

The total water supply if equally distributed over the whole season is inadequate. Stream gaugings show that it is only sufficient to irrigate 16 per cent of the area of the irrigable land.

The total flow from the eastern slope is sufficient to irrigate 15 per cent of the total irrigable area in the west, but the flow at low water, the season when water is needed, is only sufficient to supply water for 2 per cent of the irrigable area. The above figures are from the most reliable government records and serve to show the dependence of irrigation upon forestry. They show that the water for which private individuals have already constructed about 1,000 miles of irrigation canals and ditches is all drawn from a forested watershed. They show that the total water supply available is markedly inadequate and that in its natural distribution it is by uncontrolled extremes of flow rendered of still less service.

To provide storage and an even distribution of the waterflow through the seasons when it is most needed, an expensive system of storage reservoirs may be necessary, but the construction of such reservoirs increases rather than decreases the importance of the preservation of a forest cover.

The function of a reservoir in an irrigation system is to increase the utilization of the water by holding it over from times of flood, when it is useless and harmful, to periods of drought, when it is required in the production of crops. The forest is to this extent a reservoir. Descriptions given above of the burned-over country in the Crow's Nest Pass have emphasized the fact that the soil mulch or humus was destroyed, that hard gravel, clay and rock were exposed, that the spongy vegetation common in the forest was absent, and the moisture of the soil was decreased by transpiration from the grass and evaporation by the sun. The natural result of these conditions is that the moisture from melted snow and rain is not held, but immediately runs from the bare hard slopes to the streams and rushes to the prairie in a flood. In the forest, on the other hand, moisture from precipitation is absorbed by the vegetation, moss and humus, and, finding no smooth hard surfaces from which the run off is immediate, it soaks gradually into the soil from whence it appears later in springs and seepage. Snow is held later in the spring and its rapid melting is prevented. Thus destructive floods are minimized and a large proportion of the water is held to swell the flow of the streams during the dry season.

The destructive floods in the west are the June floods, occasioned by the rapid melting of the snow on the mountains near and above timber line. If nothing intervenes between the snow line and the streams but bare rock and hard sod, the rush of the water from the melting snow to the rivers is precipitate and productive of disastrous floods. This is exemplified in the rivers of northern British Columbia where under such conditions snow melting at noon finds itself in the rivers in the afternoon. The line above which the greater part of the water comes from melting snow, in June, is, on the eastern slope, 6,000 feet. The average elevations of the main tributaries of the rivers leading from the eastern slope is less than 5,000 feet. If between the above elevations, there is a forest cover and its accompanying soft ground mulch, through which the moisture must soak and trickle in little streams before reaching the main tributaries, the run off will be checked and consequently the extremes of high and low water, so inimical to successful irrigation, will be remedied.

The damage by floods is not confined to that inflicted upon the irrigation interests. Every industry in the west suffers directly or indirectly.

Farmers suffer through the flooding of land and destruction of crops; lumbermen suffer through the destruction of stream improvements, the breaking of booms and the loss of logs in the high water; municipalities, provinces and railways suffer through the destruction of bridges and road-beds; every form of business dependent upon traffic or water-power feels the loss imposed by floods.

Reservoirs may restrain floods, but if reservoirs are to be constructed forests will be necessary for the protection of the reservoir basins. The slow run-off through a