

# Mark beetle update

## Activity in 2017



Erika Eidson and Tom Eckber  
Forest Health  
Idaho Department of Lands

# Bark beetles

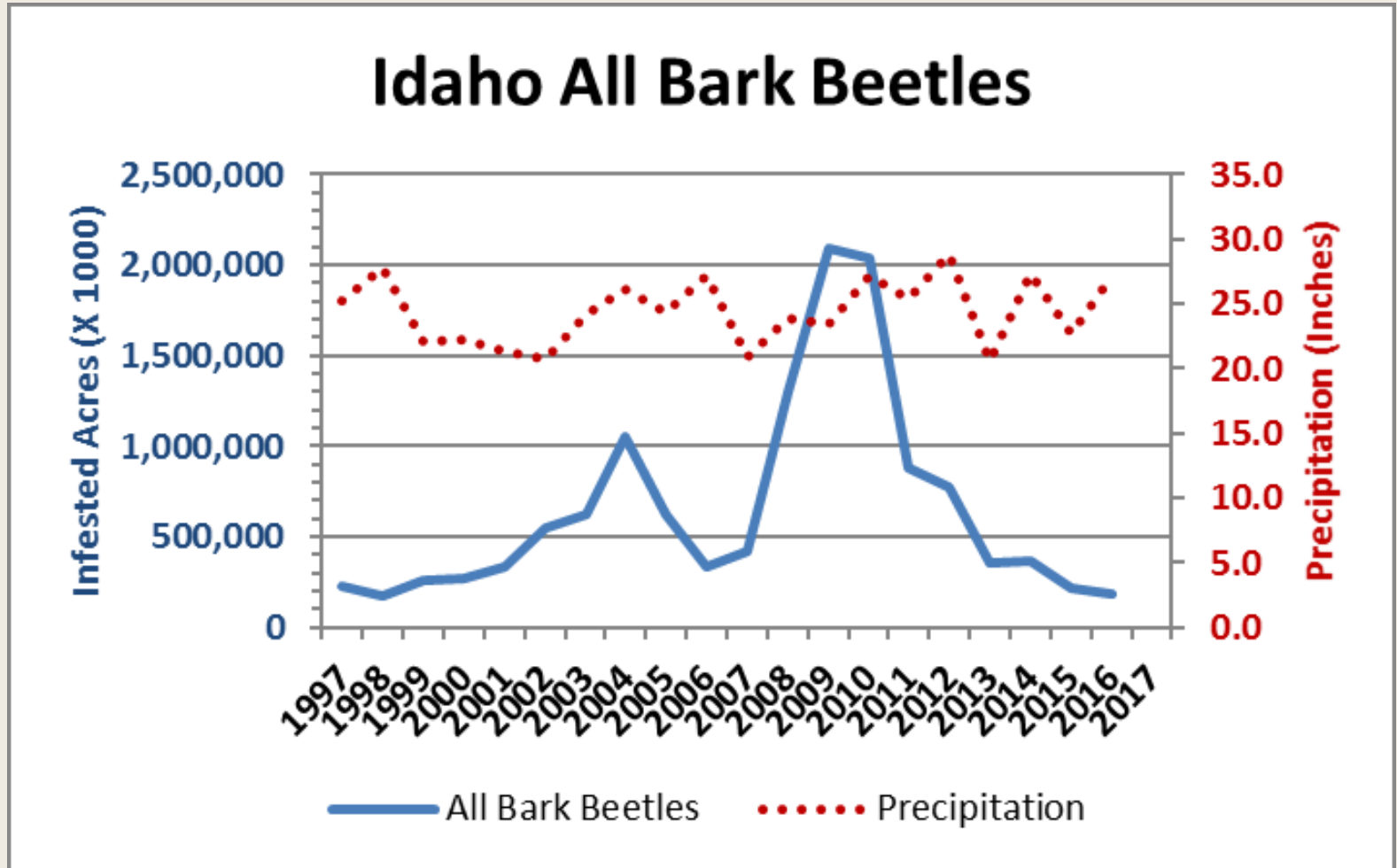


**about the size of a  
grain of rice**



**>100 species in Idaho, but <10  
species are major tree killers**

# Bark Beetles



# Bark beetles





# Bark beetles feed & reproduce in the phloem

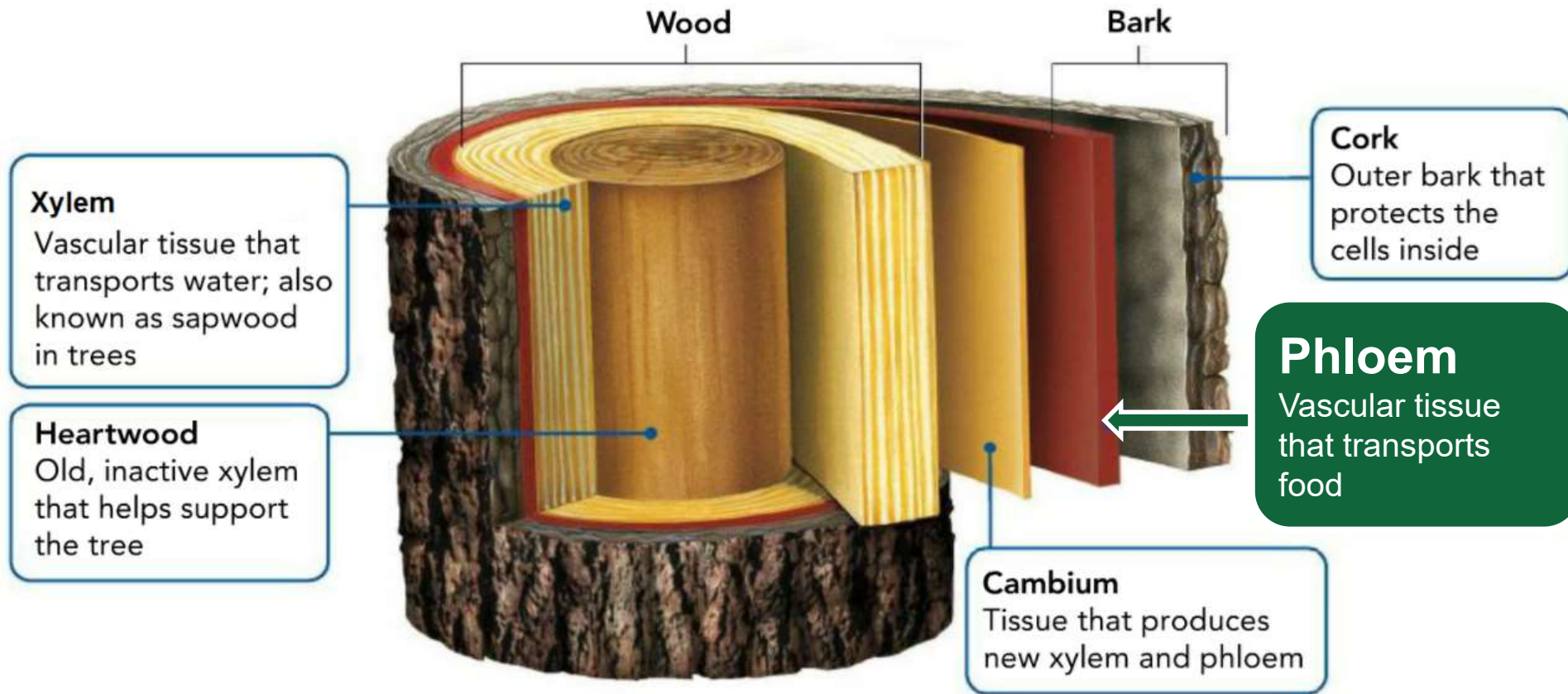


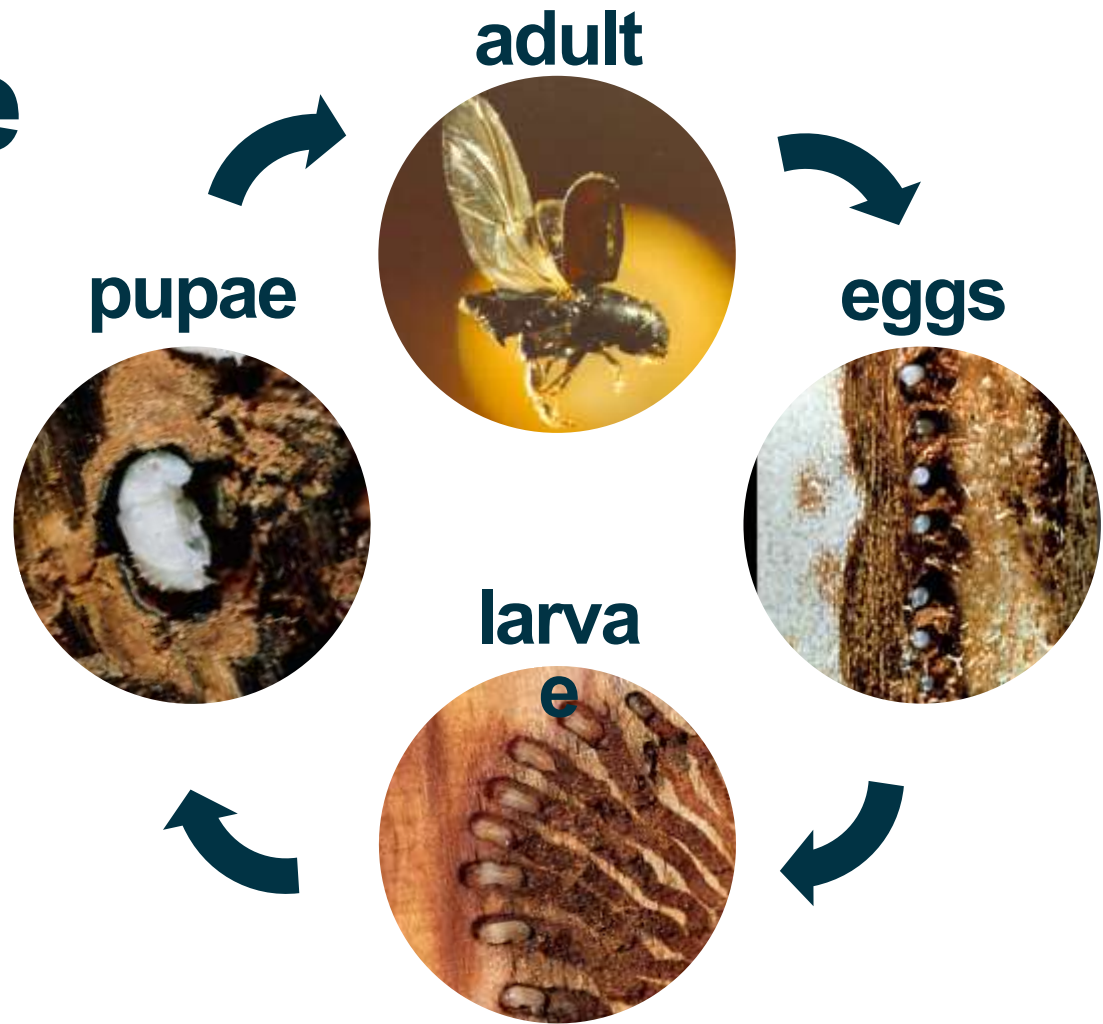
Diagram from Pearson's The Diversity of Life eText

