FOREST HEALTH PROTECTION
USDA Forest Service
State and Private Forestry

Current Status of Forest Insects in the Northern Region

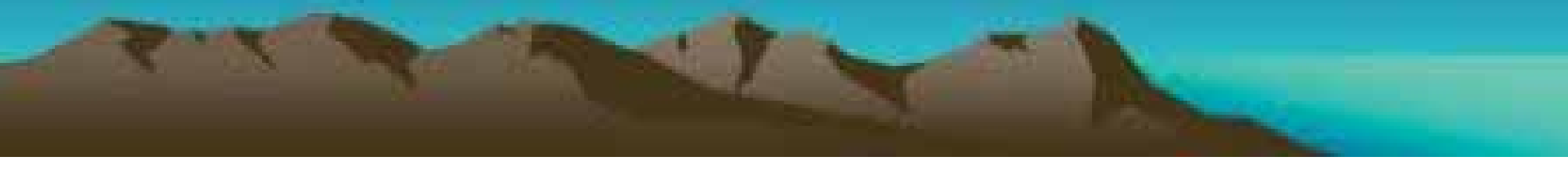
April 2007

Lee Pederson
USFS-Forest Health Protection

USDA Forest Service Regions

Current Status/Trends

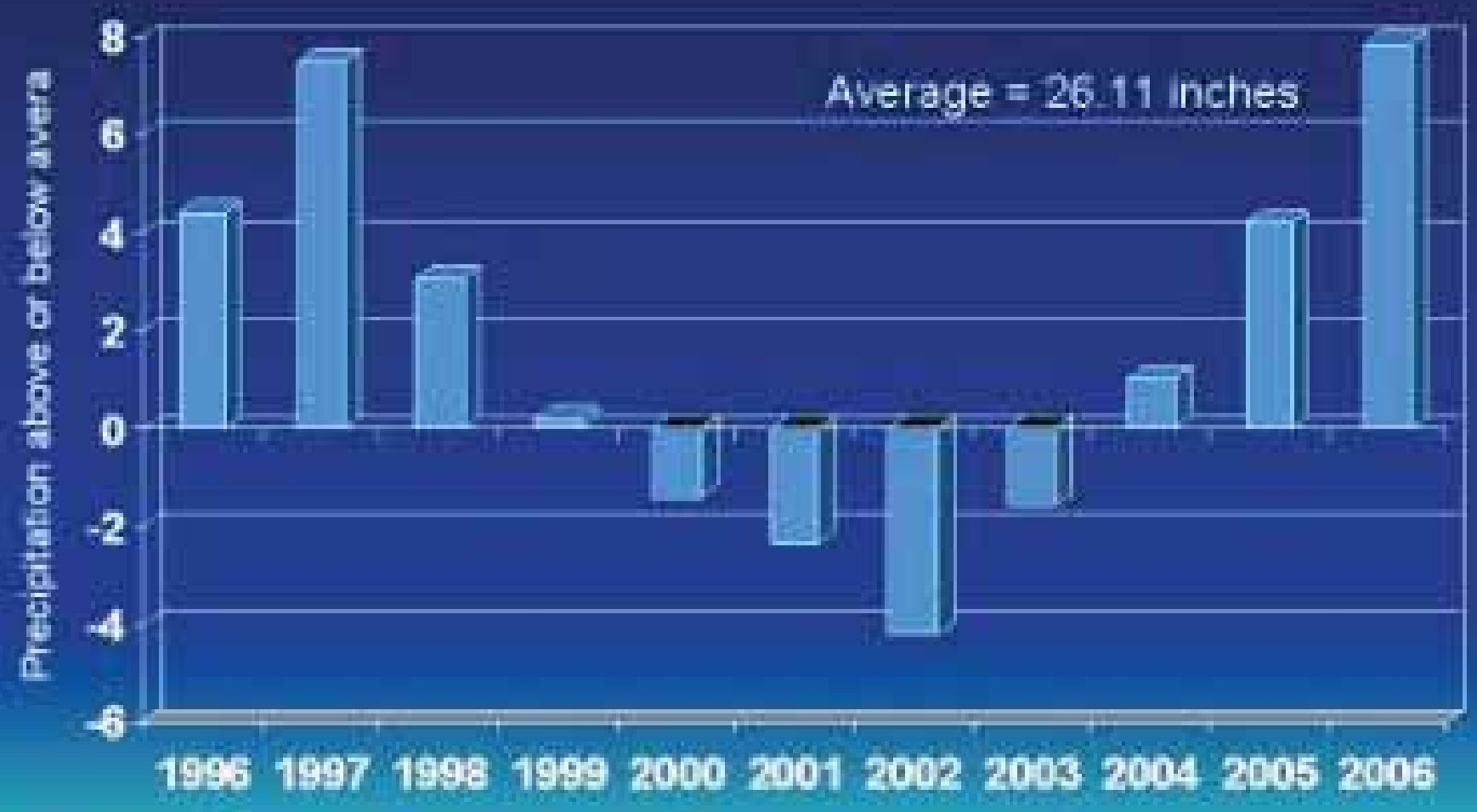
- Status and trends of forest pests
- Biology of forest pests
- Management of forest pests



Things that profoundly effect forest insects in their environment.....

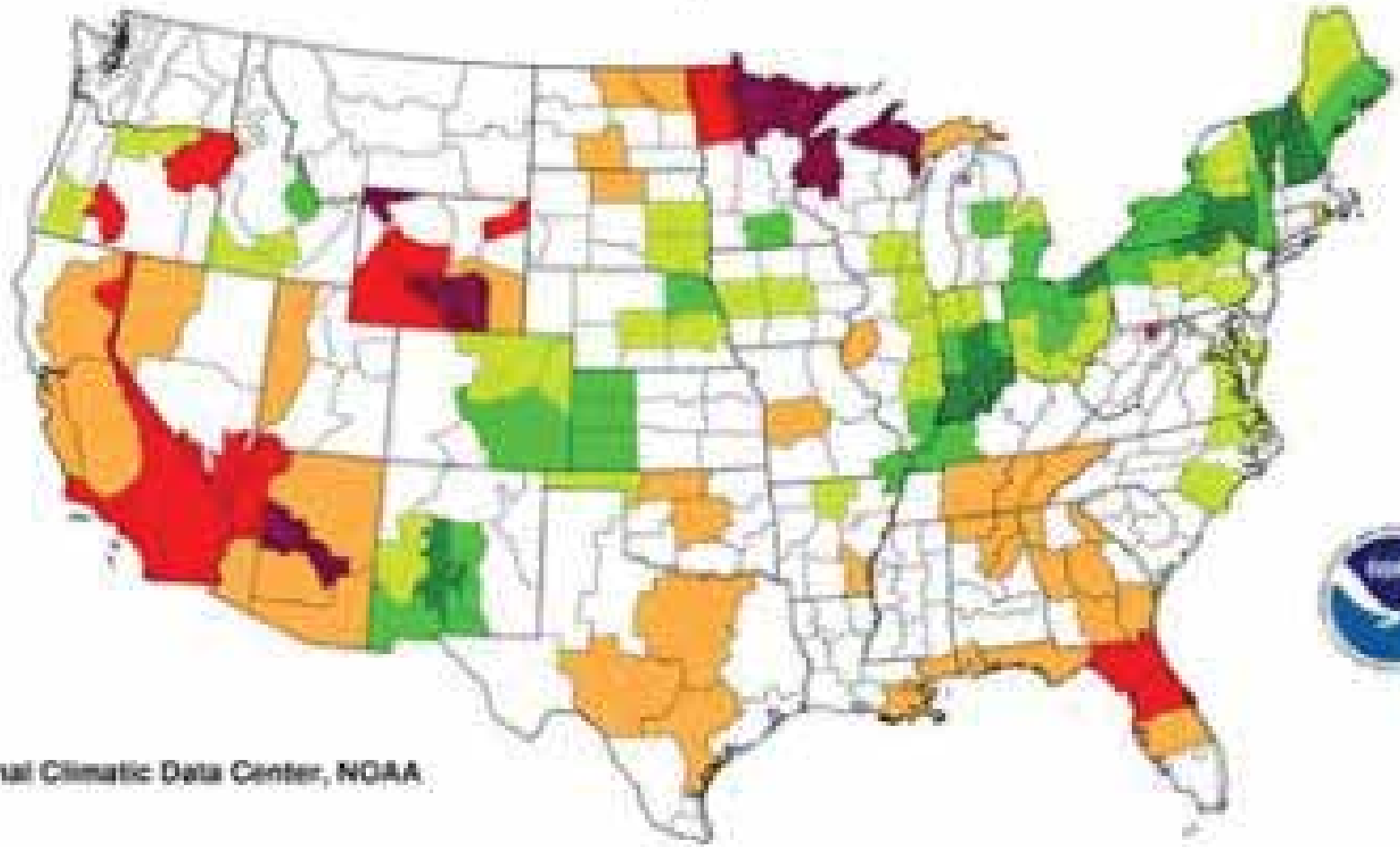
- Moisture
- Temperature
- Light
- Available, susceptible food hosts (trees)
  - Lack of moisture causes stress in trees, making them more susceptible to insect attack. So, this warrants a closer look at precipitation.....

Precipitation in CDA Area



Palmer Hydrological Drought Index
Long-Term (Hydrological) Conditions

February 2007



National Climatic Data Center, NOAA

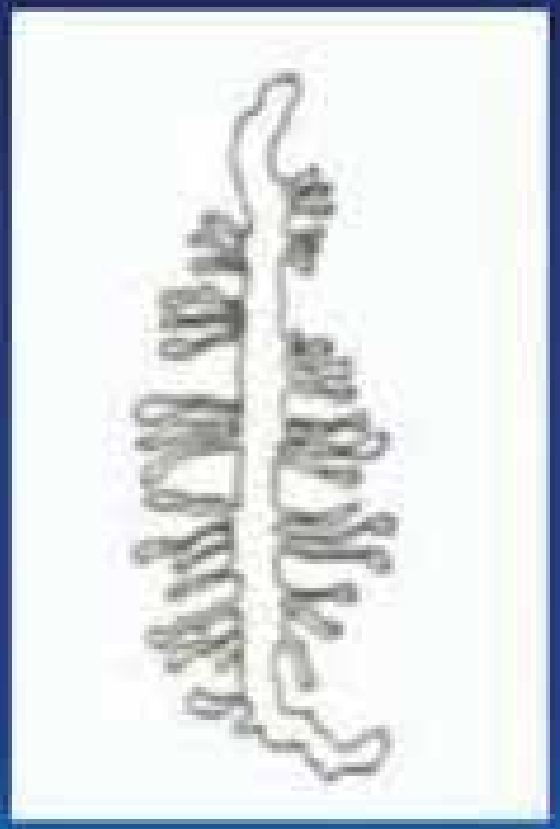
extreme drought	severe drought	moderate drought	mid-range	moderately moist	very moist	extremely moist
-4.00 and below	-3.00 to -3.99	-2.00 to -2.99	-1.99 to +1.99	+2.00 to +2.99	+3.00 to +3.99	+4.00 and above

Winter Winds

- 4 major windstorm events in CDA in November and December
- Wind gusts up to 60 mph


Bark Beetles


Prince George, B.C. 2006




Mountain Pine Beetle
Continues to be the most damaging bark beetle in the Region

Mountain Pine Beetle


Pitch Out

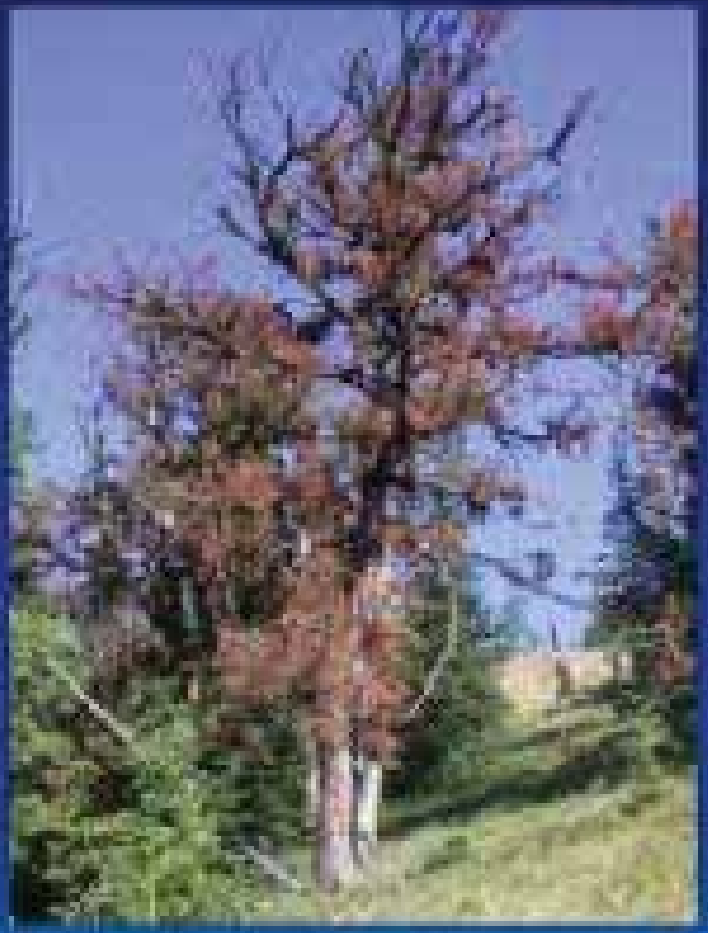
Early Signs of MPB Beetle Attack

(Tree Crowns are Green)

