" supporting a greater abundance of mid-grasses. Where exposure is a factor, north slopes tend to be grassier, while south slopes are characterized more by shrubs.

Gravelly Range Site

GRASSES and GRASSLIKE		**50-65%**
Bush Muhly	}	
Black Grama	}	15-20
Cane Bluestem	}	
Plains Bristlegrass	}	
Arizona Cottontop	}	5-10
Perennial Threeawns		1-5
Burrograss		1-3
Slim Tridens	}	
Spike Pappusgrass	}	1-5
Fluffgrass	}	
Sand Dropseed	}	
Annual Grasses	}	1-5

Woody		**30-35%**
Creosote Bush		15-20
Mariola		3-5
Range Ratany	}	
Yerba-de-pasmo	}	1-3
Allthorn	}	
Tarbush	}	
Littleleaf Sumac	}	1-5
Whitethorn	}	
Cacti	}	1-2
Broom Snakeweed		1-2
Condalia spp.	}	
Longleaf Ephedra	}	1-3
Winterfat		1-5

Forbs		**5-10%**
Wild Buckwheat	}	
Croton	}	

Globemallow	}		
Desert Holly	}		
Wooly Paperflower	}		5-10
Other Annuals		}	
Other Perennials		}	1-5

SD-2
Deep Sand Range

This site is a grassland ecosystem, dominated by short and mid-grasses mixed with shrubs and half shrubs. It is characterized by short lived perennials such as dropseed, which fluctuate greatly with good and bad years. Forb composition also fluctuates substantially with very high concentration of annuals such as tansymustard, occurring when moisture conditions are right.

Deep Sand Range Site

GRASSES and GRASSLIKE		**65-75%**
Mesa Dropseed	}	
Sand Dropseed	}	
Spike Dropseed	}	20-25
Giant Dropseed		30-35
Black Grama		5-10
Bush Muhly		1-5
Plains Bristlegrass		1-5
Threeawns	}	
Fluffgrass	}	1-3
Annual Grasses		1-3

Woody		**15-20%**
Sand Sagebrush	}	
Yucca	}	
Broom Dalea	}	5-10
Fourwing Saltbrush	}	
Littleleaf Sumac	}	1-5
Broom Snakeweed		1-5
Cacti	}	
Longleaf Ephedra	}	1-5

Forbs		**10-15%**
Desert Holly	}	
Wooly Indian-Wheat	}	1-3
Bladderpod	}	
Euphorbia spp.	}	
Filaree	}	
Spectacle Pod	}	
Wild Buckwheat	}	
Tansymustard	}	1-3
Blanketflower	}	
Globemallow	}	

Wooly Paperflower	}	3-5
Other Annuals	}	
Other Perennials	}	1-5

SD-2
Loamy Range

This site is a grassland aspect that is characterized by short and mid-grasses. Black grama is the dominant species. Bush muhly, tobosa, burrograss, threeawns, and sand dropseed also occur in significant amounts. Forbs include globemallow, desert baileya, croton and desert holly. Soaptree yucca, longleaf ephedra, and fourwing saltbrush are the principle shrubs.

Loamy Range Site

GRASSES and GRASSLIKE			**75-85%**
Black Grama			20-30
Bush Muhly			5-10
Blue Grama			0-5
Burrograss	}		
Threeawns spp.	}		3-8
Ring Muhly		}	
Fluffgrass		}	1-5
Sand Dropseed	}		
Mesa Dropseed	}		5-10
Tubosa			10-15
Alkali Sacaton			5-10
Cane Bluestem		}	
Plains Bristlegrass		}	
Arizona Cottontop		}	1-5
Annual Grasses			1-3

Woody			**5-15%**
Soaptree Yucca		}	
Longleaf Ephedra		}	1-10
Fourwing Saltbrush	}		
Broom Snakeweed	}		
Cacti	}		1-3

Forbs			**5-10%**
Globemallow	}		
Desert Baileya	}		
Croton	}		
Annual Buckwheat	}		
Desert Holly	}		
Filaree	}		1-5
Wooly Indian-Wheat	}		
Rayless Goldenrod	}		

Scorpion Weed	}		1-3
Russian Thistle		}	
Threadleaf Groundsel		}	
Astragalus spp.			1-3
Other Annuals	}		
Other Perennials	}		1-5

SD-2
Sandy Range

This site is a grassland aspect, which is characterized by short and mid-grasses. Black grama is the dominant species. Appreciable amounts of the dropseeds, threeawns, and bush muhly also occur. Soaptree yucca and longleaf ephedra are the principal shrub species. Broom snakeweed comes and goes with good and bad years and as the plant community deteriorates from its potential. Mesquite invades readily.

