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INFORMATION FORESTRY

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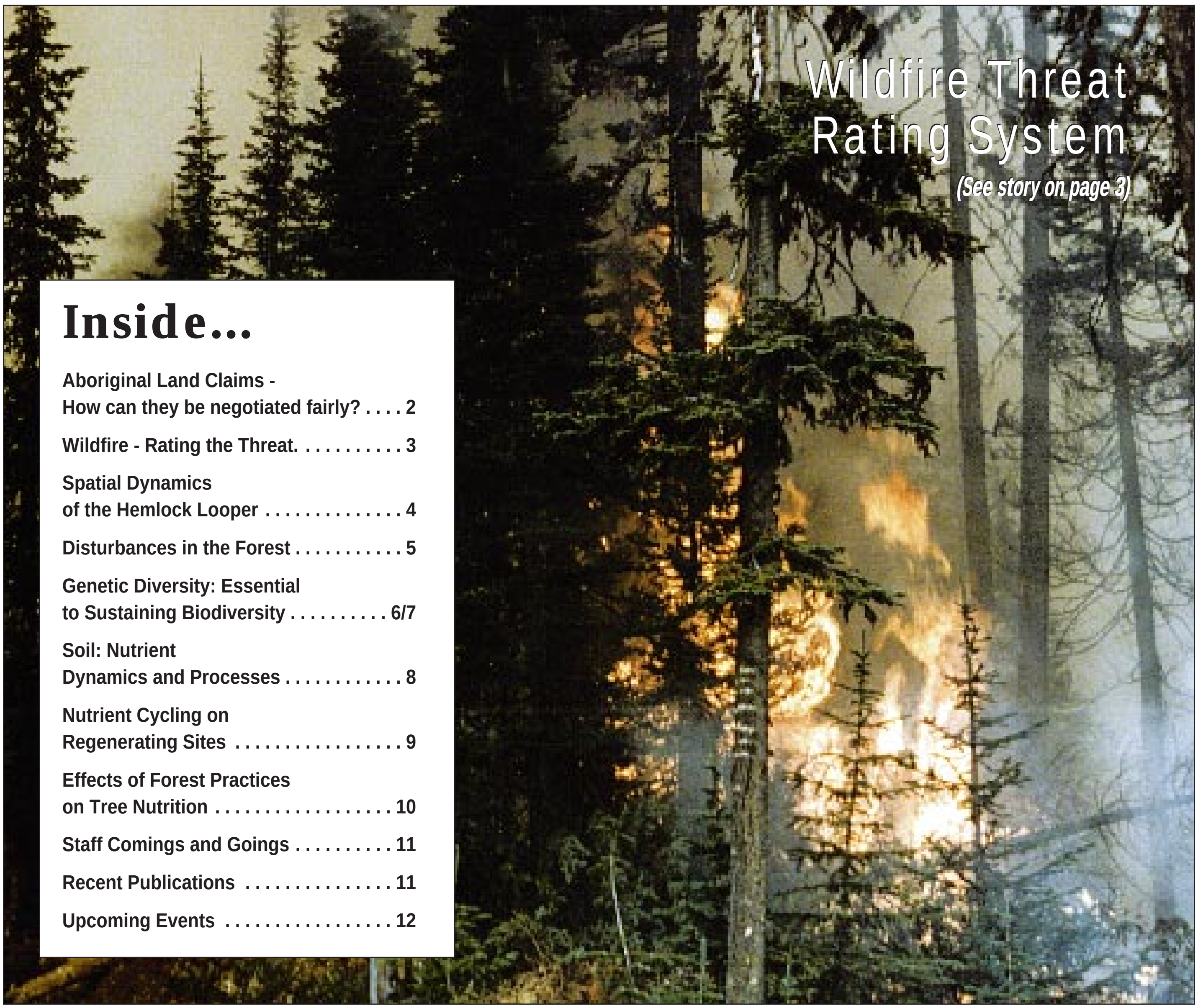

Wildfire Threat Rating System

(See story on page 3)

Inside...

Aboriginal Land Claims -
How can they be negotiated fairly? 2

Wildfire - Rating the Threat. 3

Spatial Dynamics
of the Hemlock Looper 4

Disturbances in the Forest 5

Genetic Diversity: Essential
to Sustaining Biodiversity 6/7

Soil: Nutrient
Dynamics and Processes 8

Nutrient Cycling on
Regenerating Sites 9

Effects of Forest Practices
on Tree Nutrition 10

Staff Comings and Goings 11

Recent Publications 11

Upcoming Events 12

Natural Resources Canada
Canadian Forest Service

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Canada

Aboriginal Land Claims
How can they be negotiated fairly?

"The objective behind the negotiations is to provide First Nations with a land base and the resources to manage their own affairs."

The topography of Canada is as varied as the country is vast. The land in one area can far exceed another in terms of growth rates and quality of growing stock. How then, can aboriginal land claims ever be established equitably? How can an area of land that has consistently provided high quality and high value forest products be compared to land that cannot sustain an economically viable forest industry? These are questions that the federal government is addressing in ongoing First Nations land claims negotiations.

