



# COASTAL GRAND FIR AND BALSAM WOOLLY ADELGID

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COASTAL FOREST HEALTH WORKSHOP

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CAL FIRE

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## **Site Access**

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Wildland Conservancy

Private landowners

## **Field Assistance**

Kyle Farmer

Ryan Kiefer

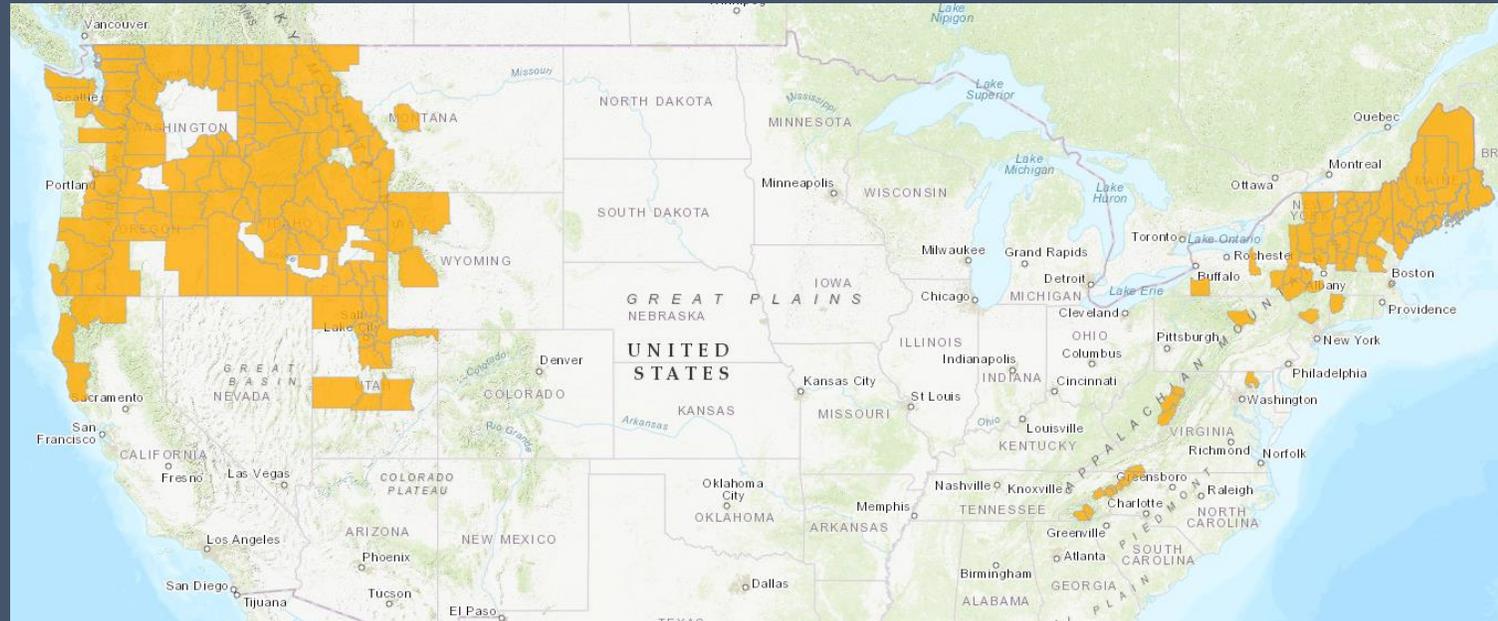
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# BALSAM WOOLLY ADELGID (BWA)

