Balsam Woolly Adelgid in California

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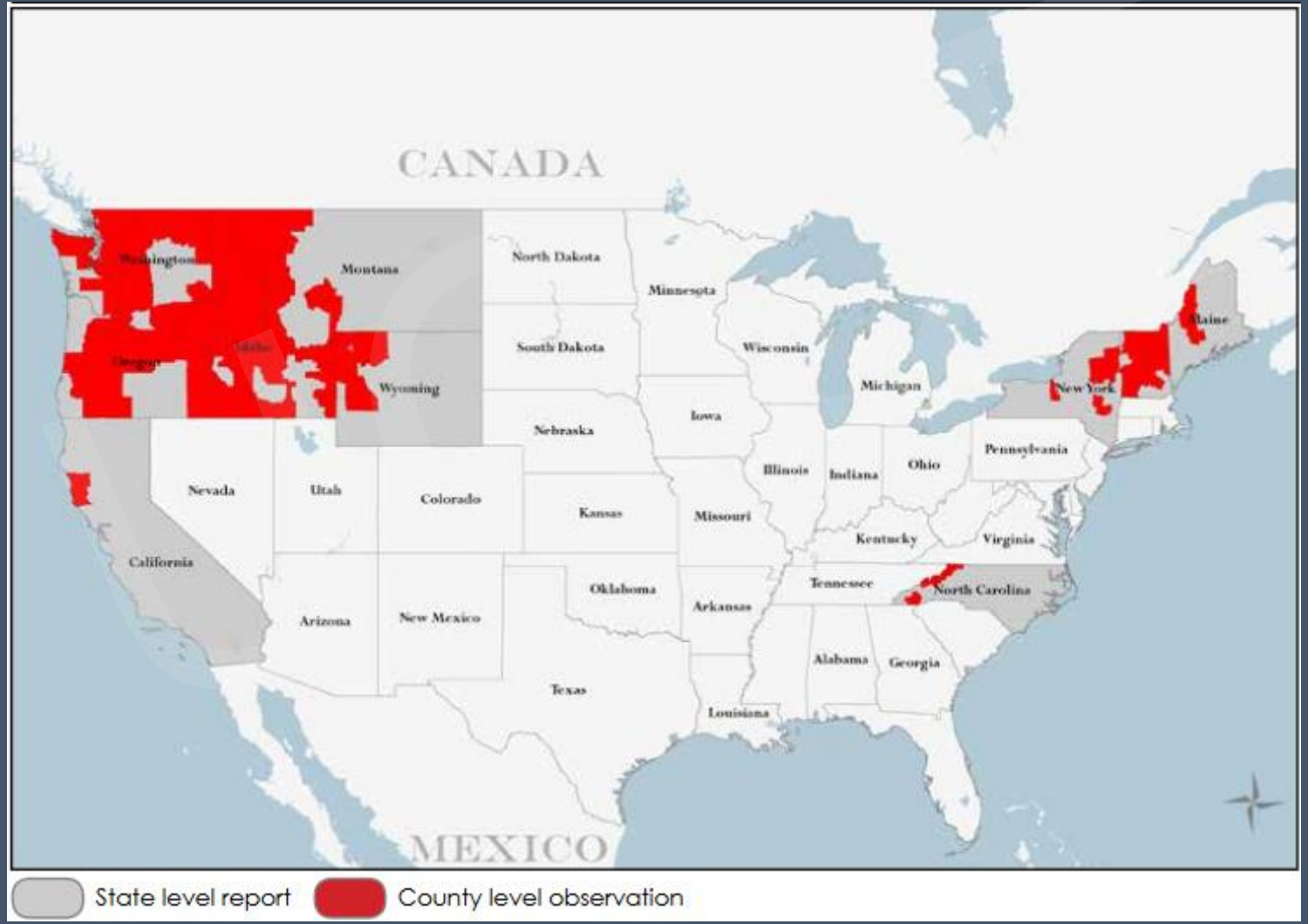
Balsam Woolly Adelgid (BWA)
Adelges piceae Ratzeburg (Hemiptera: Adelgidae)

- Invasive aphid-like insect
  - likely intro. from Europe on nursery stock
- First detected in eastern NA in 1900
  - balsam fir, Fraser fir
- Detected in western NA in 1928
  - grand fir, noble fir, European silver fir, Pacific silver fir, subalpine fir
- Hosts: All true firs (*Abies* spp.) in NA

