Using Natural Disturbance Patterns for Sustainable Forest Management

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2006 Alberta Development Officers Association Conference
Jasper, Alberta
October 28th, 2006
What is “Natural Disturbance”?

- Forest Fires
- Floods
- Wind Storms
- Insect and Disease
- Landslides
- Browse
- ...
Fire is the main disturbance agent in this area.
Is fire bad for ecosystems?

- Soil temp
- Light
- Cover
- Micro-climate
- Soil nutrient availability
- Downed woody debris
- Injured trees
- Dead standing trees
- Species shift
Fire affects ecosystems in many ways and at many scales
Before Fire Control

After Fire Control (Jasper Park)
Humans are also disturbance agents
Foothills Model Forest
Natural Disturbance Program

Sound science

What are the patterns and processes of natural disturbance?

...put into practice

Committed to finding integration solutions to make best use of our new knowledge.

...by all partners through collaboration.

Directed by a team of collaborators, including companies, government, parks, and others.
What do we know so far about disturbance patterns?

Plenty.
Old Forest Moves Around in Time and Space

1800 (5%)
1850 (10%)
1900 (13%)
**Old Forest Levels**

<table>
<thead>
<tr>
<th>Pct. Forest &gt; 200 yrs.</th>
<th>Occurred</th>
</tr>
</thead>
<tbody>
<tr>
<td>0%</td>
<td>Never</td>
</tr>
<tr>
<td>&gt;0-10%</td>
<td>62% of the time</td>
</tr>
<tr>
<td>11-20%</td>
<td>19% of the time</td>
</tr>
<tr>
<td>21-30%</td>
<td>9% of the time</td>
</tr>
<tr>
<td>31-40%</td>
<td>6% of the time</td>
</tr>
<tr>
<td>41-100%</td>
<td>6% of the time</td>
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</tbody>
</table>

There is no single “best” amount of old forest from an ecological point of view.
Old Forest Should be Managed at ALL Scales.

500,000 ha landscapes never run out of “old” forest in Alberta’s foothills.

30,000 ha landscapes run out of “old” forest 16% of the time in Alberta’s foothills.
Unburnt or partially burnt areas account for 25-50% of wildfires.
Unburnt Island Sizes

4,225 islands < 1 ha
466 islands 1-2 ha
350 islands 2-10 ha
67 islands 10-100 ha
4 islands > 100 ha
Wildfires burn through creeks almost as often as they do upland forest.
Fires facilitate natural processes in rivers -
Fish habitat
Flood control
Erosion control
Disturbance frequency
Seral-stage percentages
Old growth spatio-temporal tendencies
Disturbance types / severity
Disturbance event sizes
Patch size distribution
Patch shape distribution
Event mosaics
Area of island remnants
Numbers of island remnants
Island remnant locations
Edge architecture
Within patch heterogeneity
Coarse woody debris
Dead & live standing individuals
Mineral soil exposure
Biomass loads
Soil nutrients
Soil compaction
Disturbance probabilities
Water temperatures
Water flows
Water nutrients

...and there are LOTS of natural patterns,
- and LOTS of ecological “So What’s”.
If you get the disturbance patterns right, it will go a long way to providing sustainable solutions for biodiversity.
The Hwy40 North Demonstration Project

- Foothills Forest Products
- ANC
- Hinton Wood Products
- Willmore Wilderness Area

70,000 ha
The Team:
West Fraser
ANC
Foothills FP
Willmore
ASRD Regulator
ASRD F&W
ASRD Fire
Alberta Energy
CAPP
FMF Disturbance Expert
The Plan (so far)
Why here?

- Good timber values
- Barrier to eastward movement of fire AND mountain pine beetle
- Great visibility and education opportunity
- Reduces new roads
- Covers existing oil and gas development
- Leaves lots of remaining old forest intact
Now What?

- Team finishes the plan.
- Partners develop their plans and submit for approval.
- Begin monitoring now:
  - Grizzly bear
  - Woodland caribou
  - Fish
  - Soils
  - Birds…
- Start looking for education opportunities (*pullouts*?!).
- Talk about it.
Summary

- Hwy40 is an applied demonstration of a disturbance plan based on sound science.
- Disturbance does not respect administrative boundaries.
- Project will be evaluated on 2 levels:
  - Degree to which it provides sustainable solutions for other values.
  - Degree to which the framework is robust, accepted, feasible, and supported.