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Pacific Forest Research Centre
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ENERGY FROM THE FOREST



A LOOK AT THE FUTURE

- FACT ●** *Canadians are among the world's greatest per capita energy consumers.*
- FACT ●** *Our fossil fuel supplies are not limitless—especially the oil on which our transportation industry depends.*
- FACT ●** *A major renewable energy source is forest biomass, a term that includes all forest vegetation—branches, tops, sawdust, liquors, and other residues.*
- FACT ●** *About three per cent of Canada's energy supply already comes from forest biomass, mainly mill residues burned by the forest industry to provide power for its own use.*
- FACT ●** *The solar energy captured each year by Canada's forests amounts to some 2½ times the nation's present energy demand—an enormous potential for reducing our dependence on other fuels.*
- FACT ●** *As much as 10 per cent of our energy requirements could be obtained from this source by the year 2000. Additional contributions may come from "energy plantations"—areas of fast-growing trees planted and cultivated specially for harvesting to produce energy in 2 to 10 years.*

Management of forests for energy biomass (or a mix of products) and efficient conversion of biomass to energy demand new technologies. Many questions remain on such matters as measuring, harvesting, and transporting biomass and on converting it to energy, fuels or chemical feedstocks. It is also important to understand the possible effects of intensive biomass harvesting on the environment.

To help provide answers, the Canadian Forestry Service (CFS) has established the ENergy from the FORest (ENFOR) program—a six-year research and devel-



opment contract program with total funding of about \$30 million. Centrally coordinated at CFS headquarters in Ottawa, ENFOR has two subprograms:

- biomass *production*, dealing with forest-oriented subjects, such as inventory, growth, harvesting, transportation, and environmental impact; and
- biomass *conversion*, concerned with the transformation of raw material into energy, fuels, and chemicals.

The ENFOR program in the Pacific and Yukon Region of CFS is run by a com-

mittee made up of representatives from the B.C. Ministry of Forests and the Canadian Forestry Service and is headed by **Dr. Glenn Manning**, Program Manager of the Pacific Forest Research Centre's (PFRC) economics program. This committee has established a number of priorities to be dealt with in studying this field in B.C.:

- general economic feasibility (including present availability of residues);
- appropriate harvesting and transportation technology (closely related to economic feasibility);

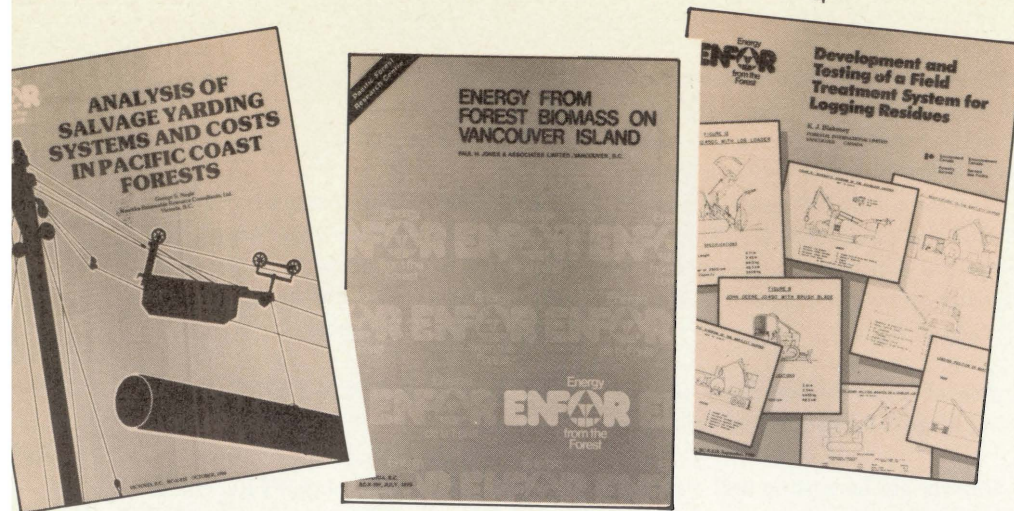
- environmental feasibility; and
- future availability (inventory).

Due to the unique character and diversity of British Columbia forests, our program is very broad in scope. Little work done elsewhere in Canada is readily applicable locally.

