

to universities and forestry organizations which totalled over \$19.3 million in 1985-86.

The CFS has negotiated forest resource development agreements worth more than \$1 billion with the provinces to encourage forestry renewal on private and public lands; to ensure long-term timber supplies and to foster regional economic development. Depending on specific provincial needs, these agreements may provide for reforestation, intensive forest management, silviculture, access roads, inventory and planning, industrial development, private or group ventures, research, technology transfer, training, administration and public information. The CFS also provides forestry advice for the management of federal lands and directly manages forest lands on several Department of National Defence properties and pursues policies and programs which stimulate employment in the forest sector.

Provincial. All forest land within the provinces, with the exception of private land, national parks, federal forest experiment stations, military areas and Indian reserves (except in Newfoundland), is administered by the respective provincial governments.

The provincial forest services have traditionally concentrated on the management, protection and utilization of the forest resources.

Tenure system and timber allocation. The tenure arrangements, in force in the provinces, are generally intended to satisfy goals of providing a means of allocating public timber in order to maximize returns from the resource to the residents and the provinces, to ensure maximum utilization of the timber resource and to facilitate effective forest management. The bulk of cutting rights to provincial Crown timber remains held in the form of long-term arrangements, which have been or are evolving in almost all provinces in the direction of increasing the responsibility of industry for managing the forest lands for which they hold licences, generally in return for some form of compensation. In provinces where there is a large degree of private ownership of forest land, forest policy is to provide incentives for greater utilization of timber from those lands. Some provinces are also requiring forest companies holding long-term licences, involving large forest areas of volumes of timber, to make timber surplus to their needs available to smaller firms. Otherwise, smaller timber cutting rights are allocated by quota privileges or through competitive bidding. Timber resources are fully allocated in most provinces. Fees for holding cutting rights and timber harvested are generally set administratively or through negotiation. Stumpage rates vary by location, species, and

product category, and are normally adjusted regularly to reflect prevailing market conditions.

Forest protection. The reduction of losses of timber and other forest values due to forest fires, insect infestations and disease epidemics continues to be a major undertaking of the provincial forestry agencies. Losses vary regionally but all jurisdictions are striving to enhance their capability to detect, control or suppress insects, disease and fires. In addition, the significant increase in reforestation investments have to be protected from competition by weeds and brush.

Provincial governments have stepped up public awareness campaigns in an effort to lessen the number of human-caused forest fires. As lightning remains the primary cause of forest fires, automated lightning detection networks have been or are being installed by several provincial forestry agencies. Used in connection with other elements of fire detection networks, including aerial and ground patrols, lookout towers and improved heat detection equipment, detection capability is being expanded in several provinces. A national training group has been formed to standardize training to make inter-agency fire-fighting assistance among jurisdictions more effective. Most provinces participate in the Canadian inter-agency forest fire centre at Winnipeg which co-ordinates the sharing of personnel and equipment between provinces and territories when they need support to handle an extreme fire situation.

Several provinces have highly developed programs for fire detection and fire-fighting. Nova Scotia, for example, has 35 observation towers and an aerial patrol service with five helicopters and two fixed-wing aircraft.

In Quebec, a new system to combat forest fires has been developed which uses computers, satellites and patrol planes, as well as data obtained from sounding devices, weather stations, radar and lightning detectors. The Maniwaki Technology Transfer Centre, established in the summer of 1986, processes data from points throughout the province and provides fire related forecasts.

In Ontario, fires are detected by aerial patrols using contracted aircraft, in conjunction with a lightning locator system and by public reports. To assist in fighting fires, water bombers and helicopters are utilized and several fire crews employed. A communications system includes a network of radios, telex and facsimile. A network of 125 primary weather stations supplies information to determine fire weather indexes and aids in detection patrol planning.

Manitoba also has a network of lookout towers and an aircraft detection system and ground patrols. Public education in fire prevention is