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RANGE TECHNICAL NOTE NO. 52

SUBJECT: ECS - RANGE - MANAGING CALIFORNIA RANGELAND IN A  
DROUGHT .

Purpose: To transmit the above-named Technical Note.

Effective Date: When received.

Filing Instructions: File with other Range Technical Notes  
in the Technical Note binder under  
Range.

The attached Technical Note was developed by former State Range Conservationist Joel Brown while California was still in the throes of a five-year drought. The drought ended before the Technical Note could be distributed; however, the information is still valid. With the variation in weather throughout the state, one place or another is in a drought situation.

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Attachment

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# TECHNICAL NOTES

US DEPARTMENT OF AGRICULTURE

SOIL CONSERVATION SERVICE

TN - RANGE - 52

SEPTEMBER 1994

## MANAGING CALIFORNIA RANGELAND IN A DROUGHT

The Mediterranean climatic regime is limited to California on the North American continent. Mediterranean grasslands, such as the California annual type, are unique in that they are dominated by annual species. There is much speculation about the form and function of California grasslands prior to the introduction of livestock in the 1700s, and much debate over the cause of the "degradation". In any event it is highly likely that these areas will remain dominated by annual species in the future and, therefore, must be managed on that basis.

In addition, most of the annual type rangeland in California occurs on steep slopes with highly erodible soils. This unique combination of Mediterranean climate and geologically active landscapes bring with it the increased risk of erosion. Rainfall is limited to the winter and early spring and often occurs when temperatures are not favorable for growth. The period of time that both temperature and moisture are adequate is very short and highly unpredictable.

Because of the dominance by annual species, range management in California takes on a much more variable aspect. Forage production varies directly as a function of precipitation and temperature and it is difficult to predict both how much and when during the growing season adequate forage will be available to insure minimum levels of livestock performance. The economic constraints of traditional livestock operations require a commitment on the part of the rancher prior to the growing season as to how much and how long grazing will occur. Even after that decision is made, flexibility is the key to both maintaining livestock performance and ensuring adequate plant cover to prevent excessive erosion and protect the productive capacity of the ecosystem.

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Prepared by Joel Brown, State Range Conservationist, Ecological Sciences Staff, Soil Conservation Service, Davis CA. Adapted from "COPING WITH FIVE YEARS OF DROUGHT IN THE CENTRAL SAN JOAQUIN VALLEY" By Neil K. McDougald, William E. Frost, Aaron O. Nelson and Ralph L. Phillips and published as Range Science Report #28 by UC Davis Cooperative Extension.

It is this variability in time that is characteristic of the annual type grasslands. Technical assistance in this type of ecological system must be oriented more toward dealing with the extremes rather than managing for the average year. Several consecutive years of drought in the Central Valley and surrounding foothills is creating a severe hardship for the livestock industry. Lowered forage production has resulted in residual dry matter well below the minimum threshold levels for California. Residual dry matter is the dry plant material left on the ground from previous year's growth which provides favorable micro-environments for early seedling growth, soil protection, soil organic matter and a source of low quality fall forage for livestock (Clawson, McDougald, and Duncan 1982).

Residual dry matter levels resulting from continuous drought are creating a situation similar to that following a wildfire. Besides a reduction of the current year's forage, the forage production in the season following a wildfire is reduced and the length of adequate green forage period is shortened. This results in the need to reduce stocking rates. In the growing season following a fire, forage production will be reduced by 30 to 50 percent and species composition will shift primarily to forbs. In the second growing season, forage production will still be about 20 percent less than on undisturbed sites. Only in the third growing season will forage production be similar to that of undisturbed sites (McDougald, Frost, and Clawson 1991).

Sound rangeland and livestock management strategies can help the producer endure the drought. What follows is a series of range and livestock management recommendations. As no specific management program can be applied in all situations, they should all be carefully evaluated in terms of cost in relation to expected return. Each livestock operation must evaluate their management options and select those best suited to their specific situation.

### **Range Management**

Move cattle to pastures with scattered blue oak. In much of the state, early season forage production and total forage production is greater beneath the canopies of blue oak than in adjacent open areas.

