Research in silviculture and silvics deals with the response of forests and trees to cultural treatments designed to secure satisfactory regeneration and maximum productivity. Current research emphasizes regeneration silviculture, including artificial seeding, planting, natural regeneration, and harvest cutting methods. Treatments under investigation include: planting methods and equipment, species adaptability to site, planting site and seedbed preparation using mechanical equipment and fire, and various harvest cutting practices. The cultural effects of such treatments in quality and quantity of seed, germination and survival of seedlings and vigour and survival of planted stock are being measured. These are related to environmental factors, including soil moisture and lethal temperatures. Research is carried out on cultural practices to improve productivity, including thinning and pruning in natural and planted stands, the use of chemicals to release desirable species, and the use of fire to control species composition. The results of these experiments are combined into recommendations for the practice of silviculture in each important forest ecosystem.

Research in forest mensuration and survey methods is designed to develop and test the best methods of conducting forest inventories, preparing tables of growth and yield, and determining the volume of individual trees and stands. Improved methods of measuring tree and stand volumes on both conventional and new types of air photos are investigated. Sampling designs suitable for the determination of forest inventories are developed from a combination of airphoto interpretation and ground sampling. Improved methods of constructing yield tables and volume tables are developed, using regression functions calculated on digital computers. Methods of developing models of stand growth through regression analysis of individual tree-growth patterns are tested. An extensive series of permanent and single examination sample plots is maintained in the main forest-cover types to provide the data for growth analysis. The results of this research are employed by the wood-using industries to improve the inventory and regulation of their forest crops.

Study of the biology of important forest trees is a major field of research, aimed at obtaining a better understanding of the genetic, physiologic and ecologic controls of growth and development. Tree improvement work is centred on the pines and spruces; a search is being made to find outstanding trees and to breed from them superior strains adapted to the Canadian environment. Physiological research is primarily focussed on the flowering and cone production of spruce and Douglas fir, and there are encouraging signs that methods for inducing seed formation in "seed orchards" of young "plus" trees will soon be perfected. Environmental studies in both field and laboratory are exploring the relations between tree growth and the factors of light, temperature, moisture and nutrients, both in the crown layer of the air and the root layer of the soil. The identification and classification of seedlings and trees, as well as of minor forest plants, is a continuing aid to the other research activities.

The geographic study of forests and forest sites has to do with problems of forest-land inventory, classification of soils and forest-vegetation types, climatology and hydrology. The land base on which forests grow is receiving greater attention as provincial planting programmes grow and information is needed on the soil, its suitabilities and productive capacity, and its response to fertilizers. Closely tied to studies of the land are investigations of the natural forest cover, which indicate present and potential uses. Climatological studies, particularly on open lands, are assisting in the identification of areas where frost, high temperatures and atmospheric drought constitute a hazard to reforestation. A programme of watershed research has been started