MINUTES
REGULAR MEETING OF THE BOARD OF LAND COMMISSIONERS
Monday, July 28, 2014 at 9:00 a.m.
Capitol Building, Room 303
Helena, MT

Please note: *The Land Board has adopted the audio recording of its meetings as the official record, as allowed by 2-3-212, MCA. These minutes provide an abbreviated summary of the Land Board discussion, public testimony, action taken, and other activities. The time designations listed are approximate and may be used to locate the referenced discussion on the audio recording of this meeting. Access to an electronic copy of these minutes and the audio recording is provided from the Land Board webpage at http://dnrc.mt.gov/LandBoard. The written minutes summary, along with the audio recordings, are listed by meeting date on the Land Board Archive webpage.*

Members Present

Governor Steve Bullock
Attorney General Tim Fox
Commissioner of Securities and Insurance Monica Lindeen
Secretary of State Linda McCulloch
Superintendent of Public Instruction Denise Juneau

Members Absent

None

Testifying Staff

John Tubbs, DNRC Director
John Grimm, DNRC TLMD Real Estate Management Bureau Chief
Monte Mason, DNRC TLMD Minerals Management Bureau Chief
Amy Gannon, DNRC Forestry Division Forestry Assistance Bureau Pest Management Program Manager and Forest Entomologist

Attachments

Related Materials, Attachment 1 – Sign-in Sheet
Related Materials, Attachment 2 – Forest Insect and Disease Conditions in Montana – submitted by Amy Gannon during item 714-9
Related Materials, Attachment 3 – Montana Forest Insect and Disease Conditions and Program Highlights 2013 – submitted by Amy Gannon to accompany item 714-9

Call to Order

00:00:02 Governor Bullock called the meeting to order.
00:00:07 Ms. Juneau moved to approve the June 16, 2014, minutes. The motion was seconded by Mr. Fox and carried unanimously.

Business Considered

714-1 Timber Sales
A. North Spencer
B. Odell Creek Salvage (Limited Access)

00:00:23 Mr. Tubbs gave an overview of the items.
00:02:16 Ms. McCulloch moved to approve items 714-1A and 714-1B. The motion was seconded by Ms. Juneau.

Board Discussion/Comments

00:02:25 Ms. Lindeen

00:03:20 The motion to approve items 714-1A and 714-1B carried unanimously.

714-2 Disclaimer of Interest: Landmark Land Company, LLC

(item 714-2 was presented after item 714-6)

00:13:35 Mr. Tubbs gave an overview of the item.

00:14:36 Mr. Mason

Board Discussion/Comments

00:24:08 Governor Bullock

00:24:30 Mr. Fox moved to approve item 714-2. The motion was seconded by Ms. Lindeen.

00:24:38 Mr. Fox

00:24:55 Governor Bullock

00:25:12 The motion to approve item 714-2 carried unanimously.

714-3 Communitization Agreements

A. Sundheim Federal 24-35-1H Well

B. Kittleson Federal 34-23-1H Well

C. Dave T 2958 13-25H Well

00:03:43 Mr. Tubbs gave an overview of the items.

00:04:24 Ms. Juneau moved to approve items 714-3A, 714-3B, and 714-3C. The motion was seconded by Mr. Fox and carried unanimously.

714-4 Land Banking Parcels: Set Minimum Bid for Sale

00:06:40 Mr. Tubbs gave an overview of the item.

00:07:33 Mr. Fox moved to approve item 714-4. The motion was seconded by Ms. Juneau and carried unanimously.

714-5 Land Banking Parcels: Final Approval for Sale

00:07:54 Mr. Tubbs gave an overview of the item.

00:08:55 Mr. Grimm

00:10:16 Ms. Lindeen moved to approve item 714-5. The motion was seconded by Ms. Juneau.

Board Discussion/Comments

00:10:25 Ms. Lindeen

00:10:40 Mr. Grimm

00:11:04 The motion to approve item 714-5 carried unanimously

714-6 Sale of Cabin and Home Sites: Set Minimum Bid for Sale

A. Gallatin County – Sale 710

B. Missoula County – Sale 712

00:11:14 Mr. Tubbs gave an overview of the items.

00:13:09 Ms. McCulloch moved to approve items 714-6A and 714-6B. The motion was seconded by Mr. Fox and carried unanimously.

714-7 Stip v. State of Montana DNRC, DV-11-110

00:25:21 Mr. Tubbs gave an overview of the item.

00:26:30 Governor Bullock

00:26:36 Mr. Tubbs

00:26:48 Ms. McCulloch moved to approve item 714-7. The motion was seconded by Ms. Lindeen.

Board Discussion/Comments

00:26:58 Mr. Fox
00:27:18 Governor Bullock

00:27:26 The motion to approve item 714-7 carried unanimously.

714-8 Easements

00:27:38 Mr. Tubbs gave an overview of the item.

Public Comments

00:29:03 Randall Knowles

00:30:27 Mr. Fox moved to approve item 714-8. The motion was seconded by Ms. Juneau and carried unanimously.

714-9 Montana Insect and Disease Condition Update

00:30:58 Ms. Gannon gave an overview of the item.

Board Discussion/Comments

00:40:18 Governor Bullock
00:40:42 Ms. Gannon
00:41:48 Governor Bullock
00:41:53 Ms. Gannon
00:42:05 Ms. McCulloch
00:42:20 Ms. Gannon
00:42:33 Governor Bullock

General Public Comment

00:42:55 Mr. Knowles

Adjournment

00:53:38 Adjournment

PRESIDENT

/s/ Steve Bullock
Steve Bullock, Governor

ATTEST

/s/ John E. Tubbs
John E. Tubbs, DNRC Director

Related Materials
Attachment 1

LAND BOARD MEETING SIGN-IN SHEET
July 28, 2014

NAME	AFFILIATION	E-MAIL	*Check to be added to the interested parties list.*
Ramona Knowles	Public	Knowlesmontana@juno.com	yes

Contact Lucy Richards at lrichards@mt.gov or indicate on this sign-in sheet if you would like to be placed on the Land Board interested parties list.

This sign-in sheet is a public record under Title 2, Chapter 6 of the Montana Code Annotated, but may not be reproduced or distributed for use as a mailing list without the permission of the named individuals under 2-6-109, MCA.

Related Materials
Attachment 2

Forest Insect and Disease Conditions in Montana

Amy Gannon
DNRC Forestry Division
Forest Pest Management Program

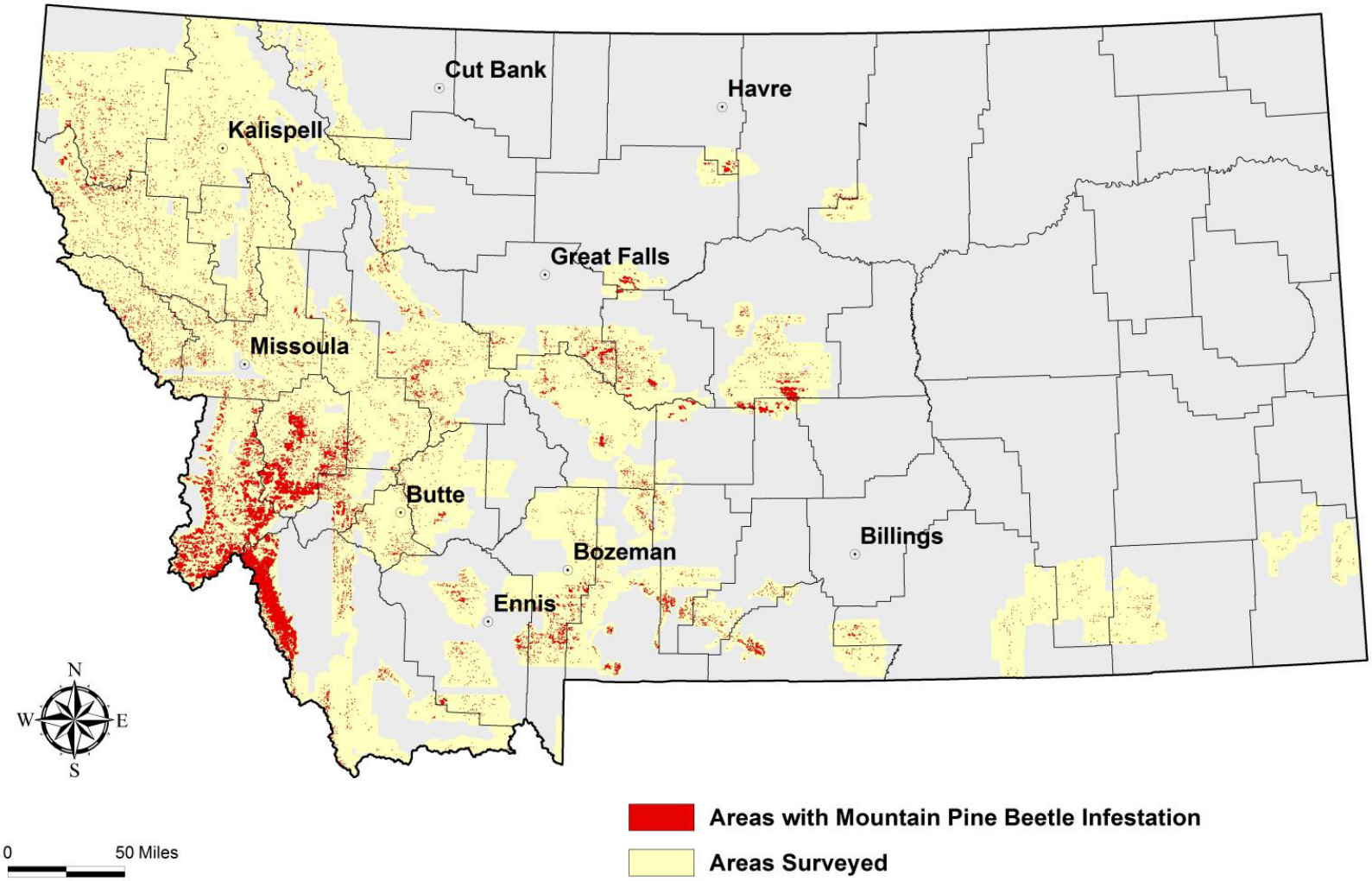
Land Board - 2014

Mountain Pine Beetle

Attack all species of pine
Bore into tree
Feed on inner bark
Introduce blue stain
Kill tree outright

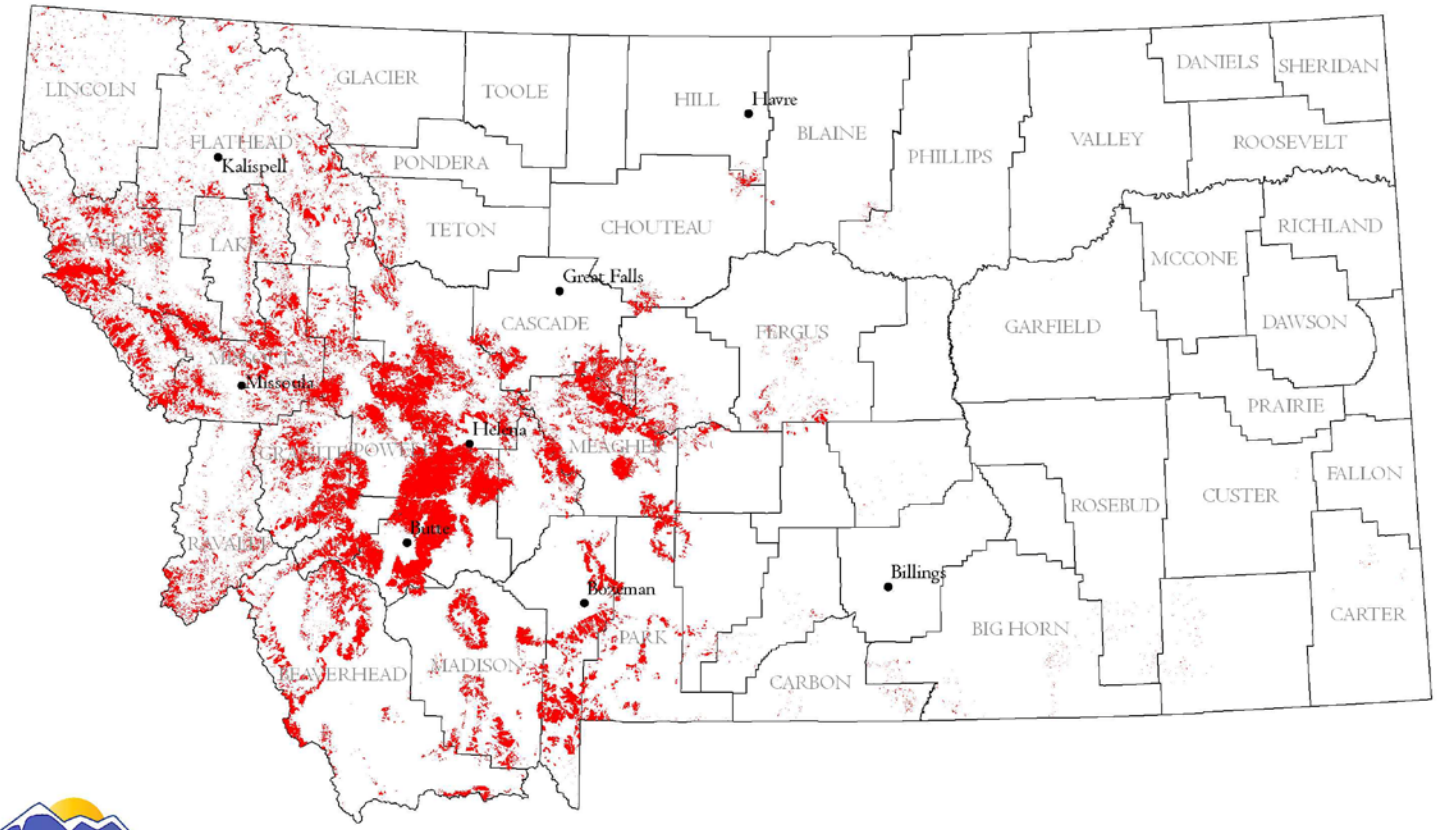
Ownership	Acres	Acres Surveyed
Federal	444,294	15.2 million
State	3,660	1.3 million
Private	18,933	10.5 million
Total	526,458	27.0 million

Montana


Cut Bank
Havre
Kalispell
Great Falls
Missoula
Butte
Bozeman
Billings
Ennis
N
W
E
S
0
50 Miles
Areas with Mountain Pine Beetle Infestation
Areas Surveyed

MOUNTAIN PINE BEETLE IN MONTANA

Montana 2000 - 2011



Mountain Pine Beetle - in all host species

0 25 50 100 150 200 Miles

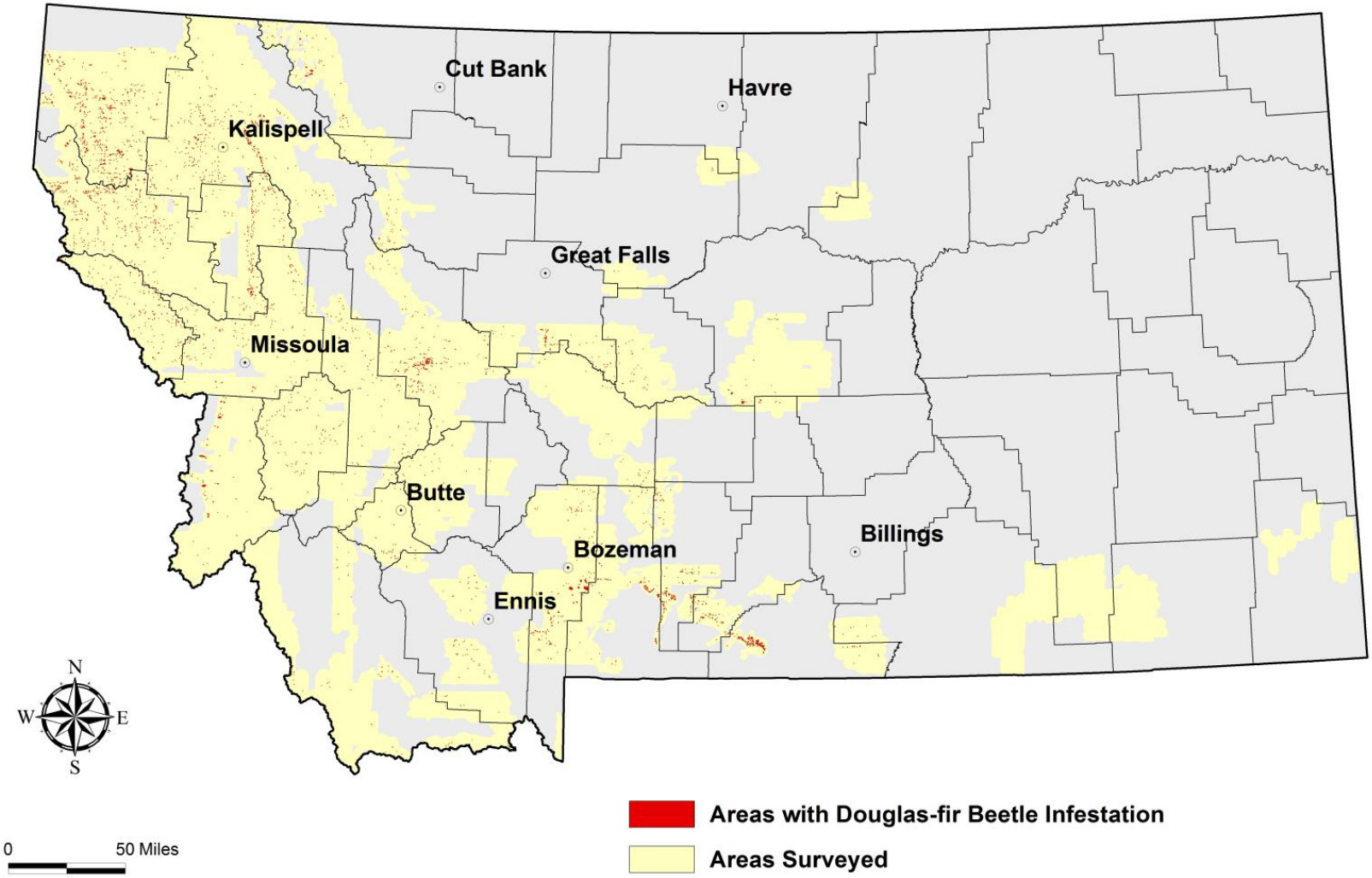
Douglas-fir Beetle

Attacks Douglas-fir
Kills trees outright
Preferentially selects tree that are:

- Mature
- Fire-scorched
- Densely stocked
- Stressed

Ownership	Acres	Acres Surveyed
Federal	12,247	15.2 million
State	968	1.3 million
Private	2,686	10.5 million
Total	15,901	27.0 million

Montana


Cut Bank
Havre
Kalispell
Great Falls
Missoula
Butte
Bozeman
Billings
Ennis
N
W
E
S
0
50 Miles
Areas with Douglas-fir Beetle Infestation
Areas Surveyed

Western Spruce Budworm

Defoliates Douglas-fir, spruce, true firs

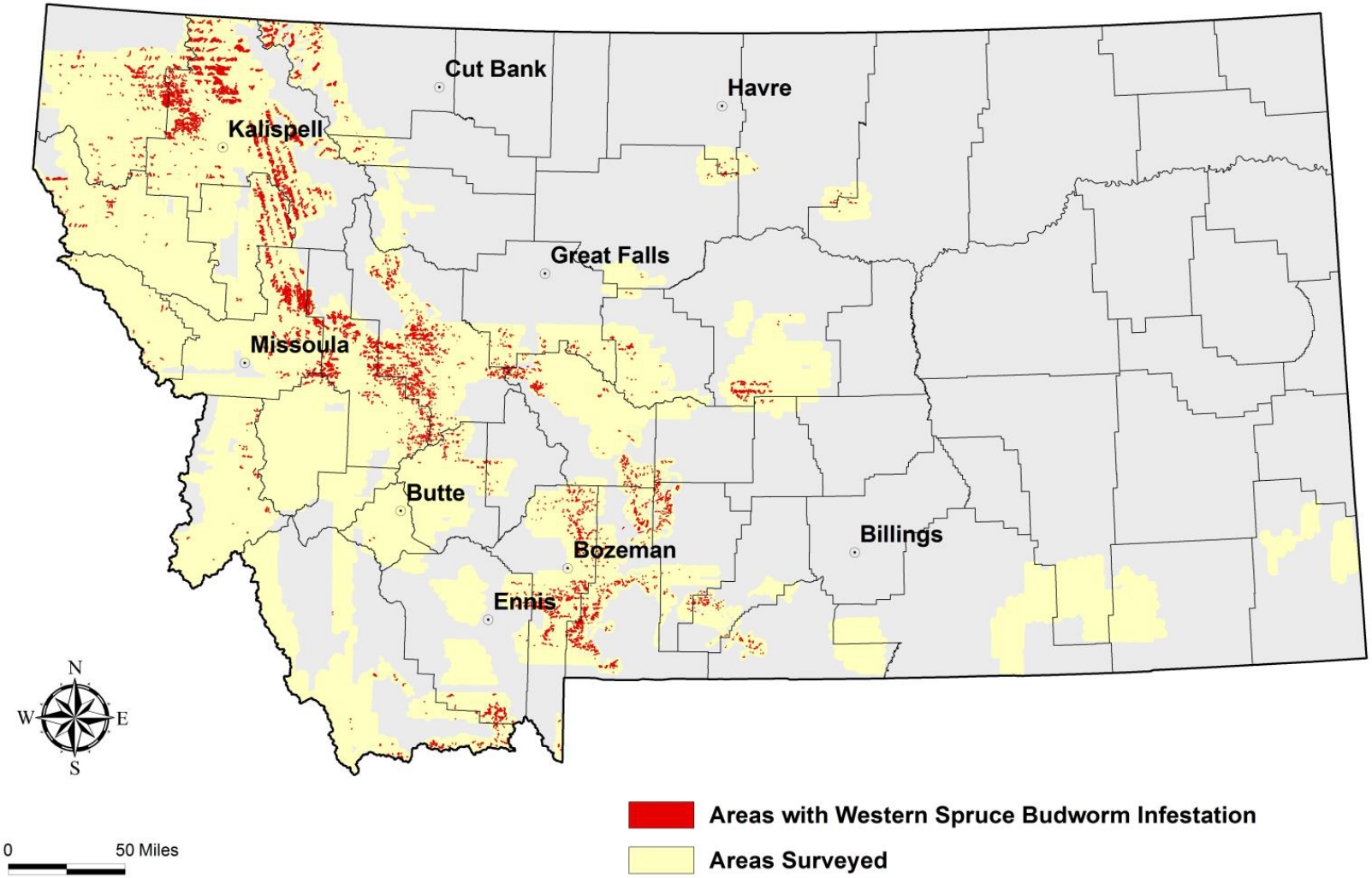
Not necessarily tree killers

Prefer sites that are:

- Warm, dry sites
- Multi-storied stands
- Pure stand of host trees

Ownership	Acres	Acres Surveyed
Federal	455,861	15.2 million
State	31,230	1.3 million
Private	118,912	10.5 million
Total	596,003	27.0 million

Montana


Cut Bank
Havre
Kalispell
Great Falls
Missoula
Butte
Bozeman
Billings
Ennis
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0
50 Miles
Areas with Western Spruce Budworm Infestation
Areas Surveyed

Mitigating the Impacts

Active management includes:

- Promoting species and age class diversity
- Favoring early seral species
- Addressing root disease
- Enhancing vigor of residual trees

Effective forest management relies upon

- mill infrastructure and forest products industry

Insects and diseases transcend ownership boundaries
Working collaboratively with multiple partners

Questions?

