WORKSHOP PROCEEDINGS 2001-10

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réseau sur la gestion durable des forêts

Biodiversity / Land Use and Land Cover Change (LUCC) Workshop Proceedings

September 28 & 29, 2001
Edmonton, AB

A Network of Centres of Excellence
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Biodiversity – Land Use and Land Cover Change (LUCC) Workshop Proceedings

Workshop held September 28 & 29, 2001
at the U of Alberta

Compiled by

Bruce Macnab and Richard Moses

Table of Contents

1. Summary Agenda

SUSTAINABLE FOREST MANAGEMENT NETWORK
KNOWLEDGE EXCHANGE WORKSHOP

"Biodiversity and Land Use/Land Cover Change:
Progress and Future Directions"

September 28-29, 2001

Tory Building Room 3-36
University of Alberta, Edmonton, Alberta

The workshop was structured around facilitating knowledge exchange between SFMN researchers and partners. Industry and researcher representatives worked together to design the agenda to meet this goal. Day 1 was a series of talks from industry, government, and researchers designed to inform and encourage participants to understand biodiversity issues from several perspectives. Most talks were approximately 30 minutes in length, with 10 minutes allocated for questions afterwards. Day 2 focussed on workshop discussions, with an emphasis on knowledge gap analysis and with the goal of developing an action plan for future biodiversity/LUCC initiatives in the SFMN.

Day 1. Friday, September 28.

9:00-9:40	Assessing changes in biodiversity in relation to human disturbance in the boreal forest: moving from the CCFM criteria and indicators framework toward implementation. *Stan Boutin, University of Alberta.*
9:40-10:20	Managing biodiversity within the Alberta forest planning process. *Jim Schieck, Alberta Research Council/Fish and Wildlife, Sustainable Resource Development, Alberta*.
10:20-10:35	Break
10:35-11:15	Forest management planning and practices for the conservation of biodiversity. *Margaret Donnelly, Louisiana-Pacific Corporation.*
11:15-11:55	The Alberta forest biodiversity monitoring program (AFBMP): a model for monitoring trends in biodiversity. *Dan Farr, Biota Research/Foothills Model Forest*.
12:00-1:00	Lunch

1:00-1:40 A synopsis of current SFMN biodiversity research projects. *Susan Hannon, University of Alberta*.

1:40-2:00 Land use/land cover change issues in boreal regions. *Arturo Sanchez, University of Alberta*.

2:00-2:40 The current status of land use/land cover change issues in Canada. *Mike Wulder, Pacific Forestry Center, Canadian Forest Service.*

2:40-2:55 Break

2:55-3:35 Current needs and future directions for land use/land cover change issues – from an access perspective. *Ken Dutchak, Resource Data, Public Lands Division, Sustainable Resource Development, Alberta.*

3:35-4:15 Knowledge gaps and future directions for the conservation of biodiversity in the boreal forest. *Fiona Schmiegelow, University of Alberta*.

4:15-4:45 Discussion

Day 2. Saturday, September 29.

9:30 – 11:00 Discussion 2. Linking remote sensing and the assessment of biodiversity. What is needed?

11:00-14:00 Final Discussion. The work/action plan: Identifying key directions for the future.

2. Brief Abstracts of Day 1 presentations

- *Stan Boutin, University of Alberta.*

Assessing changes in biodiversity in relation to human disturbance in the boreal forest:moving from the CCFM criteria and indicators framework toward implementation.

The introductory remarks presented the approach that the SFM Network has set out for phase II of the network based on last year's strategic plan. Stan emphasized the importance of integration in plans to develop scientifically sound indicators relative to levels of human disturbance. He further pointed out that the biodiversity and land use and land cover changes groups could benefit from the joint approach to research, and that this would be consistent with the Criteria and Indicators approach developed by the Canadian Council of Forest Ministers.

- *Jim Schieck, Alberta Research Council/Fish and Wildlife, Sustainable Resource Development, Alberta*.

Managing biodiversity within the Alberta forest planning process.

Jim's presentation provided an example of the needs and general approach toward biodiversity from the Alberta government perspective. He discussed some of the realities in the province related to the partitioning of the landscape, and suggested that biodiversity monitoring and conservation had to include active production areas. Some of the key points from this presentation include:

1. the need to develop best practices to promote biodiversity value of 'extensive management areas" (due to general lack of low disturbance/protected areas within province),
2. the need to implement adaptive management framework,
3. the need for large scale, long-term biodiversity monitoring program in province.

