STEEP TERRAIN HAZARDOUS FUELS TREATMENT DEMONSTRATION

Tad Mason, CEO
TSS Consultants

California Association of Resource Conservation Districts 2019 Annual Conference

Nov 14, 2019
OVERVIEW

- Sponsors
- Implementation Team
- Goal
- Location
- Equipment Deployed
- Implementation
- Results
  - Soil Impacts
  - Production and Cost
- Observations
- Recommendations
- Acknowledgements
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- USDA Forest Service Pacific Southwest Region and administered by the Watershed Training and Research Center.
- California Department of Forestry and Fire Protection

Implemented by:
- Tad Mason, TSS Consultants
- Martin Twer, The Watershed Center
- Nick Goulette, The Watershed Center
Successfully demonstrate to natural resource managers, landowners, private contractors, agency personnel, concerned public and other stakeholders, the options available to treat excess forest biomass material on steep terrain.
EXCAVATOR SYSTEMS
ALL TERRAIN EXCAVATOR SYSTEMS
FELLER BUNCHER SYSTEM
PROJECT LAYOUT

Steep Terrain Demonstration Areas

Waterhole
Class I Watercourse
Class II Watercourse
Class III Watercourse
Permanent RD
Seasonal RD
SPI Ownership
PLSS Grid

Demonstration Areas
A
B
C
D
E
F
G

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<table>
<thead>
<tr>
<th>UNIT</th>
<th>MANUFACTURER</th>
<th>MODEL, TYPE OF EQUIPMENT AND ATTACHMENT</th>
</tr>
</thead>
<tbody>
<tr>
<td>A</td>
<td>TimberPro</td>
<td>TL 735C (feller-buncher) with Fecon BH 80 mastication attachment</td>
</tr>
<tr>
<td>B</td>
<td>John Deere</td>
<td>JD 210G LC (excavator) with Fecon BH 80 mastication attachment</td>
</tr>
<tr>
<td>C</td>
<td>Fecon</td>
<td>FTX 128L (skid-steer) with Fecon BH 85SD-4 mulching attachment</td>
</tr>
<tr>
<td>D</td>
<td>ASV</td>
<td>ASV RT 120F (skid-steer) with Fecon BH 74SS mastication attachment</td>
</tr>
<tr>
<td>E</td>
<td>Menzi</td>
<td>Menzi Muck M545 (all terrain excavator) with Fecon BH 40EXC mastication attachment</td>
</tr>
<tr>
<td>E</td>
<td>Menzi</td>
<td>Menzi Muck M220 (all terrain excavator) with Fecon FMX50 mastication attachment</td>
</tr>
<tr>
<td>F,G</td>
<td>FAE - Prime Tech</td>
<td>PT 175 (skid-steer) with FAE 140/U-175 mastication attachment</td>
</tr>
<tr>
<td>F,G</td>
<td>FAE - Prime Tech</td>
<td>PT 300 (skid-steer) with FAE 200/U-210 mastication attachment</td>
</tr>
<tr>
<td>F,G</td>
<td>Takeuchi</td>
<td>TB 2150 (excavator) with FAE UML/HY/VT-125 mastication attachment</td>
</tr>
</tbody>
</table>
DEMO SCHEDULE WEEK OF JUNE 4, 2018

- Mon+Tues: Move in
- Fri+Sat: Media and general public viewing
- Sat PM: Move out
MONITORING PROTOCOL

Soil impacts:
- Visual inspection
- Pre Treatment and Post Treatment Conditions
  - Class 0 – Undisturbed
  - Class 1 – Slight Disturbance
  - Class 2 – Some Disturbance
  - Class 3 – Mod Disturbance
  - Class 4 – High Disturbance
  - Class 5 – Severe Disturbance
  - Class 6 – Altered Drainage

System Productivity and Cost:
- Shift level data collected
- Vendors provided key cost data; equip cost, O&M, economic life
## Soil Impact Analysis Results

<table>
<thead>
<tr>
<th>Treatment System</th>
<th>Pre-Treatment Disturbance Class Ranking</th>
<th>Post-Treatment Disturbance Class Ranking</th>
</tr>
</thead>
<tbody>
<tr>
<td>ASV RT 120F</td>
<td>2</td>
<td>3</td>
</tr>
<tr>
<td>FAE - Prime Tech PT 175</td>
<td>2</td>
<td>3</td>
</tr>
<tr>
<td>FAE - Prime Tech PT300</td>
<td>2</td>
<td>3</td>
</tr>
<tr>
<td>Fecon FTX 128L</td>
<td>2</td>
<td>3-5</td>
</tr>
<tr>
<td>John Deere JD 210GLC</td>
<td>2</td>
<td>2-3</td>
</tr>
<tr>
<td>Menzi M220</td>
<td>2</td>
<td>2-5</td>
</tr>
<tr>
<td>Menzi M545</td>
<td>2</td>
<td>3</td>
</tr>
<tr>
<td>Takeuchi TB 2150</td>
<td>2</td>
<td>3</td>
</tr>
<tr>
<td>TimberPro TL 735C</td>
<td>2</td>
<td>2-3</td>
</tr>
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### TREATMENT SYSTEM CAPITAL COST

