TIMBER Lines

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THIS ISSUE:

Alberta's forest industry—a brillant spot on the province's economic horizon. See story page 3.

Government of Canada / Gouvernement du Canada
Canadian Forestry Service / Service canadien des forêts
Canada

GETTING THE MOST FROM GROWTH AND YIELD

Having been promised a user-friendly software package, you sit down at your computer, and eagerly feed the floppy disk into its slot. A couple of commands later and, presto! you are now ready to work with the PSP (Permanent Sample Plot) Catalogue, a comprehensive data base of growth and yield information from research plots across the prairie provinces.

Growth and yield is one of the oldest established areas of research among forested nations. It's the study of timber stands which are reexamined and measured at regular intervals to see how well or poorly they've grown, and to forecast how much wood volume will be produced at the time of harvest. If a stand has received some kind of silvicultural treatment like thinning or fertilization, the increase in wood volume that can be used commercially can be dramatic.

Over the years, the Canadian Forestry Service, the provincial forest management agencies in Alberta, Saskatchewan and Manitoba and the forest industries themselves have established numerous permanent sample plots. These areas are living laboratories in which the effects of silvicultural treatments, or disease, insect and fire impacts can be seen over time. The PSP Catalogue mentioned earlier contains information on 2200 Canadian Forestry Service growth and yield plots across Alberta, Saskatchewan and Manitoba. Some of these plots go back as far as 1921, and are still being remeasured. Some provincial data are also included.

The PSP Catalogue consists of two diskettes for use with an IBM or compatible personal computer and a user's manual. The first diskette has the software that responds to queries for information. The second diskette contains general information about each of the 2200 plots such as its location, the date it was established, the agency that established it, tree species and any silvicultural treatments that have been applied. More detailed information can be obtained from the tree growth file on the Northern Forestry Centre's mainframe computer. This specific information is just a phone call away and can be printed out, or sent out on magnetic tape or diskette.

NOTE

The exclusion of certain manufactured products or company names does not necessarily imply disapproval, nor does the mention of other products or company names necessarily imply endorsement by the Canadian Forestry Service.

Growth and yield predictions help determine the volume of wood at harvest

Why all this effort to package growth and yield information? Establishing and maintaining permanent sample plots is time, money and labor intensive. The catalogued plots add up to a sizeable investment and a wealth of information. Information sharing was a key consideration in getting the cataloguing project underway. Research organizations and the forest industry realize that in these days of dwindling research dollars, pooling available information is essential, and that everyone stands to benefit.

The PSP Catalogue dovetails neatly, for example, with the objectives of the Regional Growth and Yield Co-op, a group of growth and yield specialists from the CFS and the provincial forest management agencies in Alberta, Manitoba and Saskatchewan. About six major forest companies from across the region and a representative from the University of Alberta also participate in the Co-op. In a very general sense, its goals are to review the progress that's been made in growth and yield to date, identify and develop projects of interest to its members and to consolidate and share data and information.

Dr. Imre Bella is the present chairman of the Co-op. Dr. Bella heads the Northern Forestry Centre's research into stand productivity and forest inventory. At its last meeting, the Co-op defined a number of projects for the coming year. One of these is to assemble a list of the members' permanent sample plots, rate them in terms of their potential use, and identify any gaps and redundancies in the information. This list would focus on plots where lodepole pine, white spruce, jack pine or trembling aspen are the dominant species. The PSP Catalogue gives the Co-op a good start on this project.

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ALBERTA'S FOREST INDUSTRY COMING ON STRONG

August 4, 1987. The Western Diversification Initiative is announced by Prime Minister Brian Mulroney, committing $1.2 billion to aid western Canada's economy. Two weeks later, the forest industry was the first to step into the spotlight with $150,000 of that money channelled into a feasibility study for a new pulp mill in Peace River, Alberta. A matching amount was contributed by the provincial government, with the balance—$1.5 million—to be spent by Daishowa Canada Co. Ltd., the Canadian subsidiary of the second-largest pulp and paper company in Japan. The Daishowa pulp mill is projected to cost about $500 million, creating about 500 new jobs.

