SUSTAINABLE FOREST MANAGEMENT NETWORK
RÉSEAU DE GESTION DURABLE DES FORÊTS
Networks of Centres of Excellence
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tomorrow's forests

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THE SFM NETWORK NEWSLETTER

Research excellence through training, networking, partnerships and knowledge exchange





SFM Network Forges Ahead

NCE announces funding renewals and creates five new initiatives

By Networks of Centres of Excellence and SFM Network Staff

The Honourable Maxime Bernier, Minister of Industry and Minister responsible for the Networks of Centres of Excellence (NCE), announced in late March an investment of up to $21.9 million over three years to extend the research activities of two networks in the areas of forest management and smart civil engineering structures. As well, he approved $4 million over two years for five new initiatives to support university collaboration with Canadian organizations in the areas of advanced design engineering, new economy, health, children's safety and the care of the elderly.

"This investment fits with the vision of the federal government to pair the best researchers with partners in all sectors to advance knowledge and apply results in areas of importance to Canadians," said Minister Bernier. "These groups were selected for their ability to translate research into tangible results, helping Canadians and Canadian industry compete globally."
The two networks are Sustainable Forest Management Network (SFM Network) and ISIS Canada – Intelligent Sensing for Innovative Structures. The five new initiatives are the Canadian Design Research Network, the Canadian Obesity Network, Emerging Dynamic Global Economies – EDGE Network, the National Initiative for the Care of the Elderly, and PREVNet – Promoting Relationships and Eliminating Violence Network.

Funding to the SFM Network and ISIS Canada was awarded following an in-depth review of their scientific accomplishments, their future research priorities and their training and knowledge transfer activities. This review is required at the mid-point of their seven-year funding cycle to demonstrate that they continue to meet the NCE program's evaluation criteria and add value to their field of activity. In the SFM Network's case, the Expert Panel commended the Network for its advances in all five activity areas: research program excellence, development of the next generation of researchers, networking and partnerships, knowledge exchange and technology extension, and Network management. The NCE itself selected the peer-review team, one expert each from Finland, Germany, France and the United States, and two from Canada.

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"Over the years, the networks have consistently delivered high-quality research and partnerships, and contributed to the advancement of the Canadian economy and society," said Dr. Suzanne Fortier, President of the Natural Sciences and Engineering Research Council (NSERC) and Chair of the NCE Steering Committee. "With its focus on excellence and collaboration, the Networks of Centres of Excellence program mobilizes leaders from all sectors to deliver results that contribute to a stronger, better Canada."

"For more than a decade, the SFM Network has continued to provide a strong and dynamic research program for studying Canadian forests and the economic, social and cultural factors affecting them. The University of Alberta has been pleased to serve as the host institution since the Network's inception, and we will continue to provide strong support for this unique initiative," stated University of Alberta President Dr. Indira Samarasekera.

Sustainability for Canada's forests requires consideration of how forest management transcends political jurisdictions. For example, while most forest lands are provincially-owned, there are increasing national and international demands for forest products to be produced in a sustainable manner. Through the SFM Network, diverse sectors come together to fund, plan, conduct and apply research on forestry policies and practices. Results are used to inform policy makers, revise or renew land management strategies and create a better public understanding of the scientific issues concerning Canada's forests.

The Network's research program recognizes that sustainability emerges from the interaction of economic, ecological and social forces acting on the forest and the institutions that determine how it is managed. The program seeks to integrate the contributions of many disciplines and sectors to develop and refine policies and practices that will sustain the flow of benefits that society has come to expect from the forest.

Research priorities are initiated by the industry, government, Aboriginal and NGO partners of the Network in collaboration with the university-based research community. Funded research teams work closely with partners and Network staff to facilitate the exchange of knowledge and its implementation. Recent research has addressed a wide range of priorities including natural disturbance management, landscape zonation, Aboriginal forest tenure, watershed processes, forest management decision-support tools, redesign of forest institutions and trade-offs between economic, ecological and social values.

