Phytophthora ramorum Pathways: Water resource contamination in Washington State

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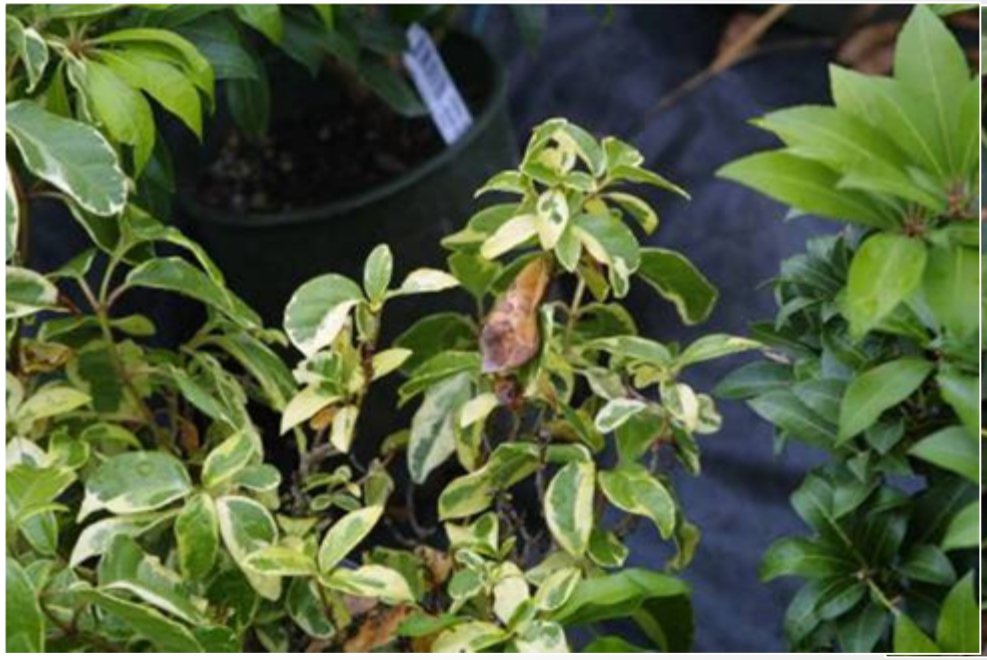
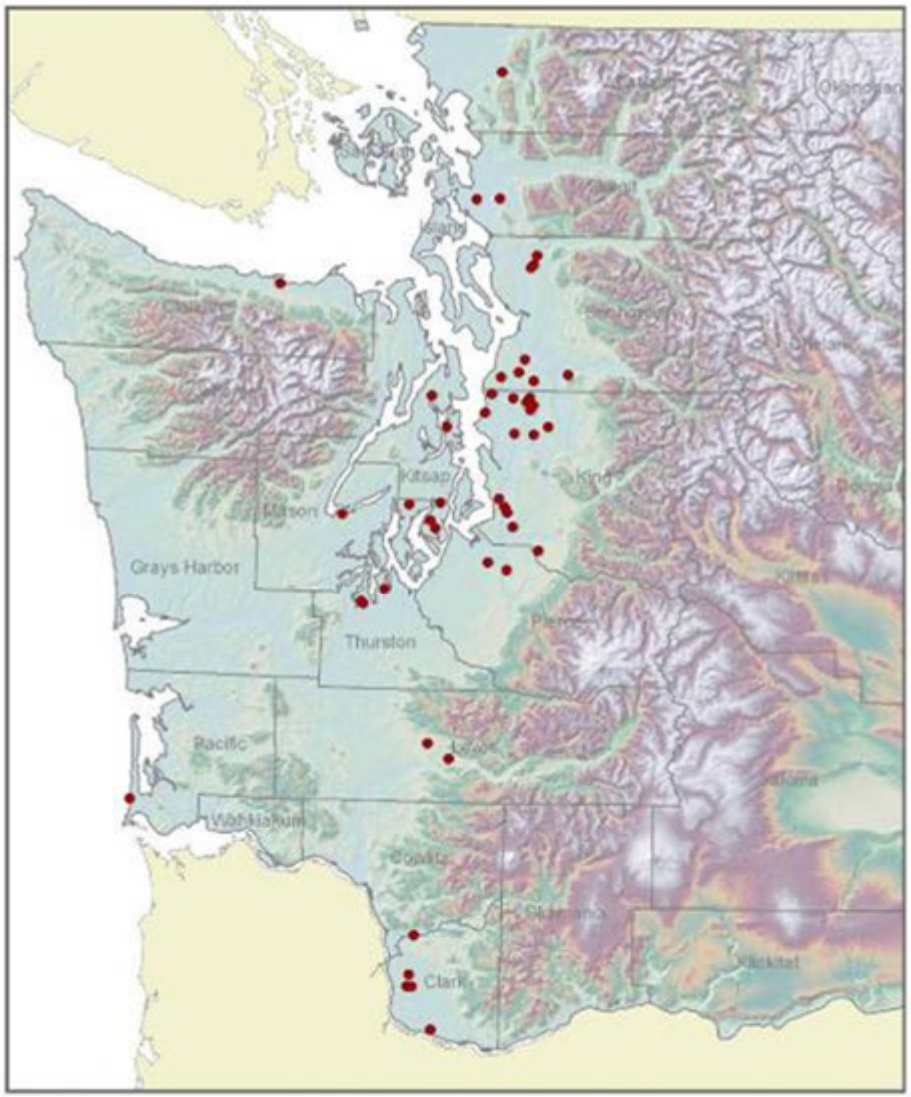
Topics

