

# Western Update



Nik Wiman, Oregon State University  
(many coauthors)

12/1/15 NEIPM BMSB WG

N Wiman OSU



# Ecoregions

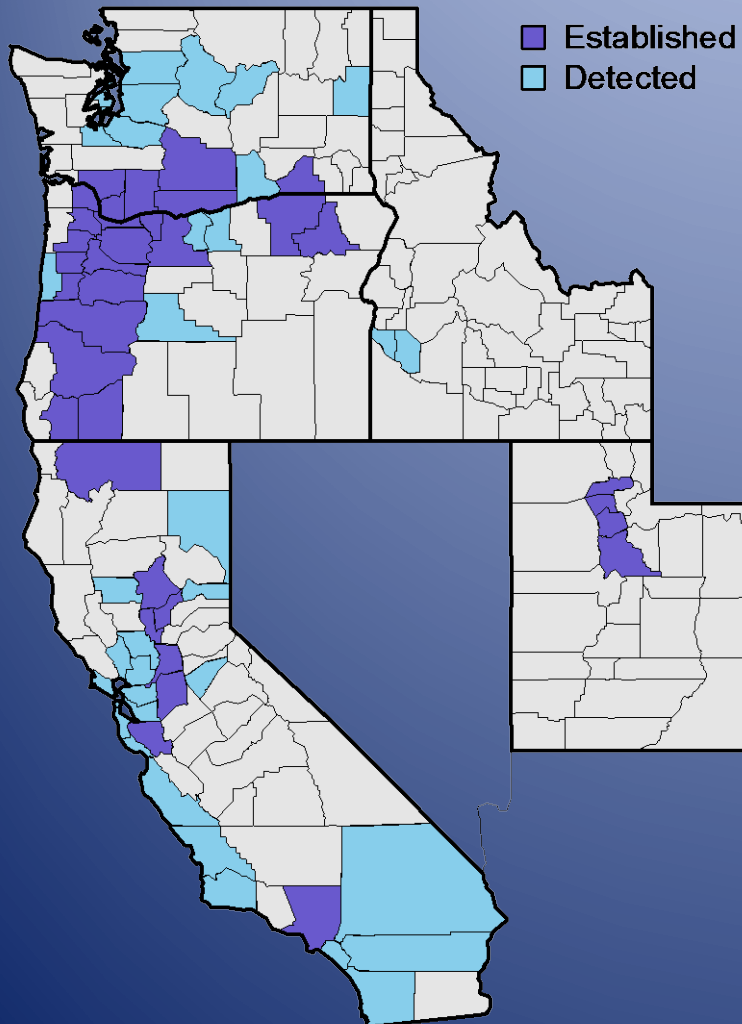


ed  
:  
ALL NOW Have BMSB

# Map Definitions

- **Established**: multiple stages found in successive years, or compelling evidence of large population (been there a while)
- **Detected**: one or two found, single stage, potential hitchhiker (often indicates an established population in the area)

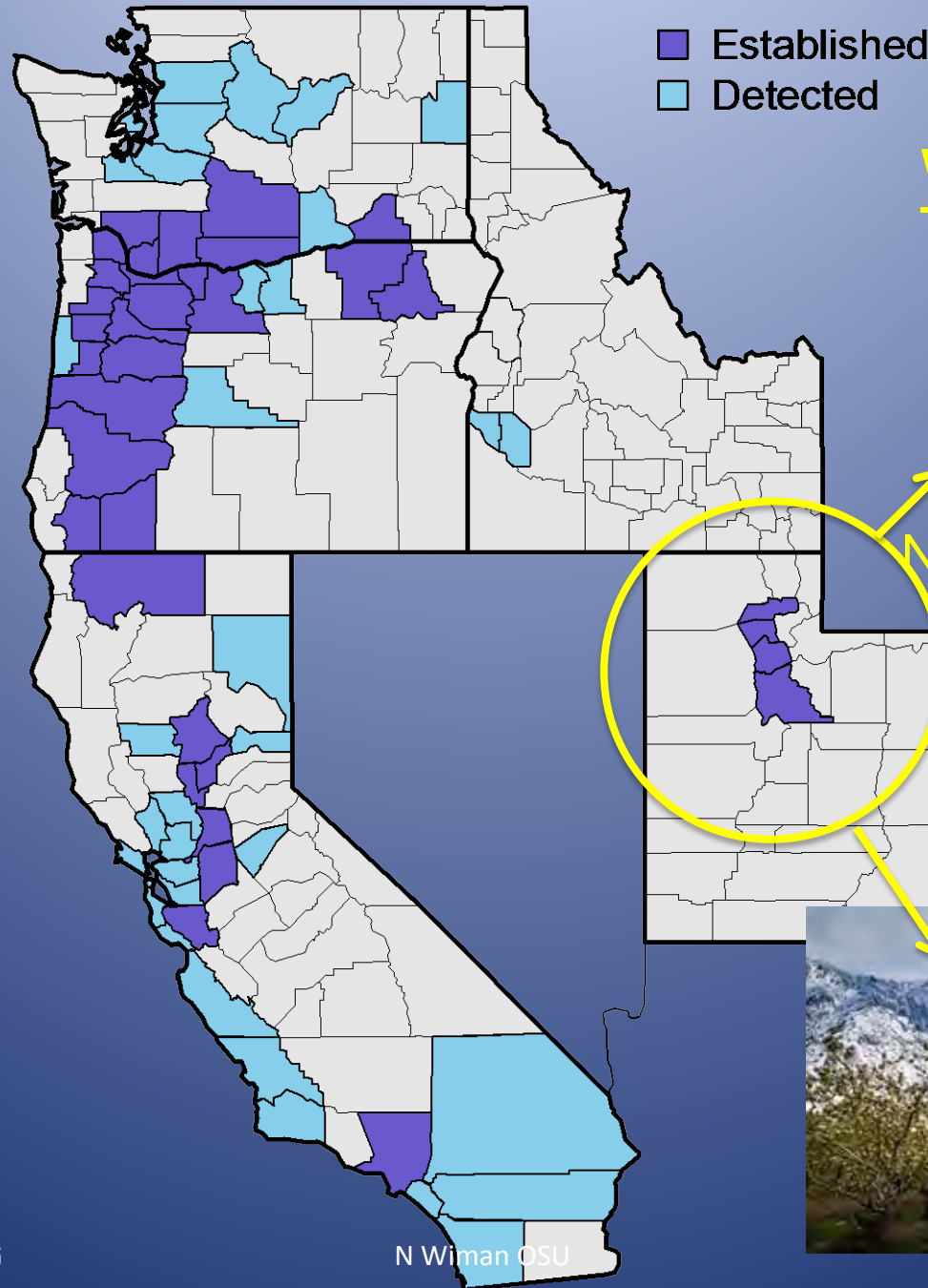
# Current Status



Map is changing rapidly:

OR relatively stable  
(2 new detects)

