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FORESTS AND THE CONSERVATION OF IRRIGATION WATER SUPPLY

It is natural to regard a forest as chiefly useful for supplying wood products, and the great lumber industry of Idaho is based on this type of usage. In the southern part of the State, however, we have a great industry which benefits by a forest product, or rather an influence, of a very different kind. We refer to the extensive irrigation projects which receive the bulk of their water - probably more than 85% - from mountain watersheds in National Forests. These forested areas lie at the very source of the water supply because the greater part of the precipitation occurs in the mountains, and the importance of these watersheds is due to their influence on this rain and snow, determining the manner in which it will be delivered as water to the ranches below.

When the rain falls on a forested mountainside, its downward force is broken by branches and leaves; it is absorbed by a forest soil made spongy by humus and interlacing roots. The water is stored as in a reservoir, to seep into the streams and escape gradually, without destructive effect, to farms and cities in lower country.

Were the same area devoid of vegetation, each raindrop in a heavy downpour would hammer the soil, compacting it and reducing its absorptive properties, until the surplus water would go rushing off down the slope. Such a runoff carries away the fine top soil and humus - the fertile elements. With further erosion small gullies appear and enlarge; the washed surface becomes coarse and infertile. The streams rise to overflowing, filled with material ranging from silt to rocks, this debris to be deposited in the stream bed to hinder the flow, to fill reservoirs, or to cover fields and orchards with a mass of sand and gravel. The flow comes too fast to be utilized and is almost wholly lost.

If one mismanages his farm so that erosion occurs, he alone may be the loser, but the destruction or impairment of a forested watershed concerns the welfare of hundreds and thousands. Consider that, whereas the farms lie at lower altitudes where the topography is comparatively gentle, the forests are in the mountains, at the source of the streams where the precipitation is heaviest.

Not less than 85% of the water used for irrigation in the West is derived from mountain watersheds in the National Forests. It is estimated that our National Forests contain 1,175 watersheds supplying many municipalities, 324 water projects, and 1,266 irrigation projects. The water supply of Salt Lake City, Denver, Colorado Springs, Portland, Seattle, and Boise comes from streams rising in National Forests, and a similar source is proposed for San Francisco.

It is fortunate that these forests are administered by an organization which has, as its ideal, the greatest possible service to the public.

Erosion may be started on a watershed not only by clearing off the timber, but also by fire and excessive grazing. It is not claimed that the presence of vegetation will preclude all erosion, because this tendency is dependent on the steepness of slope, the looseness of the soil, and

the rate and volume of precipitation. Each of these factors may tend to augment the erosion by increasing the volume and velocity of the runoff, but, except under rare and extreme conditions, the presence of a good cover of plant growth will absolutely prevent destructive erosion, and even extreme conditions will be greatly mitigated by the presence of vegetation.

Clearcutting of timberland and broadcast burning of the brush is a destructive practice that encourages soil depletion. In the future we shall find, that as timber is cut on steep mountain slopes at high altitudes, the clearcutting method will become less feasible, and some system of partial cutting that will not at any time lay the soil bare, must be adopted on dangerous areas. It is even conceivable that all cutting might be very restricted or prohibited in types which have great protective value.

Fire always reduces the storage capacity of a watershed and a severe fire or repeated fires will expose the soil without protection to the elements.

Grazing is considered as a major forest use, because the forests contain so much forage. Of about 156,000,000 acres in National Forests, 8,000,000 acres lie above the altitude of forest growth. Of this, 4,200,000 acres are barren, about 1,500,000 acres have a cover of brush, and the remaining 2,300,000 acres are grassland. These areas are particularly susceptible to erosion of which they furnish excellent examples and they are usually very important for irrigation.

Excessive grazing, particularly by sheep, may not only diminish the forage resources to zero and change the type from good grass and weeds to worthless plants which the stock will not eat, but the erosion may be severe as a result of the scant forage cover, the trampling of the soil to a hard non-absorbing surface, and the cutting down of stock trails in which gullies often start. The severe floods from the Wasatch Mountains in Utah, have been due largely to overgrazed mountain range. In places such as Manti Canyon, where gazing has been controlled, so that the range revegetated, a former condition of severe flooding in the valley below has been controlled and floods no longer occur.

Whether the efficiency of the watersheds is impaired by clearing timber, fire or grazing, the resulting effect on the delivery of water to the lower country is the same. Whereas on a good watershed the snow and rain water is held back and delivered to the reservoirs and irrigation ditches slowly and over a long period, from denuded watersheds the water rushes quickly, with destructive force. It cannot all be utilized; it comes all at once. Even tho caught in a reservoir, the debris accompanying such a concentrated flood would decrease its storage capacity, - a process now taking place in the Arrowrock Reservoir near Boise. The water thus escapes and the irrigation ditches are soon empty to remain so until the next rain comes. In the meanwhile the crops are ruined.

Probably irrigation farming is of all industries most dependent on a steady flow of water during the dry season. Consider then, that in southern Idaho the area of irrigated land is estimated to be 2½ million acres. In 1919 the capital invested in the whole enterprise was 91½ millions, and the products raised were valued at $77 millions of dollars.

As a guarantee of safety and the permanency of this investment, the protection of mountain watersheds is the primary consideration.