SURVEY OF DAMAGE TO PINE REPRODUCTION

A preliminary survey by C. F. E. S. in Black's Mountain Experimental Forest and Range, Lassen National Forest, to Ponderosa Pine reproduction.

Purpose - To determine:

I. Seriousness of Damage

II. Factors responsible for damage

A. Livestock (class of stock and damage in relation to:)

1. Watering places
2. Timber margins
3. Bedgrounds
4. Trails
5. Open timbered areas
6. Slopes and ridge tops

B. Insects

1. Gnawing
2. Boreing
3. Needle
   a. Clipping
   B. Tunneling

C. Rodents

1. Squirrels
2. Rabbits

D. Porcupine

E. Climatic

1. Frost

2. Snow

F. Mistletoe

G. Natural pruning and competition

H. Unknown causes

III Character of Damage

A. Livestock

1. Needles

2. Leaders, primary and secondary laterals

3. Bark injury

a. Rubbing

b. Trampling

c. Chewing

B. Insect

1. Gnawing

2. Boreing

3. Needle

4. Bark

C. Rodent

1. Squirrels - Chipmunks

a. Bark

b. Tips

2. Rabbits

a. Bark

D. Porcupine

1. Leaders

2. Laterals

3. Bark

E. Climatic

1. Frost

a. Leaders

b. Laterals

c. Needles

2. Snow

a. Laterals

F. Mistletoe

1. Leader

2. Laterals

G. Natural Pruning and Competition

H. Unknown Causes

1. Leaders

2. Laterals

3. Bark

AREA SELECTED FOR STUDY

I. Reasons for selection of Black's Mountain Area

II. Description of Area

A. Geographic Location

1. Sections 1 - 2 - 3- 10 - 11- 12 - 13 - 14 - 15 - 22 - 23 - 24 - T33N - R7E - 6 - 7 - 18 and 19 T33N - R8E - Inc.

B. Acreage

1. Total Area
2. Area of pure pine type

" " that part of pine type studied.

C. Topography

1. Entire area - Bounded on north and east by ridges from which it slopes gently to the south and west. It is gently rolling and is cut by several small draws that run in a southerly and westerly direction.
2. Pine area - gently rolling area extending from bases of ridges on north and east in a southwesterly direction to Grass Valley.

D. Elevations

1. Over entire area
   a. Minimum - in SW Corner of area (Grass Valley)
   b. Maximum - on ridge on east side of area
2. Pine area
   a. Maximum - on slopes of mountain in NE portion of area
   b. Minimum - Borders of Grass Valley - S22

E. Vegetative types

1. Artimesia tridentata, Purshia tridentata, Festuca idahoensis.
2. Artimesia tridentata, Cavex geyeri
3. Ceanothus prostatus, Festuca idahoensis
4. Juncus balticus, Aira

III. Grazing use of area.

A. History of use

1. Numbers.

2. Class

a. Sheep

b. Cattle and horses

3. Season of Use

4. Distribution of Stock

a. Allotment boundaries

1. Trespass (if any)

5. Handling

6. Salting and water

7. Bedgrounds.

a. Number and location

b. History and when used - how heavily

B. Recent Use

1. Numbers

2. Class

a. Sheep

b. Cattle and horses

3. Seasonal Use

4. Distribution of stock

a. Allotment boundaries

b. Actual observed use

1. Stock movements

a. Trespass

5. Handling

6. Salting and water

7. Utilization

8. Bedgrounds

a. Number and location

IV. Field Methods

A. Location of Plots (Using Dunnings SI Control)

1. Spacing - plots located, on E-W lines at 10 chain intervals beginning 5ch. E or W of N -S section lines at points 5 - 15 - 25 etc. chains North of section corners, with compass and chain.

2. Size of plots - plots are 13.2 feet square and are divided into 4 compartments each 6.6' square.

3. Transects

a. Cattle - 80 ch N. 45° W of a point located 80 ch N 38° E of "Old Cabin."

1. Plots 10 x 10 miles square.

b. Sheep - 85 ch due north and hence 15 ch east from Patterson Well.

1. Plots 10 x 10 miles square - divided into 9 compartments each 10.93 feet square

B. Damage Sampling

1. Size of Crew - 2 men.

a. Duties

1. Head chainman and swamper - to open course for compass sight and to take chain ahead.

2. Compass man and rear chainman - to run compass, direct course of swamper and to assist in chaining. Head and rear chainman alternate positions weekly.

