Disinfestation of walnut twig beetle infested wood from commercial walnut orchards

Elizabeth Fichtner,-UCCE Tulare
Katherine Wilson-UCCE Tulare
Steve Seybold-USFS
Alex Souza-UCCE Tulare

United States Department of Agriculture
Animal and Plant Health Inspection Service

Pathway Assessment: *Geosmithia* sp. and *Pityophthorus juglandis* Blackman movement from the western into the eastern United States

Agency Contacts:

Leslie Newton
1730 Varsity Drive Suite 300
Raleigh, NC 27606
Phone: 919-855-7533
Fax: 919-855-7599
Email: leslie.p.newton@aphis.usda.gov

Glenn Fowler, PhD
1730 Varsity Drive Suite 300
Raleigh, NC 27606
Phone: 919-855-7511
Fax: 919-855-7599
Email: glenn.fowler@aphis.usda.gov

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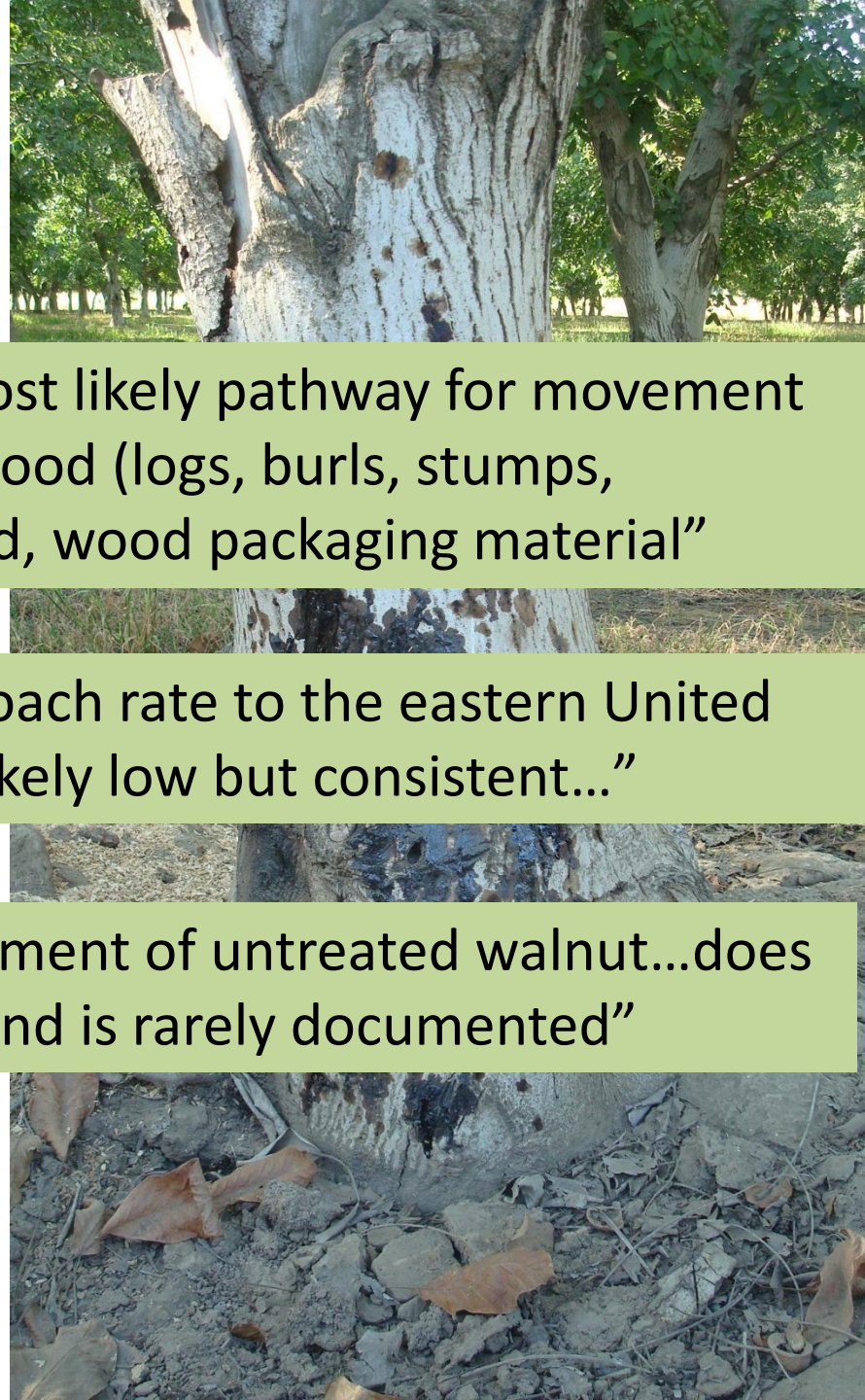
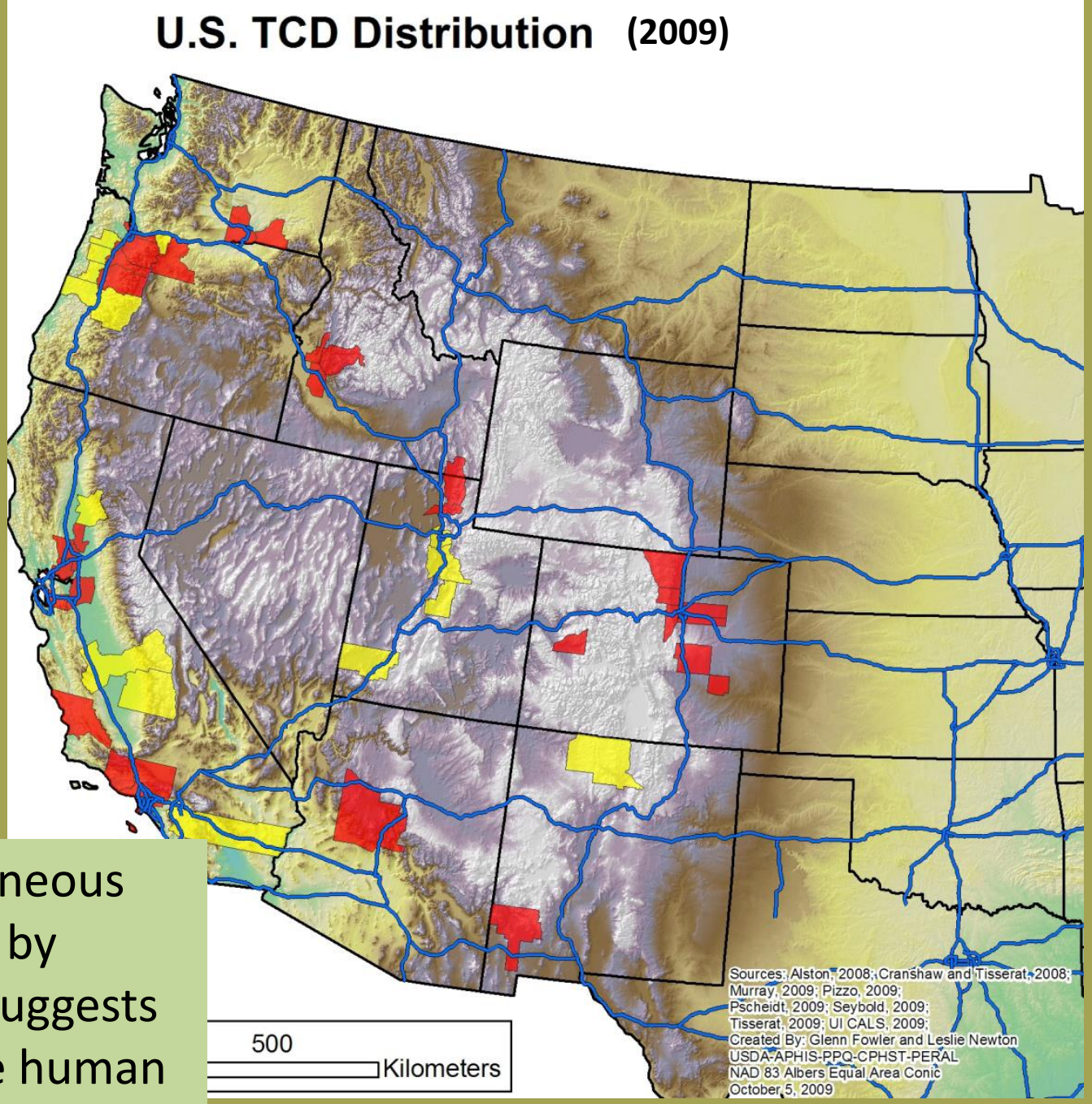


