Coastal Grand Fir Decline in Northern California

California Forest Pest Council Meeting

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Site Access

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Ryan Maberry

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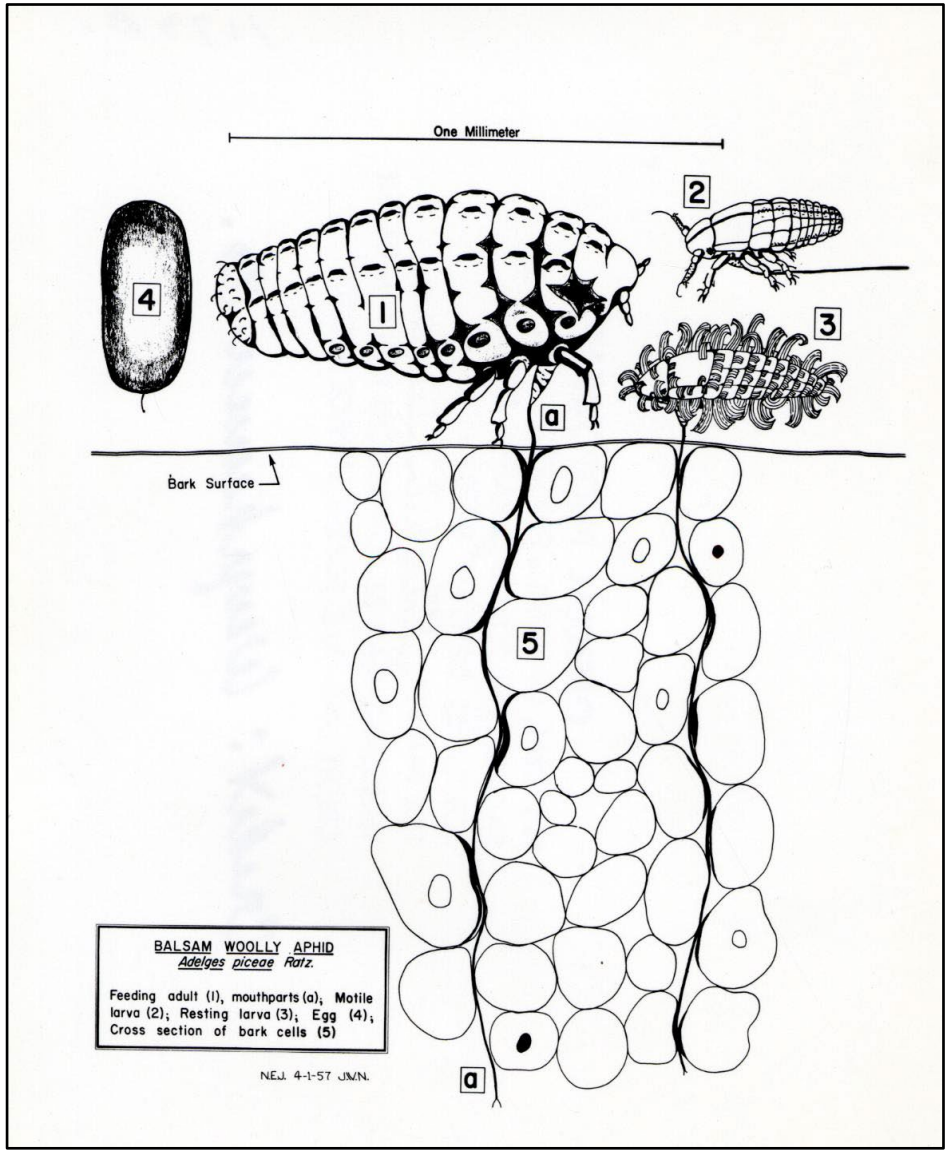
Background

- 2017 – 2018: Grand fir decline on the north coast
- Balsam woolly adelgid (BWA) noticed in Humboldt ~2017
- Need for locally specific information on BWA

