2018 Montana Forest Insect and Disease Conditions Report

Whitebark pine mortality near Big Sky.

Montana's diverse forests extend over 23 million acres and host a wide variety of insects and diseases that are a natural component of forest ecology, largely going unnoticed until outbreaks occur. Landscape scale outbreaks are commonly interrelated with climate, weather and forest conditions. Recent forest conditions have prompted the State of Montana's "Forests in Focus 2.0 Initiative" along with the USDA "Shared Stewardship Strategy" that reinforce the need for proactive management and interagency partnerships. The **2018 Montana Forest Insect and Disease Conditions Report** provides an overview of the organisms currently impacting Montana forest resources.

In 2018, various bark beetles and western spruce budworm continued to shape forests throughout Montana. Despite some localized variability, mountain pine beetle remained at nearly endemic levels throughout the state. Conversely, Douglas-fir beetle and fir engraver increased throughout the host range, particularly in the Northwest Region. Western spruce budworm was detected on over 900,000 acres and present in all four regions of the state. White pine blister rust plays a significant, detrimental role in all of Montana's 5-needle pine ecosystems including limber, western white and whitebark pine. Detection of this disease is difficult to assess from aerial survey and complete statewide data is lacking. Nonetheless, this disease should not be overlooked as a critical driver of forest conditions. Likewise, root disease is not readily detected from aerial survey yet influences stand structure and species, having lasting impacts on infected forests. Root diseases are comprised of the five most common species: armillaria, tomentosus, heterobasidion, schweinitzii, and laminated.

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Methods

The state is divided into four reporting areas generally based on geographic boundaries: Northeast, Southeast, Northwest, and Southwest. The Continental Divide is commonly designated as an ecological boundary and was used to divide the state east-west, albeit in unbalanced halves. The USDA Forest Service (USFS) divides National Forests into seven forests, some of which are non-contiguous, and the regions were designed to encompass Forests in their entirety. The regions also include seven reservations and three State Forests.

Data for this report was derived from aerial surveys along with ground-based observations. The USFS Forest Health Protection Program Aerial Detection Survey (ADS) conducts annual surveys from fixed-wing aircraft flying in either grid or contour patterns across multiple ownerships of Montana forests. In 2018, ADS surveyed 47,186,358 acres between July 25th and September 27th. According to ADS protocols, areas burned by wildfire are not surveyed until three years later. The actual amount of mortality from tree diseases, dwarf mistletoes and white pine blister rust are often difficult to identify from the air thus, these agents are generally underestimated with ADS.

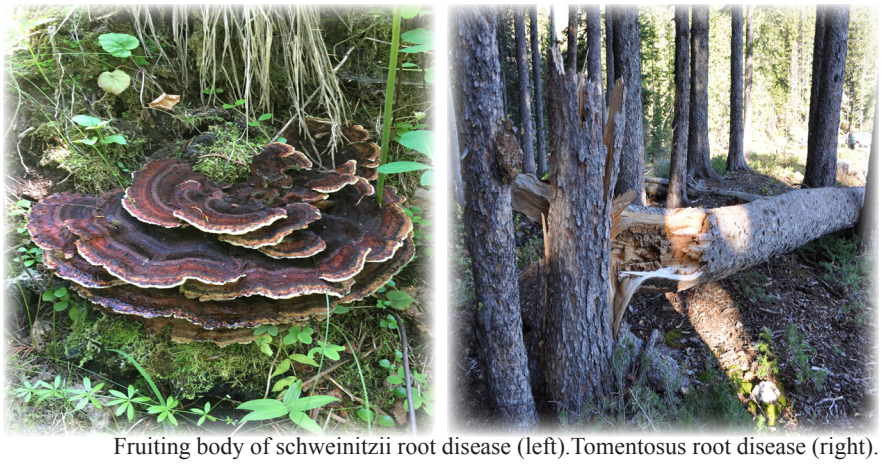
Statewide Forest Pest Summary Table

Damage Agents	Acres with Agent Detected	SWA	Trend
Douglas-fir beetle	18,727	7,220	↑
Fir engraver	19,554	4,294	↑↑
Ips	1,629	286	n/a
Larch needle cast	7,114	3,863	↓ - endemic
Mountain pine beetle	11,197	2,104	↑*
Spruce beetle	93	9	↓ - endemic
Western pine beetle	45	6	↑ - new
Western spruce budworm	912,338	621,483	↑

*Nominal increase.

