How much fire management can we afford? Changing economic constraints to fire management in interior Alaska.

Joe Little

Sherri Wall
Motivation

• According to U.S. Forest Service (2003)
  – 99% of all fires are extinguished in initial attack
  – 80% of all fire costs generated by 2% of total fires
  – Alaska 2004, approx. 6.5 million acres and $148 million in expenditures
Planning for Fire Suppression Costs

• National Fire Management Analysis (NFMAS) and FIREPRO Systems, based on Cost plus Net Value Change (C+NVC), represents total cost.
• Objective: Minimize C+NVC, suppression costs (C) reduce NVC (lower damage losses)
• NVC changes primarily due to reduced timber losses; traditionally did not include non-market values (e.g., environmental service flows)
Changing Perspectives

• Explicit recognition of need to re-incorporate fire into ecosystems
• 20 year avg. (USFS) suppression cost $582/acre, $51/acre for wildfire use
Preliminary Findings

- State
- Federal
- Combined
- Average Costs Per Acre & Per Fire
A Breakdown of State & Federal Suppression Expenditures in Alaska

<table>
<thead>
<tr>
<th>Year</th>
<th>Federal</th>
<th>State</th>
<th>Total State &amp; Federal Costs</th>
</tr>
</thead>
<tbody>
<tr>
<td>1997</td>
<td>$17,904,842</td>
<td>$25,318,700</td>
<td>$43,223,542</td>
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<tr>
<td>1998</td>
<td>$19,365,050</td>
<td>$37,120,900</td>
<td>$56,485,950</td>
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<tr>
<td>1999</td>
<td>$12,521,839</td>
<td>$21,989,500</td>
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<td>2000</td>
<td>$15,337,406</td>
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<td>2001</td>
<td>$20,537,374</td>
<td>$26,578,200</td>
<td>$47,115,574</td>
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<tr>
<td>2002</td>
<td>$21,257,412</td>
<td>$45,137,600</td>
<td>$66,395,012</td>
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<tr>
<td>2003</td>
<td>$16,949,436</td>
<td>$26,783,200</td>
<td>$43,732,636</td>
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<tr>
<td>2004</td>
<td>$59,644,069</td>
<td>$88,592,200</td>
<td>$148,236,269</td>
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<tr>
<td>2005</td>
<td>$41,341,580</td>
<td>$22,707,500</td>
<td>$64,049,080</td>
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</tbody>
</table>
Inflation-Adjusted Suppression Costs for Fires on State Land

Up 2.2 million per year
Real Suppression Costs for Fires on State Land without 2004 Season

Up $630,000 per year

Cost in Millions $

Year

Federal Suppression Costs

Up 3.9 million per year
Federal Suppression Costs without 2004

Up 2.4 million per year

Cost in Millions $
Total Federal and State Suppression Costs

Up 6.8 million per year
Total Federal and State Suppression Costs without 2004

Up 2.2 million per year
Cost averaged over acre and fire

<table>
<thead>
<tr>
<th>Year</th>
<th>Acres of Fire Activity</th>
<th>Cost Per Acre</th>
<th># Fires</th>
<th>Cost Per Fire</th>
</tr>
</thead>
<tbody>
<tr>
<td>1997</td>
<td>2,026,899</td>
<td>$21</td>
<td>773</td>
<td>$55,917</td>
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<td>1998</td>
<td>120,752</td>
<td>$468</td>
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<td>$137,102</td>
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<tr>
<td>1999</td>
<td>1,005,428</td>
<td>$34</td>
<td>486</td>
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<td>2000</td>
<td>756,296</td>
<td>$47</td>
<td>369</td>
<td>$95,598</td>
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<tr>
<td>2001</td>
<td>98,720</td>
<td>$477</td>
<td>321</td>
<td>$146,777</td>
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<td>2002</td>
<td>2,183,363</td>
<td>$30</td>
<td>543</td>
<td>$122,274</td>
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<td>2003</td>
<td>602,718</td>
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<td>2004</td>
<td>6,523,182</td>
<td>$23</td>
<td>696</td>
<td>$212,983</td>
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<td>2005</td>
<td>4,663,880</td>
<td>$14</td>
<td>624</td>
<td>$102,643</td>
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<tr>
<td>Averages</td>
<td>1,997,915</td>
<td><strong>$132</strong></td>
<td>522</td>
<td><strong>$115,131</strong></td>
</tr>
</tbody>
</table>
Key Factors Driving Fire Costs

- Extent of rural-urban interface

- The use of aviation assets
  Ex. McGrath – aircraft logistics & support costs

- Climate Change
  - Longer Season
  - July Rains

- Training/Safety Costs
How do public and political pressures to act affect resource allocation?

• Action taken where wouldn’t otherwise – i.e. greater expense to monitor and map the Wild Lake fire in a limited zone.

• Inconsistent application of policy also has a cost

• Creates a political need to make it look like something is being done - Commissions.
What is the relationship between suppression expenditures and values at risk?

- They should be very closely tied
  - wide range of values
  - hard to quantify

1) Life
2) Property
3) Resource values – timber values, fisheries, wildlife

- Ecosystem has developed with fire; if suppressed potential to damage non-market values.
Are there economic constraints?

- Federal
  - Preparedness
  - Suppression – Ask Congress for money

- State
  - Preparedness
  - Suppression – Legislature ratifies
What are the constraints on equipment and personnel?

- 2004 - brought in resources from lower 48
  - Type six engines
- Alaska’s fire season Memorial Day to after July 4
- Lower 48 August to September
- Alternating big fire years
Direction for further research

Data

• Costs broken down by Critical, Full, Modified, Limited FMO
• Costs broken down by community to assess economic impacts
• Costs broken down by preparedness and suppression
Acknowledgements

• Alaska Division of Forestry
  – Chris Maisch, State Director
  – Lex McKenzie, Anchorage
  – Jean Davis, Juneau

• AFS
  – Sue Christensen
  – Mary Lynch

• Interagency
  – Dave Burley
  – Lynne Willoughby