

Montana Forest Health Highlights 2016

Produced by the Forest Pest Management Program of the Montana Department of Natural Resources and Conservation (DNRC)



Whitebark pine mortality due to mountain pine beetle and white pine blister rust

Montana's landscape encompasses unique habitats with more than 20 million acres of forested land. High elevation forests are home to the venerable and imperiled whitebark pine while ponderosa pine, western larch, and Douglas-fir colonize the mid-slopes and foothills that transition to the dry eastern plains. Accompanying our diverse forests is a suite of equally diverse insects and diseases that both influence and injure timber resources. Some pests, such as mountain pine beetle, are highly conspicuous and cause noticeable damage to millions of acres of pine forests. Others, including root disease, progress much more gradually, but ultimately play a tremendous role in shaping forest composition.

The State of Montana Department of Natural Resources and Conservation (DNRC) and the USDA Forest Service Aerial Detection Survey Program

(ADS) cooperatively monitor and quantify the relative impacts of forest pests across all forest ownerships in the state. In 2016, ADS flew over more than 32 million acres to assess tree mortality. Aerial surveys were verified with ground-based observations.

Montana Forest Health Highlights are a summary of the comprehensive "Montana Forest Insects and Disease Conditions and Program Highlights 2016" which can be found at <http://dnrc.mt.gov/divisions/forestry/forestry-assistance/pest-management/montana-forest-pest-condition-reports>. The full report contains detailed narratives, tables, and maps for each county surveyed.

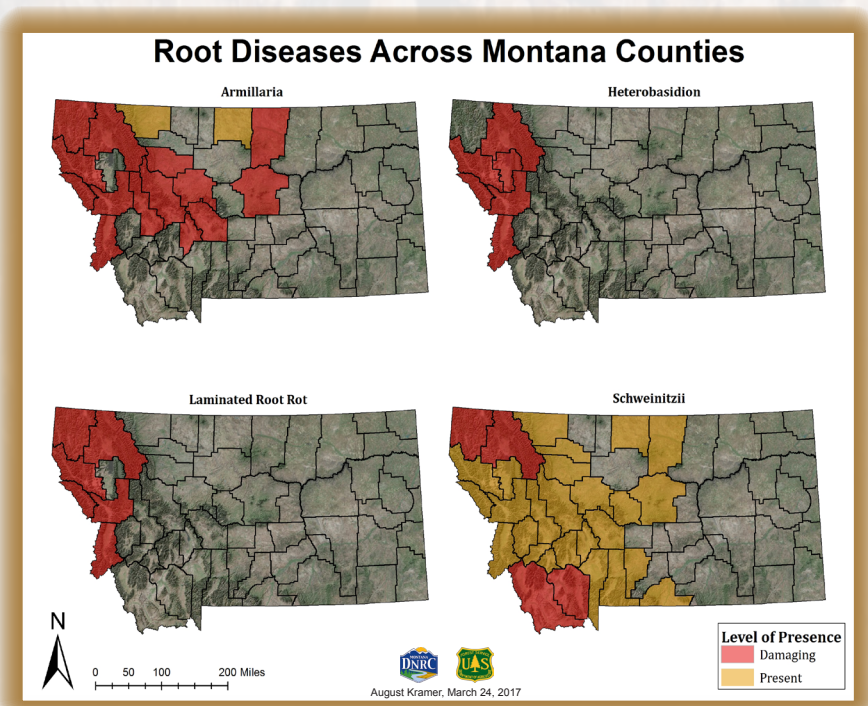
For paper copies or additional information, please contact the Montana DNRC Forest Pest Management Program (406-542-4330).

Diseases

ROOT DISEASE

Root disease is widely considered the most damaging disease of western Montana due to its widespread distribution and longevity on a site. Although difficult to detect, root diseases are estimated to impact over 5 million acres of Montana's forests. These diseases eliminate large diameter trees and impede regeneration, thus they are considered problematic for areas that are managed for timber. However, these native fungi are integral parts of the forest that foster ecosystem diversity by influencing tree species dominance, creating canopy gaps, and generating downed woody debris that may serve as wildlife habitat.

Armillaria, Heterobasidion, laminated, and schweinitzii are the four predominant root diseases impacting western Montana. Distribution maps of these four diseases in Montana were generated using data from the 2016 USDA Forest Service General Technical Report RMRS-GTR-342.



Armillaria root disease



Laminated root rot

Distribution maps of the four predominant root diseases in Montana

WHITE PINE BLISTER RUST (WPBR)

White pine blister rust is pervasive across the range of five-needle pines including western white, limber, and whitebark pines. Impact on high-elevation whitebark and limber pines is critical due to the narrowness and fragility of their niche habitat, the challenge for these species to swiftly and successfully regenerate, and the recent wave of mortality from the combination of WPBR and mountain pine beetle outbreaks. Because it is an introduced pathogen, our native five-needle pines lack the tolerance that is acquired through coevolution, resulting in widespread and typically lethal infestations.



