Healthy Landscapes Program

FRI AGM
June 17, 2009
David Andison
The FRI Healthy Landscape Program

Develop understanding, and tools that allow us to consider landscapes as fully integrated ecosystems, the health of which is the ultimate measure of sustainability.
To avoid national train wrecks, the Clinton administration will shift federal policy away from a single species approach to one that looks at entire ecosystems.

(James Babbit, ‘97)

This is a BIG Idea! ...but not new.

“To avoid national train wrecks, the Clinton administration will shift federal policy away from a single species approach to one that looks at entire ecosystems.”

(James Babbit, ‘97)

“..cogs and wheels…”

(Aldo Leopold, ‘49)
Generalized Management Model

- **Reality**
  - Current conditions

- **Values**
  - Needs & wants

- **Paradigms**
  - A way of thinking

- **Frameworks**
  - Interpretive guidance

- **Systems**
  - Standardized procedures

- **Tools**
  - Make it happen
The Idea: How the Natural World Works.

Elements of biodiversity

Long-term processes

Short-term processes

“Biodiversity”

Outcomes

Earth, water, air, fire, & life.

Evolutionary, geologic, climatologic, biologic, hydrologic, pedologic...

Disturbance

Diversity and number of individuals, species, ecosystems & interactions.

Species population levels, timber supply, wildfire risk, clean water, recreation…
A wildfire kills 70% of large trees within the riparian zone of a small stream.

Dead trees fall down and create large woody debris (LWD) in and over the stream.

New LWD changes water flow, direction and velocity, and create new pools.

Convoluted streams with LWD and a variety of sizes of pools act as buffers against flooding.

LWD over the stream create bridges for small mammal habitat and travel.

Organic matter and sediment erode from the banks into the stream.

Heat from the fire, exposed mineral soil and sunlight encourage pioneer vegetation growth.

Insect diversity explodes.

New growth is high in nutrient value for browse.

Woodpeckers

Cavity nesting birds...
A wildfire kills 70% of large trees within the riparian zone of a small stream.

- Dead trees fall down and create large woody debris (LWD) in and over the stream.
- New LWD in the stream changes water flow direction and velocity, and create new pools.
- Structure and compositionally diverse aquatic ecosystems filter toxins in water.
- The changes to water flow direction and velocity causes organic matter and sediment to erode from the banks into the stream.
- Convoluted streams with LWD and a variety of sizes of pools act as buffers against flooding.
- New LWD over the stream create bridges for small mammal habitat and travel.
- Fish and invertebrate communities need organics for nutrients, fresh sediment for spawning, pools for habitat, and LWD for shade and hiding cover.

These are also social & economic values.
Assumptions:

• Landscape health is the ultimate measure of sustainability.

• Disturbance-related patterns (as a proxy for landscape health) can be used as the universal goal of land management.

• A landscape not operating within the natural range is at risk.

• The further you venture beyond NRV, the greater the risk of loss of system health.

• We can differentiate a “healthy” from an “unhealthy” landscape via simple indicators.
Landscape 1 is “Healthier” than Landscape 2

Green = Measurable Historical Range
Red = Beyond Historical Range
Black Dots = Current (point, range)
Example of the Traditional Land Management Process.

**Management Actions**

- **Agency A**
  - Install dams, build levees, dig reservoirs, add LWD.
  - We want to minimize the risk of both flooding and water shortages.
- **Agency B**
  - We want access to recreational fishing.
  - Stock lakes and streams with fish.
- **Agency C**
  - We want our water to be safe and clean.
  - Prevent and control all wildfires.
  - Forbid any disturbance in riparian zones.

**Economic, Ecological & Social Issues**

- Loss of young riparian forest habitat type.
- Aquatic diversity declines.
- Riparian forests become old.
- The landscape risk to natural disturbance increases.
- Biological benefits of LWD continue to decline.

**Decision Filtering Process**

**Unintended cumulative social, ecological, & economic impacts.**
We want to a) begin to restore riparian zones to more historical landscape structures and, b) integrate riparian zone management with the rest of the landscape.

A disturbance plan kills 70% of large trees within the riparian zone of a small stream.

Dead trees fall down and create large woody debris (LWD) in and over the stream.

New LWD in the stream changes water flow direction and velocity, and create new pools.

Changes to water flow cause organic matter and sediment to erode into the stream.