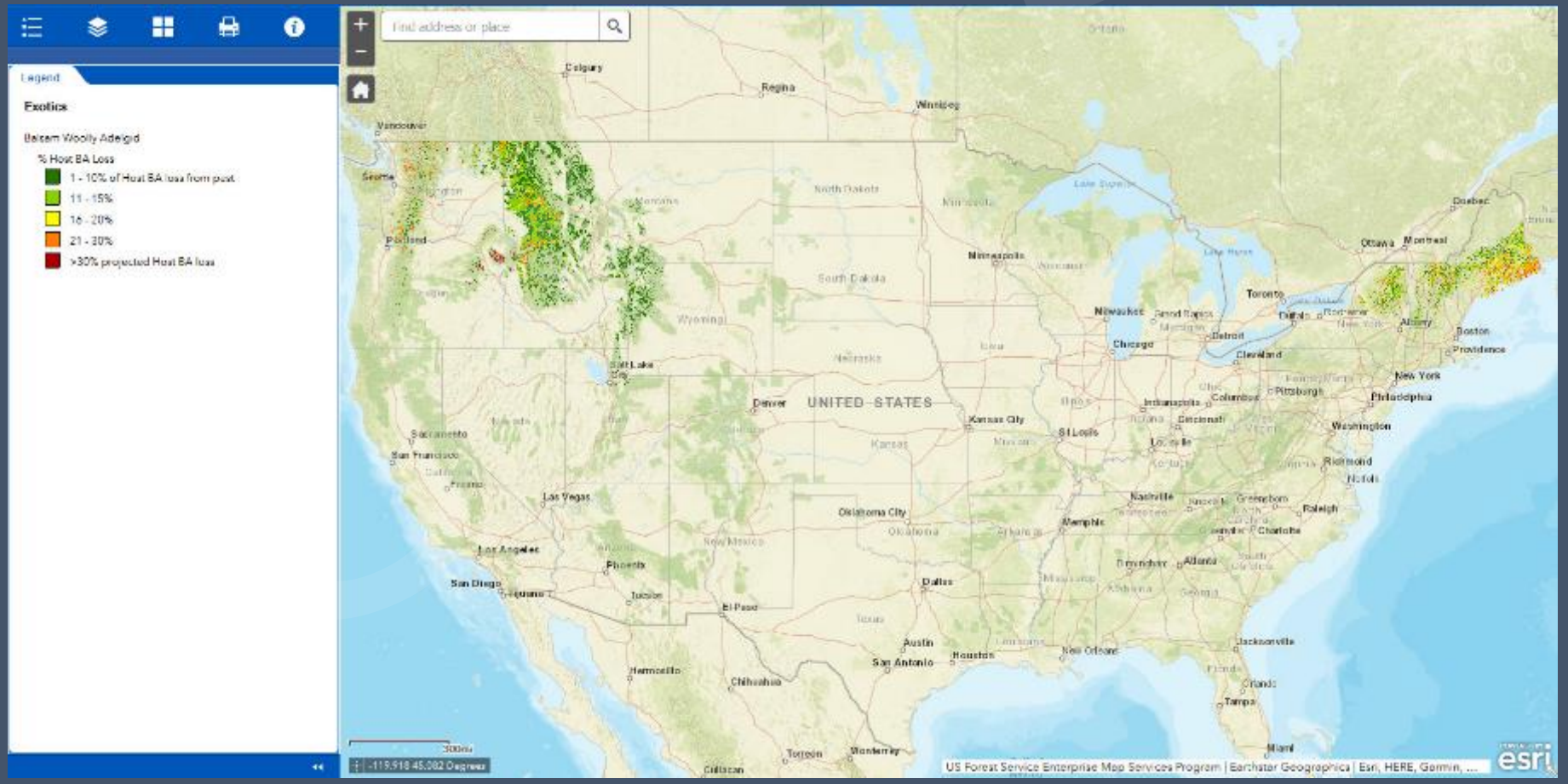

Chris Lee, Cal Fire

North American Distribution



USDA Forest Service, Northern Research Station and Forest Health Protection. "Alien Forest Pest Explorer - species map." Database last updated 25 March 2019. <https://www.nrs.fs.fed.us/tools/afpe/maps/> (5/28/2019)