"The most likely pathway for movement is raw wood (logs, burls, stumps, firewood, wood packaging material"

"…approach rate to the eastern United States likely low but consistent…"

"…movement of untreated walnut…does occur…and is rarely documented"



Outbreaks simultaneous …areas connected by major highways…suggests movement may be human assisted.

plant disease

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First record of Thousand Cankers Disease *Geosmithia morbida* and walnut twig beetle *Pityophthorus juglandis* on *Juglans nigra* in Europe

Prof. Lucio Montecchio
University of Padova, TESAF, viale dell'Università 16, Legnaro, PD, Italy, I-35020; montecchio@unipd.it

Dr. Massimo Faccoli
University of Padova, DAFNAE, Legnaro, PD, Italy;
massimo.faccoli@unipd.it

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Thousand Cankers Disease (TCD) of walnut is responsible of widespread mortality of black walnut (*Juglans nigra* L.) in the USA since mid-1990's (1). The disease is caused by the fungus *Geosmithia morbida* Kolařik (Ascomycota, Hypocreales), vectored by the walnut twig beetle *Pityophthorus juglandis* Blackman 1928 (Coleoptera, Scolytinae). In September 2013, TDC was observed in northeastern Italy (Bressanvido, Vicenza, 45°39'N, 11°38'E) in black walnuts of different ages: ca. 80-yrs-old plants growing in a garden, and 17-yrs-old trees belonging to a nearby walnut plantation for timber production. Main symptoms were yellowing, wilting, twig and branch dieback, and a high number of small bark cankers

