

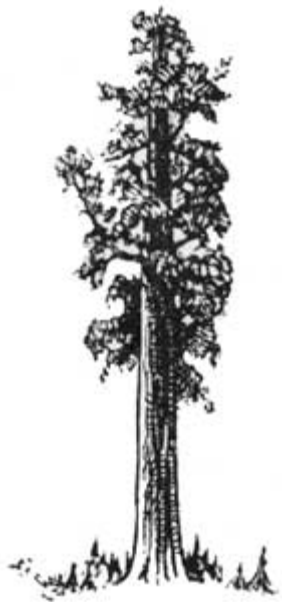
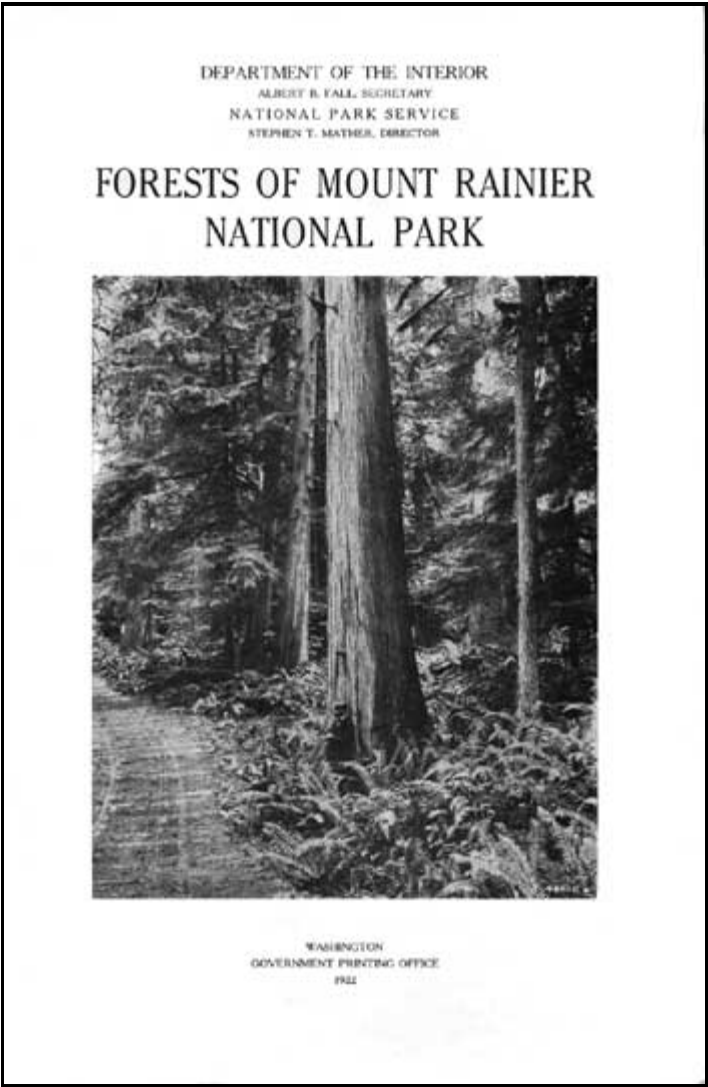
MOUNT RAINIER

