A HISTORY OF RANGE USE AND ITS RELATION TO SOIL AND WATER LOSSES ON THE WALLA WALLA RIVER WATERSHED, WASHINGTON AND OREGON

BY R. R. HUMPHREY

Associate Range Conservationist, Soil Conservation Service, Pacific Coast Region, Kennewick, Washington

INTRODUCTION

The present condition of any watershed reflects the land-use practices that have been employed on that watershed throughout its history. Except in instances of severe early misuse, recent practices will leave a greater impress than earlier ones. Recommendations of the most desirable type of land use, whether primarily to improve the economic condition of the residents on the watershed or in the community, or to reduce excessive soil and water losses in order to prevent local or downstream flood or siltation damage, or for whatever purpose, will be more adequate if based on a thorough knowledge of the causes back of the deteriorated condition.

The Walla Walla River and its tributaries rise on the northwesterly facing slopes of the Blue Mountains in southeastern Washington and northeastern Oregon, and flow in a westerly direction across a rolling plain to enter the Columbia River near Wallula, Washington, 312 miles upstream from its mouth. The watershed covers most of Walla Walla and Columbia Counties in Washington, and part of Umatilla and Wallowa Counties in Oregon. It is about 60 miles long from east to west and 50 miles wide from north to south, and contains approximately 1,795 square miles.

Vegetation Prior To White Settlement

Until as late as 1860 the soils were well stabilized by the native vegetation; timber and brush intermixed with grass and weeds on the Blue Mountains, bunch and associated grasses (**Agropyron spicatum, Poa secunda,** and **Festuca idahoensis** for the most part) on the rolling hills of the middle and lower watershed, and wild rye (**Elymus condensatus**) and sagebrush (**Artemisia tridentata**) in the valleys. Prior to establishment of the Whitman Mission in 1803, the grass-covered hills were assumed to have limited agricultural possibilities, grazing being the only use for which they were believed adapted. The comparatively restricted valley areas, even, were rated far below their true productivity.

Original Grazing by Game Animals

So far as known, none of the Walla Walla River watershed area was grazed heavily prior to about 1860. Game animals—antelope, deer, and elk—roamed over the area, but because of predators, probably rarely became sufficiently numerous to overgraze the range. Buffalo, although ranging east from western Montana to the Atlantic Ocean, (2, 15)[1] seem to have occurred only occasionally on the area drained by the Walla Walla River or its tributaries.

Introduction of Horses

Horses were apparently first introduced into the region about 1730 (8). Santa Fe, New Mexico, seems to have been the center of distribution for these, as well as for most, or all, of the horses of the western plains. In spite of the grazing by these Indian horses, there is no indication that the range suffered from overgrazing until the introduction of large numbers of cattle, sheep and draft horses over a hundred years later.

Expansion of the Livestock Industry

A treaty with the Indians in 1859 assured would-be settlers of comparative safety, and initiated an era of rapid expansion and settlement. The stock-raising possibilities of the grass-covered hills were beginning to be recognized

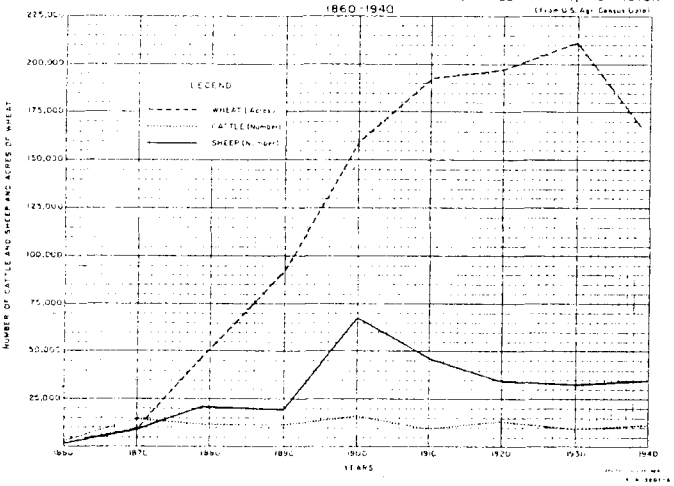
[1] Numbers in parenthesis refer to bibliography at close of this article.

and by the end of 1859 scattered ranches were established in the northern foothills of the Blue Mountains and up the Touchet River as far as the present site of Dayton. The discovery of gold and other minerals in Idaho, eastern Oregon, and elsewhere further stimulated settlement and provided a market for disposal of livestock and other agricultural products. Up to this time there were few sheep or beef cattle in the area, most of the cattle being milch cows or oxen, and the sheep consisting of small farm flocks for local or domestic use.

