AN ABSTRACT OF THE THESIS OF

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The Malheur National Forest of the State of Oregon is located almost entirely in the semi-arid transition zone with elevations of approximately 4000-7000 feet. This area contains a mixture of large types relatively low in grazing capacity (ponderosa pine association) interspersed with small, distinct types of high grazing capacity (shoestring meadows).

The main range plant types according to their relative area are as follows:

(1) The ponderosa pine type is the most predominating type of the summer deer range.

(2) The meadow type is the second main type, but undoubtedly the most important type as far as actual grazing capacity is concerned.

(3) The sagebrush type is largely made up of sagebrush with an understory of palatable grasses and weeds.

(4) The browse type is similar to that of the sagebrush type, and it is an important type because of the double story of palatable vegetation available for game and livestock.

(5) The juniper type is represented by juniper stands which are open and interspersed with mountain mahogany, bitterbrush, sagebrush, palatable grasses, and weeds, similar to that of the sagebrush and bitterbrush types. This type is in the true winter deer concentration area.

Principal deer forage plants of all plant types, in order of their importance, are bitterbrush, elk sedge, mountain mahogany, snowbrush, black tree lichen, quaking aspen, alfileria or filaree, clover, and cheatgrass.

The major portion of the winter deer range is outside of the boundary of the Forest and on private, state, or public domain lands. The majority of the summer deer range is on National Forest land.

Estimated deer population of the winter concentration area in 1938 was approximately 38,000 mule deer, as compared to the estimated carrying capacity of 26,000.

The bulk of the mule deer of the Malheur National Forest migrate in the spring and fall, but there are many deer that remain on the deer concentration areas the year around. The spring and fall migrations are forced upon the mule deer by seasonal weather conditions. Observations indicate that they do not usually concentrate on their winter ranges until the snow crusts.

Most of the livestock men of this area are dependent upon the National Forest for their summer ranges. About ninety per cent of the winter deer concentration areas are on private, state, or public domain lands. Livestock men see a close similarity between proper game management and sound livestock-operating programs.

The value of a big game refuge is dependent upon the proper administration, as a refuge can either destroy or benefit the game it is intended to protect. The maximum deer population of any given area is determined by the amount of food the winter range can produce. Whenever the game population arrives at, or exceeds the carrying capacity of its winter ranges, the game refuge has ceased to be of any benefit to that particular range. It appears that the Canyon Creek and Myrtle Park Game refuges have ceased to be beneficial. No justification is apparent for the continuation of either of the game refuges.

There are at present two main game problems on this Forest. The range areas of the South Fork of the John Day River and the main John Day River are in very severe condition.

During the range survey in 1938 a record was kept of all the deer seen. Our survey covered all that portion of the National Forest inside the Forest boundary from Aldrich Mountain south including the Myrtle Park Game Refuge and Snow Mountain area. The result of our survey or the actual count was 354 does, 225 fawns, 151 bucks, 8 undetermined sex, and 42 skeletons and dead deer. This would give a ratio of 1 doe to 1.57 fawns, and a ratio of 2.34 does to 1 buck. The percentage of the fawns in the herd is 27 per cent. This will give a potential increase of the herd of 44.5 per cent.

"High-skirted" areas were mapped by the range survey crew to show the areas overused by deer and the winter deer concentration areas. The actual count of the winter game survey was 2,740 deer. This count was made from the mouth of Smoky Creek to the mouth of Deer Creek on the South Fork of the John Day River.

The principal reasons why the deer population has exceeded the carrying capacity of its winter ranges causing game problems are considered to be as follows:

(1) The creation and maintenance of game refuges.

(2) Mild winters during the recent years.

(3) Insufficient annual kill.

(4) Reduction of the bag limit.

(5) Unbalanced sex ratio.

(6) Predatory animal control.

(7) Competition between livestock and game for forage plants.

(8) Premature grazing by deer in the spring.

(9) Decreased carrying capacity of the winter range land due to past over-browsing and over-grazing.

(10) Improved cover for deer due to fire protection.

(11) Drought years.

(12) Present law enforcement is probably more adequate.

(13) Encroachment of elk on winter deer concentration areas.

The suggested remedies for the game problems are:

(1) Increased annual kill.

(2) Abolishment of the Canyon Creek and Myrtle Park Game Refuges.

(3) Later hunting season to take advantage of the fall migration.

(4) Advertisements to induce people to hunt the deer in the Malheur National Forest.

(5) Increased annual kill of elk on this Forest.

MULE DEER PROBLEM
OF THE
MALHEUR NATIONAL FOREST, OREGON

by

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MULE DEER PROBLEM
OF THE
MALHEUR NATIONAL FOREST, OREGON

INTRODUCTION

The chief purpose of this report is to summarize all the facts made available to the writer during his employment on range and game work with the United States Forest Service, Malheur National Forest, Oregon, from June 1938 to March 18, 1939.

Inasmuch as the majority of the people of this section of the state of Oregon are engaged in the livestock industry and are dependent upon the public lands for their summer range lands, an effort will be made to show a correlation between game and range management.

The problem is that the deer numbers have exceeded the carrying capacity of their winter ranges. The mule deer in the summertime inhabit the National Forest lands where the feed is plentiful, but in the wintertime when deep snows cover most of the Forest ranges, the deer are forced to migrate to the lower elevations on the winter deer concentration areas which are mostly on private, state, or public domain lands. Photographs throughout this thesis will illustrate that the winter deer ranges are in a very unsatisfactory condition.

In the following report, all statements made regarding wildlife and range conditions and trends are based upon the observations of those persons mentioned in the acknowledgment and to personal observations. These statements of facts apply only to that locality. These comments should be interpreted as indications of the general trend rather than concrete statements of proven facts.

DESCRIPTION OF THE FOREST

The Malheur National Forest is located almost entirely in the semi-arid transition zone of the state of Oregon with elevations of approximately 4,000 to 7,000 feet. This area contains a mixture of large range types relatively low in grazing capacity (ponderosa pine association) interspersed with small, distinct types of high grazing capacity (shoestring meadows).

Main Types and Forage Plants

The following important range types on and adjacent to the National Forest are listed according to their relative area.

The ponderosa pine type (6 *Pinus ponderosa*) is the most predominating type on the Forest (Illustration 1). This range plant type is the summer range of the mule deer. The most important forage plant in this type is elk sedge

(Carex geyeri), and because of its abundance and palatability could be called "the backbone of this range land". This main type could be subtyped or divided according to the character or aspect of the understory in the following manner.

(U. S. Forest Service Photo)

Illustration 1. Showing a typical ponderosa pine type with an understory of elk sedge (Carex geyeri), and pine grass (Calamagrostis rubescens).

6 PP - Cge (6 *Pinus ponderosa* - *Carex geyeri*)
6 PP - Cru (6 *Pinus ponderosa* - *Calamagrostis rubescens*)
6 PP - Pne (6 *Pinus ponderosa* - *Poa nevadensis*)
6 PP - Ptr (6 *Pinus ponderosa* - *Purshia tridentata*)
6 PP - Art (6 *Pinus ponderosa* - *Artemisia* spp.)
6 PP - Cld (6 *Pinus ponderosa* - *Cercocarpus ledifolius*)
6 PP - Cvl (6 *Pinus ponderosa* - *Ceanothus velutinus*)

The principal forage plants of the ponderosa pine type, with their proper use factors (palatability ratings) for cattle, sheep, and deer, (3) are as follows:

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(3) Reid, E. H., Standard palatability list, Oregon and Washington. U. S. Forest Service, June 3, 1938.