Sandy Range Site

GRASSES and GRASSLIKE		**70-75%**
Black Grama		5-10
Mesa Dropseed	}	
Sand Dropseed	}	
Spike Dropseed	}	20-25
Bush Muhly		1-5
Plains Bristlegrass		1-5
Arizona Cottontop		
Cane Bluestem		
Tobosa		
Threeawns	}	
Fluffgrass	}	1-3
Annual Grasses		1-3
Blue Grama		

Woody		**10-15%**
Soaptree Yucca	}	
Longleaf Ephedra	}	5-10
Sand Sagebrush	}	
Fourwing Saltbrush	}	
Winterfat	}	
Broom Dalea	}	1-5
Cacti		1-3
Broom Snakeweed		1-3

Forbs		**10-15%**
Croton	}	
Wild Buckwheat	}	
Globemallow	}	
Euphorbia spp.	}	3-5
Spectacle Pod	}	
Desert Baileya	}	
Filaree	}	3-5
Threadleaf Groundsel	}	

Desert Holly		}	
Astragalus spp.		}	
Horsenettle		}	
Russian Thistle		}	
Lambquarters		}	
Tansymustard		}	1-3
Other Annuals	}		
Other Perennials	}		1-5

SD-2
Draw Range

This site is a grassy swale dominated by mid grasses, rhizomatous and stoloniferous short grasses, and some tall grasses. It may, in some instances, have a component of shrubs and trees (such as desert willow) that are both dominant in stature and natural to the site, where occasional deeper soil wetting occurs. A substantial amount of woody species beyond an "aspect" sort of dominance usually represents an abnormal increase or an invasion of these plants, however. Both numbers and kinds of forbs are quite variable and are dependent upon moisture and temperature conditions at any given time. Mesquite may be considered to have become naturalized to the site in minor amounts.

Draw Range Site

GRASSES and GRASSLIKE		**80-90%**
Tobosa		50-60
Vine Mesquite	}	
Alkali Sacaton	}	15-20
Cane Bluestem	}	
Arizona Cottontop	}	
Sideoats Grama	}	5-10
Borrograss	}	
Mat Muhly	}	
Plains Bristlegrass	}	
Feather Fingergrass	}	
Threeawns spp.	}	1-5
Others		1-3

Woody		**5-10%**
Littleleaf Sumac	}	
Desert Willow	}	
Condalia spp.	}	
Catclaw Mimosa	}	
Whitethorn	}	3-8
Allthorn	}	
Mesquite	}	
Fourwing Saltbrush	}	
Broom Snakeweed	}	1-3

Forbs		**5-10%**
Globemallow	}	
Verbena	}	
Scorpionweed	}	

Desert Holly	}	
Wooly Indian-Wheat	}	1-3
Others		3-8

SD-2
Bottomland Range

This site is a tall grass ecosystem dominated by giant sacaton. Tobosa, vine mesquite, alkali sacaton, and cane bluestem are associated species, with burrograss, mat muhly, and feather fingergrass typically present in lesser amounts. Forbs and shrubs occur in minor amounts when the site is at its potential.

