APHIS - National Plant Board

Phytophthora ramorum

Regulatory Working Group Reports

Working Group Co-Chairs

Gray Haun – National Plant Board

Prakash Hebbar – USDA-APHIS-PPQ

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Contents

1-Executive Summary:

As a follow-up of *P. ramorum* National Program Review in December 2009, APHIS-PPQ-EDP in consultation with the National Plant Board, established seven Regulatory Working Groups, consisting of individuals from both Federal and State regulatory agencies, to provide a forum for discussion on regulatory issues pertaining to the *P. ramorum* National Program. This group replaced the previous working groups and focused on developing action items based on recommendations from the December, 2009 National Program Review, as well as past recommendations.

Action items in key regulatory areas addressed by the working groups to eliminate *P. ramorum* from the nursery production system included; risks with host plant imports (Quarantine 37), designation of host plants currently deemed as high risk for pathogen introduction, *P. ramorum* regulatory surveys, role of nursery assessment teams, Best Management Practices, triggers for regulation and de-regulation and regulatory protocols. Each sub-group was requested to review the report of the National Program Review and other relevant documents, define tasks or action items, recommend implementation strategies, roles and responsibilities and timelines. In total, between May 13 and October 25, 2010, over 25 conference calls and / or face to face meetings were held by the various sub-groups. Brief updates were provided at the National Plant Board Meeting in Indianapolis in July, 2010 which was followed by the Regulatory Working Group Co-chair meeting that was held in Salem, OR in October, 2010.

The current document co-authored by members of the NPB and APHIS, outlines recommendations from the various working groups based on existing regulatory and scientific data. So far several short-term actions have been initiated which include review of confirmed nursery protocols, in-depth analysis of port-of-entry (Q37) data, initiation of the *P. ramorum* National Survey, analysis of data on positive host species and nurseries, piloting nursery assessment teams to assist nurseries and several applied research efforts on soil remediation. Research initiatives on soil remediation and rapid diagnostics are being coordinated by CPHST at the National Ornamental Research Site at Dominican University in CA. Discussions are on-going on long-term action items such as developing clear guidelines (triggers) for regulation / deregulation, revision of Q37 program and revision of regulatory protocols for *P. ramorum* nurseries that include BMPs/CCPs.

APHIS-PPQ will take into consideration the recommendations on regulatory issues provided by the regulatory working groups, in addition to inputs from other stakeholders to formulate the future direction of the *P. ramorum* National Program.

2-Background:

Several initiatives were undertaken in 2009 by APHIS PPQ and NPB to review the *P. ramorum* quarantine program. During this period, APHIS solicited input from stakeholders with the goal of evaluating the program's operational components and identifying program strengths, weaknesses, and areas needing improvement through a number of activities, including: a) NPB / PPQ *P. ramorum* working group meetings held in May and June 2009, b) NPB Field Trip Report issued in August 2009, c) The Quality Assurance Review Report issued in October 2009, and d) NPB / PPQ dialogue meeting held in November 2009. The above efforts culminated in the

National Program Review held in Riverdale, MD on December 15 – 16, 2009. The primary goal of the National Program Review was to clarify the program vision, goals and recommend action plans. Details of the review can be accessed through:

http://www.aphis.usda.gov/plant_health/plant_pest_info/pram/program_review.shtml

The two-day program review culminated in developing high-priority action items that were identified as either short- or long-term as described below.

Short-term action items (Actions completed within 1 year)

- Define systems approach which includes BMPs and CCPs
- Tailor and revise regulatory options and protocols in conjunction with BMPs/CCPs
- Evaluate Q37 program for host plant import program
- Analyze in detail available APHIS data on hosts and detections
- Develop rapid, low-cost field diagnostics
- Review soil/substrate/water mitigation methods
- Develop triggers for regulation and de-regulation

Long-term action items (Actions completed within 3-5 years)

- Define and develop data for CCPs and rank them
- Application of systems approach in a wider scale and their implementation in nurseries – produce clean stock
- Review and revise Q37 for host plant import program
- Identify and define data gaps and knowledge to determine risks
- Fast-track diagnostic kits that are low-cost, rapid and for use on-site
- Develop soil mitigation strategies/ methods – at NORS-DUC
- Measure control strategy using USNCP protocol and its epidemiological (spread/disease) impact

The vision statement developed states**: "The program will take a proactive approach to protect native biodiversity, wild lands, and managed landscapes from** *Phytophthora ramorum* **through a system of voluntary and mandatory (Best Management Practices) approaches focused on Critical Control Points."** A management framework was established to allow all stakeholders to come together to share, information and coordinate program implementation. Current working groups / committees were realigned into 3 focal areas; a) nursery practices coordination group, b) research coordination group, and c) regulatory working group. The current document details outputs from discussions of the various regulatory working groups.

3. Objectives of the *Phytophthora ramorum* Regulatory Working Group

As a follow-up of *P. ramorum* National Program Review in December 2009, APHIS-PPQ-EDP established several Regulatory Working Groups, consisting of Federal and state agencies, to provide a forum to discuss regulatory issues related to the *P. ramorum* program. This group

replaced the previous working groups and focused on developing action items to implement recommendations from the December, 2009 National Program Review, as well as past recommendations.

Action items addressed included:

- Review and revise regulatory protocols to take into account CCP's, high-risk plants, as well as soil and water positives. Actions initiated so far include review of confirmed nursery protocol, compliance agreements, trace-forward/-backs
- Conduct in-depth analysis of port-of-entry data and revise the current Q37 protocols as appropriate to strengthen exclusion of the artificial introduction of *P. ramorum* into the United States.
- Conduct a national nursery survey for *P. ramorum* in 2010 as funded by Farm Bill (Section 10201).
- Develop clear guidelines (triggers) for regulation / deregulation.

Working Group Chairs: Gray Haun NPB (TN) and Prakash Hebbar, APHIS-PPQ (MD)

Sub-teams and Co-Chairs

- **High Risk Plants:** Carolyn Pizzo (PPQ); Kathleen Kosta (CA)
- **Q37:** Matthew Travis (PPQ); Shashank Nilakhe (TX)
- **Regulatory Surveys**: Anthony Man-Son-Hing(PPQ) ; Dennis Barclift (AL)
- **Nursery Field Teams:** Steven Whitesides (PPQ); Jan Hedberg (OR)
- **Triggers:** Steven Miller (PPQ); Gary Gibson (WV)
- **Critical Control Points/Best Management Practices:** Catherine Marzolf (PPQ); Carol Holko (MD)
- **Protocols:** Don Givens/Stacy Scott (PPQ); Victoria Smith (CT)

A regulatory working group process template was developed to facilitate the implementation of priority action items developed during the recent (December 2009) *P. ramorum* National Program Review. The working group was co-chaired by Gray Haun (National Plant Board) and Prakash Hebbar (APHIS-PPQ). Several sub-groups were formed to address key action items and clarify overall objectives from the discussions on regulatory issues. The sub-groups and the objectives were,

- **High Risk Plants:** Analyze data on *P. ramorum* detections on host plants.
- **Q37:** Implement measures to eliminate or reduce the artificial introduction of *P. ramorum* into the US.

- **Regulatory Surveys:** Conduct *P. ramorum* national surveys.
- **Nursery Field Teams:** Pilot role of nursery assessment teams as first responders.
- **Critical Control Points/Best Management Practices**: Define, assess, and rank CCPs and BMPs for consideration in developing regulatory protocols and defining applied research needs (NORS-DUC).
- **Regulatory Protocols:** Tailor and revise regulatory protocols to apply BMPs
- **Triggers:** Develop Triggers for regulation and deregulation of *P. ramorum* affected areas

Each sub-group was requested to review the report of the National Program Review and other relevant documents, define objectives, amend, delete or add action items as deemed necessary. Although the role of a Nursery Field Team was not discussed at length during the National Program Review, this activity was included as an action item. Several activities are already being piloted under the Nursery Field Team umbrella as they are the first responders to positive *P. ramorum* finds in nurseries in various states. Once the outlines of the action items are agreed upon, representatives from the Regulatory Working Group intend to meet with their Nursery Industry and Research Coordination counterparts to discuss strengths, gaps and other issues relating to this report. (Scheduled for Feb 2011)

Key Time lines of Activities:

In total, between May 13 and October 25, 2010, several conference calls and / or face to face meetings were held by the various sub-groups

- **Thursday, May 13th**: The first conference call was conducted with the working group participants and working group process template document was provided..
- **Thursday May 27th**: Initial feed-back from the working groups was received.
- **Thursday June 3rd**: Brief update was obtained from all the sub-groups.
- **Thursday June 24th**: First written draft obtained from the working groups.
- **Thursday July 1st**: Brief updates from Co-chairs during the National call and preparation of the working document/presentation for the NPB meeting.
- **Thursday July 29th**, Update was provided at the National Plant Board Meeting in Indianapolis
- **October 25-29th,** Regulatory Working Group Co-chair meeting, Salem, OR

4- Reports from Working Groups

4-1: High Risk Plant Working Group

Objective: Analyze data on *P. ramorum* detections and associated host plants.

Background: *P. ramorum* is known to occur on over 100 species of plants. The host plants are referred to as Hosts and Associated Plants (HAP). The "host" plants are those which have been confirmed through completion of Koch's Postulates under controlled conditions as genuine and true hosts.* Associated plants are those which have been found to have been infected with *P. ramorum* at least one time in the native environment, but have not been tested and proven to be a host through Koch's Postulates.

*Koch's Postulates are the long-standing, accepted standard for definitively proving a plant to be a host of a suspected pathogen.

Sub Team Co-chairs: Carolyn Pizzo APHIS, USDA and Kathleen Kosta, California Department of Food and Agriculture.

Team Members: PPQ: Christel Harden, Department of Plant Industry, Clemson University; Steven Whitesides, USDA/APHIS; Collin Wamsley, Missouri Department of Agriculture; Melinda Sullivan, USDA/APHIS; Walker Haun, Tennessee Department of Agriculture.

Action Items / Tasks Identified and Strategies:

1. **In-depth analysis of plant species positive for *P. ramorum***: Analyze existing records to determine if the high risk plants, as identified by National Plant Board in 2006, continue to be the most prevalent species found with the disease
2. **Develop criteria for high risk plants**: Evaluate factors other than the most frequently found infected species, which may contribute to risk of movement of plant materials such as host species that are determined to be prolific sporulaters, certain conditions of each receiving state that increase risk, etc.
3. **Evaluate "environmental" conditions that favor pathogen detection**: Collect and evaluate data on the date the positive samples were collected verses the date the sample was entered into the databank to determine the absolute best time of year to detect diseases caused by *P. ramorum*
4. **Determine optimal conditions for host plant inspections:** Collect data on specific atmospheric conditions at the time of, and two weeks prior to, the collection of plants positive for *P. ramorum* to further define the best time to do inspections
5. **Evaluate "shipping" conditions that favor pathogen sporulation**: Evaluate the effects of stress and transplant shock on the development of symptoms during shipping to determine an adequate hold/isolation period for incoming nursery stock

Current status and available data: The currently available data collected since 2003 is based on host species identified as positive for *P. ramorum* during nursery inspections. Briefly the results are as follows (Table 1).

Table 1. Breakdown of plants confirmed positive for *P. ramorum* by genera and year

Year	Camellia	Rhododendron	Viburnum	Pieris	Kalmia	Others (#Genera)
2003	45%	30%	12.5%	10%	2.5%	0
2004	71%	21%	2%	2%	1%	3% (6)
2005	37%	46%	5%	5%	3%	4% (6)
2006	46%	32%	5%	4%	1%	12% (10)
2007	23%	45%	3%	4%	14%	11% (7)
2008	31%	32%	15%	5%	5%	12% (4)
2009	7%	56%	9%	11%	4%	14% (9)
2010	22%	43%	9%	8%	3%	11% (8)
Average	35%	38%	8%	6%	4%	8% (6)

The majority of the nursery samples that have been confirmed as positive for P. ramorum over the past 8 years are still those that are regulated at the genus level, namely Camellia (35%), Rhododendron (38%), Viburnum (8%), Pieris (6%), and Kalmia (4%). These genera account for ~90% of the detections. The remaining ~8% were other (4 to 10 genera / year) plant genera.

Table 2: Number of positive confirmations for other genera from year 2004 to 2010

#	Plant Genus	Detection (years)	2004	2005	2006	2007	2008	2009	2010
1	**Magnolia**	6 y	0	1	2	2	2	2	2
2	**Laurus nobilis**	5 y	0	2	2	1	0	1	3
3	**Loropetalum**	4 y	0	0	0	1	3	2	1
4	**Osmanthus**	3 y	0	0	3	3	0	0	1
5	Syringa	2 y	4	0	1	0	0	0	0
6	Umbellularia	2 y	1	0	1	0	0	0	0
7	Aebis	2 y	0	1	1	0	0	0	0
8	Nerium	2 y	0	0	1	1	0	0	0
9	Prunus	2 y	0	0	1	1	0	0	0
10	Arbutus	2 y	0	0	0	1	0	1	0
11	Leucothoe	2 y	0	0	0	0	1	1	0
12	Aesculus	1 y	1	0	0	0	0	0	0
13	Douglas fir	1 y	1	0	0	0	0	0	0
14	Acer	1 y	1	0	0	0	0	0	0
15	Quercus	1 y	1	0	0	0	0	0	0
16	Pittosporus	1 y	0	1	0	0	0	0	0
17	Pyracantha	1 y	0	1	0	0	0	0	0
18	Jasminum	1 y	0	1	0	0	0	0	0
19	Vancouveria	1 y	0	0	1	0	0	0	0
20	Gaultheria	1 y	0	0	1	0	0	0	0
21	Corylopsis	1 y	0	0	0	0	1	0	0
22	Arcostaphylos	1 y	0	0	0	0	0	1	0
23	Illicium	1 y	0	0	0	0	0	1	0
24	Hamamelis	1 y	0	0	0	0	0	1	0
25	Ilex	1 y	0	0	0	0	0	1	0
26	Mahonia	1 y	0	0	0	0	0	0	1
27	Sequoia	1 y	0	0	0	0	0	0	1
28	Tracheolospermum	1 y	0	0	0	0	0	0	2

Of the 28 different genera, *Magnolia* (5 species), *Laurus nobilis*, *Loropetalum* (2 species), *and Osmathus* (5 species), were positive for *P. ramorum* between 3-6 times since 2004. All other genera were detected once or twice at the most.

Detailed analysis of existing records entered in the NAPIS database, which includes negative data is underway; results have not yet been compiled.

Recommendations:

Action Item 1. In-depth analysis plant species positive for *P. ramorum*

- Analysis of existing records confirms that the 5 high risk plants viz, Camellia, Rhododendron, Viburnum, Pieris and Kalmia, as identified by National Plant Board in 2006, continue to be the most prevalent species found with the disease.
- Of the 28 other genera found positive in nurseries, *Magnolia, Laurus, Loropetalum and Osmathus* were positive between 3-6 times since 2004. All other genera were detected once or twice at the most.
- Analysis of data from CA, OR, WA, which includes negative samples should help us better understand the "high risk plants".

Action Item 2. Develop criteria for high risk plants

- USDA-ARS is currently working on developing criteria for high risk plants. Several papers have been published on sporulating capacity of host species under highly controlled artificial conditions. Of the hosts listed above, several have been shown to sporulate and also harbor the pathogen in their root system.
- Tests should be conducted simulating nursery conditions rather than "highly artificial" conditions. The high risk plants, once identified, should be given a more thorough inspection than other plants.
- Request CPHST to further evaluate existing data in regards to sporulation potential of HAP and the potential risk of those plants not designated as High Risk Plants. Obtain information and consult USDA-ARS.
- Because of their propensity to contract this disease, the top 5 host plants serve as a sentinel plant for detection of *P. ramorum* in the nursery and this also allows each state to focus their limited resources.
- Support research to demonstrate potential for disease transmission from ornamental nursery stock to the native environment

Action Item 3. Evaluate "environmental" conditions that favor pathogen detection

- Recommend that research be completed at USDA-ARS, NORSDUC to resolve said questions under both optimal and sub-optimal conditions similar to those present in the nurseries.

Action Item 4. Determine optimal conditions for host plant inspections

- Recommend the Protocol committee develop a standard data collection sheet that captures all pertinent data to pin down the best time to complete inspections, based on climatic conditions, seasonal changes, growth stage of the plant, etc.

- Once the HR plant are identified, each state may consider performing a second inspection of the HR plants at a time when the conditions are conducive to symptom expression and ideally 30 to 60 days prior to shipping.

- Request that research be completed to determine the correlation between host phenology, infection and symptom expression, to further pinpoint the optimum time for inspection of HR plants.

Action Item 5. Evaluate "shipping" conditions that favor pathogen sporulation

- Obtain information from nurseries on shipping procedures and practices for handling shipments on arrival.

Conclusion

- The majority of the nursery samples that have been confirmed as positive for P. ramorum over the past 8 years are still those that are regulated at the genus level, namely Camellia (35%), Rhododendron (38%), Viburnum (8%), Pieris (6%), and Kalmia (4%). These genera account for ~90% of the detections. The remaining ~8% were other plant species. Magnolia, Laurus, Loropetalum and Osmathus were positive for P. ramorum more frequently.

- The information extracted from State and Federal data banks will provide confirmation on the hosts which are more frequently found infected with *P. ramorum*, and is expected in a short time. Number of negative samples will also be factored into the estimations.

- Identifying environmental conditions in individual states that must be factored into the determination of risk may take some time to finalize.

- The recommended research projects whose results will provide additional data to fine tune the handling of high risk plants are long term projects

References:

Tooley P. W. et al, 2004. Susceptibility of selected Ericaceous host species to *Phytophthora ramorum*. Plant Disease 88: 993-999.

Tooley P. W. and Browning M, 2009. Susceptibility to *Phytophthora ramorum* and inoculums production potential of sme common Eastern forest understory plants. Plant Disease 93: 249-256.

Shishkoff N. 2007. Persistence of *Phytophthora ramorum* in soil mix and roots of ornamentals. Plant Disease 91: 1245-1249.

Action Item Matrix: High Risk Plants

ACTION ITEM (TASKS)	ASSIGNED TO	STATUS	TARGET COMPLETION DATE	NOTES:
1-In depth analysis of Existing Records	HR Plants Group, PPQ-CPHST, ODA, CDFA, WSDA	Have trace forward data for 2009, 2010 Positive plant data for nurseries, all years	4TH QUARTER, 2011	Initial data analysis confirm that hosts regulated at genus level account for over 90% of positive plants
2-Develop Criteria for High Risk	HR Plants Group, USDA-ARS, CPHST	Collecting information Require data on weather during shipping sporulation	4th quarter 2012 if research is completed prior to that	Need sporulation potential information from USDA-ARS, CPHST/researchers
3-Evaluate environmental conditions,	Nursery Industry, USDA-ARS, CPHST	Collecting information	1 year after research is done	Consult Industry and obtain information on shipping practices. Obtain information from USDA-ARS
4- Determine optimal conditions for host plant inspections	State Agriculture Departments, CPHST	Collecting information	4TH QUARTER, 2011	Requested protocol working group require data sheet to be prepared during CNP.
5- Evaluate shipment stress/ transplant shock	Nursery Industry, USDA-ARS, CPHST	Collecting information	1 year after research is done	Consult Industry and obtain information on shipping practices. Obtain information from USDA-ARS
6-Determine what action to be taken for high risk plant imports	High Risk Plants Group, Q37 group	Have discussed various remedies from not shipping to only allowing tissue cultures and extra inspections	2nd quarter 2012	Q37 WG in the process of evaluating plant imports

4-2: Quarantine 37 (Q37) Applications Sub- Group

Objective: Develop improvements to regulations to reduce artificial introduction of *Phytophthora ramorum* into the United States; to include an assessment of risk at Ports of Entry (POE), improve host plant tracking, production practices in host plant countries of origin, and diagnostic screening at POE.

