

Forest Health Conditions 2009 - 2010



Rocky Mountain Region (R2)



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Cover Photo by Jennifer Ross, 2010, Lost Lake Campground and East Beckwith Mountain – Gunnison National Forest – Jennifer is a GIS specialist with the Forest Health Protection group in R2..

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Appendices C and E were aerial survey summary reports produced soon after the survey seasons ended. Their Table of Content pages may differ slightly from the original summary report page numbers due to their inclusion into this 2009 – 2010 Forest Health Conditions report.

Major Forest Health Conditions in R2

Information presented here is summarized from aerial and ground observations by R2 Forest Health Protection (FHP) staff and R2 state partners. Aerial Surveys are conducted annually, primarily over western conifer and aspen forests. Aerial surveys can detect faded foliage caused by bark beetle attack, needle or leaf loss or discoloration caused by defoliating insects, wind thrown trees, and in some cases, fungi or abiotic factors. Ground surveys constitute a broad range of observations in rural and urban forest environments throughout the Region.

Mountain Pine Beetle

Mountain pine beetle (MPB) (*Dendroctonus ponderosae*) kills lodgepole, ponderosa and 5-needle pines (whitebark, limber and bristlecone pines) in the Rocky Mountain Region. Acres affected by mountain pine beetle by year, state and host detected by aerial survey in the USFS Rocky Mountain Region are found in [Appendix B](#) in graphical format and [C](#) and [E](#) in tabular format. Mountain pine beetle outbreaks are influenced by both forest stand and weather conditions. Older, larger, and denser forests and warmer, drier conditions weaken trees and help mountain pine beetles overcome trees' defenses. This can lead to or perpetuate mountain pine beetle epidemics. Epidemics may continue until susceptible pine hosts are depleted, and/or weather becomes unfavorable for MPB survival. Severe cold weather (temperatures < 30°F under the tree bark) can contribute to ending an epidemic but these events are uncommon and beetles are well adapted to Rocky Mountain winters. Woodpeckers, insect predators and parasites, competition among beetles, and tree resistance can reduce the number of beetles but generally are ineffective at slowing or reducing epidemic populations.

In the Rocky Mountain Region (R2), the number of acres with mountain pine beetle activity detected by aerial survey decreased from 1,840,000 in 2008 to 1,663,000 acres in 2009 and to 1,539,000 acres in 2010 ([Figure B2](#)). The forest area affected since consistent aerial surveys began in 1996 expanded to 6,697,000 acres in Colorado, Wyoming and South Dakota, including 1,350,000 affected acres located in the USFS's Intermountain and Northern Rockies Regions in western Wyoming. Following is a more detailed breakdown of mountain pine beetle activity by area in 2009 and 2010.

Mountain pine beetle in Colorado and southern Wyoming

In the late 1990's mpb caused tree mortality began in northern Colorado lodgepole pine forests, since that time beetle populations and associated tree mortality pockets continued to expand and coalesce. This was the largest mountain pine epidemic recorded in the contiguous lodgepole pine forests in Colorado and southern Wyoming. By 2009, 3.6 million acres had some level of mountain pine beetle caused tree mortality in the lodgepole, ponderosa and limber pine trees; this was an increase of nearly 600,000 acres from 2008. In 2010, the epidemic area expanded another 400,000 acres, bringing the area impacted over the course of this epidemic to 4 million acres. The overall impacted area continues to grow, affecting a greater proportion of susceptible pine forest. The core areas of the epidemic have become virtually depleted of host trees, consequently, the number of acres on which mountain pine beetle was active in a given year declined. In 2009, variable levels of fading pines were detected on 1,416,000 acres and in 2010 on 1,257,000 acres in this epidemic area.



Figure 1. Mountain pine beetle in lower elevation ponderosa and limber pine stands in Albany County Wyoming. (Photo: B. Howell, 2010)

By the summer of 2010, the mountain pine beetle active epidemic area was primarily north of a line from Aspen to Fairplay. Levels of tree mortality intensified and increased in a northeasterly direction. There was less pine beetle activity detected south and west of the epidemic area despite the presence of suitable hosts.

In 2009 and 2010, the epidemic expanded from primarily lodgepole pine forests and limber pine stands into lower elevation ponderosa pine stands in the northern Front Range. This was most notable north of Nederland, CO, in Colorado's Boulder and Larimer Counties, and in southern Wyoming's Albany and Converse Counties. In these counties, acres with ponderosa pine mortality caused by MPB (Figure 1) increased to total 331,000 with most of that increase occurring in 2009 and 2010. Some of these pockets of tree mortality extend to where the forest meets the grassland and into isolated ponderosa and limber pine trees in the plains. Note that cumulative acres for ponderosa pine presented in summary tables in the appendices include acres affected by a previous MPB outbreak that occurred in Chaffee, Park and Lake Counties from 1996 to about 2003.

In 2009 and 2010, some areas west of the Continental Divide were not mapped because most of the suitable host trees have been already killed (Figure 2). Some scattered older trees and regenerating stands of younger trees less than 5 inches in diameter remain alive in the older epidemic areas. However, mortality in smaller trees occurs due to mountain pine beetle attacks at the base of these small trees, as well as from a combination of attacks by pine engraver beetles (*Ips* spp.) and twig beetles (*Pityogenes knechteli*). Twig beetle populations increased in pines weakened by mountain pine beetle activity. In some younger stands of lodgepole pine that were not attacked by mountain pine beetle, these secondary beetles reached notable population levels. (Figure 3).



Figure 2. Extensive areas of suitable host depletion in Grand County, CO. (Photo: B. Howell, 2010)



Figure 3. Younger stands of lodgepole pine being affected by a combination of mountain pine beetle and secondary beetles on the Medicine Bow National Forest, WY.(Photo: B. Howell,2010)

Mountain pine beetle in Wyoming

Aerial surveys in the Wyoming portion of the Black Hills National Forest and adjacent lands in Crook and Weston Counties detected mountain pine beetle caused tree mortality on 280 acres in 2009 and 400 acres in 2010. Since 1996, 39,000 acres have been affected in these two northeastern Wyoming counties.

In forest lands in north-central Wyoming (Bighorn National Forest, Big Horn, Johnson, Sheridan, and, Washakie Counties), 5,600 acres were affected in 2009 and 2,000 acres were affected in 2010. Much of the mountain pine beetle activity in this area had been in limber pine and ponderosa pine stands. Mountain pine beetle in the lodgepole pine forest only occurred in a few scattered pockets. In northern Natrona County in the southern foothills of the Big Horn Mountains, mountain pine beetle heavily impacted almost all of the isolated pockets of limber pine forest, affecting 1,500 acres in 2009 and 780 acres in 2010.

In western Wyoming, including the Bridger-Teton and Shoshone National Forests, Grand Teton and Yellowstone National Parks and adjacent lands in Fremont, Hot Springs, Lincoln, Park, Sublette, and Teton Counties, mountain pine beetle activity in all pine species continued to cause extensive tree mortality. Mountain pine beetle killed lodgepole, limber, and whitebark pines, as well as a small amount of ponderosa pine, on 788,000 acres in 2009 and on 525,000 acres in 2010 across this large area. Many high-elevation whitebark pine and limber pine forests have experienced nearly 100% mortality of mature trees (Figure 4).

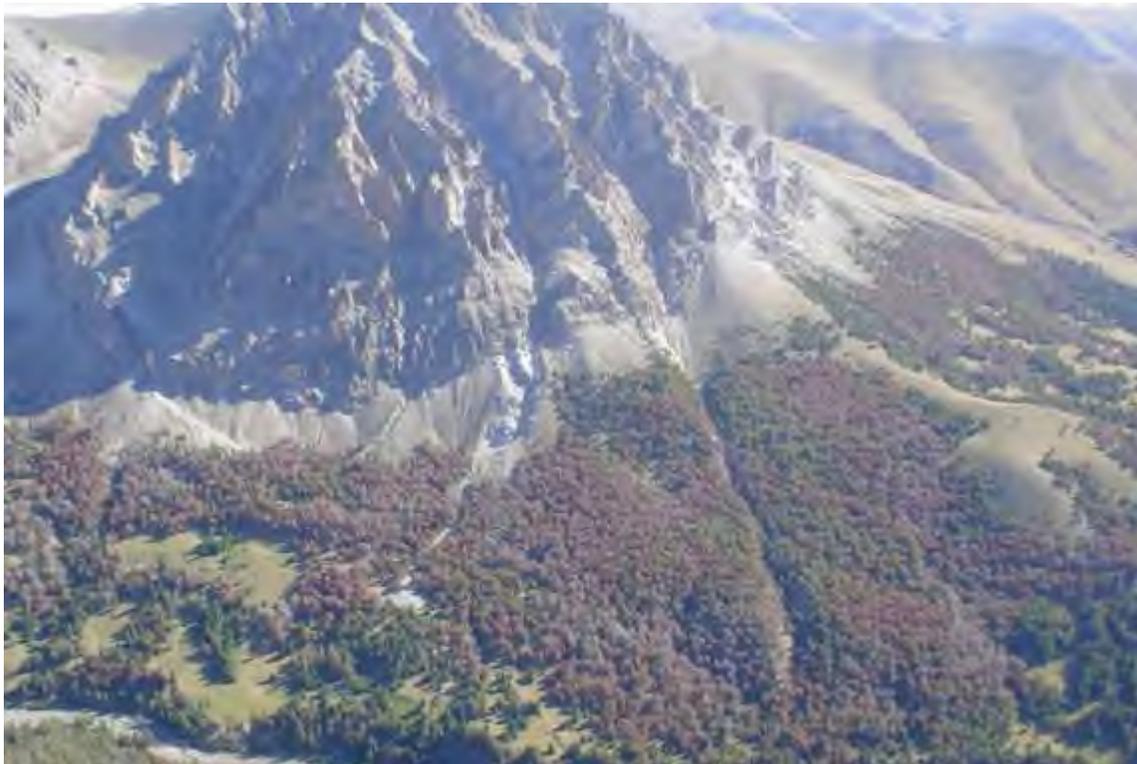


Figure 4. Whitebark and limber pine mountain pine beetle caused mortality on the Shoshone National Forest (Photo: A. Dymerski, 2010)

Nebraska

Mountain pine beetle was officially confirmed in Nebraska for the first time in 2009 in the “Panhandle” of Nebraska (Costello & Schaupp 2011). Mountain pine beetle attacked pines were found in Kimball, in the Wildcat Hills near Scottsbluff and in the western edge of the Pine Ridge near Harrison, Crawford, and Chadron. Current aerial and ground surveys indicate the population is small and scattered in ponderosa pine, but successful attack and emergence has been verified. Some Scots pine planted in shelterbelts and communities far removed from native pine forest were heavily attacked, and a few were killed. (Costello, S.L. and W.C. Schaupp, Jr. 2011. First Nebraska state collection record of the mountain pine beetle, *Dendroctonus ponderosae* Hopkins (Coleoptera: Curculionidae: Scolytinae). Coleopterists Bulletin: 65(1): 21-23.)

South Dakota

Fading trees were detected on 22,000 acres in 2009 and 44,000 acres in 2010 in ongoing mountain pine beetle epidemics in the South Dakota portion of the Black Hills. Since 1996 when an epidemic in Beaver Park was first noted, aerial surveys detected 369,000 acres with varying levels of mountain pine beetle activity. In 2009 and 2010, high levels of pine mortality were mapped in increasingly visible areas near Mt. Rushmore, Custer Peak, Harney Peak, Medicine Mountain, and O’Neill Pass (Figure 5). In 2010, Mt Rushmore National Memorial received project funding to protect high value trees in the visitor use developed area and significant stands of old growth forest within the Memorial boundary. Volunteers coordinated by the South Dakota Department of Agriculture, Resource Conservation & Forestry Division and South Dakota State University assisted by marking infested trees on the Memorial for sanitation and thinning activities.



Figure 5. Mountain pine beetle caused mortality in the Black Elk Wilderness adjacent to Custer State Park. (Photo: Beth Steinhauer, 2009)

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Spruce Beetle

Spruce beetle (*Dendroctonus rufipennis*) populations typically build up in older spruce-dominated forests where scattered wind thrown trees have provided habitat for outbreak populations to develop. Since the late 1990's, this situation has been widespread throughout the Rocky Mountain Region, and as a result, there are a number of infestations in varying stages of development. Since 1996, 993,000 acres have been affected in the Rocky Mountain Region, with host tree species depletion occurring on many of these acres. In 2010, 285,000 acres were detected with varying levels of current spruce beetle caused mortality. Of those acres, 200,000 were new acres not previously recorded between 1996 and 2009 ([Figure B6](#)).

Spruce Beetle in Southern Colorado

Spruce beetle is currently very active in Southern Colorado (Figure 6). An ongoing epidemic spreading from Hinsdale and Mineral Counties to adjacent counties in all directions may have been started due to wind thrown or avalanche downed trees. Over the course of this epidemic, 237,000 acres were affected in Hinsdale and Mineral Counties and an additional 63,000 acres of varying levels of spruce beetle mortality occurred in Archuleta, Conejos, Costilla, Gunnison, Huerfano, Rio Grande, and Saguache Counties.



Figure 6. Spruce beetle impact on the Rio Grande National Forest, 2010 (Photo: J. Backsen, 2010)

In 2010, fading trees were detected on 149,000 acres in multiple locations across these nine southern Colorado counties. Building epidemics were detected on the Grand Mesa in Mesa and Delta Counties and more recently in the Wet Mountains in Custer County. From 2009 to 2010, spruce beetle activity detected in Delta and Mesa Counties increased from 3,900 acres to 26,000 acres. Active acres detected near known areas with wind thrown trees in the Wet Mountains increased from 6 to 210 acres from 2009 to 2010.

Spruce beetle in northern Colorado and southern Wyoming

Spruce beetle continued to kill extensive forests of high elevation mature Engelmann spruce in 2009 and 2010 in northern Colorado and southern Wyoming. In Grand, Jackson, and Larimer Counties in Colorado, areas with detectable spruce beetle caused mortality increased from 10,000 acres in 2009, to 27,000 acres in 2010. Most of these active acres are occurring in new areas in these counties. Since 1996, 151,000 acres of these three counties have been affected by spruce beetle. Spruce beetle infestations were observed in high elevation spruce forests in the upper Laramie River Basin, upper Cache La Poudre Basin, on the upper slopes of Crown Point, Comanche Peak and on north facing slopes of other high peaks in the Never Summer Range. Active spruce beetle populations on the Arapaho-Roosevelt National Forest increased from 7,900 acres in 2009 to 21,000 in 2010.

In 2010, spruce beetle activity was detected on the Rabbit Ears Range east of Muddy Pass. A large spruce beetle epidemic killed much of the older spruce mostly north of this area from 2001 – 2004. Detectable spruce mortality was reported on 3,000 acres in both 2009 and 2010 in Routt County, Colorado, with 5,000 acres affected over the two years. Since 1996, 85,000 acres were affected by spruce beetle in Routt County.

In southern Wyoming, spruce beetle activity continues to expand and intensify on the Medicine Bow National Forest. In 2009, 9,700 acres were mapped on the National Forest, primarily on the Snowy Range and in 2010 16,000 acres were mapped, including 12,000 acres not previously reported with spruce beetle activity. Spruce beetle mortality became more apparent along popular scenic drives and recreation sites in the Snowy Range. Since 1996, 83,000 acres in multiple locations on the Medicine Bow National Forest have been affected by spruce beetle.