- *Phytophthora ramorum* in WA
- Spread from nurseries via waterways
- Management and regulatory challenges



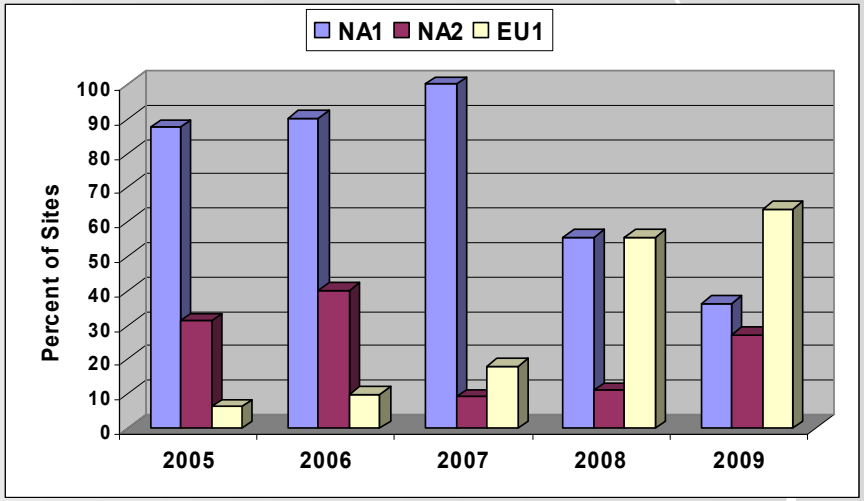
WSDA Nursery Surveys



Western Washinton
P. ramorum Positive Nursery Sites 2003-2010

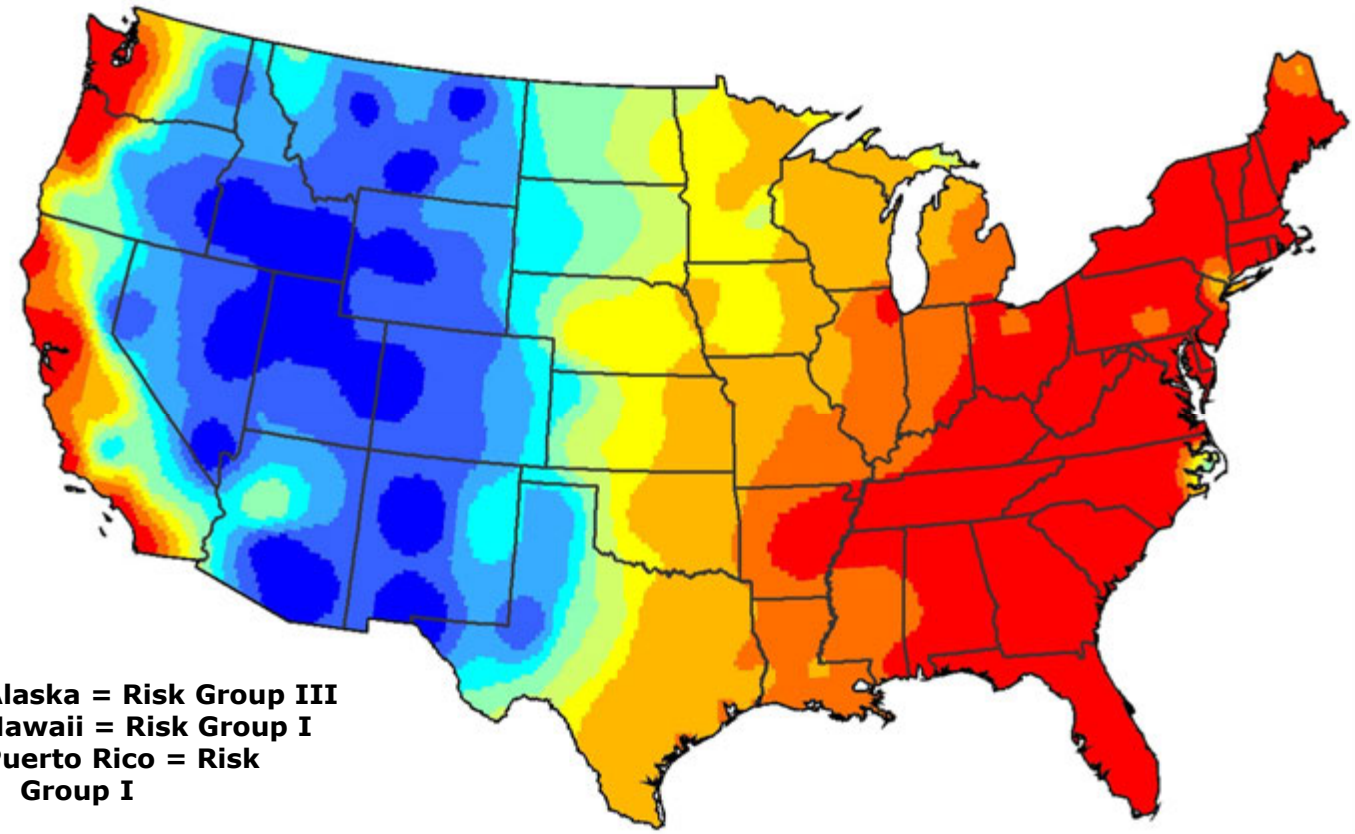
- First discovered in 2003
- A total of 48 nurseries
- All three lineages present

Detection of all 3 lineages

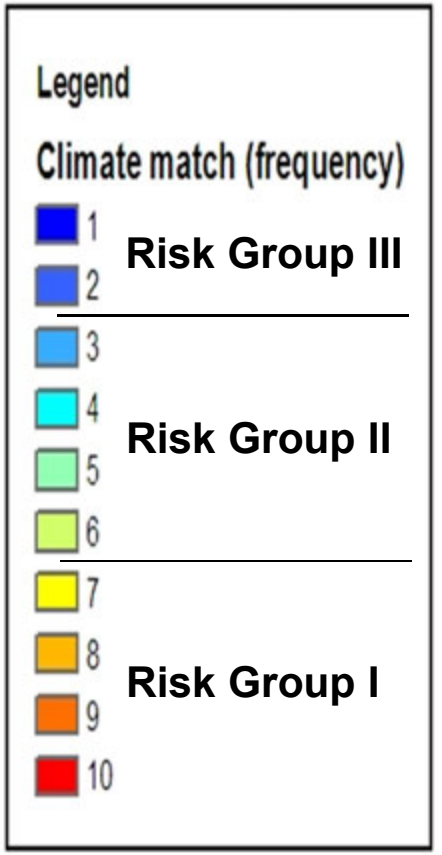


EU1 – Europe (A1)
NA1 – Most common in N. America (A2)
NA2 – "Washington" clade (A2)

Annualized P. ramorum Climate Matching by area in USA



Alaska = Risk Group III
Hawaii = Risk Group I
Puerto Rico = Risk Group I



WSDA and DNR have been monitoring spread in water










P. ramorum Detection in Water (2006-2011)

King County

- Sammamish River
- Ditch/pond by Nursery #34
- Little Bear Creek
- Wooden Creek
- Industrial ditch