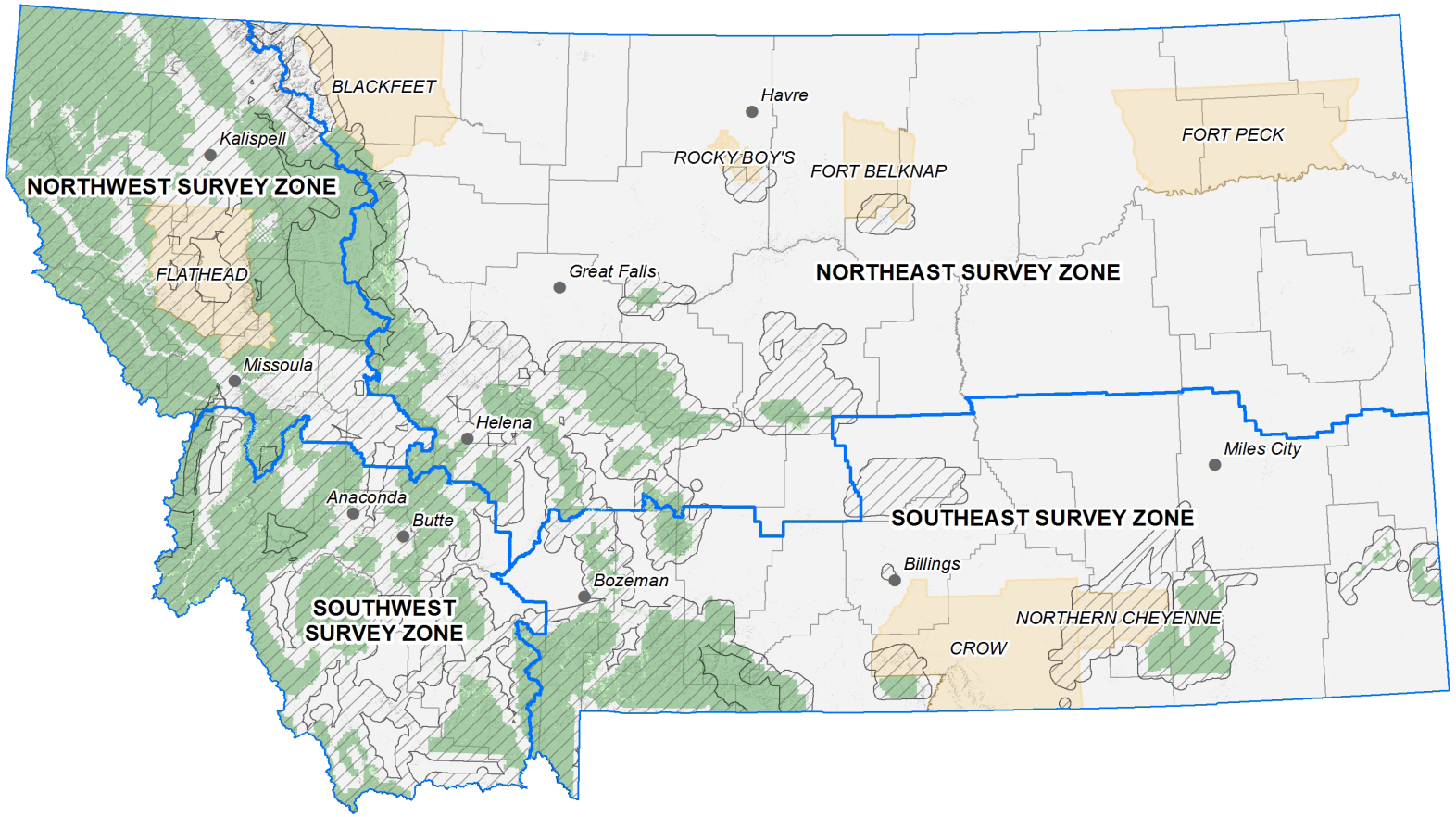
Damage agents are not always contiguous and surveyors employ individual style in recording data. For example, a 100-acre unit with two patches of mortality may be recorded as having 4% damage whereas another surveyor may record each separate patch as having 100% damage. Both methods are correct, but total acres may be inflated if the range of severity is not taken into account. To account for this potential discrepancy, severity-weighting methods consolidate damage into a single high severity category (severity-weighted acres, or SWA) and reduce total acres by a factor representing the acres recorded with low and moderate severity.

General trends were calculated using SWA for each pest in 2018 relative to 2017. "↔" indicate continued pest activity (SWA was within +/- 25% of SWA in previous year). "↑" or "↓" represents increased or decreased pest activity (SWA differed by < 500% of SWA in previous year). "↑↑" or "↓↓" represents substantially increased/ decreased pest activity (SWA differed by >= 500% of SWA in previous year). "↑ - new" represents no pest activity in previous year. "↓ - endemic" indicates no pest activity in 2018 where it was detected in 2017. "N/A" is noted where data was insufficient to determine a trend.



Fruiting body of schweinitzii root disease (left).Tomentosus root disease (right).

2018 Aerial Detection Survey Zones



Area Flown
Reservations
National Forest
Survey Zone Boundary

0 62.5 125 250 Miles

N
W E
S

Northwest Region

The Northwest Region encompasses the Kootenai, Flathead and Lolo National Forests along with Coal Creek, Stillwater and Swan State Forests and the Flathead Reservation.

Western spruce budworm (*Choristoneura freemani*) was detected on 177,174 acres (111,628 SWA) throughout the region, particularly near the Garnet and Nevada Ranges and Seeley-Swan Valley. Recorded western spruce budworm activity increased from 39,180 acres observed in 2017. **Douglas-fir tussock moth** (*Orgyia pseudotsugata*) damaged ornamental Colorado blue spruce in Missoula, Columbia Falls and Kalispell. No significant damage to Douglas-fir was detected from ground or aerial surveys in 2018. **Black pineleaf scale** (*Nuculaspsis californica*) caused decline and mortality in ponderosa pine in two distinct patches in Missoula County. A third patch was confirmed but damage was not recorded.