That Japanese interest in Alberta is exactly what the province wants to see, and the kind of interest it is wooing aggressively. A string of upgrading and expansion announcements over the past couple of years has helped to nurture investor confidence. It's an impressive list:

- Atlas Lumber Ltd., upgrade of sawmill at Sentinel, estimated 200 direct and indirect jobs to be created;
- Champion Forest Products Ltd., expansion of pulp mill at Hinton, creation of 370 permanent new jobs;
- Grande Cache Forest Products Ltd. (formerly British Columbia Forest Products Ltd.), upgrade of sawmill at Grande Cache, protection of 750 direct and indirect jobs;
- Millar Western Industries Ltd., construction of chemithermomechanical pulp mill in Whitecourt, almost 1100 direct and indirect jobs;
- Pelican Spruce Mills Ltd., opening of second oriented strandboard plant in Drayton Valley, 875 direct and indirect jobs;
- Procter & Gamble Cellulose Ltd., modification of pulp mill in Grande Prairie to use aspen;
- Sunpine Forest Products Ltd., upgrade of sawmill and addition of wood treating facility at Sundre, 222 direct and indirect jobs;
- Weldwood Canada Ltd., conversion of waferboard to oriented strandboard at Slave Lake, protection of 308 direct and indirect jobs. [1]

Aspen is making big inroads in Alberta's forest industry

Currently, there are seven pulp and paper projects representing almost $2 billion in investment either underway or pending. The fact that these projects are located in parts of Alberta still reeling from the economic body blows dealt to oil and agriculture make the deals that much sweeter.

Much of the movement in Alberta's forest industry has been spurred on by provincial government assistance to forest companies in the form of loan guarantees, deferred-payment government loans and government debentures. That favorable financial climate, the fact that Alberta has the largest uncommitted timber reserves in North America, and the new technologies that have been developed to use aspen lured many to a forest industry investment seminar in Edmonton in September. About 350 investors, financial analysts and forest industry executives heard enthusiastic, but realistic assessments of what Alberta has to offer. With a bullish international pulp and paper market predicted through to the end of the 1990's, optimism is the keynote right now for Alberta's forest industry, and for a provincial economy determined to diversify.

[1] Alberta Forestry, Lands and Wildlife Newsletter July 1987.

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Over the next year, the Co-op also intends to review all the growth and yield models that are available in terms of the general features, strengths, weaknesses and data needs for each. The members want to compile a field guide for permanent sample plot establishment and remeasurement. Also, a private consultant is already canvassing each Co-op member's needs to develop a priority list of specific growth and yield projects down the road. As a long-term goal, the Co-op wants to see growth and yield models developed and refined for natural, and especially managed, stands. Some of this work is already underway with funding from the federal-provincial forestry agreements.

The PSP Catalogue and the Growth and Yield Co-op—two separate but related channels to streamline information on growth and yield from across the region and make it more accessible.

MEETING THE MIXEDWOOD CHALLENGE

Drive about 30 kilometres south of Grande Prairie, Alberta, turn onto a logging road and soon you come to a sign that says "Vegetation Management Project". Reading further, you discover this project is sponsored by the Canada-Alberta Forest Resource Development Agreement. Talk to Lorne Brace, and you'll find this is a research project intended to provide clear facts about a variety of methods, including herbicides, for controlling aspen, brush and grass until conifer forests become established.

Mr. Brace, a research scientist with the Northern Forestry Centre, is coordinating the Vegetation Management Project. It's a joint undertaking of the Canadian Forestry Service and the Alberta Forest Service. Over five years, the two agencies want to see how effective various treatments are in helping to carry out two major forest management tasks. One is site preparation, or preparing sites for replanting following harvesting. The second is conifer release; that is, removing the deciduous growth that seriously competes with conifer seedlings in their critical early growing stages. Aspen is a particular challenge in areas that are designated for production of commercial spruce and pine, because it grows much faster than the conifers and takes the lion's share of valuable nutrients, moisture and sunlight in the process.

Herbicides are one of the options available to forest managers to control deciduous growth until the softwoods become established. Clearing out brush and aspen by hand is another. Third, various kinds of plows, discs or blades can be used to mechanically treat a site to reduce aspen, brush and grass competition. The vegetation management project is testing these methods separately and in various combinations to find out which is ideal for preparing a site, and for controlling competing growth once the softwoods are planted.

