Montana Forest Health Highlights 2018

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

Montana's diverse forests host a wide array of insects and diseases that are a natural component of forest ecology and largely go unnoticed. Periodically, populations of these organisms build up into landscape scale outbreaks and cause notable damage, commonly interrelated with climate, weather and forest conditions. Forest Health Highlights features some of the more common insects and diseases noted in Montana forests in 2018 along with State and cooperative monitoring efforts.

From left to right: whitebark pine killed by mountain pine beetle. adult Douglas-fir beetle, and grand fir mortality

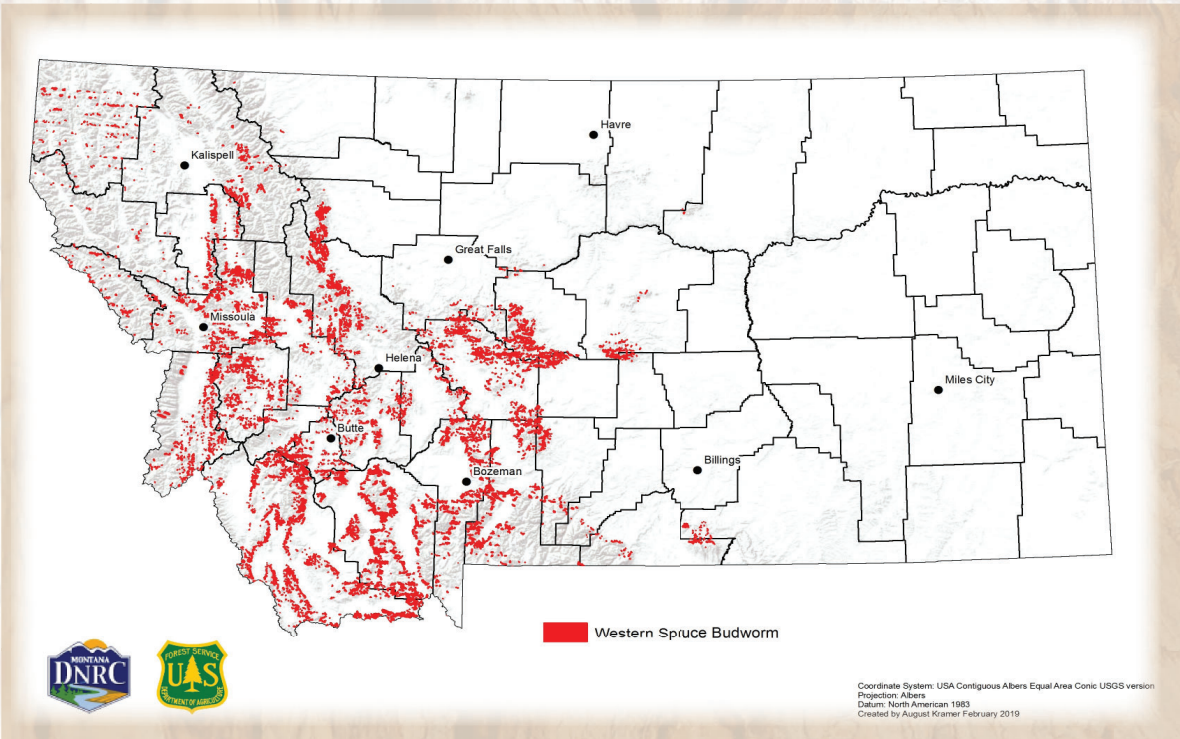
Douglas-fir beetle (*Dendroctonus pseudotsugae*) increased throughout the range of Douglas-fir in Montana with 19,032 acres at least minimally impacted. As anticipated, Douglas-fir beetle attacked fire-scorched trees in the vicinity of forest fires, particularly the Rice Ridge Fire of 2017. Douglas-fir beetle typically attack mature trees that are stressed by fire scorch, root disease, overstocking, and windthrown trees.

Mountain pine beetle (*Dendroctonus ponderosae*) has declined throughout Montana with only 11,773 acres recorded with impact in 2018, the majority of which were classified as low severity. Nonetheless, mountain pine beetle is a part of Montana's forest ecology and future outbreaks are expected. Landowners and forest resource managers can mitigate impacts of anticipated, eruptive outbreaks by managing forests to promote species, structure and age diversity now and in the future.

Fir engraver (*Scolytus ventralis*) continued to attack trees in northwest Montana and was detected on 20,319 acres in 2018. Grand fir has been in notable decline in recent years and multiple bark beetle species have been isolated from dead and dying trees. Drought stress is likely predisposing trees to attacks by otherwise non-aggressive bark beetles.

Western spruce budworm (*Choristoneura freemani*) defoliated Douglas-fir, grand and subalpine fir, larch and spruce on approximately 940,000 acres in Montana in 2018, representing a more than two-fold increase since 2017. Mature trees can generally survive moderate defoliation but prolonged, intensive defoliation can cause reduced growth and branch dieback. Understory trees oftentimes do not have adequate nutrient reserves to withstand heavy defoliation and can be outright killed by western spruce budworm.