Background: Since the first observation of *Phytophthora ramorum* in Europe and the Netherlands in 1993, followed by the identification of *Phytophthora ramorum* in nurseries throughout the United States, there has been much discussion and debate among stakeholders in receiving and shipping states on APHIS's ability to screen, test, and track host plant material entering the U.S. through ports of entry. Furthermore, the technology available to the Plant Inspection Stations has been limited to meet this current undefined risk. In the 2009 National Program Review four action items were identified: 1) Evaluate whether 7 CFR 319.37 (Q37) needs revision to include highest risk host plant material (the "Filthy 5") for post-entry, 2) Research the development of field diagnostic kits for quick screening, 3) Conduct trace work analysis for tracking and tracing plant material for follow-up surveys. This group's assignment addresses these action items.

Sub Team Co-chairs: Matthew Travis, APHIS-PPQ and Shashank Nilakhe (TX), NPB

Team Members: PPQ/CPHST: Paula Henstridge, Cory Marker, Russ Bulluck, Charla Hollingsworth, Don Seaver, Anthony Man-Son-Hing, Alex Belano, Bill Aley, Mary Palm, Gordon Muraoka, Gregg Goodman, **NPB:** Brad White (WA), Steve Schmidt (NC).

Action Items Identified:

1. Evaluate Q37 Program for *P. ramorum* host plant imports.
2. In-depth analysis of ports of entry (POE) data and determine risks.
3. Improve tracking host plant movement: from POE to destination (Barcodes).
4. Monitoring production practices in host plant origin countries.
5. Screening of Plant Imports/rapid diagnostics.
6. Review regulations for *P. ramorum* host plant imports and suggest improvements.

Summarize briefly the Current status and Recommendations.

Action Item 1. Evaluate Q37 Program for *P. ramorum* host plant imports**:** The post-entry regulation (7 CFR 319.37-7) currently contains 8 genera which are also listed as hosts or Host-Associated-Plants (HAP) for *P. ramorum*. These are *Acer* spp., *Aesculus* spp., *Euonymus* spp., *Prunus* spp., *Quercus* spp., *Rosa* spp., *Rubus* spp., and *Syringa* spp. Of the 5, "High Risk" plants, *Rhododendron*, *Camellia*, *Pieris*, *Viburnum* and *Kalmia*, only *Rhododendron* is mentioned in the CFR 319.37-8 (ix) "Growing Media" regulation. This regulation however, does not mention *Phytophthora ramorum*.

The group discussed the impacts of adding all of the current hosts and HAP to 7 CFR 319.37-7. The impacts and challenges are as follows:

1) Adding plants to Q37 would require a change in the regulation, the group recognized that this would be a lengthy process and additional plants may overburden state partners conducting the post-entry program.

2) The additional plants would necessitate a more efficient tracking and notification system. This would require an overhaul of the current notification system from Plant Inspection Station (PIS) to the state of destination.

However the group was not in agreement that this alone would reduce the artificial spread of the pathogen. The group discussed adding only the plants determined to be of the highest risk (another subgroup) from the high risk countries; however the determination of what countries present the highest risk can be complex and is unknown at present. APHIS has used another tool other than formally changing the regulation, a letter of instruction to countries of the European Union for the import of *P. ramorum* host plants.

Recommendation:

- The group recommended a letter of instruction as mechanism and possibly developing a comprehensive import regulation that addresses import of *P. ramorum* hosts of most concern to the United States. This would be a long term strategy that would require additional rule making by APHIS.

- The P. ramorum working group recommended considering "tissue-culture" for imports of the top 5 high risk plant hosts. (Note: the term "tissue-culture" is not internationally uniform). Tissue culture plants are treated the same as bare-root plants and the Q37 working group does not see this measure as meeting the goal of the program to reduce the artificial spread of the pathogen. Further discussion on the rule for *Phytophthora* of US concern is needed.

- Also, inspections for *P. ramorum* are visual and require more enhanced technology for testing plant material coming in through PISs (see action item #5).

Action Item 2. In-depth analysis of ports of entry (POE) data and determine risks: Risk analysis is defined as a systematic approach to decision making through gathering and evaluating data and information. The group gathered and evaluated data from the PPQ 280 database, this data represents plant material being processed through the PISs. In analyzing this data from both the PPQ Eastern Region (ER) and Western Region (WR) we found the following 'trends':

- Viburnum spp. was the highest import reported from 2004 to 2010, followed by Rhododendron spp., Camellia spp. and Pieris spp. (Table 1).

- From 2004 to 2010, of the top 5 hosts for *P. ramorum*, the ER accounts for 73% and the WR accounts for 27% of the imports (data not shown). The highest imports were into Miami, FL followed by, POE's in Washington State, Honolulu, HI; JFK, NY and Los Angeles, CA. (Table 2).

- In the ER ports, March to June are the heaviest months for the top 4 hosts and in the WR ports, May-July are the heaviest months for the top 4 hosts (data not shown).

- From 2004 to 2010, 99% of the *Viburnum*'s came through ER PISs station in Miami and 1% came through WR PISs. This occurred only in 2007 and 2008 and the imports were mainly from Costa Rica. (Table 3). Imports from Canada were consistent.

- From 2004 to 2010, 74 % of the *Rhododendron*'s come through WR PISs and 5% came through ER PISs

- From 2004 to 2010, 76% of all Camellia spp. coming through the PISs were in the WR and 3% came through the ER PISs

- From 2004 to 2010, 86% of Pieris spp. came through the ER PISs and 13% through the WR PISs. While this data suggests that the ER is the region of highest risk in terms of possible introduction of *P. ramorum*, based on volume of host material entering the United States, further data to include the country of origin of the plant material, those countries current regulations and restrictions on host plant material, and trading trends need to be further investigated (see Action Item #4).

- HAP plants were shipped from 32 countries and they are as follows; **North and South America:** Canada, Costa Rica, Colombia, Chile; **Asia:** Vietnam, Taiwan, South Korea, China, India, Japan, Nepal, Indonesia; **Asia/Pacific:** Australia, New Zealand; **Western Europe:** United Kingdom, Belgium, Germany, Switzerland, Sweden, Norway, Netherlands, France, Finland; **Eastern Europe:** Hungary, Russia, Ukraine, Poland, Georgia, Turkey, Czech Republic; and **Africa:** South Africa, Madagascar.

- Plants were also imported as seeds and tissue cultures in flasks (Table 4 and 5).

Table: 1 Data on Imports of *P. ramorum* High Risk Plants (units/y) by Genus and by year

Plant Genus	2004	2005	2006	2007	2008	2009	2010	Total
Rhododendron	2948	11007	995	5412	25871	75505	1556	123,294
Camellia	6664	881	4763	15803	7081	20	nil	35,212
Viburnum	19227	592	2	302,858	96354	513	4	419,539
Pieris	73	3	nil	3400	800	1467	486	6229
Total units of HRP imports /y	28912	12483	5760	327,473	130,106	77505	2046	584,285

HRP: High Risk Plants

Table 2-Data on Imports of *P. ramorum* High Risk Plants (units/y) by Ports of Entry and Year

Port of Entry	2004	2005	2006	2007	2008	2009	2010	Total
Miami, FL	5690	104	nil	306480	96311	5	nil	**408, 590**
Orlando, FL	nil	nil	15	1000	nil	nil	nil	1015
Atlanta, GA	nil	nil	123	160	137	99	2	521
JFK, NY	11749	14	208	253	197	208	nil	**12637**
Linden, NJ	150	135	nil	91	nil	nil	nil	376
LA, CA	172	10410	121	217	174	nil	nil	**11074**
SFO, CA	329	19	166	6	18	68	32	638
Anchorage, AL	nil	10	nil	768	135	nil	nil	913
Seattle, WA	859	103	531	2271	12139	nil	12	**15915**
Sumas, WA	nil	nil	nil	nil	nil	49932	1486	**51418**
Blaine, WA	nil	nil	nil	1680	12848	14008	nil	**28536**
Oroville, WA	nil	nil	nil	nil	1245	847	nil	2092
Honolulu, HI	902	534	4549	14540	6773	2323	504	**30125**
New Orleans, LA	117	58	34	nil	12	nil	nil	221
Huston, TX	nil	7	13	nil	7	nil	nil	27
Pembina, ND	nil	nil	nil	nil	nil	9500	nil	9500
Port Huron, MI	8944	445	nil	nil	nil	nil	nil	9389
Chicago, IL								<50
Indianapolis, IN								<50
East Port, ID								<50

Table 3 Data on Imports of *P. ramorum* High Risk Plants (units/y) by Country and Year

Country	2004	2005	2006	2007	2008	2009	2010	Total
Canada	8099	1278	300	2450	14545	77133	1998	
Costa Rica	nil	nil	nil	306200	93900	nil	nil	
South Africa	80	nil	100	14500	6500	nil	nil	
Australia	254	10010	243	113				
New Zealand	53	53						
China/ Hong Kong	6006		500	1098				
Vietnam	100	1			1			
Nepal	11000							
India	373							
Netherlands	175	635		105	19			
United Kingdom	307	1	112	350	7			
Germany	500			10				
Japan			4315	1075	487	366	49	
Ukraine	11			1225				
Belgium			30	8	12000			
Chile					1850			
South Korea	110	24		30	154			

Plants were also shipped as tissue culture, seeds or rooted cuttings.

Table 4-Data on Imports of *P. ramorum* High Risk Plant (kg/y) of Seeds by year

Plant Genus	2004	2005	2006	2007	2008	2009	2010	Total
Rhododendron	1.371	0.106	0.132	0.461	0.022	0.261	0.003	
Camellia	0.034	0.237	0.167	0.068	0.023	0.042		
Viburnum	3.590	0.143	0.046	0.221	0.042	0.079	0.017	
Pieris	.057	0.014	0.001	nil	0.001	41037		
Total (g) HAP imports/y								

Table 5-Data on Imports of *P. ramorum* High Risk Plant –Rooted cuttings/Tissue culture flasks

Plant Genus	2004	2005	2006	2007	2008	2009	2010	Total
Rhododendron	nil	nil	nil	nil	nil	nil	nil	nil
Camellia	nil	nil	nil	1960	32519	nil	nil	34479
Viburnum	nil	nil	nil	nil	nil	nil	nil	nil
Pieris	nil	nil	nil	nil	nil	nil	nil	nil
Total (flasks) of HAP imports/y				1960	32519			34479

Action Item 3. Improve tracking host Plant movement: from POE to destination (Barcodes).Tracking of host material from Ports of Entry (POE) to destination has long been a point of discussion and debate among stakeholders. Use of the current PPQ system, PIS recording plant introduction into the PPQ 280 database system (exclusive to PPQ) and issuance of PPQ Form 264 –Notice to State Plant Quarantine Official of Shipment of Imported Plant Material has been a valued tool, but not successful in providing timely and accurate information to the destination states. In the PPQ Eastern Region, 15 State Plant Regulatory officials report that they receive the PPQ form 264, but on not in a timely manner to conduct follow-up inspections; the remaining 11 states do not receive the 264s or are unaware of the form.

Recommendation: APHIS should revitalize the enhancement of this system and work with stakeholders to put a consistent and a quicker reporting system in place. Suggestion of having access to the import database through a "Username and Password" was discussed with POE staff at APHIS-PPQ.

Uses of radio frequency identification (RFID) tags are currently being piloted at the U.S. Arboretum by CPHST and PPQ, and will greatly enhance the ability to track individual plants. Some outcomes of this project are: 1) Use and ease of tagging plants, 2) Use of the handheld device, 3) Use of the web based software, 4) Plant inspection and ease of finding tagged plants, 5) Tag durability. Implementation and acceptance in the industry should be the next step in this program. The group did not address the cost or implementation aspect of this Action Item.

Action Item 4. Monitoring production practices in host plant origin countries
During the group's discussions of other Action items, it became evident that there is a need to develop an in-depth understanding and knowledge about the origins of 'high risk' plant material. Specifically, 1) The nursery certification programs of the European Union, Netherlands, United Kingdom, Switzerland, and South Africa, 2) The regulatory practices and restriction of these countries, and 3) Pre-clearance programs in these countries. Furthermore the group discussed

with PPQ Import and Export Director, Bill Thomas, the need to develop a team to research these aspects and then develop a ranking system for the countries shipping the largest volume of host plant into the U.S. Once the research team has developed a profile for each of the identified countries, then Action Item #1 can be further developed.

Recommendation: The group recommended an on-site visit in key countries to observe their *P. ramorum* program and safeguarding measures. A temporary halt or post-entry quarantine should be imposed for host plant imports from countries that do not have the same standards as in the US or do not provide adequate information.

Action Item 5. Screening of Plant Imports/rapid diagnostics
The working group discussed two possible methods for rapid diagnostics based on current science and CPHST pilot activities. The two options are as follows:

1. Further evaluate the current commercial test kits, for example AGDIA Immuno-strip for *P.ramorum*.
2. Evaluate the use of the CPHST mobile lab.

Recommendation: The group recommends that both the above methods are piloted in the next calendar year at a PIS (Blaine, WA or Miami FL), that receives an assortment of *P. ramorum* hosts, from most countries with the disease and at a greater frequency. These methods will be evaluated on the results, timeliness, and adaptability to the location. There would need to be further evaluation on the diagnostic processes and the impacts on regulatory authority and operational factors. Once the methods are evaluated, then this Action Item can further be developed and adapted to other PISs and field situations. The pilot project will gauge the level of *P. ramorum*-infected plant material entering the United States.

Action Item 6. Review regulations for *P. ramorum* host plant imports and suggest improvements
The review of *P.ramorum* host plant regulations were considered under Action item #1. The working group understands that this item is a work in progress and requires the input of the "High Risk Plants" working group. Some discussion with Emergency Domestic Programs, Q37 Risk Management and Plants for Planting has occurred and needs to continue.

Conclusions:

- The subgroup has reviewed the current Q37 regulations and program and questions whether a regulatory change would provide the reduction in spread of *P.ramorum*. Current Q37 revisions are on-going and the group should develop a further understanding of the other possibly regulatory options.

- The subgroup performed an analysis of the plant material coming into PISs. Further analysis on the plant material origin country, Action item #4, needs to be developed and analyzed.

- The subgroup envisions the development of a RFID system integrated with improved notification system. The group recommends that the current process be enhanced to include electronic notification to SPRO and SPHDs or access to the data base.

- The subgroup needs to work with APHIS to further develop a risk ranking system of countries, based on production practices, regulatory practices/ restrictions and trade trends.

- The subgroup recommends that CPHST conduct a pilot of the two proposed diagnostic options. Once complete, engage APHIS to develop the techniques, policy and procedures in support of the diagnostic tool.

Action Item Matrix:

ACTION ITEM (TASKS)	ASSIGNED TO	STATUS	TARGET COMPLETION DATE	NOTES:
Evaluate Q37 Program for *P. ramorum* host plant imports.	Q37 Work Group	Completed	November 2010	Details in the final working group report
In-depth analysis of ports of entry (POE) data and determine risks.	Q37 Work Group	Completed	November 2010	Details in the final working group report
Improve tracking host Plant movement: from POE to destination	Q37 Work Group	Ongoing Need a quicker reporting system in place. Need access to the import database	December 2011	
Monitoring production practices in host plant origin countries	PPQ-QPAS	Ongoing On-site visit to observe *P. ramorum* program and safeguarding measures. A temporary halt to host plant imports or Post-entry requirement	September 2011	
Screening of Plant Imports/rapid diagnostics	PPQ-CPHST	Ongoing Evaluate the current commercial test kits, Evaluate the use of the CPHST mobile lab	December 2011	Informed CPHST
Review regulations for *P. ramorum* host plant imports and suggest improvements	PPQ Q37 Work Group	Ongoing	2011-12	Under discussion at PPQ Long-term may need regulatory changes

Appendix I: Supporting Documentation utilized by the subgroup

Guidance Documents:
Phytophthora ramorum National Review
http://www.aphis.usda.gov/plant_health/plant_pest_info/pram/downloads/review_2009/NationalReviewReport.pdf

Phytophthora ramorum Regulatory Working Group Process Template for Action Plans- Prakash Hebbar, 11 May 2010

AGDIA Test Kit User Guidelines

PPQ Agricultural Quarantine Analysis System (AQAS), 280 Database

RSPM 24 - Integrated Pest Risk Management Measures for the Importation of Plants for Planting into NAPPO Member Countries
http://www.canadanursery.com/Storage/9/548_RSPM24.pdf

ISPM 5 - Glossary of Phytosanitary Terms
http://www.aphis.usda.gov/import_export/plants/plant_exports/downloads/pimglossary.pdf

Title 7 Code of Federal Regulations 319.37 – 7
http://edocket.access.gpo.gov/cfr_2006/janqtr/pdf/7cfr319.37-7.pdf

Phytophthora ramorum Federal Order 2-22-10
http://www.aphis.usda.gov/plant_health/plant_pest_info/pram/downloads/pdf_files/federal_order_2-22-10.pdf

4-3: Regulatory Survey Working Group

Objective: Conduct the 10201 Funded National Survey for *P. ramorum*

Background: *Phytophthora ramorum* (*P. ramorum*) is the causal agent of the plant disease called Sudden Oak Death which is also referred to as Ramorum Blight, Ramorum Die-Back and Twig Blight or Die-Back. This disease has been detected in nursery stock and the environment in Europe, California and Oregon. Its primary potential-threat is to eastern forest ecosystems. At the present time, the movement of nursery stock from naturally-infected areas and from known-infected nurseries are regulated by State and Federal quarantines. Authorization to allow movement of plants is predicated upon visual inspections and sampling. Despite these efforts, P. ramorum continues to be detected in nurseries throughout the United States, although the rate of detections has decreased. This organism is difficult to detect during visual inspections and identification requires sophisticated laboratory testing for confirmation. Consequently, early detection continues to be the best approach at this time to minimize the artificial spread of this pathogen. There is a growing consensus among the scientific community in support of water sampling as a proven method of alerting for the presence of this organism. And as such, the Regulatory Survey Working Group has dedicated some time and discussions towards this end.

Sub Team Co-chairs: Dennis Barclift, NPB and Anthony Man-Son-Hing, APHIS-PPQ

Team Members: PPQ: A. Wagner, C. Pizzo, S. Whitesides **NPB:** C. Wamsley, Wayne Dixon, Sherry Aultman K. King**. Scientific Support:** CPHST: Heather Hartzog

Action Items Identified:

1). Conduct and coordinate enhanced and stand alone P. ramorum survey and obtain funding.

2). Analyze data obtained from P. ramorum survey.

3). Develop plans for enhanced and stand alone P. ramorum survey and obtain continued funding for FY11.

4). Organize and deliver soil and water detection workshops

5). Refine the definition of regulatory survey.

Summary of Current status and data Recommendations.

