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In this Issue...

Gypsy Moth
page 3

Natural Resources Canada

Ressources naturelles Canada

Canada

The Forest Ecosystem Research Network of Sites

"Through FERNS the high-quality of Canada's forest research is promoted nationally and internationally."

Approximately half, or 418 million hectares, of Canada's landmass is forest. This makes the country steward to one-tenth of the world's forests. That kind of responsibility requires long-term, scientifically sound research to ensure sustainable forests for Canada and the world. The Forest Ecosystem Research Network of Sites (FERNS), coordinated and promoted through the Canadian Forest Service, is a national suite of 23 autonomous research sites focused on developing innovative forest management practices and on understanding ecosystem processes at the stand level.

Like many forested countries, Canada is being evaluated internationally against the effects of its forestry practices on ecosystem productivity, ecosystem processes and long-term biodiversity. These complex issues – applied to an immense country with 14 ecological zones and numerous sub-zones – require multi-disciplinary and multi-partner approaches to research. FERNS, as a network of autonomous research sites, allows questions about forestry practices and ecological processes to be answered in a timely fashion based on long-term, comprehensive scientific studies.

"This country has a significant number of world-class, interdisciplinary, forest research installations representing major Canadian ecosystems. They have produced an impressive wealth of fundamental information – well in excess of 650 reports – scientifically tracking how Canada's forests grow and respond to various levels of disturbance and harvest," says Dean Mills (**dmills@pfc.cfs.nrcan.gc.ca**), coordinator of Business Development and Marketing at the Canadian Forest Service, Pacific Forestry Centre and the coordinator of FERNS. "Through FERNS, the high quality of Canada's forest research is promoted nationally and internationally."

Rather than just promoting the research within the Canadian Forest Service, FERNS includes research installations operated by provincial forest ministries, universities, forest industries, other federal government departments, consultants and individuals. Long-term multidisciplinary, multi-partnered research sites in Canada that are focused on the study of sustainable forest management in terms of harvesting options and ecosystem functioning are eligible for consideration in FERNS. Potential installations must also be accessible, well documented with historical stand and site information, located in a major forested Canadian ecozone, and protected for long-term research values. The site also must include areas of mature forest where natural successional stages can be observed or investigated.

"As a national network of research installations, FERNS will preserve the long-term research investments of these sites," explains Mills. "Data preservation and availability is essential, especially with research installations like the Petawawa Research Forest which has been operating in Ontario since 1918."

Another installation included in FERNS is the Sicamous Creek Research Project, a cooperative project between the British Columbia Forest Service, Riverside Forest Products and Canadian and American universities. This research project has been investigating how a high-elevation forest ecosystem in the southern interior of BC responds to different cutting and site preparation treatments. The goal has been to find ways to manage high-elevation forests to provide a sustainable wood supply while protecting the soil, wildlife, water quality, and scenic beauty of the ecosystem. Within this one installation are 35 integrated research studies.

"FERNS is a useful communications tool for researchers like myself," says Alan Vyse, a BC Forest Service research forester emeritus. "I can tell colleagues across the country about long-term silvicultural research sites in my part of BC and I can learn about other sites."

The worldwide scientific community today places a stronger emphasis on archiving and inter-connectivity of data sets. The wealth of information and data available from the installations accumulated through FERNS will make a significant contribution to Canada's forestry information requirements. More information including links to the 23 installations is available at the FERNS web site: **www.pfc.cfs.nrcan.gc.ca/ecology/ferns**.

FERNS represents all ecosystems in Canada.
= FERNS site

Science, Policy and the Gypsy Moth

"The gypsy moth in North America is an excellent example of how science and policy and Canadian and American researchers have worked together to restrict spread of an alien species."

Cover Story:
Gypsy moth (Lymantria dispar) *is one of North America's most devastating forest pests.*

The concept of partnership plays a significant role in a gypsy moth's life – and its death.

Originally from Europe and now in North America, the female gypsy moth is flightless and depends on human transport to travel any great distance. This affiliation between humans and the alien insect's movement was discovered through scientific research. Such science has been partnered with policy-making to combat infestations. Besides severely damaging trees, gypsy moth defoliation can cause other ecosystem changes and threaten native biodiversity. Infested areas also face trade restrictions as goods shipped outside the infected area must be certified free of gypsy moth. A partnership of cooperation between the private and public sectors is now necessary to prevent the spread of gypsy moth.

