

# ***STEEP TERRAIN HAZARDOUS FUELS TREATMENT DEMONSTRATION***



California  
Association of  
Resource  
Conservation  
Districts 2019  
Annual  
Conference

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TSS Consultants



# OVERVIEW

- Sponsors
- Implementation Team
- Goal
- Location
- Equipment Deployed
- Implementation
- Results
  - Soil Impacts
  - Production and Cost
- Observations
- Recommendations
- Acknowledgements



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# PROJECT SPONSORS AND IMPLEMENTATION TEAM

- Funding provided by:
  - 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

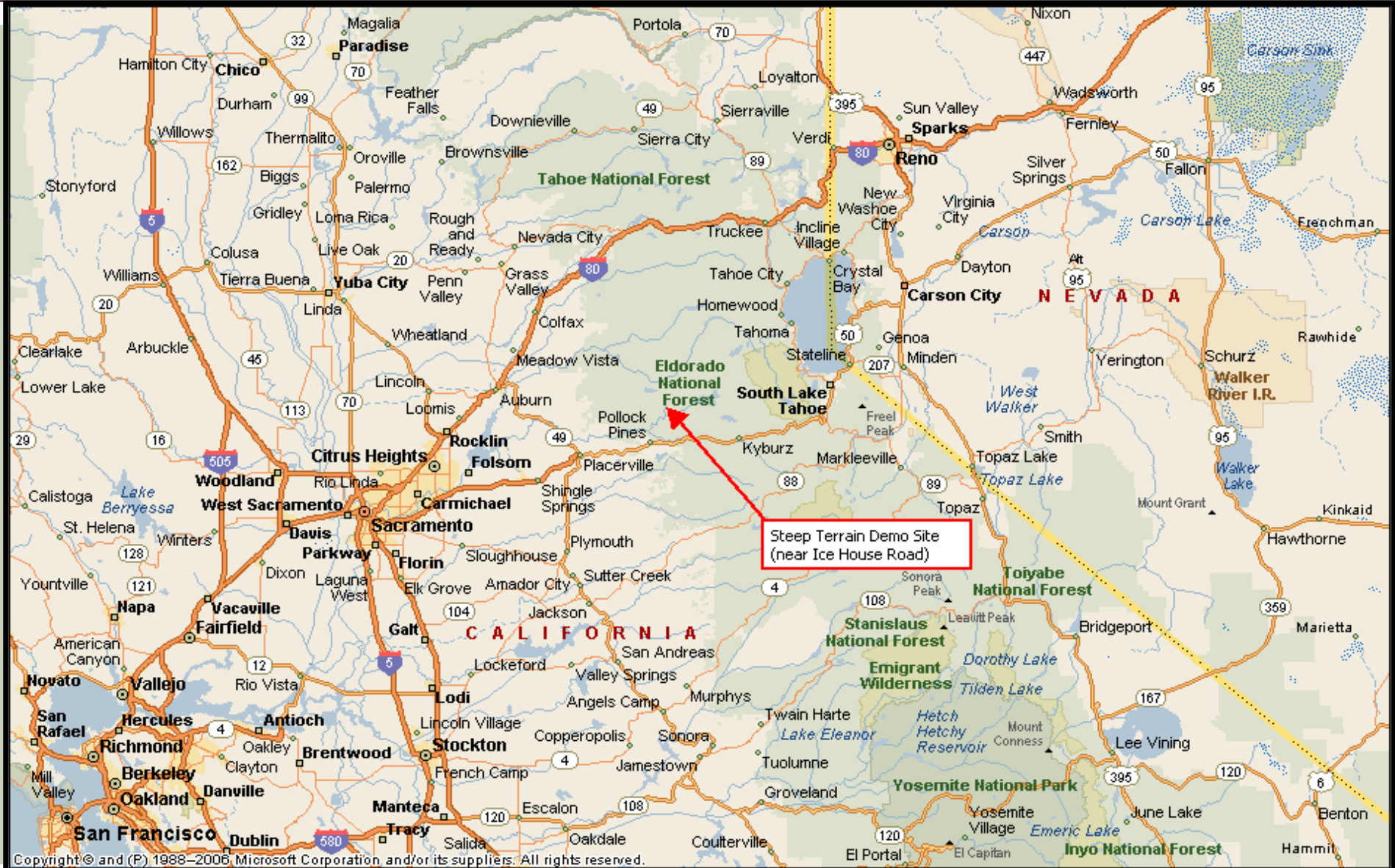


# PROJECT GOAL

- 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.



