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Collaborative modeling and social learning: engaging local people in the development and use of decision-making tools

Highlights

- Collaborative modeling involves local people in model development and use.
- Collaborative modeling helps to get local input and increases the ownership of local people in the modeling process.
- Communicating simulation results helps increase public trust in managers and motivation to further participate in the planning process.
- Social learning refers to situations where people learn from one another.
- Learning to appreciate opposing views helps reduce conflict.
- Information on long-term effects of different management strategies in a large area together with in-depth discussion enhances social learning.
- Different types of prior knowledge lead to different types of learning.

Computer models and integrated decision-making tools are developed to study the long-term effects of different forest management strategies over large areas. Planners use these tools to evaluate alternative management scenarios. To be successful, both the model parameters involved in the analysis and the indicators selected to demonstrate the effects should suit the local conditions. The models need to incorporate forest values that are locally important and also make sense to local people.

This research note describes how local people can contribute to the development of, and learn from, the use of decision-making tools. This is one of a series of research notes synthesizing results of the Labrador forest management model integration project.

Collaborative modeling

The collaborative modeling process involves local experts and forest users in the different stages of model development and use. The participants give their input at key times in the collaboration process to help define and refine the questions and issues that should be included. This may be done, as in our Labrador project, by asking the participants to list and rank factors important for them in the forest or even indicators they would like to use in measuring those factors. This does not necessarily mean more work for the planners, since it can be integrated in the regular public participation process used in forest management planning.

This process also involves showing local experts and forest users the preliminary simulation results of different management scenarios. People are given the opportunity to comment and ask questions

about the results and scenarios. The input is then used to refine the model or to create new management alternatives and exploratory scenarios.

Collaborative modeling has two equally important benefits. First, it helps to assemble the information on local conditions and values essential for the model development. Second, it increases the local ownership of the modeling process. In this way it also facilitates knowledge transfer.

Communicating modeling results

When model simulation results are shown to local people, they are better able to understand potential long-term and large-scale consequences of different management alternatives. Many of these consequences are difficult to understand without modeling tools. Information about long time scales and large areas demonstrates the complexity of the planning tasks faced by forest managers. When local people understand and appreciate the complexity of forest management planning, their trust both in managers and the planning process may increase. The time scales relevant for sustainable forest management may extend up to 200-400 years or longer, over multiple human lifetimes. That means searching for answers to questions like "What kind of forest will your grandchildren's children have?" In communicating simulation results for a large area, care should be taken to avoid giving too much attention to specific places, but instead placing the emphasis on the responses of key indicators at a landscape scale. This is important since many ecological processes like disturbance by fire act at a landscape scale.

Approaches to illustrating modeling results

Communicating simulation results requires interpretation and presentation in a form that is understandable to the participants. Simulation results can be illustrated in various ways including tables, graphs or time series of maps. Different visualization methods can also be used either at stand or at landscape levels to show what the forest would look like under different management regimes.

