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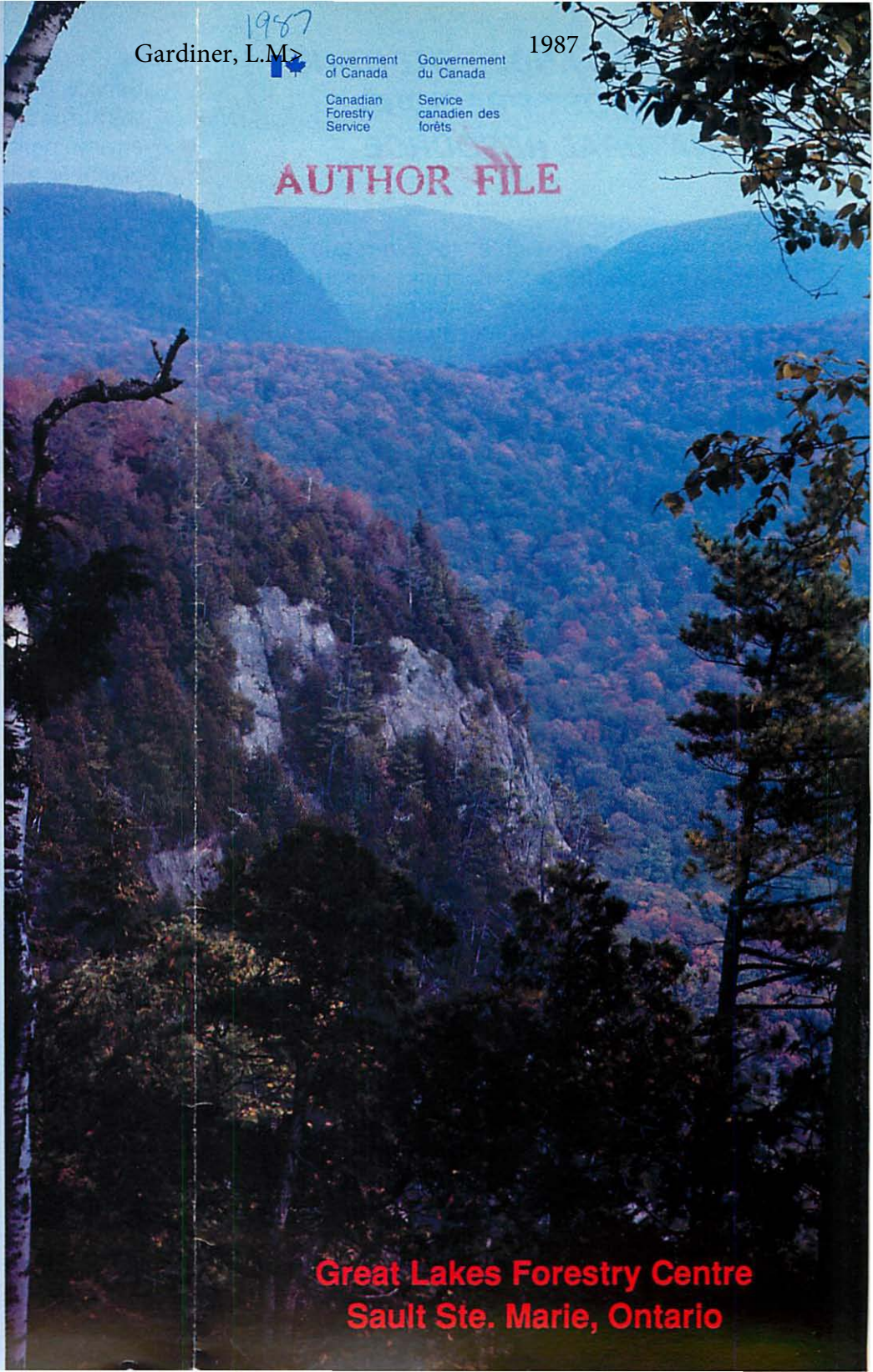
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Canada 

Great Lakes Forestry Centre
Sault Ste. Marie, Ontario



ENHANCING AND PROTECTING OUR MOST PRECIOUS NATURAL RESOURCE

It is almost impossible to overstate the importance of forestry to Canadians. Nearly half the land area of Canada is forest land, and forest-based industries provide direct employment for well over a quarter of a million Canadians. Salaries and wages in the forestry sector of Canada's economy are estimated at close to \$8 billion annually.