# PROJECT LOCATION





# SKID STEER SYSTEMS





# EXCAVATOR SYSTEMS





# ALL TERRAIN EXCAVATOR SYSTEMS

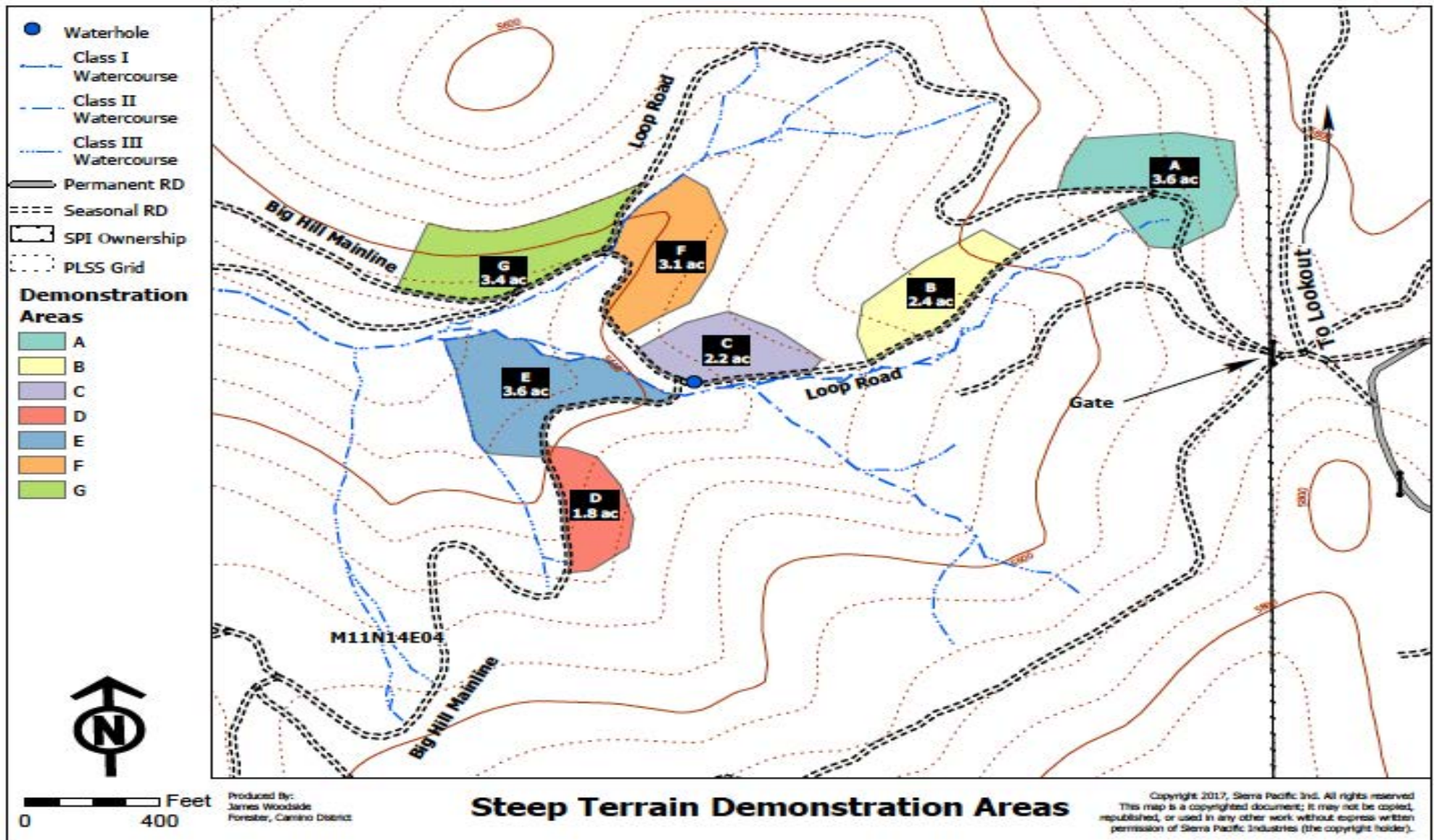


# FELLER BUNCHER SYSTEM





# PROJECT LAYOUT





# TREATMENT SYSTEM DEPLOYMENT

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

# DEMO SCHEDULE WEEK OF JUNE 4, 2018

- Mon+Tues: Move in
- Wed - Sat: Impact Monitoring/Cost Monitoring.
- Fri+Sat: Media and general public viewing
- Sat PM: Move out