New Counties in WA, UT  
New Counties in CA



## Wasatch Front

Urban Problems  
Urban/ag interface  
\$30 mill tree fruit  
Apples/cherries

New established pops



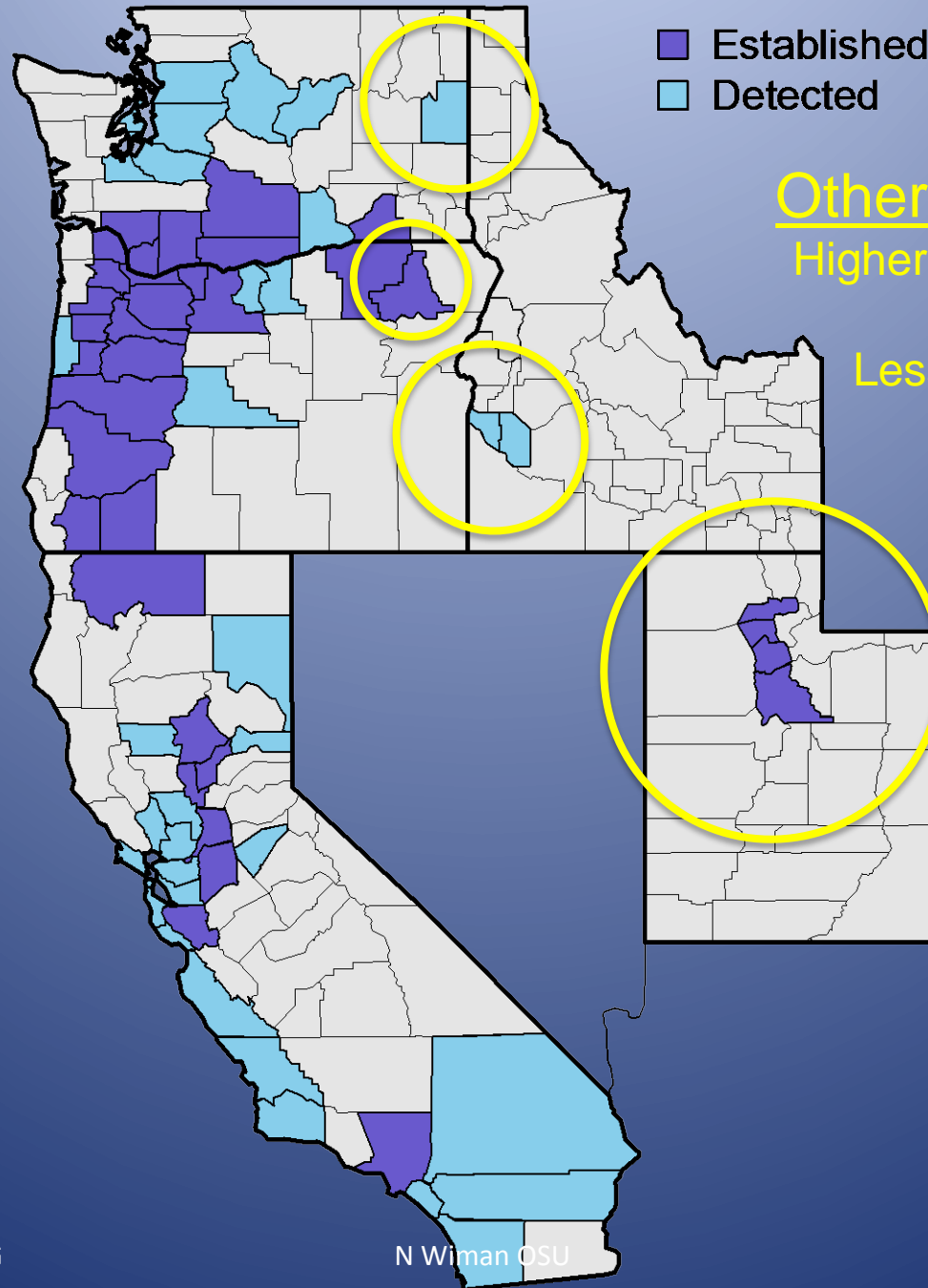
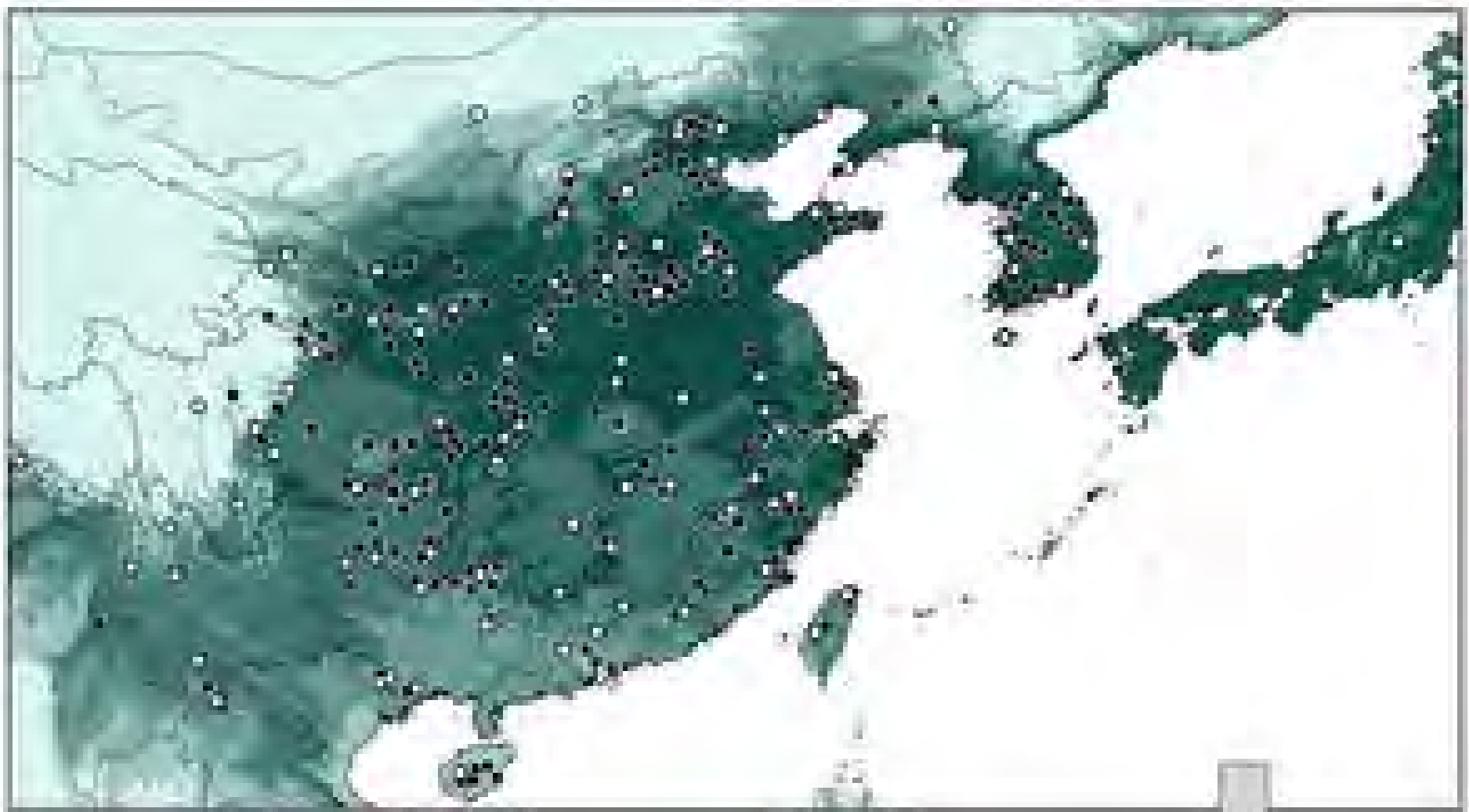


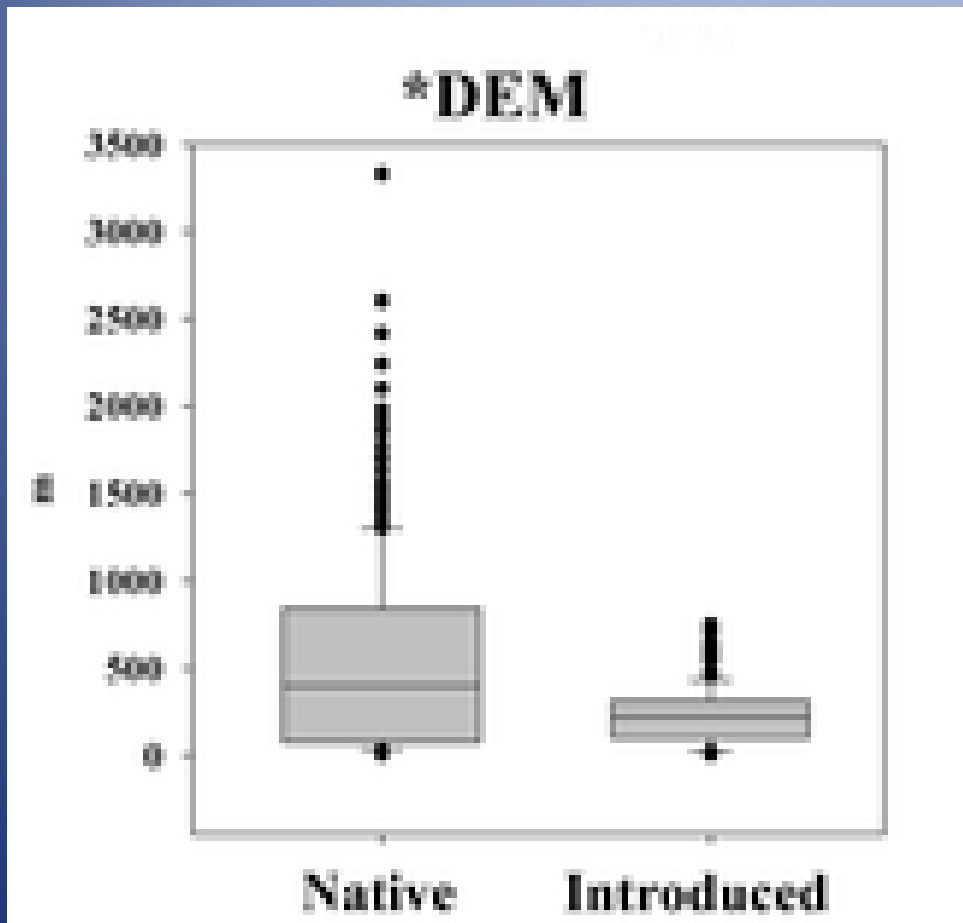
Figure 1. Direct comparison of BMSB occurrence-associated variables between native and introduced distributional areas.



Zhu G, Bu W, Gao Y, Liu G (2012) Potential Geographic Distribution of Brown Marmorated Stink Bug Invasion (*Halyomorpha halys*). PLoS ONE 7(2): e31246. doi:10.1371/journal.pone.0031246

<http://journals.plos.org/plosone/article?id=info:doi/10.1371/journal.pone.0031246>

Figure 1. Direct comparison of BMSB occurrence-associated variables between native and introduced distributional areas.



Median: approximately 500 m  
(1,640 ft)

Maximum: approxi. 3400 m  
(11,154 ft)

Many sites in 6,000 ft range

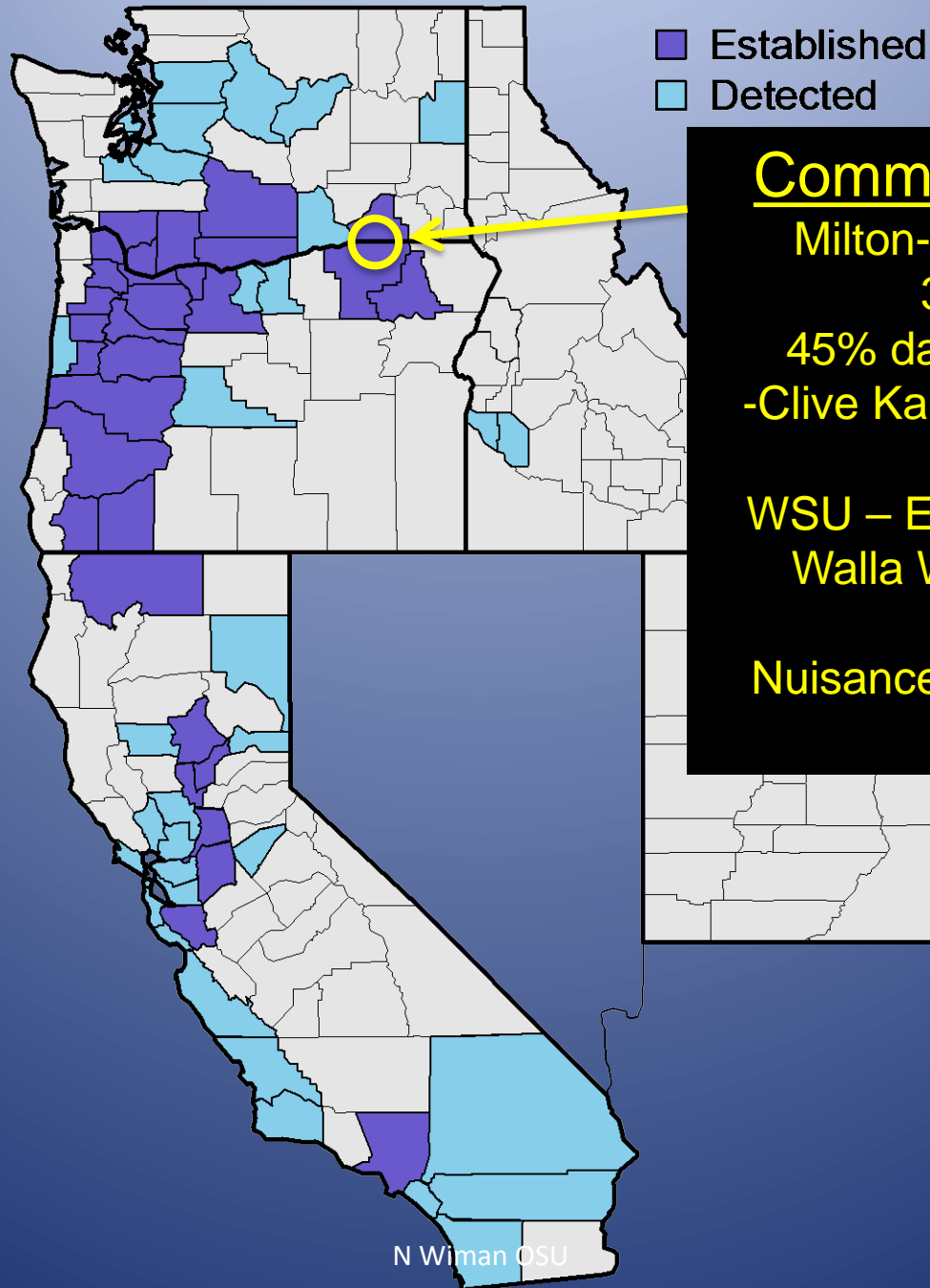
Zhu G, Bu W, Gao Y, Liu G (2012) Potential Geographic Distribution of Brown Marmorated Stink Bug Invasion (*Halyomorpha halys*). PLoS ONE 7(2): e31246. doi:10.1371/journal.pone.0031246