Visually evaluate the available forage remaining in each pasture. Map these areas into categories of high, moderate and low forage following the guidelines for residual dry matter (Clawson, et al. 1982, Frost et al. 1988). Use these maps to locate supplemental feeding areas and build temporary electric fencing to improve livestock distribution and use existing forage or residual dry matter efficiently.

Use nitrogen fertilization if and when rains occur. Nitrogen results in a quick forage production response and increases the quantity of protein in the forage. Nitrogen should be applied to open rolling sites rather than the steeper sites for the best

results. The benefit of fertilization may be limited in areas of low average rainfall.

Poisonous plants become a bigger problem during drought. Locate all areas with poisonous plants and monitor them closely or exclude cattle from them if possible. Hungry animals will eat poisonous plants that they normally do not consume.

Utilize pastures with predominantly south and west aspect early in the grazing season. The forage on these areas will mature and dry earlier than that on north and east exposures. This grazing strategy will lengthen the period in which adequate amounts of green forage is available.

Swales, due to their deeper, more fertile and higher water-holding soils, are the highest forage producing sites on annual rangeland. However, during winter the cold air settles into the low areas restricting plant growth. By fencing large swales and restricting their use until temperatures are warm, the plants will have a photosynthetic advantage enabling them to produce near their potential. Since plants on these areas are the last to mature and dry, delaying their use may further extend the period in which large amounts of high quality green forage is available.

High quality and accessible water is extremely important under drought conditions. Development of all sources of water supply should be considered. This includes spring and seep development, water tank and pond or reservoir construction and drilling wells. Hauling water short distances in order to harvest the feed from certain areas may be necessary in some cases, but should be used only as a last resort as it is a costly, time-consuming, and a temporary solution.

### **Supplemental Feeding**

Supplemental feeding is a normal practice to maintain herd performance in reproductive rate and weaning weights. During drought additional supplemental feed is provided for replacement of lost forage production. Supplemental feeds provide additional protein and energy to cattle. Common protein-rich supplements include cottonseed, soybean, linseed, and safflower oil meals or products containing these feeds. Well-cured green leafy alfalfa hays cut in the early bloom stage are high in protein. These high quality hays will provide adequate protein for all classes of livestock when fed in adequate amounts.

Common high energy feeds include the grains such as barley, corn, milo and wheat. Molasses is an excellent energy source and in addition acts as a binder to keep down dust in ground and pelleted mixes. It is also used to increase palatability of feed mixes.

Liquid supplement can be formulated to provide either protein or energy. These liquids are commonly used when adequate amounts of low quality dry forage is available. Under drought conditions requiring replacement for forage, these supplement forms are not

recommended unless they are provided along with low quality roughages. Liquid supplements should not be considered if it takes more the 2 pounds per cow per day to maintain desired livestock performance.

As animals are exposed to severe drought conditions for some time, their maintenance requirement will decrease and a lower feed level will be adequate (Table 3). Gradual reduction of feed levels is important as it will allow animals to adjust to the lower level with little pronounced effect. However, weak animals should not be allowed to decline in condition and become weaker because greater quantities of feed are then required to bring them back to good condition.

Feeding the daily requirements twice a week is more effective than daily feeding. These less frequent large feedings allow the weaker animals, as well as the stronger animals, to get their fill. This will also save on labor costs.

During normal feeding conditions, animals deposit some of the essential minerals in their bones. During short deficiency periods these minerals are used. Under most dry feed conditions, cattle should receive a calcium and phosphorous supplement. During prolonged drought it is even more important that cattle receive these two minerals. This is particularly important for young growing animals, pregnant females and lactating heifers and cows. Vitamin A is very critical during drought. Dry feed contains very little Vitamin A. Vitamin A can be provided by having some green hay in the ration or by adding a stable form of Vitamin A to the feed mix. Another option is injectable Vitamin A. However, animals that have been on green pasture for some time usually will not experience Vitamin A deficiency for 4 to 6 months when placed on a Vitamin A deficient ration.