Current status and available data: The currently available data collected since 2003 is based on number of nurseries where presence (in plants, soil or water) of *P. ramorum* was confirmed during nursery inspections conducted through Program funding, CAPS survey or Farm bill funded National Survey (Table 2). The higher number of positive nurseries detected are in the three western states of CA, WA and OR where larger number of host plants are propagated and also substantial portion of program funding are allocated to conduct nursery surveys (Fig 1). The 2004 spike in nursery positives were due to a large shipment of positive host plants from CA. Since then the number of positive nurseries detected per year have been declining steadily. So far *P. ramorum* has been detected in 26 states around the country, although the majority of these detections have been the result of trace-forward investigations.

Table 1: ***Phytophthora ramorum*** **2010 survey initiatives (+: Survey conducted)**

State	Regulatory Program	CAPS survey	Farm Bill National Survey
Alaska			
Alabama	**+ (ER)**		**+**
Arizona			
Arkansas			
California	**+ (WR)**		
Colorado			
Connecticut		**+**	
Delaware			
Florida	**+ (ER)**		**+**
Georgia	**+ (ER)**		**+**
Hawaii			
Idaho			
Illinois			
Indiana		**+**	**+**
Iowa			
Kansas			
Kentucky		**+**	**+**
Louisiana			**+**
Maine			
Maryland			**+**
Massachusetts		**+**	
Michigan			**+**
Minnesota			
Mississippi			**+**
Missouri			
Montana			
Nebraska			
Nevada			
New Hampshire			
New Jersey			
New Mexico			
New York		**+**	**+**
North Carolina		**+**	
North Dakota			
Ohio			**+**
Oklahoma			**+**
Oregon	**+ (WR)**		
Pennsylvania			**+**
Rhode Island			
South Carolina		**+**	
South Dakota			
Tennessee			**+**
Texas			**+**
Utah			
Vermont		**+**	
Virginia		**+**	**+**
Washington	**+ (WR)**		
West Virginia		**+**	**+**
Wisconsin			
Wyoming			

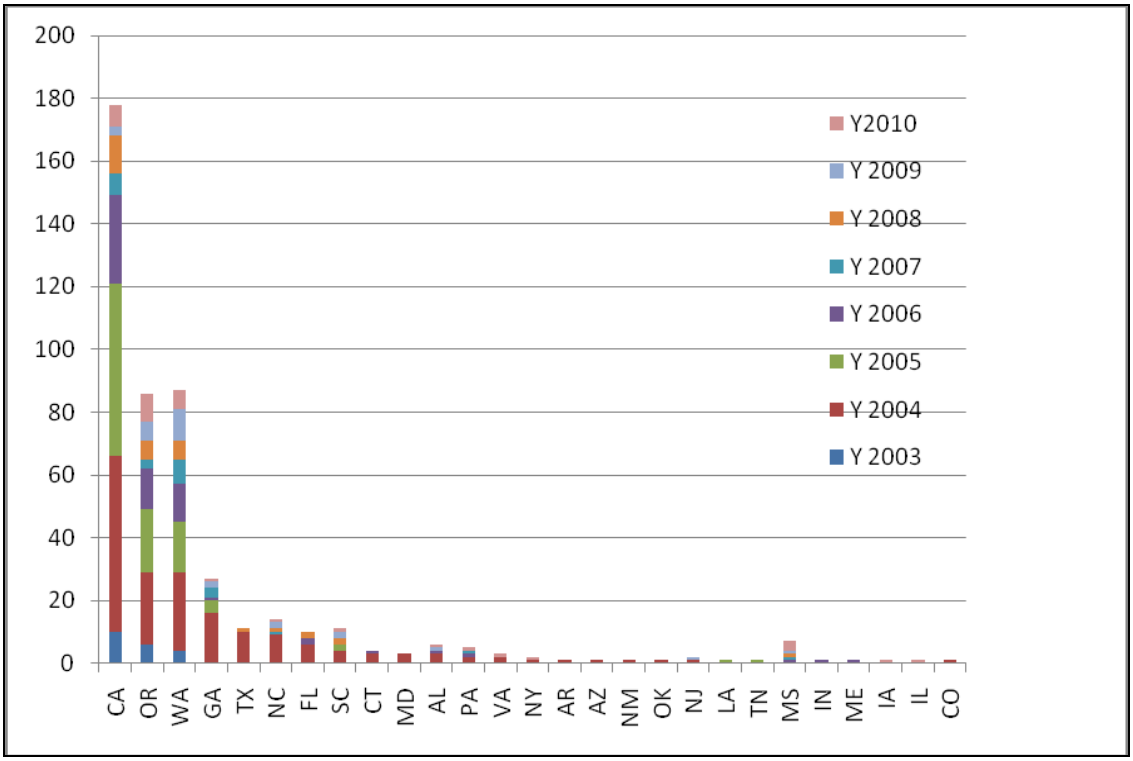


Figure 1. Number of positive nurseries since 2003 in various states by year.

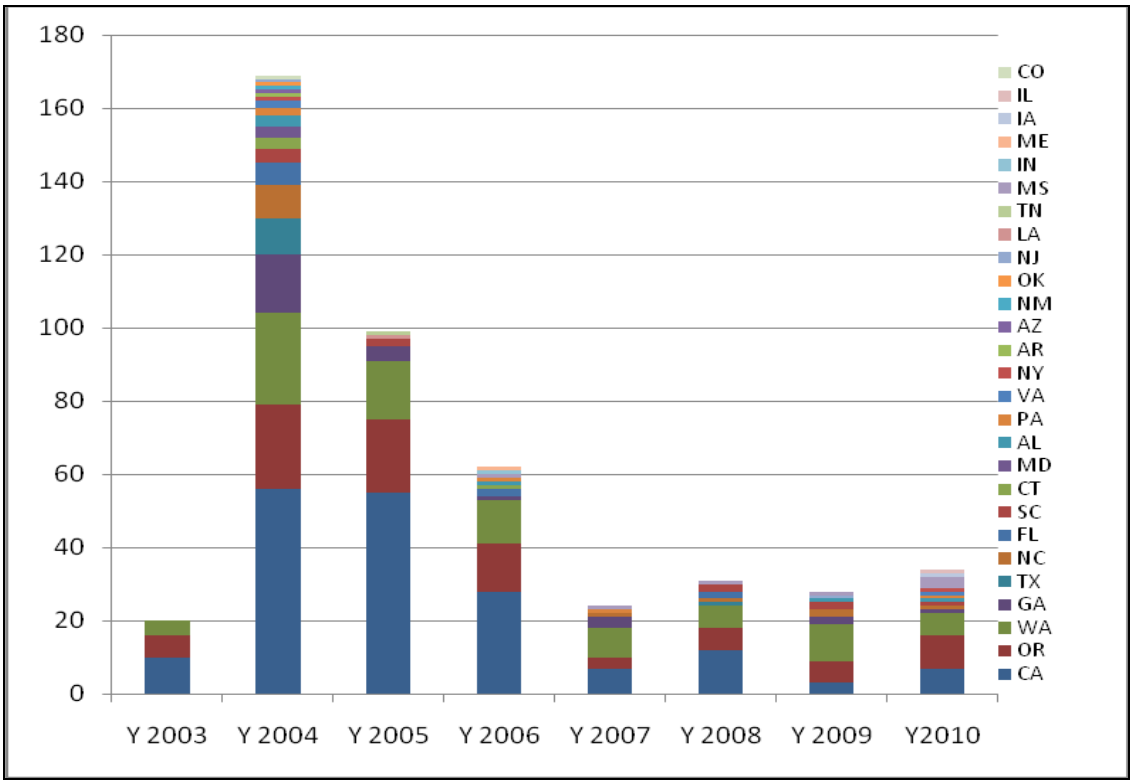


Figure 2: Total number of nurseries positive in all (27) the states by year.

Table 2: Number of retail and Inter-state shippers positive for *P. ramorum* from 2003-2010 by State

#	State	Nursery	O3	04	05	06	07	08	09	10	Total	Minus 04
1	CA	Retail	8	49	44	21	5	11	1	3	142	93
		Interstate	2	12	10	7	2	2	3	4	42	30
2	OR	Retail	4	17	13	7	0	2	1	1	45	32
		Interstate	2	6	4	6	3	3	5	8	37	31
3	WA	Retail	0	19	16	6	3	1	2	2	49	30
		Interstate	2	5	2	6	4	4	4	4	31	26
4	AL	Retail	0	3	0	1	0	0	3	1	8	5
		Interstate	0	0	0	0	0	0	0	0	0	0
5	AR	Retail	0	1	0	0	0	0	0	0	1	1
		Interstate	0	0	0	0	0	0	0	0	0	0
6	AZ	Retail	0	1	0	0	0	0	0	0	1	0
		Interstate	0	0	0	0	0	0	0	0	0	0
7	CO	Retail	0	1	0	0	0	0	0	0	1	0
		Interstate	0	0	0	0	0	0	0	0	0	0
8	CT	Retail	0	1	0	0	0	0	0	0	1	0
		Interstate	0	2	0	1	0	0	0	0	3	1
9	FL	Retail	0	6	0	2	1	2	0	0	11	5
		Interstate	0	0	0	0	0	0	0	0	0	0
10	GA	Retail	0	14	4	1	3	0	2	0	24	10
		Interstate	0	0	0	0	0	0	0	0	0	0
11	IA	Retail	0	0	0	0	0	0	0	0	1	1
		Interstate	0	0	0	0	0	0	0	0	0	0
12	IL	Retail	0	0	0	0	0	0	0	0	1	1
		Interstate	0	0	0	0	0	0	0	0	0	0
13	IN	Retail	0	0	0	1	0	0	0	0	1	1
		Interstate	0	0	0	0	0	0	0	0	0	0
14	LA	Retail	0	5	2	0	0	0	0	0	7	2
		Interstate	0	0	0	0	0	0	0	0	0	0
15	MD	Retail	0	2	0	0	0	0	0	0	2	0
		Interstate	0	1	0	0	0	0	0	0	1	0
16	ME	Retail	0	0	0	1	0	0	0	0	1	1
		Interstate	0	0	0	0	0	0	0	0	0	0
17	MS	Retail	0	0	0	1	1	1	1	3	7	7
		Interstate	0	0	0	0	0	0	0	0	0	0
18	NC	Retail	0	3	0	0	0	1	2	1	7	4
		Interstate	0	6	0	0	0	0	0	0	6	0
19	NJ	Retail	0	1	0	0	0	0	1	0	2	1
		Interstate	0	0	0	0	0	0	0	0	0	0
20	NM	Retail	0	1	0	0	0	0	0	0	1	0
		Interstate	0	0	0	0	0	0	0	0	0	0
21	OK	Retail	0	1	0	0	0	0	0	0	1	0
		Interstate	0	0	0	0	0	0	0	0	0	0
22	PA	Retail	0	0	0	1	0	0	0	0	1	1
		Interstate	0	0	0	0	0	0	0	1	1	1
23	SC	Retail	0	2	2	0	0	1	0	1	6	4
		Interstate	0	1	0	0	0	1	1	1	4	3
24	TN	Retail	0	1	1	0	0	0	0	0	2	1
		Interstate	0	1	0	0	0	0	0	0	1	0
25	TX	Retail	0	11	0	0	0	0	0	0	11	0
		Interstate	0	0	0	0	0	0	0	0	0	0
26	VA	Retail	0	1	0	0	0	0	0	1	2	1
		Interstate	0	1	0	0	0	0	0	0	1	0
27	NY	Retail	0	0	0	0	0	0	0	0	0	0
		Interstate	0	0	0	0	0	0	0	1	1	1

Red: Stream positives associated with positive nurseries (MS: 1 nursery since 07; AL: 4 nurseries since 08; GA: 1 nursery since 09; FL: 1 nursery since 08; NC; 1 nursery since 010). Blue: 2004 major trace forward incident

Table 3: Data from Regulated States

State	Nursery Positive	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	Total # & %	Total -04 data
CA	Repeat	0	1	2	4	14	15	4	6	2	4	52 (39%)	48 (39%)
	New	**2**	**0**	**8**	**57**	**38**	**13**	**3**	**7**	**2**	**3**	**133 (61%)**	**76 (61%)**
	Total	2	1	10	61	52	28	7	13	4	7	185	124
	Trace Positives	0	0	6	60	28	3	0	1	0	1	99 (53%)	39 (31%)
	Retail	2	1	8	49	42	21	5	11	1	3	143 (77%)	94 (76%)
	Interstate	0	0	2	12	10	7	2	2	3	4	42 (23%)	30 (24%)

OR	**Repeat**	**0**	0	0	0	4	4	1	2	3	4	18 (22%)	18 (30%)
	New	**0**	**0**	**6**	**23**	**13**	**9**	**2**	**3**	**3**	**5**	**64 (78%)**	**41 (70%)**
	Total	0	0	6	23	17	13	3	5	6	9	82	59
	Trace Positives	0	0	6	11	10	0	0	0	0	1	27 (33%)	16 (27%)
	Retail	0	0	4	17	13	7	0	2	1	1	45 (55%)	28 (47%)
	Interstate	0	0	2	6	4	6	3	3	5	8	37 (45%)	31 (53%)

WA	Repeat	0	0	0	2	9	9	3	1	4	6	34 (42%)	32 (57%)
	New	**0**	**0**	**2**	**22**	**9**	**3**	**4**	**4**	**2**	**0**	**46 (58%)**	**24 (43%)**
	Total	0	0	2	24	18	12	7	5	6	6	80	56
	Trace Positives	0	0	2	14	2	1	2	0	0	0	21 (26%)	7 (12%)
	Retail	0	0	0	19	16	6	3	1	2	2	49 (61%)	30(53%)
	Interstate	0	0	2	5	2	6	4	4	4	4	31 (39%)	26 (47%)

Data from Non-regulated States

Other	Repeat	0	0	0	0	2	3	3	2	5	2	17 (14%)	17 (34%)
24 states	**New**	**0**	**0**	**0**	**67**	**7**	**6**	**3**	**4**	**5**	**8**	**100 (86%)**	**33 (66%)**
	Total	0	0	0	67	9	9	6	6	10	10	117	50
	Trace Positives	0	0	0	55	0	3	0	2	3	2	65 (56%)	10 (20%)
	Retail	0	0	0	55	9	8	6	5	9	7	99 (85%)	44 (88%)
	Interstate	0	0	0	12	0	1	0	1	1	3	18 (15%)	6 (12%)

Data from all States

All States	Repeat	0	1	2	6	29	31	11	11	14	16	121 (26%)	115 (41%)
	New	**2**	**0**	**16**	**169**	**67**	**31**	**12**	**18**	**12**	**16**	**343 (74%)**	**174 (59%)**
	Total	2	1	18	175	96	62	23	29	26	32	464	289
	Trace Positives	0	0	14	140	40	7	2	3	3	4	212 (46%)	72 (25%)
	Retail	2	1	12	140	80	42	14	19	13	13	336 (72%)	196 (68%)
	Interstate	0	0	6	35	16	20	9	10	13	19	128 (28%)	93 (32%)

Trace Positive number shown here are those that were clearly associated with a trace forward or trace back investigations of intra or inter-state shipments of *P. ramorum* infested shipments. Further analysis is needed.

Results:

- Since the outbreak of *P. ramorum* in 2003, a total of 464 nurseries located in 27 states have tested positive. The majority of positives were host plant samples, followed by soil and water positives. However, majority of these positive detections have been the result of trace forward investigations and is not indicative of resident populations of *P. ramorum* in 27 states.
- Of the 464 nurseries tested positive, 336 (72%) were retail nurseries and 128 (28%) were interstate shippers.
- The majority (74% or 347 nurseries) of the 464 positive nurseries, both retail and inter-state shippers, were in the regulated states of CA (40% or 185 nurseries), OR (18% or 82 nurseries) and WA (17% or 80 nurseries). The rest of the country accounted for the remaining 25% or 117 nurseries.
- Out of the 336 retail nurseries testing positive, the majority (71% or 237 nurseries) were in the regulated states of CA (42% or 143 nurseries), OR (13 % or 45 nurseries) and WA (15% or 49 nurseries) and the remaining (30% or 99 nurseries) were in other states.
- Out of the 128 interstate shipping nurseries testing positive, once again the majority (86% or 110 nurseries) were in the regulated states of CA (33% or 42 nurseries), OR (29% or 37 nurseries) and WA (24% or 31 nurseries) and the remaining (14% or 18 nurseries) were in other states.

Data analysis excluding the 2004 incident:

- If the major 2004 incident wherein positive plants were shipped to over 178 nurseries around the country was excluded from the above analysis, the overall percent difference of new and repeat detections of *P. ramorum* in nurseries in CA, OR and WA does not vary significantly, however the percentage of positive nurseries in other parts of the country is slightly lower when the 2004 data is excluded.
- Excluding data from the 2004 incident, of the 289 nurseries testing positive in the other years, 196 (68%) were retail nurseries and 93 (32%) were interstate shippers.
- Excluding data from the 2004 incident, the majority (83%) of the 289 positive nurseries (both retail and inter-state shippers) were in the regulated states of CA (43% or 124 nurseries), OR (21% or 59 nurseries) and WA (19% or 56 nurseries). The rest of the country accounted for the remaining 17% (50 nurseries).
- Excluding the 2004 incident, of the 196 retail nurseries testing positive, the majority (78% or 152 nurseries) were in the regulated states of CA (48% or 94 nurseries), OR (14% or 28 nurseries) and WA (15% or 30 nurseries) and the remaining (22% or 44 nurseries) were in other states.
- Excluding the 2004 incident, out of the 93 interstate shipping nurseries testing positive, once again, the majority (93% or 87 nurseries) were in the regulated states of CA (32% or 30 nurseries), OR (33% or 31 nurseries) and WA (28% or 26 nurseries) and the remaining (7% or 6 nurseries) were in other states.

Action Item 1. Enhanced and stand alone *P. ramorum* survey and funding

- For FY 2010, 18 states participated in an enhanced *P. ramorum* National Survey (15 in the east & 3 in the west). This concerted effort was made possible with the supported of $500,000.00 from the Farm Bill's 10201 funding. These funds were obligated through cooperative agreements, and water testing (water baiting and/or water filtration) was an integral part of the states' work plans. A number of states elected not to participate in the enhanced *P. ramorum* National Survey; however, they each maintained a robust stand alone *P. ramorum* survey (Table 4).

- States were selected based upon a map generated by climate host mapping of *P. ramorum* and the relative risk based on climate and host strength of the states.

