The Dangerous Concept of the Precautionary Principle

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Precautionary Principle

If the consequences of an action, especially the use of technology, are unknown but are judged by some scientists to have a high risk of being negative from an ethical point of view, then it is better not to carry out the action than risk uncertain, but possibly very negative, consequences.

wikipedia.com
Works Well in Some Situations

- Importing cows where mad cow disease is prevalent
- Genetically modified organisms
- Actions that have widespread, very significant downsides

What About Dynamic Systems?

No action is always a choice for change

Application of the precautionary principle may have good results – or they may be negative

The case of forest fires – but an ecology of place

Must be evaluated in risk management context
Riparian Zones and Fire

- Dynamic systems (yes!!)
- What is **Risk to Wildfire** with:
  - No action
  - Active management
- An Ecology of Place
- An Ecology of Time
Fire Does Burn Riparian Zones

- Creek circled in red
- Note fire-scarred incense-cedar in foreground
The Historical Story
Riparian Zones Vs. Uplands

• More Moist
• More Productive
• More backing fire: bottom of drainage
Riparian Foliar Moisture Exceeds the Uplands

Agee et al. 2002

Table 4
Late season foliar moisture content (%) in riparian and upland forests in three forest series, Baker City watershed, northeastern Oregon

<table>
<thead>
<tr>
<th>Forest series</th>
<th>Overstory trees</th>
<th></th>
<th>Strubs</th>
<th></th>
<th>Herbs</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Riparian</td>
<td>Upland</td>
<td>Riparian</td>
<td>Upland</td>
<td>Riparian</td>
</tr>
<tr>
<td>Pseudotsuga menziesii</td>
<td>143 (18)</td>
<td>135 (10)</td>
<td>198 (13)</td>
<td>122 (16)</td>
<td>289 (60)</td>
</tr>
<tr>
<td>Abies grandis</td>
<td>146 (11)</td>
<td>153 (12)</td>
<td>234 (18)</td>
<td>&gt;</td>
<td>125 (16)</td>
</tr>
<tr>
<td>Abies lasiocarpa</td>
<td>120 (6)</td>
<td>138 (7)</td>
<td>131 (3)</td>
<td>136 (29)</td>
<td>107 (6)</td>
</tr>
</tbody>
</table>

* Sample size is four and standard deviation (S.D.) is in parentheses.

Agee et al. 2002

Historical Fire Regimes of the Pacific Northwest

- **Low Severity**
  - Frequent (5-15 yrs) but low intensity
- **Mixed Severity**
  - Less frequent (25-75 yrs) and a mix of severities
- **High Severity**
  - Infrequent (100+ yrs) and stand-replacing
Historical Fire Regimes

Changes in Fire Regimes

Historical

Now

Adapted from
Forest Service Regions 1-6 – FRCC 2000 – All Cover Types
Low Severity Fire Regimes

- Riparian zones appear to burn as often as uplands
- Work by Emily Heyerdahl and Diana Olson in Blue Mountains of NE Oregon
- Uplands: Mean FRI approximately 11 yrs
- Riparian: Mean FRI approximately 14 yrs (Statistically similar)

Dugout Creek, Malheur NF
Percentiles of Weibull Median FRIs

Diana Olson 1999
North Fork Malheur River, Malheur NF

Dugout Creek

20th Century Changes

- Fire Exclusion Homogenizes Landscape
- Fuels Increase
- Fire Return Interval Lengthens
- Fire Intensities Increase
- Fire Regime Shifts from Low to High Severity – Uplands AND Riparian Zones
Multi-layered Canopy Common in Riparian

Spruce Budworm Kill

- Focuses on grand fir, which is more likely to be a riparian species in lower elevation dry forests
- Defoliates and over time kills trees, increases dead fuel loading in riparian zone.
Overstory Crown Density

- Douglas-fir, grand fir series
- Similar structure: upland and riparian
- Mostly
  - Severe surface fire potential
  - Torching potential

Less independent crown fire potential – but it does occur…..
1996 – Summit Fire, Blue Mountains

1994 Tyee Fire

Dry Douglas-fir Series

Potato Creek

Mud Creek
These were “No Action” choices

• Historical low-severity fire regimes
• Damage is severe from wildfire
• We’re sure of “what” but not “when” or necessarily “where” in short term
• Longer term – 2/3 of drier forests over next century unless more active management occurs

Nature of Active Management

• Mimic the Natural Forest (It’s not so dangerous after all!)
• Uplands
• Lower surface fuels
  – Raise ladder fuels
  – Reduce crown density (some places)
• Riparian zones: surface and ladder fuels
• Treated upland
• 8 years after wildfire passes through
• Crown fire transitioned to surface fire
• Adjoining riparian zones would have been protected if adjacent upland had been treated like this

Mixed Severity
Drier Douglas-fir Forests

• Central Oregon Cascades into Northern California
• Mixed Severity Fire Regime
• Note patch size smaller and severity is variable across the landscape
Steamboat Creek Study

High Severity Fire Regimes

- Fires infrequent
  - 100-400 yrs
  - Stand replacement
- Wider riparian zones act as fire boundaries
- Olympics: Hoh fire, Queets fire, Hee-haw fire
- Implication: less active mgt needed
Subalpine fir zone

- High severity fire regime
- Little French Creek
- Riparian zone burns while upland does not

High Severity Fire Regime
Little French Creek

- Payette National Forest, Idaho 1994
- Uplands burn in 1900 and 1933
- Riparian Zone Missed
- 1980’s – Spruce Beetle in Riparian
- 1994 – Riparian Burns
Precautionary Principle Must be Flexible

- A Context of Place
- A Context of:
  - History
  - Current Condition
  - Risk
- Assess “no action” to “active mgt”

Focus on Dry Forests

- Where the major shifts in fire severity have occurred
- Priority: more firesafe uplands, no need to treat every acre
- IF riparian treated, leave more canopy, treat surface fuels, especially fine dead fuels
- Perpetuate slow input of large CWD to stream channels
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