Bottomland Range Site

GRASSES and GRASSLIKE			**85-95%**
Giant Sacaton	}		
Alkali Sacaton	}		70-80
Tobosa			1-5
Vine Mesquite			3-5
Borrograss		}	
Threeawns spp.		}	
Feather Fingergrass		}	
Mat Muhly		}	
Other Annuals		}	3-5
Cane Bluestem	}		
Sideoats Grama	}		
Arizona Cottontop	}		
Plains Lovegrass	}		3-5

Woody		**1-5%**
Soaptree Yucca	}	
Longleaf Ephedra	}	
Fourwing Saltbrush	}	
Broom Snakeweed	}	
Allthorn	}	
Littleleaf Sumac	}	1-5

Forbs		**5-10%**
Desert Holly	}	
Astragalus spp.	}	
Croton	}	
Russian Thistle	}	
Wild Buckwheat	}	
Bladderpod	}	1-5
Others		1-5

SD-2
Limestone Hills Range

This site is a mixed grassland and shrubs with a showy amount of mid-grasses to be seen along with sometimes surprisingly productive short grasses due to favorable moisture and temperature conditions, especially on north facing slopes. Forbs are a minor component of the potential plant community, although shrubs and half shrubs occur in significant amounts to both livestock and wildlife. Shrubs and cacti are usually more prevalent on south facing slopes.

Limestone Hills Range Site

GRASSES and GRASSLIKE				**70-80%**
Black Grama				30-35
Bush Muhly	}			
Curlyleaf Muhly	}			15-20
Blue Grama		}		
Sideoats Grama		}		5-10
Plains Bristlegrass			}	
Plains Lovegrass			}	
Green Sprangeltop			}	
Cane Bluestem			}	5-10
Arizona Cottontop		}		
Tanglehead		}		
New Mexico Feathergrass		}		1-5
Threeawns spp.	}			
Rough Tridens	}			
Slender Tridens	}			
Tobosa	}			
Fluffgrass	}			1-5
Other Perennials		}		
Annuals		}		1-3

Woody				**15-20%**
Ocotillo	}			
Sacahuista	}			3-8
Feather Dalea	}			
Wright Lippia	}			
Apacheplume	}			
Littleleaf Sumac	}			1-5
Agave		}		
Sotol		}		
Yucca		}		1-5
Mariola	}			
Range Ratany	}			1-5

Broom Snakeweed			1-3
Other Cacti			1-3

Forbs			**5-10%**
Wild Buckwheat	}		
Wooly Indian-Wheat	}		
Blanket Flower	}		1-5
Other Annuals		}	
Other Perennials		}	5-10

SD-2
Malpais Range

This site is a site that is dominated by grasses, such as black grama, sideoats grama, bush muhly, and blue grama. Although varied mixtures of shrubs and half-shrubs may be present (such as apacheplume, condalia, littleleaf sumac, fourwing saltbrush, and winterfat), these are mainly noticeable as visual aspect species and do not make up an appreciable percentage of the composition by air-dry weight.

Malpais Range Site

GRASSES and GRASSLIKE	**70-80%**
Black Grama	20-25
Sideoats Grama	10-15
Bush Muhly	5-10
Blue Grama	5-10
Vine Mesquite	0-3
Curly Mesquite }	
Tobosa }	3-8
Plains Lovegrass }	
Green Sprangletop }	
Cane Bluestem }	
Arizona Cottontop }	
Tanglehead }	10-15
Threeawns spp. }	
Tridens spp. }	
Plains Bristlegrass }	3-8
Halls Panicum	3-8
Others	0-3

Woody	**15-20%**
Fourwing Saltbrush	3-5
Apacheplume }	
Condalia spp. }	
Littleleaf Sumac }	3-5
Yucca }	
Sotol }	
Agave }	1-5
Cacti	0-1
Winterfat	0-3
Broom Snakeweed }	
Others }	1-3

Forbs	**3-8%**

Annuals	1-5
Perennials	1-3

SD-2
Shallow Range

This site is a site that is characterized by short and mid-grasses. The aspect of this site is a grassland with a good scattering of shrubs. The forb composition fluctuates widely from year to year and from season to season.