The standard of living of Canadians depends to a very large extent on international trade, and forest products are by far Canada's largest export. Of our total annual production of forest products, over half, or 15 billion dollars' worth, is sold abroad. Most of these products are sold to the United States, but a quarter of our exports of forest products are spread around the world.

Tourism and recreation form the basis for a rapidly growing industry that provides jobs and income for an increasing number of our people. Forest lands are, of course, vital to this important development. Because of our forests, Canada is unique in being able to offer the wilderness experience in an infinitely varying degree of accessibility. Travellers from many countries are discovering that it can be found throughout a month's canoe trip, or at their car door.

While ever mindful of the economic and social values of their forests, Canadians are becoming increasingly aware of the important role played by forest lands in regulating the environment. Forests function in erosion control, retention of water and control of streamflow, production of oxygen and provision of wildlife habitat. The value of these functions is virtually incalculable.

For nearly 90 years, the Canadian Forestry Service (CFS) has been promoting Canada's forest resources for the economic, social and environmental benefit of all Canadians. Originally primarily a federal government research body, the CFS has seen its mandate broadened in recent decades to embrace all aspects of good forest management including support for the creation of jobs and for new markets for forest products. The CFS operates two national institutes that are devoted to solving broad forestry problems, and six regional centres in which research, development and services are directed primarily at specific geographical areas. The Great Lakes Forestry Centre (GLFC) is one of the regional centres.

GLFC conducts programs of forestry research and development with the aim of contributing to the solution of major forest management and environmental problems in Ontario. The principal fields of endeavor are described briefly in this leaflet.

Forest Environment Research



In-depth ecological studies are a prime requisite for understanding the long-term impact

of pollution or of particular forest management practices. Although many projects at GLFC deal in some way with environmental impact, the main environmental research is concerned with acid precipitation.

Acids in rain and snow from coal combustion, mineral smelting and transportation are threatening the well being of Canada's forests and the livelihood of Canadians who depend on them. Intensive research is carried on at GLFC to determine the effects of this type of pollution on the total forest environment and on productivity in valuable hardwood and conifer stands. Results from these studies will provide a scientific basis for clean-air negotiations.

Forest Production Research

Production research at GLFC is concerned with reforestation, the ecological acceptability of mechanizing silvicultural operations, black spruce silviculture and the potential of the forest as a renewable source of energy.

Renewal of cut-over and burned-over forest lands is the most serious challenge for Canadian forestry. In the past, about two-thirds of Ontario's harvested area has been adequately reforested by planting, seeding or natural regeneration. In an effort to realize the full potential of forest land, GLFC researchers are developing new planting and cultural techniques for the boreal forest.

If Canada is to retain its competitive position in world trade, labor-intensive methods of site preparation, planting and thinning must be augmented by innovative and efficient mechanized methods of silviculture. CFS interest in this field is concentrated at GLFC, where research is concerned mainly with evaluating how effectively

mechanized silvicultural operations create biological conditions favorable for the establishment and growth of forest stands.



Black spruce is the most important commercial tree species in Ontario. It is highly valued for use in many of the paper products we now take for granted. A comprehensive research program on black spruce silviculture is producing valuable information on basic black spruce ecology, developing new methods of forest renewal and growth, and testing the impact on this forest type of both traditional and new management practices.

Energy from forest biomass (wood, bark and leaves) is an attractive alternative to using coal and oil, particularly as the forest is renewable. This is of special interest to Ontario, which consumes over one-third of the nation's energy, and imports 90% of it as raw materials. At GLFC, the energy potential of various forest stands has been determined, and recent investigations have been aimed at the development and testing of heavy equipment to harvest and process logging residues for fuel. The effect of drainage on biomass production in northern Ontario wetlands is also being studied in collaboration with the Ontario Ministry of Natural Resources (OMNR). All of this work is done largely by contract with outside agencies.

Forest Protection Research

Every year, about as much wood as we use is lost to the economy through forest fires, forest insects and tree diseases. The CFS has a long history of research into ways of reducing these staggering losses.

The province of Ontario has one of the best forest fire control organizations in the world. Forest fire research at GLFC is therefore concerned primarily with understanding conditions that lead to fire, and the effects of wild and prescribed fire on the forest environment. The CFS maintains a data bank on fire weather and fire behavior that has many uses, among them the continual improvement of the Canadian Forest Fire Danger Rating System.



