

Novel approaches to sudden oak death management in California's wildlands:

A case study of “eradication” and collaboration in Redwood Valley

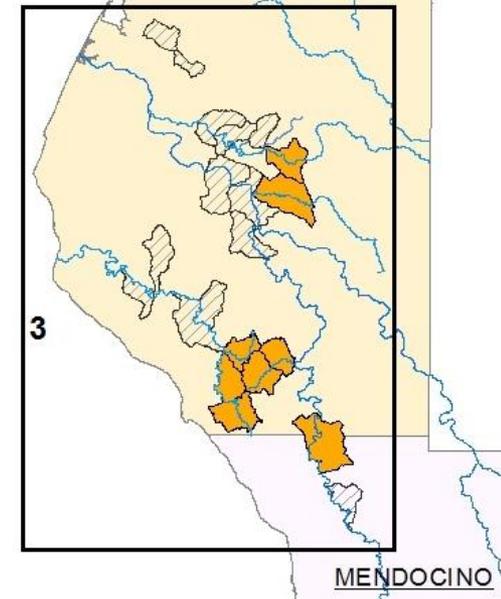
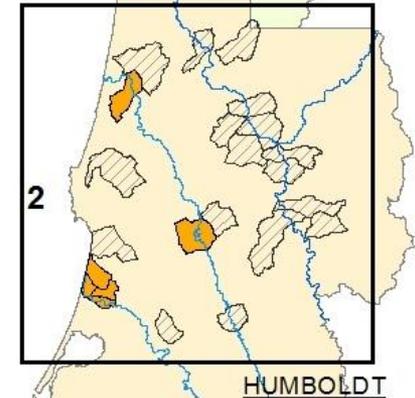
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USDA Forest Service

UCCE's efforts for the north coast

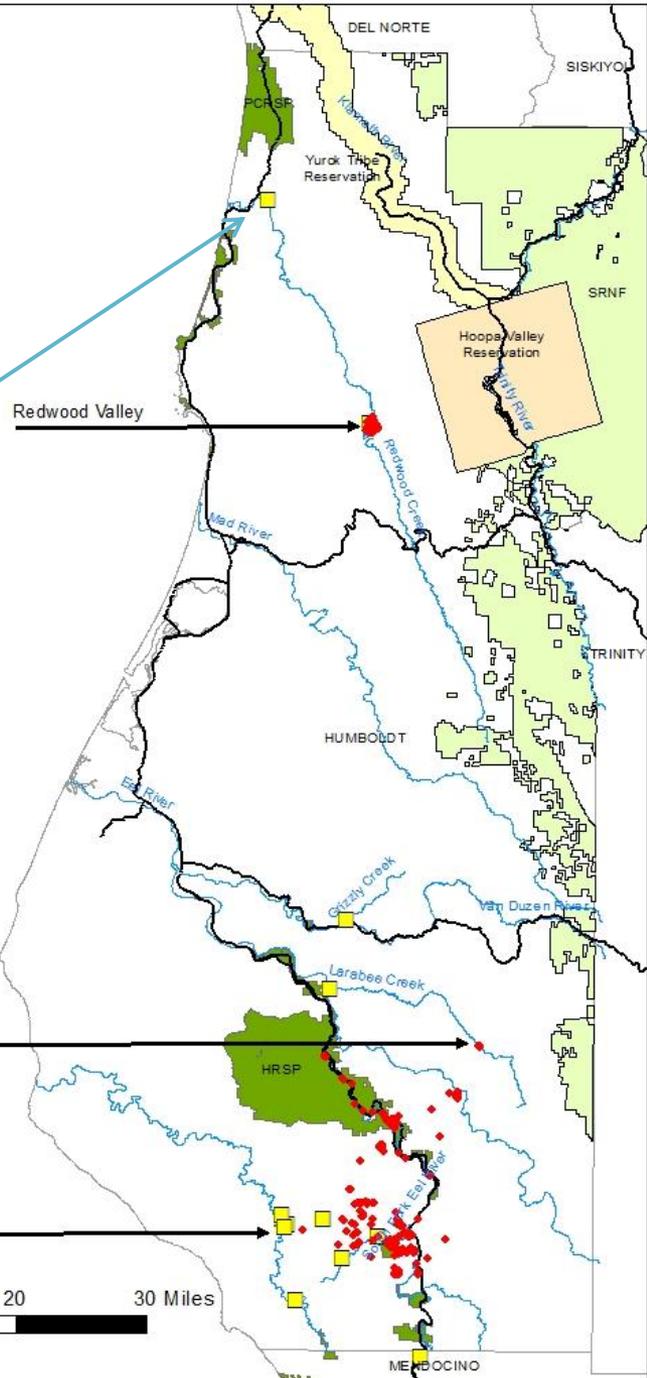
- Since 2004 we have been conducting ground-based and **stream monitoring** for the pathogen
- Installed many experiments to both control the spread of the pathogen and to learn how to protect high-value trees and forests
- Developing a set of science-based tools to provide managers and landowners with resources to address the pathogen
- Coordinating an inter-agency response team