Douglas-fir beetle (*Dendroctonus pseudotsugae*) was scattered throughout the region having at least minimal impact on 10,874 acres (4,022 SWA), an increase from 8,357 acres detected in 2017. **Mountain pine beetle** (*Dendroctonus ponderosae*) was detected at low levels on 7,760 acres (1,185 SWA), an increase from 4,616 acres in 2017. **Fir engraver** (*Scolytus ventralis*) continued to attack trees in northwest Montana and was detected on 19,544 acres (4,294 SWA) in 2018, an increase from 6,268 acres detected in 2017. Grand fir has been in notable decline in recent years and multiple bark beetle species, in addition to fir engraver, have been isolated from dead and dying trees.

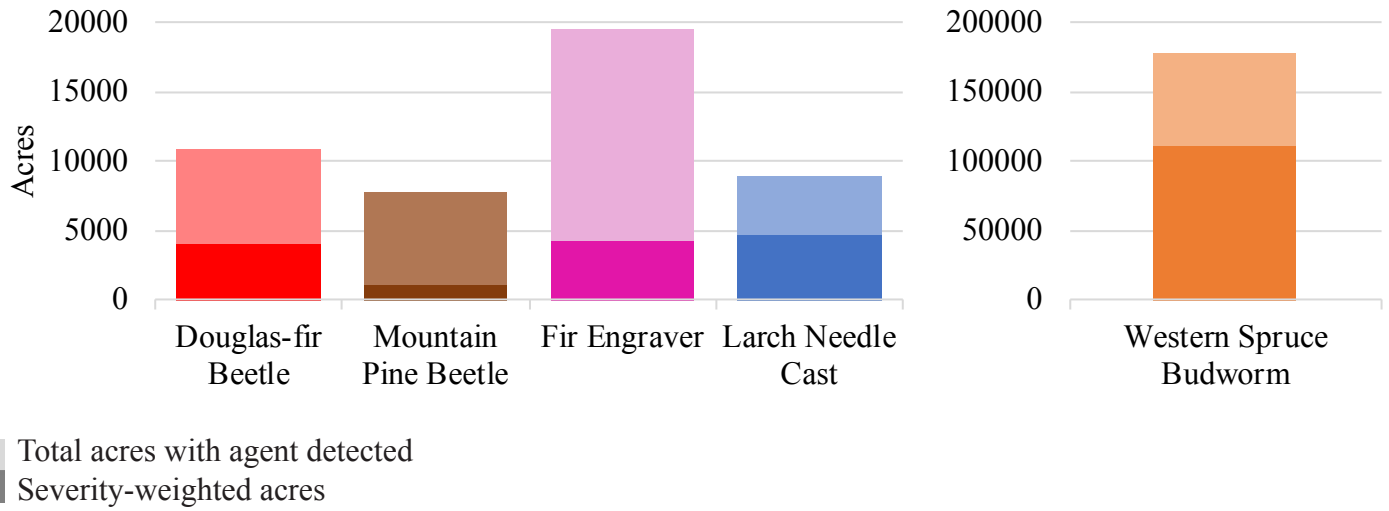
Larch needle cast (*Meria laricis*) was detected on larch foliage on 7,114 acres (3,863 SWA) in the region around Plains and Thompson Falls**.**

Ponderosa pine damaged by black pineleaf scale near Missoula.

Black pineleaf scale on ponderosa pine needles.

