Status of Browse on Ranges of Eastern Oregon and Eastern Washington

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SINCE the science of game management was first thought of, it has been known that the principal factor in keeping game populations is food. Cover and water are essentials also, but both can be provided much more easily than game food. With deer and elk, winter food is the immediate problem, and the importance of browse has been fully recognized by every administrator of big game in the West. It has been considered a staple food in the diet of both deer and elk, especially during the winter months. Now browse appears to be definitely on the decline and the question arises, what will happen to the game if the browse disappears? The discussion in this paper will deal with browse conditions in eastern Washington and eastern Oregon.

With its wide spread in elevation, temperature, and rainfall, the area considered covers nearly all the mammalian life zones and includes the characteristic forage zones of each. Elevation varies from 200 feet along the Columbia River to over 14,000 feet on the highest Cascade Mountain peak. Temperatures vary from $-50°$ to $+114°$F., and the precipitation ranges from an average of 7 inches to 40 inches per annum. Much of the moisture falls as snow, but the Cascade Mountains intercept considerable rain during the summer months.

This area is not a browse country when compared with the Rocky Mountain region. However, there is evidence that at one time it supported much more browse than it does now. Dead stumps and weakened stools of struggling palatable species indicate a much more thrifty and abundant stand than is now present.

The high mountains with their perpetual or late snow fields afford excellent basins of grass and weeds, usually fresh and succulent until late summer. While some browse is present on the summer range, it is not as important as where found on the intermediate and lower winter ranges.

The intermediate or ponderosa pine timber range furnishes succulent weeds and grass for a short period after the snow leaves but by late July these plants begin to dry. Both deer and elk take full advantage of the elevational changes in forage conditions, but in winter they must seek the foothill country where snow depths offer less resistance. This seasonal change of range creates definite migrations, some of which may extend over 100 miles. There are always a few individuals, usually females, that spend the entire year on the low range. Occasionally we find a few bull elk that prefer the solitude and the isolation of the winter fastness and they will stay in a willow thicket where snow becomes so deep they can't leave the area. If the willows hold out the elk pull through, but evidence has been found where the elk used poor judgment in selecting winter quarters. Browse is found in varying amounts over most of the range. But those summer ranges

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carrying the greatest populations of elk show the greatest depletion of browse, and of course, the fewer browse plants on a range the more noticeable is their destruction. This leads one to believe that only time and overuse are needed to eliminate the browse on all ranges so used. Even though these summer range problems are somewhat infrequent, they are directly important on those ranges where they occur and indirectly so to the whole range area.

It is the browse species occurring on the winter ranges that give us the most immediate concern. These are found in a narrow belt extending from the arid benches or cultivated lands 1,000 to 1,500 feet above the lower timber limits. Necessarily this belt varies in width according to topography, from one-half mile to five miles. The distribution of species is fairly regular throughout the region except that mountain mahogany finds its northern limit in the Blue Mountains of southeastern Washington, and Rocky Mountain maple decreases in density toward the southern border of Oregon. Under dense stands of both fir and pine, browse is rather scarce. It reaches its greatest abundance in the scattered timber edges, the adjacent open lands, and in the protected draws or canyons.

The winter game range is largely owned by stockmen, but may be interspersed with land grant timber areas and public lands. On an average, 80 percent of the big game winter range is privately owned, and it is on these ranges that the deer and elk must spend three to five months of each year on an area one-sixth the size of the summer range. The purpose of owning these range lands is to provide spring and fall range for livestock, and most of them are grazed more by live stock than good management would justify. That leaves the deer and elk rather slim picking during the winter. Since snow usually covers the ground during the period of use, browse must furnish most of the forage. For that reason the greatest damage is to the browse.

