

# Managing the bark beetle activity in your neighborhood





**At least a couple  
beetle 'hotspots'  
causing significant  
tree mortality**

# Today's Presentation

- Background on bark beetle outbreaks
- Step by step management of bark beetles
  - Identify the culprit
  - Mark their current location
  - Know your timeline
  - Decide on treatment plan
- Beetle sanitation – removing infested trees in time
- Preventative pesticide options for protecting unattacked trees
- FAQs
- Community Q&A

# Bark beetles

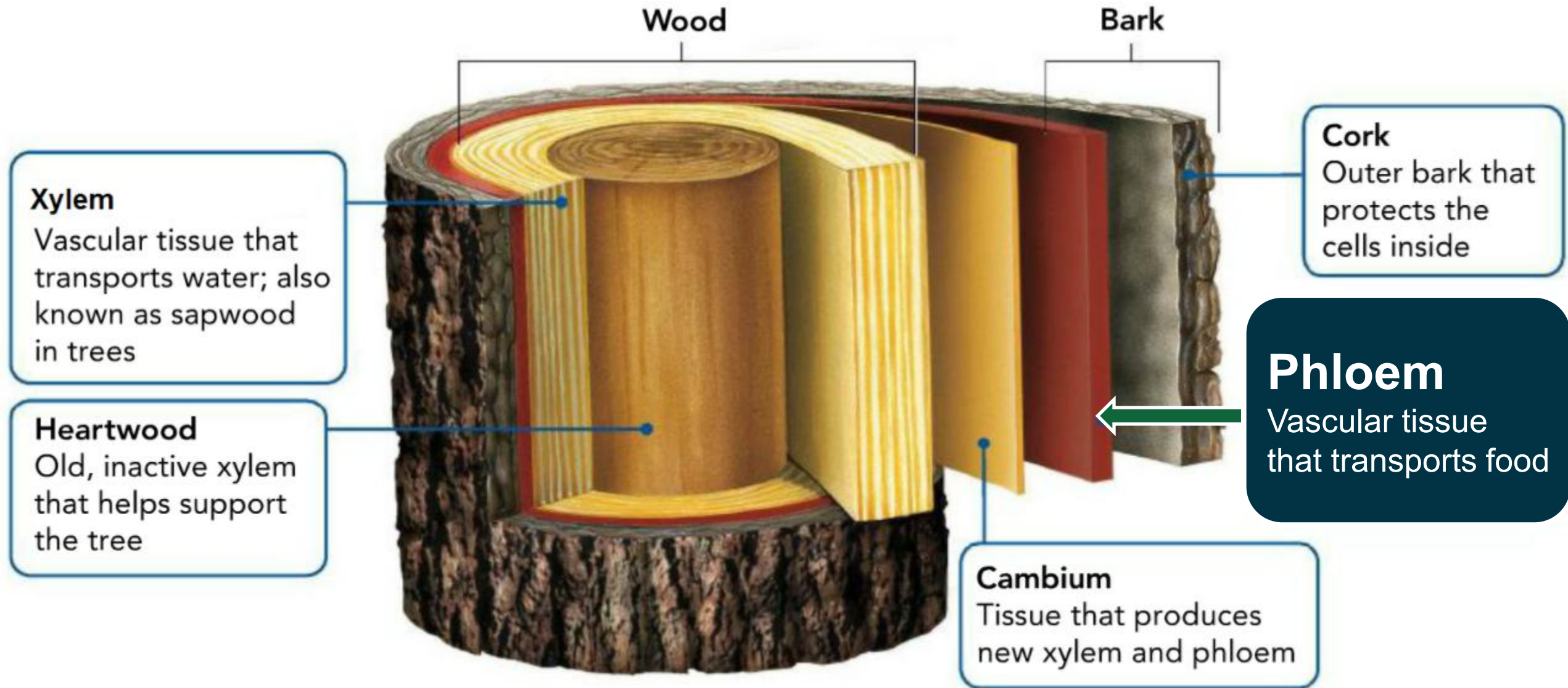


**about the size of a  
grain of rice**

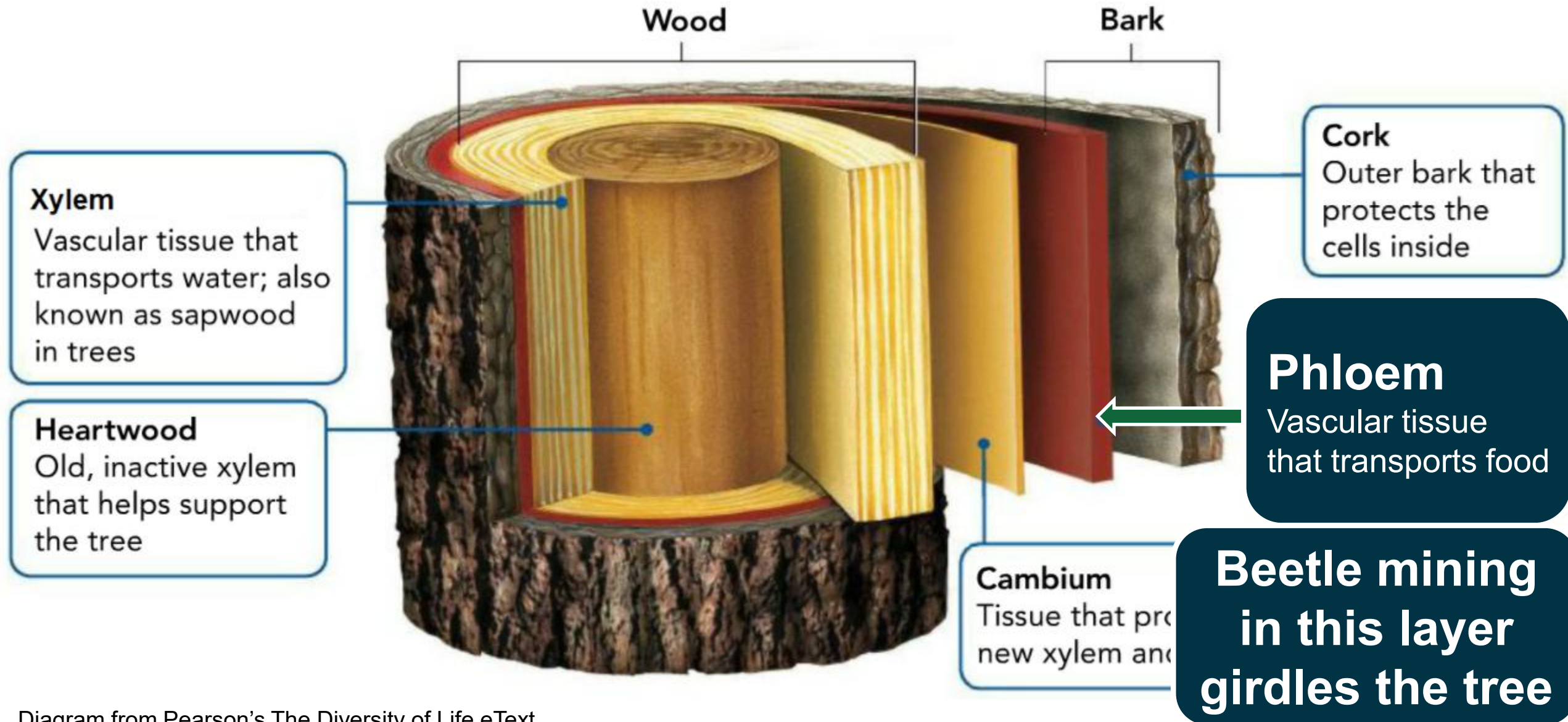


**typically kill trees  
within one year**

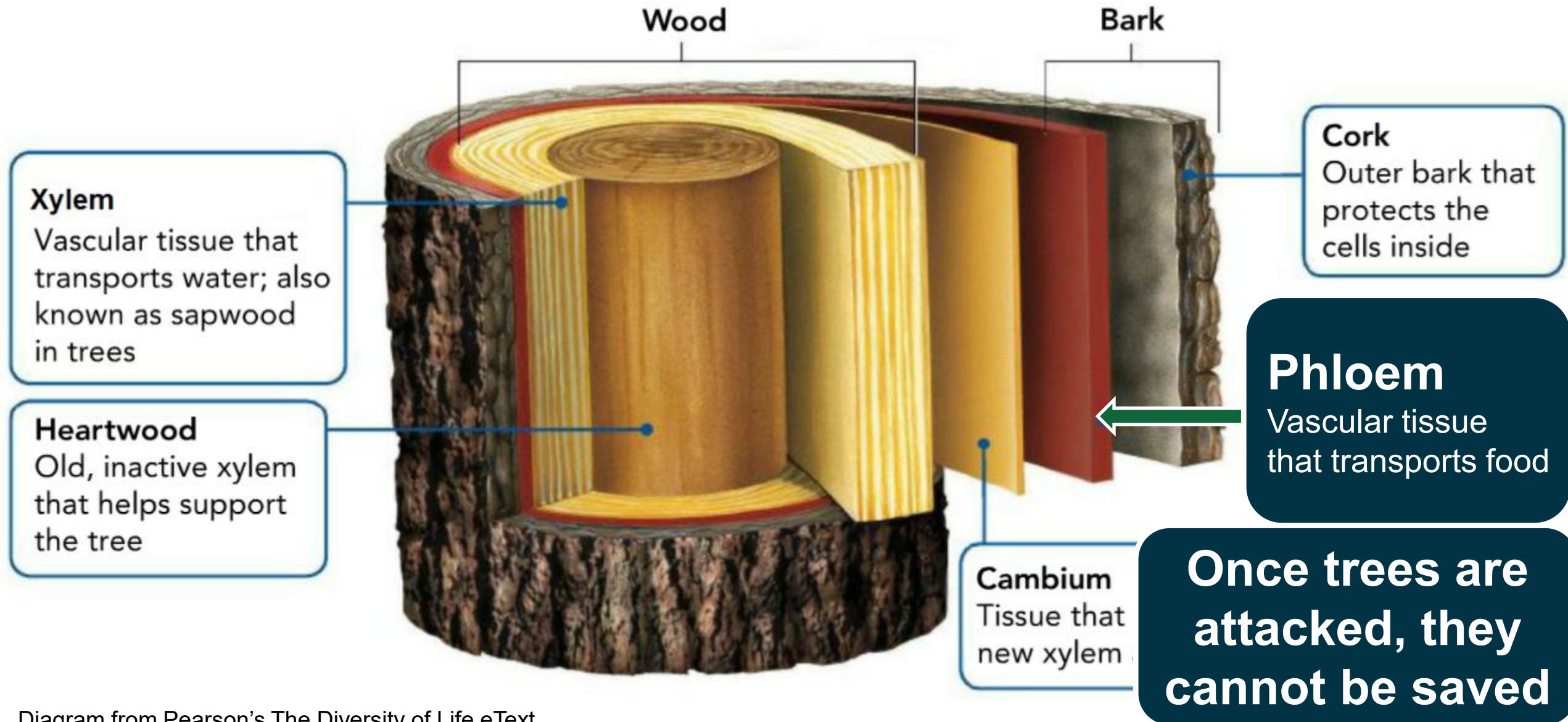
# Bark beetles feed & reproduce in the phloem



