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UNITED STATES GOVERNMENT

Memorandum

TO : Keith Arnold, Director, Pacific Southwest Forest & Range Experiment Station

DATE: July 6, 1961

FROM : B. K. Crane, Assistant Regional Forester By Milton M. Wright

SUBJECT: Management, A. L. Hormay

Reference is made to Mr. Offord's memorandum of June 14.

Attached is proposed itinerary covering Mr. Hormay's R-2 trip.

Enclosure

Milton M. Wright

*EJC
i/cw*

AAH

PROPOSED ITINERARY FOR HORMAY'S R-2 TRIP -- ROTATION GRAZING

First Week

- August 6 -- Sunday Reservations for Hormay at Cory Hotel, Denver
- 7 -- Gierisch and Hormay Leave Cory Hotel at 8:00 a.m. Drive to Pawnee N.G., see Main C&H allotment and then to Laramie, Wyoming
- 8 -- Drive to Pole Mountain and see Beacon C&H allotment (Medicine Bow) Return to Laramie.
- 9 -- Fly (chartered plane) to Sheridan, Wyo. See Freezeout C&H allotment (Bighorn). Return to Sheridan.
- 11 -- Fly (chartered plane) to Chadron, Nebraska -- see Powderhorn allotment (Nebraska). Return to Chadron.
- 12 -- Fly (commercial airlines) to Denver. Reservations for Hormay at Cory Hotel.

Second Week

- 13 -- Sunday at Denver
- 14 -- Wright and Hormay Drive to Gunnison, Colo.
- 15 -- Visit Saguache Park Allotment (Rio Grande) and Monchego Park allotment (Gunnison). Return to Gunnison
- 16 -- Visit Mule Park allotment (Gunnison) and drive to Delta.
- 17 -- Visit Sheep Creek and Smith Point allotments (Uncompahgre) and return to Delta.
- 18 -- Visit Kannah Creek allotment (Grand Mesa) and drive to Steamboat Springs.
- 19 -- See Big Creek allotment (Routt) and drive to Denver.

Office Memorandum

UNITED STATES GOVERNMENT

*Next: Recent events affecting
Coker may challenge this.
Let's take it along on Aug. 15th
with a sign. EJM*

TO : M. J. Reed

4210
DATE: July 18, 1961

FROM : Lynn Rader

*Discussed w/
Robert Woolfolk
wk. Aug 1 -
at Susonville
M.*

SUBJECT: RM&WH Programs--Study Plans; Harvey Valley

In line with our memorandum of June 14 to Woolfolk, I have worked up the attached preliminary plans for supplemental field studies at Harvey Valley. I would appreciate it if you will go over these and see if you think they are suitable before giving them to Joe. I believe they are pretty much in line with what we discussed.

The transect measurement is going rather slowly as there are three sets of measurements to be made on a good many of the transects. Measurement of the 50 inch lines on a refined basis, with data recorded to allow comparison of lines of different length, takes quite a bit longer than just recording the total intercept along the line to the nearest half inch. However, it also gives a great deal more information.

*Woolfolk for
only a
smaller
sample?*

The fellows are recording by 5 inch segments along the 50 inch lines and reading intercepts to 1/100 of an inch. This will allow us to compare lines 10 inches, 20 inches, -- , up to 50 inches in length. I got together with Bob Miller when he was here and worked up the form to record this data for machine processing.

*2
same*

At the rate this work is going, we may only be able to measure the transects in Unit 4, if we want to make a utilization survey and get into these other studies. However, I feel that we will buy more by measuring transects in one pasture using this procedure than by measuring both pastures on the old basis, ie, to the nearest half inch. Also it will not be such a chore in the future when we only have to make one set of measurements and when we may be able to use shorter and possibly fewer lines.

I'll appreciate your suggestions on the proposed plans and your feelings as to the advisability of putting our effort on this rather than additional transect measurements.

*EJM
I think real
good - see notes. may
need further modification
To sharpen up
meant.*

Lynn

PRELIMINARY PLANS FOR SUPPLEMENTAL FIELD STUDIES
AT HARVEY VALLEY

Results of grazing management systems are reflected in both vegetation and livestock response. Evaluation of vegetative response to management should include: (1) Changes in plant cover, usually measured in terms of density and composition; (2) Changes in forage production and grazing capacity; and (3) Estimation of the degree of forage utilization associated with livestock use.

