Forestry Assistance Bureau
Montana Department of Natural Resources & Conservation

Forest Pest Management

Providing assistance to family forest landowners in the identification and management of forest insects and diseases.

Montana Forest Health Highlights 2013


Front range near Livingston, Montana

Montana's forest lands consist of a wide array of forest types that vary in occurrence and distribution according to elevation, soil type, climate, and environmental factors. Natural disturbances such as wildfire, wind, ice storms, insects, and diseases strongly influence species composition and forest structure. These forces, along with Native American use of fire on the landscape, resulted in what we now consider "historic" forest conditions. However, due primarily to fire exclusion that limits regeneration of serial species and allows mid- to late-successional species to become dominant, forest insects and diseases now play the leading role in determining the structure and species composition of forest stands. This often results in conditions outside those we consider historic norms. When this situation occurs, it is often seen as either ecologically damaging or an impediment to meeting long-term objectives, and therefore worthy of management.

The first step in managing forest insects and diseases is to determine the organisms currently exerting the greatest impacts on Montana forests. The U.S. Forest Service, Forest Health Protection (FHP) program, in cooperation with the State of Montana Department of Natural Resources and Conservation (DNRC), conduct an annual aerial survey of millions of acres of forested lands across numerous ownerships in Montana. Due to the difficulty in identifying and mapping many of the common forest diseases from the air, aerial survey most accurately reflects the distribution and impacts of insects, particularly bark beetles and defoliators.

The 2013 Aerial Detection Survey (ADS) took place July through September. It covered approximately 27.1 million acres of mixed-ownership (federal, state, private) forested lands.

Data from this survey, along with ground observations, were used to compile the 2013 "Montana Forest Insect and Disease Conditions Report".

The full report is available at:
http://www.dnrc.mt.gov/Forestry/Assistance/Pests/Documents/2013mtconditionsreport.pdf.

BARK BEETLES

Mountain Pine Beetle

Mountain pine beetle activity is generally declining in Montana; this can be attributed in large part to the depletion in suitable host material across areas of recent outbreaks. Nonetheless; 526,458 acres were recorded as having mortality in 2013 (Figure 1). There are still active outbreaks, however, notably in the Big Hole area in the Beaverhead-Deerlodge National Forest and the southern portion of the Bitterroot National Forest. Mountain pine beetle is still active throughout the range of high elevation whitebark pine and can be found to some degree in most stands.

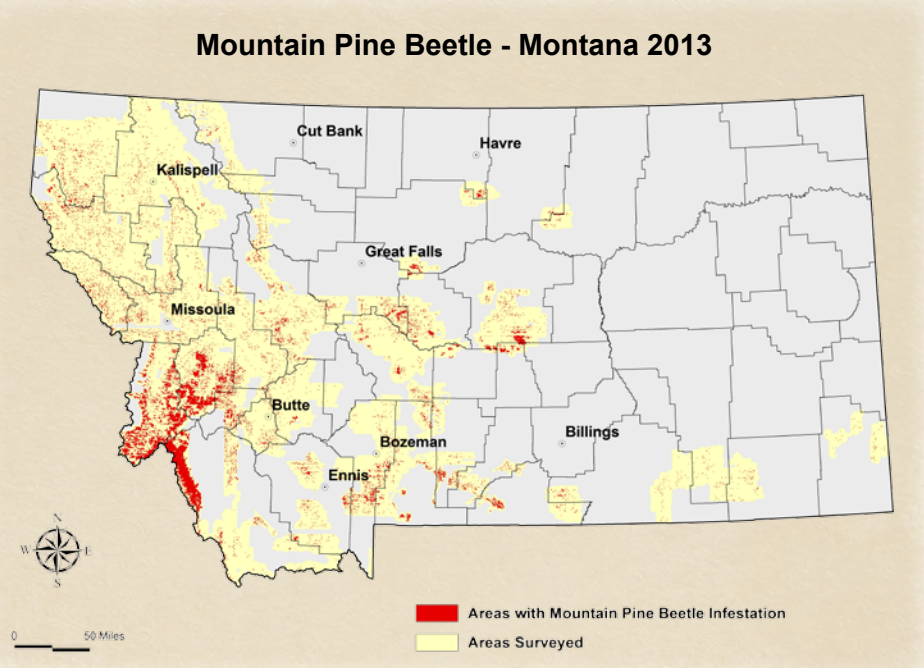
A mountain pine beetle on a whitebark pine.

