STEEP TERRAIN HAZARDOUS FUELS TREATMENT DEMONSTRATION

California Forest Biomass Work Group Meeting

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TSS Consultants

OVERVIEW

- Project Goals
- Summary of Objectives
- Project Sponsors
- Project Implementation
- Results
  - Soil Impacts
  - Production and Cost
- Observations
- Recommendations
- Acknowledgements

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PROJECT FUNDING AND IMPLEMENTATION

- 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 OBJECTIVES – SHORT TERM

Short term objectives of this project include:

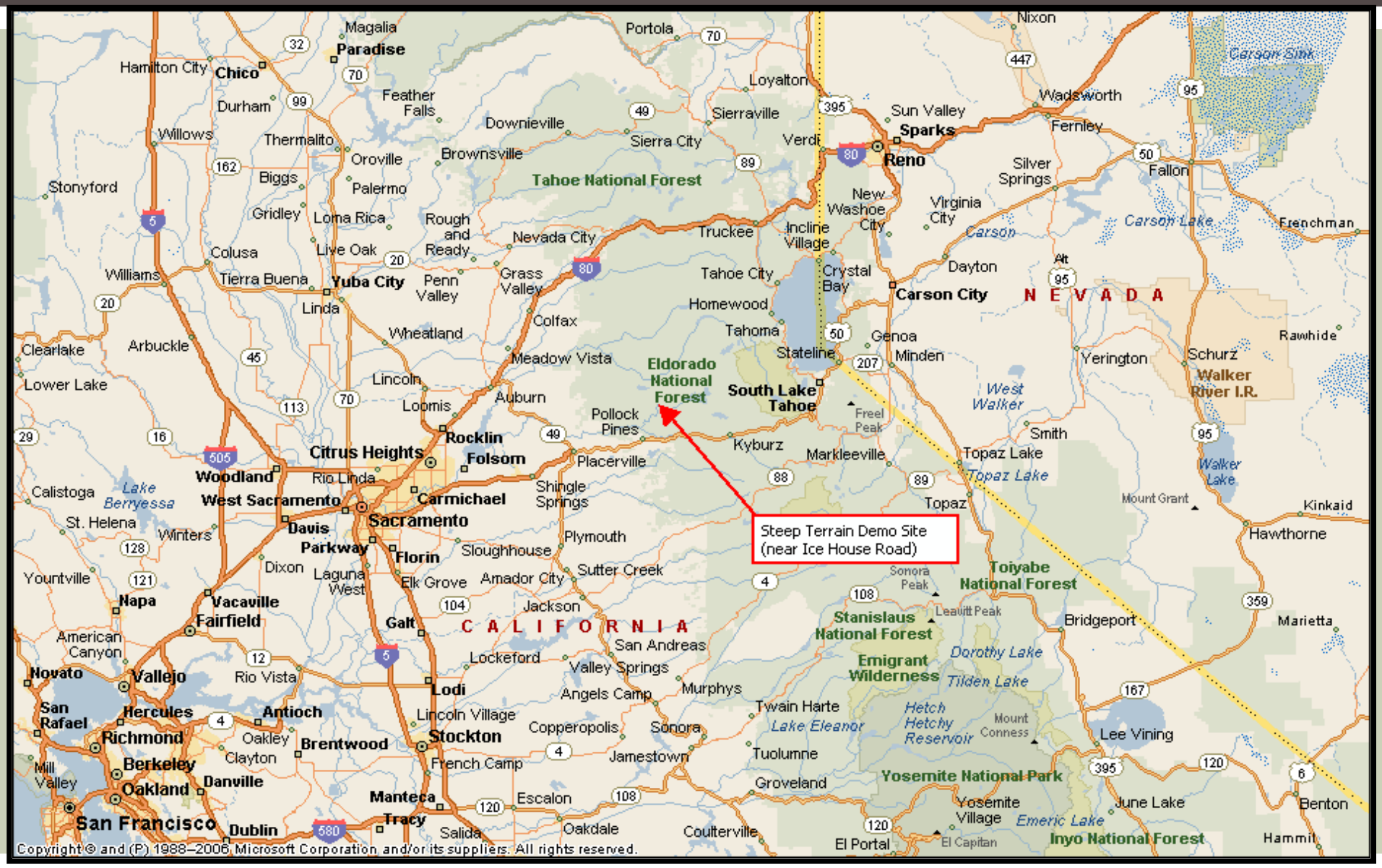
- Improved ability of agencies to plan and budget for future fuels treatment projects.
- Development of an informed cadre of local fuels treatment contractors and local stakeholder groups (e.g., fire safe councils, homeowners association, resource conservation districts).
- Outreach to the general public (e.g., media, homeowners, forest landowners) with regards to fuels treatment opportunities, techniques and latest technology.
- Secure public support for increasing the pace and scale of ecologically sound fuels treatment activities.
- Promotion of cost effective, minimum impact steep terrain fuels treatment alternatives.