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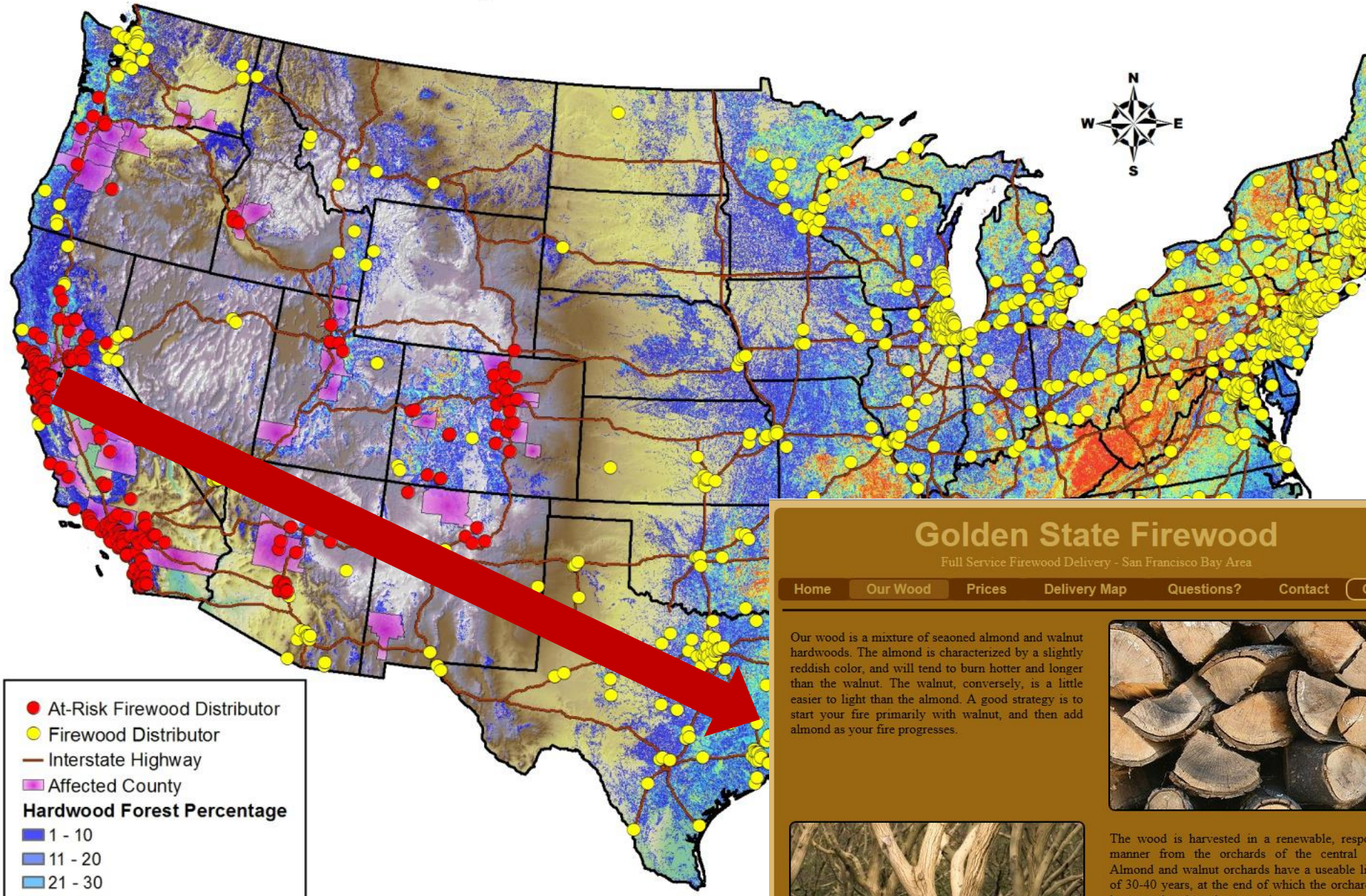
Firewood Distributors, Hardwood Forests and TCD Affected Counties



- At-Risk Firewood Distributor
- Firewood Distributor
- Interstate Highway
- Affected County