Table 4: Data from the Farm Bill funded National Survey **as of April, 2011.**

State	Number of Nurseries surveyed	Number of water samples tested	Number of water samples positive	Number of soil samples tested	Number of soil samples positive	Number of plant samples tested	Number of plant samples positive	participate in the training workshop	proposals for FY10-11 Farm Bill funding
AL	92	0	0	0	0	258	1	Yes	Yes
FL	19	10	0	0	0	149	0	Yes	No
GA	15	60	1	0	0	0	0	Yes	Yes
IN	21	11	0	0	0	420	0	No	Yes
KY	40	30	0	0	0	176	0	No	Yes
MD	17	18	0	39	0	427	0	Yes	No
MI	30	12	0	0	0	549	0	Yes	Yes
MS	7	0	0	0	0	295	4	Yes	No
NY	4	5	1	0	0	20	0	No	Yes
OH	5	10	0	0	0	0	0	No	Yes
PA	6	0	0	0	0	553	0	Yes	No
SC	48	41	0	46	1	12	0	No	Yes
TN	60	11	0	0	0	407	0	No	Yes
VA	100	106	0	23	1	1030	0	Yes	Yes
WV	22	4	0	7	0	205	0	Yes	Yes
LA	33	43	0	0	0	72	0	No	Yes
TX	9	18	0	71	0	0	0	Yes	Yes
OK	25	0	0	25	0	9	0	No	Yes
Nationally → 18	**553**	**379**	**2**	**211**	**2**	**4582**	**5**	**10Y/8N**	**14Y/4N**

Action Item 2. Analyze data obtained from *P. ramorum* National Survey, Previous National Surveys and Incorporate USDA-Forest Service Stream Baiting Data. **(Updated April 2011)**

- Survey data from the Farm Bill funded National Survey was collected and as of April 2011, in total 18 states participated in the survey, and all states have reported their results fully or partially (Table 4). A number of states are still in the process of adding new data as the funding was obtained later in the year. Only nine positive samples have been obtained so far, five from leaf samples (MS 4, AL 1), two from soil/leaf debris samples (VA 1, SC 1) and two from water holding ponds, (NY 1, GA 1).
- The group felt that at least 3 years of survey is necessary utilizing more sensitive methods such as water and soil baiting methods before any analysis or trends can be formulated and establishment of *P. ramorum* in the nurseries can be confirmed. The Regions will be monitoring the accomplishment reports from the targeted states.

Action Item 3. Develop plans for enhanced and stand alone *P. ramorum* survey and obtain continued funding for Fiscal Year 2011.

- All states were notified of the 10201 FY 2011 funding availability, the conditions associated with the availability, the methods to summit suggestions and the overall notification process.
- Numerous states have submitted Farm Bill suggestions to continue during 2011 with their enhanced and stand alone *P. ramorum* survey.

Action Item 4. Soil and Water Detection Workshops

- The Regions have tracked and monitored states identifying a need for *P. ramorum* water and soil detection training. And as such, funding was dedicated in support of this effort.

- In 2010, there were two (2) workshops organized and delivered. The first workshop was held on August 17 & 18, 2010 and, it was located at Kansas State University. In attendance were representatives from: Washington Department of Agriculture, PPQ-KS, PPQ-CPHST-Raleigh, PPQ-CPHST-Beltsville, PPQ-Western Region, PPQ-Eastern Region, PPQ-MS, PPQ-GA, Kansas State University, Kansas State University-GPDN, Texas A&M, Alabama Department of Agriculture and PPQ-Oregon.


The second workshop was held on October 5 – 7, 2010 and, it was located in Richmond, Virginia. In attendance were representatives from: Virginia Department of Agriculture,

Georgia Department of Agriculture, PPQ-PA, PPQ-VA, PPQ-Penn State University, West Virginia Department of Agriculture, Pennsylvania Department of Agriculture, Maryland Department of Agriculture, PPQ-Eastern Region, PPQ-Headquarters-EDP, PPQ-CPHST-Raleigh, PPQ-Molecular Diagnostic Laboratory, Beltsville, Washington State University and Virginia Tech.

Action Item 5. Refining the definition of a regulatory survey and exploring the utilization of a one-time nursery survey questionnaire.

- The group discussed the notion of two types of regulatory surveys; an Enhanced Survey and a Stand Alone Survey. These categories would be correlated to risk (low, medium and high). More specifically, an Enhanced Survey would equate to a HIGH RISK (e.g. a repeat positive nursery) and a Stand Alone Survey would equate to a LOW or MEDIUM RISK (e.g. a general nursery survey and nurseries with one time positive). The group had further discussions on what types of testing would be associated with an Enhanced Survey and a Stand Alone Survey. Although there wasn't a group consensus on the particular types of testing (foliage, water, soil-substrate, and potting media) associated with the two tier survey system, there was overall agreement of having multiple types of testing as an integral part of the survey. The group also listened to the testimonies of SC's Clemson University as it related to the utilization of mini ELISA field testing kits. The particular field *Phytophthora* sp. foliage diagnostic kit is a product of Pocket Diagnostic. After hearing the usefulness of this product, the group felt that this diagnostic tool would be very beneficial for field survey work. If validated by APHIS, it would prove advantageous to both regulatory personnel and to the nursery community it serves. More specifically, it would provide a definitive and timely diagnostic result. And, this would result in the ability of states to release plants on hold more quickly.

- The group also discussed and considered the implementation of a one-time nursery survey utilizing the Integrated Plant Health Information System (IPHIS). All survey data from Federal cooperative agreements involving pest surveys will be entered into the National Agriculture Pest Information System (NAPIS) either directly or through an approved PPQ system (e.g. the Integrated Survey Information System (ISIS)). For 2011, NAPIS will continue to be the APHIS-PPQ approved final repository for all survey data in the CAPS program. However, by 2012 all states will be required to use IPHIS data entry system for planning, conducting, and reporting survey data. Examples questions can be viewed on Appendix II.

Conclusion: The main recommendations are:

- Continue to fund and solicit suggestions to conduct ongoing P. ramorum nursery surveys with the same level of testing intensity – Farm Bill's 10201 funding.

- Continue to strive for efficacious and validated field diagnostic tools that identify Phytophthora species – CPHST

- Solicit ongoing funding in support of soil and water detection workshops – HQ, Regions and States.

- Encourage and solicit pilot testing of IPHIS one-time P. ramorum nursery surveys by states – HQ, Regions and States (SPHDs and SPROs).

- Collaborate with other sub-groups to strategize overall outcomes (e.g. Trigger Group on policy to address environmental finds, Nursery Field Teams to address future use of mobile diagnostic labs and sampling intensities at high risk or repeat nurseries, and overall BMP implementations).

- Collectively work with all sub-groups to foster a concerted outreach effort at all levels – emphasizing communication and the quality of program information. The target audience is the nursery industry

Action Item matrix:

ACTION ITEM (TASKS)	ASSIGNED TO	STATUS	TARGET COMPLETION DATE	NOTES:
• Continuation of the Phytophthora ramorum National Nursery Survey	States	Ongoing	Annually	The success of the P. ramorum National Nursery Survey will be dependent upon states' participation and the availability of dedicated funding (Farm Bill or others). Additionally, there is legitimate need to have both qualitative and quantitative survey data.
• Efficacious and validated field diagnostic tools identifying Phytophthora species and/or Phytophthora ramorum	CPHST	Ongoing	Ongoing	States view this diagnostic capability as critical to field survey work.
• Solicit ongoing funding in support of soil and water detection workshops	HQ, Regions, CPHST, States, Universities.	Ongoing	Annually	Workshops will be dependent upon the number of states identifying the need and the availability of dedicated funding.
• Encourage and solicit pilot testing of IPHIS one-time P. ramorum nursery survey by states.	HQ, Regions, States	Ongoing	Ongoing	Implementation will be dependent upon training, buy-in from internal and external stakeholders, an explicit survey template with well defined parameters, periodic benchmarks and evaluations, and technical support. However, by 2012 all states will be required to use IPHIS data entry system for planning, conducting, and reporting survey data.

4-4: Nursery Assessment Teams

Objectives: Creation within each state a panel of experts (Assessment Team) who agree to be available upon short notice by invitation of state & APHIS officials, to provide assessment and clarification of actions that are triggered by a positive *P. ramorum* confirmation at a nursery.

Background: A nursery assessment team is activated **only following** a request made by the appropriate Regional Program manager following discussions with the State Plant Regulatory Official (SPRO) and/or State Plant Health Director (SPHD) in the state with the affected nursery. Typically, either the situation in the nursery requires scientifically-based recommendations regarding *P. ramorum*, or the State is in need of ensuring that their implementation of the Confirmed Nursery Protocol (CNP) is scientifically valid. The request will follow detailed discussions with the affected nursery and include the State officials obtaining the nursery owner's permission and complete cooperation for the assessment team's site visit. This request usually (but not always) results from a repeat positive nursery, a nursery that has undergone the CNP or retail CNP (rCNP), or a nursery that is positive due to unusual circumstances.

Nursery operations and cultural practices vary widely across nurseries everywhere. Fundamental nursery operations such as water management and sanitation practices are important factors that can influence plant health factors. When a positive outbreak of *P. ramorum* is confirmed, actions steps are triggered for containment and eradication to prevent further spread of the disease.

Sub Team Co-chairs: Steven Whitesides APHIS-PPQ and Jan Hedberg NPB

Team Members: **PPQ:** P. Bailey, J. Corban, C. Marzolf, M. Travis, D. Seaver (CPHST), A. Man-Son-Hing, R. Bulluck, S. Whitesides **NPB:** J. Hedberg, D. Kenny, D. Barclift

Action Items Identified:

1. Define composition, trigger, and timelines for involvement of the Nursery Assessment Teams (NAT).
2. Define the role and scope of the NAT
3. Implement a comprehensive, nationalized template that defines protocol for use when called into action by state and APHIS request.
4. Assess risk to environments surrounding *P. ramorum* positive nurseries
5. Provide feedback to applied research groups at NORS-DUC and elsewhere

The purpose of the nursery assessment team is to provide an objective scientific review of the practices of the nursery, identify the critical control points (CCPs) within the nursery and to provide recommendations for reducing the risk of acquiring or spreading *Phytophthora ramorum* in the future. These recommendations are site specific and based on a systems approach incorporating best management practices (BMPs) as outlined in several publications sponsored

by the nursery industry. The Regional Program Manager will receive the full list of recommendations from the assessment team for distribution. The Regional Program Manager (RPM) and the SPHD or SPRO can choose to provide the entire set of recommendations, a subset, or they can hold on to the recommendations for use at a later time.

Action Item 1. The actual composition of the assessment team depends on the circumstances surrounding the request and the availability of selected experts and can include:

- SPRO and SPHD of the affected state
- Nursery and Ornamentals Extension specialist(s) from the affected state
- State Department of Agriculture (SDA) plant pathologist and/or diagnostician
- University scientists with *Phytophthora* and nursery expertise
- Center for Plant Health Science and Technology (CPHST) scientist(s) if APHIS is requested for scientific assistance

The issue of sampling is discussed prior to the visit, as assessment team members may feel that sampling is necessary at the time of the site visit. The request is passed through the RPM and the SPHD or SPRO before the team is assembled. All previous assessments have included sampling, but the state must agree and there must be the appropriate personnel present to obtain an official regulatory sample. The State can also decide to only have their state or PPQ personnel conduct the actual sampling after the assessment team points out the plants (or other areas) from which to collect samples.

Action Item 2. The following lists the major role(s) played by the SPRO, PPQ and CPHST:

- STATE – Communicates the purpose of the nursery assessment team (to provide an objective scientific assessment of the situation within the nursery) to the nursery owner(s) and secures the owners full cooperation. This is a critical step as the owner(s) must understand the assessment is not intended as a punitive measure, but is designed to identify and ameliorate problems, highlight good management practices and offer recommendations for reducing the risk of acquiring or spreading the pathogen. The State participates fully in the pre- and post-assessment team briefings and will decide on distribution of the assessment team recommendations to the nursery owner.

- PPQ – Communicates and coordinates all logistical arrangements with State counterparts. This includes securing hotel and onsite travel arrangements, meeting facilities, obtains permission for sampling and timing of site visit, and provides any necessary supplies and sanitation tools for the nursery assessment team use. PPQ participates fully in the pre- and post-assessment team briefings and delivers assessment team recommendations to state counterparts.

- CPHST – Compiles a list of in-State or regional extension specialists, university researchers, diagnosticians and scientists with ornamental, nursery and *Phytophthora*

experience. CPHST also leads the nursery assessment team, facilitates the pre- and post-assessment briefing, compiles a draft nursery assessment team report based upon the post-assessment, sends the draft report out for comment and prepares the final assessment team report, with appropriate recommendations, for delivery to the PPQ program.

Action Item 3. Template of Recommendations:

Step I: Define composition, trigger, and timelines for the Nursery Assessment Teams (NAT)

- Assemble NAT comprised of scientific expertise within each state at risk for *P. ramorum* outbreaks which include academic, nursery operations, water treatment, and regulatory specialists.
- Identify a basic group of NAT responders to include alternates if core members are unavailable upon short notice.
- Determine an agreed-to trigger by which the NAT involvement is implemented. Mobilization of the NAT is to be at the request of state and APHIS officials.
- Define the response timeframe for mobilization of the NAT.

Step II: Define Role and Scope of Nursery Assessment Teams.

- Communicate with nursery management regarding operations and cultural practices common to that nursery.
- Provide to nursery management background information about *P. ramorum*, its biology, and key components that influence risk of disease.
- Communicate with nursery management the scope of action steps required for containment/eradication of *P. ramorum*.
- Discuss with nursery management the CCP's/BMP's appropriate to their operation that are important to reduce risk and maintain *P. ramorum* eradication.
- Provide additional science-based recommendations to the nursery management after on-site assessment and evaluation specific to the nursery operations.
- Compile an assessment team response protocol taken from those used by other states that provided a standardized inspection, consistent with regulatory policy and response.
- Submit a summary report of the assessment to the involved state and APHIS agencies and to the nursery management through the state agency.

Action Item 4. Assess risks to environments surrounding *P. ramorum* positive nurseries.

- This would include waterways and lakes, forestry and related habitats wherein susceptible host plants are harbored.
- Evaluate the need to create a water collection / treatment ponds to avoid run-off.

Action Item 5. Provide feedback to applied research groups at NORS-DUC and elsewhere

- Submit a summary report to applied research groups at NORS-DUC and others who may be actively working on projects that are related, or could help provide insights to the findings documented at the positive nursery.

Action Item Matrix

ACTION ITEM (TASKS)	ASSIGNED TO	STATUS	TARGET COMPLETION DATE	NOTES:
Define composition, trigger, and timelines for involvement of the Nursery Assessment Teams (NAT)	Triggers working group	Completed	December 2010	Outputs from Working group will be included in the final report
Define the role and scope of the NAT	CPHST	Completed	Nov 2010	Outputs from Working group will be included in the final report
Implement a comprehensive, nationalized template that defines protocol for use when called into action by state and APHIS request	PPQ HQ, Regions, CPHST, States,	Ongoing	Ongoing	Several examples of NAT reports are available. Recommendations are Nursery and State specific
Assess risks to environments surrounding *P. ramorum* positive nurseries	HQ, Regions, States	Ongoing	Ongoing	Collaboration with USDA-FS is recommended
Provide feedback to applied research groups at NORS-DUC, USDA-ARS, Universities and elsewhere	PPQ HQ, Regions, CPHST, States,	Ongoing	Ongoing	Suggest applied research topics for potential funding and initiate collaboration with Nursery industry.

4-5: Triggers Working Group

Objective: Establish triggers that would require an area or a nursery to be quarantined or otherwise regulated for *Phytophthora ramorum*. Determine whether the Federal Rule on *P. ramorum* should continue to apply to the entire states of California, Oregon and Washington, or should it be revised and applied only to those areas and nurseries across the nation where *P. ramorum* is found to exist.

Background: A Federal quarantine was enacted for *P. ramorum* in several counties in CA and a portion of a county in OR in early 2002. The quarantine has since been expanded to 14 counties in CA and a significantly larger area within the same county in OR. After *P. ramorum* was discovered in the nursery system on the west coast, an emergency Federal Order was enacted for the states of CA, OR and WA in an effort to eliminate the disease in the nursery environment and prevent further spread. Despite these efforts, *P. ramorum* has been found in nursery stock, soil and/or water in several other states across the nation.

***P. ramorum* has not been found to be established on the natural vegetation outside of the quarantined counties in CA and OR**.

Sub Team Co-chairs: Gary Gibson (WV) NPB and Steven Miller, APHIS-PPQ

Team Members: NPB: Kathy Kosta (CA); Amber Morris (CA); Wayne Dixon (FL); Philip Marshall (IN); Gary McAninch (OR); Mark Stanley (CA) PPQ: Catherine Marzolf; Stacy Scott

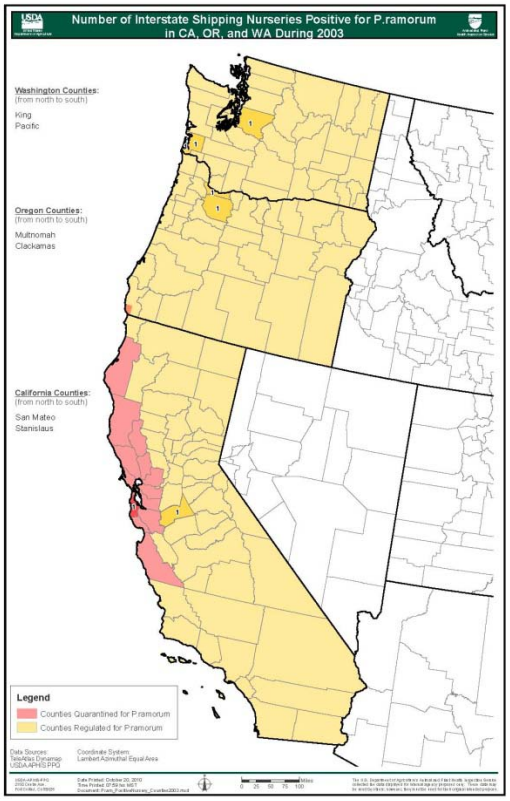
Current status:

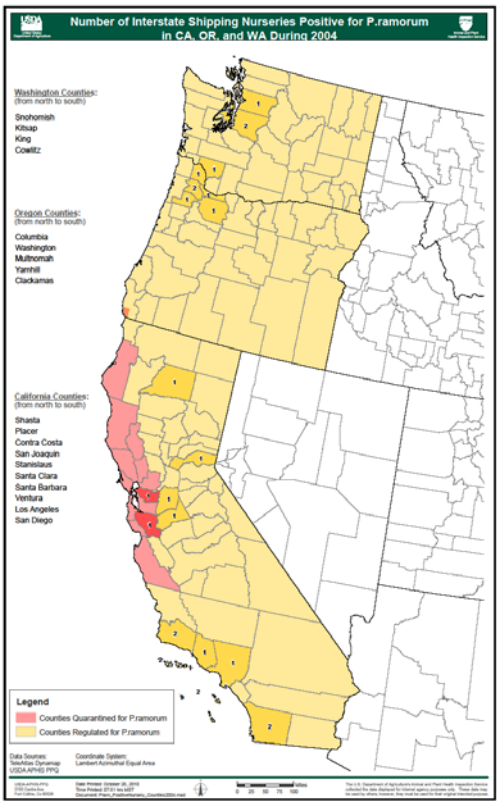
Presently, nurseries that ship host and associated hosts interstate are regulated in all of the counties of CA, OR and WA. Additionally, there are 14 counties in CA and a portion of one county in OR under Federal quarantine where *P. ramorum* is established and causing disease in the environment. Therefore, areas around the country are classified as either; a) quarantined, b) regulated or c) non-regulated (all states except CA, OR and WA). It has been generally accepted that disease in vegetation outside a nursery would trigger quarantine.