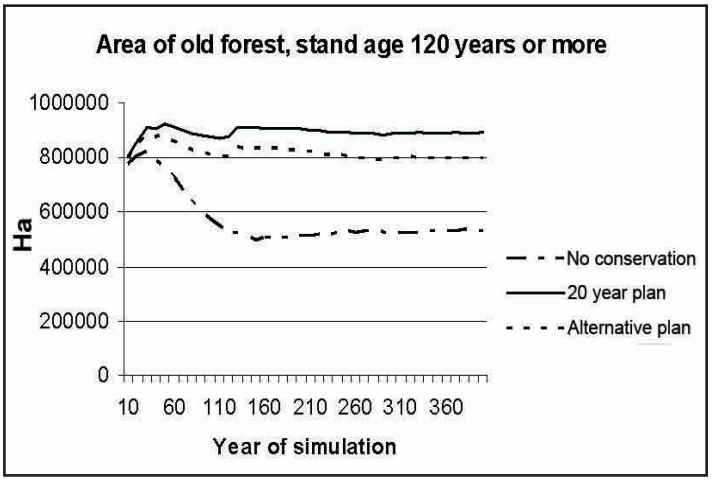

Figure 1. An example of illustration using a graph format: Development of the area of old forest with stand age 120 years or more in the three main scenarios in Central Labrador: 1. No conservation scenario with logging permitted everywhere, 2. 20 year plan scenario where logging is not permitted in 59 % of the forest land, and 3. Alternative plan scenario where logging is not permitted in 47 % of the forest land, and small habitats and special features are not protected. During the simulation period of 400 years, the area of old forest in the 20 year plan scenario and the alternative plan scenario remain stable, but in the no conservation scenario the area of old forest is reduced by about 36 % from the current situation.

Photorealistic visualization shows pictures of real places that are manipulated using computers to show future forest conditions based on management decisions. It is easy to understand, since it relates to people's personal experience in the forest. However, it is time-intensive and puts a lot of emphasis on the visual aspects, and not all indicators can be visualized. For example, the projected quantity of old forest in a landscape is better illustrated using a graph or table (Figure 1), while its spatial variation may be best communicated using maps (Figure 2). Tables are useful in summarizing the key features of each scenario (Table 1), making it possible to compare their positive and negative effects. Presenting information in this format may

not be ideal for all publics. More research is needed on the usefulness of different visualization tools for different publics.

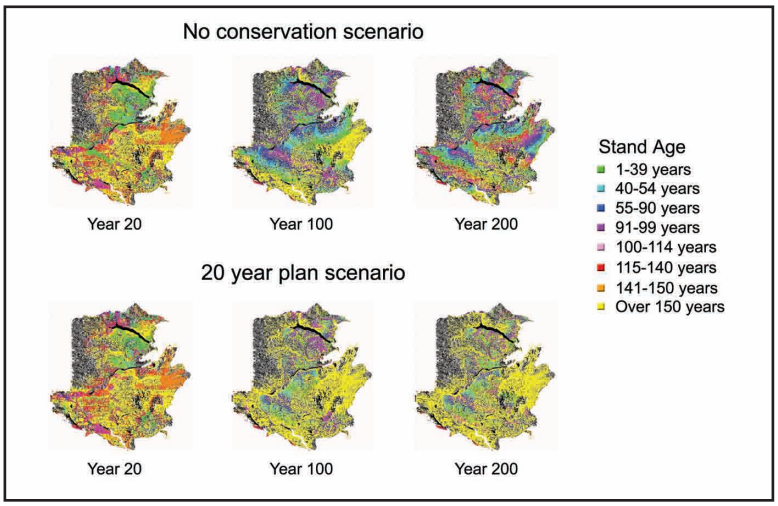

Figure 2. An example of illustration using a time series of maps: Development of stand age in two scenarios in Central Labrador. During a simulation period of 200 years, the area of stands over 150 years old is reduced to a fraction of the current situation in the no conservation scenario, whereas in the 20 year plan scenario, where in 59 % of the forest land logging is not permitted, the area of stands over 150 years is maintained at the current level or even increased. There is some uncertainty in the age classification of the oldest stands in the data.

	Quantity of Wood Cut	Biodiversity	Roads
No conservation scenario	maximum	Negative effects on biodiversity	A lot of roads built
20 year plan scenario	minimum	Biodiversity well protected	Medium km of roads built
Alternative plan scenario	medium	Biodiversity protected	The least km of roads built

Table 1. An example of illustration using a table: Summary of the effect of the three main scenarios on three key indicators in Central Labrador.

Communicating uncertainties

The uncertainties involved in simulation results must be clearly stated. Everyone should understand that decision-making tools are not designed or intended to predict the future, but rather to illustrate possible outcomes of different forest management strategies. Talking about the future always involves uncertainty. Models provide a simplified illustration of the forest and a certain level of uncertainty exists in our overall knowledge of the important factors and how they interact. Uncertainty related to the input data also exists. Modellers spend a lot of time understanding these uncertainties, and it is essential that a corresponding amount of time is taken in communicating them to local people.