"Alien species invade ecosystems, not countries," says Dr. Vince Nealis (**vnealis@pfc.cfs.nrcan.gc.ca**), an insect ecologist at the Canadian Forest Service, Pacific Forestry Centre in *Alien Invaders in Canada's Waters, Wetlands, and Forests,* published by Natural Resources Canada. "We must recognize this and account for ecological, not political boundaries. The gypsy moth in North America is an excellent example of how science and policy and Canadian and American researchers have worked together to restrict spread of an alien species."

Dr. Nealis explains that although the gypsy moth came to Boston from Europe in the late-1800s, it was not found in Canada until 1911 and infestations requiring treatment did not occur until 1924. In both Canada and the US, infestations of the gypsy moth prompted the respective countries to enact legislation to combat injurious alien species. In Canada, this is the Plant Protection Act (1924). Since then, control objectives have included both prevention of spread and eradication of the insect – decisions based on collaborative research of Canadian and American scientists. Nonetheless, by 2000 the gypsy moth had infested most susceptible Canadian forests from New Brunswick to Lake Superior in Ontario. Meanwhile, in British Columbia, new introductions of the insect were found in the 1970s and continue to be found and associated with human transport of goods from eastern Canada. Fortunately, none of these introductions have resulted in a permanently established population of gypsy moth in BC.

Dr. Brad Stennes (**bstennes@pfc.cfs.nrcan.gc.ca**), a forest economist with the Industry Trade and Economics Research Program at the Pacific Forestry Centre, estimates potential increased inspection costs from a widespread gypsy moth infestation could reach several million dollars. This would be in addition to potential market losses, especially in the nursery sector.

Trade issues necessitate open communication and cooperative research between Canada and its closest neighbour. For example, both Canadian and American scientists use the same female sex pheromone as a lure in their respective monitoring programs. As well, the Canadian Food Inspection Agency, together with the BC Ministry of Forests, use the same detection grid design as used in the US. Such standardization assists researchers in understanding each other's research results, aids in collaborative research and provides objective, scientific data for negotiation of any trade restrictions that result from infestations.

Dr. Nealis is optimistic that the gypsy moth could be kept out of BC through preventive action. Although it is not possible to eliminate the insect from its established range in eastern Canada, Dr. Nealis says preventing movement of gypsy moth from the east is a policy that would go a long way toward avoiding such establishment in BC. "Whereas the federal government has the legislated authority for critical aspects of the program overall, provincial governments and the private sector have the operational capability of supporting the monitoring, inspection, auditing, and information gathering elements of a cooperative program. A program to prevent infestation in western Canada could be carried out successfully through a partnership among federal and provincial agencies and the private sector."

Alien Invaders in Canada's Waters, Wetlands, and Forests (Claudi, R.; Nantel, P.; Muckle-Jeffs, E., eds. 2002. Natural Resources Canada, Canadian Forest Service, Ottawa.) is written by experts in several disciplines concerning the global impact of alien species across Canada. More information is available through the Canadian Forest Service bookstore at: **bookstore.cfs.nrcan.gc.ca**.

Forests are More than Trees: Protection and Recovery of Species at Risk

"Besides trying to protect species at risk we are also trying to remove invasive species that are threatening endangered species in their natural habitat."

There are some 140,000 known plant and animal species in Canada, many of which are unique to this country. Canada has a moral responsibility to the world to preserve such biodiversity. Thus, for the past 25 years the Committee on the Status of Endangered Wildlife in Canada (COSEWIC) has been assessing and classifying specific species that are in need of protection. In June of this year a Species at Risk Act was proclaimed into law to conserve and protect endangered species and their habitats such as forests.

In Canada at least 340 species have been classified as being at risk of extinction. The birds, fish, mammals, insects, amphibians, reptiles, vascular plants, mosses and lichens that are at risk inhabit fields, wetlands, open waters and forests. Therefore, any legitimate forest management program includes plans to protect these threatened, endangered, or extirpated (i.e. no longer existing in the wild in Canada but existing elsewhere) species. Since 1986, the Canadian Forest Service, Pacific Forestry Centre has been assisting the Department of National Defence (DND), Canadian Forces Base (CFB) Esquimalt in Victoria, British Columbia, care for its forests under the Natural Resource Program on DND Lands. Integral to this management program – which covers 16 CFB Esquimalt properties totalling 4000 hectares of land – is a concern about protecting species classified as being at risk.

