The TFL 49 project: Criteria and indicators and a decision support system for an alternative zoning approach to sustainable forest management

by Rob D'Eon

Highlights

• Criteria and indicators allow managers to assess whether they are meeting sustainble forest management goals.

• Decision support systems can be useful tools for making forest management decisions that are based on overlapping objectives.

• Researchers are developing a decision support system that will allow managers to evaluate tradeoffs between indicators using different management strategies and stand-level practices.

The TFL 49 project is a multi-disciplinary research project lead by a team of researchers from the University of British Columbia Faculty of Forestry, and funded by the Sustainable Forest Management Network. TFL 49 is a forest tenure in south-central British Columbia held by the project's industry partner, Tolko Industries Ltd., and is the research site. The primary project objective is the development of a decision-support framework for sustainable forest management (SFM) of TFL 49. This research note is the first of a series stemming from the project.

The TFL 49 project in a nutshell

Lead by Dr. John Nelson of UBC forestry, the project team consists of researchers representing the three pillars of SFM: ecological, social, and economic. Within each of these research areas, the team will derive criteria and indicators of SFM for TFL 49. Using a variety of computer modelling techniques, the team with create a decision-support system (DSS) that will integrate ecological, social, and economic values into a decision tool used by TFL 49 managers. The DSS will be used to predict, project, and assess outcomes from a variety of management scenarios – focussing on a landscape-level zonation approach.

Why develop criteria & indicators of SFM?

In 1995, the Canadian Council of Forest Ministers (CCFM) released a framework for SFM in the form of 6 criteria and numerous associated indicators. Since then, these criteria and indicators (C&Is) have become the basis of SFM in Canada and have provided SFM leadership around the world. A criterion represents a desirable forest value that one wishes to enhance or maintain – for example, the maintenance

of biodiversity, or the maintenance of economic activity. An indicator is something measurable that can be used to evaluate success in achieving the criteria – for example, maintaining the abundance and distribution of vertebrate species, or maintaining annual allowable cut levels. While the CCFM C&I framework provides a useful starting point, many believe localized refinements can be more useful and tailored to specific operational circumstances. Therefore, several of the major objectives of this research project (see box) are directly related to identifying and implementing ecological, social, and economic indicators tailored to a SFM framework for TFL 49.

Primary research objectives of the TFL 49 project

1. Identify a set of ecological indicators for vertebrate species and ecosystem conditions and functions.

2. Identify a set of social indicators, focused on visual values and visible measures of stewardship.

3. Identify a set of economic indicators.

4. Develop and apply a decision-support system that can forecast impacts of stand-level management practices and landscape-level zonation strategies on these indicators.

A decision-support system for TFL 49

A decision-support system (DSS) is an information system that supports decision-making. A DSS is a useful tool for managers dealing with complex circumstances that require decisions based on numerous overlapping objectives over large geographic areas and long time frames. At the heart of a DSS are integrated computer models that can project or interpret the consequences of management activities. In this way, the complexities of overlapping objectives, actions, and consequences over large areas and long time frames can be integrated and assessed objectively.

Forest managers are routinely faced with complex decisions involving a wide variety of overlapping objectives. This is especially true as forest managers are increasingly required to demonstrate sustainability of ecological, social, and economic objectives. Managers of TFL 49 have embraced a SFM framework and desire a DSS as an aid in implementing SFM. Therefore, a major objective of the project (see box) is to develop a DSS for TFL 49 that can be used to assess trade-offs between indicators using different management strategies and associated stand-level practices.

The DSS for TFL 49 will include a stand-level/ecosystem model (FORECAST), forest level models (ATLAS/ZAM), a disturbance model (Mountain Pine Beetle), a road network model (CARP), a habitat

model (Patch Analyst), and a suite of visual communication tools. Figure 1 illustrates the integration of these models in the DSS.

What about zoning?

Zoning is routinely used to control urban and regional development (e.g., residential, industrial, agricultural). The same principles used in urban and regional zoning can be used to zone forest land. One method is the TRIAD approach, which is based on the concept of partitioning a forest landbase into distinct zones with different objectives. Typically, three zones are used: (1) a Timber Production Zone where intensive forest management is practiced and timber production is the primary objective, (2) a Multiple-use Zone where both timber and non-timber

Figure 1. The integration of models forms the basis for a decision-support system for sustainable forest management of TFL 49.