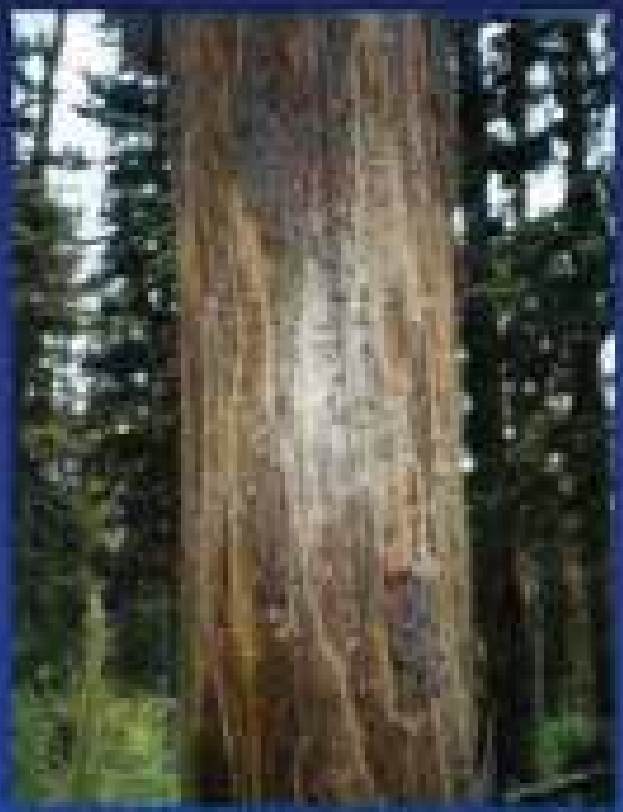
Boring dust

Beetles under
bark

Later Signs of MPB Beetle Attack



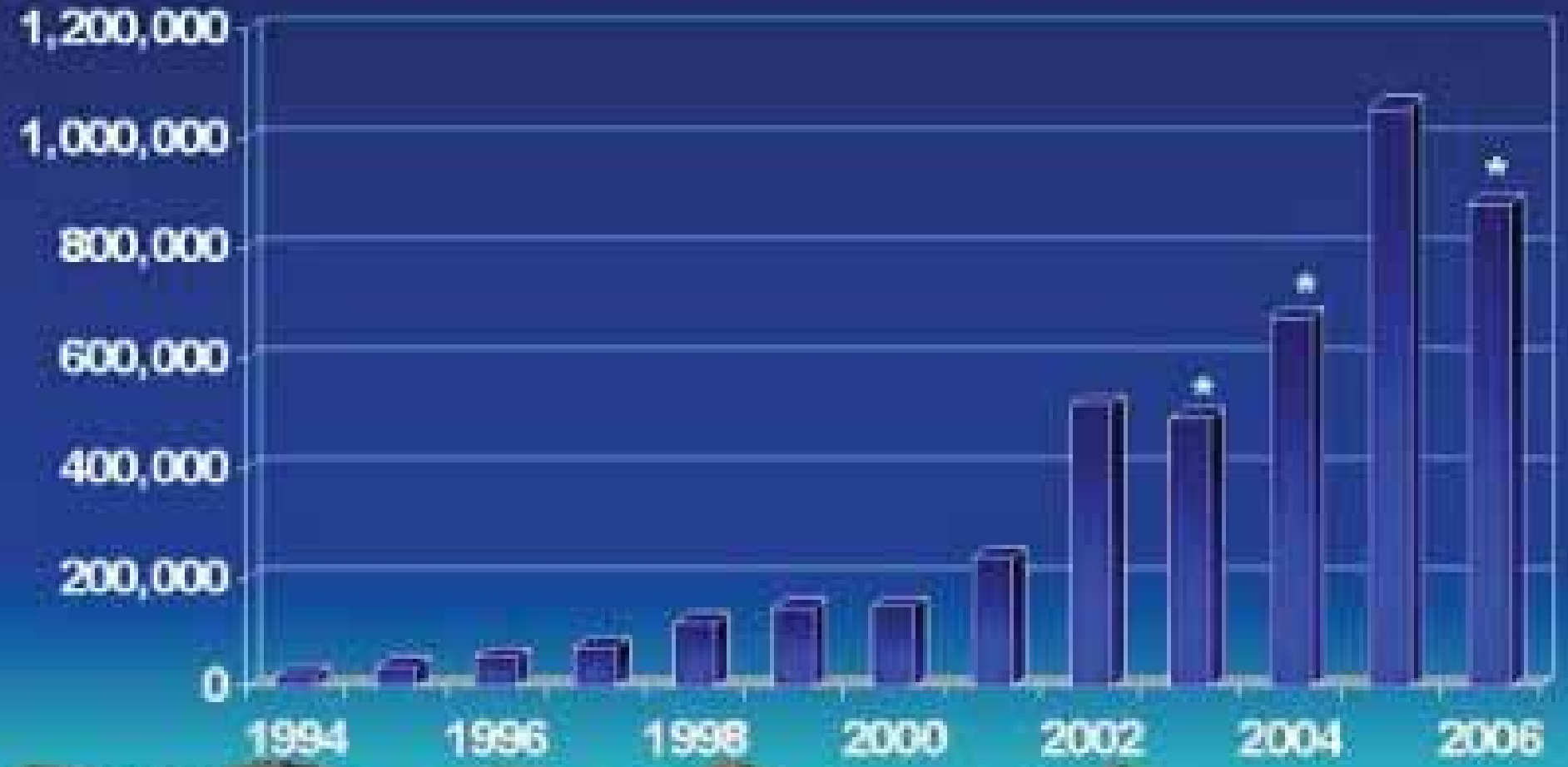
Fading Crowns



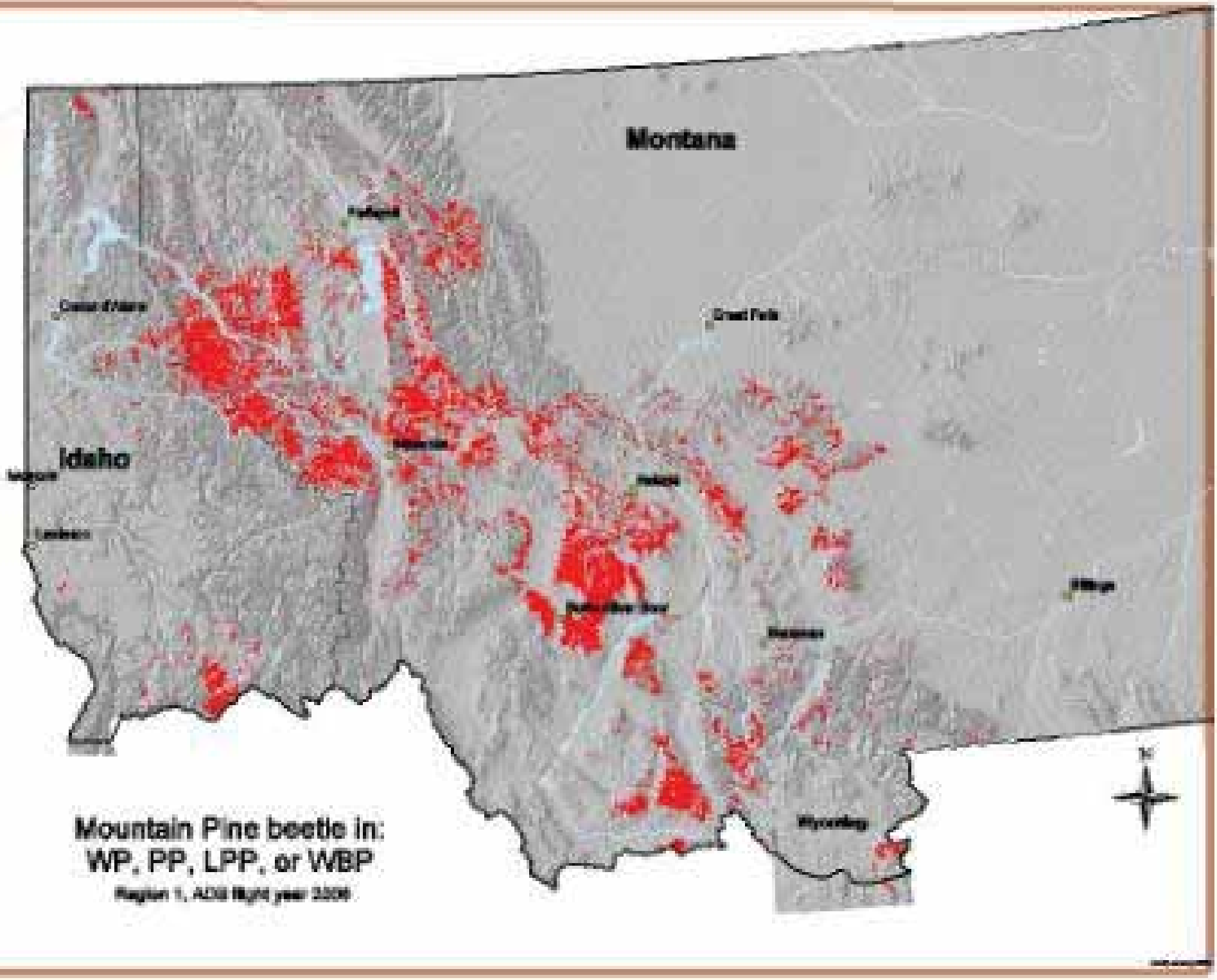
Galleries under bark

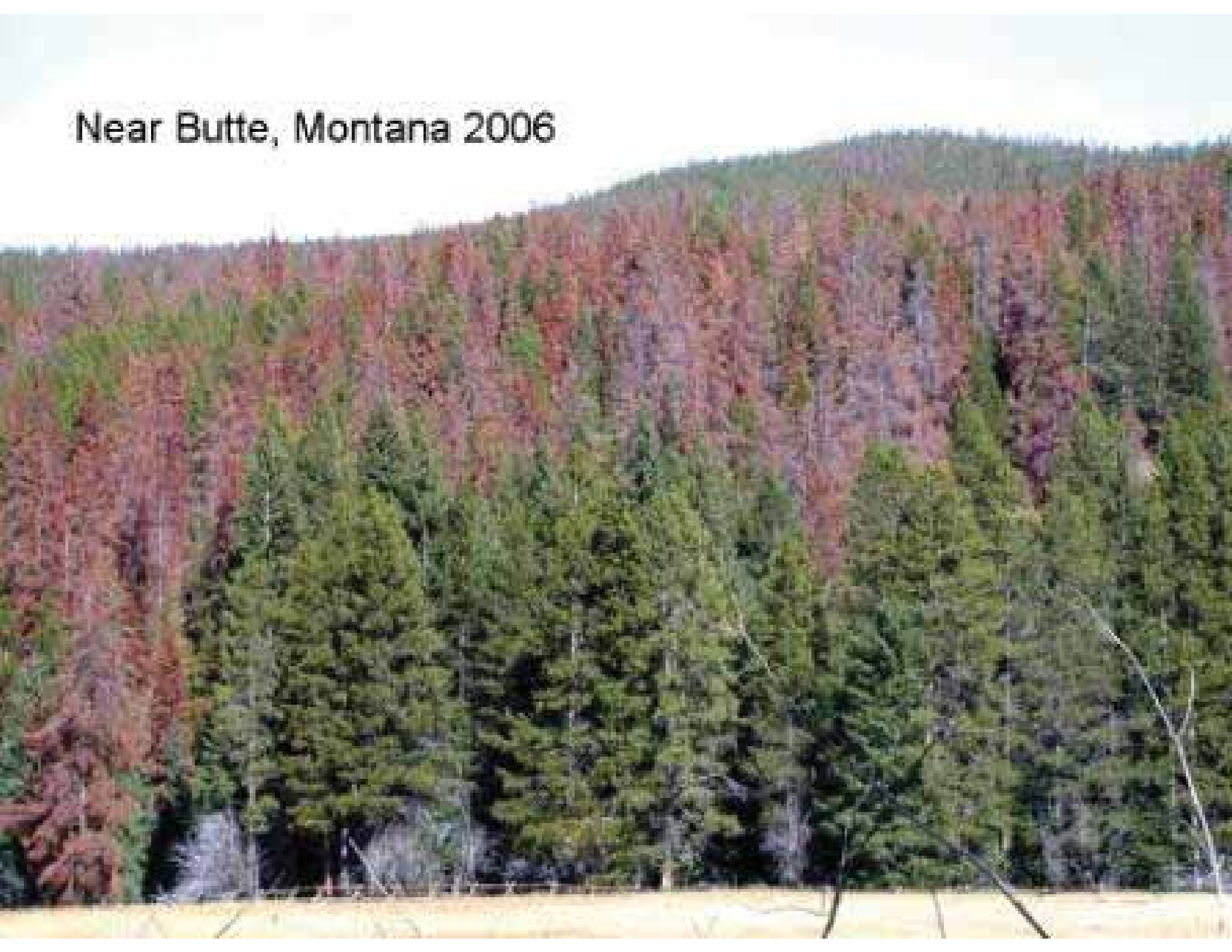
Acres Infested by Mountain Pine Beetle

Northern Region



* Not all areas flown in 2003, 2004, or 2006


Montana
Idaho
Mountain Pine beetle in:
WP, PP, LPP, or WBP


Near Butte, Montana 2006


Thompson Pass 2006

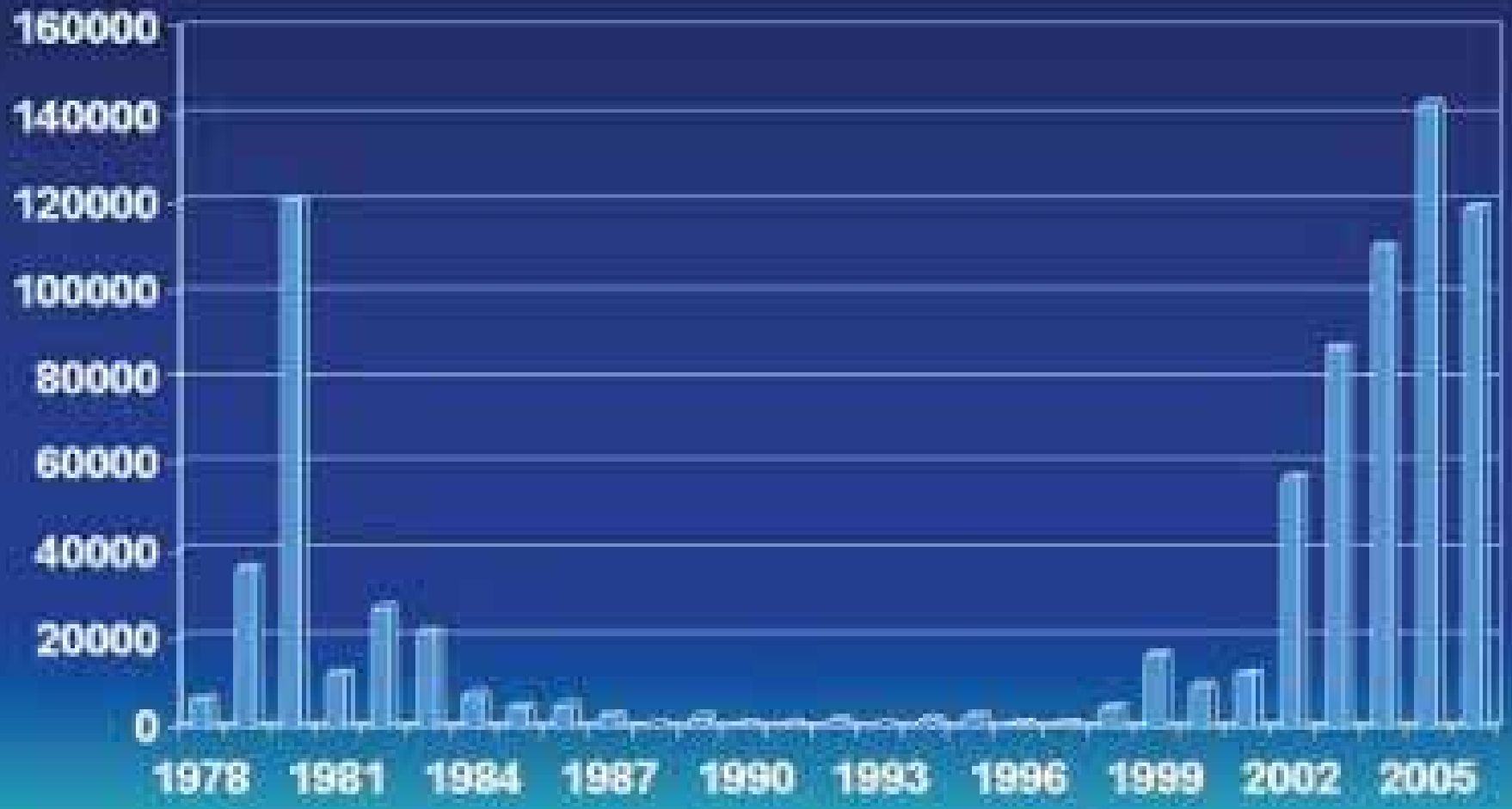
Whitebark pine

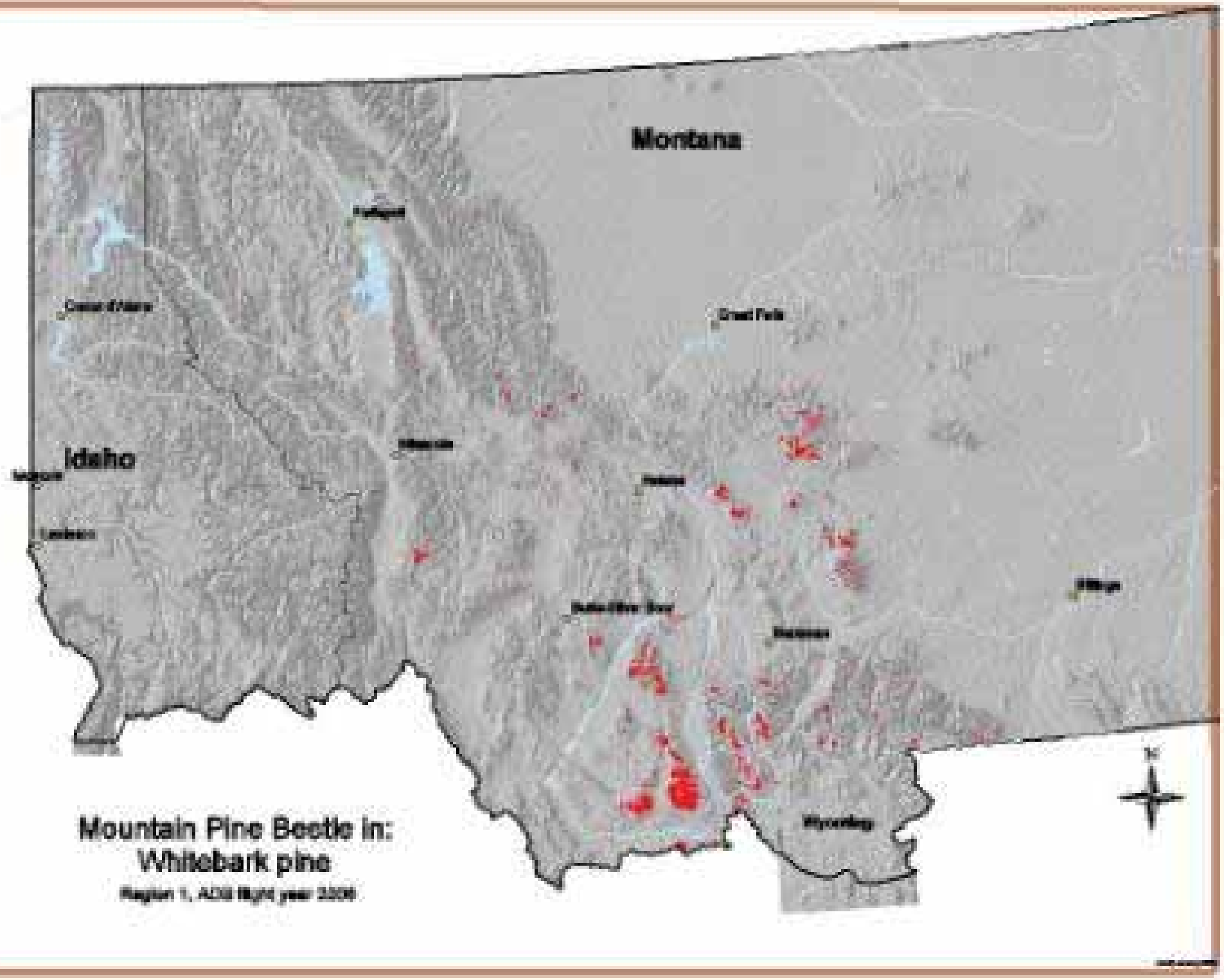

Yellowstone NP 2004


White pine blister rust

Mountain Pine Beetle Infested Whitebark Pine

Northern Region Acres




Montana
Idaho
Mountain Pine Beetle in:
Whitebark pine


Mountain pine beetle in British Columbia