Scientific Names	Common Names	Proper Use Factors		
		Cattle	Sheep	Deer
Grasses:				
Agropyron spicatum	Bluebunch wheatgrass	70	40	Good
Bromus marginatus	Big mountain brome	60	40	Fair
Bromus tectorum	Cheatgrass	20	20	Excellent
Calamagrostis rubescens	Pinegrass	20	10	Poor
Festuca idahoensis	Idaho fescue	60	40	Good
Koeleria cristata	Junegrass	70	50	Good
Poa nevadensis	Nevada bluegrass	70	60	Good
Poa secunda	Sandberg bluegrass	60	40	Good
Grass-like:				
Carex geyeri	Elk sedge	50	40	Excellent
Weeds:				
Achillea lanulosa	Yarrow	20	30	Fair
Arnica spp.	Arnica	0	10	Fair
Balsamorhiza sagittata	Arrowleaf balsamroot	40	60	Good
Fragaria spp.	Strawberry	0	0	Poor
Hieracium scouleri	Woolyweed	40	70	Good
Lupinus spp.	Lupine	20	40	Good
Browse:				
Alnus oregona	Red alder	10	20	Fair
Amelanchier florida	Pacific service berry	40	60	Good
Arctostaphylos uva-ursi	Kinnikinnick	0	0	Good
Artemisia arbuscula	Low sagebrush	0	10	Poor
Artemisia frigida	Estafiata	0	20	Fair
Artemisia tridentata	Big sagebrush	0	5	Poor
Betula glandulosa	Rosin birch	5	10	Good
Ceanothus velutinus	Snowbrush	0	0	Excellent

Scientific Names	Common Names	Proper Use Factors		
		Cattle	Sheep	Deer
Cercocarpus ledifolius	Curlleaf mt. mahogany	0	0	Excellent
Chrysothamnus lanceolatus	Rubber rabbit brush	0	0	Poor
Chrysothamnus nauseosus	Rubber rabbit brush	0	0	Poor
Clematis ligusticifolia	Western virgin bower	0	0	Fair
Cornus stolonifera	Red-osier cornel	0	10	Fair
Crataegus douglasii	Black hawthorn	0	5	Fair
Lepargyrea canadensis	Buffaloberry	0	0	Good
Philadelphus lewisii	Lewis mockorange	10	10	Fair
Populus tremuloides	Quaking aspen	20	40	Excellent
Prunus demissa	Western chokecherry	10	20	Good
Prunus emorginata	Bitter cherry	20	30	Good
Purshia tridentata	Bitterbrush	40	50	Excellent
Ribes spp.	Currant	10	20	Fair
Rosa spp.	Rose	20	40	Fair
Salix spp.	Willow	20	40	Fair
Sambucus glauca	Elderberry	40	60	Good
Symphoricarpos, spp.	Snowberry	10	30	Good
Vaccinium caespitosum	Dwarf huckleberry	0	10	Poor
Trees:				
Juniperus sp.	Juniper			Fair
Pinus ponderosa	Ponderosa pine			Poor
Pseudotsuga taxifolia	Douglas fir			Poor
Moss:				
Allectoria fremont	Black tree Lichen, Black Moss, or Unsea			Excellent

This meadow type (2 wet or dry) is the second main type, but undoubtedly the most important type as far as actual grazing capacity is concerned (Illustration 2). This type is interspersed among the main timbered type. Many deer were observed during the summer of 1938 in these meadows, especially late in the day.

(U. S. Forest Service Photo)

Illustration 2. Showing meadow type, sagebrush type in foreground, and ponderosa pine type in background.

The main forage plants for cattle, sheep (3) and deer are as follows:

Scientific Names	Common Names	Proper Use Factors		
		Cattle	Sheep	Deer
Grasses:				
Agropyron smithii	Bluestem wheatgrass	70	40	Fair
Deschampsia elongata	Slender hairgrass	35	20	Poor
Festuca idahoensis	Bluebunch fescue	60	40	Good
Glyceria striata	Fowl mannagrass	60	30	Fair
Koeleria cristata	Junegrass	70	50	Good
Poa spp.	Bluegrasses	70	60	Good
Grass-like:				
Carex spp. (Wet Meadow)	Meadow sedges	40	20	Good
Carex spp. (Dry Meadow)	Dry-land sedges	50	40	Poor
Juncoides spp.	Woodrush	40	20	Poor
Juncus spp.	Rush	30	20	Poor
Weeds:				
Achillea lanulosa	Yarrow	20	30	Fair
Leontodon taraxacum	Dandelion	50	70	Good
Potentilla spp.	Fivefingers	10	20	Fair
Trifolium spp.	Clover	80	80	Excellent
Browse:				
Artemisia tridentata	Big sagebrush	20	30	Poor
Betula glandulosa	Rosin birch	5	10	Good
Dasiphora fruticosa	Bush cinquefoil	0	20	Good
Populus tremuloides	Quaking aspen	20	40	Excellent
Salix spp.	Willow	20	40	Fair
Symphoricarpos spp.	Snowberry	10	30	Good

(3) Reid, E. H., Ibid.

The third main type, the sagebrush (4 Artemisia), is largely made up of sagebrush with an understody of the following grasses, weeds, and browse (Illustration 2). This type is usually found on dry, well-drained sites bordering the timber, meadow, and juniper types. The main forage plants for cattle, sheep (3), and deer are as follows:

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(3) Reid, E. H., Ibid.

Scientific Names	Common Names	Proper Use Factors		
		Cattle	Sheep	Deer
Grasses:				
Agropyron spicatum	Bluebunch wheatgrass	70	40	Good
Bromus tectorum	Cheat	20	20	Excellent
Festuca idahoensis	Idaho fescue	60	40	Good
Koeleria cristata	Junegrass	70	50	Good
Poa nevadensis	Nevada bluegrass	70	60	Good
Poa secunda	Sandberg bluegrass	60	40	Good
Weeds:				
Achilles lanulosa	Yarrow	20	30	Fair
Balsamorhiza sagittata	Arrowleaf balsamroot	40	60	Good
Erigeron spp.	Fleabane	20	50	Good
Eriogonum spp.	Buckwheat	0	10	Good
Erodium cicutarium	Afileria	80	80	Excellent
Helianthella douglasii	Little sunflower	20	40	Good
Lupinus spp.	Lupine	20	40	Good
Senecio columbianus	Butterweed	0	0	Good
Wyethia helianthoides	Big mules-ears	10	10	Good
Browse:				
Artemisia arbuscula	Low sagebrush	0	10	Poor
Artemisia frigida	Estafiata	0	20	Fair
Artemisia tridentata	Big sagebrush	0	5	Poor
Purshia tridentata	Bitterbrush	40	50	Excellent

The fourth type, the browse type (5 bitterbrush) is an important type because of the double story of palatable vegetation available for game and livestock (Illustration 4). This is a characteristic type on the "breaks" adjacent to the private lands. This type is chiefly in the winter deer concentration areas. Observations during the summer indicated that deer were largely responsible for the overused condition of the bitterbrush on Murderers Creek, Deer Creek, Smoky Creek, Lonesome Creek, Venator Creek, and Bear Creek drainages. Cattle did not seem to compete with deer for bitterbrush to any great extent until the fall grazing season. Bitterbrush is undoubtedly the most important deer food in this section of the country. The map will illustrate that bitterbrush is high-skirted or in a weakened condition over most of the South Fork country. The forage plants of this type are similar to those of the sagebrush type.