Legend

- Vegetation Positive
- Stream Positive
- Rivers and Creeks
- Roads
- County Boundary
- State Parks
- Six Rivers National Forest
- Yurok Tribe Reservation
- Hoopa Tribe Reservation

New stream positive discovered in May 2010, but where was the source?



Why is Redwood Creek Important?

- Del Norte County is disease free
- Proximity to Hoopa and Yurok Reservations
- Proximity to Redwood National Park
- End of the accessible road
- Heart of Humboldt County
- It is still a small infestation
- Only 10% of the at risk habitat in CA is infested, <1% of Humboldt County
- If we did nothing, we knew that disease expansion would be significant

New stream site in Redwood Creek

- Spring 2010 detected the pathogen near to Orick from Redwood Creek
- July 2010 found a source location in Redwood Valley in a residential area (30 miles up stream)
- November 2010 determined that it originated from this source
- March 2011- April 2012:
 - Secured landowner permission for treatment to remove infested bay and tanoak
 - Secured funding
 - Completed the project

Redwood Valley SOD Site



Infection just beginning to show

But under the canopy the infection was well developed.



Treatment approach

- Treat infested tanoak and California bay laurel + 100 meter buffer by either:
 - 1) Cutting trees, followed by stump treatment to control sprouting
 - Cut material was shipped in covered bins to a biomass plant for electricity generation (residential area)
 - Lopped and scattered (wildland area with steep slopes)
 - Burned in piles
 - 2) Treating infested trees with herbicides to die in place (wildland area with steep slopes)



CalFire crews working to secure a safe falling lane.



Dealing with the biomass.



Loader filling the bins with canopy material.

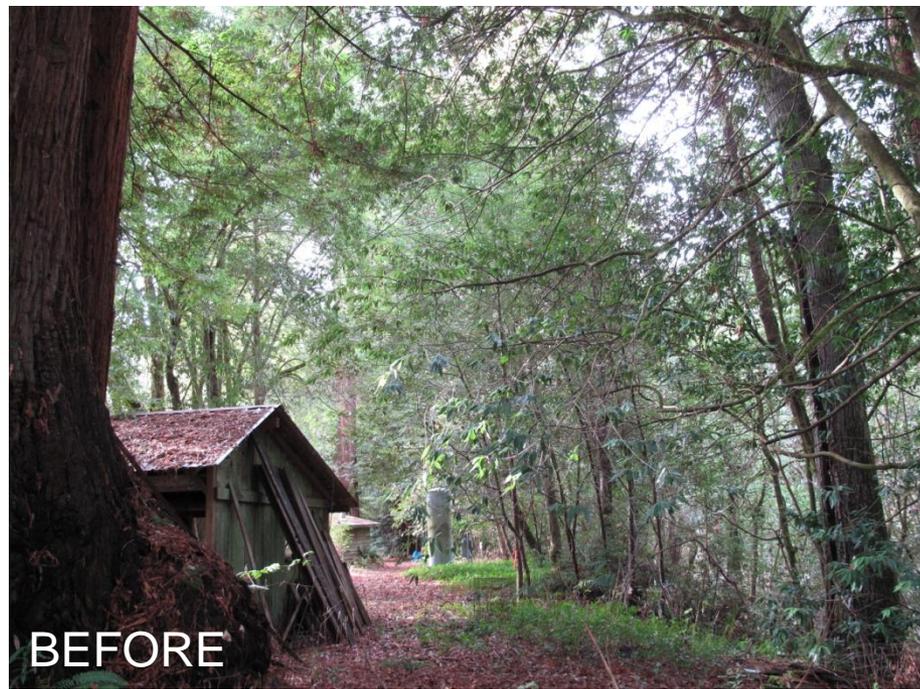


Bin is secure and ready for transport to power plant.

