Patterns of structural response
to simulated partial harvesting
of boreal mixedwood stands

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boreal stand development

(photos: C. Sharkey; drawings: Chen & Popadiouk 2002)
habitapt structure

Heterogeneity

Overstory

Vertical structure

DWD

Snags

Understory

Regeneration
late-successional species
forest age distribution

Percent of total area

Young

Old

Rotation age
partial harvesting

- How might partial harvesting affect structural development in boreal stands?

2/3 partial-cut mixedwood stand
hypothesized effects
stand dynamics model

SORTIE-ND
Software for spatially-explicit simulation of forest dynamics

(C. Canham)
partial harvest scenarios
simulations & model output

Boreal mixedwood stands dominated by *Populus tremuloides*

- Analysis of structural differences
- 37 variables → factor analysis

<table>
<thead>
<tr>
<th>Overstory</th>
<th>Dead wood</th>
</tr>
</thead>
<tbody>
<tr>
<td>Understory</td>
<td>Vertical structure</td>
</tr>
<tr>
<td>Regeneration</td>
<td>Heterogeneity</td>
</tr>
</tbody>
</table>
## habitat models

<table>
<thead>
<tr>
<th>Species</th>
<th>Can Cov</th>
<th>Height</th>
<th>Lg trees</th>
<th>Snags</th>
<th>Saplings</th>
<th>DWD</th>
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</thead>
<tbody>
<tr>
<td>Redback salamander</td>
<td>X</td>
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<td></td>
<td>X</td>
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<tr>
<td>Brown creeper</td>
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<td>X</td>
<td>X</td>
<td></td>
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<tr>
<td>Ovenbird</td>
<td>X</td>
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<tr>
<td>Least flycatcher</td>
<td>X</td>
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<td>X</td>
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<tr>
<td>Red-backed vole</td>
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<td>Northern flying squirrel</td>
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<tr>
<td>American marten</td>
<td>X</td>
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</tbody>
</table>
structure trends

Unharvested

30% rem
50% rem
70% rem
structure trends

Unharvested
30% rem
50% rem
70% rem
5-year impacts
species responses

- R. Salamander: +49%, +45%, +40%
- Marten: +38%, +20%, -10%
- R.-B. Vole: +4%, -8%, -10%
- Ovenbird: -17%, -26%, -36%
- B. creeper: -2%, -28%, -49%
- F. Squirrel: -23%, -44%, -67%
- L. Flycatcher: -86%, -97%, -100%

Removal percentages:
- 30% rem
- 50% rem
- 70% rem
canopy turnover

partial harvesting

promotes canopy turnover

enhances gap-related structure
snag & large tree retention
fostering complex structure

- Light/moderate intensity harvesting
- Aggregated harvest patterns
- Retain snags, large trees, DWD
acknowledgements

- Sustainable Forest Management Network
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- NSERC

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- Lora Murphy, Charlie Canham