Shallow Range Site

GRASSES and GRASSLIKE	**60-70%**
Black Grama	20-30
Sideoats Grama	15-20
Blue Grama }	
Hairy Grama }	15-20
Bush Muhly	5-10
Cane Bluestem	3-5
Sand Dropseed	5-10
Hairy Tridens	3-5
Ear Muhly	1-3
New Mexico Feathergrass	1-3
Fluffgrass	1-3
Other Grasses	3-5

Woody	**20-30%**
Littleleaf Sumac	1-3
Creosotebush	1-3
Range Ratany	1-3
Common Javelinabush	1-3
American Tarbush	1-3
Spiny Allthorn	1-3
Mesquite	2-5
Catclaw Mimosa	1-3
Cactus	1-3
Mariola	2-5
Broom Snakeweed	1-3
Other Shrubs	3-5

Forbs	**5-10%**
Stemless Actinea	2-5
Wooly Groundsel	1-3
Globemallow	1-3
Bladderpod	1-3
Senna	1-3
Other Forbs	2-5

Other grasses that could appear on this site would include: Vine Mesquite, Silver Bluestem, Burrograss, Spike Dropseed, Threeawns, Tobosa, Muhlys, Arizona Cottontop, and Plains Bristlegrass.

Other woody plants include: Condalia, Tesajo Cactus, Apacheplume, Wolfberry, Cactus, Ephedra spp., Yucca, Winterfat, and Fourwing Saltbrush.

Other forbs include: Desert Zinnia, Wooly Paperflower, Prickleaf Dogweed, Verbena, Deerstongue, Croton, and Wright's Buckwheat.

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 similarity index 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. (See ecological site descriptions).

For example, if we were judging the similarity index for a Shallow 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 similarity index is expressed as a percentage from 0 to 100%. 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 are counted as "other."

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 a similarity index of 60% to 70% for forage for cattle. Estimating the percent composition of grasses, grass like plants, forbs, legumes, and shrubs/trees should be done at the end of the growing season. However, since the contest may be conducted in other seasons, 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 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).

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 forest land, that 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 forest lands 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 will also identify weak or missing elements (limiting factors) that are limiting cattle numbers so that management alternatives can then 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,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. Plant stubble heights for short, mid, and tall grasses dictate the utilization. Categories: light, moderate, heavy, severe.

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, and 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.
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 from water to meet their forage requirements.

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 depends 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 WOODY PLANT CONTROL — Use when grazing restraint is the limiting factor because of woody plants.
4. DECREASE STOCKING RATE FOR BEEF CATTLE— Use when forage utilization is the limiting factor because of overuse.
5. INCREASE STOCKING RATE FOR BEEF CATTLE— Use when forage utilization is the limiting factor because of lack of use.
6. CONTINUE PRESENT STOCKING RATE— when the forage utilization class is "moderate."
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. USE PRESCRIBED FIRE — Can be used for plant control or to enhance palatability of forage.
10. PLANT ADAPTED FORAGE SPECIES— Use when the Similarity Index is 10% 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.

New Mexico Range Judging Contest Scorecard

INSTRUCTIONS:
Place an "X" in the block that corresponds with the correct site and factor or description observed. Double check your answer making sure that the "X" is only in one box and does not overlap into the adjacent space.

Name: _____ **Team Number:** _____

Chapter: _____

Resource Inventory-Present Conditions **Recommended Management Practices**

Ecological Sites	**Site #**		
	1	**2**	**3**
Gravelly			
Deep Sand			
Sandy			
Loamy			
Shallow			
Draw			
Bottomland			
Limestone Hills			
Malpais			

Similarity Index			
76%-100%			
51%-75%			
26%-50%			
0%-25%			

Beef Cattle Habitat			
Excellent (31-40)			
Good (21-30)			
Fair (11-20)			
Poor (<11)			

Management for Beef Cattle	**Site #**		
	1	**2**	**3**
Continue Present Management			
Begin A Planned Grazing System			
Apply Woody Plant Control			
Continue Present Stocking Rate			
Decrease Stocking Rate for Beef Cattle			
Increase Stocking Rate for Beef Cattle			
Change the kind of Grazing/browsing animal			
Develop Water for Beef Cattle			
Use Prescribed Fire			
Plant Adapted Forage Species			

Instructions: Print the plant ID number from the key in the appropriate blank. Place an "X" in the appropriate column (s) describing characteristics and ecological factors.