# Bark beetles feed & reproduce in the phloem

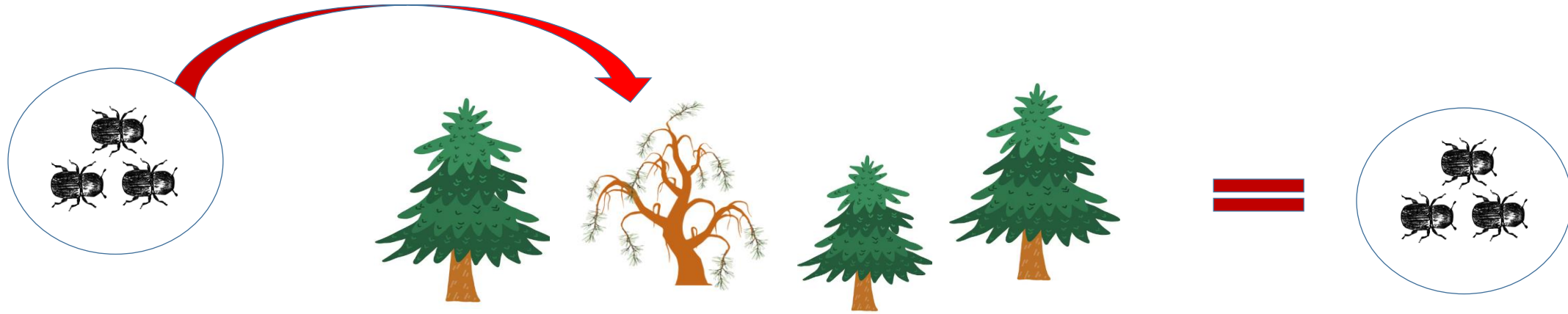


# Bark beetles feed & reproduce in the phloem



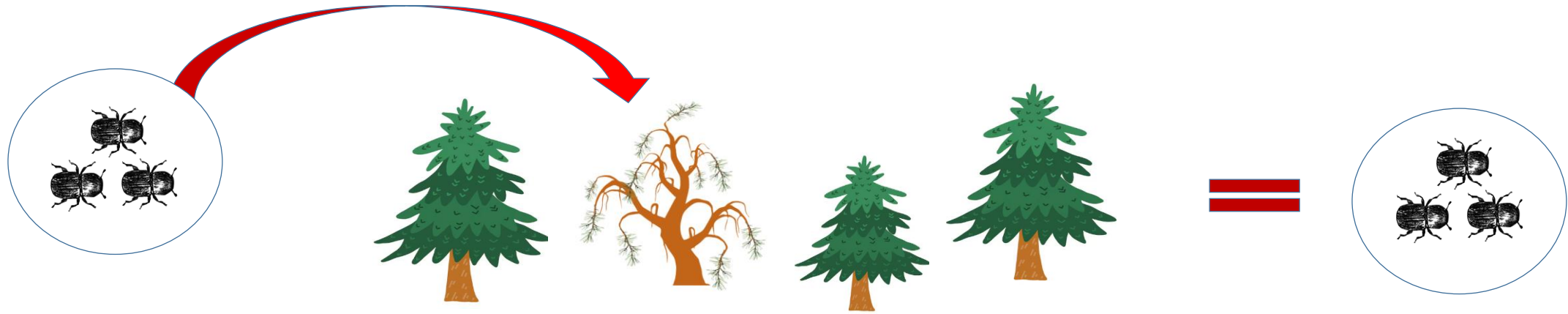
**What causes  
outbreaks?**

**When bark beetle populations are small, they target a few stressed, damaged, or unhealthy host trees.**

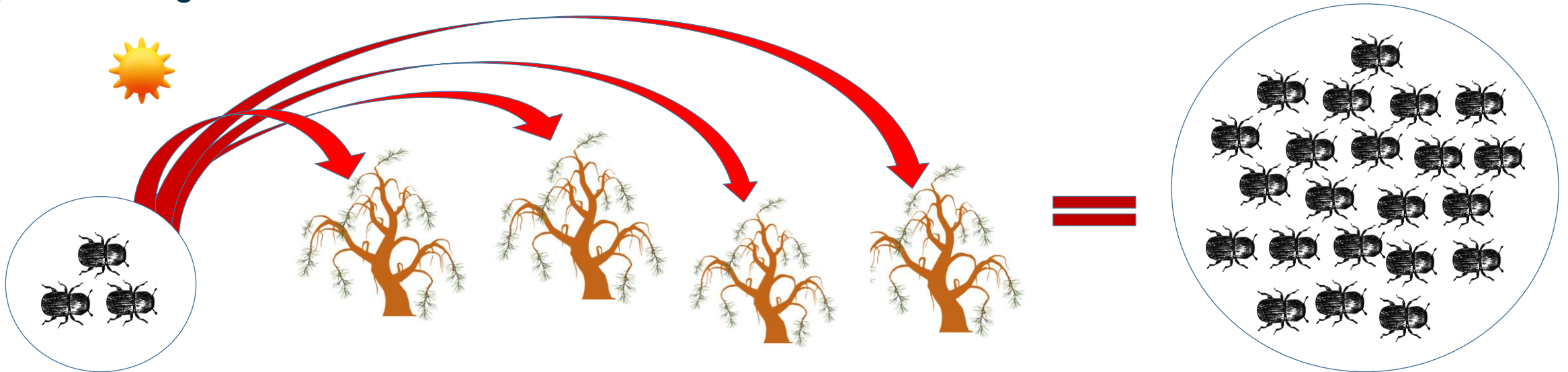


**In Idaho, most tree-killing bark beetles are native insects. Small populations serve to take out unhealthy trees, providing additional habitat and resources for other species.**

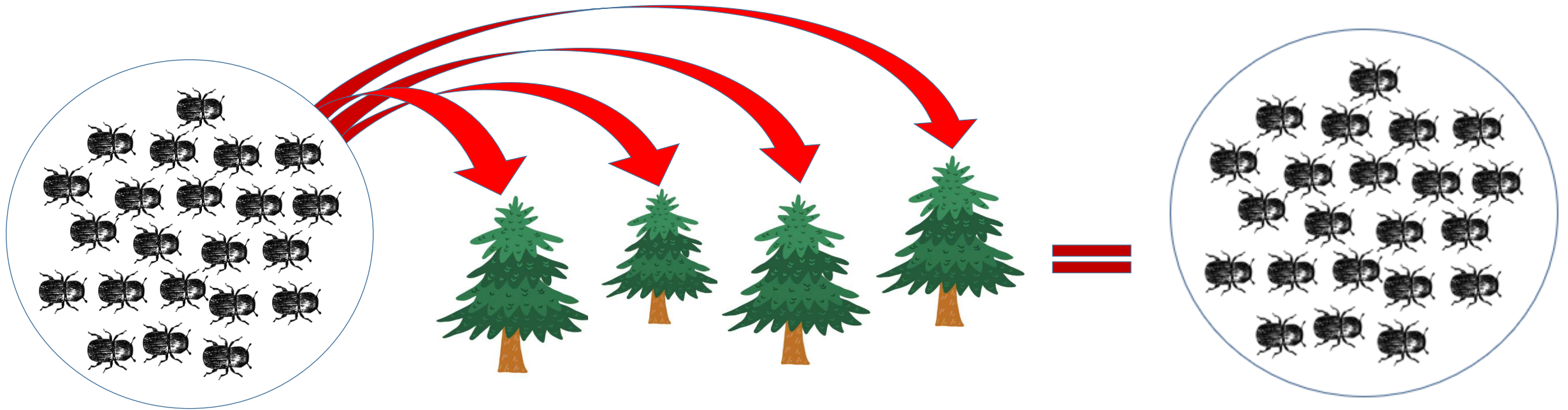
**When bark beetle populations are small, they target a few stressed, damaged, or unhealthy host trees.**



**Drought and other stressors can lead to many stressed host trees in an area, which can allow beetle populations to grow**