Some 30 or 40 species of browse are found on the winter game ranges, but investigations to date show only five or six to be of primary importance as big game food. A study by the Washington Game Department (1939) found in eastern Washington only three browse species, each of which made up ten percent or more of the winter diet. There were eight species that made up three percent or over, and 14 that furnished two percent or over. The three most important species were snowbrush ceanothus (*Ceanothus velutinus*), bitterbrush (*Purshia tridentata*), and curlleaf mountain mahogany (*Cercocarpus ledifolius*). In eastern Oregon, Cliff (1939) found the same three browse plants to provide over ten percent of the winter diet for deer and elk. Only two others, rabbitbrush (*Chrysothamnus* spp.) and Douglas fir (*Pseudotsuga taxifolia*), provided over three percent.

Frequent range examinations have shown that huckleberry (*Vaccinium* spp.) is generally heavily used, especially in the timbered areas. There is no doubt but what huckleberry is one of the important game forage plants, but its occurrence is limited on game winter range.

During the past 10 or 20 years, curlleaf mountain mahogany has been so heavily browsed that it ceases to produce much forage. The leaves are gone from the stems as high as the browsing animals can reach and only the umbrella canopy maintains life and growth in the tree. Only in southeastern Oregon does mahogany furnish an appreciable amount of forage. Rocky Mountain maple (*Acer glabrum*) is important in the Cascade Mountains and northern highlands. Big sage (*Artemisia tridentata*) is becoming more important

as the more palatable species decline in forage production.

There are such plants as snowberry (*Symphoricarpos albus*), serviceberry (*Amelanchier alnifolia*), chokecherry (*Prunus demissa*), bittercherry (*Prunus emarginata*), Sierra juniper (*Juniperus occidentalis*), and many others. Locally they may be important but generally they are in limited abundance.

Occurrence and abundance are important factors in determining the value of some browse species but considering distribution, abundance, productivity, and palatability, the five most important browse species for big game in this region are bitterbrush, snowbrush ceanothus, big sage, huckleberry, and Rocky Mountain maple.

The use of browse by livestock is mostly in the fall and winter seasons. In the spring when grass is green and succulent and many weeds are available, cattle and sheep seldom use browse. But as the grasses are depleted or lose palatability the animals turn to browse. The change in preference for food takes place gradually but by late August, without the stimulus of early rains, the grass on the low and intermediate ranges has dried. From then on sheep and cattle use browse more and more. Browse develops slowly and full growth is not reached until late summer. In this region as the twigs mature they retain most of the elements taken from the soil which makes them more palatable and nourishing than the dry grass and forbs according to Cowan, Hoar and Hatter (1950).

During the drier seasons of the drought period, 1917–1937, browse furnished much of the summer forage to both livestock and game. During that period many of the winters were mild and open. Livestock were left out as long as they could find feed, and that usually meant an added drain on browse. On the other hand, game found much green grass during those open winters, and it helped to maintain some of the herds which were too large for the browse forage available to them. Some game died during the more severe winters. Studies show that deer must have some browse during long, cold winters (Taylor, 1947). Observations also show that after grass and forbs mature both sheep and cattle do better on the range with browse than those ranges without browse.

During the drought period there was a general decline in livestock numbers, but the continual increase in big game maintained a constant and heavy drain on browse. During the winters 1948–49 and 1949–50 there was exceedingly severe use of browse. Green or dry grass was not available and browse had to carry the load.

In 1942–43, there was an epidemic of the meadow mouse (*Microtus montanus*). Much of the cover was killed by these rodents girdling the stems. On rather large areas of bitterbrush as much as 90 percent of the plants died as a result of the mouse work. It should be noted that the plants generally were not in good condition due to many years of too heavy use. Whether they would have suffered less had they been more thrifty is only problematical. But mice did reduce the bitterbrush considerably. Other species such as mountain mahogany, sage, and even western wheatgrass were killed by the rodents.

After the mouse attack a few plants still had a narrow stringer of cambium left, and might have recovered. But two years of bad grasshopper damage eliminated any chances those plants may have had, and in addition, some thrifty plants were killed.

These two epidemics occurred just after the most severe drought the country had experienced in several hundred years

according to Keen (1937). Just how much effect the drought had on browse is not known, but it is reasonable to believe that it weakened the resistance of the plants and some succumbed to the destroying agents which otherwise might have survived.

