Memorandum

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

FROM: B. K. Crane, Assistant Regional Forester

DATE: July 6, 1961

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

[Signature]
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 Freezecout 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 (Uncomphagre) 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.
TO: M. J. Reed
FROM: Lynn Rader
DATE: July 18, 1961

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.

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.

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.

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.
(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.

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.

Height-Weight Relationships

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.

(3)
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.
Sample Design Within a Grid Sub-Plot

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

This procedure gives a systematic Random Sample - equally spaced lines - equally spaced Sample Plots. (Spacing determined by the size of Area to be sampled - i.e. An Arbitrary Measure of Sample plots at this Stage)

(5)
I.

First choose the best location for planting.

1. Distance is decided based on the location and species. For each species, we have determined an optimal distance.

2. Measure Distance at Each Trial Location:

\[
\text{Mean Distance} = \frac{d_1 + d_2 + ... + d_n}{n} \quad \text{(in ft)}
\]

3. Height: \( h_1 \quad \text{to the right} \text{ (in ft, minus stake)} \)

4. Total Density = \( \frac{1}{ft^2} \text{/Plant} \)

Dr. to provide density in terms of plants per ft².

\[
\text{Total Density} = \frac{\text{Number of Plants}}{\text{Area} \times \text{ft}^2}
\]

Field:

1. Plunge Distance to Point A, C, or E.

2. | Allot: Distance to Plant (between A, C, or E, Stake) |

   - Plant the first seed in this position.
Circular Plot Method -
Use Circular Plots - 9.6 sq. ft. Area.
Dia. = 3.15'
Circ. = 10.00'

Measurements -
1. Count of Plants by species.
2. Measure ref. Dia. + Height (Horiz. + Vert.)

No. of Plants 76 sq.ft. x 4533.75 = No. Plants in one
and:

No. Plants/acre x Acre Ref. Ref. Plant + Basic Ten/price
(by species)

or:
No. Plants/acre (by spec.) x Acre Ref. Plant Case
Plant Case x Weight/price = Bonds/avg. price.
Chapter 1 Plot Method

1. Measure Veg. Size & Record Plant

2. Other Veg. Types
   - Use same as Vegetables
   - Cropped Veg at 6.5 ft x 10 = Process the hay

Procedure to Make 3 Types of Measurements:

1. Measure Distance to Plants in East Central
   - Use Quarter & Measurements
   - Record for Future Plant Height

2. Lay Distance Hat - Show Center the Plant Centers
   - Distance
   - Count Plants by 5's
   - Add the center (Plant in Between Them)

3. Clip Hat
   - Keep Individual Plants Apart - for growth by Dia. 1/4"  or the Ground

4. Record in Square of Individual Plants to be Separated for growth
### Plant Cover + Yield Measurements

**Harvey Valley Demonstration Allotment**

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*Note:* Fill in the table with measurements for each species.

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Spice for totals, etc.