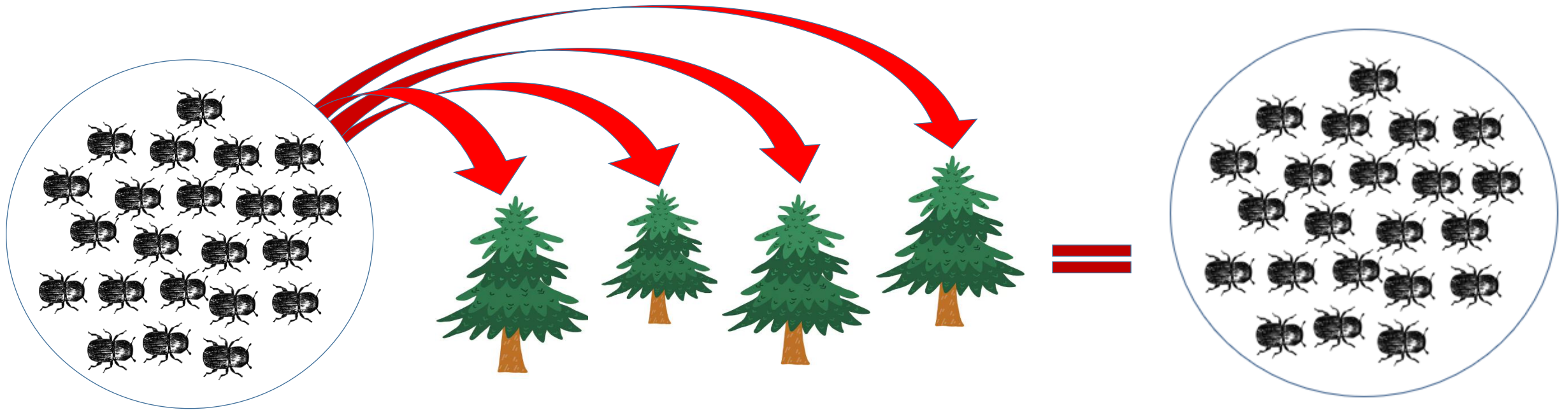
**When beetle populations are large, even healthy trees are targeted because the beetles have the numbers to overcome tree defenses**



### **What can suppress an outbreak?**

- A weather event that is either bad for the beetles (i.e; off-season cold snap) or great for the trees (i.e; excellent moisture year)
- Beetles naturally run out of suitable host trees/breeding material
- Active management to reduce the beetle population, eliminate breeding material, and/or protect host trees

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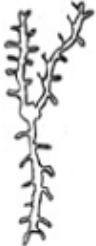
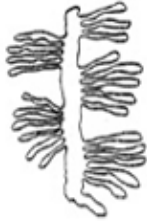
Three beetles are visible in the background, rendered in a light green color. One beetle is in the top left, another in the top right, and a third in the bottom center. They are all facing different directions.

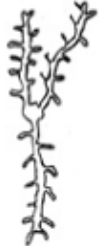
# **Step 1:**

## **Confirm & identify the culprit**

A large number of small, dark brown beetles of various species are scattered across a white background. The beetles are of different sizes and shapes, some appearing more elongated and others more rounded. They are distributed throughout the frame, with a higher concentration in the center where a text box is located. The text box is a dark teal color with rounded corners and contains white text. The overall image conveys a sense of a large infestation or a collection of many different beetle species.

Many different beetle species can  
infest trees, and each species  
requires different management

| BEETLE SPECIES                                                                                                   | PRIMARY HOSTS                                                  | LIFE CYCLE          | GALLERY PAT-<br>TERN                                                                  | SIGNS &<br>SYMPTOMS                                                             | KEY MANAGEMENT<br>STRATEGY                                                         |
|------------------------------------------------------------------------------------------------------------------|----------------------------------------------------------------|---------------------|---------------------------------------------------------------------------------------|---------------------------------------------------------------------------------|------------------------------------------------------------------------------------|
| <b>Mountain pine beetle</b><br> | All pines, especially lodgepole, ponderosa and whitebark pines | 1 generation/year   |    | Pitch tubes, boring dust, fading crown                                          | Manage dense stands and older stands through thinning                              |
| <b>Western pine beetle</b><br>  | Ponderosa pine only                                            | 2+ generations/year |    | Pitch tubes, boring dust, distinctive gallery, wood pecker damage, fading crown | Manage dense stands and older stands through thinning                              |
| <b>Pine engraver</b><br>        | Ponderosa pine, lodgepole pine, western white pine             | 2+ generations/year |    | No pitch tubes, boring dust, distinctive gallery, fading crown                  | Do <i>not</i> create slash through management activities between December and June |
| <b>Douglas-fir beetle</b><br>  | Douglas-fir                                                    | 1 generation/year   |   | No pitch tubes, boring dust, fading crown                                       | Remove green blowdown, thin dense stands                                           |
| <b>Fir engraver</b><br>       | Grand fir                                                      | 1 generation/year   |  | No pitch tubes, boring dust, distinctive gallery, fading crown                  | Minimize grand fir component of stands, minimize stress on residual trees          |

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| <b>Western pine beetle</b><br>  | <u>Ponderosa pine</u> only                                                                                                                  | 2+ generations/<br>year |    | Pitch tubes, boring<br>dust, distinctive<br>gallery, wood peck-<br>er damage, fading<br>crown | Manage dense stands<br>and older stands<br>through thinning                                 |
| <b>Pine engraver</b><br>        | <u>Ponderosa pine</u> ,<br><u>lodgepole pine</u> , <u>west-</u><br><u>ern white pine</u>                                                    | 2+ generations/<br>year |    | No pitch tubes,<br>boring dust,<br>distinctive gallery,<br>fading crown                       | Do <i>not</i> create slash<br>through management<br>activities between<br>December and June |
| <b>Douglas-fir beetle</b><br>  | <b>“Pine Beetle” is not a good enough ID.<br/>There are at least 3 different species of<br/>“pine beetles,” each with different biology</b> |                         |                                                                                       |                                                                                               | Remove green<br>down, thin dense<br>stands                                                  |
| <b>Fir engraver</b><br>       | Grand fir                                                                                                                                   | 1 generation/year       |  | boring dust,<br>distinctive gallery,<br>fading crown                                          | Minimize grand fir<br>component of stands,<br>minimize stress on<br>residual trees          |

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| <b>Pine engraver</b><br>        | Pond<br>lodgep<br>ern                                          |                     |    | No pitch tubes, boring dust, distinctive gallery, fading crown                  | Do <i>not</i> create slash through management activities between December and June |
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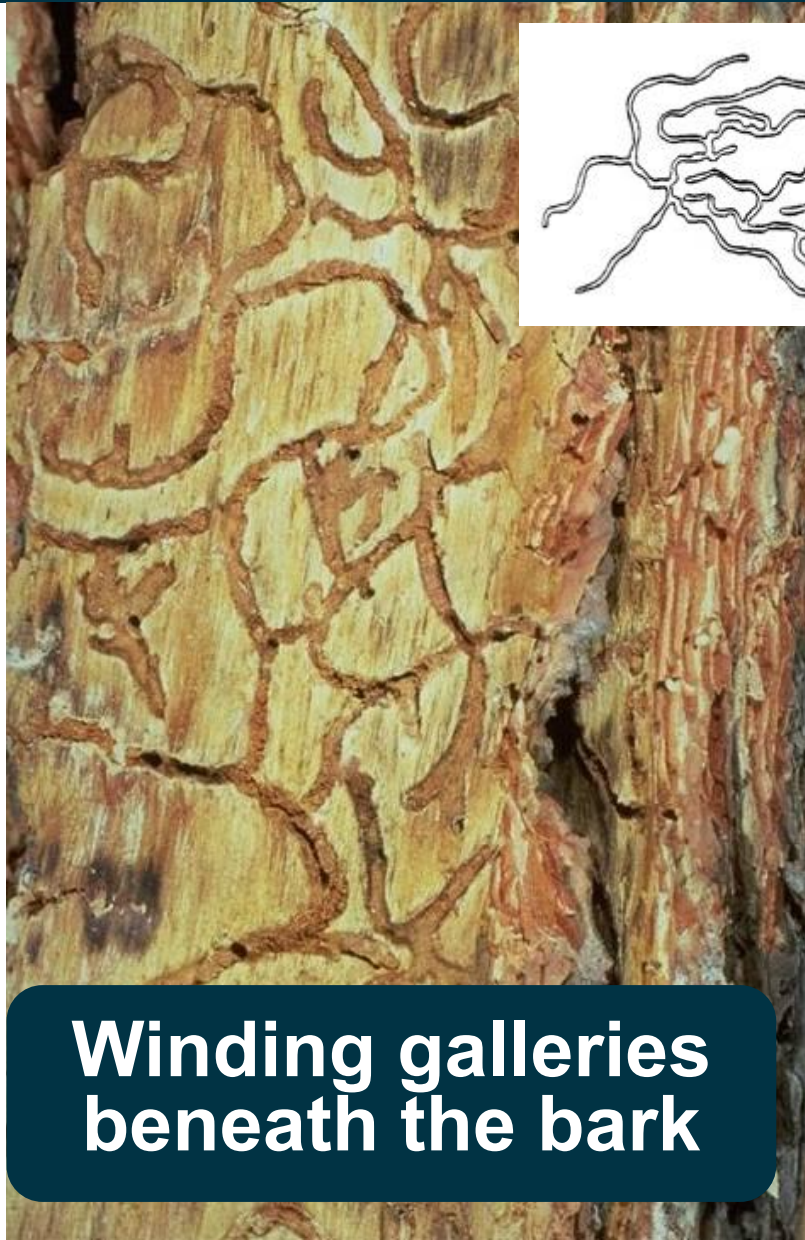
**We have identified western pine beetle as the species behind this outbreak**