"Some of the species on DND lands include the Pacific water shrew, the sharp-tailed snake, the Oregon spotted frog, the Pacific giant salamander, and plants such as the seaside birds-foot trefoil. These and many others have all been classified by COSEWIC as species at risk," says Arthur Robinson (**arobinson@pfc.cfs.nrcan.gc.ca**), Federal Lands Program officer at the Pacific Forestry Centre. He is responsible for implementing the Natural Resource Program on DND Lands. "For each species at risk, a team is formed to deal with the concerns. It is composed of representatives from various organizations and individuals including those with expertise specific to the individual species. The team develops recovery strategies and action plans to not only ensure that the species will be protected in the area, but to help it thrive and increase in number."

Researchers on DND property looking for the tiny species-at-risk plant, Minuartia pusilla.

Robinson explains that the Canadian Forest Service receives funding from Environment Canada under the Interdepartmental Recovery Fund to receive funds for recovery projects concerning species at risk on DND lands. An example of these projects is a study on the phenology and demography of 11 plant species at risk. Projects funded by other sources include monitoring owls and migratory birds at Rocky Point on Vancouver Island, studies on flora and fauna in Masset, BC, and numerous inventories on various forests. Such projects have provided DND with a greater understanding of the endangered species on their land. To aid in identification, Robinson has created detailed guides about every species at risk on DND lands. He is also helping to present workshops to explain the Species at Risk legislation and its implications to federal landowners as well as how to manage federal forests to ensure they remain safe habitats for the species.

"Besides trying to protect species at risk," explains Robinson, "we are also trying to remove invasive species that are threatening endangered species in their natural habitat. Examples include research on English ivy, Daphne laurel, Scotch broom and gorse conducted by Dr. Raj Prasad, a research scientist at the Pacific Forestry Centre. These plants threaten the endangered Garry oak and other ecosystems."

COSEWIC determines if a species is threatened or endangered based on a rigorous, independent scientific process operating at arm's length from the government. The Act is one component of a three-part Strategy for the Protection of Species at Risk. It was created based upon extensive cross-Canada consultations involving all levels of government, Aboriginal peoples, non-governmental organizations, farmers, ranchers, fishers, representatives of industry and other interested Canadians. A Species at Risk Registry has been created by COSEWIC to allow those who are concerned about threatened species to view the facts and hold decision-makers accountable. It is at **www.sararegistry.gc.ca**.

Climate Change and Mountain Pine Beetle Range Expansion in BC

"Our data show a significant increase in the number of infestations occurring in areas that were historically climatically unsuitable for the beetle."

The United Nations Intergovernmental Panel on Climate Change estimates that the average global surface temperature is likely to increase by between 1.4°C and 5.8°C by 2100. Canada, far from the equator, should experience greater climate changes than the global average. The country's mean annual temperatures may increase between 5°C and 10°C over the next century. If you are a mountain pine beetle, these are your options: move, adapt, or die out.

Of all forest life, insects – which are cold blooded – are probably best equipped to adapt to climate change. They are good dispersers with high reproductive rates. In fact, the mountain pine beetle has already adapted. Dr. Allan Carroll (**acarroll@pfc.cfs.nrcan.gc.ca**), a research scientist at the Canadian Forest Service, Pacific Forestry Centre, has uncovered a substantial shift in climatically suitable habitats for the mountain pine beetle in the latter half of the 20th century. The shift, northward and toward higher elevations, has been followed by mountain pine beetle populations. "Our data show a significant increase in the number of infestations occurring in areas that were historically climatically unsuitable for the beetle. Moreover, our modeling predicts that under a plausible climate change scenario there will be continued expansion north and east of climatically suitable habitats," says Dr. Carroll. "This suggests that mountain pine beetle populations will continue to move north and into higher elevations."

The mountain pine beetle population has doubled yearly in the last several years. It caused mortality of pine trees across about two million hectares of forest in British Columbia in 2002 alone. Foresters have limited control options with a beetle that only emerges from underneath the bark for a couple of weeks per year. Range expansion could have huge implications for the forest industry in BC. "If beetles are able to expand into new pine habitats, the populations are not going to go away as they did in the past," says Dr. Carroll. "The big worry is that they will expand into jack pine. If they do, the problem will quickly take on national significance."

Mountain pine beetle populations have expanded their range to the north and into higher elevations in recent decades.