The Forests of Mount Rainier National Park



THE FORESTS OF MOUNT RAINIER NATIONAL PARK

By
G. F. Allen
United States Forest Service



1922

Government Printing Office
Washington

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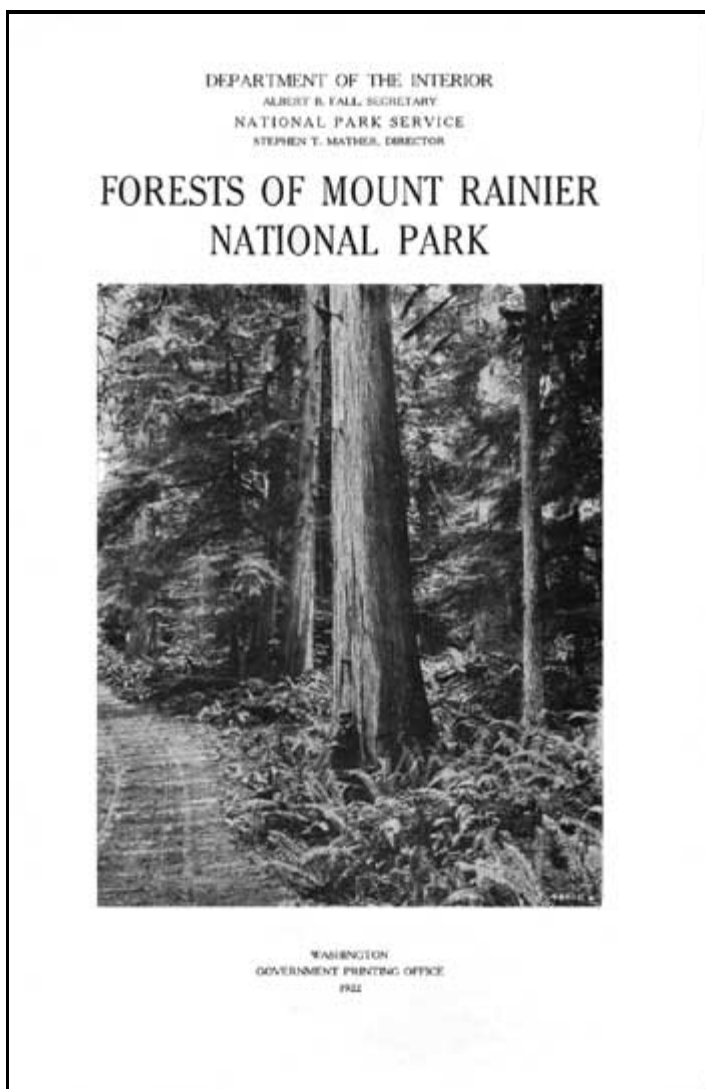
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GENERAL STATEMENT.

The remarkable development of the forests about the base of Mount Rainier results from climatic conditions peculiarly favorable to tree growth. The winters are mild and short. The ocean winds that pass through the gaps of the Coast Range are laden with moisture which falls in the form of rain or snow on the west slope of the Cascades. The trees are nourished by this moisture through a long season of annual growth, and form an evergreen forest which is, in some respects, the most remarkable in the world. This forest, distinguished by the extraordinary size and beauty of the trees and by the density of the stand, extends into the deep valleys of the rivers which have their sources in the glaciers. On the dividing ridges and in the upper stream basins the composition and character of the forest change with the increasing severity of the climate.

The distribution of the different species of trees according to the intervals of altitude at which they occur separate the forests of the Mount Rainier National Park into different types. The lines of separation are to some extent also determined by complex conditions of slope, exposure, and moisture. The successive forest belts are uniform in the composition of their central areas, but blend and overlap where they come together.

The low valleys of the main and west forks of White River, of the Carbon, the Mowich, the Nisqually, and the Ohanopecosh are covered with a dense and somber forest of fir, hemlock, and cedar. The trees, pushing upward for light, are very tall and free from limbs for more than half their height. Their tops form a continuous cover which the sunshine rarely penetrates, and on which the light snows of early winter fall and melt, without reaching the ground. Even in midsummer time light is soft and shaded, and the air cool and humid. In the wintertime the young growth is sheltered from wind and the severity of the cold is tempered by the protecting mountain ranges. Saved from fire by the uniform dampness of the air the trees grow until they decay and fall from old age. They are succeeded by the suppressed younger trees. The forest remains mature, not uniformly sound and vigorous, yet not decreasing as a whole in size and volume. Individuals perish, but the character of the forest is constant. The deep alluvial soil covered with moss and decayed vegetation nourishes a luxuriant tangled undergrowth of vine maple, willow, and devil's-club. The forest floor is covered with a deep layer of decayed vegetation and is encumbered with fallen and mossy logs and upturned stumps. The explorer who leaves the trails must be a strong and active man if he can carry his pack 6 or 8 miles in a long summer day.

Ascending from the river bottoms to the lower slopes of the dividing ridges the forest becomes more open and the trees are smaller. Salal, Oregon grape, and huckleberry bushes take the place of the taller undergrowth of the valleys. up to 3,000 feet the Douglas fir and the hemlock still are the dominant species. Above this altitude new species are found intermingled with the trees typical of the lowland, but forming a distinct forest type. The noble and silver fir appear, sometimes growing in pure stands, but more often associated with the Douglas fir and western hemlock at the lower limits of the type, and with alpine fir and mountain hemlock at the upper limit.