Douglas-fir trees defoliated by western spruce budworm



Distribution of western spruce budworm throughout Montana in 2018

Root diseases are often overlooked when discussing forest conditions but nonetheless are significant causes of tree decline and mortality across Montana's forested landscapes. A projected 3 million acres of forests are impacted annually by one of the varied root diseases: armillaria root disease, heterobasidion root disease, tomentosus root disease, laminated root disease and schweinitzii root and butt rot.

Stump infected with tomentosus root disease

Black pineleaf scale

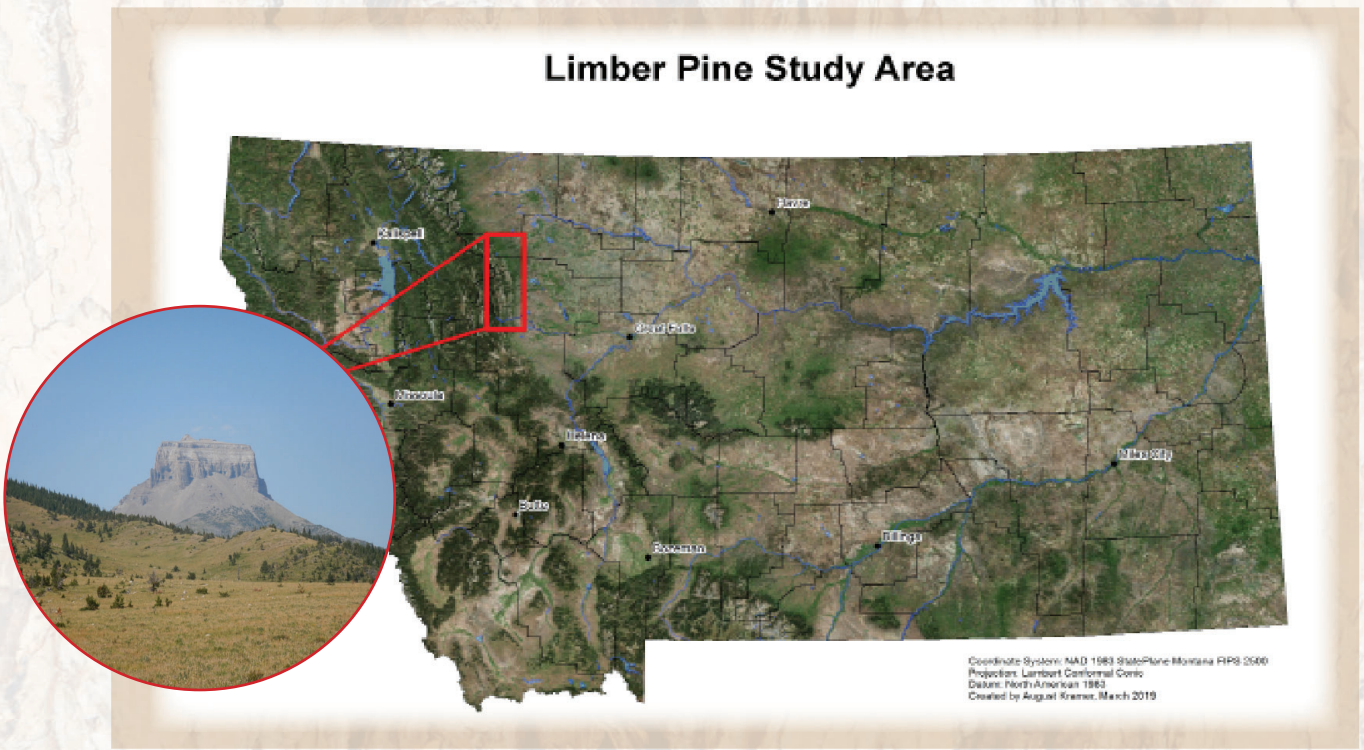
Black pineleaf scale (*Nuculaspsis californica*) continued to infest ponderosa pine in multiple areas near Missoula. Persistent infestations have presumably stressed trees that have then been attacked and killed by pine engraver beetles.

Douglas-fir tussock moth larva and damage on Colorado blue spruce

Douglas-fir tussock moth (*Orgyia pseudotsugata*) damaged Colorado blue spruce in Missoula, Columbia Falls and Kalispell. Damage by this foliage-feeding moth is often detected on Colorado blue spruce prior to widespread damage in the Douglas-fir component of regional forests. No damage to Douglas-fir was detected from ground or aerial surveys in 2018.