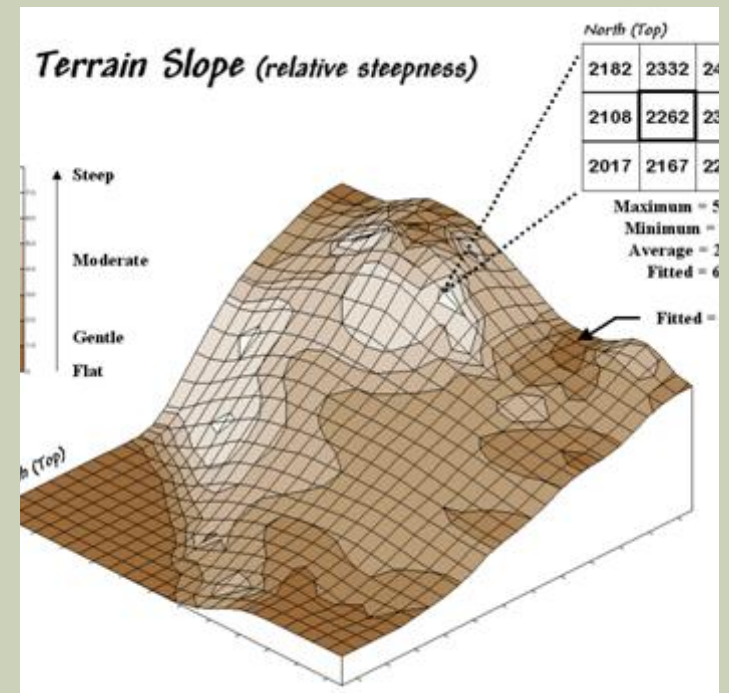
# MONITORING PROTOCOL

## 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

| TREATMENT SYSTEM        | PRE-TREATMENT DISTURBANCE<br>CLASS RANKING | POST-TREATMENT<br>DISTURBANCE CLASS RANKING |
|-------------------------|--|---|
| ASV RT 120F             | 2  | 3   |
| FAE - Prime Tech PT 175 | 2  | 3   |
| FAE - Prime Tech PT300  | 2  | 3   |
| Fecon FTX 128L          | 2  | 3-5   |
| John Deere JD 210GLC    | 2  | 2-3   |
| Menzi M220              | 2  | 2-5   |
| Menzi M545              | 2  | 3   |
| Takeuchi TB 2150        | 2  | 3   |
| TimberPro TL 735C       | 2  | 2-3   |

# TREATMENT SYSTEM CAPITAL COST

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

# TREATMENT SYSTEM PRODUCTIVITY AND HOURLY COST

| TREATMENT SYSTEM        | EQUIPMENT TYPE        | HOURS/ACRE | HOURLY RATE (\$/PMH) |
|-------------------------|-----------------------|------------|----------------------|
| ASV RT 120F             | Skid Steer            | 14.2       | \$63.09              |
| FAE - Prime Tech PT 175 | Skid Steer            | 1.4        | \$109.60             |
| FAE - Prime Tech PT300  | Skid Steer            | 1.5        | \$135.74             |
| Fecon FTX 128L          | Skid Steer            | 6.6        | \$71.28              |
| John Deere JD 210GLC    | Excavator             | 9.7        | \$96.69              |
| Menzi M220              | All Terrain Excavator | 41.3       | \$80.26              |
| Menzi M545              | All Terrain Excavator | 39.5       | \$161.65             |
| Takeuchi TB 2150        | Excavator             | 1.7        | \$77.37              |
| TimberPro TL 735C       | Feller-Buncher        | 2.4        | \$165.54             |



# OBSERVATIONS – FIRE AND FUELS

## ■ 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.

# OBSERVATIONS – SOIL IMPACTS

## ■ 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.

# OBSERVATIONS – PRODUCTION RATES AND COSTS

## ■ 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.



# MORE INFORMATION

- 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.

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- Steve Dunsy, USFS Regional Office
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## ■ Implementation Team

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- Martin Twer, The Watershed Center
- Nick Goulette, The Watershed Center
- Ricky Satomi, UC Cooperative Extension
- Susie Kocher, UC Cooperative Extension
- Nancy Starr, UC Cooperative Extension

# QUESTIONS?



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