# Western pine beetle I.D.

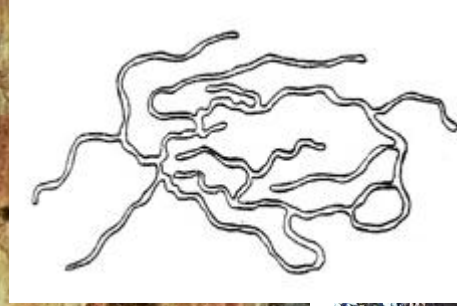


Host trees:  
ponderosa pine  
>6" diameter

UGA47990417



Winding galleries  
beneath the bark



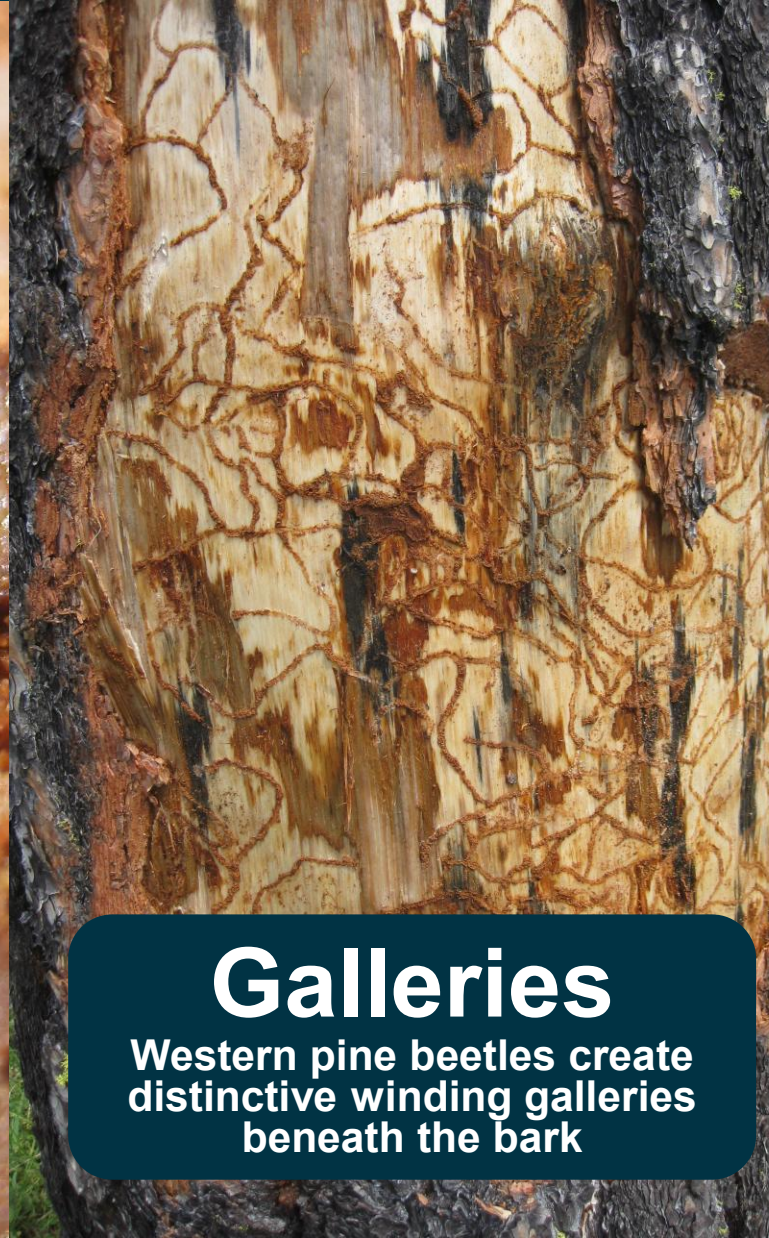
pitch tubes or  
boring dust

# Western pine beetle I.D.



## Adults

Western pine beetle adults are the size of a mouse poop and are rarely seen



## Galleries

Western pine beetles create distinctive winding galleries beneath the bark



## Larva

Western pine beetle larvae move into the bark to complete their development

The background of the slide features three large, faint, light green silhouettes of beetles. One beetle is positioned in the upper left, another in the upper right, and a third in the lower left. They are all facing towards the right side of the frame.

# **Step 2:**

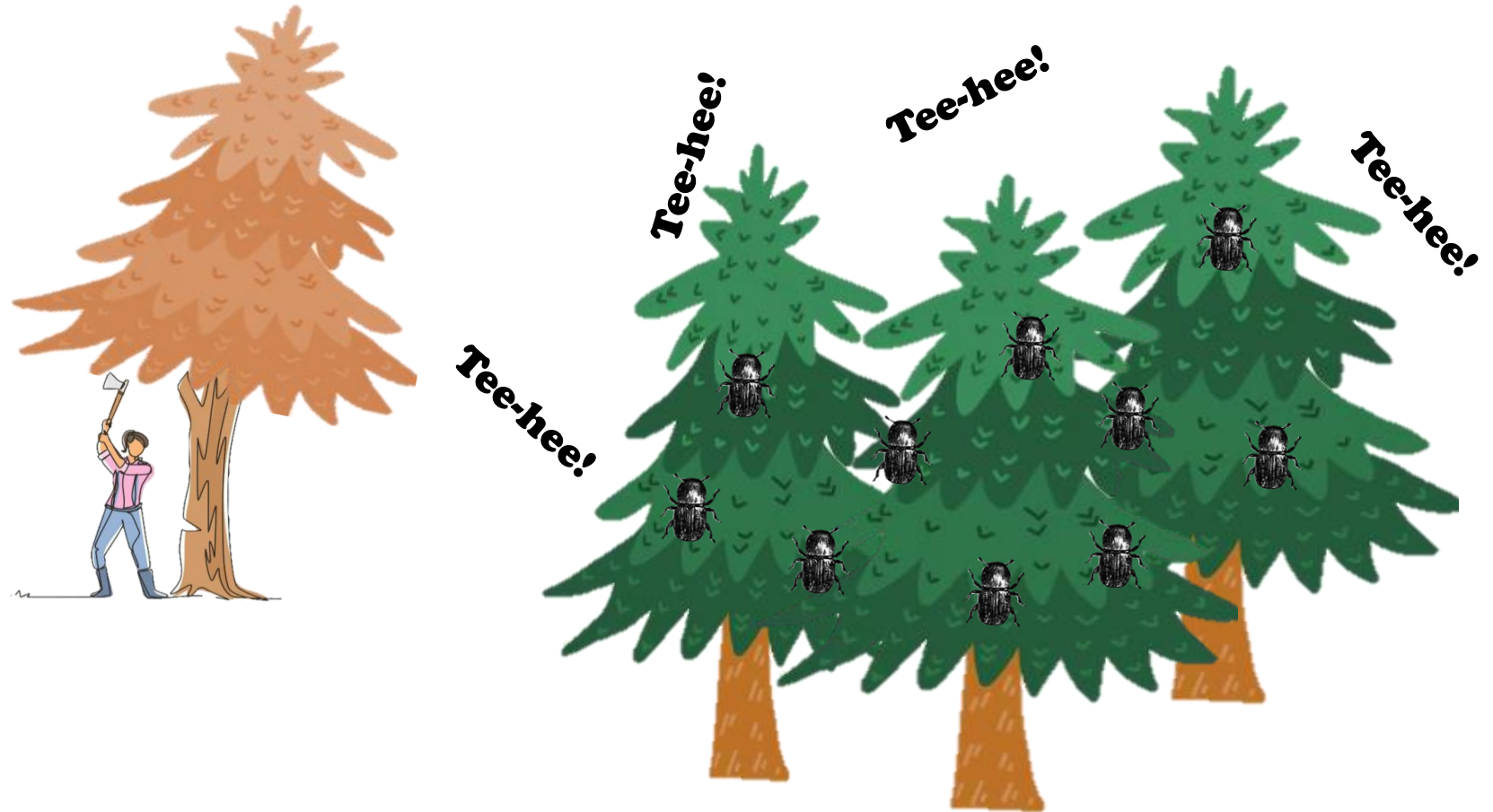
## **Where are they now?**

# If you are just cutting down the red trees, you are probably missing the beetles!

It takes a long time for the needles to fade on attacked trees

Beetles leave the infested tree once they have completed their development

Trees that are **currently** infested with beetles often still have green needles



# If you are just cutting down the red trees, you are probably missing the beetles!

It takes a long time for the needles to fade on attacked trees

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Trees that are **currently** infested with beetles often still have green needles



Once trees are attacked, they **CANNOT BE SAVED** even if the needles are still green

# When do the beetles move to new host trees?

Different species of bark beetles move at different frequencies and different times of year!

| BEETLE SPECIES                                                                                                   | LIFE CYCLE          |
|------------------------------------------------------------------------------------------------------------------|---------------------|
| <b>Mountain pine beetle</b><br> | 1 generation/year   |
| <b>Western pine beetle</b><br> | 2+ generations/year |
| <b>Pine engraver</b><br>      | 2+ generations/year |

