Post-Mortem
An UPSAG landslide prescription effectiveness study

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Why study landslides?

• **WAC 222-10-030**
  - Specific mitigation measures or conditions must be designed to avoid accelerating rates and magnitudes of mass wasting that could deliver sediment or debris to a public resource or [...] threaten public safety

The rules say we should limit management-induced landslides
Post-Mortem Purpose

• Determine whether FFR mass wasting prescriptions are effective at reducing landslides from forest practices.

• From Schedule L-2: S8. Test the effectiveness of mass wasting prescriptions in meeting mass wasting targets.
Hypotheses

• Macro Hypotheses
  – Compare statistically the forest practices effectiveness for 5 harvest treatments and 5 road treatments

• Micro Hypotheses
  – Suggest possible outcomes of trigger data analyses
  – May not be statistically significant given small sample size for any given BMP or landslide trigger
Proposed Study Design

- Statistically sample landslides
  - Randomly select 21-28 4-square-mile blocks
  - Stratify harvest and road types
  - Count landslides/Estimate volumes
- Identify individual triggering mechanisms at each landslide
Sampling Plan – Cluster Design

- Each cluster becomes a sample unit.
# Harvest Strata

<table>
<thead>
<tr>
<th>Strata</th>
<th>Age Range</th>
</tr>
</thead>
<tbody>
<tr>
<td>Clearcut</td>
<td>0-20 years</td>
</tr>
<tr>
<td>Partial Harvest</td>
<td>0-20 years</td>
</tr>
<tr>
<td>Buffered</td>
<td>0-20 years</td>
</tr>
<tr>
<td>Sub-mature</td>
<td>21-40 years</td>
</tr>
<tr>
<td>Mature</td>
<td>41+ Years</td>
</tr>
</tbody>
</table>
Sampling plan – cluster design

- Map cluster with polygons representing harvest and road strata.
- Slide data is normalized by area or road length (e.g., density).
Road Strata

- Substandard
- Orphaned
- Standard
- Mitigated
- Abandoned
Statistical Design – Cost

- We need a storm to produce >= 1 slide per mi$^2$ over 600 sq. miles of land subject to forest practice rules.
- Air photos - $80,000-200,000
- Photo interp - $84,000-95,000
- Field crews - $255,000-415,000
- Access/Analysis - $140,000
Mass Wasting Landscape-Scale Effectiveness Monitoring

- UPSAG will initiate the development of this study design as we have time around the implementation of Accuracy & Bias and Post-Mortem.

- It will concentrate on the determination of natural background and on the long-term trends in rates of landslides from forest practices.

- As the Post-Mortem made so much progress towards full landscape-scale, we believe that this study may be 1 or more add-ons to Post-Mortem (that will require additional peer-review).