# Bark beetle Life cycle

Adults fly in spring  
or summer

Excavate galleries  
in phloem & mate

Offspring develop  
under bark





**Bark beetle  
exit holes**



# Trees fight back



**Toxic resin to  
flush out beetles**



**We usually only see pitch tubes  
in pines and sometimes spruce**

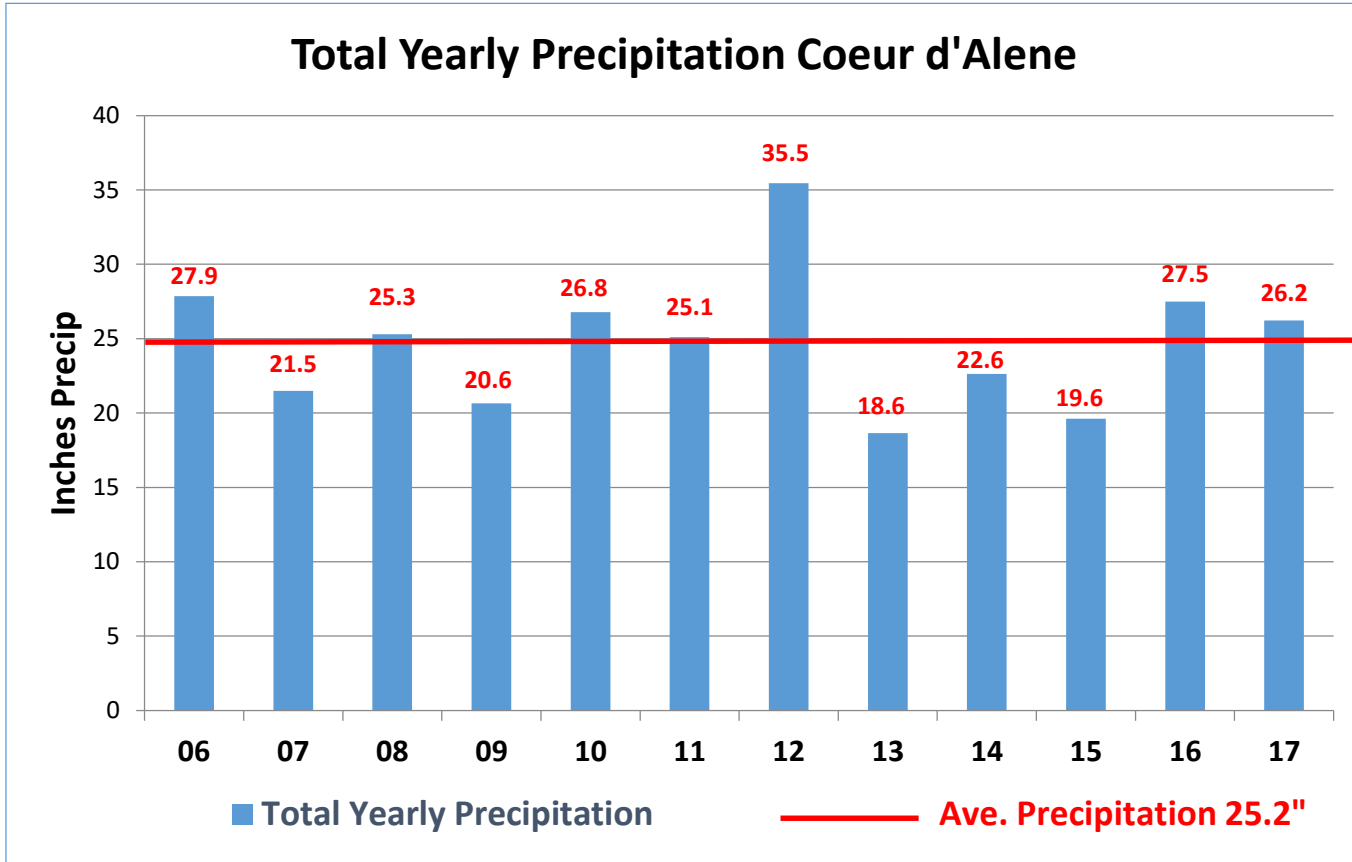
**Engelmann spruce, Nez Perce NF 8/2017**

**Toxins &  
crosis**

**Intensive phloem  
reactions  
around beetles**



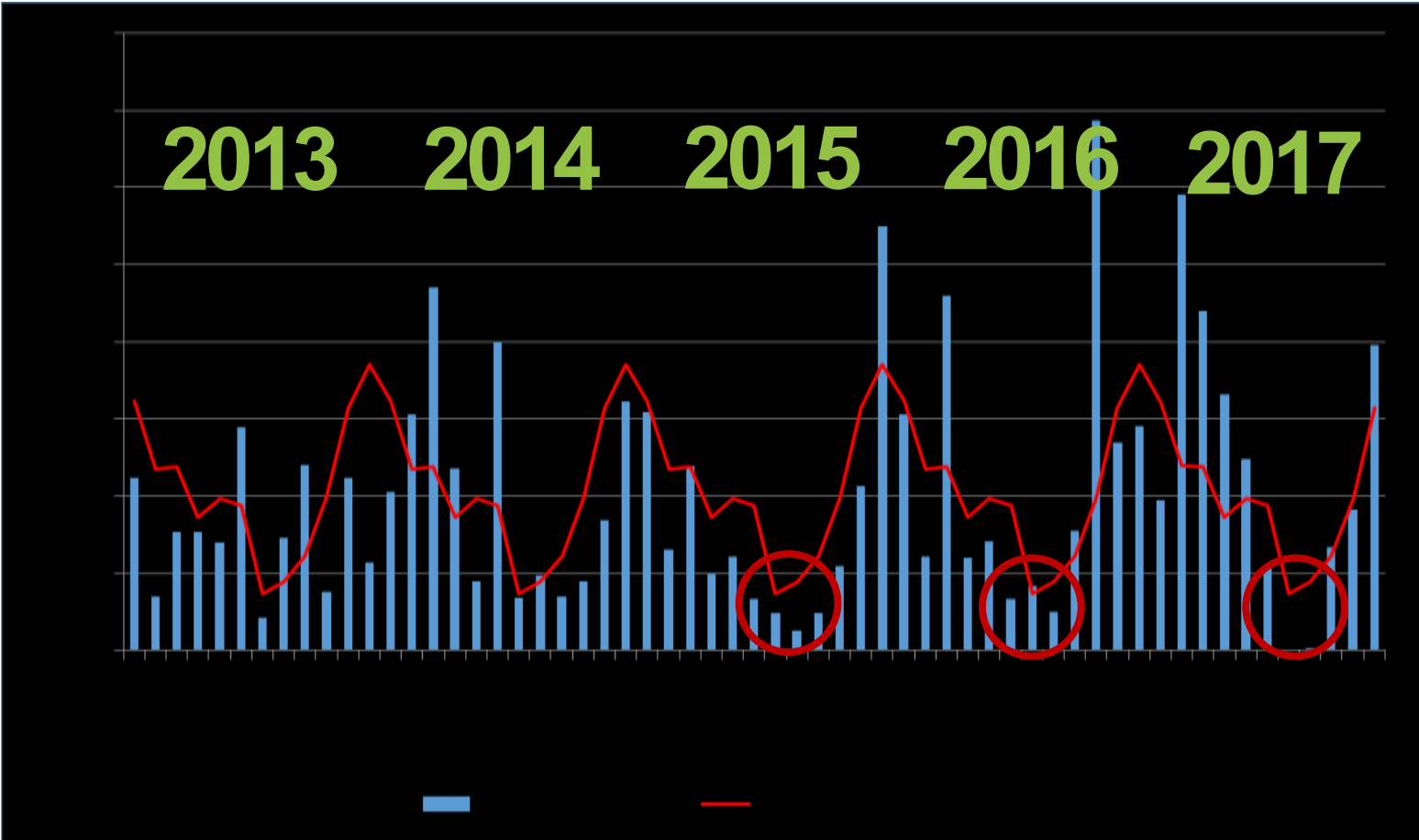
# North Idaho (CDA) Precipitation



**Doesn't Tell the Whole Story**



# North Idaho (CDA) Precipitation



# Drought 2015-16

None

Abnormally dry

Moderate drought

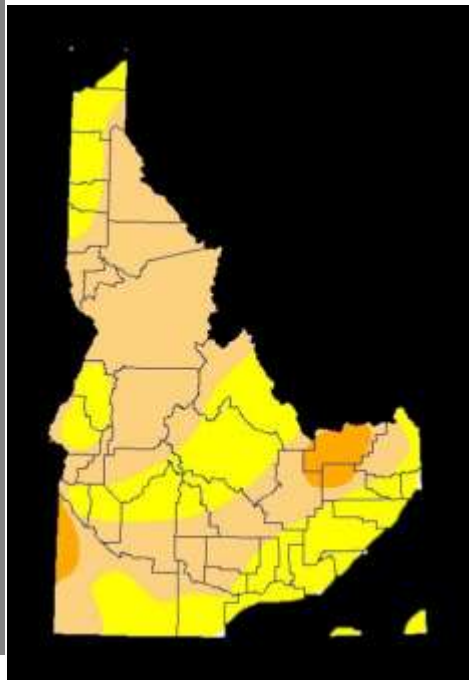
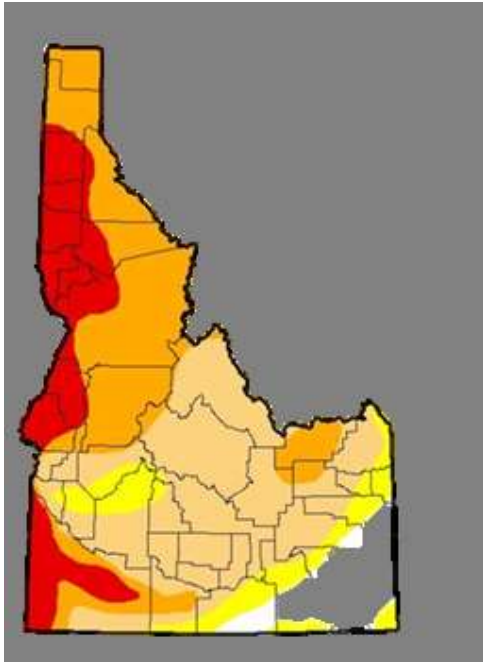
Severe Drought

Nov 2015

March 2016

July 2016

Nov 2016





# Drought 2017

None

Abnormally dry

Moderate drought

Severe Drought

Feb 2017

April 2017

June 2017

July 4 2017



# Drought 2017

None

Abnormally dry

Moderate drought

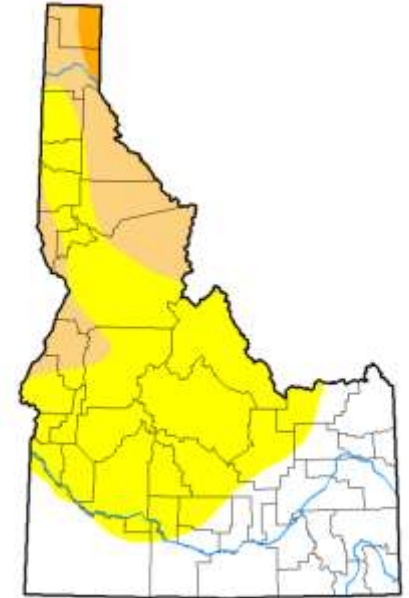
Severe Drought

July 18<sup>th</sup>

August 15<sup>th</sup>

Sept 19<sup>th</sup>

Sept 26<sup>th</sup>



# The Usual Suspects

<b>Bark beetle species</b>	<b>Acres affected in 2017</b>
<b>Fir engraver</b>	<b>55,155</b>
<b>Douglas-fir beetle</b>	<b>48,593</b>
<b>Mountain pine beetle</b>	<b>28,787</b>
<b>Western pine beetle</b>	<b>3,375</b>
<b>Pine engraver</b>	<b>2,069</b>
<b>Spruce beetle</b>	<b>5,063</b>







How to identify which  
beetles are affecting our trees.

# Who killed my tree?



**What is the host tree species?**

**What do the galleries look like under the bark?**

**What are the other signs and symptoms?**

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# Who killed my tree?



What is the host tree species?

What do the galleries look like under the bark?

What are the other signs and symptoms?

