

## Ground-breaking Project Gets Results

Up-to-date findings of some studies included in a major vegetation management research project in northwestern Alberta have been published and are available at the Northern Forestry Centre.

This multidisciplinary project began in 1985 under the Canada-Alberta Forest Resource Development Agreement. Led by Lorne Brace, a Research Manager with the Northern Forestry Centre, the project has been a shared venture with Alberta Forestry, Lands and Wildlife and Procter & Gamble Cellulose Co. Ltd. The main study area is about 30 kilometres south of Grande Prairie.

Manual labor, brush removal equipment and a herbicide were used separately and in various combinations to prepare planting sites, and to reduce brush and aspen around white spruce and lodgepole pine crop trees. A granular formulation of hexazinone known as Pronone 10G was tested. Reducing drift of the chemical onto non-target areas was seen as the main advantage in using the granules. Responses of the aspen and brush, and of the crop trees to the herbicide have been monitored and analyzed. Movement of the chemical through soil, water and other plants has also been exhaustively sampled. Another study has tracked the behavior of small animals such as mice and voles after the herbicide application. And in 1987, "satellite trials" were established at Calling Lake, Webberville and Hines Creek in northern Alberta. These trials have focused on aspen regeneration, and have compared chemical and non-chemical treatments applied before and after harvest.

Forest researchers are a patient breed. A wait of several years, often decades, for definitive results from studies conducted in a forest "laboratory", is routine. However, Mr. Brace, together with Northern Forestry Centre colleagues Surin Sidhu, Joe Feng,

Doug Maynard and Stan Navratil, has noted some strong trends emerging.

"On the site preparation plots we found we got the best vegetation control results by disc trenching followed by Pronone at the rate of 4 kilograms per hectare, and by applying 4 kilograms per hectare of Pronone alone," Mr. Brace says. "This effectively checked the aspen and brush at the time, and now three years later, we're seeing some impressive

diameter growth on the spruce and pine." The spruce and pine responded similarly to the different treatments, with the exception of double disking. While that particular treatment was as effective as 4 kilograms per hectare of Pronone in spurring pine growth, it was counter-productive for the spruce. Findings from the conifer crop release studies are tentative at this stage,

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## Site Classification & GIS to Team Up

The idea of evaluating forested land based on its ecological characteristics has gained a foothold in Alberta. When the *Field Guide to Forest Ecosystems of West-central Alberta* was published in 1986, co-author Ian Corns found many forest managers willing to try ecological site classification on for size. It's been a good fit, and now the idea is being re-tailored to merge with geographic (GIS) and other land-related information system technologies. One end product will be a predictive mapping system, a tool to help forest managers plan the best uses of their management areas.

Dr. Corns, a research scientist with the Northern Forestry Centre, is working with the Alberta Research Council, Millar Western Industries Ltd., Canadian Forest Products Ltd. and DataSpan Technology Inc. Two pilot areas have been chosen in Alberta, one west of Whitecourt and the other southeast of Grande Prairie. Available forest cover maps, soil maps, and digital base maps including elevation models will become layers in a GIS environment. These layers will be merged to generate new map units. The next critical step will be writing ecological site classification

guidelines into a software program that will allocate site types to these new units. At this point "site type" maps would be generated for each pilot area. Baseline field data being gathered this summer will serve as reference points against which reliability of the maps will be checked.

Predictive site type mapping, if successful, would scale down the need for intensive, on-ground surveys. Large areas could be site classified and mapped at a fraction of the cost of traditional procedures. The site type mapping approach is anticipated to help forest managers determine the productivity they might expect from a certain site, signal conditions that might physically hamper their operations, and indicate the species that are best suited to particular sites. Difficulties with vegetation competition that could be expected after logging would also be flagged. And the extent and location of particular site types could be determined without leaving the office. If successfully used on the pilot areas, predictive site type maps could become a regular component of the forest manager's toolbox in Alberta—and in other forest management areas with land-related information system technologies in place. ●

## Project *continued from page 1.*

as these sites have only been monitored for a year.

Mr. Feng and Dr. Sidhu tracked the movement of the Pronone through soil and water. They concluded that under typical northern Alberta weather conditions, the chemical would leach out of the granules within two weeks of application. Herbicide residues in soil, surface water and in sediment pools near the application site decreased appreciably over time. In the year following application, residues in soils were down to 16% of the amount applied; by the second year that figure was down to 4% of the total.

Mr. Feng's creativity was put to the test in carrying out the soil and water studies. He devised new procedures for soil sampling and residue analysis, procedures that have been published and are now being transferred to other research agencies, analytical laboratories and federal and provincial regulatory agencies.

The small mammal studies were handled by Penner and Associates Ltd. of Edmonton. Population numbers and reproductive characteristics of mice, voles and shrews were noted before and after the herbicide application. Small amounts of hexazinone entered the food chain and were detected in some animals shortly after the application. There appeared to be no negative effects on the animals that could be linked to the chemical. It appeared that insect eaters tended to accumulate greater amounts of the chemical in their tissues than plant eaters, and the study recommends more research be done in this area.