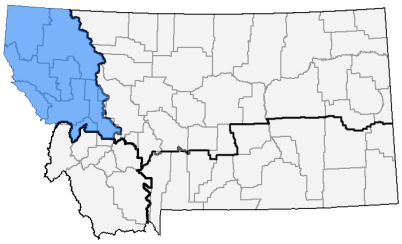
Northwest Region Summary Table

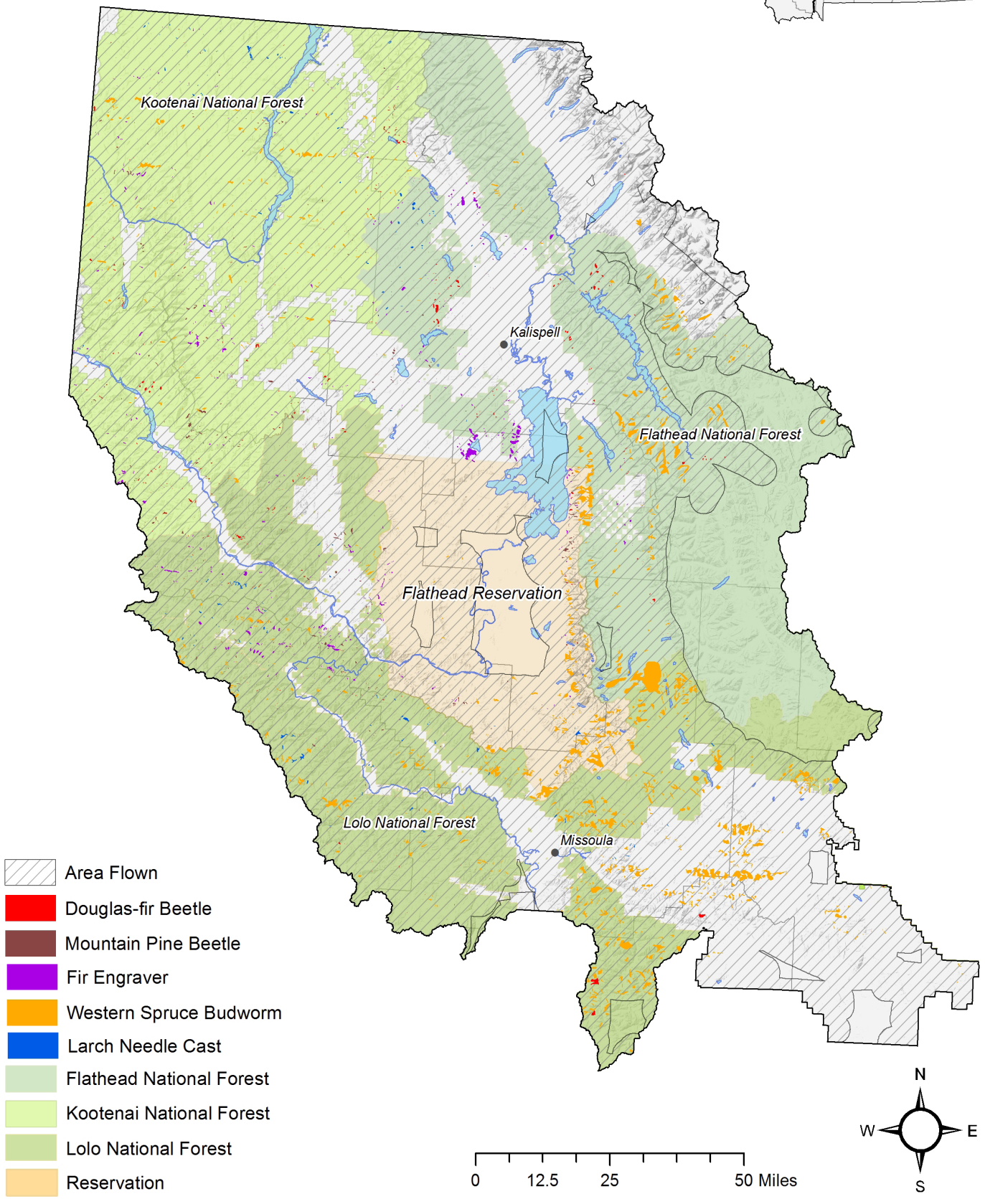
Damage Agents	Acres with Agent Detected	SWA	Trend
Douglas-fir beetle	10,874	4,022	↑
Mountain pine beetle	7,760	1,185	↑
Fir engraver	19,554	4,294	↑↑
Larch needle cast	7,114	3,863	↓ - endemic
Western spruce budworm	177,174	111,628	n/a



Northwest Montana Survey Zone

2018 Aerial Detection Survey





Southwest Region

The Southwest Region encompasses the Bitterroot and Beaverhead-Deerlodge National Forests.

Western spruce budworm was detected on 368,120 acres (233,055 SWA) throughout the region, particularly near Ennis, Butte, and the Pioneer, Snowcrest, Centennial, Greenhorn, Sapphire, Ruby, Tobacco Root, Gravelly, and Flint Creek Mountain Ranges. Recorded western spruce budworm activity increased from 147,072 acres observed in 2017.

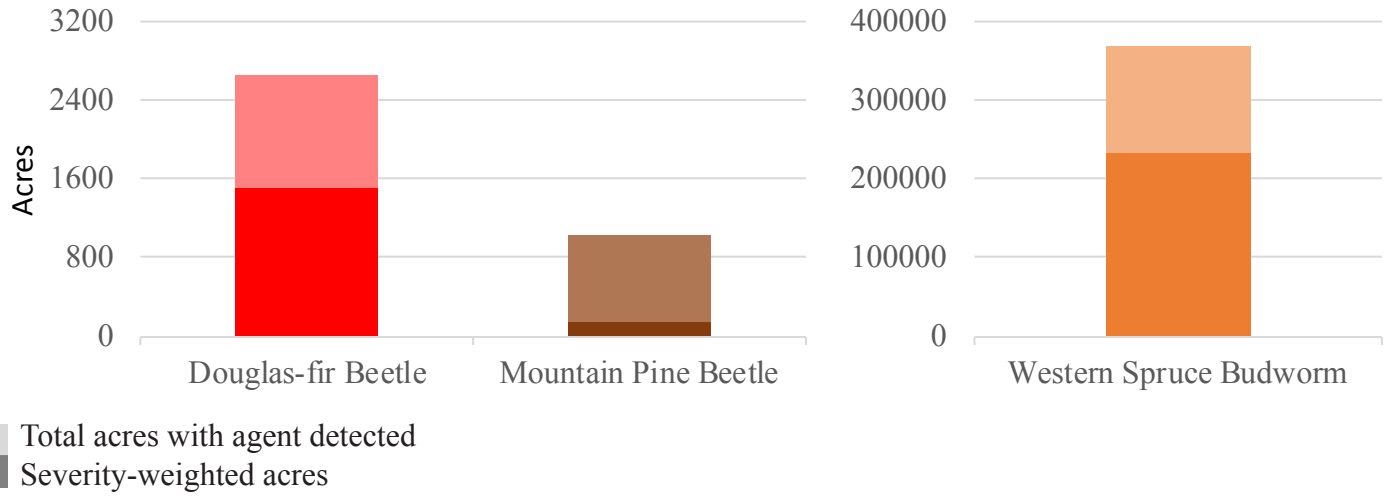
Douglas-fir beetle was detected on 2,434 acres (1,511 SWA) in the region, primarily in the area west of Hamilton. Douglas-fir beetle activity increased in the region from 1,113 acres detected in 2017. **Mountain pine beetle** continued to decline in the region and was detected at minor levels on only 1,026 acres (155 SWA).