## *ADELGES PICEAE* RATZEBURG (HEMIPTERA: ADELGIDAE)

- Invasive
- 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



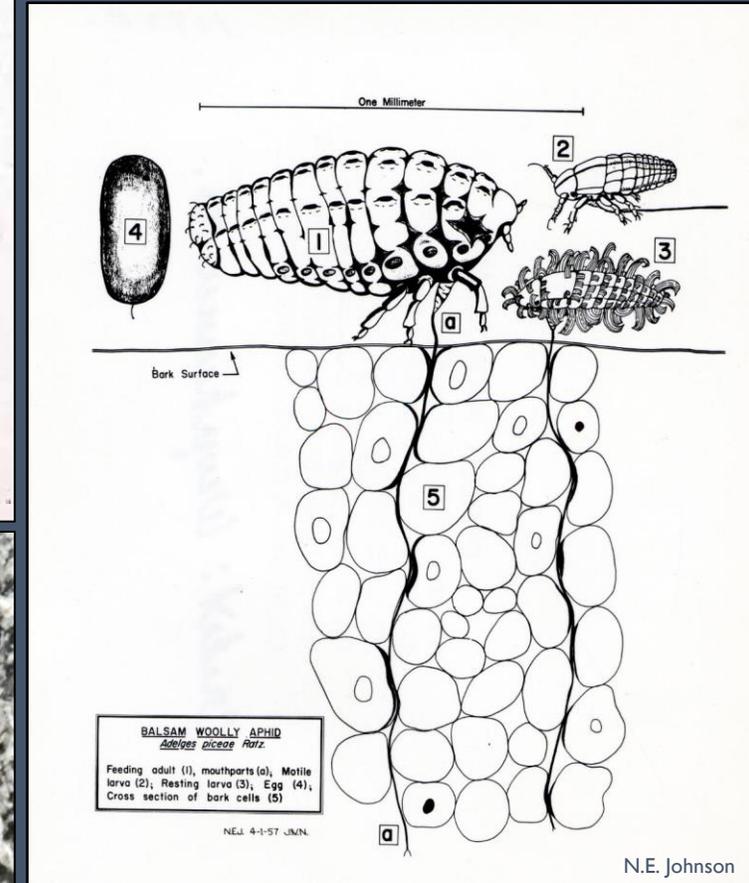
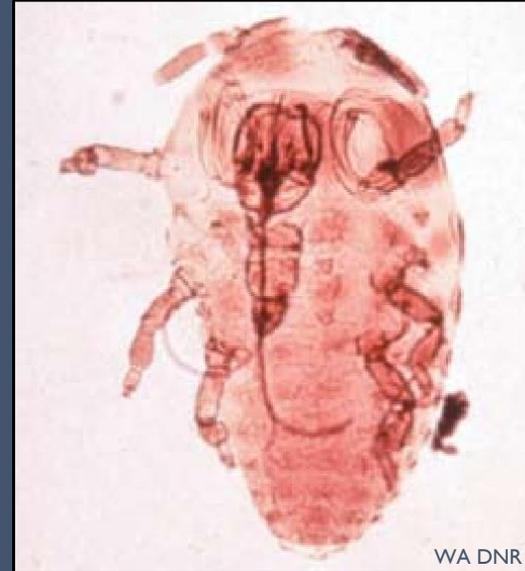
# CA INFESTATION

- 1928 – BWA first detected in SF
- ~2011 – grand fir decline observed near Fort Bragg
- ~2017 – BWA observed near Fortuna
- What is BWA doing in CA?



# BWA CHARACTERISTICS

- Tiny wingless insect (~1 mm)
- 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<sup>2</sup>)
- Disperse by wind and birds