Current vegetation studies on the Harvey Valley Demonstration Allotment are primarily designed to measure changes in the density and composition of plant cover. This is accomplished through the periodic measurement of condition and trend transects located in the major vegetation types. Information gained from these studies is essential to indicate what is happening to the vegetative cover as a result of grazing management. However, such measurements are not easily converted to grazing capacity. Actual forage production estimates are needed to indicate changes in productivity resulting from rest-rotation grazing.

In the past, forage utilization on the allotment has been determined through ocular estimation of the degree of forage use. During the 1960 grazing season an attempt was made to determine utilization using the percent of ungrazed plants method. When properly applied, this technique is particularly well suited to give quantitative estimates of utilization on large areas such as the range units at Harvey Valley. However, sufficient information is not currently available to allow conversion from percent of ungrazed plants to volume of forage removed. Information on the height-

weight distribution of major forage plants found at Harvey Valley and data on relationships between percent of plants ungrazed and weight of forage removed is needed.

Forage Production

There are two possible approaches to the estimation of forage yields at Harvey Valley. One is to clip plots in the major forage types. The other would be an indirect approach where an estimate of numbers of plants per unit area along with average diameter and height of major forage species is combined with average yield by diameter and height classes or per square inch of plant to give weight of vegetation produced per acre.

Preliminary clipping in the fall of 1960 indicated that square foot clipped plots can be used to estimate forage production for meadow types at Harvey Valley with a reasonable number of sample plots. However, for the sage and timber types, larger plots are required. Additional information is needed to determine the sample required to give an acceptable degree of accuracy using this method. Comparison of clipped plots and indirect methods of estimating forage production for sage and timber types is desirable to determine which method will be most suitable.

During the 1961 field season, preliminary work will be aimed at obtaining information on measurement techniques for indirect methods of determining forage yields and data for comparison of estimates obtained by indirect methods with those obtained from clipped plots.

Procedures

1. Two sampling procedures will be compared for indirect methods of estimating forage yield.

*Document
- To sample units?
- To include
Variation in forage
yield.*

Focus is on the technique on one type.

- (a) The point centered quarter method of sampling will be used to determine numbers of plants per unit area for two quite different vegetation types and for the major forage species. Supplemental measurements to give average diameter and height of plants will be made.
- (b) Using the same center point, a 9.6 square foot circular plot will be located. Numbers of plants of the major species and average diameters and heights will be recorded.

1/2 ft or ground level

2. Following measurements required in (a) and (b) above, all plants in the 9.6 foot plot will be clipped and segregated to provide weight information by species, diameter and height classes. The sum of individual plant weights per plot will allow estimation of production by the clipped plot method using a 9.6 square foot plot as the basis of measurement.

3. Production of meadow vegetation will be determined by clipping 1 square foot sample plots.

Probably not possible for some species.

Height-Weight Relationships

only major forage species?

For individual plants clipped in 2 above, a 1 inch square portion will be separated and segmented to determine height-weight relationships for the major forage species. This information will be a first step in obtaining the necessary data for applying the percent of ungrazed plants method of determining utilization. During the 1961 utilization survey, necessary measurements in addition to records of plants grazed, ie, stubble will be made height records, to allow correlation of ungrazed plants with weight removal.

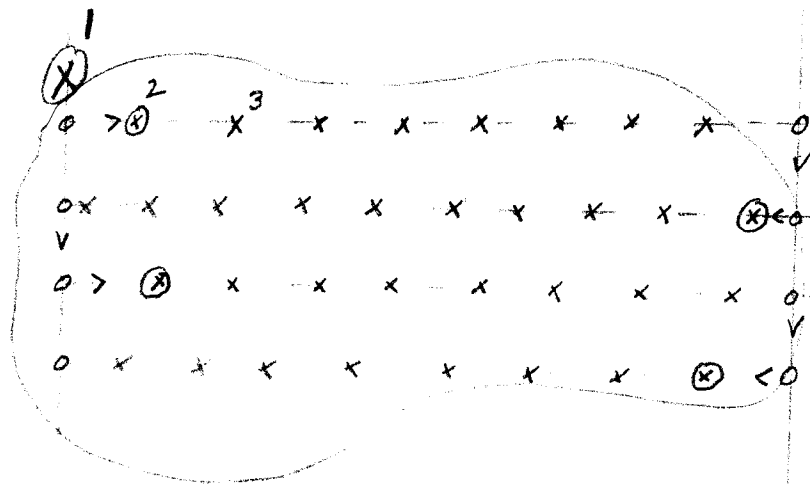
Sampling Design

Two points must be considered in a suitable sampling scheme for conditions at Harvey Valley. These are: (1) Sampling in relation to vegetation types; and (2) Sampling in relation to range units.