Evidence of feeding in Douglas-fir by western spruce budworm.

Whitebark pine and subalpine fir.

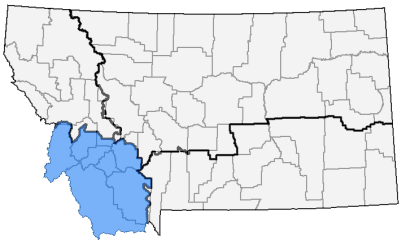
Southwest Region Summary Table

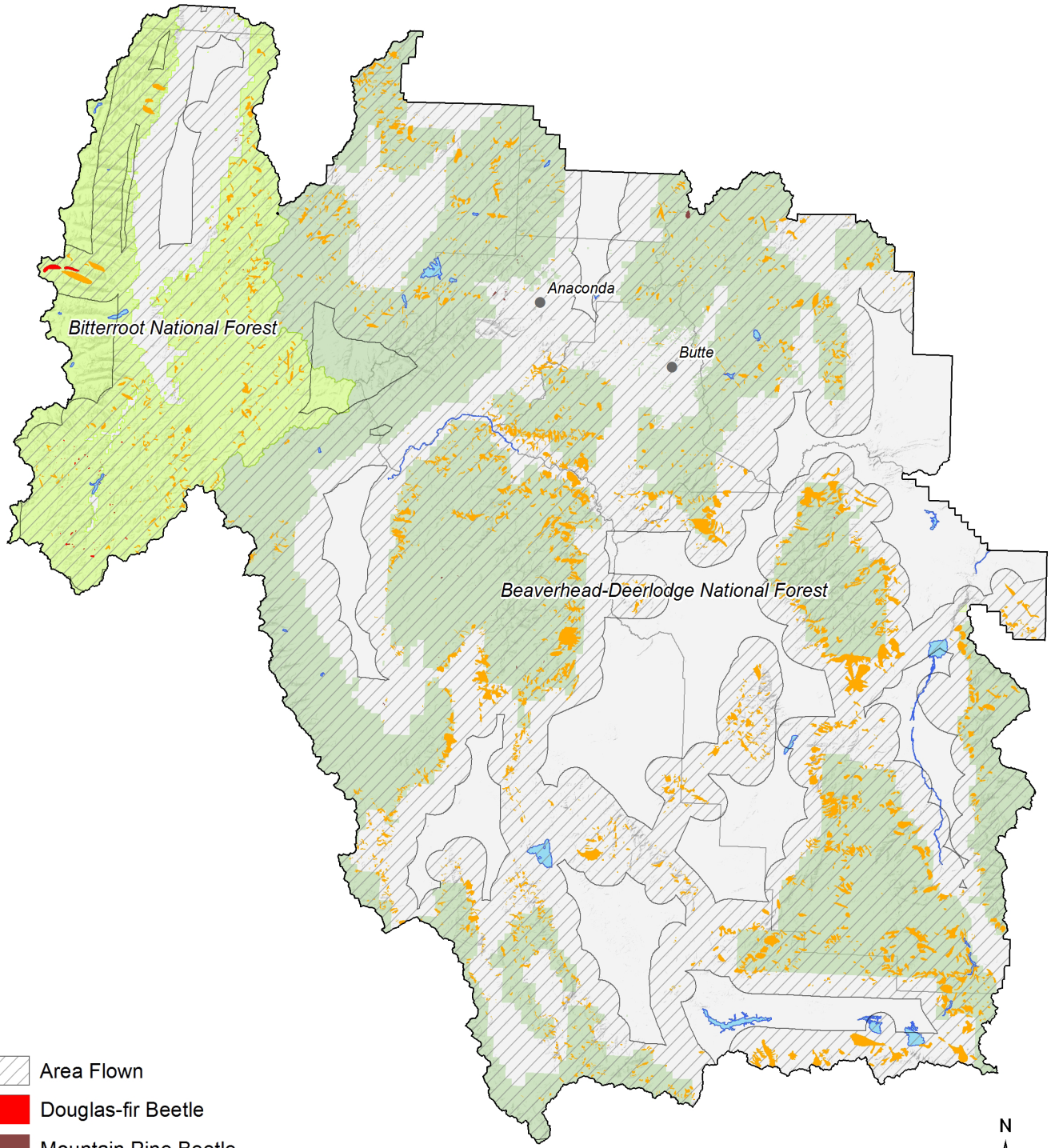
Damage Agents	Acres with Agent Detected	SWA	Trend
Douglas-fir beetle	2,434	1,511	↓ - endemic
Mountain pine beetle	1,026	155	↓ - endemic
Western spruce budworm	368,120	233,055	↑



Southwest Montana Survey Zone

2018 Aerial Detection Survey





Area Flown
Douglas-fir Beetle
Mountain Pine Beetle
Western Spruce Budworm
Beaverhead-Deerlodge National Forest
Bitterroot National Forest

0 12.5 25 50 Miles

N
W E
S

Northeast Region

The Northeast Region encompasses the Helena-Lewis and Clark National Forests and the Blackfeet, Rocky Boy's, Fort Belknap and Fort Peck Reservations.

