SOIL RESOURCE MANAGEMENT FOR GROUND-BASED LOGGING ON STEEP SLOPES...

Gina Rone
Forest Soil Scientist
Fremont Winema National Forest
February 9, 2017
Pilot Timber Sale

- Fremont-Winema NF, Bly RD
- Purchased by Collins Pine, Lakeview, OR
- Logged by Miller Timber Services, Philomath, OR
- OSU Research Unit - John Sessions
- Unit 10: 54 acres
PILOT TIMBER SALE

- Logged: July – August 2016
- Tethered Ponsse Harvester & Forwarder on wheel tracks
- Mixed conifer stand at ~6,100 ft. elevation
FIELD CONDITIONS

+ Average slope ~20% to 60%
+ Usual slope limits for ground-base equipment: 35%
Monitoring Results

**Table 1**: Monitoring results for soil disturbance (Page-Dumroese et al., 2009)

<table>
<thead>
<tr>
<th>Disturbance Class</th>
<th>0</th>
<th>1</th>
<th>2</th>
<th>3</th>
<th>Coarse Woody Debris</th>
</tr>
</thead>
<tbody>
<tr>
<td># of Points</td>
<td>101</td>
<td>27</td>
<td>13</td>
<td>9</td>
<td>~34 tons/ac</td>
</tr>
<tr>
<td>% Disturbance</td>
<td>67</td>
<td>18</td>
<td>9</td>
<td>6</td>
<td></td>
</tr>
</tbody>
</table>

...have to be taken with a grain of salt

- Monitoring occurred shortly after harvest completion – results don’t tell the whole story yet
- Proposed treatments not completed yet – Rx fire
- Mother Nature remains at the table – weather, weeds, resiliency etc.
In pumice soil, displacement accounts for most of the disturbance.

- Compaction in pumice is limited but still present.
- Expect compaction to be higher in finer textured soils compared to coarser.
Pumice soils were pulverized and churned under dry conditions

- Sliding of equipment

Hydrophobicity test – no difference between disturbed and undisturbed this fall
OBSERVATIONS CONT.

- Side tracking & turning
OBSERVATIONS CONT.

- Converging & side-by-side skids
OBSERVATIONS CONT.

- Evolution of a skid trail
- Slash mat deterioration
Observations cont.

Upper slopes rockier, shallow soils, opening, less material

Slope location, terrain, and aspect dictate slash amounts

More slash at lower end of skid trails and on concave east-facing terrain
OBSERVATIONS CONT.

- Slash cover varied along trails; required 18 in. thickness inconsistent
Continuous traffic along rocky knoll removed soils and left cobbles and gravel
OBSERVATIONS CONT.

- No waterbars installed
Leave trees are shedding needle cast to provide cover on bare soils
SUMMARY & CONCLUSIONS

+ Know your soils
+ Match logging system and equipment to terrain
+ Avoid side tracking along hills and turning, keep skid trails straight
+ Eliminate unnecessary side-by-side skids, utilize existing infrastructure and trails
+ Incorporate adequate trail spacing
+ Shut down activities when conditions deteriorate and/or plan for the right season
  - logging when soils are too wet (fine-textured soils) or too dry (coarse textured soils)
+ Factor in variable slash availability due to terrain and habitat type
+ Ensure sufficient slash placement, maintain existing integrity of duff and organic matter
  - Consider slash placement direction (perpendicular to tracks)
+ Account for additional disturbance from post-harvest slash treatment and fire
+ Apply above principles during all stages of site treatment - include good operators and practitioners at all stages