The fifth type, the juniper type (9 juniper) is represented by juniper stands which are open and interspersed with mountain mahogany, bitterbrush, sagebrush, palatable grasses, and weeds, similar to that of the sagebrush and bitterbrush types (Illustration 3). This type is in the true winter deer concentration areas. Juniper stands are unusually "high-skirted" over the greater portion of the winter deer ranges. This plant appears to be a fair winter

deer forage. The map will illustrate those areas where mountain mahogany was observed as "barked" by deer. This illustrates the extreme scarcity for the right kind of feed for the deer during the winter.

(U. S. Forest Service Photo)

Illustration 3. Showing a typical scene of the juniper type on the winter deer range. Juniper (Juniperus occidentallis) "high-skirted" by deer on the fall and winter ranges on Murderers Creek. The line branches within reach of the deer are defoliated so that they will not contribute anything to the winter food supply. This condition is typical of the winter deer concentration areas. Juniper is one of the staple winter deer foods in this vicinity, and it is very important that it be kept in a productive condition.

The forage plants of this type are similar to those of the sagebrush type, with the exception of about four main winter deer plants not found in the sagebrush type, namely, juniper, mountain mahogany, mockorange, and squaw-apple. The proper use factor of these plants for cattle, sheep (3) and deer are as follows:

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(3) Reid, E. H., Ibid.

Scientific Name	Common Name	Proper Use Factors		
		Cattle	Sheep	Deer
Browse:				
Cercocarpus ledifolius	Curlleaf mt. mahogany	0	0	Good
Perophyllum ramosissimum	Squaw-apple	0	0	Fair
Philadelphus lewisii	Mockorange	10	10	Fair
Trees:				
Juniperus spp.	Juniper	0	0	Fair

Game Plants

The main game plants that are utilized by the mule deer in order of their importance as trees, browse, grass, grass-like, weeds, and moss, are listed as follows:

1. Juniperus spp.--Juniper. Juniper is one of the main cover plants of the deer concentration areas. Although this plant is usually "high-skirted" on the concentration areas, it is only considered to be a fair game food. A "high-skirted" browse plant or tree gives the appearance of having a distinct grazing line showing overuse of the available food. This condition can be shown in illustrations 3, 4, 6, 7, 11, 12, 13, and 14. There are two species of juniper on the concentration areas, Rocky Red Cedar (Juniperus scopulorum), and Western Juniper (Juniperus occidentalis). Western Juniper (Juniperus occidentalis) is probably the most predominating species. Observations during the summer and winter indicated that these two species of juniper have been browsed in the majority of instances on an overused deer range. Juniper appears to be a winter emergency food.

2. Pinus ponderosa--Ponderosa pine. This tree appears to be utilized throughout the winter, even when other foods are available. Ponderosa pine is probably an emergency

food. Many of the does killed during the special doe season in Murderers Creek were observed browsing on ponderosa pine.

3. Pseudotsuga taxifolia--Douglas fir. Douglas fir is a very poor emergency food.

Browse:

1. Purshia tridentata--Bitterbrush. Bitterbrush is probably the most important deer food on the entire Forest, and concentration areas (Illustration 4). Bitterbrush is an evergreen plant and deer relish the leaves and tender shoots of this plant during the entire year. Cattle appear to compete mostly with deer for this browse during the fall months when the herbaceous plants lose their succulence.

2. Cercocarpus ledifolius--Curlleaf mountain mahogany. Mountain mahogany is a very important year-long game plant. It is the most important cover plant for mule deer in this area. This is probably one of the reasons which had made it possible for the deer to increase to their present estimated population. Observations during the past summer showed that the deer had "barked" this plant throughout most of the Murderers Creek, Bear Creek, Smoky Creek, and Utley Creek areas, as shown on the map. This condition

probably indicates that: (1) Mountain mahogany is an excellent game food, (2) this plant must contain certain nutritional elements necessary in the mule deer's diet, or (3) the winter deer range is overused and deer feed scarce.

Illustration 4. Showing closely-cropped shrub of bitterbrush (Purshia tridentata) on Black Canyon on the South Fork of the John Day River. Most of the lower branches have been grazed back, showing a club-shaped appearance in contrast to the good growth beyond the reach of livestock and game. This illustration is typical of the condition of bitterbrush over vast areas in the South Fork country. The thinly-scattered grasses in the picture are cheat grass (Bromus tectorum), and wheat grass (Agropyron spicatum).

3. Ceanothus velutinus--Snowbrush. Snowbrush is a very important game plant. Deer seem to relish the leaves and tender twigs of this plant throughout the year. The characteristic low-like growth of snowbrush makes most of this plant available for deer browsings. It appears to be a good cover plant on cut-over areas, especially on the open, north slopes.

4. Populus tremuloides--Quaking Aspen. Quaking aspen is a very important game food in the spring, summer, and early fall. Aspen is also an important cover plant, and it is usually found along creek bottoms and moist areas. Mule deer probably inhabit this cover in the summertime to escape insect pests.

5. Prunus emarginata--Bitter Cherry. Bitter cherry is an important spring and summer food for deer. It is a deciduous plant, and is usually found on the open, north slopes.

6. Prunus demissia--Western Chokecherry. Chokecherry is a very important spring and summer deer food. It is a deciduous plant, and is usually found along creek bottoms. This plant is not as common as bitter cherry on this Forest.

7. Symphoricarpos spp.--Snowberry. Snowberry is a

deciduous plant browsed mainly in the spring and summer. There are several species of snowberry on the Forest. Symphoricarpos aerophilus is probably the predominating species.

8. Lepargyrea canadensis--Buffaloberry. Buffaloberry is a very important game food and it is found in the white fir and Douglas fir types. This deciduous plant is browsed mainly in the spring and summer.

9. Betula glandulosa--Rosin Birch. This plant is sometimes called bog birch, and it is usually found in meadows and moist places. Observations during the past summer indicated that this plant had been browsed frequently by deer.

10. Dasiphora fructicosa--Bush Cinquefoil. Bush cinquefoil (sometimes called shrubby cinquefoil) is usually found in wet meadows. This plant is a very palatable deer food.

11. Arctostaphylos uva-ursi--Kinnikinnick. Kinnikinnick is an evergreen, vine-like plant. This plant is important only as a late spring, summer, and fall browse plant. It is usually found at high altitudes in the main timbered types.

12. Sambucus glauca--Elderberry. Elderberry is usually found along creek bottoms in the juniper types. This plant is apparently relished and heavily browsed where found.

13. Amelanchier florida--Serviceberry. Serviceberry is a very important game plant. This plant is usually found in the creek bottoms in the timbered types.

14. Artemisia frigida--Estafiata. Estafiata is a very palatable sagebrush for mule deer on this Forest. As a rule, it is found on the winter deer concentration areas.

15. Salix spp.--Willow. Willow is a fair game food, and it is usually found in the meadows near water. This plant is browsed mainly in the spring, summer, and early fall.

16. and 17. Cornus stolonifera--Red-osier cornel, and Alnus oregona--Alder. These two game plants are usually found along creek bottoms in the main timbered types. These two shrubs are utilized mainly in the spring and summer months.

18. and 19. Perophyllum ramosissimum--Squaw-apple, and Philadelphus lewisii--Lewis mockorange. These two

browse plants are usually found in the juniper types on the concentration areas. They appear to be fair game food and are browsed where found.

20. and 21. Ribes spp.--Currant, and Rosa spp.--Rose. These two plants are usually found in the ponderosa pine types. Currant and rose are browsed occasionally in the spring and summer months.

