Case Study: Sudden Oak Death /ramorum blight caused by *Phytophthora ramorum*

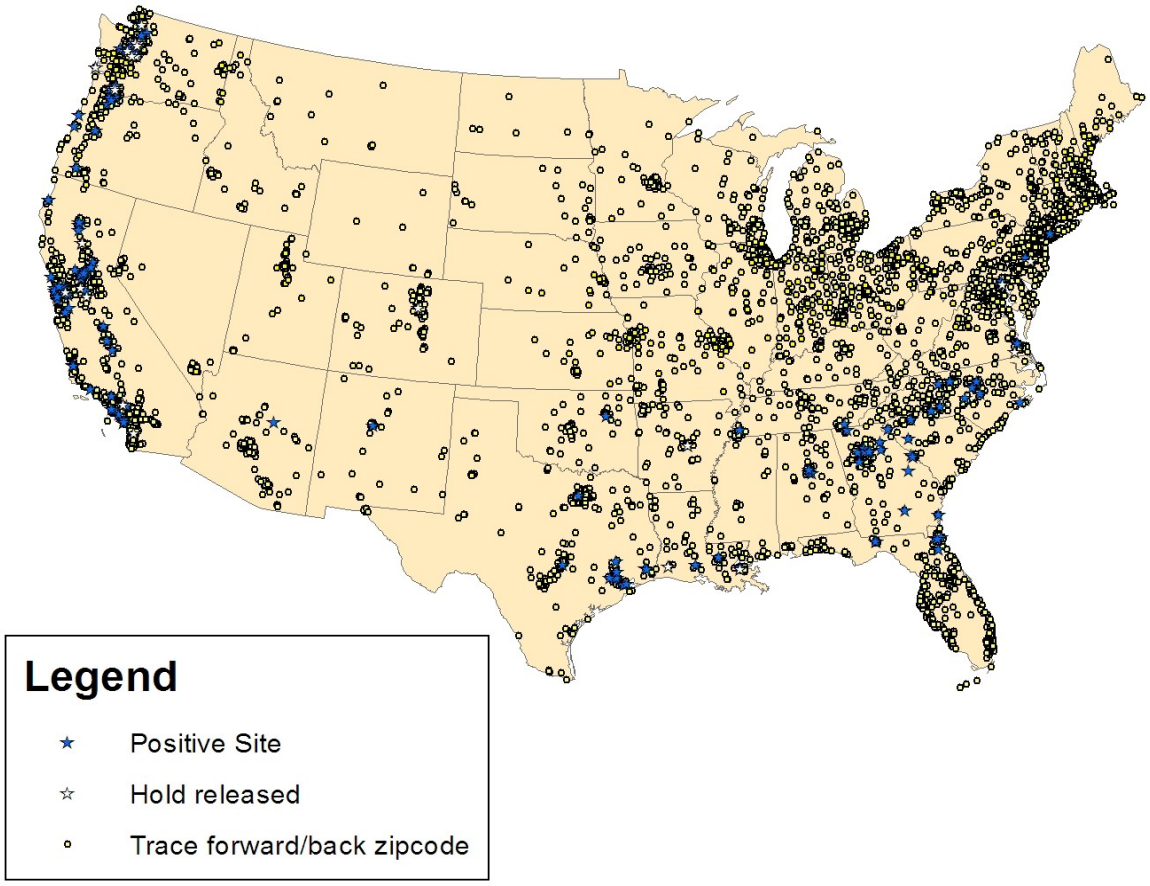
In early March 2004, biologists from the California Department of Food and Agriculture discovered during routine inspections that several large wholesale nurseries in southern California were contaminated with the quarantine plant pathogen *Phytophthora ramorum.* These nurseries had made shipments of potentially infected plants to what would subsequently be discovered to be hundreds of retail nurseries (see map) throughout the U.S. Within days of this discovery, the National Plant Diagnostic Network became engaged and prepared for an unprecedented investigation involving diagnostic laboratories at Land Grant Universities and state departments of agriculture throughout the country. Ultimately, tens of thousands of plant samples were obtained from both originating and destination nurseries to enable regulatory officials to trace the sources and extent of the contamination. This required extensive inter-agency cooperation and coordination involving officials within NPDN, APHIS, US Forest Service, and state departments of agriculture and associated laboratories. Fortuitously, staff at NPDN laboratories were already trained to perform basic procedures to assay for *P. ramorum* and quickly proceeded to learn and deploy the APHIS-approved diagnostic protocol. By March 23 (*just two weeks after the initial discovery!*), several NPDN laboratories were authorized to receive samples from throughout the U.S., and the Network was fully ready to assist in the containment and eradication effort. When the first confirmations of *P. ramorum* outside of its Pacific coast range were reported in nursery samples from Florida (April 1) and Georgia (April 16), the need for NPDN laboratories to provide triage in support of APHIS-PPQ became immediately obvious. Supplemental USDA funding to buy needed supplies and employ skilled technicians proceeded without delay because of the USDA cooperative agreements in place at the NPDN institutions. In the ensuing months and into 2005, state and federal regulatory officials continued surveys to further trace the extent of the contamination. Most of their samples went to NPDN and affiliated state department laboratories with over 110,000 samples being processed during this period.

Sudden oak death (a.ka. ramorum blight), is an emergent and highly aggressive disease of many species of woody plants along the Pacific coast of North America. The primary species of economic and ecological importance are oaks and California bay laurels in coastal forests and various ornamental hosts in landscape and other settings. The causal agent was unknown to science prior to 1993 and was initially isolated from *Rhododendron* and *Viburnum* plants in Europe. It was formally characterized as *Phytophthora ramorum*, a new species, in 2001 and determined to be a disease agent worthy of regulatory action by state and federal agencies. In North America, the accidental shipment of *P. ramorum* infected nursery plants to uninfested parts of the country and threats of more of the same has resulted in immense economic and regulatory consequences.

What often goes overlooked because of the seamless, cooperative nature of NPDN partners is that the systems that the Network had put into place shortly after its establishment were critical for implementing the national plan quickly. At approximately $40 per sample, additional funds provided by USDA were crucial to enable the diagnostic laboratories to fully participate and to provide the needed surge support to regulatory laboratories. Unfortunately, two of the nurseries that were involved in the shipments of contaminated plants ceased operations at those facilities. However, the rapid detection and diagnostic capabilities provided by the NPDN enabled many nurseries with stock that was declared free of the pathogen to be allowed to quickly resume operations, thus averting catastrophic financial losses. *P. ramorum* continues to be a regulated, high consequence pathogen with periodic incidents over the years that have required the participation of NPDN labs (1,000-4,000 samples per year at university labs). NPDN's ongoing efforts in the training of diagnosticians and of first detectors enable our nation to be prepared for future outbreaks of *P. ramorum* and other significant plant pests and pathogens.

Synopsis:

- In March 2004, the pathogen causing sudden oak death /ramorum blight was detected in nurseries in southern California that had shipped plants to retail nurseries throughout the U.S., prompting a national effort to trace the sources and extent of the contamination.
- NPDN laboratories rapidly mobilized to prepare for the surge of samples anticipated during the forensic analysis.
- Over 110,000 samples were processed in NPDN laboratories during this episode, with 826 of those samples being confirmed positive using APHIS-PPQ approved protocols.
- The surge support provided by NPDN provided critical relief to federal and state regulatory diagnostic laboratories, and thereby enabled many nurseries with *Phytophthora ramorum*-free stock to be allowed to quickly resume operations, thus averting catastrophic financial losses.



Map: USDA APHIS-PPQ