Spruce Beetle in northern and western Wyoming

Beetle-caused mortality in Engelmann spruce was generally at low levels on the Bighorn National Forest but a few notable pockets of activity were detected at high elevations east of Shell Lakes and north of Kearney Lake Reservoir, primarily in Johnson County, and around Bald Mountain in the Sheridan and Big Horn Counties. Extensive areas of older Douglas-fir beetle caused mortality and subalpine fir decline may be masking some of the spruce beetle activity on the Bighorn National Forest.

In many areas of northwestern Wyoming, spruce beetles are running out of suitable host trees, but the epidemics throughout this area were still active. In 2010, recent spruce mortality was detected on over 53,000 acres primarily on the Absaroka Range on the Shoshone National Forest and on an additional 2,300 acres of the adjacent Bridger-Teton National Forest in Region 4. Ground observations revealed current spruce beetle attacks west of Dead Indian Pass, Sunlight Basin, and Clarks Fork of the Yellowstone River. Since 1996, a cumulative total of 278,000 acres were affected on the Shoshone National Forest, with additional acres impacted farther west in Wyoming.

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Douglas-fir Beetle

Douglas-fir beetle (*Dendroctonus pseudotsugae*) has been an important disturbance agent in the Rocky Mountain Region in the past 15 years. Population increases in this Region often occur in areas where trees have been damaged by fire or stressed by heavy defoliation from western spruce budworm or Douglas-fir tussock moth. Since 1996, aerial survey has detected Douglas-fir beetle caused mortality on 632,000 acres within the USFS Rocky Mountain Region ([Figure B7](#)) and an additional 100,000 acres on the Intermountain and Northern Rockies Regions' portion of western Wyoming.

Douglas-fir beetle in Colorado

Aerial surveys detected Douglas-fir beetle activity in Colorado on 23,000 acres in 2009 and 37,000 acre in 2010. Since 1996, aerial surveys have detected 306,000 acres with varying levels of Douglas-fir beetle caused mortality.

A notable increase of Douglas-fir beetle activity occurred along the Colorado Front Range south of Denver in Douglas County where 20 acres were detected in 2008, 3,100 acres in 2009, and 9,700 acres in 2010. That increased Douglas-fir beetle caused tree mortality was likely related to the heavy Douglas-fir tussock moth defoliation that occurred in this area in 2007 and 2008.

On the northern portions of the western slope, Douglas-fir beetle activity decreased. In some areas this may be due to host tree depletion, but in many locations beetle activity ceased despite the presence of suitable hosts. New acres affected were most notable in southern Colorado (Figure 7), north of CO Highway 160 in Archuleta, Gunnison, Hinsdale, La Plata, Mineral, and Montezuma Counties.



Figure 7. Douglas-fir beetle caused tree mortality near Telluride, CO. (Photo: J. Backsen, 2010)

Douglas-fir beetle in Wyoming

In the R2 forests of WY, acres with active Douglas-fir beetle decreased from 21,000 acres in 2008 to 3,300 acres 2009 and then increased to 5,600 acres in 2010. The increased acres were found on the Shoshone National Forest (Figure 8) where aerial survey detected Douglas-fir beetle caused tree mortality on 1,200 acres in 2009 and 4,400 acres in 2010. An increase was also seen in the Northern Rockies Region in Yellowstone and Grand Teton National Parks where detected activity increased from 91 acres in 2009 to 1,400 acres in 2010.

Douglas-fir beetle activity detected by aerial survey on the Bighorn National Forest continued to decline from 1,200 acres in 2009 to 600 acres in 2010. Over the course of the recent epidemics on the Bighorn National Forest, 26,000 acres have been affected with many areas depleted of suitable hosts.

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Figure 8. Douglas-fir beetle damage on the, Clarks Fork of the Yellowstone River, Shoshone NF. (Photo A. Dymerski, 2010)

Subalpine fir Mortality

Region wide tree mortality is a continuing problem in high-elevation subalpine fir (*Abies lasiocarpa*). Mortality is attributed to western balsam bark beetle (*Dryocoetes confusus*), two species of root decay fungi (*Armillaria* sp. and *Heterobasidion annosum*), and in many areas a combination of the beetle and fungi. Other agents also may be involved with subalpine fir mortality within the Region.

In 2009, subalpine fir mortality was detected to varying levels on 233,000 acres and in 2010, 332,000 affected acres were detected. All national forests in the Region contained significant mortality in subalpine fir.

Subalpine fir mortality in Colorado

Statewide totals for Colorado were 346,000 affected acres in 2008, 184,000 affected acres in 2009 and 265,000 affected acres in 2010.

Subalpine fir mortality in Wyoming

The total detected in the USFS Rocky Mountain Region portion of Wyoming was 49,000 affected acres in 2009 and 67,000 acres in 2010. Subalpine fir mortality, primarily due to attacks from the western balsam bark beetle, was at relatively low levels in the Absaroka and Wind River Ranges and appeared to have declined except in Park and Fremont Counties. The moderate level of subalpine fir mortality in the Big Horn Mountains was most notable in Big Horn and Johnson Counties, although fewer newly faded fir trees were evident compared with 2008.

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Western Spruce Budworm

In Colorado, the area of forest defoliated by western spruce budworm, *Choristoneura occidentalis*, more than doubled in 2009. Aerially visible defoliation on 382,000 forested acres was mapped in 2009 as compared to 155,000 acres in 2008. In 2009, infestations were detected in portions of the Culebra, Sangre de Cristo, San Juan, Flat Top and Rampart Ranges. In 2010, 213,000 acres were defoliated by western spruce budworm, primarily in southern Colorado ([Figure B8](#)).

In the R2 portion of Wyoming, approximately 4,500 acres were affected in 2009 and 2010. Almost all of this defoliation occurred in Fremont and Park Counties in the Wind River and Absaroka Mountains. Some smaller areas of defoliation were detected in Big Horn and Washakie Counties in the Big Horn Mountains and in Albany and Carbon Counties in the Medicine Bow Mountains and Sierra Madre.

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Aspen Decline and Mortality

Aspen health continued to be a major concern in the Region. Aspen forests in many areas of western Colorado experienced widespread, severe, rapid dieback and mortality. This phenomenon, termed “sudden aspen decline” (SAD), appeared in 2004 and increased rapidly through 2008. The affected area appears to have stabilized since then. Sudden Aspen Decline was different from the usual changes and damages observed during the last hundred years in that the current event was taking place at a landscape scale, the mortality occurred rapidly, and the mortality agents involved were different.

Ground monitoring and research began in 2005 to describe and explain the rapid decline in southwestern Colorado (Worrall et al. 2008, Worrall et al. 2010). Results suggest that SAD is caused by several interacting factors including site factors (low elevations, south-west aspects, and open stands), a group of secondary insects and diseases, and hot temperatures and drought during 2002 and 2003. In many affected stands, there was no significant regeneration response to overstory loss from SAD. The impacts of SAD were consistent with projected effects of climate change. In southwestern Colorado, SAD occurred mostly in areas projected to become climatically unsuitable for aspen in the early 21st century. (Worrall JJ, Egeland L, Eager T, Mask RA, Johnson EW, Kemp PA, Sheppard WD. 2008. **Rapid mortality of *Populus tremuloides* in southwestern Colorado, USA.** Forest Ecol. and Mgmt. 255(3-4): 686-696.) (Worrall JJ, Marchetti SB, Egeland L, Mask RA, Eager T, Howell B. 2010. **Effects and etiology of sudden aspen decline in southwestern Colorado, USA.** Forest Ecology and Management 260(5):638-648.)

In 2009 and 2010 a study was initiated to evaluate the extent, severity and causal factors associated with aspen decline and mortality in other parts of Colorado, Wyoming, and South Dakota. In South Dakota and northern and western Wyoming, the characteristic symptoms and visual signature of SAD were not observed during aerial surveys. Ground survey plots confirmed that stand characteristics were not consistent with SAD. Although a few declining aspen stands were mapped during aerial surveys, ground survey data indicated most aspen stands were healthy in these areas. Ground plots established in declining stands of central and northern Colorado and southern Wyoming showed some conditions consistent with SAD, but data analysis is incomplete at this time.

In 2009, 357,000 acres and in 2010, 199,000 acres of aspen exhibited dieback/mortality symptoms and were mapped during aerial survey in Colorado and southern Wyoming. Many areas mapped with aspen decline in previous years were not aerially detectable in 2009 – 2010. In 2010, the Colorado areas with severe aspen decline detected via aerial surveys were significantly lower than the previous two years. Part of this reduction is believed to be the result of aspen regeneration in the understory of many affected stands (Figure 9). In addition, dead and declining trees have fallen in stands where natural regeneration has not occurred, making damage no longer visible from the air.

Aspen defoliation produces a visual signature distinct from dieback and mortality when observed during aerial surveys. Aspen defoliation may be caused by western tent caterpillar, large aspen tortrix, leaf diseases, hail and/or freeze damage.



Figure 9. Photo of aspen stand recovering due to increased precipitation after aspen mortality was caused from Sudden Aspen Decline in south central Colorado. (Photo W. Ciesla, 2010.)
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White Pine Blister Rust

The exotic, invasive disease, white pine blister rust, remains a serious concern in the Rocky Mountain Region. Limber pine and whitebark pine are heavily impacted by this disease in Wyoming and limber pine populations in the southern Rockies are becoming infected as the disease continues to spread through Colorado. Heightening concerns, the 5-needle pines are especially susceptible to mountain pine beetle so the combined impacts of these two threats may be severe. Widespread population decline has already occurred in some areas in the northern portion of the region. The 5-needle pines that naturally occur in the Region:

1. Limber Pine (*Pinus flexilis*) - Colorado, Nebraska, South Dakota, and Wyoming
2. Rocky Mountain Bristlecone Pine (*Pinus aristata*) - Colorado,
3. Whitebark Pine (*Pinus albicaulis*) – Wyoming
4. Southwestern white pines (*Pinus flexilis* var. *reflexa*) - southern Colorado near the New Mexico state border.

These five-needle pines are often planted in urban settings and conservation plantings throughout the Region.



Figures 10a&b – Seeds collected from “possibly Superior”, Colorado bristlecone pine trees grow into 1-year-old seedlings at Dorena Genetic Resource Center, Cottage Grove, OR. These were inoculated with *C. ribicola*, the fungal pathogen that causes white pine blister rust disease. Seedlings that appear resistant to the disease are recorded as seedlings from truly, “Superior” trees.

Recent research has identified limber, Rocky Mountain bristlecone, and whitebark pines that possess heritable traits that offer resistance to *Cronartium ribicola*, the fungus which causes white pine blister rust (Fig. 10a&b). These “Superior” trees are being protected from mountain pine beetle. Region-wide cone collections have been initiated for whitebark, Rocky Mountain bristlecone, and limber pine. Seed collected is used to resume blister rust resistance testing and for conservation and restoration.

Forest Health Protection has installed long-term monitoring plots throughout the Rocky Mountain Region to evaluate pest trends and impacts of white pine blister rust, mountain pine beetle, and other damaging agents. We are also working with the National Park Service and the National Forests to evaluate the efficacy of using pruning to protect high-value trees and to develop planting guidelines for limber pine.

Colorado

White pine blister rust was first discovered in Colorado in 1998 on limber pines near the Wyoming border in Larimer County. Isolated infestations have been observed throughout Colorado since then. In 2002 and 2003, the disease was discovered in the Sangre de Cristo Mountains on both limber pine and Rocky Mountain bristlecone pine and in the Wet Mountains on limber pine. In 2005, a few infected limber pines were observed near Estes Park, Colorado. In 2006, infected limber pines were identified near Ward, Colorado. In 2009, isolated infestations were detected on limber pine in Rocky Mountain National Park and on the north slopes of Pikes Peak.

South Dakota

This disease was discovered in some of the relic stands of limber pine in the Cathedral Spires area of Custer State Park in the 1990s. White pine blister rust cankers are now present on some of the stems of these trees and some mortality has occurred in recent years.

Wyoming (R2)

White pine blister rust caused mortality is occurring on limber and whitebark pine trees and regeneration across Wyoming. The disease continues to intensify and spread into previously uninfected stands. Although blister rust is killing pine throughout the state, mountain pine beetle has recently replaced white pine blister rust as the leading cause of large-tree mortality. A study in the Bighorn National Forest found that mountain pine beetle incidence was positively correlated with white pine blister rust branch canker severity and stem canker incidence. Mountain pine beetle infested trees also had higher incidences of branch cankers and stem cankers compared with non-infested trees (64% and 42% versus 49% and 18%, respectively).

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Other R2 FH Damage Agents of Concern

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| <p><u>Armillaria Root Disease</u> <i>Armillaria</i> spp.</p> <p>Colorado, Nebraska, South Dakota, and Wyoming</p> <p>Occurs on all tree species in the Region</p> | <p>Results of a recent survey and species testing of <i>Armillaria</i> in Wyoming indicate that <i>A. solidipes</i> (<i>A. ostoyae</i>) is the most common <i>Armillaria</i> species in Wyoming. This species was frequently associated with conifer hosts and cover types, which are the predominant cover type in Wyoming, and was found mainly in the south and northeast parts of the state. <i>A. sinapina</i> was associated with conifer and hardwood hosts and cover types, and was widely distributed, but not in the central area of the state. <i>A. gallica</i> was found mostly in oak and other hardwood hosts and cover types, and only in northeast Wyoming. <i>A. cepistipes</i> was found in both hardwoods and in conifers. It was also found in both hardwood and conifer cover types, but only in west-central Wyoming.</p> <p>All four species cause root disease. <i>Armillaria</i> was found at 30% of the locations examined and was confirmed to be causing disease 66% of the time.</p> <p>Evidence of <i>Armillaria</i> was confirmed in the root crown area of a bur oak that had died recently. This suggests the fungus might be causing the decline of bur oaks in eastern and north central Nebraska. Other causes probably include human activities and grazing around the native bur oak forests.</p> <p>Return to the Table of Contents</p> |
| <p><u>Ash Decline:</u> Ash Anthracnose (<i>Discula</i> sp.), Woolly Ash Aphid (<i>Prociphilus fraxinifolii</i>), and Abiotic problems.</p> <p>Nebraska and South Dakota</p> <p>Ash trees (primarily green ash)</p> | <p>More problems have been found in ash trees in Nebraska and South Dakota since surveys for exotic emerald ash borers have focused more attention on ash.</p> <p>Ash anthracnose occurred in spring 2009. Anthracnose is a common fungal disease of ash and some years the disease can result in complete defoliation of the tree by the middle of June. The typical symptoms are blotches and distortions to the newly expanding leaves. Often, these slightly curled leaflets begin to drop in early June. Usually the tree produces a second crop of leaves by the end of June, so the problem is short-lasting but is a stress on the tree.</p> <p>The ash leaf curl aphid, a.k.a. the woolly ash aphid, showed up across South Dakota in early summer. The symptoms are curled leaves forming rosettes at the ends of ash shoots; particularly the rapid growing terminal shoots</p> <p>Dieback and decline of black ash (<i>Fraxinus nigra</i>) was noted throughout the Midwest and Northern Plains beginning about 2005. Symptoms typically associated with this decline were wilting and dying leaves by mid-summer followed by dieback and the eventual death of the entire tree dying by the next year. Studies have attempted to connect these decline problems to abiotic or biotic stressors but there has not been a single cause that can explain the decline. Since black ash is also susceptible to emerald ash borer, this decline may not have much relevancy, but it is another reason to discontinue its use in the landscape.</p> <p>Return to the Table of Contents</p> |

