

Phytophthora ramorum : Program History & Progress



***Phytophthora ramorum* Program Review, December 15-16th, 2009
Emergency & Domestic Programs, Riverdale, MD**

Critical Events

1995



1999



2000



- Unknown plant pathogen detected on oaks and tanoaks in California in 1995
- In 1999, University of California received \$1.5 million from Forest Service to study tanoak mortality
- In July 2000, research identified pathogen as new species of *Phytophthora* (University of California)
- In 2000, *Phytophthora* isolates from Germany and Netherlands identical to those in isolated from CA in 1993 (C. Brazier, UK).

Critical Events

2001



2002



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- January 2001 detection in a Nursery in Santa Cruz , CA
 - Oregon institutes quarantine from CA
 - Phytophthora spp.* formally named *Phytophthora sp. nov. ramorum* (Werres et al, 2001)
 - APHIS begins drafting regulations to control artificial spread in Spring 2001
 - In August 2001, Oregon confirms *P. ramorum* in Curry County; infected areas are quarantined by OR
 - APHIS publishes interim rule in February 2002

Critical Events

2001



2002



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- In November 2002, USDA establishes parallel restrictions on foreign nursery stock shipped to U.S.
 - In 2002, *P. ramorum* detected in 150 nurseries in UK.
 - European detections determined to be a different (A1) mating type from those in California (A2).
 - U.S. Department of Energy funds \$3.8 million in gene sequencing research to develop diagnostics

Critical Events

2003

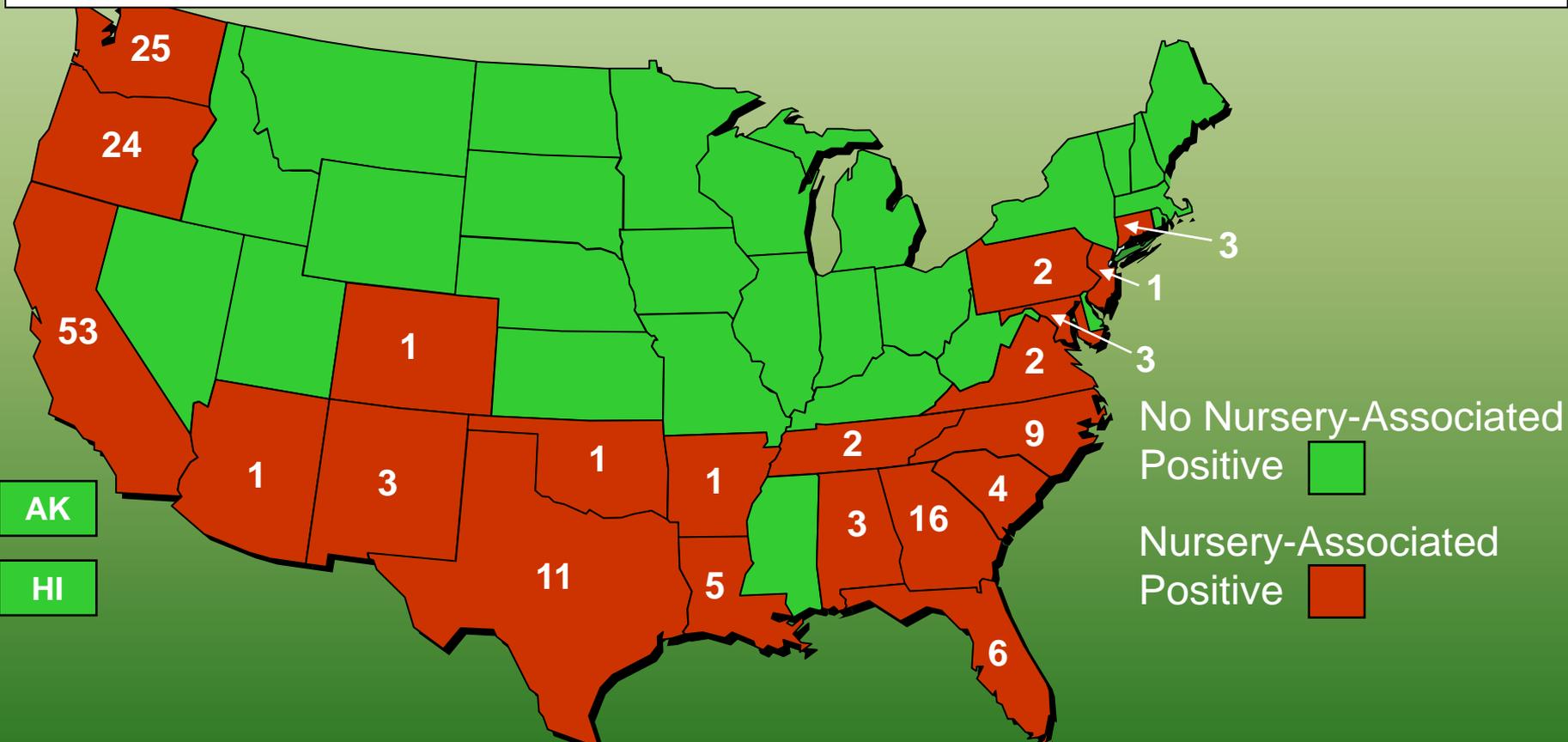
- USDA conducts Nursery Surveys in 7 states
- In 2003 there were 21 positive nurseries in total in CA, WA, and OR. (mainly trace forwards and some trace backs)
- Following detections, OR requested USDA to enforce stricter regulations; ODA adopts emergency rule
- USDA, CA, OR, WA and Canada agree on protocols to respond to nursery detections