Natural Resource Conservation Service team evaluating treatment progress







BEFORE

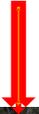


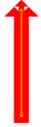
DURING



AFTER

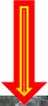






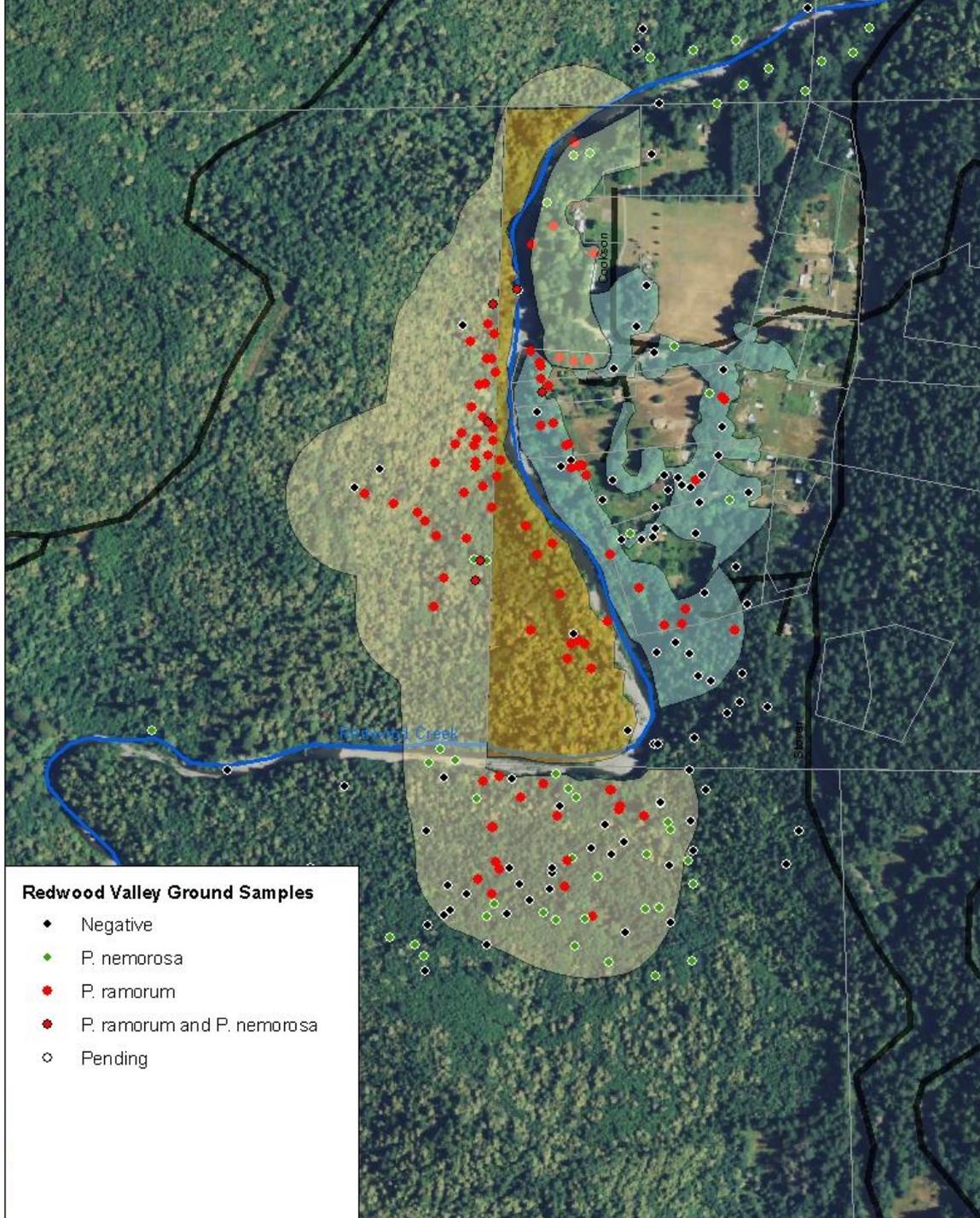








Disease spread and containment plan (March 2011)