- *Margaret Donnelly, LP Corporation*

Forest management planning and practices for the conservation of biodiversity.

Margaret primarily presented an example of the realities of forest companies in relation to biodiversity, from the perspective of LP Corporation, Swan River, Manitoba. She emphasized the need to incorporate biodiversity indicators and monitoring in terms of forest management planning and practices. A few key points of the presentation include:

1. the need for landscape level approaches in dealing with biodiversity
2. the need for researchers to develop a dialogue with forest industry.
3. the need to account for the reality of forest planning processes by planning ahead, and ensuring that the forest industry is able to incorporate research results into realities such as their 5 year planning cycle

- *Dan Farr, Biota Research/Foothills Model Forest*

The Alberta forest biodiversity monitoring program (AFBMP): a model for monitoring trends in biodiversity.

Dan presented an example of one approach to biodiversity monitoring, the Alberta forest biodiversity monitoring program (AFBMP). He discussed the current status of this initiative, as well as some of the implementation challenges, including the choice of taxa for monitoring trials. An important take home message was that this program would not replace research, but that the results of monitoring would need to be addressed by the research community in assessments of causation.

- *Susan Hannon, University of Alberta*.

A synopsis of current SFMN biodiversity research projects.

Susan's synopsis of current SFM Network biodiversity research projects presented workshop participants with an overview of research results and approaches that complement the biodiversity research plan outlined by Stan Boutin in his introductory remarks. She emphasized the different scales that are a necessary aspect of biodiversity research. Her collaboration with Arturo Sanchez was also discussed in light of the challenges and opportunities in collaboration between researchers in biodiversity and remote sensing.

- *Arturo Sanchez, University of Alberta*.

Land use/land cover change issues in boreal regions.

Arturo provided an overview of the main components and models used in land use/land cover change (LUCC) research. In attempting to answer the question, "what is LUCC?", he discussed the approaches of remote sensing to land use dynamics and land cover dynamics. He also spoke of some of the challenges related to data and classification, as well as scalar dynamics.

- *Mike Wulder, Pacific Forestry Center, Canadian Forest Service*

The current status of land use/land cover change issues in Canada.

Mike's presentation assessed what is being done in Canada in examining land use and land cover dynamics. He specifically addressed the efforts of organizations such as the Canada Centre for Remote Sensing and the Canadian Forest Service. Workshop participants were also given an overview of the initiatives planned or underway in all provinces and territories. He also discussed the limitations associated with conditions such as cloud cover, and feasibility issues related to costs.

- *Ken Dutchak, Resource Data, Public Lands Division, Sustainable Resource Development, Alberta*

Current needs and future directions for land use/land cover change issues – from an access perspective.

Ken presented an example of real world use of remote sensing in an examination of the Access program in Alberta. He discussed the current status of the project, as well as some the plans for the future related to provincial mapping.

- *Fiona Schmiegelow, University of Alberta*

Knowledge gaps and future directions for the conservation of biodiversity in the boreal forest.

The primary focus of Fiona's presentation was an attempt to answer the question, "how can we operationalize biodiversity?". Examples of the promise from current research were presented in a basic overview of the challenges and limitations inherent in attempts

to forge ahead. The importance of setting benchmarks in which to gage your progress, and the need for participants to embrace uncertainty were two of the key messages for workshop participants.

3. Workshop Discussions

Knowledge Exchange

One of the primary purposes of this workshop was to provide an opportunity for the exchange of information and knowledge between SFM Network researchers and partners. Over the course of both days of the workshop, there was considerable discussion about the importance of collaboration between researchers and partners. Two of the presentations from day 1 provided examples of biodiversity and LUCC from the perspectives of government and industry partners respectively. In addition, there was considerable discussion relevant to knowledge exchange issues throughout the discussions on day 2.

Key Knowledge Exchange Points from Day 1 Talks

As noted above (see brief abstracts section above) , J. Schieck (Alberta Research Council/Fish and Wildlife, Sustainable Resource Development) presented an example of the needs and approach toward biodiversity from the Alberta government perspective. He discussed a several points that have a bearing on SFM Network knowledge exchange within this research. In particular, he stressed the need of the province, to implement an adaptive management framework, and the need for a large scale, long-term biodiversity monitoring program.

