



# An Introduction to Bark Beetles and Recommendations for Management

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# Forest Insects

- Bark beetles



- Defoliators





# Bark Beetles

- Bark beetles of importance in southwest Colorado
  - Mountain pine beetle (*Dendroctonus ponderosae*)
  - Spruce beetle (*Dendroctonus rufipennis*)
  - Douglas-fir beetle (*Dendroctonus pseudotsugae*)
  - Roundheaded pine beetle (*Dendroctonus adjunctus*)
  - *Ips* spp (Pine *ips*, pinyon *ips*)
  - And many others not discussed



*Dendroctonus* =  
tree killer!



# Bark Beetles



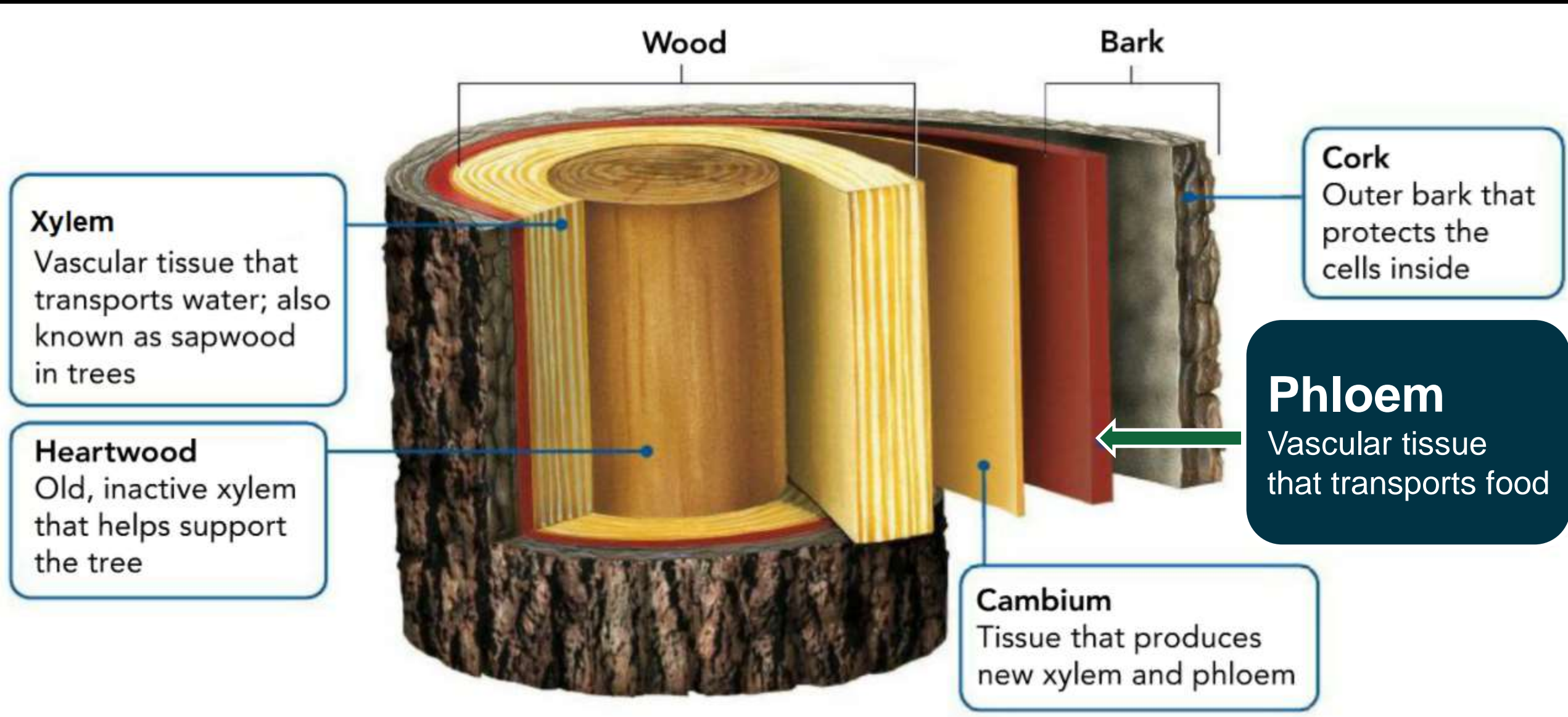
**about the size of a  
grain of rice**



**typically kill trees  
within one year**



# Bark beetles feed & reproduce in the phloem



**bark beetle**

**life cycle**

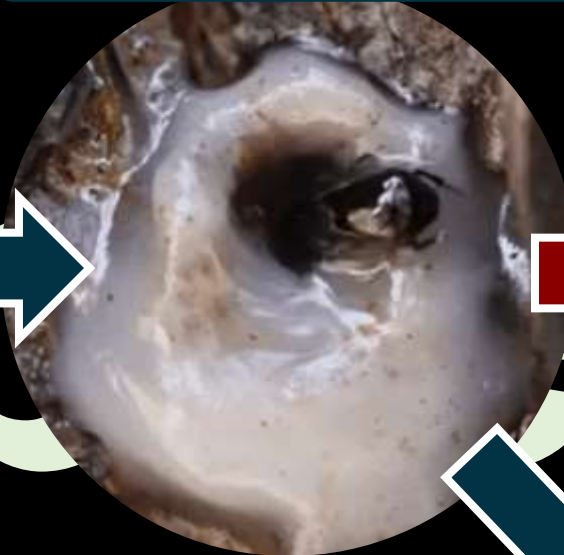
**find host**



**bore in**



**fight defenses**



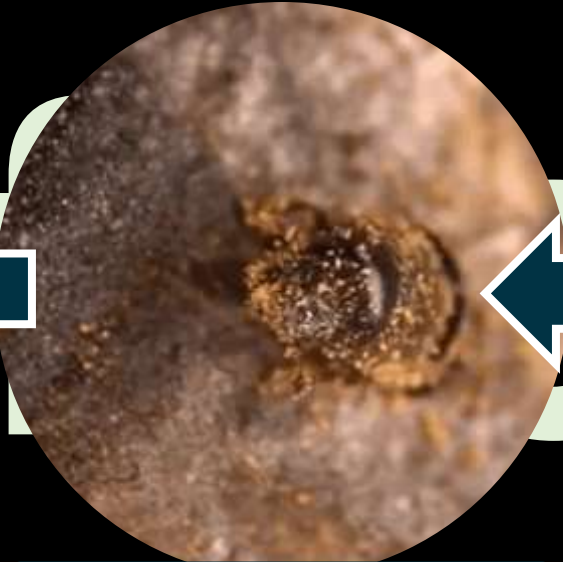
**die trying**



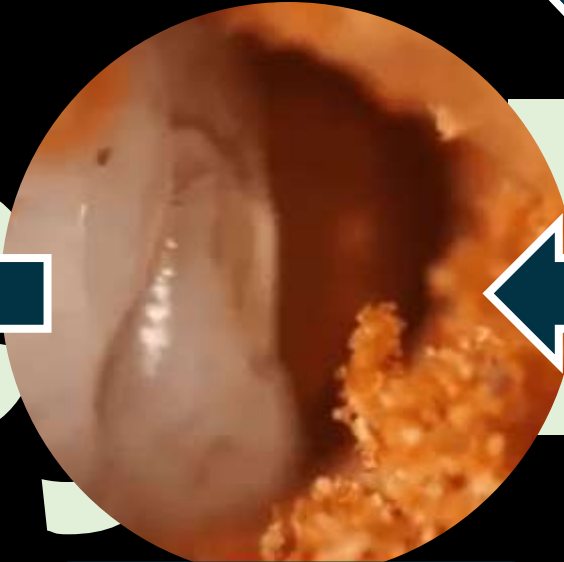
**fly off**



**offspring exit**



**larvae feed**



**lay eggs**





# Symptoms of Attack

boring dust = mix  
of bark shavings  
and frass that  
accumulates in  
crevices and base  
of tree



pitch tubes =  
resin  
accumulation at  
point of attack,  
often with frass





# Endemic vs Epidemic

## Endemic (natural population)

- Very low population densities
  - Less than one tree attacked per 5 acres, per year
  - Attack weakened trees only
  - Travel longer distances for the next host
  - Low tree mortality

## Epidemic (outbreak)

- populations rapidly build up to high levels
  - several groups of **four or more trees are attacked on at least 20 acres over 2 to 3 consecutive years.**
  - Attack healthy trees
  - Do not travel far for the next host
  - High tree mortality





# Potential For Epidemic





# Mountain pine beetle

- Hosts: Lodgepole, ponderosa, whitebark, limber, and bristlecone pine >8 in DBH
- Dense, mature, even-aged pine
- Large diameter is preferred
- 1 year life cycle
- Current outbreak near Gunnison





