INNOVATIONS

THE CANADIAN MODEL FOREST NETWORK BULLETIN

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FEATURED IN THIS ISSUE

How do we know if a forest is being sustainably managed?

Step 1 — Identifying LLI

Step 2 — Gathering Data

Step 3 — Applying LLI

LLI Workshops

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HOW DO WE KNOW IF A FOREST IS BEING SUSTAINABLY MANAGED?

The world has been grappling with this question for the past decade. A common response has been to define the criteria that need to be met for forest management to be sustainable, and to choose a set of quantitative and qualitative indicators or measures of sustainability for each criterion. Conserving biodiversity, for example, is a common criterion; possible indicators could be how much forest is protected from development, or the number of endangered forest species.

At least 140 countries are at work on criteria and indicators, or C&I. Canada and 11 other countries have developed C&I for temperate and boreal forests (the Montréal

Process C&I). Canada's federal, provincial, and territorial forest ministers have approved a similar set that is tailored to Canadian forests.

Indicators of biodiversity in the rainforests of British Columbia, however, won't necessarily apply to the northern boreal forests of Quebec and Ontario, or the Acadian forests of the East Coast. To obtain credible, valid and practical measurements of sustainability, individual forest managers across the country need to consider the particular mix of social, economic and environmental forces at play in their forests. The national C&I framework then provides a common foundation for developing indicators that address these factors.

What are local level indicators?

Local level indicators (LLI) define sustainability for a particular area, from a small private woodlot to a million-hectare forest management unit, and allow forest managers to measure and report progress toward sustainable forest management (SFM).

Why develop LLI?

Resource managers, decision-makers, the public and the market all want to see evidence of progress toward SFM in Canadian forests. When developed with broad public participation and scientific rigour, LLI are widely accepted frameworks for defining, measuring and tracking sustainability, and form the basis of sustainable forest management planning.

LLI and Canada's Model Forests

Canada's model forests are places where the best sustainable forest management practices are developed, tested, then shared across the country. Each model forest has developed a suite of LLI, most based on the six criteria espoused by

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Natural Resources Canada Ressources naturelles Canada

Canada

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Canada's forest ministers. Model forests are well-suited to lead the development and use of LLI for several reasons:

Scale: Model forests range in size from 113,000 hectares to 2.75 million hectares (roughly the range of industrial forest management units); four of these forests contain significant small private holdings.

Coverage: Model forests exist in all of the major forest regions of Canada, and encompass a mix of landscapes ranging from uninhabited wilderness to small forest-dependent communities and urban environments.

Diversity: Model forests bring to the table those who often aren't included in forest management planning, such as academics, environmentalists, Aboriginal people, and members of forest-dependent communities. All have a genuine interest in forest management, and also bring considerable knowledge, experience, expertise and credibility to the process.

I'm interested in developing LLI. Where do I start?

This issue of *Innovations* gives you an overview of how Canada's model forests developed their LLI. It's split into three sections, one for each of the main steps in the process:

1. **Identifying LLI**
2. **Gathering Data**
3. **Using LLI**

Each section includes lessons learned, case studies and a sample of the model forest tools available for LLI developers and users. Starting on page 7, you'll find information about workshops, how to get a copy of the model forest LLI User's Guide, the model forest network's Web site address (where you can find LLI publications and links to each of the model forests), and how you can get in touch with the network.

STEP 1 — IDENTIFYING LLI

Nearly all of the model forests started with the criteria developed by the Canadian Council of Forest Ministers (CCFM).[1] Some evaluated an established set of indicators (often the 83 CCFM indicators) for applicability to their model forest; others started from a blank slate and built their own initial list.

Involving a diverse group of partners from the beginning — not just for comment after the work is done — is essential if the LLI are to be widely accepted. Even though the model forests already included a diverse group of partners, almost all held workshops to increase the diversity of participation in LLI development.

Lessons Learned: Criteria for Screening Indicators

No matter where they started from, all model forests had to whittle their initial sets of indicators down to something more manageable. The following is a synthesis of the screening criteria used by the model forests:

Credibility

- Is the indicator *relevant*, and does it tell us something meaningful about SFM?
- Is it *reliable*, and relatively free of extraneous influences?
- Is it *responsive* to management actions?
- Is it *sensitive* to change, and will it show meaningful trends over time?
- Can future indicator levels be *predicted* with reasonable accuracy?

Practicality

- Is data for this indicator currently *available*?
- Is data *affordable*, and can it be collected and compiled at a reasonable cost?