22. Chrysothamnus nauseosus--Rubber Rabbit Brush. Rubber rabbit brush is found throughout the summer and winter ranges of the mule deer. This plant appears to be an emergency food on the area as a whole. It is utilized mainly on the winter range, but only where better foods were not available.

23. Artemisia tridentata--Big Sagebrush. Big sagebrush is found throughout the summer and winter ranges of the mule deer. This plant is utilized probably as an emergency food on an overused range.

Grasses:

Grasses are mainly utilized by mule deer in the spring and early summer. Observations indicate that the deer utilize grasses and other herbaceous plants while they are tender.

1. Bromus tectorum--Cheat Grass. Cheat grass is probably one of the most important late winter and early spring foods of the mule deer. Although the tender shoots of this grass in the spring are not as nutritional as other foods, this annual grass is an important plant because it is one of the main succulent forage plants of the concentration areas. Deer usually follow the snow line back and graze on the tender shoots of this grass.

2. Poa secunda--Sandberg Bluegrass.
Poa nevadensis--Nevada Bluegrass.
Festuca idahoensis--Idaho Fescue.
Agropyron spicatum--Bluebunch Wheatgrass.
Koeleria cristata--Junegrass.
Bromus marginatus--Big Mountain Brome.

The above grasses are mainly utilized early in the spring on the concentration areas. The deer graze these palatable grasses on their spring migration to their summer ranges.

3. Agropyron smithii--Bluestem Wheatgrass, and Poa pratensis--Kentucky Bluegrass. These two plants are usually found in the mountain meadows and are utilized mainly in the spring and summer.

Grass-like:

1. Carex geyeri--Elk Sedge. Elk sedge is the most important deer food of this Forest, with the exception of

bitterbrush. It is probably the most abundant and widespread of all the grasses in all types. Observations indicate that the deer graze this palatable grass-like plant throughout the year. This plant has strong rootstocks and is very resistant to overgrazing and trampling.

2. Carex spp.--Meadow Sedges. These sedges are very palatable to deer in the spring and summer months.

Weeds:

1. Trifolium spp.--Clover. Clover is an important spring and summer herbaceous game plant. This plant is very common in meadows.

2. Balsamorhiza sagittata--Arrowleaf Balsamroot. Arrowleaf balsamroot is a very important deer food, and it is utilized in the spring, summer, and early fall. This plant is abundant throughout the Forest on open hillsides.

3. Hieracium scouleri--Woolyweed. Woolyweed is an important spring and summer deer food. This plant is plentiful in all timbered types.

4. Erodium cicutarium--Alfileria. Alfileria (sometimes called Filaree) is a very important spring weed on the deer winter concentration area. This plant is an annual, and it is an excellent forage plant.

5. Eriogonum spp.--Buckwheat. Buckwheat is an important year-long food for deer. Although this plant usually dries up in the winter, the mule deer seem to relish the dried-up stems of this plant on the concentration areas. It is a very common herbaceous plant.

6. Lupinus spp.--Lupine. Lupines are very common weeds of all timbered types. Deer seem to relish the tender leaves and blossoms of lupines in the spring and summer.

7, 8, and 9. Leontodon taraxacum--Dandelion
Potentilla spp.--Fivefingers
Erigeron spp.--Fleabane

These three plants are usually found in the meadows. They are usually utilized in the spring and summer months.

10. Arnica spp.--Arnica. Arnica is probably the most common plant of the timbered types. This plant is rarely utilized.

Mosses:

1. Allectoria fremontii--Black Tree Lichen, Club Moss, or Unsea. This very important winter deer food is abundant on this Forest. Deer seem to relish this moss at all times of the year. Most of the windfalls were observed to be stripped of this lichen soon after they had fallen.

Main Forage Plants--Mule Deer

SCIENTIFIC NAME	COMMON NAME	PALATABILITY				SEASON USED			
		Excellent	Good	Fair	Poor	Winter	Spring	Summer	Fall
Trees:									
Juniperus spp.	Juniper			x		x			
Pinus ponderosa	Ponderosa pine				x	x			
Pseudotsuga taxifolia	Douglas fir				x	x			
Browse:									
Alnus oregona	Alder			x					
Amelanchier florida	Serviceberry		x				x	x	x
Arctoslaphyos uviursi	Kinnikinnick		x				x	x	x
Artemisia frigida	Estafiata			x		x			
Artemisia tridentata	Big sagebrush				x	x			
Betula glandulosa	Rosin birch		x				x	x	x
Ceanothus velutinus	Snowbrush	x				x	x	x	x
Cercocarpus ledifolius	Curlleaf mt. Mahogany	x				x	x	x	x
Chrysothamnus nauseasus	Rubber rabbitbrush				x	x			x
Cornus stolonifera	Red-osier cornel			x			x	x	x
Dasiphora fruticosa	Bush cinquefoil		x					x	x
Lepargyrea canadensis	Buffaloberry		x				x	x	
Peraphyllum ramoissimum	Squaw-apple			x		x	x	x	x
Philadelphus lewisii	Lewis mock orange			x			x	x	x
Populus trumloides	Quaking aspen	x					x	x	x
Prunus demissa	Western chokecherry		x				x	x	
Prunus emarginata	Bitter cherry		x				x	x	
Purshia tridentata	Bitterbrush	x				x	x	x	x

SCIENTIFIC NAME	COMMON NAME	PALATABILITY				SEASON USED			
		Excellent	Good	Fair	Poor	Winter	Spring	Summer	Fall
Ribes spp.	Current			x			x	x	
Rosa spp.	Rose			x			x	x	
Salix spp.	Willow			x			x	x	x
Sambucus glauca	Elderberry		x				x	x	
Symphoricarpus spp.	Snowberry		x				x	x	x
Vaccinium caespitosum	Dwarf huckleberry				x			x	x
Grasses:									
Agropyron spicatum	Bluebunch wheatgrass		x				x		
Agropyron smithii	Bluestem wheatgrass			x			x		
Bromus marginatus	Big mt. brome		x				x		
Bromus tectorum	Cheat	x				x	x		
Festuca idahoensis	Idaho fescue		x				x		
Koeleria cristata	Junegrass		x				x		
Poa nevadensis	Nevada bluegrass		x				x		
Poa pratensis	Kentucky bluegrass		x				x	x	
Poa secunda	Sandberg bluegrass		x				x		
Grass-like:									
Carex geyeri	Elk sedge	x				x	x	x	x
Carex spp.	Meadow sedges		x				x	x	x
Weeds:									
Achillea lanulosa	Yarrow			x			x	x	
Arnica spp.	Arnica			x			x	x	
Balsamorhiza sagittata	Arrowleaf balsamroot		x			x	x	x	x
Erigeron spp.	Fleabane		x				x	x	

SCIENTIFIC NAME	COMMON NAME	PALATABILITY				SEASON USED			
		Excellent	Good	Fair	Poor	Winter	Spring	Summer	Fall
Eriogonum spp.	Buckwheat		x			x	x	x	x
Erodium cicutarium	Alfileria	x					x		
Hieracium scouleri	Wooly weed		x				x	x	
Leontodon taraxcum	Dandelion		x				x	x	
Lupinus spp.	Lupine						x	x	
Potentilla spp.	Fivefingers			x			x	x	
Trifolium spp.	Clover	x					x	x	x
Moss:									
Allectoria fremontii	Black tree lichen, unsea	x				x	x	x	x

LAND STATUS

The major portion of the winter deer range is outside of the boundary of the Malheur National Forest and on private, state, or public domain lands.