Western spruce budworm was detected on 226,697 acres (183,751 SWA) particularly near White Sulphur Springs, in the Big Snowy Mountains, Little Belt Mountains and along the Rocky Mountain Front. Acres detected in 2018 increased from 106,496 acres detected in 2017.

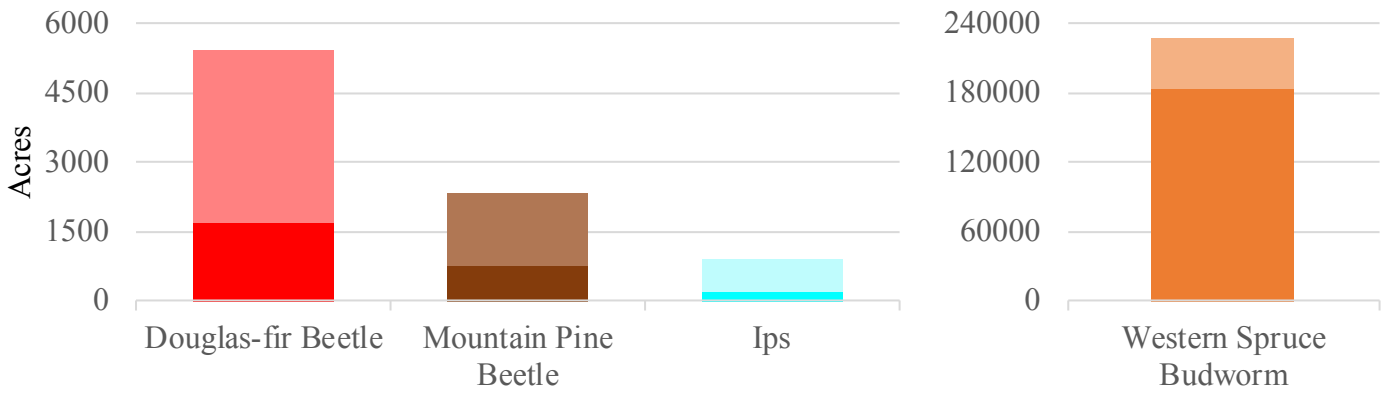
Douglas-fir beetle was scattered throughout the region having a minimal impact on 5,398 acres (1,686 SWA). Douglas-fir beetle activity decreased from 6,825 acres detected in 2017. **Mountain pine beetle** was detected on 2,351 acres (760 SWA) in the Little Rocky Mountains and Little Belt Mountains. Mountain pine beetle increased in 2018 from 1,199 acres recorded in 2017. **Ips** activity was detected on 892 acres (202 SWA), primarily in the Moccasin, Little Snowy, Bears Paw and Little Rocky Mountain Ranges.

Douglas-fir beetle.

Limber pine growing along the Rocky Mountain Front.