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| <p>Cedar Apple Rust <i>Gymnosporangium juniperi-virginianae</i></p> <p>Kansas</p> <p>Eastern Redcedar and Rocky Mountain Juniper</p> | <p>A wet spring in 2010 caused a more severe outbreak of cedar-apple rust than in previous years.</p> <p>In early April, galls swell and produce orange, gelatinous tendrils that are approximately 1 inch long. The tendrils remain on the galls through May.</p> <p>This rust has mostly been of aesthetic concern, but coupled with higher moisture levels earlier this year, the rust was more apparent to the public than in previous years. Return to the Table of Contents</p> |
| <p>Dothistroma needle blight <i>Mycosphaerella pini</i></p> <p>Kansas, Nebraska, and South Dakota</p> <p>Austrian and Ponderosa Pines</p> | <p>This disease was reported in ponderosa pine shelterbelts and in other pine plantings throughout much of the Great Plains States in 2010. This serious disease is an ever growing concern in windbreaks or landscapes. Symptoms generally started in the fall and by spring infected trees had significant needle loss. After years of damage, this can lead to tree mortality.</p> <p>Scattered occurrences of Dothistroma needle blight were observed in the Black Hills National Forest in ponderosa pine in 2009 and 2010. Return to the Table of Contents</p> |
| <p>Dutch elm disease <i>Ophiostoma ulmi</i></p> <p>South Dakota</p> <p>American Elms</p> | <p>This fungal pathogen continues to kill the remaining native American elms in cities of the Great Plains. Trees infected with Dutch elm disease generally have branches, or entire canopies with dropping leaves. These leaves are usually yellow, curled, and dry. The sapwood of branches typically has brown streaking.</p> <p>Dutch elm disease reports are scattered across South Dakota in 2009. Many locations reported fewer incidences of the disease, while other communities marked more trees than in a typical year. The only factor that may explain this difference is elm density in a community. Cities with few widely spaced elms no longer have losses due to root graft transmission, a common source of street tree infection.</p> <p>Another disease called black spot produces similar symptoms. Elm trees infected with this foliage disease have black spotted leaves that often fall prematurely. Infected leaves are moist with yellow and small black spots; they are not curled.</p> <p>The best means of managing Dutch elm disease for the community is to quickly remove infected trees. Valuable elms can be protected with injections of fungicides that must be applied by a commercial applicator and treated every two to three years. Return to the Table of Contents</p> |

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| <p><u>Diplodia Shoot Blight</u> <i>Diplodia sapinea</i> (= <i>Sphaeropsis sapinea</i>)</p> <p>Kansas, Nebraska, and South Dakota</p> <p>Ponderosa Pine</p> | <p>Crown dieback and occasional mortality due to Diplodia infection, sometimes in concert with pine engraver attack, was mapped during aerial surveys in widely scattered ponderosa pine stands in the Black Hills and on the Bessey Ranger District of the Nebraska National Forest near Halsey, Nebraska. Diplodia was also involved in tree mortality of jack pine on the Bessey Ranger District.</p> <p>These Diplodia infected areas were usually impacted heavily by hail just prior to the appearance of disease symptoms. The path of hail storms and subsequent Diplodia bloom is often evident during aerial surveys.</p> <p>Diplodia blight is a very serious problem on Austrian pines in the eastern half of South Dakota. This was the second bad year in a row for this disease, probably because of the stress from the recent drought plus wet conditions in the spring of 2009 and 2010. Drought Stress has been clearly linked to increased disease development and wet spring conditions favors infection of young needles and shoots.</p> <p>Many trees were killed in 2010. In South Dakota, the disease is commonly reported throughout the state on Austrian and ponderosa pines in shelterbelts and community plantings. While the disease typically results in stunted and dying shoot tips, it has more recently been associated with branch dieback in infected trees. The disease also appeared on ponderosa pine trees along the highway between Hill City and Rapid City.</p> <p>In Nebraska, Diplodia again caused increased damage and mortality in ponderosa pine in the Pine Ridge and Niobrara River Valley following damage from hail (Figures 20a&b). Diplodia is causing damage in Austrian, ponderosa, and to a lesser extent Scots pine throughout Nebraska. This is likely related to drought conditions.</p> <p>In Kansas, the disease is most severe on mature trees >20 years of age. Repeated infections over many years can kill large sections of trees or entire trees. Higher than normal precipitation levels in 2010 have led to a higher number of reports of this disease across the state.</p> |
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Figures 20a & b: Diplodia outbreak pictures - Keller State Park in north-central Nebraska – photos by: L. Stepanek 2010



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| <p>Gypsy Moth <i>Lymantria dispar</i></p> <p>Colorado</p> <p>Hardwoods,</p> | <p>Each year during Spring, CO, KS, NE, SD, and WY put out Gypsy Moth traps in popular recreation sites. Hopefully, this early detection effort will help forest health specialists find the moth if it is transported to the state during the Summer.</p> <p>Only 1 male Gypsy moth was found in the Region near Longmont, CO. All other states in R2 reported no finds of gypsy moths in their traps. Return to the Table of Contents</p> |
| <p>Marssonina leaf blight <i>Marssonina</i> spp.</p> <p>Colorado</p> <p>Aspen</p> | <p>Marssonina leaf blight was observed from 2009 ground surveys throughout Colorado, predominantly on the Western slope of the Colorado Rocky Mountains. This disease is caused by a fungal pathogen and results in foliar dieback and defoliation. Consecutive years of damage are rare since the fungus requires highly specific climatic conditions for infection. This leaf blight did not cause extensive damage to aspen in 2010. Return to the Table of Contents</p> |
| <p>Pine Engraver Beetle <i>Ips</i> spp.</p> <p>Colorado, Nebraska, and South Dakota, and Wyoming</p> <p>Ponderosa pine, lodgepole pine and jack pine</p> | <p>Mortality caused by pine engraver beetles occurred throughout the Region's pine forests. Populations of <i>Ips</i> beetles can increase to levels that cause standing live tree mortality during periods of drought, following fire, hail or snow damage, or if logging slash is not treated properly. High levels of <i>Ips</i> spp. have also developed in association with mountain pine beetle and have contributed to mortality seen in mountain pine beetle epidemic areas. This is especially noticeable in younger lodgepole pine stands. Localized areas of ponderosa pine forests in the Front Range, particularly south of I-70 are still drought stressed and have elevated <i>Ips</i>-caused tree mortality. <i>Ips</i> caused tree mortality in South Dakota decreased in the Black Hills since the drought has eased over the last two summers. Tree mortality decreased in Nebraska from levels recorded following the fires of 2006. <i>Ips</i> beetles caused ponderosa pine mortality in stressed trees in the Pine Ridge and Wildcat Hills of western Nebraska. Diplodia shoot blight combined with <i>Ips</i> resulted in mortality in central Nebraska and in the Bessey Ranger District. Return to the Table of Contents</p> |
| <p>Pine Wilt <i>Bursaphelenchus xylophilus</i> & <i>Monoctonus</i> spp.</p> <p>Kansas, Nebraska, and South Dakota</p> <p>Austrian, Mugo, Scotch, and White Pines</p> | <p>Pine wilt disease is caused by a plant parasitic nematode called the pine wood nematode, <i>Bursaphelenchus xylophilus</i>. The nematode is vectored by a longhorned borer, called a pine sawyer beetle. These beetles are in the genus <i>Monoctonus</i>. They kill pine trees by feeding and reproducing in the resin canals of branches and trunks causing foliage to "wilt."</p> <p>Pine wilt is common in eastern and south-central Nebraska and is slowly spreading north and west. The disease occurs sporadically in other parts of Nebraska and has been found in southwestern South Dakota and eastern Kansas.</p> <p>It usually occurs in urban plantings and shelterbelts in these states and continues to be the most damaging disease of conifers in the Great Plains. This disease kills mostly Scotch pines, but Austrian and Mugo pines can be killed.</p> |

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| | <p>In Kansas, pine wilt was observed in over 11 counties. Conservation plantings and windbreaks containing exotic pines are most often damaged in this state.</p> <p>In Nebraska, pine wilt is continuing to spread and cause mortality. In 2010 it was found in southeastern, south central, and northeastern Nebraska.</p> <p>In South Dakota, rapidly declining Austrian and Scotch pine in the southwestern portion of the state were colonized by the nematode. Many shelterbelt and community plantings of these pine species have died during the past decade due to pine wilt disease. Return to the Table of Contents</p> |
| <p>Thousand Canker Disease, Walnut Twig Beetle, and Walnut Decline</p> <p><i>Geosmithia sp. nov</i> <i>Pityophthorus juglandis</i></p> <p>Colorado</p> <p>Black Walnut</p> | <p>Surveys conducted in South Dakota, Nebraska and Kansas did not find any thousand cankers disease or the walnut twig beetle. Colorado is the only state in the Region where these invasive pests occur.</p> <p>Colorado - Both the walnut twig beetle and thousand cankers disease are widespread in black walnut trees in Colorado and thousands of trees have been killed. Heavy damage occurred in portions of the Denver Metro area, including the communities of Arvada, Aurora, Brighton, Denver proper, Golden and Wheat Ridge. Losses also occurred in the City of Boulder and, more recently, in Longmont, Lyons and Berthoud. On the other side of the state, the disease has been present in Grand Junction for several years and infected trees also were detected in Delta. In addition, thousand cankers disease was observed in several locations along the Arkansas River Valley and other sites in southeastern Colorado.</p> <p>Several states east of Colorado with native populations of black walnut have already established quarantines against shipment of walnut logs from areas of known infestations.</p> <p>South Dakota- Declining walnut were a common sight across South Dakota in 2009 and 2010. The recent concern regarding the thousand canker disease increased everyone’s awareness of walnut health. An examination of several declining walnut in the southeastern part of South Dakota did not reveal any signs of the canker or the beetle.</p> <p>All the walnut trees appeared healthy two or three years ago and they produced an abundant crop of walnuts. The next spring some dieback was noticed and the trees continued to die back the following year. A close inspection of these trees found that the bark was killed on the south side of these trees from the base to about 20 or 30 feet up. Also the lower scaffold limbs had the bark killed on the south side. Only branches on the north sides of the trees appeared normal, though these may have some dieback. It is a mystery why this pattern of dieback occurred on trees. SD Forest Health specialists suspect freeze injury that happened several years ago. The trees were producing callus tissue along the edge of the wounds and appear to be recovering. These trees will be monitored for decline and for thousand cankers disease. For Nebraska information about TCD survey, (Appendix A)</p> |

Surveyed Black Walnut in Kansas
 (Where Host equals WLB - as of 12/17/10)

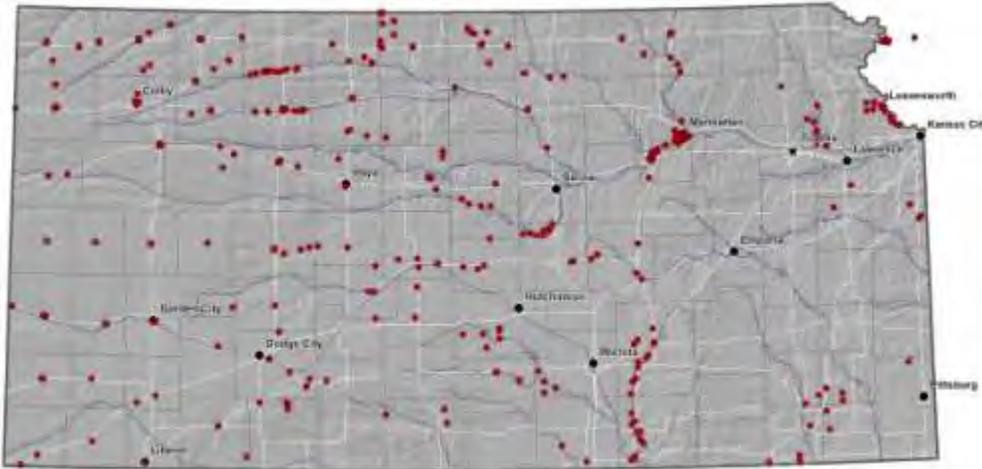


Figure 12. Black Walnut Survey in Kansas. There is an estimated 26.2 million black walnut trees (35.3 million cubic feet) found in Kansas. Kansas Department of Agriculture and Kansas Forest Service are working together to monitor the condition of black walnut across the state. As of December 2010, no detection of TCD was reported. Using 2008 FIA data, the percent of standing dead Black walnut trees is particularly high in certain counties. [Return to the Table of Contents](#)

Verticillium Wilt

Verticillium dahliae

Colorado and South Dakota

Catalpa trees

Verticillium wilt was a common problem on catalpas this year in **South Dakota**. The classic leaf symptoms of this wilt disease are yellowing, marginal scorching with a black margin, curling, and premature leaf fall, though not all these symptoms will appear on the same leaves or tree.

In addition to these symptoms there will often be some branch dieback, either one or two branches in the same portion of the canopy or sometimes the entire tree. Dying branches often have green streaking on the sapwood. The disease is caused by a soil-borne fungus that can live in the soil for many years feeding off dead material or by remaining dormant. It can move into the root through wounds or natural openings and then spread through the tree. The disease has two forms; chronic and acute. Trees with the acute form of the disease often die within a season or two. Trees with the chronic form may suffer only a branch or two dying then recover only to have another branch die in a few years.

The disease cannot be controlled with a fungicide treatment, instead it is managed by maintaining tree health and ensuring the tree receives adequate water during drought and fertilizing. The disease is often worse in years with cooler, wet conditions. The problem was also noticed in **Colorado** this year. [Return to the Table of Contents](#)

Appendix A.

2010 Citizen Monitoring Report in Nebraska

Nebraska conducted a “Citizen Monitoring – First Detection” project to find declining ash and walnut trees in communities. This project was an Early Detection survey to find three new, invasive insects and a disease to ash or walnut trees. **Emerald Ash Borer** (*Agrilus planipennis* or *Agrilus marcopoli*) may someday spread to **green ash** (*Fraxinus pennsylvanica*) in Nebraska; this insect was found doing extensive damage to ash trees in Michigan; **Thousand Canker Disease & Twig Beetle** (*Geosmithia sp. nov* & *Pityophthorus juglandis*, respectively) are new pests found throughout Western U.S. which are easily transported and transmitted to **black walnut** (*Juglans nigra*) trees. If either of these walnut pests is found in Nebraska, then efforts for suppression and eradication will hopefully prevent the spread of these pests to the native walnut stands in Eastern U.S. By 2010, both the twig beetle and pathogenic fungus have been found in several locations in Colorado. This Citizen Monitoring project also helped Nebraska to document and inventory rural and urban walnut trees for future monitoring.

Forest Health specialists from Nebraska Forest Service implemented a Nebraska Tree Pest Detector Program using special forest health funding for early detection of tree pest problems.

The early detection started in May 2010 by Nebraska Forest Service offering six free, half-day, hands-on workshops around the state (Figures 13 A, B, & C). The workshops were designed to train participants in how to detect emerald ash borer in ash trees and thousand cankers disease in walnut trees. Identifying ash and walnut trees was taught and then how to conduct a community survey and record useful data (GPS locations and photographs). The instructors were from Nebraska Forest Service, USDA Forest Service, and APHIS. Also the University of Nebraska sent instructors from Nebraska-Lincoln Extension.