"We are particularly proud that the Government of Canada has demonstrated its commitment to research excellence and sustainable forest management through the Network," stated Board Chair, Barry Waito.

"Clearly, we are identifying new solutions for the development of more sustainable forest management practices across the country. Our research findings are making a difference on the ground," stated SFM Network Scientific Director, Dr. Jim Fyles. Presently, 160 researchers from 35 universities are working in partnership with 12 forest companies, seven Aboriginal groups, one NGO and 11 federal and provincial government departments and agencies.

Mr. Norm Denney, Alberta Forestlands Manager, Weyerhaeuser Company Limited, stated: "The structure and mandate of the SFM Network has provided Weyerhaeuser with an opportunity to contribute to setting research direction and to focus on research priorities that are of importance to the company. As a result, our company has access to reliable scientific data on such issues as natural disturbance, variable retention, and a variety of wildlife projects."

In addition to this example, last year the Coulombe Commission recommended sweeping changes to forest management in Quebec that were supported, in part, by Network research results. Similarly, Network findings have made important contributions to support the Ontario Forest Management Guide for Natural Disturbance Pattern Emulation.

A joint research project with BIOCAP Canada, a research program that assesses the use of land, agricultural and forestry sectors to help manage greenhouse gas emissions, has been instrumental in the policy development of Canada's approach to the Kyoto Protocol and the use of forests with respect to the legal underpinnings of carbon management.

Network research has linked global warming to increasing forest fire risk across the whole country. This research has pinpointed the time-frames and implications for the western and eastern parts of the country.

We are identifying new solutions for the development of more sustainable forest management practices across the country. Our research findings are making a difference on the ground. *Dr. Jim Fyles*

A multidisciplinary research team led by Dr. Ilan Vertinsky, University of British Columbia, is assessing the effectiveness of how forest harvesting rights are structured and allocated in different provinces. The research team is investigating the impact of tenure reform on the cost and availability of timber and the provision of secondary products. Proposals are being developed for new tenure arrangements and their potential consequences are being evaluated within specific regional contexts.

The Network's research over an eight year period helped the Little Red River Cree (LRRC) Nation to obtain a better understanding of the ecological, economic and social aspects of forest management under their control. At the same time, Network researchers have benefited from their engagement with the LRRC through an increased understanding of Aboriginal issues and contributions to sustainable forest management.

Several aspects of Louisiana-Pacific Canada's proposed 20-year Forest Management Plan in Manitoba are based on Network research. Ducks Unlimited is using Network research findings to provide input into changing buffer and riparian guidelines in Manitoba. J.D. Irving in New Brunswick is continuing to work with Network researchers to determine the range of silviculture intensity that is compatible with the persistence of forest bird populations on the lands it manages.

A partnership among the Government of Yukon, the Kaska Tribal Council, Environment Canada, Parks Canada and the SFM Network will result in a best practices framework to serve as the foundation for the re-commencement of appropriate commercial forest management operations.

"One of the most unique aspects of the Network is that we are training the next generation to engage effectively in multidisciplinary research," stated Fyles. To date, 26 Network graduates have accepted academic appointments at universities across Canada. Six are principal investigators on projects funded by the Network and five are focused on issues involving Aboriginal communities.

To pass new knowledge on to forest managers as soon as possible, the Knowledge Exchange and Technology Extension (KETE) initiative condenses results from multiple projects into short, easy to read reports. In addition to the book published in 2003 in cooperation with the NRC Research Press, many reports outlining implementation options as well as Research Notes aimed at the practitioner have been released and distributed to partners.

The NCE program is managed jointly by the three federal granting agencies – the Natural Sciences and Engineering Research Council, the Canadian Institutes of Health Research, and the Social Sciences and Humanities Research Council, in partnership with Industry Canada. The federal government provides approximately 60 percent of the funding to the SFM Network while the remaining funding is contributed by the user-sector partners.