Limber Pine Monitoring Project

The combined impacts of white pine blister rust, mountain pine beetle, and changing climate patterns are suspected to be altering limber pine stands throughout the Rocky Mountain Front; however, the impacts and the full suite of pest organisms are unknown. In 2017 the USFS Forest Health Monitoring Program, The Nature Conservancy, and Montana DNRC funded a collaborative study to determine the distribution and condition of limber pine in this region. Two years of data collection was completed in 2018 on a total of 79 plots. Bark beetle samples were taken from twigs on 39 plots and more than 6,000 individual trees were measured for variables including tree vigor, cone production, damage agents and overall structure.

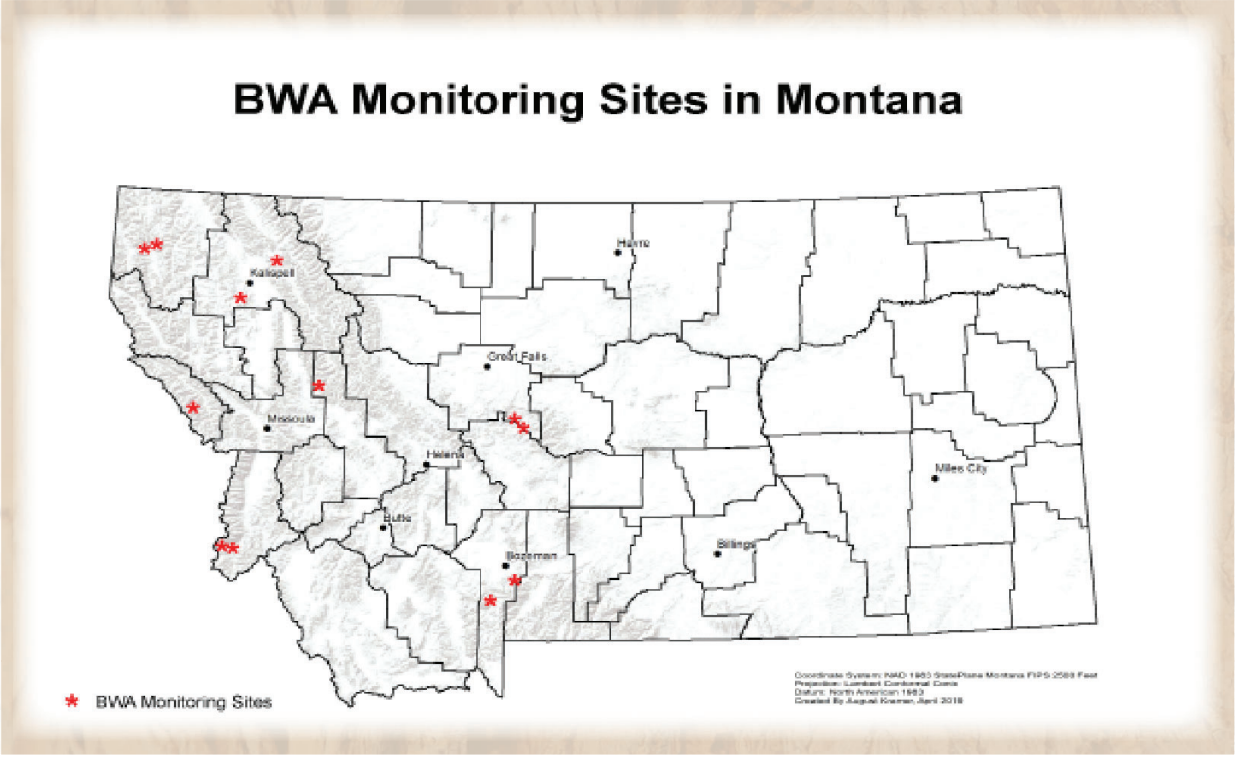


Limber pine study area (Ear Mountain shown in inset)

Balsam Woolly Adelgid Survey

The DNRC Forestry Assistance Bureau worked with USFS Forest Health Protection to locate and install 36 plots across 6 different regions in Montana. The objective of the long-term study is to assess the impact of the non-native invasive balsam woolly adelgid (*Adelges piceae*) on subalpine and grand fir in forested ecosystems. Balsam woolly adelgid was first identified in Montana in 2007 and general surveys have been ongoing to better understand the extent of balsam woolly adelgid distribution in the state.

Balsam woolly adelgid on subalpine fir



Balsam woolly adelgid monitoring site locations

Drought

The National Oceanic and Atmospheric Association* has recorded an overall decrease in annual precipitation and increase in summer temperature across much of Montana over the last 60 years. In 2012, the state experienced the driest July to September period in the historical record, and recent trends have continued through 2018. Moisture deficit during critical summer periods may be contributing to the decline of mature trees in the northwest part of Montana. Trees that appear to be otherwise healthy rapidly declined and were infested by secondary bark beetles that are known to typically attack dead and dying trees. Primarily grand fir and Douglas-fir have been affected although other tree species have been noted with similar decline patterns.

*Source: https://statesummaries.ncics.org/chapter/mt/

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