Both lodgepole pine and jack pine are suitable hosts for the mountain pine beetle. Lodgepole pine covers most of BC and extends into the Yukon and Northwest Territories; jack pine spans the country. Yet the beetle's range has been limited mainly to the southern half of BC, held in check by the occurrence of cold winter temperatures and summers too cool for the beetles to complete their development in a single year. Dr. Carroll's research shows that during the last 40 years the number of infestations increased in habitats that were normally climatically unsuitable. This can only mean that conditions over time have become more suitable for the beetle.

Dr. Carroll combined his expertise in mountain pine beetle ecology and outbreak development with that of other researchers. He used a model for mountain pine beetle climate suitability developed by Dr. Les Safranyik, a recently retired Canadian Forest Service, Pacific Forestry Centre scientist. He also used BioSIM© software (developed by Dr. Jacques Régnière, a research scientist with the Canadian Forest Service) that generates landscape level projections of climatically suitable habitats. Dr. Carroll drew from data collected by the Forest Insect and Disease Survey between 1959 and 1996 on mountain pine beetle infestations, and daily weather data for western Canada. He then overlaid maps of mountain pine beetle occurrence in the province on a map of historically suitable climate to determine if beetle infestations have followed the expansion of climatically suitable habitats.

Dr. Carroll's research currently predicts that as long as temperatures increase life will be "better" for the mountain pine beetle, but this summer he plans to investigate what happens if it gets too hot. "My colleagues in the US Forest Service have developed a model that takes into account the potential negative impacts on the beetle if temperatures increase beyond what is good for their development," he says. "I hope to combine this with the existing model of climatic suitability to create an improved risk assessment system for land managers to use in decision support."

Information on other mountain pine beetle research is available at **pfc.cfs.nrcan.gc.ca/entomology/mpb**.

Host/pathogen Interaction Research in the White Pine Blister Rust Pathosystem

White pine blister rust was introduced to a nursery in Vancouver, British Columbia in 1910. The disease spread rapidly through western North American hosts – five-needle pines like western white, sugar, and whitebark are among the most susceptible – to the point that, in many regions of BC, white pine is no longer considered a viable commercial species. Diamond-shaped, orange-coloured cankers indicate infections on young stem and branch tissue; older stems bear scars of roughened, dead bark, often with resinosis. Through 19 years of painstaking research Canadian Forest Service research scientists have discovered both stem and needle forms of resistance to the white pine blister rust pathogen. Dr. Rich Hunt (**rhunt@pfc.cfs.nrcan.gc.ca**), a forest pathologist at the Pacific Forestry Centre, collects spores, screens seedlings, and pyramids resistant traits for the BC Ministry of Forests. Dr. Abul Ekramoddoullah (**aekramod@pfc.cfc.nrcan.gc.ca**), a research scientist in Forest Biotechnology and Genetics at the Pacific Forestry Centre, develops biochemical and immunochemical methods for screening western white pine thought to be resistant to blister rust. In the following interview, the researchers share their perspectives on the challenges and opportunities in studying host/pathogen interactions in the white pine blister rust pathosystem.

Dr. Hunt studies slow-canker-growth seedlings at different stages of development.

Dr. Rich Hunt:

"Developing the white pine blister rust inoculum seems simple, but it took us about three years to figure out how to collect the spores. In dry weather you can take a canker and break the little pustule and the spores tumble down into a film canister. But this year it's been raining all the time, which is terrible weather for collection. If you get a raindrop in the film canister the spores will try to germinate and then you end up with a tangled mass of yellow fungus. We solved that problem by modifying these tiny vacuum cleaners people use to clean computer keyboards. We use the vacuums to suck the spores into a film canister. Add a little desiccant and we can just put the film canisters in the egg rack in the fridge and store them for years.

"But the main challenge as far as I'm concerned is testing the different resistance types. For instance, the main resistance type that we've collected for is what we call "slow-canker-growth". With this type of resistance the canker in the stem grows very slowly. We've established four different categories of this type of resistance which we need to verify. There are also at least two defences that we know of in needles. But if we have a defence in the needle that takes effect, we don't know if that tree also has slow-canker-growth resistance in the stem.

"One of the responses in the needle is this little hypersensitive spot. We thought if we could graft into the stem of a hypersensitive seedling we would be able to see if we get slow-canker-growth. It turns out that we have trees that we know don't have slow-canker-growth, and yet when we graft into the stem of hypersensitive seedlings they all behave as if they do have slow-canker-growth. Whatever is happening in that needle is also happening in the stem. It mimics the other resistance slow-canker-growth.