WHAT HAS BEEN DONE

In 1978/79, the ENFOR Program funded a study through PFRC titled: "Study of Energy From Forest Biomass—Forest Biomass Location and





Three published reports on ENFOR projects funded through PFRC. Two more are being prepared.

Volume, Extraction and Delivery Costs on Vancouver Island". A major benefit of the report (Paul H. Jones & Associates Ltd., 1978, BC-X-197) was that, while it suggested energy may be derived from biomass under certain specific assumptions, it also showed the large information gap, especially in the areas of harvesting and transportation technology and in the availability of data on operating costs.

In 1979/80, PFRC contracted three studies. The *first*, with Forestal International Ltd. of Vancouver, was to test and evaluate biomass reduction equipment. The results of this contract, published as "Development and Testing of a Field Treatment System for Logging Residues" (BC-X-212: September, 1980), indicated no presently available chippers are suitable for logging slash reduction, as lack of throughput and damage to blades from rocks and grit raise biomass costs to unacceptable levels.

The *second* study was an intensive review of existing west-coast biomass harvesting costs, performed by Nawitka Renewable Resource Consultants, Ltd. of Victoria. The report, published as "Analysis of Salvage Yarding Systems and Costs in Pacific Coast Forests" (BC-X-214: October, 1980), identified harvesting problems which require fur-

ther analysis.

The *third* study, a two-year contract with McDaniels Research Ltd., Vancouver was completed in March, 1981.

A report, "Forest Biomass Energy in British Columbia: Opportunities, Impacts and Constraints", is being prepared for publication at press time. This report identified a number of government policies and attitudes as being responsible for the slow growth in biomass energy utilization.

WHAT IS BEING DONE

Two contracts were let in 1980/81. These initiated the biomass inventory phase of the ENFOR program in the Pacific and Yukon Region. One contract, extending to March 1983, was awarded to Talisman Land Resource Consultants, Vancouver for the preparation of biomass weight equations and the development of a model for the estimation of the quantity of biomass following logging in B.C. forests. An interim report for 1980/81 has been received.

The second contract awarded was to Nawitka Renewable Resource Consultants, Victoria, for the development of biomass weight equations for the Yukon. This is a two-year study, and an interim report for 1980/81 has been received.

In addition to the continuation of the two biomass inventory studies initiated in 1980/81, two contracts to develop and test biomass harvesting and processing systems were awarded in 1981/82. These studies are outgrowths of the results obtained from the 1979/80 Forestal contract.

The first of these contracts to Forestal International, Vancouver, is for the development and initial testing of an innovative system of logging debris processing and the collection of harvesting costs. This study will be completed in March 1983. The second contract, also a two-year study, was awarded to the B.C. Ministry of Forests. This study will perform a production trial of the system developed under the Forestal 1981/82-82/83 contract and evaluate silvicultural and environmental costs and benefits of the system.

OTHER PROJECTS

Close to 30 additional ENFOR contracts have also been let to industry, universities, and individuals in B.C., but are managed by the ENFOR Secretariat in Ottawa. These studies range from "Cost Benefit Analysis of Gas Drying System for Woodwaste Feedstocks" to "Bin and Silo Design for Biomass Materials" to "Updating of Publications of Literature Reviews Concerning Forest Biomass". Anyone wishing further details on these additional studies should write the ENFOR Secretariat, Canadian Forestry Service, Environment Canada, Ottawa, Ontario, K1A 1G5 and request a copy of ENFOR REVIEW Vol. 2. No. 1.

THE FUTURE

Clearly, forests are something that Canada has in abundance and, unlike fossil fuels, they are renewable. However, proper management and controlled use will be necessary if they are to provide a continuing source of energy, as well as other forest products. It is intended that these biomass studies will help move Canada a step closer to energy self-sufficiency.

A Forest Sector Strategy for Canada

In 1980, a decision was made to have major policy review papers prepared for the principal Canadian resource sectors—fisheries, forestry, agriculture, and minerals. In a subsequent decision, the respective resource ministers were requested to deal specifically with three fundamental issues: strengthening the resource base, adequacy of research and development, and new market development.

On September 30, 1981, the **Hon. John Roberts**, Minister of Environment Canada, tabled "A Forest Sector Strategy for Canada". This discussion paper examines policy options for increasing the contribution of the entire forest sector to the social and economic fabric

of Canada. The objective is to provide a global assessment and decision-making framework based on international market opportunities and on various constraints that threaten the timber supply and undermine forest industry prospects for growth. Subsequent Memoranda to Cabinet will deal with specific programs and related resource requirements.