# Western pine beetle



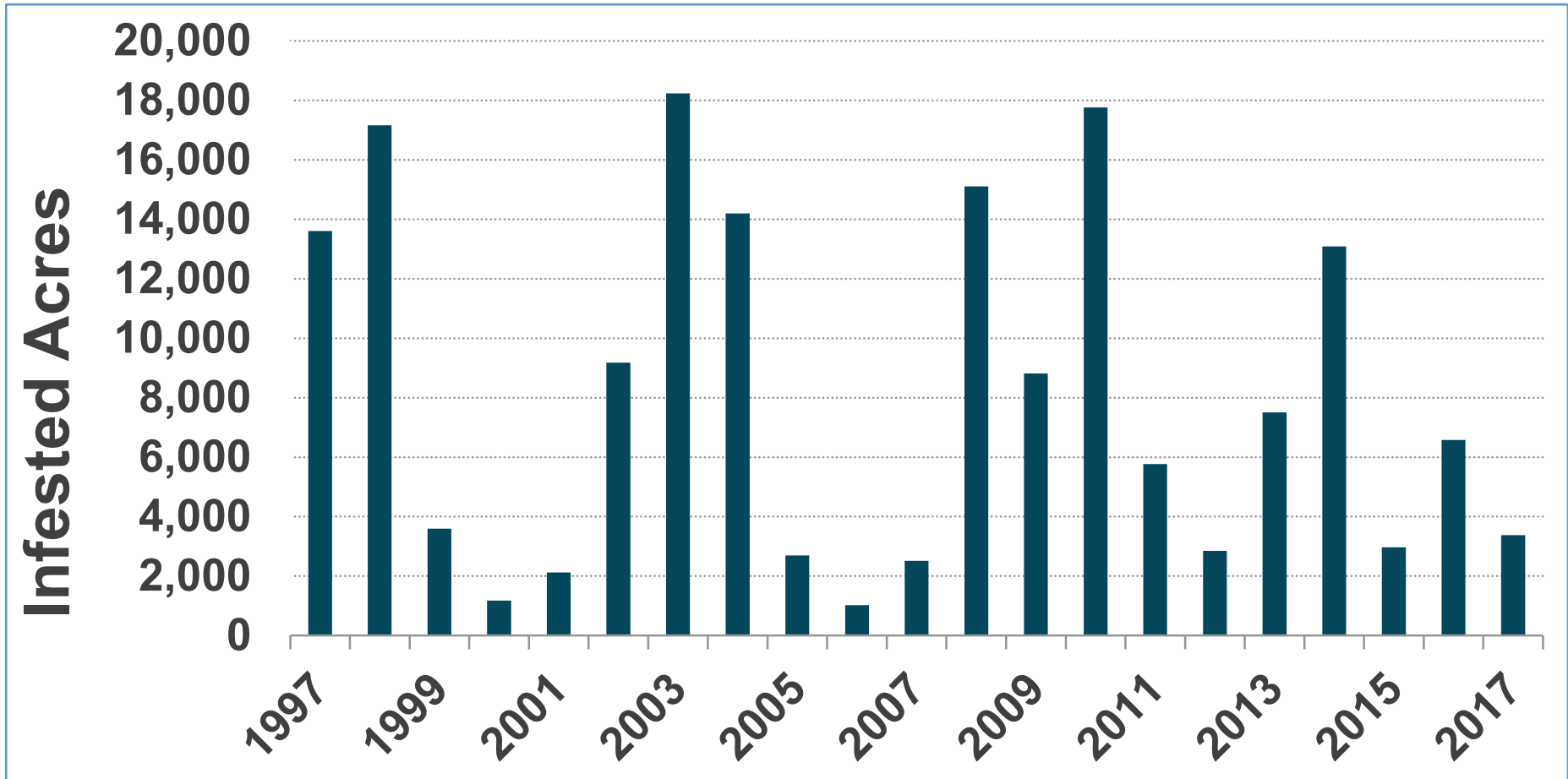
Only attacks  
ponderosa pine  
In Idaho

*Dendroctonus brevicomis*  
2 generations per year in Idaho

- 1<sup>st</sup> generation adults fly in  
May/June
- 2<sup>nd</sup> generation  
adults fly in  
Aug/Sept



# Western pine beetle statewide





# Western pine beetle

Hosts: Ponderosa pine > 6 in DBH



Dense stands over 10''



Old, slow-growers



# Western pine beetle



Drought



Mechanical damage



Fire damage



Defoliators/Disease

Outbreaks often start due to external disturbance

UGA1442005

UGA1468373



# Western pine beetle



Fall 2015, Sanders



Spring 2016, S of Riggins

**Mortality tends to occur in 'pockets'**



# Western pine beetle

Not Usually Landscape Level Mortality

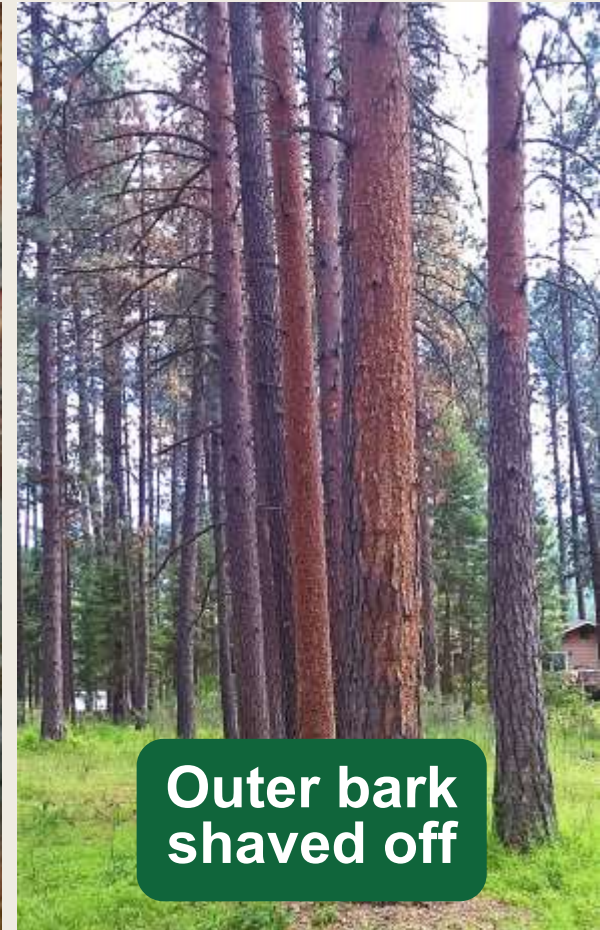
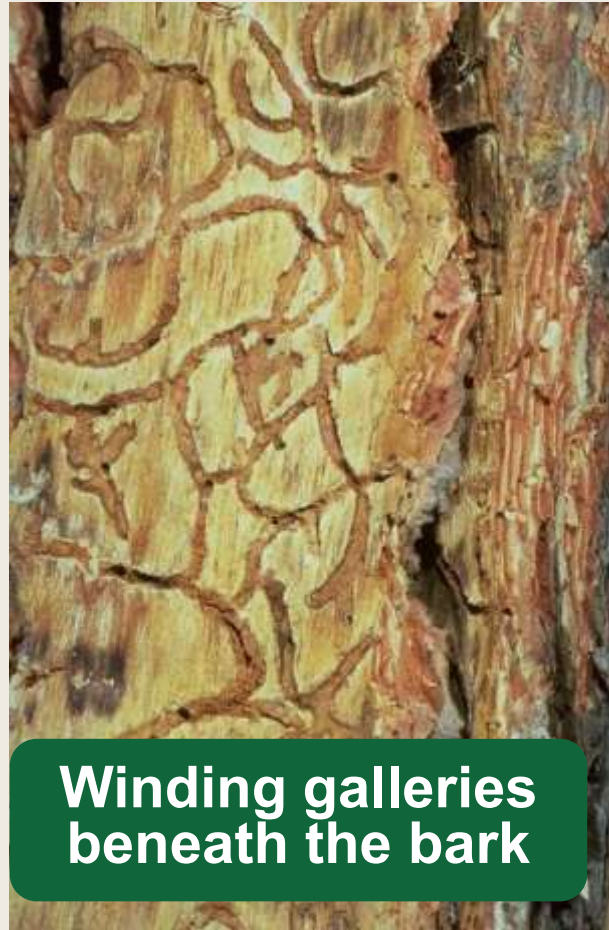


*Except in California During Drought*

Spring 2016 pictures, Calfire



# Western pine beetle: the signs





# Western pine beetle



Woodpeckers eat larvae in the inner bark

S. Kegley, USFS

# Western pine beetle management

## 1. Sanitation & Salvage

Remove currently infested trees prior to beetle emergence

- Survey for trees that have western pine beetle signs with crowns that are still green
  - Don't just chase the red & dead trees, but remember pouch fungus degrades volume of killed trees
- Remember there are 2 generations per year





# Western pine beetle management

## 2. Thinning

Thin to a basal area of 80-100 ft<sup>2</sup> per acre

**Target Spacing for Western Pine Beetle Management (90 ft<sup>2</sup> / Acre)**

Tree Diameter	Ft <sup>2</sup> /Tree	Spacing	TPA @ Spacing	Ft <sup>2</sup> @ Spacing
8	0.35	13 X 13	256	89
10	0.55	16 X 16	169	93
12	0.79	18 X 20	120	94
14	1.07	22 X 22	89	95
16	1.4	26 X 26	64	90
18	1.77	30 X 30	48	85
20	2.18	32 X 32	42	92
22	2.64	36 X 36	33	88
24	3.14	40 X 40	27	85





# Western pine beetle management



**Debark, destroy or remove infested materials**

# Douglas-fir beetle



Attacks  
Douglas-fir  
& down larch

## *Dendroctonus pseudotsugae* 1 generation per year in Idaho

- Most overwinter as adults
- Fly in mid to late spring
- Some emerge later in mid-summer
- Early attackers may make 2nd attack late