More information at: **http://dnrc.mt.gov/forestry/assistance/pests**

Related Materials
Attachment 3

Montana Forest Insect and Disease Conditions and Program Highlights 2013

Forest Service
Region 1
Northern Region

Montana
Department of
Natural Resources
and Conservation
Forestry Division

Forest Health
Protection
Report 14-2

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MONTANA

Forest Insect and Disease Conditions and Program Highlights – 2013

Report 14-2

March 2014

Editor:

Chris Hayes, USDA Forest Service, Northern Region, State and Private Forestry, Forest Health Protection

Contributors:

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Amy Gannon, Brennan Ferguson, Montana Department of Natural Resources and Conservation, Forestry Division

Data Summary:

Scott Sontag, USDA Forest Service, Rocky Mountain Research Station

Map Production:

Terri Johnson, USDA Forest Service, Intermountain Region, State and Private Forestry, Forest Health Protection, Boise Field Office

Cover Photo:

Forest impacted by mountain pine beetle in the Pioneer Mountains, Beaverhead-Deerlodge National Forest, courtesy of Brytten Steed, USDA Forest Service

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ABBREVIATIONS

The following abbreviations are used throughout this document:

Beetles	DFB	=	Douglas-fir beetle, *Dendroctonus pseudotsugae* Hopkins
	ESB	=	Spruce beetle, *Dendroctonus rufipennis* (Kirby)
	FE	=	Fir engraver, *Scolytus ventralis* LeConte
	IPS	=	Pine engraver, *Ips pini* (Say)
	MPB	=	Mountain pine beetle, *Dendroctonus ponderosae* Hopkins
	RTB	=	Red turpentine beetle, *Dendroctonus valens* LeConte
	WBBB	=	Western balsam bark beetle, *Dryocoetes confusus* Swaine
	WPB	=	Western pine beetle, *Dendroctonus brevicomis* LeConte
Defoliators	DFTM	=	Douglas-fir tussock moth, *Orygia pseudotsugata* McDunnough
	GM	=	Gypsy moth, *Lymantria dispar* L.
	LCB	=	Larch casebearer, *Coleophora laricella* Hübner
	PB	=	Pine butterfly, *Neophasia menapia* (Felder & Felder)
	WSBW	=	Western spruce budworm, *Choristoneura freemani* Razowski
Exotic Insects	BWA	=	Balsam woolly adelgid, *Adelges piceae* Ratzeburg
Pathogens	LPPDM	=	Lodgepole pine dwarf mistletoe, *Arceuthobium americanum* Nutt. ex Engelm.
	LPDM	=	Limber pine dwarf mistletoe, *Arceuthobium cyanocarpum* (A. Nelson ex Rydberg) Coulter & Nelson
	DFDM	=	Douglas-fir dwarf mistletoe, *Arceuthobium douglasii* Engelm.
	WLDM	=	Western larch dwarf mistletoe, *Arceuthobium laricis* (Piper) St. John
	WPBR	=	White pine blister rust, *Cronartium ribicola* J.C. Fisch.
Hosts	DF	=	Douglas-fir
	ES	=	Engelmann spruce
	GF	=	Grand fir
	LP	=	Limber pine
	LPP	=	Lodgepole pine
	PP	=	Ponderosa pine
	SAF	=	Subalpine fir
	WBP	=	Whitebark pine
	WL	=	Western larch
	WWP	=	Western white pine
Other	ADS	=	Aerial Detection Survey
	BLM	=	Bureau of Land Management
	FIA	=	Forest Inventory and Analysis
	FS	=	Forest Service
	NF	=	National Forest
	NP	=	National Park
	IR	=	Indian Reservation

RA	=	Reporting Area
RD	=	Ranger District
TPA	=	Trees per acre

HIGHLIGHTS

- Mountain pine beetle activity has decreased across much of the state, returning to endemic population levels in many areas that experienced recent outbreaks. It is still, however, causing extensive tree mortality in both ponderosa and lodgepole pine trees in many areas, most notably the Bitterroot and Beaverhead-Deerlodge National Forests.
- Douglas-fir beetle activity increased slightly throughout the state, most notably in the Flathead, Bitterroot, and Gallatin National Forests.
- Western spruce budworm defoliation decreased in the number of acres affected with 596,000 acres damaged in 2013, compared to just under 1.5 million acres found damaged in 2012. Significant defoliation was still found, however, in the Kootenai and Flathead National Forests, as well as on the Seeley Lake Ranger District of the Lolo National Forest.
- Balsam wooly adelgid presence has been confirmed in Broadwater, Flathead, Gallatin, Granite, Lewis and Clark, Lincoln, Mineral, Missoula, Park, Ravalli, and Sanders Counties.
- Root disease fungi cause damage and mortality on over 3.7 million acres in western Montana, killing more than 13 million trees annually.
- Larch needle cast was mapped on about one-fourth of the area (12,363 acres) in western Montana compared with 2012 (nearly 48,000 acres). Counties affected included Flathead, Lake, Lincoln, Missoula, Sanders, and Mineral.

SUMMARY OF CONDITIONS

Bark Beetles

Mountain pine beetle

MPB-caused tree mortality was found in multiple pine species across Montana in 2013. Most areas that experienced recent outbreaks continue to experience declines in intensity. In landscapes with few remaining susceptible host trees, mortality was scattered, but some areas of the state experienced elevated MPB-caused tree mortality. Areas of high mortality levels in LPP included the Big Hole of Beaverhead-Deerlodge NF and southern Bitterroot NF. A new outbreak also erupted throughout the Bear Creek drainage near Red Lodge, MT. These areas of increased activity likely contributed to an increase in total number of trees killed in 2013, even though there was a decrease in number of affected acres across the state. This trend was driven largely by MPB in LPP which went down slightly in acres affected but nearly doubled in number of trees killed.

Some areas, particularly on the Beaverhead-Deerlodge NF, had significant tree mortality in high-elevation 5-needle pines. Portions of southern Gallatin NF and neighboring portions of Custer NF also contained regions of high-elevation 5-needle pine mortality, adding to the overall increase in detected activity (acres and number of trees) in that host type.

MPB-caused tree mortality in PP decreased, although significant patches of mortality remain in places like the Bitterroot NF and eastern Lewis and Clark NF. MPB in WWP was found at low levels and decreased to nearly half of levels detected in 2012.

Due to the continued decrease in available susceptible host, it is likely the decline in MPB activity will continue across the state, with areas of activity where pockets of susceptible pine host remain.

Douglas-fir beetle

Recorded acres of DFB-caused mortality in Montana increased five-fold in number of acres impacted (15,901 acres) and ten-fold in estimated number of trees killed (39,034 trees) from 2012 to 2013. DFB-caused mortality was detected on all land ownership types, with tree mortality occurring in scattered pockets throughout the state. Some DFB activity was associated with prior WSBW-caused defoliation, as observed throughout the Gallatin NF and Bitterroot NF in ground surveys.

Acres of DFB-caused mortality are anticipated to be under-reported across Montana due to difficulties associated with assessing DFB-caused mortality in trees with prior WSBW defoliation. Much of the DF host type throughout Montana has experienced severe WSBW defoliation for the better part of the last decade. This defoliation, if coupled with unusually warm and dry weather or another outbreak catalyst, could promote increased DFB activity in subsequent years.

Other Bark Beetles

IPS populations and associated tree mortality continued at low, endemic levels in 2013 with total acres and number of trees estimated killed both increasing slightly. Nearly all mortality was in PP as scattered spots across the state, with greatest impacts east of the Continental Divide. Throughout the state, IPS populations have remained fairly static. If weather continues to provide near or above normal precipitation patterns and barring large areas of improper slash management, we expect populations will continue at or near endemic levels. In areas of PP where drought is chronic, or annual thinning treatments leave small or moderately sized slash piles, levels above typically endemic mortality may occur.

Estimates of ESB-caused mortality remained low in 2013, as populations remained endemic throughout the majority of Montana. Outbreak populations of ESB declined sharply to low levels in the two locations that had elevated activity in recent years. These include federally managed lands within the Gravelly Mountains, Beaverhead-Deerlodge NF and the Rock Creek drainage, Custer NF. Ground surveys identified that ESB-caused mortality was isolated to scattered individual trees. ESB populations are not expected to erupt again within these locations as the prevalence of susceptible, large-diameter ES host has been substantially reduced.

Defoliators

WSBW remained the most active and damaging insect defoliator in Montana in 2013. Number of acres defoliated by WSBW decreased since 2012. However, defoliation from WSBW remained high in Flathead, Lake, Lewis and Clark, Lincoln, Missoula, Park and Powell Counties. Scattered and low levels of defoliation from WSBW were recorded in Glacier NP. High and extensive areas of WSBW-caused defoliation were recorded on the Coal Creek State Forest along the Whitefish Mountain range. Defoliation from WSBW has been fairly continuous for many years in Flathead, Lake and Lincoln counties (since 2008). Heavy and consecutive defoliation from WSBW can predispose DF trees to attack by DFB. DFB activity increased by 5-fold across the state in 2013, especially in Flathead, Lake, Lewis and Clark, and Lincoln County where WSBW-caused defoliation is at high levels.

There was no recorded defoliation from DFTM via ground or ADS in 2013. Defoliation from PB was recorded on approximately 100 acres in Ravalli County.

Balsam Wooly Adelgid

BWA was detected on SAF or GF through ground surveys in Montana for the first time in 2010. In 2013, extensive ground surveys were conducted throughout the state by Montana Department of Natural Resources and Conservation and R1 Forest Health Protection. BWA was confirmed in Broadwater, Flathead, Gallatin, Granite, Lewis and Clark, Lincoln, Mineral, Missoula, Park, Ravalli, and Sanders Counties. BWA is an exotic pest that causes branch dieback and can cause tree mortality. The most obvious indicator of its presence is the white “wool” covered females on the bark of stems and branches of trees during summer months. To-date, BWA infections have been observed causing branch dieback and overall stress in host trees within Montana. Direct mortality caused by BWA has not been

documented thus far; however, severe infestations in other locations such as Idaho have caused tree mortality.

Root Diseases

Root diseases are diseases of the site and do not change significantly from one year to the next. Based on a recent assessment using FIA plots, root disease fungi are estimated to cause damage and mortality on nearly 4 million acres in western Montana, killing more than 13 million trees annually. Root disease-caused mortality is more common west of the Continental Divide. We currently do not have an assessment of root disease distribution and impact east of the Continental Divide. In general, large areas of root disease can be found east of the Divide, but it tends to occur in more discrete patches, rather than being ubiquitous throughout an area. Also, root diseases can be commonly found in riparian areas east of the Continental Divide, often in ES and SAF. The most impacting root diseases are armillaria root disease, laminated root disease, annosus root disease, schweinitzii root and butt rot, and to a lesser extent tomentosus root disease.

Foliage Diseases and Tip Blights

There was a substantial decrease in larch needle diseases from nearly 48,000 acres in 2012 to just over 12,000 acres in 2013. Larch needle diseases were mapped in Flathead (3,849 acres), Lake (2,550 acres), Lincoln (2,047 acres), Missoula (1,629 acres), Sanders (1,299 acres), and Mineral (990 acres) counties. This is a decrease in all counties, except a minor increase in Missoula County and an eight-fold increase in Lake County.

Rhabdocline needle cast was found to be a continuing problem at the Plains Tree Improvement Area (MFO-TR-13-15). However, no Rhabdocline needle cast was reported by ADS in 2013, whereas, over 300 acres were reported in Sanders County in 2012.

Lodgepole pine needle cast was detected on 5,604 acres, with more than 80% (4,548 acres) detected in Gallatin County. The remainder was detected in Park (616 acres), Lincoln (264 acres), and Flathead (176 acres) counties. Elytroderma needle disease was detected on 204 acres of Lake County and 13 acres of Missoula County.

Dwarf Mistletoes

Historical assessments of dwarf mistletoe stands in Montana show that about 16% of DF, 33% of LPP, and 30% of WL stands are infected with dwarf mistletoe. More recent assessments using FIA data collected on over 50,000 trees across Montana show that only about 1% of DF, 3.2% of LPP, and 3.9% of WL trees are infected. The clumpy nature and protracted disease-cycle of dwarf mistletoes allow for impacts across an individual stand to range from none to severe. The clumpy nature of dwarf mistletoe is likely the reason for differences between these two measurements; the first is measuring infected stands and the second is measuring infected trees.

White Pine Blister Rust

WWP, WBP, and LP are all susceptible to WPBR.

Western white pine

Mature WWP continues to be lost due to a combination of WPBR and MPB. Lack of suitable sites, either man-made or natural, limits natural regeneration and WPBR may kill a high proportion of natural seedlings. Rust-resistant stock is planted operationally on suitable WWP sites on forest lands throughout northwestern Montana. In addition to planting rust-resistant stock, pruning branches from the lower bole is an important tool used in WPBR management.

Whitebark pine

WPBR has been impacting WBP ecosystems for many decades. In addition, recent outbreaks of MPB have caused widespread mortality in many WBP stands already impacted by WPBR. The combination of WPBR, bark beetle outbreaks, and lack of natural regeneration due to fire suppression has raised concerns about the long-term viability of WBP ecosystems.

Standardized methodology is now being used to establish monitoring plots in WBP stands throughout the West. These plots are designed to provide a statistically-based assessment of the incidence of WPBR in the ecosystem and the condition of WBP. Whitebark and Limber Pine Information System, WLIS, is a database which was developed (http://www.fs.fed.us/r1-r4/spf/fhp/prog/programs2.html) to compile and provide results of surveys in both WBP and LP. WLIS is being expanded to include 4 other high-elevation 5-needle pines and will be available in its new format soon. The addition of these 4 species required a name change, so WLIS is now called the High Elevation 5-Needle Pine Database, Hi5Db.

Limber pine

LP is found at elevations ranging from 2,700 feet near the community of Terry in far eastern Montana to around 9,000 feet in and around the Beaverhead-Deerlodge NF in southwestern Montana. West of the Continental Divide, LP is largely confined to limited areas adjacent to the Divide, while scattered populations of LP can be found across much of eastern Montana. WPBR is found throughout the distribution of LP, but there are a few areas where LP remains apparently free of the disease, including locations southwest of Ennis and south of Billings.

Abiotic Damage

Less than 200 acres of windthrow were mapped in 2013, similar to 2012. Most (167 acres) of the damage was in the Big Snowy Mountains on the Lewis and Clark NF in Fergus County. The remainder of the damage was on private land in Park (21 acres) and Chouteau (2 acres) counties.

ANNUAL AERIAL DETECTION SURVEY

Aerial detection surveys are an overview assessment designed to locate and document forest change events, as seen from the air. It is a form of data collection that allows the observer to survey large tracts of forested land in a relatively short period of time. Single engine, high-wing aircraft flying at speeds of approximately 90 to 130 mph at an average altitude of 1,500 feet above ground level are used to fly either contour or grid patterns within a Reporting Area (RA). The damage extents, or polygons, of the aerially detected signatures of recently killed or defoliated trees are marked on a digital sketch mapping system or on paper 1:100,000 scale topographic maps. These polygons are given a code for the agent that likely caused the damage, which is inferred from the size and species of trees affected as well as the color and pattern of the damage. The agent code is followed by the total number of trees affected, trees per acre (TPA) affected, or an intensity of the damage (L for light and H for heavy). Areas burned by wildfire are not surveyed until the third year following a fire, as it can be difficult to distinguish mortality caused by fire from that caused by insect or disease activity. The actual amount of mortality from tree diseases, dwarf mistletoes, and WPBR are greatly underestimated with ADS because symptoms from these agents can be difficult and, in some instances, impossible to identify from the air.

The annual ADS in Montana was conducted from July 1 to September 27, 2013. The survey encompassed approximately 27.1 million acres of mixed ownership forested lands, excluding most designated wilderness areas (Figure 2). Five FHP observers, using three contract aircraft, conducted the 2013 ADS and identified approximately 1.2 million acres of forest damage within Montana.

The data summarized in this report is a product of the annual ADS, as well as ground surveys and biological evaluations. The digital data files, data summaries, and ADS damage maps are available from the Missoula FHP Field Office, in both paper and digital GIS format. Data may also be downloaded at http://www.fs.usda.gov/detail/r1/forest-grasslandhealth/?cid=stelprdb5182976.

INSECT AND DISEASE CONDITIONS BY COUNTY

County Results

For each county, damage by ownership is noted and, to the extent possible, we have indicated areas affected and estimated extent of damage. Counties that are not included had no reported information. Forestland data in the following tables are from the annualized surveys performed by USDA Forest Service, Forest and Inventory Analysis (http://www.fia.fs.fed.us). In some of our tables you will observe acres of damage on some ownership where there is no forestland reported. Because of the limited forestland within ownerships of some counties, the density of FIA plots may not have been sufficient at the county level to identify forested acres (i.e. forestland exists but was missed in the FIA sample resulting in an estimate of zero acres). This discrepancy is within their standard of error. Other Federal lands include tribal ownership. Acres flown include areas of non-forest covered during the survey.

Beaverhead County

Forestland, Mortality, and Defoliation Acres by Ownership (1,772,377 ac flown)

	National Forest	*Other Federal*	*Private*	*State*	*Total*
Forestland	1,082,534	121,507	42,316	32,496	1,278,853
DFB	42	30	22	6	100
ESB	18	2	0	2	22
MPB-LPP	150,780	3,285	5,924	898	160,886
MPL-PP	2	9	1	0	12
MPB-High Elevation	5,088	153	17	15	5,273
SAF Mortality	58	27	4	5	94
WSBW	2,503	4,099	603	1,623	8,829
Aspen Damage	74	64	2	34	174

Most areas surveyed in 2013 had not been surveyed in 2012 due to smoke from forest fires; overlap in survey between years occurred on approximately one quarter of the Pioneer Mountains along the scenic byway. In areas of overlap, MPB activity in both LPP and high-elevation 5-needle pines was greatly reduced, although scattered mortality continues. However, in the principle area surveyed – the Anaconda and Beaverhead Mountains along the west edge of the Big Hole valley – MPB activity, especially in LPP, was extreme. MPB activity west of the Big Hole was in explosive outbreak from 2010-2012 resulting in significant landscapes of dead and dying trees, largely on FS managed lands, and these outbreaks appear to have continued into 2013. Because this area was not surveyed in 2012, it likely added significant acres of MPB activity to the state's annual total in 2013 that were not recorded in 2012. Patches of significant high-elevation 5-needle pine mortality were noted west of Twin Lakes and south of Grant.