The Canadian Forest Service provides forestry advice to federal treaty negotiation teams involved with land claims. This entails advising federal negotiators on the relative value of forest land under negotiation, as well as providing forestry expertise and support to individual treaty tables. Over the last hundred years, treaties have been signed in most areas of Canada. But in B.C., very few treaties were signed so the federal and provincial governments are working together with First Nations on comprehensive land claims negotiations to complete this overdue task.

Chris Lee

"The objective behind the negotiations is to provide First Nations with a land base and the resources to manage their own affairs," explains Mr. Chris Lee, land claims policy advisor at the Pacific Forestry Centre. "The intent is to have B.C. provide the land and Canada provide the cash, with both parties sharing settlement costs."

To determine the value of the land offered by B.C. (thereby determining the province's share of the cost), a method has been developed to compare the relative value between different types of forests as well as to determine the comparative value of other types of land. This system of "representative hectares" converts diverse types of land into a common denominator of value. An area of high forestry value coverts into a large number of representative hectares while an area of low value converts into a small number of representative hectares.

"The memorandum of understanding established for these negotiations had to include a method of calculating relative value that would be clear, durable, fair, affordable, neutral and efficient," says Lee. "The representative hectare approach attempts to capture the most significant elements needed to determine relative value without a complex, lengthy and expensive appraisal of individual parcels of land."

Land under negotiation has been separated into three types: Forest Land (provincial crown land that is capable of producing commercial timber in a reasonable time period); Benchmark Land (rural, provincial crown land which is suitable for agriculture, range, settlement or commercial use); and Other Lands (alpine, sub-alpine, non-vegetated, rock or swamp, or forest land that is not available or suitable for forestry).

Of the above categories, forest land makes up 28% of actual hectares, while benchmark land and other lands equal 10% and 62% respectively. However, the forest land makes up 88% of representative hectares, while benchmark lands and other lands combined make up only 12% of the representative hectares. In other words, only a little over a quarter of the land under negotiation is forest land, but it's worth much more in terms of forestry revenue than the rest of the provincial land that's being negotiated.

"The most significant factors in determining the relative value of land are the stumpage value and the volume of timber per hectare," explains Lee. "This is an important element in individual treaty negotiations as First Nations become more involved with the forest industry in their area and begin to manage the forest land in what will be their settlement land."

Canada is a big country. And land claims is a big issue. But there is a strong consensus in this country that resolving land claims is beneficial to both aboriginal and non-aboriginal peoples. Only through careful evaluation of the land, its resources and its people can the land claims issue be justly resolved.

Chris Lee can be reached at clee@pfc.forestry.ca

Wildfire - Rating the Threat

"The WTRS will help us determine how different land use decisions will affect the wildfire threat."

Scream "fire" and you can clear a room. Scream "Wildfire Threat Rating System" and you can fill a room - with forest resource managers interested in fire management strategies.

A Wildfire Threat Rating System (W.T.R.S.) has been developed for the McGregor Model Forest near Prince George, B.C. It provides forest resource managers with the knowledge to assess where and how fires are a potential threat and allows the exploration of fire management options. When this fire management planning system is coupled with a forest management planning system, it can be used to determine the wildfire threat associated with alternative forest management plans.

"A shift to alternative silviculture techniques means the landscape is changing as well as the fuel complex, which means the wildfire threat has also changed," said Dr. Brad Hawkes, fire research officer in the Fire Management Network of the Canadian Forest Service. "The W.T.R.S. will help us determine how different land use decisions will affect the wildfire threat in a given area."

Although the W.T.R.S. will be essential to determining how the wildfire threat is affected by various silvicultural techniques, its immediate use is as a tool for managing wildfires. The concerns of a fire manager include: the potential for fire ignition; the values at risk; the potential wildfire behaviour; and fire suppression. The W.T.R.S. compiles these factors to create an overall wildfire threat for a specific area.

"With GIS and the accompanying analysis system, we are able to look at many variables at once and understand how they operate together," explains Hawkes. "With such information we can make predictions for future scenarios to determine which factors would lead to, or avoid, a wildfire in the area."

Forest inventory information about the McGregor Model Forest was coupled with silviculture information to create a fuel-type map for the area. This map was overlaid with digital terrain information to determine slope and aspect which affects fire behaviour. Details such as rate of spread, fire intensity and potential for crowning were combined into another map. The suppression capability was calculated by considering such factors as access to water supplies and characteristics of the landscape. Finally, the values at risk were added into the equation. Each of these components were weighed equally to come up with an overall wildfire threat.

The McGregor Model Forest is valued by local communities for its employment, forest products, recreation and cultural values. The 181,000 hectares of mostly rolling plateaus and abundant wetlands are dominated by spruce and alpine fir. The forest has been affected by timber harvesting, wildfire, defoliating insects, bark beetles, disease, wind throw, and floods.