Photo by Lorraine Maclauchlan
8.5 million hectares of fading LPP recorded in 2006
(21 million acres)


BC
Alberta

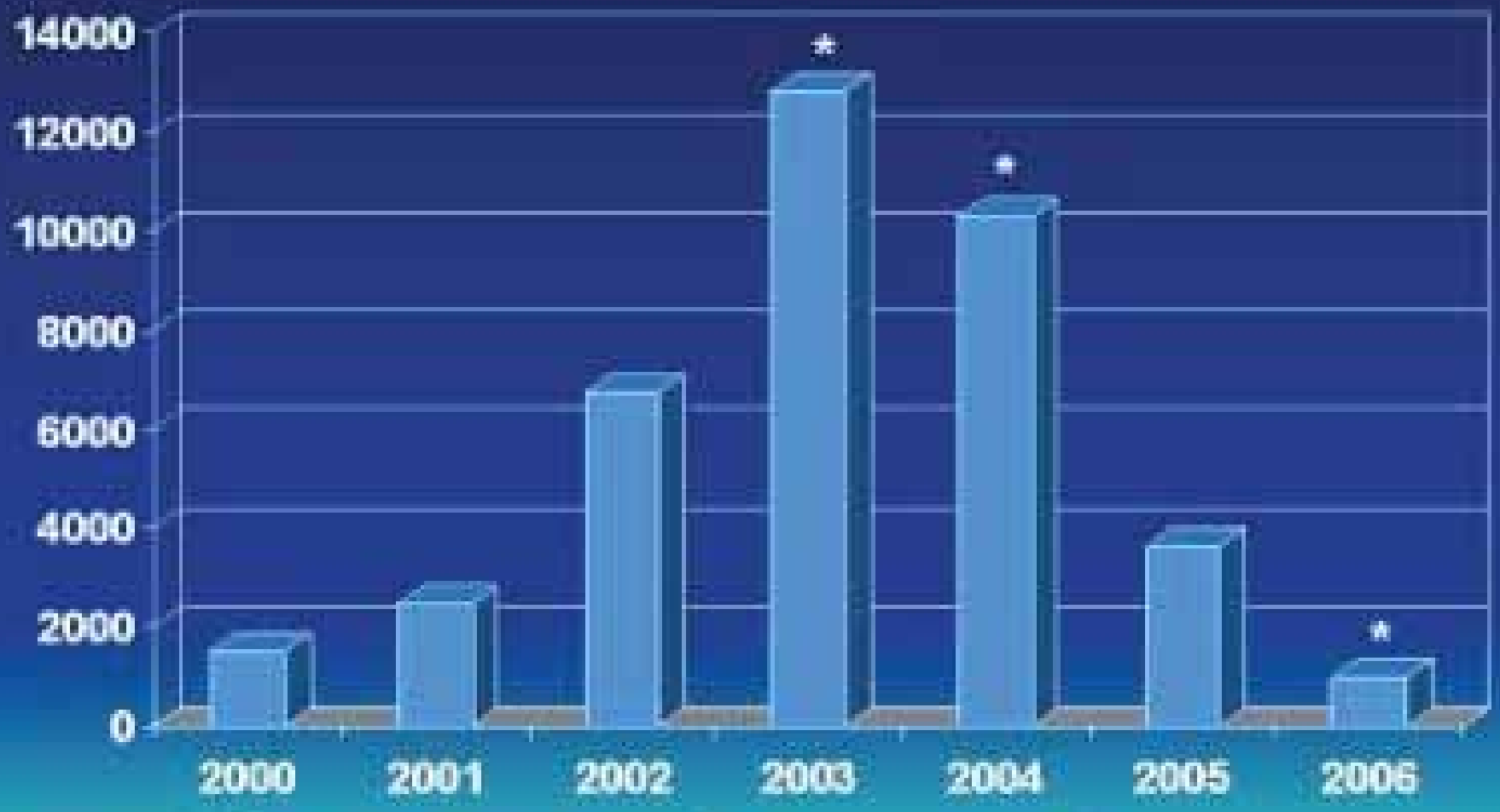

MPB has moved farther north than it has ever been recorded


STOP
the spread of
Mountain Pine Beetle
ARRET
It is unlawful to transport pine wood with bark into the Province of Alberta.
Alberta
Aidez à enrayer la propagation du dendroctone du pin.
Il est illégal de transporter du bois de pin muni d'écorce dans la province d'Alberta.


Other Regions:
Utah: Spruce beetle killing nearly ½ its Engelmann spruce
Central Idaho: 4.5 million LPP & DF killed
Colorado: 4.8 million LPP killed—5X more than 2005


Western Pine Beetle
Host: ponderosa pine

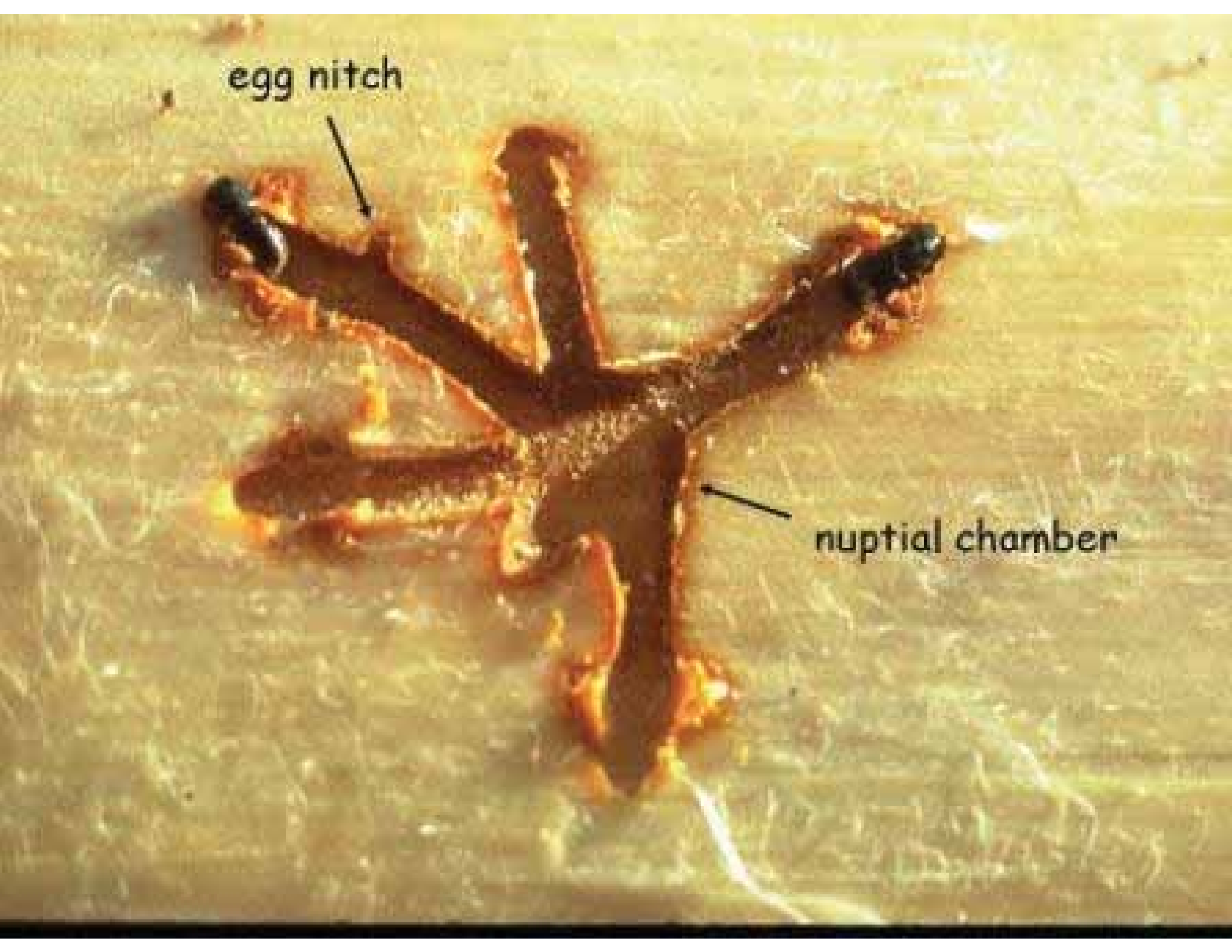
Western Pine Beetle Infested Acres
Northern Region