Validity

- Is the indicator *measurable* at an appropriate scale and time frame?
- Is the indicator and its relevance readily *understandable*?
- Is the assessment of the indicator *cost-effective*, and is the cost of supporting it justified by the value of the information it provides?
- Is there the necessary *commitment* to measure, report on and use this indicator?

From the Model Forest Toolbox

Criteria and Indicators of Sustainable Forest Management: A Practical Guide to Using Criteria and Indicators in Newfoundland and Labrador

Western Newfoundland Model Forest: Martin von Mirbach, 1999. Download at www.wnmf.com

This practical handbook is an essential starting point for forest managers interested in developing LLI. The guide is consistent with the requirements of the Canadian Standards Association SFM standard, which makes it particularly well-suited to anyone considering CSA certification. It is also a valuable guide for those taking part in public consultations for developing district forest management plans.

The guide presents a framework for developing LLI in the province, organized

under 23 values identified as important by people throughout Newfoundland and Labrador, and grouped under the six CCFM criteria. There are one or more goals for each value, and indicators to measure whether these goals have been reached. The appropriate scale — stand, local, district and provincial — for each indicator is also included.

The guide outlines seven steps for applying this framework to a specific area, from forming an effective public participation process and deciding on values and goals, to measuring, monitoring and reporting on indicators and the final step — reviewing, learning and improving. There are suggestions for dealing with challenges such as costly indicators and incomplete or inaccurate data.

Western Newfoundland's partners are using the guide, which has been distributed widely and is one of the tools used by district forest managers to develop LLI for their districts throughout the province. "Developing indicators from scratch for each district would be quite an onerous task, so we've adopted the model forest's indicators as the starting point," says Len Moores, Director of Ecosystem Health for the Newfoundland Forest Service. "The model forest went through a legitimate process for developing indicators, getting 30-odd stakeholders involved," says Moores. "Because there was such extensive consultation for the model forest set of indicators, all the district planning teams have had to do is adapt them to local conditions." The Newfoundland Forest Service is also in the process of determining to what extent the model forest LLI will work at the provincial level.

Although developed for Newfoundland, the approach promoted in the guide can be easily adapted for use elsewhere.

Case Study

Prince Albert: Monitoring Public Participation

Prince Albert Model Forest Public Participation Review (Prince Albert Model Forest: Jeji Varghese, 2000). Download at www.pamodelforest.sk.ca

Public participation in decision-making is one of the most crucial elements of SFM, but also one of the most difficult to measure. It's easy to count the number of forest products companies with citizen advisory boards, or to compile a list of government-sponsored public meetings. But, is public participation at these levels appropriate and effective?

The Prince Albert Model Forest has reviewed the fairness and effectiveness of its public participation process, and put in place a strategy for future monitoring. The review and the strategy are the work of Jeji Varghese, an independent Natural Resource Sociology Consultant who is currently a PhD student in the Department of Rural Economy at the University of Alberta.

Under the strategy, public participation processes must:

1. facilitate a two-way information flow;
2. be flexible;
3. be representative of the desired target population;
4. be open;
5. provide guidance to managers on how to proceed with difficult issues;
6. allow for frank and open expression of diverse views;
7. "give something back" to participants;
8. be cost-effective relative to the information received.[2]

For each of these eight working principles, Varghese identified several indicators based on input from the model forest partners, working groups, and members of the public who participate in the model forest's consultations. For example, a high level of respect among participants is one indicator that information will flow both ways (principle 1).

The strategy also details how to gather data on and score each indicator — often one of the stumbling blocks of qualitative assessments. Data about the level of mutual respect, for example, may be gathered by assessing comments made in one-on-one interviews with a sample of participants after a consultation. Each indicator is given a numerical score by comparing the data with a series of statements ranging from least (0 to 3) to most (7 to 10) conducive to sustainability. For example, data that supports the statement "participants perceive power differences between groups" is a sign that the level of respect is not as high as it could be, and would result in a score for the mutual respect indicator in the middle range (4 to 6) of the sustainability scale.

Although the strategy was developed specifically for the Prince Albert Model Forest, the criteria, indicators and scoring method are a good starting point for any group that wants to take an in-depth look at public participation.

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1 The Waswanipi Cree Model Forest began with the C&I developed for the James Bay Advisory Committee on the Environment.