<http://journals.plos.org/plosone/article?id=info:doi/10.1371/journal.pone.0031246>



Government Camp





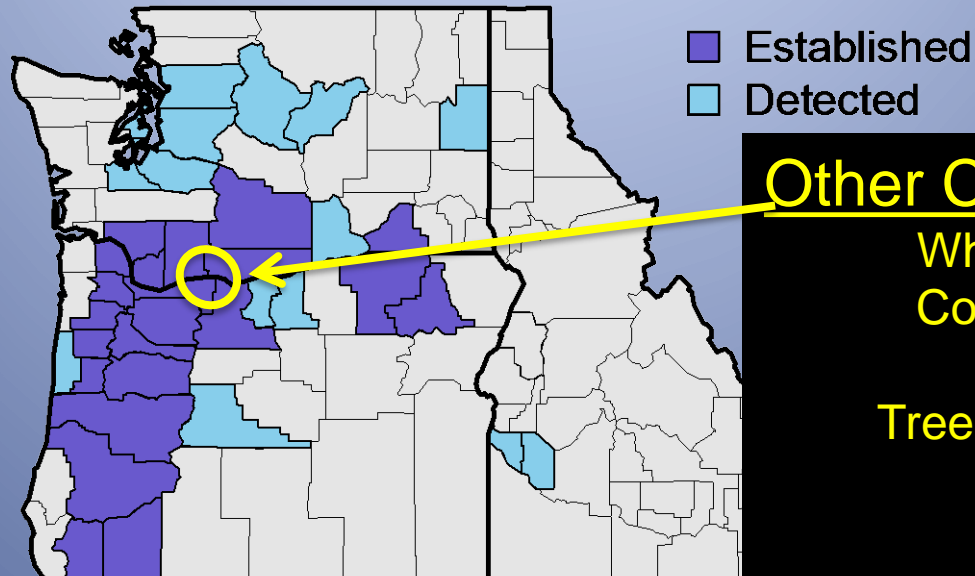
## Commercial Damage

Milton-Freewater Apples  
3,000 acres

45% damage to grannies  
-Clive Kaiser, OSU Extension

WSU – Easy to find BMSB in  
Walla Walla wine grapes

Nuisance problems in Walla  
Walla

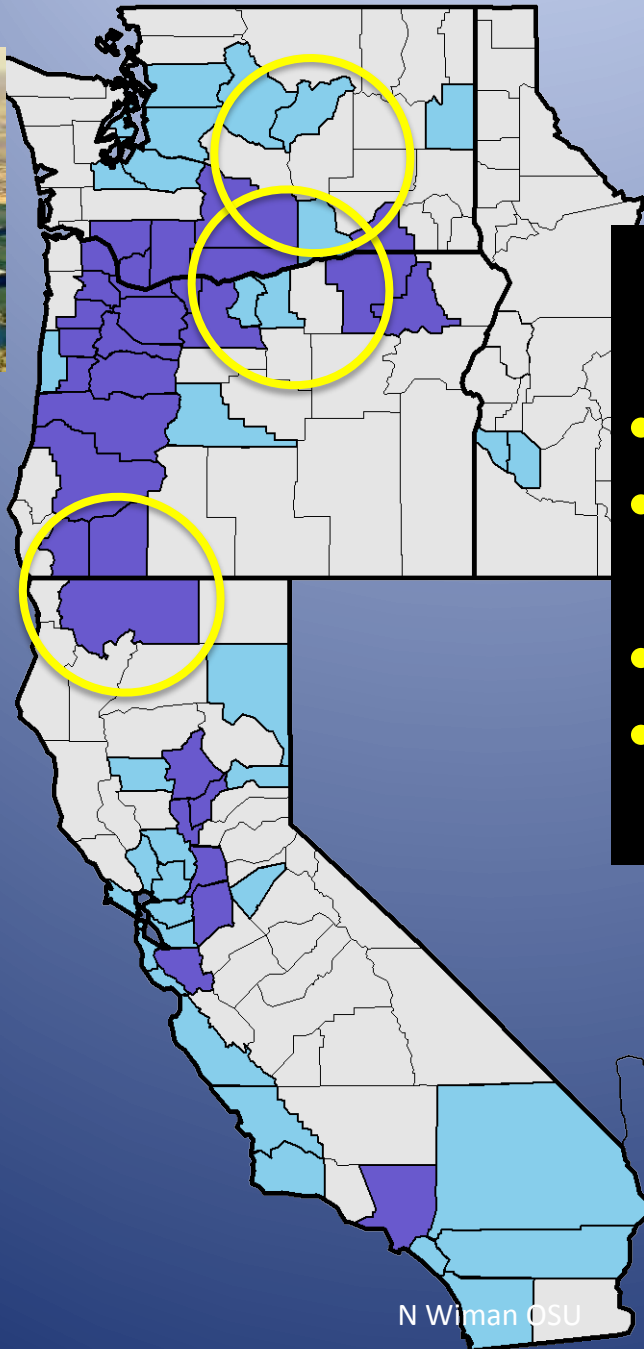


### Other Commercial Finds

- White Salmon WA
- Commercial pears
- Mosier OR
- Tree fruits and grapes
- Maryhill WA
- Wine grapes

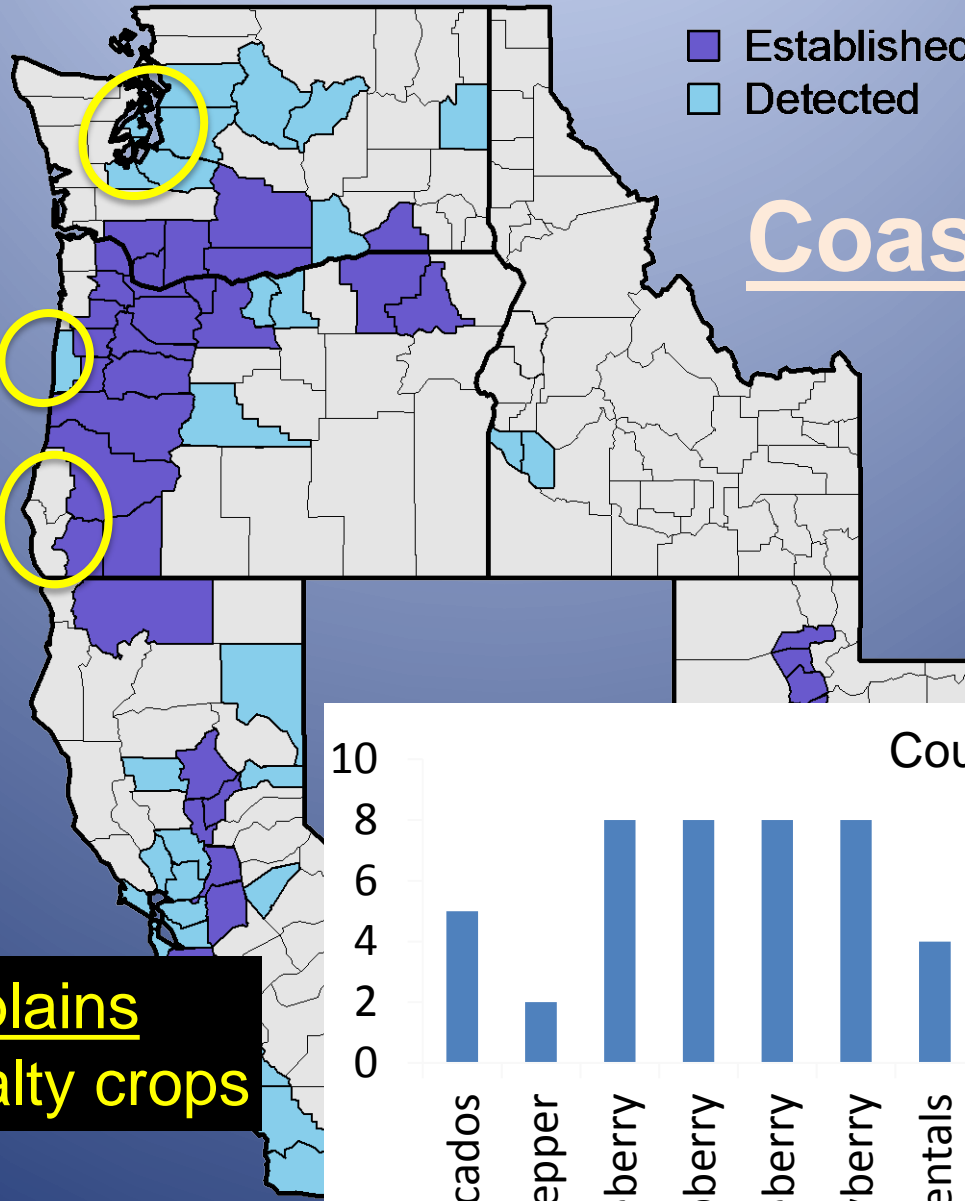
■ Established  
■ Detected

Irrigated Desert  
High production :  
• Tree fruits  
• Wine grapes  
  
• SO far, no damage  
• Few nuisance issues



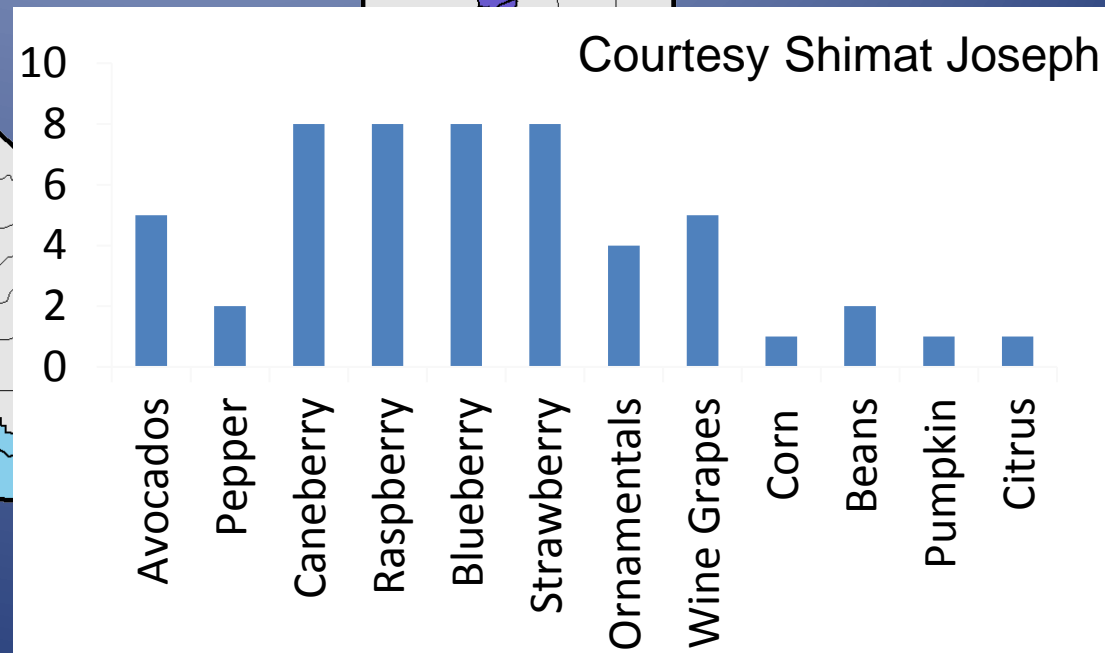
**PNW Coastal**  
Minor fruits  
Nursery  
Very wet

