

ecological impact of a variety of forestry practices is also under study with a view to producing environmentally sound management patterns for the nation's forests.

Research on timber harvesting has been intensified by work conducted within the logging development program of the Forest Management Institute. The objective of this work is to improve logging productivity and reduce the cost of wood delivered from the standing forest to the consuming mills.

Adequate protection of forests against fire is of vital importance in Canada. The Service works in full co-operation with provincial forest services in almost all phases of forest fire control and has made major contributions in the fields of forest fire danger measurement and forecasting and in fire control planning. Investigations are being made of forest fire behaviour, of the use of prescribed fire for hazard reduction and seedbed preparation, of better methods of reporting forest fires, and of fire damage appraisal and related factors in forest protection standards. Studies are being continued in the use of chemicals for fire suppression and pre-suppression, of fire-fighting equipment and techniques, and of the use of aircraft in forest fire control. Another important field of endeavour is the study of fire hazard created by slash from various kinds of logging practices for different species.

Research on forest insects and diseases is conducted at Service research centres and field stations throughout Canada. A Canada-wide survey is undertaken in co-operation with the provincial forest services and forest industries to maintain an annual census of forest insect and disease conditions and to detect and predict the occurrence of outbreaks. Survey results are made available to owners and operators of forest lands for use in planning salvage programs and directing control measures to reduce damage.

Experiments are also carried out in insect and disease control, utilizing cultural techniques, chemicals and biological control agents including parasites, predators and insect pathogens. Technical advisory services are provided in evaluating quarantine programs, possibilities of eradication or control, or other applications of research results. Examples include recommendations for reduction of seedling losses in forest tree nurseries through cultural techniques and chemical applications; the co-operative organization of cull surveys to improve forest inventories; consultation and advisory services for local authorities on the Dutch elm disease problem; and technical co-operation with provincial governments and industrial agencies in the organization of spraying operations. Of particular significance in the summer of 1972 were the large-scale chemical control operations covering about 6.8 million acres of forest land infested with spruce budworm in the Maritimes, Quebec and Ontario areas. In addition, 425,000 acres on Anticosti Island were treated against hemlock looper.

Research programs are designed to lead to comprehensive understanding of the biology and ecology of the more destructive forest insects and fungi, and the causes of fluctuations in abundance or severity of damage in time and place. Problems under intensive study include insect defoliators, leaf diseases, sucking insects, dwarf mistletoe, stem cankers, bark- and wood-boring beetles, trunk and root decays, tip- and root-boring insects, and diseases of tree seedlings in forest nurseries. Problems of national importance in insect pathology, cytology and genetics, bio-climatology and chemical control are investigated.

Current forest economics research is concentrated on studies of future supply and demand; assessment of the impact of forest resources and forest industry on local, regional and national economies; and the evaluation of quantifiable and non-quantifiable benefits which flow from the forest. Specific projects include those covering the compilation and assessment of forest inventory data on a national basis, investigations on potential forest products trade, trends of wood use in residential construction, the implication of pollution control measures for forest industries, and the development of methods for predicting lumber prices.

Forest products research. This work is directed toward obtaining background data on the properties of Canadian woods, developing new and better uses for wood products, improving methods of processing, effecting more complete utilization of wood substances, and reducing the pollution of air, water and land which may result from the operation of forest industries. Activities cover all major aspects of forest products and include: the determination of the physical, mechanical, chemical and anatomical properties of wood and their relation to adaptability in use; studies of factors affecting quality of wood and of manufactured wood products; determination of factors that cause wood waste in logging and manufacturing; investigation into fire retardant treatments, the preservative treatment and painting of wood and the use of wood for the manufacture of a variety of products by chemical or mechanical