
Forest fertilization, (the practice of adding nutrients to the soil,) is one method used to increase forest productivity. Studies have concluded that opportunities exist to increase the productivity of some tree species on some sites in some situations, although the uncertainty and site-specificity of growth response have been identified as major limitations. Information about the benefits of operational-scale fertilization is not available on a site-specific basis despite several large-scale Douglas-fir [Pseudotsuga menziesii (Mirb.) Franco] fertilizer trials established in the Pacific Northwest. Fertilizer response information is presently limited to mean volume response by site class and with a fixed stand density.

Response to fertilization depends on the degree to which nutrients are limiting growth and the ability of individual trees to respond to the fertilizer before other limitations to growth.

FIGURE 1. Distribution of sampled stands.
begin to exert control. If response to fertilization is to be predictable, these other limitations and their interaction must be identified and examined.

The goal of this project is to develop site-specific industrial guidelines for coastal Douglas-fir fertilization decision-making. For each major site type in the Very Dry and Dry Maritime Coastal Western Hemlock biogeoclimatic subzones these guidelines will propose the most responsive fertilizer treatment(s) and give an estimate of the three-year growth response for spaced immature Douglas-fir stands.

Establishment activities involved two steps. In the first step, a survey was carried out to select, locate and describe suitable ecosystems using specific site and stand selection criteria. Ecosystems located and described in the survey (candidate stands), were then analyzed according to their understory vegetation, climatic and site characteristics, site indices and foliar nutrient levels. This analysis was done to facilitate selection of stands for fertilizer trials (fertilized stands), which would represent a wide range of site characteristics typical of immature stands of coastal Douglas-fir.

In the second step, potential nutrient deficiencies were diagnosed, fertilizer treatments prescribed and fertilizer trials established in the selected stands. These fertilized stands, or installations (Figure 1), were also surveyed at this stage for more detailed stand and site data.

The biogeoclimatic ecosystem classification system used for ecosystem selection allows for the grouping of similar ecosystems into site units. The ecosystems grouped into a site unit have the same or equivalent environmental properties, vegetation and productivity potential. These site units provide the framework that will later be used for interpretation and application of the fertilizer trial results.

The experimental design is a compromise between short-term screening trials and large, more intensively studied trials such as the B.C. Forest Service Productivity Committee Installations and the Shawnigan Lake Trials. As with any compromise, this one has meant a reduction in the number of stands that might have been studied using standard screening trial methods, and it also results in a less accurate estimation of area-based volume-growth response than might be obtained through the use of larger installations with more replication. However, response will be evaluated in a total of 56 stands and experience elsewhere has suggested that response to fertilization varies considerably both within and among stands. Consequently, obtaining highly accurate growth response estimates may be of less value when the results are extrapolated to other stands and the methodology used in this study should provide most of the benefits of these alternative approaches.

Copies of this 33 page report, *Douglas-fir fertilization decision-making for industrial use: an establishment report* by R. Carter and K. Klinka, are available while supplies last from:

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