

# More On Stubble Height Guidelines

**Factors to consider for shortgrasses and when making the decision if destocking is necessary.**

**By Jerry Holechek and Dee Galt**

Over the past five years, grass stubble heights have widely replaced other methods of measuring grazing intensity on rangelands of the western United States. Stubble height refers to the basal portion of herbaceous plants remaining after the top portion has been harvested by grazing animals or artificially.

Compared to other grazing intensity methods, stubble heights have advantages of simplicity, rapidity, high repeatability, and accurately reflecting grazing severity. Stubble height information can be related to percent grazing use (6, 4). Percent grazing use may be more understandable to the public and has stocking rate applications. Stubble height guidelines have been developed for many upland and riparian grasses in the western United States (3, 5).

Recently we published stubble height guides for several New Mexico grasses based on both our research and consulting experiences (4). Since then we have had the opportunity to further develop and refine our guidelines. In this paper we will focus on the issue of appropriate stubble height guidelines for extra-short grasses such as the sod-bound form of blue grama.

In addition we will present stubble height guidelines that can be useful in the critical decision regarding whether a grazing allotment, ranch or pasture should be destocked due to drought or severe grazing. These guidelines were developed in cooperation with the Range Improvement Task Force at New Mexico State University and U.S. Forest Service range personnel in New Mexico.

## Guidelines for Extra-Short Grasses

A major problem we have encountered over the past five years is that some shortgrasses, particular-

ly blue grama and curly mesquite, can adopt a stunted growth form on certain sites where guidelines we and other researchers (1, 2, 7) have developed do not well apply.

Generally, a minimum stubble height of 1½ inches has been recommended for blue grama and curly mesquite. However, under conditions of clay to clay loam soils, at the low end of their precipitation range (9–15 inches annual precipitation), under drought, and under sustained heavy grazing, a stunted, sod-bound form of these grasses can develop where stubble heights of ungrazed plants seldom exceed 2 inches (Figure 1).

Based on research and experience in New Mexico and southern Arizona, we have developed a guide that places the stunted, sod-bound forms of blue grama and curly mesquite into grazing intensity categories based on stubble height (Table 1). Linear

**Table 1. Grazing intensity guidelines for blue grama and curly mesquite on sod-bound and bunchgrass sites in New Mexico.**

Blue Grama Grazing Intensity Guide (Sod-bound Sites)			
Qualitative Grazing Intensity Category	Percent Use of Forage by Weight	Residual Blue Grama Herbage (lbs/ac.)	Stubble Height (inches)
Light to non-use	0-30	120+	1.2+
Conservative	31-40	120-95	1.2-1.0
Moderate	41-50	95-70	1.0-0.75
Heavy	51-60	50-70	0.75-0.50
Severe	>60	<50	<0.50
(Bunchgrass Sites)			
Light to non-use	0-30	300+	2.5
Conservative	31-40	300-200	2.5-2.0
Moderate	41-50	200-120	2.0-1.5
Heavy	51-60	120-80	1.5-1.0
Severe	>60	<80	<1.0

correlation and regression equations relating stubble heights to actual percent grazing use (cages) and standing vegetation were used in developing these guides. This guide has application to other extra-short grasses such as ring muhly, slender grama, and sprucetop grama.

Where uncertainty or controversy exists over whether blue grama sites are sod-bound or bunchgrass we suggest using a 1.0 inch stubble height as the cut-off between moderate and heavy grazing. This recommendation is supported by Crafts and Glendening (1942) who developed stubble height guides for blue grama in New Mexico.

### Critical Stubble Heights

No range management decision is tougher or more emotional than the one regarding whether or not to destock a ranch, grazing allotment, or pasture due to lack of standing forage from drought or excessive grazing. In New Mexico, these decisions often must be made in late spring or early summer, when there is hope that rainfall will soon alleviate the situation.

Various grazing studies show that one year of heavy grazing across a pasture will generally not have lasting long adverse impacts, although it should not be repeated year after year (5). However, when grazing becomes severe across one-third or more of a pasture, long term harm to soil, vegetation, and wildlife become more probable (Figure 2). In addition, lack of forage imperils the health as well as productivity of livestock in the pasture.



**Fig. 1.** Blue grama rangeland in western New Mexico in mid October 2000. Even though this pasture received no livestock grazing in 2000, grass height remained below the critical level due to severe drought. This pasture was rested until October 2001, when enough forage was available to support livestock grazing.



**Fig. 2.** Blue grama rangeland in central New Mexico in early October of 2001. Based on stubble heights, the pasture in the background received conservative grazing the previous year, while grazing was severe on the pasture in the foreground. Critical stubble heights were exceeded under conditions of severe drought on the pasture in the foreground.