Redwood Valley Ground Samples

- ◆ Negative
- ◆ *P. nemorosa*
- ◆ *P. ramorum*
- ◆ *P. ramorum* and *P. nemorosa*
- Pending

Redwood Valley Treatment Area



Total treatment
area ~380 ac
or ~150 ha
(May 2012)

Monitoring approach

- Aerial reconnaissance
 - Flight planned for July
- Stream monitoring
 - Not detected just downstream of the treated area this spring or at Orick. No new tributaries to Redwood Creek have positives.
 - There is detection in the mainstem of Redwood Creek upstream of Orick, so more study is needed.
- Perimeter surveys
 - Some small missed areas.

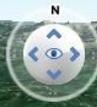
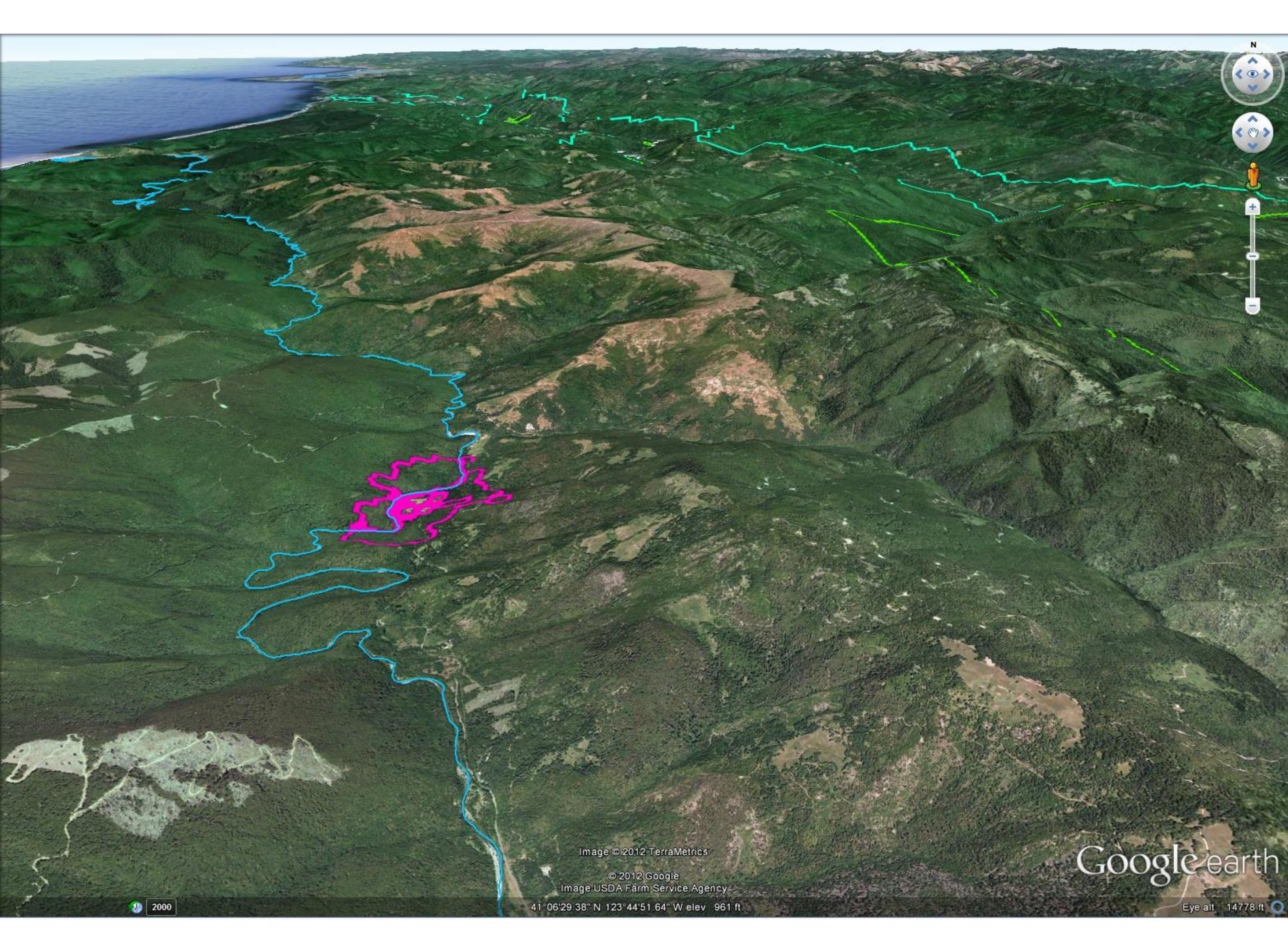


