Ministry of Natural Resources

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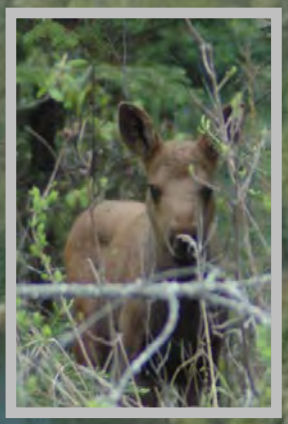
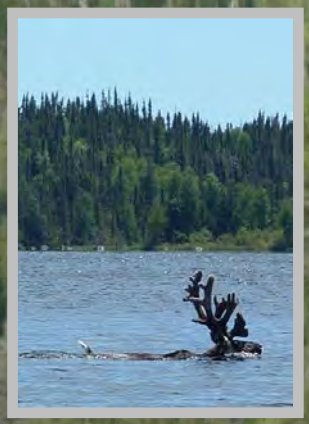
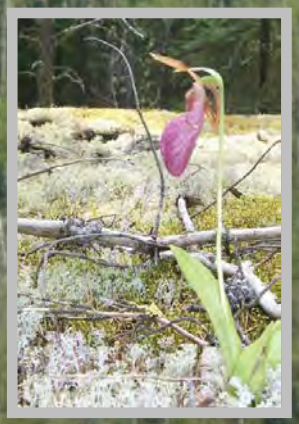
Science and Information in support of Ontario's Forest Management Guides For Landscapes

Science Package – Series B

Results: Landscape Guide Region 3W







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Electronic Document – Version 2018

This electronic document contains numerous linked embedded objects including journal articles, data summaries, government reports etc. The user of both this electronic document and the linked embedded objects should refer directly to the linked embedded object(s) and cite appropriately. Otherwise this science and information package should be cited as;

Elkie, P., M. Gluck, J. Elliott, G. Hooper, R. Kushneriuk, Rempel, K. Ride, A. Smiegielski, 2018. **Science and Information in support of Ontario's Forest Management Guides for Landscapes: Science Package - Series B: Results: Landscape Guide Region 3W.** Ontario Ministry of Natural Resources, Forest Policy Section.

To open linked embedded files click on the underlined, **blue** coloured words found throughout this package.

Contents

1 Overview

This document includes simulation results and tools for target setting and forest management planning that have been submitted and presented to the Forest Management Guide for Landscapes development team. It is intended for use by forest management planning teams when considering direction from the Forest Management Guide(s) for Landscapes (hereafter called landscape guides).

The simulated ranges of natural variation (SRNV) are science based ecological estimates of landscape potential with no anthropogenic influence. As part of the landscape guide project, SRNV's were estimated for numerous forest composition and species specific habitat indicators. The SRNV for a given indicator is generally expressed as the amount (i.e., usually area based) and distribution (i.e., relative landscape pattern).

SRNV for a series of landscape level indicators (i.e., forest composition and habitats) were estimated for the entire area where forest management planning occurs in Ontario. These SRNV's were estimated using stochastic landscape level simulation models. Briefly, these models attempt to emulate landscape level disturbances (i.e., fire, insect and weather events), succession and post disturbance transitions. The stochastic nature of the models (i.e., random fire starts from simulated lightning strikes) means that each time a simulation is completed the result will be unique. The simulation models were run between 10 to 60 times depending on the eco-region in the province. In each eco-region, simulations were run long enough to remove the existing anthropogenic footprint.
The area based SRNV are expressed and characterized using box and whisker plots. The plots include a minimum (bottom whisker), maximum (top whisker), the median value, and a box representing the range between the 25^{th} to 75^{th} percentiles. The current value of the indicator is plotted on the box and whisker diagram illustrating the current state of that indicator.

Refer to "***Science and Information in support of Ontario's Forest Management Guides for Landscapes: Science Package – Series A: Simulations, Rationale and Inputs. Version 2013***" (Elkie *et al.,* 2013) for explanations of models, simulations, rationale and inputs.

2 Simulation Results

Simulation results are organized by landscape guide regions (Figure 1).