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Network Partners: Ducks Unlimited, Louisiana-Pacific Canada Ltd., Manitoba Conservation, University of Alberta and Weyerhaeuser Company.

Other Project Partners: Alberta Conservation Association, Canadian Wildlife Service, L&M Wood Products, Mistik Management, Saskatchewan Environment, Saskatchewan Forestry Center (Forest Development Fund), Saskatchewan Wildlife Federation, University of Saskatchewan.

Boreal Forest Riparian Bird Communities:

What is the impact of forest harvesting, agriculture and oil and gas development?

By Julienne Morissette
Ducks Unlimited Canada

Riparian areas and the forest surrounding wetlands are among the most biologically diverse areas of the boreal forest. Riparian areas are transition zones between land and water bodies such as wetlands, rivers, streams, and lakes. They may include a wide range of different habitats such as floodplains, shrubby areas, treed areas, grassy meadow-like areas, wetlands, or any combination of these. Because the boreal forest faces increasing pressures from forestry, oil and gas exploration, agriculture, and urban expansion, it is critical that we understand the cumulative effects of these human activities and their associated infrastructures for all habitats especially wetlands and riparian areas.

Recently, progressive forest industries in the boreal have started to adopt a harvesting philosophy modeled on natural disturbances such as fire. The growing acceptance of the natural disturbance model for boreal forest management in western Canada, has led to some debate over appropriate policy regarding shoreline forest retention near riparian areas. This model suggests that alternatives to leaving forested buffers along the shorelines of wetlands, rivers and streams may be appropriate if forests are to be managed at a landscape scale and in a manner that reflects natural processes. There is very little scientific information from boreal regions to support these impending policy changes.

Donna Grassia, Louisiana-Pacific Canada Ltd. (LP) biologist, and Sue Prentice research assistant are banding birds at the experimental harvest sites on the LP Forest Management Area in the Duck Mountains, Manitoba.

This work is helping us define on a very large scale riparian boreal bird communities and their response to existing and planned forestry activities. *Dr. Keith Hobson*

While there have been many research studies on upland bird communities, there has not been as much focus on bird communities adjacent to lakes, rivers and streams (riparian areas) in the boreal forest. Since birds are sensitive to changes in vegetation and forest structure, they are a useful group to study to help evaluate current harvesting practices around riparian areas, to develop the scientific basis for developing new harvesting practices and to assess cumulative effects of multiple types of disturbances. Our research team, headed by SFM Network Principal Investigator Dr. Keith Hobson, a research scientist at the Canadian Wildlife Service, has conducted surveys at approximately 2000 boreal wetlands in the Provinces of Alberta, Saskatchewan, and Manitoba. "Because of Network involvement, this work is helping us define on a very large scale," says Hobson, "boreal riparian bird communities and their response to existing and planned forestry activities. One of our greatest interests is whether or not riparian areas can be harvested in a way that approximates natural disturbance such as fire." The study areas include the Alberta-Pacific Forest Industries Inc. Forest Management Area (FMA); west-central Saskatchewan on the Mistik Management FMA and the Weyerhaeuser FMA north of Prince Albert; and the Duck Mountain region of Manitoba and Saskatchewan including the Louisiana-Pacific FMA.

The team has compared bird community composition of early post-disturbance riparian habitats (burned vs. harvested) and contrasted these to riparian habitats before and after experimental harvest. We will compare bird communities for a range of variable retention buffer harvest, including 0-100% retention in a 50m zone as part of

'a before and after harvest' experiment as well as a range of existing intact buffer widths including 30m, 50m and 90m. These comparisons will evaluate the success of both retaining a typical intact buffer and variable retention buffer harvest as a proxy for natural disturbance. Preliminary analysis indicates that there are differences in the bird communities associated with each of the treatments. Network student, Kevin Kardynal is currently developing a more detailed analysis of bird communities immediately post-disturbance. Results obtained by monitoring changes in the bird community at these sites over time will also be most valuable in evaluating these harvesting practices in the longer term.