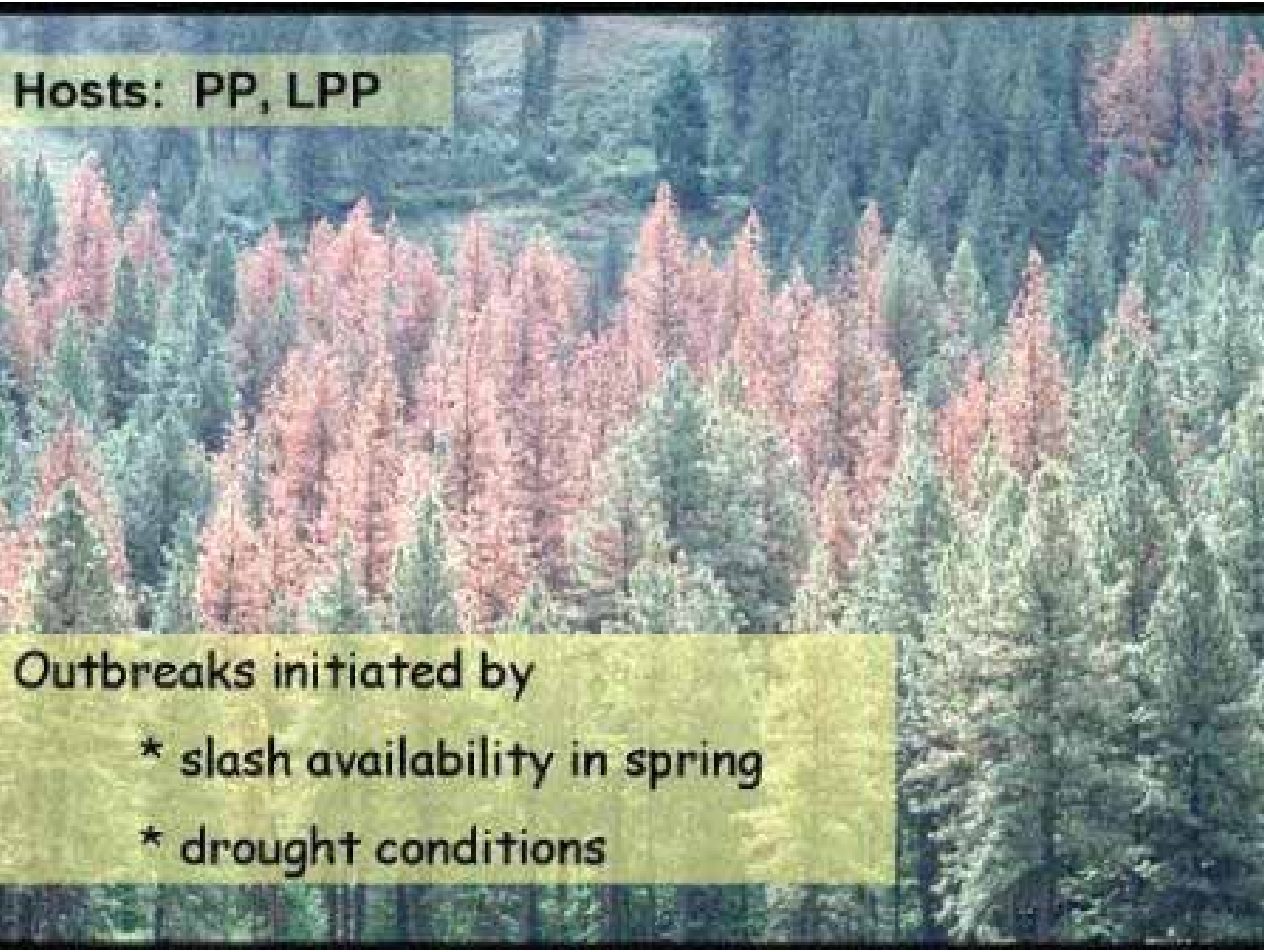


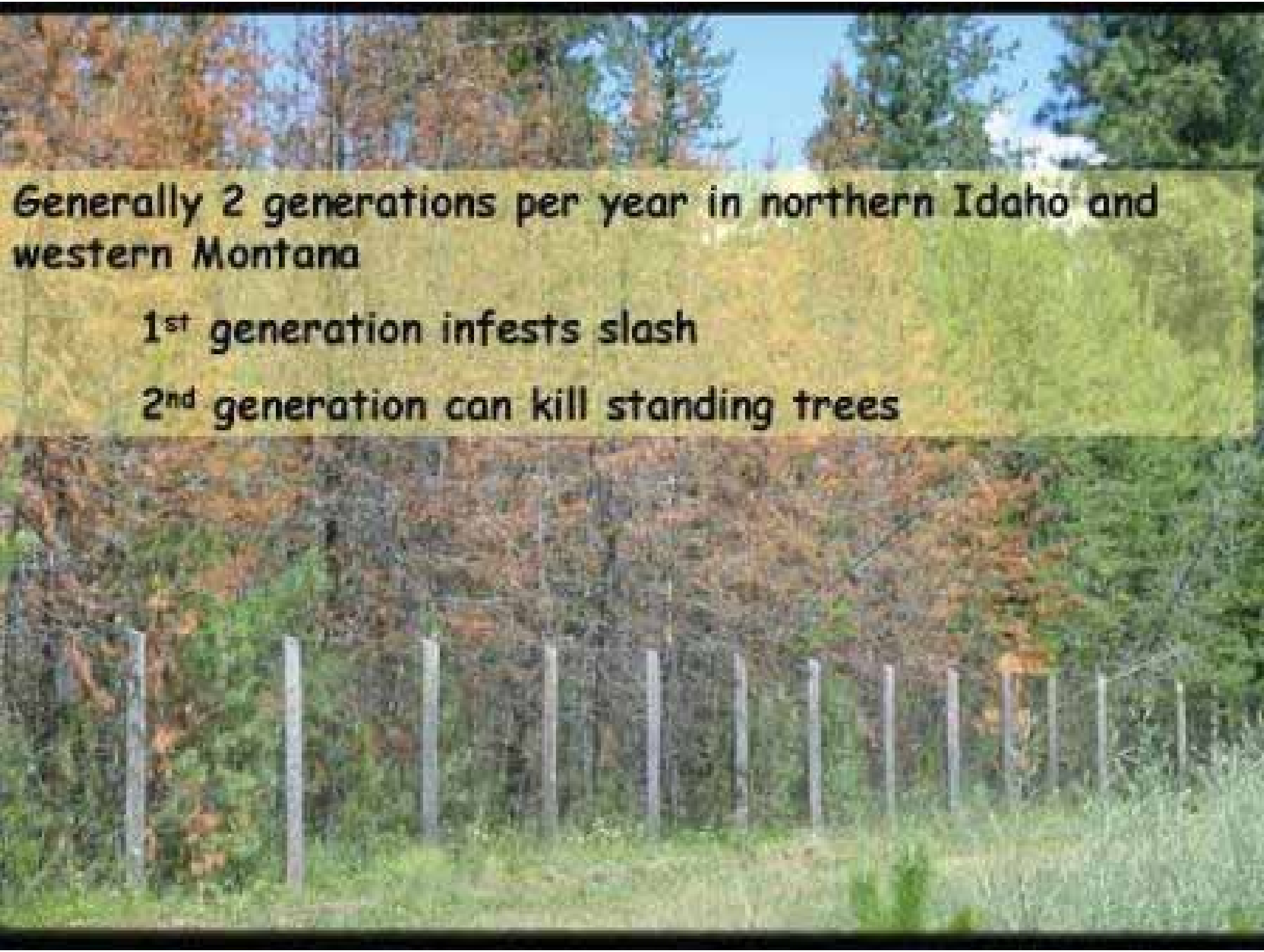
* Not all areas flown in 2003, 2004, or 2006

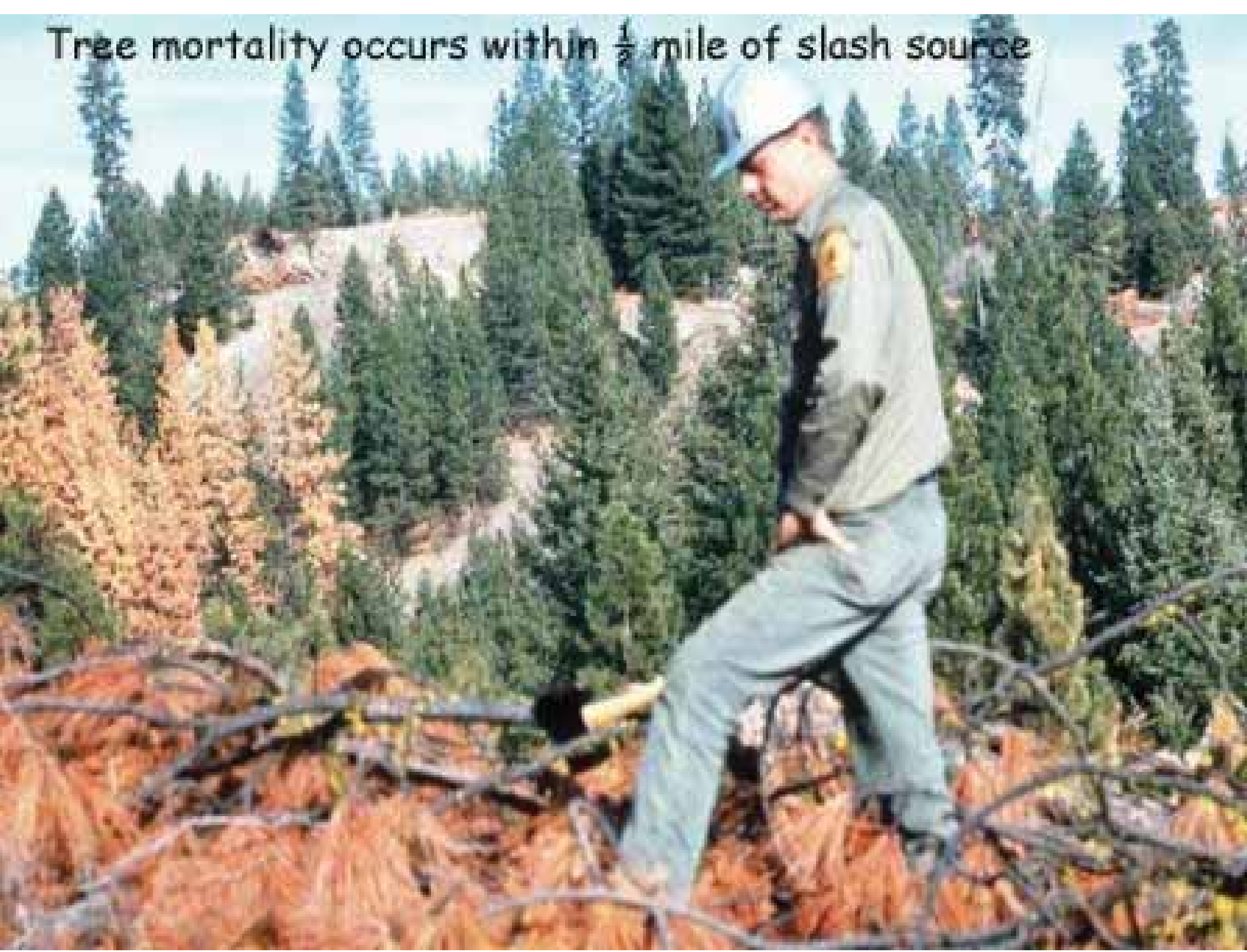

Montana
Idaho
Western Pine Beetle

Pine Engraver

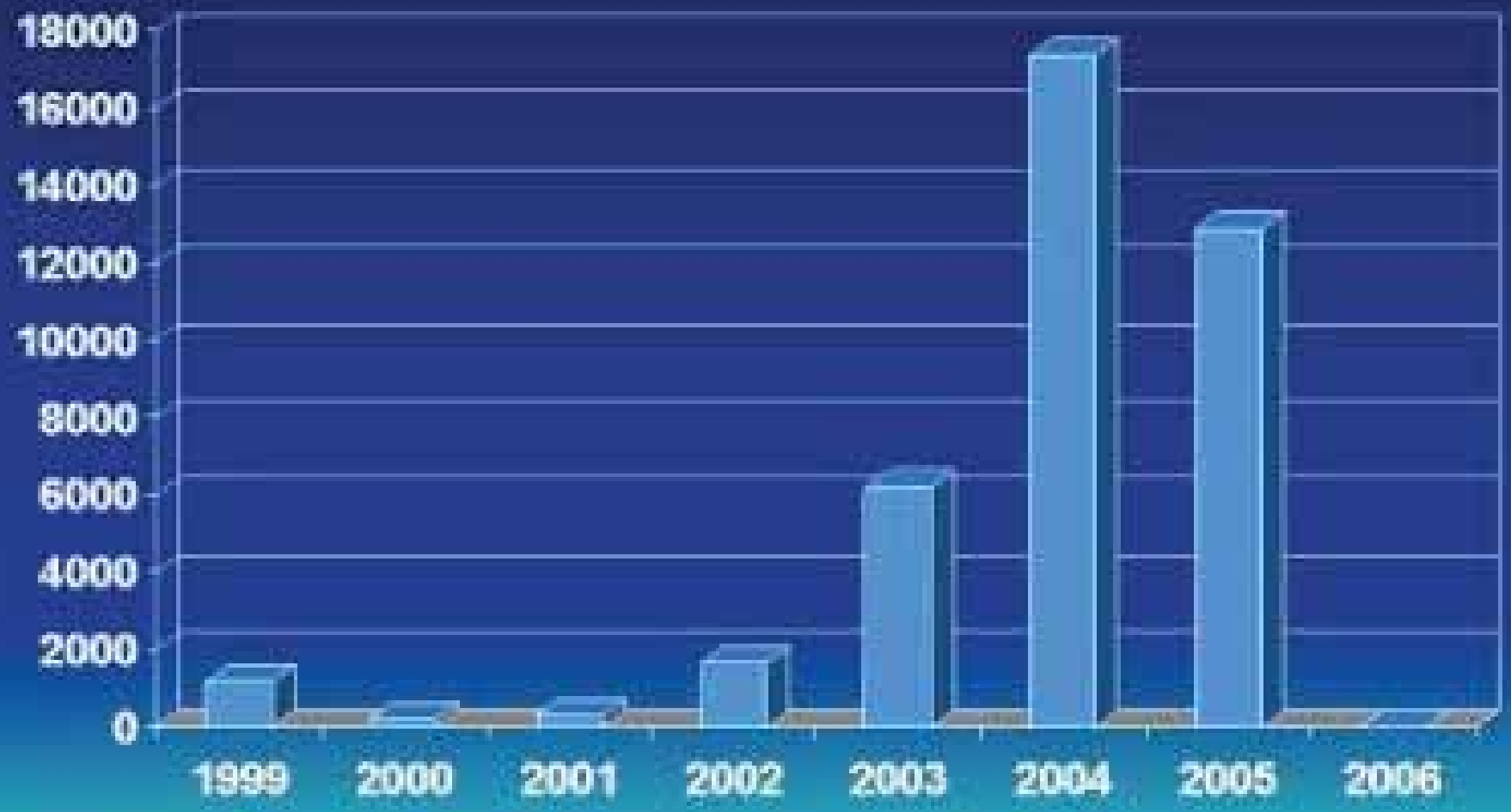

egg nitch
nuptial chamber


Hosts: PP, LPP
Outbreaks initiated by
* slash availability in spring
* drought conditions


Generally 2 generations per year in northern Idaho and western Montana
1st generation infests slash
2nd generation can kill standing trees


Tree mortality occurs within ½ mile of slash source

Pine Engraver Infested Acres
Northern Region

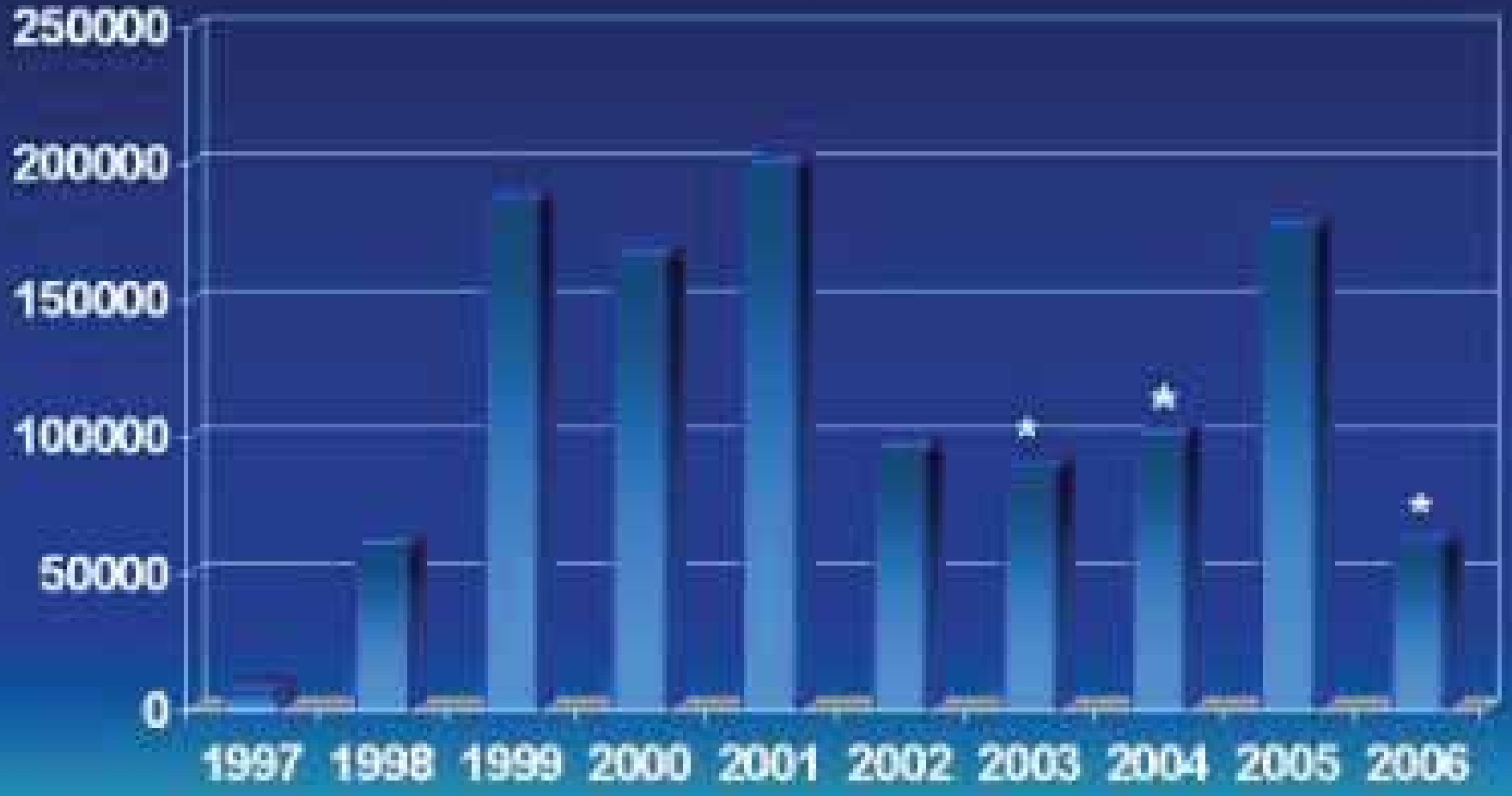



Douglas-fir Beetle


Host: Douglas-fir

Douglas-fir beetles and other bark beetles are attracted to partially burned trees