Any discussion of the forestry sector would not be complete without extensive consultation with other federal government departments, especially those within the Federal Forest Sector Strategy Committee. The paper also reflects a broader consultative process involving the provinces, industry, the Canadian Council of Resource and

Environment Ministers, the Canadian Forestry Advisory Council, forestry schools, and non-government organizations.

The result of such extensive consultation is such that major findings—presented on timber supply, market potential, manpower and research needs, and the urgency of forest renewal—represent a consensus in the forestry community.

Copies of this Discussion Paper may be obtained by writing to: Information Branch, Pacific Forest Research Centre, Canadian Forestry Service, 506 West Burnside Road, Victoria, B.C. V8Z 1M5

PFRC Staff Motivates Students to Higher Goals

Two of the three members of the Lower Similkameen Indian Band, who spent 10 weeks at PFRC last Fall getting on-the-job training, have been accepted at the British Columbia Institute of Technology (BCIT), thanks in part to the encouragement and motivation they received by PFRC staff.

"After Shirley and Wayne (Terbasket) returned from Victoria, they both had a strong desire for higher education. They tried very hard to get into BCIT, were rejected, and finally accepted. We have no doubt that the staff at the Pacific Forest Research Centre deserve the most credit in motivating and encouraging them," wrote Barnett Allison, Chief of the Similkameen Indian Band.

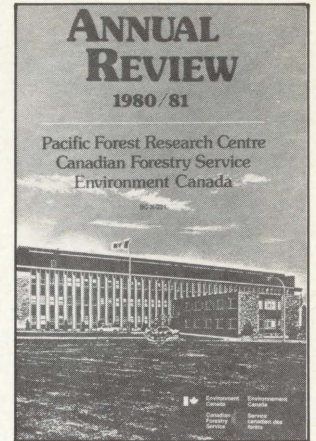
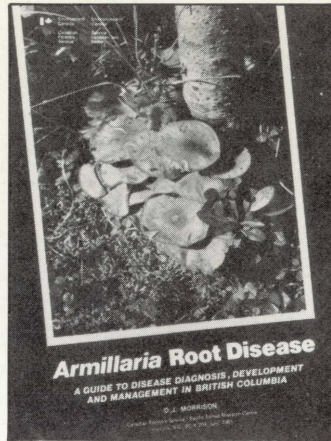
Lecture in China

Dr. Y. Jim Lee, a research scientist and expert in remote sensing at the Pacific Forest Research Centre, left Victoria September 23 on a two-month lecture tour of China. Dr. Lee is the first Canadian Forestry Service scientist to work in China under the terms of a "Memorandum of Understanding" on forestry scientific exchange signed this Spring by the **Hon. John Roberts**, Minister of Environment Canada, and **Yon Wen Tao**, Forestry Minister of the People's Republic of China.

Travelling on an invitation from the Chinese Academy of Forestry in Peking, Dr. Lee will speak on the application of remote sensing with the use of satellites in forest management and explain types of equipment and expertise required.

Dr. Lee's lectures will be attended by senior forestry personnel from throughout China. He will also make a number of field trips to north, central, and southern China and into Manchuria.

Recent Publications



RECONNAISSANCE OF VEGETATION ALONG THE DEMPSTER HIGHWAY, YUKON TERRITORIES

W. Stanek, K. Alexander & C.S. Simmons

This report is the result of a survey completed in 1979, along the Dempster Highway from the North Fork Pass (lat 64°30'N; long 138°15'W) to Peel River, NWT (67°22'N; 134°55'W). It was co-sponsored by Foothills Gas Pipe Lines (Yukon) Ltd. and Environment Canada.

BC-X-217

ARMILLARIA ROOT DISEASE — A Guide to Disease Diagnosis, Development and Management in British Columbia

D.J. Morrison

This report, which describes the biology, signs and symptoms, damage and distribution, and management options for *A. mellea*, is intended for foresters responsible for management of *A. mellea*-infested stands.

BC-X-203

ANNUAL REVIEW 1980/81 — Pacific Forest Research Centre, Canadian Forestry Service, Environment Canada

This report on forest research and operations at the Pacific Forest Research Centre reflects the progress made during the fiscal year 1980/81 in achieving program objectives in British Columbia and the Yukon.