**Fly mid-summer**

**Fly May/June & Aug/Sept**

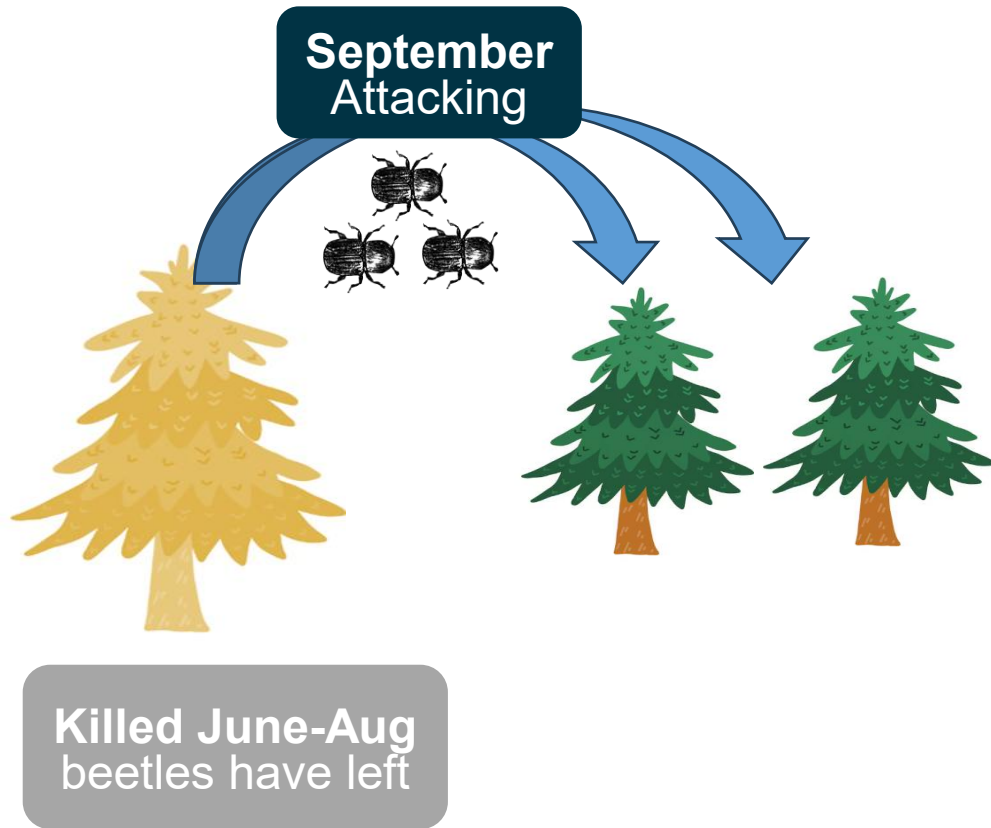
**Fly early spring – July/Aug**

# Western pine beetle movement



**June-Aug**  
Developing

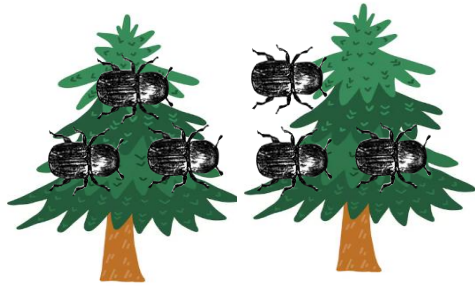
# Western pine beetle movement



# Western pine beetle movement

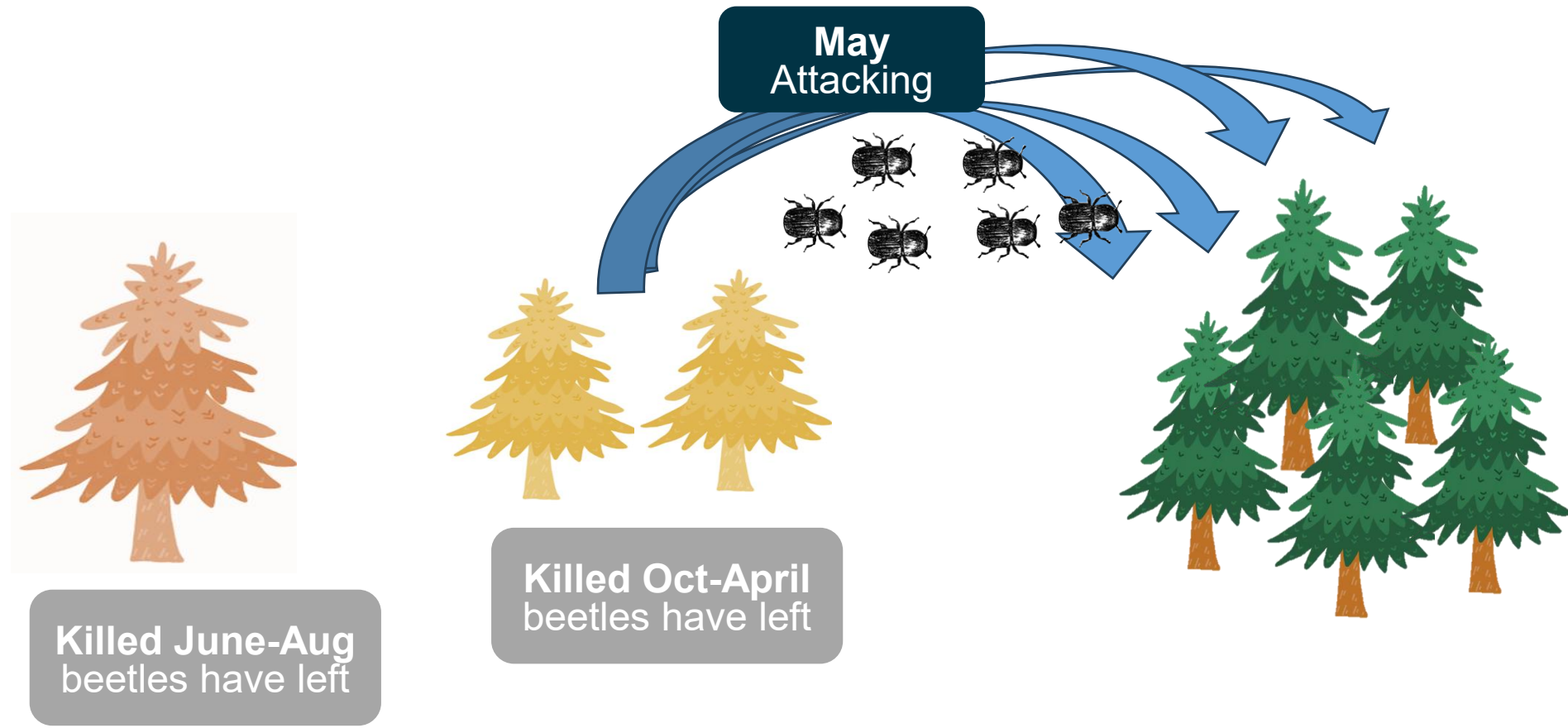


**Killed June-Aug**  
beetles have left



**Oct – April**  
Developing

# Western pine beetle movement



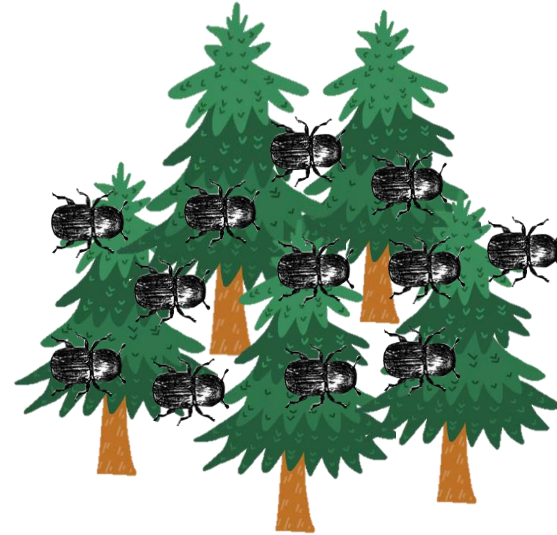
# Western pine beetle movement



**Killed June-Aug**  
beetles have left



**Killed Oct-April**  
beetles have left



**June-Aug**  
Developing

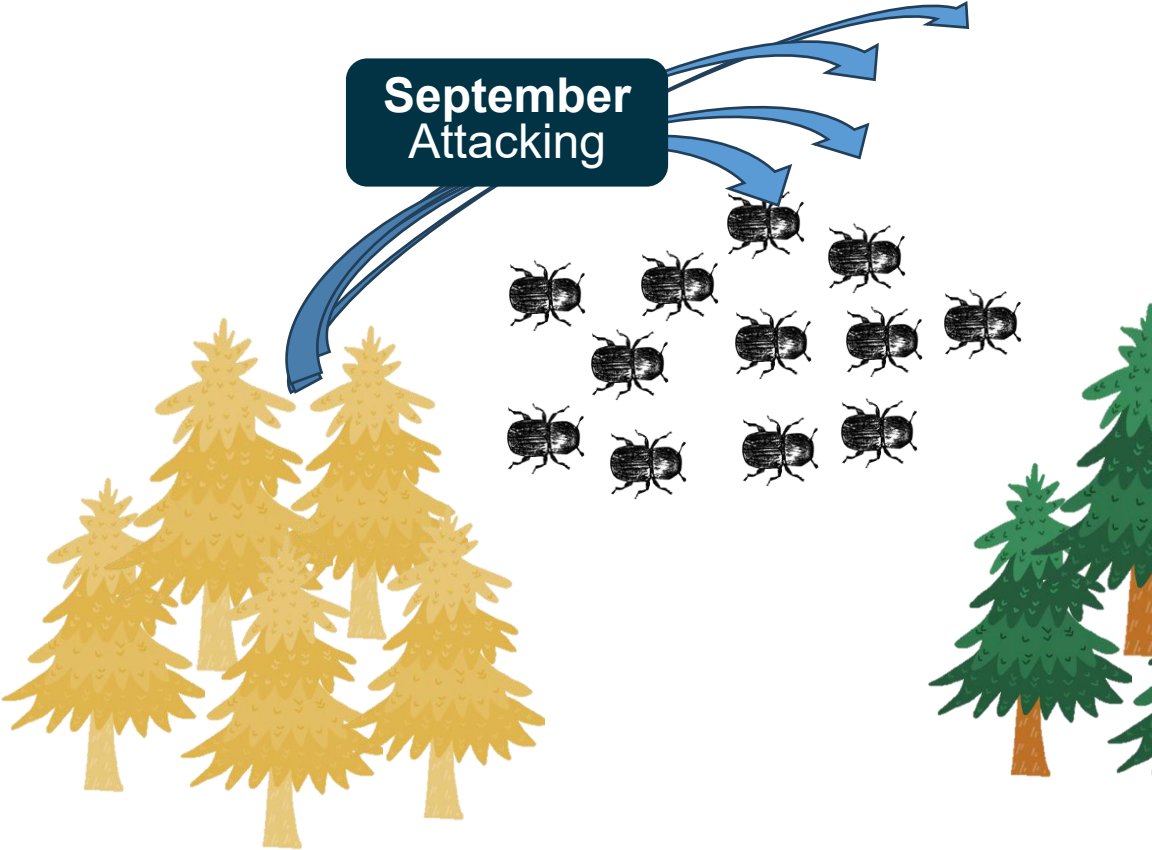
# Western pine beetle movement



**Killed June-Aug**  
beetles have left



**Killed Oct-April**  
beetles have left



**Killed June-Aug**  
beetles have left

# Western pine beetle movement

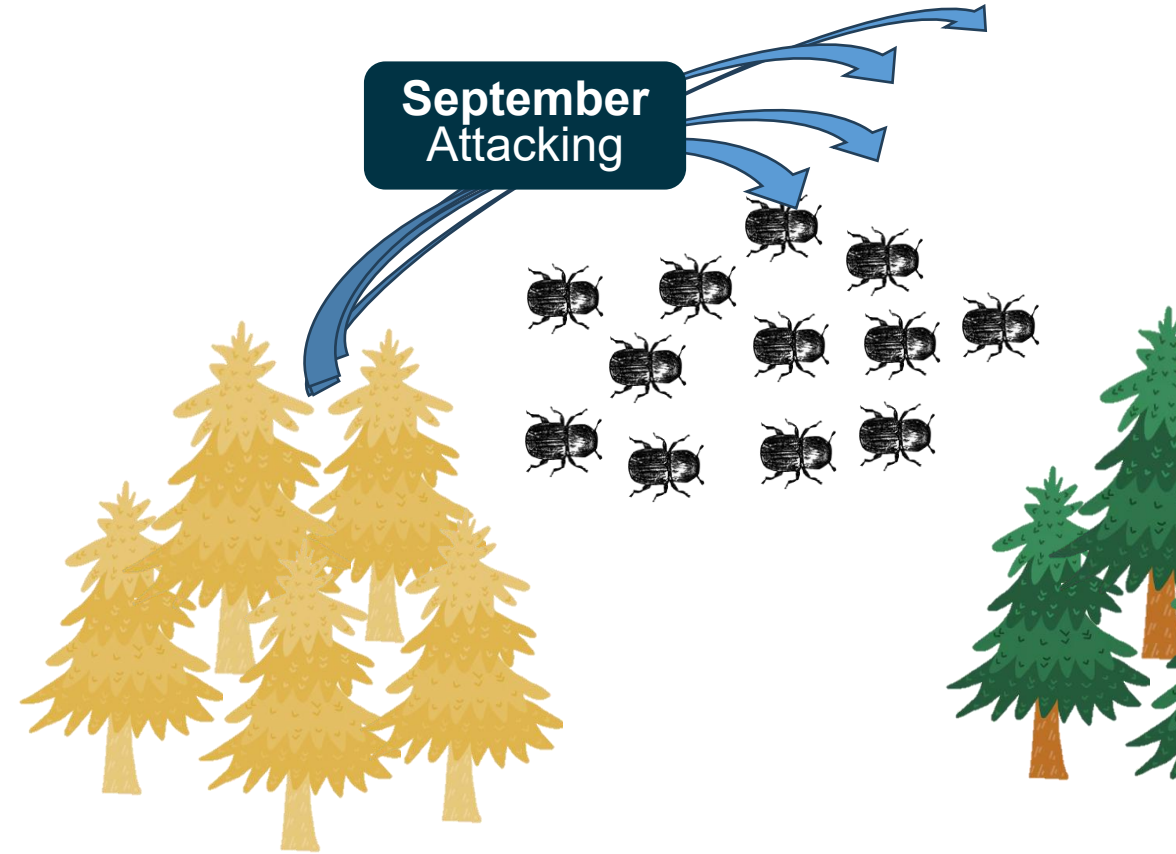
- Beetles move twice per year (in May and in Sept)
- Outbreaks can grow quickly
- Active infestations can be hard to track
- Exact flight timing depends on weather



**Killed June-Aug**  
beetles have left



**Killed Oct-April**  
beetles have left



**Killed June-Aug**  
beetles have left

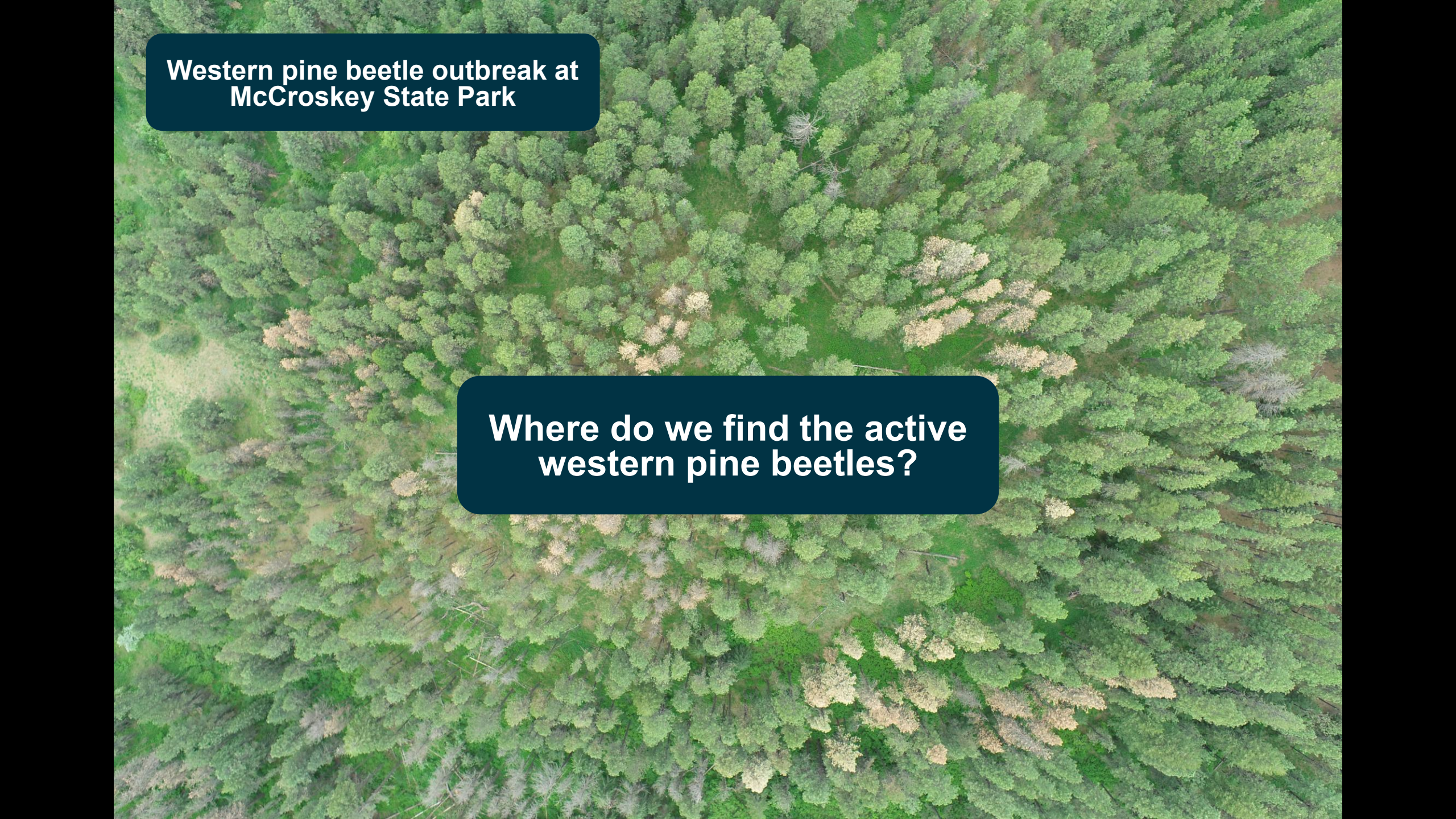