Whichever option (or combination of options) proves to be "ideal", it will have to have proven itself against three yardsticks. One, it will have to have been effective in doing the job at hand, that is, controlling the competing vegetation without hindering the growth of conifer crops. Two, it will have to have shown itself to be cost-effective. And most importantly, it will have to have withstood a battery of environmental impact tests. The use of herbicides in forestry continues to be a controversial issue. This vegetation management project is designed to provide the unequivocal and unbiased environmental information on the use of herbicides that their opponents say is lacking. It will track the movement of herbicides and their byproducts through soil, water and plants. It will also monitor changes in the plant community. Finally, a grant from the World Wildlife Fund is going toward studies to help determine any effects on small mammals like mice and voles, which are vitally important in the wildlife food chain.

HELICOPTER PLAYS IMPORTANT ROLE

The research plots, covering about 45 hectares, are located on Procter and Gamble Cellulose Ltd.'s Forest Management Agreement area. 1985

The NORTHERN FORESTRY CENTRE, located in Edmonton, Alberta is the western and northern regional establishment of the Canadian Forestry Service. District offices are located in Prince Albert, Saskatchewan and Winnipeg, Manitoba. The Northern Forestry Centre coordinates all federal forestry research and development activities throughout Alberta, Saskatchewan, Manitoba and the Northwest Territories.

Soil core sample is taken to track movement of Pronone

MEETING THE MIXEDWOOD CHALLENGE

Donaren disc trencher is used for site preparation

was primarily a planning and gearing-up year, covering such things as literature searches, getting site and soil surveys underway and setting up the plots.

The key event of 1986 was the application of the herbicide known as Pronone, on the plots set aside to test site preparation methods. Pronone comes in a granular form, and when dropped from a helicopter bucket the small pellets form a swath with distinct boundaries, eliminating problems with drift. By 1989, about half the total research area will have received the herbicide, or herbicide-mechanical treatments. With last year's application of Pronone began the regular and intensive rounds of sampling of water, soil, plants and animals in the area which will continue until the end of the project in 1989.

With the herbicide down, the mechanical site treatments got underway this spring. White spruce and lodgepole pine seedlings were then planted on the prepared sites. Their progress will be watched closely until the close of the project to see what effects the various site preparation treatments have on their growth and survival. With this work done, it will be time to turn to the next major phase of the project, applying different manual and chemical treatments to plots on which the seedlings have already been established. Major work on these conifer release plots will likely begin next fall.

ASPEN—DILEMMA OR OPPORTUNITY?

Alberta's mixedwood boreal forest presents many management challenges. Aspen is beginning to make major inroads in the province's forest industry, and where economic and site conditions are right, aspen is being encouraged as the dominant commercial species. In fact, the aspen's response to the different treatments over the course of the project will yield useful clues to managing it as a commercial resource. However, in some areas of the province softwoods represent a better economic return, and it's primarily for management of these areas that findings from the vegetation management project will prove valuable.

CO_2 IN THE BOREAL FOREST

"Forests retreating as climate warms", "Alberta will be hotter and drier 50 years from now, say experts"—headlines from the Edmonton Journal the week of September 10th brought home to its readers the reality of changing climate patterns in this corner of the world. About 150 researchers and scientists attended a symposium in Edmonton in September to examine the impact that climate variability and change is likely to have on the Canadian prairies. Scientists around the world agree current climate warming is due to pollutants from a myriad of human activities, from heavy industry right down to burning gas in our cars. These gaseous waste products have created the "greenhouse effect", a trapping of heat in the earth's atmosphere.

Competitive interactions of plants and animals in boreal forest ecosystems could be affected by increased CO2 in atmosphere

Dr. Teja Singh of the Northern Forestry Centre is studying the reaction of northern boreal forests to this warming trend, and presented the results of the first phase of the study to the symposium. His partner in this overview of climatic change and its effect on western Canada's forests is Dr. Ken Higginbotham of the University of Alberta. In the last 60 years, Dr. Singh says, the mean annual temperature of western Canada's boreal forests has gone up almost one full degree celsius. That may not seem like much, but northern forests are very fragile and sensitive to climate change.