We are also assessing whether increased industrial activity by forestry and energy sector development results in reduced numbers of sensitive passerines, shorebirds, and waterfowl species in riparian habitat and wetlands at the landscape scale. In contrast to industrial development, agricultural conversion has dramatically changed the landscape matrix around boreal wetlands. The team will address two key questions: (a) How much of the surrounding forest can be removed before boreal bird species disappear from these wetlands and aspen parkland or prairie species begin to dominate? (b) At what spatial scale does agricultural conversion affect the extinction threshold for boreal species? Results from preliminary analyses conducted by Dr. Erin Bayne suggest changes in boreal wetland bird communities are occurring due to human activity. For example, birds common to aspen parkland regions were more abundant in boreal landscapes cleared for agriculture while some boreal specialists such as the Common Loon were less abundant.

The ultimate goal of the team's research is to use these types of data to make recommendations on which species of birds, or combination of species, are suitable as reliable indicators to monitor boreal forest change. If all stakeholders worked together to plan for multiple land uses and for industrial development, the combined footprint on the landscape could be reduced.

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Network Partners: Tembec, Abitibi-Consolidated, Provincial Governments of British Columbia, Ontario, Quebec and Newfoundland and Labrador.

Project Affiliates: Innu of Labrador, United States Department of Agriculture/Forestry Division, Dr. Timo Kuuluvainen, University of Helsinki, whose year long sabbatical was partly funded by the SFM Network.

New SFM Modeling Toolkit in the Works

By Marvin Abugov
SFM Network

"**The idea for a new suite** of relevant SFM modeling tools," says Principal Investigator Dr. Christian Messier, "came out of my last 10 years of work in the field, and uniquely from within the SFM Network itself." He explained that when he started working with the SFM Network, stand and landscape models were not used very much to help manage the forest. That has now changed. Computer modeling tools are becoming increasingly important because of the complexity of factors that must be considered in how a forest area is managed. "I think forest managers feel they need a computer tool because of the large number of variables they have to deal with," says Messier. "This is especially true given the variety of options they have access to, and the interactions among those options."

The traditional way of developing landscape simulation models is typically to look at a single problem in a specific area and attempt to develop a computer modeling tool to deal with that specific problem. However, as time goes on, more questions and variables arise. The researcher then has to increase the number of elements in the model as well as the computing power required to deal with all those aspects. As a result, these models can become very complex and can be difficult to test. "More importantly," Messier states, "they can't be used anywhere else because they were created in a very specific fashion, to solve a specific question, for one very specific area on the landscape."

Our goal is to be able to evaluate ecological, social and economic values at the same level of complexity. *Dr. Christian Messier*

This situation creates a dilemma for the forest manager: which modeling tool is the best one to use in a given situation? "Because of my involvement in the SFM Network," says Messier, "I had a unique platform from which I could get to know many of the researchers developing these models." He came up with the idea of recycling these various models and the various components included in each one so that they could be reassembled as needed very quickly and efficiently. Says Messier, "I wanted to find out whether or not we could create a new model from the various parts of all of the existing models to uniquely answer various questions as they arose."

The concept gained momentum when he received a request from the Innu in Labrador to help them with their forest resource planning. Messier realized he would have a unique opportunity to test the veracity of the idea in an area that had neither forestry operations, nor any existing computer models in use. Rather, the researchers would be free of all of these constraints. They could ask the relevant research questions and then pick and choose the most relevant modeling tools in whole, or in part, to uniquely answer a particular forest management question.