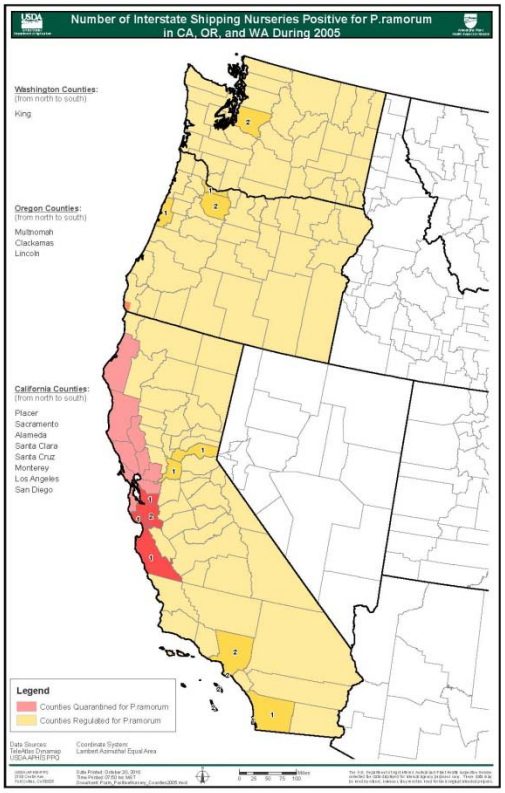
Regulatory action is taken anytime the disease is found in a nursery and/or residential landscape (generally, a trace forward from a positive nursery). Even though nurseries have been found positive in several states throughout the nation, only the three western states are currently regulated by an Interim Federal Rule. The following triggers and proposed regulatory process are the result of the *P. ramorum* Triggers Committee discussions and the review of their work at the *P. ramorum* Regulatory Working Group Co-Chair meeting in Salem, Oregon, October 26th – 28th 2010.

The maps below (Fig 1) indicate the number of positive interstate shipping nurseries (dark yellow) in quarantined (pink) and regulated (yellow) counties in CA, OR and WA since the first detection in 2003.

Figure 1: Nursery detections of *P. ramorum* in quarantined (shaded pink) and regulated areas from 03 to 06







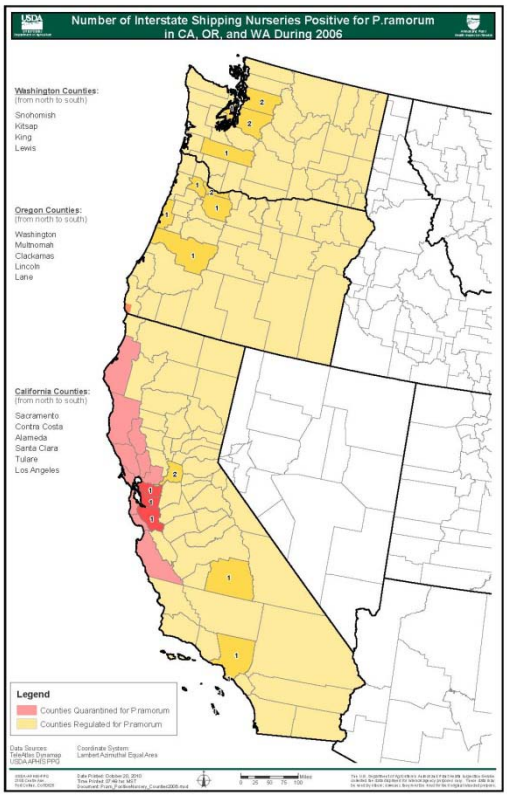
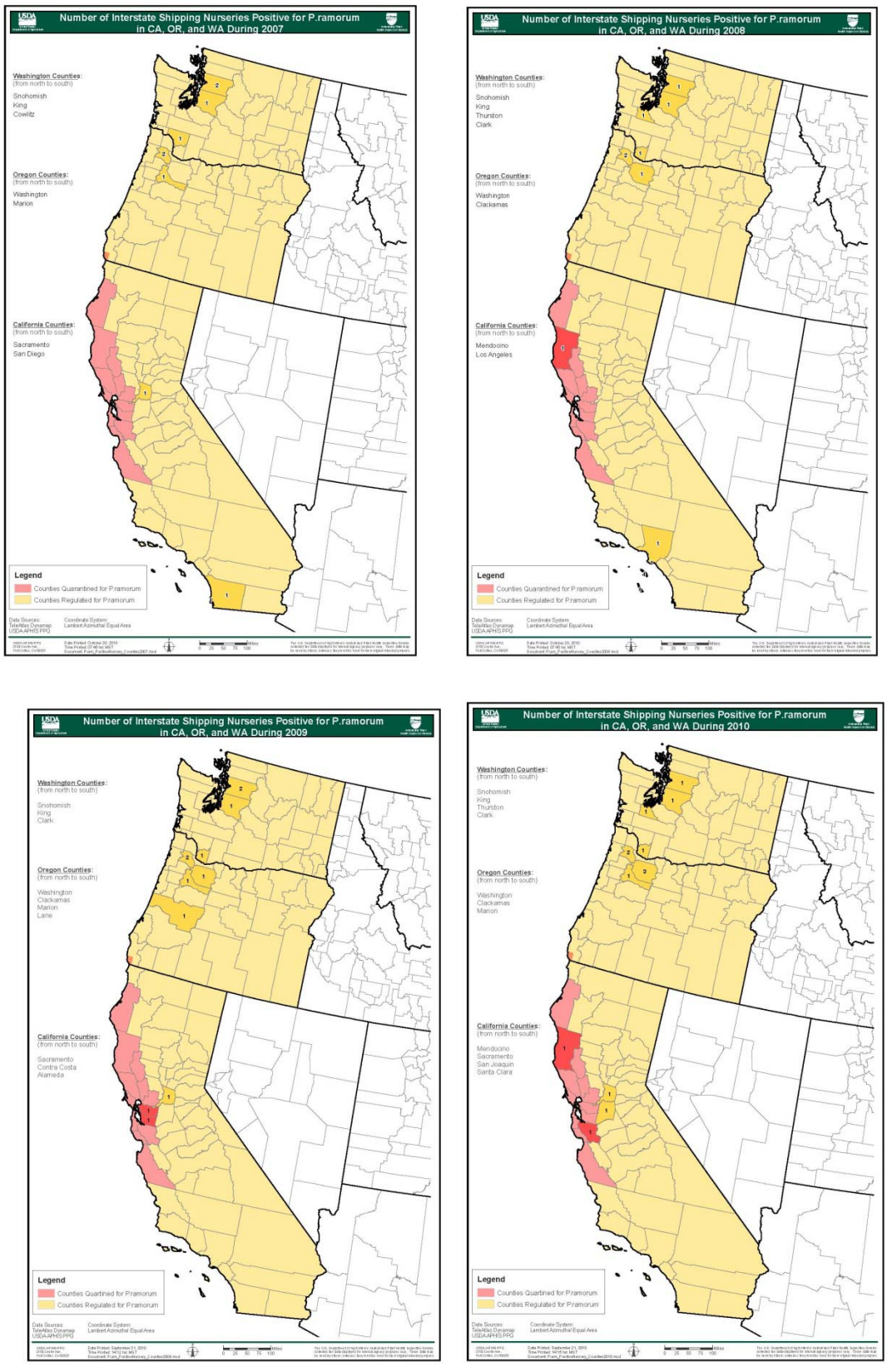


Figure2. Nursery detections of *P. ramorum* in quarantined (shaded pink) and regulated areas from 07-10



The above data from the regulated states clearly show that since nursery surveys were initiated, the majority of the ~3500 nurseries surveyed annually in 118 different counties in the regulated states have never tested positive for *P. ramorum*. Most of the positive nurseries are located in the western counties, especially in WA and OR. Currently nurseries within 35 counties in OR, 44 in CA and all 39 counties in Washington State are regulated. In total 14 counties in CA and 1 county in OR are quarantined.

Data on positive nurseries in both regulated and non-regulated states is shown in Table 1. The first recorded major shipments of positive host plants into 17 different non-regulated states occurred in 2004. Since then, although in smaller numbers, inter-state movement of positive plants has continued to occur nation-wide. So far, *P. ramorum* nursery detections have been recorded in 24 non-regulated states at least once (Table 1). Of those nurseries positive for *P. ramorum* a small number (~20) of them are or have been inter-state shippers of host plants. Among the non-regulated states, the states of AL, FL, GA, LA, MS, NC, SC and TX had higher nursery detections than the other states. In view of the above detections in the non-regulated states and their potential risk to the environment, USDA-FS has been conducting stream and vegetation surveys since 2007 (see data Figure 3).

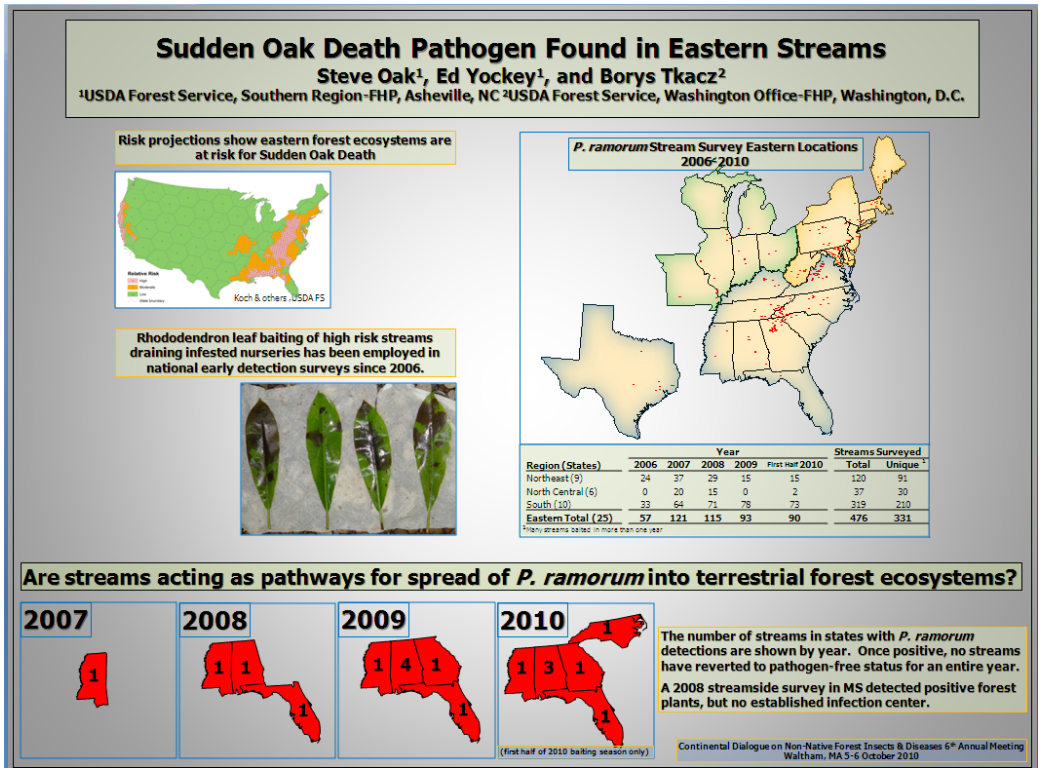
Since the initial discovery of the pathogen in the wildands of the coastal counties of CA, and later in nurseries in CA, extensive surveys for *P. ramorum* in the environment (vegetation and water-ways) have been conducted by the USDA FS, State Departments of Forestry, Natural Resources and by University Researchers. The survey results suggest that, in the 15 Quarantine Counties, the positives in the wild-lands and water-ways are associated with stem and trunk cankers (e.g. tan oaks) and with sporulating overstory (bay laurel). Outside of the quarantine counties, in both the regulated and non-regulated areas around the country, where *P. ramorum* has yet to be detected on any vegetation or "bole/tree hosts", all the detections of the pathogen in the water-ways and streams are associated with a positive nursery. Based on water-baiting studies, over-flow from irrigation water or holding ponds is suspected to be the source of the pathogen.

Surveys conducted by USDA-FS since 2007 in 476 locations in the East have identified 8 positive streams in 5 (MS, AL, GA, FL and NC) states associated with *P. ramorum* infested nurseries (Figure 1). Once the streams are tested positive, they continue to be positive for multiple years. However, vegetation associated with the streams has not tested positive, except for 2 isolated incidents in MS and WA, in any of the surveys conducted by the USDA-FS. In addition, once the nursery soils are infested, eradication of the pathogen from the soil is difficult. The pathogen present in the soil or infected plant debris may be moving into the streams through the soil profile or through surface run-off of, irrigation or rain water or even from overflowing water in holding ponds. Soil and water samples collected from several nurseries both in the West and East have tested positive for *P. ramorum* (Figure 3)

Table 1: Data on positive nurseries in various states from 2003 to 2010

#	State	03	04	05	06	07	08	09	10	Total
1	CA	10	61	54	28	7	13	4	7	184
2	OR	6	23	17	13	3	5	6	9	82
3	WA	2	24	18	12	7	5	6	6	49
4	AL	0	3	0	1	0	0	3	3	11
5	AR	0	1	0	0	0	0	0	0	1
6	AZ	0	1	0	0	0	0	0	0	1
7	CO	0	1	0	0	0	0	0	0	1
8	CT	0	3	0	1	0	0	0	0	4
9	FL	0	6	0	2	1	2	0	0	11
10	GA	0	14	4	1	3	0	2	0	24
11	IA	0	0	0	0	0	0	0	1	1
12	IL	0	0	0	0	0	0	0	1	1
13	IN	0	0	0	1	0	0	0	0	1
14	LA	0	5	2	0	0	0	0	0	7
15	MD	0	3	0	0	0	0	0	0	3
16	ME	0	0	0	1	0	0	0	0	1
17	MS	0	0	0	1	1	1	1	3	7
18	NC	0	9	0	0	0	1	2	1	13
19	NJ	0	1	0	0	0	0	1	0	2
20	NM	0	1	0	0	0	0	0	0	1
21	OK	0	1	0	0	0	0	0	0	1
22	PA	0	0	0	1	0	0	0	1	2
23	SC	0	3	2	0	0	2	1	2	10
24	TN	0	2	1	0	0	0	0	0	3
25	TX	0	11	0	0	0	0	0	0	11
26	VA	0	2	0	0	0	0	0	1	3
27	NY	0	0	0	0	0	0	0	1	1

Figure 3: Results from Stream baiting in Eastern States (Courtesy Steve Oaks, USDA-FS)



Surveys conducted in the West have also identified positive streams, mostly in association with vegetation positive for *P. ramorum* and a few associated with positive nurseries and residential infestations.

Survey results (refer to section 4-3 on Regulatory survey) from the various nurseries positive for *P. ramorum* have shown that while the majority of the inter-state shippers that have tested positive over the years are from the regulated states of CA, OR, WA, at least 20 inter-state shipping nurseries are located in the non-regulated states. A majority of positive detections here have been associated with trace events.

Action Items Identified:

1. Establish triggers for designating a county as quarantined
2. Determine triggers to release counties from regulation and/or quarantine.
3. Identify triggers for designating a county as regulated

Action Item 1. Establish triggers for designating a county as quarantined: Disease symptoms found in the natural environment, not linked to a positive nursery, would need to be cultured and replicated prior to a quarantine designation. Environmental risk factors should be

considered as well. Generally, if the disease is found to be causing a stem or trunk canker, even in proximity of a positive nursery, and environmental conditions favor further spread of the disease, quarantine would be imposed. Diseased understory plants in a landscape and/or natural environment, not linked to a positive nursery, would also trigger quarantine. Understory plants in close proximity to a positive nursery that have been determined to be infected through runoff water (or other means) from the nursery, and where perimeter surveys do not indicate further spread of the disease (i.e., away from the water course), would not necessarily require a quarantine. Protocols would be applied to eliminate the disease and annual surveys would be accomplished for three years to ensure there has been no disease recurrence. It is recommended that in all environmental finds surveys be conducted annually for three years beginning at the time of the last confirmed positive. Anytime quarantine is imposed the default is at the county-wide level until a delimitation survey is completed and a plan of action is established and implemented. Delimitation would be accomplished immediately and an evaluation of risk factors in the environment would be completed in order to develop a plan of action that would reduce the boundaries of the quarantined area.

Landscape positives resulting from nursery trace forwards would likewise be required to complete the residential treatment protocol. It is recommended that water positives should not be a trigger for regulatory action. However, water positives would trigger further baiting and survey in an effort to find the source and determine if hosts near the positive water may have been infected. In such cases, protocol developed by ODA and CDFA with regard to water positives should be followed. Nurseries located near positive water finds need to be advised that irrigation from such sources would require specialized treatment of the water and should be inspected and sampled on an annual basis.

Action Item 2. Determine triggers to release currently regulated and/or quarantined counties from regulation and/or quarantine Protocols would be applied to eliminate the disease and annual surveys would be accomplished for three years to ensure there has been no disease recurrence. Removal of a county from quarantine would require three years of negative survey data from the treatment area and perimeter surveys beginning at the time of the last confirmed positive.

Counties within CA, OR and WA that are currently regulated for interstate movement of HAP nursery stock should be designated as de-regulated if there has never been a positive detection of *P. ramorum* in an interstate shipping nursery. If the SPRO can demonstrate to USDA APHIS PPQ that an adequate nursery surveillance system is in place that assures that *P. ramorum* is not further widespread or remerging, then further deregulation below the county level can occur. Significant progress has been made in the past six years in reducing the incidence of this pathogen within the nursery system and any efforts to reduce the regulatory burden should be taken in concert with preventing the reemergence of *P. ramorum*.

Action Item 3. Identify triggers for designating a county as regulated in currently non-regulated areas: When nurseries anywhere in the United States are found to be positive, the Confirmed Nursery Protocol (CNP) shall be followed. If the positive nursery ships HAP interstate, it shall be deemed regulated and not the state, the county, or an area as long as the SPRO can demonstrate to USDA APHIS PPQ that an adequate nursery surveillance system is in place that assures that *P. ramorum* is not further widespread within the county and / or state.

It is important however, to draw a distinction between a regulatory incident such as a trace event and an established population of *P. ramorum* within the nursery (soil and/or water). If infected plants related to a trace event are detected quickly and destroyed, the risk of the pathogen establishing within a nursery is lower. To mitigate the risk associated with the presence of *P. ramorum* in soil or water to host plants, it has been suggested that a nursery found positive more than once (repeat nursery) should be required to implement BMPs in addition to completing the Confirmed Nursery Protocols.

Trigger Scenarios and Actions:

Trigger #1 - *P. ramorum* Detected in Landscape or Natural Environment
Premise:
P. ramorum is detected through an official sample in vegetation (a plant) in a landscape or natural environment and is not a regulatory (trace) incident.

Action Triggered:
- Additional samples will be collected from the "infected" plant and cultured for *P. ramorum*. If the cultures turn out to be positive for *P. ramorum* the entire county in which the infection was found shall be quarantined if there is a parallel state quarantine and if there is no eradication or containment effort underway. If eradication or containment effort is underway, and there is a parallel state quarantine, less than an entire county may be quarantined.
- In the event of multiple geographically-isolated finds, the quarantine area may be expanded.
- If there is no state quarantine issued, the entire state will be quarantined. Refer to 7CFR 301.92-3(a)

Trigger #2 - *P. ramorum* Detected in a Nursery or Landscape Environment (Isolated Regulatory Incident)
Premise:
P. ramorum is detected in a nursery or landscape planting and the infected plant material is traced back to a positive nursery.

Action Triggered:
- Standard confirmed nursery or residential protocols will be followed.
- If no additional infected plants are found – No Quarantine Action Will Be Taken. However, 3 years of additional surveys will be conducted on the property to insure that the pathogen is not present.