In the summertime the deer inhabit the National Forest lands where there is an abundance of feed and range land. In the winter time, however, when the snow covers most of these summer ranges, the deer are forced to the winter deer concentration areas.

The map will show the National Forest boundary and the deer concentration areas.

DEER POPULATION

The deer population of the winter concentration areas has increased steadily from 1916 to 1935. The hard winter of 1936-37 was believed to have killed many of the fawns, yearlings, and old deer. This was apparent last summer when we found 42 skeletons on a five per cent survey of the Murderers Creek and Deer Creek Drainages on the South Fork of the John Day River. There has been a marked increase in the deer population since the "1938 Winter Deer Survey and Deer Census", when a conservatively-estimated deer population was 38,000. Many of the livestock men as well as Forest Service employees believe that there are

more deer now than there were in 1935 (2). It is believed that the deer population arrived at the carrying capacity of the winter ranges around 1928. The carrying capacity of the concentration areas has shown a prominent decrease in deer feed since the increase in the deer population.

The graph below will illustrate the increase of the estimated deer populations and will show a relationship to the carrying capacity of the winter deer ranges.

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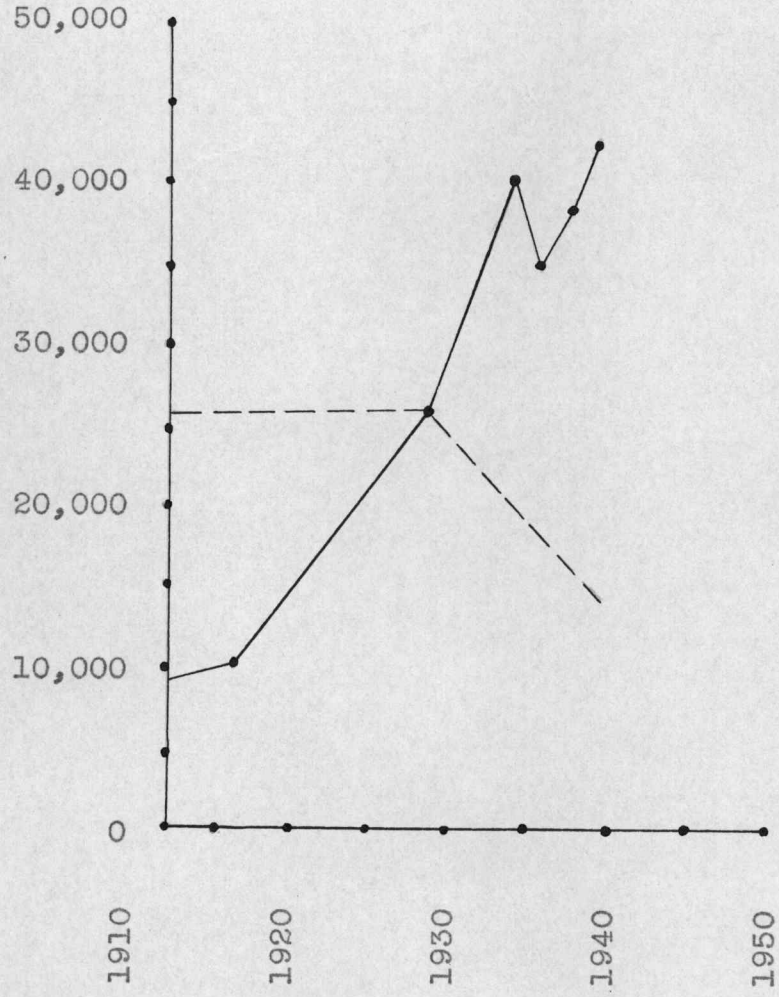
(2) Edwards, O. T. Report on the 1938 Winter Deer Range Survey and Deer Census, Malheur National Forest, Oregon. U. S. Forest Service. June 1938.



Legend: — — — —Estimated Carrying Capacity
————Estimated Deer Population.

Illustration 5. Showing the estimated mule deer population and carrying capacity of the Malheur National Forest and adjacent lands, from the year 1910 to the year 1939, inclusive.

MIGRATION

Big game animals are known to travel or migrate long distances during different times of the year. The majority of the mule deer in the Malheur National Forest migrate in the spring and fall, but there are many deer that remain on the deer concentration areas the year around. The Murderers Creek and Deer Creek drainages are typical fawning grounds. The summer deer census will illustrate this fact. The spring and fall migrations are forced upon the mule deer by seasonal weather conditions. Mule deer have been known to make their fastest and longest migrations when the snow crusts, caused by alternate thawing and freezing. The arrows on the map will show the principal migration routes.

The spring migration usually starts sometime in March or April, depending upon the depth of the snow. Investigations from ranchers and other local people of this area indicate that the mule deer follow the snow line in their spring migration to the summer ranges. Livestock men of this area claim that it is in the months of February, March, and April that the deer do the greatest damage to the range lands, especially to their privately-owned dry pastures. This damage is caused by the deer following the snow line and foraging on the tender shoots of grasses, and by trampling.

The mule deer generally inhabit these summer ranges at high elevations from April to October, depending upon the weather conditions, where there is an abundance of succulent feed. The first snowfall of any depth usually forces them down to the lower areas, but the deer do not actually concentrate on the private lands until the snow crusts. In other words, the deep snows alone do not cause them to concentrate. This movement usually begins in October and extends into January, depending upon the severity of the winter and the amount of snowfall.

RELATIONSHIP BETWEEN LIVESTOCK AND WILDLIFE

There is a popular belief by some people that there is a general unfriendliness between the livestock industry and game interests. There never has been and there never will be any serious conflict between livestock interests and proper game management. Wildlife has found its chief supporters among the real stockmen of the state of Oregon. They are not sportsmen in the sense in which this word is usually employed. Many, if not most of them, could not be termed hunters, and a great many prominent livestock men in Grant County never go hunting or fishing. Some of these livestock men pursue these pleasures chiefly by way of entertaining their friends from town, and take little pleasure in the kill. Many of the Izee ranchers have guide

hunting camps on their private land. The livestock men of Grant County are dependent upon the public lands as summer pasture for their livestock, and because they use these public lands they are accused of selfishness by a desire to hog the natural resources of these public lands. These attitudes based on misunderstandings are a great handicap to the livestock men of Grant County.

Illustration 6. Showing juniper (Juniperus occidentalis) "high-skirted" by deer, with an understory of unused grasses, bluebunch wheatgrass (Agropyron spicatum), and Idaho fescue (Festuca idahoensis). This picture of the winter deer concentration area above the Chester Jones Ranch on the South Fork of the John Day River illustrates overuse of this cattle range on private land by deer, and not cattle.

The range methods used by the western livestock men are usually the product of several generations of study of the correlation between the animal units and the forage resources. They have seen the disastrous effect of having this relationship unbalanced. They do not raise more livestock than they have winter feed. They have had the definite understanding of forage plants as a crop that should be harvested by wild or domestic animals. They realize the esthetic and economic value of wildlife on their property, and that when these numbers are held within reason they make very little difference to the grazing capacity of their range lands. The map will show that the winter deer concentration areas are almost entirely on non-National Forest lands.