Mortality of DF due to DFB remained present, although dead trees remained difficult to detect due to past heavy defoliation by WSBW. Defoliation of DF by WSBW continued to decrease on all ownerships, while in some areas past defoliation remains impressive. An increase in ESB in ES also appears to be from the addition of the Beaverhead and Anaconda ranges to the 2013 survey, although numbers remain low and patches scattered. Scattered individual dead SAF were also noted at low numbers.

WPBR is common in WBP in Beaverhead County and LPDM is also present in this county.

Ground surveys for BWA were conducted in this county and no BWA were found.

Big Horn County

Forestland, Mortality, and Defoliation Acres by Ownership (606,855 ac flown)

	National Forest	*Other Federal*	*Private*	*State*	*Total*
Forestland	0	0	317,544	26,652	344,196
DFB	0	0	16	0	16
ESB	0	0	2	0	2
FEB	0	0	168	0	168
MPB-LPP	0	0	472	0	472
MPL-PP	0	0	323	0	323
MPB-High Elevation	0	0	294	0	294
SAF Mortality	0	0	4	0	4
Aspen Damage	0	0	43	76	119

No survey was conducted in 2012; 2013 survey included the Wolf Mountain area east of I-90. A wide range of damage agents were detected, although none at significant levels. MPB was found in under 500 acres in each of the three host types surveyed; LPP, PP, and high-elevation 5-needle pine.

WPBR is present in LP in this county. LPPDM and LPDM are present in this county.

Blaine County

Forestland, Mortality, and Defoliation Acres by Ownership (101,247 ac flown)

	National Forest	*Other Federal*	*Private*	*State*	*Total*
Forestland	0	71,952	56,108	4,590	132,649
DFB	0	0	34	72	106
MPB-LPP	0	0	6	0	6
MPB-PP	0	8	447	0	455
WSBW	0	3	1,035	0	1,038
Aspen Damage	0	0	13	0	13

The southwest portions of Blaine County, where forested areas within the Fort Belknap IR occur, were surveyed in 2013. MPB activity detected by ADS significantly decreased in LPP but remained at similar levels in PP forests. However, much of the decline detected is likely due to substantial direct control management efforts conducted by the Fort Belknap IR (MFO-TR-13-08). A group of 150 trees killed by MPB was recorded along Beaver Creek. DFB activity increased in 2013 and was the most active in Grouse Gulch. WSBW activity significantly increased and was widely scattered across the Fort Belknap IR.

Unspecified aspen damage was detected on 13 acres of tribal land about 1.5 miles west-southwest of the community of Lodgepole. Western gall rust and comandra blister rust are common in PP on the Fort Belknap IR causing stem deformities, branch mortality, top kill, and occasional whole tree mortality. Comandra blister rust was noted causing top-kill in LPP on the north slopes of White Cow Canyon (MFO-TR-13-08). Armillaria root disease can be found on the Fort Belknap IR, in the Mission Canyon area, with large pockets developing in DF and aspen (MFO-TR-13-08). LPPDM is present in the county.

Broadwater County

Forestland, Mortality, and Defoliation Acres by Ownership (104,916 ac flown)

	National Forest	*Other Federal*	*Private*	*State*	*Total*
Forestland	163,207	30,232	91,273	0	284,712
DFB	4	0	0	0	4
MPB-PP	0	4	0	0	4
WSBW	757	163	129	0	1,049

Only one quarter of the area surveyed in 2012 was surveyed again in 2013, and encompassed the Elkhorn Mountains on the west side of the County. In the overlapping areas both MPB and WSBW activity greatly decreased.

WPBR has been found in LP in this county. Armillaria root disease is present in the county, and schweinitzii root and butt rot is quite common, especially causing significant decay in butt logs of larger, older DF. LPPDM is present in the county.

BWA was found along Holloway Road east of Canyon Ferry.

Carbon County

Forestland, Mortality, and Defoliation Acres by Ownership (269,227 ac flown)

	National Forest	*Other Federal*	*Private*	*State*	*Total*
Forestland	166,384	89,996	44,891	6,188	307,459
DFB	645	7	475	227	1,354
ESB	12	0	5	0	17
MPB-LPP	628	0	91	2	721
MPL-PP	8	2	46	4	60
MPB-High Elevation	978	32	92	0	1,103
SAF Mortality	781	85	46	0	912
WSBW	695	10	572	426	1,703
Aspen Damage	0	0	170	0	170

Non-wilderness areas of the Custer NF and forested areas northeast of Cooney Reservoir were surveyed in 2013; no area within the county had been surveyed in 2012. A wide range of agents was detected. MPB was active in LPP, PP, and most significantly in high-elevation 5-needle pines. DFB was active in over 1,300 acres, with WSBW also active in over 1,700 acres, often in overlapping areas along the Beartooth Range. High elevation SAF had over 900 acres with mortality (complex of agents), and ESB was noted in the ES, both principally found in the Pryor Mountains. ADS also found several large (approx. 50 acre) patches of aspen damage along northeast front of Beartooth Range on private lands.

Spruce broom rust and tomentosus root disease in ES are prevalent in various campgrounds in this county. WPBR is common in WBP and LP, and LPPDM and LPDM are present in the county.

Ground surveys for BWA were conducted in this county and no BWA were found.

Carter County

Forestland, Mortality, and Defoliation Acres by Ownership (339,187 ac flown)

	National Forest	*Other Federal*	*Private*	*State*	*Total*
Forestland	65,569	0	38,907	0	104,477
MPB-PP	61	6	38	2	107

Nearly all FS lands, as well as forested BLM, State and private lands, were surveyed in 2013; no survey had been conducted in 2012. Despite the large survey area, little insect activity was noted outside of ~100 acres of MPB (and co-occuring *Ips* species) in PP.

Cascade County

Forestland, Mortality, and Defoliation Acres by Ownership (492,976 ac flown)

	National Forest	*Other Federal*	*Private*	*State*	*Total*
Forestland	186,847	26,686	90,064	14,444	318,041
DFB	64	2	69	9	144
ESB	7	0	7	0	11
MPB-LPP	5,086	109	589	61	5,845
MPB-PP	628	9	190	10	837
MPB-High Elevation	137	0	4	2	143
IPS	0	0	2	0	2
SAF Mortality	24	0	0	0	24
WSBW	1,431	374	1,904	477	4,186
Aspen Damage	1	4	106	0	111

Most of the same areas were flown in both 2012 and 2013, and covered much of the Adel and Little Belt Ranges along the southern edge of the county. MPB-caused mortality continued to decrease significantly, although mortality remains in all host types where susceptible host exists. Mortality of DF due to DFB, however, appears to have increased, although it remained at low levels (<150 acres). Nevertheless, detection may be difficult due to past heavy defoliation by WSBW. Defoliation of DF by WSBW decreased 8-fold, but WSBW remains in low populations scattered across host type. Activity by other agents remained low, and scattered aspen damage (>100 acres) was also noted in the Little Belts.

Tomentosus root disease was noted in Kings Hill Campground, possibly contributing to butt decay in SAF (MFO-TR-13-24). Declining LPP crowns due to dwarf mistletoe and heartwood decay (*Phellinus pini*) were also noted. Significant levels of LPPDM exist in Many Pines Campground (MFO-TR-13-24). WPBR is common in LP in this county. Armillaria root disease is present in the southeastern portion, and schweinitzii root and butt rot is quite common, causing significant decay in butt logs of larger, older DF.

Chouteau County

Forestland, Mortality, and Defoliation Acres by Ownership (216,269 ac flown)

	National Forest	*Other Federal*	*Private*	*State*	*Total*
Forestland	13,320	10,297	34,057	1,342	59,015
DFB	4	0	10	0	14
MPB-LPP	3,229	2	417	0	3,648
MPB-PP	2	8	34	3	47
MPB-High Elevation	332	0	0	0	332
WSBW	0	14	1,110	10	1,134
Windthrow	0	0	2	0	2

Similar northeast and south-central portions of Chouteau County were aerially surveyed in 2013 as compared to 2012. MPB-caused LPP mortality was the most prominent damage detected within both portions of the county surveyed in 2013. Acres detected with MPB activity decreased 3-fold and the estimated number of trees killed within these areas was reduced 2-fold. Similarly, defoliation caused by WSBW declined dramatically from nearly 20,000 acres in 2012 to 1,000 acres in 2013.

ADS detected two acres of windthrow in the Highwood Mountains. Armillaria root disease is present in the northern portion of the county on the Rocky Boy's IR, but appears to be uncommon. Also, butt rot and breakage caused by *Ganoderma applanatum* has been observed in quaking aspen on the Rocky Boy's IR.

Deer Lodge County

Forestland, Mortality, and Defoliation Acres by Ownership (286,794 ac flown)

	National Forest	*Other Federal*	*Private*	*State*	*Total*
Forestland	202,932	6,256	40,344	36,307	285,839
DFB	14	0	12	2	28
MPB-LPP	4,129	232	1,706	2,738	8,805
MPB-PP	8	0	2	0	10
MPB-High Elevation	293	0	801	2	1,096
SAF	2	0	0	0	2
Aspen Damage	1	0	5	0	6

Only slightly more acres were flown by ADS in 2013 versus 2012. The majority of tree mortality in the county was caused by MPB. Number of acres with MPB decreased by about 50% in LPP, remained very low in PP, but increased by 3-fold in high elevation 5-needle pines. MPB is still very active along Mill Creek drainage just southeast of Anaconda.

Low and scattered amounts of defoliation from WSBW were found in the county via ground surveys, while no visible defoliation from WSBW was recorded during ADS.

Unspecified aspen damage was detected via ADS on 6 acres in northern portions of the county (5 acres on private land and 1 acre on the Beaverhead-Deerlodge NF), which was less than the 44 acres detected in 2012. WPBR has been found in LP in this county. Schweinitzii root and butt rot is common in DF, causing decay in butt logs but not acting as an aggressive root pathogen. LPPDM and LPDM are also present in the county.

Fergus County

Forestland, Mortality, and Defoliation Acres by Ownership (828,903 ac flown)

	National Forest	*Other Federal*	*Private*	*State*	*Total*
Forestland	88,290	178,582	247,800	11,587	526,259
DFB	116	8	405	2	531
MPB-LPP	57	23	17	0	97
MPB-PP	5,609	548	8,734	938	15,829
MPB-High Elevation	2	28	6	0	36
IPS	0	6	20	4	30
SAF	6	0	0	0	6
WSBW	10,052	105	807	36	11,000
Windthrow	167	0	0	0	167
Aspen Damage	0	0	154	2	156

ADS in both 2012 and 2013 covered most of the Big and Little Snowy Ranges, North and South Moccasins, and Judith Mountains. Acres with MPB-caused mortality were down, especially in LPP, although mortality in PP is still significant in the Little Snowies and southern half of the Big Snowies. High-elevation 5-needle pine mortality is still limited, as is the host type. DFB-caused mortality increased but was limited mainly to the southern side of the Big Snowies. WSBW activity saw a 10-fold or greater decrease, although defoliation remained significant on the northern side of the Big Snowies (see also MFO-TR-13-10). ADS detected scattered damage in aspen, particularly on private lands north of the Big Snowies and in the North Moccasins.

ADS detected windthrow on 167 acres (one 55 acre polygon and one 112 acre polygon) in the Big Snowy Mountains. White pocket heart rot (*Phellinus chrysoloma*) in lower stems, butts, and roots of ES and armillaria root disease of SAF and DF were observed near Crystal Lake (MFO-TR-13-10). In addition, fir broom rust and delphinella shoot blight were affecting SAF, and Cytospora canker was affecting SAF and DF in the area. Armillaria root disease was positively identified in the Moccasin Mountains north of Lewistown. LPPDM is present in this county.

Flathead County

Forestland, Mortality, and Defoliation Acres by Ownership (2,440,769 ac flown)

	National Forest	*Other Federal*	*Private*	*State*	*Total*
Forestland	1,732,522	493,638	430,799	131,256	2,788,215
DFB	1,056	6	311	64	1,437
ESB	91	6	18	10	125
FE	185	0	4	0	189
Larch Needle Diseases	2,585	456	752	56	3,849
LLP Needle Cast	0	0	90	86	176
MPB-LPP	667	0	220	9	896
MPB-PP	399	6	46	21	472
MPB-WP	347	0	0	5	352
MPB-High Elevation	91	0	7	0	98
IPS	0	2	6	0	8
SAF	1,563	14	11	38	1,626
WSBW	143,865	9,396	9,952	12,630	175,843
Aspen Damage	35	0	233	129	397

Most of Flathead County was flown in 2013, with the exception of Glacier NP. The insect causing the most damage in the county was WSBW. Defoliation from WSBW decreased slightly in 2013 but remained high and was found scattered throughout the county, especially northeast and northwest of Kalispell. No defoliation from DFTM was recorded via ground or ADS surveys in 2013.

MPB activity significantly decreased in both LPP and PP forests from 2012 levels. MPB is still active near Condon, MT. MPB activity increased slightly in both WWP and high-elevation 5-needle pines in 2013, although the number of acres with mortality remained relatively low.

DFB increased in 2013 with mortality found on about 1,400 acres. Ground surveys at the Coram Experimental Forest suggest DFB activity is increasing in many stands where large diameter host is present (MFO-TR-13-28). FE and ESB-caused mortality was also observed but was not extensive.

Unspecified aspen damage was detected via ADS on a 389 acre polygon about 2 miles south of Ashley Lake and four 2 acre polygons on the south end of Flathead County. More than half the aspen damage was on private land, about one-third on state land, and about one-tenth on the Flathead NF. Larch needle cast was detected on about 3,850 acres—less than half of the 9,000 acres detected in 2012—with 456 acres detected west of Bowman Lake within the border of Glacier NP. The remainder of the acres affected by larch needlecast was distributed across the county. More than 175 acres of lodgepole pine needlecast were detected on private and state lands by ADS about 8 to 9 miles west and west-northwest of Little Bitterroot Lake. WPBR is common in both WWP and WBP in this county. Root diseases are common in counties west of the Continental Divide. The more common ones known to occur in this county are s-type annosus root disease, armillaria root disease, and schweinitzii root and butt rot. The tree species most affected by all root diseases are DF and true firs. P-type annosus root disease is known to occur in PP in this county. DFDM, LPPDM, and WLDM are present and common in this county.

Significant levels of Rhabdocline needlecast were documented at the Bigfork Tree Improvement Area (MFO-TR-13-16). A visit to the Coram Experimental Forest documented low levels of armillaria root

disease in regeneration trees, significant butt decay in mature ES trees caused by tomentosus root disease, and high levels of WPBR in natural WWP (MFO-TR-13-28).

BWA was detected along Red Meadow Creek and Coal Creek. It was also found at Strawberry Lake in Jewel Basin and along Emery Creek near Hungry Horse Reservoir.

Gallatin County

Forestland, Mortality, and Defoliation Acres by Ownership (1,026,834 ac flown)

	National Forest	*Other Federal*	*Private*	*State*	*Total*
Forestland	588,292	53,441	209,483	19,551	870,767
DFB	2,084	2	125	207	2,418
ESB	4	0	2	0	6
LLP Needle Cast	17	4,528	3	0	4,548
MPB-LPP	1,736	0	436	24	2,196
MPB-PP	0	0	8	0	8
MPB-High Elevation	2,934	2	96	0	3,032
SAF	155	2	29	0	186
WSBW	22,619	873	11,758	841	36,091
Aspen Damage	0	0	58	0	58

Similar portions of Gallatin County were aerially surveyed within 2013 as compared to 2012. MPB activity continued to cause low levels of LPP mortality within the county in limited spot infestations. MPB was still active at low to moderate levels within high-elevation 5-needle pines, which have acted as refugia for MPB populations since they crashed in the LPP host type in 2009 and 2010. DFB activity increased to cause low levels of mortality that was scattered within pockets of DF that often had prior WSBW-caused defoliation. WSBW populations declined dramatically in 2013 after causing substantial damage associated with the severe 2012 drought year. The number of acres with WSBW activity detected was reduced 4-fold in 2013. Ground surveys documented limited MPB and DFB activity and a substantial decline in WSBW-caused defoliation within various county locations (MFO-TR-13-22).

Lodgepole pine needle cast was detected on 4,548 acres in the southeast corner of the county. All of these acres were in Yellowstone NP, except for 17 acres on the Gallatin NF and 3 acres on private land. WPBR is common in WBP and LP in this county. LPDM is present in the county.

Significant levels of butt decay caused by tomentosus root disease in DF and ES were documented in Battle Ridge, Swan Lake and Spire Rock campgrounds (MFO-TR-13-14) and other portions of the Gallatin NF (MFO-TR-13-11).

LPPDM is a management concern across much of the Horse Butte peninsula (MFO-TR-13-11) and neighboring areas also on flat land with obsidian sand soils.

BWA was found near Storm Castle, Hebgen Lake, Targhee Pass, Hyalite and along Moose Creek.

Glacier County

Forestland, Mortality, and Defoliation Acres by Ownership (510,810 ac flown)

	National Forest	*Other Federal*	*Private*	*State*	*Total*
Forestland	33,208	203,178	160,796	0	397,181
DFB	8	505	37	0	550
ESB	4	16	10	0	30
MPB-LPP	21	323	15	0	359
MPB-PP	6	0	0	0	6
SAF	2	1,097	12	0	1,111
WSBW	0	19,871	6366	0	26,237

The western forested portion of Glacier County was aerially surveyed in 2013, similar to the area surveyed in 2012. Low levels of scattered MPB-caused mortality were detected throughout LPP hosts and ground surveys at Marias Pass indicate that MPB activity was still low, although some secondary bark beetle activity was killing root diseased LPP (MFO-TR-13-32). DFB increased 3-fold in the number of acres and tree mortality detected and was scattered at low levels within DF host that often had prior WSBW-caused defoliation. WSBW activity declined dramatically as 3-fold fewer acres were detected with defoliation in 2013 compared to 2012.

WPBR is common in WBP and LP. Armillaria root disease is known to be a significant pathogen in DF in the western portion of the county on the Blackfeet IR. LPPDM and WLDM are present in this county. Armillaria root disease was found having a significant impact on LPP at Summit Camground. A white pocket butt rot, likely due to an *Onnia* species, was also found to be impacting LPP at Summit Campground (MFO-TR-13-32).

Golden Valley County

Forestland, Mortality, and Defoliation Acres by Ownership (81,170 ac flown)

	National Forest	*Other Federal*	*Private*	*State*	*Total*
Forestland	16,983	5,661	58,085	0	80,728
DFB	10	2	4	0	16
MPB-PP	2,928	458	3,323	143	6,852
MPB-High Elevation	16	0	0	0	16
WSBW	747	0	1	0	748

Much of the same areas were surveyed in 2012 and 2013. MPB activity decreased, with a drop of 15-30% in the PP host type. WSBW decreased dramatically from over 10,000 acres to under 1,000.

Granite County

Forestland, Mortality, and Defoliation Acres by Ownership (1,072,860 ac flown)

	National Forest	*Other Federal*	*Private*	*State*	*Total*
Forestland	591,608	25,622	171,424	30,348	819,002
DFB	120	18	62	10	210
EBS	6	0	0	0	6
FE	0	0	2	0	2
MPB-LPP	91,183	3,321	7,684	426	102,614
MPB-PP	79	4	100	10	193
MPB-High Elevation	3,617	18	285	0	3,920
SAF	14	1	0	0	15
WPB	2	0	0	0	2
WSBW	0	2,438	1,850	27	4,315
Aspen Damage	0	0	2	0	2

The majority of Granite County was flown in 2013. MPB activity remained at similar levels between 2012 and 2013, however, the intensity or trees per acre killed declined in some areas. This decrease is mostly due to host depletion. MPB activity appears to have decreased along Rock Creek corridor, while ground surveys confirmed that MPB is still active near East Fork reservoir. Weather patterns in 2013 will in part determine if MPB continues to decline or increase again in 2014 in these areas. Host depletion will also contribute to a decline in MPB activity over the next few years.

WSBW activity slightly increased in the county and was detected from both ADS and ground surveys but was not extensive. DFB, ESB, and FE all remained at low levels in 2013.

ADS detected unspecified aspen damage about 5 miles south of Philipsburg. Common root diseases found in this county include s-type annosus, armillaria root disease, schweinitzii root and butt rot, and tomentosus root disease. DF and true firs are most affected by the first three root diseases and ES, SAF, and DF are most affected by tomentosus root disease. P-type annosus is known to occur in PP. Elytroderma needle disease is a significant agent in PP in localized areas. LPPDM and WLDM are present in this county.

BWA was detected along Butte Cabin Creek in the Rock Drainage.

Hill County

Forestland, Mortality, and Defoliation Acres by Ownership (76,941 ac flown)

	National Forest	*Other Federal*	*Private*	*State*	*Total*
Forestland	0	0	30,788	1,535	32,323
MPB-LPP	0	46	2,469	66	2,581
MPB-PP	0	0	2	0	2
WSBW	0	33	717	94	844

The area in Hill County that was surveyed contains forested lands within the Rocky Boys IR. MPB activity on the IR increased in 2013, primarily in LPP, but is still at lower levels as compared to several years ago or the nearly 6,000 acres in 2009 (MFO-TR-13-07). WSBW activity significantly declined across the IR.