Cranberries  
Cassie Bouska  
OSU Extension  
Coos/Curry

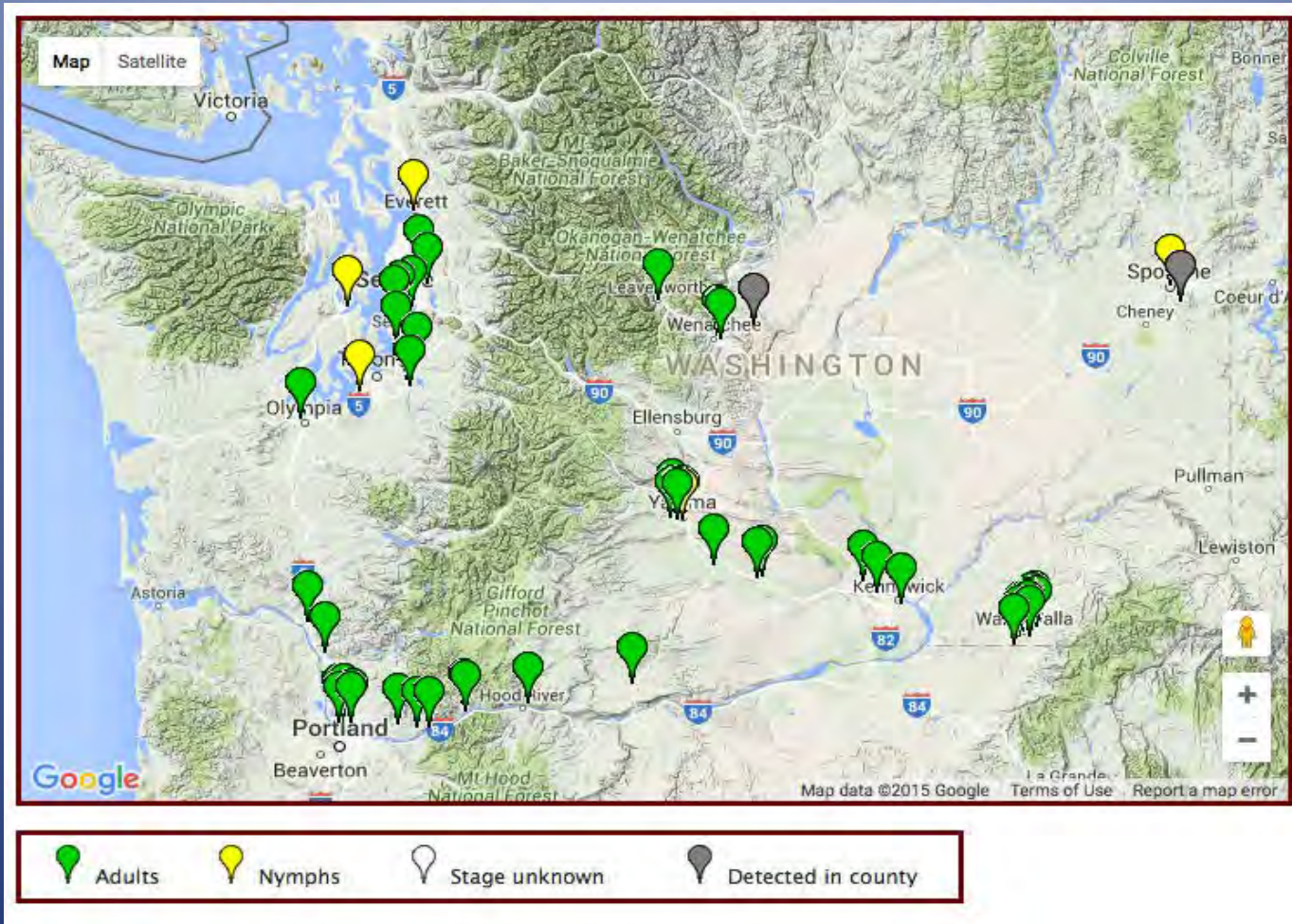


# Coastal Areas

**CA coastal plains**  
Important specialty crops



# WSU reports -online



# Willamette Valley – the epicenter

“We are at our wits end. Is there any research in their eradication that that looks promising.”

# New specialty crop issues



“Nursery Stock”

State tests for 51 pesticides on legal marijuana begins spring  
'16

“wild west”

N Wiman OSU



# BMSB in nut crops



- OR has the unfortunate distinction of having the first nut crop to be affected by BMSB, next CA?
- SB problematic on nuts worldwide

# BMSB in Hazelnuts



- Huge growth in this Willamette Valley industry:
  - 40k acres to 100k acres in 10 years
- Soon eclipse pears as OR's biggest orchard crop
- Processors reporting damage 2015 – corking

# BMSB Damage

- Early feeding: blank nuts
  - Kernel expansion: shriveling
  - Mature nut: corking
- Chris Hedstrom Thesis