In Ontario, stem decays and root and butt rots cause extensive losses in both young and mature timber. Forest pathology research is aimed mainly at factors that predispose trees to infection, and at understanding the epidemiology and pathology of the major tree diseases. In a search for biological control methods, basic studies are carried out on infection behavior and on the interactions between pathogens and host tissue. Particular attention is paid to diseases of conifer plantations and to root

and stem rots in boreal mixedwood stands, which now occupy 50% of the province's forest land.

Forestry research in Sault Ste. Marie began in 1945 with studies aimed at understanding outbreaks of the spruce budworm, the well known scourge of the spruce-fir forests of eastern North America. The CFS has long recognized that widespread use of chemical pesticides against this insect and others is at best a holding action. Forest entomology research at GLFC is directed at developing knowledge of insect population dynamics, mass rearing techniques for production of parasites and predators, and determination of vulnerable periods in the seasonal cycles of important pests. The goal is to develop an array of techniques, based on knowledge of factors that regulate insect populations naturally, which may be deployed to prevent outbreaks of harmful species. Target insects in this work include the gypsy moth, larch sawfly, European pine sawfly, pine false webworm, spruce budworm and jack pine budworm.

Forestry Services

GLFC plays an important role in the FORSTATS Program, which is the CFS national program to collect, compile, interpret and publish national statistics related to forestry. Emphasis at the Centre is on developing and maintaining a comprehensive computerized forestry data base, publishing forestry statistics for Ontario, undertaking studies at the national level and providing data for the national program. These data are used primarily to develop federal forest policy, but are available to the entire Canadian forestry community for many different purposes as well.

Economics studies at GLFC are directed mainly at providing economics information for use in all facets of federal forestry in Ontario and in the CFS

national economics program. Socio-economic analyses of forest management and industry problems contribute to a better understanding of the forestry sector in Ontario and to the development and assessment of GLFC and CFS research programs.



Although forest protection is a provincial responsibility in Canada, for over 40 years the federal Forest Insect and Disease Survey has fulfilled its role of detecting, identifying and evaluating the impact of forest insects and diseases. Along with units in other CFS regional centres, the GLFC Survey Unit maintains one of the world's largest biological data banks. Accurate and timely information on the kind and severity of insect and disease problems is provided to forest managers who must carry out control operations in Ontario. The GLFC Survey Unit also conducts research on sampling methods to develop reliable pest surveys and, in cooperation with OMNR, monitors the effectiveness of control programs carried out by the province.

In addition to the services outlined above, staff at GLFC maintain a popular public forest ecology trail near the local airport, and a growing arboretum just to the east of the main forestry complex.

Forestry Development

The federal government makes a heavy financial contribution to forestry development through agreements with the provinces. By means of the Canada-Ontario Forest Resource Development Agreement, the federal and Ontario governments will have shared equally in spending \$150 million, during the 5-year period ending in March 1989, on enhancement of the provincial forest resource. This agreement focuses on raising the levels of regeneration and stand maintenance, particularly in northern Ontario. It also makes possible such diverse activities as tree improvement, road construction, analysis of investment opportunities and promotion of integrated forest management.

The Director General of GLFC is cochairman of the committee for implementing the Agreement, and responsibility for project selection and program management is shared with OMNR. In addition, GLFC is directly responsible for forest research projects and silvicultural operations on industrial forest lands, Indian reserves and federal lands.

Support Services

Like any successful modern research organization, GLFC has efficient management and administrative teams that provide direction, planning, supervision and control of all programs, and maintain the physical plant and services necessary for the work of the Centre. Adoption of new management techniques ensures that resources are employed productively and economically.

GLFC programs are aided by a comprehensive array of support services. These include a photography unit renowned for the excellence of its pictures and audio-visual materials, an increasingly important computer and biometrics

service, an electronics unit for the design and construction of special instruments and maintenance of electronic equipment, analytical chemistry laboratories capable of over 150,000 analyses of plant material, water and soil each year, and a battery of modern greenhouses for experimental work and production of large amounts of plant materials.



Finally, the end products of GLFC research and development - scientific reports and other publications - are produced and disseminated to forest managers, scientists and the general public by the Communications Services Unit. This Unit is also responsible for fostering public awareness of the economic, social and environmental importance of forests and forestry research. It does this by producing brochures, posters, displays and audio-visual material and by conducting open houses and public tours of the Centre.

There is also an excellent library containing some 400 technical journals and over 8000 books. The staff can provide computerized literature searches and interlibrary loan services by electronic mail.

