

# Montana Forest Health Highlights 2014

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



Whitebark pine and subalpine fir stands near Big Sky, Montana.

Montana's landscape is covered by diverse forest types that include an even more diverse array of insects and diseases. Although many of these organisms are an essential part of the forest ecosystem, vigorous forests are generally much more resilient to them.

Recent drought, overstocking, and disruption in fire ecology have reduced overall forest vigor and led to intensified outbreaks of insects and diseases. Fire exclusion has resulted in forest insects and diseases being largely responsible for determining the structure and species composition of forests.

Much of our understanding of Montana forest conditions comes from cooperative aerial surveys between the Montana DNRC and USFS Forest

Health Protection. The 2014 aerial detection survey took place from late June through September and covered approximately 30.7 million acres of mixed-ownership (federal, state, private) forested lands. Due to the difficulty in identifying and mapping many of the common forest diseases from the air, aerial survey most accurately reflects the status of insects, particularly bark beetles and defoliators. This data, along with ground observations, were used to compile the 2014 "Montana Forest Insect and Disease Conditions Report." The full report is available at: <http://dnrc.mt.gov/divisions/forestry/forestry-assistance/pest-management/montana-forest-pest-condition-reports>.

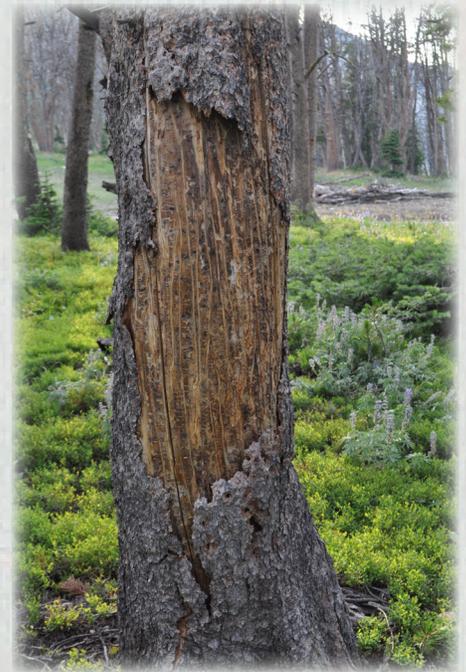
# BARK BEETLES

## Mountain Pine Beetle

Over the course of its recent outbreak, mountain pine beetle has killed trees on more than six million acres in Montana. Although the outbreak is generally waning, largely due to host depletion, mountain pine beetle is still active in the southern Bitterroot and Big Hole Valleys. Mountain pine beetle continues to kill whitebark pine in high elevation ecosystems as well. In 2014, a total of **598,830** acres of all pine species showed recent mortality from mountain pine beetle (see Table 1).

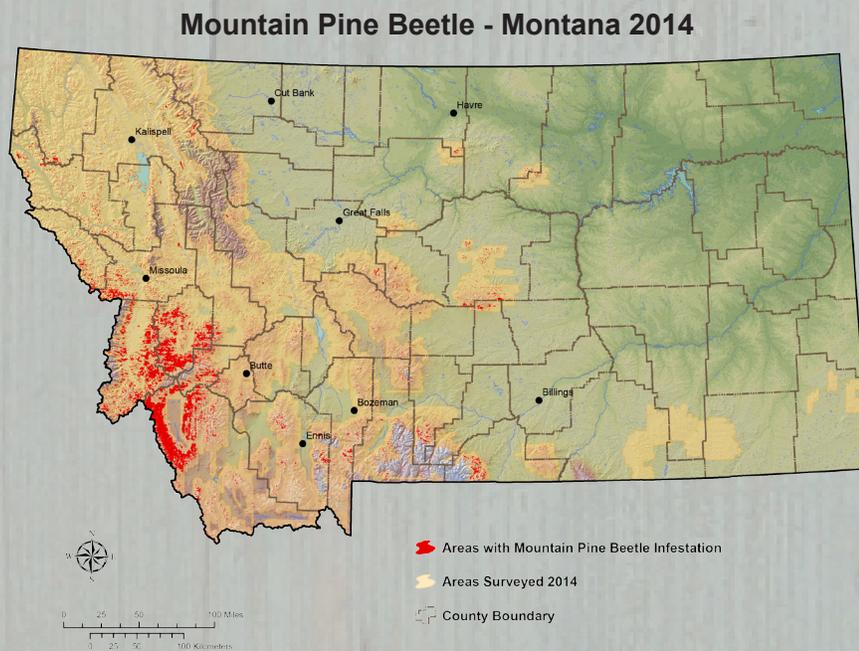
Table 1. Distribution of Mountain Pine Beetle Across Various Ownerships in 2014 (acres).