Balsam Woolly Adelgid (*Adelges piceae)*

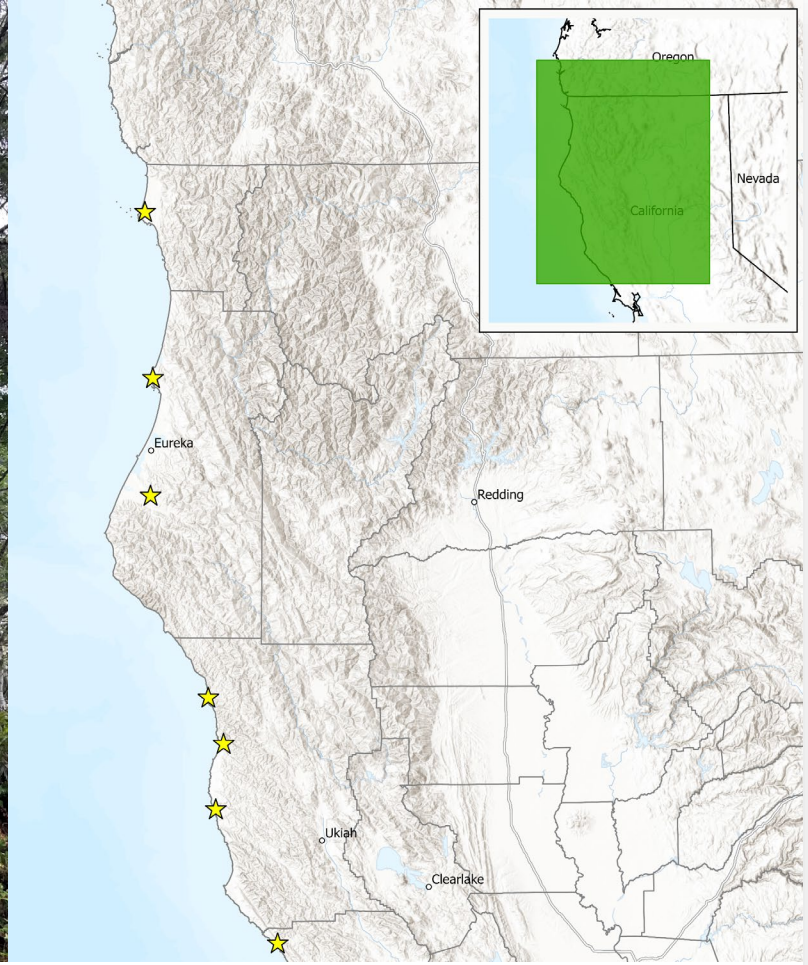


Questions

1. How extensive and severe are BWA infestations in coastal grand fir stands in northern California?

2. What other pests and/or pathogens are affecting grand fir health in this area?

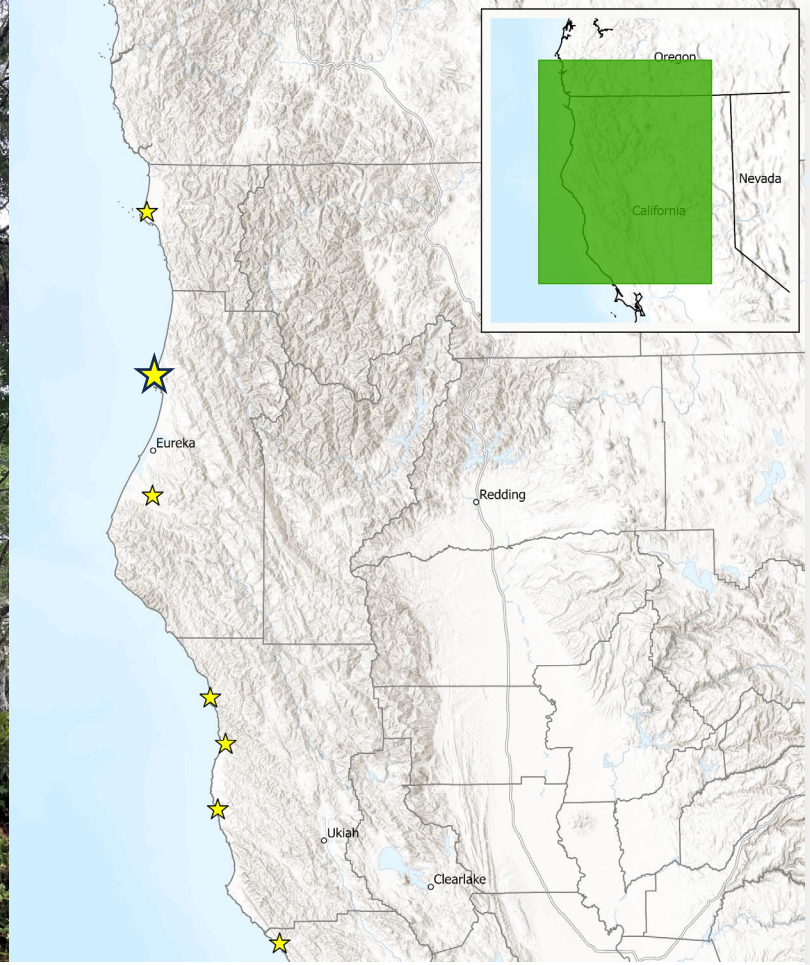
3. What is the overall health status of coastal grand firs in northern California?