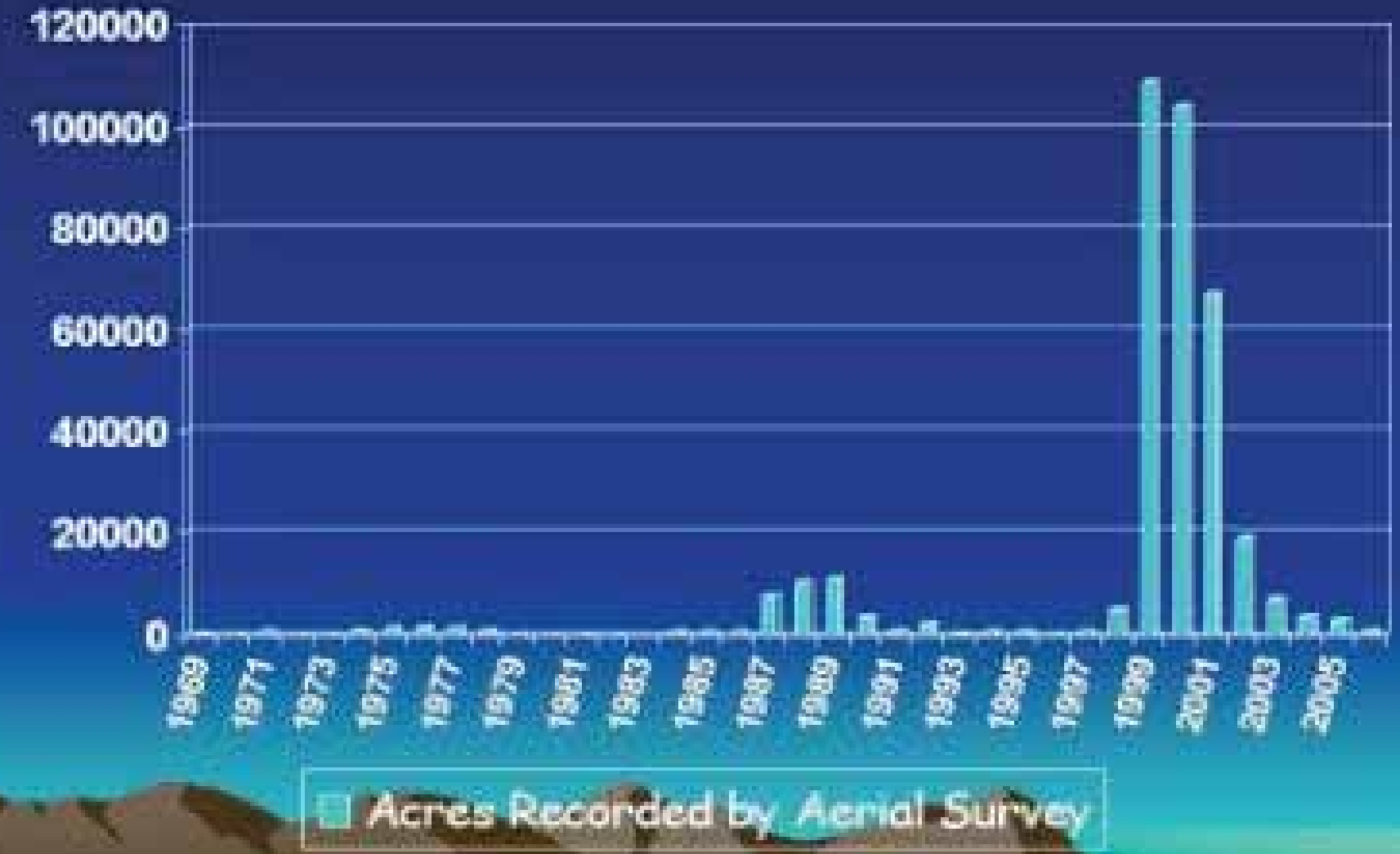
Douglas-fir Beetle Infested Acres
Northern Region

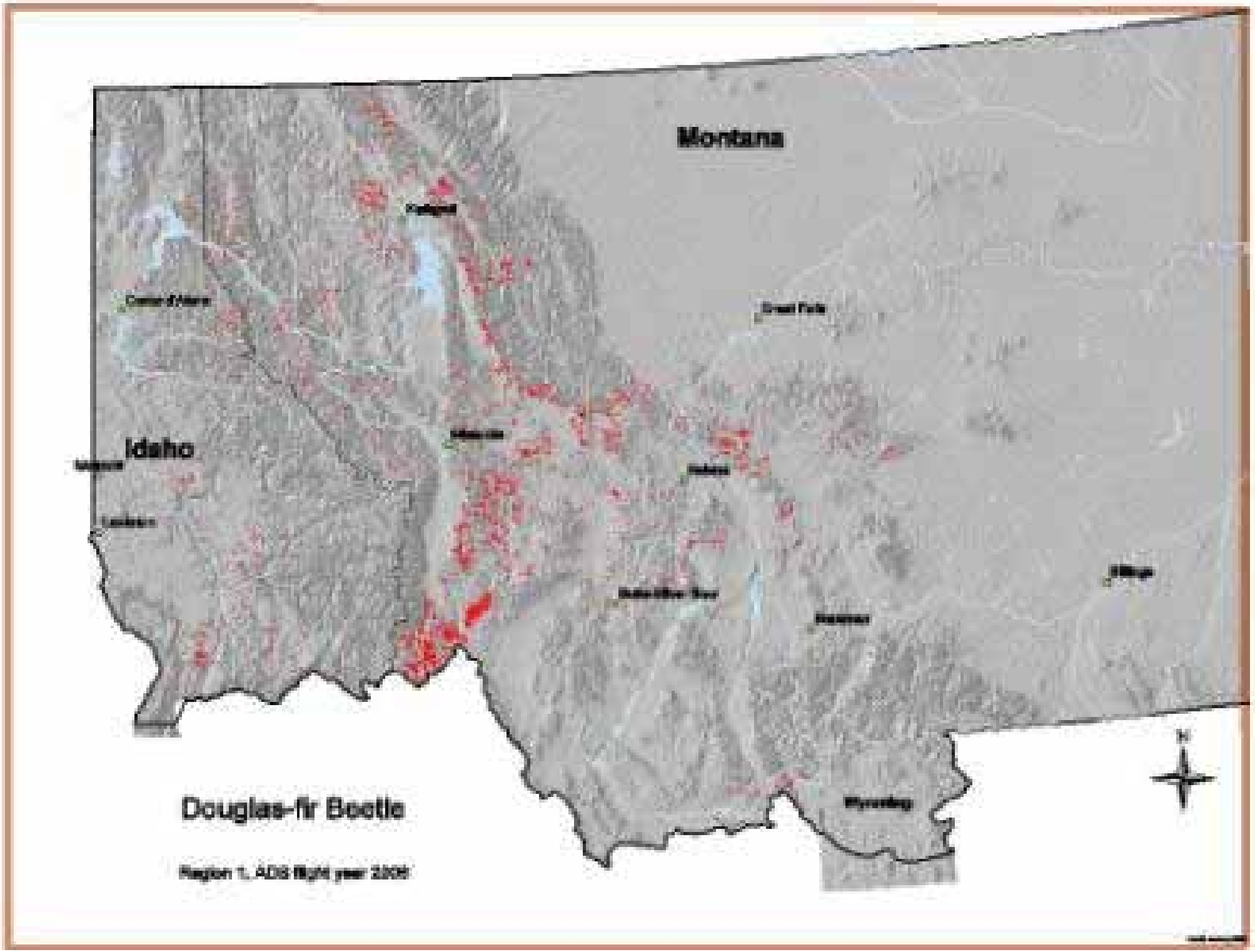


* Not all areas flown in 2003, 2004, or 2006

Douglas-fir Beetle Infested Acres

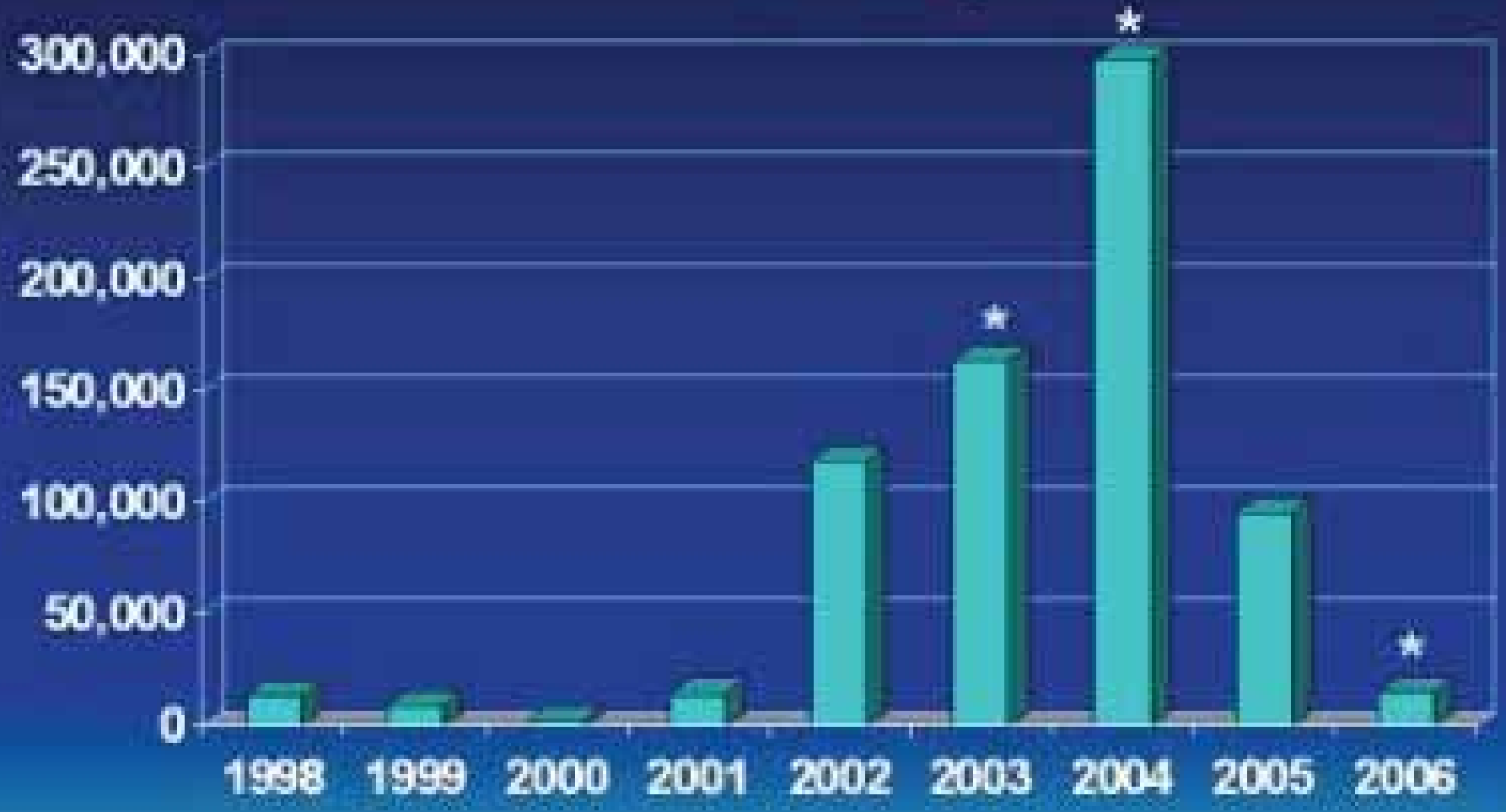
Idaho Panhandle National Forests and Adjacent Lands
1969-2006




