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THE MAKING OF A DEER RANGE SURVEY AND GAME STUDY FOR DEER
MANAGEMENT ON NATIONAL FORESTS IN WESTERN OREGON

A thesis
presented to
the faculty of the School of Forestry
Oregon State College



In Partial Fulfillment
of the Requirements for the Degree
Bachelor of Science

By
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A large, stylized handwritten signature, likely of the author Virgil Taylor Heath, written in dark ink.

INTRODUCTION

A game count is made in each region annually. These counts are really, so far, not much more than estimates or guesses. Little has been done to make accurate deer counts in the National Forests of Western Oregon. The public is beginning to demand that the big game shall be so managed that they can place big game hunting among their recreational activities, but before big game plans can be made on an intelligent and scientific basis, it is important that the amount of game shall be known. It is predicted by many authorities that, in the near future, big game will be placed on a sustained yield basis in the National Forests. Before this can be made possible, there must be a reliable census and inventory made.

This paper deals with a range and game survey preparatory to the making of a Game Management plan for deer on a National Forest in Western Oregon. I do not claim this paper to be original as to material and forms. This material was gathered by extensive reading of Government Bulletins, books, papers presented at Wild Life meetings and conclaves, and unpublished records found in Forest Service files. Material taken from reports presented at Forest Service meetings by W. M. Rush was used extensively. I am not going to tie this paper down by using some definite forest or area. I prefer to leave it general, for I lack time and information to make a study that could allow me to be definite.

In the making of these range surveys and game counts, the results should show: species of deer, condition, sex, age, amount, location, time, actions, diseases, predators, types of forage and its condition, amount of each forage plant consumed, the general condition of the range, and recommendation that would be of future use in making the game management plan.

An analysis should be made of the stomach contents of all dead deer found on the range and a Stomach Analysis form filled out and filed.

There are a number of methods used in making game counts; their accuracy depends upon the personnel, topography, season of the year, the weather, and many other minor influences that tend to defeat accuracy.

GAME ESTIMATES

The proper organization of the game count does more toward accuracy than any other one factor, for the proper organization places the most competent men in the places where the most accuracy is desired; it places the men in the field at the proper time of the day, and it provides for instruction of the personnel before the game count and survey is made.

There are five major methods of game counts that are applicable to Western Oregon.

1-District Method.

This method calls for a party of one or two men to cover certain assigned districts.

2-Party Method.

2-Party Method.

A central point is chosen as headquarters, and all the country that can be conveniently traveled is covered. New points are then chosen until the whole country has been covered.

3-Small Party Method.

Only one or two men are used, and they cover the whole country by themselves.

4-Strip Method.

This method is similar to the strip cruising method. All the men begin at one side of the country to be covered and travel in parallel routes across the country to the other side of the range.

5-District Ranger Method.

The Ranger keeps a systematic record of all the game that he sees on his district while he is out on trips or inspection tours. He makes note of the movements of the deer as they travel from one country to another. The ranger has a chance to get data on their movements as to time of year that they migrate, weather, and range conditions.

Summary.

The counting and management of deer on National Forests in Western Oregon has its draw-backs, for the National Forests of Western Oregon are situated to a large extent in the higher Cascade Mountains where the deer stay for only a minor part of the year. In the early fall, the deer migrate to lower elevations which are not on National Forests. In cases of this kind, the Federal Government would have to work in conjunction with other

game protection agencies. Studies will have to be made to see why deer really migrate to the lower ranges. It will have to be determined whether it is the predators, the weather, shortages of food, or just habit that causes the deer to make their yearly migrations from the high to the low ranges.

March and April are good months for making counts in the districts that extend into the lower country, for the deer tend to be grouped at this time of the year. The winter months are excellent if advantage is taken of the snow storms. When the snow is deep, it is an easy matter to locate the deer and keep track of their movements and study their habits. If the weather happens to become too bad, the winter months can become useless so far as accurate counts are concerned. During the summer months, only a comparative estimate can be made, for the deer are in the high mountains and scattered over a large territory where they tend to be alone or in very small groups. The fall months are not very good, for during September, October, and November, the deer are either migrating or they are moving about because of breeding season.

Planning a game count.