"To detect needle resistance we can inoculate seedlings. First, we have to collect the seeds in the field and stratify them which takes three months, then grow them which takes a month or longer. Then we can inoculate the seedlings and check the needles for those little hypersensitive spots. But to detect slow-canker-growth we have to inoculate trees when they're two years old then wait three or four years. It takes eight years to go from seed to when we're finished testing a seed lot. It would be much easier if we could detect those resistances with

techniques Abul has developed. If we could check a tree in the field for resistance at any age it would save years."

Dr. Abul Ekramoddoullah:

"I came to the Pacific Forestry Centre with a background in allergens. Compared to conifer proteins it's easy to extract from pollen. When I started working with white pine it took two years to come up with an extraction procedure that would allow us to analyze the protein. We had to use a drastic method. The protein extract contained high amounts of detergent and a reducing agent, which interfered with commonly-used protein determination methods. So we had to develop a method for determination of conifer proteins extracted with detergent and reducing agents. Then we needed to figure out how to do it on an equal protein basis to make it possible to compare and contrast between the experimental group and the control group for susceptibility and resistance. That comparison is crucial.

"Today we have some exciting opportunities in our research into white pine blister rust. We are working on developing an antibody probe to validate our initial observations on the slow-canker-growth protein. In 1997 one of our graduate students discovered the anti-fungal protein present in the slow-canker-growth tree. We cloned the gene and discovered it showed homology with the macadamia nut anti-fungal protein. We were very excited about that. Now we are going back to see whether this protein is associated with anti-fungal resistance. If it is anti-fungal it makes sense that the trees that are producing this protein are slowly stopping the growth of the fungus.

Dr. Abul Ekramoddoullah separating proteins.

"To investigate we must first survey more of this material. This is a big task. It means Rich has to look for slow-canker-growth seedlings at different stages of development. Second, we must test the function to see if this protein really is anti-fungal. To test this, we are producing the protein in a recombinant form in bacteria in the lab that is identical to what the white pine would have produced. We grow the blister rust fungi as well, and set up anti-blister rust assay to see if the protein slows the growth of the fungus. To discover the genetic regulation we have to backtrack from the little information that we know on the expression of this protein, information that will eventually lead to a screening procedure.

"If the results of these two strategies are encouraging then we will know we have a marker for a slow-canker-growth gene. At least we will know for sure that there is something unique about this tree. In the meantime we are making an antibody probe for this protein. With our probe we will be able to go in and see which trees are resistant. Then we will develop screening tools.

"But single-gene resistance is actually our big project. So far in BC our breeding program doesn't have the single-gene resistance which has been identified in white pine needles in Oregon. Five years ago, in a project funded by Forest Renewal BC, we tested whether that resistance would work against our white pine blister rust fungal variants in BC. We found that the single gene from the Oregon program does also act against our rust fungi. The BC government incorporated our findings into their breeding program. They are selecting among slow-canker-growth trees to act as parents for the next generation of seedlings and Rich is selecting Oregon trees which have two copies of the single-gene resistance. The practice of putting both these resistances together is called "stacking" or "pyramiding" genes.

"In the future we hope to isolate this single gene and another similar gene from sugar pine. White pine blister rust also affects sugar pine, but sugar pine and white pine don't hybridize. We want to know whether we can apply the sugar pine gene in western white pine. We are already collaborating with the US Forest Service on this question. Rust fungi evolve so we want to stack layers of defence from different tree species. Our hope is to bring several resistant genes into not only the western white pine, but the eastern white pine and sugar pine as well."

Mountain Pine Beetle Epidemic

Risk Reduction Research and Development Program

"Interested researchers are invited to consider participating in the Mountain Pine Beetle Initiative research program."

The research and development element of the Mountain Pine Beetle Initiative will lead to a more efficient use of control options on future beetle outbreaks.

As detailed in the December 2002 and April 2003 issues of *Information Forestry*, the Federal Mountain Pine Beetle Initiative is a response to the mountain pine beetle epidemic that last year spread across an estimated two million hectares of lodgepole pine in British Columbia. Besides providing assistance for rehabilitating both federal and private lands affected by the mountain pine beetle, the Initiative includes a research agenda called the Mountain Pine Beetle Epidemic Risk Reduction Research and Development Program. This program will explore development, demonstration and dissemination of forest management options to reduce the risk of future mountain pine beetle epidemics.