Schweinitzii root and butt rot and low levels of armillaria root disease can be found in stands near Bailey Mountain and in the general area of West Fork Beaver Creek in the southern portion of Rocky Boy's IR. Red ray rot is very common in PP on private lands bordering the IR. LPPDM is common in many stands. Elytroderma needle blight is impacting LPP in the West Fork Beaver Creek drainage (MFO-TR-13-07). Aspen stands are impacted by a number of insects and diseases, including aspen shoot blight and black canker (MFO-TR-13-07).

Jefferson County

Forestland, Mortality, and Defoliation Acres by Ownership (745,479 ac flown)

	National Forest	*Other Federal*	*Private*	*State*	*Total*
Forestland	420,834	64,848	143,906	12,542	642,130
DFB	45	2	9	0	56
ESB	22	0	0	0	22
MPB-LPP	250	0	18	0	268
MPB-PP	10	7	8	1	26
MPB-High Elevation	772	203	4	263	1,242
IPS	0	0	2	0	2
SAF	66	0	2	0	68
WSBW	2,338	380	1,210	122	4,051
Aspen Damage	2	0	23	0	25

In both 2012 and 2013, most of the county was flown, with slightly less coverage on the eastern edge in 2013 (e.g. London Hills). MPB activity continued in all host types but with an over 10-fold decrease. Remaining activity in high-elevation 5-needle pines can be found north of Homestake Pass, with scattered individual LPP killed all along the western edge of the county in the Boulder Mountains. Scattered SAF mortality was also detected along this western edge. WSBP experienced an over 10-fold decrease in area affected, yet some activity remained in the northern half of the state. A few scattered polygons of aspen damage were noted.

WPBR has been found on LP in this county.

Judith Basin County

Forestland, Mortality, and Defoliation Acres by Ownership (496,183 ac flown)

	National Forest	*Other Federal*	*Private*	*State*	*Total*
Forestland	274,980	0	21,438	5,876	302,294
DFB	54	0	3	0	57
ESB	6	0	2	0	8
MPB-LPP	1,755	5	10	0	1,770
MPB-PP	2,804	7	185	11	3,007
MPB-High Elevation	1,397	0	98	0	1,495
SAF	35	2	1	0	38
WSBW	2,896	33	391	0	3,319

In both 2012 and 2013, ADS covered most of the Little Belt and Highwood Mountains within the county. Detectable insect damage dropped significantly in 2013 when compared with 2012, with approximately half the MPB-caused mortality in PP, one third the mortality in high-elevation 5-needle pines, and around a 7-fold decrease in LPP. MPB activity in PP remains significant near Judith Guard Station where

North and South Forks of the Judith River meet. MPB also remained active east of King's Hill in high-elevation 5-needle pines, and in the Highwood Mountains in LPP. WSBW-caused defoliation continued in patches in the Hugesville area and south end of Highwood Mountains. Few scattered patches of aspen damage were found along the north end of the Little Belts.

Armillaria and tomentosus root diseases are significantly impacting ES, DF, and SAF in Dry Wolf campground (MFO-TR-13-10). WPBR is common in LP. Tomentosus root disease is known to be significant in some campgrounds. LPPDM is present in this county.

Lake County

Forestland, Mortality, and Defoliation Acres by Ownership (926,814 ac flown)

	National Forest	*Other Federal*	*Private*	*State*	*Total*
Forestland	157,720	0	337,849	46,889	542,458
DFB	104	0	482	29	615
Elytroderma	0	0	190	14	204
ESB	4	0	8	2	14
FE	0	0	2	0	2
Larch Needle Disease	1,381	0	717	451	2,549
MPB-LPP	1	0	165	18	184
MPB-PP	178	2	491	21	692
MPB-High Elevation	2	0	2	0	4
IPS	144	0	77	51	272
SAF	48	0	48	6	102
WSBW	16,927	67	4,034	3,214	24,242

The majority of Lake County was flown in 2013. WSBW was the most common insect agent found. Number of acres defoliated by WSBW decreased by approximately 50%, but defoliation was still detected across most of the county. DFTM was not recorded in 2013.

MPB-caused mortality significantly decreased to low levels in LPP but increased slightly in PP forests. Pockets of MPB-caused tree mortality were again recorded in the Swan Valley.

The 2013 ADS detected over 2,500 acres of larch needle cast in Lake County, which is a significant increase from the 300 acres of larch needle diseases detected during the 2012 ADS. These acres occur in large polygons along the Highway 83 corridor from Lindbergh Lake, south of the county line, north to Swan Lake. ADS also detected over 200 acres of Elytroderma needle blight. These polygons range in size from a couple acres to 20 or 30 acres and most are located along US Highway 93 from Polson to Rollins. Several 30 to 50 acre polygons were also mapped east of Pablo and Ronan.

WPBR is common in both WWP and WBP. Root diseases are common in counties west of the Continental Divide. The more common ones known to occur in this county are s-type annosus root disease, armillaria root disease, and schweinitzii root and butt rot. The tree species most affected are DF and true firs. P-type annosus root disease is known to occur in PP. Elytroderma needle blight is a significant agent in PP in localized areas in this county, as noted by the 2013 ADS. DFDM, LPPDM, and WLDM are present in this county.

Lewis and Clark County

Forestland, Mortality, and Defoliation Acres by Ownership (1,245,323 ac flown)

	National Forest	*Other Federal*	*Private*	*State*	*Total*
Forestland	944,036	66,516	337,187	35,581	1,383,322
DFB	259	27	257	56	599
MPB-LPP	2,930	80	441	61	3,513
MPB-PP	117	53	456	73	699
MPW-High Elevation	174	2	6	2	184
IPS	0	4	38	4	46
SAF	115	0	0	0	115
WSBW	38,194	2,836	13,153	2,716	56,899

In 2012, ADS included much of the Big Belt Range and along Highway 200 east to Rogers Pass and south; in 2013 much more of the county, covering nearly all forested areas, was flown. Activity by MPB increased in LPP and high-elevation 5-needle pines but decreased in PP. However, in areas of survey overlap, especially in the Big Belts, dramatic decreases in MPB activity are apparent. Remaining MPB activity in LPP was greatest between Stemple Pass and Marysville, and scattered along the entire Rocky Mountain Front. WSBW remained active in the county wherever host was found.

Although still in low numbers, mortality of DF due to DFB and of SAF due to a complex of agents had increased in total acres surveyed. Areas of notable activity included south of Flesher Pass for DFB and south of Gibson Dam for SAF mortality. Actual mortality due to DFB may be higher due to difficulty in detecting affected trees in areas of significant WSBW-caused defoliation. Ground survey found DFB in DF of various sizes in the Marysville area (MFO-TR-13-36).

Schweinitzii root and butt rot were present in large DF, and a high number of perennial cankers of DF were present in localized areas of the Marysville project area northwest of Helena (MFO-TR-13-36). Armillaria root disease is present in the southeastern portion of the county, and schweinitzii root and butt rot is quite common, causing significant decay in butt logs of larger, older DF. WPBR is common in WBP and LP. LPPDM is present and common in the county.

BWA was detected near Stemple Pass and Rimini Road.

Liberty County

No aerial survey was conducted in 2013. A visit to East Butte of the Sweetgrass Hills documented WPBR levels in LP and WBP (Lockman, unpublished data). LPPDM is present in this county.

Lincoln County

Forestland, Mortality, and Defoliation Acres by Ownership (1,598,233 ac flown)

	National Forest	*Other Federal*	*Private*	*State*	*Total*
Forestland	1,726,042	0	387,173	55,797	2,169,013
DFB	1,934	0	241	103	2,278
ESB	40	0	33	2	75
Larch Needle Diseases	1,560	0	290	197	2,047
LLP Needle Cast	14	0	249	0	263
MPB-LPP	866	0	393	1	1,260
MPB-PP	88	0	21	0	109
MPB-WP	112	0	144	0	256
MPB-High Elevation	855	0	0	0	855
SAF	165	0	10	12	187
WPB	8	0	2	0	10
WSBW	29,773	0	3,334	2,693	35,801

Approximately 30% more acres were flown in 2013 than in 2012. WSBW-caused defoliation more than doubled and was found throughout the county. DFB activity significantly increased in 2013. This increase may, in part, be associated with high levels of WSBW damage in DF forests over the past few years (MFO-TR-13-23).

MPB-caused tree mortality was found at low levels. MPB activity remained at similar levels in LPP, but appears to have decreased in PP and WWP, and slightly increased in high-elevation 5-needle pines. MPB-caused tree mortality was found near Libby in the Cabinet Mountains, in the southwest portion of the county, and on the southwest side of Lake Koocanusa. Groups of 50 to 300 TPA were recorded in the southwest portion of the county. Although fewer acres of MPB-caused tree mortality were mapped, the number of trees killed per acre increased in some locations.

The 2013 ADS detected over 2,000 acres of larch needle cast in this county, which is a considerable decrease from the 13,000 acres detected during the 2012 ADS. Nearly all polygons of larch needle cast occur in a wide swath stretching from Libby Dam east to Fairview Ranger Station, with one large polygon (220 acres) situated about 4.5 miles southeast of the Fairview Ranger Station. Most of these acres are on FS lands, but areas on private lands and state lands were also detected. ADS also detected over 260 acres of lodgepole pine needle cast. One large polygon (230 acres) occurred along Wolf Creek of Fisher River, near the Fairview Ranger Station, and a smaller 36 acre polygon was mapped in about 3.5 miles southeast of Happy's Inn, and just north of US Highway 2. No lodgepole pine needle cast was detected during the 2012 ADS.

Root diseases are common in counties west of the Continental Divide. The more common ones known to occur in this county are s-type annosus root disease, armillaria root disease, laminated root disease, and schweinitzii root and butt rot. The tree species most affected are DF and true firs. P-type annosus root disease is known to occur in PP.

Armillaria root disease was found to be the major agent of change and is apparent throughout Coyote and Schreiber Project Areas on the east and west sides of US Highway 2 south of Libby near Schreiber Meadow. Armillaria root disease is responsible for well-defined pockets and scattered individual tree

mortality between pockets (MFO-TR-13-23). WLDM was found contributing to mortality of WL in Coyote Project Area, east of US Highway 2 (MFO-TR-13-23).

A site visit to the Northwest Peaks Scenic Area (MFO-TR-13-24) documented mortality of overstory WBP due to a combination of MPB, secondary beetles (including wood borers), and possibly armillaria root disease. During this same visit, WPBR was found to be prevalent throughout the area, causing direct mortality of the understory WBP trees, and branch mortality and top kill in the larger trees. SAF has been dying in the Northwest Peaks Scenic Area for a number of years, as evidenced on the ground and in ADS. Alpine larch was found to have discolored needles, possibly due to meria needle cast.

A site visit to Mt. Wam (MFO-TR-13-26), in the northeast corner of the county, documented infection levels of WPBR in WBP to be 38.8% and 24.5% in two transects on the south side of the ridge running southwest from Mt. Wam. SAF is climax on these sites and is quickly growing and outcompeting WBP.

Atropellis cankers are present in many LPP east of Lake Koocanusa, reducing vigor of individual trees and contributing to stem failure.

WPBR is common in both WWP and WBP. DFDM, LPPDM, and WLDM are present in this county.

BWA was detected along Fitzsimmons Road in the Stillwater State Forest and near Pete and Cripple Creek.

Madison County

Forestland, Mortality, and Defoliation Acres by Ownership (1,210,019 ac flown)

	National Forest	*Other Federal*	*Private*	*State*	*Total*
Forestland	598,079	111,610	170,000	12,531	892,219
DFB	104	34	21	9	168
ESB	60	12	4	0	76
MPB-LPP	789	294	211	67	1,361
MPB-PP	2	4	6	0	12
MPB-High Elevation	3,691	25	317	8	4,041
SAF	664	6	10	0	680
WSBW	11,811	87	1,333	151	13,382
Aspen Damage	206	0	74	0	280

Relatively little of the Madison and Gravelly Ranges were surveyed in 2012, while nearly all major forested areas within the county were surveyed in 2013. Due to the increased survey area many of the damage agents had elevated measures of activity, but increases were not on scale with increased survey area. Most telling, tree mortality due to MPB, measured as number of trees killed as well as total acres affected, decreased; as did total acres of defoliation by WSBW. However, MPB-caused mortality did occur in all host types. Aspen damage was noted in several large and scattered polygons across the Gravelly and Ruby Ranges.

WPBR is causing some damage to WBP within the Branham Lakes Campground, and more extensive damage in areas along the road to the campground (MFO-TR-13-13). In lower areas of the Standard Creek drainage, LPPDM was causing damage to LPP and a windthrown 9-inch diameter ES showed possible tomentosus root disease infections (awaiting laboratory confirmation at time of publication) in

an upper area of the drainage (MFO-TR-13-13). Schweinitzii root and butt rot was confirmed on large, old DF in several locations on the Madison Ranger District. WPBR is common in WBP and LP. LPDM is present in this county.

Ground surveys for BWA were conducted in this county and no BWA were found.

Meagher County

Forestland, Mortality, and Defoliation Acres by Ownership (990,526 ac flown)

	National Forest	*Other Federal*	*Private*	*State*	*Total*
Forestland	445,511	6,153	203,935	12,114	667,712
DFB	21	0	60	0	81
ESB	9	0	2	0	11
MPB-LPP	503	2	71	0	576
MPB-PP	193	77	553	110	933
MPB-High Elevation	2,844	0	0	0	2,844
SAF	69	0	2	0	71
WSBW	4,773	98	7,441	175	12,487
Aspen Damage	21	0	60	0	81

Similar portions of Meagher County were aerially surveyed within 2013 compared to 2012, except the western edge of the county was not flown in 2013. MPB activity declined throughout the county within LPP and PP host types to overall low levels of scattered infestations in 2013. Similarly, a dramatic 20-fold reduction in the amount of area with WSBW-caused defoliation was detected and changed from nearly 200,000 acres of defoliation detected in 2012 to 12,000 acres in 2013. Ground surveys in ES along the Scenic Byway indicated that, in addition to presence of ESB, many large ES were being killed by *Ips* species, often in conjunction with root disease (MFO-TR-13-27).

A site visit to Showdown Ski Area (MFO-TR-13-05) noted that *Porodaedalea pini* (=*Phellinus pini*) group root and butt rotting fungus was affecting LPP overstory in at least half of the management units. LPP are variously damaged by LPPDM, comandra blister rust, and atropellis canker. WBP and LP are variously affected by WPBR, but threatened across the ski area.

Tomentosus root disease was found responsible for the failure and decline of many ES, leading to the temporary closure of Jumping Creek Campground (MFO-TR-13-27).

LPPDM is present in other areas of the county as well.

Ground surveys for BWA were conducted in this county and no BWA were found.

Mineral County

Forestland, Mortality, and Defoliation Acres by Ownership (767,757 ac flown)

	National Forest	*Other Federal*	*Private*	*State*	*Total*
Forestland	641,095	0	60,733	24,325	726,153
DFB	265	0	28	2	295
ESB	36	0	0	0	36
FE	6	0	0	0	6
Larch Needle Diseases	976	0	14	0	990
MPB-LPP	2,183	0	14	0	2,198
MPB-PP	245	0	33	18	296
MPB-WP	2	0	0	0	2
IPS	2	0	0	0	2
SAF	279	0	0	0	279
WSBW	1,681	0	12	0	1,693
BWA	2	0	0	0	2

MPB remains active at low and scattered levels throughout the county, but overall number of acres recorded only slightly decreased for LPP (MFO-TR-13-40). Groups of 10 to 50 MPB-killed trees can still be found, primarily along the western edge of the county and to a lesser extent in the central portion. Larger groups of MPB-killed LPP were also mapped near Little Joe Mountain. MPB activity significantly decreased in PP forests.

WSBW activity increased slightly in the county and was mostly found in the southern portion. Other bark beetles species were recorded at similar low levels between 2012 and 2013, and BWA was recorded on a few acres in 2013.

Nearly 1,000 acres of larch needle cast were detected by the 2013 ADS, a considerable decrease from the nearly 12,500 acres mapped during 2012. Most polygons range in size from 75 to 100 acres, and nearly all are northwest of Superior at mid-elevation near the Idaho border to the west, and near the border with Sanders County to the east.

WPBR is common in WWP and WBP. The more common root diseases known to occur in this county are s-type annosus root disease, armillaria root disease, laminated root disease, and schweinitzii root and butt rot. The species most affected are DF and true firs. Tomentosus root disease has been found impacting WL heavily infected with larch dwarf mistletoe. P-type annosus root disease is known to occur in PP. Douglas-fir dwarf mistletoe, LPPDM, and WLDM are also present in this county.

Significant levels of WPBR in WBP were noted on Mink Peak (Lockman, unpublished data).

BWA was detected near Lookout Pass, near the Mullan Rest Stop, along Mullan Gulch, and Cedar Creek Roads.

Missoula County

Forestland, Mortality, and Defoliation Acres by Ownership (1,550,359 ac flown)

	National Forest	*Other Federal*	*Private*	*State*	*Total*
Forestland	664,867	19,019	577,757	151,918	1,413,561
DFB	152	2	128	20	302
Elytroderma	0	0	13	0	13
ESB	10	0	10	2	22
Larch Needle Diseases	871	0	759	0	1,630
MPB-LPP	1,521	4	191	14	1,730
MPB-PP	325	0	638	141	1,104
MPB-WP	0	0	2	0	2
MPB-High Elevation	4	0	2	0	6
IPS	0	0	120	2	122
SAF	90	0	68	8	166
WPB	2	0	0	2	4
WSBW	26,743	1,003	21,544	2,829	52,120

Approximately the same number of acres was flown in 2012 and 2013. Defoliation from WSBW could be found across most of the eastern portion of the county but was especially prevalent along the chain of lakes north of Seeley Lake and along Rock Creek. Number of acres recorded defoliated by WSBW slightly decreased from 2012 to 2013. Ground surveys confirmed that in areas north of Seeley Lake, WSBW caused significant defoliation and damage to overstory DF and outright killing of understory trees.

MPB is mostly at low and scattered levels throughout the county, although locations within the Rock Creek and Lee Creek drainages had large activity centers (MFO-TR-13-35). MPB activity significantly decreased in both LPP and PP. In 2013, areas with significant levels of MPB-caused mortality were found along the west-side of county between Lolo Hot Springs and Alberton, south of Lolo, and along the Blackfoot River from Bonner east to the county line. Other bark beetles remained at low levels and scattered throughout the county. SAF mortality was recorded again on a few hundred acres.

The 2013 ADS detected over 1,500 acres of larch needle cast in this county, which is a slight increase from the 1,100 acres detected in 2012. One large polygon (nearly 430 acres) is located about 9.5 miles east of Placid Lake, and the remaining acres were mapped in large polygons along the Highway 83 corridor from Lindbergh Lake to just north of Condon. One 13-acre polygon of Elytroderma needle blight was mapped approximately 2 miles northeast of Evaro on Tribal lands.

Root diseases are common in counties west of the Continental Divide. The more common ones known to occur in this county are s-type annosus root disease, armillaria root disease, laminated root disease, and schweinitzii root and butt rot. The tree species most affected are DF and true firs. P-type annosus root disease is known to occur in PP. Armillaria root disease is killing trees and schweinitzii root and butt rot is causing windthrow within the Cold Jim Project Area northwest of Condon (MFO-TR-13-20).

WPBR is common in both WWP and WBP. Elytroderma needle blight is a significant agent in PP in localized areas in this county. Comandra blister rust is common in PP in this county. DFDM, LPDM, and WLDM are present in this county.

BWA was detected along Elk Meadow Road, Six-Mile Road in the Lolo area, along Beaver Creek near Lindbergh Lake on the Mission Mountain Range in the Swan Valley, and near Graves Creek.

Musselshell County

Forestland, Mortality, and Defoliation Acres by Ownership (18,051 ac flown)

	National Forest	*Other Federal*	*Private*	*State*	*Total*
Forestland	0	21,621	281,162	9,837	312,619
MPB-PP	0	0	160	0	160

The small southeastern corner of the Little Snowy Mountain Range found in Musselshell County was surveyed in both 2012 and 2013. As noted throughout the Range, MPB activity had decreased some but remained active in the PP host type.

Park County

Forestland, Mortality, and Defoliation Acres by Ownership (759,593 ac flown)

	National Forest	*Other Federal*	*Private*	*State*	*Total*
Forestland	727,176	71,073	193,572	23,620	1,015,440
DFB	363	2	95	2	463
LLP Needle Cast	402	0	215	0	617
MPB-LPP	2,057	0	693	0	2,750
MPB-PP	0	0	4	0	4
MPB-High Elevation	912	0	179	2	1,094
SAF	74	0	17	0	91
WSBW	14,300	536	18,062	320	33,217
Windthrow	0	0	21	0	21
Aspen Damage	0	0	39	0	39

Similar portions of Park County were aerially surveyed in 2013 compared to 2012. MPB continued to cause mortality of LPP at low rates within isolated pockets that were scattered throughout the county. Activity in high-elevation 5-needle pines increased 5-fold in the estimated number of trees killed by MPB which primarily occurred within the northeast portion of the county. DFB activity increased from almost no activity detected in 2012 to low and moderate levels causing mortality in DF host that often had prior levels of WSBW-caused defoliation. WSBW activity declined substantially in 2013 compared to the high levels of defoliation that occurred in conjunction with severe drought in 2012. Acres of defoliation attributed to WSBW were reduced 2-fold.