Nearly all the trees of this type have deep and widespreading roots which serve to hold in place the surface deposit of volcanic pumice which covers the slopes of the mountain. Evidence afforded by the after effects of forest fires in other parts of the Cascades indicates that the destruction of the forest on the mountain sides is followed by erosion. Heavy rains and the melting of the upper snow banks by warm Chinook winds combine to produce a surface run-off that denudes the steeper declivities down to the underlying bedrock.

At elevations above 4,500 feet the lowland trees have disappeared entirely. Subalpine species adapted to withstand the burden of deep snow take their place. Mountain hemlock, alpine fir, and Englemann spruce grow singly and in scattered groups or form open groves, alternating with grassy parks and rocky ridges. The symmetrical outline of the slender pyramidal crowns and rapidly tapering trunks of the spruce and alpine fir trees that stand singly on the greensward of the open parks bring to mind the closely trimmed cultivated evergreens that adorn city parks and lawns. Their lower branches reach the ground and the tops terminate in slender upright spires.

As timber line is approached tree growth is confined to dwarfed and flattened mountain hemlocks, alpine firs, and the white-bark pines firmly rooted among the crevices of the rocks.

The extreme upper limit of tree growth on Mount Rainier is 7,600 feet above sea level. There is no well-defined timber line. Scattered clumps of low stunted trees occur up to 7,000 feet. A few very small and flattened mountain hemlocks grow above this elevation. A very large part of the area above 4,500 feet consists of glaciers, talus slopes, barren rocky peaks, and open parks. Basins at the heads of canyons in the high mountains are usually treeless, on account of the great depth of snow which accumulates in them during the winter. On the steep, smooth upper inclines the snow banks frequently slip and form slides, which acquire momentum as they rush down the mountain side and break and carry away large trees. Repeated snowslides in the same place keep the slopes nonforested, and their track is marked by light green strips of brush and herbage.

The transition of the forest from its lowland to its extreme alpine type is one of the most interesting features of a visit to the mountain. Entering the park at the western boundary close to the Nisqually River the road skirts the base of the lightly timbered spurs and passes into a forest of large and old Douglas Fir and western hemlock. Red cedars grow along the streams the cross the road. Little yew trees and vine maples mingle with the young conifers that form the undergrowth; the gloom of the forest is occasionally relieved by the white bark of alders and the smooth gray stems of the cottonwoods that grow on the sandy bank of the Nisqually. After the road crosses the Tahoma Creek, noble fir and silver fir appear, but the Douglas fir and western hemlock are still the prevailing species.

Above Longmire Springs the noble and silver fir, mixed with western hemlock, become the dominant type. The trees are shorter and the branches heavier. Mountain ash and Alaska cedar grow on the margin of the mountain streams. Huckleberry bushes take the place of the taller undergrowth of the valley.

Above Narada Falls the forest is more open, and the trees are still smaller. Mountain hemlock and alpine fir succeed the trees of the lower slope. Little glades and mountain meadows are seen. They become larger and more numerous and the traveler soon enters the open park of Paradise Valley, in which are but scattered groves of trees. The same successive altitudinal types are met in ascending to Moraine and Grand Parks by way of the Carbon Valley, and in following the Mowich watershed, Mowich Lake, and Spray Park routes.

Approaching the park from the east the routes pass through open western yellow pine forests and western larch stands. Since Mount Rainier is west of and apart from the summit line,

these species which are peculiar to the eastern slope are not found within the limits of the park.

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EFFECTS OF FIRE.

Notwithstanding the shortness of the summer season at high altitudes, the subalpine forests in some parts of the park have suffered severely from fire (fig. 1). The bare white trunks of fire-killed silver and alpine firs bear witness to numerous fires which occurred from time to time before the regulations governing the park went into effect. The little resin pockets in the bark of these trees blaze fiercely for a short time and the heat separates the bark from the trunk. In this way the tree is killed, although the naked trunk is left untouched by fire. The destruction of the alpine forest in this way is often erroneously attributed to disease or to the depredation of insects.