2 These eight criteria are adapted from Tom Beckley's review of public participation literature. (Beckley, Thomas. 1999. Public Involvement in Natural Resource Management in the Foothills Model Forest, *Canadian Forest Service, Fredericton, New Brunswick. Draft Report.)*

STEP 2 — GATHERING DATA

Establishing LLI is one thing; actually gathering data to monitor them is quite another. Most people find this step intimidating. It involves collecting existing data and generating new data; both these approaches take time and expertise. Partnership-based approaches are effective in helping to share the burden of gathering data on a broad set of diverse indicators.

Lessons Learned: Simplifying Data Collection

A thorough assessment of what is involved in collecting data on a full set of indicators usually results in pressure to simplify the data collection requirements. The following are some of the methods used by model forests to scale down their need for information.

Reduce the number of indicators. Use fewer but *smarter* indicators that provide rich insight into SFM rather than simply relevant information.

Start by collecting data on a partial set. Demonstrating progress as soon as possible helps build support for future work.

Make better use of existing data. Often indicators can be revised slightly to take advantage of existing data.

Use sampling methods to replace direct measurement. This can be done either

by selecting "case study" areas or by using sampled data rather than full measurements.

Explore new methods. Remote sensing and digital datasets offer the potential to collect certain data across large areas.

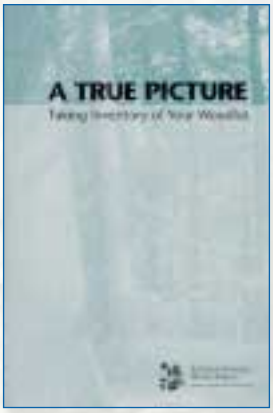
From the Model Forest Toolbox

Protocols for Assessing Water Quality and Aquatic Biodiversity Using Macroinvertebrates

(Fundy Model Forest: Dr. Alyre Chiasson and Chris Williams, 1999). Download at www.FundyModelForest.net

The Fundy Model Forest has developed a way to use macroinvertebrates — aquatic organisms that live in the sediment and gravel of streams, rivers and lakes — as indicators of water quality. Because different species of macroinvertebrates are affected to different degrees by chemical pollution and habitat destruction, their presence or absence in an aquatic ecosystem is a sign of its integrity. Studying macroinvertebrate populations in conjunction with testing water chemistry can help accurately evaluate the effects of forestry practices on water quality and biodiversity.

A True Picture: Taking Inventory of Your Woodlot



(Eastern Ontario Model Forest, 1997, download at www.eomf.on.ca/services/pubs.html)

Inventories are standard elements of any monitoring program. This guide, a companion to the Eastern Ontario Model Forest's *Code of Forestry Practice*, tells woodlot owners how to complete an inventory. The document is clear and readable despite the technical subject matter, drawing on the experiences of two fictitious woodlot owners as case studies. Statistically accurate, the inventory is suitable for a forest management plan such as that required by the Ontario Managed Forest Tax Incentive Program.

The guide is currently being used in the Forest Management Technician Program at Sir Sandford Fleming College in Lindsay, Ontario. Although *A True Picture* and the *Code of Forestry Practice* were originally designed for Eastern Ontario woodlots, their ideas and information about SFM apply equally well in other areas of the Canadian forest community where small land holdings can be found.

Case Studies

Long Beach: Developing Monitoring Protocols

Criteria and Indicator Monitoring Programs (Long Beach Model Forest, 2001, download at www.lbmf.bc.ca)

Gathering data on LLI is particularly difficult for the Long Beach Model Forest because of the number of groups with a mandate to monitor the model forest land base of 400,000 hectares of temperate rainforest on Vancouver Island. These groups include the Clayoquot Sound Central Region Board, which oversees the implementation of the recommendations of the Scientific Panel for Sustainable Forest Practices in Clayoquot Sound, and Pacific Rim National Park, which monitors ecological integrity and forest companies in the region, who track SFM as part of certification activities.

Long Beach's C&I Working Group has started several projects to develop monitoring protocols, including:

- climate and hydrometric monitoring in Clayoquot Sound
- a survey of agencies to find out which Long Beach indicators they monitor and how the data are stored, accessed and reported
- establishing permanent monitoring plots where indicators are used to monitor the effectiveness of variable retention strategies in maintaining biodiversity, watershed and coastal integrity, and forest productivity
- reviewing options for integrating LLI data, including GEO-NETWEAVER, a software program that integrates a complex set of social, economic and environmental indicators and sends output to a GIS database that can be used to map how well management objectives are being achieved at different scales

McGregor: Capturing Traditional Ecological Knowledge

Developing a Process for Translating and Integrating Traditional Ecological Knowledge (TEK) into the Scenario Planning Process (Lheidli T'enneh First Nation: Pearson Farnsworth and David Hagens, 2001). Download at www.mcgregor.bc.ca

During millennia of living in the Prince George area of British Columbia, the Lheidli T'enneh Band has accumulated intimate knowledge of their forest environment. But this traditional ecological knowledge (TEK) is not in a format that can be easily integrated into forest management planning. Recently, the band developed a method to capture this knowledge and, through LLI, integrate it into the scenario planning process of the McGregor Model Forest.