Spore-filled blisters caused by white pine blister rust

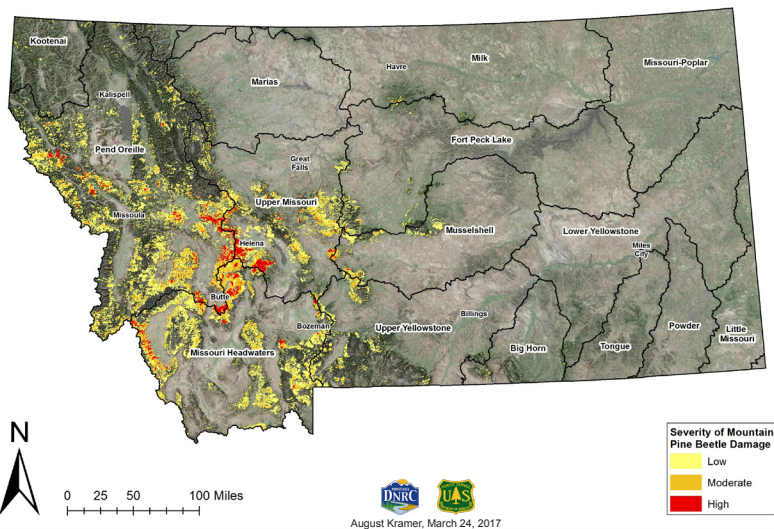
Insects

BARK BEETLES

Douglas-fir beetle is on the rise throughout the entire host range, affecting 14,839 acres of Douglas-fir in 2016, particularly in Flathead, Lake, Lincoln, and Sanders Counties. Douglas-fir beetle targets trees that have been stressed by overstocking, fire, root disease, or western spruce budworm defoliation, all of which are prevalent across Montana's Douglas-fir forests.

Mountain pine beetle activity continues to wane throughout much of Montana, although significant pockets of activity still occur in high-elevation whitebark pine ecosystems. Since the onset of the mountain pine beetle outbreak in approximately 2000, trees have been killed on over six million acres across western and central Montana. In 2016, 10,765 acres of forest were affected by mountain pine beetle, most notably in Beaverhead, Fergus, Flathead, Missoula, and Sanders Counties. A cumulative impact map of the mountain pine beetle outbreak from 1999-2015 was created using data from ADS and USFS entomologist Joel Egan.

Cumulative Mountain Pine Beetle Impact Across Montana Watersheds from 1999-2015



Cumulative area impacted by mountain pine beetle from 1999-2015

BLACK PINELEAF SCALE

Black pineleaf scale is a native insect, infesting ponderosa pine needles throughout the host's range in Montana. Typically, black pineleaf scale only selects hosts that are weakened by drought, fire, bark beetles, or other damage. In normal conditions mortality is rare, but if heavy feeding occurs over several years, black pineleaf scale may overwhelm and kill trees. Foliage of infested individuals may turn blotchy yellow or brown, become stunted, or fall off. Heavy infestations of black pineleaf scale and subsequent damage have been reported around the Missoula area of western Montana.



Black pineleaf scale



Western spruce budworm defoliation

WESTERN SPRUCE BUDWORM

Western spruce budworm continues to cause widespread damage throughout the host range with 890,194 acres detected in 2016. Although western spruce budworm does not outright kill mature trees, chronic, heavy damage can kill understory trees or predispose mature trees to Douglas-fir beetle. Gallatin, Judith Basin, Madison, Meagher, and Park Counties were the most notably affected by western spruce budworm.



Damage caused by black pineleaf scale

DWARF MISTLETOE

Dwarf mistletoes are parasitic plants that invade and derive nutrition from conifer hosts, resulting in slow decline and eventual mortality of hosts. Dwarf mistletoes are species-specific and in western Montana, the most common conifers affected include Douglas-fir, western larch, and lodgepole pine. The ponderosa pine dwarf mistletoe is not known to occur in western Montana. Mistletoes reproduce by seed that is disseminated from infested overstory trees onto the understory. This mechanism of infection makes uneven-aged silviculture and multi-storied stands difficult to manage, although non-host species and proactive removal of infected overstory can be effective.



Dwarf mistletoe plants growing in fir (top) and pine (bottom) branches

EARLY DETECTION AND RAPID RESPONSE

Non-native invasive insects could have devastating impacts on Montana's native and community forests. Bark beetles are particularly threatening to our forest resources and could be transported in out-of-state firewood. Early detection of invasive organisms is critical in effective eradication or management. In 2016, Montana participated in the national Early Detection and Rapid Response (EDRR) program to detect newly introduced exotic bark and ambrosia beetles and to quickly assess and respond to new infestations. The DNRC deployed insect traps baited with lures at 12 sites throughout western Montana in areas that posed a particularly high likelihood of non-native invasive bark beetle introductions: National Parks, campgrounds, marinas, and popular recreation venues. In total, 42 different species of non-native insect pests were identified from the traps. Continued monitoring will determine whether control is warranted.



Early detection of non-native bark beetles involves hanging Lindgren funnel traps in at-risk forests

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