Trigger #3 - Deregulation of currently regulated counties
Premise:
P. ramorum never found in an interstate shipping nursery or on vegetation in a particular county.

Action Triggered:
- The county is deregulated.

Trigger #4 - *P. ramorum* Detected in a Watershed
Premise:
P. ramorum is detected in water (e.g. stream) but no source of the pathogen can be found on plants in the watershed.

Action Triggered:
- No Regulatory Action will be taken based solely on a stream positive where *P. ramorum* is detected in a moving body of water, but no plants along the waterway have been found to be positive. Surveys should be conducted to identify the source.

Additional Action:
- A stream positive will trigger additional surveys up and down waterway for the purpose of locating the source of the inoculum and downstream consequences.
- Advisory issued to anyone using the water as an irrigation source.
  See CCP/BMP Group question #3 for NORS DUC

Discussions on alternative to current broad-based regulatory system for *P. ramorum*

A "revised" regulatory system was suggested at the *P. ramorum* meeting in Salem, Oregon as an alternative to the current regulatory system. It would require that the current Federal *P. ramorum* Interim Rule be amended and is designed after or similar to the Federal Black Stem Rust regulations. The thoughts behind the discussions were that a) the risk of *P.* ramorum based on risk assessments are restricted to certain states and b) the current regulations do not cover inter-state shippers in non-regulated states and c) the need for a better system in place that could help reduce the regulatory and financial burden required under the existing rule, prioritize resources and better target the pathogen irrespective of its geographic location. In addition, there are some states that are under the opinion that *P. ramorum* will not be able to establish and affect their natural resources because potential hosts or the environmental conditions that would support the pathogen does not exist. Then there are also some states that are concerned based on the current risk scenarios. States that have large nurseries which propagate and ship *P. ramorum* host plants inter-state would still like to see some level of regulation in place to safeguard the nursery industry.

This proposed system shown below compares and contrasts the BSR and the *P. ramorum* programs taking into account the different situations. The concept shown here is for discussion only and for obtaining feed-back and comments from stakeholders on improving the current regulatory program.

1- Compare and Contrast Black Stem Rust and *P. ramorum* Programs

Pathogen – Black Stem Rust
Pathogen – *P. ramorum*

2- Threat

Black Stem Rust – Wheat Crop
***P. ramorum* – Forests/Wild lands**

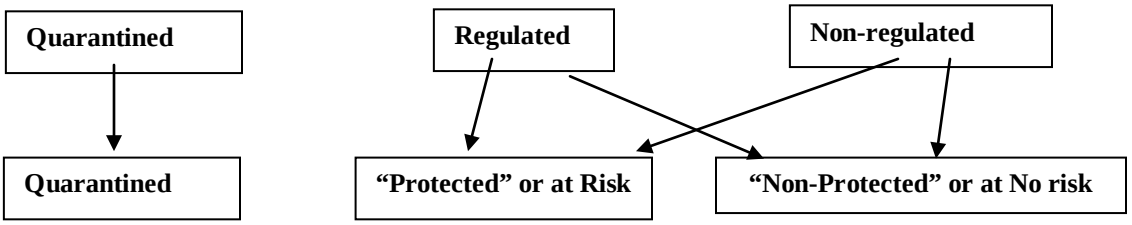
3- Regulated Articles "Vector" that may move the pathogens

Black Stem Rust – Barberry
***P. ramorum* – Host Plants**

4- Current Regulatory Classification of Areas within Continental US

Black Stem Rust		***P. ramorum***		
Protected	**Non-protected**	**Quarantined**	**Regulated**	**Non-regulated**

5- Proposed Regulatory Classification of Areas for *P. ramorum*



- States can opt to be "protected" or "non-protected" based on risk assessment and / or threat to their natural resources (forests). e.g. 17 wheat growing states are protected based on threat to wheat crop
- States can opt to define threatened areas e.g. for BSR, Western WA is not protected & Eastern WA is protected. CA can decide whether the currently regulated area should be categorized as "protected or at risk" or "not-protected or at no risk"
- Regulated articles (host plants) will be allowed to move interstate into or through protected areas with certificates (inspected and free of *P. ramorum*)
- Interstate movement of regulated articles into or through any state or area that is not designated as protected area is allowed without restriction.
- Irrespective of classification *P. ramorum* host plants can be shipped between individual nurseries from "non-protected" to "protected" or even "quarantined" areas through compliance agreements, survey and nursery inspections.
- For example, barberry varieties (resistant only) are propagated in a "non-protected" state (GA) can be shipped to "Protected state" (MN) if the nursery is inspected and under compliance agreement and environ survey has been conducted.
- Quarantine areas will remain quarantined based on presence of *P. ramorum* on vegetation

The following will be applicable to currently Regulated and Non-Regulated areas

1) States or counties/districts within some states that are not concerned about *P. ramorum* based on scientific data (environment, susceptible vegetation) would be declared "Non-Protected" or categorized as "not at risk".

2) States or counties/districts that believe they are at risk from *P. ramorum* based on current scientific knowledge would be declared "Protected".

3) The currently quarantined areas in CA and OR will stay quarantined due to presence of *P. ramorum* in the vegetation and has optimum environment for pathogen proliferation.

4) Under the proposed system the following would occur:

a) Regulated articles (lumber) and nursery stock could move from Protected areas to Non-Protected states or counties/districts without any special certification addressing *P. ramorum*. We envision a "regulatory/compliance program" in place in the protected states.

b) Regulated articles and nursery stock moving from Non-Protected states to Protected (and Quarantined) states or counties/districts would have to be certified as free of *P. ramorum* We envision a "regulatory /compliance program" in place to regulate inter-state shippers of host plants.

c) Regulated articles (lumber, etc) and nursery stock moving from Quarantined areas to Protected states counties/districts would have to be certified as free of *P. ramorum*. We envision a "regulatory /compliance program" in place to regulate inter-state shippers of host plants.

Conclusion:

If the above regulatory changes are made, the number of regulated areas/counties (118) in the three Western States (CA, OR and WA) would decrease. Currently 35 counties in OR, 44 in CA all 39 counties in Washington State are regulated. In total 14 counties in CA and 1 county in OR are quarantined.

The number of counties/areas in CA and OR currently under quarantine (15) will stay quarantined.

The number of counties/areas "protected" or "at risk" throughout the country would depend on risk analysis.

The number of states /areas (non-protected or not at risk) under the federal regulations would decrease.

The number of nurseries under the "revised regulatory program" would cover nurseries shipping inter-state to "protected" or "at risk" states.

Action Item Matrix:

ACTION ITEM (TASKS)	ASSIGNED TO	STATUS	TARGET COMPLETION DATE	NOTES:
1. Establish triggers for designating a county as quarantined	Triggers Working Group	Completed	Need regulatory changes if new counties will be listed, therefore long-term	Discussions are under way with NPB
2. Determine triggers to release counties from regulation and/or quarantine.	Triggers Working Group	Completed	long-term	
3. Identify triggers for designating a county as regulated	Triggers Working Group	Completed	long-term	
4. Triggers for regulating of nurseries in currently non-regulated states	Triggers Working Group	Completed	long-term	

4-6: Critical Control Points (CCP) and Best Management Practices (BMP) Applications Sub- Group

Objective: Define, assess, and rank CCPs and BMPs for consideration in developing regulatory protocols and defining applied research needs (NORS-DUC).

Background: The discovery in 2004 of *Phytophthora ramorum* in a nursery outside of the quarantined area in California, and subsequent movement of infected nursery stock across the country, led to much discussion and debate among stakeholders in receiving and shipping states. The federal regulatory program has been valuable, although not completely successful, in stopping the movement of *P. ramorum* in interstate nursery stock shipments. Development of management practices to prevent the introduction into and spread of *P. ramorum* within nursery environments has been under discussion since 2005 and voluntary programs exist in California and Oregon. In the 2009 National Program Review, two high value action items identified were: 1) For nursery production, define, identify, and rank Critical Control Points (CCPs) and develop a systems approach or Best Management Practices (BMPs) in collaboration with NPB and Industry, 2) Develop regulatory options that are timely and in alignment with BMPs/CCPs and the current state of scientific knowledge. This group's assignment addresses these action items.

Sub Team Co-chairs: Catherine Marzolf, APHIS-PPQ and Carol Holko (MD), NPB

Team Members: PPQ: Russ Bulluck; John Corban; Robert S. Johnson **NPB:** Wayne Dixon (FL); Richard Gaskalla (FL); Jan Hedberg (OR); Kathy Kosta (CA); Amber Morris (CA); Nancy Osterbauer (OR); Craig Roussel (LA); Tom Wessels (WA)

Action Items Identified:

1. Define CCPs and rank them in terms of importance
2. Define BMPs and rank them in terms of importance
3. Define systems approach which includes BMPs
4. Review feasibility of application of BMPs in conjunction with CCPs in retail and wholesale nurseries
5. Assess cost-effectiveness of BMPs for retail and whole-sale nurseries
6. Application of Systems approaches on a wide scale and their implementation in nurseries to produce clean stock
7. Provide feedback to applied research group at NORS-DUC

Recommendations.

Note: The group agreed on the definitions of CCP, BMP, and Systems Approach, which were primarily derived from international standards. CCPs and BMPs were not ranked as this will depend on specific nursery situations and regulatory status.

Action Item 1. The Critical Control Point (CCP) is the point (or step) at which a critical measure must be applied. It is a point that is critical or essential to biosecurity/safeguarding. It is the point where a control measure can be used to prevent or eliminate a plant health hazard or to reduce it to an acceptable level (ISO 22000, 2005).

Action Item 2. The Best Management Practices (BMP) is defined as a set of phytosanitary standards applied at CCPs in order to address the biosecurity or safeguarding hazard and enhance plant quality.

Action Item 3. A Systems Approach is defined as the integration of different risk management measures, at least two of which act independently, and which cumulatively achieve the appropriate level of protection against regulated pests (ISPM No. 14, 2002; revised ICPM, 2005). The group identified the following as CCPs for potential *P. ramorum* introduction into the nursery environment: Plants, Pots, Substrate, Water, Container Mix, and Conveyance. To begin composing the menu of BMP options available to address each CCP, we referenced both the Horticultural Research Institute's Nursery Industry Best Management Practices for *Phytophthora ramorum* – to prevent the introduction or establishment in California nursery operations (http://www.suddenoakdeath.org/pdf/cangc_bpm_FINAL.pdf), and the Oregon Department of Agriculture's Grower Assisted Inspection Program http://www.oregon.gov/ODA/PLANT/NURSERY/docs/pdf/gaip_bcps.pdf). Appendix I contains a menu of BMPs compiled by the work group for each CCP.

Action Item 4. In regards to how the CCPs and BMPs could be implemented in the nursery environment, the group revisited an idea put forth by the National Plant Board a few years ago about the development of nursery management plans. Recognizing that one size will never fit all in the nursery trade, nursery management plans would be specific to each nursery, whereby the nursery and regulators would utilize a menu option of BMPs to address CCPs and tailor the plan for that particular nursery. This provides a realistic approach to implementing a regulatory program that reduces the opportunity for introduction of the pathogen into nurseries and for infection to spread from the source. These nursery plans would be developed by a nursery in consultation with and approval of the SPHD and SPRO of their respective State, and would utilize accepted BMPs to address CCPs in a manner that is most relevant to their particular nursery (retail vs. production, size, stock, etc.). The BMP options should not be set in stone and the program should be left with flexibility to incorporate new CCPs or BMPs, or revise existing CCPs and BMPS, that best help a nursery address a particular area of concern. The BMPs are based on the best available science and are expected to change over time.

The group recommends that APHIS consider nursery management plans attached to compliance agreements as a tool to implement that plan. The use of the identified CCP and BMP menu by a nursery, together with their regulatory certifying entity, for developing nursery management plans will provide uniformity to the certification process for nurseries under the federal regulation wishing to ship nursery stock interstate. The group, while agreeing that the BMPs are a generally good practice for all nurseries to consider, felt that any requirement for these plans should be for a particular subset of nurseries though could not come to agreement on what particular subset. It may include all nurseries in quarantined areas to only nurseries with recurrent detections of *P. ramorum*. Our subgroup defers to the Triggers and Protocols subgroups to help define when and how CCPs and BMPs should be implemented.

Action Item 5. The working group has not addressed this Action Item in regards to cost effectiveness, and cautions the program as to the relevance of this when addressing a federally regulated pest. It is possible that cost estimates exist based on the current voluntary programs such as GAIP. Appendix II contains a synopsis of the BMPs adopted to address the four mandatory CCPs within GAIP. These participating nurseries may be able to provide information on the cost of implementing particular BMPs and if they believe that there is a benefit from their implementation that has offset the cost, which could be helpful in obtaining buy-in from industry for this regulatory approach. Appendix III includes references that contain information on the economic impact of *P. ramorum* on the nursery industry. Additionally, there may be Farm Bill funds available to assist nurseries with the implementation of the BMPs, such as with purchases of a sterilizer or concrete pads for compost piles.

Action Item 6. Discussion of Action Item #6 was considered premature by our group. Presently, there is research being conducted to evaluate the efficacy of adopting a systems approach for pest management in nurseries, including *Phytophthora* disease management. Also, the costs associated with implementing a systems approach within nurseries has yet to be quantified. Once this information is available, this action item can be addressed. The co-chairs also noted that APHIS should consider benefits/rewards that could be offered to nurseries that voluntarily prepare a plan of BMPs to address CCPs, such as reduced scrutiny.

There are other efforts within PPQ and NPB that may benefit from this document. The CCPs and BMPs should be shared with the National Plant Certification Program for the potential development of a national 'gold' standard for CCPs and BMPs to address a number of different pest issues. Additionally, APHIS should develop outreach materials in regards to CCP and BMPs.

Action Item 7. During our discussions, the working group identified a few scientific/research questions that would be appropriate for NORS DUC to address. These include the following:

- Evaluate splashing and leaf drop as a potential transfer mechanism allowing for the movement of *P. ramorum* from hosts to non-host potting media and then back to hosts.
- Does the cleaning of propagation mist beds, sorting areas, cutting benches, machines, and tools require chemical usage or is thorough cleaning effective?
- What is the risk of *P. ramorum* infection from irrigation water? Different sources of water should be considered, including treated, untreated, municipal and well water. The water should be both naturally and artificially infested.
- Specific distance and monitoring period of host material on adjacent properties? (See relevant BMP under CCP: Plants)
- What is the minimum period of time to withhold fungicide treatments to overcome symptom masking, and for what subset of HAP is this important?

Appendix IV includes references that may contain information relevant to addressing these questions.

Conclusions and Next Steps:

- Reach out to other stakeholders for review and comment.
- Incorporate answers to science questions into CCPs and BMPs.

  APHIS makes a determination on when, where, and how these CCPs and BMPs would be incorporated into a regulatory action or part of a voluntary program.

A**ppendix I. Menu of BMPs identified for each CCP.**

CCP: Plants

- Any plant material purchased from off-site locations should be from nurseries that are licensed or certified under all phytosanitary laws and applicable federal and state regulations.

- Avoid accepting returned plant material to the nursery site. If it is necessary to accept a return, isolate the plant material, and inspect for any symptoms of disease.

- Do not mix existing crops with incoming HAP material.

- Train nursery staff to recognize the signs and symptoms of *Phytophthoras.* Do not accept any buy-ins, transfers, or returns that are suspect.

- For epidemiologically significant HAP buy-ins, suspend the use of *Phytophthora*-active fungicides on 10% or 100 plants, whichever is fewer, for a two-month period. This is to determine if fungicides that may have been used by the seller were suppressing symptom expression.

- Reduce potential inoculums dispersal from High Risk (HR) plants to other crops.
  - Create a physical barrier, [*such as plexiglass, height of about 30 inches*], between HR plants and all other crops or;
  - Create a two-meter break between HR plants and all other crops or;
  - Interplant with non-host plants to the genus level

- Maintain a separate cull pile for HR plants and associated potting mix. Do not reuse media from HR plants. Any media that is reused should be steam sterilized or composted according to strict national standards.

- For plants used for propagation, chemically treat prior to taking cuttings, take cuttings only from healthy plants, and/or dip cuttings into an approved disinfectant solution before sticking.

- Monitor regularly for *Phytophthora* symptoms or remove over story and under story of known hosts of *P. ramorum* growing within the nursery landscape and foliar hosts in adjacent properties.

- In Quarantine areas, require regular monitoring of hosts in surrounding properties. [specific distance and monitoring period tbd (NORS DUC)]. If disease is present, host material within nursery must be safeguarded to ensure that the nursery material is not exposed to the disease.

- Train staff and inspect HR plants monthly throughout the growing season.

CCP: Pots

- Use pots that are (1) new, (2) clean and properly disinfested, or (3) sanitized by steam sterilization or hot water dip for HAP plant production. Reference USDA List of approved disinfectant options.

- Dispose of debris from pots appropriately. Refer to Media and Plant Sections.

- Store pots on a barrier that effectively separates them from underlying substrate.

CCP: Substrate

- Prevent build up of fallen leaves and plant debris from HR plants in production areas and monitor with every crop rotation or quarterly, whichever is more frequent.

- After every crop rotation, disinfest propagation mist beds, sorting area, cutting benches, machines, and tools to minimize the spread or introduction of pathogens. Reference USDA List of approved disinfectant options.

- Adequately control weeds on the nursery site as they may potentially harbor the pathogen (Shishkoff, N. 2007).

CCP: Water

- Avoid overhead irrigation of HR plants or irrigate in a manner to avoid prolonged leaf wetness and splash.

- During periods of active use, monitor and test, quarterly at a minimum, untreated irrigation water from any source other than a well or a municipal water supply to confirm that it is free from the pathogen.

- Monitor water treatment systems to verify that appropriate treatment measures are being applied.

- Divert soil and water movement from adjacent properties that are populated with *P. ramorum* host plants to prevent contamination of the nursery and neighboring nurseries.

- Eliminate accumulations of standing surface water.

- Ensure run off from all cull piles is directed away from media components, media mixing area, growing beds, and irrigation water to prevent contamination.

- Insert a well drained physical barrier (e.g. raised benches, effective gravel layer, asphalt, concrete) between native soil and containers to prevent splash dispersal of pathogen from potentially infested ground.

CCP: Container Mix

- Ensure that growing container mix is from an area known to be free from *P. ramorum*.

- Ensure that cull piles are clearly separated from container mix components.

- Do not reuse container mix from HR plants.

- Any container mix that is reused should be steam sterilized or composted according to strict national standards.

- Site container mix piles away from potential sources of *P. ramorum* infection.

CCP: Conveyance

- Unload incoming deliveries onto a hard, impermeable-surfaced area that is clean and free of any debris. Collect all debris from plants, surface of area, and delivery truck. Properly dispose of refuse by burning, double bagging, deep burial, or steam sterilization. Do not compost this material.

- Require pick-up and delivery trucks to properly clean and sanitize truck bed, undercarriage, and tires prior to entering nursery operational areas.

- If a known *P. ramorum*-infested area has been visited, wash and sanitize shoes, tools and vehicles that may have contacted contaminated soils before traveling to disease-free areas.