Plans must be made and followed before a game count and range survey can be really successful. The entire success of the undertaking depends upon the plan. It should be made by a person that is familiar with the country and the habits of the deer. The personnel of the counters should be selected because

of their ability and its value to that type of work, and not because they just happen to be available. They must be men with ability, stamina, and knowledge of deer's habits. The best men should be placed where the most deer are likely to be found. Each person that is to count should know the exact territory that he is to cover.

It is impossible to cover the entire country or range without having missed some of the herds of deer and a great many deer that are by themselves. Although the entire range can be covered in one day by some of the methods, from ten to fifty percent of the deer will escape observation because of: movement during the day, deer hiding in the brush, and single deer that may be detached from the deer that are in bunches or small groups.

If the counts are well planned, there should be no duplications unless the count extends over several days. The experienced men will cover the territory without disturbing the deer to any great extent. When deer are found in groups, it is essential that they are not disturbed, for an accurate count can not be made while the deer are moving fast.

The time of the day must be selected with great care, for deer feed at certain hours of the day. The proper time to count is during feeding hours. The weather conditions help to control the time at which the deer feed, but as a rule, you can depend upon the deer feeding in the early morning and early evening. They begin in the morning before the sun is up and are through feeding by about nine o'clock; they begin to feed again about four o'clock

in the afternoon and feed until dark. When there is a full moon in good weather, they feed at night, so plans should be made so that the deer counts will not be made during the light of the moon. It can be easily seen that the successful deer counts are made in the early mornings and evenings during the dark of the moon.

It is essential that the proper method is used while the count is being made. Each method has its advantages and disadvantages which change according to conditions that exist at the time of the count. A discussion follows showing the good and poor points of the methods discussed earlier in the report.

The Strip Method.

The strip method is excellent if the men all follow the proper procedure. The range is all covered at one time, but care must be taken so that disturbed game is not counted twice or more. The parallel lines tend to radiate toward a meeting point or a nice warm cabin along toward evening when the men are beginning to tire. This leaves a triangular shaped area on each side of the range that was not covered. Counters are also liable to count over on another persons strip when a band is seen.

The District Method.

The District Method seems to have more advantages than any of the other methods, for the whole area is covered in one day. When the whole range is covered in one day the movement of the deer does not have much to do with the accuracy of the count, but it does take a large group to do the counting, and so the

ability of the group as a whole would not be so good as a smaller and more select group. When large groups are used for counting, they are usually taken from: C. C. C. crews, E. C. W. crews, and E. R. A. crews. They may be the best men in the crew that are used, but even then they may not be too good.

Party Method.

This method is probably the least accurate of the methods discussed, for the deer will be disturbed by the party of people moving through the woods. The party is supposed to radiate out from some central point that has been chosen. The farther the party is out from the starting point, the less accuracy is obtained, for they are getting farther and farther apart.

Small Party Method.

This method is good so far as cheapness is concerned, for the Ranger district personnel can handle the counting. The main disadvantage is that too much time is taken, and the deer have a chance to move from one range to another.

District Ranger Method.

This method when some care is used has a chance to be a reliable one. The deer have a chance to move from one range to another, but if the rangers on districts joining each other would coordinate their monthly trips, this source of error can be largely overcome.

A TYPE OF WORKING PLAN FOR A RANGER DISTRICT.

Purpose

The purpose of this study and plan are:

- 1-Determine the amount of deer and associate species of game animals in the _____ District according to their age, sex, amount, condition, and the extent of ravages from predators.
- 2-To determine the amount and kind of forage found on the range, and the extent to which each kind is being used.
- 3-To determine the deer carrying capacity of the range (a) inside the forest (b) private.
- 4-To determine the amount of deer that use each district in winter as well as summer.
- 5-To determine the loss from winter kill, illicit hunting, and predators.
- 6-To get useful information to use in developing plans for better and more efficient management.

Personnel.

The personnel will consist of the District Ranger, who will be in charge, the Assistant Ranger, E. C. W. foreman assisted by the most competent men that can be picked from amongst the C. C. C. ranks.

Trips.