	Federal	State	Private	Total
Lodgepole pine	486,573	5,719	21,086	513,378
Ponderosa pine	23,526	2,589	7,654	33,769
High-elevation pines	47,359	107	4,217	51,683
All pine species	557,458	8,415	32,957	598,830



Exposed mountain pine beetle galleries in a whitebark pine.

Figure 1. Distribution of Mountain Pine Beetle Infestations in Montana, 2014.



An adult Douglas-fir beetle.



Douglas-fir beetle boring dust.

## Douglas-fir Beetle

Douglas-fir beetle is increasingly prevalent throughout the range of Douglas-fir. In 2014, **20,466** acres were detected with mortality. Douglas-fir beetle typically attacks trees that are stressed due to root disease, fire scorch, overstocking, or defoliation. Trees that have been severely defoliated by western spruce budworm over multiple years can be particularly susceptible to attack.

## DEFOLIATORS

### Western Spruce Budworm

Western spruce budworm continued to feed on Douglas-fir, spruce, and grand fir, defoliating trees on over **878,000** acres in 2014. Damage was widespread throughout the host range but with variable intensity. Defoliation was most severe in Flathead, Lewis and Clark, Missoula, and Powell Counties.



Western spruce budworm feeding damage.

## INVASIVE SPECIES

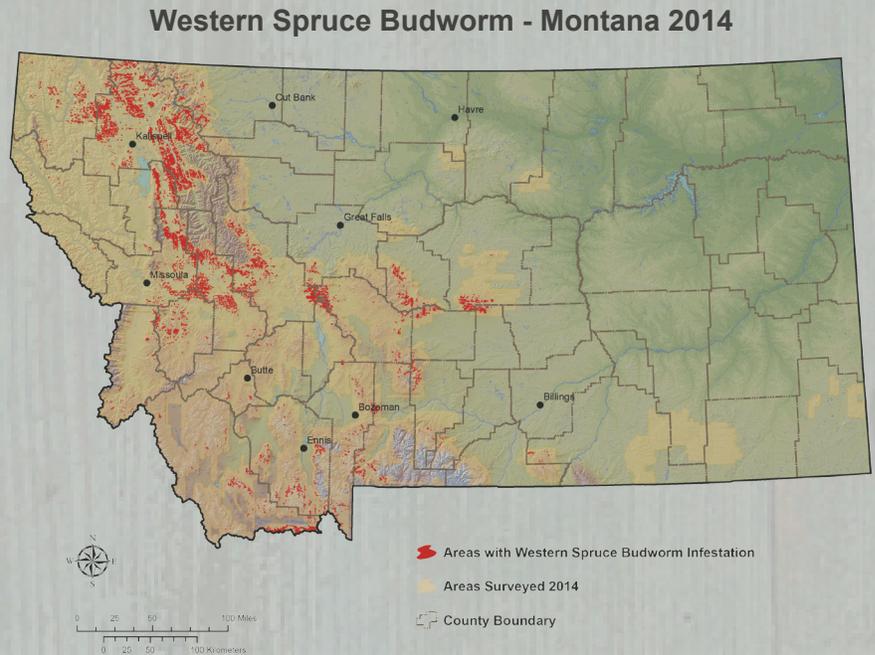
### Emerald Ash Borer

Emerald ash borer (EAB) has **not** yet been detected in Montana, but there is a tremendous likelihood that it will be introduced in the near future. Many Montana communities and shelterbelts are planted with ash trees, and riparian corridors in eastern Montana are lined with ash as well. A recent survey indicates that ash represents more than 60% of all city-owned trees in some communities.

To address this threat, the Montana DNRC produced an “Emerald Ash Borer Readiness and Response Plan” to outline the agency’s approach to EAB including:

- Prevention
- Mitigation and eradication
- Risk assessment
- Communication
- Early detection
- Restoration & utilization

Figure 2. Distribution of Western Spruce Budworm Infestations in Montana, 2014.