For the 1961 field season, we will be concerned only with sampling in relation to vegetation types. Two quite different sub-types will be selected. Within these types, a systematic random sample will be taken. The general procedure for locating sample points is given in the attached diagram.

*what's this?
restricted
random?*

Sample Design Within A Given Subtype



1. Random Point: Locates Sample Lines
2. " " : Start of each line of Plots
3. Sample Plots - equal spacing

of course between plots (on a line) correlation need in. necessary to treat each line of plots as single sampling unit.

This procedure gives A Systematic Random Sample - Equally Spaced Lines - Equally Spaced Sample Plots. (Spacing determined by the size of Area to be Sampled - ie, An Arbitrary Number of Sample plots at this stage)

I.

Point Centred Quarter Method +

no
effecting/

- Measure: d_1 - from center of center pin
 To center of clearing or plant
 or To closest edge of plant + one radius of plant
1. Distance to nearest plant in each quarter - for each species we have n - to nearest tree (foot)
 2. Mean Distance of each plant measured.
 3. Mean Height of each plant (leaves - flower stalks)

Separation of one or the other depends on whether

$$\text{Mean Distance} = \frac{d_1 + d_2 + \dots + d_n}{n} = d_{\text{mean}} (0.00')$$

flowering or non-flowering as decided

$$\text{Mean Area} = \text{Mean distance}^2 = \dots \text{ ft}^2 \text{ per plant}$$

2.5
3.0
3.5
4.0
4.5
5.0
5.5
6.0
6.5
7.0
7.5
8.0
8.5
9.0
9.5
10.0

$$\text{Total Density} = \frac{1}{\text{ft}^2/\text{plant}}$$

or, to get density in terms of plants per acre

$$\text{Total Density} = \frac{43560}{\text{ft}^2/\text{plant}} = \text{plants per acre}$$

Notes: (To be done along with the above)

1. Average Diameter in feet of plants in each quarter
2. Average Weight per plant (leaves & branches, flowers etc.)
 Plants per acre = Average weight per plant

II

Circular Plot Method -

Use Circular Plots - 9.6 Sq. ft. Area.

Dia. = 3.495'

Circ. = 10.98'

Measurements -

1. Count of Plants by species.
2. Measure int. Dia. + Height (leaves + stems)

No. of Plants 9.6 Sqft x 4533.75 = No. Plants Per Acre

And:

No. Plants/Acre x Ave. Wt. Per Plant = Pounds Sq. / Acre
(by species)

Or:

No. Plants/Acre (by spp.) x Ave. Dia. = Plant Closes

Plant Closes x Weight / Sq. inch = Pounds Sq. / Acre

III

what
Ht. of
plant

Clipped Plot Method -

1. Meadow Veg - Use 9.6 sq ft Plots.
2. Other Veg. Types -
Use same 9.6 sq ft. Plot -
Grass Veg as 9.6 sq ft x 10 = Ponds for base.

Procedure to Make 3 Types of Measurements

1. Measure Distance to Plants to Point Center.
Quarta - (7 Measurements)
Record for Diameter and Height
2. Lay Circular Plot - Same Center as Point Center
Quarta.
a. Count Plants - by sp.
b. Are dia. & Ht. (if not already measured)
3. Clip Plot -
Key Individual Plants separate - for weight
by dia. & Ht. - or use square inch.
4. Separate but square out individual plants to
be sequential for weight etc.

measure
all plants
physically

Unit No. _____
 Veg. Type _____
 Plot No. _____

PLANT COVER + YIELD MEASUREMENTS
 Harvey Valley Demonstration Allotment

DATE _____
 OBS. _____

SPECIES	POINT CENTERED QUANTER				9.6 Sq. Foot Plot				Weight (Grams)
	Distance	Ave. Dia.	Leaf Ht.	Stem Ht.	No. Plants	Ave Dia.	Leaf Ht.	Stem Ht.	
	2 stands represented by 1 plant								

Space for totals, etc