Pierce County

- Rosedale Stream
- Ditch by Nursery #45

Thurston County

- Ditch by nursery #41

Clark County

- Ditch by nursery #44

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Clark County

- Ditch by nursery #44

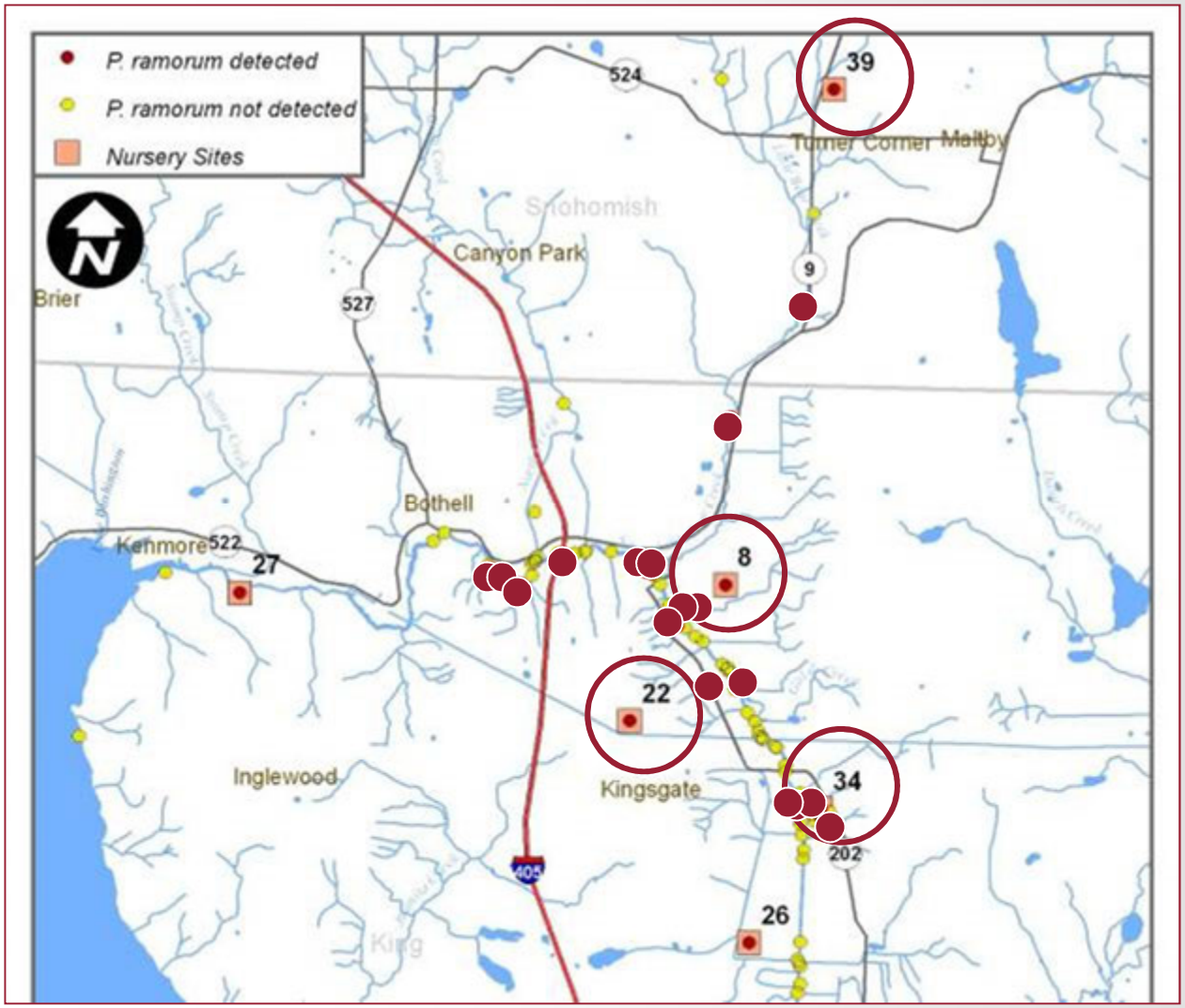
Mystery on the Sammamish River

What are the sources of contamination?

"+" Since 2007 - NA1 (2, 5, 12), NA2, & EU1

Mystery on the Sammamish River

What are the sources of contamination?



- NA1 and NA2 may have come from four nurseries.
- The source of the EU1 is unknown.
- Baiting residential storm water retention ponds may be an effective way to determine if inoculum is coming from landscape plants.