The two scientists have identified a host of questions that need more research. They are working on the premise that the carbon dioxide level in the earth's atmosphere will double in about 40 years, a scenario widely adopted by other scientists who use computers to model, or forecast climatic change. Dr. Singh, for example, is examining the effect of the warming on the productivity of forests, on wood quality, and on the ability of forests to regenerate naturally after logging or fire. With drier conditions, forest fires in a given area may become more frequent and destructive. Dr. Singh will also look at how the temperature rise will affect the forest's ability to regulate waterflow and control soil erosion, and how it might change the abiility of existing trees to fight off insects and disease.

Dr. Higginbotham's part of the study has a different focus. He is looking more specifically at the physiological responses of plants and trees to the warming, and how they will respond to a longer growing season. He is also studying how the different components of ecosystems will be affected—for example, how the warming will affect competitive interactions of plants and animals in boreal forest ecosystems. Together, the two scientists have put together a comprehensive assessment of the research that needs to be done into the effect of increased carbon dioxide on the northern boreal forest, which is one of the largest remaining forest regions in the world.

As the current bioclimatic zones shift, the niches agriculture and forestry occupy in the economy will shift as well. This is an issue, the scientists say, which will have to be addressed by decision makers and those in power to shape policy. Drs. Higginbotham and Singh also stress that the study of climatic change can't be done in isolation, or fragmented into different disciplines. The impact of climatic warming stretches into many research areas and political arenas all around the world. This study, as a first step in defining the work that needs to be done, is bound to gather a lot of interest worldwide.

FIELD GUIDE IN A CLASS BY ITSELF

Since its publication last year, the Northern Forestry Centre's FIELD GUIDE TO FOREST ECOSYSTEMS OF WEST-CENTRAL ALBERTA has been garnering admiring reviews. Site classification is one of the meat-and-potatoes components of forestry that doesn't have a high profile, but like a good nourishing meal, is essential to getting a lot of work done. The FIELD GUIDE helps to speed up the site classification process.

Informed decisions on the productive and silvicultural possibilities of a site must be made knowing whether the soil is more acidic or alkaline, where it sits in the clay-to-sand spectrum, what the dominant vegetation on the site is, the elevation of the site and how much moisture it receives and from what sources. Many factors come together in a complex, intricate way on a site to produce an environment suitable for commercial production of one tree species, and not another. A person who knows how climate, vegetation and soils interrelate on a site will be able to

FIELD GUIDE continues on page 7

FIELD GUIDE CONTINUED FROM PAGE 6

Using a stereoscope to interpret aerial photos is part of the site classification process

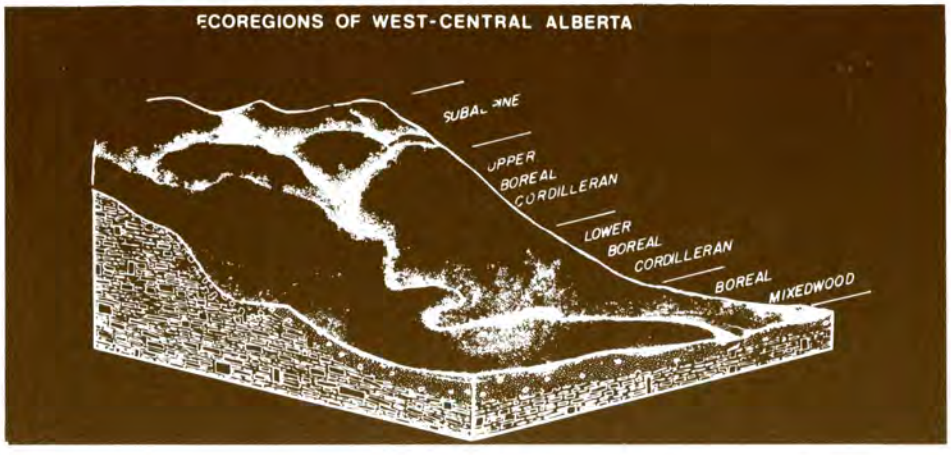
determine if it's suitable to establish a commercial tree crop, as well as the silvicultural methods necessary to prepare a site for a chosen crop.

To become knowledgeable, tools are needed. In Alberta, forest managers have a valuable tool in the FIELD GUIDE TO FOREST ECOSYSTEMS OF WEST-CENTRAL ALBERTA. This guide covers an area of 25,000 square kilometres, an area which is the lifeblood of several of Alberta's largest forest industries. This field guide does two things. First, it classifies and describes the five ecoregions, or ecological zones, within the total area. It describes these ecoregions in terms of climate and elevation, soils composition, characteristic tree species, successional relationships and forest productivity. Second, it provides a framework for making management decisions for the smaller ecosystem units which make up ecoregions. By following the guide through its steps, together with the wealth of background information included in the guide, even a relatively inexperienced forester can sum up the commercial potential or limitations of a site.