Hardwood Forest Percentage

- 1 - 10
- 11 - 20
- 21 - 30
- 31 - 40
- 41 - 50
- 51 - 60
- 61 - 70

Golden State Firewood

Full Service Firewood Delivery - San Francisco Bay Area

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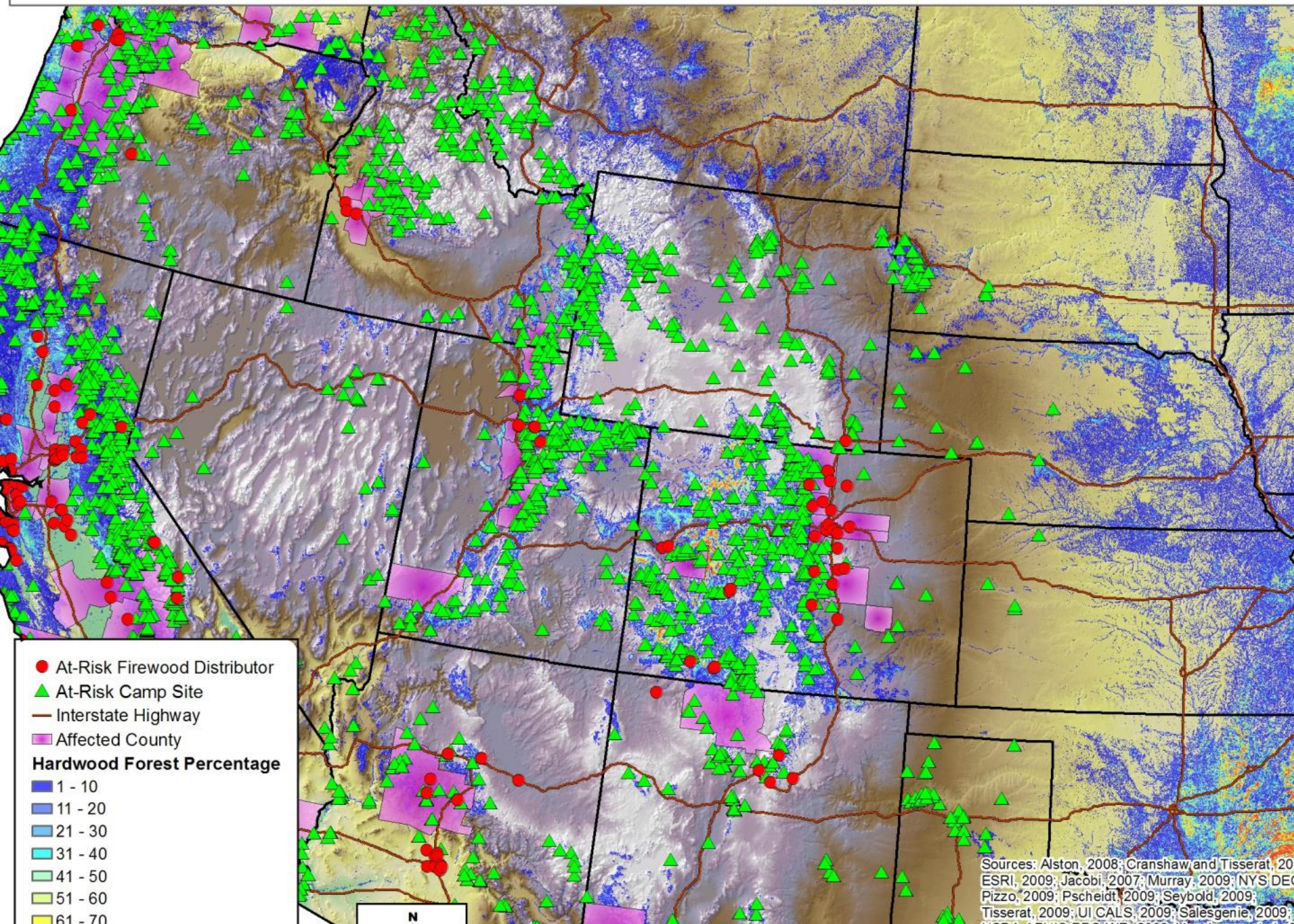
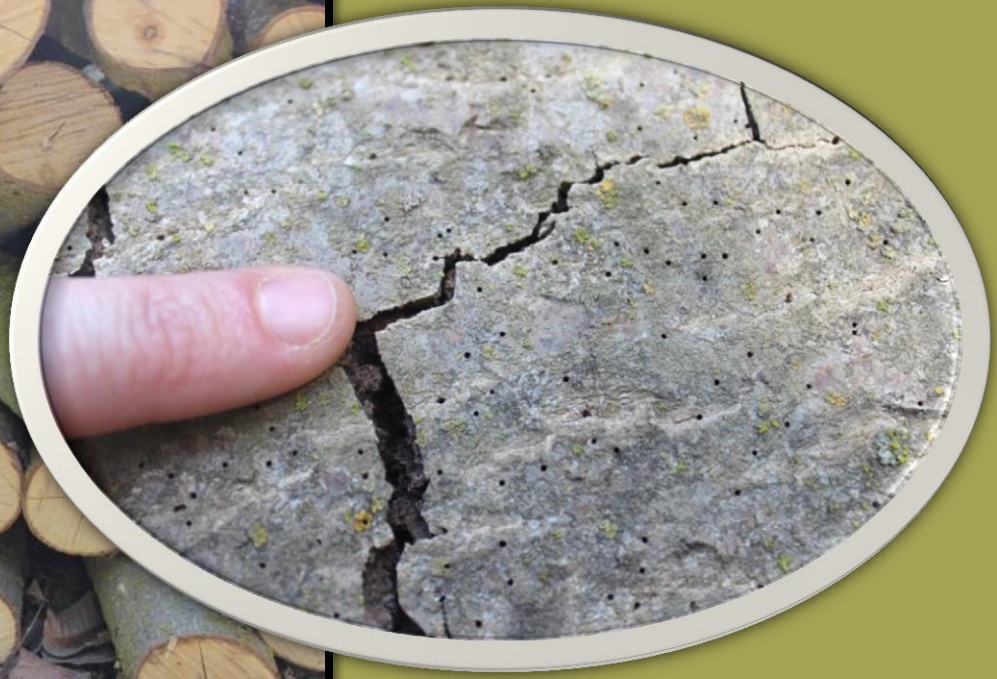
Our wood is a mixture of seaoned almond and walnut hardwoods. The almond is characterized by a slightly reddish color, and will tend to burn hotter and longer than the walnut. The walnut, conversely, is a little easier to light than the almond. A good strategy is to start your fire primarily with walnut, and then add almond as your fire progresses.

