NPS Hazard Fuels
Projects

FETG May 2009

Jennifer Allen
Denali hazard fuels project

- Create defensible space for infrastructure
- Lessen the wildland fire risk to this area
- Historic HQ reflect the “Period of Historic Significance”
Developed objectives and monitoring design

- Identified objectives
  - Determine if prescription parameters were met
  - Reduce crown fire potential
  - Concerns of grass increase and duff moisture drying

- Determined efficient means of measuring objectives.
Plot Data

- Tree density and measurements
- Species cover
- Fuel loading
- Permafrost

27 plots measured in 2003 pre-treatment
2005 post-treatment
Thinning in Zone 2

- 30-foot buffer around the structure
- All flammable vegetation < 50 trees/acre

2003 pre-treatment

2005 post-treatment
Thinning in Zone 3

- 30-100 ft buffer around the structure
- 20 ft Crown Spacing ~ 110 trees/acre

2003 pre-treatment

2005 post-treatment
Stand Model of Denali Front Country Zone 3 Open White Spruce Pre-Treatment

Trees per acre: 750 Height to live crown: 2 ft
Stand Model of Denali Front Country Zone 3 Open White Spruce Post-Treatment

Trees per acre: 250
Height to live crown: 7 ft
Results

- Prescription implementation: Tree densities & ladder fuel heights
- Fire behavior assessment
- Understory changes
Denali Hazard Fuels Plot
Tree Density Changes

Expected:
- 50 trees/acre
- 110 trees/acre

Zone 2
- Spruce
- Deciduous

Zone 3
- Spruce
- Deciduous
Fire Behavior Comparisons - Denali Hazard Fuels Treatment Pre/Post

**Fire Behavior Parameters**

- **Rate of Spread (ch/hr)**
  - Pre Zone 3: 2.0
  - Post Zone 3 (4' CBH): 1.0
- **Crown Rate of Spread (ch/hr)**
  - Pre Zone 3: 4.0
  - Post Zone 3 (4' CBH): 3.0
- **Flame Length (ft)**
  - Pre Zone 3: 2.0
  - Post Zone 3 (4' CBH): 1.0
- **Fire Growth - 1hr (acres)**
  - Pre Zone 3: 5.0
  - Post Zone 3 (4' CBH): 3.0

**Fuel Model: 9 90th% Weather**

*Crown fire reduced*
Yukon-Charley River Hazard Fuels Assessment

- 7 Cabin/Historic sites
- At each site:
  - 3 plots in control
  - 3 plots in thinned
- 46 plots measured
  - 2005 post-treatment
Cheese Camp

32% grass

93% grass
Slaven’s Public Cabin

3.1% Grass cover

14.6% Grass cover
Yukon-Charley - Hazard fuels treatments

![Bar graph showing percentage grass cover for Control and Mechanical treatments. The Mechanical treatment has significantly higher grass cover compared to the Control.]
## Grass cover

<table>
<thead>
<tr>
<th>CABIN SITE</th>
<th>CONTROL % Grass</th>
<th>THINNED % Grass</th>
<th>Year Thinned</th>
</tr>
</thead>
<tbody>
<tr>
<td>Cheese Camp</td>
<td>32.3</td>
<td>93.8</td>
<td>2004</td>
</tr>
<tr>
<td>McGregor</td>
<td>7.3</td>
<td>11.5</td>
<td>2004</td>
</tr>
<tr>
<td>Nation Bluff</td>
<td>39.6</td>
<td>100</td>
<td>1999</td>
</tr>
<tr>
<td>Ricketts Trainor</td>
<td>6.3</td>
<td>100</td>
<td>1998</td>
</tr>
<tr>
<td>Sam Creek</td>
<td>60.4</td>
<td>78.1</td>
<td>1999</td>
</tr>
<tr>
<td>Slaven's Public Use</td>
<td>3.1</td>
<td>14.6</td>
<td>2004</td>
</tr>
<tr>
<td>Woodchopper Roadhouse</td>
<td>22.9</td>
<td>14.6</td>
<td>2004</td>
</tr>
</tbody>
</table>
Tree Failure at Denali

- Wind storm
- Numerous trees fell
- Caused by thinning?
Hazard Trees near NPS structures?
A Preliminary Survey at Denali NPP - 2009

Variables measured were:
1) DBH
2) Height
3) Distance from closest structure
4) Presence and extent of rot
5) Evidence of damage and disease

Were windfall trees rotten?
Preliminary Results

- 11% of white spruce trees considered major hazard trees > 60% rot
- Larger diameter trees had rot (>33 cm DBH)
- Not all windfall trees had rot
- Various human-related disturbances
Adaptive Management – Evaluation

Presented data to FMO’s and discussed results

- **Tree Density:** Less thinning - crown fire behavior was still reduced. Changes in RX - less thinning.
- **Progressive Thinning:** Wind harden trees
- **Mixed Size thinning:** Leave mix of tree sizes
- **Grass:** Leave deciduous trees in future thinning projects