

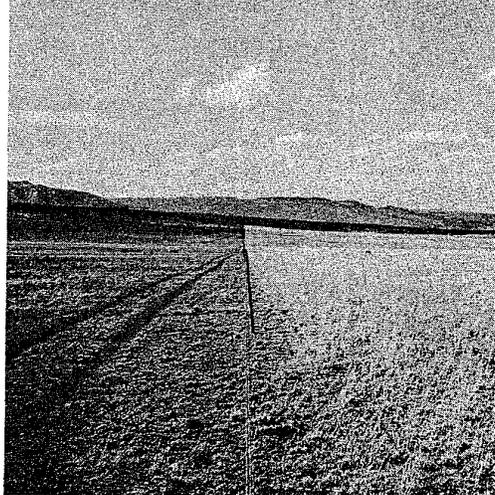
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# RANGE CONSERVATION - TECHNICAL NOTES

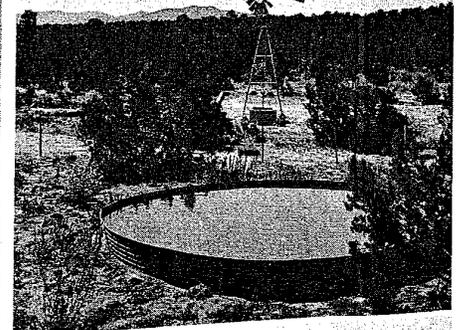
A CHEMICAL PLANT CONTROL



PROPER RANGE USE PAYS



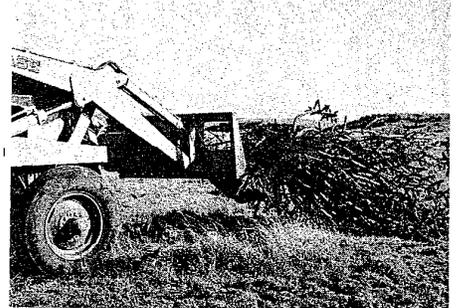
GOOD LIVESTOCK WATERING



CHAINING PINON JUNIPER



CHOLLA CONTROL



U. S. DEPARTMENT OF AGRICULTURE  
SOIL CONSERVATION SERVICE  
NEW MEXICO

RANGE TECHNICAL NOTE NO. 42

June 25, 1970

SUBJECT: RANGE - Range Sites - Determining Total Annual Yield  
on Grazing Lands

This technical note furnishes guidance on plot size and shape for measuring herbage production.

Since 1961 the Soil Conservation Service has based its range inventory on the weight estimate of total annual yield of all plant species on a range site. The study of Pechanec and Pickford as early as 1937 gave evidence that the range inventory is much more reliable if based on plant weights rather than density. Now the Range Data System as described in Section 4.10 of the National Handbook for Range and Related Grazing Lands also is based on the weight estimate technique.

AO  
Area Range Conservationists  
Regional Range Conservationist, RTSC  
Adjoining States: Arizona, Colorado, Oklahoma, Texas, Utah

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The procedure is based on the fact that the weight of herbage produced in pounds per acre is equivalent to the grams of herbage produced on a 96 square foot plot. It is difficult and impractical to estimate weight of vegetation on so large a plot except on areas of very low productivity. A plot one-tenth as large, containing 9.6 square feet, has proven very satisfactory for measuring grass and forb production on most New Mexico grazinglands. On uniform stands of close growing vegetation such as blue grama or Kentucky bluegrass sod or wet meadows a 1.92 square foot plot is useful. To obtain pounds per acre the grams of herbage must be multiplied by 10 if a 9.6 square foot plot is used and by 50 if a 1.92 square foot plot is used.

Because of their size and spacing trees and shrubs must be measured using larger plots. Normally, a 1/100 or 1/10 acre plot is satisfactory. A typical shrub or a representative tree branch is selected, stripped and weighed. This becomes the weight unit. Count the number of weight units in the plot and multiply by the appropriate factor to obtain pounds per acre.

Plots are used as training tools for learning to estimate total annual yield for a range inventory. By estimating weight of herbage in plots, checking by clipping and weighing, and repeating as needed, a person can soon learn to estimate pounds per acre directly on the range.

The double sampling technique is suggested for gathering data for the Range Data System. Using Form SCS-Range 417, ten plots are estimated and two are clipped along a predetermined transect. Three plot frames are adequate for this technique. After estimating, leave the first frame on the plot having the greatest representation of species so far encountered for the study area. Use the remaining two frames, leaving the second on the next representative plot. Use the third frame to continue. If a more representative plot is encountered, leave the third frame there and pick up the least representative of the first two frames. After all ten plots have been estimated and recorded return to the two plots still with frames and clip and record.

Plot frames may be made from wood, wire, rods, string, band saw blades, or other materials and may be circular, square, or rectangular. A satisfactory circular frame can be made from unserviceable (must be beyond repair) engineer's chain. The ends are fastened together using a Eureka Tape Repairer. One hundred thirty-two inches of chain are needed for a 9.6 frame and 59 inches for a 1.92 frame.

For 1/100 or 1/10 acre plots a "belt" transect is quite satisfactory. Measure a stick 4-1/3 feet long. Determine the direction of travel. Holding the stick horizontally with the ends pointing left and right walk toward a predetermined landmark. Count all plants intercepted by the stick. Travel 100 feet for a 1/100 acre sample or 1000 feet

for a 1/10 acre sample. Another 1/100 acre plot can be fashioned by marking off four corners 21 feet apart in the shape of a square.

The following chart lists some common plot sizes and shapes for measuring grass and forbs.

Plot size	Dimensions			Conversion factor. Grams to pounds per acre
	Circular	Square	Rectangular	
96 square feet	11.04 foot dia.	9.8 feet/side	-	Direct
9.6 " "	3.5 " "	3.1 " "	-	10
4.8 " "	2.48 " "	2.2 " "	-	20
2.4 " "	1.74 " "	1.55 " "	-	40
1.92 " "	1.58 " "	1.39 " "	24"x11½"	50
0.96 " "	1.10 " "	.98 " "	" "	100

#### References

1. Frandsen, Waldo R. 1965 Determining herbage yields on rangelands. Range Technical Note No. 1, Western Regional Technical Service Center, Soil Conservation Service.
2. Pechanec, Joseph F., and Pickford, G. D. 1937 A weight estimate method for the determination of range or pasture production. Jour. Amer. Soc. Agron. 29:894-904.
3. Soil Conservation Service 1967 National Handbook for Range and Related Grazing Lands.