In the summer and fall of 1861, however, large numbers of both sheep and cattle were driven into eastern Oregon and Washington from the Willamette Valley. The winter of 1861 was one of the most severe ever recorded in the Pacific Northwest, and almost wiped out these rather speculative attempts at livesock raising. Out of 4,500 sheep driven into the Yakima country that fall only 45 were alive by spring. Cattle and horses, likewise, were very hard hit, and the total monetary value of stock lost in the country around Walla Walla was esimated at about $10,000,000 (6, 12). In spite of this severe setback, however, the movement of stock, both cattle and sheep, into eastern Oregon and Washington continued. In 1864 about 6,000 sheep were driven into the Walla Walla area, and it is recorded that by the winter of 1865-66 200,000 sheep were being wintered there. At this time, however, cattle were in greater local demand than sheep, and the number of cattle raised in the county first approximated the peak they ultimately reached in 1900 (fig. 1). Extensive shipments to eastern markets began about 1875. Prices were low, however, and continued so until the severe winter of 1880-81 which killed off about 50 per cent of the cattle in eastern Washington and Oregon (17). Since that time the number of cattle in the county, though subject to minor fluctuations, has tended to remain more or less constant.

The numbers of sheep, which essentially paralleled those of cattle until 1890, increased much more rapidly until 1900 (fig. 1). Whereas in 1890 there were less than twice as many sheep than cattle, in 1900 there were more than four times as many. A superiority in sheep numbers, though a little less than this, has continued down to the time of the latest available records in 1940.

FIGURE 1. GROWTH OF THE LIVESTOCK INDUSTRY AND WHEAT RAISING IN WALLA WALLA COUNTY, WASHINGTON 1860-1940



Development of Dry-Land Wheat Raising

Up to 1863 small grains, wheat, oats, and barley were raised only in the

flood plains bordering the stream courses. In the fall of 1863, a farmer by the name of Andrew Kilgore sowed 50 acres of wheat on the upland near Weston and the following summer threshed an average of 35 bushels to the acre from his small plot (4). The news—and the practice—spread rapidly, until in 1867 the wheat raised near the Blue Mountains exceeded the demand, and by the early seventies Walla Walla, Wasco, and Umatilla Counties were coming to be known as "one of the world's great granaries." There was a consistent increase in the acreage of land devoted to wheat raising which reached its peak in 1930. The records for 1935 showed a moderate decrease.

Effect of Wheat Raising on Horse Numbers

With the development of wheat raising the need for draft horses increased, and the number of horses in Walla Walla County increased from 1,070 in 1860 to 13,625 in 1900 (20, 22). There were still essentially this many in 1920, but fifteen years later the development of power farming had cut this figure almost in half, 6,937 animals being recorded for 1935. During the rather long periods when these horses were not in use they were grazed on the stubble fields and on the adjacent range lands. In 1904, 15,000 horses were grazing the area proposed for the Wenaha National Forest, and were concentrated for the most part on the foothills area below the timber (10). Heavy use similar to this continued for many years and must have played an important part in contributing to deterioration of the range. Present Forest Service policy now permits no horses on open range on the Umatilla National Forest.

Overgrazing and Its Effect On the Plant Cover

On a basis of present range use by cattle and sheep, the degree to which these animals utilize available feed, and the condition of the range, it seems probable that the grazing lands of the watershed have been subjected to some degree of overgrazing since about 1875, a period of 65 years. Moreover, grazing use has tended to become heavier, rather than lighter, during this time. This is indicated by the fact that development of wheat raising has consistently removed more and more of the native grasslands from grazing use, while the numbers of cattle have remained essentially constant and those of sheep have increased.