The planning of trips is essential so as not to over look

any of the range that should need attention. The trips will be of three types:

1-Regional Circuit

This circuit is made each month by a party; the amount and movement of the deer should be shown on a map in some convenient color. The date and weather conditions should be shown by some appropriate symbol.

2-Side trips

These trips are made to take in country that is missed on regional trips, or to cover some territory that needs attention.

3-Band trailing trips

These trips are made to study the habits of deer, condition, birth rate, death rate, etc. This is the best way to keep track of deer during migration.

OBSERVATION AND RESEARCH

A daily report will be made while on trips. This should be complete and brief. Notes should be taken on forage condition, condition of the deer, depth of snow kept on snow stake record form. It is customary to make six or eight snow depth readings close to the snow stake and get an average. Reports should show the kind of conditions that the range was left in due to the snow. Photographs should be taken and dated when ever it is possible to show the conditions as they really exist. The photographs should show condition of range, depth of snow, damage done to range from tramping, over grazed conditions, condition of deer, etc.

A diary to supplement the report must be kept.

Experimental grazing plots should be set up and complete records both written and photographic should be compiled. A record form will be found in the appendix.

Due to the fact that deer hunting is becoming more popular each year, some step will have to be taken to increase the number of deer on the range. Winter range would have to be found.

Experiments would have to be made to find desirable winter range.

Before much could be done to establish winter range snow studies would have to be made; this would necessitate the setting up of snow stakes. Forms will have to be kept showing the snow conditions at all times of the year. A sample form for snow stake records will be found in the appendix.

OUTLINE FOR DAILY REPORT OF GAME STUDY (1)

1-Area covered today.

2-Number of game animals seen today, by species. Try to get deer by classes as: bucks, spikes, does, and fawns.

3-Conditions of animals seen. Make this as complete as possible; state whether fat, fair, weak, or down.

4-Dead animals seen. State examinations made and your opinion of cause of death (such as starvation, predators, disease, ticks, or combination of causes).

5-Progress of tick infestations.

6-Movements of animals. Movement to winter range, within winter range and from winter range; additional movements noted today; cause of movements.

7-Band trailing done today

8-Predators seen by species. Number killed. Signs of predators that were not seen.

9-Forage on days trip. Separate outline for forage data.

Examination of stomach contents; your findings. Saved sample for R. O. examination and gave it No. _____.

10-Other information: damage to private property, fences, pastures, gardens, etc.

11-Photograph record.

12-Snow stake report.

(1) The above outline was copied from an outline found in Forest Service files on Elk studies.

FORAGE DATA

The proper forage has more to do the success of big game management than any other one item. If there is proper forage on the range, all other hinderances to big game management can be removed with a high degree of success. Before a successful plan can be put into action, there must be plenty of available range forage data. The following data must be available:

1-Important forage plants used by deer during the following periods

(A) Late fall (B) Winter (C) Early Spring . Use forms for

"Notes on Individual Forage Plants used by Game.". A list of

Forage plants used at different periods from data collected must be made at the close of each study.

2-Prepare palatibility table for deer with eighty percent as the maximum palatibility.

- 3-Type out the areas used at different periods of the year, and make a write up of type showing the forages used and the percent each species plays in making up 100% of usable forage within type. (Use Forest Service Form 764A, as shown in the appendix.)
- 4-Determine by observation the percent of total forage consumption by game that is eaten above snow line at different times of the winter.
- 5-Locate and determine character of feeding grounds.
- 6-Find reason for poor physical condition of game during and after severe periods of winter. State whether it is from type of forage, lack of volume, snow too deep for travel to and from feeding grounds, or a combination of factors.
- 7-Collect specimens of important forage plants and any other data that seems pertinent.

INSTRUCTIONS FOR GATHERING GAME SURVEY DATA

The gathering of game survey data should all be done in the same manner so that there will not be too many discrepancies in the completed plan. The data should be grouped under three heads (A) Spring (B) Fall (C) Winter.

Spring

Select an area that you have determined to be good deer range because of its heavy use by deer. Lay out plots 2'x 25' as samples. These plots should be laid out in each type of forage on the area. Care should be taken to see that a sample of each type is plotted.

Make a type map of the entire area, and make an estimate according to G-survey standards. A standard write-up shall be made up for each type. It will show both composition and density.