"It was found that although the McGregor Model Forest as a whole has a moderate to high overall wildfire threat, there were many areas that rated a much lower threat," said Hawkes. "Knowing what part of the forest is under the greatest threat allows the fire manager to assess potential fires in a strategic manner. For example, before fire season begins, the fire manager would be able to determine the optimal place to position fire-fighting resources."

The W.T.R.S. was first introduced in Australia but its application to the McGregor Model Forest was a collaborative effort between the Canadian Forest Service, the B.C. Ministry of Forests and the McGregor Model Forest.

Dr. Brad Hawkes can be reached at bhawkes@pfc.forestry.ca

The W.T.R.S. allows fire managers to assess fires in a strategic manner.

Studying the Spatial Dynamics of the Hemlock Looper

"The suitability of a forest stand to a defoliator such as the hemlock looper will depend upon two broad factors..."

A little more elbow room at the banquet table may be just what it takes to curb the voracious appetite of the hemlock looper, says Dr. Allan Carroll, an insect ecologist who has spent three years studying this destructive defoliator in the balsam fir forests of Newfoundland.

Dr. Carroll joined the Pacific Forestry Centre research staff in March 1997 to work with the Effects of Forestry Practices Network investigating ways in which we can use forest practices to control forest defoliators. Dr. Carroll comes to us from the Atlantic Forestry Centre (Newfoundland) where he was the leader of a multidisciplinary project of the Forest Ecosystem Processes Network studying the spatial dynamics of hemlock looper, one of Newfoundland's most serious pests.

"The Black Pond project was established to assess how stand conditions influence the spatial dynamics of hemlock looper populations," says Carroll. In an ecological context, spatial dynamics refers to where populations occur rather than when they occur. "The suitability of a forest stand to a defoliator such as the hemlock looper will depend upon two broad factors: the quality of foliage within the stand to the larvae and/or the probability of mortality from predators and parasites. Long-term observations indicate that hemlock looper populations tend to concentrate in dense, mature, slow-growing balsam fir stands rather than ranging far and wide throughout the forest. This suggests that either the quality of food for hemlock looper larvae is high, or there is a lower probability of mortality from predators and parasites in these stands."

Hemlock Looper

It would appear that the hemlock looper is a discerning diner, but why one patch of trees and not another? Utilizing intensive manipulations of an existing forest stand to simulate the range of conditions encountered by the hemlock looper, Carroll was able to ascertain that foliage quality, mediated by tree vigour, was primarily responsible for dictating stand suitability. "In dense, slow-growing stands, trees are typically in direct competition with their neighbours for nutrients and light. This results in complex changes to the chemical characteristics of foliage, enhancing its quality to hemlock looper larvae."

For the hemlock looper, however, stressed trees not only mean better food, but better timing. The looper feeds on tender young buds as soon as they flush. In a fast-growing, vigorous stand, the flush occurs before the hemlock looper caterpillars emerge. By the time they appear, the foliage is no longer appealing to them. In stressed trees, however, the flush more closely coincides with the emergence of the looper caterpillars.

The traditional approach to controlling hemlock looper populations involves aerial application of insecticides. Allan Carroll's work is aimed at preventing outbreaks before they occur by using forest practices to alter stand conditions. "There are several practices we can adopt," says Carroll. "Increasing the vigour of high-risk stands by thinning, spacing or even fertilizing will reduce the suitability of these stands to the looper. Alternatively, we can harvest high-risk stands and literally snatch the food out from under the pest."

Carroll has also looked at ways of identifying high-risk stands at the landscape level. "When you are dealing with single stands within thousands of hectares of forest, the logistics can be daunting," he says. Remote sensing may prove a useful diagnostic tool. Last year, Carroll and Joan Luther, a remote-sensing specialist with the Landscape Management Network, conducted laboratory tests with a handheld spectroradiometer and demonstrated that balsam fir vigour can be discriminated based upon spectral reflectance. Aerial field tests are scheduled for this year.

Dr. Carroll looks forward to applying the knowledge gathered in the Black Pond project to similar defoliating pests in B. C.'s forests. "The western hemlock looper, a close cousin to its eastern counterpart, is a prime candidate for this research, as is the spruce budworm."

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Disturbances in the Forest

"We do not yet know what disturbance really means to ecosystem management."

The only thing constant is change. This is particularly true of our perpetually evolving forest ecosystems where change is brought about both by natural and man-made disturbances.

Disturbances are essential components of natural ecosystem processes. Researchers Vince Nealis and Fangliang He of the Pacific Forestry Centre are studying disturbance processes to evaluate the effects of man-made disturbances and to guide our forest management decisions.

Dr. Vince Nealis, an insect ecologist, came to the Pacific Forestry Centre from the Great Lakes Forestry Centre in early 1997 to work in the Forest Ecosystem Processes Network. According to Nealis, our attitude towards disturbances is undergoing a change.

Dr. Fangliang He (far right) explains the effects of weevil on a sitka spruce tree.