One 21 acre polygon of windthrow was mapped on private lands about 4 miles southeast of Livingston. ADS also detected over 600 acres lodgepole pine needle cast; one larger polygon (~120 acres) mapped about 4.5 miles southeast of Livingston, and another 25 acre polygon ~ 3.5 miles east of the larger polygon. Several larger polygons, ranging in size from 90 acres to almost 250 acres, were also mapped in the southern portion of the Crazy Mountains. No lodgepole pine needle cast was detected during the 2012 ADS.

WPBR is common in WBP and LP stands. Tomentosus root disease is known to be significant in some campgrounds, and LPPDM is present in the county.

A visit to the area around Cooke City (MFO-TR-13-14) documented relatively low levels of WPBR in WBP. During this same visit, high levels of LPPDM were noted near the Kersey Lake Trailhead, tomentosus root disease was found impacting ES around an administrative site, and spruce broom rust was found contributing to mortality of some ES south of Silvergate.

BWA has been confirmed in SAF in the county.

Ground surveys for BWA were conducted in this county and no BWA were found.

Phillips County

Forestland, Mortality, and Defoliation Acres by Ownership (125,876 ac flown)

	National Forest	*Other Federal*	*Private*	*State*	*Total*
Forestland	0	92,341	36,374	3,031	131,746
MPB-LPP	0	45	0	0	45
MPB-PP	0	374	93	8	475
WSBW	0	392	132	0	524
Aspen Damage	0	0	2	0	2

The western forested portions of Phillips County located on the Fort Belknap IR were surveyed in 2013. WSBW activity was found on this part of the IR. MPB activity increased slightly in LPP and remained at similar levels in PP forests.

Western gall rust and comandra blister rust are common in PP on the Fort Belknap IR causing stem deformities, branch mortality, top kill, and occasional whole tree mortality. Comandra blister rust was noted causing top-kill in LPP on the north slopes of White Cow Canyon (MFO-TR-13-08). Armillaria root disease can be found on the Fort Belknap IR, in the Mission Canyon area, with large pockets developing in DF and aspen (MFO-TR-13-08). LPPDM is present in the county.

Pondera County

Forestland, Mortality, and Defoliation Acres by Ownership (185,678 ac flown)

	National Forest	*Other Federal*	*Private*	*State*	*Total*
Forestland	120,956	0	8,692	0	129,648
DFB	10	0	4	4	18
ESB	2	0	0	0	2
MPB-LPP	32	0	6	4	42
MPB-PP	12	0	0	0	12
MPB-High Elevation	0	0	8	0	8
SAF	79	0	6	0	85
WSBW	1,048	0	409	0	1,457
Aspen Damage	0	0	6	0	6

Virtually the same area within the county was flown along the Rocky Mountain Front during both 2012 and 2013 surveys. Nearly all insect activity, including MPB and WSBW, decreased from 2012; only a slight increase in SAF mortality (<90 acres) and presence of minor DFB activity (<20 acres) were noted. Aspen damage was noted but at a fraction of that detected in 2012 at only 6 acres.

WPBR is common in WBP and LP in this county.

Powder River County

Forestland, Mortality, and Defoliation Acres by Ownership (368,927 ac flown)

	National Forest	*Other Federal*	*Private*	*State*	*Total*
Forestland	258,656	64,601	153,745	10,562	487,564
MPB-PP	234	0	6	2	242

Most all Federal lands, along with adjacent State and private lands south of Highway 212, were surveyed in 2013; no area had been surveyed in this county in 2012. Despite the significant acreage flown, only approximately 240 acres of MPB (and associated *Ips* species) as scattered individuals or small patches were detected in PP host.

Dothistroma needle disease is likely causing needle loss in Padget Creek drainage (MFO-TR-13-09).

Powell County

Forestland, Mortality, and Defoliation Acres by Ownership (1,171,609 ac flown)

	National Forest	*Other Federal*	*Private*	*State*	*Total*
Forestland	636,164	71,953	243,908	38,601	990,626
DFB	106	16	65	8	195
ESB	20	2	4	0	26
MPB-LPP	654	75	421	61	1,211
MPB-PP	340	9	439	17	805
MPB-High Elevation	528	0	0	4	532
IPS	0	2	2	2	6
SAF	59	7	5	0	71
WPB	0	0	6	0	6
WSBW	33,027	11,072	10,662	2157	56,918
Aspen Damage	2	0	12	0	14

WSBW defoliation was found throughout most of the county in 2013. WSBW slightly increased in number of acres defoliated and intensity of defoliation in areas flown in 2013. Significant defoliation from WSBW was recorded along the eastern border of the county and in the Swan Mountain Range. DFB and other bark beetles remained at low levels between 2012 and 2013.

MPB activity significantly decreased in both LPP and PP across the county. However, MPB activity was still recorded at low levels across most of the county; groups of 5 to 40 trees were killed by MPB between Ovando and Seeley Lake. DFB and other bark beetles remained at low levels in 2013. SAF decline was also recorded again at low levels in 2013.

Minor amounts (14 acres) of aspen dieback were mapped in 2013. These polygons occur in 2 acre patches southeast of Deerlodge and along Highway 141 north of Avon. All but one 2 acre polygon are on private lands.

A *Pholiota* sp. (probably *P. squarrosa*) was associated with decay of an old SAF near the Quigley Trail Head (MFO-TR-13-18). This fungus causes a white stringy rot. Brown cubical and white pocket rots were also prevalent in stumps of various conifer species around the area.

Ground surveys for BWA were conducted in this county and no BWA were found.

Ravalli County

Forestland, Mortality, and Defoliation Acres by Ownership (1,270,830 ac flown)

	National Forest	*Other Federal*	*Private*	*State*	*Total*
Forestland	1,051,465	0	113,533	35,146	1,200,144
DFB	1,439	0	52	6	1,497
MPB-LPP	120,509	0	1,748	534	122,791
MPB-PP	15,523	0	1,993	1,129	18,645
MPB-High Elevation	4,423	0	0	0	4,423
Pine Butterfly	103	0	0	0	103
IPS	0	0	4	0	4
SAF	122	0	0	0	122
WPB	6	0	6	0	12
WSBW	3,401	0	701	418	4,520

Approximately 10-20% more acres were flown in Ravalli County in 2013 versus 2012 with a majority of the forested acres in the county flown. MPB was the most prevalent insect found throughout the county in 2013. Number of acres affected by MPB remained high and at similar levels to 2012 for LPP, decreased in PP, and remains high and significantly increased in high-elevation five-needle pines. Groups of 100 to 300 MPB-killed trees are scattered throughout the county.

The majority of MPB activity was mapped south of Hamilton where activity has been increasing over the past few years. MPB is attacking PP as small as 3 inches in diameter and as large as 40 inches. MPB is expected to continue on this increasing trajectory as long as suitable host trees remain and barring any unusual weather event. High levels of MPB activity was also mapped north of Hamilton in the Bitterroot Mountain Range. As has been found in other counties, DFB activity showed an increase while other bark beetles remained at low and scattered levels (MFO-TF-13-03).

Number of acres defoliated by WSBW significantly decreased between 2012 and 2013. Defoliation of PP by pine butterfly was found again in 2013, but remained at relatively low levels. Low levels of SAF mortality were also recorded.

Root diseases are common in counties west of the Continental Divide. The more common ones known to occur in this county are: s-type annosus root disease, armillaria root disease, laminated root disease, and schweinitzii root and butt rot. The tree species most affected are DF and true firs. P-type annosus root disease is known to occur in PP in the foothills of both the Bitterroot and Sapphire Mountains.

WPBR is common in WBP. Notable levels of comandra blister rust cause top kill in PP in the foothills of the Bitterroot Mountains.

Elytroderma needle blight is a significant agent in PP in localized areas in this county; high levels continue to exist in the area around Lake Como. DFDM, LPPDM, and WLDM are present, with DFDM being quite common in the lower elevations of the Sapphire and Bitterroot Mountains.

BWA has been confirmed in SAF in the county. BWA was found contributing to mortality of small, understory SAF in the area around Lick Creek, north of Lake Como (MFO-TR-13-02). BWA was also detected by ground surveys along Rock Creek, Roaring Lion Creek, North Fork Rye Creek, White Stallion

Road, St. Mary's Road, Kootenai Creek, Bass Creek, Skalkaho Highway, Willow Creek, and along Signal Creek, Beartrap Creek, and St. Clair Creek, and in the Sula State Forest. BWA was also detected along the lower portion of Lost Horse Creek and in the Ambrose Saddle area.

Rosebud County

Forestland, Mortality, and Defoliation Acres by Ownership (431,440 ac flown)

	National Forest	*Other Federal*	*Private*	*State*	*Total*
Forestland	71,706	31,579	269,379	37,463	410,126
MPB-PP	45	0	73	2	120

Federal, tribal, State and private lands in the southern portion of the county constituting the Custer NF and Northern Cheyenne IR were surveyed in 2013; no areas had been surveyed in 2012. Despite the significant acreage flown only approximately 120 acres of MPB (and associated *Ips* species) were detected in PP host as scattered individuals or small patches.

Sanders County

Forestland, Mortality, and Defoliation Acres by Ownership (1,658,435 ac flown)

	National Forest	*Other Federal*	*Private*	*State*	*Total*
Forestland	899,872	5,888	468,740	62,100	1,436,600
DFB	1,295	0	170	117	1,582
ESB	38	0	4	2	44
FE	9	0	3	4	16
Larch Needle Diseases	556	0	661	82	1,299
MPB-LPP	3,636	0	78	2	3,716
MPB-PP	602	0	290	37	929
MPB-High Elevation	239	0	2	0	241
IPS	0	0	4	0	4
SAF	126	0	12	0	128
WPB	2	0	0	0	2
WSBW	8,978	0	624	125	9,727
BWA	13	0	15	0	28

Approximately 15% fewer acres were flown in 2013 versus 2012. WSBW was the most active agent in the county. Defoliation from WSBW slightly decreased in 2013, but was still widely scattered especially in the central to northwestern part of the county.

MPB is especially active in the central and northwest corner of the county. Acres of MPB-killed LPP increased significantly between 2012 and 2013 and the intensity, or TPA killed, increased in some areas. In other areas, MPB activity decreased because of host depletion. Number of acres of PP killed by MPB remained similar. MPB-caused mortality in high-elevation 5-needles pine increased in 2013. DFB-caused tree mortality increased significantly while other bark beetle activity remained at low and scattered levels throughout the county.

SAF mortality was noted in the county as well as BWA; both at low and scattered levels.

Nearly 1,300 acres of larch needle cast were mapped in this county during the 2013 ADS, down from over 11,000 acres detected in 2012. Numerous polygons occur in a wide line stretching north from a point east of St. Regis to Thompson Lake. Outside of this area, one 180 acre polygon was mapped in the

very northern portion of the county in the Cabinet Mountains, and another 70 acre polygon was mapped just across the county line north of Saltese.

Rhabdocline needle cast continues to be a significant agent in DF in the Plains Tree Improvement Area (MFO-TR-13-15), but its presence was not noted in the 2013 ADS.

Root diseases are common in counties west of the Continental Divide. The more common ones known to occur in this county are s-type annosus root disease, armillaria root disease, laminated root disease, and schweinitzii root and butt rot. The tree species most affected are DF and true firs. P-type annosus root disease is known to occur in PP, while tomentosus root disease is known to occur in localized areas in the county, affecting DF and ES.

WLDM, armillaria root disease and tomentosus root disease continue to contribute to the decline of WL along Montana State Highway 135 between St. Regis and Paradise.

WPBR is common in both WWP and WBP. DFDM, LPPDM, and WLDM are present and common in this county.

BWA was detected south of Plains on Forest Road 508, at the southern point of Bull Lake, along Cougar Peak Road, and north of Thompson Falls.

Silver Bow County

Forestland, Mortality, and Defoliation Acres by Ownership (431,116 ac flown)

	National Forest	*Other Federal*	*Private*	*State*	*Total*
Forestland	141,487	25,719	74,189	11,669	253,065
DFB	31	22	9	6	68
ESB	4	0	0	2	6
MPB-LPP	696	16	19	8	739
MPB-PP	4	2	0	2	8
MPB-High Elevation	135	2	8	34	179
SAF	8	0	0	2	10
WSBW	199	0	0	2	201
Aspen Damage	0	0	158	4	162

Nearly the entire county was flown in 2013 with the exception of a small area in the west Fleecer Mountains, constituting a 15-20% increase over what was flown in 2012. MPB in LPP greatly decreased in activity with scattered individuals remaining throughout the Fleecer, Highland, and Boulder Mountains. However, mortality in high-elevation 5-needle pines increased to nearly 180 acres, particularly in the Fleecer Mountains. DFB also increased minimally, as did ESB activity and SAF mortality, although all agents remained at very low levels. WSBW-caused defoliation experienced a 10-fold decrease with small patches remaining on the east side of the Fleecers. Scattered patches of aspen damage were noted with largest spots in the Highland Mountains east of Table Mountain, and west of Fleecer Mountain in the Fleecers.

WPBR is common in WBP and LP.

Stillwater County

Forestland, Mortality, and Defoliation Acres by Ownership (200,894 ac flown)

	National Forest	*Other Federal*	*Private*	*State*	*Total*
Forestland	116,026	5,336	130,074	5,336	256,773
DFB	146	1	34	0	181
ESB	2	0	0	0	2
MPB-LPP	78	0	14	0	92
MPB-PP	6	4	120	6	136
MPB-High Elevation	56	0	2	0	58
SAF	44	0	2	0	46
WSBW	1,396	173	1,069	13	2,651
Aspen Damage	50	14	64	0	128

This county was not surveyed in 2012 and had the south-central and southwestern portions surveyed in 2013. Within these areas, MPB and DFB were very limited to isolated areas that had low levels of tree mortality. Similarly, WSBW occurred at low to moderate levels as well.

Sweet Grass County

Forestland, Mortality, and Defoliation Acres by Ownership (333,302 ac flown)

	National Forest	*Other Federal*	*Private*	*State*	*Total*
Forestland	246,823	9,860	146,838	3,684	407,204
DFB	409	2	49	4	464
ESB	2	0	0	0	2
MPB-LPP	279	0	66	0	345
MPB-PP	0	0	4	0	4
MPB-High Elevation	1,139	0	10	0	1,149
SAF	321	0	0	0	321
WSBW	3,119	68	5,010	79	8,276

Similar areas were aerially surveyed in the northwestern portion of Sweet Grass County in 2012 and 2013, however, a substantial southern portion was flown in 2013 but not 2012. Overall, only low levels of DFB and MPB activity caused low levels of scattered mortality throughout the area surveyed within respective DF and LP hosts in 2013. MPB activity was substantial and continued within high-elevation 5-needle pines in the southern portion of the county in 2013. WSBW activity continued at low levels, primarily within DF throughout the county.

WPBR has been found in WBP and LP in this county. Tomentosus root disease, schweintizii root and butt rot, and stem decays affect overmature conifers.

Ground surveys for BWA were conducted in this county and no BWA were found.

Teton County

Forestland, Mortality, and Defoliation Acres by Ownership (237,296 ac flown)

	National Forest	*Other Federal*	*Private*	*State*	*Total*
Forestland	189,474	23,750	17,420	7,618	238,262
DFB	55	3	2	4	64
ESB	8	0	0	0	8
MPB-LPP	646	55	41	11	753
MPB-High Elevation	48	1	14	0	63
SAF	393	8	0	2	403
WSBW	0	0	13	10	23

Most of the non-wilderness Rocky Mountain Front was flown in 2013; nothing in the county had been flown in 2012. Scattered mortality due to MPB in LPP and high-elevation 5-needle pine hosts, to DFB principally in DF, ESB activity in ES, and a complex of agents in SAF was detected. Very little WSBW activity was noted.

WPBR is common in WBP and LP in this county. Armillaria root disease kills conifers and aspen, and tomentosus root disease and schweinitzii root and butt rot are causing damage in overmature conifers in parts of this county.

Toole County

WPBR occurs in WBP and LP in this county. A visit to West Butte of the Sweetgrass Hills documented WPBR levels in LP (Lockman, unpublished data).

Wheatland County

Forestland, Mortality, and Defoliation Acres by Ownership (147,482 ac flown)

	National Forest	*Other Federal*	*Private*	*State*	*Total*
Forestland	49,747	0	27,983	6,218	83,948
DFB	4	0	0	0	4
MPB-LPP	250	0	37	0	287
MPB-PP	2,352	0	1,310	0	3,663
MPB-High Elevation	33	0	0	0	33
IPS	0	0	121	0	121
WSBW	684	0	756	41	1,481

In 2013, ADS covered three corners of the county corresponding to the Crazy, Little Belt, and Big Snowy Mountains. Overall, somewhat less area was surveyed, particularly in the Little Belts, in comparison with 2012. Damage dropped for all agents, including MPB, in all host types with some activity remaining in both the Little Belt and Big Snowy Mountains. WSBW activity decreased 20-fold with most remaining activity in the Crazy Mountains. Decreases do not appear to be fully attributable to decreased survey area.

WPBR occurs in LP in this county.

Table 1. Forest Mortality, Defoliation, and Other Damage on Montana National Forests, National Parks, and Tribal Lands, 2013

BEAVERHEAD NF		
DILLON RD	**Acres**	**Trees**
Douglas-fir Beetle	24	50
Mountain Pine Beetle (PP)	2	2
Mountain Pine Beetle (LPP)	9,201	20,631
Subalpine Fir Mortality	22	39
MPB (High Elev 5-needle Pines)	2,497	6,118
Western Spruce Budworm	1,350	0
Aspen Damage	10	0
MADISON RD		
Douglas-fir Beetle	51	39
Engelmann Spruce Beetle	42	91
Mountain Pine Beetle (PP)	2	8
Mountain Pine Beetle (LPP)	170	684
Subalpine Fir Mortality	62	59
MPB (High Elev 5-needle Pines)	214	322
Western Spruce Budworm	10,418	0
Aspen Damage	123	0
SHERIDAN RD		
Douglas-fir Beetle	46	27
Engelmann Spruce Beetle	30	22
Mountain Pine Beetle (LPP)	533	807
Subalpine Fir Mortality	60	52
MPB (High Elev 5-needle Pines)	2,617	3,939
Western Spruce Budworm	1,368	0
Aspen Damage	148	0
WISDOM RD		
Engelmann Spruce Beetle	4	2
Mountain Pine Beetle (LPP)	143,957	828,342
Subalpine Fir Mortality	2	1
MPB (High Elev 5-needle Pines)	2,414	2,620
WISE RIVER RD		
Douglas-fir Beetle	16	30
Engelmann Spruce Beetle	2	1
Mountain Pine Beetle (PP)	2	1
Mountain Pine Beetle (LPP)	2,175	3,798
Subalpine Fir Mortality	4	8
MPB (High Elev 5-needle Pines)	263	785

BITTERROOT NF		
DARBY RD	**Acres**	**Trees**
Douglas-fir Beetle	669	2,422
Mountain Pine Beetle (PP)	6,387	19,522
Mountain Pine Beetle (LPP)	22,420	159,573
Subalpine Fir Mortality	21	70
MPB (High Elev 5-needle Pines)	1,965	2,991
Western Spruce Budworm	1,364	0
Pine Butterfly	103	0
STEVENSVILLE RD		
Douglas-fir Beetle	788	4,476
Mountain Pine Beetle (PP)	1,260	2,871
Mountain Pine Beetle (LPP)	10,950	48,180
MPB (High Elev 5-needle Pines)	216	455
Western Spruce Budworm	1,420	0
SULA RD		
Douglas-fir Beetle	6	15
Mountain Pine Beetle (PP)	2,965	9,351
Mountain Pine Beetle (LPP)	39,393	430,987
Western Pine Beetle	2	1
Subalpine Fir Mortality	2	5
MPB (High Elev 5-needle Pines)	1,394	3,694
Western Spruce Budworm	984	0
WEST FORK RD		
Douglas-fir Beetle	16	55
Mountain Pine Beetle (PP)	6,809	34,116
Mountain Pine Beetle (LPP)	49,515	476,558
Western Pine Beetle	4	2
Subalpine Fir Mortality	98	100
MPB (High Elev 5-needle Pines)	847	4,676
Western Spruce Budworm	350	0
CUSTER NF		
ASHLAND RD		
Mountain Pine Beetle (PP)	283	158
BEARTOOTH RD		
Douglas-fir Beetle	988	3,132
Engelmann Spruce Beetle	21	51
Mountain Pine Beetle (PP)	14	26
Mountain Pine Beetle (LPP)	1,050	2,652
Subalpine Fir Mortality	1,039	1,636