# Wilder-Gunnison Highlands Outbreak



**Pitch tubes**



**galleries with larval chambers**



**adults, pupae, and larvae**



# Spruce Beetle

- Host: Engelmann spruce and blue spruce
- Mature, >16 in DBH
  - Outbreak, down to 4 in DBH
- Two-year life-cycle in Colorado
- Remove downed trees when possible
- Love the cool underside





# Signs of Spruce Beetle Activity





# Douglas-fir Beetle

- Host: Douglas-fir
- Prefer mature trees, but will attack smaller
- One year life cycle
- Moving through Colorado
- Control
  - MCH
  - Push-pull





# Roundheaded Pine Beetle

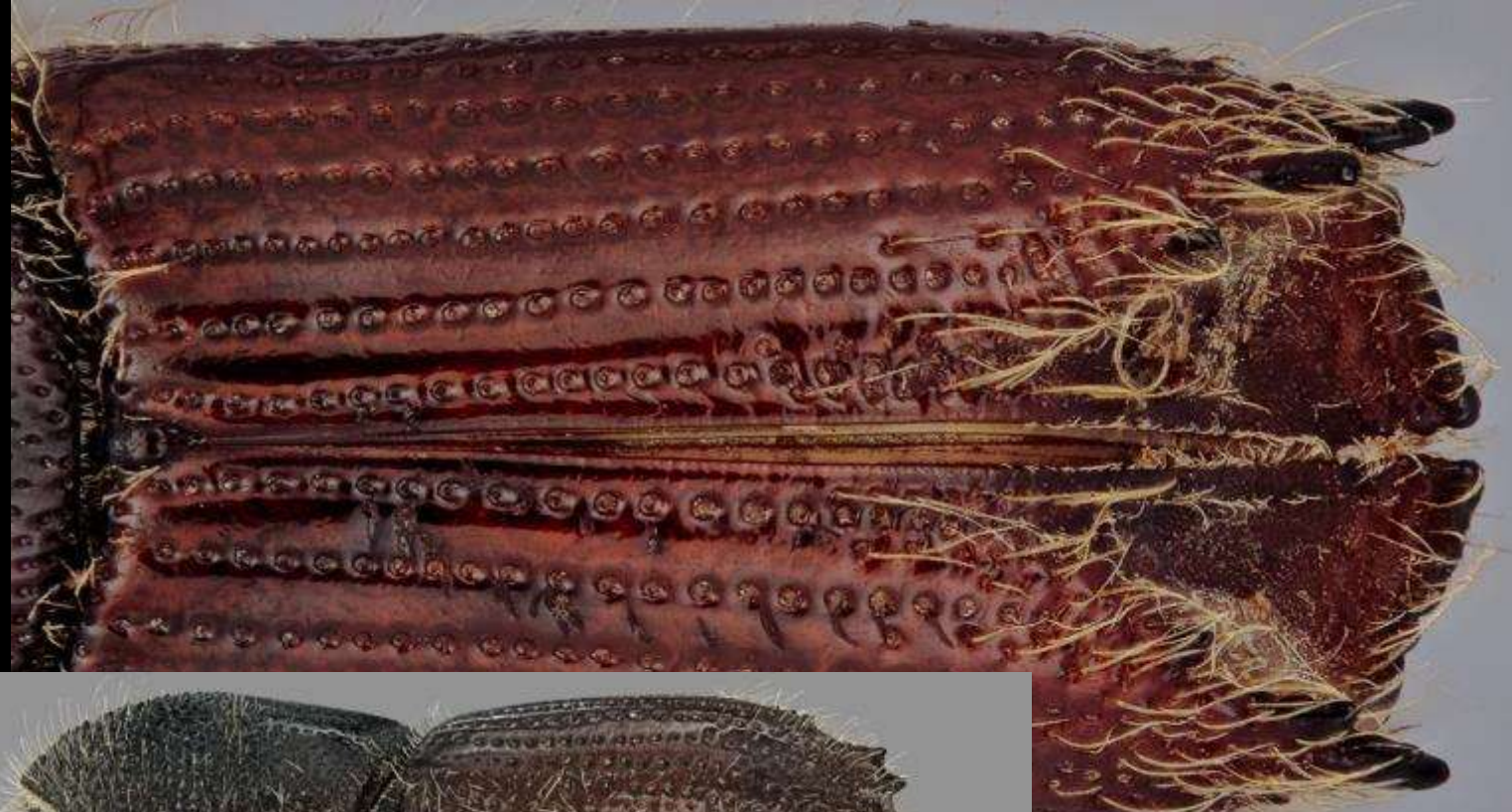
- Host: Ponderosa pine
- Prefer smaller diameter, but will kill large in outbreak
- One year life cycle; late fall flight
- Outbreak near Dolores (complex of beetles)