## ROOT DISEASE

Root diseases are caused by wood-decaying fungi that spread from tree-to-tree primarily at root contacts and grafts. The fungi can infect and kill a living root but then remain alive in the woody biomass of the root system for decades after the tree has died. The ability to occupy a piece of ground from one forest generation to the next, while continuing to spread, is why root disease is referred to as a “disease of the site.” As an example of the impact of root disease, an estimated three million acres of national forest lands suffer damage and mortality from these pathogens in western Montana.

Two primary functions of the plan are to 1) outline the DNRC’s preparedness and planning for an introduction of EAB and 2) collect stakeholder contact information prior to an EAB detection and response. EAB will affect a great diversity of stakeholders so efficient communication is critical for an effective response.

The plan can be found at: [http://dnrc.mt.gov/divisions/forestry/docs/assistance/urban/final\\_eab-response-and-readiness-plan-for-the-dnrc.pdf](http://dnrc.mt.gov/divisions/forestry/docs/assistance/urban/final_eab-response-and-readiness-plan-for-the-dnrc.pdf)

An EAB trap in an ash tree.



## FIVE-NEEDLE PINE

### RESTORATION

#### **Whitebark Pine Regeneration**

The combined effects of white pine blister rust and mountain pine beetle have killed vast landscapes of mature, cone-bearing, whitebark pine trees across the Greater Yellowstone Ecosystem (GYE). Fire exclusion has altered conditions necessary for natural regeneration by allowing more competitive subalpine fir to encroach. To assess the abundance of natural regeneration, the DNRC established 489 survey plots on private lands in the GYE. Plots were located at various elevations, differing aspects, and in a range of plant communities. Four areas were identified as having little no whitebark pine regeneration or were largely dominated by subalpine fir competition. These areas were targeted for supplemental plantings of whitebark pine seeds.



Whitebark pine mortality: a stand in the Greater Yellowstone Ecosystem.

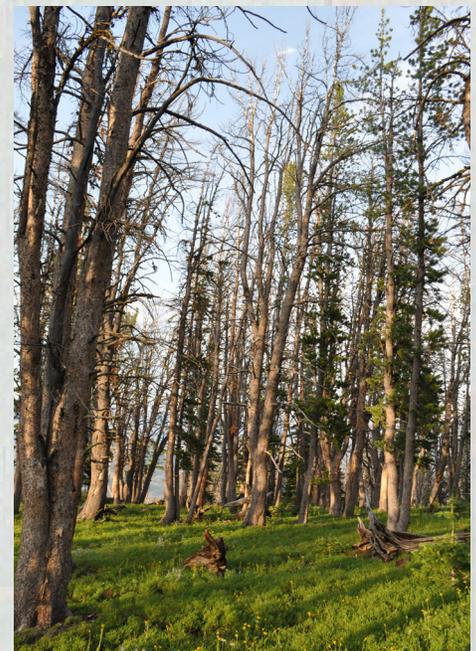


Whitebark pine regeneration.

#### **Western White Pine**

The Montana DNRC assisted the Inland Empire Tree Improvement Cooperative (University of Idaho) with data collection on the Woodward Point western white pine realized-gain trial located on the Swan River State Forest. A realized-gain trial is a test of the actual gain of a breeding program, in this case the U.S. Forest Service's rust-resistance breeding program for western white pine, where rust resistant materials are evaluated alongside woodsrun ("wild") materials in operational field tests (Mahalovich 2010<sup>1</sup>). The breeding program now has a total of six realized-gain trials installed on cooperators' lands across northern Idaho, western Montana, and northeast Washington.

The Woodward Point realized-gain site was established in 2012 and has a total of 6600 western white pine, 2200 on each of three replications. Initial results from the 2014 remeasurement show a 96% seedling-survival rate. Only one tree had a definite white pine blister rust canker while a handful of others may be showing early bark reactions in response to infection. The next remeasurement will take place in 2016.



Whitebark pine stand in GYE.

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<sup>1</sup> Mahalovich, M.F. 2010. U.S.A. Inland Northwest Western White Pine Breeding and Restoration Program: history, current and future directions. Pages 50-74 in: Proceedings of the 3rd Western White Pine Management Conference; June 17-18, 2008; Vernon, B.C. Cleary, M.; ed. British Columbia Ministry of Forests and Range; Kamloops, British Columbia. 116 p.