The present situation of the browse forage is not very encouraging. Generally browse is producing about half of its potential crop. Production is so closely utilized that the plants do not get an opportunity to recover full production strength. Token reductions in game herds and livestock do little good because depletion of browse keeps ahead of the herds. The degree of depletion varies from practically zero on up. I know of only a few ranges where the trend in browse production is not downward. On many ranges the browse condition has reached a point where it is doubtful if the downward trend can be checked and the production increased without removing all use. That is a rather drastic action to take, but the one big question that is uppermost in the range administrators' minds is, what will happen if we do lose the browse?

Losing the browse is not fantasy. There are many ranges in both states, especially in the Blue Mountains, where browse is slowly passing out of the picture. The discouraging part is that it is the best species that go first. But the plants have gone without leaving a new generation of its kind. The reason for the lack of reproduction is partly due, at least, to overuse.

One thing that happened on several ranges tends to prove the value of browse. Elk were planted on the Rattlesnake range in Yakima County, Washington, in 1913 (Mitchell and Lauckhart, 1948). They survived and increased in numbers from 50 to 3,000 or 4,000 before anyone heard much about them. About 1927 some crop damage was reported. In other words, while browse was available on the range the animals did not have to seek other food in winter. Browse on that range now is very much depleted. It might also be noted that from 1913 to 1917 the winters were very severe.

There was a similar occurrence in Oregon. A small nucleus of elk survived the low game population period, 1890 to 1920. They stayed in the Trout Meadows country in the Whitman National Forest. These animals were seldom seen until about 1930 when ranch damage troubles began to develop during the winter months. That area is one where the browse has suffered materially. The average height of big huckleberry has been reduced 12 to 16 inches and production much curtailed.

On the Murders Creek mule deer range in central Oregon a large population of deer created a serious browse condition and severe die-offs occurred during abnormally hard winters. A special hunt reduced the herd to a low figure but for six years the population has held constant at one-fourth the high numbers. There is considerable bunchgrass on the range but deer died with bunchgrass all around them. The present population practically represents the carrying capacity of the browse.

Desolation Creek, Oregon, had a high mule deer population in 1932. There was a heavy die-off that winter. Elk competed effectively with deer for the remaining small supply of browse. The deer herd is now less than 20 percent of what it was in 1932 and has shown no increase from that number for ten years. The bunchgrass on the range has not changed materially. The carrying capacity for deer appears to depend on browse.

If these examples are criteria of what will happen when the browse is gone, then we can expect to winter feed the elk and

probably eliminate the deer from many ranges. Just how it will affect the grazing of livestock is still problematical.

As would be expected, the agencies doing range forage research have concentrated on grass, and browse has been somewhat neglected. Hormay (1943) made a study on bitterbrush, which has served as our principal guide. But we need similar studies on several different plants. Consequently the range administrator has little factual information on browse on which to base management.

The important need now is to determine the basic features of the plant life histories. We need the answers to such questions as:

1. How long does the plant live?
2. How much can the plant be grazed and what is the period of sustained production?
3. What part of the game dietary needs does browse provide?
4. What part of the livestock dietary needs does browse provide?
5. How is browse regenerated?
6. Can browse be artificially propagated and transplanted to wild lands?

We also need to know the relation of browse to deer and elk. As an example, we think elk can winter much better on dry grass than can deer, but we don't know that dry grass alone is an adequate diet to bring elk through a severe winter. According to present literature, browse is a "must" in the deer diet. How other foods can be substituted for it, and which are the best foods, are still not known.

If we knew the answers to some of these questions it might change our management materially. If we knew for example, that we could not keep our deer herds without certain kinds of browse and if we knew that we couldn't regenerate the browse plants artificially we would want to remove all game and livestock use from some ranges tomorrow so as to protect the browse plants left.

The unfortunate situation is that we don't know enough about some of the good browse plants to start an intelligent management. Until we do have those answers, however, we should start now to take every precaution to save what we have. With a food reserve we can always grow a game or livestock crop, but without the food it just can't be done.

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