The field guide is the first of its kind in Canada to correlate detailed forest ecosystem classification information with reconnaisance soil survey maps of the area. Dr. Ian Corns, the research scientist with the Northern Forestry Centre who coordinated compilation of the field guide, says that feature gives the guide a unique advantage. "A soil survey map shows how soil types are distributed in a certain area, but doesn't provide much interpretive information useful to foresters," he explains. "If you're out in the field, the guide allows you to identify the ecosystem you're within, giving you information not only on its soils, but also its vegetation, environment and relative productivity. You can then evaluate the various interpretations laid out in the guide for managing a site in relation to its corresponding soil survey map unit and report. What you get is a more complete picture of the extent of certain site conditions in a specific geographic area."

This past summer, Dr. Corns led field trips to forested areas near Whitecourt, Grande Prairie and Hinton primarily for Alberta Forest Service staff and industrial foresters to show them how the field guide works. The word is that these "show and tell" sessions were very well received. The field guide has also generated interest in Saskatchewan and Manitoba. In Saskatchewan, Northern Forestry Centre staff are contributing to forest growth and productivity studies in relation to site and ecological site classification with Weyerhaueser Ltd. And in Manitoba, a pilot project is now in its second year to gear site classification to both silvicultural and forest inventory interests. This work is being funded through a contract under the Canada-Manitoba Forest Renewal Agreement.

In the meantime, two summers of fieldwork have been completed in Alberta's Bow Crow and Rocky-Clearwater Forests toward developing a field guide to forest ecosystems in the foothills region of the province. This work has been sponsored by the Canada-Alberta Forest Resource Development Agreement. When this field guide is ready, it will undoubtedly be another welcome tool for forest managers in Alberta.



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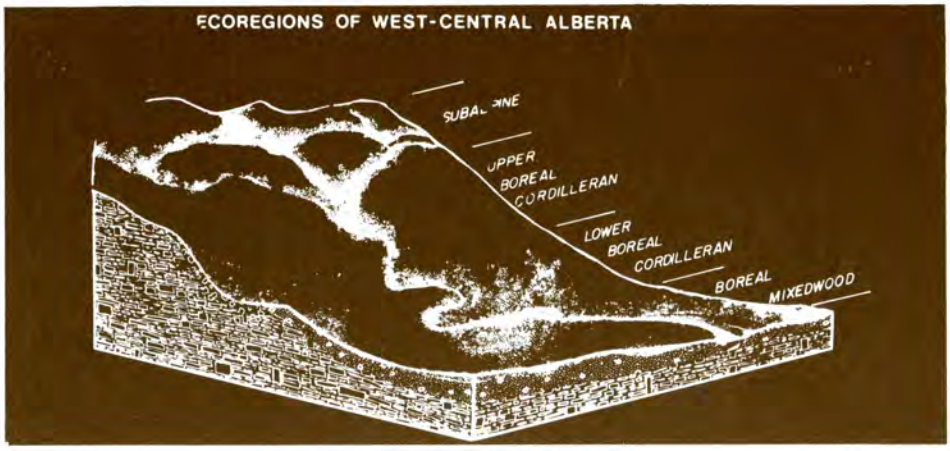
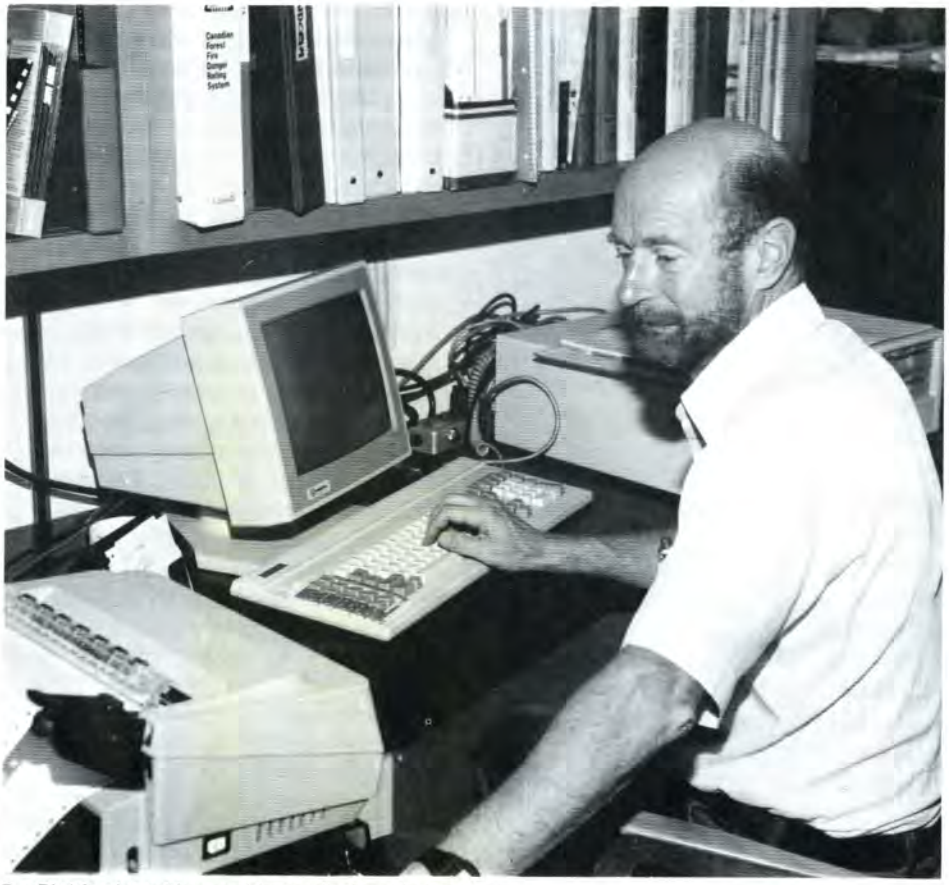