Mr. A. E. Belshaw, cattleman of Izee, stated that deer do the greatest damage to the forage on his lands during February and March when they follow the snow line and eat the tender shoots of the various grasses. This is probably the critical time of the year to graze the range land. Mr. D. C. Martin, sheepman at Dayville, stated that the deer conflict most with his sheep from December to March, and that the deer are widening their winter range around Jackass Mountain on the South Fork of the John Day River. The livestock men have seen a close similarity between proper game management and a sound livestock

operating program. Wayne Stewart, a prominent livestock man at Dayville, stated that during the pioneering days of the livestock industry of the west, markets for surplus

Illustration 7. Showing "high-skirted" juniper (Juniperus occidentalis) on Aldrich Gulch, South Fork of the John Day River. This picture illustrates the underuse of grass by livestock and the overuse of juniper by deer.

livestock were not always easily found and operators often held on to their increases, anticipating available markets. Livestock numbers under these conditions often increased beyond the winter feed supply. As these number increased, the range feed naturally decreased in a like proportion, causing over-stocking. As a result, there were great periodic losses of livestock. These losses were blamed on the hard winters. Mr. Wayne Stewart stated that the severe

winter of 1889-1890 left almost everyone in Grant County in a state of bankruptcy. In the year 1889 and 1890 was a low point in the livestock cycle, and these cycles were more or less unavoidable in those days due to the unbalance of the number of stock to their feed supply. Ranchers now go through hard winters without these great losses, largely because of the available markets and transportation facilities not then available. They are able now to balance the feed supplies to the livestock numbers, and they have found that with smaller numbers properly cared for they can produce greater increases than were possible from the large herds of uncared-for and improperly-fed animals.

The stockmen of Grant County claim that the present policy of game management is very similar to the old system of livestock ranches. They know that game animals tend to run in cycles, and that nature has provided certain checks that are effective in regulating these cycles before they reach a point at which they would totally destroy a species. A good example was the Kaibab Deer Problem where the estimated carrying capacity of the Forest was 65,000 deer, and when the estimated deer numbers reached 150,000, the inevitable result was a decline in the deer population. They are now only about 15,000 deer on this same area. Proper game management is, when the deer arrive at their

Illustration 8. Showing Niles Sprouls' Cattle Ranch in Bear Valley.

Illustration 9. Showing the winter cattle feed lot, Niles Sprouls' Cattle Ranch, Bear Valley.

carrying capacity of their winter ranges (1), they should be sustained year after year.

Mr. D. C. Martin, sheepman of Dayville, stated that the mule deer in Grant County have been increasing steadily since 1920. In the year 1913, he hunted the entire Murderers Creek and Deer Creek Drainages and saw only one buck. Mr. A. E. Belshaw, cattleman at Izee, stated that in the year 1916 he did not see another hunter for ten days, and during this time he saw only two bucks. Heavy deer concentrations were first noticed in the year 1928 by Mr. Belshaw in the Izee country, and that they have been increasing steadily since that time, arriving at their maximum number in 1935. The hard winter of 1936 killed many deer in the Izee country (see Illustration 5).

The livestock men of Grant County believe that there are more deer this year, 1938-39, than ever before, even surpassing the deer numbers of 1935. They believe that the history of the livestock business has demonstrated that these cycles are not necessary among the larger game animals. A reasonable number of game animals can be maintained year after year without supplementary feeding, and a sustained carrying capacity will produce more and larger bucks than the present policy of game management is providing.

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(1) Cliff, E. P. Lecture on Game Management. Oregon State College, April 28, 1938.

Therefore, what the livestock men advocate is a sound game management program.

BIG GAME REFUGES

The value of a big game refuge is dependent upon its proper administration, as a refuge can either destroy or benefit the game it has intended to protect. The maximum deer population of any given area is determined by the amount of food the winter range can produce. Wherever the game population exceeds the carrying capacity of its winter ranges, the game refuge has ceased to be of any benefit to that particular range. In other words, the refuge has outlived its usefulness. Such is the case of the Myrtle Park Game Refuge where an average of twenty-five deer per section was seen by the summer range survey in a five per cent cruise of that area, and this range is a part of the deer concentration area. This would indicate that this game refuge has ceased to be beneficial. The map will show the areas "high-skirted" by deer over-browsing.

It appears that the Canyon Creek Game Refuge has also served its useful part as an outflow of the deer population to the surrounding area. This area also contains numerous "high-skirted" species of browse such as bitterbrush, snowbrush, and mountain mahogany.

No justification is apparent for the continuation of

either of the above game refuges. It appears that the deer problem would benefit materially by the discontinuance of the Myrtle Park and Canyon Creek Game Refuges.

GAME PROBLEMS

South Fork of the John Day River

Description

The South Fork country has long been a favorite wintering grounds for the mule deer. This valley-like country is completely surrounded by foothills and high mountainous areas (Illustration 10).

Illustration 10. Showing a view of the Murderers Creek basin from Aldrich Gulch, which is a portion of the typical winter deer range of the South Fork of the John Day River.

The elevation at the Wayne Stewart Ranch is approximately 3,000 feet, Timber Mountain about 4,500 feet, Shake Table 4,500 feet, Thorn Creek Butte 5,000 feet, and Aldrich Mountain 7,500 feet. In general, the elevation of the winter deer concentration area of the South Fork country is between 2,000 and 4,000 feet.

This basin-like country of the South Fork of the John Day River is a natural place for the mule deer to congregate in the winter time, as a result of the deep snows on their summer ranges.

History

The range area of the Murderers Creek and Deer Creek Drainages and adjacent small tributaries to the South Fork of the John Day River was and is one of the most heavily-used winter game ranges on the Malheur National Forest. In 1929, a large portion of this winter range for deer was set aside as the "Murderers Creek and Deer Creek Game Refuge". The establishment of this game refuge was soon followed by a marked increase in the deer population.

In 1935, the State Game Commission discontinued the game refuge and opened the area to hunting. Livestock grazing on this particular area has been reduced somewhat to make room for the increased deer population.

Summer Range Survey

Deer Census. During the range survey in 1938, a record was kept of all the deer seen. The survey covered all that portion of the National Forest inside the Forest boundary from Aldrich Mountain south including the Myrtle Park Game Refuge and the Snow Mountain area.

The result of the survey or the actual count was 354 does, 225 fawns, 151 bucks, 8 undetermined sex, and 42 skeletons and dead deer. This would give a ratio of 1 doe to 1.57 fawns, and a ratio of 2.34 does to 1 buck. The percentage of the fawns in the herd is 27 per cent. This will give a potential increase of the herd of 44.5 per cent.

"High-Skirted" Areas. "High-skirted" areas were mapped by the range survey crew to show the areas overused by deer concentration areas. It will be observed that bitterbrush and mountain mahogany have been overused throughout most of the area that was surveyed (see map).

Illustration 11. Showing juniper (Juniperus occidentalis) "high-skirted" on the north slope of Black Canyon on the South Fork of the John Day River. Scab-rock country illustrating the overuse of juniper by deer, and the underuse of wheatgrass (Agropyron spicatum) by livestock.

Illustration 12. Showing juniper (Juniperus occidentalis) "high-skirted" by deer on Jackass Mountain. This condition is typical of the South Fork country.

Illustration 13. Showing a deer trap of the Oregon State Game Department on the head of Thorn Creek. Ponderosa pine saplings have been "high-skirted" by deer. The needles have been cropped as high as deer and cattle can reach.

Illustration 14. Showing juniper (Juniperus occidentalis) "high-skirted" by deer on Placedor Gulch. Note that the browsed line is higher than a saddle horse, illustrating the extreme lack of food in the winter on this range land.