New LWD over the stream create bridges for small mammals.

Aquatic communities need organics for nutrients, fresh sediment for spawning, pools for habitat, and LWD for cover.

Convoluted streams with LWD and a variety of sizes of pools act as buffers against flooding.

Diverse, healthy aquatic ecosystems are more likely to filter toxins in water.

Healthy fish communities are preferred fishing destinations.

Landscape Health Issues

Decision Filtering Process

Management Actions

Landscape Condition Responses

Biological Responses

Economic and Social Responses
The HL Three Box Model

INDICATORS (e.g.)

- Frequency
- Duration
- Size
- Shape
- Type
- Severity
- Response to Veg.
- Response to Topog.

Below

NRV

Above

Disturbance Attributes

- % Old Forest
- % Old Riparian For.
- % Young Forest
- % Old Non-Forest
- % Young Riparian
- Water Sediment
- Large Old Area Freq
- Large Woody Debris

Landscape Condition Responses

- MPB Threat
- Wildfire Threat
- Grizzly Bear Habitat
- Bull Trout Habitat
- Caribou Habitat
- Wood Supply
- Access
- Rec. Fishing

These are all management controls; the “Levers”.

These are primary management effects; “Desired Future Forest / Water / Land”, etc

These are the key management outputs; “Fine Filter Values”.

INDICATORS (e.g.) Below NRV Above

INDICATORS (e.g.) Below NRV Above

INDICATORS (e.g.) Below NRV Above

INDICATORS (e.g.) Below NRV Above

INDICATORS (e.g.) Below NRV Above

INDICATORS (e.g.) Below NRV Above
Disturbance Plan

- Harvesting
- Prescribed Burning
- Well Sites
- Roads
- Paving
- Response to Natural Disturbances
- Pipelines
Project #1: Flesh it out.

Generalized Management Model

- Reality: Current conditions
- Values: Needs & wants
- Paradigms: A way of thinking
- Frameworks: Interpretive guidance
- Systems: Standardized procedures
- Tools: Make it happen

Project #2:
Talk, share, & help interpret.

- CEMA and LARP
- WPAC’s
- IMAGINE
- …

Alberta’s Land Use Framework

- Vision: “The peoples of Alberta work together to respect and care for the land as the foundation for our economic, environmental and social well-being.”
- “Supported by a land stewardship ethic”.
- One of 3 Desired Outcomes: Healthy ecosystems and environment.
Project #3: The Upper Athabasca HL Project
May 27 HL Project Partnership Meeting

- Hinton Wood Products
- Alberta Newsprint Co.
- Jasper National Park
- Alberta SRD – Forest Mgmt.
- Alberta SRS – Land Use Planning group
- Foothills Forest Products
- Weyerhaeuser Company
- Talisman Energy
- Alberta Environment
- Sundre Forest Products
- Foothills Land Mgmt Forum
- Alberta Energy
- Coal Valley
- Shell
- Alberta SRD – Forest Protection
- Alberta Tourism Parks and Recreation
- Alberta SRD – Oil Sands Branch
- Miller Western Forest Products
- Foothills Research Institute
- (Canfor)
- So far....
### Future Projects: Support The Three Box Model

#### Disturbance Attributes
- Frequency
- Duration
- Size
- Shape
- Type
- Severity
- Response to Veg.
- Response to Topog.

#### Landscape Condition Responses
- % Old Forest
- % Old Riparian For.
- % Young Forest
- % Old Non-Forest
- % Young Riparian
- Water Sediment
- Large Old Area Freq
- Large Woody Debris

#### Biological & Other Responses
- MPB Threat
- Wildfire Threat
- Grizzly Bear Habitat
- Bull Trout Habitat
- Caribou Habitat
- Wood Supply
- Access
- Rec. Fishing

#### Indicators (e.g.)

<table>
<thead>
<tr>
<th>Below</th>
<th>NRV</th>
<th>Above</th>
</tr>
</thead>
<tbody>
<tr>
<td>Frequency</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Duration</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Size</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Shape</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Type</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Severity</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Response to Veg.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Response to Topog.</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

- These are all management controls; the “Levers”.
- These are primary management effects; “Desired Future Forest / Water / Land”, etc.
- These are the key management outputs; “Fine Filter Values”.

Below NRV Above

Future Projects: Support The Three Box Model
Questions?