Montana
Idaho
Douglas-fir Beetle
Region 1, ADS flight year 2006


Fir engraver
Host: Grand fir

Fir Engraver Infested Acres
Northern Region

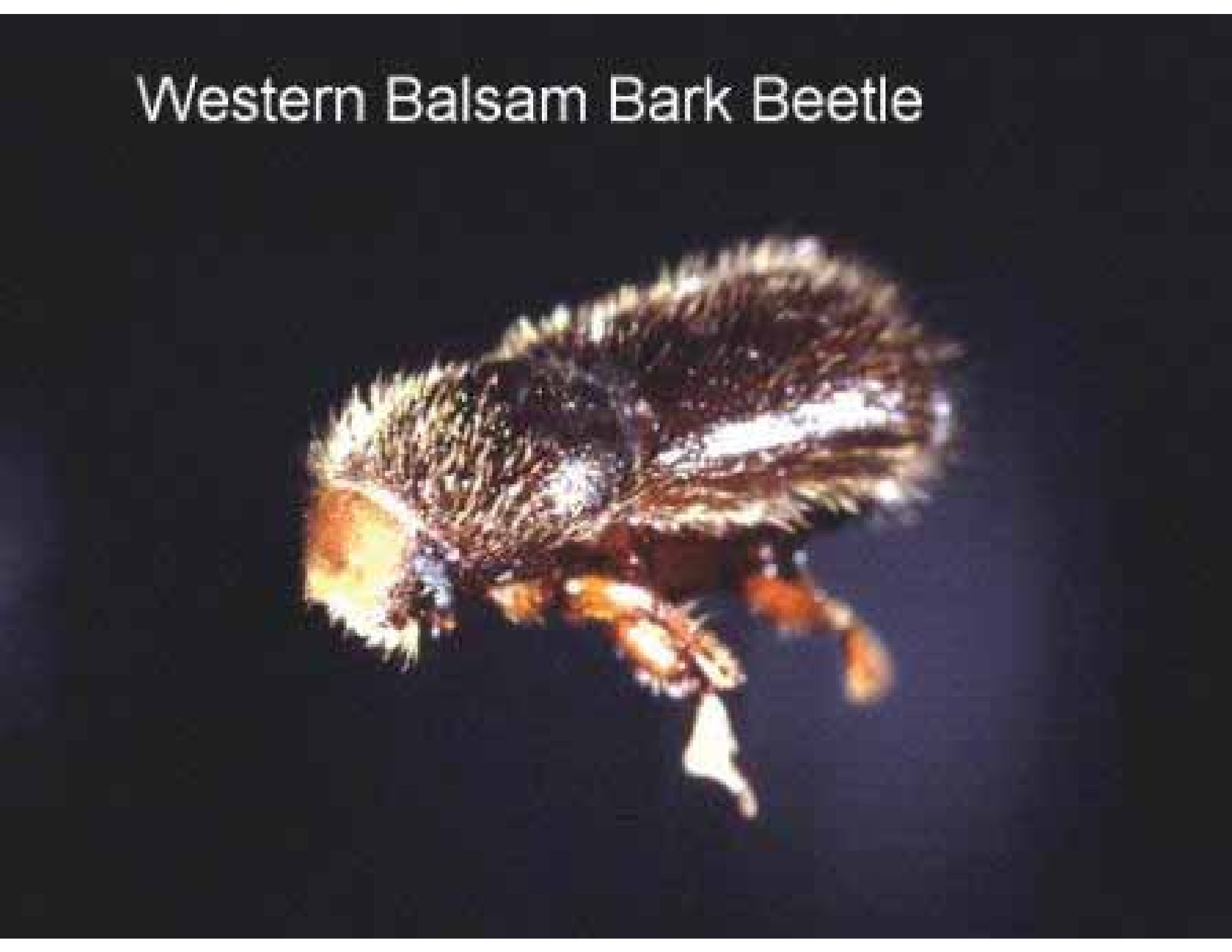


* Not all areas flown in 2003, 2004, or 2006


Montana
Idaho
Fir Engraver
Region 1, ADS flight year 2006

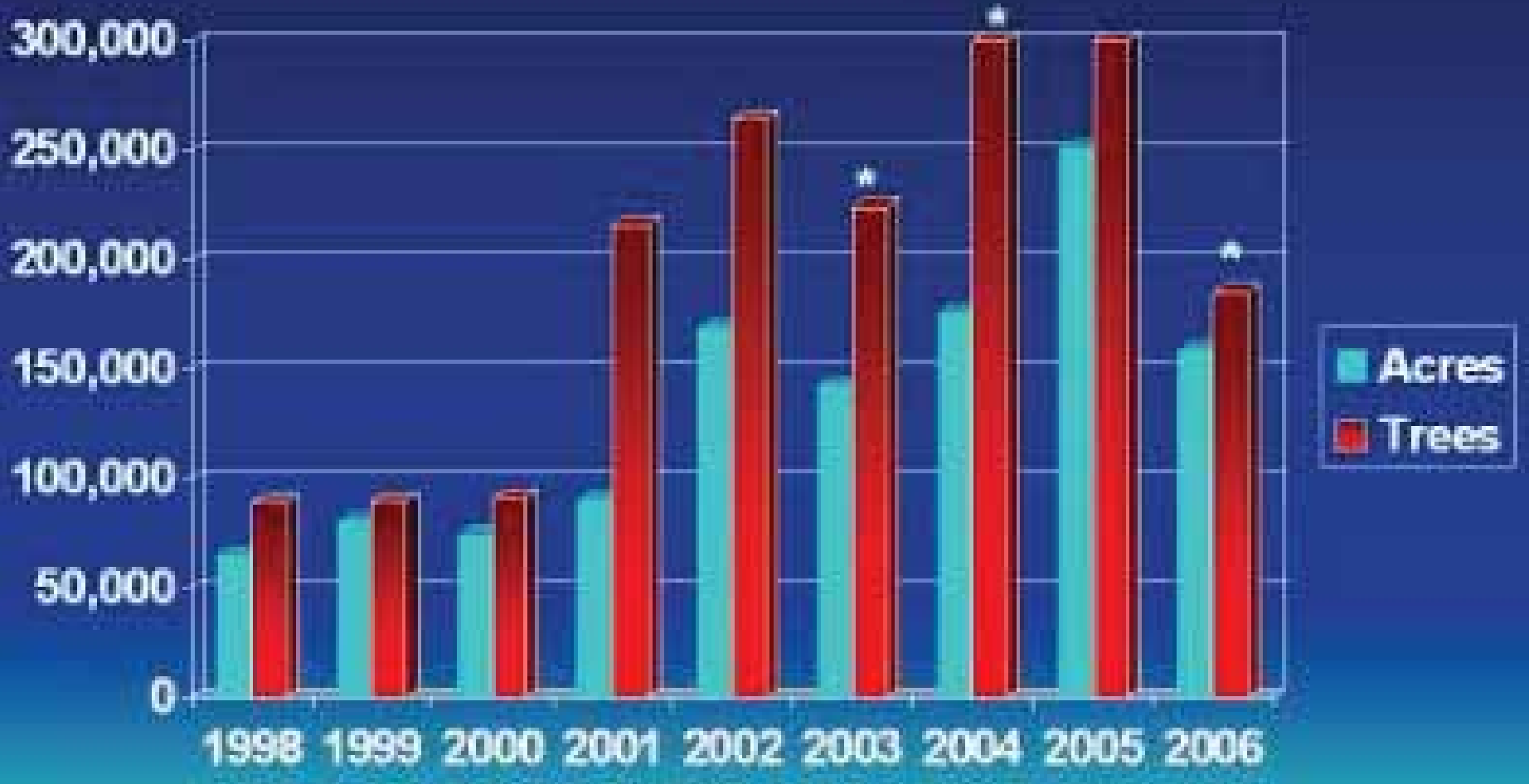

Subalpine fir mortality complex

Western Balsam Bark Beetle

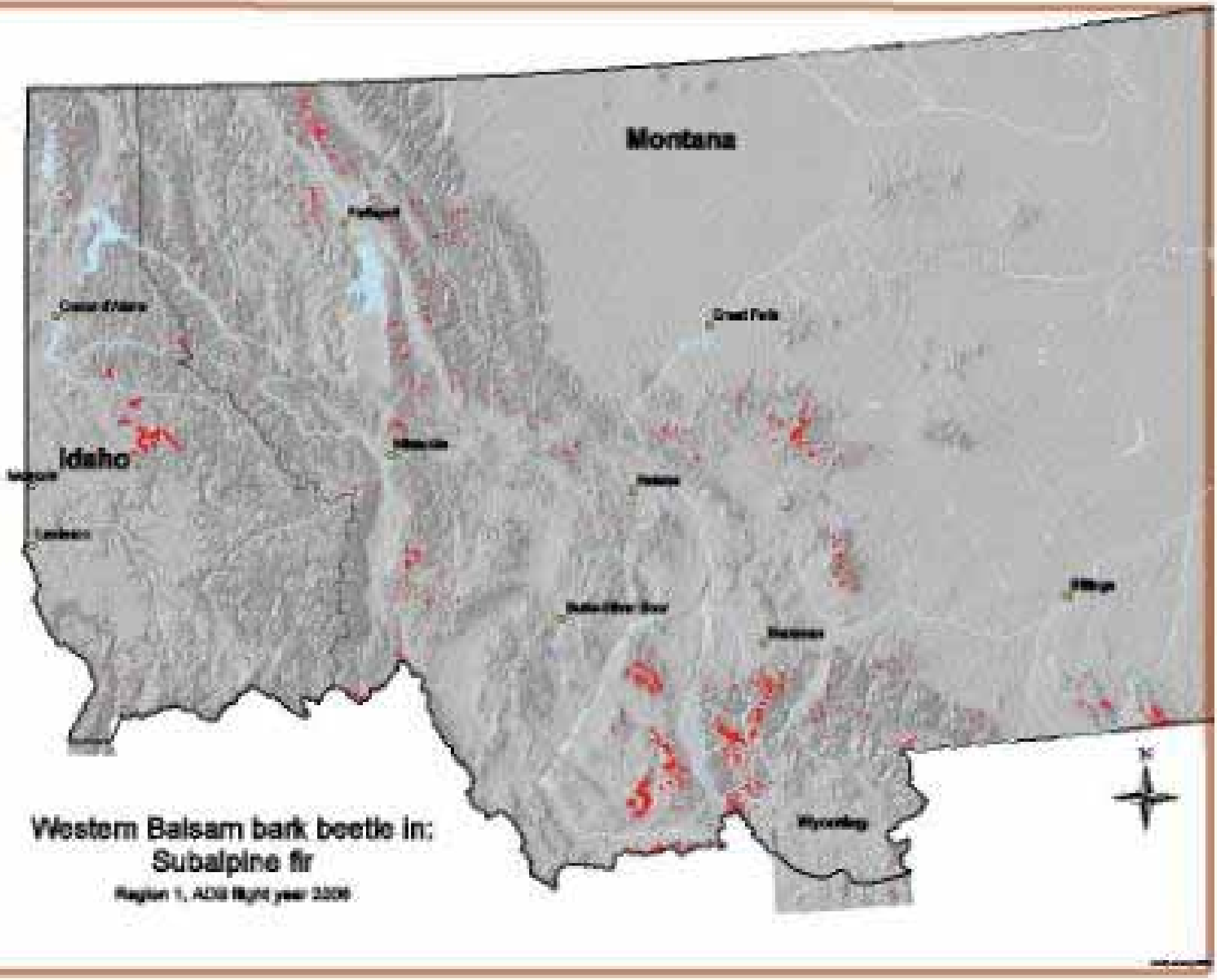


Balsam Woolly Adelgid

Subalpine Fir Mortality
Northern Region



* Not all areas flown in 2003, 2004, or 2006

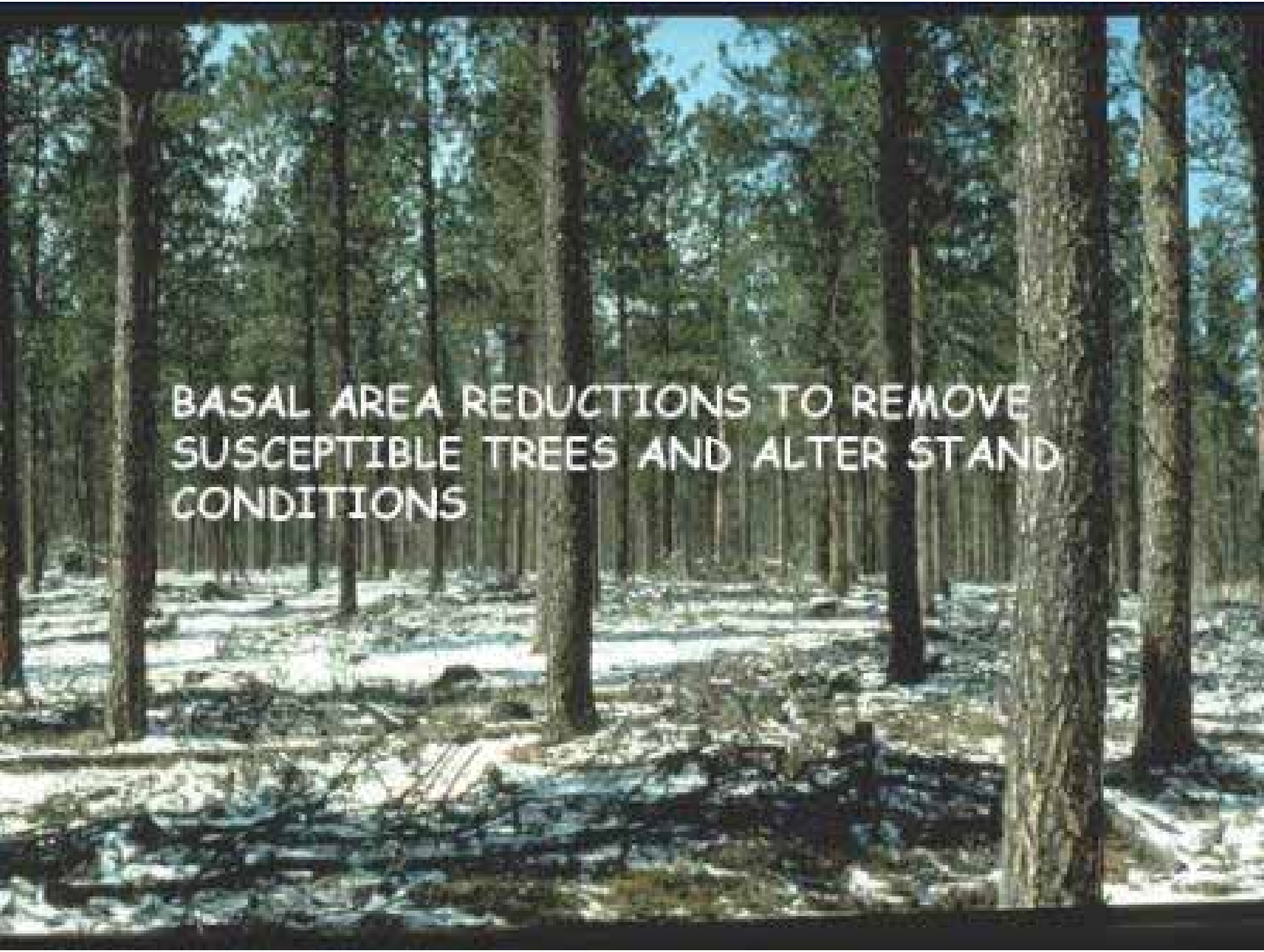

Montana
Idaho
Western Balsam bark beetle in:
Subalpine fir
Region 1, ADS flight year 2006

Management Options for Bark Beetles


SALVAGE OF BEETLE-
KILLED TREES


Photo by BC Ministry of Forests


Silvicultural Manipulation of High Hazard Stands


BASAL AREA REDUCTIONS TO REMOVE
SUSCEPTIBLE TREES AND ALTER STAND
CONDITIONS

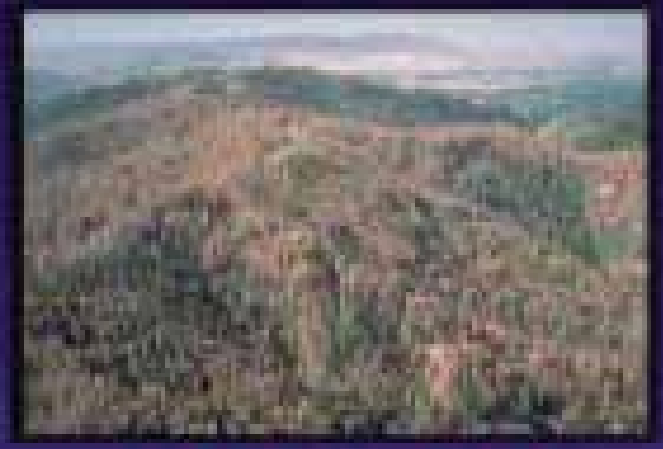
Partial Cuts to promote non-host species


Regeneration Harvest

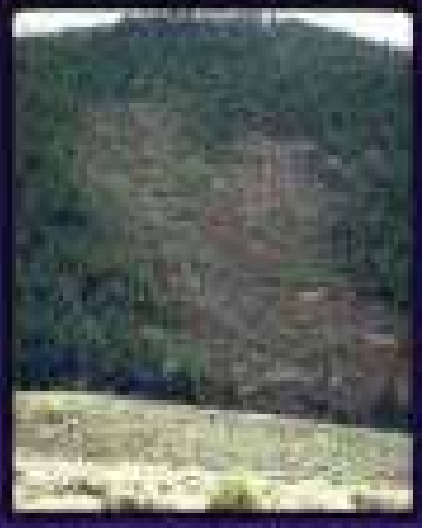

ULTIMATELY CREATE A MOSAIC OF SIZE,
AGE, OR SPECIES COMPOSITION

Douglas-fir Beetle Management Options

Outbreaks Triggered by some sort of Disturbance



Defoliation



Windthrow

Fire


Salvage Windthrow


Salvage Fire Damaged Trees

Douglas-fir Beetle Hazard Rating
Stands most likely to be infested

- Large diameter Douglas-fir trees
- Older trees
- Dense stands
- High proportion of Douglas-fir in stand


Silvicultural Manipulation
High Hazard Stands


Slash Management
for Pine Engraver (*Ips* beetles)

Slash Management Options

- Do not create slash from early winter through late spring
- Conduct management activity after mid-July and before winter
- Utilize slash greater than 3" in diameter
- Prompt slash disposal—burning, chipping, bulldozer trampling
- Lop into smaller pieces and scatter in openings