**Table 2. Critical stubble height minimums for different categories of New Mexico forage grasses.**

<b><u>Grass Category</u></b>	<b><u>Minimum Stubble Height</u></b>	<b><u>Examples</u></b>
Extra-short	0.75 inches	Sod-bound blue grama Sod-bound curly mesquite Ring muhly
Short	1.5 inches	Six-week grama Blue grama Hairy grama Sedges Cheatgrass
Short-mid	2.5 inches	Black grama Threeawns Western wheatgrass Crested wheatgrass Tobosa Kentucky bluegrass Mountain muhly Galleta Muttongrass Junegrass Wolftail Rushes
Mid	4.0 inches	Orchard grass Arizona fescue Sideoats grama Indian ricegrass Sand dropseed Little bluestem Smooth Brome Pine dropseed Tufted hairgrass Mountain brome Timothy Bottlebrush squirreltail Thurber fescue Needlegrass Oatgrasses Intermediate wheatgrass Plains lovegrass

We have developed a set of critical stubble height guidelines for different categories of New Mexico forage grasses that would trigger the decision to destock (Table 2 and 3). These same guidelines would be applied regarding the decision whether to initiate or continue grazing after forage growth is initiated. New

growth of forage should be above these critical heights before any grazing is initiated. The critical stubble height guidelines in Table 2 came from past research, our own studies, and our practical experiences.

We do point out that some judgement is required in applying these guidelines. Destocking only

becomes necessary when half or more of the primary forage grass species are at or below the critical stubble height levels.

### **Final Thoughts**

Stubble heights have become an important range management tool. However, all stubble height guidelines must be applied with

Table 3. Common and scientific names for forage grasses in Table 2.

<u>Grass Category</u>	<u>Common Name</u>	<u>Scientific Name</u>
Extra-short	Blue grama	<i>Bouteloua gracilis</i>
	Curly mesquite	<i>Hilaria belangeri</i>
Short	Six-weeks grama	<i>Bouteloua barbata</i>
	Blue grama	<i>Bouteloua gracilis</i>
	Hairy grama	<i>Bouteloua hirsuta</i>
	Sedges	<i>Carex</i> spp.
	Cheatgrass	<i>Bromus tectorum</i>
Short-mid	Black grama	<i>Bouteloua eriopoda</i>
	Threeawns	<i>Aristida</i> spp.
	Western wheatgrass	<i>Agropyron smithii</i>
	Crested wheatgrass	<i>Agropyron desertorum</i>
	Tobosa	<i>Hilaria mutica</i>
	Kentucky bluegrass	<i>Mountain muhly</i>
	Muhlenbergia montana	<i>Poa pratensis</i>
	Galleta	<i>Hilaria jamesii</i>
	Muttongrass	<i>Poa fendleriana</i>
	Junegrass	<i>Koeleria cristata</i>
	Wolftail	<i>Lycurus phleoides</i>
	Rushes	<i>Juncus</i> spp.
Mid	Orchard grass	<i>Dactylus glomerata</i>
	Arizona fescue	<i>Festuca arizonica</i>
	Sideoats grama	<i>Bouteloua curtipendula</i>
	Indian ricegrass	<i>Oryzopsis hymenoides</i>
	Sand dropseed	<i>Sporobolus cryptandrus</i>
	Little bluestem	<i>Schizachyrium scoparium</i>
	Smooth Brome	<i>Bromus inermis</i>
	Pine dropseed	<i>Blepharoneuron tricholepis</i>
	Tifted hairgrass	<i>Deschampsia caespitosa</i>
	Mountain brome	<i>Bromus montanus</i>
	Timothy	<i>Phleum pratense</i>
	Bottlebrush squirreltail	<i>Sitanion hystrix</i>
	Thurber fescue	<i>Festuca thurberi</i>
	Needlegrass	<i>Stipa</i> spp.
	Oatgrasses	<i>Danthonia</i> spp.
	Intermediate wheatgrass	<i>Agropyron intermedium</i>
	Plains lovegrass	<i>Eragrostis intermedia</i>
Tall	Albali sacaton	<i>Sporobolus airoides</i>
	Sand bluestem	<i>Andropogon hallii</i>
	Big sacaton	<i>Sporobolus wrightii</i>
	Deergrass	<i>Muhlenbergia emersleyii</i>
	Bill muhly	<i>Muhlenbergia rigens</i>
	Indiangrass	<i>Sorghastrum nutans</i>

prudence and knowledge that they will not fit every situation. Stubble heights below critical levels can be caused by drought and wildlife and livestock grazing. Under conditions of severe

drought, grass plant growth may not attain even the critical heights we have established.

It is important for range managers to keep in mind grass plant heights below critical levels do

not necessarily indicate past grazing was heavy or severe. It is essential that range managers examine conditions over the entire pasture or allotment and not just rely on one or two key areas that

may not be representative when making critical decisions on destocking or resuming grazing. In closing, we believe more research is needed on how plant heights relate to grazing tolerance for different forage grasses.

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*About the Authors:* Jerry Holechek is a professor of range science, Department of Animal and Range Sciences, New Mexico State University, Las Cruces, NM 88003; and Dee Galt is a private range consultant, 3000 Devendale Drive, Las Cruces, NM 88005. This paper was supported by the New Mexico Agricultural Experiment Station and part of project 1-5-27417.

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