Infestation Risk Map

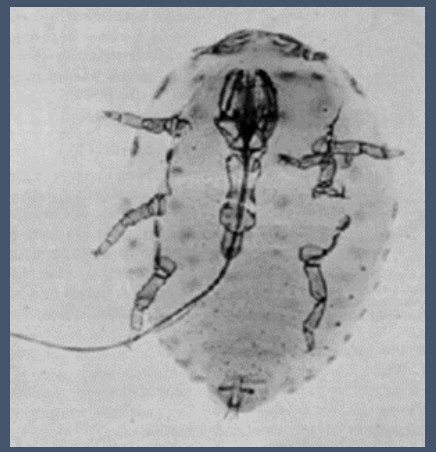


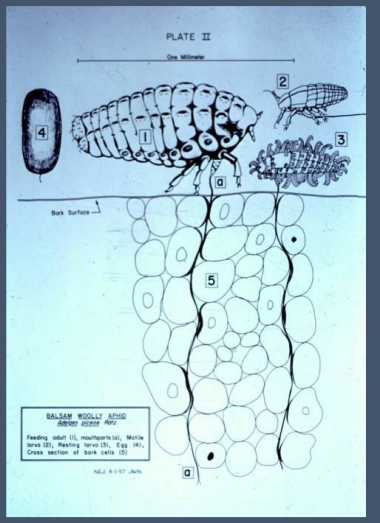
BWA Characteristics

- Tiny wingless insect (0.04 in long)
- Piercing/sucking mouthparts
  - Inject toxic saliva that damages vascular tissues
- Mostly immobile
- Excretes waxy wool-like substance
- Infests stems and twigs (100-200 adelgids/in^2)
- Disperse by wind and birds

BWA Life Cycle in NA

- Asexual repro. & no males (parthenogenetic)
- Single host (anholocyclic)
- Multiple generations





Symptoms of Infestation

- Swelling at bud and branch nodes (gouting)
- Stunted terminal growth
- Top curl
- Woolly masses on stem
- Irregular growth rings in stem ("rotholz")
- Branch dieback
- Crown thinning

Stand and Landscape Impacts

- Changes in forest structure
- Infestations are persistent
  - Can reduce reproductive potential of hosts
- Surviving infested trees susceptible to other pests/diseases
- Host tolerance
  - Subalpine, grand, and pacific silver fir very susceptible
  - noble, white, and European firs less susceptible; unless o- site
  - More susceptible at low elevations and moist environments
- Site quality impacts susceptibility of hosts

MANAGEMENT

- Challenge b/c of persistent infestations
  - Outbreaks can occur with favorable environ conditions
- Silvicultural practices
- Biological control
  - 1950-60's – 25 predators introduced (8 established)
  - Native and introduced predators appear ineffective
- Chemical control
  - Systemic injections of insecticides

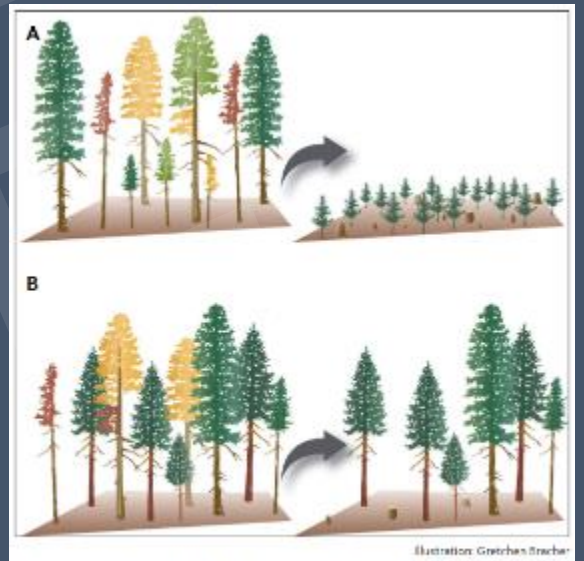


Illustration: Gretchen Bracher
Figure 4-2. Balsam woolly adelgid management: (A) In infested stands dominated by true fir, harvest damaged and high-risk species and convert to nonhost species that are adapted to the site. (B) In mixed-species stands, remove damaged and high-risk hosts.