Action Item Matrix

ACTION ITEM (TASKS)	ASSIGNED TO	STATUS	TARGET COMPLETION DATE	NOTES:
Define CCP, BMP, and Systems Approach	CCP/BMP working group	Completed	Nov 2010	Outputs from Working group will be included in the final report
Identify a list of BMPs for each CCP.	CCP/BMP working group	Completed	Nov 2010	Outputs from Working group will be included in the final report. Ranking would be extremely difficult because each nursery is different and not all BMPs will pertain to every nursery
Assess cost-effectiveness of BMPs for retail and whole-sale nurseries	CCP/BMP working group	Ongoing	Ongoing	The subgroup envisions that these nursery plans would be developed by a nursery in consultation with and approval of the SPHD and SPRO of their respective State, and would utilize accepted BMPs to address CCPs in a manner that is most relevant to their particular nursery (retail vs. production, size, stock, etc.).
Application of Systems approaches on a wide scale and their implementation in nurseries to produce clean stock	CCP/BMP working group, Nursery practices group	Ongoing	Ongoing	The subgroup, while agreeing that the BMPs are a generally good practice for all nurseries to consider, felt that any requirement for these plans should be for a particular subset of nurseries though could not come to agreement on what particular subset. It may include all nurseries in quarantined areas to only nurseries with recurrent detections of *P. ramorum*.
Provide feedback to applied research groups at NORS-DUC, USDA-ARS, Universities and elsewhere	CCP/BMP working group	Completed	Ongoing	Evaluate mechanism for the movement of *P. ramorum*. Effectiveness of phytosanitary methods, chemical usage Risk of infection from irrigation water? . Specific distance and monitoring period of host material on adjacent properties? What is the minimum period of time to withhold fungicide treatments to overcome

Table 1: Synopsis of the BMP adopted by 16 nurseries in Oregon's Grower Assisted Inspection Program (GAIP) for 4 mandatory CCPs

Best management practice	Number of farms adopting
Incoming Plants[a]	
Buy from licensed and/or certified nurseries only	16
Inspect incoming plants upon arrival	12
Inspect delivery trucks for debris	12
Clean debris from loading dock	11
Adopted policy for returned plants	4
Quarantine incoming plants for a set time period	3
Soil and potting media[a]	
Store on a concrete/asphalt pad	10
Store on another barrier (e.g., layer of bark or plastic)	7
Store in a designated area	1
No standing water allowed near media	1
Use dedicated equipment or clean before using	7
Compost media	2
Test media regularly for *Phytophthora*	9
Only authorized personnel allowed in potting area	2
Water management[a]	
Test irrigation water/ponds	11
Adjusted irrigation practices for plants	3
No standing water in production areas	3
Irrigate plants with well or river water	10
Treat irrigation water chemically or with ozone	4
Filter the irrigation water	1
Used containers[a]	
Use new containers only for HAP[c]	16
Chemically sanitize used containers before using for HAP	10
Sanitize used containers with steam or hot water before using for HAP	2

[a] Mandatory critical control point for farms participating in the GAIP; [b] Certified as free of *P. ramorum* based on the federal regulations 7 CFR 301.92; [c] HAP = host and associated host plants for *P. ramorum* (23).

Supporting Documentation utilized by the subgroup

Marching Orders:
Phytophthora ramorum National Review
http://www.aphis.usda.gov/plant_health/plant_pest_info/pram/downloads/review_2009/NationalReviewReport.pdf

Phytophthora ramorum Regulatory Working Group, Process Template for Action Plans

Existing Programs:
Nursery Industry Best Management Practices for *Phytophthora ramorum* - to prevent the introduction or establishment in California nursery operations - Version 1.0
http://www.suddenoakdeath.org/pdf/cangc_bpm_FINAL.pdf

Best Cultural Practices (BCPs), Oregon Department of Agriculture Grower Assisted Inspection Program (GAIP)
http://www.oregon.gov/ODA/PLANT/NURSERY/docs/pdf/gaip_bcps.pdf

United States Nursery Certification Program Pilot, Requirements For The Certification Of Nurseries Under The United States Nursery Certification Program
http://www.aphis.usda.gov/plant_health/acns/downloads/USNCP-Standards.pdf

References:
Confirmed Nursery Protocol: Version 8.0, APPENDIX 9: Biosecurity Measures for Nurseries
http://www.aphis.usda.gov/plant_health/plant_pest_info/pram/downloads/CNP/CNP%20v8.0%203-31-10.pdf

RSPM 24 - Integrated Pest Risk Management Measures for the Importation of Plants for Planting into NAPPO Member Countries
http://www.canadanursery.com/Storage/9/548_RSPM24.pdf

ISPM 5 - Glossary of Phytosanitary Terms
http://www.aphis.usda.gov/import_export/plants/plant_exports/downloads/pimglossary.pdf

HACCP Definitions
http://www.fda.gov/Food/FoodSafety/HazardAnalysisCriticalControlPointsHACCP/HACCPPrinciplesApplicationGuidelines/default.htm#defs

Canadian *P. ramorum* Nursery Certification Program
http://www.canadanursery.com/Storage/35/2831_FORMATTED_Certification_Standard-edited_june_2010_Latest.pdf

Research:
The soil phase of *P. ramorum*, Nina Shishkoff, FDWSRU/ARS/USDA
http://nature.berkeley.edu/comtf/pdf/2006Meeting/Nina%20Shishkoff.pdf

List of References as Resource for Follow-Up by APHIS and NORS-DUC

QUARANTINE AND ECONOMIC IMPACTS

Dart, N.L. and G.A. Chastagner. 2007. Estimated economic losses associated with destruction of plants due to *Phytophthora ramorum* quarantine efforts in Washington state. Online. Plant Health Progress doi:10.1094/PHP-2007-0508-02-RS.

ENTRIX, Inc. 2008. Economic analysis for the impact of *Phytophthora ramorum* on the nursery industry: ORPIN 603-1177-08. ENTRIX, Inc., Vancouver, WA, 17 pp.

Hall, K.M., and H.J. Albers. 2009. Economic analysis for the Impact of *Phytophthora ramorum* on Oregon forest industries. Oregon State University

EPIDEMIOLOGY

Hansen, E.M., A. Kanaskie, S. Prospero, M. McWilliams, E.M. Goheen, N. Osterbauer, P. Reeser, and W. Sutton. 2008. Epidemiology of *Phytophthora ramorum* in Oregon tanoak forests. Can. J. For. Res. 38:1133-1143.

Kluza, D.A., D.A. Vieglais, J.K. Andreasen, and A.T. Peterson. 2007. Sudden oak death: geographic risk estimates and predictions of origins. Plant Pathology doi:10.1111/j.1365-3059.2007.01602.x

Venette, R.C. and S.D. Cohen. 2006. Potential climatic suitability for establishment of *Phytophthora ramorum* within the contiguous United States. Forest Ecology and Management 231:18-26.

CRITICAL CONTROL POINTS

Dart, N.L., G.A. Chastagner, E.F. Rugarber, and K.L. Riley. 2007. Recovery frequency of *Phytophthora ramorum* and other *Phytophthora* spp. in the soil profile of ornamental retail nurseries. Plant Dis. 91, 1419-1422.

Linderman, R.G. and E.A. Davis. 2006. Survival of *Phytophthora ramorum* compared to other species of *Phytophthora* in potting media components, compost, and soil. HorTech. 16:502-507.

Shishkoff, N. 2007. Persistence of *Phytophthora ramorum* in soil mix and roots of nursery ornamentals. Plant Dis. 91:1245-1249.

Tjosvold, S.A., D.L. Chambers, E.J. Fichtner, S.T. Koike, and S.R. Mori. 2009. Disease risk of potting media infested with *Phytophthora ramorum* under nursery conditions. Plant Dis. 93:371-376.

Tjosvold, S.A., D.L. Chambers, S.T. Koike, and S.R. Mori. 2008. Disease on nursery stock as affected by environmental factors and seasonal inoculum levels of *Phytophthora ramorum* in stream water used for irrigation. Plant Dis. 92:1566-1573.

Werres, S., S. Wagner, T. Brand, K. Kaminski, D. Seipp. 2007. Survival of *Phytophthora ramorum* in recirculating irrigation water and subsequent infection of *Rhododendron* and *Viburnum*. Plant Dis. 91:1034-1044.

DISEASE MANAGEMENT

Garbelotto, M., D.J. Schmidt, and T.Y. Harnik. 2007. Phosphite injection and bark application of Phosphite + Pentrabark™ control sudden oak death in coast live oak. Arboriculture & Urban Forestry 33:309-317.

Linderman, R.G. and E.A. Davis. 2008. Eradication of *Phytophthora ramorum* and other pathogens from potting medium or soil by treatment with aerated steam or fumigation with Metam Sodium. HortTech. 18:106-110.

Linderman, R.G. and E.A. Davis. 2008. Evaluation of chemical agents for the control of *Phytophthora ramorum* and other species of *Phytophthora* on nursery crops. Online. Plant Health Progress doi:10.1094/PHP-2008-0211-01-RS.

Manter, D.K., J.J. Karchesy, and R.G. Kelsey. 2006. The sporicidal activity of yellow-cedar heartwood, essential oil, and wood constituents towards *Phytophthora ramorum* in culture. Forest Pathology 36:297-308.

Manter, D.K., R.G. Kelsey, and J.J. Karchesy. 2007. Antimicrobial activity of extractable conifer heartwood compounds towards *Phytophthora ramorum*. J. Chem. Ecol. 33:2133-2147.

Osterbauer, N.,K., Griesbach, J.A., and Hedberg, J. 2004. Surveying for and eradicating *Phytophthora ramorum* in agricultural commodities. Online. Plant Health Progress doi:10.1094/PHP-2004-0309-02-RS.

Swain, S., T. Harnik, M. Mejia-Chang, K. Hayden, W. Bakx, J. Creque, and M. Garbelotto. 2006. Composting is an effective treatment option for sanitization of *Phytophthora ramorum*-infected plant material. J. Appl. Microbio, 101:815-827, doi:10.1111/j.1365-2672.2006.03008.x

Tjosvold, S.A., S.T. Koike, and D.L. Chambers. 2008. Evaluation of fungicides for the control of *Phytophthora ramorum* infecting *Rhododendron, Camellia, Pieris,* and *Viburnum*. Online. Plant Health Progress doi:10.1094/PHP-2008-0208-01-RS.

Yakabe, L.E. and J.D. MacDonald. 2010. Soil treatments for the potential elimination of *Phytophthora ramorum* in ornamental nursery beds. Plant Dis. 94:320-324.

4-7: Protocols Working Group

Objective: Tailor and revise regulatory protocols to apply BMPs

Background: Regulatory protocols are deployed in reaction to a confirmed *P. ramorum* positive within a nursery. The desire to improve the success of sanitation actions in the nursery led to the conclusion that a pointed critical control point (CCPs) assessment and prescriptive BMP implementation may need to be a part of the regulatory requirement for *P. ramorum*. The hypothesis is that the inclusion of CCPs/BMPs into the regulatory protocols will reduce the number of repeat *P. ramorum* positive nurseries, and reduce the likelihood of spread to other nurseries and to the environment. The 2009 National Program Review called for reviewing and revising regulatory protocols to take into account CCPs, high-risk plants, as well as soil and water positives as a priority task.

Sub Team Co-chairs: Vicky Smith NPB (CT) and Stacy Scott APHIS-PPQ

Team Members: PPQ: Art Wagner, Charla Hollingsworth, Don Seaver NPB: Erin Lovig (CA); Nancy Osterbauer (OR), Jennifer Falacy (WA), Eric Hitzler (SC), Mike Evans (GA)

Action Items Identified:

1. Review feasibility of application of BMPs in conjunction with CCPs as a part of Confirmed and Retail Nursery protocols
2. Tailor and revise regulatory options and protocols in conjunction with BMPs/CCP
3. Provide suggestions to improve *P. ramorum* regulations to incorporate BMPs
4. Review and revise Confirmed and Retail Nursery protocols (e. g. update, flow charts, check lists, user friendly options). Revise to reflect new Federal Orders and regulations.
5. Forward appropriate research questions/issues to applied research group at NORS-DUC

Summary of Current Status, Recommendations, and Next Steps

Action Items 1: **Review feasibility of application of BMPs in conjunction with CCPs as a part of Confirmed and Retail Nursery protocols**

The working group has drafted a “first time” and “repeat” nursery course of action and recommends the consideration of the following:

Scenario and Assumptions: The revised ‘wholesale’ CNP will contain a CCP assessment / BMPs requirement and will be used in nurseries in the Regulated States (CA, OR, WA) and nurseries in non-regulated states that ship HAP interstate. (See definition of terms at the bottom of these notes).

In Oregon and California, the state or county inspectors provide informal guidance on CCPs and BMPs to both first time and repeat positive nurseries. Second-time positive nurseries in

California are inspected by the State Plant Pathologist for a more detailed assessment and recommendation.

First Time Positive: Two options were discussed on how to approach first time positive nurseries.

- **Option 1:** devise criteria to determine which first time positive nurseries would require the formal CCP assessment and BMP implementation. This option was less popular than option 2.
- **Option 2:** no first time positive nursery would be required to have the formal CCP assessment but would receive the APHIS CCPs/BMPS guidance document/checklist at the beginning of the EAN period. Communicate to the nursery owner that they are welcome to request a CCP assessment.

Recommendation: all first time positive nurseries will receive the APHIS CCP/BMP guidance document/checklist and acknowledge receipt when signing the EAN.

Definition of Terms

- **CCP Assessment and BMP Guidance Document**: Is an 'official' APHIS document using the CCP/BMP WG's work. This document can also be provided to all new HAP interstate shippers and all nurseries across the nation that become positive for *P. ramorum* or are dealing with HAP plants.
- **CCP Assessment:** This is the information gathered and conclusions drawn about the critical control points in a second time positive nursery. The conclusion will include a diagnosis of specific critical control points that require improvement via BMPs. The nursery will choose from a menu of BMPs, provided by APHIS and by their own experience, and agree to implement them via the EAN in the short term or through their compliance agreement for the long term.
- **CCP Assessment Team**: The composition of the team is determined on a state by state basis, primarily by the State Dept. of Ag, or County Ag Commissioner (California). It should consist of a state regulatory official (state or county nursery inspector), a *P. ramorum* subject matter expert, such as the state plant pathologist or other *P. ramorum* expert, an APHIS inspector and an APHIS PPQ CPHST scientist if request is made. Since the subsequent findings of the CCP assessment team require regulatory actions, the team needs to include regulatory personnel.

Action Item 2. Tailor and revise regulatory options and protocols in conjunction with BMPs/CCP

- **Second Time Positive Nursery**: In California, currently, nurseries that do not want to participate (i.e., don't want to enter into a compliance agreement, etc.,) are not allowed to ship interstate. Nurseries that **do** ship interstate have to show that they receive plants from other certified nurseries. Similarly in Oregon, nurseries that ship HAP interstate are required to purchase plants from certified nurseries. So, if a nursery that was positive wants to continue to sell interstate or sell to another nursery that ship interstate, they must get certified.

Recommendation: A mandatory CCP assessment would take place at the earliest, within a week. Once completed, this nursery is required to select BMPs to address CCP issues identified in the assessment report. These selected BMPs would be incorporated into the EAN in the short term and into the compliance agreement in the long term.

Check List:

- Re-evaluate the previous assessment, and review the situation at the nursery
- Identify the CCP's that will need to be addressed
- Work with the nursery to implement the mandatory BMP's needed to address the identified CCP's.
- For subject nurseries in the Quarantine and Regulated Area, incorporate requirements into their compliance agreements.
- For subject nurseries outside the Q and R area; explore use of Federal EANs.
- Revisit the nursery to insure the required actions have been taken

Action Item 3. Provide suggestions to improve *P. ramorum* regulations to incorporate BMPs

- **Emergency Notification:** The EAN will be written to include the CCP assessment requirement. All agreed that the best tool to institute the BMP requirement long term is in the shipping compliance agreements that each nursery has. Compliance agreements are currently only applicable in the regulated states, however, further discussions with APHIS is needed on approaches for regulating inter-state shippers in non-regulated states and confirmed positive for the presence of *P. ramorum*.

- **BMP audit periodicity:** Currently inspection periodicity in CNP is monthly and annual inspection varies from state to state. Since the implementation of BMPs will be chosen by a given nursery will be written into the compliance agreement, the duration of the audit is still under discussion. The question of how many years of negative sampling are needed before a nursery can revert back to a 'regular' compliance agreement is under discussion.

Recommendation: BMPs should be in the compliance agreement for two years, if sampling remains negative, BMPs should become suggestions rather than mandatory.

Action Item 4: Review and revise Confirmed and Retail Nursery protocols (e.g incorporate new regulations, update, flow charts, check lists, user friendly options).

- APHIS is currently reviewing and revising the Confirmed Nursery Protocol. Issues that still need to be addressed include, sample size, the quarantine period, and updating which diagnostic procedures will trigger regulatory response. With the implementation of any new federal order or regulations each of the regulatory protocols will be revised to reflect the new procedures.

Action Item 5: Forward appropriate research questions/issues to applied research group at NORS-DUC. This action item will be ongoing.

Discussions – Key points

- There is a general agreement that implementing mandatory CCP/BMP in first time positive nurseries may be difficult. The most successful approach dealing with first time positive nurseries will be, when signing the EAN , is to hand them the APHIS CCP/BMP guidance document/checklist and request a acknowledgement receipt.
- For repeat positives nurseries, mandatory CCP assessment should take place at the earliest, within a week. Once completed, this nursery is required to select BMPs to address CCP issues identified in the assessment report. These selected BMPs would be incorporated into the EAN in the short term and into the compliance agreement in the long term.
- BMPs should be in the compliance agreement for two years, if sampling remains negative, BMPs should become suggestions rather than mandatory.
- If nurseries decide not to participate or implement the requirements of the compliance agreement, they will not be able to ship interstate.
- There is a need for more clarification on the regulatory authority/vehicle to implement proposed CNP change in repeat positive nurseries outside the regulated states.
- A second time positive inter-state shipping nursery would receive the CCP assessment and BMP implementation in a non-regulated state needs further discussion.
- A Standard Operating Procedure - APHIS CCP/BMP guidance document/checklist should be provided to a brand new interstate shipper of HAP plants, or if a current shipper opens a new location. In addition the new facility should be encouraged to require a non-binding CCP assessment. The new compliance agreement would contain this SOP.
- Most group members agreed that the implementation of this new CNP is not a 100% guarantee for eradicating the pathogen and render the plants disease free.

Action Item Matrix

ACTION ITEM (TASKS)	ASSIGNED TO	STATUS	TARGET COMPLETION DATE	NOTES:
1: Review feasibility of application of BMPs in conjunction with CCPs as a part of Confirmed and Retail Nursery protocols	Regulatory working Group	Completed	November 2010	
2-Tailor and revise regulatory options and protocols in conjunction with BMPs/CCP.	Regulatory working Group	Ongoing	2011	
3. Provide suggestions to improve *P. ramorum* regulations to incorporate BMPs	Regulatory working Group	Completed	December 2010	
4-Review and revise Confirmed and Retail Nursery protocols (e. g. update, flow charts, check lists, user friendly options).	Protocols Working Group	Ongoing	March 2011 onwards	
4-Coordinate with CPHST to improve sampling and diagnostic procedures in the protocols	WR RPM, CPHST Pram Program Rep	Initiated	January 2011	The Protocols working group identified several issues that need to be addressed
4-Review and made recommendations for changes to the rCNP	Protocols Working Group	Ongoing	2011	Not being an inter-state shipper, the risk from an infected retail nursery is to the environment. Input needed from stakeholders and risk should be assessed before making decisions
4-Review and revise CNPs to reflect any new federal order or regulations	Protocols Working Group	Ongoing	As new regulations are made	
5-Forward appropriate research questions/issues to applied research group at NORS-DUC	Protocols Working Group	Ongoing	Ongoing	

General Conclusions:

The information presented here outlines recommendations and action items discussed by the various Regulatory Working Groups (RWGs) over a period of several months. The RWGs comprising of individuals from both Federal and State regulatory agencies based their conclusions on existing regulatory and scientific data. Action items in several key regulatory areas were addressed by the working groups to eliminate *P. ramorum* from the nursery production system. Recommendations pertain to the Quarantine 37 involving imports of host plants, designation of host plants currently deemed as high risk for pathogen introduction, *P. ramorum* regulatory surveys, role of nursery assessment teams, Best Management Practices, triggers for regulation and de-regulation and regulatory protocols and is based on existing regulatory and scientific data.