The Mountain Pine Beetle Epidemic Risk Reduction Research and Development Program is designed to enhance the understanding of factors influencing magnitude and geographic distribution of mountain pine beetle. This will lead to a more efficient use of control options on future beetle outbreaks. Research and development is focused on epidemic dynamics such as detection, mapping and prediction; forest ecology such as responses and impacts; and management options at both landscape and stand levels. The Mountain Pine Beetle Epidemic Risk Reduction Research and Development Program includes research on product and market options, timber supply, and economic modeling to enhance community and manufacturing stability within sustainable forest resource management.

Research priorities for the Mountain Pine Beetle Epidemic Risk Reduction Research and Development Program have been established through a series of scoping sessions. Participants included land managers, regulators, policy-makers and First Nations who are actively battling the mountain pine beetle.

The magnitude of the current mountain pine beetle infestation means that intervention to bring the epidemic under control is not feasible. Therefore, short-term research priorities will provide information and address immediate needs to counteract the effects of the infestation. Short-term priorities include:

- Socio-economic impacts of epidemics
- Rate and geographic character of mountain pine beetle spread
- Definition of current attack boundaries
- Beetle control and salvage
- Impacts on and options for product mix
- Increased efficiency and reduced ecological 'footprint' for control and salvage

Longer-term research will focus on reducing the risk of mountain pine beetle epidemics. This research by its nature is broader in scope and geographical significance. Research priorities will center on more efficient and cost-effective monitoring, early detection, rapid response options, stand management to reduce vulnerability to beetle attack, and modeling for potential changes in macro-level environmental conditions. Some of the longer-term research priorities include:

- Monitoring and incidence technology
- Early control intervention
- The economics of control and non-control
- Decision support systems
- Effective transfer of mountain pine beetle management techniques
- Risk reduction management
- Mountain pine beetle control options
- Risk assessment of mountain pine beetle bridging into Boreal forest
- Ecological impacts
- Mountain pine beetle risk and impact assessments arising from changing macro-level environments

"Interested researchers are invited to consider participating in the Mountain Pine Beetle Initiative research program," says Dr. Bill Wilson (**bwilson@pfc.cfs.nrcan.gc.ca**), Director of Industry, Trade and Economics at the Pacific Forestry Centre and Canadian Forest Service leader of the Mountain Pine Beetle Initiative. "The review process for the March 2003 call is completed but the next call for research is in September 2003. A series of specific research priorities will be posted on the Mountain Pine Beetle Initiative web site in August."

The Mountain Pine Beetle Initiative web site, **mpb.cfs.nrcan.gc.ca**, details the procedures for applying for research assistance. It also provides further information about the priority topics, the review process and evaluation criteria, as well as submission deadlines. Because this is a publicly funded program, research results will be kept in the public domain.

Rehabilitating Federal and Private Lands under the Mountain Pine Beetle Initiative

"We are available to visit landowners and provide advice on eligible activities for the Private and Federal Forestlands Rehabilitation programs."

The mountain pine beetle epidemic in 2002 spread over an estimated two million hectares of trees in British Columbia. As detailed in the December 2002 and April 2003 issues of *Information Forestry*, the Federal Mountain Pine Beetle Initiative is a response to the mountain pine beetle epidemic. In addition to a research agenda that will address forestland management questions, the 5-year Initiative will provide assistance for rehabilitating both federal and private lands attacked by the mountain pine beetle. This assistance will be administered on a cost-shared basis under the Initiative's Federal Forestlands Rehabilitation Program and the Private Forestlands Rehabilitation Program.

The Federal Forestlands Rehabilitation Program is part of the Initiative that, in cooperation with Parks Canada, Indian and Northern Affairs Canada and the Department of National Defence, will address mountain pine beetle impacts on national parks, First Nations reserve lands, and military and other federal forestlands. The focus will be on identification and containment of the infestation in parks; on control, rehabilitation and forest management skills on First Nations reserves; and on forest rehabilitation on military lands and other federal forestlands.

The Private Forestlands Rehabilitation Program will assist non-industrial private landowners within the mountain pine beetle infested area that ranges from Fort St. James east to the Rocky Mountains. Emphasis will be on early mountain pine beetle control efforts and rehabilitation of beetle infested forestlands.