Whitebark pine stand killed by mountain pine beetle.

Table 1. Distribution of Mountain Pine Beetle Across Various Ownerships in 2013 (acres).

	Federal	State	Private	Total
Lodgepole pine	407,941	5,004	21,809	434,754
Ponderosa pine	35,892	2,708	18,696	57,296
High-elevation pines	31,503	333	1,960	33,796
Western white pine	461	5	146	612
All pine species	475,797	8,050	42,611	526,458

Figure 1. Distribution of Mountain Pine Beetle Infestations in Montana, 2013.



Douglas-fir beetle boring dust.

Douglas-fir Beetle

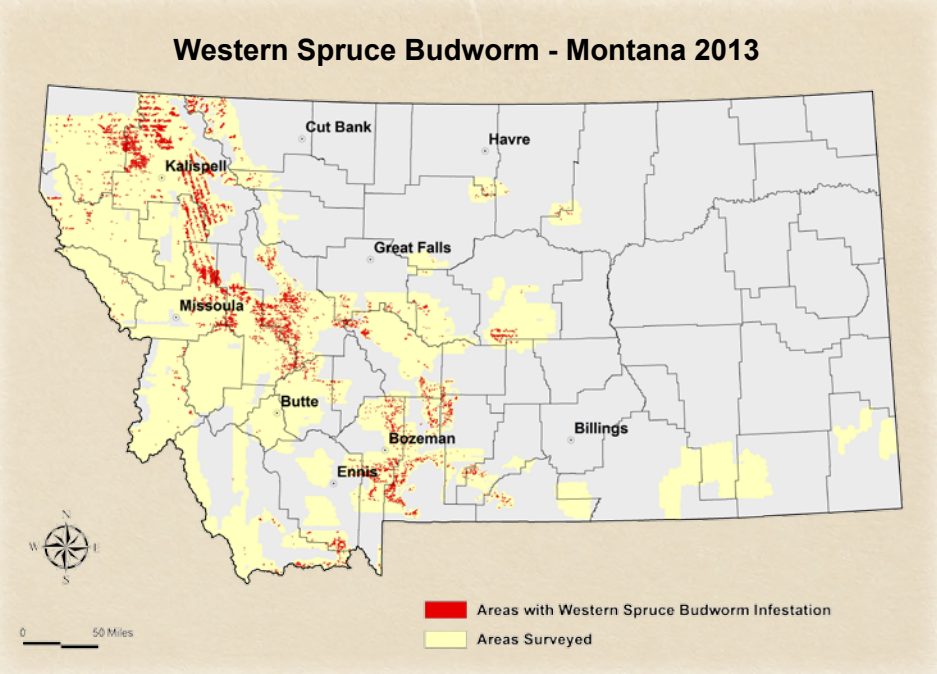
Douglas-fir beetle is still at endemic levels but activity increased in pockets throughout the host range and was detected on 15,901 acres. Much of this increase is associated with areas impacted by long-term defoliation from western spruce budworm. Douglas-fir beetle populations can also build up in wind-thrown or fire-scorched trees, thus outbreaks commonly occur a few years after landscape scale disturbances.

DEFOLIATORS

Western Spruce Budworm

Western spruce budworm was the most damaging defoliating insect in 2013 (Figure 2). Populations remained high in Flathead, Lewis and Clark, Lincoln, Missoula, Park, and Powell Counties, on which approximately 596,000 acres were defoliated. The Coal Creek State Forest along the Whitefish Mountain Range experienced notably high levels of damage. The five-fold increase in Douglas-fir beetle activity, which is known to be associated with physiological stress caused by western spruce budworm defoliation, is focused in some of the same areas where defoliation remains at high levels.

Figure 2. Distribution of Western Spruce Budworm Infestations in Montana, 2013.