	PLANT ID #	PLANT CHARACTERISTICS						CATTLE FOOD RATING	
		Perennial	Annual	Cool Season	Warm Season	Native	Introduced	Desirable	Undesirable
1									
2									
3									
4									
5									
6									
7									
8									
9									
10									
11									
12									
13									
14									
15									
16									
17									
18									
19									
20									
21									
22									
23									
24									
25									

GRASSES

1. Western Wheatgrass
2. Slender Wheatgrass
3. Redtop
4. Big Bluestem
5. Sand Bluestem
6. Poverty Threeawn
7. Red Threeawn
8. Pine Dropseed
9. Cane Bluestem
10. Silver Bluestem
11. Six Weeks Grama
12. Needle Grama
13. Sideoats Grama
14. Black Grama
15. Blue Grama
16. Hairy Grama
17. Slender Grama
18. Buffalograss
19. Bermudagrass
20. Tufted Hairgrass
21. Arizona Cottontop
22. Desert Saltgrass
23. Bottlebrush Squirreltail
24. Plains Lovegrass
25. Fluffgrass
26. Arizona Fescue
27. Sheep Fescue
28. Tanglehead
29. Curlymesquite
30. Galleta
31. Tobosa
32. Junegrass
33. Green Sprangletop
34. Wolftail
35. Mountain Muhly
36. Bush Muhly
37. Mat Muhly
38. Ring Muhly
39. Spike Muhly
40. Indian Ricegrass
41. Hall's Panic
42. Vice Mesquite
43. Mutton Bluegrass
44. Kentucky Bluegrass
45. Little Bluestem
46. Burrograss
47. Plains Bristlegrass
48. Indiangrass
49. Alkali Sacataon
50. Sand Dropseed
51. Mesa Dropseed
52. Giant Sacaton
53. Columbia Needlegrass
54. Needle & Thread
55. NM Feathergrass
56. Sleepygrass

FORBS

57. Fringed Sagebrush
58. Horsetail Milkweed
59. Locoweed
60. Filaree
61. Pingue
62. Wooly Indianwheat
63. Russian Thistle
64. Threadleaf Groundsel

TREES & SHRUBS

65. Big Sagebrush
66. Four-wing Saltbush
67. Shadscale
68. Winterfat
69. True Mountain Mahogany
70. Hairy Mountain Mahogany
71. Rubber Rabbitbrush
72. Long Leaf Mormon Tea
73. Torrey Mormon Tea
74. Apache Plume
75. Tarbrush
76. Creosotebrush
77. Cacti
78. Mesquite
79. Shinnery Oak Bush
80. Gambel Oak
81. Skunkbush Sumac
82. Broom Snakeweed
83. Yucca
84. Sand Sagebrush

Beef Cattle Habitat Evaluation Form

Size of Home Range or Evaluation Area (Acres) _____

Pasture: _____ Pasture **Number:** _____

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

A. Forage Factors

Forage of annual and perennial grass, forbs, and woody plants.

1. **Forage Condition –** how abundant (composition by weight) are the desirable food producing plants?

	Circle Correct Value		
	Site 1	Site 2	Site 3
Site has 76%-100% by weight of desirable forage plants for beef cattle.	40	40	40
Site has 51%-75% by weight of desirable forage plants for beef cattle.	30	30	30
Site has 26%-50% by weight of desirable forage plants for beef cattle.	20	20	20
Site has 0%-25% by weight of desirable forage plants for beef cattle.	10	10	10

2. **Forage Diversity** - how diverse is the desirable food producing plant community? (Food types= grass, forbs, and woodies.)