Methods

- 7 sites in Sonoma, Mendocino, Humboldt, and Del Norte
- Five .1 ha plots/site
- Revisited ~2 years later

Scale	Variables
Plot	Elevation Slope Aspect Distance from ocean Canopy cover
Tree	DBH Height Live/Dead
Live Grand Firs	Bole infestation Gouting Deformities Crown decline
Other	Regeneration (0.02 ha plot) Root and bole cores BWA phenology



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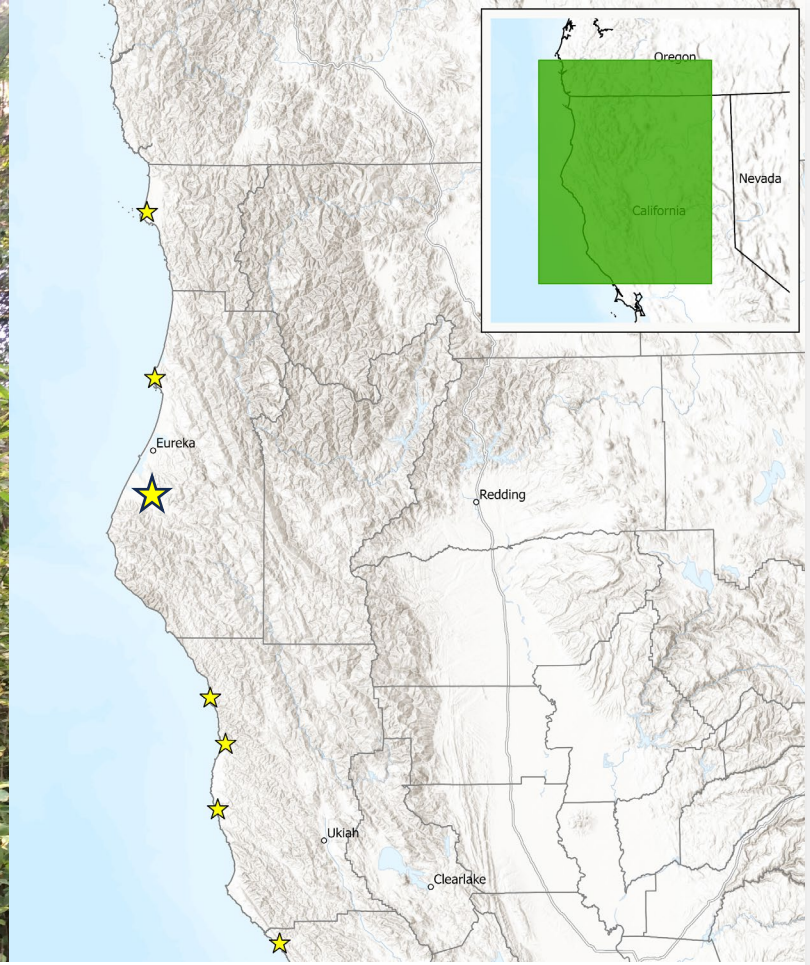