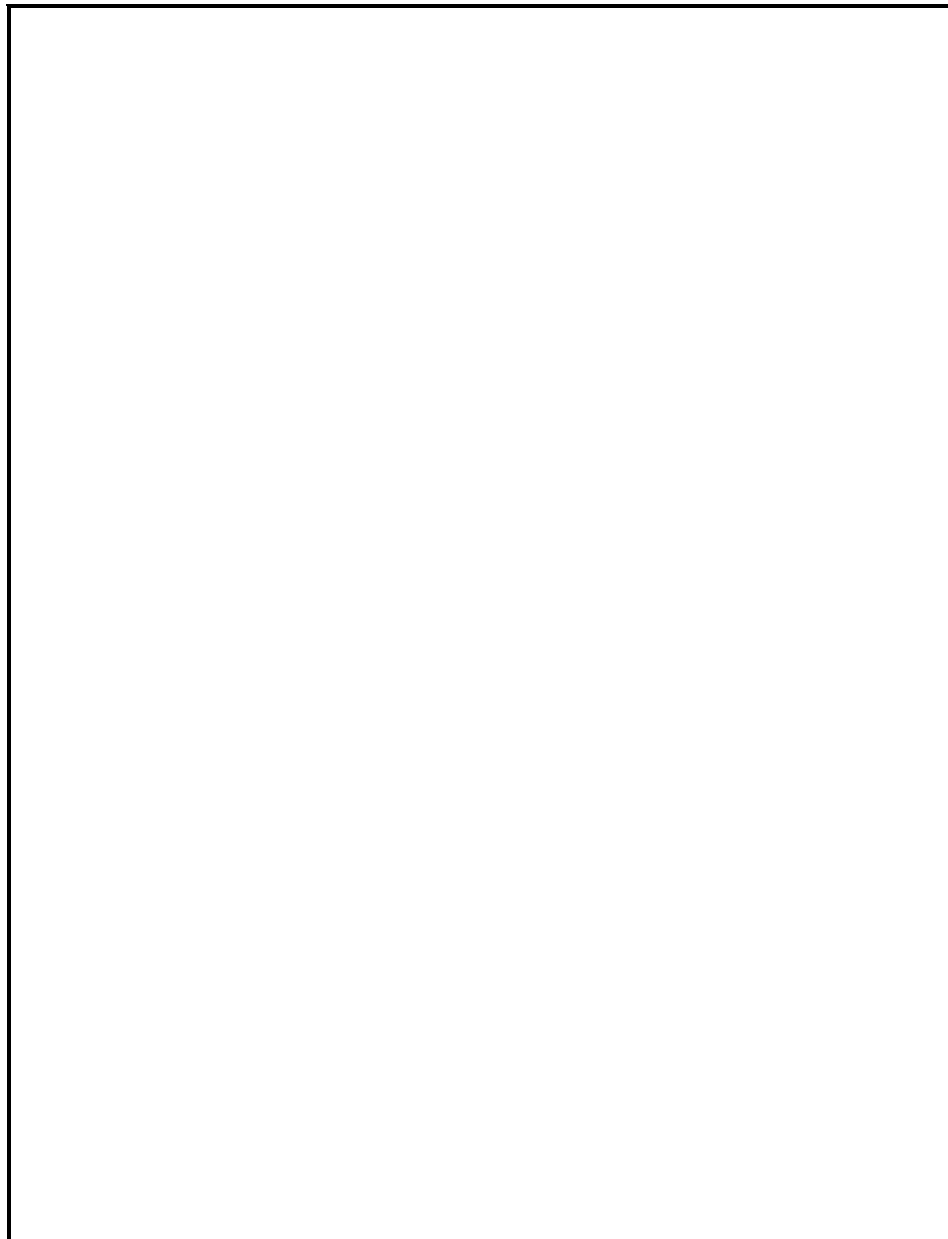




Fig. 1.—Whitened spectral monuments of a former forest which was swept by a severe forest fire in 1885. "Ghost trees" in the Silver Forest, seen from the road to Paradise Valley. Photograph by A. H. Barnes.

There has been little apparent change in the alpine burns within the last 30 years. Reforestation at high altitudes is extremely slow. The seed production is rather scanty and the ground conditions are not favorable for its reproduction. It will take more than one century for nature to replace the beautiful groves which have been destroyed by the carelessness of the first visitors to the mountain.