The wood is harvested in a renewable, respo
manner from the orchards of the central
Almond and walnut orchards have a useable li
of 30-40 years, at the end of which the orchar
be cut and replanted once again.

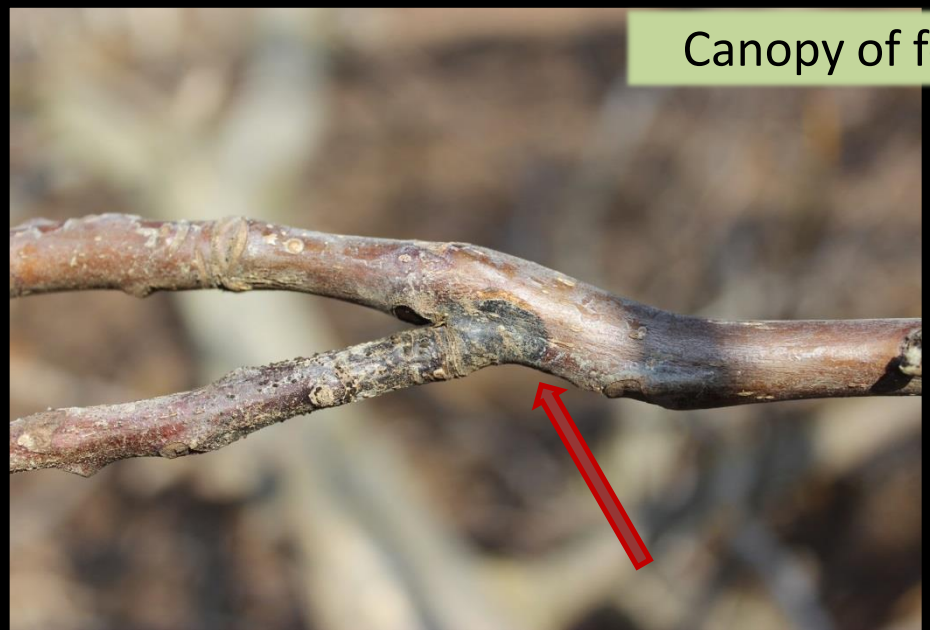
After a minimum of 18 months seasoning and
our wood is cut and spilt into pieces of betwe
and 18" in length. The pieces are easy to hand
will fit in a standard wood-burning stove.

At-Risk Camp Sites, Firewood Distributors, Hardwood Forests and TCD Affected Cou



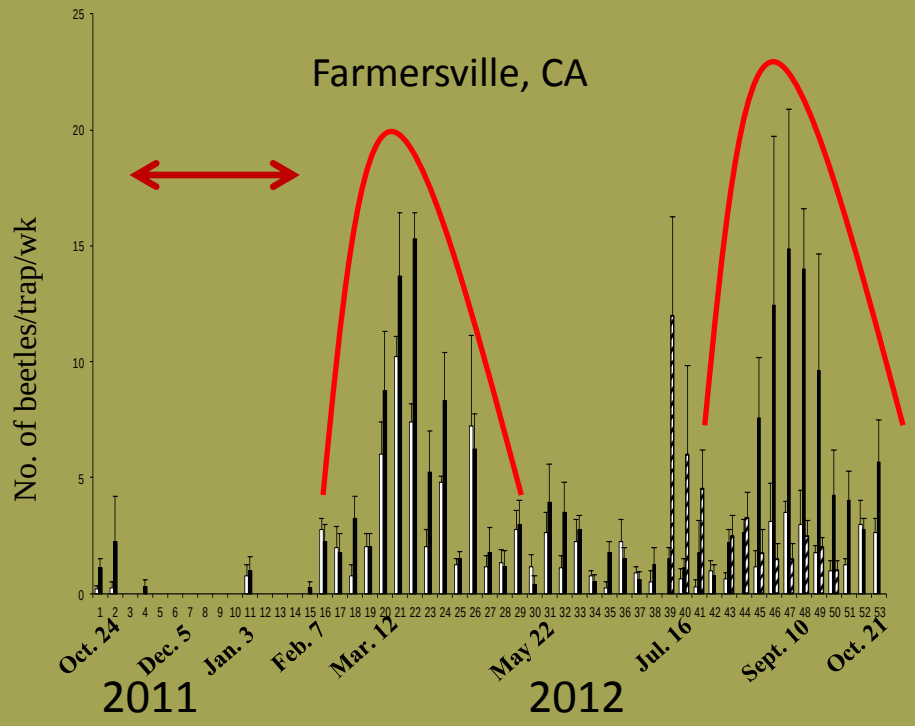


Canopy of felled trees



Previous Work

- Characterize seasonal WTB activity.
- Allow comparison with Sac. Valley.
- Develop sanitation guidelines for management of WTB…prevention of local and long distance disease transmission.
- Determine ‘reduced’ flight season and ‘peak’ flight activities.