PROJECT OBJECTIVES – LONG TERM

Long term objectives of this project include:

- Significant increase in the number of acres (across all landscapes at risk regardless of slope gradient) treated in support of the reduction of hazardous fuels and improvement of the ecological health of at risk landscapes.
- Reduction of site impacts from fuels treatment activities.
- Creation of long-term sustainable jobs.
- Promotion of an informed public, one that more fully appreciates the complexities of fuels treatment efforts and the statewide challenge of creating and maintaining fire resilient landscapes.
- Improved water yields, timing and quality.

PROJECT LOCATION



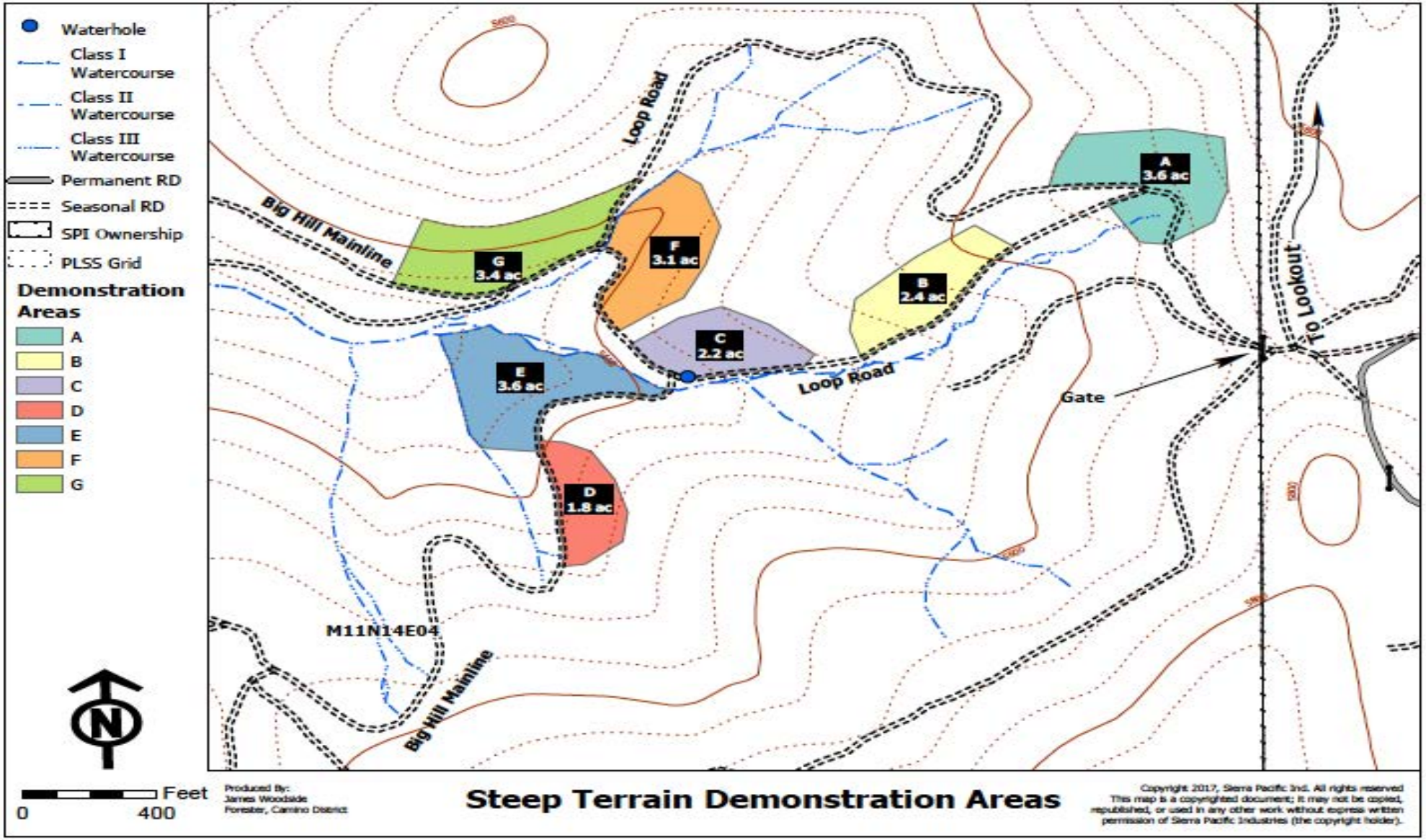
SKID STEER SYSTEMS

EXCAVATOR SYSTEMS

ALL TERRAIN EXCAVATOR SYSTEMS

FELLER BUNCHER SYSTEM

PROJECT LAYOUT

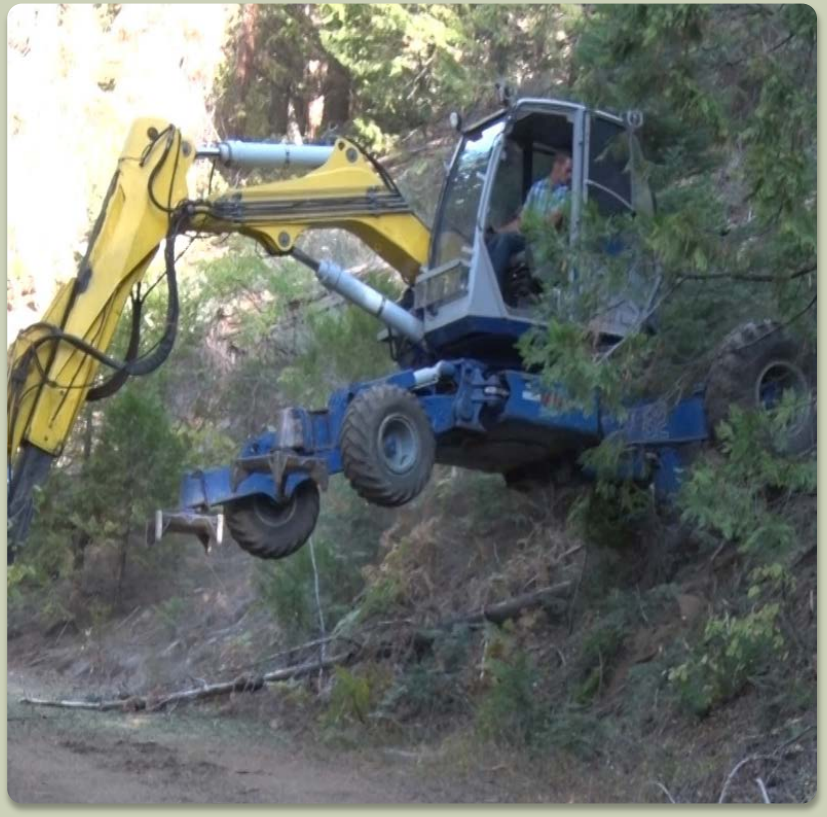


TREATMENT SYSTEM DEPLOYMENT

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



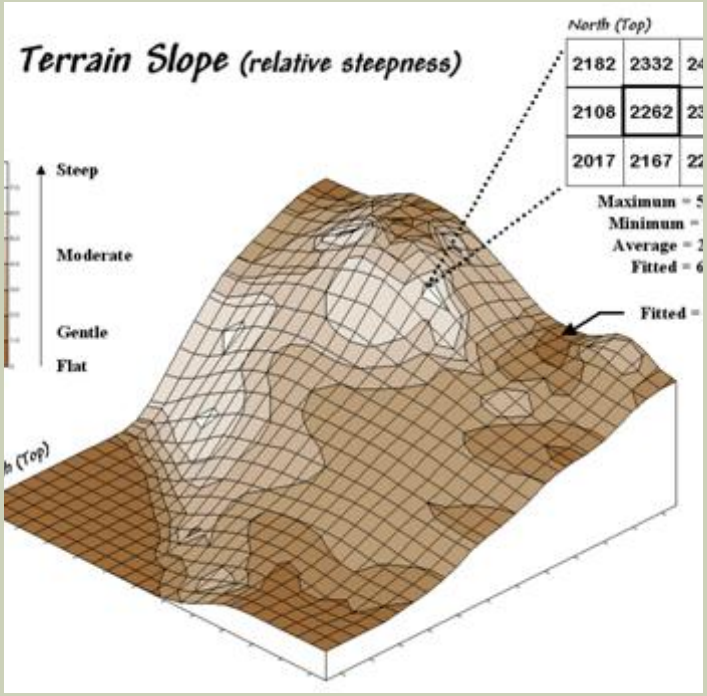
MONITORING PROTOCOL

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 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.

OBSERVATIONS – DEMO ATTENDANCE

- **Participation**

Approximately 161 stakeholders attended the demo. Demographics were wide ranging and included fuels treatment contractors, land managers, agency representatives, media (print), power utilities, collaborative groups, fire safe councils .

- **Registration**

Use of on-line registration worked well and facilitated follow-up and delivery of results.

- **Media Participation**

Attracting media participation can be very challenging. Only two media reps attended (Sacramento Bee and Lake Tahoe News).

- **Outreach**

Strongly suggest use of communications/outreach plans for equipment demos as target audiences will shift depending on demo location.

RECOMMENDATIONS FOR FUTURE DEMONSTRATIONS

- **Extend Post-Treatment Monitoring**

Consider monitoring post-treatment conditions over an extended period of time (5 to 10 years). Key variables to monitor include soil conditions, vegetation response, and woody debris decomposition rates.

- **Steep Terrain Demos**

Replicate HFTD within sensitive sites (such as riparian areas). Much of the terrain considered at risk to wildfire in CA is within riparian areas.

- **Woody Material Collection and Processing**

Value-added uses for excess forest biomass material are dynamic (thermal, power, soil amendments, advance biofuels) as innovative conversion technologies evolve. Conduct equipment trials to test techniques to optimize collection, processing and transport of forest biomass material.

ACKNOWLEDGMENTS – PART I

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

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.

QUESTIONS?

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