At low elevations the forest recovers more rapidly from the effects of fire. Between the subalpine areas and the river valleys there are several large ancient burns which are partly reforested. The most extensive of these tracts is the Muddy Fork burn. It is crossed by the Stevens Canyon Trail from Reflection Lakes through the Ohanopecosh Hot Springs. This burn includes an area of 20 square miles in the park and extends north nearly to the glaciers and south for several miles beyond the park boundary nearly to the main Cowlitz River. The open sunlit spaces and wide outlooks afforded by reforested tracts of this character present a

strong contrast to the deep shades and dim vistas of the primitive forest. On the whole they have a cheerful and pleasing appearance, very different from the sad, desolate aspect of the alpine burns which less kindly conditions of climate and exposure have kept from reforestation.

The original forest was fire killed many years before the coming of the white man. A few naked and weather beaten stubs are still standing. Only the larger of the fallen trunks remain, and these are rotten except for a few seasoned and weatherworn shells. The second growth is of all ages, from seedlings to trees 12 to 14 inches in diameter. Vine maple, willow, and mountain ash have sprung up along the streams and the hillsides are covered with huckleberry bushes and a variety of grasses and flowering plants.

Similar old burns are found on the ridge between Huckleberry Creek and White River, in the northeastern part of the park, and on the ridge between Tahoma Creek and Kautz Creek below Indian Henrys Hunting Ground.

The old burns in the middle altitudes of the park occupy regions once frequented by the Klickitat Indians. Every summer parties of hunters and berry pickers from the sagebrush plains crossed the Cascades with their horses. They followed the high divides and open summits of the secondary ridges until they came around to the open parks about Mount Rainier where they turned their horses out to graze and made their summer camp. The women picked huckleberries and the men hunted deer and goats. They made great fires to dry their berries and kindled smudges to protect their horses from flies. It was also their custom to systematically set out fires as they returned. Burning made the country better for the Indians. The fires kept down the brush and made it more accessible. Deer could be more easily seen and tracked and the huckleberry patches spread more widely over the hills.

No considerable part of the lower forests of the park has been burned. The principal danger is from lightning. However, few of the trees struck are ignited and these fires are usually extinguished by the rain. On account of the coolness of the air and its greater humidity the fire danger in the forests on the lower slopes of Mount Rainier seems much less than it is in corresponding situations in the main ranges of the Cascades.

AGES AND DIMENSIONS OF TREES.

Trees grow more rapidly at low altitudes than at higher and cooler elevations. Under similar conditions some species increase in size faster than others, but the rate of growth depends principally upon environment. The average increase at the stump in the valley land is about 1 inch in 6 years. A Douglas fir growing along the road between the park boundary and Longmire Springs, at the age of 90 to 120 years may have a breast diameter of 20 inches and yield 700 feet of saw timber. But many of the trees of this size may be much older on account of having grown in the shade or under other adverse conditions. The trees between 200 and 300 years of age are often 40 to 50 inches in diameter and may yield an average of from 2,700 to 5,500 board feet. The largest Douglas firs are sometimes over 600 years old and 60 to 100 inches in diameter. Such trees when sound will produce over 8,000 feet of lumber.

The western red cedar has a shorter and more tapering trunk and its volume in board feet is proportionally smaller. A tree 50 inches in diameter and 175 feet high contains about 3,400 board feet.

The size of the trees decrease rapidly at higher elevations. In the subalpine forest the annual

growth is very small. At elevations of 6,000 feet the white-park pine requires 200 years to attain a diameter of 10 to 12 inches. The annual rings are so close together that they can not be distinguished without a magnifying glass.

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DESCRIPTION OF SPECIES.

DOUGLAS FIR (*PSEUDOTSUGA TAXIFOLIA*)

The Douglas fir (figs. 2, 3, 4, and 5) is the best known and the most important timber tree of western North America. It is found from British Columbia southward to northern Mexico. The finest forests occur in Oregon and Washington at low elevations. The Douglas fir is common in the park up to 3,500 feet, sometimes in nearly pure stands, but more often mixed with other species. It grows in all situations. In the higher mountains it prefers warm southern exposures and is seldom found on wind-swept ridges. It seeds annually, but most profusely at intervals three or four years apart. The red squirrels gather and store large quantities of the cones in order to provide a supply of the seeds for their winter rations. The growth of the young tree is very rapid. As the tree becomes older the rate of growth varies with situation and the character of the soil so that the size does not closely determine the age of the tree.