Wood piles as source of WTB

2014 Objectives

1. Quantify WTB infestation, rate of WTB emergence, and associated insect sex ratio, from infested wood removed from TCD-affected orchards.

2. Characterize climatological parameters associated with peak WTB emergence and duration of emergence from wood.

February 2013

- Freshly –cut, infested English walnut wood from Tulare County orchards.

- ~20-000 cm^3 in each of 6 chambers.

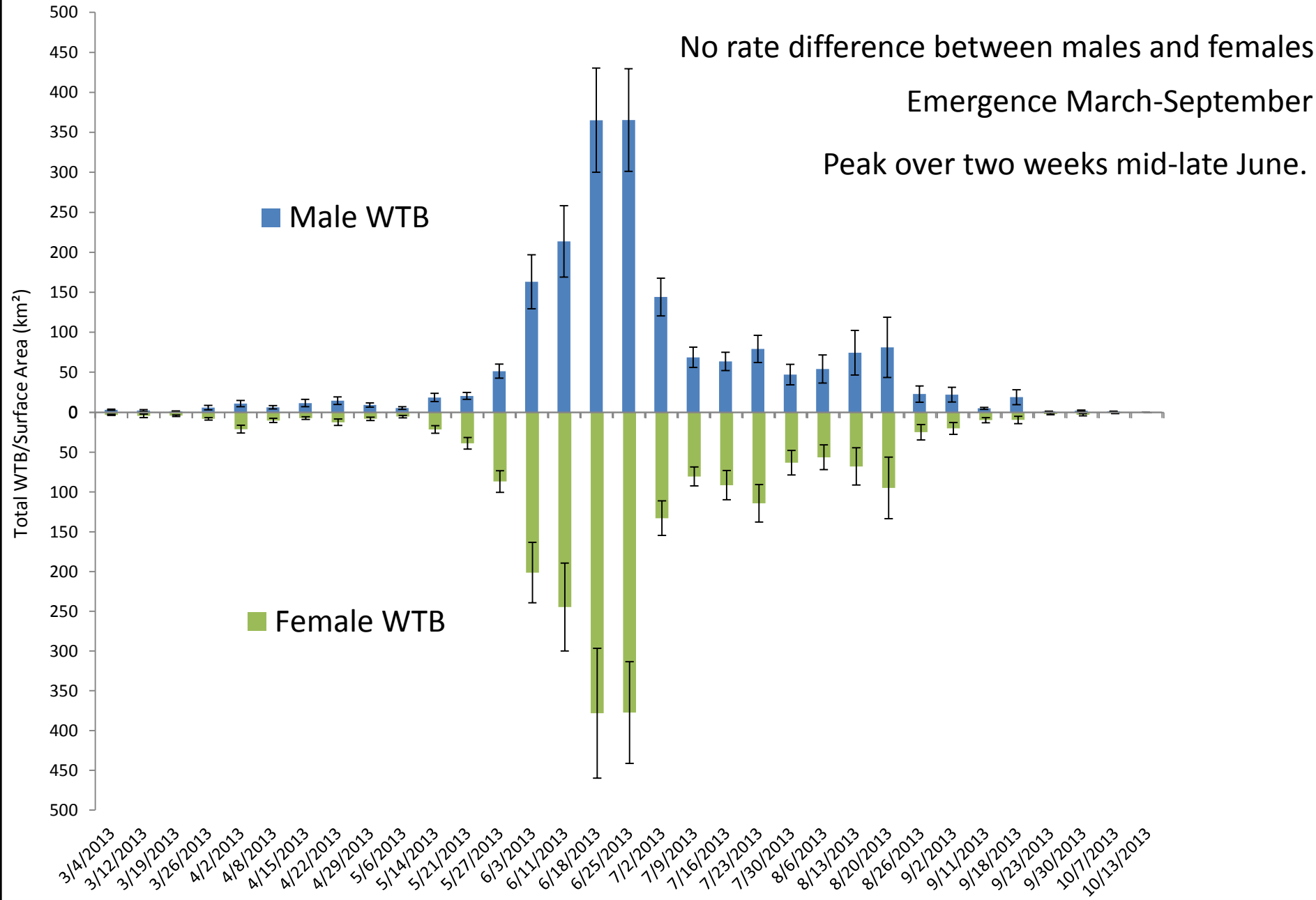
- Climatological data-loggers (HOBOs) placed in each chamber.

- Insects collected weekly (ongoing).