3. Recording - One man determined tree height, counted parts, and observed damage. Second man recorded observations, Opinions on damage, composition and density were obtained jointly. Observer and recorder alternated daily.

CHARACTER OF DAMAGE - WORD PICTURE

Livestock damage

Needle damage

On needle clipping, the ends of the needles usually have a frayed appearance suggesting pulling. It is further evidenced by needles being taken to a uniform level (along one plane). Often needles and laterals are both taken off at one plane.

Leader and lateral damage

On the more mature tips that are taken, the bark is usually broken cleanly where the member is bitten into, and the bark is stripped a short way over the central woody portion before the wood is pulled in two thus leaving a short section of woody stem protruding out of the cleanly broken bark. The younger, more succulent parts taken by livestock are usually sheared off cleanly. Often several parts are taken at a uniform length in one bite thus indicating stock damage. On the older specimens, clean cut, square tips were classified as livestock - and those of ragged edge and tip were attributed to insects.

Bark injury

Livestock rubbing is done principally with the head. Often the trees are heavily rubbed, the bark being worn thin and smooth, sometimes being peeled off in strips for short distances. The bark, when any is left on the tree, has a stringy shredded appearance. Sometimes the trees are broken off.

Insect damage

Tip damage

Tip damage is generally characterized by the extreme uneveness with a ragged, frayed appearance and presence of pitch mixed with saw-dust like substance which apparently is cuttings left by the insect. Often, tips of damaged leaders have hollows in the stub at different levels and have pleasantly rounded edges though very uneven. Insect gnawing is often done at very oblique angles giving the "hollows" effect described above. Damaged tips are often slightly swollen where damaged, thus probably indicating that damage was progressing while life was present and physiological processes continued to combat the damage causing the enlargement.

Bark injury

Bark injury may be indicated by small scars where shredded and frayed bark appears. Presence of pitch and saw-dust further evidences insect work. Large knot- like swellings often over the entire diameter of the limb may indicate insect work, also abundance of pitch and saw-dust emerging from small holes in the bark.

Needle damage

Needle damage appears to be of three types.

1. Cut off more or less squarely with a slightly beveled edge and a slight peak in the center and having a smooth appearance.
2. Work along edge of needle giving it the appearance of having a serrated edge.
3. Tunneling through center of needle.

Rodent damage

Laterals

Rodent injury, though rare, shows the work of very small teeth, probably squirrels or chipmunks.

Bark

Rodent gnawings are distinguishable from porcupine in that the

scars are much smaller from insect because rodent scars are deeper and larger and by the presence of small teeth marks.

Climatic damage

Frost damage

The trees may be heavily frosted and may have many needles and several parts killed while activities are still going on in the tree. Nearly all of this type of damage was found on the edges of the timber along flats and in openings. Often entire trees were found killed.

Snow and ice

The excessive weight of ice and snow sometimes breaks off parts of the tree or deforms it so it cannot completely recover.

Porcupine

Bark injury

The size of the wound (usually fairly large), the presence of teeth marks, and the position of the wound on the tree indicates porcupine.

On small trees porcupine work is usually within a foot or so of the ground. On larger trees that can support the weight of the animal, the scars may be found higher up.

Unknown

Unidentifiable specimens that may have been damaged by insects, livestock, rodents, or other. These for the most part are quite old and badly weathered.

I. H. Johnson
Dec. 29, 1933.

BLACK'S MOUNTAIN EXPERIMENTAL FOREST AND RANGE

6. Description of area.

Location:

The Black's Mountain Experimental area is on the Lassen National Forest, California. The southern boundary of the area is forty-six miles northwest of Susanville by road and forty-three miles north of Westwood. Black's Mountain area is easily accessible both by road and by the Western Pacific Railroad line which runs almost parallel to the west side of it a distance of two to two and one-half miles.

The exact location of the experimental forest and range according to the U. S. General Land Office Survey of 1871 follows: it includes all of Sections 3, 10, 11, 12, 13, 14, 15, 23, 24, and part of Sections 1, 2, 22, and 26 in T 33N R7 E M.D.M., and all of sections 6, 7, 18, 19, and part of Sections 8, and 17, in T 33N R8 E M.D.M.