Dr. Maynard and Dr. Sidhu looked at nutrient cycling, analyzing the presence of elements such as potassium, sulphur and calcium in leaves and in the soil before and after the Pronone was applied. They found that although the levels of these elements fluctuated initially after the application, by the second and third seasons after application nutrient cycling in the vegetation on the herbicide-treated plots was no different than that on the control plots. Differences in the nutrient levels in the soils between treated and untreated sites still existed two years after the herbicide application. It's not known at this time if those differences will have an impact on site productivity.

The major finding from the "satellite trials" is that aspen density can be manipulated before or shortly after harvesting the crop trees, and thus, before it becomes a competition problem. Dr. Navratil found that

the most successful aspen control resulted from injecting single trees with a measured amount of herbicide before harvesting, and from double disking of the site after harvest. These procedures checked both the height and growth rates of the aspen, and its formidable ability to start new trees by suckering. In fact, Dr. Navratil recorded a 90% reduction in aspen suckering with chemical treatment of individual trees.

It must be emphasized that results from the Grande Prairie Vegetation Management Project are not definitive, and that more measurements and monitoring are needed to draw firm conclusions. However, in just five years research precedents have been set, and many gaps bridged in understanding the dynamics of northern mixedwood forests. ♣

## Harvesting Study Tells a Good Story

"Before" and "after" pictures are often reliable and convincing testimonials to an event. Shown here are "before" and "after" shots of a harvesting study coordinated by the Northern Forestry Centre. They show that aspen can be effectively harvested from mixedwood forests while protecting the white spruce understory. This study, funded by the Canada-Alberta Forest Resource Development Agreement, is the first in Alberta to blend these harvesting and silvicultural aspects of mixedwood forest management.

Nine study stands were chosen in the summer of 1988, three each near Drayton Valley, Hinton and Whitecourt in Alberta. Cooperating with the Northern Forestry Centre were the Forest Engineering Research Institute of Canada (FERIC) (Western Division), the Alberta Forest Service, Weyerhaeuser Canada Ltd. (Alberta), Weldwood of Canada Ltd. (Hinton Division), Blue Ridge Lumber (1981) Ltd. and Millar Western Industries Ltd. In each trial one stand served as a control. Harvesting in the other two stands tested conventional and modified systems using various combinations of feller-bunchers, grapple skidders, and Swedish processors and forwarders. Two of the nine stands were logged in winter. At issue were how well each system protected the white spruce understory (especially those trees taller than 2.5 metres), how completely it made use of the timber resource, and how each system affected logging production rates and costs.

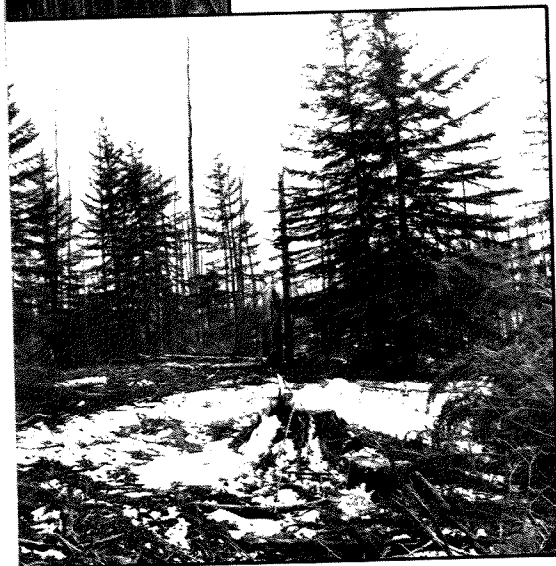
Underpinning any system, of course, are the human resources - people. "It became clear that the more crew members were involved in the purpose and planning of the logging operations, the more positively it affected the outcome," notes Lorne Brace, a Research Manager with the Northern Forestry Centre. The best results were obtained when crews helped select the equipment and



harvesting patterns to match stand and site conditions, planned and established skid trails in advance, and were well-trained and supervised. The number of times stands had to be entered for felling and forwarding, a big factor in understory damage, was reduced. Although skid trails were longer, there were fewer of them, and protective features such as "rub stumps" greatly reduced skidding damage to valuable white spruce trees. "The insights and experience of the crews also boosted overall performance," Mr. Brace says.

# It's Business As Usual

Life deals out irony sometimes, the Montreal Lake Indian Band has found. In June of 1989, band members working on the fire crew at Prince Albert National Park in central Saskatchewan responded to an urgent call - on the nearby Montreal Lake reserve. Ultimately, the fire thwarted control efforts, cutting a sizeable swath across the northern half of the reserve.