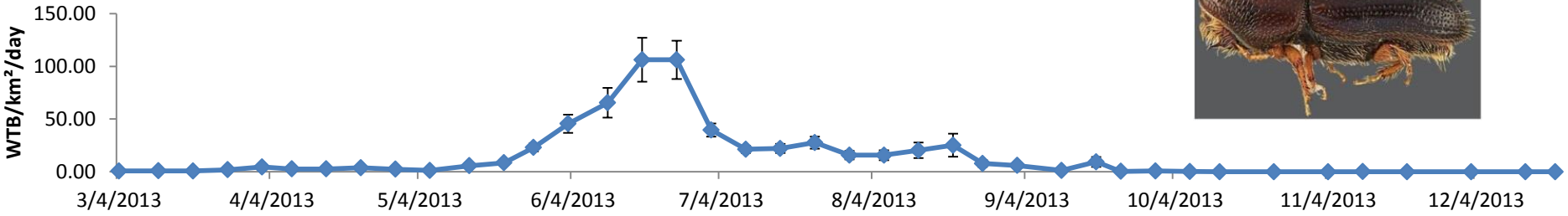
**WTB sex ratio determined*

**> 40 other species characterized*

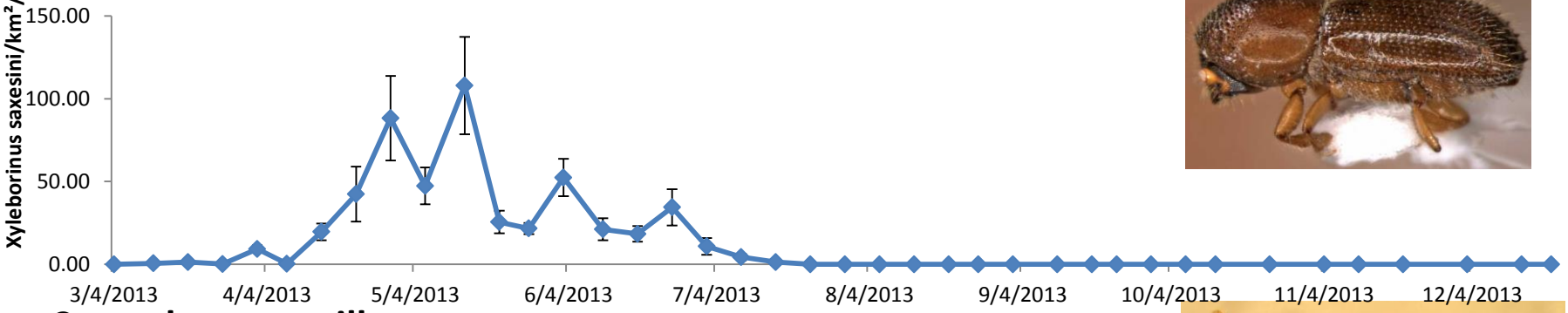
Walnut Twig Beetle Male:Female/Surface Area (km²)