Image © 2012 TerraMetrics

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Image USDA Farm Service Agency

41°06'29.38" N 123°44'51.64" W elev 961 ft

Google earth

Eye alt 14778 ft

2000



Conclusions

- 20 private landowners have been involved
- 6 different funding sources (NRCS, Forest Service, CAL FIRE, ARRA, Moore Foundation, UC Berkeley Center for Forestry)
- 180 days of CAL FIRE crew time
- Thousands of lab samples
- Value of stream monitoring for early detection
- Most importantly, together we can proactively work to protect the region's forest resources
- The efforts are not over yet, but the collaboration is heartening



Thank You to Our Partners

- CAL FIRE
 - Mike Howe, Russ Henley, Hugh Scanlon, Mark Rodgers, Jack Marshall, Kurt McCrea
 - CDC Crews and Captains
- Natural Resource Conservation Service (NRCS)
 - Diana Dellinger, Steve Smith, David Casey
- USDA Forest Service State and Private
 - Phil Cannon, Pete Angwin, Zack Heath, Bruce Moltzan
- American Recovery and Reinvestment Act
- Cookson Ranch Foundation and 19 adjacent landowners
- Able Forestry
 - James Able, Dan Cohoon, Dan Graybill
- Sargent and Sons
Excavation and Logging
- DG Power for biomass disposal
- In kind support from Hoopa Tribal Forestry, Redwood National Park, Bureau of Land Management, Green Diamond Resource Co.

Current state of knowledge on operational sanitation measures to lower risk of *P. ramorum*

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Heavy Equipment: Potential SOD Vector

California bay laurel stumps

Equipment is working where trees have been fallen



BMPs for contractors working in SOD infestations

- BMPs for SOD specify (from *P. lateralis* research and other practical approaches to cleaning):
 - Clean soil and debris off personal equipment, machines, and vehicles
 - Sanitize boots with Lysol, ethanol, 10% bleach
- Tested in Redwood Valley
 - 100% (n=22) pathogen recovery rate from soil/debris samples from **heavy equipment** (3 dates with 400-ml samples)
 - 40% (n=15) pathogen recovery from residue after cleaning and incubation with water (3 dates with < 2 ml soil)
 - 20% (n=15) pathogen recovery from residue after cleaning and incubation with 10% bleach (3 dates with < 2 ml soil)
 - 67% (n=6) recovery from **boot treads** (1 sample date)
 - 0% (n=16) recovery from debris on **chainsaws** (from cotton swabs)



Logging Equipment: Lots of Infested Soil



**LOG LOADER: CAN
HARBOR OVER 500
LITERS OF
SOIL/DEBRIS**

P. ramorum

in soil adhered to equipment

- What is the best (effective and inexpensive) method for getting the majority of infected material off equipment and vehicles?
 - Air compressor
 - Power washing
 - Hotsy (180° water) pressure washer
 - Quaternary ammonium
 - Peracetic acid or peroxide
- Treatment of drafted water for dust abatement and fire fighting
- Sanitation is very expensive and time consuming, needs further study
- Is any detection of *P. ramorum* acceptable after cleaning? What is our standard?
- Do we understand pathways and risks of transmission?

Swabs after
cleaning