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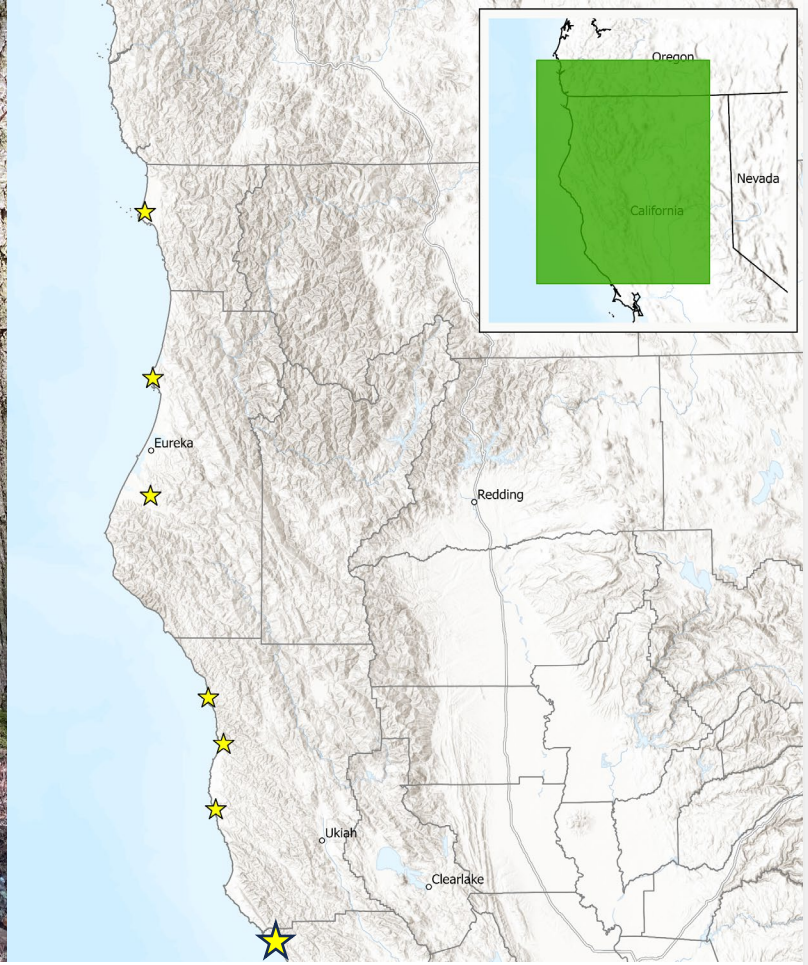
Photo Credit: Mike Jones



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Question 1: How extensive and severe are BWA infestations in coastal grand fir stands in northern California?

- Widespread across northern coastal California
- BWA infestations one of many stressors on coastal grand fir
- Notable effects on grand fir growth patterns

Gouting on Coastal Grand Fir

- Varied forms of gouting
- Some easier to see on downed material
- Translation to upper canopy often needed

Bunched needles on and between swollen nodes

Swollen nodes with shortened internode

Irregular growth past swollen node

Typical pre-infestation growth

Getting the Wiggles

Examples of irregular growth on BWA-infested grand fir

Question 2: What other pests and/or pathogens are affecting grand fir health in this area?

- So many.
- Canker fungi
- Root disease
- Tip wilters
- Twig, bark, and root beetles
- Miscellaneous aphids

Other Pests and Pathogens

Root Diseases

Armillaria spp., Phaeolus schweinitizii, Heterobasidion occidentale

Photo Credit: Chris Lee (left), Wallis Robinson (center, right)

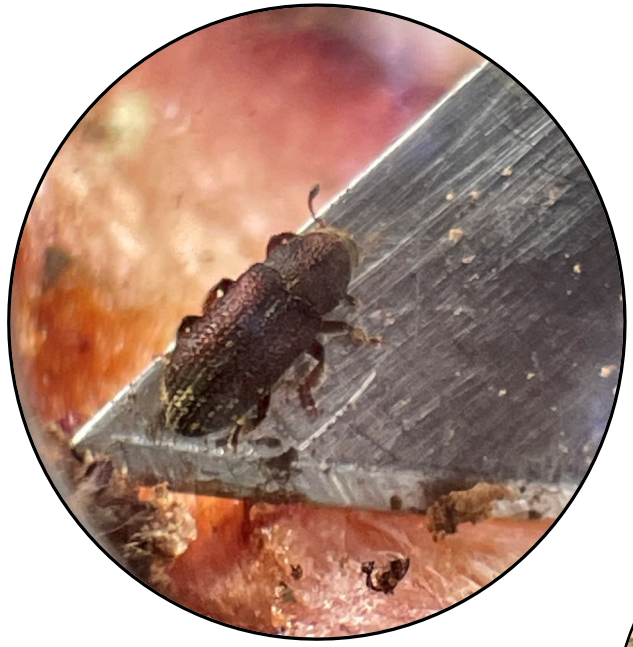
Other Pests and Pathogens (continued)

Pathogens

Tip wilt fungus (unconfirmed), *P. cancriformans*

Pests

Bark/root beetles, twig beetles, flat headed wood borers, miscellaneous aphids



Question 3: What is the overall health status of coastal grand firs in northern California?

- Grand fir decline in many different stand conditions
- More decline in stands with more additional stressors
- Observed mortality upon resurvey

Closing Thoughts

- BWA infestations widespread on coastal grand firs in study area
- Grand firs dealing with multiple stressors
- Embracing change, encouraging diversity
- What is normal for coastal grand fir?