

Forest Insect Pests

RESOURCE BRIEF

Importance

The severity of insect-caused tree mortality has increased in recent years throughout the West, and the insects have spread to previously unaffected plant communities. Several native bark beetle species in the Scolytidae family are altering extensive areas within Greater Yellowstone. Their feeding activity can girdle a tree in one summer, turning the crown red by the following summer and the needles usually drop within the next year, leaving a standing dead tree. Pockets of red-needled trees are evident throughout the park. Forest structure, tree health, and climate are the major factors in determining whether an outbreak expands; drought and warmer temperatures can make forests more vulnerable to infestation.

Status

An aerial survey conducted during 2007 with the US Forest Service confirmed that mountain pine beetle (*Dendroctonus ponderosae*) activity remains at epidemic levels, affecting about 25% of the area occupied by mature whitebark pine in the park (Figure 1). It has also increased 20-fold in lower-elevation lodgepole pine has increased throughout much of the West over the past two years.

The western spruce budworm (*Choristoneura occidentalis*) is present in the park throughout the lower Lamar and Yellowstone River valleys, primarily in Douglas-fir and secondarily in Engelmann spruce. This insect usually does not kill mature overstory trees except in severe outbreaks, but at high densities it can cause mortality among understory seedlings and saplings. Conspicuous defoliation is visible above the Mammoth Terraces and on Bunsen Peak. Douglas-fir beetle (*D. pseudotsugae*) and Engelmann spruce beetle (*D. rufipenni*) activity have declined since 2000. Spruce beetles are likely to continue to decline in the near future because they have killed almost all of their preferred food source (spruce trees more than 10 inches in diameter).

Discussion

Landscape-scale drought and the availability of suitable host trees have contributed to the initiation and persistence of insect outbreaks. Healthy trees can defend themselves from beetle attack by “pitching out” adult females as they try to bore into the tree. Extreme winter temperatures can kill off overwintering broods and wet summer weather



PHOTO BY BRITTEN STEED, USFS, BUGWOOD.ORG

Mountain pine beetle on lodgepole pine

impedes the insects from invading additional trees. Insect activity also decreases as the older and more susceptible trees are killed off. Winter 2007 and spring 2008 precipitation may reduce the decade-long drought stress on many trees, thereby increasing the trees’ ability to defend against infestation. However, any short- or long-term relief on new infestations will depend partly on climatic conditions in subsequent years.

Agreements between Yellowstone and the Rocky Mountain and Great Lakes Cooperative Ecosystem Studies Units are supporting research on the reciprocal effects of beetle outbreaks and wildfire, and how these interactions affect subsequent fires and insect infestations.

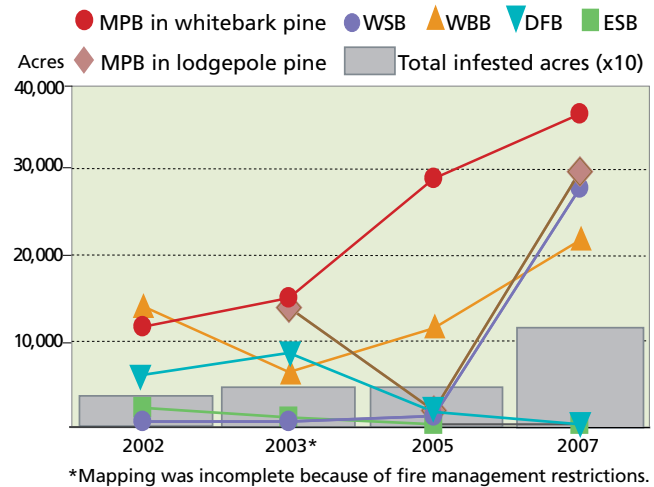


Figure 1. Estimated mountain pine beetle (MPB), western spruce budworm (WSB), western balsam bark beetle (WBB), Douglas-fir beetle (DFB), and Engelmann spruce beetle (ESB) activity observed in four surveys. DFB and ESB each infested <400 acres in 2007, but the total infested area in the park rose to >117,000 acres because the other three species increased.