# Douglas-fir beetle

Large down logs of Douglas-fir or larch are highly attractive



**WON'T KILL STANDING LARCH**



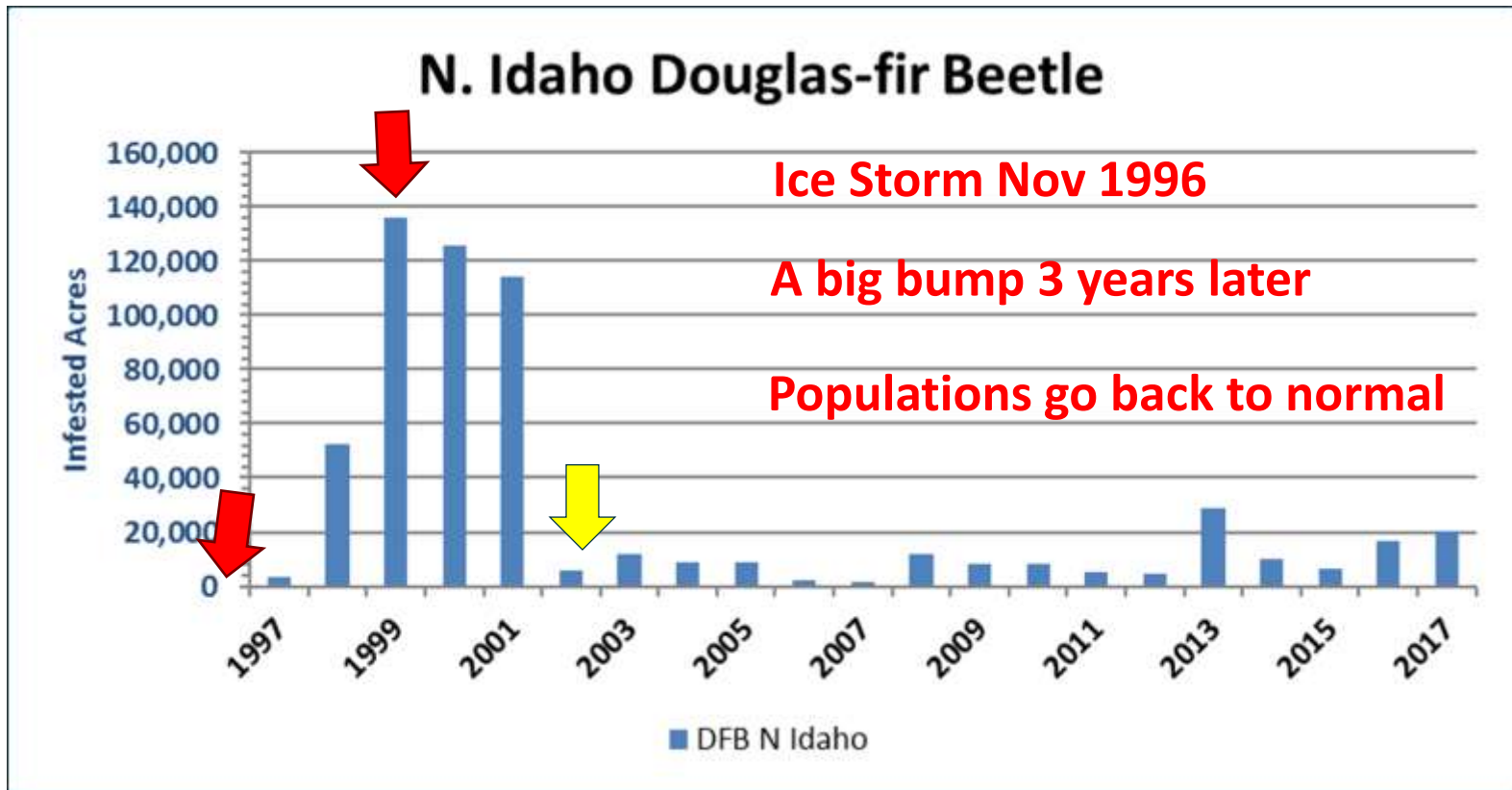
# Douglas-fir beetle



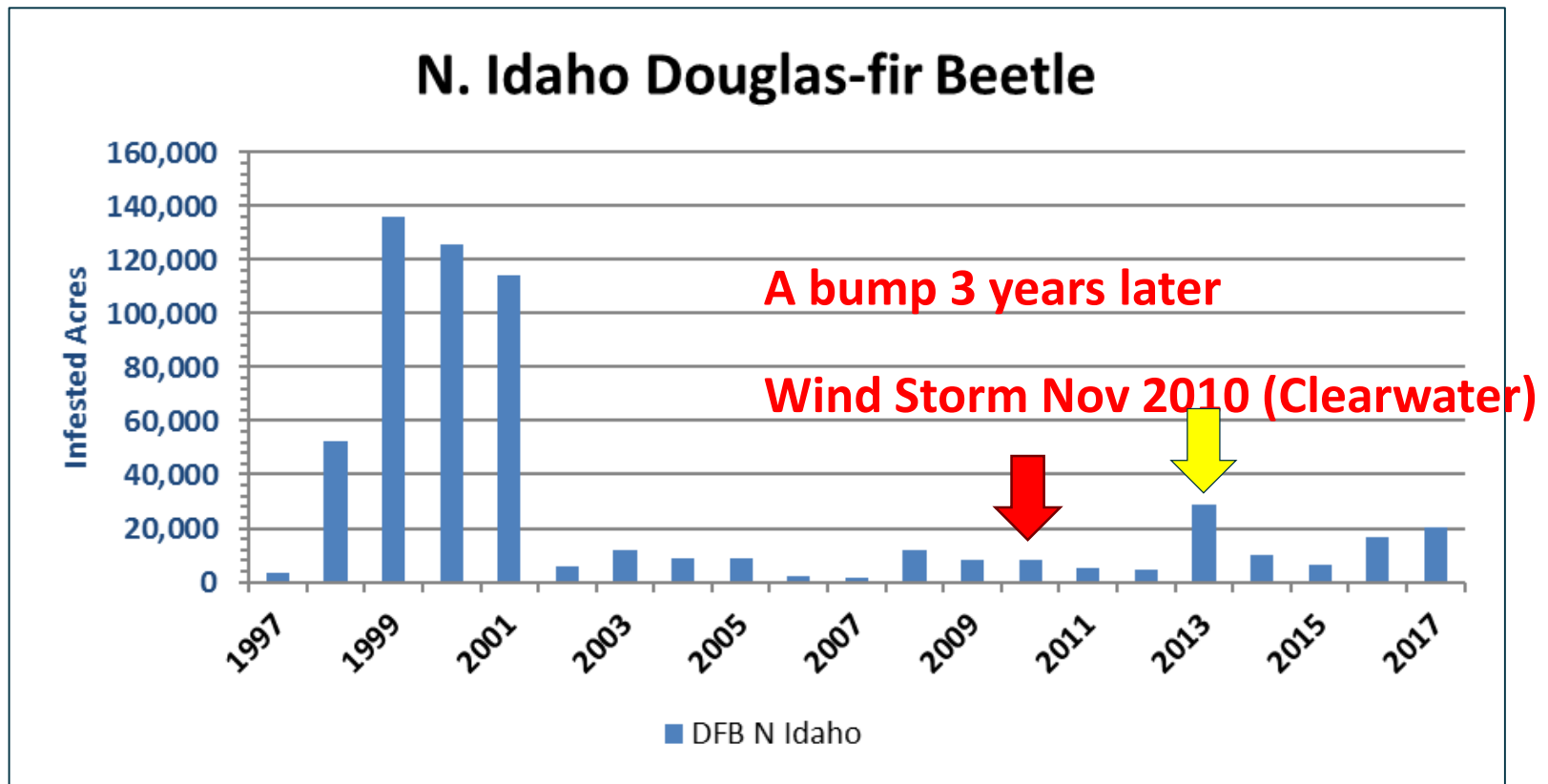
Aftermath of Clearwater Valley Windstorm, Nov 2010



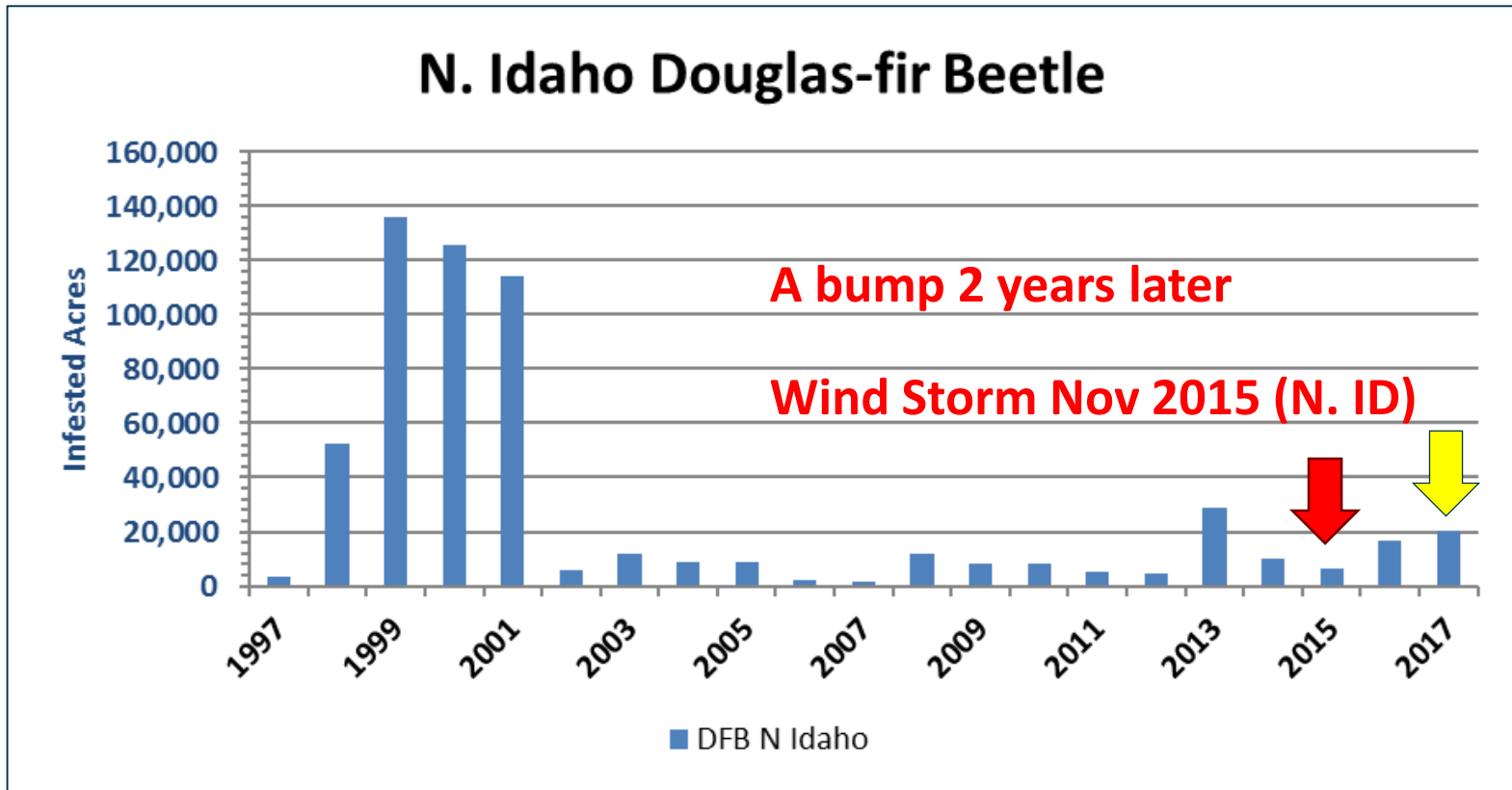
# Douglas-fir beetle N. Idaho



# Douglas-fir beetle N. Idaho



# Douglas-fir beetle N. Idaho



# Douglas-fir beetle

Hosts: large-diameter Douglas-fir & down larch

Dense and recently burned stands are high risk



# Douglas-fir beetle: the signs



No pitch tubes, reddish frass



Vertical "J" galleries



# DFB Mortality near Dent Bridge, Aug 2013



# Douglas-fir beetle management

## Prevention:

- Remove large down trees within 1 year
- **Thinning:** reduce stand density to below 120 ft<sup>2</sup> per acre
  - Watch out for root disease

- Reduce Douglas-fir component to below 50%
- **MCH** can be applied in high-risk areas





# Douglas-fir beetle management

## During an outbreak:

- Sanitation and salvage- remove currently infested trees prior to beetle emergence
- Trap trees- create attractive log decks during beetle flight, remove them prior to beetle emergence





# Douglas-fir beetle management

Staining of wood is not a big issue like it is with pines

Beetles carry stain fungus, but it shows up much later

Should not be an issue if salvage is timely

Decay can be an issue if you wait too long





# Sapwood Rot and Stain

- If logs are removed in timely manner, defect is minimal
  - If you wait too long, you'll lose some volume
    - You could lose 4" of diameter



# Pine engraver

*Ips pini*

2-3 generations per year in Idaho

- Overwinter as adults
- Fly in early spring
- Next generation emerges in ~6 weeks
- 3rd generation can occur in warm and dry years