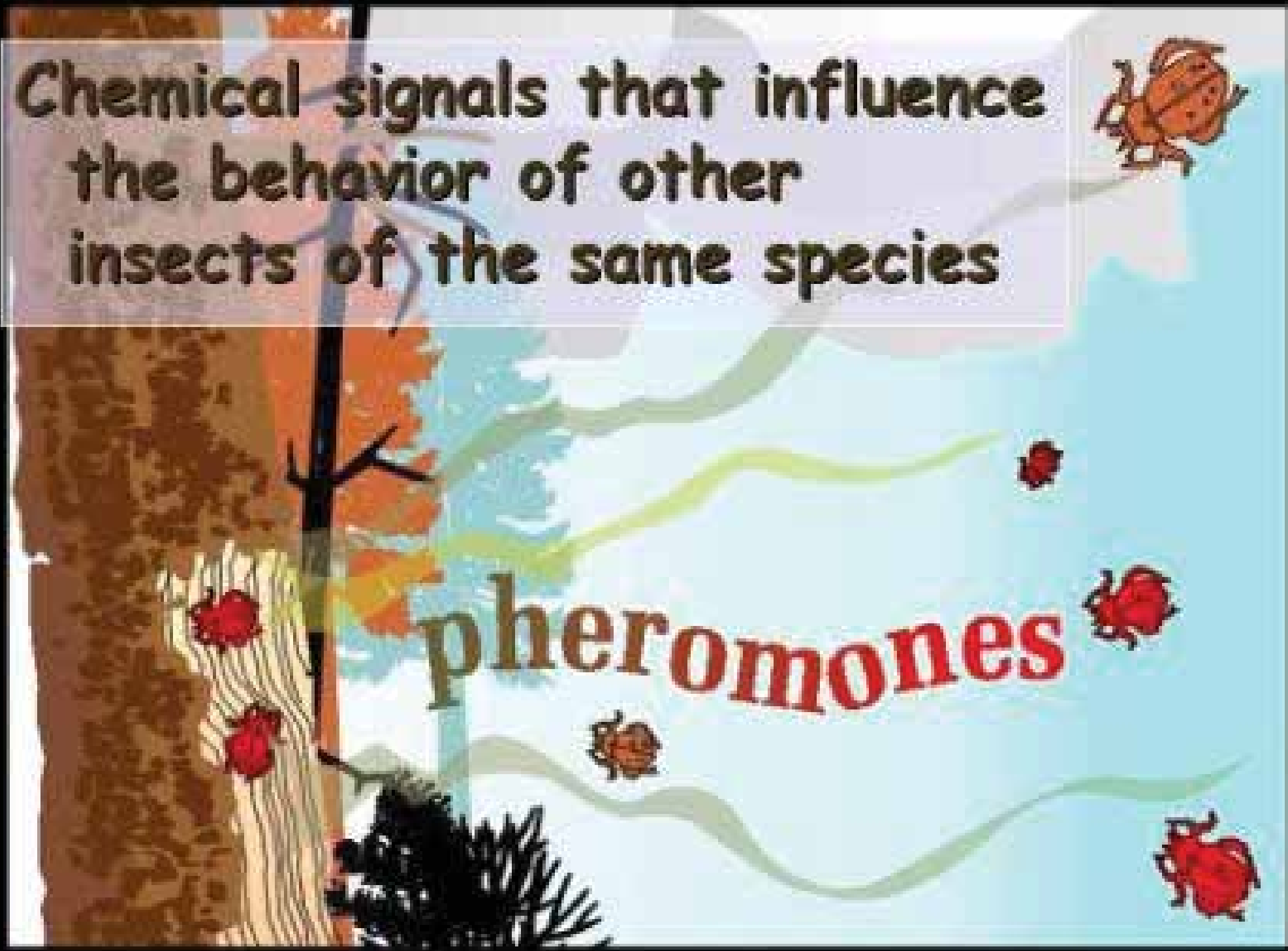
Slash Management Options

- Green chain
  - Create a continuous supply of green slash throughout the flight period
  - Must be continued for every generation that season

Slash Management Options

- Very large piles of slash
  - 20 feet wide, 10 feet deep
    - Large enough so that interior pieces do not dry out
    - Emerging beetles are attracted deeper into pile

Preventive spraying with Carbaryl


Chemical signals that influence the behavior of other insects of the same species
pheromones

Bark Beetle Pheromones

- attractant or aggregation
- anti-attractant or deterrent

Beetle Manipulation by Attractant Pheromone Baiting

- Use tree baits to stimulate attacks in stands scheduled for harvest
- Funnel traps to trap and remove beetles


Tree Bait


Pheromone Trap


Caution:
Spillover

Anti-attractants

- MCH
  - Douglas-fir beetle
- Verbenone
  - Mountain pine beetle

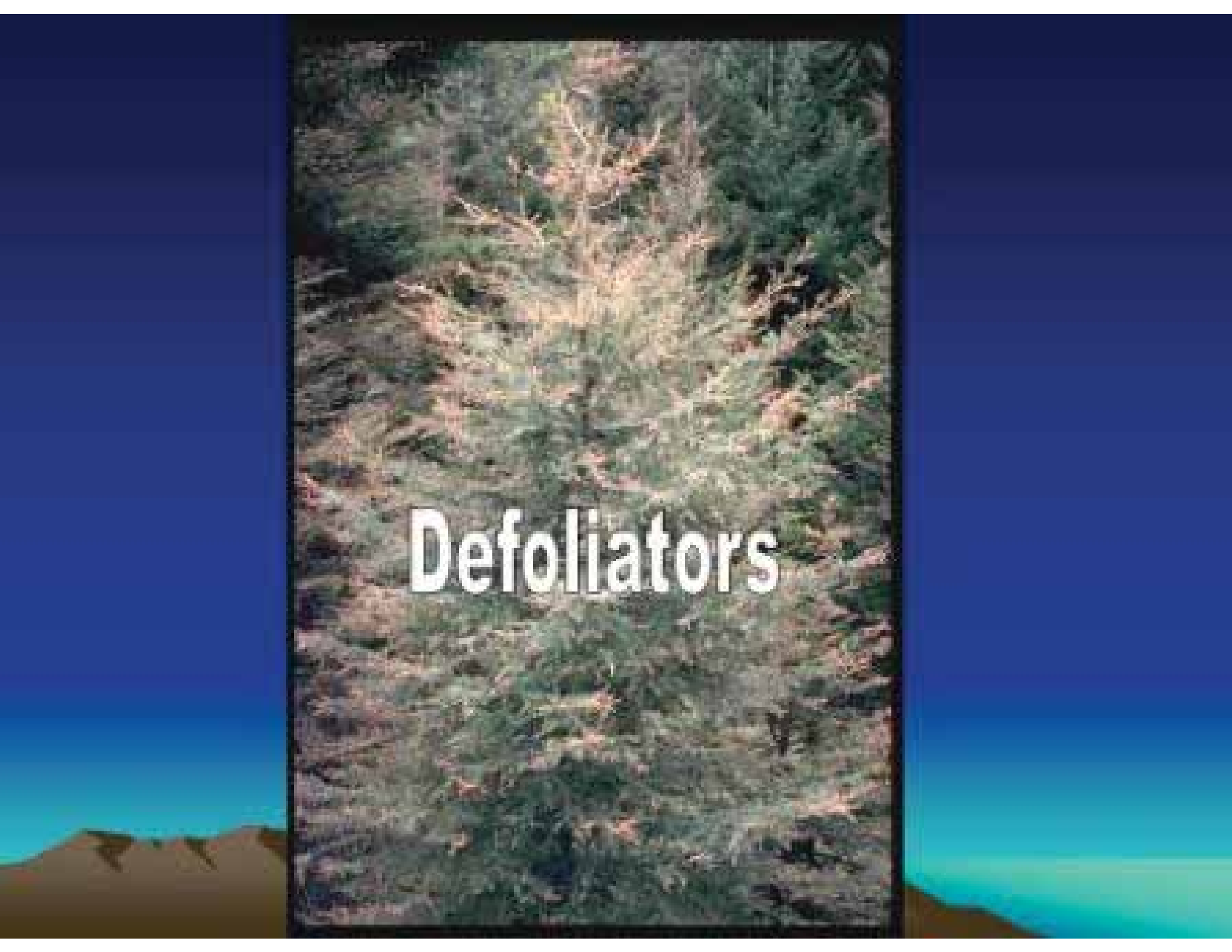

MCH
Anti-aggregant pheromone
for Douglas-fir beetle

MCH is effective on…

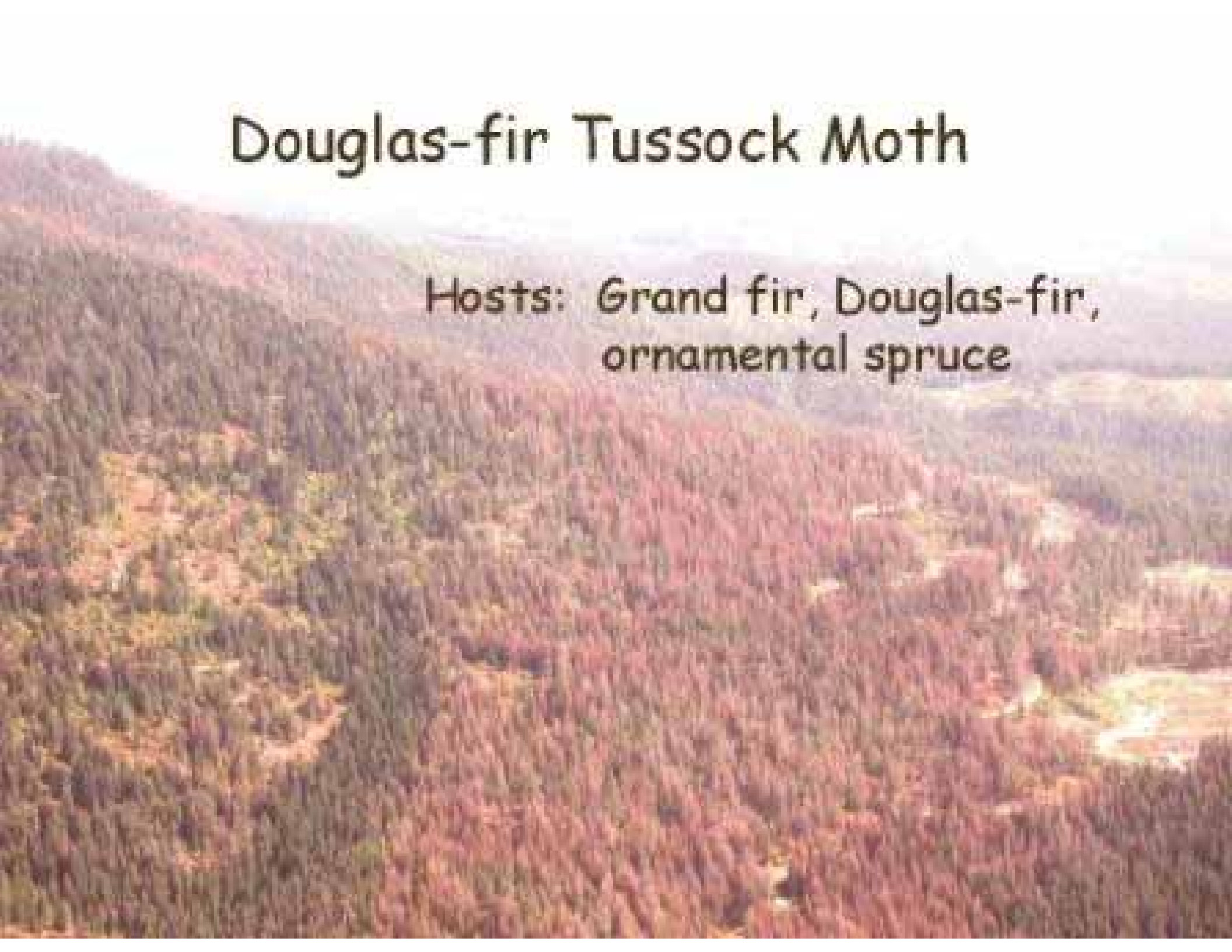
- Large Acreages (150-300 acres)
  - 25-30 per acre
- Individual Trees and small acreages

Verbenone
Anti-attractant for MPB

- Tested for stand protection
  - Lodgepole pine
  - Whitebark pine
- Individual tree protection
  - Western white pine
  - Whitebark pine


Defoliators

Douglas-fir Tussock Moth



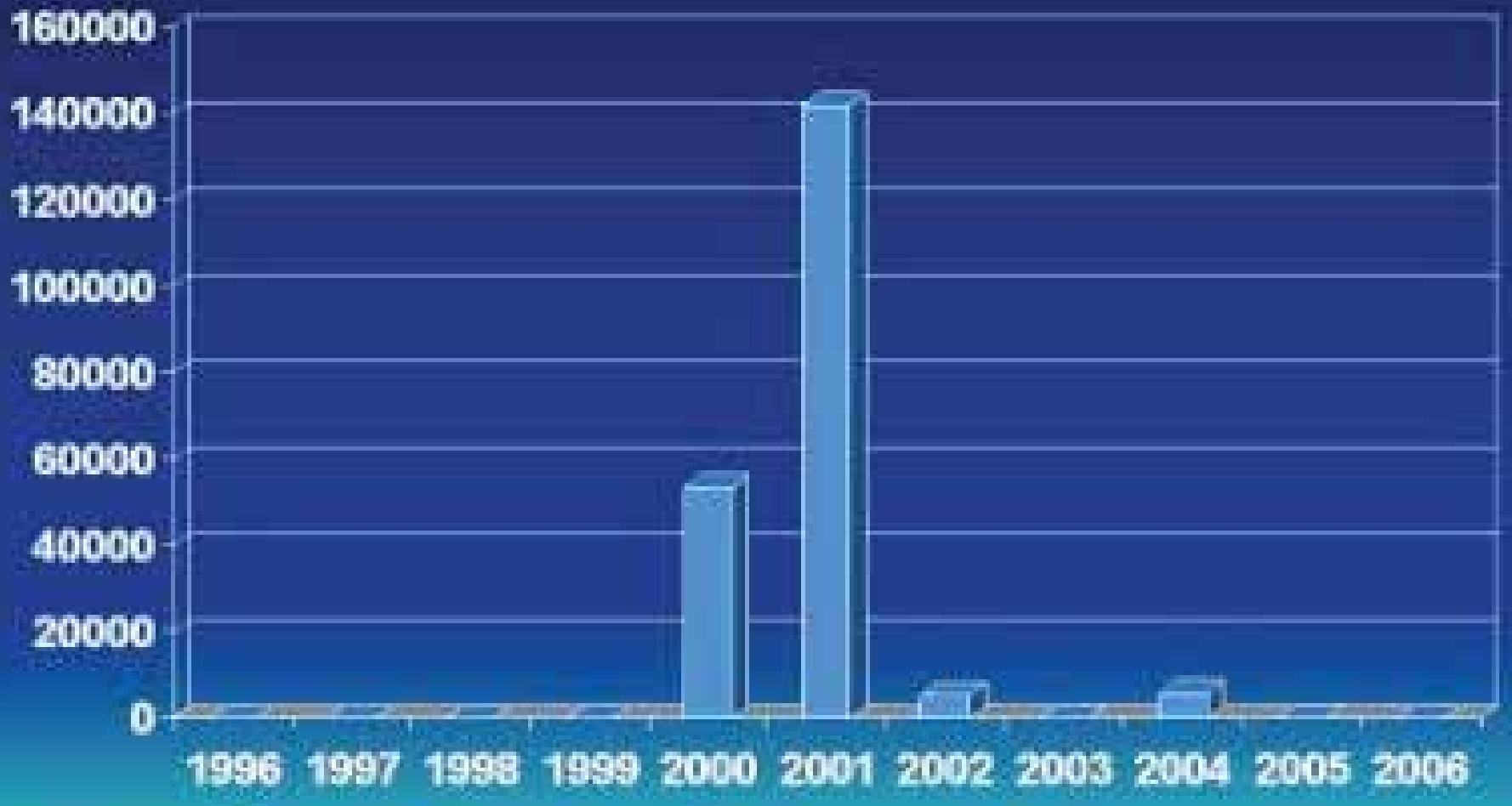
Hosts: Grand fir, Douglas-fir, ornamental spruce