M. Donnelly (LP Corporation) discussed the conservation of biodiversity in terms of forest management planning and practices. She emphasized the need for landscape level approaches in dealing with these issues, and further pointed for the need for researchers to develop a dialogue with forest industry. This last point was emphasized in her description of the need to account for the reality of forest planning processes by planning ahead.

Day 2 Knowledge Exchange discussion

Day 2 discussions related to knowledge exchange can be categorized under 2 main topics: 1)making biodiversity research have an impact on forest policy and practices; 2)potential biodiversity monitoring case studies.

Making research have an impact on forest policy and practices.

There was considerable discussion over the course of the two days related to the challenge of ensuring that research results have an impact on forest planning and practices. There was general agreement that one of the factors impeding the impact of biodiversity/LUCC research on partners was a general lack of effective communication

between researchers and partners. Brian Kotek (Tembec) suggested that the development of implementation teams, involving researchers, and representatives of the forest industry and government might facilitate more effective communication.

The workshop participants also discussed focussing on the development of an operational forest management plan that directly incorporated biodiversity/LUCC research. Most participants felt, however, that this approach was beyond the scope of the group to pursue at this point.

Potential monitoring case studies
The challenge of ensuring that Network research has an impact on policy and practices was also discussed in terms of the specifics of the proposed biodiversity index and monitoring approach developed in the Guelph workshop (see SFM Workshop Proceedings 2001-4). M. Donnelly (LP Corp.) re-iterated the need for research to work with the industry planning process, and suggested a case study approach for the implementation of monitoring programs. F. Schmiegelow (UAlberta) noted that this case study approach had the potential to embed specifics of monitoring within Detailed Forest Management Plans. M.-A. Villard (UMoncton) and S. Dyer (Alberta Pacific Forest Industries Ltd.) suggested that the Network should examine opportunities for monitoring case studies across the country.

Workshop participation and knowledge exchange outcomes
Though there were some excellent exchanges during the course of the workshop, some of the knowledge exchange discussions were hampered by the generally poor participation from industry. This occurred despite considerable effort put toward involving partners in workshop organization and planning. The SFM Network will continue to look towards partners and other Network participants for suggestions to promote better participation in the future.

Integration of biodiversity and land use/land cover changes (LUCC) groups

The other primary objective of this workshop was to further integrate the research of SFM Network biodiversity groups with that of the LUCC group. S. Boutin (UAlberta) emphasized the importance of integration of these two groups in his opening talk. Aside from the ways that the two groups could benefit from the joint approach to research, Boutin also pointed out that the integration of the groups would be consistent with the Criteria and Indicators approach developed by the Canadian Council of Forest Ministers. Specifically it was noted that Criterion 1, "Conserving Biological Diversity", contains 3 elements, ecosystem diversity, species diversity and genetic diversity (http://www.nrcan.gc.ca/cfs/proj/ppiab/ci/indica_e.html). Indicators of the ecosystem diversity element within Criterion 1 are discussed in terms such as the area, type and age of forests, area of protected forests, and forest fragmentation. As a result it was acknowledged that LUCC is a dominant aspect of the ecosystem element of Criterion 1, and that the SFM Network biodiversity research should also reflect this.

Day 2 Integration Discussion

On Day 2, discussions related to group integration, centred primarily on the ways the needs of biodiversity researchers could be met by LUCC researchers, with specific reference to remote sensing tools. This exercise was key to the integration between the groups as it was an important step in the development of metrics of human disturbance (land use and cover change) that might be easily and unambiguously obtained by remote sensing.

Following is a list of metrics that biodiversity workers identified as potentially being of use. Those that are underlined are the metrics that LUCC researchers identified as being achievable given existing remote sensing technology. There was some discussion of the costs of procuring these data, and other practical considerations. Further considerations and comments are in *italics* in parenthesis:

- Forest/non-forest area
- Insect defoliation
- Forests aged younger than 10 years
- Deciduous/coniferous forest
- Balsam poplar/trembling aspen (*but very costly*)
- Forest Canopy by coniferous content
- Canopy Closure
- Canopy Height (*but very costly*)
- Stand Density??
- What is the disturbance history *(a possibility that would need to be explored*)
- Linear disturbances
  - Seismic lines
  - Pipelines
  - Well sites
  - Roads
  - Roads by type??
  - Low impact seismic lines??
  - Reclamation vs. seismic lines (regeneration characteristics)
- Residual volume/ha (both single tree and patches) – *I believe this was said to be possible, but likely to be quite costly given the requirements for extremely high resolution*
- Cutblocks
- Selective cutting (*a possibility that would need to be explored*)
- Fire history (less than 10 years)
- Sampling at the township level
- Leaf area index
- Riparian areas
- Slope indicators
- Moisture index
- Land use conversion
- Stream crossings
- buffers
- Structural complexity