# What is the current situation?

Western pine beetles recently completed their late-summer attacks

Fully red trees no longer contain western pine beetles

Infested trees will still have green needles this time of year

An aerial photograph of a dense forest. The majority of the trees are a vibrant green, but there are several distinct patches of trees that have turned a pale yellow or tan color, indicating they have been affected by a pest outbreak. These patches are scattered throughout the forest, with some appearing as small clusters and others as larger, more irregular areas. The overall texture of the forest canopy is a mix of these two colors, creating a mottled appearance.

**Western pine beetle outbreak at  
McCroskey State Park**

**Where do we find the active  
western pine beetles?**

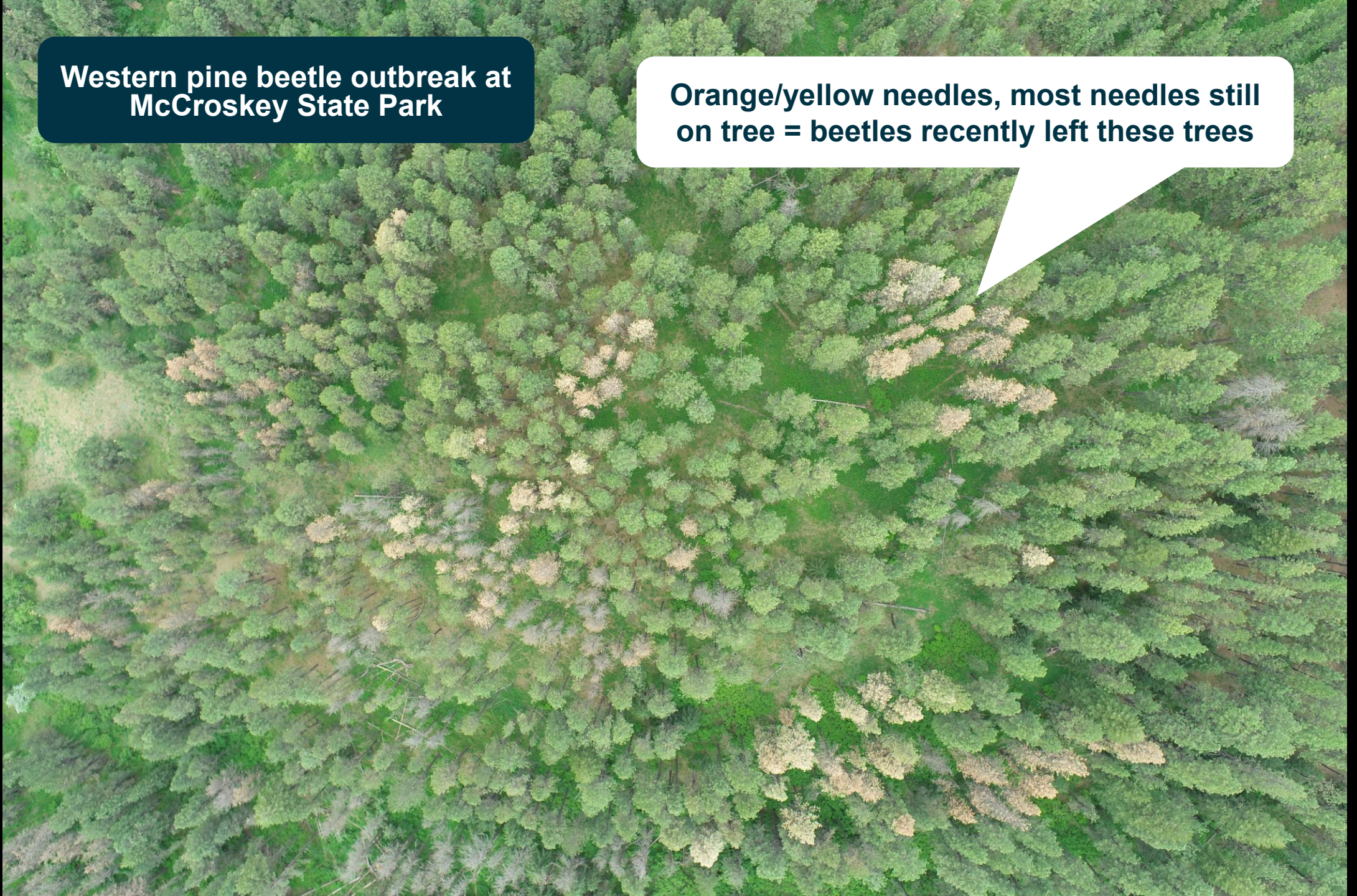
An aerial photograph of a dense forest. The majority of the trees are green, but there are several distinct patches of trees that are yellowish-brown, indicating they are dead. These patches are scattered throughout the forest, with a larger concentration in the upper-left and middle-right areas. The ground between the trees appears to be a mix of brown and green, suggesting some dead trees have fallen or their needles have dropped.