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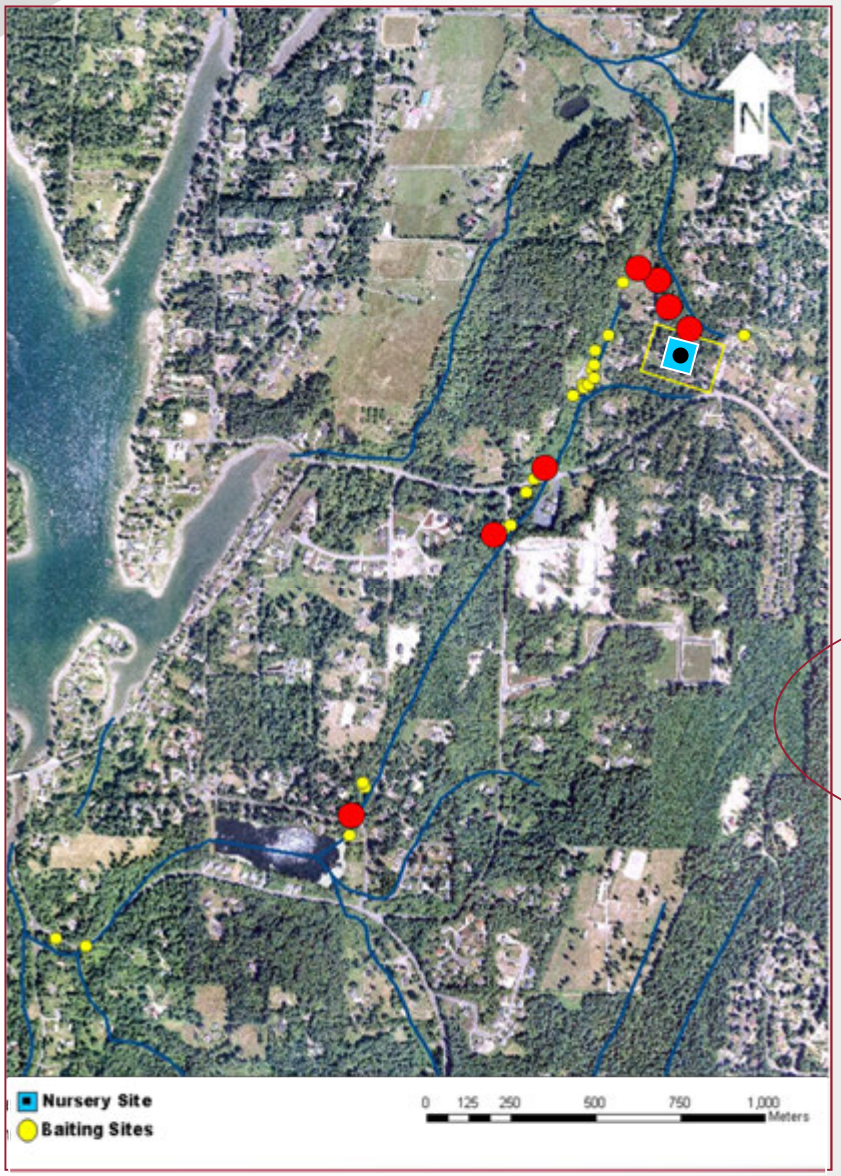
Thurston County
- Ditch by nursery #41

