Update on Pooled Fund
MDSS Benefit/Cost Analysis

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MDSS Stakeholder Meeting #9
September 18, 2007
Pooled Fund Study Partners

- California
- Colorado
- Indiana
- Iowa
- Kansas
- Minnesota
- Nebraska
- New Hampshire
- New York
- North Dakota
- South Dakota
- Virginia
- Wyoming
- Meridian Environmental Technology
Project Background

• Field tests have not examined economic benefits and costs of MDSS

• Project Objectives
  – Describe the essential functions of a winter MDSS
  – Describe the resources needed to supply the essential functions of an MDSS
  – Characterize and estimate the costs and benefits of deploying MDSS in state transportation departments
Project Approach

- Initial information gathering
  - Literature review
  - Stakeholder interviews
- Follow benefit-cost analysis methodology
  - Using MDSS as simulator, in absence of better data
- Matrix of implementation alternatives using case study approach
- Strategic outreach
Simulation Approach

• Use MDSS as analytic tool to predict future pavement conditions resulting from various maintenance actions
• Use MDSS outputs to compare the outcomes associated with different maintenance philosophies
• Incorporate risk factors to “dampen” potential benefits
Use MDSS as Analytic Tool

- Agency Uses MDSS Recommendations
- Agency Follows Rules of Practice
- MDSS
  - Material Use Labor Hours
  - Level of Service (e.g. % Ice)
    - Safety
    - Delay
  - AGENCY BENEFITS
    - MOTORIST BENEFITS
  - RANGE OF USE
Case Studies

• Three states (CO, MN, NH)
  – Representative of different climates
  – Good historical data on maintenance practices

• Multiple route segments in each state
  – Capture variety of traffic and terrain conditions

• Simulate using ~5 years of historic weather and maintenance data
  – Helps to “tune” MDSS and provide some validation

• Extrapolate to other routes in each state
## Benefit-Cost Taxonomy

<table>
<thead>
<tr>
<th></th>
<th>Agency</th>
<th>Motorist</th>
<th>Society</th>
</tr>
</thead>
</table>
| **Benefit**      | • Reduced labor costs  
• Reduced materials use  
• Reduced equipment use  
• Reduced fleet replacement costs | • Reduced response time  
• Reduced clearance time  
• Reduced motorist delay (through improved LOS)  
• Improved safety (through improved LOS) | • Reduced environmental degradation |
| **Cost**         | • Software and support  
• Communications  
• In-vehicle computer hardware  
• Training  
• Administration  
• Weather forecast provider |                                                                           |                                                                                                |

*Bold* – included in methodology  
*Italicics* – not included in methodology
### Initial Proposed Result Format

<table>
<thead>
<tr>
<th></th>
<th>Case 1</th>
<th>Case 2</th>
<th>Case 3</th>
</tr>
</thead>
<tbody>
<tr>
<td>Alt. 1</td>
<td>xx to yy</td>
<td>xx to yy</td>
<td>xx to yy</td>
</tr>
<tr>
<td>Alt. 2</td>
<td>xx to yy</td>
<td>xx to yy</td>
<td>xx to yy</td>
</tr>
<tr>
<td>Alt. 3</td>
<td>xx to yy</td>
<td>xx to yy</td>
<td>xx to yy</td>
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- Uses ranges for benefit-cost ratios \((xx, yy)\) based on range of risks, sensitivity
- Alternatives based on factors such as mobile data collection, adherence to recommendations
Next Steps

Finish simulation activities          Oct 2007
Finish analysis of simulation results Dec 2007
Presentation of results to PFS       Jan/Feb 2008
Draft & final report                 Feb 2008
For more information...

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