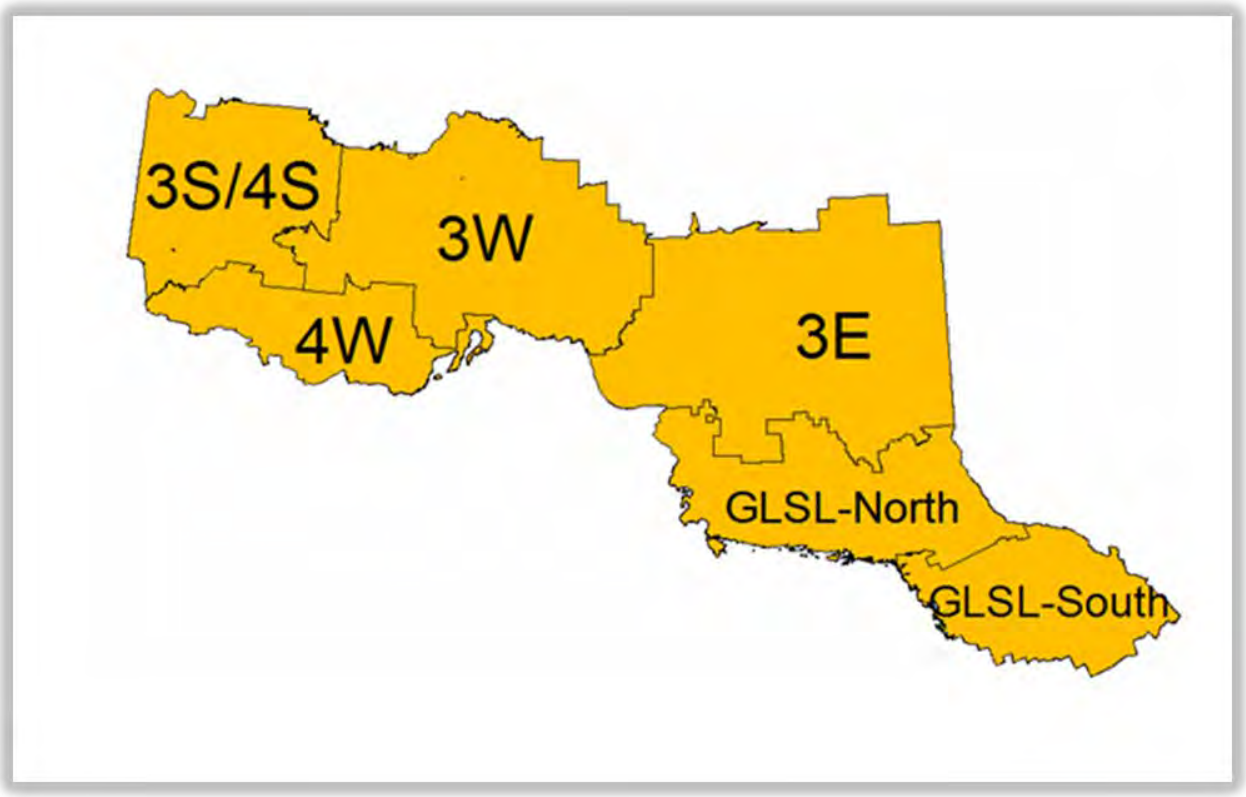

Figure 1 Landscape guide regions. Landscape guide regions approximate ecoregions but are snapped to 2006 forest management unit boundaries. GLSL-North includes eco-region 4E and GLSL-South includes eco-region 5E.

2.1 Simulation surfaces

2.1.1 Example animation simulation

The attached example includes a 100 year BFOLDS simulation in Landscape Guide Region 3W. Many simulations were used in estimating the simulated range(s) of natural variation and the example is for illustrative purposes.

Example Simulation Animation

2.1.2 Disturbance return interval surfaces

We created surfaces depicting the mean stand replacing disturbance return interval. The main disturbance type that caused stand replacement was crown fires. In the GLSL forest, surface fire, wind and spruce budworm mortality also caused occasional stand replacement (see Elkie *et al.* 2013 for a full explanation of disturbance types simulated). These surfaces were created by estimating the time, during the simulation measurement sampling period (i.e., 400-500 years GLSL North, 900-1000 years GLSL South and 100-200 years all boreal regions), that a given tessellated polygon (GLSL) or pixel (Boreal) was below the age of 20.

Crown Fire Return Interval Surface

2.1.3 Forest unit occurrence surfaces

In the boreal landscape guide regions, we created surfaces depicting the mean number of times a forest unit occupied a pixel. These surfaces provide an estimate of both relative occurrence and distribution of each **forest unit**.

Forest Unit	Description
Bfdom	Balsam fir dominated
Bwdom	White birch dominated
Conmx	Conifer mixedwood
Hrdmx	Hardwood mixedwood
Hrdom	Hardwood dominated
Pjdom	Jackpine dominated
Pjmx1	Jackpine mixed conifer
Podom	Poplar dominated
Sbdom	Black spruce dominated
Sbmx1	Black spruce mixed

2.2 Prescriptive Indicators

We estimated area based simulation ranges of natural variation (SRNV) for each prescriptive indicator and pattern based SRNV for several prescriptive indicators.

Forest unit by development stage and landscape classes

Old growth and Mature and old

Conifer – all ages

Young forest

2.3 Evaluative Indicators

We also estimated area based SRNV for each evaluative indicator[1].

Indicator results	Model description
Lynx	**Lynx description**
Northern Flying Squirrel	**NFS description**
Snowshoe hare	**Hare description**
Boreal songbirds	**Songbirds description**
Marten	**Marten description – marten analyst**
	Marten 2 models

[1] Caribou and moose results are included in separate species specific science and information packages.

3 Literature cited

Elkie, P., M. Gluck, J. Boos, J. Bowman, C. Daniel, J. Elliott, D. Etheridge, D. Heaman, G. Hooper, R. Kushneriuk, G. Lucking, S. Mills, B. Naylor, F. Pinto, B. Pond, R. Rempel, K. Ride, A. Smiegielski, G. Watt, M. Woods. 2013. **Science and Information in support of Ontario's Forest Management Guides for Landscapes: Science Package – Series A: Simulations, Rationale and Inputs. Version 2013.** Ontario Ministry of Natural Resources. Forest Policy Section.