<table>
<thead>
<tr>
<th>TREATMENT SYSTEM</th>
<th>EQUIPMENT TYPE</th>
<th>BASE COST</th>
<th>TOTAL COST</th>
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<tbody>
<tr>
<td>ASV RT 120F</td>
<td>Skid Steer</td>
<td>$130,000</td>
<td>$142,000</td>
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<tr>
<td>FAE - Prime Tech PT 175</td>
<td>Skid Steer</td>
<td>$250,000</td>
<td>$250,000</td>
</tr>
<tr>
<td>FAE - Prime Tech PT300</td>
<td>Skid Steer</td>
<td>$385,000</td>
<td>$385,000</td>
</tr>
<tr>
<td>Fecon FTX 128L</td>
<td>Skid Steer</td>
<td>$207,000</td>
<td>$207,000</td>
</tr>
<tr>
<td>John Deere JD 210GLC</td>
<td>Excavator</td>
<td>$250,000</td>
<td>$300,000</td>
</tr>
<tr>
<td>Menzi M220</td>
<td>All Terrain Excavator</td>
<td>$250,000</td>
<td>$265,000</td>
</tr>
<tr>
<td>Menzi M545</td>
<td>All Terrain Excavator</td>
<td>$420,000</td>
<td>$440,000</td>
</tr>
<tr>
<td>Takeuchi TB 2150</td>
<td>Excavator</td>
<td>$170,000</td>
<td>$195,400</td>
</tr>
<tr>
<td>TimberPro TL 735C</td>
<td>Feller-Buncher</td>
<td>$500,000</td>
<td>$625,000</td>
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## TREATMENT SYSTEM PRODUCTIVITY AND HOURLY COST

<table>
<thead>
<tr>
<th>TREATMENT SYSTEM</th>
<th>EQUIPMENT TYPE</th>
<th>HOURS/ACRE</th>
<th>HOURLY RATE ($/PMH)</th>
</tr>
</thead>
<tbody>
<tr>
<td>ASV RT 120F</td>
<td>Skid Steer</td>
<td>14.2</td>
<td>$63.09</td>
</tr>
<tr>
<td>FAE - Prime Tech PT 175</td>
<td>Skid Steer</td>
<td>1.4</td>
<td>$109.60</td>
</tr>
<tr>
<td>FAE - Prime Tech PT300</td>
<td>Skid Steer</td>
<td>1.5</td>
<td>$135.74</td>
</tr>
<tr>
<td>Fecon FTX 128L</td>
<td>Skid Steer</td>
<td>6.6</td>
<td>$71.28</td>
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<tr>
<td>John Deere JD 210GLC</td>
<td>Excavator</td>
<td>9.7</td>
<td>$96.69</td>
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<tr>
<td>Menzi M220</td>
<td>All Terrain Excavator</td>
<td>41.3</td>
<td>$80.26</td>
</tr>
<tr>
<td>Menzi M545</td>
<td>All Terrain Excavator</td>
<td>39.5</td>
<td>$161.65</td>
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<tr>
<td>Takeuchi TB 2150</td>
<td>Excavator</td>
<td>1.7</td>
<td>$77.37</td>
</tr>
<tr>
<td>TimberPro TL 735C</td>
<td>Feller-Buncher</td>
<td>2.4</td>
<td>$165.54</td>
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</table>
Treatment Systems
All treatment systems significantly altered fuel profiles.

Increased Down Woody Material
Amount of down woody material increased as a result of treatment – not surprising since all systems were equipped with mastication attachments.

Potential Fire Damage to Root Systems/Topsoil
Elevated levels of down woody material (post treatment), may contribute to below ground root damage in the event of a fire. However, research findings are mixed. Also, as woody material decomposed over time and is incorporated into the soil, this potential damage will be mitigated.
Overall Soil Impacts
Field experience indicates that equipment-based treatments will cause soil disturbance. Overall visual soil impacts were relatively minimal. Alternative treatment systems such as livestock, hand crews and/or prescribed fire may be a better option if working on highly sensitive soils.

Treatment Prescriptions
Different terrain, ecosystem types and management objectives result in very site specific treatment prescriptions. Prescriptions will impact treatments, which in turn have potential to more significantly impact soils.
Productivity and Cost

Production rates and costs differ based on treatment system, site, complexity of treatment prescription and operator proficiency. Findings confirm that operator proficiency is a primary factor when considering acreage treated per day.

Vegetation Consistency, Terrain and Prescription

From previous demos - Cost per acre rate was lowest for nearly all equipment systems when deployed in very consistent veg (shrub dominated site), gentle terrain and a very simple prescription. Some demo sites had relatively high cost per acre due to varied veg types and complex treatment prescription.
Copies of the HFTD final report are available for download from the UCANR Woody Biomass Utilization website: http://ucanr.edu/steepdemo

In addition the site hosts equipment video clips, and related reports.
Communications and Outreach Team

- Jennifer Chapman, Eldorado National Forest
- Mark Luster, Sierra Pacific Industries
- Ricky Satomi, UC Cooperative Extension
- Diane Dealey Neill, Amador-El Dorado Forest Forum
- Heather Williams, Cal Fire
- Scott McClean, Cal Fire
- Jeremiah Norrell, Georgetown Fire Department
- Ann Dunsky, USFS Regional Office
- Steve Dunsky, USFS Regional Office
- El Dorado County Fire Safe Council
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QUESTIONS?

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