BC-X-221

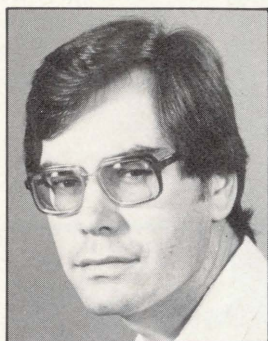
Information Reports Digest

Information Reports Digest presents (bi-monthly) the English and French abstracts of *all* information reports published by the six Research Centres and two Institutes and Headquarters of the Canadian Forestry Service, along with details on how to obtain copies of these reports. Anyone wishing to receive Information Reports Digest should write to:

Scientific & Technical Publishing Unit
Canadian Forestry Service
Environment Canada
351 St. Joseph Boulevard
Hull, P.Q. K1A 1G5

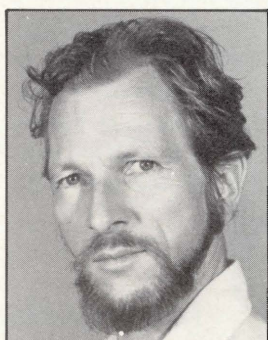
New Staff

Ross Macdonald, Regional Director of the Canadian Forestry Service, Pacific and Yukon, has announced the appointments to three research staff positions at the Pacific Forest Research Centre (PFRC).



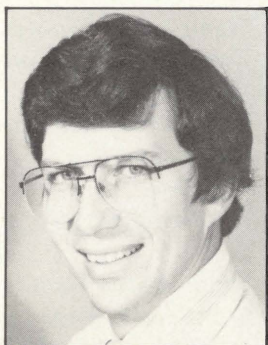
Dr. Allan Auclair has been appointed to a research scientist position in the environmental forestry program. In this new position, he will be working in the area of fire ecology and fire effects.

Dr. Auclair was born in Montreal, Quebec and received his B.Sc. degree from McGill University, Montreal and his Ph.D. in 1968 from the University of Wisconsin. Dr. Auclair was an Assistant Professor from 1969 to 1974 at McGill University and an Associate Professor at the same university from 1974 to 1979. Immediately prior to joining the staff at PFRC, Dr. Auclair was Associate Professor and Center Director at George Mason University in Washington, D.C.



Dr. Hugh Barclay has been appointed to a research scientist position in the forest resources program. He will be responsible for the simulation modelling of the Shawnigan Lake fertilization and thinning project. His immediate priority is the analysis of the growth and yield data from the experimental site located about 30 miles north of Victoria.

A native of Port Alice, B.C., Dr. Barclay earned his B.Sc. from the University of British Columbia in 1964, his M.Sc. in 1973, and his Ph.D. in 1978 from the University of Victoria. Dr. Barclay was a Research Associate with the Department of Biological Sciences at Simon Fraser University from 1978 to 1980. Most recently, he was an Assistant Professor of Ecology, Department of Biology at Dalhousie University, Halifax, N.S.



William A. White has been appointed forest economist with PFRC. He will be responsible for studying the economics of disease and insect attacks, as well as the economics of intensive forest management.

Mr. White earned his B.Sc. in Economics from Brigham Young University in Provo, Utah in 1977 and is currently completing his thesis for a M.A. Econ. from the University of Regina. Immediately prior to joining the staff at PFRC, Mr. White was a Research Officer and Economist with the Department of Tourism and Renewable Resources, Forestry Branch, Government of Saskatchewan.



PFRC Display

Students operating under the auspices of the federal government's Student Youth Employment Program (SYEP) refurbished this 40-foot trailer into a mobile information unit as part of their summer work at PFRC. The trailer made its debut during Canadian Environment Week (October 11-18) at a Victoria shopping centre, drawing thousands of visitors. Free seedlings and a mushroom identification clinic attracted visitors who also were shown various aspects of the research activities at PFRC.



Searching for California Medfly ?

United States Department of Agriculture crew in 1891 physically removing gypsy moth egg clusters from an elm in Malden, Massachusetts. (Taken from Forbush, E.H., and C.H. Fernald. 1896. *The Gypsy Moth*. Wright and Potter Printing Co., Boston. pp. 495)

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