

the lower levels of the atmosphere for possible use in the control and prediction of atmospheric pollution accumulation.

An investigation has been carried out to determine the practicality of a single ended back-scatter fog detector as a general visibility device for use at automatic weather stations. The purpose of the investigation is to determine the validity of the manufacturer's calibration and claims with respect to different obscurants.

The handling of large quantities of data quickly is only feasible by means of computers. Investigations are under way to determine the techniques involved in moving the sensor outputs directly and automatically into the computer, thus eliminating the present intermediate handling and processing steps which may involve manual operations or complex analogue devices.

9.2.4.2 Forestry research

The responsibility of the federal government for forestry research and development is defined and established by the Forestry Development and Research Act (1966) and the Department of the Environment Act (1970).

The primary federal organization concerned with forestry is the Canadian Forestry Service of the Department of the Environment. Within the Canadian Forestry Service there are six regional forest research centres, six forest research institutes, two forest products laboratories, and one independently operating forest experiment station. Collectively, these establishments undertake research and operations either on a regional or a national basis. The program of the Canadian Forestry Service includes forest resource research, development and services; forest products research, development and services; aid to universities; and special assignments.

Forest resource research. The work undertaken in this category covers research, surveys and related services pertaining to forest land and soils; forest inventory and mensuration; silviculture and tree biology; timber harvesting; protection against fire, insects and diseases; and forest economics.

Research is proceeding on methods of combining forest land and forest inventory data to achieve improved forest and environmental management. An important part of this work is conducted under a co-operative program of watershed research in Alberta. In forest-soils research, programs dealt with include soil chemistry, soil biology and the hydrologic characteristics of watersheds but, currently, considerable emphasis is being given to forest fertilization and related mineral-nutrition studies.

Considerable attention is devoted to large-scale aerial photography; ultra-small-scale, high-altitude aerial photography and satellite imagery in developing improved methods for taking forest inventory and mapping vegetation. A large operational task that has followed from aspects of this work has been the mapping of vegetation in the 1,000-mile-long Mackenzie Transportation Corridor. Evaluation of imagery from the ERTS is currently a priority research program. Studies of growth and yield, the evaluation of site potential, and the development of mathematical models for trees and forests are continuing to provide valuable information for reforestation operations and for forest management.

A substantial portion of the research program in silviculture involves the study of factors responsible for the success or failure of natural regeneration following various methods of cutting and treatment of seedbeds; the development of improved methods of regenerating forest stands following logging or fire; and the establishment of forests on abandoned farmland, heathland or bogland. Different methods of seeding and planting are being compared, and increased emphasis is being given to problems associated with container planting. The effects of mechanization of logging on reproduction and on slash and soil conditions are being investigated. Studies of different methods of stand-tending such as pruning, cleaning and thinning are under way to determine means of increasing both quantity and quality of wood production. Investigations of successional changes are in progress in most of the important forest types, and the relation of forest growth to site is being studied with a view to the assessment of long-term productivity. The light, temperature and moisture conditions required to produce optimum growth and development of various tree seedlings are being determined to provide guidelines for improved forestry practices. Tree breeding studies include research on the pattern of genetic variation throughout the distribution range of several commercially important species to identify, select or develop superior strains. The