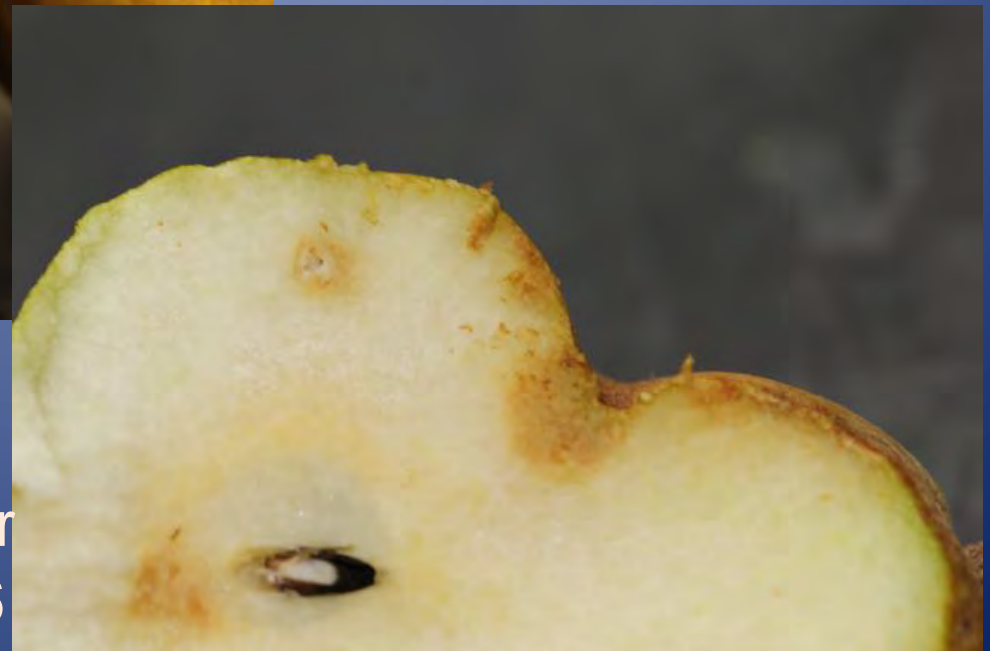


Indicates late season orchard immigration

# More WV commercial damage



European pear

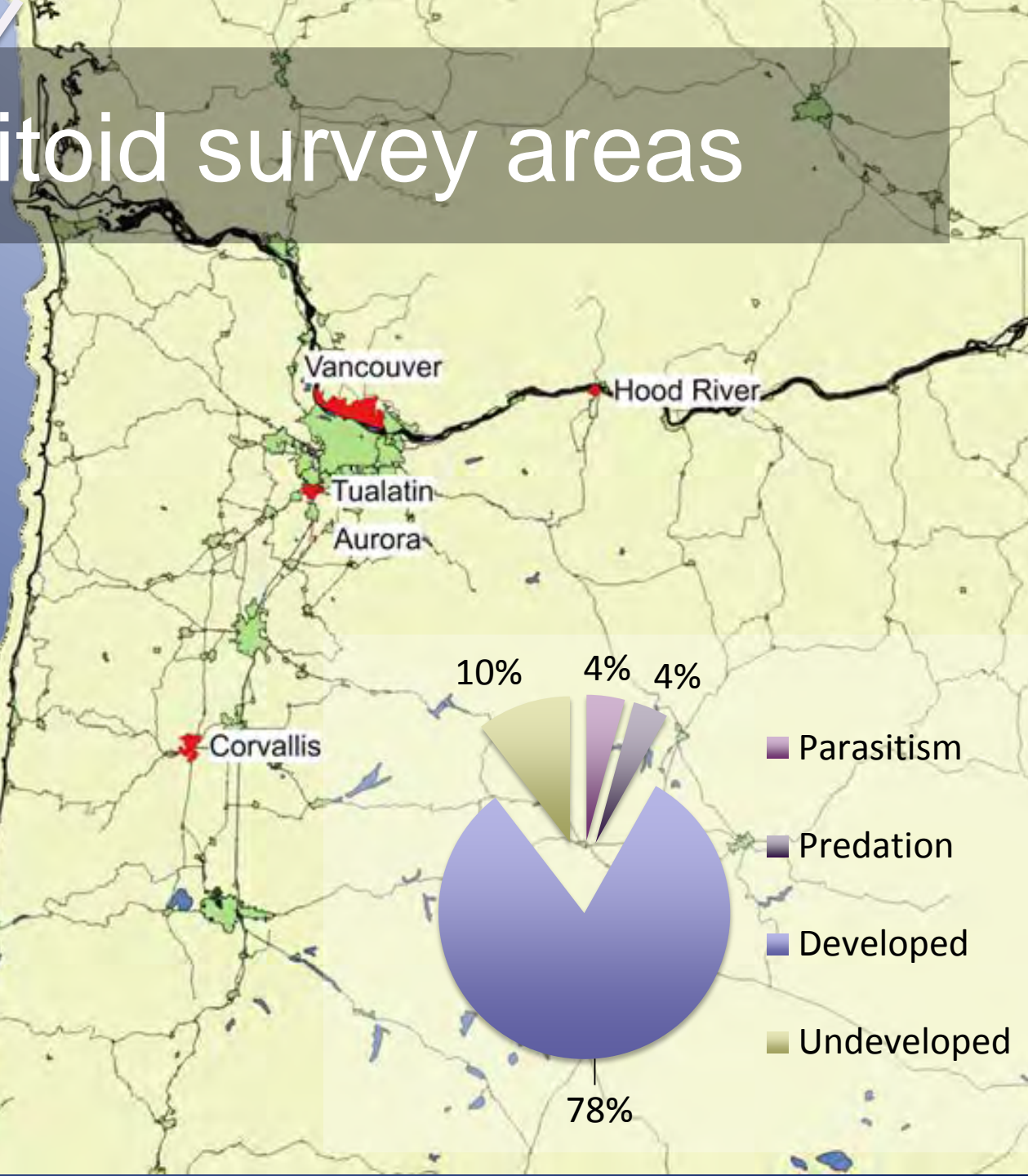
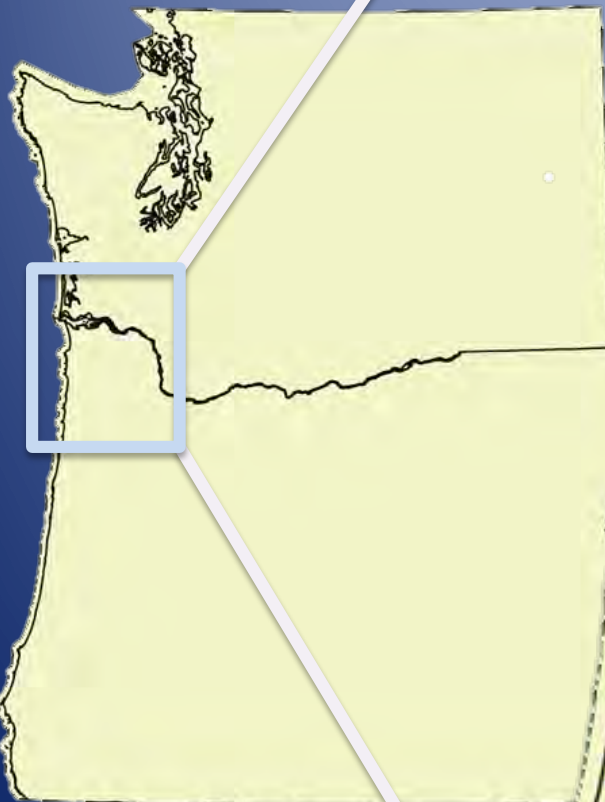


~200 ac farm  
Heavy BMSB losses on pear  
Will be spraying BMSB 2016

# Status Summary

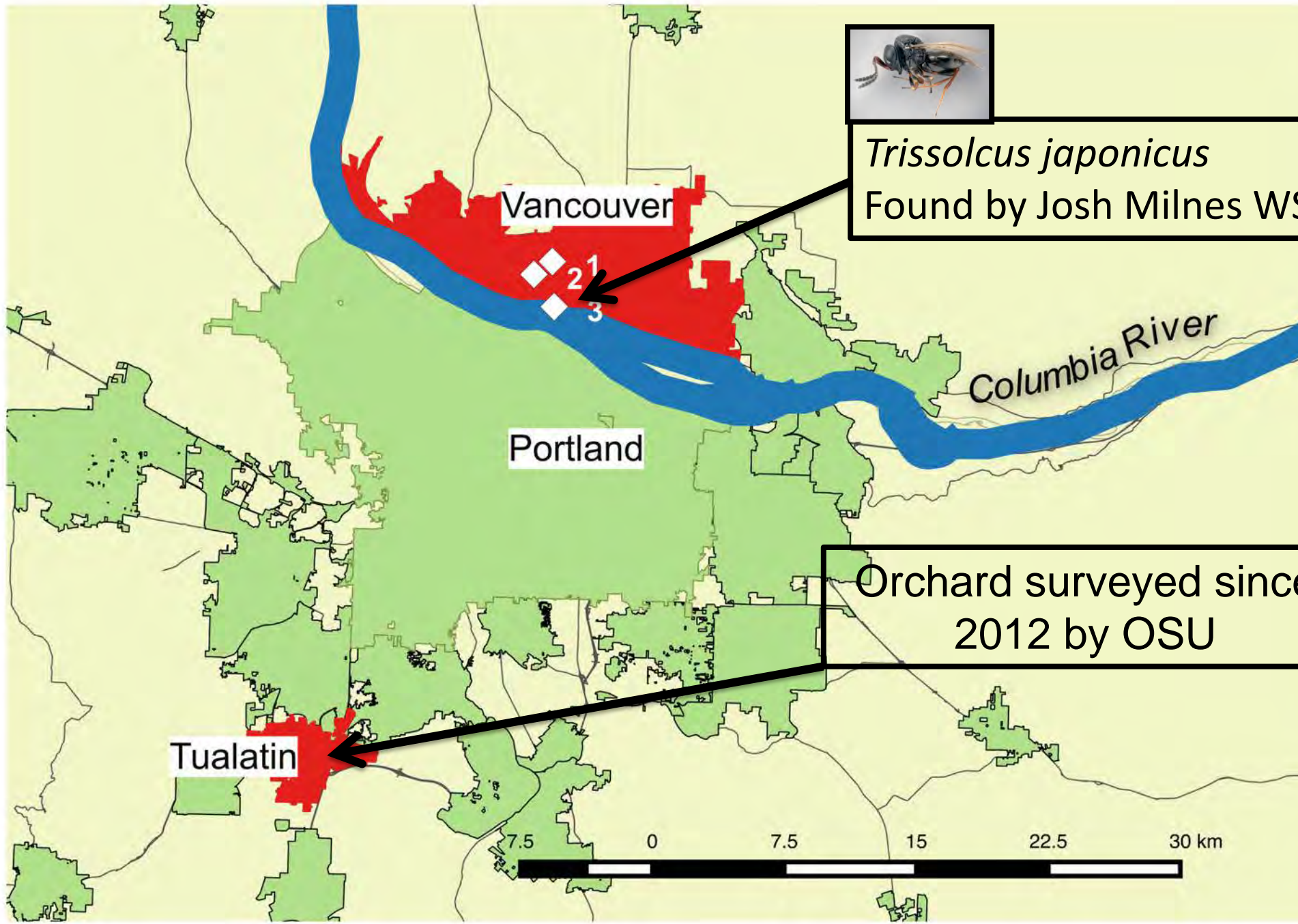
	Nuisance	Vegetables	Small fruits	Tree Fruits	Tree nuts
OR	X	X	X	X	X
WA	X			X	
CA	X				
UT	X				

# Parasitoid survey areas





*Trissolcus japonicus*  
Found by Josh Milnes WSU



# Shipping lanes





# Do we expect similar environmental adaptation for all BMSB haplotypes?

Tremendous  
environmental variation  
in home range

Predicting infestation in  
areas where BMSB isn't  
doing well, e.g., the  
coastal plains of SE US –  
wrong BMSB type?

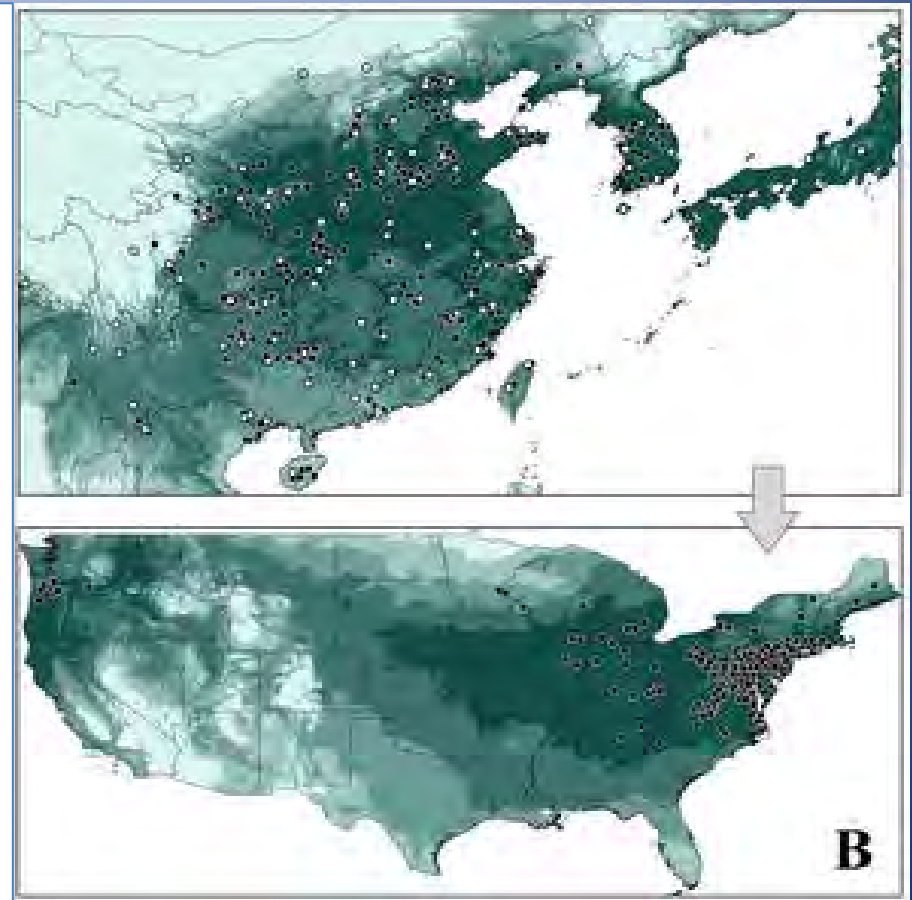


Figure 3. Niche model based on reduced native records and projected onto the US using Maxent.  
(see Waldenbach)

Zhu G, Bu W, Gao Y, Liu G (2012) Potential Geographic Distribution of Brown Marmorated Stink Bug Invasion (*Halyomorpha halys*). PLoS ONE 7(2): e31246. doi:10.1371/journal.pone.0031246

<http://journals.plos.org/plosone/article?id=info:doi/10.1371/journal.pone.0031246>



# Planning grant: Addressing the threat of BMSB in the western US

Nik Wiman, PD

USDA-NIFA-SCRI #2014-51181-22514



# Western Problems Highlighted

- Massive specialty crop production
  - (CA almonds \$5.8 billion, grapes \$5.6 billion, tomatoes \$1.2 billion, WA apples \$2 billion)
- Specialty crop diversity
- Valuable export markets
- Unique environment types