This consistent overuse of the native forage is evident everywhere on the watershed except in inaccessible areas and areas so far removed from water that they receive little grazing. In many places the original grasses have disappeared and have been replaced by annual grasses, downy chess **(Bromus tectorum)** for the most part.

All degrees of deterioration from the original vegetative cover occur. Locally, largely on ridge-tops of the upper watershed, either no vegetation (and in many cases no topsoil) now remains, or a scattered stand of weeds and local remnants of grass form an ineffective "cover" that has little or no control over accelerated soil loss and water loss. The origin of these more or less unvegetated ridges has given rise to much speculation, opinion being divided as to whether they antedate heavy grazing on the forest areas, or have resulted from heavy local grazing and excessive trampling. The tentative conclusion reached in this study is that with a few exceptions these ridges were probably at one time covered either with a rather heavy stand of grasses (mostly **Agropyron spicatum** and **Poa secunda)** intermixed with some weeds, or with a more open stand of bunch grass with a larger percentage of weeds. These conclusions are based on the following evidence: (1) early descriptions of the area; (2) scattered remnants of a good grass cover on local areas; (3) relict areas that still support excellent stands of **Agropyron spicatum** and **Poa secunda.**

National Forest Areas

By 1900 it was rather generally recognized that much of the forested range

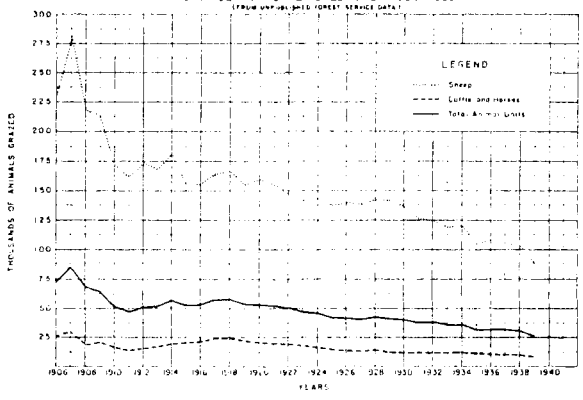
was in poor condition as a result of overgrazing and improper seasonal use. There is little likelihood, however, that any immediate action would have been taken to remedy the situation had it not been for the creation of the forest reserves. In 1905 the Wenaha Forest Reserve was set aside by presidential proclamation (13). This original reserve included that portion of the present Umatilla National Forest now included within the Walla Walla watershed. Prior to 1905 the forest lands were classed as public range, and were subject to all the abuses of early and heavy grazing that might be expected in a region where summer range was at a premium.

The first administrative act of the Forest Service was to subdivide the forest into allotments based on prior use. Reductions in the numbers of sheep and cattle permitted have been practically continuous since the first world war (fig. 2). Drought and increasing use by big game, however, have prevented these reductions in use being fully effective in range restoration. A vegetal survey was made in 1913 to provide information on the vegetal types of the national forest area (24). Yearly range condition and utilization estimates have been depended upon to determine the grazing capacity of the federally-owned lands of the watershed.

About 200,000 sheep, 40,000 cattle, and 15,000 horses were grazing the reserve area in 1904 (10). Both cattle and horses were confined largely to the foothill slopes of the mountains, seldom grazing the higher timbered country. Sheep, on the other hand, spent the summer months in the timber, grazing the foothills en route to and from the summer range.

Figure 2, which shows the number of cattle and horses, and of sheep grazed on the area now included within the Umatilla National Forest, indicates the reduction that the attempt to reach the correct carrying capacity has necessiated. The increase in the numbers grazed from 1912 to 1918 reflects the pressure for beef and other livestock products during the first World War, rather than any increase in the range carrying capacity during this period. An almost record drought in 1911 followed in 1912 by one of the wettest years in the history of the watershed may have given added initial impetus to this increase.