There were more than 80 participants to these workshops from 40 different communities throughout Nebraska. These workshop attendees represented more than 1150 years of experience in agriculture or some form of “Green” industry. Forty-seven of these participants were professionals who work with trees. All participants committed to at least 3 hours of their time doing this detection/monitoring work over the next 3 years (2010 – 2012).

Surveys were conducted at 321 sites in 33 counties across the state by approximately 41% of workshop participants. No cases of emerald ash borer or thousand canker disease were found.

More than 500 hours of volunteer time were contributed, along with mileage expenses for over 2000 miles doing the surveys. The estimated total value of the volunteer time (@ \$16.43 per hour*), mileage costs (@ \$0.50 per mile) and other expenses incurred during the surveys is \$10,343. This amount exceeds the expenses charged to the Citizen Monitoring funds used to develop the program which will continue during 2011 and 2012.

State and Federal agencies involved in this work were pleased with the success in the first year of the project. There were high levels of interest and enthusiasm from the volunteers. More Tree Pest Detector workshops are planned in the Spring of 2011. All participants (instructors, volunteers, and administrators) are looking forward to many good years with this program.



Figures 13A, 13B, and 13C Photos taken at an Early Detection Training Sessions.

A1 --- Nebraska Forest Health assistant, Laurie Stepanek teaches trainees how to identify walnut and ash trees in urban areas.

A2 --- USFS entomologist Bill Schaupp , explains how to recognize the damages caused by walnut twig beetle and emerald ash borer.

A3 ---Nebraska Forest Health Specialist instructs participants in taking digital photographs of tree symptoms to verify tree damage symptoms from Emerald Ash Borer or Thousand Canker

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Appendix B.

General Aerial Detection Survey (ADS) Graphs for USFS Rocky Mountain Region (R2) from 1996 - 2010

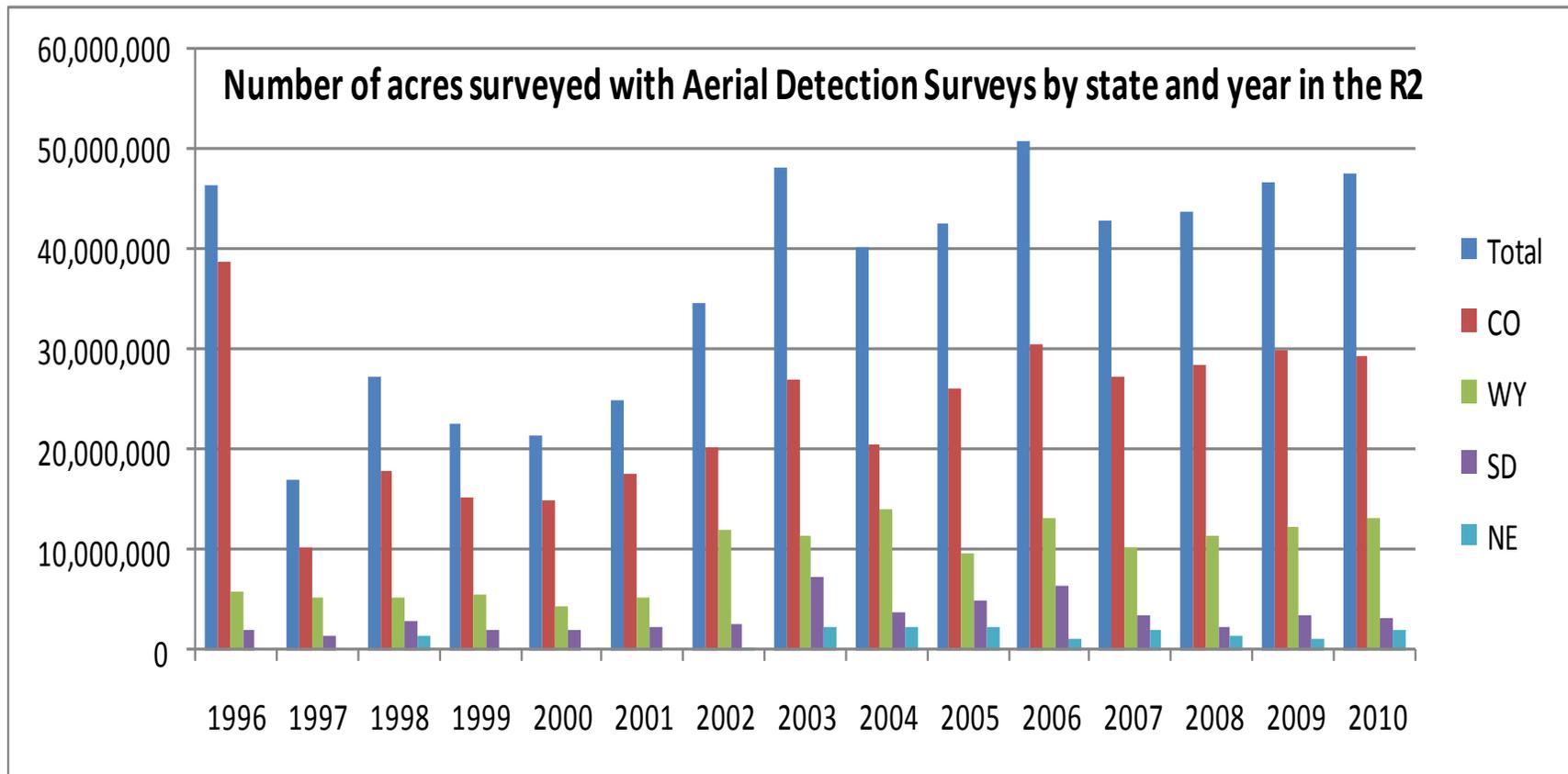


Figure B1 – Total acres surveyed with Aerial Detections Surveys each year and by state.

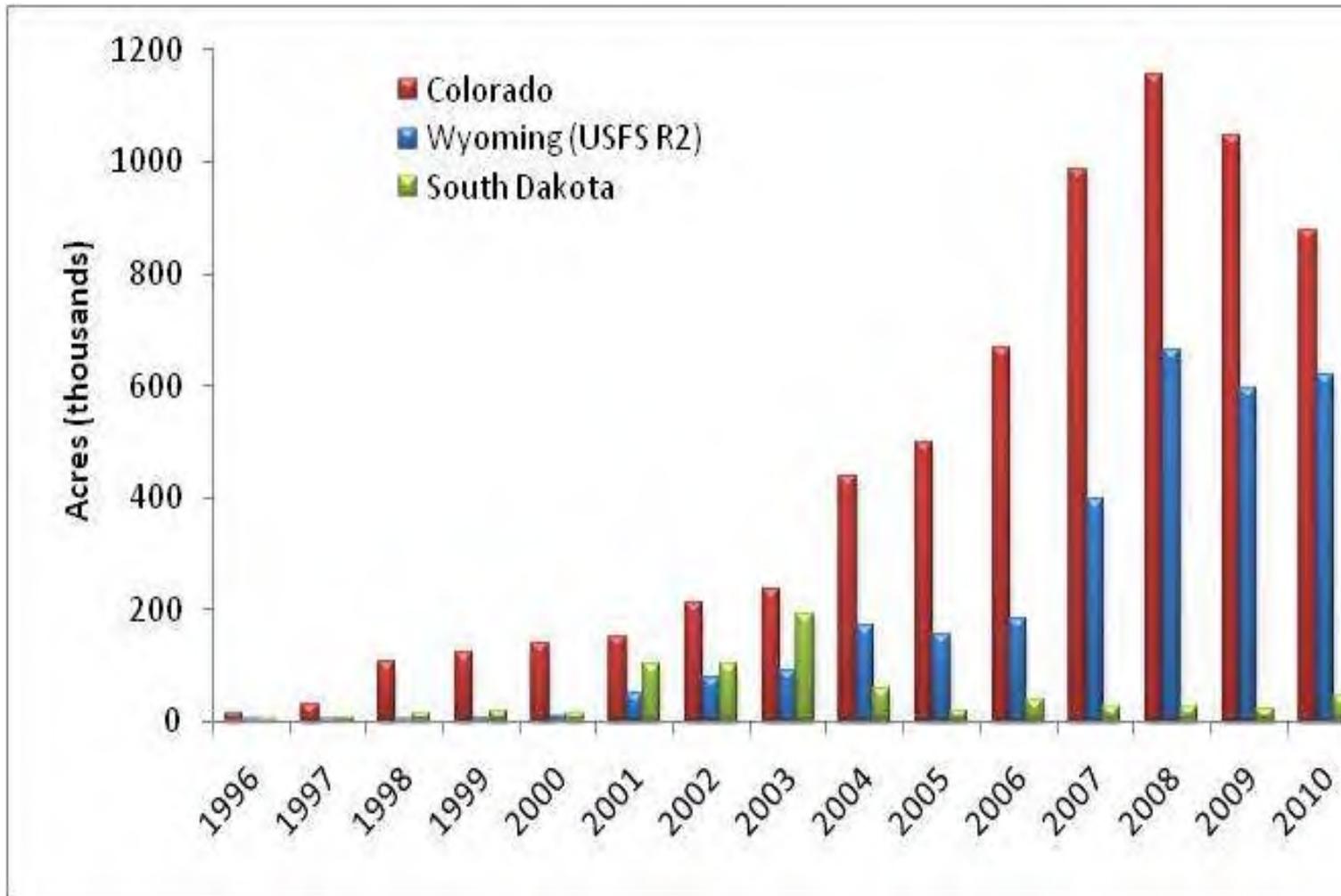


Figure B2. Acres affected by Mountain pine beetle by year and state in all host trees detected by aerial survey in the USFS Rocky Mountain Region (R2).

[Return to MPB](#)

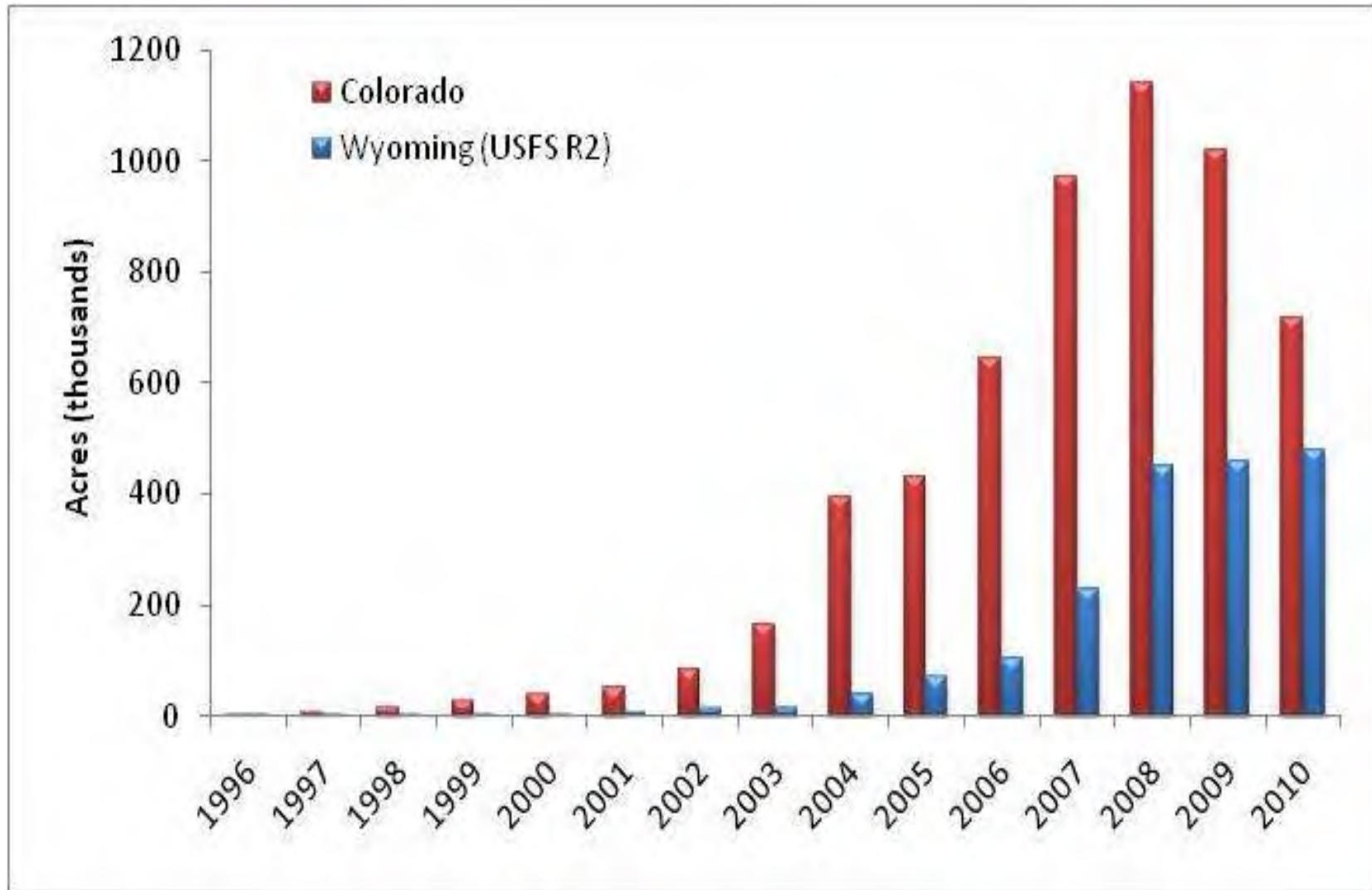


Figure B3. Acres affected by **Mountain pine beetle in Lodgepole Pine by year and state** detected by aerial survey in the USFS Rocky Mountain Region (R2)

Note: Wyoming (USFS R2) indicates forested lands east of the Continental Divide: State and Private forests, and National Forests - Shoshone, Big Horn, Medicine Bow, and Black Hills.