Area:

Exclusive of patented lands located within the boundaries there is a total

of 400 acres. This consists of 200 acres in Section 1 and 200 acres in Section 2 T 33 N R 7E. The experimental area comprises a total of 10,280 acres.

Topography:

The topography of the experimental area is typical of much of the country throughout the east side pine type. Nowhere on the area are there found truly steep slopes or broken, rugged topography characteristic of much of the mountainous West. From the southwest corner, an almost level flat known as Grass Valley, there is a gradual increase in elevation toward the north and east boundaries of the experimental unit so that the general aspect is mainly south and west. Black's Mountain in the northwest corner of the experimental area is the principal feature in the topography. Patterson Mountain is in the northeast and a small unnamed mountain in the southeast portion. Black's Mountain reaches to a height of 7310 feet above sea level but the entire mountain is not included in the experimental forest. This means that the summit of Patterson Mountain, a height of 6,830 feet, is the highest point in the topography. Since this is located in a region of very

limited spring and summer rainfall there is a scarcity of surface water and there are no permanent streams, springs, or lakes on the area. In Section 14 and 15 there are several small drains all extending in a southwesterly direction but there is water in these from melting snow in early spring only.

Elevations:

The experimental area is not one of sudden elevational variations. From an elevation of 5,550 feet (?) (the lowest on the area found in Section 22), there is a gradual increase over a distance of four miles to the northwest corner on Black's Mountain where the elevation is 6,400 feet (?) ascending gradually in a northeasterly direction from Grass Valley; the highest point on the area is the summit of Patterson Mountain, the elevation of which is 6,830 feet as mentioned previously in this report. In the southeast portion the maximum elevation is 6510 feet (?).

Vegetation:

REPRODUCTION WORK AS AFFECTED BY LIVESTOCK

The Ponderosa pine area has been heavily grazed in the past few years as is shown by the shrubby, clipped appearance of browse species, especially Purshia tridentata. In spite of the heavy grazing, pine reproduction has not been seriously affected and appears to be establishing itself well despite drought. Reproduction along flats has a scrubby appearance and is sparse. As one progresses into the timber, the reproduction increases in density and in height with relation to diameter. Reproduction appears in several different height planes, indicating that it was established during seasons of abundant rainfall and heavy seed production.

The margins of flats, particularly Grass Valley, show evidence of greater stock damage than that found in the interior of the pine type. This is apparently caused by the cattle as they drift from water near the railroad and Ebby Lake back to the timber. A few of the trees are stunted and shrubby, due to rubbing and trampling by livestock, or from growing on the open unprotected timber edge. Along Patterson Flat and near Patterson R.S.

the damage is very slight.

Serious damage to reproduction by livestock is localized to a few small areas. Of the several bedgrounds found on or adjacent to the area, Long's Well and a bedground in the SE¼ of Section 15 have been very heavily used in the past but not in 1933. There reproduction damage is extreme and damaged trees have the bushy appearance of ornamental shrubs. The bedground in the edge of the timber just south of Patterson shows a total absence of reproduction under 5' class and no vegetation except a little Artimesia tridentata. Several other bedgrounds on the area have been used moderately to heavy. Reproduction is slightly scrubby but is not seriously damaged and is increasing normally.

Cattle returning from water have worn prominent trails up draws and across country along which occasionally is found a tree that has been rubbed or nipped. Damage of this sort is scattered.

Sheep were trailed between Patterson Flat and Harvey Valley along the road. Some damage is evident but it is scattered and limited.

A very small amount of damage appears on areas on which dual use occurred up to 1933. This is especially true of the upper two-thirds of Section 15 and the lower two-thirds of Section 10, where grazing was very heavy. An occasional leader or lateral tip or perhaps a bite of needles may have been taken. Sheep have encroached about $1\frac{1}{4}$ miles south into cattle unit and cattle drifted north into the sheep range thus subjecting it to a "double use", but there was no serious damage to reproduction. The new tree crop is heavy and well established; a large percentage of it being six feet or more in height. Trespass horses have roamed between Patterson Flat and Grass Valley but caused no visible damage to reproduction. Only one heavily damaged localized area was found, location is $SW\frac{1}{4}$, $NW\frac{1}{4}$, $SW\frac{1}{4}$, S 14, damage was caused by trespass sheep in 1933. No overnight bedground was in evidence; the area did not appear to have been overgrazed. Perhaps the sheep were bedded up there for noon and caused the damage. These is no other reason for the damage.