Photo credit: Andre Roy, BScF, RPF

The mountain pine beetle epidemic has attacked large areas of private forestlands as well as First Nations reserve lands, parks, military and other federal forestlands in British Columbia.

"To be considered for participation in the private forestlands element of the program the landowner must have a minimum of 10 contiguous hectares of productive non-industrial forestland in BC where the main focus, or potential use, is forest management," explains Nello Cataldo (**ncataldo@pfc.cfs.nrcan.gc.ca**), program manager in the Private Forestlands Rehabilitation Program and the First Nations and other federal forestlands components of the Federal Forestlands Rehabilitation Program. Working at the Canadian Forest Service, Pacific Forestry Centre, Cataldo explains that the First Nations element of the program includes First Nations Bands and their economic development groups, Tribal Councils, and First Nations forestry businesses and registered organizations within the beetle-infested area. "Priority will be given to proposal applications from First Nations Bands to plan and carry out mountain pine beetle forest management activities on their reserve forestlands."

To help those receiving assistance under the Initiative, a Canadian Forest Service forestry liaison officer is available on both the northern and southern ends of the mountain pine beetle epidemic. Helena Adamowicz is the forestry liaison officer in Prince George and Maureen Scott is the forestry liaison officer in Kamloops. They will help identify needs, implement and monitor the programs in the area, and provide technical advice.

"We are available to visit landowners and provide advice on eligible activities for the Private and Federal Forestlands Rehabilitation programs," explains Scott. "We also offer assistance with completing the application form. As a next step, support is provided through the program for landowners to hire a qualified person to survey the infected area. They then can develop a mountain pine beetle report that outlines strategies and treatments for dealing with the infestation. We are coordinating our program with the provincial ministries to ensure that work done on private and reserve land aligns with the provincial bark beetle management strategy."

Continued on Page 12

First Nations Forestry Program Renewed

"The program has been well received by First Nations."

Every great tree starts as a seed. In the same sense, every business requires seed funding to get it off the ground. Therefore, the First Nations Forestry Program has been providing seed funding since 1996 to enhance innovative forestry initiatives in First Nations communities in Canada. Recognized for its success in meeting this objective and as an outstanding example of interdepartmental cooperation, the First Nations Forestry Program has just been renewed until March 31, 2008.

"During the past seven years, the First Nations Forestry Program has been a very successful Government-First Nations partnership," says Herb Dhaliwal, Minister of Natural Resources Canada. "With the renewal of this program, the Government of Canada can continue to help First Nations communities and workers gain valuable experience in managing our forests."

The First Nations Forestry Program strives to improve economic development in First Nations communities by providing opportunities to enhance their capacity to manage forests, operate and participate in forest-based businesses, and increase cooperation and partnerships. This program also helps First Nations individuals increase their forestry-related knowledge, capabilities and business skills so they can more fully participate in Canada's forest sector.

Funded jointly through Natural Resources Canada, Canadian Forest Service and Indian and Northern Affairs Canada, the First Nations Forestry Program has funded 1326 projects, created more than 74,000 weeks of work and created opportunities for more than 5644 First Nations people to improve their forestry-related skills. Approximately 61 percent – or 375 of the 612 First Nations communities in Canada – participate in the program. Most of these communities are located in rural and remote areas.

"The forest has always been an integral part of the social, spiritual and cultural lives of First Nations in Canada. One of the goals of the First Nations Forestry Program is to help First Nations communities build an economic base in the forest without losing their traditional connection to the land," says Elaine Teske, Director of Programs, Canadian Forest Service, Pacific Forestry Centre and co-chair of the British Columbia First Nations Management Board.

In BC, the First Nations Forestry Program is delivered through a management board composed of twelve members (nine of which represent First Nations and three represent the Canadian Forest Service, the Department of Indian Affairs and Northern Development, and the BC Ministry of Forests) who review and approve project proposals. Applications are received at the Canadian Forest Service, Pacific Forestry Centre in response to annual call letters that are distributed to all bands and tribal councils as well as interested businesses, organizations and individuals in BC.

"The First Nations Forestry Program has provided a hand to many First Nations communities in strengthening their connection to the forest resources within their traditional territories," says Chief Nathan Matthew of the North Thomson Band, BC. He has been a member of the First Nations Forestry Program Management Board in BC for the last seven years. "The funding has been particularly effective in supporting the necessary planning and training related to forestry initiatives. The program has been well received by First Nations and should definitely be strengthened."