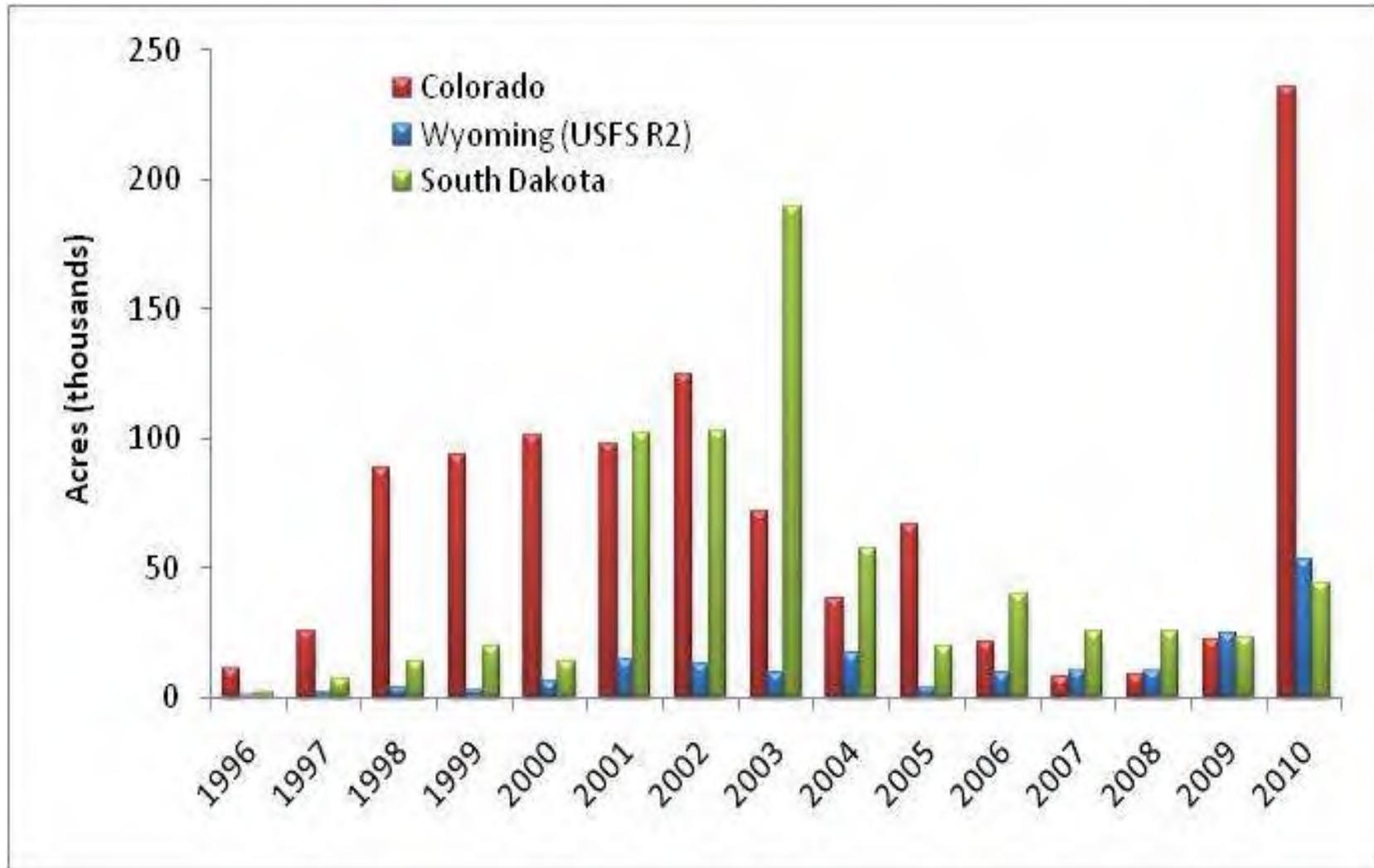


Figure B4. Acres affected by **Mountain pine beetle in Ponderosa Pine by year and state** detected by aerial survey in the USFS Rocky Mountain Region

Note: This graph illustrates both MPB activity and the variation among surveyors more obviously than many. For example, the 2003 acreage for South Dakota is an expansive “Lumper Approach” by 2 surveyors versus the “Splitter Approach” from 2005 by 2 different surveyors.

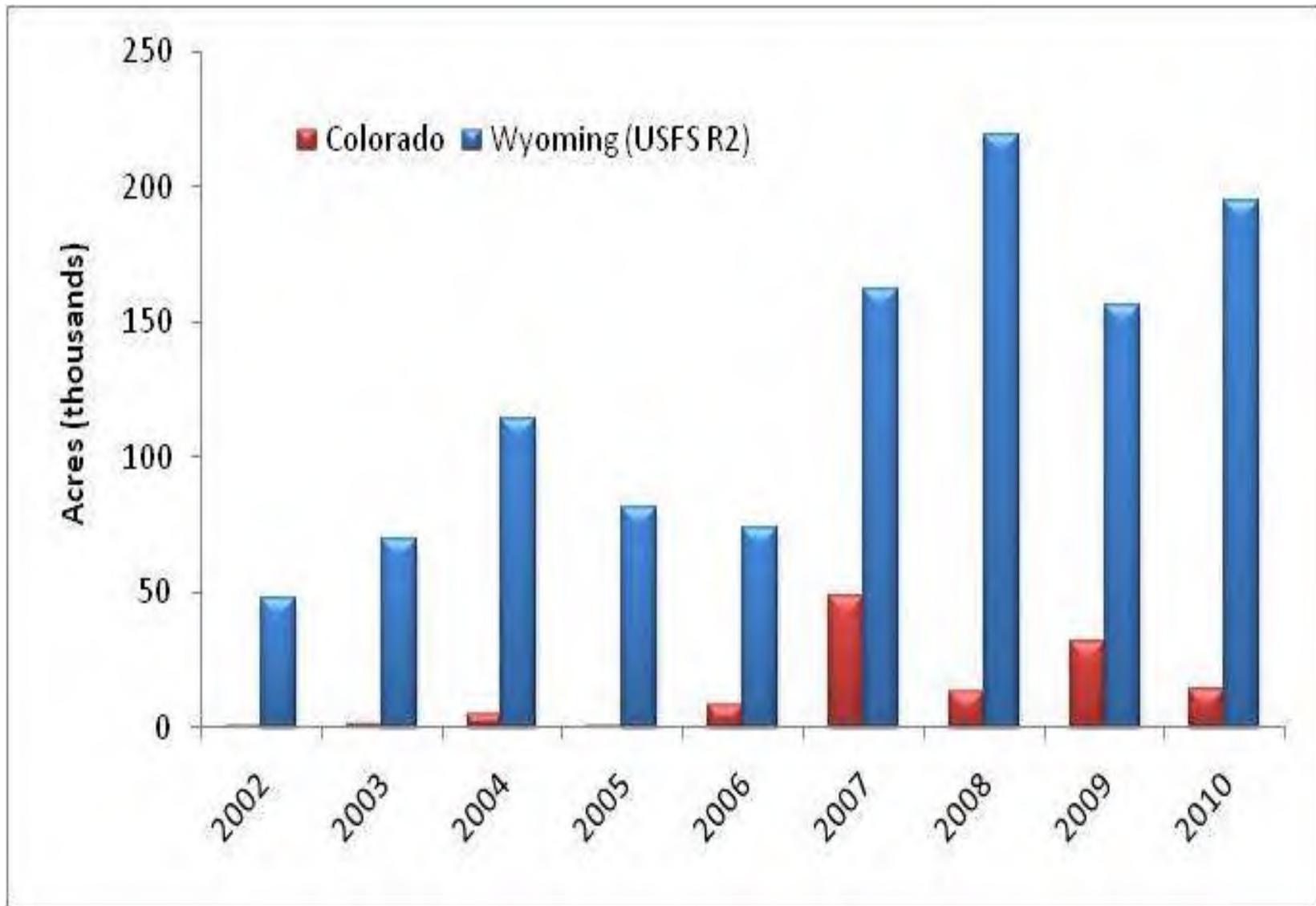


Figure B5. Acres affected by **Mountain pine beetle in Five Needle Pines (White Pines) by year and state** in all white pine hosts (Limber, Bristlecone, & Whitebark) detected by aerial survey in R2

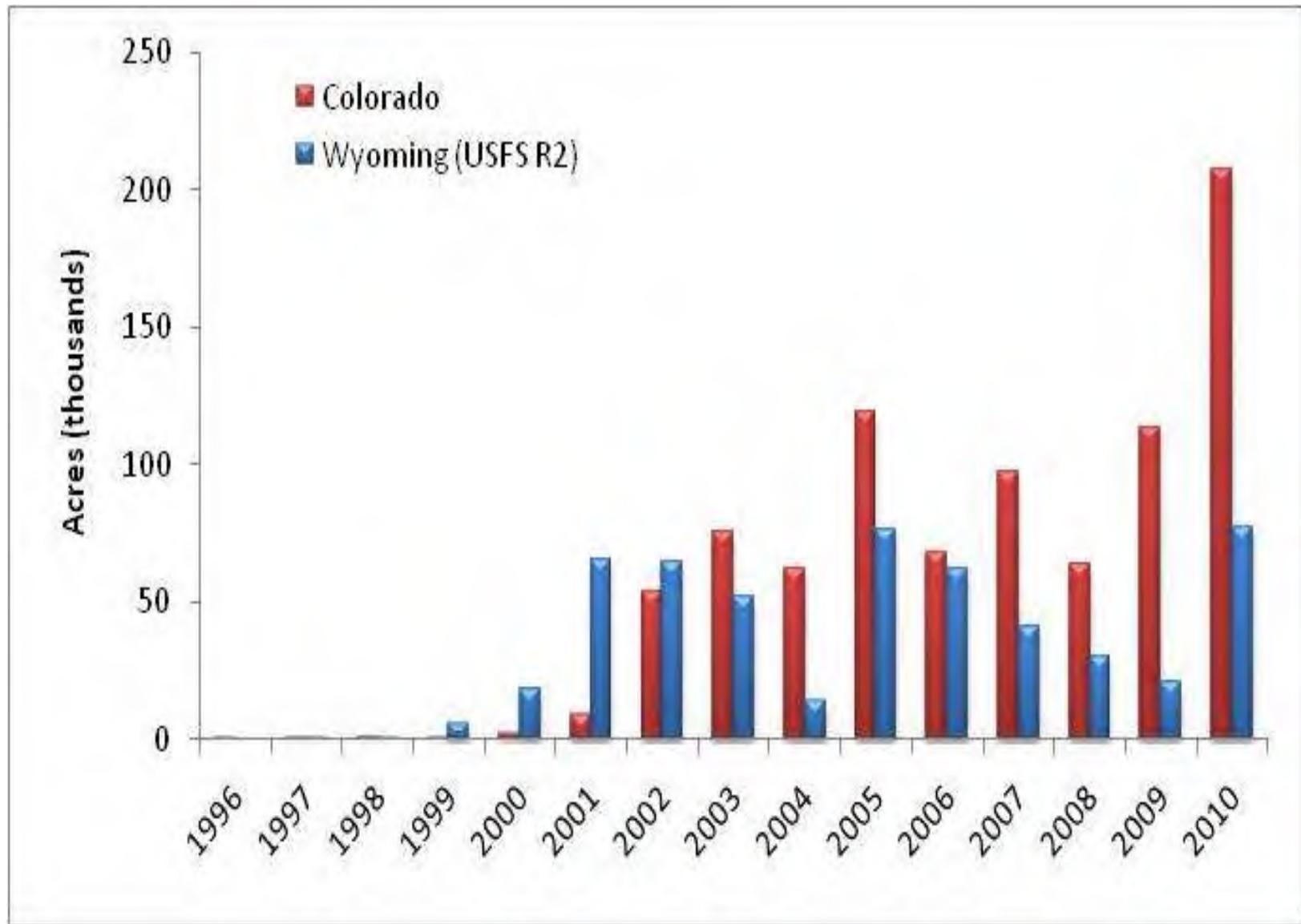


Figure B6. Acres affected by **Spruce beetle by year and state** detected by aerial survey in the USFS Rocky Mountain Region

[Return to Spruce Beetle](#)

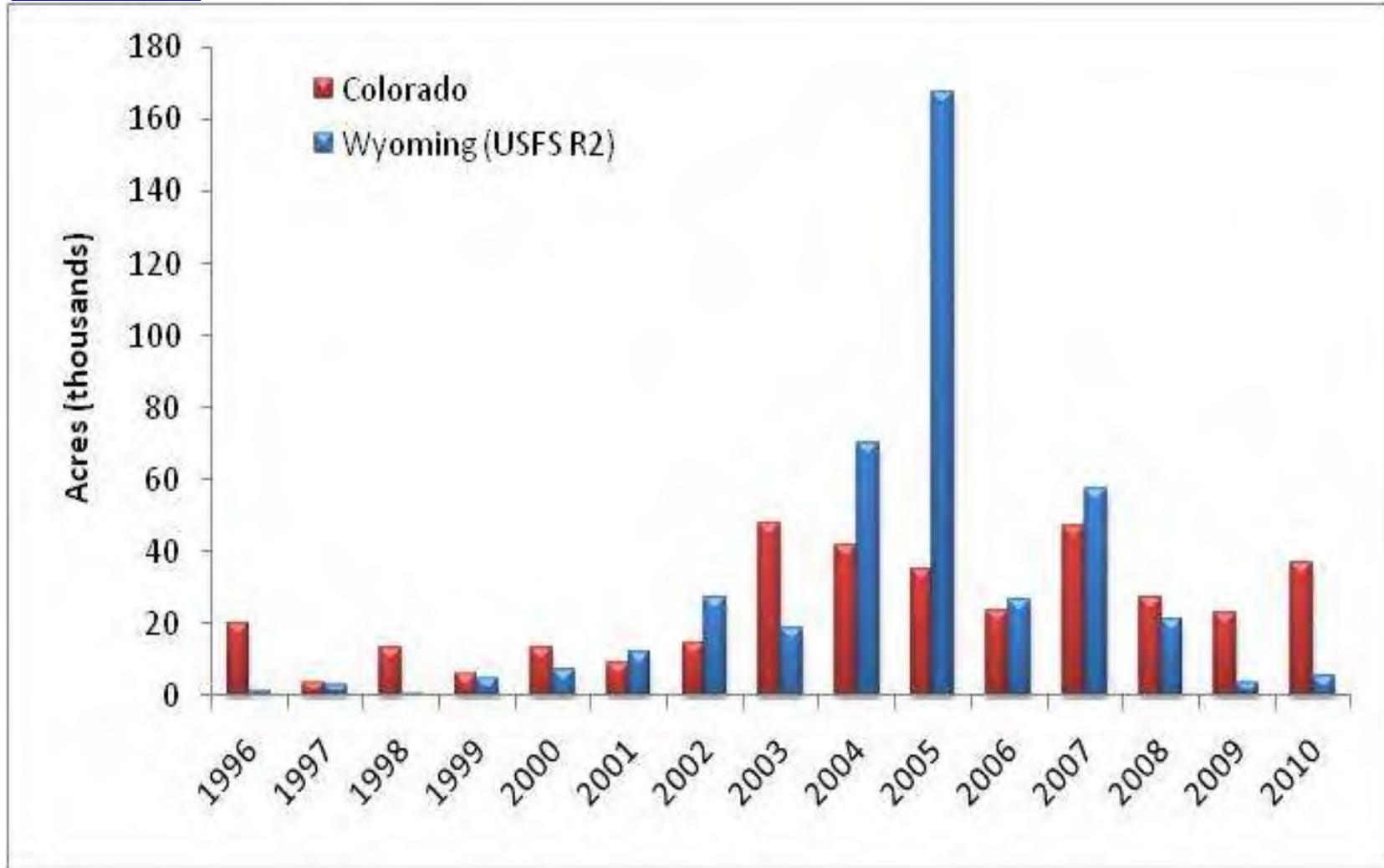


Figure B7. Acres affected by **Douglas-fir beetle by year and state** detected by aerial survey in the USFS Rocky Mountain Region.
[Return to Douglas-fir Beetle](#)