Feeding cattle in drought conditions may involve a variety of feedstuffs. Low-quality roughages such as cereal straw, milo or corn stover, and cottonseed hulls are a good roughage source. Poultry manure and litter are good sources of nitrogen.

When feeding the animals, reduce the distance the animals must travel as much as possible. Walking in search of feed and water can use up as much as 30 percent of the energy from feed. This should be balanced against the need to utilize existing range forage efficiently.

Extremely cold weather can also increase energy requirements. Under these conditions roughages, such as hay and straw, will produce more body heat than concentrated feeds, such as barley or corn.

## Livestock Management

A selling policy dealing with class of animals to sell and rate to be placed on the market should be formulated. Pregnancy check all heifers and cows, cull those that are open and save the most desirable and younger cows. Carrying these on minimal rations will enable you to save valuable breeding stock and replenish the herd after the drought has broken.

Wean calves as soon as possible. Don't let heifers or cows get into poor condition. Weaning ages can be classified into three groups:

1. 6 months or older
2. 3 to 5 months
3. 6 weeks to 3 months

Calves weaned at 6 months or older perform well on high quality roughage. Calves 3 to 5 months can be raised on good quality hay and grain. Calves 6 weeks to 3 months require diets higher in grains and a higher quality of hay, but do not hesitate to wean calves, regardless of age, to save the cows.

Group the herd according to their nutritional needs. This will allow for proper feeding of each group and provide an easier means of assessing livestock condition. The following is an order of priority:

1. Calves under 3 months
2. Lactating heifers
3. Calves 3 to 6 months
4. Lactating cows
5. Heifers or cows in the last 1/3 of pregnancy
6. Calves 6 to 12 months of age
7. Calves 12 months or older
8. Heifers or cows in early and mid-pregnancy
9. Bulls

Groups low on the priority list can stand longer periods of nutritional stress. These animals should be given low priority in the feeding program. Those animals most likely to die during drought conditions are young calves and pregnant or lactating heifers and cows. These classes of animals should receive highest priority and be fed the best feed. Bulls should remain in fair condition except prior to the breeding season when condition needs to be improved.

Watch for build-ups of internal and external parasites. Parasites can be a more serious problem on cattle under stress than under normal conditions. A good parasite control program will be even more important during drought. Make sure your cattle actually have internal parasites before you treat. Deworming is expensive.

**Table 3. Submaintainance Diets - Daily Quantities for Various Classes of Cattle**

Class of Cattle	Calves 6-12 Months	Yearlings 12-18 Months	Cows Early Pregnancy	Cows Late Pregnancy	Dry Cows Over 18 Months
Feed	lbs. per day				
Legume Hay	6-8	6-8	8-10	16-18	6-8
Grain	4	4	6-8	8-10	4-6
Grain Legume Hay	2-2.5 1	2-2.5 1	4.5-6.5 2	6.5-8.5 2	2.5-5.5 1
Low quality dry roughage Protein meal (41% protein)	6 1	6 1	12-16 1	16-20 1.5	6-12 0.75
Grain Low quality dry roughage Protein meal (41% protein)	2-2.5 1 0.25-0.5	2-2.5 1 0.25-0.5	4.5-6.5 2 0.5	6.5-8.5 2 0.5	2.5-5.5 1 0.25-0.5

### Conclusions

Recovery from the drought for ranchers will be difficult, especially if cattle prices remain high. Most ranchers sold livestock and are carrying small herds. If they attempt to restock quickly to predrought levels, it will be at a great financial and ecological risk. The annual grassland system requires some time after a drought to replenish seed banks and add organic matter to the soil surface. Both of these factors are critical in preventing erosion. Post drought forage production may therefore be somewhat reduced. If pastures are stocked at traditional levels, the risk of erosion will be greatly increased. Riparian areas are especially vulnerable during this time.

Technical assistance in California for range management should be structured toward finding new ways to manage these unique ecosystems that can both protect the resource base and allow good managers to be profitable. The initial step will be a reexamination of basic fundamentals of range management and conservation and how they apply in this ecosystem.

## References

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