	Circle Correct Value		
	Site 1	Site 2	Site 3
Food plants represented by all 3 of the major plant types.	40	40	40
Food plants represented by 2 of the 3 major plant types.	20	20	20
Food plants represented by 1 of the 3 major plant types.	10	10	10

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

	Tallgrass	**Midgrass**	**Shortgrass**	Circle Correct Value Site 1	Site 2	Site 3
Light or none	(>8”)	(>5”)	(>4”)	30	30	30
Moderate	(6-8”)	(3-5”)	(2-4”)	40	40	40
Heavy	(4-6”)	(2-3”)	(1-2”)	20	20	20
Severe	(<4”)	(<2”)	(<1”)	10	10	10

Lowest score of three rated criteria = Limiting Factor for Forage Factors ☐ ☐ ☐

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

	Circle Correct Value Site 1	2	3
1. Grazing Accessibility - How accessible are the forage plants to grazing animals?			
Slope less than 5%	40	40	40
Slope 5-10% and smooth	35	35	35
Slope 5-10% and rough (exposed surface rock)	25	25	25
Slope 11-15% and smooth	30	30	30
Slope 11-15% and rough (exposed surface rock)	20	20	20
Slope greater than 15% and smooth	15	15	15
Slope greater than 15% and rough (exposed surface rock)	10	10	10
2. Grazing Restraint - How much woody cover is there below 6 feet?			
Brush canopy cover less than 30%	40	40	40
Brush canopy cover 31-50%	30	30	30
Brush canopy cover 51-80%	20	20	20
Brush canopy cover greater than 80%	10	10	10
3. Water - How far is water from the grazing site? (Given)			
Distance less than or equal to 1/2 mile	40	40	40
Distance greater than 1/2 up to 1 mile	30	30	30
Distance greater than 1 up to 1 1/2 miles	20	20	20
Distance greater than 1 1/2 up to 2 miles	10	10	10
Distance greater than 2 miles or not available in the grazing unit	0	0	0
Lowest score of three rated criteria = Limiting Distribution Factors			

Site 1. Summary

(A) Forage Components ☐ (B) Distribution Components ☐

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 ☐

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) Forage Components ☐ (B) Distribution Components ☐

Habitat Rating based on the Limiting Factor (lowest value)

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

RANGELAND CONTEST EXAMPLE

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

Using the Ecological Site Guide for Loamy, 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%.

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.

The present conditions for **Beef Cattle** are:
A1 = 10 A2 = 20 A3 = 40 B1 = 40 B2 = 40 B3 = 0

Taking the lowest value of A (forage factors), and B (distributions factors), 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 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 20 for Beef Cattle.

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 raise the value to the next highest number within the component group, while always looking for the lowest number.

Water (B1) 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 "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” and “Begin a Planned Grazing System.”

New Mexico Range Plants

GRASSES Mid Grass = M Tall Grass = T Short Grass = S			PLANT CHARACTERISTICS						RATING For Cattle Food	
			Perennial	Annual	Cool Season	Warm Season	Native	Introduced	Desirable	Undesirable
1	Western Wheatgrass	M	X		X		X		X	
2	Slender Wheatgrass	M	X		X		X		X	
3	Redtop	M	X		X		X		X	
4	Big Bluestem	T	X			X	X		X	
5	Sand Bluestem	T	X			X	X		X	
6	Poverty Threeawn	M	X			X	X			X
7	Red Threeawn	S	X			X	X			X
8	Pine Dropseed	S	X			X	X		X	
9	Cane Bluestem	M	X			X	X		X	
10	Silver Bluestem	M	X			X	X			X
11	Six Weeks Grama	S		X		X	X			X
12	Needle Grama	S		X		X	X			X
13	Sideoats Grama	M	X			X	X		X	
14	Black Grama	S	X			X	X		X	
15	Blue Grama	S	X			X	X		X	
16	Hairy Grama	S	X			X	X		X	
17	Slender Grama	S	X			X	X		X	
18	Buffalograss	S	X			X	X		X	
19	Bermudagrass	S	X			X		X	X	
20	Tufted Hairgrass	T	X		X		X			
21	Arizona Cottontop	M	X			X	X		X	
22	Desert Saltgrass	S	X			X	X			X
23	Bottlebrush Squirreltail	M	X		X		X		X	
24	Plains Lovegrass	M	X			X	X		X	
25	Fluffgrass	S	X			X	X			X
26	Arizona Fescue	M	X		X		X		X	
27	Sheep Fescue	M	X		X		X		X	
28	Tanglehead	M	X			X	X			X