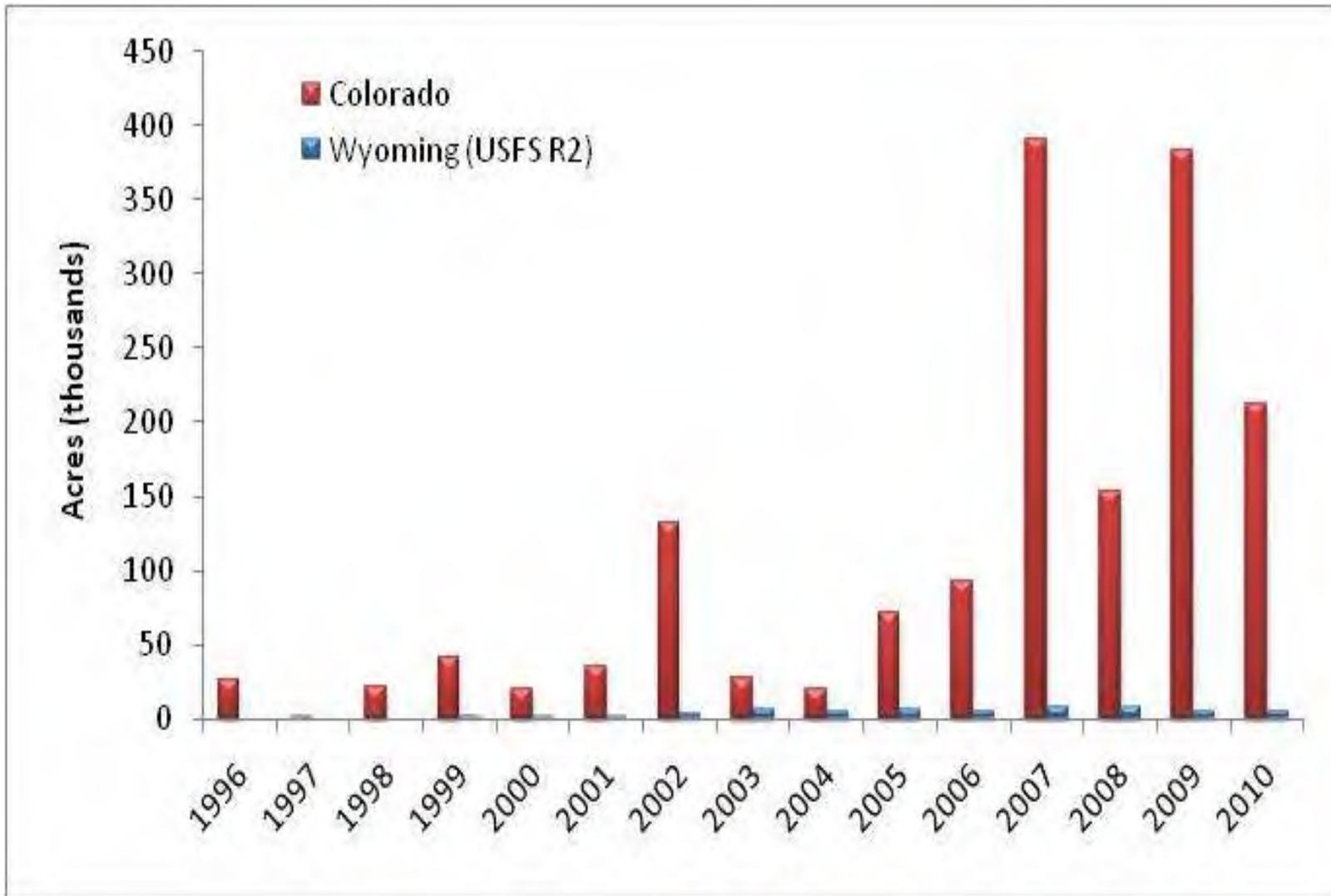


Figure B8. Acres affected by **Western Spruce Budworm in all hosts by year and state** detected by aerial survey in R2
[Return to Western Spruce Budworm](#)
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Appendix C.

The 2009 Aerial Detection Survey Summary for Colorado, Wyoming, South Dakota and Nebraska

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Mountain Pine Beetle in Ponderosa Pine, Near Red Feather Lakes, Colorado



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Thanks to Dick Halsey for preparing the cumulative numbers for R1/R4

Last updated: 1/19/2011

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Introduction

Acres figures are rounded as follows:

X < 10 acres- to the nearest acre
10 < X < 1,000 acres- to the nearest 10 acres
1,000 < X < 10,000 acres- to the nearest 100 acres
X > 10,000 acres- to the nearest 1,000 acres

These tables provide summaries for the major damage agents detected in the 2009 aerial detection survey for Wyoming including Forest Service Regions 1, 2, and 4.

Counties or National Forests that have zero mapped acres for all categories in the tables are omitted.

Acres for Yellowstone/Teton National Parks, Caribou-Targhee NF, and Wasatch-Cache NF include only the Wyoming portion of the Park or Forest.

Certain calculations using these data should be avoided. Adding numbers from different categories in an attempt to produce a total of acres impacted by multiple agents, for example will produce inaccurate, inflated results because acres experiencing multiple damages are double-counted. Producing totals for multiple agents is a separate GIS exercise.

Caution should be exercised when making year to year comparisons using these data, the survey area is not identical from year to year and extent flown each year may not equal 100 % of the forested acres in a given area. A GIS dataset of area flown is available and provides information on the spatial extent of the aerial survey for a particular year.

The county summaries include all ownerships within the county boundary. National Forest summaries are based on the Forest's proclamation boundary and include inholdings of all ownership types.

Interpreting the 2009 Aerial Detection Survey Summary Tables

The 2009 aerial detection survey summary tables have been prepared to answer the majority of questions concerning the aerial survey data and to provide consistent answers to questions from our clients. Raw GIS files are available for analysis; however minor differences in query structure can result in multiple “correct” answers to the same question. Therefore the numbers provided in these tables are to be considered final. The numbers reported here are the results of GIS queries that remain consistent from year to year. In these tables, the major forest pests that were detected in the region’s forests are summarized by state, county, and national forest. County totals include all ownerships within a county’s boundary. Forest totals include all acres within the forest’s proclamation boundary.

For bark beetles including mountain pine beetle, spruce beetle and Douglas-fir beetle the aerial survey tables provide the number of acres where some level of trees were detected that were currently dying (fading) from bark beetle attack. Fading occurs one year after initial attack so trees mapped in a given year were killed by bark beetles the previous year. Information from the prior year (2008 Acres Affected) is also provided to assess the trend of the epidemic over the last year in a given area. Because bark beetles may be active in an area for multiple years there is considerable overlap of acres from year to year. Cumulative acres affected since 1996 through the current and through the prior year are provided to determine the area affected by the ongoing epidemic. By subtracting the current cumulative acres (1996-2009 Cumulative Acres Affected) for a given area from the prior year’s cumulative acres (1996-2008 Cumulative Acres Affected) for that area, the expansion of the beetle epidemic onto new (not previously mapped) acres can be determined.

For example, in Larimer County, Colorado, where the mountain pine beetle epidemic is rapidly expanding, mountain pine beetle activity was detected on 412,000 acres in 2009 (2009 Acres Affected). Detectable mountain pine beetle activity increased by 224,000 acres since 2008 (2009 Acres Affected minus 2008 Acres Affected = increase in detected acres) and the area where beetles were active shifted onto 238,000 new acres that had not been previously mapped (1996-2008 cumulative acres minus 1996-2009 cumulative acres = new acres). Over the course of the epidemic, 499,000 acres (1996-2009 Acres Affected) in Larimer County have been affected by mountain pine beetle activity.

In Routt County, CO where the mountain pine beetle epidemic has been ongoing and the supply of host trees is being depleted, mountain pine beetle activity was detected on 68,000 acres in 2009. Detectable mountain pine beetle activity decreased by 177,000 acres (2009 Acres Affected minus 2008 Acres Affected = increase in detected acres (in this case a negative number or decrease)) and

tree mortality was detected on 29,000 new acres in the county (1996-2008 cumulative acres minus 1996-2009 cumulative acres = new acres (in this case acres where the beetle is finishing off previously unmapped stands)). Over the course of the epidemic, 339,000 acres with some level of mountain pine beetle mortality have been affected by mountain pine beetle in Routt County.

For western balsam bark beetle and associated subalpine fir disease problems, western spruce budworm, aspen defoliation, and aspen dieback and mortality caused by a combination of insects and diseases only the current and prior years acres detected are provided. For these pests, general trend information about the population of the insect or disease affects can be determined by comparing acres affected with the prior year

2009 Mountain Pine Beetle Activity

| State | 2008 Acres Affected | 2009 Acres Affected | 1996-2008 Cumulative Acres Affected | 1996-2009 Cumulative Acres Affected |
|---------------------|---------------------|---------------------|-------------------------------------|-------------------------------------|
| Colorado | | | | |
| Lodgepole Pine | 1,139,000 | 1,021,000 | 1,964,000 | 2,344,000 |
| Ponderosa Pine | 8,600 | 22,000 | 553,000 | 572,000 |
| 5-Needle Pines | 13,000 | 32,000 | 74,000 | 104,000 |
| All Hosts | 1,154,000 | 1,046,000 | 2,529,000 | 2,903,000 |
| Wyoming | | | | |
| Lodgepole Pine | 851,000 | 932,000 | 1,452,000 | 1,842,000 |
| Ponderosa Pine | 10,000 | 25,000 | 86,000 | 109,000 |
| 5-Needle Pines | 335,000 | 355,000 | 986,000 | 1,195,000 |
| All Hosts | 1,136,000 | 1,205,000 | 2,320,000 | 2,824,000 |
| South Dakota | | | | |
| Lodgepole Pine | 0 | 0 | 0 | 0 |
| Ponderosa Pine | 25,000 | 22,000 | 354,000 | 358,000 |
| 5-Needle Pines | 0 | 0 | 0 | 0 |
| All Hosts | 25,000 | 22,000 | 354,000 | 358,000 |

| Colorado County | Host Tree | 2008 Acres Affected | 2009 Acres Affected | 1996-2008 Cumulative Acres Affected | 1996-2009 Cumulative Acres Affected |
|-----------------|------------------|---------------------|---------------------|-------------------------------------|-------------------------------------|
| Adams | Lodgepole Pine | 0 | 0 | 0 | 0 |
| | Ponderosa Pine | 0 | 1 | 0 | 1 |
| | 5-Needle Pines | 0 | 0 | 0 | 0 |
| | All Hosts | 0 | 1 | 0 | 1 |
| Alamosa | Lodgepole Pine | 0 | 0 | 0 | 0 |
| | Ponderosa Pine | 0 | 0 | 430 | 430 |
| | 5-Needle Pines | 0 | 0 | 10 | 10 |
| | All Hosts | 0 | 0 | 430 | 430 |

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| Colorado County | Host Tree | 2008 Acres Affected | 2009 Acres Affected | 1996-2008 Cumulative Acres Affected | 1996-2009 Cumulative Acres Affected |
|-----------------|------------------|---------------------|---------------------|-------------------------------------|-------------------------------------|
| Archuleta | Lodgepole Pine | 1 | 0 | 1 | 1 |
| | Ponderosa Pine | 30 | 3 | 16,000 | 16,000 |
| | 5-Needle Pines | 0 | 0 | 0 | 0 |
| | All Hosts | 30 | 3 | 16,000 | 16,000 |
| Boulder | Lodgepole Pine | 42,000 | 46,000 | 55,000 | 77,000 |
| | Ponderosa Pine | 1,600 | 1,600 | 20,000 | 22,000 |
| | 5-Needle Pines | 2,500 | 3,400 | 8,100 | 11,000 |
| | All Hosts | 46,000 | 50,000 | 76,000 | 97,000 |
| Chaffee | Lodgepole Pine | 1,100 | 1,700 | 5,100 | 5,400 |
| | Ponderosa Pine | 40 | 50 | 77,000 | 77,000 |
| | 5-Needle Pines | 20 | 0 | 1,700 | 1,700 |
| | All Hosts | 1,200 | 1,700 | 83,000 | 83,000 |
| Clear Creek | Lodgepole Pine | 17,000 | 46,000 | 39,000 | 63,000 |
| | Ponderosa Pine | 110 | 120 | 4,000 | 4,100 |
| | 5-Needle Pines | 230 | 120 | 8,200 | 8,300 |
| | All Hosts | 18,000 | 46,000 | 44,000 | 68,000 |
| Conejos | Lodgepole Pine | 0 | 0 | 0 | 0 |
| | Ponderosa Pine | 0 | 1 | 4,800 | 4,800 |
| | 5-Needle Pines | 0 | 0 | 0 | 0 |
| | All Hosts | 0 | 1 | 4,800 | 4,800 |
| Costilla | Lodgepole Pine | 0 | 0 | 0 | 0 |
| | Ponderosa Pine | 0 | 0 | 4,600 | 4,600 |
| | 5-Needle Pines | 0 | 0 | 7 | 7 |
| | All Hosts | 0 | 0 | 4,600 | 4,600 |
| Custer | Lodgepole Pine | 1 | 0 | 160 | 160 |
| | Ponderosa Pine | 10 | 4 | 34,000 | 34,000 |
| | 5-Needle Pines | 30 | 20 | 780 | 790 |
| | All Hosts | 50 | 20 | 35,000 | 35,000 |

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| Colorado County | Host Tree | 2008 Acres Affected | 2009 Acres Affected | 1996-2008 Cumulative Acres Affected | 1996-2009 Cumulative Acres Affected |
|-----------------|------------------|---------------------|---------------------|-------------------------------------|-------------------------------------|
| Delta | Lodgepole Pine | 0 | 0 | 2 | 2 |
| | Ponderosa Pine | 0 | 0 | 6 | 6 |
| | 5-Needle Pines | 0 | 0 | 0 | 0 |
| | All Hosts | 0 | 0 | 8 | 8 |
| Dolores | Lodgepole Pine | 0 | 0 | 0 | 0 |
| | Ponderosa Pine | 40 | 0 | 550 | 550 |
| | 5-Needle Pines | 0 | 0 | 0 | 0 |
| | All Hosts | 40 | 0 | 550 | 550 |
| Douglas | Lodgepole Pine | 260 | 0 | 270 | 270 |
| | Ponderosa Pine | 110 | 5 | 33,000 | 33,000 |
| | 5-Needle Pines | 0 | 0 | 0 | 0 |
| | All Hosts | 370 | 5 | 34,000 | 34,000 |
| Eagle | Lodgepole Pine | 75,000 | 57,000 | 158,000 | 172,000 |
| | Ponderosa Pine | 650 | 550 | 3,700 | 4,100 |
| | 5-Needle Pines | 30 | 20 | 160 | 190 |
| | All Hosts | 76,000 | 57,000 | 161,000 | 176,000 |
| El Paso | Lodgepole Pine | 0 | 0 | 2 | 2 |
| | Ponderosa Pine | 90 | 510 | 13,000 | 13,000 |
| | 5-Needle Pines | 0 | 0 | 0 | 0 |
| | All Hosts | 90 | 510 | 13,000 | 13,000 |
| Elbert | Lodgepole Pine | 0 | 0 | 0 | 0 |
| | Ponderosa Pine | 0 | 0 | 390 | 390 |
| | 5-Needle Pines | 0 | 0 | 0 | 0 |
| | All Hosts | 0 | 0 | 390 | 390 |
| Fremont | Lodgepole Pine | 4 | 2 | 170 | 170 |
| | Ponderosa Pine | 130 | 660 | 31,000 | 32,000 |
| | 5-Needle Pines | 500 | 40 | 1,800 | 1,800 |
| | All Hosts | 640 | 700 | 33,000 | 34,000 |