# Western Specialty Crops

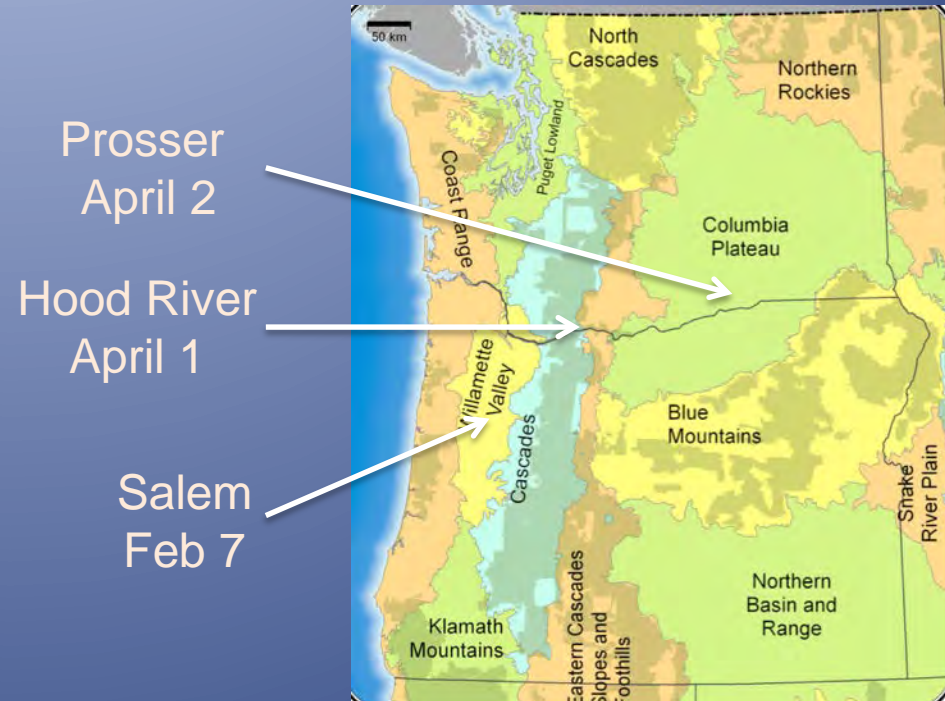


# Field-up approach

- Stakeholder focus groups/workshops
  - Asses current knowledge and attitudes
  - Query research and Extension priorities
- **Baseline data** - good for future projects, whatever the outcome of our project/funding situation
- Planning meeting: April 29-30, Portland OR

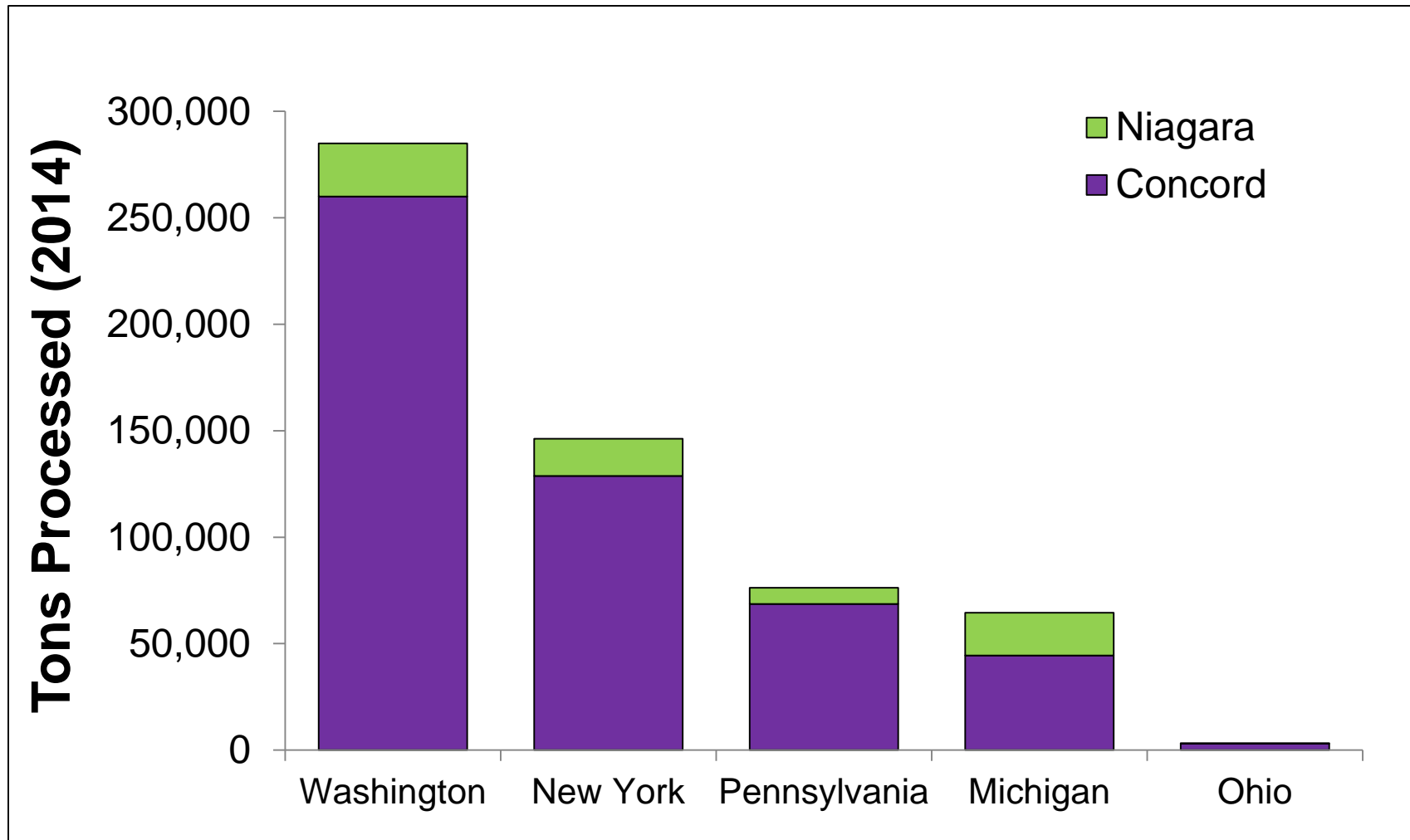
# OR/WA Focus Groups

- Gwen-Alyn Hoheisel<sup>1</sup>, Todd Murray<sup>1</sup>, Steve Castagnoli<sup>2</sup>, Peter Shearer<sup>2</sup>, Nik Wiman<sup>2</sup> (<sup>1</sup>WSU, <sup>2</sup>OSU)
- Prior assumptions: many have experienced BMSB
- Urban issue is severe, increasing agricultural





# WASHINGTON #1 JUICE GRAPE PRODUCER



Slide Courtesy of Michelle Moyer, WSU



## JUICE GRAPE PRODUCTION

- Total acreage is declining due to fruit surplus
- While \$ / ton is low, so are production inputs
  - Little to no pesticides (almost spray free)
  - Fertilizers and water only major inputs
  - All aspects mechanized



## THE PERFECT CLIMATE FOR BLUEBERRIES?

### Western WA



Acidic soils, cooler temps  
~5 yrs to full production  
Many insects and diseases

### Eastern WA



Basic soils, higher temps  
~3 yrs to full production  
SWD sprays only



## BMSB CONCERNS

- Everyone knowledgeable of BMSB
- Of 'very' to 'moderate' concern, but no BMSB present
- Yep, give \$ for research and education
- Extension priorities:
  - Diagnosing injury → disseminate IPM plans → Education programs → public awareness



## BMSB CONCERNS

- Netting
  - Feasible but not economical in concords,
- Possible Area Wide Controls
  - Worked for CM, but concern over homeowners
- Electric Deterrents or odd cultural controls
  - Everything is trellised, worker safety?
- Airblast before mechanical harvest
  - Helps with juice but not fresh market. Will it work?
- Juice production
  - Does heat step eliminate pheromone?