values are objectives, and (3) a Reserve Zone where ecological and/or social values dominate and no harvesting occurs. The advanta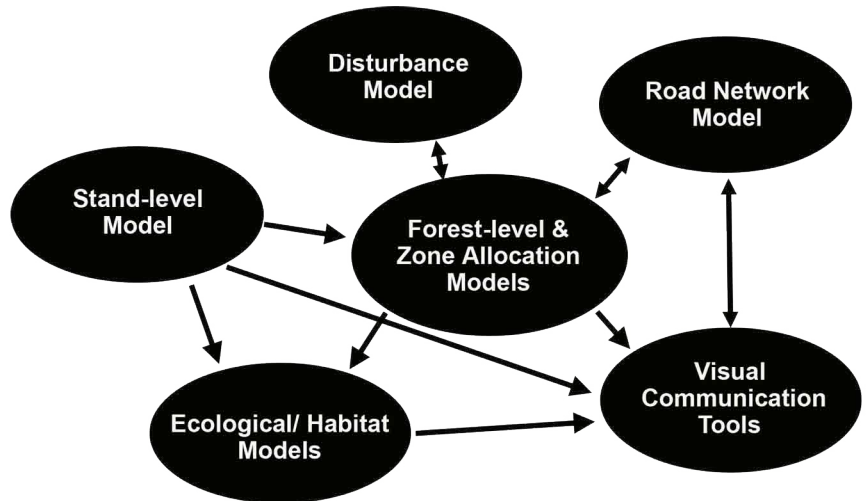ge of the TRIAD approach is that high intensity, high yield timber production can be concentrated on a small portion of the forest while leaving large portions of the forest undisturbed or managed under a low harvest intensity. Within TFL 49, a wide variety of values exists and this presents an opportunity to apply the TRIAD strategy. Investigating the merits of the zonation approach is a major focus of the TFL 49 project.
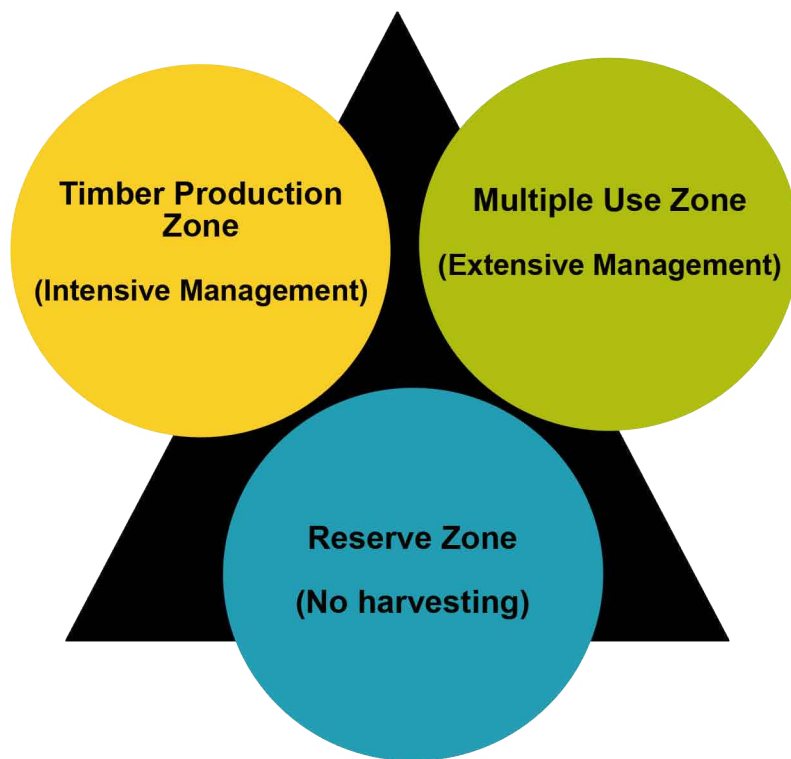

Figure 2. The TRIAD approach consists of three distinct zones on a forest landbase, each of which has a unique management objectives

For more information

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Links and further reading

Binkley, C.S. 1997. *Preserving nature through intensive plantation management; the case for forestland allocation with illustrations from British Columbia.* For. Chron. 73:553-559.

Canadian Council of Forest Ministers: **http://www.ccfm.org/home_e.html**

D'Eon, R.G., and others. 2004. *An ecological rationale for sustainable forest management concepts at Riverside Forest Products, southcentral British Columbia.* For. Chron. 80:341-348.

Rempel, R.S., and others. 2004. *Guiding principles for developing an indicator and monitoring framework.* For. Chron. 80:82-90.

Seely, B., and others. 2004. *The application of a hierarchical decision support system to evaluate multiple objective forest management strategies: A case study in northeastern British Columbia.* For. Ecol. Mgmt. 199: 283-305.