TECHNICAL NOTES

FOREST HISTORY FROM AERIAL PHOTOGRAPHS¹*By J. Harry G. Smith²*

The advantages of aerial photographs in providing a complete and accurate record of the progress of logging and of many aspects of current forest development such as road building are well known. Opportunities for the forest manager to delve back into the history of his forest are less obvious but well worth investigating. Relatively few of the forested areas of Canada which are now being brought under more intensive management have not been photographed from the air at least once in the past. We must admit that the older photos may not be of optimum quality and scale. Yet much worthwhile information can be gleaned from them if these older photos are studied in conjunction with the new ones usually required in current inventory programs.

Two series of aerial photographs of the University Research Forest at Haney, which were taken prior to crown-granting of the Forest to the University of British Columbia in 1949, may be compared with the most recent series taken in 1955. Intensive study of the trends evident in the several series taken by Aero Surveys Ltd. and the B.C. Government between 1949 and 1955 would be of interest but is not discussed here because such coverage is unusual. Many kinds of information of interest to forest managers may be learned from the first series of photos which was taken by the Royal Canadian Air Force in May 1930. Flying height was 15,000' A.S.L. and the camera had a focal length of 3.28 inches. The second group of photos was similar but was taken by the Lands and Forests Department of the Province of British Columbia in June 1940. In May 1949 and again in June 1955, the Forest was photographed by the Photographic Survey Corporation with a 12-inch focal length camera from 15,500 feet A.S.L.

The forest cover of the University Forest is comprised of approximately equal areas of old growth and scattered old growth, young growth following the fire of 1868, and very young stands following logging in the late 1920's.

The R.C.A.F. series which was taken after logging and before the devastating wildfire on the east side of the Forest deserves careful comparison with current photos. The whole of the pattern of railway logging used by the Abernathy and Loughheed Company is clearly shown. This information was quite helpful in preparing maps from the 1949 photos and in planning the conversion of the railway grades to the present road system. Spar trees, the paths made by yarding and swinging, and the trees and ground cover remaining after logging are unmistakable. The condition of adjacent stands of old growth that were not logged then is evident. In the southwest part of the Forest, trees which must have provided seed for the young growth which became established after 1868 can be identified by species groups and location. The pattern of

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occurrence of alder within these young stands and the height and degree of stocking of all young stands can be assessed.

With the help of the next series of photos taken in 1940, it is possible to separate the influences of logging from that of the wildfire which did so much damage after logging was completed. Even the amount of cover on rocky slopes and outcrops may be assessed before and after the wildfire.

The stands which were classed as non-commercial cover in 1949 because of the abundance of vine maple in them can be recognized on the 1930 photos. The 1930 series was taken shortly after partial logging and a few years before an outbreak of hemlock looper occurred on the south central part of the Forest. In the 1940 series large amounts of vine maple and smaller patches of hemlock reproduction in these stands are clearly visible. The 1940 photographs also reveal that some stands which were not economically accessible in the railroad-logging era were logged between 1930 and 1940. The quick invasion of alder on the mineral soil bared completely during road building, yarding, and swinging is generally evident. The size and shape of swamps and rock outcrops are clearly shown on the 1930 and the 1940 photos. Remnants of stands left as non-merchantable in 1930, and many of the spar trees used in logging, show up in 1940 as snags surviving the wildfire. A few patches of live trees were saved from the fire by swampy ground in the logged area.

By 1949 the pattern of reproduction had become easier to assess. Dense stands of deciduous species, classes of good, medium, and poor stocking of conifers, and many clumps of vine maple could be distinguished. The lines cut during boundary surveys show up very well in this set of photos.

By 1955 young reproduction could be assessed in still more detail and various classes of land that should be planted because they supported so few young trees could be segregated from the poorly stocked areas. The impact of current logging, and programs for clearing of old railway grades, for fire control, for camp building, and similar operations showed up well. The proportion of mineral soil exposed during tractor logging could be measured easily. Growth in height and in density of very young and young stands could be assessed in relation to stand origin and site. Mortality of some scattered old-growth Douglas fir which survived the fire of 1868, and of white pine could be noted in the old-growth and scattered old-growth types. Mortality of white pine in the young stands could also be identified.

When the 1955 photos are compared with the 1949 series, some patches of vine maple may be identified but most have been overshadowed by conifers growing in and around the clumps. This may suggest that vine maple is not particularly aggressive once it assumes a clumped habit of growth. Changes in the amount and size of huckleberry, salmonberry, and bracken show up after careful study. In the stands established after the fire of 1868, red alder is becoming much less noticeable and may gradually disappear unless logged within the next 15 to 20 years.

The items which have been mentioned are an incomplete listing of possible comparisons and observations. Many other changes which have occurred

in the past can be assessed through study of these aerial photographs at any time in the future when the need may arise. The photographs provide a permanent, accurate, and easily used record of a great many variables of interest to management planners.

Each series of photos of the University Research Forest has contributed something to a better understanding of the history of this area which in turn may influence its management now or in the future. It is likely that foresters planning the management of other areas could gain much helpful information from similar comparative studies of all available series of aerial photographs.

THE INFLUENCE OF SPACING ON COST OF PLANTING DOUGLAS FIR¹

by J. H. G. Smith and J. Walters²

The cost of planting includes two important items, the cost of the stock itself and the labor cost of planting. Cost of stock varies directly with the number of trees planted per acre. Cost of labor does not change in exact proportion to the number of trees planted per acre. As the spacing is increased,

the cost per acre decreases but the cost per tree climbs. The study reported herein provides a measure of the cost per tree with various planting densities.

Some inferences respecting the influence of spacing on cost per tree can be drawn from the study of southern pines at Auburn, Alabama, by Ware and

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