	Acres	Trees
MPB (High Elev 5-needle Pines)	1,425	5,289
Western Spruce Budworm	2,926	0
Unidentified Defoliator (PP)	28	0
Aspen Damage	99	0
SIOUX RD		
Mountain Pine Beetle (PP)	61	38
DEERLODGE NF		
BUTTE RD		
Douglas-fir Beetle	35	33
Engelmann Spruce Beetle	4	2
Mountain Pine Beetle (PP)	2	2
Mountain Pine Beetle (LPP)	722	1,757
Subalpine Fir Mortality	14	11
MPB (High Elev 5-needle Pines)	96	53
Western Spruce Budworm	199	0
DEER LODGE RD		
Douglas-fir Beetle	46	89
Engelmann Spruce Beetle	2	2
Mountain Pine Beetle (PP)	18	55
Mountain Pine Beetle (LPP)	3,751	9,208
Subalpine Fir Mortality	12	9
MPB (High Elev 5-needle Pines)	2,370	2,412
Western Spruce Budworm	11	0
Aspen Damage	6	0
JEFFERSON RD		
Douglas-fir Beetle	48	31
Engelmann Spruce Beetle	22	11
Mountain Pine Beetle (PP)	10	5
Mountain Pine Beetle (LPP)	219	926
Subalpine Fir Mortality	56	35
MPB (High Elev 5-needle Pines)	675	445
Western Spruce Budworm	208	0
Aspen Damage	2	0
PHILIPSBURG RD		
Douglas-fir Beetle	56	122
Engelmann Spruce Beetle	4	2
Mountain Pine Beetle (PP)	28	69
Mountain Pine Beetle (LPP)	94,861	189,296
Western Pine Beetle	2	1
Subalpine Fir Mortality	4	6

	Acres	Trees
MPB (High Elev 5-needle Pines)	2,411	3,548
FLATHEAD NF		
GLACIER VIEW RD		
Douglas-fir Beetle	24	16
Engelmann Spruce Beetle	46	23
Mountain Pine Beetle (WP)	177	12
Mountain Pine Beetle (PP)	183	14
Mountain Pine Beetle (LPP)	4	45
Subalpine Fir Mortality	1,419	5,513
MPB (High Elev 5-needle Pines)	99	378
Western Spruce Budworm	47,491	0
Larch Needle Cast	431	0
HUNGRY HORSE RD		
Douglas-fir Beetle	441	1,541
Engelmann Spruce Beetle	33	24
Mountain Pine Beetle (WP)	173	12
Mountain Pine Beetle (PP)	191	25
Mountain Pine Beetle (LPP)	87	184
Fir Engraver Beetle	181	903
Subalpine Fir Mortality	55	66
Western Spruce Budworm	33,147	0
Larch Needle Cast	1,826	0
SPOTTED BEAR RD		
Douglas-fir Beetle	32	40
Engelmann Spruce Beetle	4	2
Mountain Pine Beetle (PP)	4	2
Mountain Pine Beetle (LPP)	562	1,706
Fir Engraver Beetle	4	10
Subalpine Fir Mortality	40	27
Western Spruce Budworm	20,611	0
Larch Needle Cast	137	0
SWAN LAKE RD		
Douglas-fir Beetle	443	979
Engelmann Spruce Beetle	6	4
Pine Engraver Beetle (PP)	143	81
Mountain Pine Beetle (PP)	204	93
Mountain Pine Beetle (LPP)	54	178
Subalpine Fir Mortality	74	89
MPB (High Elev 5-needle Pines)	4	2
Western Spruce Budworm	33,925	0

	Acres	Trees
Larch Needle Cast	3,208	0
Aspen Damage	6	0
TALLY LAKE RD		
Douglas-fir Beetle	338	240
Engelmann Spruce Beetle	9	6
Pine Engraver Beetle (PP)	2	1
Mountain Pine Beetle (PP)	20	28
Mountain Pine Beetle (LPP)	16	24
Subalpine Fir Mortality	44	53
Western Spruce Budworm	48,887	0
Larch Needle Cast	71	0
Aspen Damage	389	0
GALLATIN NF		
BIG TIMBER RD		
Douglas-fir Beetle	517	953
Mountain Pine Beetle (LPP)	108	301
Subalpine Fir Mortality	148	881
MPB (High Elev 5-needle Pines)	934	3,254
Western Spruce Budworm	3,876	0
BOZEMAN RD		
Douglas-fir Beetle	2,193	8,848
Engelmann Spruce Beetle	6	6
Mountain Pine Beetle (LPP)	2,145	8,086
Subalpine Fir Mortality	666	5,902
MPB (High Elev 5-needle Pines)	3,064	8,333
Western Spruce Budworm	33,263	0
Diplodia Canker	25	0
GARDINER RD		
Douglas-fir Beetle	12	12
Mountain Pine Beetle (LPP)	1,749	9,859
Subalpine Fir Mortality	6	20
MPB (High Elev 5-needle Pines)	623	2,661
Western Spruce Budworm	4,622	0
HEBGEN LAKE RD		
Mountain Pine Beetle (LPP)	8	45
Subalpine Fir Mortality	13	35
MPB (High Elev 5-needle Pines)	37	120
Western Spruce Budworm	66	0
Lophodermella concolor	18	0

	Acres	Trees
LIVINGSTON RD		
Douglas-fir Beetle	189	338
Mountain Pine Beetle (PP)	2	1
Mountain Pine Beetle (LPP)	1,208	4,243
Subalpine Fir Mortality	123	233
MPB (High Elev 5-needle Pines)	1,518	3,370
Western Spruce Budworm	18,730	0
Lophodermella concolor	533	0
HELENA NF		
HELENA RD		
Douglas-fir Beetle	76	156
Mountain Pine Beetle (PP)	131	268
Mountain Pine Beetle (LPP)	717	2,803
Subalpine Fir Mortality	40	97
MPB (High Elev 5-needle Pines)	8	9
Western Spruce Budworm	21,009	0
LINCOLN RD		
Douglas-fir Beetle	213	459
Mountain Pine Beetle (PP)	14	40
Mountain Pine Beetle (LPP)	1,074	3,535
Subalpine Fir Mortality	18	48
MPB (High Elev 5-needle Pines)	145	630
Western Spruce Budworm	34,082	0
TOWNSEND RD		
Douglas-fir Beetle	6	7
Mountain Pine Beetle (PP)	137	472
Mountain Pine Beetle (LPP)	4	11
Subalpine Fir Mortality	4	10
Western Spruce Budworm	3,883	0
Aspen Damage	6	0
KOOTENAI NF		
CABINET RD		
Douglas-fir Beetle	829	1,735
Engelmann Spruce Beetle	16	8
Mountain Pine Beetle (PP)	95	121
Mountain Pine Beetle (LPP)	3,157	7,331
Subalpine Fir Mortality	34	106
MPB (High Elev 5-needle Pines)	294	326
Western Spruce Budworm	8,000	0

	Acres	Trees
Larch Needle Cast	179	0
FISHER RIVER RD		
Douglas-fir Beetle	982	2,026
Engelmann Spruce Beetle	6	7
Mountain Pine Beetle (WP)	84	43
Mountain Pine Beetle (PP)	48	73
Mountain Pine Beetle (LPP)	1,155	2,211
Western Pine Beetle	2	1
Subalpine Fir Mortality	38	60
Western Spruce Budworm	9,656	0
Lophodermella concolor	269	0
Larch Needle Cast	1,610	0
FORTINE RD		
Douglas-fir Beetle	36	80
Mountain Pine Beetle (WP)	2	1
Mountain Pine Beetle (PP)	4	2
Subalpine Fir Mortality	14	14
Western Spruce Budworm	13,997	0
LIBBY RD		
Douglas-fir Beetle	848	1,717
Engelmann Spruce Beetle	28	48
Mountain Pine Beetle (WP)	20	23
Mountain Pine Beetle (PP)	36	6
Mountain Pine Beetle (LPP)	62	249
Western Pine Beetle	2	1
Subalpine Fir Mortality	58	49
MPB (High Elev 5-needle Pines)	102	109
Western Spruce Budworm	1,595	0
Larch Needle Cast	426	0
REXFORD RD		
Douglas-fir Beetle	24	49
Engelmann Spruce Beetle	2	1
Mountain Pine Beetle (PP)	6	5
Mountain Pine Beetle (LPP)	23	50
Subalpine Fir Mortality	36	78
Western Spruce Budworm	6,274	0

	Acres	Trees
THREE RIVERS RD		
Douglas-fir Beetle	372	673
Engelmann Spruce Beetle	6	3
Mountain Pine Beetle (WP)	156	22
Mountain Pine Beetle (PP)	10	8
Mountain Pine Beetle (LPP)	4	4
Western Pine Beetle	4	2
Subalpine Fir Mortality	38	53
MPB (High Elev 5-needle Pines)	701	694
Western Spruce Budworm	3,674	0
LEWIS and CLARK NF		
JUDITH RD		
Douglas-fir Beetle	60	44
Engelmann Spruce Beetle	6	3
Mountain Pine Beetle (PP)	2,897	2,793
Mountain Pine Beetle (LPP)	5,060	16,354
Subalpine Fir Mortality	50	37
MPB (High Elev 5-needle Pines)	1,547	2,480
Western Spruce Budworm	10,875	0
Windthrow	167	0
KINGS HILL RD		
Douglas-fir Beetle	100	83
Engelmann Spruce Beetle	16	11
Mountain Pine Beetle (PP)	765	236
Mountain Pine Beetle (LPP)	5,843	9,773
Subalpine Fir Mortality	32	26
MPB (High Elev 5-needle Pines)	2,381	2,249
Western Spruce Budworm	3,064	0
MUSSELSHELL RD		
Douglas-fir Beetle	161	654
Mountain Pine Beetle (PP)	12,001	29,962
Mountain Pine Beetle (LPP)	410	858
Subalpine Fir Mortality	57	184
MPB (High Elev 5-needle Pines)	849	938
Western Spruce Budworm	6,383	0
ROCKY RD		
Douglas-fir Beetle	111	147
Engelmann Spruce Beetle	16	18

	Acres	Trees
Mountain Pine Beetle (PP)	18	23
Mountain Pine Beetle (LPP)	1,998	6,734
Subalpine Fir Mortality	539	1,628
MPB (High Elev 5-needle Pines)	75	136
Western Spruce Budworm	6,405	0
LOLO NF		
MISSOULA RD		
Douglas-fir Beetle	124	263
Engelmann Spruce Beetle	6	10
Mountain Pine Beetle (PP)	281	715
Mountain Pine Beetle (LPP)	934	4,280
Subalpine Fir Mortality	44	116
MPB (High Elev 5-needle Pines)	80	176
Western Spruce Budworm	2,638	0
NINEMILE RD		
Douglas-fir Beetle	175	249
Mountain Pine Beetle (PP)	284	592
Mountain Pine Beetle (LPP)	1,068	3,824
Western Pine Beetle	4	2
Subalpine Fir Mortality	192	389
Western Spruce Budworm	838	0
PLAINS RD		
Douglas-fir Beetle	340	556
Mountain Pine Beetle (PP)	408	185
Mountain Pine Beetle (LPP)	294	528
Fir Engraver Beetle	9	16
Subalpine Fir Mortality	31	74
Balsam Woolly Adelgid	13	10
Western Spruce Budworm	580	0
Larch Needle Cast	471	0
SEELEY LAKE RD		
Douglas-fir Beetle	95	90
Engelmann Spruce Beetle	30	17
Mountain Pine Beetle (PP)	512	2,476
Mountain Pine Beetle (LPP)	654	1,661
Subalpine Fir Mortality	100	159
MPB (High Elev 5-needle Pines)	30	27
Western Spruce Budworm	49,836	0
Larch Needle Cast	471	0

	Acres	Trees
SUPERIOR RD		
Douglas-fir Beetle	225	263
Engelmann Spruce Beetle	36	23
Pine Engraver Beetle (PP)	2	1
Mountain Pine Beetle (WP)	2	1
Mountain Pine Beetle (PP)	186	206
Mountain Pine Beetle (LPP)	1,445	2,856
Fir Engraver Beetle	6	11
Subalpine Fir Mortality	115	241
Balsam Woolly Adelgid	17	0
Western Spruce Budworm	1,020	0
Larch Needle Cast	1,094	0
THOMPSON FALLS RD		
Douglas-fir Beetle	227	284
Engelmann Spruce Beetle	24	15
Mountain Pine Beetle (PP)	106	79
Mountain Pine Beetle (LPP)	221	304
Western Pine Beetle	2	1
Subalpine Fir Mortality	62	85
Western Spruce Budworm	705	0
Larch Needle Cast	129	0
BLACKFEET IR		
Douglas-fir Beetle	39	38
Engelmann Spruce Beetle	8	4
Mountain Pine Beetle (LPP)	14	117
Subalpine Fir Mortality	18	22
Western Spruce Budworm	6,794	0
Aspen Damage	6	0
CROW IR		
Douglas-fir Beetle	16	9
Engelmann Spruce Beetle	2	1
Mountain Pine Beetle (PP)	283	571
Mountain Pine Beetle (LPP)	472	1,088
Fir Engraver Beetle	168	57
Subalpine Fir Mortality	4	2
MPB (High Elev 5-needle Pines)	294	414
Aspen Damage	119	0

	Acres	Trees
FLATHEAD IR		
Douglas-fir Beetle	545	581
Engelmann Spruce Beetle	8	4
Pine Engraver Beetle (PP)	41	53
Mountain Pine Beetle (PP)	874	540
Mountain Pine Beetle (LPP)	244	478
Fir Engraver Beetle	6	3
Subalpine Fir Mortality	94	77
Western Spruce Budworm	868	0
Elytroderma	217	0
FORT BELKNAP IR		
Douglas-fir Beetle	106	503
Mountain Pine Beetle (PP)	930	1,455
Mountain Pine Beetle (LPP)	51	73
Western Spruce Budworm	1,471	0
Aspen Damage	15	0
NORTHERN CHEYENNE IR		
Mountain Pine Beetle (PP)	108	79
ROCKY BOY'S IR		
Douglas-fir Beetle	6	5
Mountain Pine Beetle (PP)	36	28
Mountain Pine Beetle (LPP)	2,805	10,247
Western Spruce Budworm	1,973	0
GLACIER NP		
Douglas-fir Beetle	509	275
Engelmann Spruce Beetle	22	14
Mountain Pine Beetle (PP)	6	3
Mountain Pine Beetle (LPP)	325	676
Subalpine Fir Mortality	1,111	666
Western Spruce Budworm	29,251	0
Larch Needle Cast	534	0

	Acres	Trees
YELLOWSTONE NP		
Douglas-fir Beetle	12	10
Engelmann Spruce Beetle	38	53
Flooding – High Water	79	60
Lophodermella concolor	102,372	0
Mountain Pine Beetle (LPP)	1,549	5,200
MPB (High Elev 5-needle Pines)	56	80
Subalpine Fir Mortality	342	745
Western Spruce Budworm	2,268	0

Table 2. Host Type Infested by Bark Beetles on All Ownerships Statewide, 2013 (Acres)[2]

Insect[1]	USFS	Other Fed	Private	State	Total
DFB	10,990	1257	2,686	968	15,901
ESB	404	56	89	22	571
FE	199	173	10	0	382
IPS	146	35	374	63	618
MPB-LPP	397,151	10,790	21,809	5,004	434,754
MPB-PP	32,809	3,083	18,696	2,708	57,296
MPB-High Elevation	30,743	760	1,960	333	33,796
MPB-WP	461	0	146	5	612
MPB-ALL	461,164	14,633	42,611	8,050	526,458
SAF	5,361	1,359	180	73	6,973
WPB	20	0	14	0	34

[1]DFB = Douglas-fir beetle; ESB = spruce beetle; FE = fir engraver beetle; IPS = pine engraver beetle; MPB LPP = mountain pine beetle in lodgepole pine; MPB PP = mountain pine beetle in ponderosa pine; MPB 5-NP = mountain pine beetle in 5-Needle pines (WBP & LP); MPB WP = mountain pine beetle in western white pine; MPB All = mountain pine beetle in all pines; SAF = Subalpine fir mortality complex; WPB = western pine beetle
[2]Includes areas surveyed in Yellowstone NP within WY

Table 3. Bark Beetle Infestations Statewide, 2011–2013[1]

	2011		2012		2013	
Insects[2]	Acres	Trees	Acres	Trees	Acres	Trees
DFB	8,989	15,175	3,012	3,651	15,901	39,034
ESB	3,113	1,182	323	465	571	437
FE	212	326	84	72	382	1,018
MPB	1,033,791	3,653,433	666,336	1,443,184	526,458	2,570,042
IPS	115	288	119	141	618	1,178
SAF	29,991	41,731	2,908	4,392	6,973	19,383
WPB	16	9	6	3	36	18
Total	1,076,227	3,712,144	672,788	1,451,908	550,939	2,631,110

[1]Includes areas surveyed in Yellowstone NP within WY
[2]DFB = Douglas-fir beetle; ESB = Engelmann spruce beetle; FE = fir engraver beetle; IPS = pine engraver beetle; MPB = mountain pine beetle; SAF = subalpine fir mortality complex; WPB = western pine beetle.

Table 4. Douglas-fir Beetle-Caused Mortality on All Ownerships Statewide, 2011−2013

	2011		2012		2013	
Reporting Area	**Acres**	**Trees**	**Acres**	**Trees**	**Acres**	**Trees**
Beaverhead	230*	118*	87*	97*	257*	252*
Bitterroot	151*	233*	194*	6*	1,497	7,012
Bull Mountains	0	0	★	★	★	★
Custer	154	543	★	★	1,660*	4,986*
Deerlodge	251*	386*	60*	87*	305*	406*
Flathead	1,092*	1,300*	223	251	1,513	3,111
Fort Peck Lake	2	1	★	★	★	★
Gallatin	672*	2,394*	209*	354*	3,233*	10,954*
Garnets	757*	20*	44	64	62	69
Helena	851*	2,483*	101*	93*	695*	1,227*
Kootenai	953*	1,104*	653	752	3,171*	6,366*
Lewis and Clark	1,908*	4,925*	122*	137*	887	1,257
Lolo	771*	812*	736	689	1,398*	1,983*
Blackfeet IR	★	★	20	41	39	38
Crow IR	575	459	★	★	16	9
Flathead IR	108	117	171	217	545	581
Fort Belknap IR	8*	11*	16	19	106	503
No. Cheyenne IR	0	0	★	★	0	0
Rocky Boy's IR	4*	8*	8	10	6	5
Glacier NP	518*	244*	364	830	509*	275*
Yellowstone NP[1]	120*	189*	★	★	12*	10*
Total	**9,123**	**15,346**	**3,008**	**3,648**	**15,901**	**39,034**

★ = Not surveyed *= Partially surveyed

[1]Yellowstone NP includes acres in MT, ID, and WY

Table 5. Mountain Pine Beetle-Caused Mortality on State and Private Lands, Statewide, 2011−2013 (Acres)

	2011				2012				2013			
Reporting Area	**LPP**	**PP**	**5-NP**	**WWP**	**LPP**	**PP**	**5-NP**	**WWP**	**LPP**	**PP**	**5-NP**	**WWP**
Beaverhead	5,579*	8*	1,191*	0*	9,090*	32*	27*	0*	9,792*	7*	407*	0*
Bitterroot	1,382*	1,495*	0*	0*	4,944*	7,397*	0*	0*	2,320	3,175	0	0
Bull Mountains	0	377	0	0	★	★	★	★	★	★	★	★
Custer	33	129	2	0	★	★	★	★	109*	230*	94*	0*
Deerlodge	15,687*	4,869*	430*	0*	16,417*	1,298*	217*	0*	10,124*	126*	1,124*	0*
Flathead	3,714*	1,110*	2*	0*	531	623	0	2	228	75	9	5
Fort Peck Lake	0	191	0	0	★	★	★	★	★	★	★	★
Gallatin	10,018*	4*	3,652*	0*	1,662*	12*	650*	0*	1,326*	16*	511*	0*
Garnets	18,922*	29,044*	0*	0*	3,615	5,238	0	0	66	253	0	0
Helena	25,120*	23,353*	1*	0*	4,020*	8,999*	2*	0*	580*	1,318*	4*	0*
Kootenai	1,598*	220*	32*	0*	1,025	107	0	52	427*	23*	2*	144*
Lewis and Clark	7,513*	11,307*	465*	0*	4,401*	30,528*	46*	0*	1,026	14,999	137	0
Lolo	10,607*	5,679*	0*	0*	5,147	4,583	0	0	194*	816*	4*	2*
Blackfeet IR	★	★	★	★	86	0	2	0	14	0	0	0
Crow IR	4	74	2	0	★	★	★	★	472	49	294	0
Flathead IR	631	243	0	0	44	156	2	0	243	872	0	0
Fort Belknap IR	35*	48*	0*	0*	6	53	0	0	6	548	0	0
No. Cheyenne IR	0	7	0	0	★	★	★	★	0	108	0	0
Rocky Boy's IR	179*	606*	0*	0*	504	419	0	0	2,759	36	0	0
Glacier NP	39*	2*	2*	0*	22	0	0	0	2*	0*	0*	0*
Yellowstone NP[1]	0*	0*	0*	0*	★	★	★	★	1,549*	0*	56*	0)
Total	**101,231**	**78,198**	**5,779**	**0**	**51,514**	**59,445**	**946**	**54**	**31,237**	**22,651**	**2,642**	**151**