# Pine *Ips* (*Ips pini*)

- Hosts: All pine species
- Engraver beetles
- Scooped out “butt”
- Attracted to green slash
- Small diameter is preferred
- Can attack and kill mature trees
- 2-4 generations per year





# Signs of Pine *lps* activity





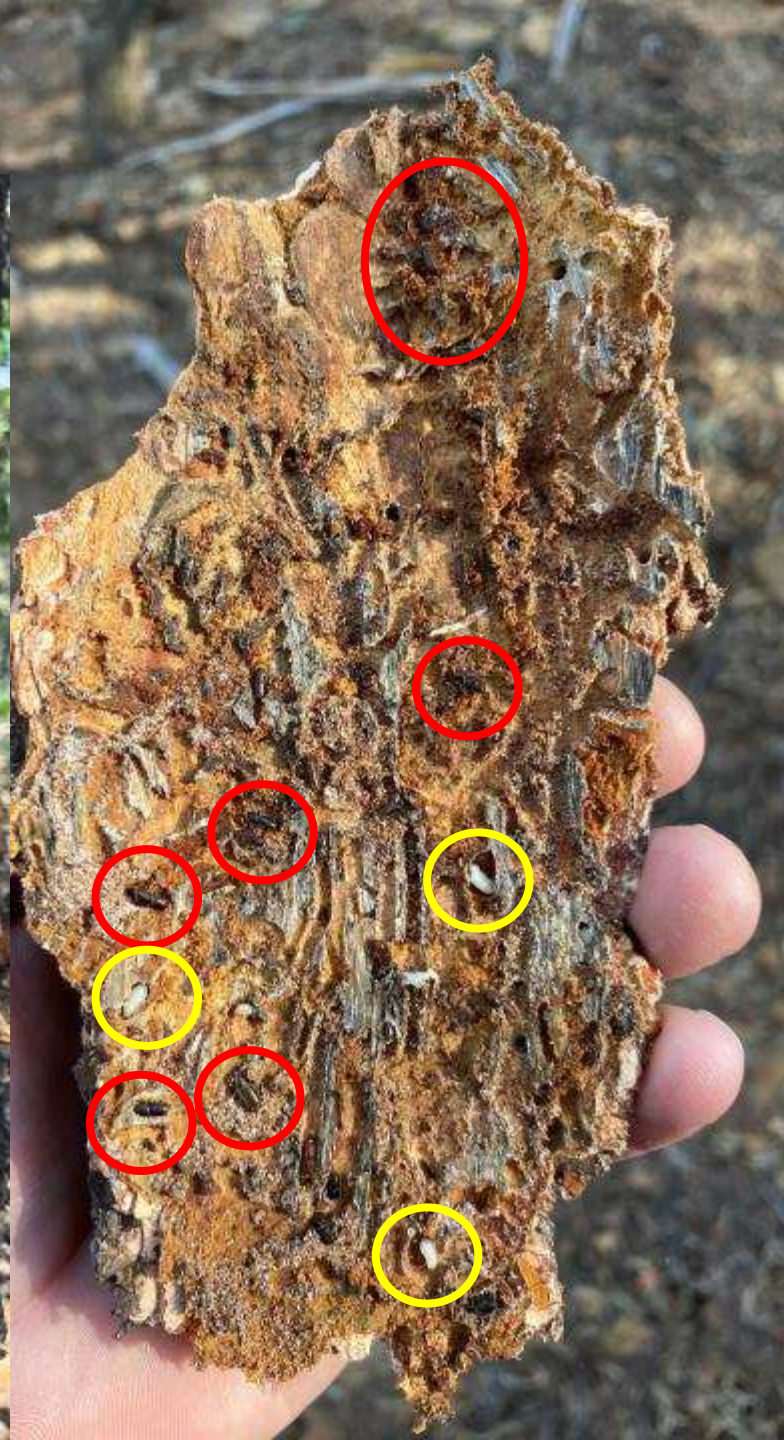
# Pinyon Ips (*Ips confusus*)

- Hosts: Two-leaf pinyon in Colorado
- Scooped out “butt”
- Attracted to green slash
- Young and mature pinyon attacked
- 2-3 generations per year
- “y” shaped, or tuning fork gallery