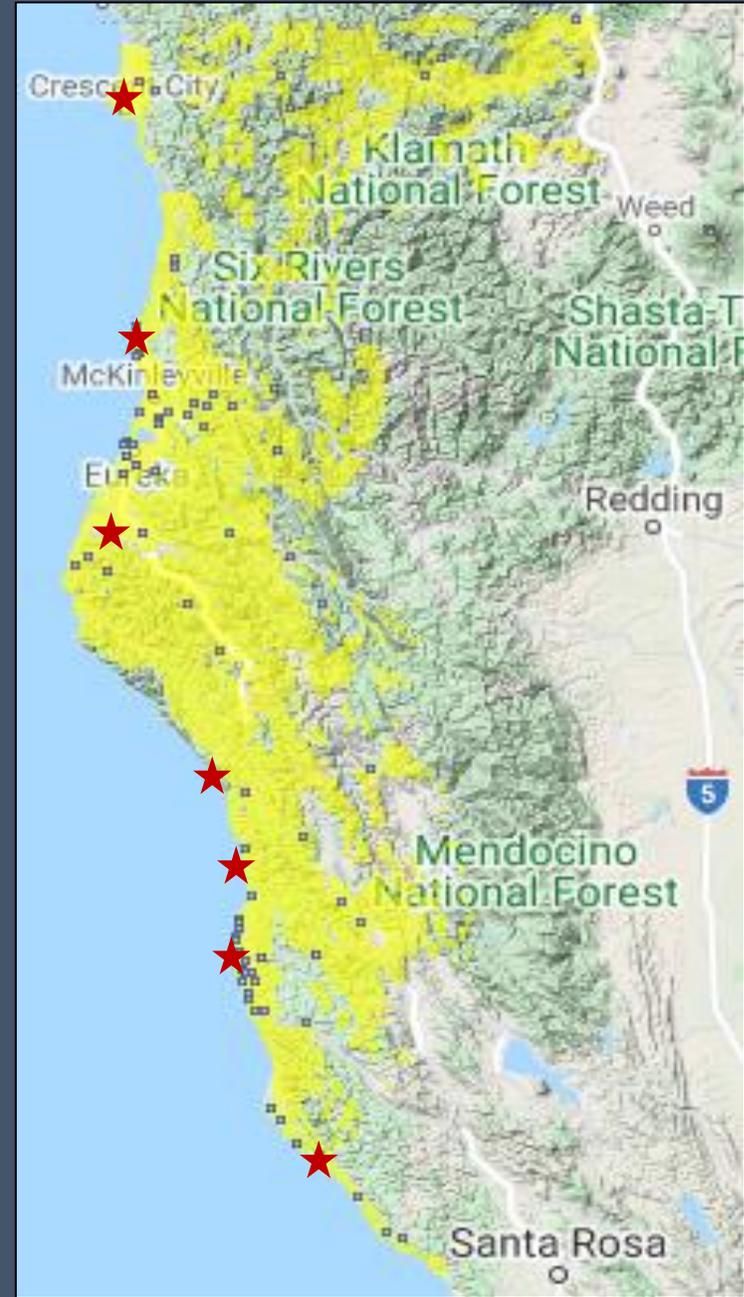
# SYMPTOMS OF INFESTATION

- Crown thinning
- Gouting
  - swelling at bud and branch nodes
- Branch deformities
  - Stunted growth, top-curl
- Woolly masses on stem
- Irregular growth rings in stem (rotholz)



# BWA RESEARCH

- Established study sites along the range of grand fir on the coast



# BWA INFESTATION

- Widespread
- Canopy infestations common
- Bole infestation variable



# OTHER GRAND FIR PESTS

- Canker fungi
- Root disease
- Tip wilts
- Twig, bark, and root beetles
- Misc. aphids



# STAND CONDITIONS AND DECLINE

- Stand density and dominance of grand fir
- Land use history
- Slope



# MANAGEMENT CONSIDERATIONS

- BWA infestations widely established
- Grand fir dealing with multiple stressors
  - Tree age, density
- Site conditions matter
- Manage for diversity
- Plan for changing structure and composition
- Disturbance regimes



A photograph of three people in a forest. In the center, a man in a blue puffer jacket and grey pants stands with his hands in his pockets. To the right, a man in an orange vest, khaki pants, and boots stands next to a tripod. In the lower left, a woman in a black hoodie and light blue pants stands near a large fallen log. The forest floor is covered in green ferns and other plants. Large white text "THANKS!" is overlaid in the center of the image.

**THANKS!**