Herbaceous crop

Type the herbaceous crop on a basis of its degree of use that is made of the various parts of each of the types. Take average 2'x 25' areas and clip them close to the root crown. Sack the clippings and weigh it after it has been thoroughly dried. The difference between its weight and the weight of clippings that will be taken this fall on the same plots will be the degree of utilization.

Browse crops

Clip one half of the browse feed from each plot laid out and keep track of its dry weight. The difference between its weight and the clip taken from the other half in the spring will be the degree of utilization.

Fall Work

The most important work in range survey is done in the fall. The fall is the proper time to put the range survey on a really scientific basis after the work was started in the spring.

Select areas that are heavily grazed by deer throughout as large a portion as possible of the year.

Type and estimate the whole area that you have selected according to G-Survey standards. Make a complete write-up of each type. Show both composition and density.

Select small representative areas 2' x 25' --one for each

type of forage found in the area. These plots should be selected on sites where there is a great deal of grazing done. The plot locations must be mapped and their location shown on a type map.

Measure the heraceous crop in the fall before snow season. The crop is measured by clipping the grass at the root crown on the sample plots selected and weigh it after it has been thoroughly dried. The difference between this weight and the weight of a clipping taken on an adjoining plot in the spring will give the degree of utilization.

To measure the browse crop: "Mark out strip 5 x 50 feet, through browse types, divide into six equal divisions along the length of the strip; clip separately by species; sack and dry all the current year's growth within reach for each alternate division, which can be browsed by the deer; weigh after it is thoroughly dry, and record. For deciduous species, twigs only will be clipped; for evergreen species, leaves and twigs. Strips must be marked by some permanent means so the same area can be checked in the spring." (1)

Winter Work

Winter work will consist mostly of obtaining the number of animal-days' use the area receives during the winter month.

(1) This portion of the paper was copied from Forest Service files.

INSTRUCTIONS FOR EXAMINING STOMACH CONTENTS OF GAME ANIMALS.

No better method of determining what a deer eats than the stomach content analysis is known; it serves as a check on visual observations that were made in the field. Two observations should be made (1) Field (2) Laboratory.

Field

Open the paunch and spread it over the ground from two to four inches thick. Divide the contents into from sixteen to twenty segments. A portion of each segment should be taken out a percentage of each species from which it is formed should be determined and recorded on a Stomach Content Analysis Form. (1)
A list of the available forage species with its relative abundance on the range should be recorded.

Laboratory

The laboratory work is a check on the results of the field observation of the stomach contents.
Take fifty to sixty small samples from different parts of the stomach contents brought in from the field. These samples should be pressed into tight cloth covered balls and dried in an oven; then they are sent into the Regional office along with the Stomach Content Analysis Form filled out as completely as possible. The identification of the contents will again be checked and determined in the Regional Office.

(1) This form will be found in the appendix.

Limiting factors

DISEASES OF DEER

In making game plans and studies, it is always necessary to take into consideration the diseases of the deer. In some localities diseases keep the deer census rate down. Before proper management can be successfully carried out, the diseases that are prevalent and their extent must be determined. The personnel of the game count should observe closely all the ailments of the deer and gather as much information as possible under existing conditions.

The diseases of deer are classified as (1) Parasitic. They may be of two classes: Animal or Zooparasites and Bacterial or Phytoparasites. (2) Dietary under three heads. Deficiency (Not enough essential elements in diet.) Malnutrition which may be by false fermentation or lack of sufficient food, and improper kinds of food. (Poison plants. (3) Traumatic or injuries and wounds.

Parasites

Parasites have a wide spread of variety; they range from the free-living animal such as the mosquito to the fixed parasite such as the tape worm. The true parasite in order to live and exist can not do too much damage to the host or it would destroy its own means of existence. The deer seems to adjust itself to the tape worm. A balance exists that allows both the deer and the tape worm to thrive.

External Parasites

These parasites cause deer to be less thrifty and restless. During hard winters the deer are an easy prey to the weather and predators. The following are a few of the external parasites that are bothersome to deer: lice, flies, ticks, mites. Most of these parasites are blood suckers that cause irritations.