CA Infestation

- 1928 - First detected in SF

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- 2012 – extensive grand fir mortality observed near Fort Bragg

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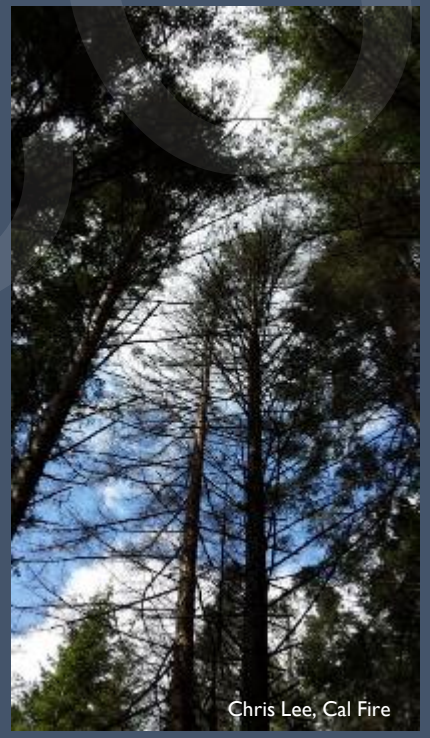
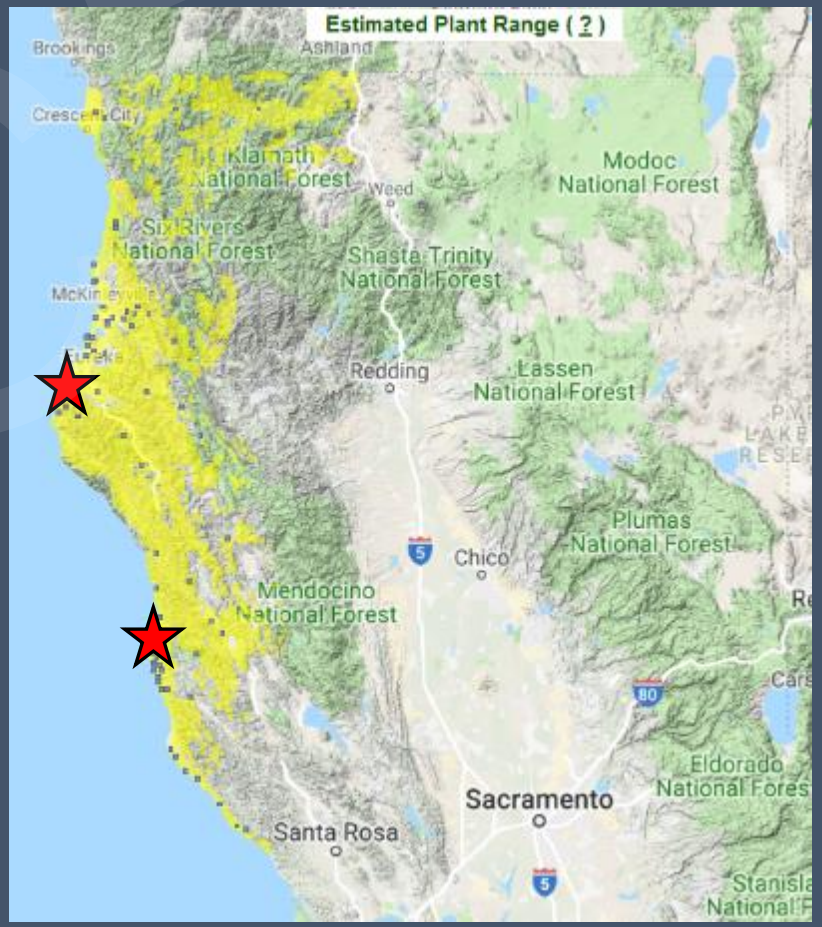
- 1928 - First detected in SF
- ~2012 - grand fir mortality observed near Fort Bragg
- ~2017 – BWA detected near Fortuna



CA Infestation Research

- What is BWA doing in CA?
- Extent of the infestation
- Is the BWA infestation in coastal grand fir different
- BWA life cycle
- Coastal grand fir susceptibility
- Range expansion
- Management guidelines



Thank You

If you have questions:

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http://ucanr.edu/sites/forestry/