# JOE'S PLACE FARMS

Joe Beaudoin

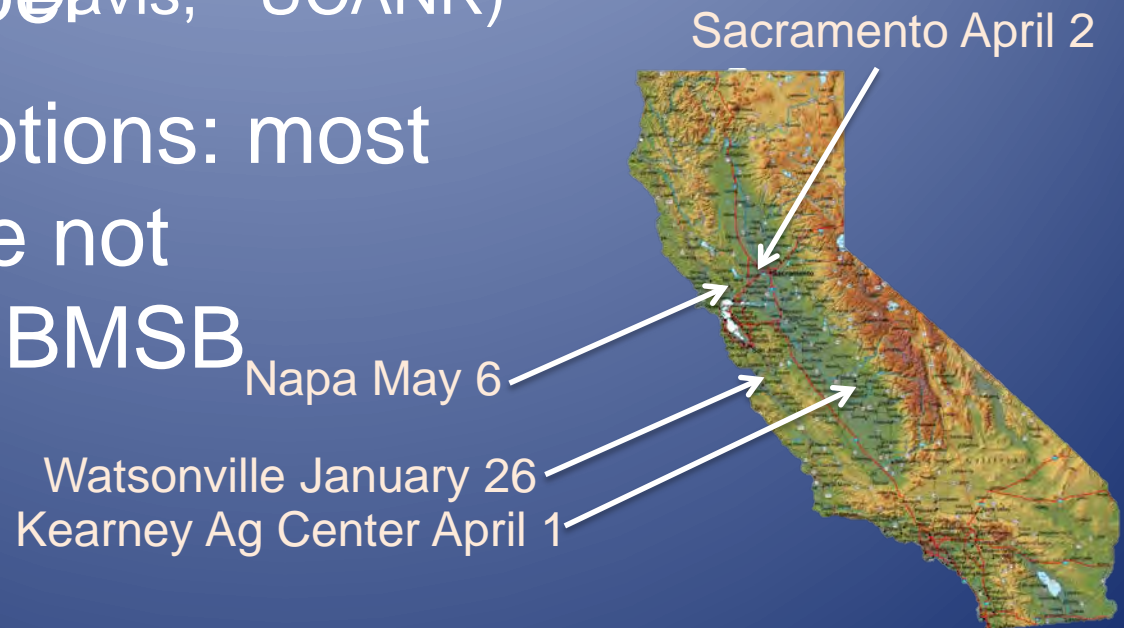
12/1/15

N Wiman OSU

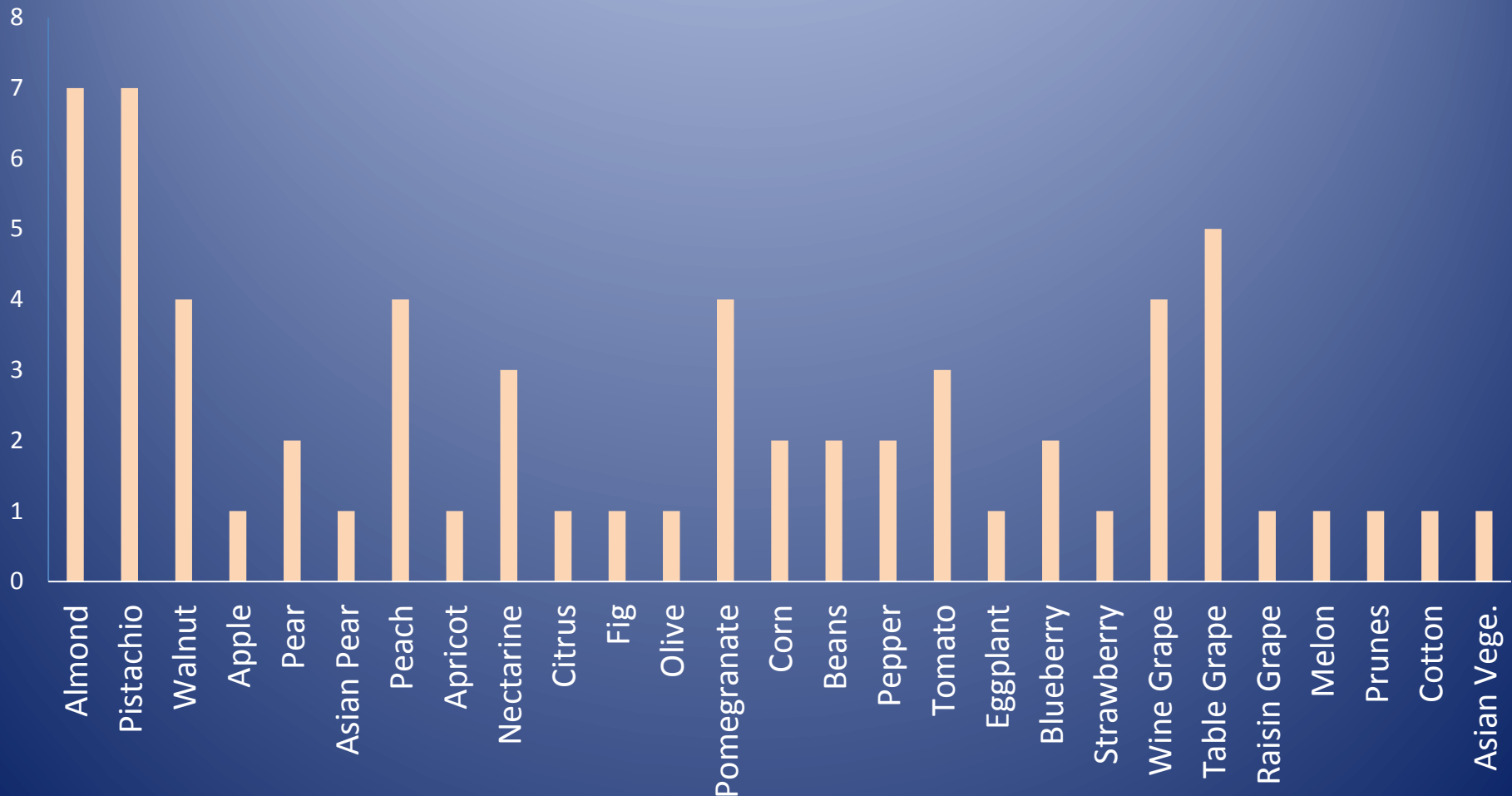
36

# California Focus Groups

- Larry Godfrey <sup>1</sup>, Frank Zalom <sup>1</sup>, Chuck Ingels <sup>2</sup>, Shimat Joseph <sup>2</sup>, Lucia Varela <sup>2</sup>, Monica Cooper <sup>1</sup>, Cooper Davis, <sup>2</sup> UCANR)
- Prior assumptions: most growers have not experienced BMSB



# Specialty crop production: Sacramento area (Chuck Ingels)

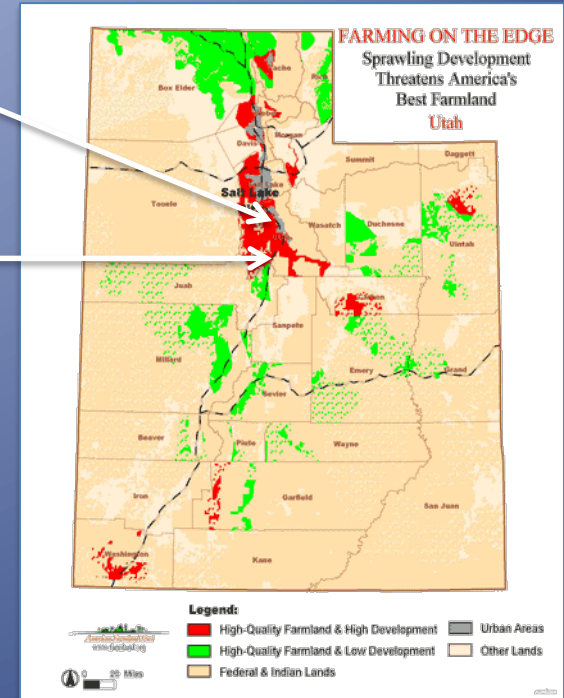


# Utah Focus Groups

- Lori Spears and Diane Alston (USU)
- Prior assumptions: most growers have not experienced BMSB
- Mostly urban issue

West Jordan  
Feb 18

Spanish Fork  
Jan 23

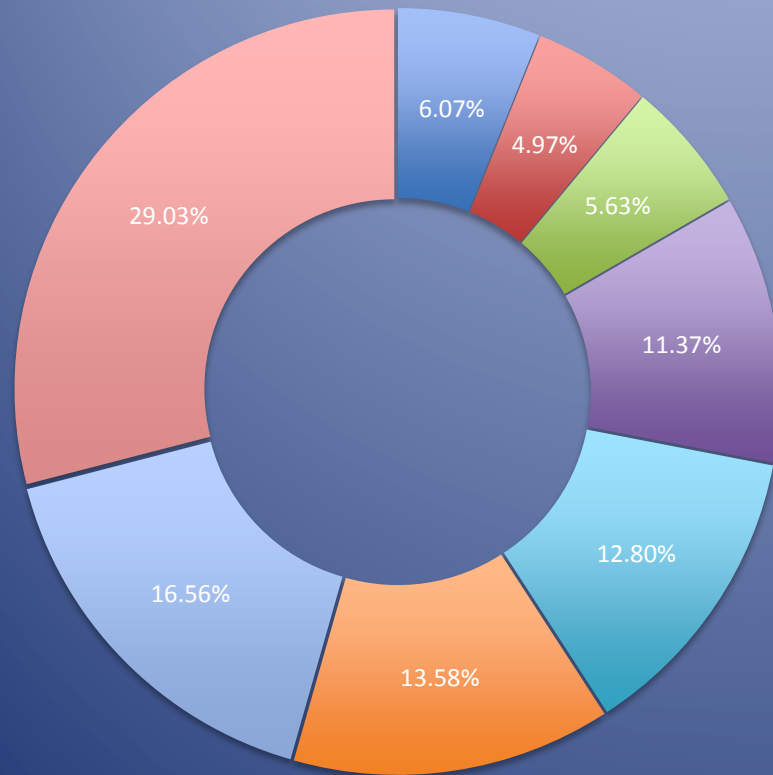


## 2015 BMSB SCRI Western States Planning Grant Meeting – Radisson Hotel, Portland Airport, 6233 NE 78<sup>th</sup> Ct, (503)-251-2000

4/29/15	Time	Title	Format	Presenter
	9:00 AM	Registration/orientation		
	9:30 AM	Welcome/agenda notes	presentation	Nik Wiman
	9:45 AM	Introductions	discussion	
	10:00 AM	CA stakeholder data summary	presentation	Larry, Chuck, Lucia, Rachel
	10:30 AM	Refresher		
	10:30 AM	UT stakeholder data summary	presentation	Lori Spears and Diane Alston
	11:00 AM	WA/OR stakeholder data summary	presentation	Gwen Hoeheisel and Todd Murray
	11:30 AM	Grower perspective on BMSB issues	presentation	Joe Beaudoin
	12:00 PM	Working Lunch: BMSB Research/status updates	discussion	
	1:00 PM	Needs/opportunities for biology & manage. of BMSB	presentation	Tracy Leskey
	2:00 PM	Biological Control - status and needs for classical and conservation BC	presentation	Kim Hoelmer
	3:00 PM	Refresher		
	3:15 PM	Biological Control update for CA	presentation	Ricky Lara
	3:45 PM	Setting research and Extension priorities	discussion	
	4:45 PM	Stakeholder relevancy of priorities/ranking	discussion	
	5:15 PM	End		
4/30/15	Time	Title	Format	Presenter
	8:00 AM	Identifying skills sets & teams based on priorities	discussion	
	9:00 AM	Identifying/Integrating with other teams	discussion	
	9:30 AM	Developing the logic model (inputs, outputs, outcomes)	discussion	
	10:30 AM	Refresher		
	10:45 AM	Strategizing and timeline	discussion	
	11:15 AM	Writing team	discussion	
	12:00 PM	Working lunch - open discussion	discussion	
	1:00 PM	Summary/wrap-up	discussion	
	1:30 PM	End		