Social learning and changing perceptions

Social learning refers to situations where people learn from one another. A meeting with a presentation followed by a period of in-depth discussion may enhance social learning. People have the opportunity to hear and appreciate diverse opinions and relate them to their prior knowledge. Even if participants do not change their opinions after hearing opposing views, learning to understand other perspectives has the potential to reduce conflict.

Social learning refers to a process during which all parties learn. Thus social learning is not limited to the public; forest managers and modellers may also learn new insights from the simulation results, or the discussion following their presentation. Thus, experts should be open to learning and also appreciate local knowledge that may be different from their own technical knowledge.

The efficiency of a message in changing perceptions depends on various factors. Some of those factors relate to the message and the way it is delivered. Others relate to people's prior knowledge of the issue, prior attitudes and the personal relevance of the matter. A higher level of prior knowledge facilitates understanding, but often results in more resistance to change. For example, in our Labrador case study, we found that forestry professionals reported having changed their minds less often than other forest users.

Research in connection with the Labrador project indicates that communicating simulation results to local people is useful and generates learning. Most participants reported that they had learned something and many also reported that they changed their minds. Many participants, who had not yet formed an opinion concerning certain questions, did so during the presentation and discussion. Forest users gained more confidence in the current forest management plan and were motivated to further participate. Forestry professionals learned about the relationships between cut block size and the fine-scale protection network and the amount of roads required. Different types of prior knowledge resulted in people learning different things even when they were presented the same information.

People's perceptions regarding forests and forestry may be changed by providing information on the long-term effects of various forest management strategies in a large area. Collaborative modeling and sharing scenario results with local people has the potential to achieve better management plans and a more supportive public.

Management Recommendations

- Public participation processes should include frequent communication of scenario results to local people.
- Different forest user groups should be given the opportunity to give their input to the modeling process.
- Locally-relevant issues and indicators should be selected.
- The value of local knowledge must be respected.
- All participants in modeling and planning processes should be open to learning.
- Communication amongst all participants is critical.
- Uncertainties, inherent in all modeling results, must be communicated to all involved parties.

Further reading

Berninger, K., Kneeshaw, D. and Messier, C. 2009. *The role of cultural models in local perceptions of SFM - differences and similarities of interest groups from three boreal regions.* J. of Enviro. Manage. 90: 740-751

Berninger, K., Kneeshaw, D. & Messier, C. 2009. *Effects of presenting forest simulation results on the forest values and attitudes of forestry professionals and other forest users in Central Labrador.* For. Pol. and Econ. 11: 140-147.

Daniels, S.E. and Walker, G.B. 1996. *Collaborative learning: improving public deliberation in ecosystem-based management.* Enviro. Imp. Ass. Rev. 16(2): 71-102.

Schusler, T.M., Decker, D.J. and Pfeffer, M.J. 2003. *Social learning for collaborative natural resource management.* Soc. and Nat. Res. 15: 309-326.

Sheppard, S.R.J., Lewis, J.L. and Akai, C. 2004. *Landscape visualization: An extension guide for First Nations and rural communities.* Edmonton, AB. Sustainable Forest Management Network.

Sturtevant, B., Fall, A., Kneeshaw, D., Simon, N., Papaik, M., Berninger, K., Doyon, F., Morgan, D. and Messier, C. 2007. *A toolkit modeling approach for sustainable forest management planning: Achieving balance between science and local needs.* Ecol. and Soc. 12(2): 7. http://www.ecologyandsociety.org/vol12/iss2/art7/

Wilson, J.S. and McGaughey, R.J. 2000. *Landscape-scale forest information: What is sufficient and what is appropriate?* J. For. 98 (12): 21-27.

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The views, conclusions and recommendations contained in this publication are those of the authors and should not be construed as endorsement by the Sustainable Forest Management Network.

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