Attacks most  
pines in Idaho



# If You Have *Ips*...

## Think Beetle Food

### The Rest of the Story



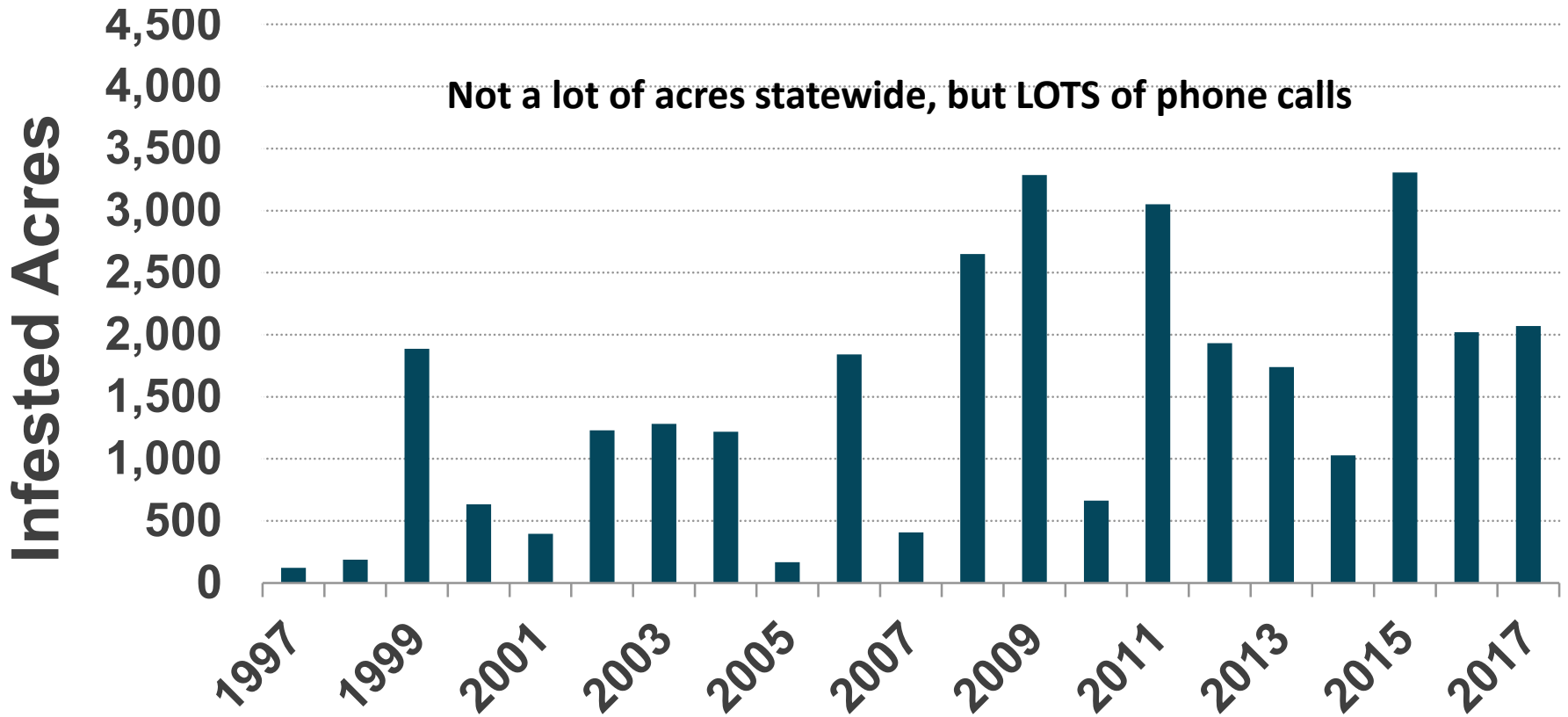
Landowner stored green logs  
from February until the fall

Cutting up in February  
instead of November  
would've been better

Rathdrum Nov 2015



# Pine engraver statewide



# Pine engraver

Hosts: usually lodgepole and ponderosa pine >3 in DBH



Dense, small-diameter stands



Tops of larger trees



# Pine engraver



**Outbreaks are usually caused by poor slash management**





# Pine engraver



Mortality  
within  $\frac{1}{4}$  mile

Populations  
build in down  
material

Next generation  
can move to  
standing trees  
in ~6 weeks



# Pine engraver: the signs



**Piles of reddish boring dust (frass), no pitch tubes**



# Pine engraver: the signs



**'Star' or 'X' shaped galleries, adults and larvae under the bark**



# Pine engraver management

## Slash management is key

- **Avoid creating pine slash piles Nov-June**
- **Clean up winter/spring storm damage**
- **Dry out host material as quickly as possible**
  - Lop and scatter
  - Knock off the bark
- **Outbreaks usually subside if there is no fresh slash in spring**



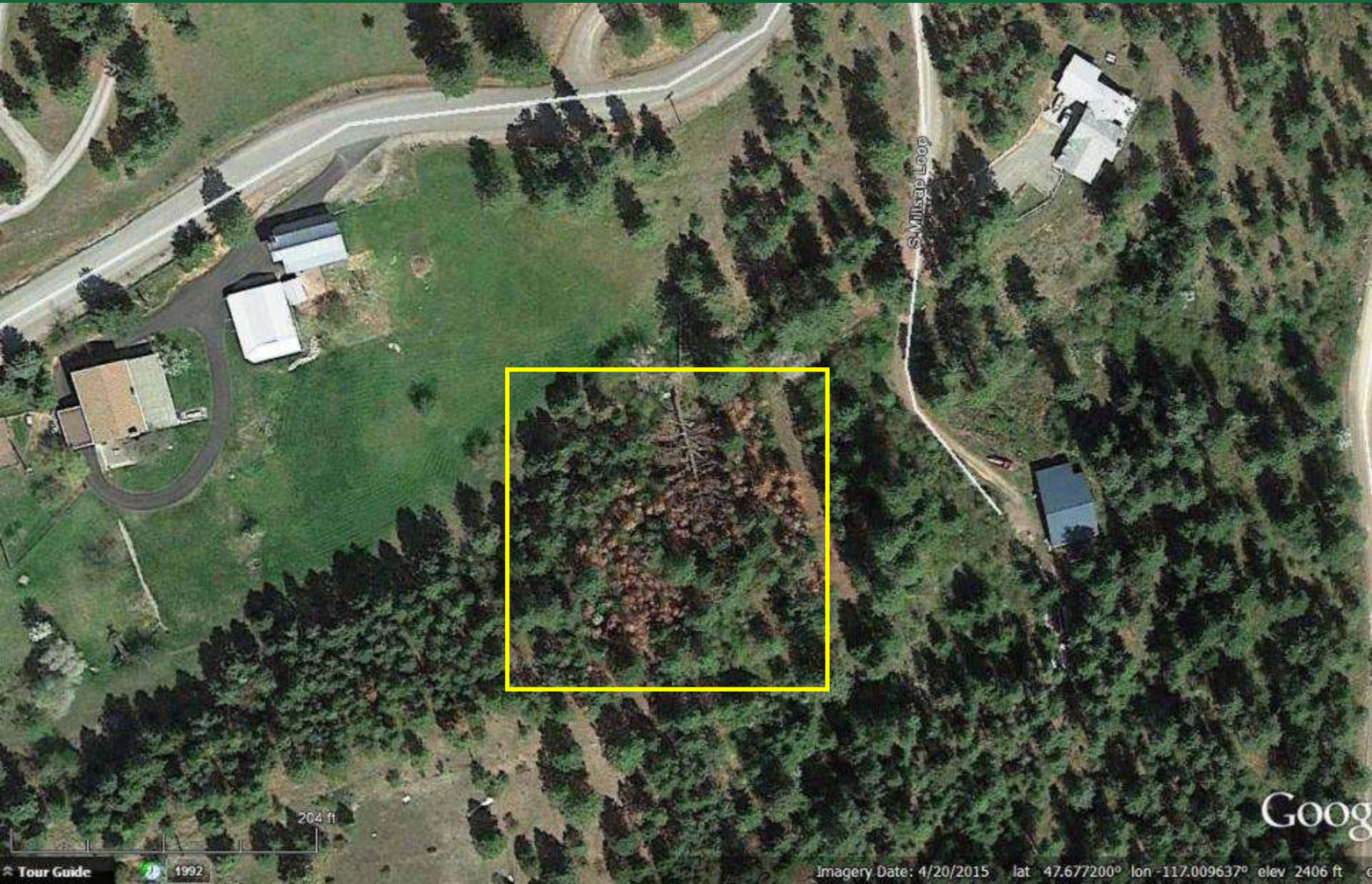
# Don't Leave Slash Piles Laying Around



South of Plummer 4/2014



# Slash Management



S. Millers Loop

204 ft



# Pine engraver management

## Large Piles

- Build slash pile large enough to continue to attract beetles deeper into the pile