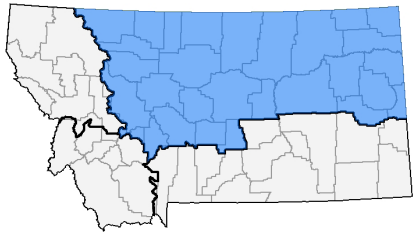
Northeast Region Summary Table

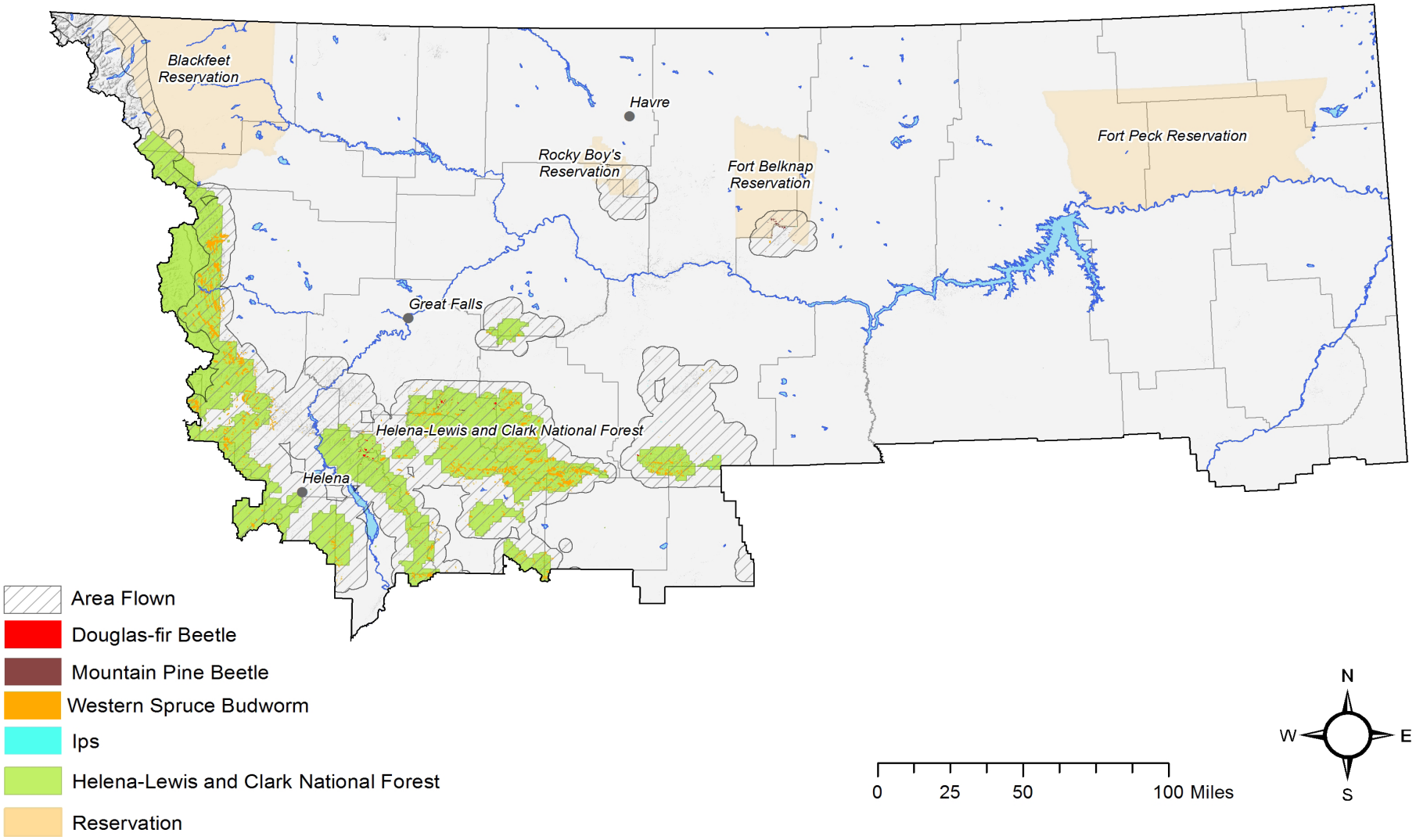
Damage Agents	Acres with Agent Detected	SWA	Trend
Douglas-fir beetle	5,398	1,686	↔
Mountain pine beetle	2,351	760	↑
Ips	892	202	n/a
Western spruce budworm	226,697	183,751	↑



Northeast Montana Survey Zone

2018 Aerial Detection Survey





Southeast Region

The Southeast Region encompasses the Custer-Gallatin National Forests Crow and Northern Cheyenne Reservations.

Western spruce budworm was detected on 140,347 acres (93,049 SWA), increasing from 82,881 acres detected in 2017. Western spruce budworm was detected most notably in Paradise Valley, Crazy Mountain, and the Madison and Bridger Mountain Ranges.

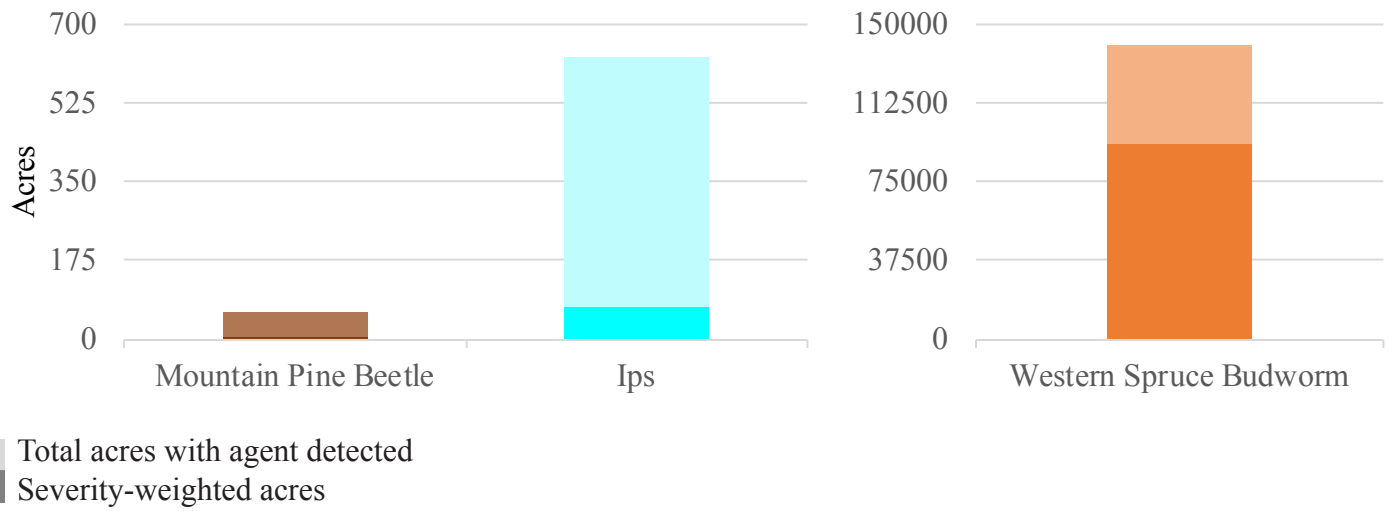
Ips activity was detected at low levels on 625 acres (70 SWA), primarily in the Bull Mountain Range and the area around Red Lodge. **Mountain pine beetle** was detected at negligible levels in 2018.