EXCHANGE BENEFITS CANADA AND U.S.



Dr. Pickford working on his predictive wind model.

"A series of fortuitous circumstances", in his words, has brought Dr. Stewart Pickford from the University of Washington to the Northern Forestry Centre until next July. There was motive—a sabbatical, and opportunity—in the form of the Science and Technology Exchange Program begun by the Canadian Forestry Service last May. Dr. Pickford is a professor of forest fire science at the University of Washington. Bryan Lee, a fire research officer with the Northern Forestry Centre, spent a year of development leave at the university with Dr. Pickford as his mentor. When Bryan came back earlier this year, Dr. Pickford came with him.

STEP is designed primarily to encourage exchanges of research, technical and professional people among the various agencies carrying out forestry research in Canada. These agencies include the Canadian Forestry Service, provincial and territorial forest management agencies, forestry faculties at universities and the forest industry. The program also eases the way for non-Canadians to temporarily transfer to Canadian Forestry Service establishments. The aim of the program is to encourage the various technologies that are available to become more widely known and used.

It will be very much a working sabbatical for Dr. Pickford. He will be continuing his work with Bryan in developing computer-assisted dispatch systems for forest fires. He'll also be developing a computer model to help predict wind speed and direction, critical elements in fire behavior. In a general sense, he says "I'm here to explore the opportunities. Canada's fire research scene is bubbling—for example, look at the developments with the Landsat satellite in detecting forest fires. I hope to pick up ideas and methods to take back to the U.S., and specifically, to the University of Washington."

We will enjoy playing host to Dr. Pickford over this next year.

NEW PUBLICATIONS

Listed below are recent publications of the Northern Forestry Centre. Copies may be obtained by writing to us.

Hillman, G.R. 1987. Improving wetlands for forestry in Canada. Inf. Rep. NOR-X-288.

Northern Forestry Centre. 1987. Program Review 1986-87.

Radvanyi, A. 1987. Snowshoe hares and forest plantations: a literature review and problem analysis. Inf. Rep. NOR-X-290.

Singh, T. 1987. Estimating downed-dead roundwood fuel volumes in central Alberta. Inf. Rep. NOR-X-289.

Walker, N.R.; Ball, W.J. 1987. Container seedling field performance after 10 years. For. Manage. Note 44.

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