● Critical Event in 2004



Positive Nursery Detections in Several States

- ❑ In March 2004, Host plants from a major nursery stock distributor tested positive for *P. ramorum*
- ❑ Surveys conducted identified positive trace forwards to 19 additional states



176 Positive Sites out of 2600 nurseries inspected

Critical Events

2004



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- P. ramorum* receives \$3 million in appropriated funds to establish National program; receives additional \$15.5 million in CCC funds to assist in survey and control efforts
 - Additional appropriated funds from USDA-ARS, FS, NIFA
 - USDA issues emergency Federal Order requiring inspection, sampling and testing before shipping or movement of nursery stock interstate
 - Confirmed Nursery Protocol (CNP) version 4.2 issued.
 - USDA-Forestry Service, USDA-Agriculture Research Service, and Universities increase their research efforts

Critical Events

2005

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- USDA conducts National survey with participation from all 50 states utilizing standard survey and testing protocols
 - 5000 nurseries surveyed, 2600 with host plants, 99 nurseries infested, including 41 growers**
 - FS survey forests in 36 states with zero detections
 - USDA issues Federal Order regulating some interstate shipments of nursery from CA, OR and WA; Canada follows suit
 - Real-time PCR validated to provide improved species specific diagnostic/detection tests

Critical Events

2006

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- USDA conducts National survey with participation from all 50 states
 - Confirmed Nursery Protocol was updated : CNP 7.0
 - 5000 nurseries surveyed, 2600 with host plants, 61 nurseries infested, including 25 growers**
 - ARS research indicates that *P. ramorum* can be recovered from roots
 - USDA-FS pilots water surveys in 11 states and pathogen found in several watersheds in OR and CA.
 - GAO (Govt. Accountability Office) issues report and recommendations for Federal response to ALB, EAB and *P. ramorum* and recognizes the significance of the Pests & Disease to US forests, landscape and nursery industry