So far several short-term actions, which include review of confirmed nursery protocols, in-depth analysis of port-of-entry (Q37) data, initiation of *P. ramorum* National Survey, analysis of data on positive host species and nurseries, piloting nursery assessment teams to assist nurseries and several applied research efforts on soil remediation have been completed or are in various stages of completion. Research initiatives on soil remediation and rapid diagnostics are being coordinated by CPHST at the National Ornamental Research Site at Dominican University, in CA. Discussions are on-going on long-term action items such as developing clear guidelines (triggers) for regulation / deregulation, revision of Q37 program and revision of regulatory protocols for *P. ramorum* nurseries that include BMPs/CCPs.

APHIS-PPQ will take into consideration the recommendations provided by the regulatory working groups, in addition to inputs from other stakeholders to formulate the future direction of the *P. ramorum* National Program. The outputs from the RWGs will be shared with the stakeholders during the Continental Dialogue *P. ramorum* meeting in Washington D.C. in February, 2011.

Phytophthora ramorum Regulatory Working Group Contact Information:

Q37 Working Group

Name	Designation/ Organization	Address	Email/Tel
Matthew Travis (Co-Chair)	State Plant Health Director, USDA-APHIS-PPQ	2200 Broening Hwy, Ste. 140 Baltimore, MD 21224	Matthew.A.Travis@aphis.usda.gov Ph. 410-631-0073, ext. 15
Shashank Nilakhe (Co-Chair)	State Entomologist/ Texas Dept. of Ag.	PO Box 12847 Austin, TX 78711	Shashank.Nilakhe@TexasAgriculture.gov 512-463-1145
Anthony Man-Son-Hing	Domestic Regional program Manager, USDA-APHIS-PPQ-Eastern Region	920, Main Campus Drive, Suite 200, Raleigh, NC 27606	Anthony.Man-Son-Hing@aphis.usda.gov 919-855-7331
Brad White	State Plant Health Regulatory Official, Washington State Dept. of Agriculture	Plant Protection Division P. O. Box 42560 Olympia, WA 98504-2560	bwhite@agr.wa.gov 360-902-2071
Stephen Schmidt	State Plant Health Regulatory Official, North Carolina Dept. of Agriculture and Consumer Services	Plant Industry Division 1060 Mail Service Center Raleigh, NC 27699-1060	stephen.schmidt@ncagr.gov 919-733-6930 Ext. 231
Cory Marker	National Program Staff Scientist – AQI, USDA APHIS PPQ CPHST	1730 Varsity Dr., Ste 400 Raleigh, NC 27606	Cory.a.marker@aphis.usda.gov 919-855-7426
Alex Belano	Branch Chief USDA-APHIS-PPQ, Regulations, Permits, and Manuals; Risk Management and Plants for Planting Policy	4700 River Road, Unit 133 4D06-g Riverdale, Maryland 20737	Alex.Belano@aphis.usda.gov (301) 734-5333
William D. Aley	Senior Import Specialist, USDA-APHIS-PPQ, USDA Departmental Permits & Q-37 Team Risk Management & Plants for Planting Policy	4700 River Road, Unit 133 4D06-g Riverdale, Maryland 20737	William.D.Aley@aphis.usda.gov 301.734.5057
Paula Henstridge	Assistant Deputy Administrator for Intergovernmental Affairs, USDA-PPQ	302-E J.L. Whitten Bldg. 14th & Independence Ave., S.W., Washington DC 20250	Paula.henstridge@aphis.usda.gov 202-720-1737
Prakash Hebbar	National Program Manager / USDA-APHIS-PPQ / Emergency and Domestic Programs	4700 River Road, Unit 26, 5C-03.40 Riverdale, Maryland 20737	Prakash.hebbar@aphis.usda.gov 301-734-5717

High Risk Plants Working Group

Name	Designation/ Organization	Address	Email/Tel
Carolyn Pizzo (Co-Chair)	State Operations Support Officer California Plant Health Director's Office, USDA-APHIS-PPQ	650 Capitol Mall, suite 6-400, Sacramento, CA 95814	Carolyn.Pizzo@aphis.usda.gov 916-930-5506
Kathleen L. Kosta (Co-Chair)	Primary State Plant Pathologist California Department of Food and Agriculture	1220 N Street Sacramento, CA 95814	kkosta@cdfa.ca.gov 916-653-1440
Steven Whitesides	Plant Pathologist Identifier, APHIS-PPQ	6135 NE 80th Ave., Ste. A-5 Portland, OR 97218	Steven.K.Whitesides@aphis.usda.gov 503.326.2814 x232 503.326.2969 fax
Christel Harden	Assistant Department Head Plant Industry	Clemson University 511 Westinghouse Road Pendleton, SC 29670	charden@clemson.edu 864-646-2135 office 864-646-2178 fax
Colin Wamsley	State Entomologist Missouri Department of Agriculture Plant Pest Control Bureau	PO Box 630/1616 Missouri Blvd Jefferson City, Missouri 65102	Collin.wamsley@mda.mo.gov Tel: 573.751.5505/5507 fax: 573.522.1109
Melinda Sullivan,	Plant Pathologist USDA-APHIS-PPQ Center for Plant Health Science and Technology (CPHST)	2301 Research Blvd., Suite 108 Fort Collins, CO 80526	melinda.j.sullivan@aphis.usda.gov Tel: 970-490-4469 Fax: 970-482-0924

Nursery Field Team

Name	Designation/ Organization	Address	Email/Tel
Steven Whitesides (Co-Chair)	Plant Pathologist Identifier, USDA-APHIS-PPQ	6135 NE 80th Ave., Ste. A-5 Portland, OR 97218	Steven.K.Whitesides@aphis.usda.gov Tel: 503.326.2814 x232 Fax: 503.326.2969 fax
Jan Hedberg (Co-Chair)	Lead Horticulturist, Nursery and Christmas Tree Program, Oregon Department of Agriculture, Plant Division	635 Capitol St. NE Salem, OR 97301-2532 USA	Jhedberg@oda.state.or.us Tel: 503-986-4644 Fax: 503-986-4786
Anthony Man-Son-Hing	Domestic Regional program Manager, USDA-APHIS-PPQ-Eastern Region	920, Main Campus Drive, Suite 200, Raleigh, NC 27606	Anthony.Man-Son-Hing@aphis.usda.gov Tel: 919-855-7331
Matthew Travis	State Plant Health Director, USDA-APHIS-PPQ	2200 Broening Hwy, Ste. 140 Baltimore, MD 21224	Matthew.A.Travis@aphis.usda.gov Tel: 410-631-0073, ext. 15
Phillip A. Bailey	Supervisory Officer USDA-APHIS-PPQ	1506 Klondike Rd., Suite 306 Conyers, GA 30094	Philip.A.Bailey@aphis.usda.gov Tel: 770-860-4025 Fax: 770-860-4050
John Corban	Pest Survey Specialist USDA-APHIS-PPQ	505 Russell Street Starkville, MS 39759	John.Corban@aphis.usda.gov Tel 662-769-8347 Fax 662-627-5234
Dennis Barclift	State Plant Regulatory Official, AL Dept. of Agriculture & Industries Division of Plant Industry	PO Box 3336 Montgomery, AL 36109-0336	Dennis.Barclift@agi.alabama.gov Tel: 334-240-7225 Fax: 334-240-7168
Catherine Marzolf	State Operations Support Officer USDA APHIS-PPQ	8100 NW 15th Place Gainesville, Florida 32606	Catherine.A.Marzolf@aphis.usda.gov Tel: (352) 313-3046 Fax: (352) 313-3041
Dan Kenny	State Plant Regulatory Official, Plant Pest Control Section Division of Plant Industry Ohio Dept. of Agriculture	8995 East Main St. Reynoldsburg, OH 43068	dkenny@agri.ohio.gov Tel: 614-728-6400 Fax: 614-728-6453
Don Seaver Gergory Parra Megan Henderson	National Program Staff Scientist Plant Pathogens and Weeds USDA/APHIS/PPQ Center for Plant Health Science and Technology (CPHST)	Suite 400, 1730 Varsity Dr. Raleigh, NC 27606	Don.seaver@aphis.usda.gov Tel: 919-855-7448 Fax: 919-855-7493 Megan.w.henderson@aphis.usda.gov Tel: (919) 855-7454 greg.r.parra@aphis.usda.gov Tel: 919-855-7548

Critical Control Points/Best Management Practices

Name	Designation/ Organization	Address	Email/Tel
Catherine Marzolf (Co-Chair)	State Operations Support Officer USDA APHIS-PPQ	8100 NW 15th Place Gainesville, Florida 32606	Catherine.A.Marzolf@aphis.usda.gov Tel: (352) 313-3046 Fax: (352) 313-3041
Carol A. Holko (Co-Chair)	State Plant Regulatory Official , Program Manager, Plant Protection and Weed Management Section Maryland Department of Agriculture	50 Harry S. Truman Pkwy. Annapolis, MD 21401	holkoca@mda.state.md.us Tel: 410-841-5920 Fax: 410-841-5835
Kathleen L. Kosta	Primary State Plant Pathologist California Department of Food and Agriculture	1220 N Street Sacramento, CA 95814	kkosta@cdfa.ca.gov 916-653-1440
John Corban	Pest Survey Specialist USDA-APHIS-PPQ	505 Russell Street Starkville, MS 39759	John.Corban@aphis.usda.gov Tel 662-769-8347 Fax 662-627-5234
Jan Hedberg	Lead Horticulturist, Nursery and Christmas Tree Program, Oregon Department of Agriculture, Plant Division	635 Capitol St. NE Salem, OR 97301-2532 USA	Jhedberg@oda.state.or.us Tel: 503-986-4644 Fax: 503-986-4786
Craig Roussel	State Plant Regulatory Official, Director, Horticulture and Quarantine Programs, Louisiana Department of Agriculture and Forestry	PO Box 3596 Baton Rouge, LA 70821-3596	craig_r@ldaf.state.la.us
Richard Gaskalla / Wayne Dixon	State Plant Regulatory Official, Director, Division of Plant Industry Florida Dept. of Agriculture & Consumer Services	P. O. Box 147100 Gainesville, FL 32614-7100 Or 1911 S. W. 34th Street Gainesville, FL 3260	gaskalr@doacs.state.fl.us Tel 352-372-3505 Fax: 352-955-2300 dixonw@doacs.state.fl.us Tel: 352.372.3505 ext. 408
Nancy Osterbauer	Plant Health Program Manager Commodity Inspection Division, Oregon Department of Agriculture	635 Capitol St. NE Salem, OR 97301-2532 USA	nosterba@oda.state.or.us Tel: 503-986-4666 Fax: 503-986-4737
Russ Bulluck	National Science Program Leader Center for Plant Health Science and Technology USDA-APHIS-PPQ	Suite 400, 1730 Varsity Dr. Raleigh, NC 27606	Russ.bulluck@aphis.usda.gov Tel: 919-855-7646 Fax:919-855-7480

Protocols Working Group

Name	Designation/ Organization	Address	Email/Tel
Don Givens / Stacy Scott (Co-Chair)	WR Regional Program Manager USDA, APHIS, PPQ	2150 Centre Avenue Building B, 3E10 Fort Collins, CO 80526	donald.r.givens@aphis.usda.gov Tel: 970-494-7564 stacy.e.scott@aphis.usda.gov Tel: 970.494.7577 Fax: 970.494.7501
Victoria Lynn Smith (Co-Chair)	Deputy State Entomologist Connecticut Agricultural Experiment Station	123 Huntington St. New Haven, CT 06504	Victoria.Smith@ct.gov Tel: 203-974-8474 Fax 203-974-8502
Arthur Wagner	Pest Survey Specialist, USDA-APHIS-PPQ	1 Gifford Pinchot Dr., Madison, WI 53726	Arthur.C.Wagner@aphis.usda.gov Tel: 608-231-9577 Fax: 608-231-9581
Mike Evans	State Plant Regulatory Official, Director, Plant Protection Division Georgia Dept. of Agriculture	19 Martin Luther King Dr., Rm. 243 Atlanta, GA 30334-4201	Mike.Evans@agr.georgia.gov Tel: 404-651-9486 Fax: 404-656-3644
Nancy Osterbauer	Plant Health Program Manager Commodity Inspection Division, Oregon Department of Agriculture	635 Capitol St. NE Salem, OR 97301-2532 USA	nosterba@oda.state.or.us Tel: 503-986-4666 Fax: 503-986-4737
Erin Lovig	Agricultural Biologist California Department of Food and Agriculture Interior Pest Exclusion	1220 N Street Sacramento, CA 95814	ELovig@cdfa.ca.gov Tel: 916-654-0312 Fax: 916-654-0986
Eric Hitzler	Nursery Inspector, Clemson University Department of Plant Industry	511 Westinghouse Rd. Pendleton, SC 29670	ejhtzlr@clemson.edu Tel: 864.646.2140 Fax: 864.646.2178
Sherry P. Aultman	CAPS Program Coordinator Clemson University Department of Plant Industry	511 Westinghouse Rd. Pendleton, SC 29670	saltmn@clemson.edu Tel: 864.646.2128 Fax: 864.646.2178
Charla Hollingsworth	National Science Program Leader Plant Pathogens & Weeds USDA-APHIS-PPQ Center for Plant Health Science and Technology	1730 Varsity Dr., Ste 400 Raleigh, NC 27606	Charla.hollingsworth@aphis.usda.gov Tel: 919.855.7406 FAX: 919.855.7480

Triggers Group

Name	Designation/ Organization	Address	Email/Tel
Steven Miller (Co-Chair)	Port Director USDA-APHIS-PPQ	222 N. Havana, Rm. 109 Spokane, WA 99202	steven.m.miller@aphis.usda.gov Tel: 509-353-2950 Fax: 509-353-2637
Gary Gibson (Co-Chair)	State Plant Regulatory Official, Director, Plant Industries Division West Virginia Dept. of Agriculture	1900 Kanawha Blvd. East Charleston, WV 25305-0191	ggibson@ag.state.wv.us Tel: 304-558-2212 Fax: 304-558-2435
Catherine Marzolf	State Operations Support Officer USDA APHIS-PPQ	8100 NW 15th Place Gainesville, Florida 32606	Catherine.A.Marzolf@aphis.usda.gov Tel: (352) 313-3046 Fax: (352) 313-3041
Don Givens / Stacy Scott	WR Regional Program Manager USDA, APHIS, PPQ	2150 Centre Avenue Building B, 3E10 Fort Collins, CO 80526	donald.r.givens@aphis.usda.gov Tel: 970-494-7564 stacy.e.scott@aphis.usda.gov Tel: 970.494.7577 Fax: 970.494.7501
Kathleen L. Kosta	Primary State Plant Pathologist California Department of Food and Agriculture	1220 N Street Sacramento, CA 95814	kkosta@cdfa.ca.gov 916-653-1440
Richard Gaskalla / Wayne Dixon	State Plant Regulatory Official, Director, Division of Plant Industry Florida Dept. of Agriculture & Consumer Services	P. O. Box 147100 Gainesville, FL 32614-7100 Or 1911 S. W. 34th Street Gainesville, FL 3260	gaskalr@doacs.state.fl.us Tel 352-372-3505 Fax: 352-955-2300 dixonw@doacs.state.fl.us Tel: 352.372.3505 ext. 408
Gary McAninch	Program Supervisor, Nursery & Christmas tree Inspection Oregon Department of Agriculture	635 Capitol St. NE Salem, OR 97301-2532 USA	gmcaninc@oda.state.or.us Tel: 503-986-4785 Fax: 503-986-4737
Philip Marshall	State Plant Regulatory Official, Director, Indiana Department of Natural Resources Division of Entomology & Plant Pathology	402 West Washington Street, Room W-290 Indianapolis, IN 46204-2739	pmarshall@dnr.in.gov Tel:317-232-4120 Fax: 317-232-2649

Regulatory Survey Group

Name	Designation/ Organization	Address	Email/Tel
Anthony Man-Son-Hing (Co-Chair)	Domestic Regional program Manager, USDA-APHIS-PPQ-Eastern Region	920, Main Campus Drive, Suite 200, Raleigh, NC 27606	Anthony.Man-Son-Hing@aphis.usda.gov 919-855-7331
Dennis Barclift (Co-Chair)	State Plant Regulatory Official, AL Dept. of Agriculture & Industries Division of Plant Industry	PO Box 3336 Montgomery, AL 36109-0336	Dennis.Barclift@agi.alabama.gov Tel: 334-240-7225 Fax: 334-240-7168
Arthur Wagner	Pest Survey Specialist, USDA-APHIS-PPQ	1 Gifford Pinchot Dr., Madison, WI 53726	Arthur.C.Wagner@aphis.usda.gov Tel: 608-231-9577 Fax: 608-231-9581
Carolyn Pizzo	State Operations Support Officer California Plant Health Director's Office, USDA-APHIS-PPQ	650 Capitol Mall, suite 6-400, Sacramento, CA 95814	Carolyn.Pizzo@aphis.usda.gov 916-930-5506
Steven Whitesides	Plant Pathologist Identifier, APHIS-PPQ	6135 NE 80th Ave., Ste. A-5 Portland, OR 97218	Steven.K.Whitesides@aphis.usda.gov 503.326.2814 x232 503.326.2969 fax
Colin Wamsley	State Entomologist Missouri Department of Agriculture Plant Pest Control Bureau	PO Box 630/1616 Missouri Blvd Jefferson City, Missouri 65102	Collin.wamsley@mda.mo.gov 573.751.5505/5507 fax: 573.522.1109
Richard Gaskalla / Wayne Dixon	State Plant Regulatory Official, Director, Division of Plant Industry Florida Dept. of Agriculture & Consumer Services	P. O. Box 147100 Gainesville, FL 32614-7100 Or 1911 S. W. 34th Street Gainesville, FL 3260	gaskalr@doacs.state.fl.us Tel 352-372-3505 Fax: 352-955-2300 dixonw@doacs.state.fl.us Tel: 352.372.3505 ext. 408
Sherry P. Aultman	CAPS Program Coordinator Clemson University Department of Plant Industry	511 Westinghouse Rd. Pendleton, SC 29670	saltmn@clemson.edu Tel: 864.646.2128 Fax: 864.646.2178
Kevin King	State Plant Regulatory Official, Director Division of Plant Industry New York Dept. of Agriculture and Markets	10 B Airline Drive Albany, NY 12235-0001	kevin.king@agmkt.state.ny.us Tel: 518-457-2087 Fax: 518-457-1204