**Western pine beetle outbreak at  
McCroskey State Park**

**Very red needles and needle loss  
= old dead.  
Beetles left long ago.**

**Western pine beetle outbreak at  
McCroskey State Park**

**Orange/yellow needles, most needles still  
on tree = beetles recently left these trees**



**Western pine beetle outbreak at  
McCroskey State Park**

**survey green trees for signs within 1-2  
tree lengths of recently killed trees**



**Western pine beetle outbreak at  
McCroskey State Park**

**survey green trees for signs within 1-2  
tree lengths of recently killed trees**

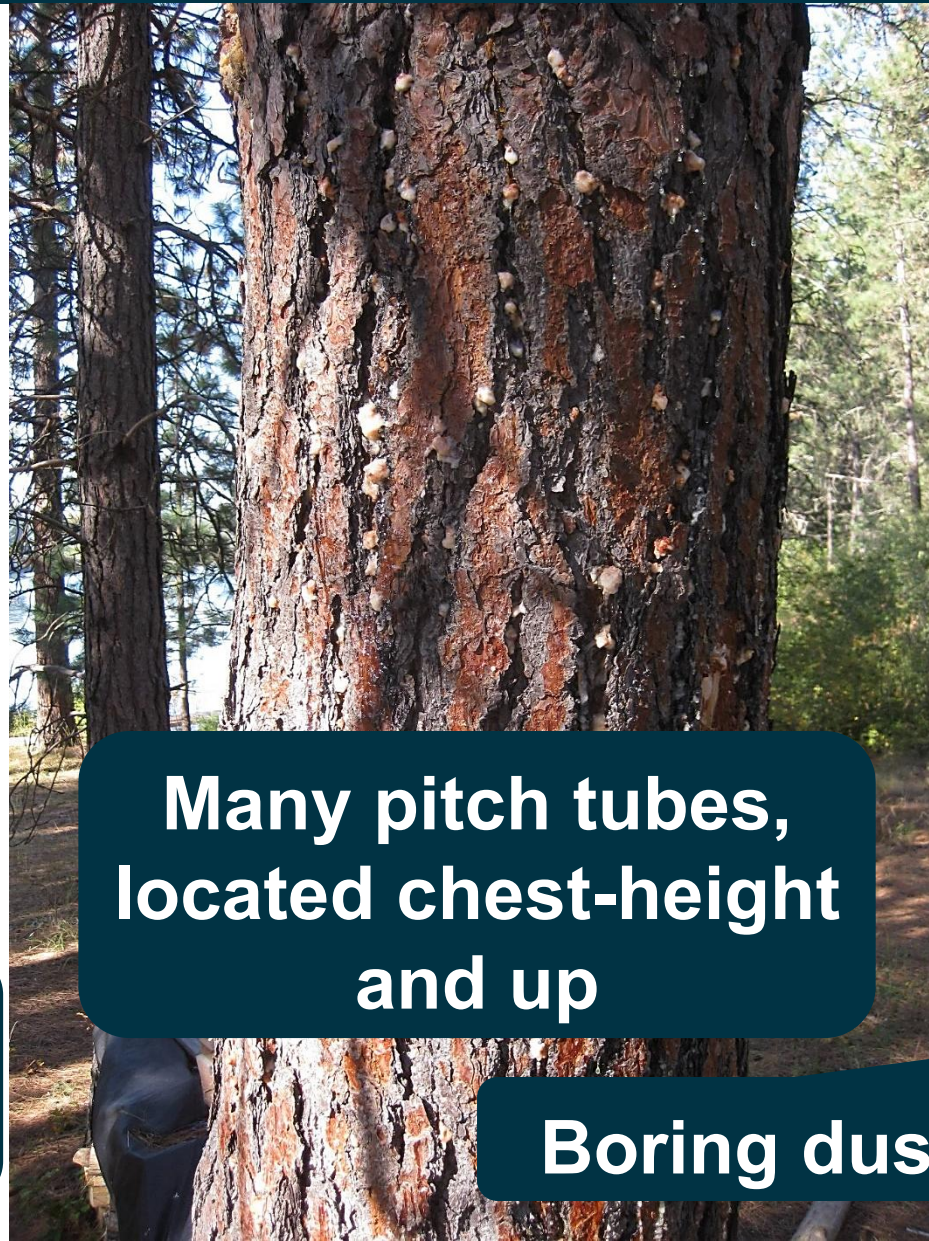


# What to look for



Only need to  
check ponderosa  
pine >6" diameter

UGA47990417



Many pitch tubes,  
located chest-height  
and up



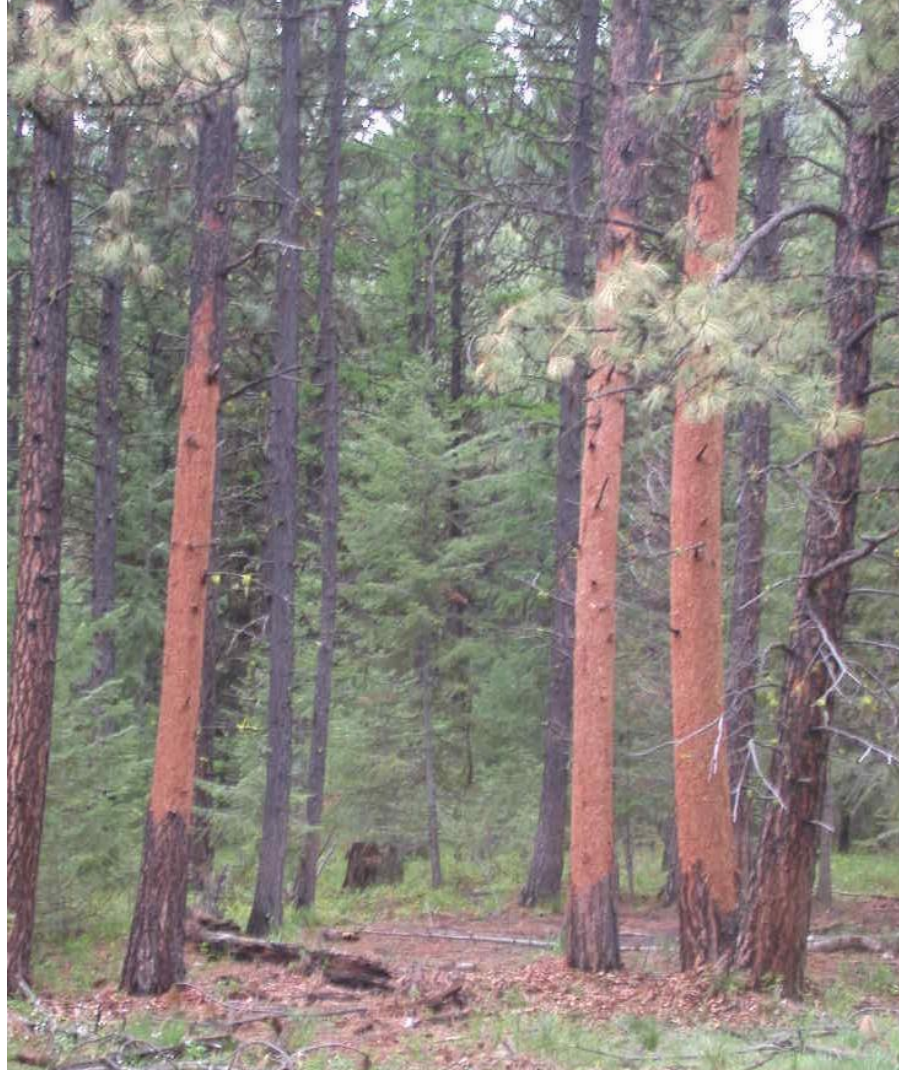
Boring dust

# What to look for

Sometimes there are not pitch tubes, just boring dust

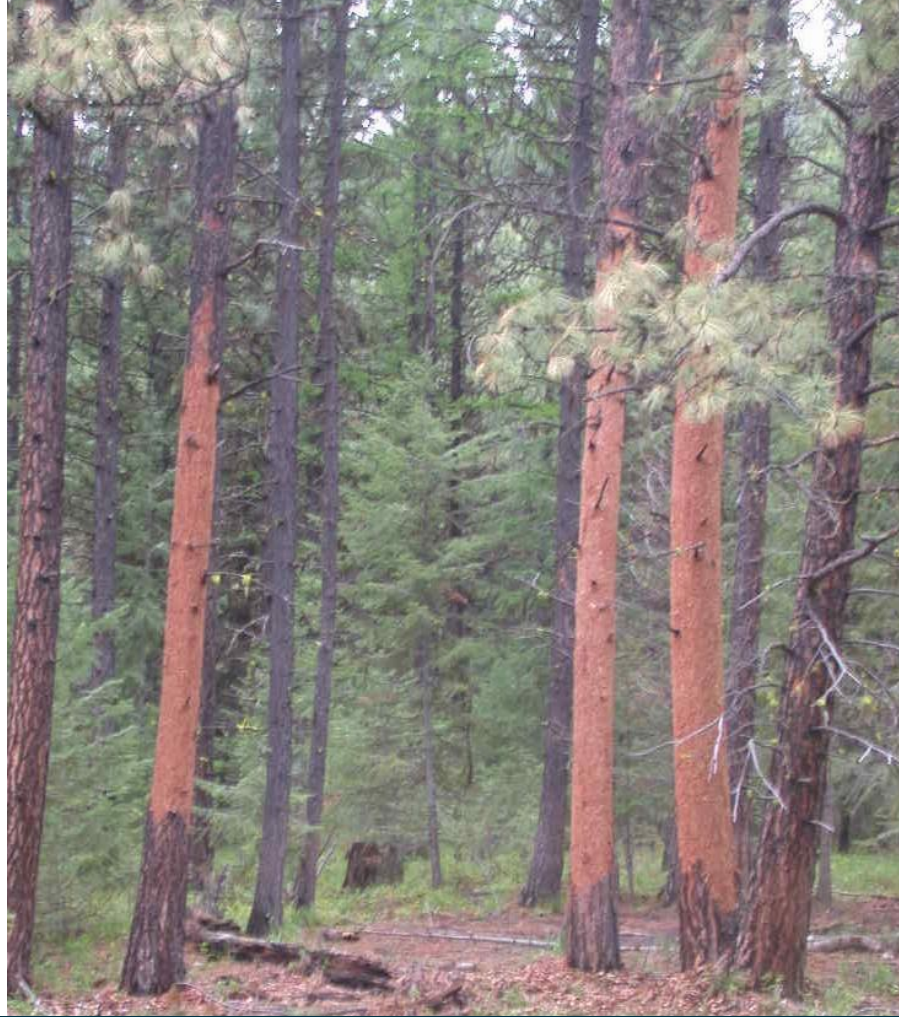


# What to look for



**Woodpeckers sometimes eat larvae in the inner bark**

# What to look for



**Trees with green needles and orange bark exposed are probably currently infested**

# Survey and Marking Tips

- Walk all the way around the tree and check all sides, especially 3ft – 25ft up the trunk
- Look at the bark very carefully on all sides, check for pitch tubes or boring dust piles
- Usually, a successful attack will have >15 pitch tubes or boring dust piles. If you only see a couple spots, the tree may not need to be removed. Injuries, pruning, and a few other minor insects can cause a small number of pitch blobs on a tree.
- Do not chop into a green tree to check the galleries unless you are certain it has been fatally attacked
- Tie a brightly colored ribbon around trees that you suspect are currently infested
- If you are not sure, you can monitor the tree until ~April before making a decision

# Survey and Marking Tips

Once a tree has been successfully infested by western pine beetle, **IT CANNOT BE SAVED**, even if the needles are still green

- Do not apply pesticide to attacked trees
- The best plan is to completely remove the trees from your property while the beetles are still inside the tree, before they come out to make more attacks
- If you would like to keep the logs, you must destroy all of the bark in order to kill the beetles. Chipping, burning, or removing and bagging up the bark are acceptable options.
- Currently infested trees usually still have green needles. The beetles have often already moved on from trees that have red/brown needles

The background of the slide features three large, faint, light green silhouettes of beetles. One beetle is positioned in the upper left, another in the upper right, and a third in the lower center. They are all facing different directions, creating a sense of movement or a natural environment.

# **Step 3:**

## **How much time do I have?**

# YOU HAVE UNTIL MAY 1, 2027

- Beetles are overwintering as larvae in the currently infested trees
- They will finish development inside the bark of the tree in spring
- Their exact emergence timing is dependent on temperature, but is usually around mid-May to mid-June
- In May/June 2027, if infested trees have not been removed or destroyed, the beetles will fly and make attacks on a new set of host trees



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# **Step 4:**

## **Decide on treatment plan**

# Do nothing?



Pre-outbreak



2017

Camp White, Post Falls  
Western Pine Beetle Outbreak



2018



Post-harvest, over 150  
mature trees lost

- Plenty of hosts in the neighborhood
- Outbreak very likely to continue to spread
- High costs – tree removals, reduced property values, reduced cooling effect
- Dead standing trees are a safety hazard
- More difficult to manage with more spread to additional properties

# Beetle Sanitation



Log wizard de-barking tool

- Goal is to reduce the beetle population in the immediate area
- Remove or destroy the beetles while they are in the currently infested trees
- Cut the trees down **AND THEN:**
  - Take to Transfer Station or Mill where they will be processed or disposed of
  - Completely destroy or dispose of all the bark before May 1st 2027

# Beetle Sanitation



- If you keep the currently infested wood on site, the beetles will still emerge and attack more trees (unless you have destroyed all the bark)
- You *can* keep the logs of old dead trees that no longer contain beetles

# Beetle Sanitation: Tips

- Coordinate with neighbors
- Get multiple quotes from reputable companies that are properly licensed and insured
- Make sure they will be removing all of the infested materials BEFORE MAY 1<sup>ST</sup> 2027
- Do not apply pesticides to infested trees
- Old dead trees are no longer a beetle threat but are still a safety hazard if left standing for too long

# Beetle Sanitation: Tips

## **Have realistic expectations**

- Not all neighbors will be able and/or willing to properly complete sanitation this winter, but everyone who does is helping to lower the beetle population
- Western pine beetles are native insects- the goal is not to completely eliminate them because they will always be around this region. The goal is to lower the immediate population so they cannot continue to kill large numbers of healthy trees in your neighborhood