Critical Events

2007

2008

2009

- From 2007 onwards, National Survey was discontinued
- CAPS program takes over survey work in 20 states (3800 nurseries, 1650 host nurseries, 23 positive in 07, 28 in '08, 25 in '09)
- APHIS funding for survey, control and spread: 2007-\$3M; 2008-\$5.4; 2009-\$5.4
- In 2007, new Interim Rule published, codifying the 2005 Federal Order, regulating all species, hybrids, cultivars of Rhododendron, Camellia, Viburnum, Pieris, and Kalmia
- Confirmed nursery protocols CNP's 8.0 and Retail protocols version 1.0 issued
- In 2007, FS conducts new soil water baiting survey in WA and MS

Critical Events

2007

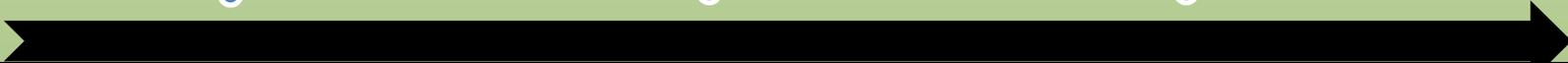


2008



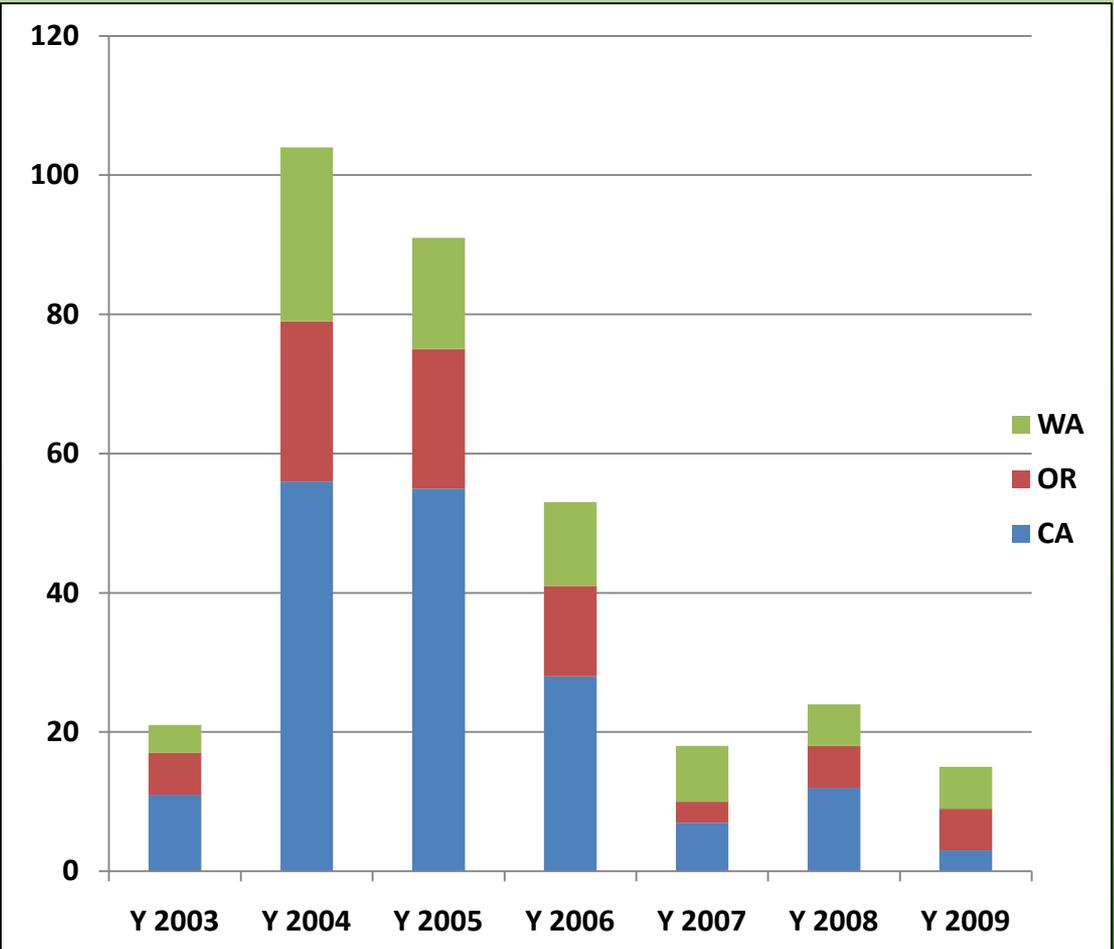
2009



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- OR expands Curry County quarantine
 - In 2009, USDA-FS provides OR with \$2.7 m (Economic Recovery \$) in support of ongoing efforts in Curry County
