

# ***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

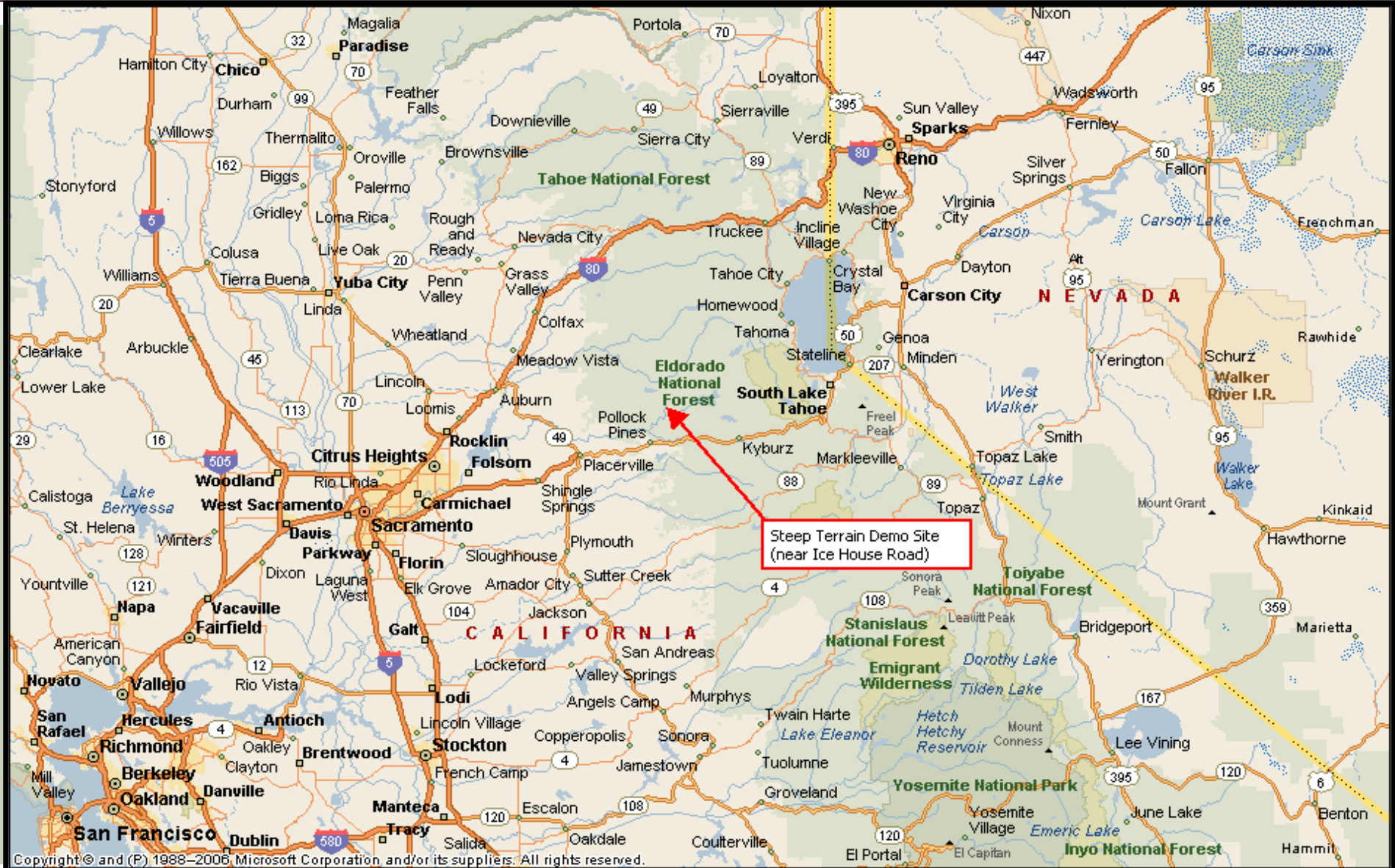


# PROJECT GOAL

- 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

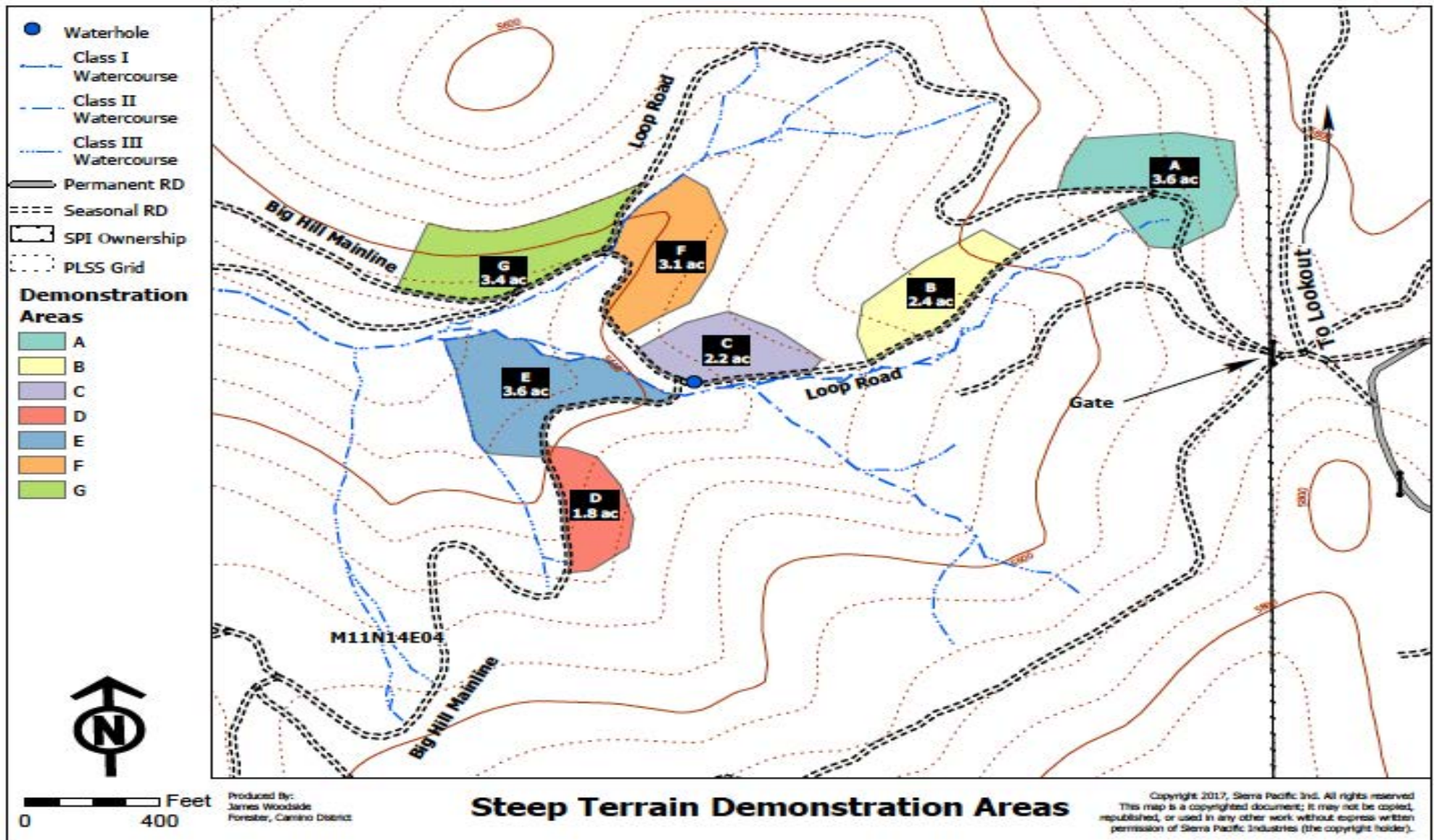


# FELLER BUNCHER SYSTEM





# 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



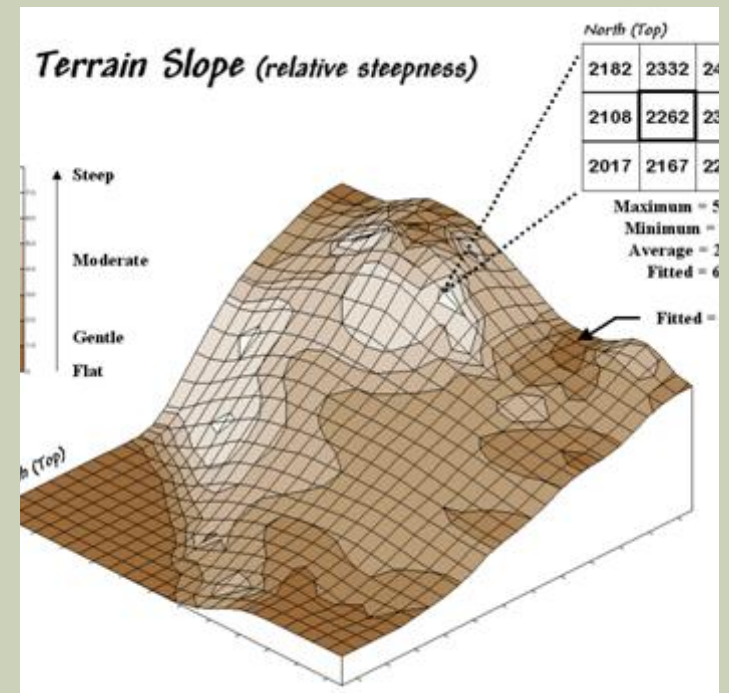
# MONITORING PROTOCOL

## 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 CLASS RANKING	POST-TREATMENT 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.



# ACKNOWLEDGMENTS – PART I

## ■ **Communications and Outreach Team**

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- 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
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- Steve Dunskey, 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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