



Estimating Water Intake for Range Beef Cattle

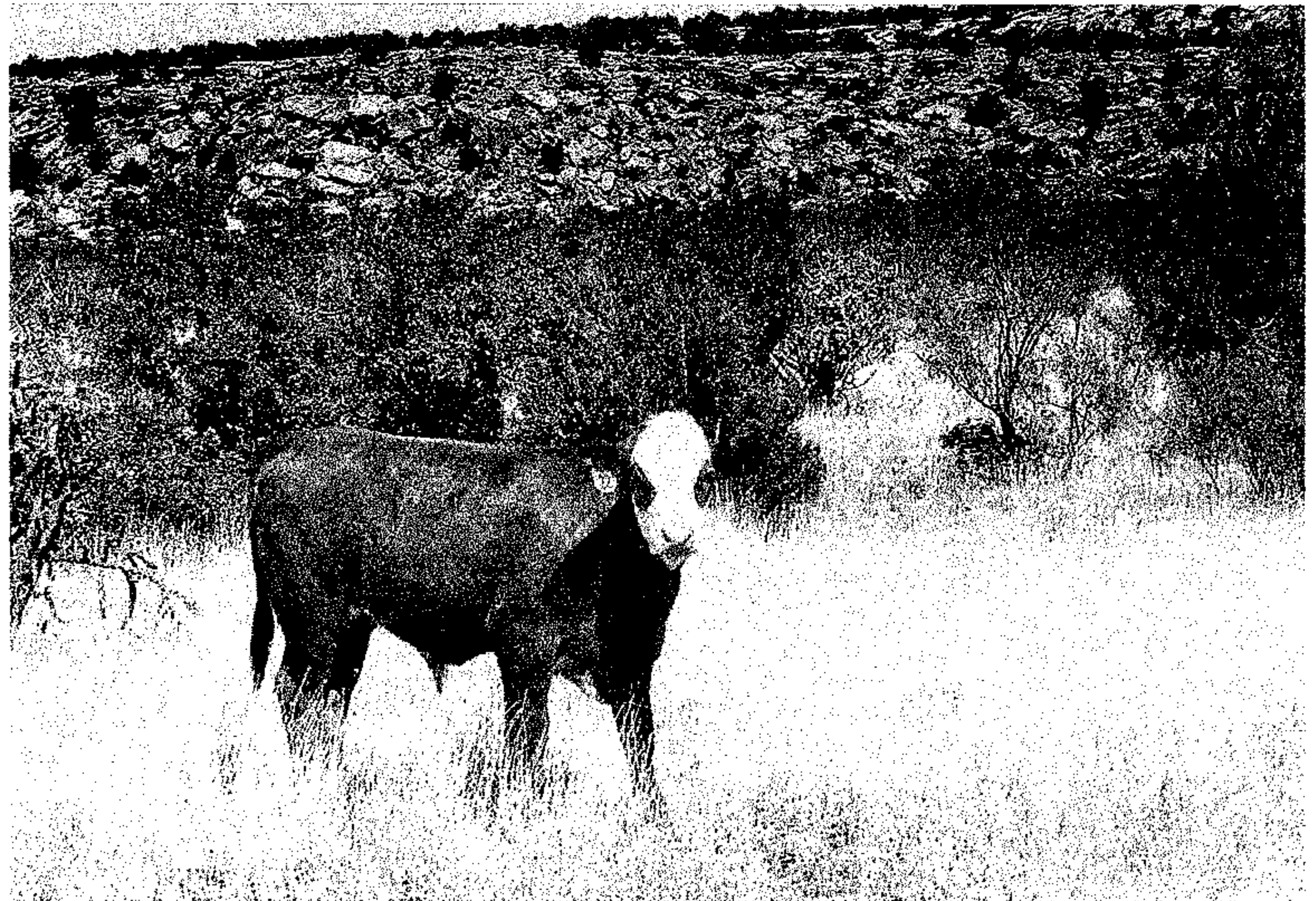
Guide B-231

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INTRODUCTION

There is great interest within New Mexico to know the water intake for lactating range beef cows. It is important to note that there is a considerable range of natural variability in water intake and limited science supporting current water use estimates for grazing beef cattle. While a single number is sometimes offered, we hesitated to provide such a number for its potential to be misinterpreted. With careful consideration of the variables, however, producers may use the formula in this guide to estimate water use for their specific situation.