FIGURE 2. NUMBERS OF SHEEP, AND OF CATTLE AND TOTAL ANIMAL UNITS GRAZED ON THE UMATILLA NATIONAL FOREST FROM 1906-1939



Closure of Mill Creek Watershed To Grazing

Following agitation for a number of years by residents of Walla Walla, the Mill Creek drainage basin (source of the Walla Walla municipal water supply) was closed to all grazing in 1925. This had been preceded for a number of years by grazing restrictions, particularly affecting sheep, that had lightened the grazing load on this por-

tion of the watershed more rapidly than on the remainder of the national forest. During the 15 years that have elapsed since 1925 the Mill Creek area has had no grazing by domestic stock. Predators have been rather consistently trapped or hunted, while deer and elk have increased unchecked. As a result the more or less natural balance has been upset, and the grazing pressure by game animals has increased until much of the watershed is now overgrazed, the soil disturbed by trampling, and erosion—which temporarily had become largely stabilized—is again active. Pollution of the Walla Walla city water supply similar to that occurring in the summer of 1940 can be expected to recur with increasing frequency in the immediate future if steps are not taken to reduce the natural yearly increase of game animals.

Effect of Fires

Fires have played their part in determining the type of vegetation able to thrive on the higher timbered portion of the waershed as well as on the grassed areas below. Fires occurred rather frequently even prior to white settlement, and as they burned almost or entirely unchecked, they were often large and extremely destructive. Runoff, from burned timber lands in particular, must have been heavy for a few years following these fires. On the grassed areas, on the other hand, most of the grass species were fire-enduring and recovered rapidly, so that excessive soil and water losses soon returned to normal. In addition, the grass fires were of short duration and did not burn the organic matter out of the soil as completely as did the timber fires.

Early Floods and Flood Damage

Native vegetation alone can rarely prevent floods; it can, however, exert a degree of control over flood run-off that tends to reduce the peaks of flash floods, retards their rate of rise and fall, and reduces the amount of sediment and debris they would otherwise carry. Data on early floods in the Walla Walla watershed, though somewhat meager, indicate that floods occurred not infrequently. Gilbert (6) reports that on June 14, 1869, "A storm occurred of tropical fierceness, during which a waterspout burst in the mountains, and sent a flood down Cottonwood Canyon that washed away houses in the valley."

Quoting Gilbert further: "The last three days of January, 1867, witnessed a flood in Walla Walla that damaged property to the extent of $18,000. A warm rain brought down torrents of water from the melting snow on the mountains, and Mill Creek soon overflowing its banks, rushed down Alder Street, converting the lower end of town into a lake. Many buildings along the creek line were washed away, and others were seriously undermined and damaged. The floods occurred nearly every year, but seldom did much damage or reached uncontrollable proportions. One, however, in 1875 caused the destruction of considerable property."

Although the $18,000 damage attributed to the 1867 flood is much less than that incurred during 1931-33 (18), it must be kept in mind that Walla Walla in 1867 was little more than a country crossroads, as Indian depredations had prevented general settlement of the surrounding territory until 1858.

It is of interest to note that although flood records on he watershed date back to 1867, none of the early accounts mention sediment damage. This does not constitute proof that such damages never occurred, but it does strongly indicate that if there were such damages they were relatively insignificant.

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INTERPRETING MOUNTAIN MEADOW RANGE CONDITION BY OBSERVING TREND AND STAGE OF PLANT SUCCESSION

G. D. PICKFORD

Pacific Northwest Forest and Range Experiment Station, Portland, Oregon

Importance of Meadow Forage

Mountain meadows in Washington and Oregon potentially are capable of producing 10 to 15 times more forage per acre than the average timbered summer range that is predominant in these States. The forage that is produced on meadows ordinarily stays lush and green throughout the summer grazing period in contrast to the timbered summer range forage which usually begins to dry in August. Range forage in a cured state usually is low in protein, in calcium and phosphorus, and in vitamins, and is incapable of producing rapid weight gains in livestock. Although mountain meadow acreage is but one or two per cent of the total summer range in Washington and Oregon, it is capable of producing an important amount of summer forage that is critically needed to produce prime beef and lamb.

Mountain meadow forage is so attractive to grazing animals that, if preventive measures are not taken, the meadows usually support more than their share of the grazing load. As a consequence, range depletion has occurred that in many instances has reduced meadow grazing capacities to or below the level of the timbered range. This forage production loss sometimes goes unnoticed because of the small areas that are involved. In other cases, the importance of the feed loss is apparent and steps are taken to correct the grazing management so that the production of meadow forage may be increased. The situation with respect