

### The Snow Cover of Washington State PHIL E. CHURCH

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From the records of the U. S. Weather Bureau on the depth-on-the-ground on the 15th and last of each month during the snow season, averages have been computed for about 100 stations in the state. The majority of these records are for a period of 20 years, 1917-18 to 1936-37.\*

The latitude, the location to the lee of a relatively warm ocean, the occasional spread of polar air to the west of the Cascades, and the diverse topography produce great differences in the snow cover of Washington.

The snow season begins by the middle of October at altitudes of about 6,000 ft. By the end of the month snow is on the ground at 3,000 ft. on the west side of the Cascades, but the Okanogan Highlands and the Blue Mountains have none.

By the middle of November the cover is continuous down to 1,500 ft. on the west side and to about 2,000 ft. on the east side of the mountains. These figures change to 1,000 ft. and 1,800 ft. by the end of the month.

In mid-December nearly all of the state is covered with snow; Puget Sound Lowland is covered and the lowest part of the "Inland Empire" has some, though less than one inch. Copious precipitation with steady wind from off the Pacific removes the snow cover from Puget Sound Lowland by the end of December and reduces the depth in the lowest part of the "Inland Empire". Elsewhere, the snow continues to accumulate.

In mid-January the average snow cover is one that blankets the whole state except the immediate shore of the Pacific and the San Juan Islands. In the mountains the rate of increase of depth reaches its maximum during

this month. In the "Inland Empire" there is but little increase in depth except in the Palouse Hills region. At the end of the month the lowlands on both sides of the Cascades attain their maximum depth of cover; on the west side it is between one and two inches and on the east side it is more than two inches.

In mid-February the lowlands show a thinner cover than two weeks ago, with most of the snow gone from the west side. In the Cascades, all places between 1,000 and 2,000 ft. have their maximum cover at this time. At higher altitudes accumulation is greater than loss. At the end of this month nearly all of the "Inland Empire" is free of snow; Puget Sound has no cover and the Blue Mountains and Okanogan Highland are steadily losing in amount. In the Cascades the maximum amount on the ground for the winter is found at altitudes between 2,000 and 4,000 ft. Snoqualmie Pass has 92 inches and Chiwawa River has 85 inches. Paradise Inn (alt. 5,550 ft.) increases 13 inches in the past two weeks and now has a total of 157 inches.

By mid-March all snow is gone on the west side of the mountains up to the 1,000-ft. level and up to the 2,000 to 2,500-ft. level on the east side. Two weeks later there is little snow left in the Blue Mountains and Okanogan Highlands. Paradise Inn reaches its maximum depth, 184 inches, on this date and the same is true for Mt. Baker, 175 inches. Loss is now greater than accumulation for all altitudes.

Only the Cascades have snow left after the middle of April. Above 3,000 ft. on the west side snow remains on the ground until the middle to the last of May and at higher elevations until June or July.—*Author's abstract*; full report to appear in *Trans. Amer. Geophys. Union*, 1941.

\*The general method of this study is similar to that used by Stone in a study of snow cover in New York and New England, *Trans. Amer. Geophys. Union*, 1938, pp. 486-492, and 1940, pp. 672-692.—*Ed.*