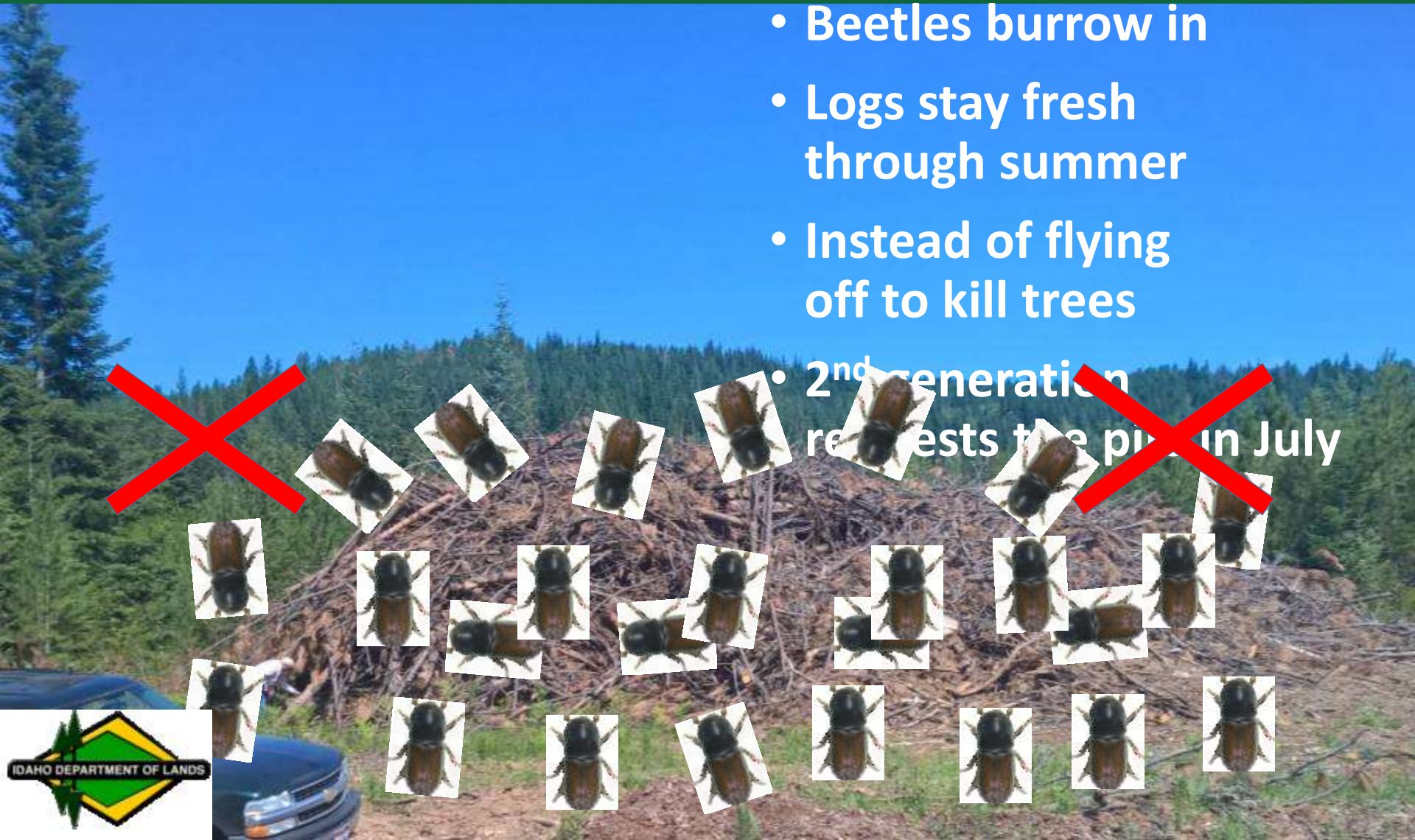


Boise NF 6/2009

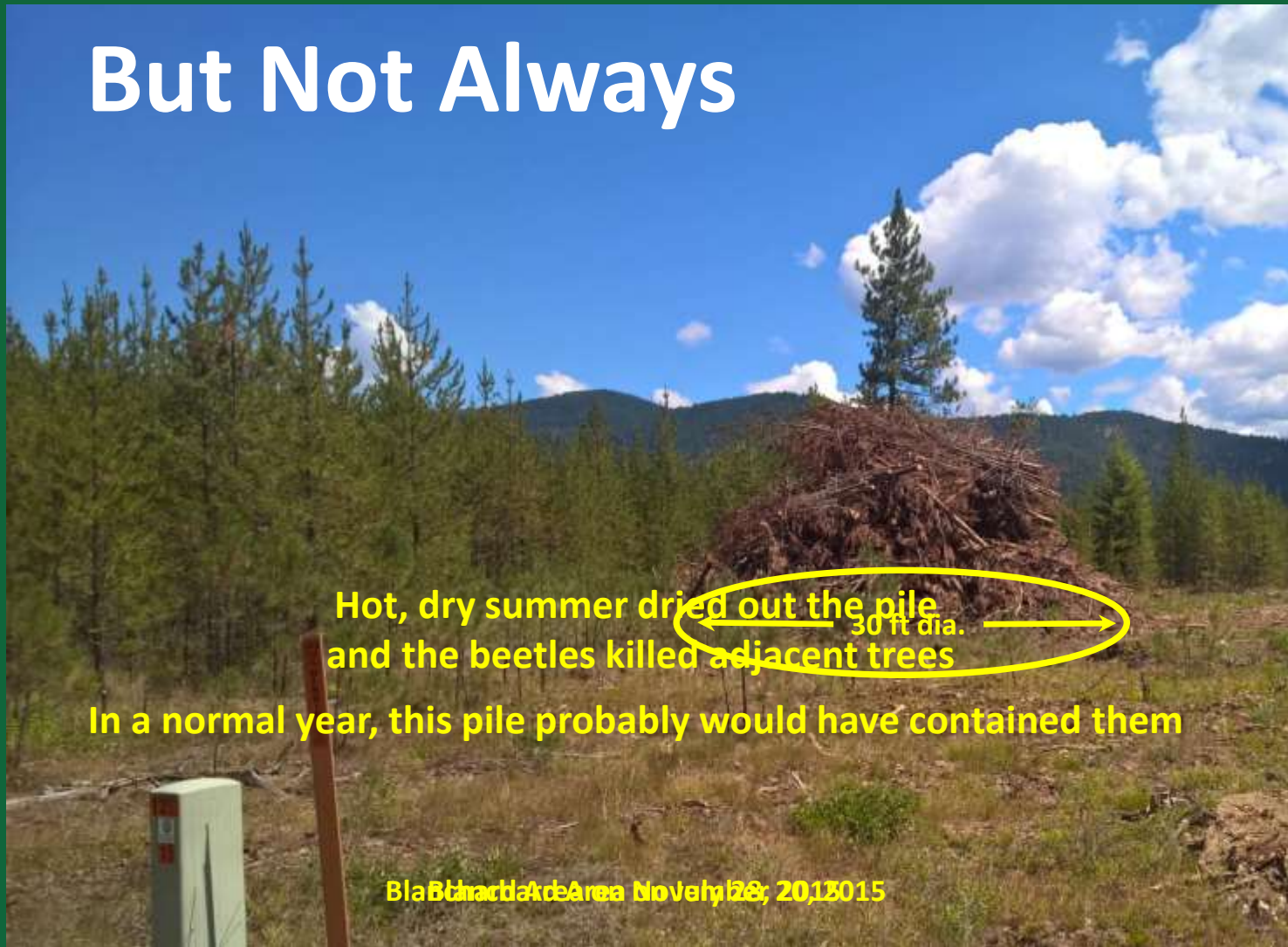


# Large Slash Piles Usually Effective

- Beetles infest the pile in spring (April-May)
- Beetles burrow in
- Logs stay fresh through summer
- Instead of flying off to kill trees
- 2<sup>nd</sup> generation re-infests the pile in July



# But Not Always



Hot, dry summer dried out the pile  
and the beetles killed adjacent trees



30 ft dia.

In a normal year, this pile probably would have contained them

Blackfoot Area November 28, 2015



# Fir engraver

## *Scolytus ventralis*

1 generation per year in Idaho

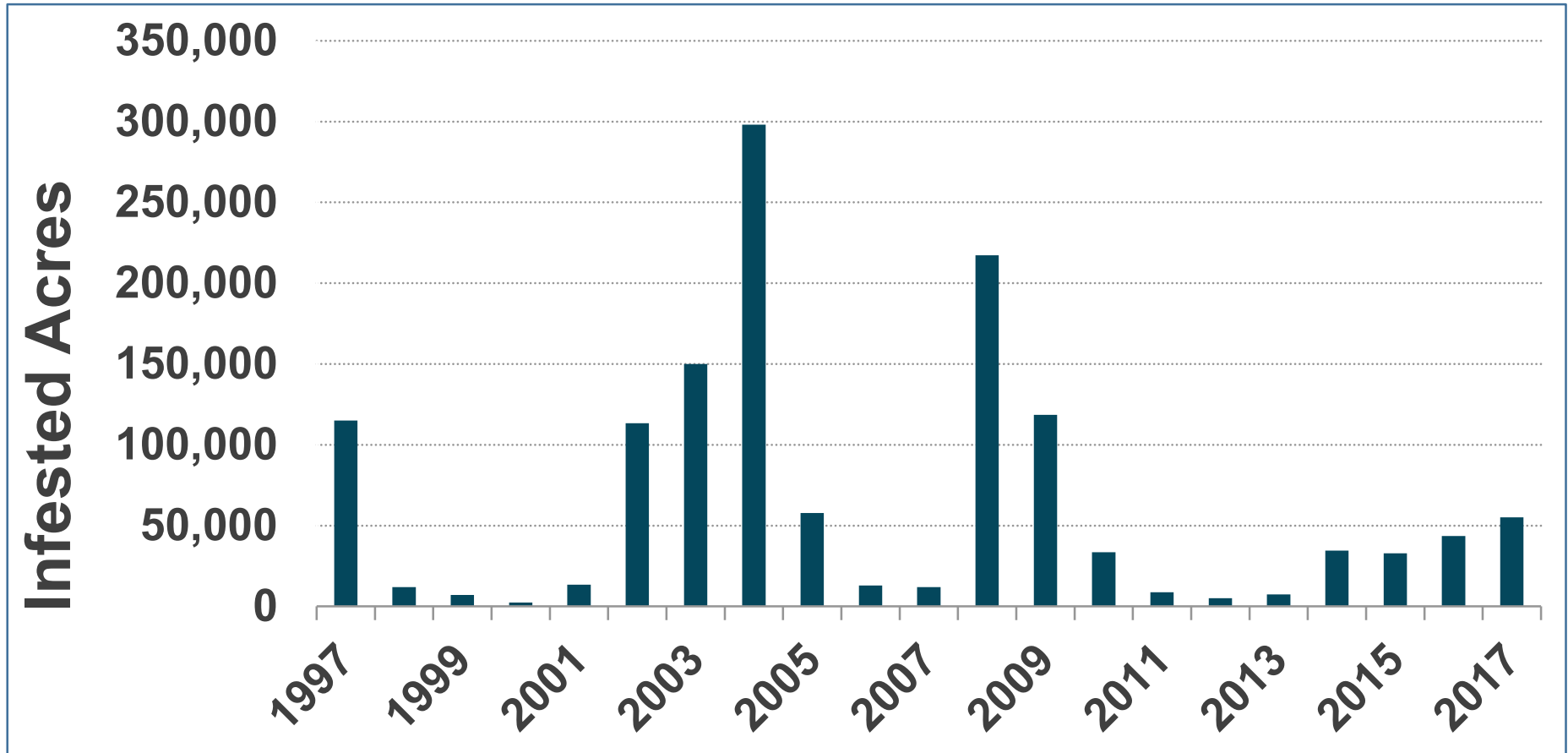
- Most overwinter as larvae
- Larvae move into the bark

Attacks grand fir

- Adults fly June-Sept



# Fir engraver statewide





# Fir engraver



Host: grand fir of all sizes

Salt & pepper mortality pattern



Sometimes just the top



# Fir engraver

**Susceptibility increased by stresses such as:**

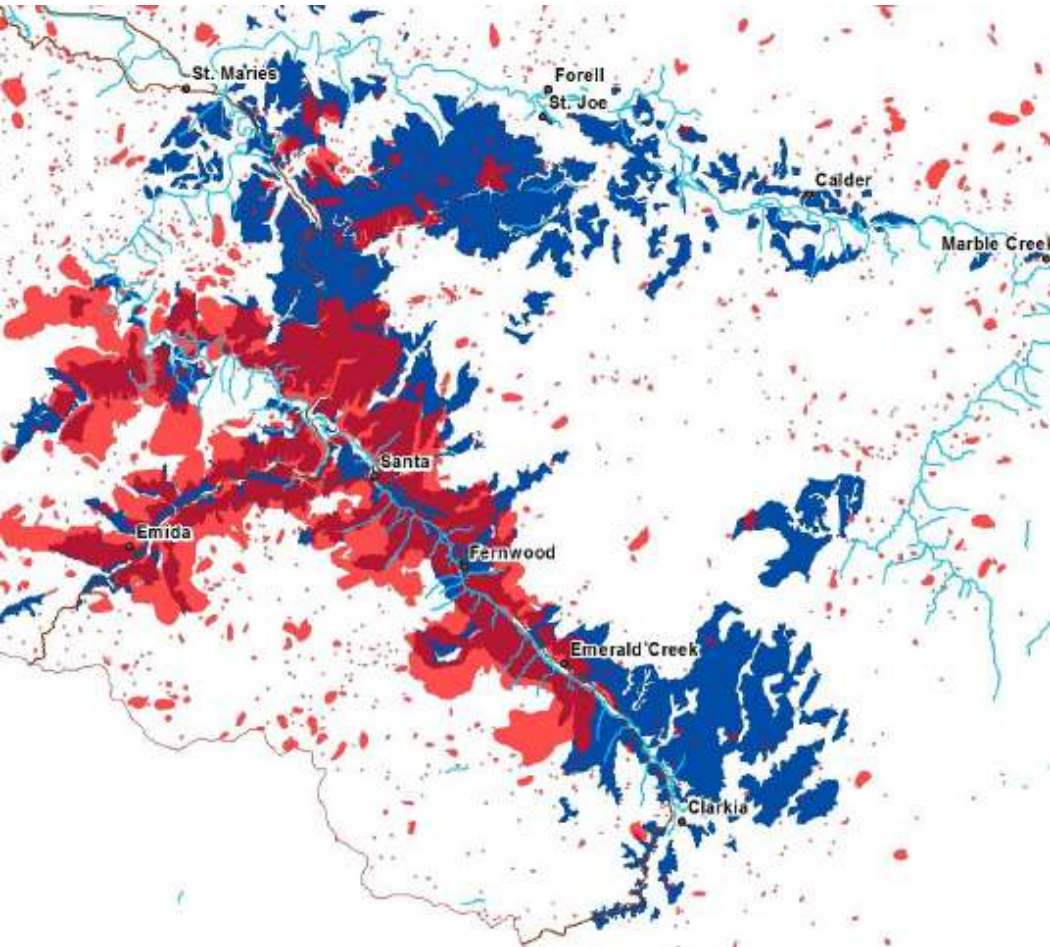
- **Root disease**
- **Defoliation**
- **Drought**
- **Too much water**