[1]LPP = lodgepole pine; PP = ponderosa pine; 5-NP = 5-needle pines (WBP & LP); WWP = western white pine

★ = Not surveyed; * = Partially surveyed; [1]Yellowstone NP includes MT, ID, and WY acres

Table 6. Mountain Pine Beetle-Caused Mortality on All Federal Ownerships, Statewide, 2011−2013 (Acres)

	2011				2012				2013			
Reporting Area	**LPP**	**PP**	**5-NP**	**WWP**	**LPP**	**PP**	**5-NP**	**WWP**	**LPP**	**PP**	**5-NP**	**WWP**
Beaverhead	91,811*	47*	32,498*	0*	69,551*	67*	8,447*	0*	157,217*	21*	8,101*	0*
Bitterroot	78,626*	20,262*	118*	0*	138,396*	38,232*	1,425*	0*	120,693	15,523	4,423	0
Bull Mountains	0	358	0	0	★	★	★	★	★	★	★	★
Custer	2,416	564	2,169	0	★	★	★	★	953*	365*	1,340*	0*
Deerlodge	83,703*	2,415*	146*	0*	92,093*	1,047*	668*	0*	97,647*	59*	5,385*	2*
Flathead	6,063*	1,674*	26*	77*	5,876	118	6	0	710	599	93	345
Fort Peck Lake	0	0	0	0	★	★	★	★	★	★	★	★
Gallatin	29,821*	2*	16,059*	0*	2,416*	2*	4,134*	0*	4,046*	0*	5,672*	0*
Garnet	36,600*	4,963*	0*	0*	8,151	968	0	0	74	9	0	0
Helena	181,007*	12,683*	77*	0*	14,319*	6,209*	503*	0*	1,885*	424*	151*	0*
Kootenai	15,003*	1,182*	32*	0*	10,639	451	112	1,211	3,995*	181*	1,094*	114*
Lewis and Clark	94,411*	24,589*	11,859*	0*	52,792*	35,129*	6,120*	0*	12,971	15,408	4,842	0
Lolo	54,163*	8,262*	112*	0*	38,651	7,858	4	0	4,463*	1,450*	108*	2*
Blackfeet IR	★	★	★	★	486	0	0	0	0	0	0	0
Crow IR	2,082	438	24	0	★	★	★	★	0	0	0	0
Flathead IR	6,339	1,200	6	2	904	662	2	0	1	2	0	0
Fort Belknap IR	138*	423*	0*	0*	157	1,189	0	0	45	382	0	0
No. Cheyenne IR	0	106	0	0	★	★	★	★	0	0	0	0
Rocky Boy's IR	722*	292*	0*	0*	946	103	0	0	46	0	0	0
Glacier NP	5,740*	2*	2*	0*	4,325	2	0	0	323*	6*	0*	0*
Yellowstone NP[1]	26,312*	0*	6,362*	0*	★	★	★	★	1,549*	0*	56*	0*
Total	**715,069**	**79,104**	**69,490**	**79**	**439,702**	**92,037**	**21,421**	**1,211**	**406,618**	**34,429**	**31,265**	**463**

[1] LPP = Lodgepole pine; PP = Ponderosa pine; 5-NP = 5-needle pines (WBP & LP); WWP = Western white pine
★ = Not surveyed; * = Partially surveyed; [1]Yellowstone NP includes MT, ID, and WY acres

Table 7. Additional Bark Beetle-Caused Mortality on All Ownerships, Statewide, 2011−2013 (Acres)

	Spruce Beetle			Fir Engraver			Pine Engraver			Subalpine Fir Mortality			Western Pine Beetle		
Reporting Area	**2011**	**2012**	**2013**	**2011**	**2012**	**2013**	**2011**	**2012**	**2013**	**2011**	**2012**	**2013**	**2011**	**2012**	**2013**
Beaverhead	3,075*	20*	98*	0*	0*	0*	0*	0*	0*	18,984*	48*	194*	0*	0*	0*
Bitterroot	0*	0*	0	0*	0*	0	0*	0*	4	46*	26*	120	0*	0*	12
Bull Mountains	0	★	★	0	★	★	0	★	★	0	★	★	0	★	★
Custer	8	★	21*	0	★	0*	2	★	0*	368	★	1,170*	0	★	0*
Deerlodge	0*	2*	34*	0*	0*	2*	0*	0*	0*	10*	6*	88*	0*	0*	2*
Flathead	8*	2	128	80*	6	189	4*	0	243	2,399*	274	1,687	0*	0	0
Fort Peck Lake	0	★	★	0	★	★	0	★	★	0	★	★	0	★	★
Gallatin	0*	8*	6*	0*	0*	0*	0*	0*	0*	1,531*	307*	957*	0*	0*	0*
Garnets	0*	2	4	4*	0	0	2*	2	0	2*	0	18	0*	0	6
Helena	2*	0*	4*	0*	0*	0*	2*	0*	48*	16*	38*	66*	8*	2*	0*
Kootenai	2*	86	91*	30*	58	0*	0*	2	0*	643*	702	207*	0*	0	10*
Lewis and Clark	4*	4*	44	26*	0*	0	24*	111*	153	3,413*	141*	690	0*	0*	0
Lolo	4*	22	102*	14*	0	18*	5*	2	6*	279*	501	546*	2*	2	6*
Blackfeet IR	★	32	8	★	0	0	★	0	0	★	63	18	★	0	0
Crow IR	0	★	2	0	★	168	0	★	0	1,601	★	4	0	★	0
Flathead IR	0	0	8	56	0	6	0	2	0	160	89	94	6	2	0
Fort Belknap IR	0*	0	0	0*	0	0	0*	0	0	0*	0	0	0*	0	0
No. Cheyenne IR	0	★	0	0	★	0	0	★	0	0	★	0	0	★	0
Rocky Boy's IR	0*	0	0	0*	0	0	0*	0	0	0*	0	0	0*	0	0
Glacier NP	10*	142	0*	2*	2	0*	0*	0	0*	474*	664	1,111*	0*	0	0*
Yellowstone NP[1]	8*	★	0*	0*	★	0*	0*	★	0*	466*	★	2*	0*	★	0*
Total	**3,121**	**320**	**571**	**212**	**66**	**382**	**39**	**119**	**618**	**30,394**	**2,859**	**6,973**	**16**	**6**	**36**

★ = Not surveyed * = Partially surveyed

[1]Yellowstone NP includes MT, ID, and WY acres

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COMMON AND SCIENTIFIC NAMES

Common Name	Pathogens	Primary Hosts
Annosus root disease		
(S-Type)	*Heterobasidion occidentale* Otrosina & Garbelotto	DF, GF, SAF
(P-Type)	*Heterobasidion irregulare* Garbelotto & Otrosina	PP
Armillaria root disease	*Armillaria ostoyae* (Romagn.) Herink	DF, GF, SAF, saplings of all conifers
Aspen heart rot	*Phellinus tremulae* (Bond.) Bond. & Borisov.	QA
Aspen shoot blight	*Venturia macularis* (Fr.) E. Muller & Arx	QA
Atropellis canker	*Atropellis piniphila* (Weir) Lohman & Cash	LPP
Black canker	*Ceratocystis fimbriata* Ellis & Halst.	QA
Black stain root disease	*Ophiostoma wageneri (*Goheen & F.W. Cobb) Harrington	DF, PP
Comandra rust	*Cronartium comandrae* Pk.	LPP, PP
Diplodia shoot blight	*Diplodia pinea (*Desmaz.) J. Kickx fil.	PP
Dothistroma needle blight	*Mycosphaerella pini* Rost. In Munk	PP, LPP, LP
Dutch Elm Disease	*Ophiostoma ulmi (*Buisman) Nannf.	Elms
Dwarf mistletoes	*Arceuthobium* spp.	DF, LP, LPP, WL
Elytroderma needle cast	*Elytroderma deformans* (Weir) Darker	PP
Ganoderma	*Ganoderma applanatum* (Pers.) Pat.	QA
Indian paint fungus	*Echinodontium tinctorium* (Ell. & Ev.) Ell. & Ev.	GF, WH
Laminated root rot	*Phellinus weirii* (Murrill) R.L. Gilbertson.	DF, GF, SAF, WH
Larch needle blight	*Hypodermella laricis* Tub.	WL
Larch needle cast	*Meria laricis* Vuill.	WL
Marsonnina leaf spot	*Marsonnina populi* (Lib.) Magn.	QA
Red ray rot	*Dichomitus squalens* (P. Karst.) D.A. Reid	PP
Red ring rot	*Phellinus pini* (Thore :Fr.) A.Ames	DF, ES, PP, WL
Rhabdocline needle blight	*Rhabdocline pseudotsugae* Syd.	DF
Schweinitzii root and butt rot	*Phaeolus schweinitzii* (Fr. :Fr.) Pat.	Mainly DF, all conifers
Spruce broom rust	*Chrysomyxa arctostaphyli* Diet.	ES
Tomentosus root disease	*Onnia tomentosa* (Fr.) P. Karst.	ES, DF, LPP, SAF, WL
Western gall rust	*Endocronartium harknessii* (J.P. Moore) Y. Hiratsuka	PP, LPP
White pine blister rust	*Cronartium ribicola* J.C. Fisch.	LP, WBP, WWP

Common Name	Insects	Primary Hosts
Balsam woolly adelgid	*Adelges piceae* Ratzeburg	GF, SAF
Douglas-fir beetle	*Dendroctonus pseudotusugae* Hopkins	DF
Douglas-fir tussock moth	*Orygia pseudotsugata (*McDunnough*)*	DF, ES, TF
Fall webworm	*Hyphantria cunea* (Drury)	CC
Fir engraver beetle	*Scolytis ventralis* LeConte	GF, SAF
Larch casebearer	*Coleophora laricella (*Hubner*)*	WL
Mountain pine beetle	*Dendroctonus ponderosae* Hopkins	All pines
Pine butterfly	*Neophasia menapia* (Felder & Felder)	PP
Pine engraver beetle	*Ips pini* (Say)	LPP, PP
Spruce beetle	*Dendroctonus rufipennis* Swaine	ES
Western balsam bark beetle	*Dryocoetes confuses* Swaine	SAF
Western pine beetle	*Dendroctonus brevicomis* LeConte	PP
Western spruce budworm	*Choristoneura occidentalis* Freeman	DF, GF, SAF, ES, WL

CC = chokecherry; DF = Douglas-fir; ES = Engelmann spruce; GF = grand fir; LP = limber pine; LPP = lodgepole pine; PP = ponderosa pine; QA = quaking aspen; SAF = subalpine fir; TF = true firs; WWP = western white pine; WH = western hemlock; WL = western larch; WBP = whitebark pine

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Figure 1. Reporting Areas and County Boundaries in Montana

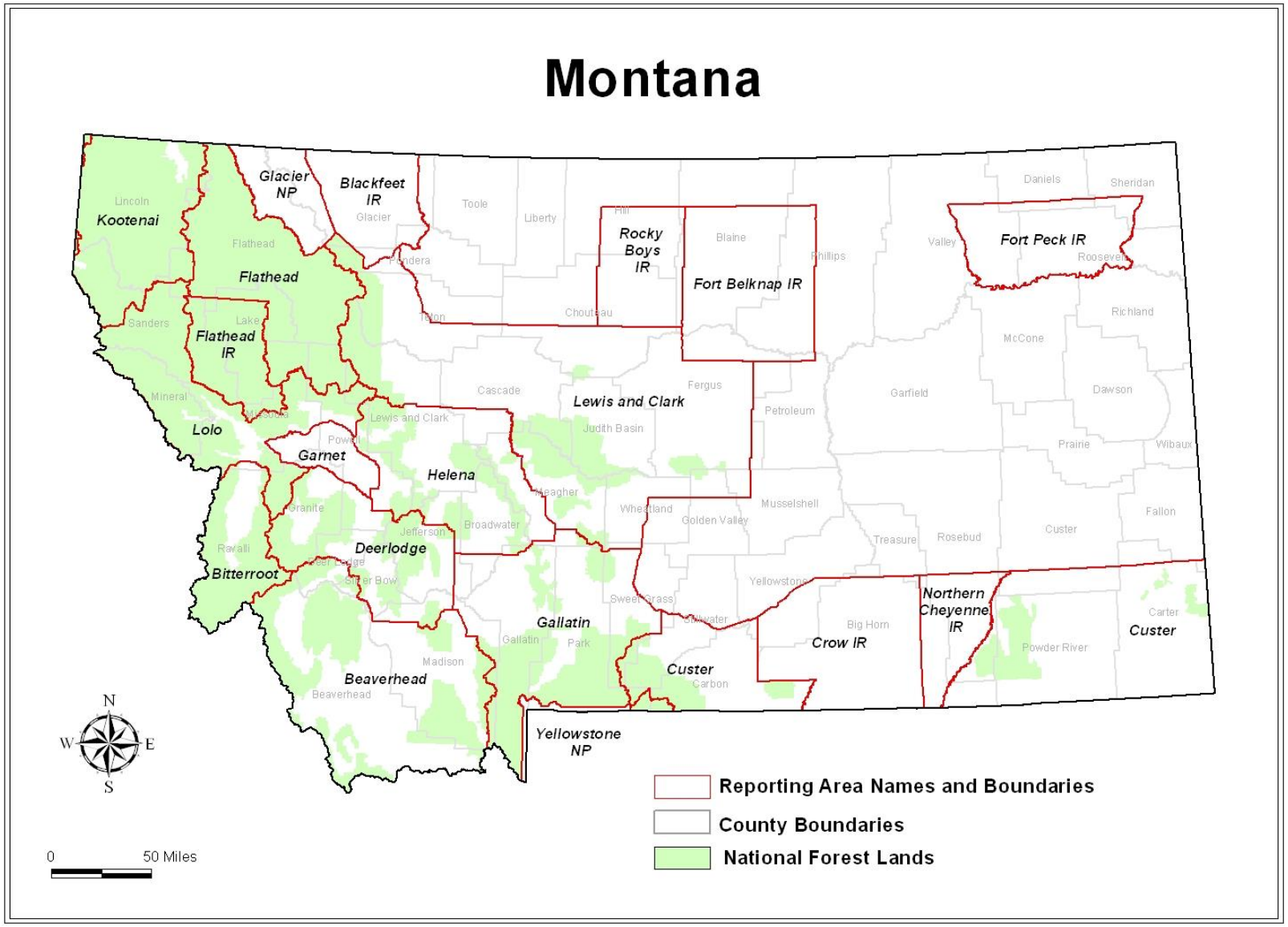


Figure 2. Areas Surveyed In 2013 Forest Health Protection Aerial Detection Survey in Montana