Internal Parasites

There are many different species of internal parasites that attack animals, but there seem to be only a few that do serious damage to the deer such as: lung worms, liver flukes, tape worms, and larvae of the dog tape worms.

Malnutrition

Whenever there is much evidence of malnutrition, a study should be made to determine the reasons and a possible remedy.

SNOW STAKE LOCATION REPORT

(To be filled in for each snow stake)

Forest: _____

Number of stake: _____

Location: $\frac{1}{4}$ Sec. _____, Sec. _____, T. _____, R. _____

Watershed: _____

Slope: _____%, North _____, South _____, East _____, West _____, Flat _____

Base of slope _____, Side of hill _____, Ridge top _____

Timber type and density: _____

Height of near-by trees: _____

Distance from stake to nearest trees: _____

Density and height of brush: _____

Other factors that have a bearing on the depth of snow in this vicinity _____

Description of stake, tree pole, etc.: _____

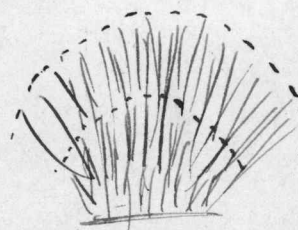
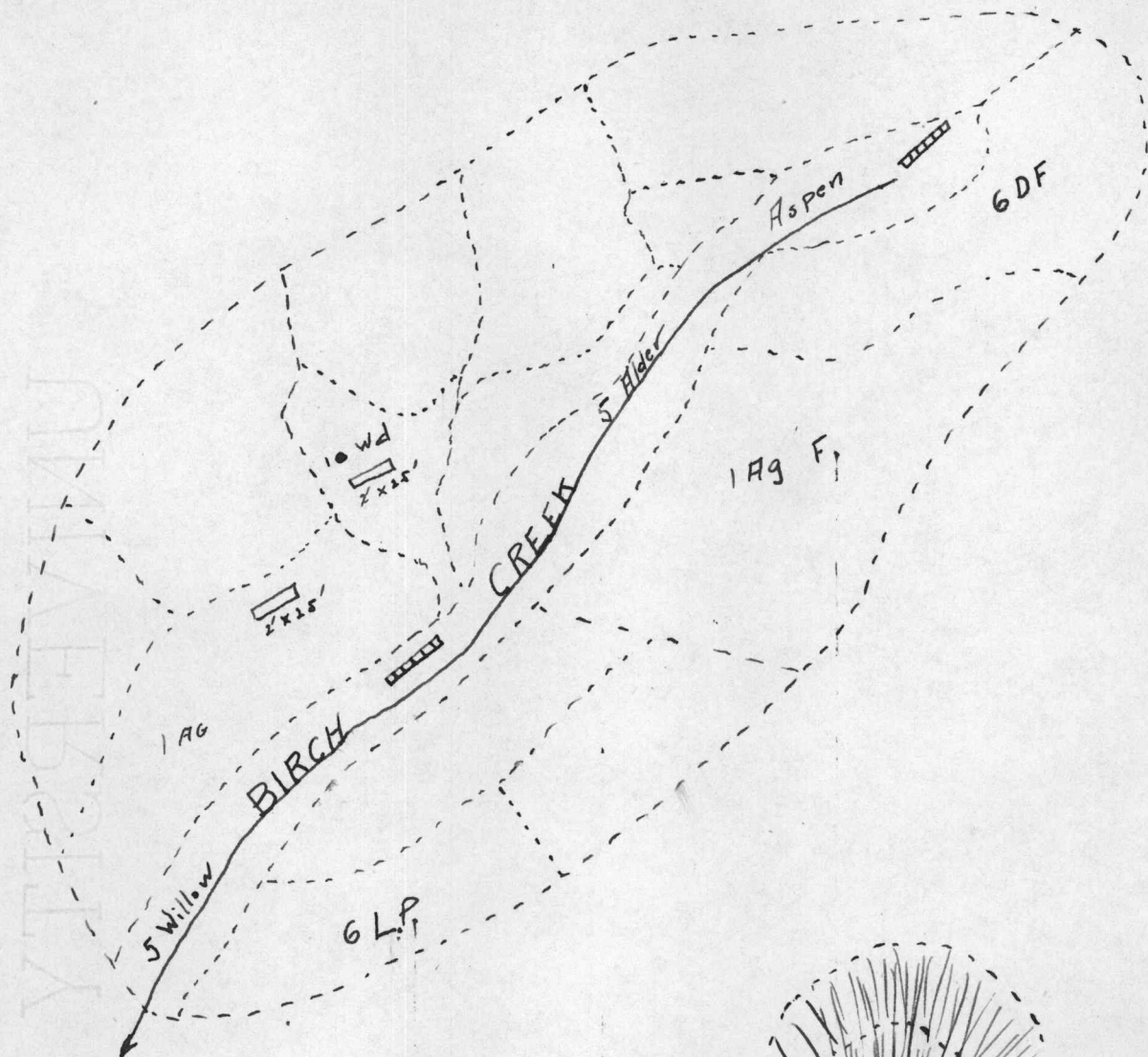
Date established: _____, 19____.