*Armillaria* root rot





# Fir engraver



Areas of attacks are commonly associated with a hardpan soil layer



# Fir engraver: the signs



**Distinctive horizontal galleries**



# Fir engraver



**Don't always kill the tree, previous attacks become buried in wood**



# Fir engraver



Old attacks cause ring separation & problems at the mill



# Fir engraver management

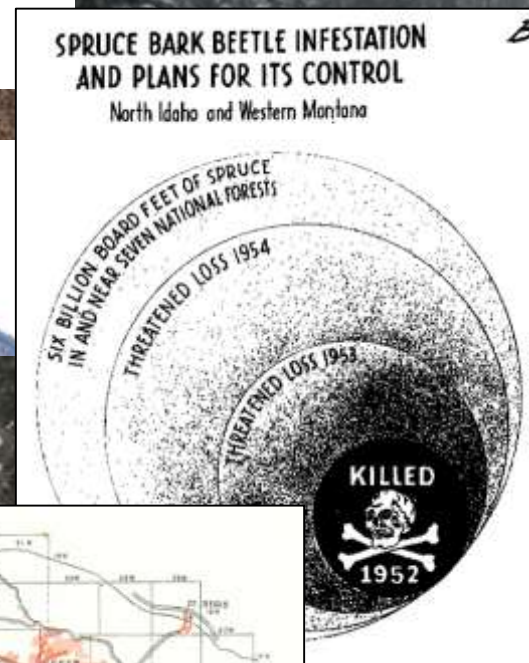
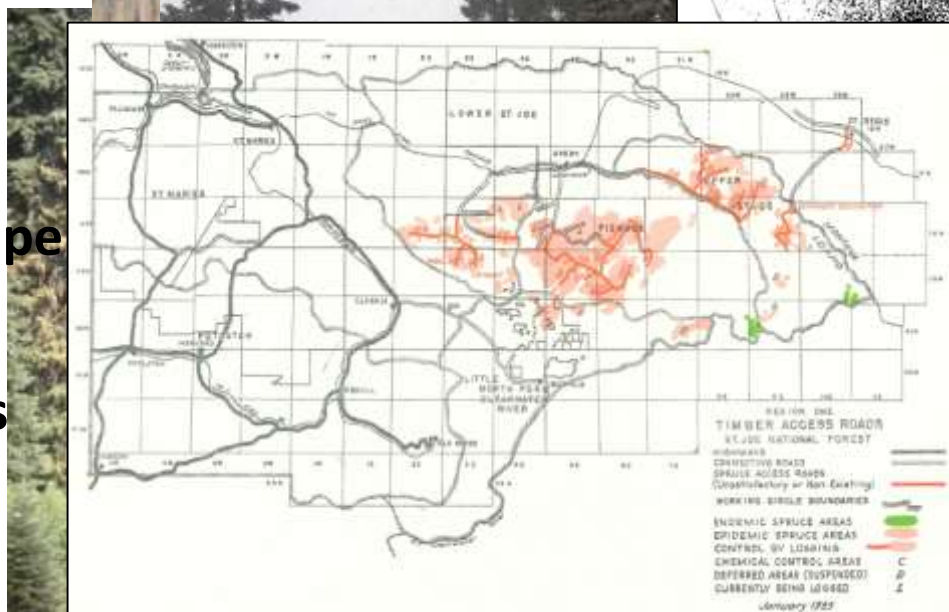
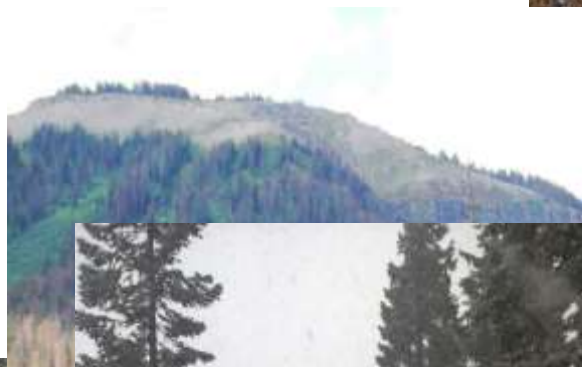
**Reduce the amount of grand fir**





# Spruce Beetle

- Recent mortality on the Nez Perce NF
- Prefers blowdown
  - ...or green logs
- Populations build
  - Usually takes 2 years to develop
- Capable of landscape level outbreaks
- Big problem in ID in the 50's and 80's





# Green Slash/Logs and Bark Beetles

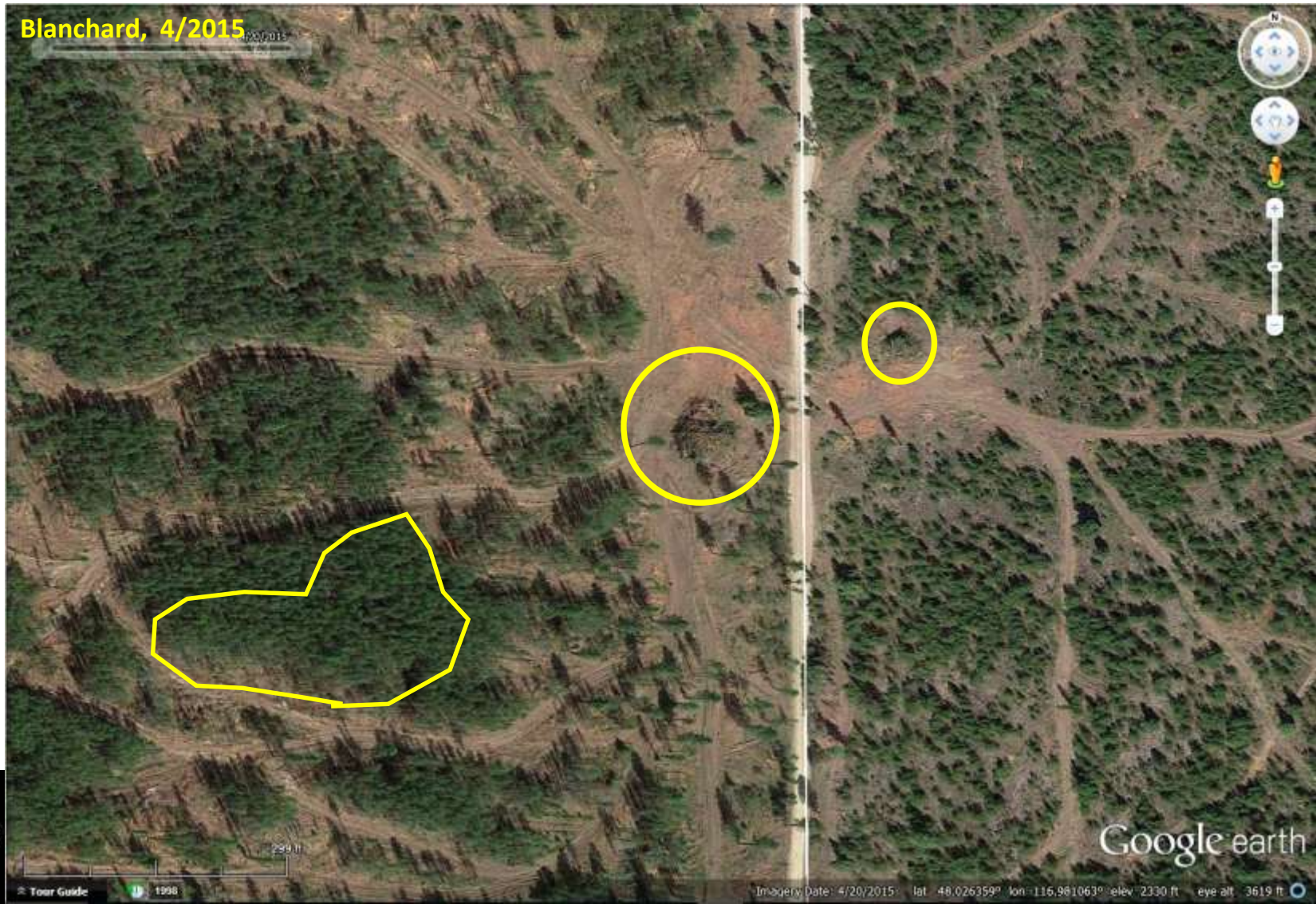
- Don't create unnecessary food - *Thinning/harvest*





# Green Slash/Logs and Bark Beetles

- Don't create unnecessary food - *Thinning/harvest*





# Green Slash/Logs and Bark Beetles

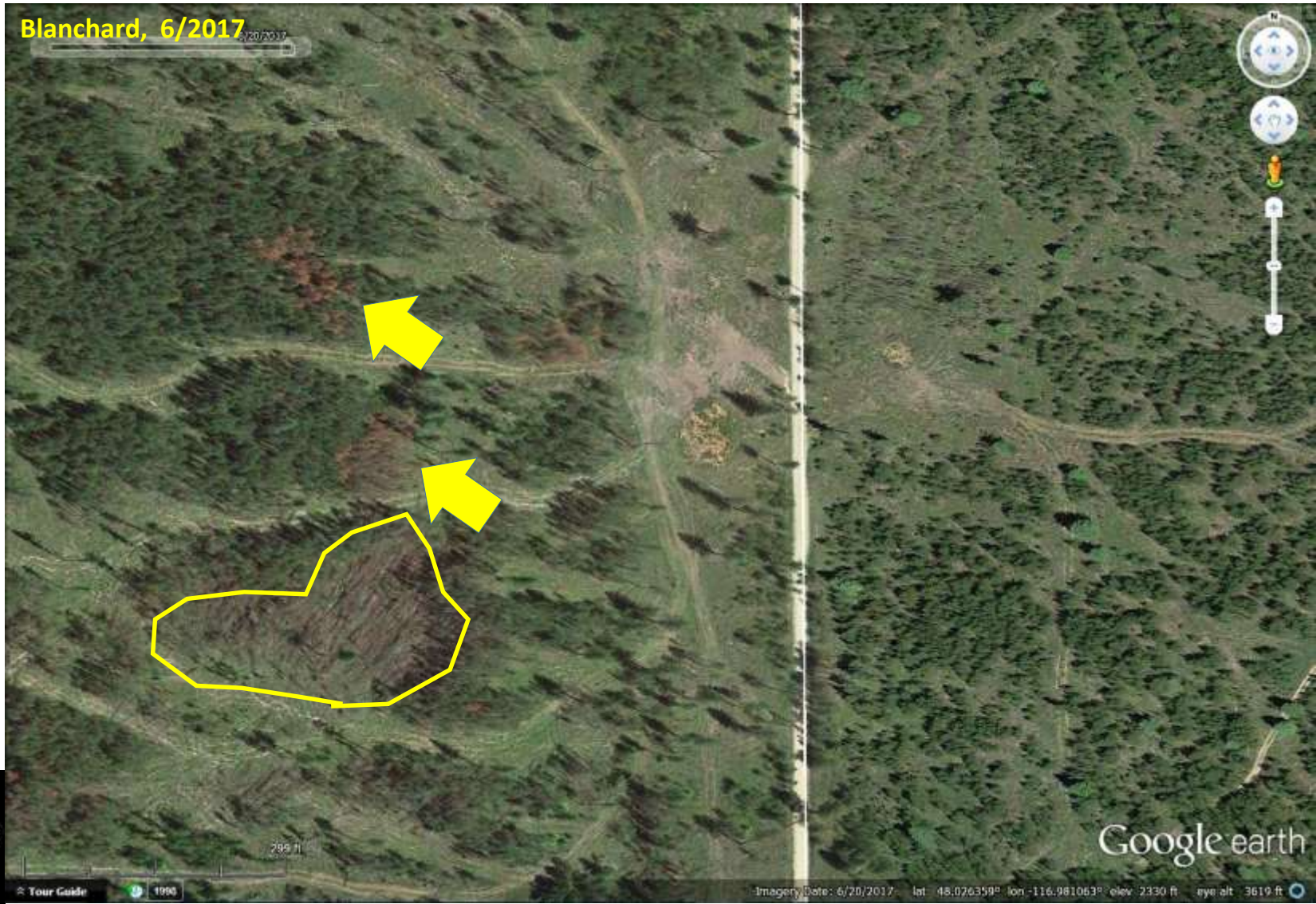
- Don't create unnecessary food - *Thinning/harvest*





# Green Slash/Logs and Bark Beetles

- Don't create unnecessary food - *Thinning/harvest*





# Green Slash/Logs and Bark Beetles

- **Don't create food for beetles unnecessarily**
  - Thinning/harvest
  - Firewood
  - Home sites