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| Colorado County | Host Tree | 2008 Acres Affected | 2009 Acres Affected | 1996-2008 Cumulative Acres Affected | 1996-2009 Cumulative Acres Affected |
|-----------------|------------------|---------------------|---------------------|-------------------------------------|-------------------------------------|
| Garfield | Lodgepole Pine | 5,200 | 2,100 | 7,300 | 8,100 |
| | Ponderosa Pine | 0 | 0 | 60 | 60 |
| | 5-Needle Pines | 10 | 90 | 400 | 480 |
| | All Hosts | 5,200 | 2,200 | 7,800 | 8,600 |
| Gilpin | Lodgepole Pine | 12,000 | 32,000 | 24,000 | 42,000 |
| | Ponderosa Pine | 90 | 160 | 2,600 | 2,700 |
| | 5-Needle Pines | 1,100 | 1,200 | 14,000 | 14,000 |
| | All Hosts | 13,000 | 33,000 | 30,000 | 46,000 |
| Grand | Lodgepole Pine | 208,000 | 150,000 | 561,000 | 576,000 |
| | Ponderosa Pine | 0 | 20 | 470 | 490 |
| | 5-Needle Pines | 210 | 600 | 3,100 | 3,700 |
| | All Hosts | 208,000 | 151,000 | 563,000 | 579,000 |
| Gunnison | Lodgepole Pine | 0 | 270 | 2,500 | 2,700 |
| | Ponderosa Pine | 70 | 20 | 1,300 | 1,300 |
| | 5-Needle Pines | 0 | 0 | 0 | 0 |
| | All Hosts | 70 | 290 | 3,800 | 4,100 |
| Hinsdale | Lodgepole Pine | 0 | 0 | 3 | 3 |
| | Ponderosa Pine | 10 | 5 | 3,200 | 3,200 |
| | 5-Needle Pines | 0 | 0 | 0 | 0 |
| | All Hosts | 10 | 5 | 3,200 | 3,200 |
| Huerfano | Lodgepole Pine | 0 | 0 | 50 | 50 |
| | Ponderosa Pine | 2 | 0 | 26,000 | 26,000 |
| | 5-Needle Pines | 0 | 0 | 220 | 220 |
| | All Hosts | 2 | 0 | 26,000 | 26,000 |
| Jackson | Lodgepole Pine | 233,000 | 128,000 | 354,000 | 360,000 |
| | Ponderosa Pine | 420 | 290 | 740 | 980 |
| | 5-Needle Pines | 1,200 | 6,800 | 6,400 | 13,000 |
| | All Hosts | 235,000 | 129,000 | 356,000 | 362,000 |

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| Colorado County | Host Tree | 2008 Acres Affected | 2009 Acres Affected | 1996-2008 Cumulative Acres Affected | 1996-2009 Cumulative Acres Affected |
|-----------------|------------------|---------------------|---------------------|-------------------------------------|-------------------------------------|
| Jefferson | Lodgepole Pine | 80 | 1,800 | 1,800 | 3,500 |
| | Ponderosa Pine | 250 | 90 | 27,000 | 27,000 |
| | 5-Needle Pines | 0 | 0 | 5 | 5 |
| | All Hosts | 330 | 1,900 | 28,000 | 30,000 |
| La Plata | Lodgepole Pine | 0 | 0 | 0 | 0 |
| | Ponderosa Pine | 2 | 10 | 12,000 | 12,000 |
| | 5-Needle Pines | 0 | 0 | 0 | 0 |
| | All Hosts | 2 | 10 | 12,000 | 12,000 |
| Lake | Lodgepole Pine | 3,800 | 960 | 9,300 | 9,900 |
| | Ponderosa Pine | 1 | 20 | 300 | 320 |
| | 5-Needle Pines | 30 | 0 | 560 | 560 |
| | All Hosts | 3,800 | 980 | 9,800 | 10,000 |
| Larimer | Lodgepole Pine | 187,000 | 398,000 | 229,000 | 454,000 |
| | Ponderosa Pine | 1,900 | 16,000 | 50,000 | 65,000 |
| | 5-Needle Pines | 6,600 | 19,000 | 27,000 | 46,000 |
| | All Hosts | 190,000 | 412,000 | 280,000 | 499,000 |
| Las Animas | Lodgepole Pine | 0 | 0 | 10 | 10 |
| | Ponderosa Pine | 0 | 0 | 12,000 | 12,000 |
| | 5-Needle Pines | 0 | 0 | 6 | 6 |
| | All Hosts | 0 | 0 | 12,000 | 12,000 |
| Mesa | Lodgepole Pine | 0 | 0 | 0 | 0 |
| | Ponderosa Pine | 60 | 180 | 5,200 | 5,400 |
| | 5-Needle Pines | 0 | 0 | 0 | 0 |
| | All Hosts | 60 | 180 | 5,200 | 5,400 |
| Mineral | Lodgepole Pine | 0 | 0 | 0 | 0 |
| | Ponderosa Pine | 0 | 0 | 710 | 710 |
| | 5-Needle Pines | 0 | 0 | 3 | 3 |
| | All Hosts | 0 | 0 | 710 | 710 |

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| Colorado County | Host Tree | 2008 Acres Affected | 2009 Acres Affected | 1996-2008 Cumulative Acres Affected | 1996-2009 Cumulative Acres Affected |
|-----------------|------------------|---------------------|---------------------|-------------------------------------|-------------------------------------|
| Moffat | Lodgepole Pine | 9,700 | 2,600 | 12,000 | 13,000 |
| | Ponderosa Pine | 0 | 380 | 0 | 380 |
| | 5-Needle Pines | 90 | 2 | 100 | 100 |
| | All Hosts | 9,800 | 2,800 | 12,000 | 13,000 |
| Montezuma | Lodgepole Pine | 0 | 0 | 0 | 0 |
| | Ponderosa Pine | 40 | 3 | 670 | 670 |
| | 5-Needle Pines | 0 | 0 | 0 | 0 |
| | All Hosts | 40 | 3 | 670 | 670 |
| Montrose | Lodgepole Pine | 0 | 0 | 0 | 0 |
| | Ponderosa Pine | 160 | 200 | 1,900 | 2,100 |
| | 5-Needle Pines | 0 | 0 | 0 | 0 |
| | All Hosts | 160 | 200 | 1,900 | 2,100 |
| Ouray | Lodgepole Pine | 0 | 0 | 5 | 5 |
| | Ponderosa Pine | 50 | 60 | 210 | 240 |
| | 5-Needle Pines | 0 | 0 | 0 | 0 |
| | All Hosts | 50 | 60 | 210 | 250 |
| Park | Lodgepole Pine | 9,400 | 27,000 | 12,000 | 34,000 |
| | Ponderosa Pine | 260 | 90 | 89,000 | 89,000 |
| | 5-Needle Pines | 30 | 30 | 270 | 300 |
| | All Hosts | 9,700 | 27,000 | 102,000 | 124,000 |
| Pitkin | Lodgepole Pine | 5,200 | 2,800 | 11,000 | 13,000 |
| | Ponderosa Pine | 20 | 10 | 80 | 90 |
| | 5-Needle Pines | 0 | 4 | 0 | 4 |
| | All Hosts | 5,200 | 2,800 | 11,000 | 13,000 |
| Pueblo | Lodgepole Pine | 0 | 0 | 0 | 0 |
| | Ponderosa Pine | 10 | 0 | 21,000 | 21,000 |
| | 5-Needle Pines | 0 | 0 | 0 | 0 |
| | All Hosts | 10 | 0 | 21,000 | 21,000 |

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| Colorado County | Host Tree | 2008 Acres Affected | 2009 Acres Affected | 1996-2008 Cumulative Acres Affected | 1996-2009 Cumulative Acres Affected |
|-----------------|------------------|---------------------|---------------------|-------------------------------------|-------------------------------------|
| Rio Blanco | Lodgepole Pine | 18,000 | 11,000 | 26,000 | 31,000 |
| | Ponderosa Pine | 0 | 6 | 30 | 40 |
| | 5-Needle Pines | 0 | 0 | 100 | 100 |
| | All Hosts | 18,000 | 11,000 | 26,000 | 31,000 |
| Rio Grande | Lodgepole Pine | 0 | 0 | 0 | 0 |
| | Ponderosa Pine | 0 | 0 | 3,300 | 3,300 |
| | 5-Needle Pines | 0 | 0 | 0 | 0 |
| | All Hosts | 0 | 0 | 3,300 | 3,300 |
| Routt | Lodgepole Pine | 245,000 | 68,000 | 331,000 | 339,000 |
| | Ponderosa Pine | 80 | 80 | 170 | 240 |
| | 5-Needle Pines | 210 | 120 | 420 | 540 |
| | All Hosts | 245,000 | 68,000 | 331,000 | 339,000 |
| Saguache | Lodgepole Pine | 3 | 6 | 780 | 790 |
| | Ponderosa Pine | 2,300 | 490 | 38,000 | 39,000 |
| | 5-Needle Pines | 30 | 0 | 330 | 330 |
| | All Hosts | 2,300 | 500 | 39,000 | 40,000 |
| San Miguel | Lodgepole Pine | 0 | 0 | 10 | 10 |
| | Ponderosa Pine | 40 | 180 | 2,700 | 2,900 |
| | 5-Needle Pines | 0 | 0 | 10 | 10 |
| | All Hosts | 40 | 180 | 2,800 | 2,900 |
| Summit | Lodgepole Pine | 65,000 | 46,000 | 125,000 | 138,000 |
| | Ponderosa Pine | 0 | 20 | 20 | 40 |
| | 5-Needle Pines | 260 | 130 | 440 | 580 |
| | All Hosts | 65,000 | 47,000 | 125,000 | 138,000 |
| Teller | Lodgepole Pine | 0 | 0 | 10 | 10 |
| | Ponderosa Pine | 90 | 100 | 9,600 | 9,700 |
| | 5-Needle Pines | 0 | 0 | 20 | 20 |
| | All Hosts | 90 | 100 | 9,700 | 9,700 |

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| Wyoming County | Host Tree | 2008 Acres Affected | 2009 Acres Affected | 1996-2008 Cumulative Acres Affected | 1996-2009 Cumulative Acres Affected |
|----------------|------------------|---------------------|---------------------|-------------------------------------|-------------------------------------|
| Albany | Lodgepole Pine | 92,000 | 126,000 | 100,000 | 157,000 |
| | Ponderosa Pine | 1,500 | 15,000 | 4,900 | 20,000 |
| | 5-Needle Pines | 6,900 | 13,000 | 31,000 | 41,000 |
| | All Hosts | 100,000 | 144,000 | 132,000 | 202,000 |
| Big Horn | Lodgepole Pine | 140 | 150 | 1,300 | 1,500 |
| | Ponderosa Pine | 0 | 0 | 1,200 | 1,200 |
| | 5-Needle Pines | 810 | 770 | 21,000 | 21,000 |
| | All Hosts | 950 | 930 | 23,000 | 23,000 |
| Campbell | Lodgepole Pine | 0 | 0 | 0 | 0 |
| | Ponderosa Pine | 0 | 0 | 180 | 180 |
| | 5-Needle Pines | 0 | 0 | 0 | 0 |
| | All Hosts | 0 | 0 | 180 | 180 |
| Carbon | Lodgepole Pine | 273,000 | 205,000 | 361,000 | 427,000 |
| | Ponderosa Pine | 1,600 | 3,300 | 3,600 | 6,400 |
| | 5-Needle Pines | 2,700 | 3,600 | 15,000 | 18,000 |
| | All Hosts | 277,000 | 212,000 | 375,000 | 444,000 |
| Converse | Lodgepole Pine | 230 | 3,000 | 600 | 3,500 |
| | Ponderosa Pine | 190 | 1,000 | 2,600 | 3,400 |
| | 5-Needle Pines | 580 | 1,600 | 2,700 | 3,900 |
| | All Hosts | 1,000 | 5,000 | 5,800 | 10,000 |
| Crook | Lodgepole Pine | 0 | 0 | 0 | 0 |
| | Ponderosa Pine | 320 | 210 | 31,000 | 31,000 |
| | 5-Needle Pines | 0 | 0 | 0 | 0 |
| | All Hosts | 320 | 210 | 31,000 | 31,000 |
| Fremont | Lodgepole Pine | 59,000 | 118,000 | 136,000 | 205,000 |
| | Ponderosa Pine | 0 | 3 | 110 | 120 |
| | 5-Needle Pines | 108,000 | 104,000 | 212,000 | 269,000 |
| | All Hosts | 157,000 | 188,000 | 318,000 | 400,000 |
| Goshen | Lodgepole Pine | 0 | 0 | 0 | 0 |
| | Ponderosa Pine | 0 | 0 | 20 | 20 |
| | 5-Needle Pines | 0 | 0 | 0 | 0 |
| | All Hosts | 0 | 0 | 20 | 20 |

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| Wyoming County | Host Tree | 2008 Acres Affected | 2009 Acres Affected | 1996-2008 Cumulative Acres Affected | 1996-2009 Cumulative Acres Affected |
|----------------|------------------|---------------------|---------------------|-------------------------------------|-------------------------------------|
| Hot Springs | Lodgepole Pine | 470 | 3,400 | 720 | 4,000 |
| | Ponderosa Pine | 0 | 80 | 770 | 850 |
| | 5-Needle Pines | 2,500 | 7,200 | 34,000 | 40,000 |
| | All Hosts | 2,900 | 9,000 | 35,000 | 42,000 |
| Johnson | Lodgepole Pine | 1,100 | 30 | 3,300 | 3,300 |
| | Ponderosa Pine | 5,200 | 560 | 22,000 | 22,000 |
| | 5-Needle Pines | 19,000 | 1,500 | 34,000 | 35,000 |
| | All Hosts | 26,000 | 2,100 | 57,000 | 59,000 |
| Laramie | Lodgepole Pine | 0 | 20 | 0 | 20 |
| | Ponderosa Pine | 210 | 2,800 | 230 | 3,000 |
| | 5-Needle Pines | 70 | 270 | 70 | 340 |
| | All Hosts | 270 | 3,100 | 300 | 3,300 |
| Lincoln | Lodgepole Pine | 46,000 | 47,000 | 114,000 | 134,000 |
| | Ponderosa Pine | 0 | 0 | 30 | 30 |
| | 5-Needle Pines | 19,000 | 21,000 | 40,000 | 51,000 |
| | All Hosts | 63,000 | 64,000 | 148,000 | 175,000 |
| Natrona | Lodgepole Pine | 130 | 2,200 | 810 | 3,000 |
| | Ponderosa Pine | 60 | 420 | 3,600 | 3,900 |
| | 5-Needle Pines | 7,000 | 2,900 | 31,000 | 32,000 |
| | All Hosts | 7,200 | 5,500 | 34,000 | 38,000 |
| Niobrara | Lodgepole Pine | 0 | 0 | 0 | 0 |
| | Ponderosa Pine | 0 | 0 | 90 | 90 |
| | 5-Needle Pines | 0 | 0 | 0 | 0 |
| | All Hosts | 0 | 0 | 90 | 90 |
| Park | Lodgepole Pine | 59,000 | 62,000 | 106,000 | 148,000 |
| | Ponderosa Pine | 0 | 480 | 30 | 510 |
| | 5-Needle Pines | 89,000 | 74,000 | 341,000 | 386,000 |
| | All Hosts | 135,000 | 129,000 | 402,000 | 477,000 |
| Platte | Lodgepole Pine | 0 | 0 | 9 | 9 |
| | Ponderosa Pine | 2 | 50 | 70 | 120 |
| | 5-Needle Pines | 0 | 7 | 10 | 20 |
| | All Hosts | 2 | 50 | 90 | 150 |