Fig. 2.—Paradise Inn, in beautiful Paradise Valley.

The Douglas fir is a long-lived tree, and specimens are occasionally found 250 to 270 feet high and over 8 feet in diameter and between 600 and 700 years in age. It reaches its greatest height and most perfect proportions in mature even-age stands growing on fairly moist well-drained bench lands. Under these conditions it is a very tall and beautiful tree. The trunk is straight, round, and free from branches for two-thirds of its height and tapers gently to the crown. The dark-brown deep-furrowed bark is 5 to 10 inches thick at the base of the tree.



Fig. 3.—Douglas fir (*Pseudotsuga taxifolia*). Photograph by A. H. Barnes.

The Douglas fir ranks first among the trees of the Pacific slope in importance for the production of lumber. It is often sold under the name of Oregon pine. Lumber dealers class the coarse-grained reddish wood produced by the young growth in open forests as "red fir." The older growth produced when the forest is more dense is a finer grained and more valuable wood, sold under the name of "yellow fir."

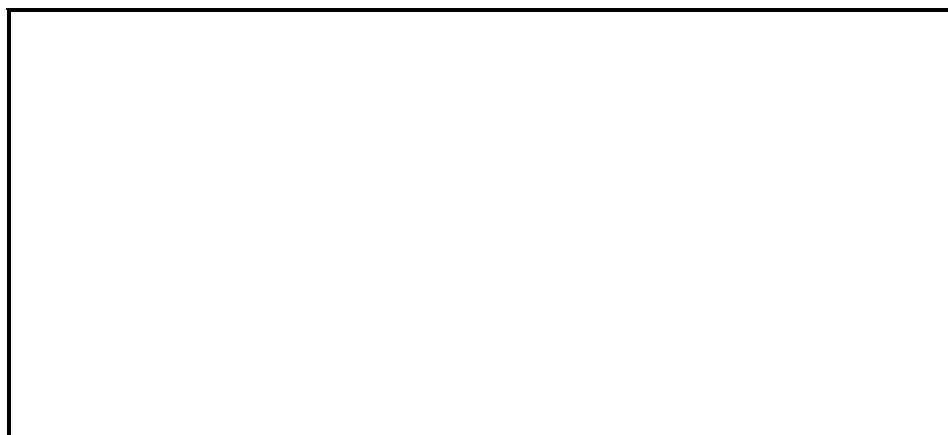




Fig. 4.—Douglas fir (*Pseudotsuga taxifolia*).

The Douglas fir is used for nearly all purposes when durability, strength, and hardness are desirable. It is made into dimension timbers, lumber, flooring, and is particularly adapted for masts and spars. The lumber is shipped by rail to the Middle Western States. The foreign cargo shipments are made to all parts of the world. The greatest amount goes to Australia, the west coasts of South America, China, the United Kingdom, and Europe, Japan, and the South Sea Islands. Coastwise shipments are made to California, Alaska, and Panama. Large quantities of the seed of this tree are sent to Europe, where the Douglas fir is grown for timber and for ornament.

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OTHER PUBLICATIONS ON MOUNT RAINIER NATIONAL PARK SOLD BY THE SUPERINTENDENT OF DOCUMENTS.

Remittances for these publications should be by money order, payable to the Superintendent of Documents, Government Printing Office, Washington, D. C., or in cash. Checks and postage stamps can not be accepted.

Features of the Flora of Mount Rainier National Park, by J. B. Flett, 1922. 48 pages, including 40 illustrations. 25 cents.

Contains descriptions of the flowering trees and shrubs in the park.

Mount Rainier and Its Glaciers, by F. E. Matthes. 1922. 48 pages, including 26 illustrations. 15 cents.

Contains a general account of the glaciers of Mount Rainier and of the development of the valley and basins surrounding the peak.

Panoramic view of Mount Rainier National Park, 20 by 19 inches, scale 1 mile to the inch. 25 cents.

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