The type of damage by livestock found on the area consisted of a very few leaders, and laterals which were taken from a few trees. Needle damage, except in this area, is very scattered. Damage by rubbing is also scattered.

In a few instances trees were broken off or killed by rubbing.

Damage by insects appears to be more serious than any other factor. Often three or more parts per tree are damaged. The type of damage by insects is cutting off of tips, tunneling through the pith of tips and killing, needle and slight bark injury.

Few trees are killed by porcupine girdling, and few have porcupine scars. Mistletoe is found often in the denser areas where more moisture is present. It is found in localized areas and at times in entire infected clumps.

Rodent damage is negligible. Occasionally a small bark scar is found and parts are cut off.

Climatic damage by frost occurs in open areas along flats where trees are exposed to low temperatures. Little damage results from breakage by snow.

REPORT ON CATTLE MOVEMENTS

In conversation with Bognuda on August 23, we found that most of the cattle had drifted out of the country by that date because of the lack of water and the rapidly drying forage. Mr. Bognuda said he was taking the rest of the cattle out by September 1.

Found out from riders from Eldridge Ranch that they were rounding up on September 18, 1933, any stock that had not drifted out by that date.

Observed 6 head of stock near Ebby Lake on September 16 that were not in good shape. Due to lack of water and dry feed, the few cattle that remain have fallen off considerably in comparison to the shape they were in a month ago.

Sheep were taken out of the Experimental Forest on or about September 1. A camp was seen just west of section corner $\frac{9 \mid 10}{16 \mid 15}$ and two days later it had left.

A band of about 16 horses were still ranging between Grass Valley and Patterson Flat on September 15.

Stock seem to congregate around Ebby Lake as a watering place. Cattle graze mostly along the edge of Grass Valley about a half mile into the timber. In the upper half of section 15, cattle sign was very scarce and in Section 10 it was entirely lacking. Very prominent trails lead up all the draws for a distance of $\frac{1}{2}$ to $\frac{3}{4}$ mile.

GEORGE A FISCHER
9/18/33

Oct. 16.

Cattle have been gradually moving northward onto sheep range. It was observed when boundaries for cattle, sheep and dual use were established that cattle have been quite far up on sheep range but to a limited degree as to numbers. On October 5 a herd of 7 was seen on Patterson Flat, by the 8th the herd had increased to 10 and on October 14 there were several more. They are apparently watering at Patterson Well and work in all directions from it.

Two separate bands of horses have been and still are working over the entire area. They migrate from Patterson Flat to Grass Valley and cover practically all the area in the Experimental Forest.

October 30.

Between October 16 and October 28, we noticed 2 bands of horses, 16 or 17 in each, on Patterson Flat. They apparently drift considerable distances, and cover nearly all the Experimental Forest.

A few cattle have been seen continually in Patterson Flat and in Section 1 and 12. They apparently had been watering at Patterson Well until the water was shut off. A few grazed in and around Patterson Flat even after the water was off. It is not known where they watered, to whom they belong, or whether they have yet been rounded up.

REPORT ON SHEEP TRESPASS IN SECS. 10 & 15
T 33N R7E

The road running east and west through sections 10 and 11 to Patterson Flat, then south along the road leading to Harvey Valley is the boundary between sheep and cattle range. The cattle allotment includes most of sections 10 - 11, all of 15, part of 14, 22 and 23.

It was found either by seeing the sheep on the ground or by evidence immediately after they had left that sheep had taken in all of section 10, the upper 2/3 of 15, and those portions of 11 and 14 that originally were cattle range.

Ranger Ailey informed us that sheep were sometimes permitted to graze over the under-utilized portion of section 10 but that this year they had taken unwarranted privileges and gone so far as to water at McCoy Corrals, near Ebby Lake, which area is a considerable distance outside of sheep range.

Range in sections 10 and 15 has been heavily grazed this year by sheep, particularly the Purshia tridentata.

A sheep camp is located just west of section corner common to dections 9, 10, 15, and 16. This camp was one of the last to be used this season. An outfit was seen there on August 28. Another camp, not used this year, is in SE $\frac{1}{4}$ S 15. A bed ground with extremely heavy reproduction damage denotes that this bedground was heavily used recently.

Herders said that they would not take sheep into section 3 and 2 because of the intense brush and lack of feed there.