Winter Game Survey

Deer Census. On March 11, 1939, the game survey party made a horseback trip into the South Fork country to obtain a deer census on the winter deer concentration area. The actual count from Smoky Creek to the mouth of Deer Creek was 2,740 deer. Many dead deer, mostly yearlings, were observed throughout this area. No effort was made to determine sexes, although a majority of the deer seen were yearlings. Ranger Palmer stated that he thought there were more deer on this area this year than there were in 1938. The actual counts by drainages are as follows:

Illustration 15. Showing a distinct heavily-browsed line ("high-skirted") on ponderosa pine sapling near Thorn Butte Lookout. This picture illustrates the extreme lack of browse on the deer concentration area. Damage like this is especially severe on the Murderers Creek Drainage. This is sometimes due to a shortage of feed, but is more often due to the fact that this animal has become accustomed to using, repeatedly, particular areas. It is imperative, therefore, to regulate hunting on areas like this before they become in this very unsatisfactory condition.

	Deer
Smoky Creek	50
Mouth of Brown Creek	25
Oliver Creek	100
Jackass Creek	150
Aldrich Gulch	175
Cow Gulch	50
Pine Creek	45
Placedor Gulch	500
Todd Creek	100
Thorn Creek	125
Murderers Creek	487
Timber Mountain	150
Water Gulch	80
Cougar Mountain	51
Deer Creek	150
Cougar Gulch	102
Magiclantern Creek	175
Rock Pile Ranch	250
Doghouse	200
Total	2,740

Game Plants. The mule deer observed were usually feeding on the south open slopes, not far from cover. Juniper, bitterbrush, sagebrush, dried cheatgrass, cheat awns, green cheat, dried wheatgrasses and fescues, green wheatgrasses and fescues, Eriogonums, and filaree composed the bulk of the available forage during the winter game survey.

Starvation. Starvation appeared to be the chief cause for the mortality on these areas. This cause is probably due to the lack of nourishment in what they did eat. Green grasses at this time of the year do not contain enough nourishment to pull the weaker animals through this critical period. The great losses of yearlings can also be

attributed to the fact they can not reach as high to obtain what browse there is left, and to the fact that they are shedding their baby teeth. All deer observed were emaciated and in very poor shape.

Predators. Some of the carcasses observed showed signs of fresh coyote tracks, but it is doubtful whether all these losses could be blamed on the work of coyotes.

Illustration 16. This yearling doe probably died as a result of starvation. Note the emaciated carcass. Death losses like this were numerous on the winter concentration areas during the middle of March, 1939.

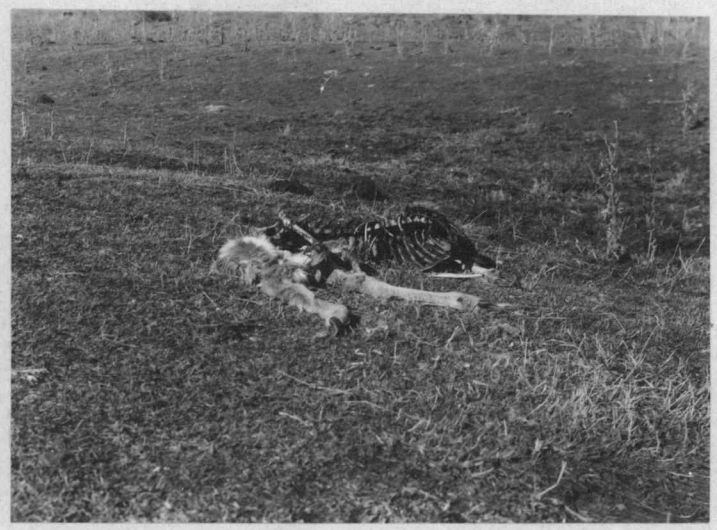

Illustration 17. Showing the carcass of a yearling buck eaten by coyotes. It is believed, however, that the true cause of this mortality was starvation and not predatory animals.

Other Losses. Only one carcass was found showing the mortality other than predators or starvation. This can be illustrated in the following photograph (Illustration 18).

Illustration 18. Showing a yearling buck with his left rear foot caught in a barbwire fence. This picture was taken above the Chester Jones Ranch on the South Fork of the John Day River.

Main John Day River

The deer concentration area on the main John Day River is in a very overused condition. Almost all of this area lies outside of the National Forest boundary. Observations made last summer indicate that this portion of the deer winter range is in a very severe condition. It appears that the destruction of the available food supply and the deer population by starvation are inevitable if measures which will remedy this situation are not applied.

REASONS FOR THE GAME PROBLEMS

The principal reasons, as expressed by eastern Oregon stockmen and employees of the United States Forest Service, why the deer numbers have exceeded the carrying capacity of their winter ranges, causing game problems, are as follows:

1. The creation and maintenance of game refuges.
2. Mild winters during recent years.
3. Insufficient annual kill.
4. Reduction of the bag limit. A few years ago hunters took five deer per season, which was later reduced to three, and now one buck per season.
5. Unbalanced sex ratio.
6. Predatory animal control.
7. Competition between livestock and game in forage plants. (See livestock and game proper-use factors under plant types.)
8. Premature grazing by deer in the early spring to the winter ranges.
9. Decreased carrying capacities of the winter range due to the increased deer population.
10. Reduced carrying capacity of the Murderers Creek and Creek Drainages due to the year-long grazing of about fifty wild horses.

11. Improved cover for deer due to fire protection, e.g., mahogany thickets, etc.

12. Decreased grazing capacity of range lands due to past drought conditions.

13. Present law enforcement is probably more adequate.

14. Encroachment of elk on winter deer concentration areas, especially at the head of Beech Creek, and along Clear Creek.

SUGGESTED REMEDIES FOR THE GAME PROBLEMS

1. The increased annual kill of mule deer by a longer hunting season and/or increased bag limit, and/or open season on does.

2. The abolishment of the Canyon Creek and Myrtle Park Game Refuges.

3. Later hunting season to take advantage of the fall migration. The bulk of the mule deer begin their fall migration sometime around the last of October and the first part of November, depending upon the weather.

4. Advertisements of the Malheur National Forest. The majority of the people living in Washington and in western Oregon believe that this is a sagebrush country, whereas the Malheur National Forest contains one of the largest stands of ponderosa pine in the world.

5. An increased annual kill of elk on this Forest.

SUMMARY

The Malheur National Forest of the State of Oregon is located almost entirely in the semi-arid transition zone with elevations of approximately 4,000-7,000 feet. This area contains a mixture of large types relatively low in grazing capacity (ponderosa pine association) interspersed with small, distinct types of high grazing capacity (shoestring meadows).

The main range plant types according to their relative area are as follows: (1) The ponderosa pine type is the most predominating type of the summer deer range, (2) the meadow type is the second main type, but undoubtedly the most important type as far as actual grazing capacity is concerned, (3) the sagebrush type is largely made up of sagebrush with an understory of palatable grasses and weeds, (4) the browse type is similar to that of the sagebrush type, and it is an important type because of the double story of palatable vegetation available for game and livestock, and (5) the juniper type is represented by juniper stands which are open and interspersed with mountain mahogany, bitterbrush, sagebrush, palatable grasses, and weeds, similar to that of the sagebrush and bitterbrush types. This type is in the true winter deer concentration area.

Principal deer forage plants of all plant types, in

order of their importance, are bitterbrush, elk sedge, mountain mahogany, snowbrush, black tree lichen, quaking aspen, alfileria or filaree, clover, and cheatgrass.

The major portion of the winter deer range is outside of the boundary of the Forest and on private, state, or public domain lands. The majority of the summer deer range is on National Forest land.

Estimated deer population of the winter concentration area in 1938 was approximately 38,000 mule deer, as compared to the estimated carrying capacity of 26,000.