The tools in the toolkit include: ***SORTIE***, a tree level and stand dynamic model funded by the SFM Network; ***LANDIS***, developed by a research group in Minnesota; ***SELES***, developed by a group in British Columbia, which will be used to link all the various modules from each of the models together; ***Biodiversity Assessment Program*** (BAP), originally developed for Millar Western and funded by the SFM Network; ***Multiple Forest Use Allocation Model***, a socio-economic model developed at Université du Québec à Montréal that will integrate non-market and market values as well as the social and cultural values that people have expressed in Finland, Quebec and Labrador; ***Patch Works***, a model that calculates the Annual Allowable Cut in Ontario; and finally ***FINLANDIS***, modified from LANDIS to address the unique forestry conditions of Finland. Among other things, the module can simulate a partial cut.

"In the end," says Messier, "our goal is to be able to evaluate ecological, social and economic values at the same level of complexity. To my knowledge, this has never been done before and is totally unique to the SFM Network and could not be done any other way, especially when you consider that we are including the social and economic aspects as well." Ultimately, Messier's research team wants to have a scientific methodology paper suitable for journal publication written in time for an upcoming meeting in Labrador in October 2006. This modeling toolkit, when complete, will have immediate application in British Columbia, Newfoundland, Ontario, Quebec, the state of Minnesota, USA and the country of Finland.

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Network Partners: Natural Resources Canada – Canadian Forest Service, Manning Diversified Forest Products Ltd., University of Alberta, Weyerhaeuser Company, Natural Sciences and Engineering Research Council of Canada (NSERC).

Other Project Partner: Alberta Conservation Association.

Harvest Residuals / Conserving Biodiversity

What shape and characteristics work best?

By Marvin Abugov
SFM Network

The natural disturbance hypothesis suggests that forest biodiversity can be conserved by emulating natural disturbances such as wildfires and insect and disease outbreaks with patterns and methods of forest harvesting. The idea is that such harvest residuals will retain structural elements essential for maintaining local populations of various species, which have evolved in the context of natural disturbances.

"But is it true?" asks SFM Network Principal Investigator Dr. John Spence. "We can't forget that the link between natural disturbance emulation and conservation has not been corroborated by much empirical evidence. We have to test these assumptions and not just assume they are true. If the concept is correct, what kinds of forest residuals are required?"

Among animals that live and forage above ground, ground and rove beetles are appropriate model taxa for the study of forest disturbances because they are species rich, numerically abundant, accessible and can be sampled by fairly simple trapping methods. From a previous two-year study, SFM Network MSc student Kamal Gandhi (now Dr. Gandhi, PhD, University of Minnesota, 2005) and other research collaborators determined that many unburned fire residuals in montane coniferous forests were late-successional patches and served as important refugia for forest-dwelling beetles, including populations of glacial relict carabid species.

In a 2004 follow-up study, Gandhi and Spence, together with Drs. David Langor (Canadian Forest Service) and Luigi Morgantini (Weyerhaeuser) and U of A technician, Karen Cryer, compared beetle assemblages in forest patches retained after harvest or wildfire on the eastern slopes of the Rocky Mountains in western Alberta. The subalpine study sites are located in the former Weyerhaeuser Company, Grande Prairie, Grande Cache Forest Management area. The researchers studied beetle assemblages from the following three kinds of sites beginning in 1999, one-year after logging: (a) harvest residuals consisting mainly of lodgepole pine trees within clearcuts (b) uncut lodgepole pine forest surrounding clearcuts and (c) clearcuts in stands that were formerly lodgepole pine. These sites are less than two hectares in size. For comparison, data from a fourth site type included fire residuals within burned areas that were less than one hectare to 10 hectares in size, compiled from data from a previous study that included the Hat Creek, Alberta fire – 15 years post burn – and the Prairie Creek, Alberta fire – 37 years post burn.