76,000 acres were sprayed in Idaho in 2001

30,000 acres sprayed in 2002

Douglas-fir Tussock Moth Defoliation

Northern Region

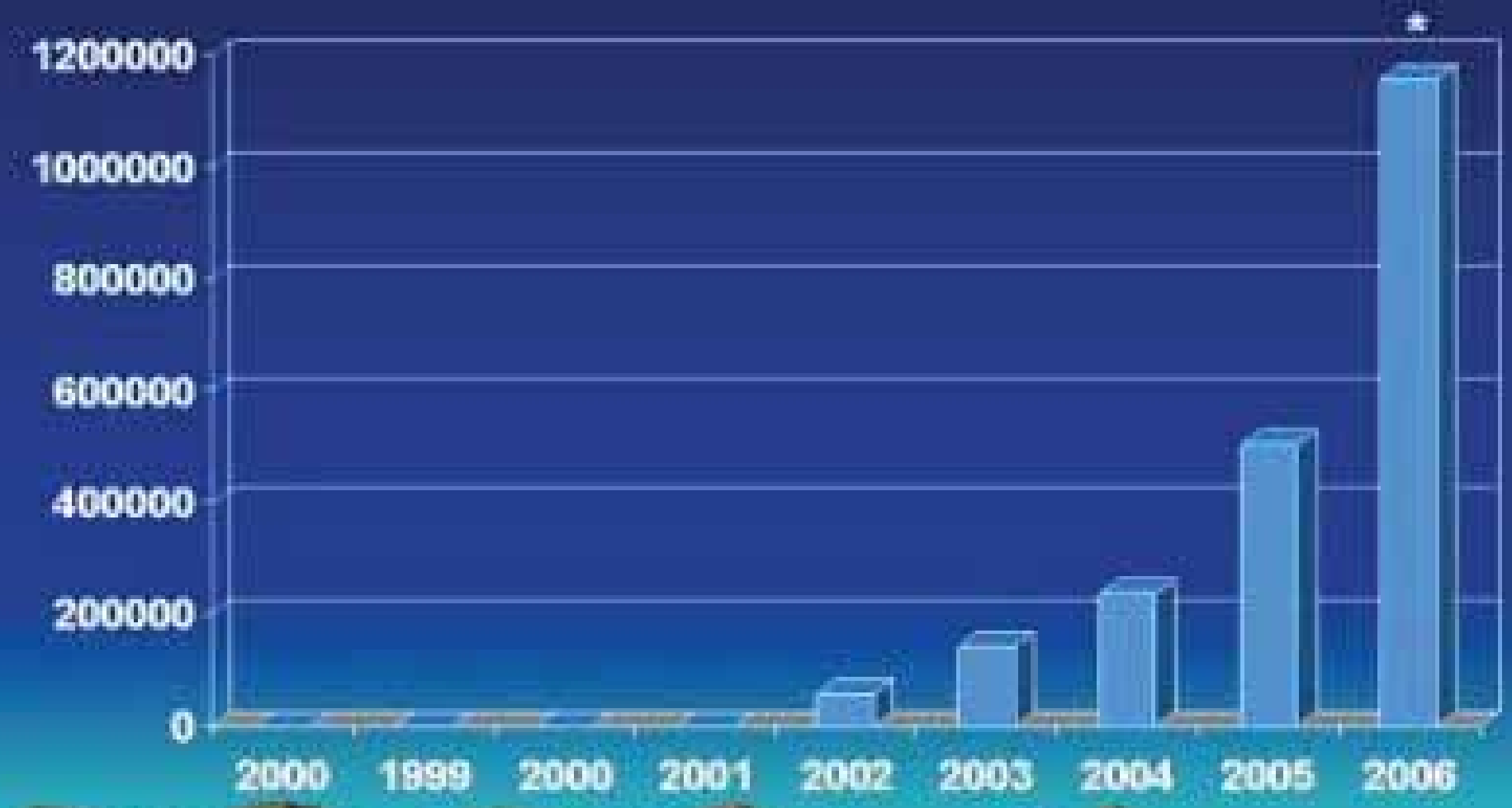



Western Spruce Budworm

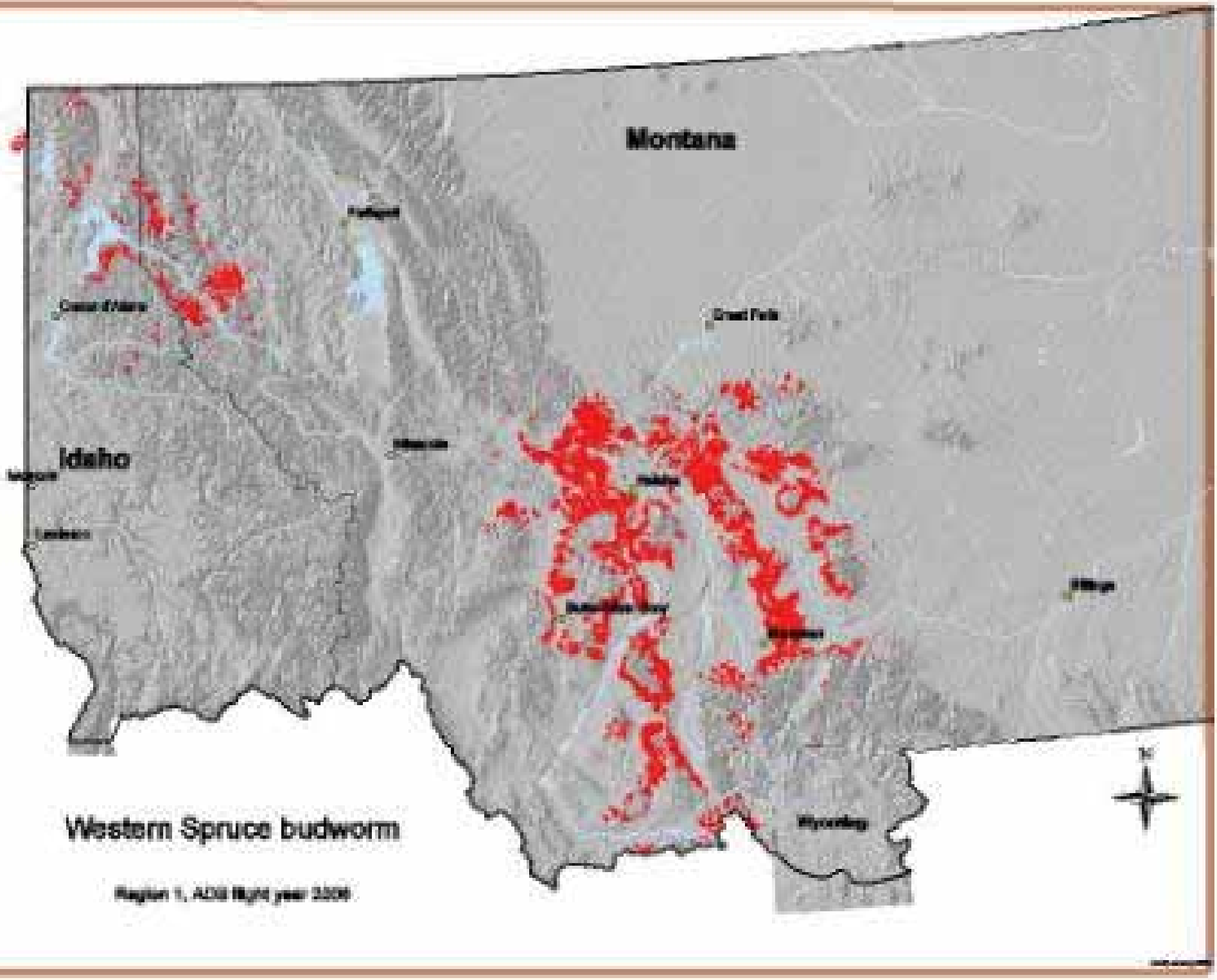
Hosts: Douglas-fir, True firs, Spruce

Spruce Budworm Infested Acres

Northern Region



* Not all areas flown in 2006

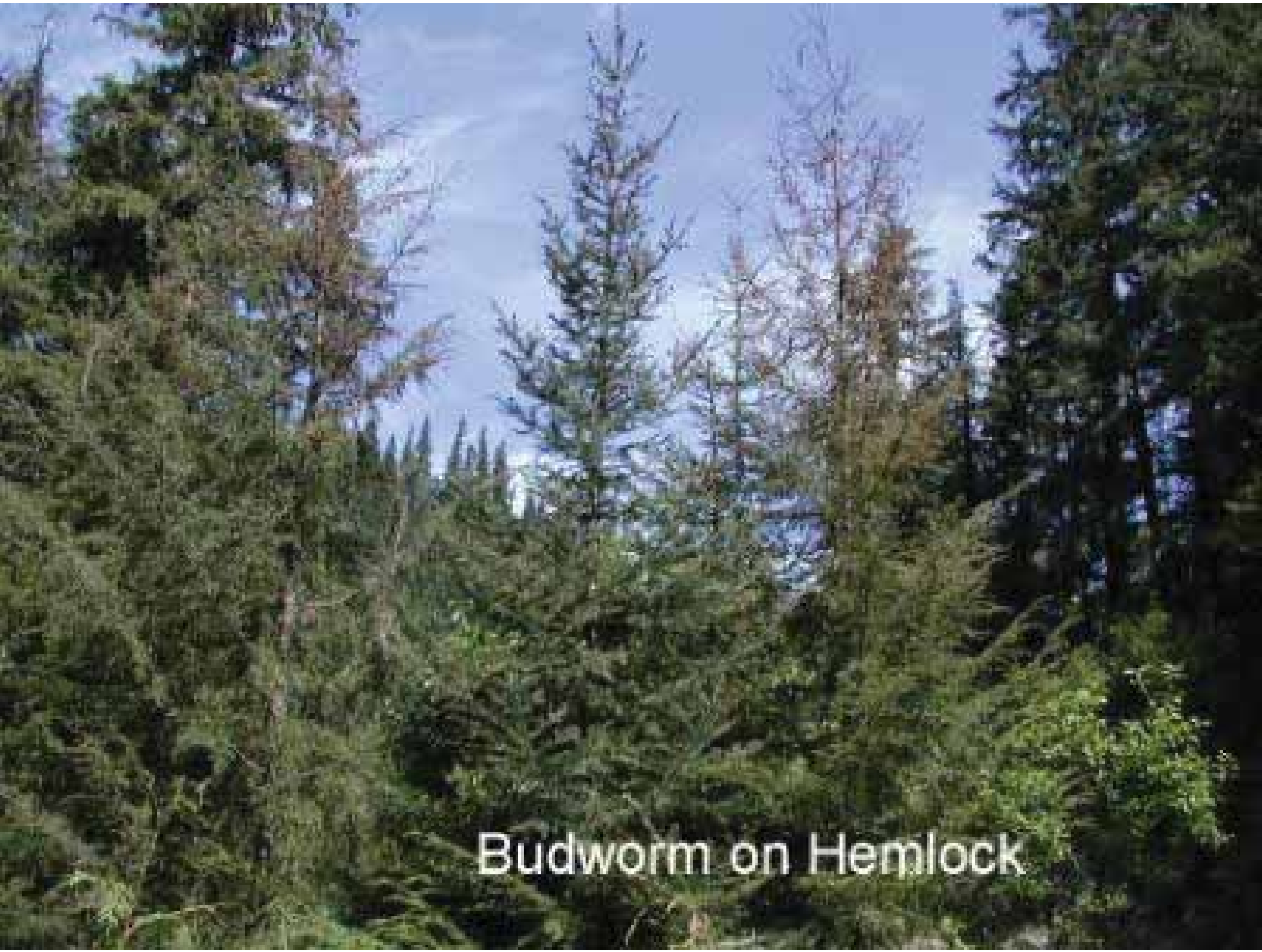

Montana
Idaho
Western Spruce budworm

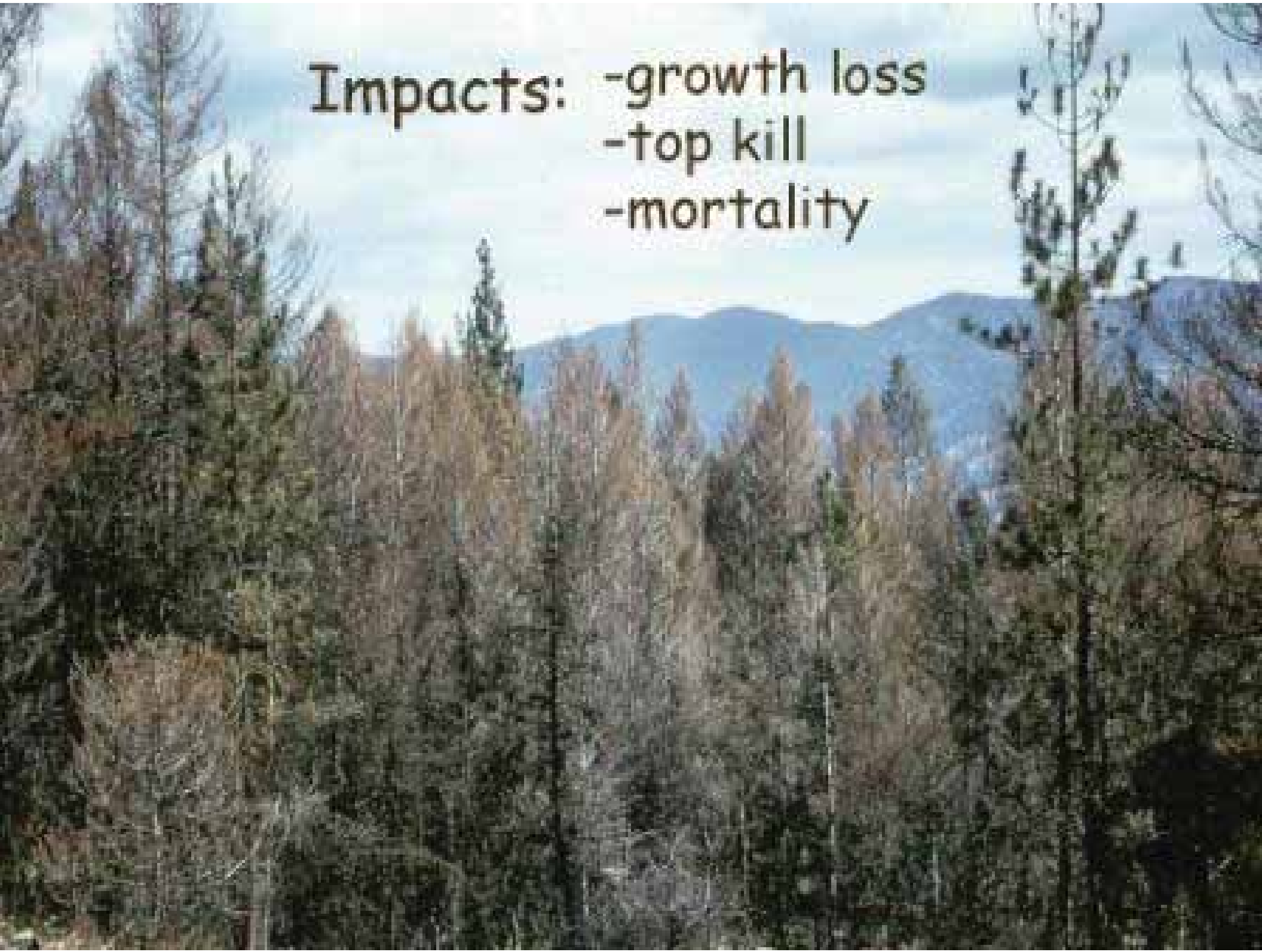
Helena 2005


Salmon, Idaho 2006
Ford
Photo by Jeff Fidgen, IDL


Photo by Jeff Siegen, JOL


Photo by Jeff Hogan, IDL


Budworm on Hemlock


Impacts: -growth loss
-top kill
-mortality


Defoliation can make trees
susceptible to bark beetles


Management Options for Defoliators
• Direct Control (spraying insecticides)
•Silvicultural manipulation
•Favor non-host species
•Thinning to promote tree vigor

Insect Trends Summary…


YES
OUIJA
NO
ABCDEFGHIJK
NOPQRSTUVW
123456789
GOOD BYE