"We no longer view disturbances as something necessarily to be prevented," says Nealis. "In fact, prevention often has negative consequences such as in fire regulated lodgepole pine ecosystems where a strict policy of fire suppression resulted in dense stands of overmature trees ripe for beetle attack. By removing one 'problem', we created another."

"Disturbances caused by insect pests are an integral component of forest ecosystem processes. Over the past fifty years, we have focused our research on methods to control insects responsible for significant damage in managed forests. But the way we perceive these pests is changing."

Nealis believes we can enhance our traditional pest management techniques with an ecological perspective on insects. The opportunity to do so arose several years ago when spruce budworm attacked a remote section of Ontario's forest.

"Because there were no plans to manage the stand for timber values, resource managers decided not to intervene. This presented an opportunity to observe the process from infestation through various stages of recovery," says Nealis. "We began to monitor and document the processes at the height of the outbreak. By selectively killing the conifer tree species, budworms have converted the stand, created a rich plant community, and hastened natural regeneration. An insect we consider a pest played a major role in this rejuvenation."

Dr. Fangliang He, a plant ecologist in the Effects of Forestry Practices Network, is interested in how the diversity of vascular plants on sites disturbed by forestry practices differs from the biodiversity of natural forest ecosystems of similar age. "Ecological management and management of natural areas is primarily the manipulation of disturbance. We do not yet know what disturbance really means to ecosystem management or what we can learn from natural disturbance in vegetation management," explains He. "Comparing man-made and natural processes helps us determine whether our forest practices are contributing favourably to the well-being of the ecosystem."

Dr. He is studying the various factors that influence plant biodiversity. He is surveying and documenting the floristic composition in the sites with different silvicultural practices and natural successional seres. "One approach is to compare the differences in species response to selective thinning and natural gap opening. This allows us to determine if selective thinning mimics natural gap disturbance."

He adds, "I am particularly interested in identifying the levels of disturbance and competition that evoke the highest diversity and to understand why these levels are most favourable. The information derived from this study will be very useful in guiding our forest vegetation management."

The ecological perspective of both researcher's studies provides an important foundation for research that will enable us to improve our forest practices and manage our forests more wisely.

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Genetic Diversity: Essential

"It is only with genetic diversity that present and future trees will have the chance to adapt to a changing environment."

It has been said that "variety is the spice of life" but it is more than that. It is essential to life itself.

Biodiversity is the very basis of existence on this planet. It is a species' genetic diversity that allows it to adapt to its changing environment. Therefore, in order to sustain biodiversity, we must study the genetic differences between species and between individuals of a species. The dynamics of genetic diversity are what Dr. Eleanor White, research scientist in the Forest Biodiversity Network of the Canadian Forest Service, is committed to understanding.

Genetic diversity and disease resistance

Golden spruce is an example of genetic diversity in the forest.

Although demand for wood is increasing, regulations in Canada, such as the B.C. Forest Practices Code, stipulate that the same amount of wood be produced on a smaller land base. To meet this challenge, a tree's expected growth rate and disease resistance as well as its wood and fibre quality, needs to be ensured without sacrificing much of the tree's genetic variation. It is only with genetic diversity that present and future trees will have the chance to adapt to a changing environment.

"When you start talking tree improvement, you have to cut down on the number of parent trees," explains White, working at the Pacific Forestry Centre. "This is just as true for trees as it is for crops or animals. When you select only a few characteristics (to propagate a species) there's a potential of reducing the genetic base."

A species can be resistant to a particular pathogen, but what if there are different races of that pathogen? The nature of biodiversity is that all organisms are adapting to their environment, including a pathogen. Many agricultural crops have been completely destroyed because although they were able to resist a particular pathogen, their restricted gene base made them susceptible to another race of the same pathogen. If a tree is resistant to, for example, white pine blister rust, will it be susceptible to a different race of that pathogen? If the genetic composition is varied, chances are greater that the species will be able to adapt to changes in the pathogen.

Understanding diseases such as white pine blister rust has been a frustrating challenge since the spores are minuscule and there are no morphological differences evident. Scientists once believed that blister rust is an organism that reproduces asexually, with each spore a clone of the other. However, as Dr. White explains, "By using ribosomal DNA as a molecular marker, genetic variation within blister rust was proven to be very dynamic; there are many different genotypes of the fungus floating around." This is why trees that appear to be resistant suddenly become infected with the disease.

Genetic diversity and climate change

How will the forest survive the possibility of global warming? As the country warms, a tree species may adapt to the climate, or gradually move north. But with climate change comes other environmental factors that a species will not be able to tolerate without a varied genetic composition.

Genetic diversity is not always evident except at the molecular level. Douglas-fir, for example, is found in many different areas in B.C. and in widely diverse weather conditions. Yet, aside from some differences between coastal and interior trees, its morphological characteristics are very similar. Studies performed at the genetic level indicate that despite appearances, the species is not very

to Sustaining Biodiversity

homogeneous. Populations of Douglas-fir differ greatly at the gene level, therefore, should climate change prove to be reality, the species may have a genetic buffer that allows it to adapt.