The bulk of the mule deer of the Malheur National Forest migrate in the spring and fall, but there are many deer that remain on the deer concentration areas the year around. The spring and fall migrations are forced upon the mule deer by seasonal weather conditions. Observations indicate that they do not usually concentrate on their winter ranges until the snow crusts.

Most of the livestock men of this area are dependent upon the National Forest for their summer ranges. About ninety per cent of the winter deer concentration areas are on private, state, or public domain lands. Livestock men see a close similarity between proper game management and sound livestock-operating programs.

The value of a big game refuge is dependent upon the proper administration, as a refuge can either destroy or

benefit the game it is intended to protect. The maximum deer population of any given area is determined by the amount of food the winter range can produce. Whenever the game population arrives at, or exceeds the carrying capacity of its winter ranges, the game refuge has ceased to be of any benefit to that particular range. It appears that the Canyon Creek and Myrtle Park Game Refuges have ceased to be beneficial. No justification is apparent for the continuation of either of the game refuges.

There are at present two main game problems on this Forest. The range areas of the South Fork of the John Day River and the main John Day River are in very severe condition.

During the range survey in 1938, a record was kept of all the deer seen. Our survey covered all that portion of the National Forest inside the Forest boundary from Aldrich Mountain south including the Myrtle Park Game Refuge and Snow Mountain area. The result of our survey or the actual count was 354 does, 225 fawns, 151 bucks, 8 undetermined sex, and 42 skeletons and dead deer. This would give a ratio of 1 doe to 1.57 fawns, and a ratio of 2.34 does to 1 buck. The percentage of the fawns in the herd is 27 per cent. This will give a potential increase of the herd of 44.5 per cent.

"High-skirted" areas were mapped by the range survey

crew to show the areas overused by deer and the winter deer concentration areas.

The actual count of the winter game survey was 2,740 deer. This count was made from the mouth of Smoky Creek to the mouth of Deer Creek on the South Fork of the John Day River.

The principal reasons why the deer population has exceeded the carrying capacity of its winter ranges causing game problems are considered to be as follows: (1) The creation and maintenance of game refuges, (2) mild winters during the recent years, (3) insufficient annual kill, (4) reduction of the bag limit, (5) unbalanced sex ratio, (6) predatory animal control, (7) competition between livestock and game for forage plants, (8) premature grazing by deer in the spring, (9) decreased carrying capacity of the winter range land due to past over-browsing and overgrazing, (10) improved cover for deer due to fire protection, (11) drought years, (12) present law enforcement is probably more adequate, and (13) encroachment of elk on winter deer concentration areas.

The suggested remedies for the game problems are: (1) increased annual kill, (2) abolishment of the Canyon Creek and Myrtle Park Game Refuges, (3) later hunting season to take advantage of the fall migration, (4) advertisements to induce people to hunt the deer in the Malheur

National Forest, and (5) increased annual kill of elk on this Forest.

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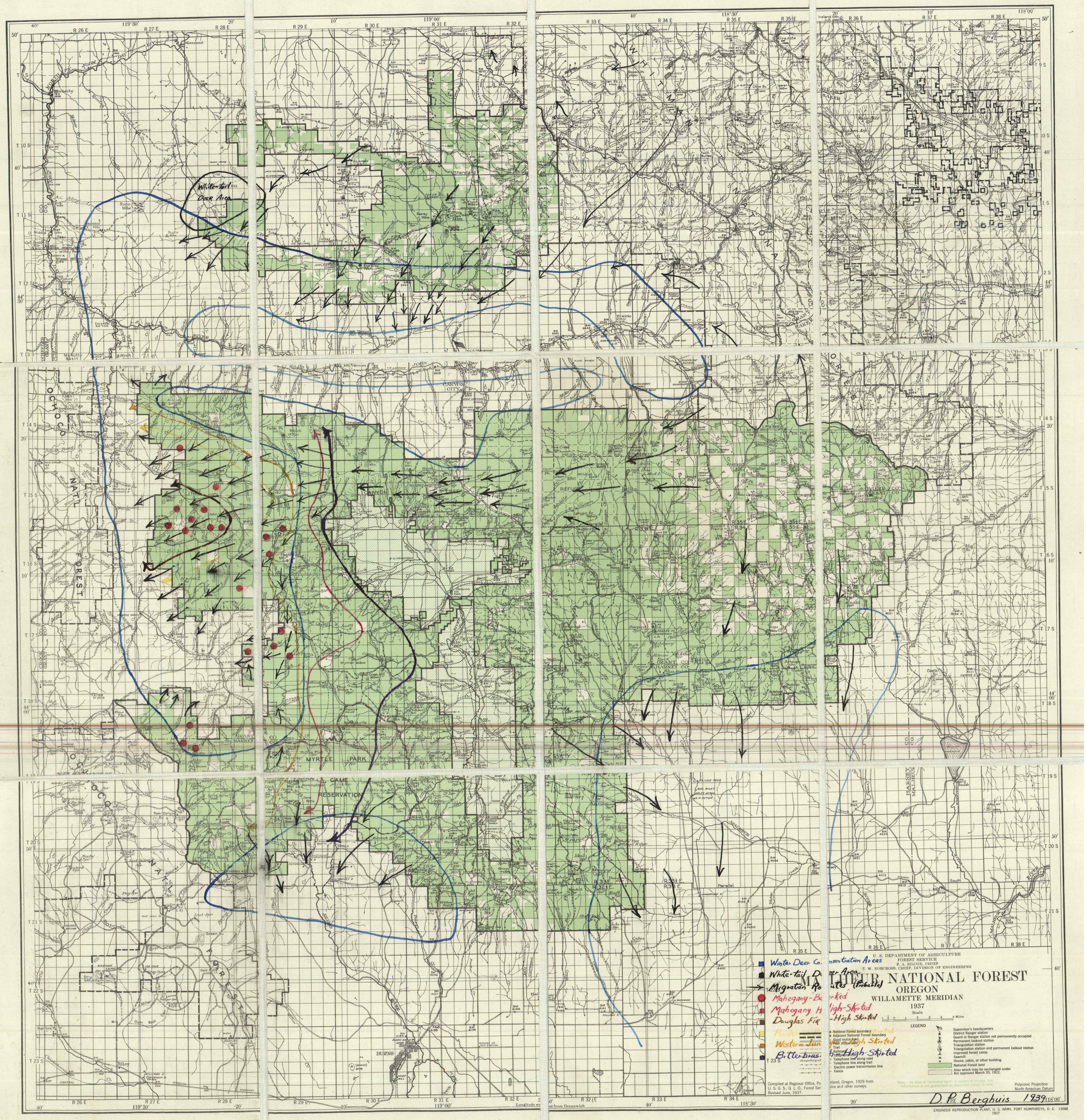
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T. W. NORCROSS, CHIEF, DIVISION OF ENGINEERING
NATIONAL FOREST
OREGON
WILLAMETTE MERIDIAN
1937
Scale
LEGEND
National Forest boundary
Adjacent National Forest boundary
Good motor road
Poor motor road
Trail
Railroad
Telephone line along road
Telephone line along trail
Electric power transmission line
Fence
Supervisor's headquarters
District Ranger station
Guard or Ranger station not permanently occupied
Permanent lookout station
Triangulation station
Triangulation station and permanent lookout station
Improved forest camp
Sawmill
House, cabin, or other building
National Forest land
Area which may be exchanged under Act approved March 20, 1922
Compiled at Regional Office, Po
U. S. G. S., G. L. O., Forest Ser
Revised June, 1937.
Polyconic Projection
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