 - In 2009, National Ornamentals Research Site – Dominican University of California (NORS-DOC) received \$1 million from Farm Bill funding to establish Nursery Research Facility
 - Stream baiting by FS resulting in positive detections in CA, OR, GA, FL, and AL
 - Several (07, 08, 09) research articles published on the disease, the pathogen and its spread

Nursery Positives for *P. ramorum* in WA, OR, CA from 2003-2009

Nursery Detection/Year



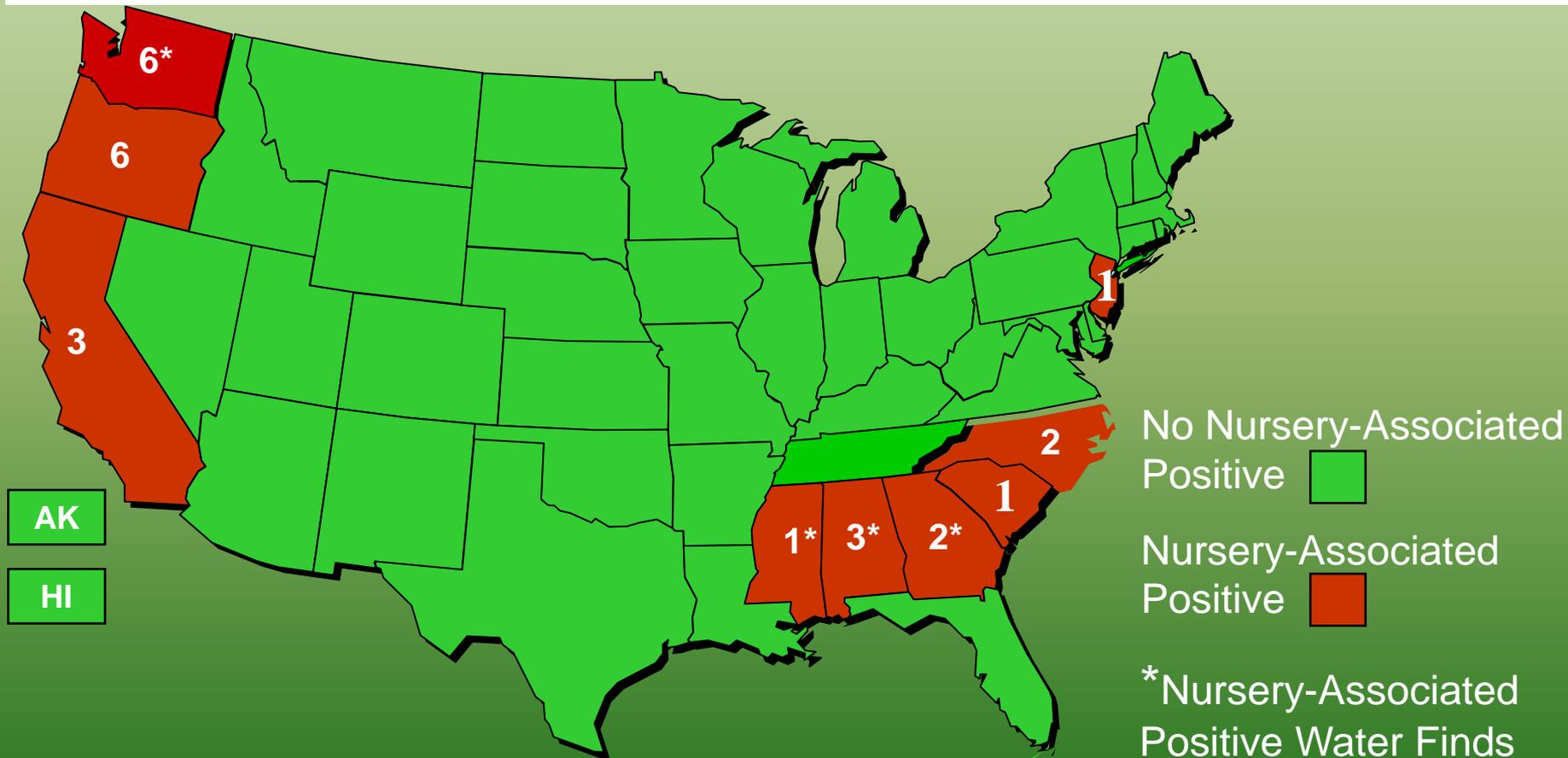
- Reasons for steady decline since 2004 attributed to,
- Identification of the high risk plants
- Inspecting host plants when pathogen is most prevalent
- 2-3x/yr inspection of high risk plants (in OR and CA)
- Critical Questions:
 - Thoroughness of sampling
 - Timing of sampling
 - Sampling in quarantine vs. Regulated areas
 - Training of field personnel