Red pine, found throughout Manitoba and eastward through to the Maritimes, has a very reduced genetic variability compared to other common species present in those areas. “What’s the secret of its success?” asks White. “It must have some sort of physiological flexibility that allows it to not rely solely on differences between individuals to keep it going. But we don’t know the dynamics; we are only scratching the surface in figuring out how diverse conifers are.”

Understanding the physiological adaptation parameters of a species is essential to determining if a species may more readily adapt to climatic changes such as global warming. But considering the overwhelming diversity of the environment, where there are differences between species as well as between individuals within those species, it is evident that genetic diversity research is in its relatively early stages.

How is genetic diversity studied?

Genetic diversity has always been of interest to scientists, but research has been limited to comparing morphological features. It requires many crosses and backcrosses to establish the genetic control of characteristics in animals such as eye colour. But similar distinguishing features, like cone shape or size can be difficult to discriminate on trees. For example, cones of lodgepole pine look very similar to each other so it is difficult to determine if there is variation within the species. If differences are evident, it may be due more to their growing environment rather than any genetic difference. Because it takes several years for a pine to mature enough to produce cones, backcrosses are difficult. With the development of DNA analysis, however, diversity can be examined within the gene itself.

“Quite extensive studies have been done using terpenes, the volatile compounds found in conifer needles and bark that give trees their scent,” explains White. “The chemical structure of these compounds are under genetic control so, as genetic markers, terpenes made diversity among tree populations evident. Isozymes, different forms of certain enzymes, have also been used. However, they are complicated to analyze and are not genes themselves, but products of genes, so the environment can effect their expression. By looking at the DNA itself, however, you are able to see the differences between trees of a species from within the gene itself.”

What is the process of DNA analysis?

DNA is extracted from a tree and digested with restriction enzymes which recognize particular nucleotide sequences in the DNA. Differences in these sequences are mapped to see if they correlate with characteristics apparently related to genetic resistance.

“We’ve isolated some genes for disease response and determined how they are organized in different conifers,” said White. “In our comparisons of trees that are resistant with those that are not, we have found a resistant tree that appears to have a single gene for resistance. We’re trying to determine if any of these disease response genes differ in the progeny of this tree. If there are differences, we’d be able to make a genetic map for a tree species that will include where the disease resistance gene is on the chromosome and where the disease response genes are.”

Although still a relatively new means of research, DNA analysis is helping scientists to understand the diverse genetic composition of trees.

What does this research mean for the forest?

We need to understand the dynamics of genetic diversity in the forest so that we can retain Canada’s legacy of biodiversity while meeting the demand for forest products. By understanding the complexities of the forest we can best utilize its resources while causing the least amount of harm to the environment and to the quality of life on the planet.

Dr. White can be reached at ewhite@pfc.forestry.ca

Soil: Nutrient Dynamics and Processes

"This is a truly multidisciplinary project that looks at the entire ecosystem."

As Dr. Doug Maynard moved westward to the Pacific Forestry Centre from the Northern Forestry Centre in Alberta, a sign welcoming travelers to British Columbia was the only indication that he had crossed a provincial border. The forests provided no clue.

"Forests have no respect for political borders," says Maynard, a soil scientist working within the Effects of Forestry Practices Network. "British Columbia and Alberta share forests along the entire length of the border. While provincial forest management policies differ, the forests and how they are effected by forestry practices do not."

Much of Maynard's research was conducted on the Alberta side of the forests the two provinces share. He now hopes to establish partnerships between researchers in each province that will transcend the borders and look at the forest as a whole. A candidate for one such partnership is in the boreal forests of northwest Alberta where Maynard is a member of a multidisciplinary team studying a site where silvicultural systems such as strip cut and shelterwood are being used to control spruce budworm.

Aspen trees are found in both B.C. and Alberta.

In this project, Maynard is investigating the effects of those forestry practices on soil nutrient dynamics related to the inorganic chemistry of soils. "We are increasingly turning to alternative silvicultural systems to manage our forests and need to know the effects these have on all aspects of the ecosystem including their impact on soils," says Maynard. "Many of these practices require more frequent entries to the forest and are distributed over a larger portion of the landscape. Soil disturbances are therefore more frequent and less localized. We need to determine if these practices are sustainable over time while providing a reasonable yield."

As the primary repository of nutrients in the inorganic or mineral form that trees require for growth, soils are important to sustainability. Disturbances caused by forestry practices can disrupt the dynamics that contribute to nutrient mineralization and alter characteristics of the soil compromising its ability to acquire, store or release these nutrients.

Nutrient mineralization is most commonly the product of decomposed organic matter such as woody debris and litter. Removing organic matter can result in a loss of inorganic nutrients. We can help offset this loss through practices designed to leave adequate amounts of organic matter on the site. One of these practices, chipper residue applications, is the subject of another of Maynard's studies in a cooperative project within the Foothills Model Forest near Hinton, Alberta.