FACTORS AFFECTING WATER CONSUMPTION

There are many variables that influence animals' water consumption, many of which cannot be accounted for directly when making estimates of water use. Factors that influence water consumption include species, breed, size, age, sex, forage quality and quantity, water accessibility (Wilson and Lucero, 1995), water temperature (Lofgreen et al., 1975), rate and composition of gain, reproductive status, lactation, physical activity, supplementation, feed intake, forage dry matter content, and ambient temperature (Winchester and Morris, 1956; National Research Council [NRC], 2000). Supplementation alone may add as much as 5 additional gallons of water consumption per pound of supplement per day for cattle (Vallentine, 1990).

WATER ACCESS

Water should be made available free choice to grazing animals, with no attempts to limit water intake. Limiting water intake can be detrimental to physiological processes including temperature regulation, milk production, metabolism, blood volume, and digestion (Squires, 1988). Cattle's overall health and wellbeing are

negatively affected when they cannot fulfill their physiological water requirements. Because it is impossible to accurately account for all variables that contribute to overall water requirements, it is recommended to provide liberal amounts of water for cattle (Squires, 1988). Squires (1988) suggested that livestock watering systems should be designed to supply enough water to meet the needs of cattle during times of greatest physiological needs (e.g., lactation and high temperatures).

ESTIMATING WATER INTAKE

There has been limited research conducted in the area of grazing range beef cow water consumption because there are many challenges to collecting data in a "real-world" situation. We elected to use a formula converted by NRC (2000) from Hicks et al. (1988) to calculate estimated water intake as follows; variables are given in Table 1:

$$\text{Water Intake (gal/day)} = [-18.67 + (0.3937 \times \text{MT}) + (2.432 \times \text{DMI}) - (3.87 \times \text{PP}) - (4.437 \times \text{DS})] / 3.77$$

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Table 1. Variable Explanations and Example Inputs for Cow and Calf Water Use Estimates Using NRC (2000) Formula

Variable	Cow (1,100 pounds)	Calf (250 pounds mid-season)
MT = maximum ambient air temperature (°F)	80	80
DMI = dry matter intake (lb)	24.8 ^a	6.25 ^a
PP = precipitation in cm/day	0.10 ^b	0.10 ^b
DS = percent of dietary salt	0.1	0.2
Estimated Water Intake Per Day (gallons)	19.2	7.1

^aAn adult lactating cow eats approximately 2.25% of its body weight per day in DMI, while a calf will eat approximately 2.5% of its body weight per day in DMI (NRC, 2000).

^bPrecipitation based on estimated 13.9 inches per year statewide (<http://weather.nmsu.edu/products/climate-new-mexico/>).

Using this formula, we estimate that an 1,100-pound lactating beef cow with a 250-pound calf would consume 26 gallons of water per day. Our water use estimate is similar to Rouda et al. (1994) estimates, based on body weight and stage of production for free-ranging cattle in south-central New Mexico. Calf water intake, however, was not included in the Rouda study.

A 26-gallon per day water use estimate for a cow and her calf is reasonable for temperatures up to 80°F. As temperatures increase above 80°F, water use requirements will increase.

Please do not hesitate to contact Dr. Marcy Ward, Extension Livestock Specialist (575-646-5947, maward@nmsu.edu), or the Department of Extension Animal Sciences and Natural Resources (<http://aces.nmsu.edu/ces/animal/>) if you have questions or comments.

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