Nursery detections in non-quarantined states : 2004 - 2009

Plant Protection and Quarantine

STATE	2004	2005	2006	2007	2008	2009
Arizona	1					
Arkansas	1					
Alabama	3		1			3
Connecticut	2		1			
Colorado	1					
Florida	6		2	1	2	
Louisiana	5	2				
Georgia	16	4	1	3		2
Maine			1			
Maryland	3					
Mississippi			1	1	1	1
New Jersey	1					1
North Carolina	9				1	2
Oklahoma	1					
Pennsylvania	2		1	1		
South Carolina	4	1			2	1
Texas	11				1	
Tennessee	2	1				
Virginia	2					
Total	70	8	8	6	7	10

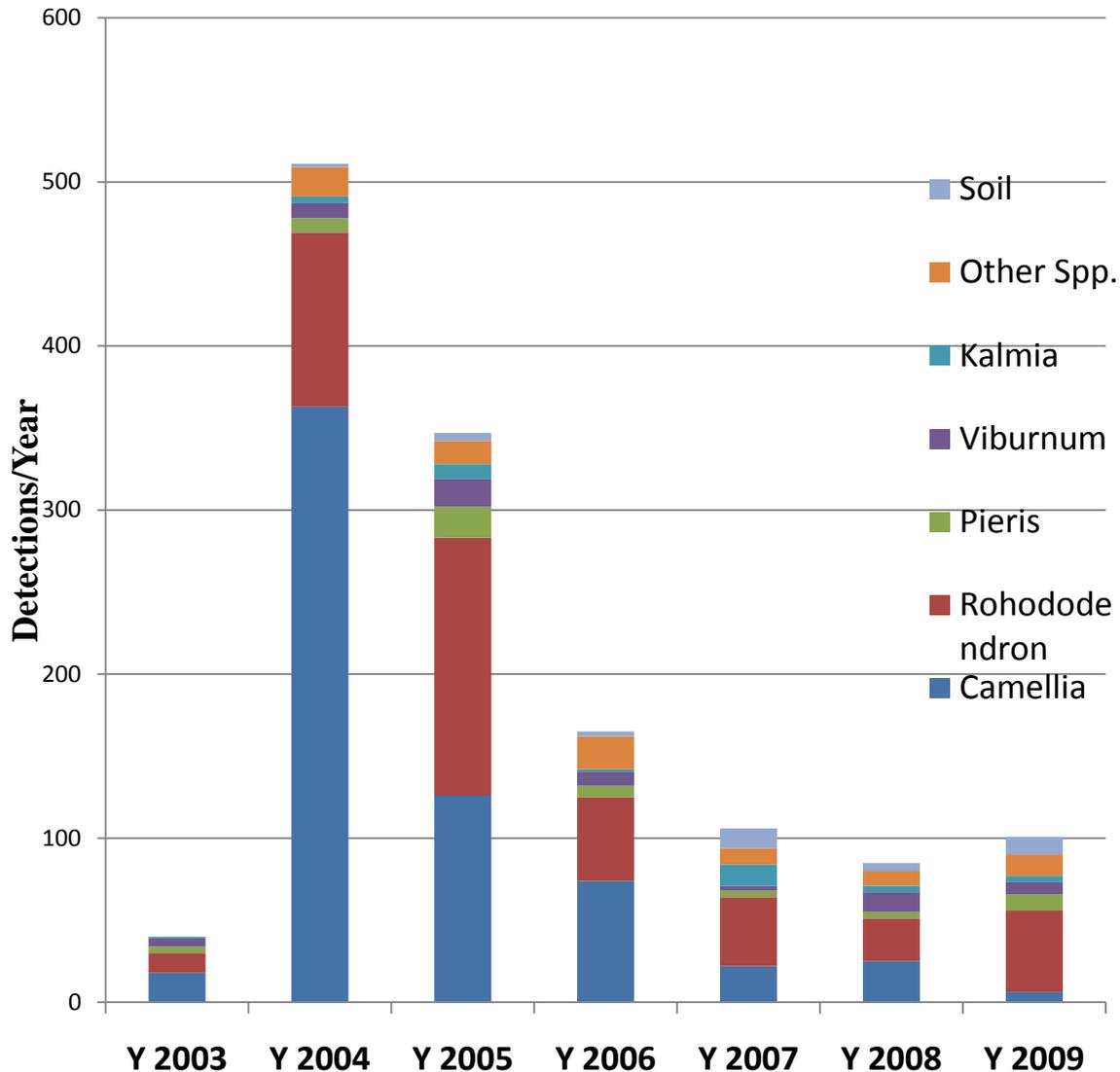
2009: APHIS *P. ramorum* Program has not observed **increase** in Positive Nursery Detections



25 Positive Sites around the country in 2009

Nursery Detections of *P. ramorum* by Plant species and Year (2003-2009)

Plant Protection and Quarantine



- Survey results agree with the ranking of the top 5 hosts.
- Soil detections still low
- Critical Questions:
 - Does sampling bias (5 host plants) affect the results
 - Does the sampling size affect the results
 - Is the soil detection method robust enough to detect low levels of the pathogen

- Paper work process: Final Rule, listing of additional plant hosts, re-look at host plant imports
- *P. ramorum* website periodically updated with new information – e.g. List of diagnostics lab, Compliance Agreements, Protocols, Links, Success stories?,
- Ongoing dialogue with NPB, Industry and other stakeholders on program implementation : Conference calls, Working groups
- Research efforts on BMP, soil remediation to be improved through CPHST coordination and closer collaboration with ARS, FS, NIFA, NORS-DOC, University researchers and Industry
- Field visits by team of experts: as a model for retail nurseries – Outreach efforts
- Funding (\$5.4) to maintain the quarantine /regulatory programs in CA (14 counties) and OR (Curry County) and nursery survey efforts in WA

Acknowledgements

**National Plant Board
State Plant Regulatory Officers
Nursery Industry – ANLA-HRI**

USDA-ARS

USDA-FS

USDA-NIFA

National IPM Center

Universities: Davis, OSU, Berkeley, NORS-DOC,

California Oak Mortality Task Force

TNC

National Plant Diagnostics Network

CPHST

APHIS-PPQ Western / Eastern Regions

State Plant Health Directors

APHIS-PPQ: Plant Health Programs