"These applications involve bringing remote chippers to the site, chipping the woody debris and spreading the residue on the site," says Maynard. Though this practice benefits the soil by increasing the amount of organic matter in the soil, enhancing its water holding capacity and reducing soil density, it also has some potentially detrimental effects. "If the layer of residue is too deep it can initially tie up nitrogen. It also has an insulating effect that may have negative consequences for cold boreal soils."

Maynard's research on this site will help determine whether chipper residue application is a sustainable practice that yields long-term benefits to soil productivity.

Dr. Maynard can be reached at
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Nutrient Cycling on Regenerating Sites

"Following harvest, a site can experience an initial liberation of nutrients."

Although Dr. Brian Titus, a forest ecologist in the CFS Forest Ecosystem Processes Network, has only recently relocated to the CFS's Pacific Forestry Centre (PFC) from the Newfoundland Forestry Centre in 1996, he has worked from a distance with PFC staff for several years in cooperative studies.

Titus' research into reforestation problems related to nutrient cycling and Kalmia, an ericaceous shrub common in Newfoundland, brought him to the attention of PFC chemist Dr. Caroline Preston who had ericaceous problems of her own. The growth rate of trees on regenerating sites in the coastal hemlock forests of Vancouver Island where the understorey is dominated by salal (a shrub related to Kalmia) had inexplicably slowed down.

From opposite sides of the country, the chemist and ecologist worked together to determine the causes of the growth check. They hypothesized that tannins released by ericaceous shrubs tie up nitrogen, depriving other species of this important nutrient. The two researchers are now literally working closely together to further investigate the role of tannins in binding proteins and reducing nitrogen availability in the soil in ericaceous-conifer systems.

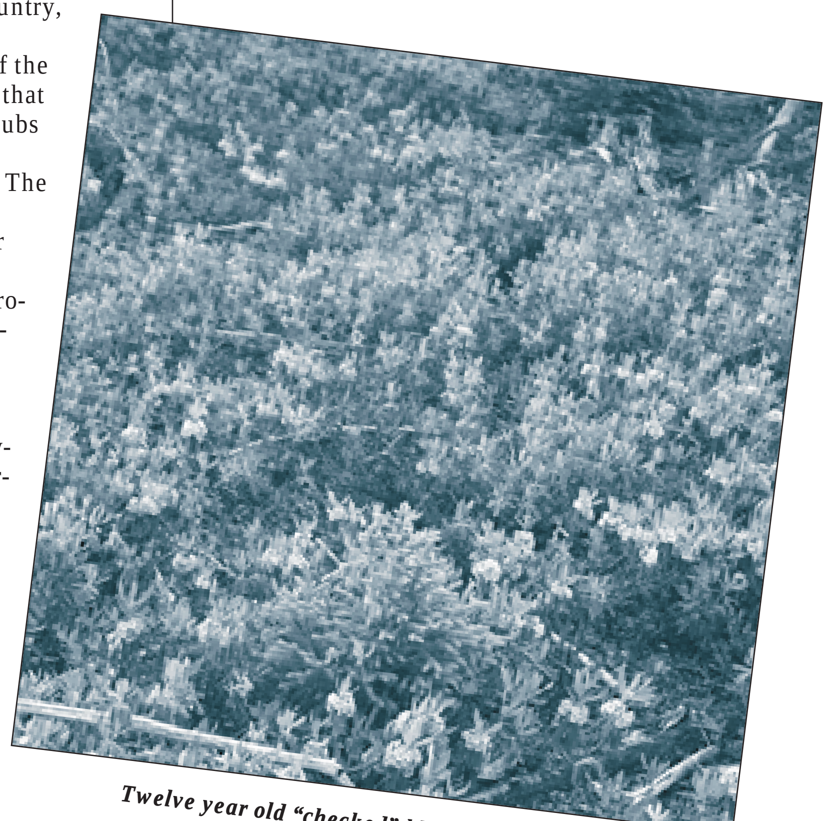
Since 1992, Titus has also worked with PFC's Dr. Tony Trofymow as the Newfoundland cooperator in the Canadian Intersite Decomposition Experiment (CIDET), a cooperative study investigating the long-term rates of litter decomposition and nutrient mineralization over a broad range of Canada's forested ecoclimatic regions. He will continue his work on this project at PFC.

Both these projects reflect Titus' interest in nutrient cycling on regenerating sites. He has also left behind work in Newfoundland on nutrient cycling in white birch stands following different harvesting intensities that is overseen by study leader Bruce Roberts.

"Following harvest, a site can experience an initial liberation of nutrients due to reduced vegetation uptake and release of nutrients from decomposing roots and slash," says Titus. The work with white birch will determine whether any increased nutrient leaching that occurs shortly after harvesting will lead to a long-term loss of site productivity.

Titus is investigating the effects of forestry practices on these fundamental ecological processes to determine how can we adapt our practices to prevent nutritional problems from occurring.