Project cooperators agree that initially, costs associated with increased protection of the understory will be higher. Given time, however, those numbers should bounce to the positive side of the balance sheet due to lower spruce regeneration costs and shorter spruce rotations as a result of diminished aspen competition. And understory protection goes a long way toward maintaining wildlife habitat and the aesthetic integrity of the boreal mixedwood forest. ♣

But sometimes setbacks can surprise with a positive flipside - opportunity. Salvage logging is under way with the help of a newly-acquired skidder and crawler tractor. And a sawmill bought last year is turning usable logs into lumber being supplied to a Prince Albert hardware store.

Three years ago a full-time forest technician was hired with funding from the Canada-Saskatchewan Forest Resource Development Agreement, and staff with Forestry Canada's Saskatchewan District Office began regularly providing technical advice to the band. Since then, forestry projects on the Montreal Lake reserve have been going full tilt. The band is expanding its white spruce plantations; areas planted 3 years ago now boast waist-high growth. Planting and pulpwood cutting for Weyerhaeuser of Canada Ltd. in Prince Albert provide steady work, and a reputation for quality has been established. The band supplies firewood locally. Thinning and release projects have been carried out. In all, forestry-related

work accounts for about a quarter of the jobs on the reserve.

Although the Canada-Saskatchewan Agreement came to a close last year, interim federal funding is keeping forest management projects alive at Montreal Lake and on other reserves. The situation is similar in Alberta, where a cost-shared forestry agreement also expired last year. Forest inventory work is continuing on reserve lands held by the Bigstone Cree Band near Slave Lake, and on the O'Chiese and Sunchild reserves near Rocky Mountain House. This summer band members have been ground-checking areas that have been aerially photographed, entering data on a software program that will eventually be loaded onto a geographic information system. Interim federal funding is also being made available for forestry programs on federal lands in Manitoba. Staff with Forestry Canada's Manitoba District Office have had some preliminary talks with the Fort Alexander Band near Pine Falls, and forest inventory work on the reserve may get under way later this year. ♣

## Aspen <sup>management</sup> FOR THE 21<sup>st</sup> CENTURY

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- Aspen harvesting
- Environmental and wildlife implications of aspen management
- Sustainability of the aspen resource

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# On the Road Again ... North of 60

The meeting started at 7 p.m. - with the sun blazing as if at high noon. It was shorts weather - but the ice on the Mackenzie River hadn't gone out. People crowded into the Town Hall meeting May 29th at the Igloo Church complex in Inuvik, waiting to hear what the federal government had to say about the environment.

The Inuvik session was one of a series of meetings held across Canada in late May and early June to gather public opinion on environmental issues and legislation. The catalyst for this process was The Green Plan, a question-and-answer document distributed by the federal Department of Environment. Public involvement has been a 2-stage process. Information sessions open to the public at large were held in communities across Canada. A number of federal departments with ties to environmental matters, including Forestry Canada, were represented. Consultation workshops at a smaller number of centres followed, where delegates from a broad spectrum of interest groups sat down with federal representatives for two days to set recommendations down on paper. In Inuvik and Yellowknife in the Northwest Territories, Green Plan sessions were combined with others concerning the federal Arctic Environmental Strategy.

Forestry Canada staff from our Winnipeg, Prince Albert and Edmonton offices talked to people in those cities and many others across our region. Perceptions of the federal government's record on environmental housekeeping varied from place to place. Diana Boylen, Senior Economist at the Northern Forestry Centre, says people at the



*Protecting the North's natural resources was the focus of presentations at Green Plan sessions in the Northwest Territories and throughout the Northwest Region during April and May.*

sessions in the Territories were generally positive. "While they acknowledged problems such as empty oil drum dumps and mine tailings, the prevailing attitude was 'Let's get on with it - what can we do about it?'" she notes. Ms. Boylen also says northerners are avid watchers of forest development "down south", especially as it relates to transport of pollutants by river, sea and air to fragile northern ecosystems.

The sessions left a lasting impression on our staff members, who talked to people with lifestyles and values foreign to their own. "When you're in a place like Inuvik and you turn on the t.v. and it's a cable channel from Detroit, you can't help but think how small the global village really is," explains Ms. Boylen. "You come away with some new perspectives of your job and how it affects other people." ♣

**Dr. John Powell** is now Regional Coordinator, Planning and Special Projects in the Northwest Region. Dr. Powell will serve as the regional contact regarding environmental impact issues, coordinating our role and activities in any environmental impact assessment processes in this region.

**Dr. Surj Malhotra**, Director, Protection and Environmental Research, is now responsible for our hydrology, and fire research and management studies. In addition, Dr. Malhotra will continue to direct our environmental impact, insect and disease, and wetland and forest productivity modeling studies.

The **NORTHERN FORESTRY CENTRE**, located in Edmonton, Alberta is the Northwest regional establishment of Forestry Canada. The Northern Forestry Centre coordinates all federal forestry research and development activities throughout Alberta, Saskatchewan, Manitoba and the Northwest Territories.

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## NOTE

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