By whom established: _____

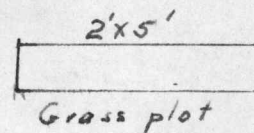
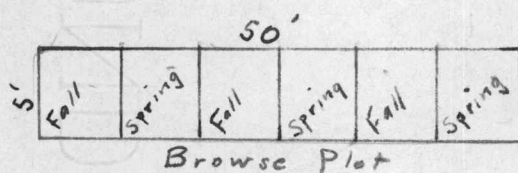
STOMACH CONTENT ANALYSIS

Animal	Sex	Age
Date Collected		Locality
Col. by		Forest
Col. No.		Exp. No.
Condition of Animal		Reason for Death
Dry Weight of Sample		Wet Weight of Sample
Species of Forage Identified		
Common Name	Scientific Name	%

Relative Abundance of Forage Available		(1)
Common Name	Scientific Name	
4) Order of abundance in locality where stomach was collected.		
<u>Remarks</u>		
Date of Exam.		Examiner
		Examiner



Available Annual Growth
to be Clipped.



The above is a sample of a Deer Management Unit for study.

OUTLINE FOR GAME OBSERVATIONS

Forest _____ Locality _____
Date _____ Approx. Temperature _____
Depth: Max. _____ Min. _____ Average _____
Snow condition: Loose _____ Packed _____
Crusted _____
Predators: Coyotes _____ Lions _____ Others _____
Seen _____
Killed _____

Game animals - Indicate, estimate, or
count. Yearlings _____

Species-Adult-Males-Male fawns-Females _____

Condition of animals seen

Forage species _____ %Annual
of forage Amount Growth eaten
Indicate _____
Animal by _____
Initial _____
Amount _____
XX Abundant _____
X Moderate _____
O Scarce _____

Extent range used by domestic stock

Observer _____

Life history notes.

Use of salt licks _____

Dates of bugling _____

Dates of breeding _____

Dates of fights _____

Dates of birth of young _____

Migrations from _____

To _____ Date _____

Causes of migration _____

Effects of hunting on migration _____

Losses: Predators _____ Disease _____

Nature of disease _____

Notes on individual forage species
used by (E) Elk and (D) Deer Winter
Period.

1. _____
Scientific name _____ Common name _____

2. Herbarium Spec. No. _____

3. _____

Nov. Dec. Jan. Feb. Mar. April
No. of days used by: _____
Deer or elk.

4. Reasons for nonuse: Deep snow;
Shedding of leaves; Snowing;
Mashed flat by snow;
Nonpalatable species available.

5. Write-up for species; Distribution
on range; Importance as a forage plant
plant for game; Use by other classes
of animals; Pawing to secure;
Reaching as high as possible to
secure and so on.

6. Additional Notes: _____

Observer _____

Snow stake report

Forest _____
Stake# _____ Date _____ Hour _____
Depth on stake _____
Average prod measurements _____
Snow is _____ Packed _____ Loose _____ Crusted _____
Photo _____ Film# _____ Negative# _____

Snow Depth Report

Forest _____
Locality _____
Slope % _____ Exposure _____
E. N. W. S.
Average prod measurements _____
Snow is loose _____ Packed _____ Crusted _____
Photo _____ Film# _____ Negative# _____

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