Overall, the study found that round patches of harvest residuals contained more carabid beetle individuals than elliptical residuals. No such differences were observed for staphylinid beetles. Several forest carabids were aggregated in round residuals, suggesting that round residuals, which contain more internal, non-edge area, also contained more representative habitats suitable for forest species. As these species seem to be late-successional specialists, they may be sensitive to differences in distance to edge between round and elliptical residuals. Furthermore, the study showed that harvest retention patches conserved different beetle assemblages than those skipped by fire. In general, harvest patches, which had been haphazardly distributed on the landscape, were missing the species indicative of seaps and wetter areas, although these same species were common in the fire residuals. Thus, both shape and characteristics of retention patches can be of conservation significance.

"It remains essential to manage biodiversity at the scales appropriate for the organisms you are trying to conserve," says Spence. "As a result of a more recent study in aspen dominated mixedwood stands in the mid-boreal ecoregion of Alberta, I think it is fair to say we can now dispel the notion that we can manage 'biodiversity' with simple plans based on how some aspects of natural disturbance affect a single taxon, whether it be spiders, beetles, fungi or songbirds." Single taxon studies, he says, miss aspects that are critical from the perspective of unstudied biotic elements. Likewise, he cautions that the recently favoured concentration of effort on the landscape scale blinds foresters to biologically significant variation on local scales. For example, Spence says, "use of a coarse filter biodiversity management approach, like the forest cover type, could do an excellent job at maintaining organisms that treat the landscape as a coarse-grained mosaic, but still fail miserably with respect to creatures that respond to more fine-grained aspects of habitat variation."

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SFM Network Partners

GRANTING COUNCILS

- Networks of Centres of Excellence / Government of Canada
- Natural Sciences and Engineering Research Council of Canada (NSERC)
- Social Sciences and Humanities Research Council of Canada (SSHRC)

PARTNERS

Governments

- Government of Canada (Environment Canada)
  (Natural Resources Canada, Canadian Forest Service)
  (Parks Canada, Ecological Integrity Branch)
- Government of Alberta (Innovation and Science)
  (Sustainable Resource Development)
- Government of British Columbia (Ministry of Forests and Range)
- Government of Manitoba (Manitoba Conservation)
- Government of Newfoundland and Labrador (Department of Natural Resources)
- Government of Ontario (Ministry of Natural Resources)
- Gouvernement du Québec (Ministère des Ressources naturelles et Faune)
- Government of Yukon (Department of Energy, Mines and Resources)

Industries

- Abitibi-Consolidated Inc.
- Ainsworth Lumber Co. Ltd.
- Alberta-Pacific Forest Industries Inc.
- Bowater Incorporated
- Canadian Forest Products Ltd.
- Daishowa-Marubeni International Ltd.
- J.D. Irving, Limited
- Louisiana-Pacific Canada Ltd.
- Manning Diversified Forest Products Ltd.
- Tembec Inc.
- Tolko Industries Ltd.
- Weyerhaeuser Company

NGO

- Ducks Unlimited Canada

Aboriginal Groups

- Gwich'in Renewable Resource Board
- Heart Lake First Nation
- Kamloops Indian Band
- Kaska Tribal Council
- Little Red River Cree / Tallcree First Nation
- Métis National Council
- Moose Cree First Nation

Institutions

- University of Alberta (host institution)
- Concordia University
- Dalhousie University
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- McGill University
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- Royal Roads University
- Ryerson University
- Thompson Rivers University
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- Canadian Institute of Forestry
- Forest Ecosystem Science Cooperative, Inc.
- Forest Engineering Research Institute of Canada (FERIC)
- Lake Abitibi Model Forest
- Manitoba Model Forest
- National Aboriginal Forestry Association

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Vision

The forests of Canada will maintain their extent, diversity and ecological vitality and be managed in a manner that will provide for the broad social, cultural and economic needs of all Canadians.

Mission

The Sustainable Forest Management Network is a national partnership in research and training excellence. Its mission is to deliver an internationally recognized, interdisciplinary program that undertakes relevant university-based research. It will develop networks of researchers, industry, government and First Nations partners, and offer innovative approaches to knowledge transfer. The Network will train scientists and advanced practitioners to meet the challenges of modern natural resource management.

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