The work was conducted by the GIS Section of the Lheit-Lit'en Development Corporation, a subsidiary of the Lheidli T'enneh Band. The first step was to digitize information gathered from about a dozen studies of the community conducted over the past 15 years and from some new interviews with community elders. The latest database technology was used to develop software that will allow community members to easily search the information.

The database will be an invaluable reference for community members as they go through the process of developing the Lheidli T'enneh LLI. Pearson Farnsworth, GIS Coordinator, hopes that these LLI will be part of the McGregor Model Forest's next round of scenario planning for the land base covered by the TEK project. LLI are essential to any scenario planning process: they are what the planners use to track the sustainability of the scenarios they project over time.

The development team has already produced a small set of trial LLI drawn from the database, which the community agreed were meaningful and that the McGregor Model Forest steering committee deemed were valid indicators for the scenario planning process.

Having a process to translate TEK into community LLI that can be integrated into McGregor's scenario planning process will allow the community to fully participate in forest management, says Farnsworth. "The only way a group can truly participate is to input their principles and the information they believe is required for sustainability," says Farnsworth. "If there was no model forest, and no scenario planning process, we could inventory TEK, but it wouldn't be applied in a meaningful way. By meshing TEK with scenario planning, the community can finally fit its cultural information into a process that's been established to do better forest management."

The TEK project received funding from the model forest network's Enhanced Aboriginal Involvement Strategic Initiative.

STEP 3 — APPLYING LLI

Choosing a set of indicators and monitoring them are the first steps, but the ultimate purpose of LLI is to make operations more sustainable. Below are a few examples of how model forests and their partners are translating the insight gained from LLI into better forest management.

Case Studies

Lake Abitibi: Best Management Practices

Harvest with Regeneration Protection Training Kit (manual and half-hour video) (Lake Abitibi Model Forest, 1997)

Abitibi-Consolidated Inc. — Iroquois Falls Division is using LLI to make sure the best management practices (BMPs) they developed with the help of the Lake Abitibi Model Forest stay that way.

"Indicators developed with the model forest let us track whether our BMPs are being implemented and are having the desired effect, and also help us zoom in on other areas that need improvement," says Jennifer Tallman, Registered Professional Forester with Abitibi-Consolidated.

HARP is one of the BMPs that won high praise in the company's most recent third-party audit. HARP stands for Harvest with Regeneration Protection, a harvesting system developed with the model forest that protects advanced growth by minimizing disturbances on lowland black spruce sites. Several model forest indicators are used to monitor HARP implementation, including evidence of site disturbance (three categories) and the number of times the operator has not complied with the system per harvest block.

As well, in response to a new provincial requirement to manage for snags, the company is using a model forest indicator to track progress on a regular basis and to take corrective action if needed. The company has also adopted the model forest's set of LLI as part of the monitoring system for its ISO 14001 environmental management system.

The independence of the model forest lends credibility to the monitoring and resulting adaptation of the company's practices, says Tallman. "It's not a group that the company has pulled together — we're just one partner in the model forest. An independent group taking a look at how the forest is being managed and recommending changes based on trends is much more credible than the company claiming it's making progress."

> *"Indicators let us track the effect our operations have on the forest and the environment. They give us a feedback loop for the forest management decisions that we make and the implementation of those decisions on the ground."*
>
> Jennifer Tallman,
> Registered Professional Forester,
> Abitibi-Consolidated Inc.

Manitoba: Management Planning and Certification

The LLI developed by the Manitoba Model Forest have been incorporated into the management planning of partner Tembec — Pine Falls Operations, forest management licence-holder for two thirds

of the model forest. LLI also provide the framework for monitoring Tembec's ISO 14001 environmental management system, and will assist the company in applying for Forest Stewardship Council certification.

In Tembec's SFM plans, many LLI targets developed by the model forest become management objectives. For example, the number of habitat units for the winter range of the Owl Lake caribou herd is one of the model forest's indicators of the conservation of biological diversity. The target for this indicator — to maintain 67 percent of current high habitat units in Zone 1 of the forest management licence — is a management objective. The target is based on caribou research conducted by the model forest.