Dr. Titus can be reached at btitus@pfc.forestry.ca



Twelve year old "checked" black spruce seedling amongst Kalmia angustifolia.

Effects of Forestry Practices on Nutrition

"To control nutrient stress, we must ensure that seedlings receive nutrients frequently at low addition rates."

For twenty years, research silviculturist Dr. Darwin Burgess has studied the effects of forestry practices on tree nutrition. Before joining the Effects of Forestry Practices Network at the Pacific Forestry Centre in 1996, Burgess led the Optimum Forest Productivity Project at the Petawawa National Forestry Institute near Chalk River, Ontario.

Burgess is involved in several field projects investigating how and why forestry practices influence forest development and nutrient cycling. In projects with sites in New Brunswick's Fundy Model Forest, British Columbia's MacGregor Model Forest, and in two locations in Ontario, he is helping to evaluate the effects of scarification, fertilization and brush control on the development of various species. "We are using a similar experimental design on each of these sites to not only determine how these practices affect forest development locally, but how the effects may differ according to forest region." In another field study, Burgess is investigating the effects of partial cutting, site preparation and underplanting on eastern white pine ecosystems within the Petawawa National Research Forest.

In addition to his field research, Burgess is studying how tree seedlings of various species adapt to different levels of nutrient stress in growth chambers where the rate of nutrient addition is carefully regulated. "To control nutrient stress, we must ensure that seedlings receive nutrients frequently at low addition rates," he explains. "The objectives of this research are to describe symptoms of stress in tree seedlings so we can quickly identify problems in the field when they arise, and to establish which rate promotes optimum growth."

Burgess is working with young seedlings whose rate of growth is consistent and predictable in the growth chambers. To isolate the effects of the rate of nutrient availability, all the seedlings receive equal light and water and are fed with a solution that contains all the essential nutrients. Only the rate of nutrient addition varies. "When seedlings are deprived of adequate nutrients, they adapt their physiology and morphology," says Burgess. "We are observing and measuring this behaviour under several intensities of nutrient stress."

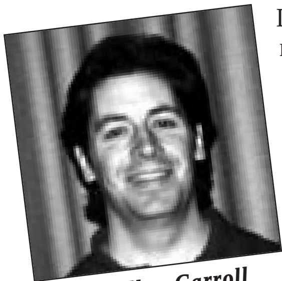
This research will also provide more information on how nutrient requirements and stress responses differ between species and whether the environment to which seedlings are adapted is influential. "We're currently working with coastal Douglas-fir seedlings using seedlots taken from different elevations to see if there is a difference between trees adapted to the mild climate of lower elevations and those adapted to the colder, harsher conditions of higher elevations."

The results of Burgess' research will help forest managers in the field discern stress related to the rate of nutrient availability and provide nursery growers with information that will enable them to produce even healthier stock.

Dr. Burgess can be reached at dburgess@pfc.forestry.ca

Partial cutting and site preparation treatments - to encourage natural regeneration of eastern white pine.

Staff Comings and Goings

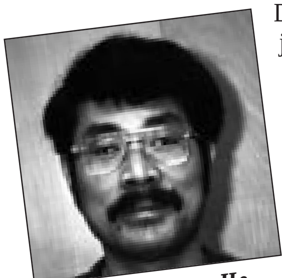


Dr. Allan Carroll

Dr. Allan Carroll, a research scientist in the Effects of Forestry Practices Network, has arrived from CFS Newfoundland. See story on page 4.

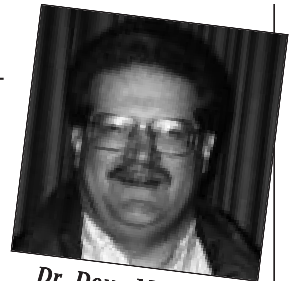
Anne Dickinson

Welcome to Anne Dickinson, technology transfer officer in Marketing and Operations. Anne comes to us from Parks Canada where she spent 13 years delivering interpretation, communications and environmental education programs.



Dr. Fangliang He

Dr. Fangliang He has just secured a position as research scientist in Plant Ecology after working at the Pacific Forestry Centre on his post-doctoral research. See story on page 5.



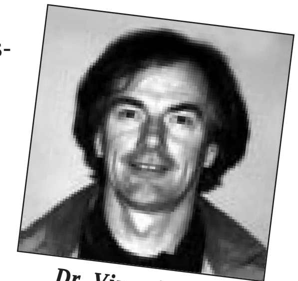
Dr. Doug Maynard

Dr. Doug Maynard, a research scientist in the Effects of Forestry Practices Network, is here from the Northern Forestry Centre in Edmonton, Alberta. See story on page 8.

The Pacific Forestry Centre welcomes Rick Morrison as senior systems scientist. He will be developing computer software in support of research projects and computing system infrastructure. His areas of interest are graphical user interface design and applications of artificial intelligence.