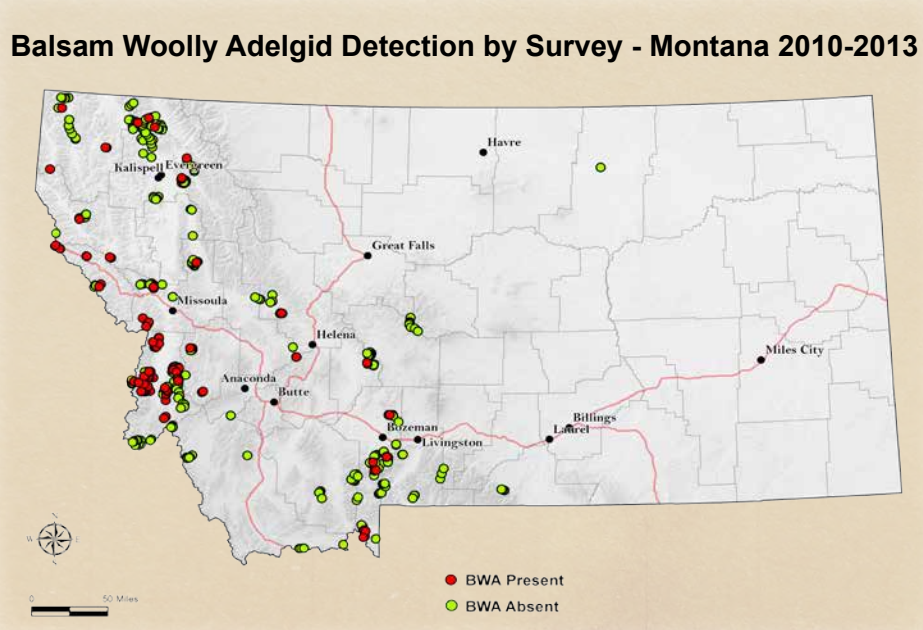


INVASIVE INSECTS

Balsam woolly adelgid

Balsam woolly adelgid, a non-native insect discovered relatively recently in Montana, damages subalpine and grand firs. Extensive ground surveys were conducted throughout Montana in 2010-2013 to determine its distribution. Balsam woolly adelgid was confirmed in 11 counties: Broadwater, Flathead, Gallatin, Granite, Lewis and Clark, Lincoln, Mineral, Missoula, Park, Ravalli, and Sanders (Figure 3). Infestations have so far not been found to be killing trees outright, but rather causing branch dieback and tree decline.

Figure 3. Balsam Woolly Adelgid Detections in Montana, from DNRC and USFS surveys conducted 2010-2013.



Balsam woolly adelgid on the trunk of a subalpine fir.

ROOT DISEASE

Root diseases are caused by fungi that spread from tree-to-tree at root contacts and grafts. The fungi can infect and kill a living root but then live on in the woody biomass of the root system for decades after the tree has died; this ability is why root disease is referred to as a "disease of the site." Based on a recent analysis of data collected on forest inventory plots, root disease is estimated to occupy 3.7 million acres in western Montana and to be responsible for killing 13 million trees each year.

White Pine Blister Rust

White pine blister rust (WPBR) is an introduced disease that has been impacting five-needled pines (western white, limber, and whitebark pines) in Montana for over 90 years. Whitebark pine ecosystems have suffered greatly in recent years due to the combined effects of mountain pine beetle (MPB) on mature trees and mortality from WPBR on all ages and sizes of trees. While mortality due to MPB is a natural part of the whitebark ecosystem, as is the natural regeneration of whitebark that follows MPB mortality and (or) wildfire, the loss of regeneration due to WPBR is causing great concern over the long-term health and sustainability of these ecosystems.

The Montana DNRC Forest Pest Management program is working with State foresters and private landowners to maintain and promote whitebark pine wherever possible. This includes surveys for regeneration in areas that have had heavy mortality from MPB, identification of potential "plus" trees (those that might be candidates for the rust-resistant breeding program), and the first operational direct-seeding of whitebark pine in stands that have had heavy MPB mortality and may be lacking in WBP regeneration.

Whitebark pine mortality: Impacts of white pine blister rust and mountain pine beetle.

Interaction of forest management and pest management

In general, vigorous forests are more resilient to insects and diseases and can be achieved through engaged stewardship and active management. Manipulation of stand density, stand structure, and species composition can often be used successfully as proactive approaches to minimizing the impacts of forests pests.

For more information on insect and disease identification and management, grant opportunities related to forest health, and pest management training available for foresters and landowners, visit: http://dnrc.mt.gov/forestry/assistance/pests.

Students participating in insect and disease training.