# Green Slash/Logs and Bark Beetles

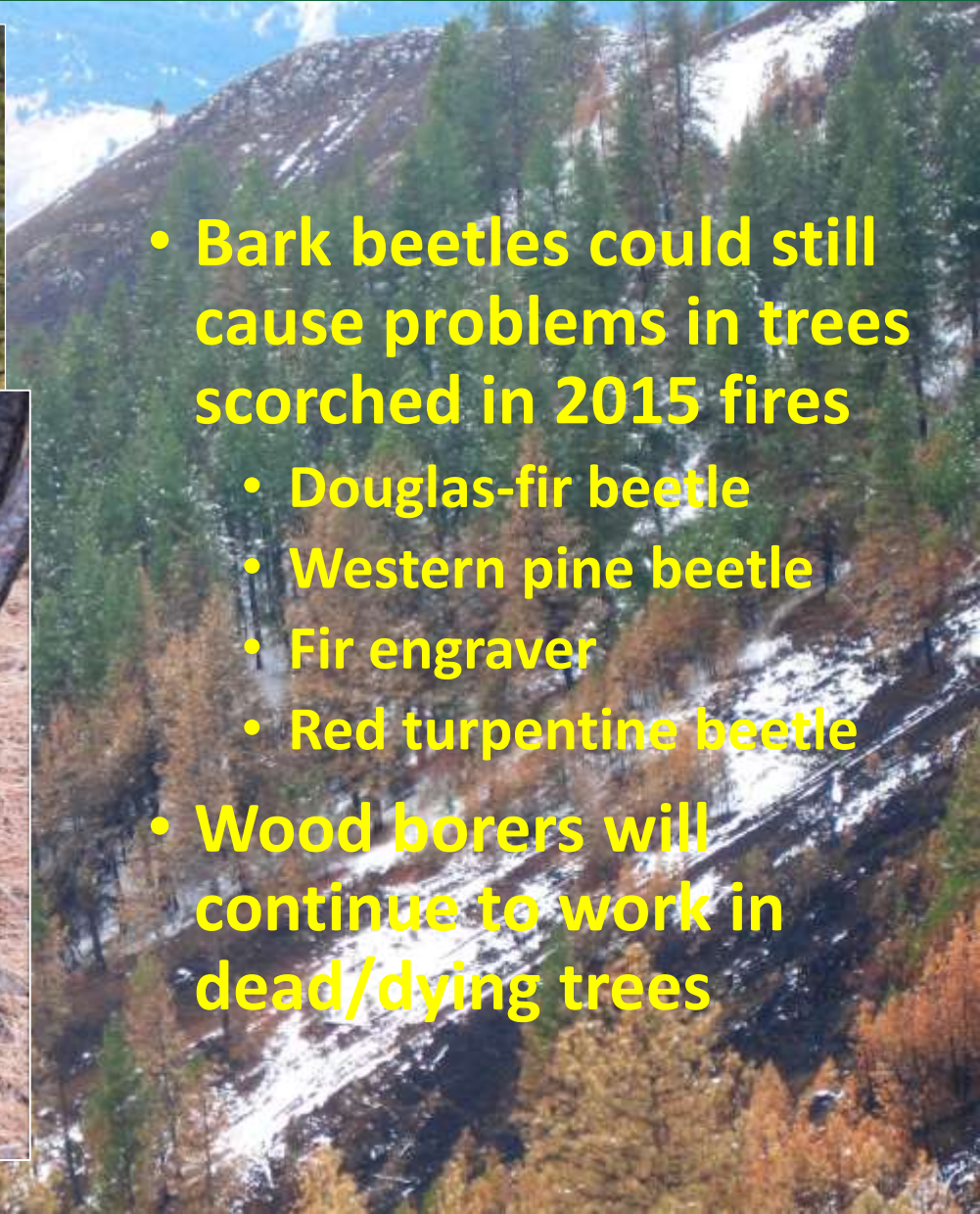
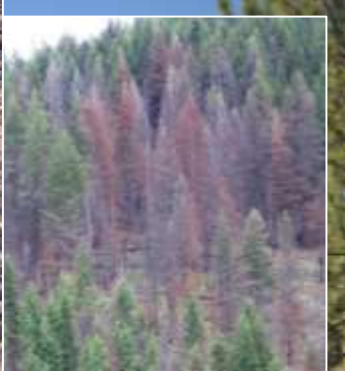
- Use proper time frame
- Treat it (help it dry out)
- Especially important for
  - Pine engraver (*Ips*) 2-3 gen/year
  - Douglas fir beetle 1 gen/year
  - Spruce beetle 1-2 years/gen

Heat of Summer is best  
(Dry out the slash/logs)





# Insects after fires



- Bark beetles could still cause problems in trees scorched in 2015 fires
  - Douglas-fir beetle
  - Western pine beetle
  - Fir engraver
  - Red turpentine beetle
- Wood borers will continue to work in dead/dying trees



Type  
On (

after a summer fire



# Larch needle cast / blight



**Green tops**



**Cast**

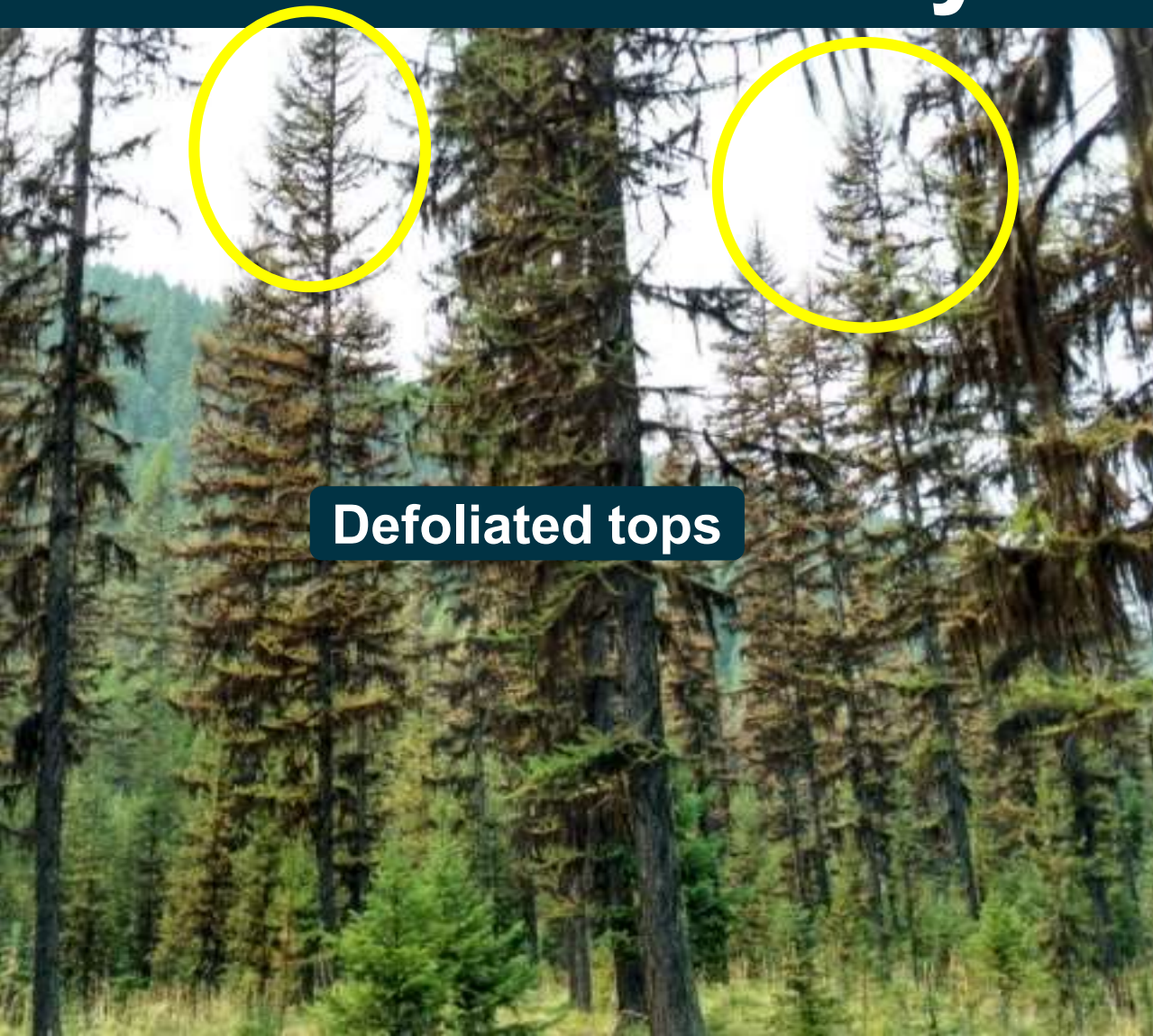


**Blight**

- Fungi favored by spring rains



# Western larch sawfly



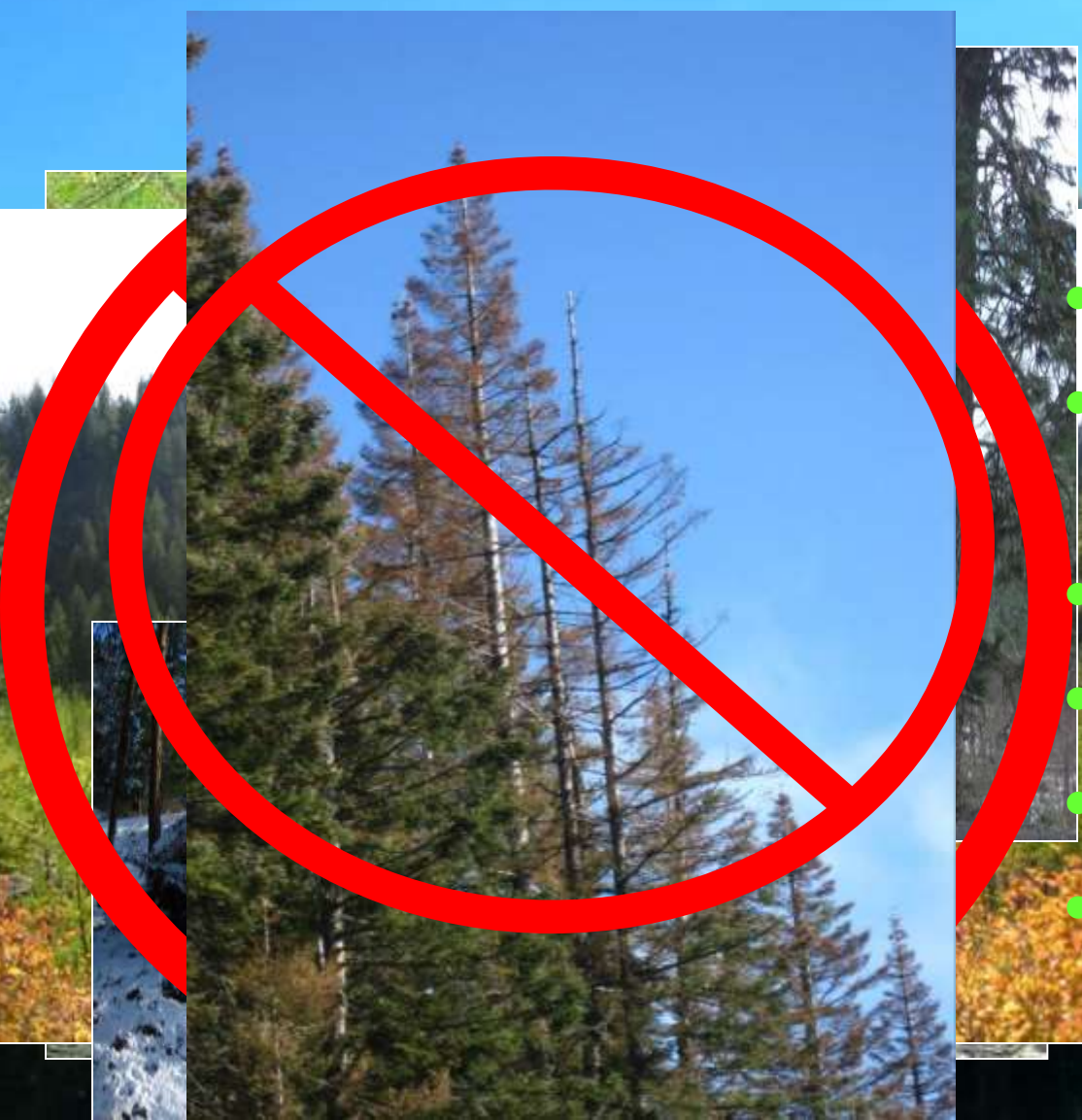
Defoliated tops



Needles chewed



# A Few Reasons to Consider Western Larch Where You Can...

- 
- No major bark beetles
  - Less damage from root disease
  - Fast growing
  - Rarely blows over
  - ...or snaps off
  - Few defoliator concerns

**Lookout Pass 10/2015**



# Douglas-fir Tussock Moth

- Outbreaks in **northern** Idaho every decade
  - On track for 2020 or so
  - Some action on the Nez Perce NF last outbreak
- Big outbreak in S. ID in the 1990's
  - ~400,000 acres!
  - Numbers are building now
- We saw defoliation in 2017 in Region 4