Subalpine fir trees in the Custer-Gallatin National Forest.

Ponderosa pine in Medicine Rocks State Park near Ekalaka.

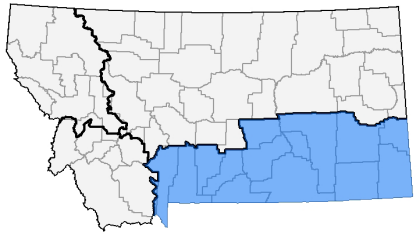
Southeast Region Summary Table

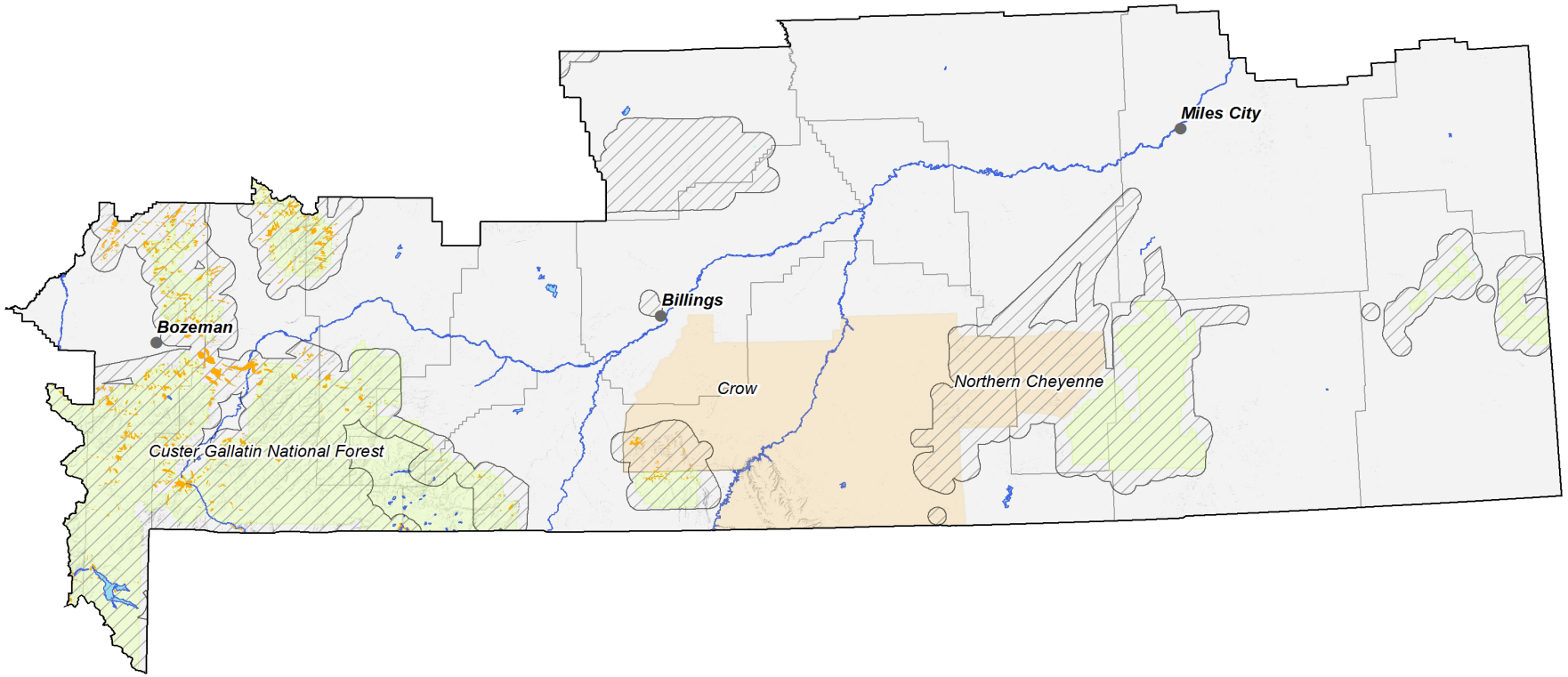
Damage Agents	Acres with Agent Detected	SWA	Trend
Mountain pine beetle	60	5	↓ - endemic
Ips	625	70	n/a
Western spruce budworm	140,347	93,049	↑



Southeast Montana Survey Zone

2018 Aerial Detection Survey





Area Flown
Douglas-fir Beetle
Mountain Pine Beetle
Western Spruce Budworm
Ips
Custer Gallatin National Forest
Reservation

0 25 50 100 Miles

N
W E
S

Balsam Woolly Adelgid

Balsam woolly adelgid (*Adelges piceae*) is a non-native sap-sucking insect that was introduced into the western US in 1929 and has been a destructive pest of true fir forests, including subalpine and grand fir. Balsam woolly adelgid was first identified in Montana in 2007, and ongoing surveys to better understand the extent of balsam woolly adelgid distribution have detected the insect in Broadwater, Flathead, Gallatin, Granite, Lewis and Clark, Lincoln, Mineral, Missoula, Ravalli and Sanders Counties.

Balsam woolly adelgid survey site in Beaverhead County.

White wool characteristic of balsam woolly adelgid.