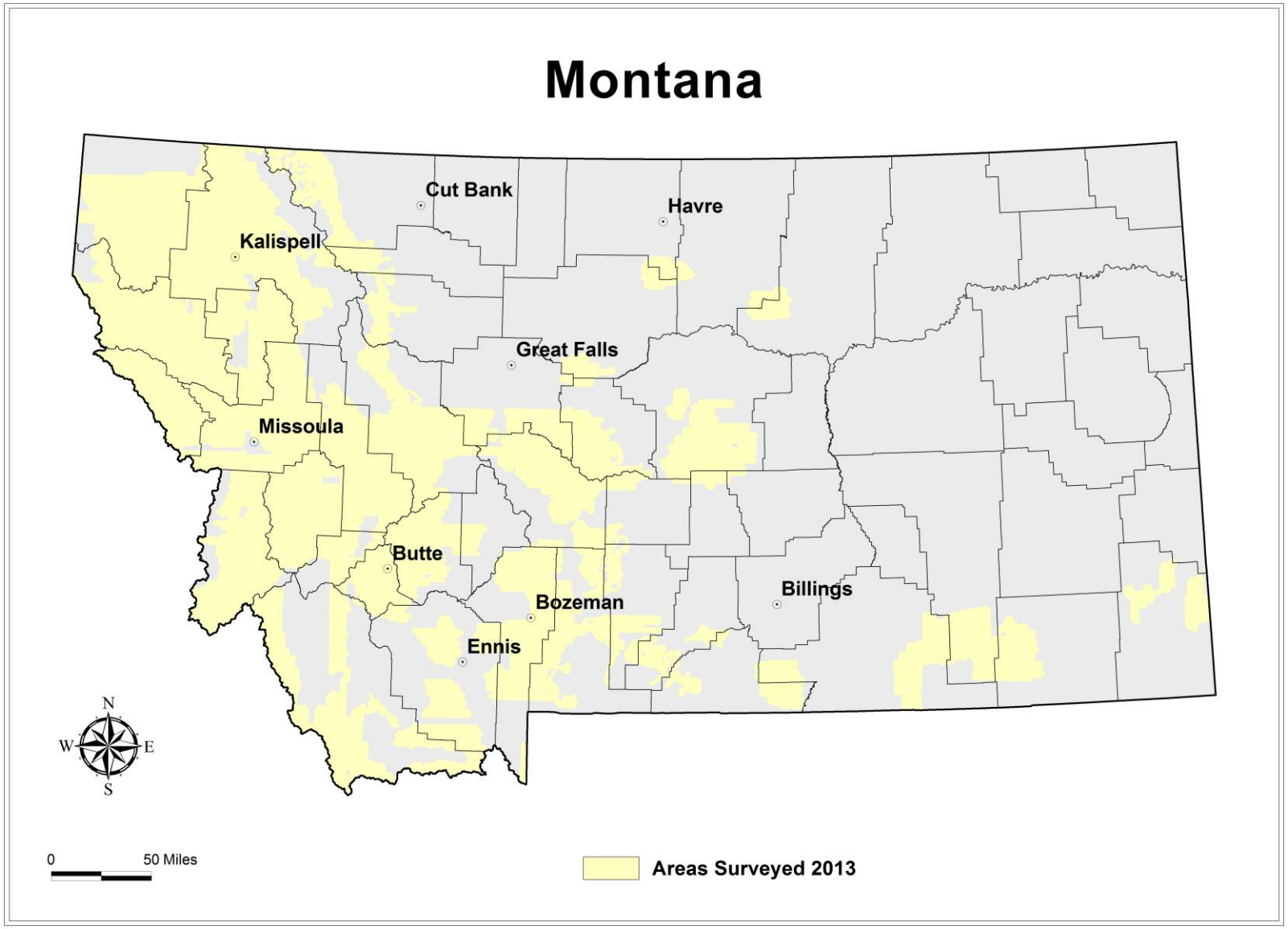


Figure 3. 2013 Mountain Pine Beetle Infestations in Montana

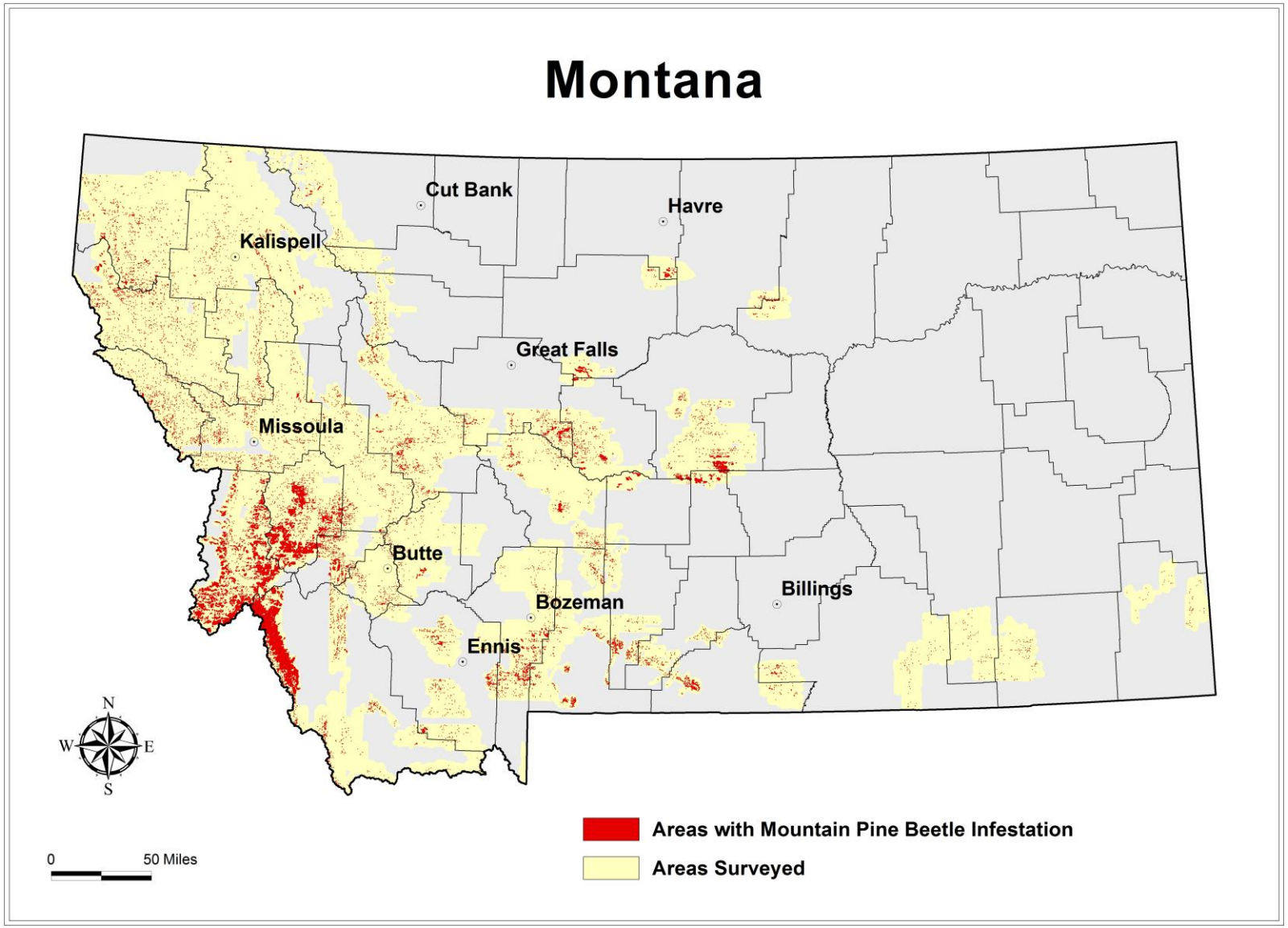


Figure 4. 2013 Douglas-fir Beetle Infestations in Montana

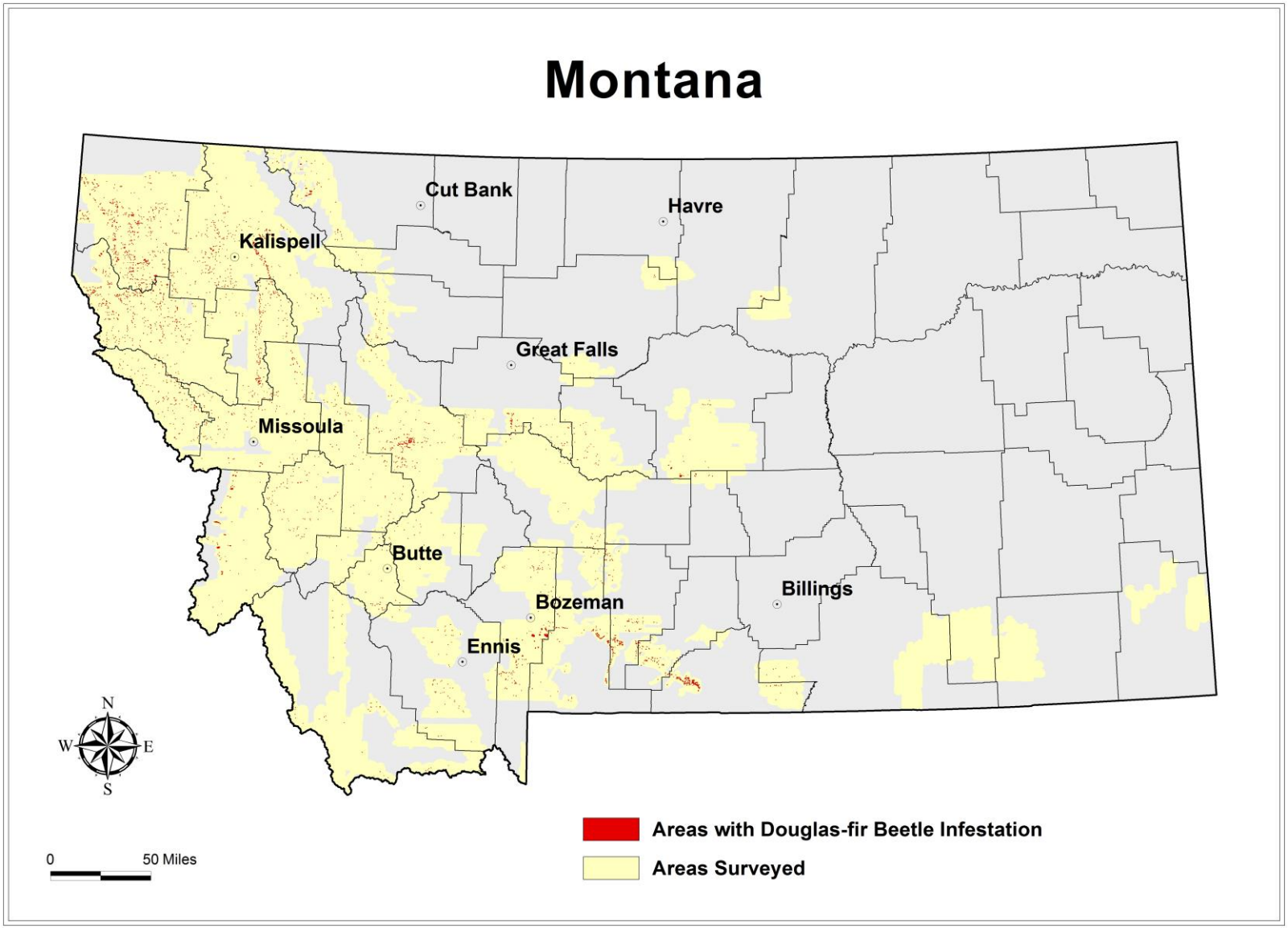


Figure 5. 2013 Fir Engraver Beetle Infestations in Montana

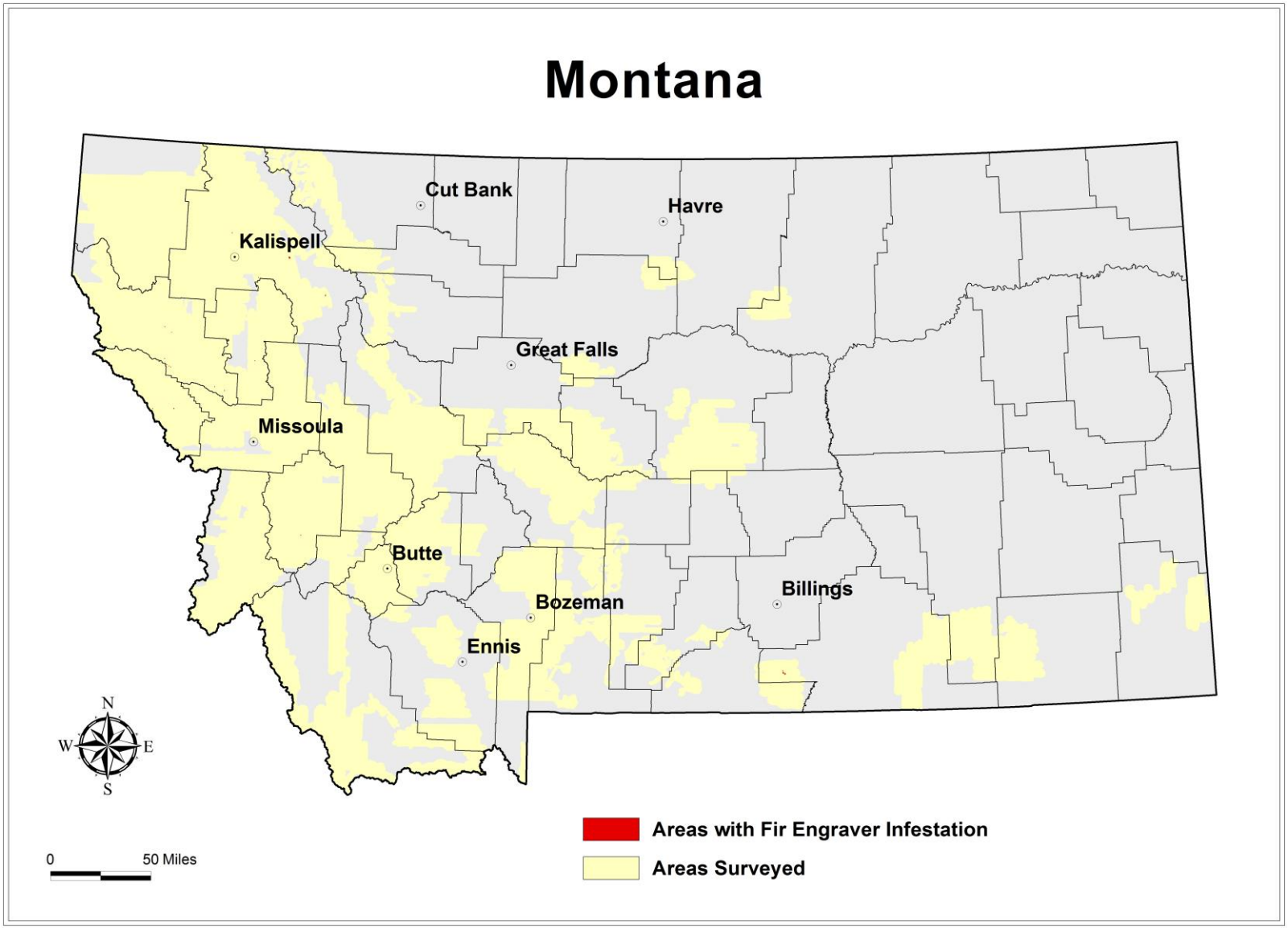


Figure 6. 2013 Subalpine Fir Mortality Complex in Montana

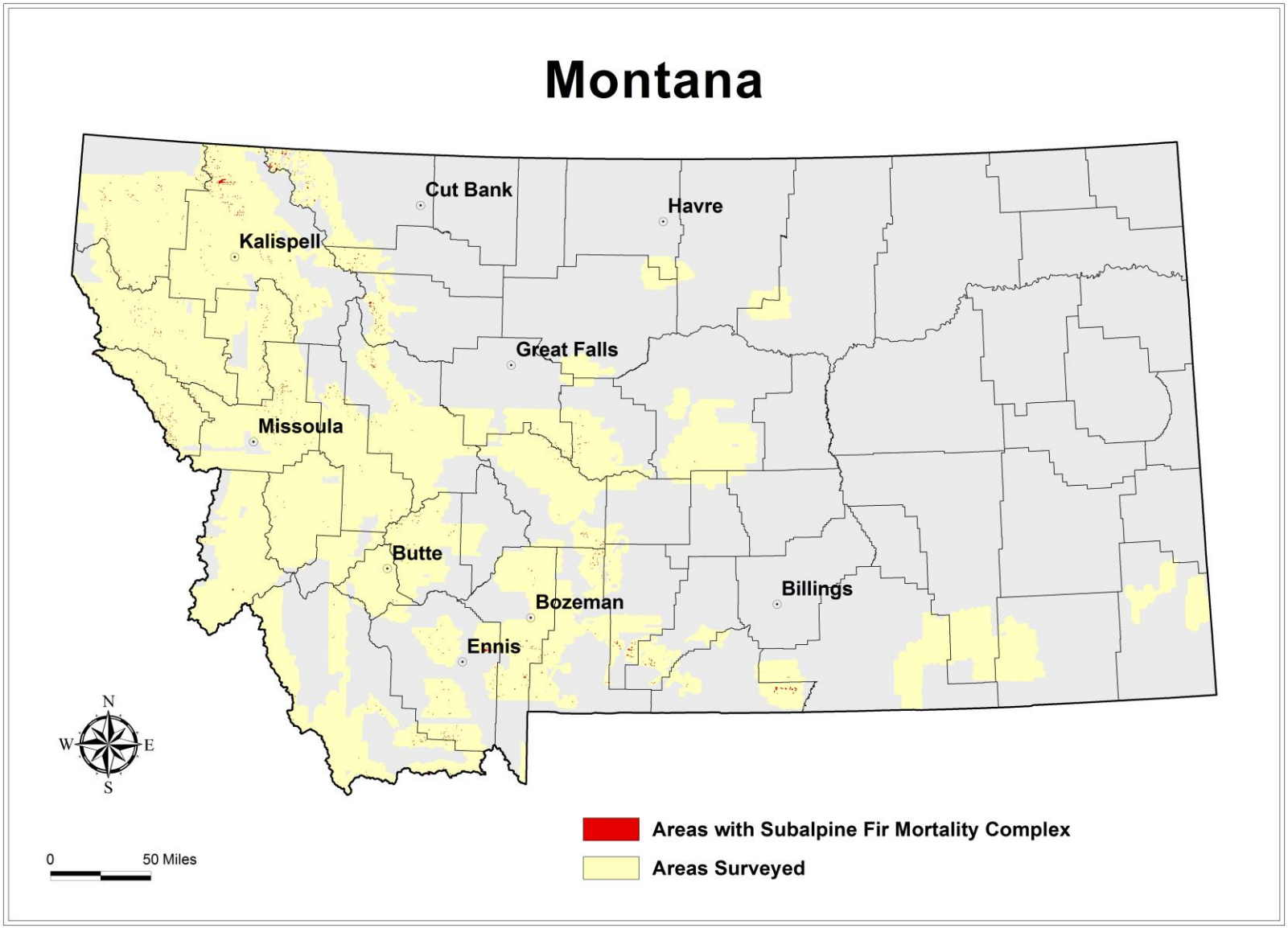
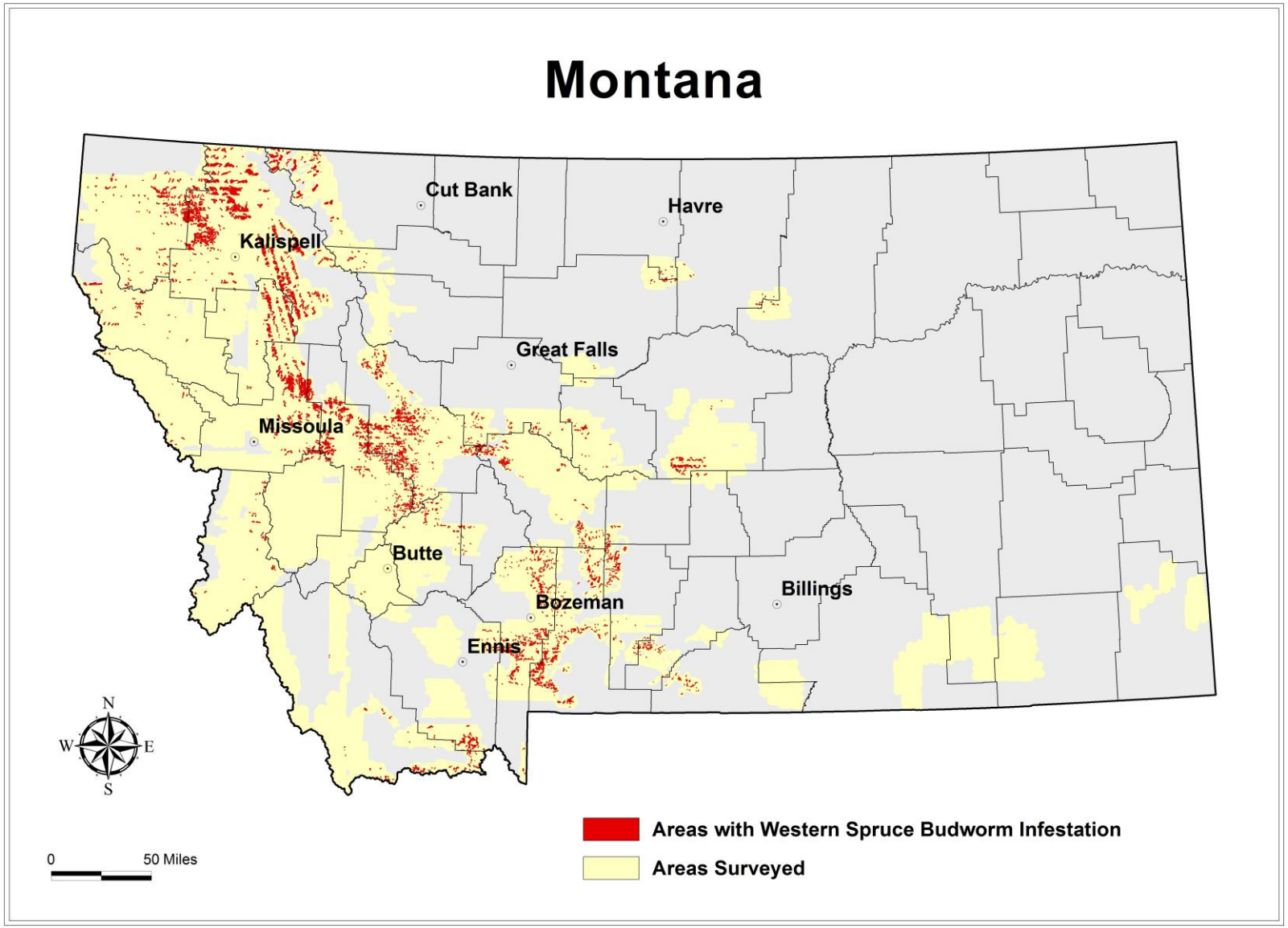
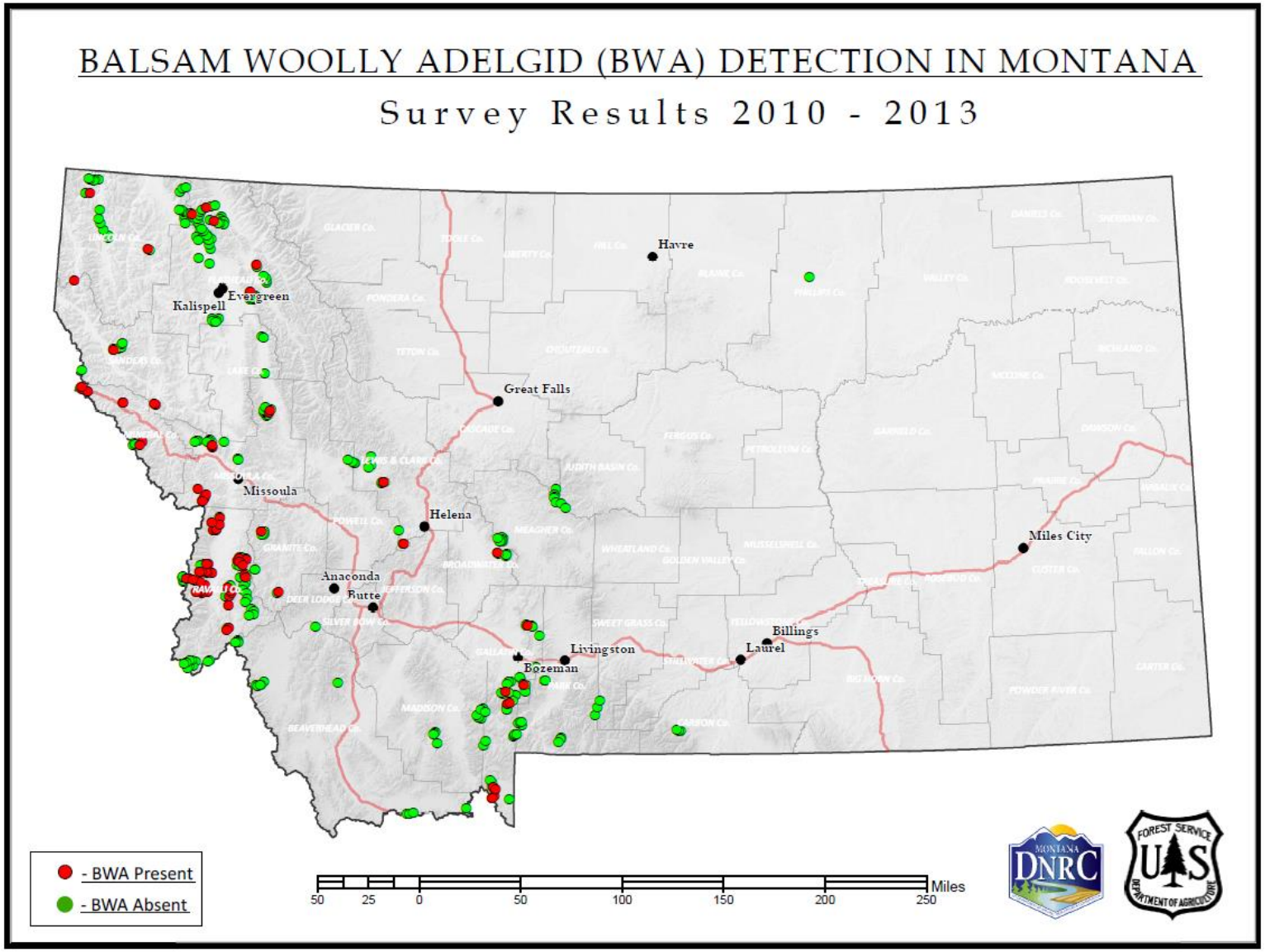


Figure 7. 2013 Western Spruce Budworm Infestations in Montana



Figurer 8. 2013 Balsam Woolly Adelgid Detection in Montana