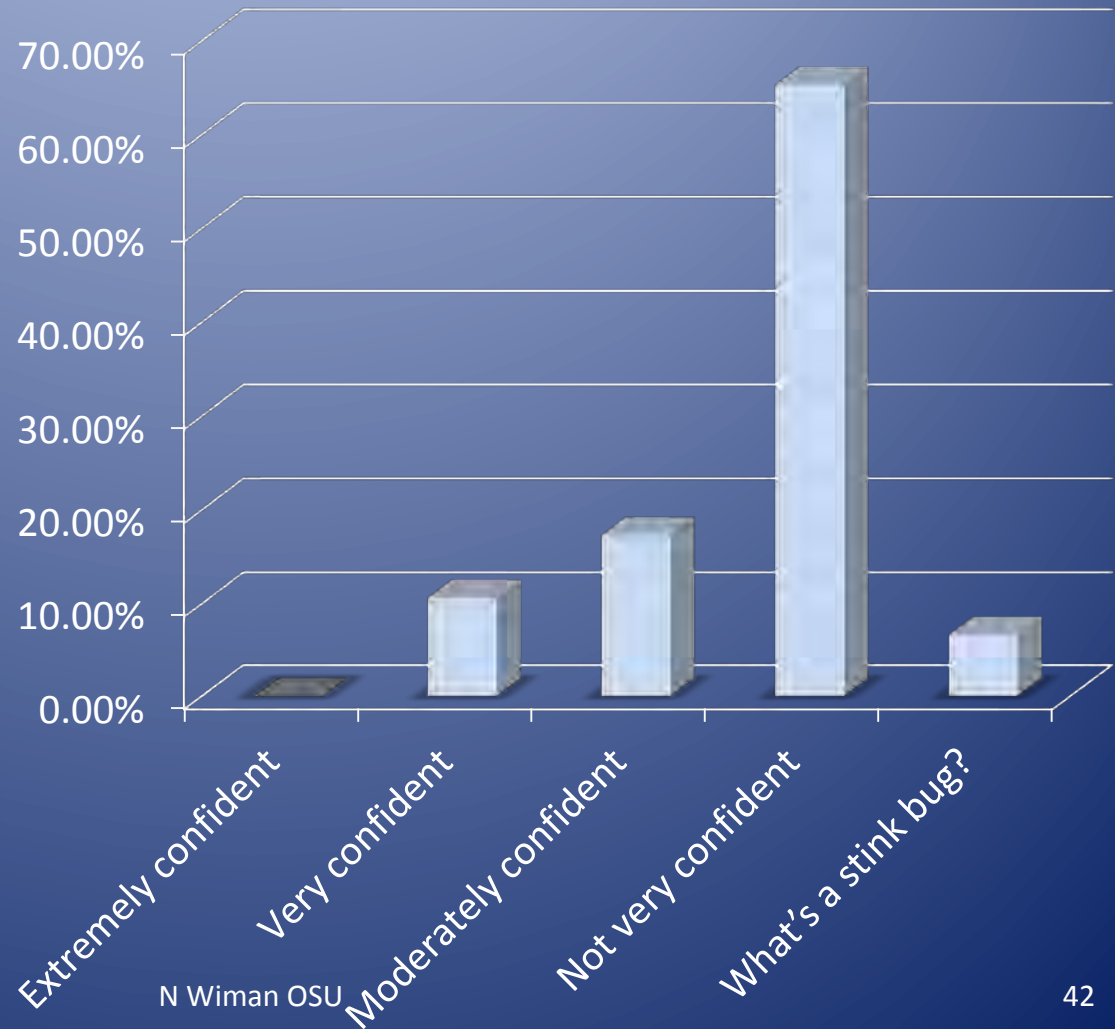
# Specialty Crop Breakdown



- Alt. orchard crops: avocado, citrus, date, fig, olive, pomegranate
- Table grapes
- Nut Crops: almond, pistachio, hazelnut, walnut, pecan, chestnut
- Wine grapes
- Pome fruits: apple, pear, Asian pear
- Small fruits: caneberry, blueberry, strawberry
- Stone fruits: cherry, peach, apricot, nectarine, plum
- Veg and field crops: bean, corn, cotton, eggplant, pepper, pumpkin, tomato

# From Napa CA (Monica Cooper, UCANR)

- How confident are you that you could identify BMSB?





© CSH

© CSH

© CSH

© CSH

© CSH

© CSH

© CSH

© CSH

© CSH

© CSH

© CSH

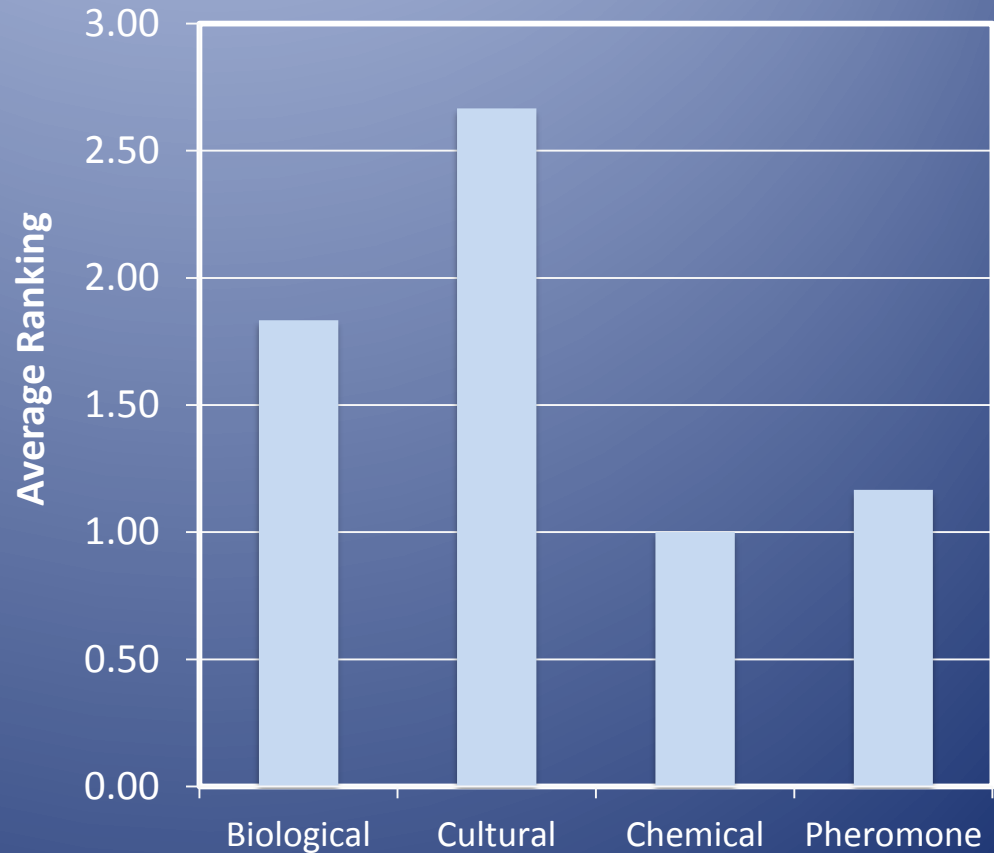
© CSH

12/1/15 NEIPM BMSB WG

N Wiman OSU

# Research Priorities

- What research priorities are most important?



# Research Priorities

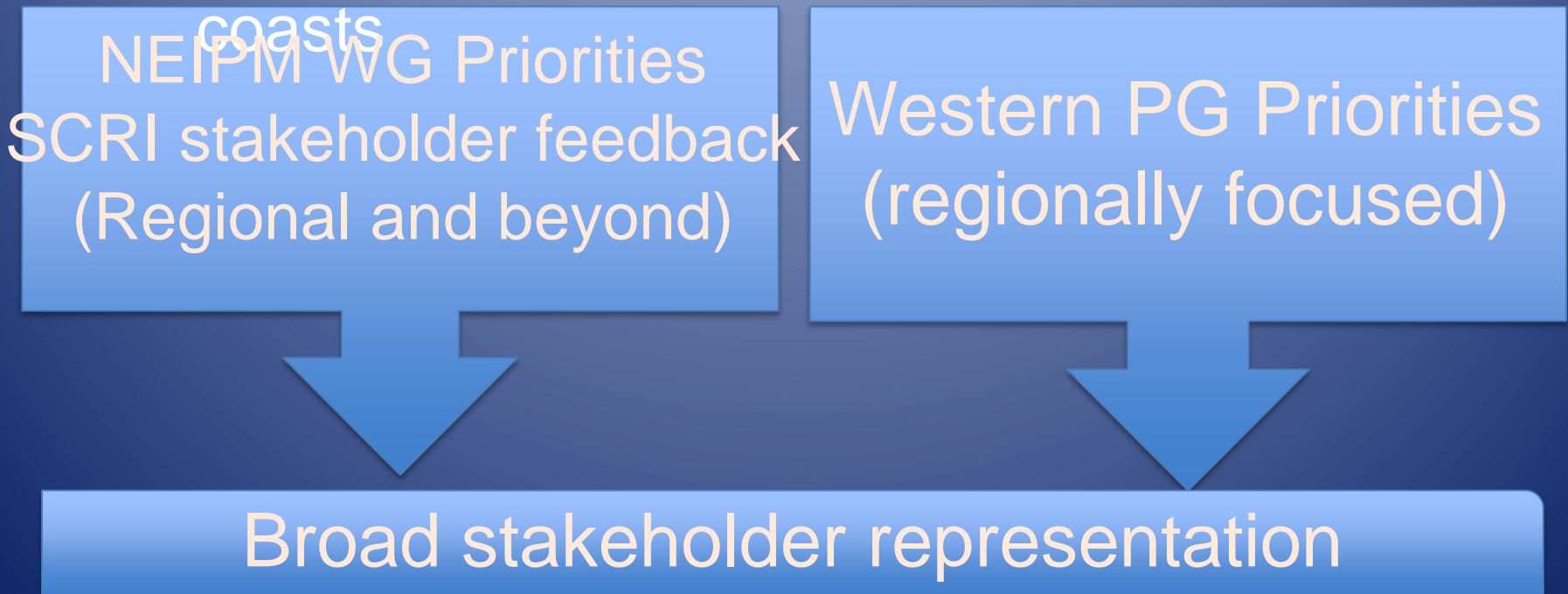
1. Determining at risk crops in the west
2. Landscape risk factors
3. Biocontrol
4. Monitoring
5. Chemical
6. Applied ecology
7. Pheromone management
8. Develop management thresholds
9. Overwintering mitigation
10. Resistance management
11. Early season biology
12. Post harvest mitigation
13. Cultural management
14. Damage characterization
15. Host plant use

# Extension Priorities

1. Develop an alert system for growers
2. Develop management strategies based on existing knowledge
3. Incorporate new knowledge into management strategies
4. Stakeholder surveys to document changes in pest status and management over timer
5. Identification skills and damage diagnosis
6. Generate mass media to sustain interest
7. On-farm demonstrations
8. Treatment guidelines for urban areas
9. Extending economic impact information

# Moving forward

- Peter Shearer (OSU - MCAREC) will lead a new national SCRI for BMSB
  - Been with BMSB from the start, on both



# Moving forward

- Regionally organized: PNW, CA, SE, MW, MA
- Leveraging expertise, some new, some carryover
- Finding common ground on priorities (or not)
  - Biological control – unified
  - Landscape factors – unified, but diverse landscapes
  - Determining priority crops
    - Well established from Leskey SCRI
    - Not known in some cases for other regions



# Thank you !

- USDA-NIFA-SCRI #2014-51181-22514
- USDA-NIFA-SCRI #2014-51181-30937
- Ack: Tracy Leskey, Peter Shearer, Kim Hoelmer, Vaughn Walton, Silvia Rondon, Jana Lee, Shimat Joseph, Josh Milnes, Larry Godfrey, Frank Zalom, Rachel Elkins, Lucia Varela, Chuck Ingels, Ricky Lara, Marc Hoddle, Gwen Hoheisel, Todd Murray, Betsy Beers, Jay Brunner, Lori Spears, Diane Alston, Bev Gerdeman, Polly Owen, Josh Arnbrister