# Protect the Survivors



A few pesticide options are available and highly effective for bark beetle **PREVENTION**

Specific types of pesticides, when applied correctly, can protect un-attacked trees from being attacked

These pesticides only provide short term protection

Pesticide protection is usually only warranted when there is a high beetle threat, such as beetle activity within ~500 feet.

A few years of preventative pesticide application on healthy trees in the immediate area of the outbreaks is probably a good investment

# Pesticide Application



## Two options:

- 1) Trunk Spray- Completely coat the bark of the healthy tree with pesticide, up to a 6" diameter top. Beetles contact the toxin on the bark surface before they enter the tree.
- 1) Tree Injections- Inject a systemic insecticide into the trunk of a healthy tree. Kills beetles as they contact the phloem tissue





## Trunk Spray:

### Pros:

- Highly effective
- Fast to apply
- Provides simple and rapid protection
- Least expensive
- Beetles contact toxin upon landing
- Requires only moderate expertise
- No damage to tree

### Cons:

- Difficult to fully coat large trees, may need a bucket truck and heavy equipment access
- Up to 100ft of drift, although most is within 50ft
- Restrictions near some sensitive sites, like streams
- Can't be applied during excessive wind or rain
- Provides 1-2 seasons of protection



## Common Bole Spray Chemicals:

### Bifenthrin:

- Nontoxic to birds, not acutely toxic to mammals, highly toxic to fish, amphibians, and honeybees
- Provides 1-2 seasons of protection for western pine beetle in Idaho

### Carbaryl:

- Nontoxic to birds, moderately toxic to mammals, fish and amphibians, highly toxic to honeybees
- 1-2 seasons of protection for western pine beetle in Idaho

### Permethrin:

- Nontoxic to birds, not acutely toxic to mammals, highly toxic to fish, amphibians, and honeybees
- Provides up to 1 season of protection

## Tree Injections:

### Pros:

- Highly effective if done correctly
- Very little contamination outside of the treated tree
- No large equipment needed, all can be carried in by hand
- Provides 2-3 seasons of protection



### Cons:

- Requires a very high level of expertise in this specific use of tree injections
- Timing of treatments is complex and varies with the beetle species, host tree species, and regional weather and climate.
- It can take more than a month before the toxin is sufficiently distributed throughout the tree to provide protection from the beetles
- Higher cost than trunk spray
- Beetles contact toxin in phloem, after initiating boring, and may inoculate tree with fungi
- Drilling into tree results in a small amount of damage to the tree
- Application can take up to 30 mins or more per tree

## Common Tree Injection Chemicals:

### Emamectin benzoate:

- Very highly toxic to aquatic invertebrates, and highly toxic to fish & honeybees. It is highly toxic to mammals and birds orally but is dermally benign to mammals.
- Emamectin benzoate should be injected in April before flight activity occurs for that year. Two to three field seasons of protection can be expected. Uptake is best in the morning and slows throughout the day. On hot, sunny days, uptake can be problematic after midday.

### Abamectin:

- Abamectin is relatively nontoxic to birds but is highly toxic to fish, aquatic invertebrates, and honeybees. Most formulated products have low toxicity in mammals. Limited research has been conducted on abamectin as a preventative treatment in the western United States. Research has shown some promise, but mixed results.

Fungicides may be included in tree injections in order to reduce the effects of fungal inoculation by the beetles



# Pesticide Tips



Proper pesticide application for bark beetle prevention is not within the expertise of some tree care and pest control companies

Ask for specifics on the proposed treatment, such as the name of the active chemical, the concentration, and the application timing/frequency

Research their proposed plan to ensure it is appropriate before agreeing. U.S. Forest Service, State, and University Extension publications are good sources of information

# Pesticide FAQs



## **What about a soil drench?**

No, does not work for this

## **What about a systemic basal bark spray?**

No, does not work for this

## **What about repellent pheromones?**

Pheromones are very species-specific. There are repellent pheromones available for other bark beetle species, but there are not repellent pheromones commercially available for western pine beetle yet.

## **Can pesticides kill the beetles within a cut log?**

Probably not, and they are probably not labeled for that use. The label is the law.

## **What about tarping infested materials?**

Probably better than nothing, but not totally effective

## **Should I use pesticides forever?**

That is probably not necessary once the outbreak has died down

# Other Questions?

**ForestHealth@IDL.Idaho.gov**

**208-769-1525**

**<https://www.idl.idaho.gov/about-forestry/forest-health/>**

**<https://linktr.ee/beetles>**



Credit: PBS Deep Look - <https://www.youtube.com/watch?v=wR5O48zsbnc>