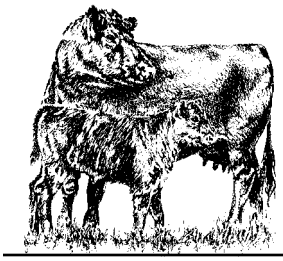

Western Beef Resource Committee *Fourth Edition*

Cattle Producer's Handbook

Drought and Other Natural Disasters Section 936

Rangeland Management Before, During, and After Drought

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Rangeland and livestock management in the southwestern U.S. presents many formidable challenges. Environmental regulations, cattle prices, and drought are just a few factors that contribute to the management challenges of the range-livestock industry. Although rangeland and livestock managers have little control over any of these variables, drought may be the least controllable or predictable.

Drought is defined by the Society for Range Management as "…prolonged dry weather when precipitation is less than 75 percent of the average amount" (SRM 1989). Using this criterion, drought occurred with the following frequency over a 40-year period from 1944-84: 43 percent of the time in the southwestern U.S., 27 percent of the time in the southern great plains, 21 percent of the time in the northern great plains, and 13 percent of the time in the northwestern U.S. (Holechek et al. 1998).

Obvious when it comes to drought in the southwestern U.S., it is not a question ***if*** drought will occur but rather ***when*** will it occur, ***how long*** will it last, and are ranch managers ***prepared***? Livestock operators must plan for drought as a normal part of the range-livestock business.

Principles of Drought and Range-Livestock Management

Ranchers depend upon the natural production of rangeland grass and other forage plants to feed their free-ranging livestock. In reality, ranchers use domestic livestock to market the forage that is produced on the range. When cattle producers think about drought management from this viewpoint, it becomes obvious why it is important to have an understanding of how drought affects rangeland forage production, and more importantly, how ranch management practices can help buffer the consequences of drought when it comes.

Drought Affects Individual Plants

General Plant Response—Drought or water stress affects virtually every physiological and biochemical process in plants (Hanselka and White 1986). As water stress progresses, cell division slows down, enzyme levels decline, and chlorophyll formation may cease. Leaf stomata close, slowing transpiration and photosynthesis, which in turn, slows shoot and leaf growth.

Buds of perennial grasses may be damaged to such a degree that they cannot produce shoots (i.e., forage) in subsequent years. Seed heads may not develop or extra-dry soil conditions may prohibit seed germination altogether. In extreme cases, carbon dioxide assimilation ceases, senescence is induced, and plants die.

Root and Shoot Growth—To survive, perennial plants must accumulate both above ground (shoot growth) and below ground (root growth) biomass through the processes of photosynthesis, transpiration, and respiration. During drought, healthy root systems are essential to extract remaining soil moisture. Under extreme drought conditions, however, limited soil moisture may be inadequate to support shoot growth.

When shoot growth is limited, adequate carbohydrates (i.e., plant food) may not be manufactured to replace roots that normally die back a little each year. The combined effect of drought is a downward spiral where roots are unable to extract moisture and minerals from the soil, which, in turn, limits shoot growth and food production of plants. In severe cases, widespread plant death may occur across parched landscapes.

Rangeland Condition and Drought

Although all rangelands are adversely affected by drought regardless of condition, rangeland in fair or poor condition is more adversely affected and recovers more slowly than rangeland in good or excellent condition

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