Rick Morrison

Dr. Vince Nealis from the Great Lakes Forestry Centre in Sault Ste. Marie, has come to the Pacific Forestry Centre to work as an insect ecologist in the Ecosystem Processes Network. See story on page 5.



Dr. Vince Nealis

Jim Wood comes to us from the Great Lakes Forest Research Centre in Sault Ste. Marie, Ontario. As a research scientist there, his general area of interest was reforestation silviculture, specifically mechanical and chemical site preparation and vegetation management. As the coordinator, Forest Ecosystem Research Network Sites at the Pacific Forestry Centre, Jim is providing national coordination and liaison among the Effects of Forestry Practices Network and the nine other Networks across the CFS.

Jim Wood

Recent Publications

The effects of woody debris on sediment fluxes in small coastal stream channels. By P.R. Commandeur, B.T. Guy, and H. Hamilton. BC-X-367

Two first-order streams on the south coast of B.C. were studied to determine the role of woody debris in controlling the routing and storage sediment within high gradient channels in logged areas.

Recent Publications - 1996 BC-X-366.

A listing of 1996 reports and publications authored by staff at the Pacific Forestry Centre.

Canada's Forest Inventory 1991: Summary by terrestrial ecozones and ecoregions. By J.J. Lowe, K. Power, M.W. Marsan. BC-X-364E

The products of this report include maps of the ecozones and ecoregions of Canada.

Advancing boreal mixedwood management in Ontario: Proceedings of a workshop; 17-19 October 1995, Sault Ste. Marie, ON. Compiled by Smith, C.R.; Crook, G.W.

A compilation of nine plenary papers that summarize the current state of knowledge about the ecology of boreal mixedwoods and discusses management philosophies for these cover types. New research relevant to the future management of boreal mixedwoods is also discussed.

Results of black spruce research in Ontario: A compendium. Compiled by Crook, G.W.; Cameron, D.A.

Contents include: Inf. Rep. 0-X-449 (Bibliography of black spruce literature published by the Great Lakes Forestry Centre); and Frontline Technical Notes 25-84.

Upcoming Events

Canada's Forests... Varied Treasures
National Forest Week 1997: May 4 - 10

National Forest Week (NFW) is an annual event that focuses attention on Canada's forest resources and the benefits they offer to Canadians. This special celebration is sponsored by the Canadian Forestry Association and is supported by governments, forest sector associations, businesses and non-profit groups across the country. The Pacific Forestry Centre (PFC) plans to host a "Science Showcase" during National Forest Week. Clients, partners and neighbours will be invited into the lab to see more of what CFS does and to talk about what PFC has to offer. Visitors and guests can expect to hear talks or seminars, see demonstrations and displays, or participate in short lab tours. To find out more about PFC National Forest Week activities, contact the NFW Coordinator at (250)-363-0600 or by fax at (250)-363-6006.

Protected Areas and the Bottom Line
Canadian Council on Ecological Areas General Meeting
September 15-17, 1997. Fredericton, N.B.

The Canadian Council on Ecological Areas (CCEA) is a national, non-profit group that supports the development of a comprehensive system of ecological areas across Canada. Its 16th General Meeting - Protected Areas and the Bottom Line - is open to anyone interested in protected areas, biological conservation, private and public land stewardship and integrated resource management. For further information: CCEA 97 Conference, PO Box 6000, Fredricton, NB, Canada, E3B 5H1. Tel: (506)453-2730; Fax: (506)453-6630; E-mail: ccea97@gov.nb.ca; Http://www.gov.nb.ca/dnre/ccea.htm.

Global Approaches: Sustainable Forestry Certification - International Conference
September 21-26, 1997. Prince George, B.C.

Hundreds of delegates from more than 30 countries will join the Canadian Institute of Forestry and the International Model Forest Network in a five-day forum on the world's progress toward sustainable forest management and its certification. This conference will provide a unique opportunity for practitioners from around the world to share their experiences and perspectives, and encourage discussion about the potential impacts of certification. For further information, contact Cathy McClary, 6233 Tas Place, Prince George, B.C., Canada, V2K 4J3; Tel: (250)962-1928; Fax: (250)962-9199; E-mail: cathy@mcgregor.bc.ca.

Wildland Fire 97
An International Wildland Fire Conference and World-Class Trade Show
May 25 - 30, 1997 Vancouver, B.C.

The 2nd International Wildland Fire Conference will focus on the social, economic and environmental impact of wildland fire, with moderators and keynote speakers from Canada and around the world. It will include more than 600 international public and private agency delegates who will share information, discuss issues, and exchange programs and strategies within the theme of Wildland Fire Management and Sustainable Development. The Conference will also feature FireInfo 97, a two-day information exhibit and poster session, and Worldfire 97, a global perspective on world wildland fire programs. For further information please contact: Events by Design, 601-325 Howe Street, Vancouver, B.C., Canada, V6C 1Z7; Tel: (250)669-7175; Fax: (205)669-7083; E-mail: 74117.273@compuserve.com.

INFORMATION FORESTRY

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