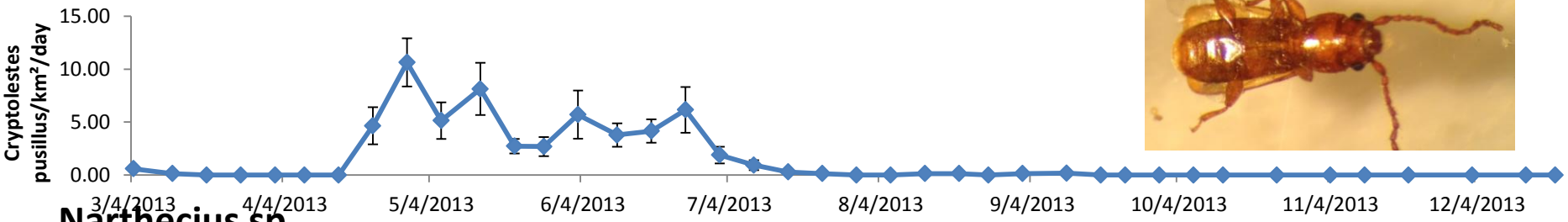
Walnut Twig Beetle



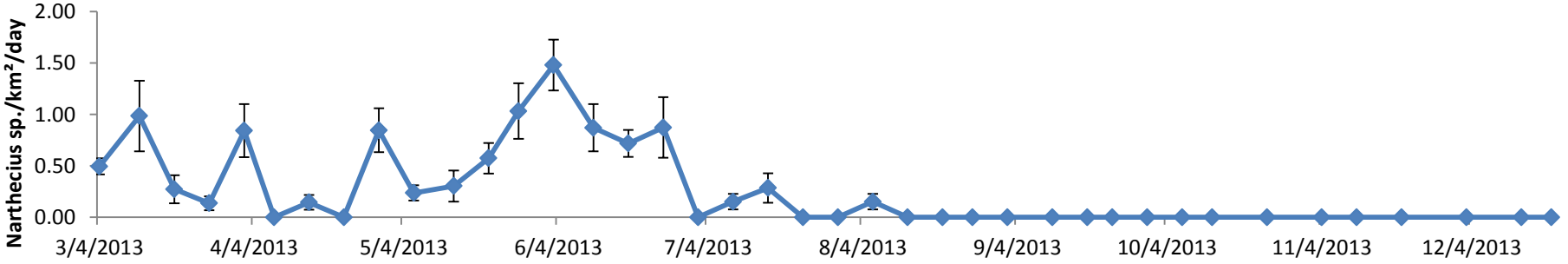
Xyleborinus saxesini

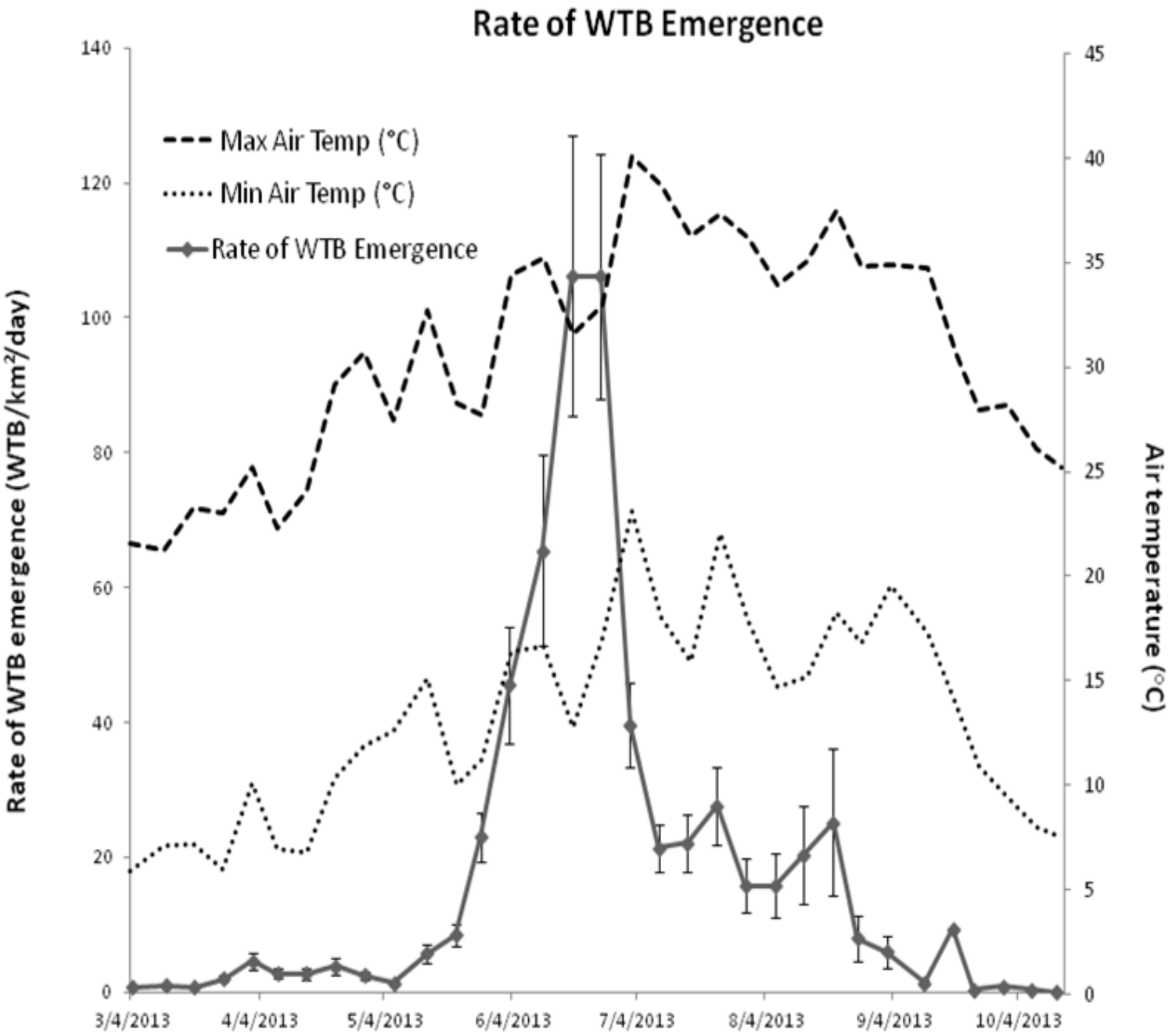


Cryptolestes pusillus



Narthecius sp.




Rate of WTB Emergence
Max Air Temp (°C)
Min Air Temp (°C)
Rate of WTB Emergence
Rate of WTB emergence (WTB/km²/day)
Air temperature (°C)
140
120
100
80
60
40
20
0
45
40
35
30
25
20
15
10
5
0
3/4/2013
4/4/2013
5/4/2013
6/4/2013
7/4/2013
8/4/2013
9/4/2013
10/4/2013

2014 Project:

- Completion of 2nd year of insect emergence characteristic.

Future Studies Planned/Considered:

- Assessment of disinfestation techniques (ie. Tarping, composting)

- Address potential for lethal paradox canker to predispose trees to TCD.