LLI targets also form the backbone of the monitoring requirements under ISO 14001, along with other established monitoring

parameters. For example, one of Tembec's targets is to implement a variable retention logging program by 2003 to achieve the objective of maintaining biodiversity of the forest at the stand level. This and other targets are integrated into operating procedures where possible, and contractor bonuses are based on meeting the targets as determined by third-party audits.

The model forest's work on LLI led to a decision by the province of Manitoba to add a requirement for indicators in the forest management plans and the environmental impact statements required

by forest management licence-holders. The model forest is looking to play a large role in helping licence-holders meet this requirement by passing on its expertise.

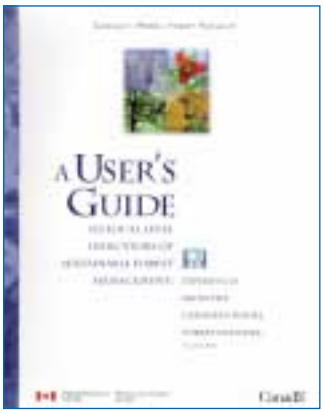
The Manitoba Model Forest has already started a joint project with Louisiana Pacific, which has operations in western Manitoba and is looking at developing indicators for use in certification systems. The model forest is working with the company on using the presence and abundance of different species of arthropods as an indicator of biodiversity.

LLI WORKSHOPS

The model forest network holds LLI workshops across Canada. More than 20 have been held so far, on topics such as socioeconomic indicators, public participation, Aboriginal involvement and indicators of biodiversity.

The model forest network hosted two carbon budget workshops recently, in Fredericton and Vancouver. Participants discussed the role of forests and forest management in the Canadian carbon budget, identified data resources and needs for modelling, and explored a protocol for future model forest involvement with other partners.

User's Guide to LLI



A User's Guide to Local Level Indicators of Sustainable Forest Management: Experiences from the Canadian Model Forest Network (Canadian Model Forest Network: Martin von Mirbach, 2000, request at www.modelforest.net)

Recognizing the need to compile and pass on the considerable expertise of the model forests to a broader audience, the Canadian Model Forest Network developed a user's guide to LLI that details the experiences of the network.

The guide describes each model forest's approach to initiating a program on LLI, selecting indicators, gathering data, and using and reporting on indicators. There are lists of relevant publications, complete sets of each model forest's LLI, a comparison of approaches to LLI across the model forest network, and contacts for more information.

Included with the guide is a CD-ROM that contains many of the LLI reports mentioned in the guide, as well as numerous other model forest documents.

State of the Forest Reports

The Eastern Ontario Model Forest's 1998–1999 State of the Forest Report (Eastern Ontario Model Forest, 1999. Download at www.eomf.on.ca/services/pubs.html)

Local Level Indicator Status Report: 2000 (Lake Abitibi Model Forest, 2001, download at www.lamf.net)

Several model forests are using LLI as a

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framework for reporting to the public on the health of their forests.

In State of the Forest reports, both the Eastern Ontario and Lake Abititi model forests have provided snapshots of forest condition that are benchmarks for measuring progress. As well as raising awareness of the importance of SFM among resource managers and the public, the reports indicate gaps in data needed to report on certain indicators, and are useful tools for resource managers preparing forest management plans.

To find out more ...

... get a copy of the LLI User's Guide and browse through the LLI publications at :

www.modelforest.net

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LLI Online Database

A searchable database of LLI information from the User's Guide is presently being developed. Watch for it at **www. modelforest.net**.

CANADA'S MODEL FOREST PROGRAM

The Government of Canada, through the Canadian Forest Service, launched Canada's Model Forest Program in 1992 to address the challenge of balancing the extensive range of demands we place on our forests today with the needs of tomorrow's generations. A network of model forests representative of Canada's diverse forest ecosystems has since been established to bring together, through partnership, individuals and organizations striving to make the goal of sustainable forest management a reality.

Each model forest in the Canadian Model Forest Network provides a unique forum where partners can gain a greater understanding of other stakeholders' views, share their knowledge, and combine their expertise and resources to develop innovative techniques, tools and approaches to sustainable forest management. Model forests act as giant, hands-on laboratories in which these leading-edge techniques are researched, developed, applied and monitored. The network also has the mandate to transfer the knowledge and techniques it develops so the benefits derived from its work can be shared with other forest sector stakeholders.

This newsletter contains just a small sampling of the activities undertaken by Canada's model forests. For more information:

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www.modelforest.net

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