- Snags
- Downed woody debris
- Understory development

Discussions highlighted the fact that defining metrics of human disturbance in this manner was central to the vision of biodiversity researchers to define relationships between biodiversity and human disturbance in order to develop an index of biodiversity for the ultimate use in biodiversity monitoring programs.

The remote sensing needs of biodiversity researchers were also discussed in terms of the resolution required depending upon the desired metric. M. Wulder (CFS, Victoria) stressed that finer resolution assessments are much more costly to procure. R. Moses (UAlberta) pointed out that the there will be a need to simplify these metrics as much as possible if they are to be operational in the future.

Finally, it was noted that integration should also be further explored with SFM Network biodiversity researchers from other regions in the country. It was felt that efforts in the coming months should be directed toward integration among other regions with biodiversity research within the network.

4. Summary Statement

The major outcomes of the workshop can be summarized in the following 3 points:

1) Further endorsement of the vision statement from the January 2001 meeting in Guelph. Researchers reaffirmed their commitment to the vision statement developed last January.

"The biodiversity group will commit to identify, measure and explore relationships among a series of common variables (reflecting biodiversity composition and function metrics) across a range of human disturbances (including reference conditions) with the intent of using that common database to evaluate alternative protocols for assessing forest biodiversity."

2) Integration between biodiversity and LUCC groups

The discussion between researchers from these two disciplines during the course of the 2 day workshop resulted in an increase in understanding of the goals, approaches, and limitations of the 2 groups. The integration included plans for research starting in 2002-2003. For example, LUCC researchers agreed to focus efforts on identification and assessment of land uses and land cover changes that are of greatest concern to biodiversity researchers, namely:

- Canopy species composition
- Canopy structure (e.g. density, closure)
- Linear disturbance

- Residual volumes and cut blocks

3) Commitment to a workshop in early 2002

A major outcome of the workshop was the commitment to deliver a set of proposed indicators for biodiversity. An early 2002 workshop was suggested as a opportunity for delivering the proposed indicators, at which participants would each present a summary paper based on filling in the table below for their respective taxa. The information that will be generated at the workshop will serve as a foundation for a "white paper" that will outline the group's approach to the development and implementation of biodiversity indicators.

Table 1. Desired elements for proposed biodiversity indicators

Indicator definition	Basic Rationale	Performance Benchmark	Sampling Regime	Breadth of Applicability	Land Use/Change to be quantified
The Y variable			W/ explicit reference to temporal and spatial scales	Region where the indicator could be applied	

5. 2001-2002 Workplan

The biodiversity/lucc is committed toward the following actions in the coming year:

- A workshop planned for early 2002 to discuss indicators (as outlined above).
- Begin the preparation of a "white paper", based on the workshop.
- Pursue further integration with other SFM Network research groups (e.g. Ontario biodiversity). It was proposed that this integration is pursued in the near future (potentially the November SFM Network AGM).

6. Participants

S. Boutin, UAlberta
M. Collins, UCalgary
M. Darveau, ULaval
M. Donnelly, LP, Swan River, MB
K. Duchack, AB Government
S. Dyer, Alberta Pacific Forest Industries Ltd.
D. Dzebrowski, MB Government, Manitoba Conservation
D. Farr, Biota Research/Foothills Model Forest.
D. Gignac, UAlberta
R. Hall, Canadian Forest Service, Edmonton
G. Hamilton, AB Government,
S. Hannon, UAlberta
I. Houde, UBC
J. Kerr, Canada Centre for Remote Sensing, Ottawa
B. Kotek, Tembec, Pine Falls, MB
B. Macnab, SFM Network
R. Moses, UAlberta
J. Roland, UAlberta
A. Sanchez, UAlberta
J. Schieck, AB Government,
F. Schmiegelow, UAlberta
C. Shank, AB Government
H. Stelfox, AB Government
M.-A. Villard, UMoncton
M. Wulder, Canadian Forest Service, Victoria