For further information regarding the First Nations Forestry Program in BC, contact Nello Cataldo at **ncataldo@pfc.cfs.nrcan.gc.ca**. The national First Nations Forestry Program web site is at **www.fnfp.gc.ca**. The BC First Nations Forestry Program web site is at **www.pfc.cfs.nrcan.gc.ca/programs/fnfp/**.

Photo credit: Andre Roy, BScF, RPF

The First Nations Forestry Program has created opportunities for more than 5644 First Nations people to improve their forestry-related skills.

Recent Publications

Extraction d'information forestière à partir d'images à haute résolution spatiale en utilisant une méthode de reconnaissance individuelle des cimes d'arbres. 2003. Gougeon, F.A.; Leckie, D.G. Ressources naturelles Canada, Service canadien des forêts, Centre forestier du Pacifique, Victoria, C-B. Rapport D'information BC-X-396F. 36 p.

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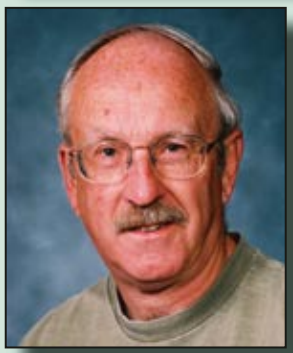
Comings and Goings

Comings and Goings

Farewell to physical scientist A.S. (Pal) Bhogal. For the last 11 years, Pal has been at the Pacific Forestry Centre developing expert and GIS systems for remote sensing applications using airborne and space-borne data. Last year, Pal was successful in the Career Assignment Program (CAP), and has been sponsored by the Science Branch at Canadian Forest Service headquarters in Ottawa. Pal's first CAP assignment is with Dr. Al Simard as a coordinator of Knowledge Management Initiatives.



Farewell to research technician Tom Gray who is retiring after 33 years with the Canadian Forest Service. At the Pacific Forestry Centre Tom was involved with developing detection, monitoring and control methods of forest defoliators in BC. He has been an integral part of studies on the management of recurring infestations, working closely with the BC Ministry of Forests.

Coming Events

Event	Date / Location	Contact
Mountain Pine Beetle Symposium	October 30-31, 2003 Kelowna, BC, Canada	web site: **http://esbc.harbour.com** Dr. Terry Shore **tshore@pfc.cfs.nrcan.gc.ca** phone: (250) 363-0666.
Joint Meeting of the Entomological Society of Canada and the Entomological Society of British Columbia	November 2-5, 2003 Kelowna, BC, Canada	
World Forestry Congress	September 21-28, 2003 Québec City, Canada	web site: **www.wfc2003.org** Secretariat at: **sec-gen@wfc2003.org**; phone: (418) 694-2424; fax: (418) 694-9922.
Information Interoperability and Organization For National and Global Forest Information Systems	September 17-19, 2003 Québec City, Canada	web site: **www.pfc.forestry.ca/interop/** or contact Dr. Alan J. Thomson, Canadian Forest Service, **athomson@nrcan.gc.ca**; phone: (250) 363-0632; fax: (250) 363-0775.
Western International Forest Disease Work Conference	August 18-22, 2003 Grants Pass Oregon, U.S.A.	web site: **www.fs.fed.us/foresthealth/technology/wif/** Conference chair, Everett Hansen, Oregon State University, **hansene@science.oregonstate.edu** phone: (541) 737-5243.

Rehabilitating Federal and Private Lands
(continued from page 9)

Adds Adamowicz, "One example of someone who may be eligible for Private Forestlands Rehabilitation funding is an owner of a 1/4 section of land that is largely forested (pine leading) in the Vanderhoof area. He or she knows they have some pine beetle in their trees and want to deal with the problem before too much damage is created in their stand. These owners could first apply for the development of a beetle management plan and then apply for the appropriate activities to be carried out."

Overall management of both programs is the responsibility of Natural Resources Canada, Canadian Forest Service but technical advisory committees will be set up for each program. The committee in the First Nations element of the Federal Forestlands Rehabilitation Program will be comprised of representatives from First Nations and the federal and provincial governments. The technical advisory committee in the Private Forestlands Rehabilitation Program will consist of private landowners, woodlot owner organizations, and federal and provincial representatives.

Application forms and guidelines detailing eligibility requirements for private landowners and First Nations within the beetle-devastated area are available at **mpb.cfs.nrcan.gc.ca.**

INFORMATION FORESTRY

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