GRASSES Mid Grass = M Tall Grass = T Short Grass = S			PLANT CHARACTERISTICS						RATING For Cattle Food	
			Perennial	Annual	Cool Season	Warm Season	Native	Introduced	Desirable	Undesirable
29	Curlymesquite	S	X			X	X		X	
30	Galleta	M	X			X	X		X	
31	Tobosa	M	X			X	X		X	
32	Junegrass	M	X		X		X		X	
33	Green Sprangletop	M	X			X	X		X	
34	Wolftail	S	X			X	X		X	
35	Mountain Muhly	M	X		X		X		X	
36	Bush Muhly	M	X			X	X		X	
37	Mat Muhly	S	X			X	X		X	
38	Ring Muhly	S	X			X	X			X
39	Spike Muhly	M	X			X	X		X	
40	Indian Ricegrass	M	X		X		X		X	
41	Hall's Panic	S	X			X	X		X	
42	Vine Mesquite	S	X			X	X		X	
43	Mutton Bluegrass	S	X		X		X		X	
44	Kentucky Bluegrass	S	X		X			X	X	
45	Little Bluestem	M	X			X	X		X	
46	Burrograss	S	X			X	X			X
47	Plains Bristlegrass	M	X			X	X		X	
48	Indiangrass	T	X			X	X		X	
49	Alkali Sacaton	M	X			X	X		X	
50	Sand Dropseed	M	X			X	X		X	
51	Mesa Dropseed	M	X			X	X		X	
52	Giant Sacaton	T	X			X	X		X	
53	Columbia Needlegrass	M	X		X		X		X	
54	Needle and Thread	M	X		X		X		X	
55	New Mexico Feathergrass	M	X		X		X		X	
56	Sleepygrass	T	X		X		X			X

FORBS		PLANT CHARACTERISTICS						RATING For Cattle Food	
		Perennial	Annual	Cool Season	Warm Season	Native	Introduced	Desirable	Undesirable
57	Fringed Sagebrush	X		X		X			X
58	Horsetail Milkweed	X			X	X			X
59	Locoweed	X		X		X			X
60	Filaree		X	X		X		X	
61	Pingue	X			X	X			X
62	Wooly Indianwheat		X		X	X		X	
63	Russian Thistle		X		X		X		X
64	Threadleaf Groundsel	X			X	X			X

TREES & SHRUBS		PLANT CHARACTERISTICS						RATING For Cattle Food	
		Perennial	Annual	Cool Season	Warm Season	Native	Introduced	Desirable	Undesirable
65	Big Sagebrush	X			X	X			X
66	Four-wing Saltbush	X			X	X		X	
67	Shadscale	X			X	X		X	
68	Winterfat	X			X	X		X	
69	True Mountain Mahogany	X			X	X		X	
70	Hairy Mountain Mahogany	X			X	X		X	
71	Rubber Rabbitbrush	X			X	X			X
72	Long Leaf Mormon Tea	X			X	X			X
73	Torrey Mormon Tea	X			X	X			X
74	Apache Plume	X			X	X		X	
75	Tarbush	X			X	X			X
76	Creosotebush	X			X	X			X
77	Cacti	X			X	X			X
78	Mesquite	X			X	X			X
79	Shinnery Oak	X			X	X			X
80	Gambel Oak	X			X	X			X
81	Skunkbush Sumac	X			X	X			X
82	Broom Snakeweed	X			X	X			X
83	Yucca	X			X	X		X	
84	Sand Sagebrush	X			X	X			X

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. beef cattle).

Extirpation — Locally extinct.

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

Graminoid — A grass like 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 referred to as mast such as acorns.

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, 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, shrub land, or forest.

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

Savanna— 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.

New Mexico Range Plants, Cooperative Extension Service Circular 374

This publication comprises synopses of 85 species. Each synopsis includes information about the common name, scientific name, description, occurrence, forage value and management.

To receive a copy of the *New Mexico Range Plants Book Circular 374,* please contact: University Communications and Marketing and Print Portal by mailing, calling, faxing or emailing a request.

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New Mexico Major Land Resource and Sub-resource Areas Map courtesy of USDA-NRCS. Ecological site descriptions are adapted from USDA-NRCS.