Clark County
- Ditch by nursery #44

Rosedale Stream and Nursery No. 19 in Pierce Co., WA



Chronology

Plants at nursery
"+" 2004 & 2005, NA1 (8)
"-" 2006-2010

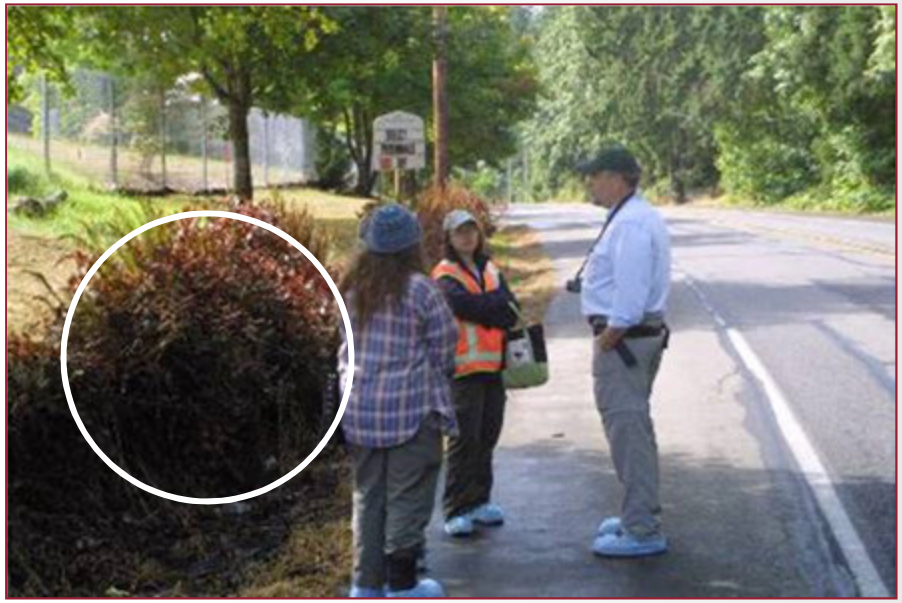
Soil at nursery
"+" 2005, NA1 genotype (8, 25, 46, 47)
"-" 2009 (not tested 2006-08, 2010)

Rosedale Stream (seasonal)
"+" 2006 - 2011, NA1 genotype (5, 8, 25, 46, and 60)

Streamside vegetation surveys
"-" to date

Gil Dermott - WSU

Nursery No. 45 in Pierce Co. with Spread to Salal Plants and Soil



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Nursery No. 45 in Pierce County, WA

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P. ramorum Detection in Water (2006-2011)

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- Little Bear Creek
- Wooden Creek
- Industrial ditch

Pierce County
- Rosedale Stream
- Ditch by Nursery #45

Thurston County
- Ditch by nursery #41

Clark County
- Ditch by nursery #44

Nursery No. 41 in Thurston Co., WA

Chronology

Plants at nursery

"+" 2008 - 2010. EU1

Soil at nursery

"+" 2008. EU1

"-" 2009, 2010

Water nursery

"+" 2008 - 2010. EU1

Off nursery site ditch

"+" 2010, 2011. EU1

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- Wooden Creek
- Industrial ditch

Pierce County
- Rosedale Stream
- Ditch by Nursery #45

Thurston County
- Ditch by nursery #41

Clark County
- Ditch by nursery #44

Nursery No. 44 in Clark County, WA

Chronology

Plants at nursery

"+" 2008 - 2010. NA1 (5, 8, 22, 61)

Soil at nursery

"+" 2008 - 2010. NA1 (5, 22, 62, 63) and EU1

Pond and drainage ditch on nursery

"+" 2008 - 2010. NA1 (2, 5)

Off site ditch

"+" 2010 & 2011. NA1 (2, 5, 22)

Persistence in WA Waterways

County	Waterway	Year					
		2006	2007	2008	2009	2010	2011
King Co.	Sammamish River		****	****	****	****	****
	Ditch/pond by #34		****	-----	****	****	****
	L. Bear Creek					****	****
	Wooden Creek					****	****
	Industrial ditch					****	****
Pierce Co.	Rosedale Stream	****	****	****	****	****	****
	Ditch by #45				****	****	****
	Salal				****	-----	-----
	Soil in ditch						****
Thurston Co.	Ditch by #41					****	****
Clark Co.	Ditch by #44					****	****

Summary

- *All three lineages of P. ramorum have spread from nurseries into water in WA.*
- *The spread of the NA2 lineage onto salal plants illustrates the importance of this pathway for the spread of P. ramorum from nurseries to plants and soil in the landscape.*

The population structure of *P. ramorum* in WA increases the risk that the NA2 and EU1 lineages will spread to the landscape

Topics

- *Phytophthora ramorum* in WA
- Spread from nurseries via waterways
- **Management and regulatory challenges**

Management of *P. ramorum* in Waterways Starts at the Nursery

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Best Management Practices

Should positive nurseries be required to address water issues on their site?

Management of *P. ramorum* in Waterways Starts at the Nursery

Treatment of Water Leaving the Nursery – Need low cost, ecologically effective approaches

Regulatory Issues Relating to *P. ramorum* in water

- "Disease" vs. "Pathogen"
- Need clearly defined triggers and responses
- Need clearly defined roles & responsibilities
- Need a policy relating to notification of water user

Dan Omdal and Amy Ramsey-Kroll – WA DNR

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WSU SOD Research & Education Program
http://www.puyallup.wsu.edu/ppo/sod.html

Thank You

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