# Signs of Pinyon *Ips*





# Bark Beetle Management

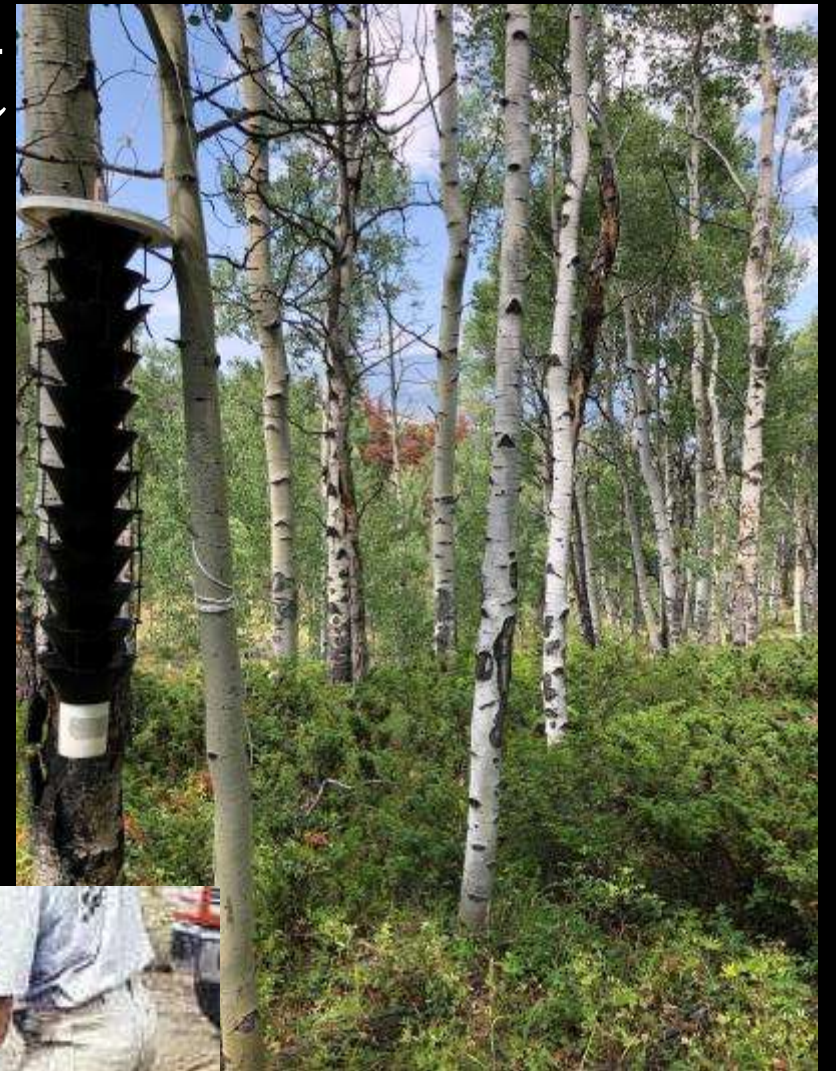
- Direct control options
  - salvage
  - solar treatments





# Bark Beetle Management

- Direct control options
  - Pheromone trapping
  - Burning/Burying
  - Peeling/Debarking





# Bark Beetle Management

- Slash piles
  - Pheromone trapping
  - Burning/Burying
  - Lop and scatter
  - Chipping
  - Clean up of broken material
  - Green chaining (not recommended)





# Bark Beetle Management

- preventive chemical treatments of individual trees prior to beetle flight
  - Astro (Pyrethroids)
  - Carbaryl (Carbamate)
  - Baseline (Bifenthrin)
- Anti-aggregation pheromones
  - Verbenone
  - MCH





# Bark Beetle Management

- Silvicultural treatments
- Consult a forester



Thinned lodgepole pine



Unthinned control





# Bark Beetle Management – Do nots

- Do not move green or infested firewood
- Do not stack infested wood between/next to host trees
- Avoid scorching trees





# Management Summary

- Bark beetle monitoring
- Preventative management rather than reactionary
  - Treating the cause rather than just the symptoms
- Direct control used in high value areas
  - Individual infested tree removal
- Insecticide application
  - High value individual tree protection
  - Recommended for small acreage only
  - Non-target effects
- Accepting some loss
  - Bark beetles in forests are usually native insects that play a role in the ecosystem-sanitizers



# Western spruce budworm

- Hosts: Douglas-fir, white fir, subalpine fir, Engelmann spruce, and blue spruce
- One-year life cycle
- Only feeds in caterpillar stage
- Voracious feeders – brown/rusty needles
- Management
  - Remove/thin some overstory, thin heavily from below







# Life Cycle





Questions?

Thank you!

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Female spruce beetle  
laying eggs under bark