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| Wyoming County | Host Tree | 2008 Acres Affected | 2009 Acres Affected | 1996-2008 Cumulative Acres Affected | 1996-2009 Cumulative Acres Affected |
|----------------|------------------|---------------------|---------------------|-------------------------------------|-------------------------------------|
| Sheridan | Lodgepole Pine | 40 | 60 | 2,000 | 2,000 |
| | Ponderosa Pine | 550 | 470 | 6,100 | 6,400 |
| | 5-Needle Pines | 120 | 250 | 2,200 | 2,400 |
| | All Hosts | 710 | 780 | 10,000 | 11,000 |
| Sublette | Lodgepole Pine | 138,000 | 145,000 | 256,000 | 310,000 |
| | Ponderosa Pine | 0 | 0 | 40 | 40 |
| | 5-Needle Pines | 23,000 | 68,000 | 75,000 | 114,000 |
| | All Hosts | 151,000 | 186,000 | 299,000 | 375,000 |
| Teton | Lodgepole Pine | 128,000 | 181,000 | 287,000 | 360,000 |
| | Ponderosa Pine | 0 | 0 | 4 | 4 |
| | 5-Needle Pines | 46,000 | 56,000 | 117,000 | 149,000 |
| | All Hosts | 147,000 | 214,000 | 324,000 | 409,000 |
| Uinta | Lodgepole Pine | 54,000 | 39,000 | 82,000 | 82,000 |
| | Ponderosa Pine | 0 | 0 | 0 | 0 |
| | 5-Needle Pines | 0 | 0 | 0 | 0 |
| | All Hosts | 54,000 | 39,000 | 82,000 | 82,000 |
| Washakie | Lodgepole Pine | 250 | 20 | 2,100 | 2,100 |
| | Ponderosa Pine | 160 | 0 | 1,800 | 1,800 |
| | 5-Needle Pines | 10,000 | 1,800 | 31,000 | 32,000 |
| | All Hosts | 11,000 | 1,800 | 34,000 | 35,000 |
| Weston | Lodgepole Pine | 0 | 0 | 0 | 0 |
| | Ponderosa Pine | 140 | 70 | 7,900 | 7,900 |
| | 5-Needle Pines | 0 | 0 | 0 | 0 |
| | All Hosts | 140 | 70 | 7,900 | 7,900 |

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| South Dakota County | Host Tree | 2008 Acres Affected | 2009 Acres Affected | 1996-2008 Cumulative Acres Affected | 1996-2009 Cumulative Acres Affected |
|---------------------|----------------|---------------------|---------------------|-------------------------------------|-------------------------------------|
| Butte | Ponderosa Pine | 0 | 0 | 120 | 120 |
| Custer | Ponderosa Pine | 3,800 | 2,400 | 42,000 | 42,000 |
| Fall River | Ponderosa Pine | 0 | 0 | 1,400 | 1,400 |
| Lawrence | Ponderosa Pine | 3,100 | 5,400 | 130,000 | 131,000 |
| Meade | Ponderosa Pine | 2 | 1 | 26,000 | 26,000 |
| Pennington | Ponderosa Pine | 18,000 | 15,000 | 155,000 | 157,000 |

| Nebraska County | Host Tree | 2008 Acres Affected | 2009 Acres Affected | 1996-2008 Cumulative Acres Affected | 1996-2009 Cumulative Acres Affected |
|-----------------|----------------|---------------------|---------------------|-------------------------------------|-------------------------------------|
| Sheridan | 5-Needle Pines | 0 | 0 | 1 | 1 |

| National Forest | Host Tree | 2008 Acres Affected | 2009 Acres Affected | 1996-2008 Cumulative Acres Affected | 1996-2009 Cumulative Acres Affected |
|-------------------------|------------------|---------------------|---------------------|-------------------------------------|-------------------------------------|
| Arapaho National Forest | Lodgepole Pine | 150,000 | 144,000 | 410,000 | 441,000 |
| | Ponderosa Pine | 70 | 70 | 1,600 | 1,700 |
| | 5-Needle Pines | 710 | 780 | 10,000 | 11,000 |
| | All Hosts | 151,000 | 145,000 | 414,000 | 444,000 |
| Bighorn National Forest | Lodgepole Pine | 920 | 220 | 5,000 | 5,200 |
| | Ponderosa Pine | 410 | 270 | 5,800 | 6,000 |
| | 5-Needle Pines | 1,500 | 760 | 14,000 | 14,000 |
| | All Hosts | 2,900 | 1,300 | 25,000 | 25,000 |

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| National Forest | Host Tree | 2008 Acres Affected | 2009 Acres Affected | 1996-2008 Cumulative Acres Affected | 1996-2009 Cumulative Acres Affected |
|------------------------------------|------------------|----------------------------|----------------------------|--|--|
| Black Hills National Forest | Lodgepole Pine | 0 | 0 | 0 | 0 |
| | Ponderosa Pine | 25,000 | 22,000 | 369,000 | 372,000 |
| | 5-Needle Pines | 0 | 0 | 0 | 0 |
| | All Hosts | 25,000 | 22,000 | 369,000 | 372,000 |
| Bridger-Teton National Forest* | Lodgepole Pine | 295,000 | 364,000 | 619,000 | 759,000 |
| | Ponderosa Pine | 0 | 0 | 40 | 40 |
| | 5-Needle Pines | 88,000 | 166,000 | 231,000 | 331,000 |
| | All Hosts | 344,000 | 469,000 | 730,000 | 923,000 |
| Caribou - Targhee National Forest* | Lodgepole Pine | 1,300 | 1,200 | 8,300 | 9,700 |
| | Ponderosa Pine | 0 | 0 | 30 | 30 |
| | 5-Needle Pines | 680 | 240 | 2,900 | 2,900 |
| | All Hosts | 2,000 | 1,400 | 10,000 | 12,000 |
| Grand Mesa National Forest | Lodgepole Pine | 0 | 0 | 2 | 2 |
| | Ponderosa Pine | 0 | 0 | 8 | 8 |
| | 5-Needle Pines | 0 | 0 | 0 | 0 |
| | All Hosts | 0 | 0 | 10 | 10 |
| Gunnison National Forest | Lodgepole Pine | 3 | 270 | 3,100 | 3,300 |
| | Ponderosa Pine | 60 | 70 | 2,000 | 2,100 |
| | 5-Needle Pines | 0 | 0 | 0 | 0 |
| | All Hosts | 60 | 340 | 5,000 | 5,400 |

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| National Forest | Host Tree | 2008 Acres Affected | 2009 Acres Affected | 1996-2008 Cumulative Acres Affected | 1996-2009 Cumulative Acres Affected |
|------------------------------|------------------|----------------------------|----------------------------|--|--|
| Medicine Bow National Forest | Lodgepole Pine | 345,000 | 309,000 | 432,000 | 544,000 |
| | Ponderosa Pine | 2,300 | 8,500 | 6,300 | 14,000 |
| | 5-Needle Pines | 4,200 | 7,100 | 22,000 | 28,000 |
| | All Hosts | 351,000 | 319,000 | 455,000 | 571,000 |
| Pike National Forest | Lodgepole Pine | 9,200 | 27,000 | 12,000 | 34,000 |
| | Ponderosa Pine | 440 | 360 | 100,000 | 100,000 |
| | 5-Needle Pines | 30 | 10 | 180 | 190 |
| | All Hosts | 9,700 | 27,000 | 112,000 | 135,000 |
| Rio Grande National Forest | Lodgepole Pine | 0 | 0 | 90 | 90 |
| | Ponderosa Pine | 1,900 | 240 | 35,000 | 35,000 |
| | 5-Needle Pines | 30 | 0 | 300 | 300 |
| | All Hosts | 1,900 | 240 | 35,000 | 35,000 |
| Roosevelt National Forest | Lodgepole Pine | 195,000 | 391,000 | 242,000 | 462,000 |
| | Ponderosa Pine | 2,600 | 14,000 | 57,000 | 70,000 |
| | 5-Needle Pines | 8,300 | 21,000 | 33,000 | 53,000 |
| | All Hosts | 201,000 | 407,000 | 301,000 | 515,000 |
| Routt National Forest | Lodgepole Pine | 426,000 | 166,000 | 594,000 | 605,000 |
| | Ponderosa Pine | 50 | 20 | 310 | 330 |
| | 5-Needle Pines | 970 | 5,800 | 4,400 | 9,900 |
| | All Hosts | 427,000 | 167,000 | 595,000 | 606,000 |
| San Isabel National Forest | Lodgepole Pine | 3,900 | 2,100 | 12,000 | 12,000 |
| | Ponderosa Pine | 100 | 90 | 134,000 | 134,000 |
| | 5-Needle Pines | 570 | 60 | 4,900 | 4,900 |
| | All Hosts | 4,600 | 2,300 | 149,000 | 150,000 |

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| National Forest | Host Tree | 2008 Acres Affected | 2009 Acres Affected | 1996-2008 Cumulative Acres Affected | 1996-2009 Cumulative Acres Affected |
|--------------------------------|------------------|----------------------------|----------------------------|--|--|
| San Juan National Forest | Lodgepole Pine | 1 | 0 | 1 | 1 |
| | Ponderosa Pine | 110 | 2 | 27,000 | 27,000 |
| | 5-Needle Pines | 0 | 0 | 3 | 3 |
| | All Hosts | 120 | 2 | 27,000 | 27,000 |
| Shoshone National Forest | Lodgepole Pine | 65,000 | 84,000 | 122,000 | 176,000 |
| | Ponderosa Pine | 0 | 20 | 20 | 30 |
| | 5-Needle Pines | 150,000 | 99,000 | 385,000 | 429,000 |
| | All Hosts | 198,000 | 164,000 | 469,000 | 536,000 |
| Uncompahgre National Forest | Lodgepole Pine | 0 | 0 | 20 | 20 |
| | Ponderosa Pine | 210 | 530 | 7,100 | 7,700 |
| | 5-Needle Pines | 0 | 0 | 0 | 0 |
| | All Hosts | 210 | 530 | 7,200 | 7,700 |
| Wasatch-Cache National Forest* | Lodgepole Pine | 33,000 | 23,000 | 44,000 | 44,000 |
| | Ponderosa Pine | 0 | 0 | 0 | 0 |
| | 5-Needle Pines | 0 | 0 | 0 | 0 |
| | All Hosts | 33,000 | 23,000 | 44,000 | 44,000 |
| White River National Forest | Lodgepole Pine | 157,000 | 114,000 | 304,000 | 338,000 |
| | Ponderosa Pine | 640 | 530 | 2,700 | 3,100 |
| | 5-Needle Pines | 300 | 240 | 1,100 | 1,300 |
| | All Hosts | 157,000 | 114,000 | 308,000 | 342,000 |

* Includes only those portions of these forests within the state of Wyoming

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2009 Spruce Beetle Activity

| | 2008 Acres Affected | 2009 Acres Affected | 1996-2008 Cumulative Acres Affected | 1996-2009 Cumulative Acres Affected |
|--------------|------------------------------------|------------------------------------|--|--|
| Colorado | 64,000 | 114,000 | 374,000 | 435,000 |
| Wyoming | 30,000 | 26,000 | 364,000 | 372,000 |
| South Dakota | 0 | 0 | 100 | 100 |

| Colorado County | 2008 Acres Affected | 2009 Acres Affected | 1996-2008 Cumulative Acres Affected | 1996-2009 Cumulative Acres Affected |
|----------------------------|------------------------------------|------------------------------------|--|--|
| Archuleta | 1,200 | 990 | 4,500 | 5,400 |
| Boulder | 40 | 0 | 40 | 40 |
| Chaffee | 3 | 0 | 10 | 10 |
| Clear Creek | 1 | 0 | 30 | 30 |
| Conejos | 1,300 | 1,700 | 11,000 | 12,000 |
| Costilla | 2 | 0 | 1,400 | 1,400 |
| Custer | 30 | 6 | 820 | 830 |
| Delta | 430 | 880 | 3,000 | 3,700 |
| Dolores | 20 | 0 | 1,800 | 1,800 |
| Douglas | 1 | 0 | 20 | 20 |
| Eagle | 2,200 | 1,500 | 4,100 | 5,100 |
| El Paso | 0 | 0 | 10 | 10 |
| Fremont | 2 | 7 | 40 | 50 |
| Garfield | 510 | 20 | 4,100 | 4,100 |
| Gilpin | 2 | 20 | 7 | 20 |
| Grand | 780 | 3,800 | 2,100 | 5,600 |
| Gunnison | 160 | 340 | 4,900 | 5,200 |
| Hinsdale | 12,000 | 28,000 | 52,000 | 66,000 |
| Huerfano | 0 | 4 | 900 | 900 |
| Jackson | 1,600 | 1,700 | 63,000 | 64,000 |

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| Colorado County | 2008 Acres Affected | 2009 Acres Affected | 1996-2008 Cumulative Acres Affected | 1996-2009 Cumulative Acres Affected |
|------------------------|----------------------------|----------------------------|--|--|
| Jefferson | 3 | 20 | 6 | 20 |
| La Plata | 140 | 0 | 4,400 | 4,400 |
| Lake | 3 | 0 | 40 | 40 |
| Larimer | 1,300 | 4,500 | 11,000 | 16,000 |
| Las Animas | 0 | 0 | 650 | 650 |
| Mesa | 400 | 3,000 | 9,800 | 13,000 |
| Mineral | 34,000 | 63,000 | 79,000 | 109,000 |
| Moffat | 0 | 0 | 600 | 600 |
| Montezuma | 0 | 0 | 290 | 290 |
| Montrose | 0 | 0 | 500 | 500 |
| Ouray | 40 | 4 | 1,400 | 1,400 |
| Park | 8 | 0 | 10 | 10 |
| Pitkin | 1,200 | 210 | 7,300 | 7,300 |
| Pueblo | 110 | 0 | 2,100 | 2,100 |
| Rio Blanco | 0 | 0 | 3,600 | 3,600 |
| Rio Grande | 5,200 | 630 | 11,000 | 11,000 |
| Routt | 1,100 | 3,000 | 81,000 | 83,000 |
| Saguache | 70 | 0 | 2,800 | 2,800 |
| San Juan | 4 | 120 | 1,600 | 1,700 |
| San Miguel | 20 | 2 | 890 | 890 |
| Summit | 300 | 320 | 330 | 650 |

| Wyoming County | 2008 Acres Affected | 2009 Acres Affected | 1996-2008 Cumulative Acres Affected | 1996-2009 Cumulative Acres Affected |
|-----------------------|----------------------------|----------------------------|--|--|
| Albany | 1,200 | 3,100 | 14,000 | 17,000 |
| Big Horn | 850 | 1,000 | 10,000 | 11,000 |
| Carbon | 2,900 | 6,600 | 50,000 | 56,000 |
| Converse | 40 | 0 | 80 | 80 |
| Fremont | 4,500 | 5,900 | 15,000 | 20,000 |

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| Wyoming County | 2008 Acres Affected | 2009 Acres Affected | 1996-2008 Cumulative Acres Affected | 1996-2009 Cumulative Acres Affected |
|-----------------------|----------------------------|----------------------------|--|--|
| Hot Springs | 230 | 520 | 940 | 1,500 |
| Johnson | 570 | 210 | 2,200 | 2,400 |
| Lincoln | 10 | 0 | 330 | 330 |
| Natrona | 30 | 5 | 30 | 40 |
| Park | 19,000 | 5,800 | 242,000 | 246,000 |
| Sheridan | 130 | 40 | 5,000 | 5,100 |
| Sublette | 130 | 5 | 520 | 520 |
| Sweetwater | 0 | 0 | 4 | 4 |
| Teton | 2 | 3,100 | 9,200 | 12,000 |
| Uinta | 0 | 0 | 8 | 8 |
| Washakie | 480 | 6 | 650 | 660 |

| South Dakota County | 2008 Acres Affected | 2009 Acres Affected | 1996-2008 Cumulative Acres Affected | 1996-2009 Cumulative Acres Affected |
|----------------------------|----------------------------|----------------------------|--|--|
| Lawrence | 0 | 0 | 100 | 100 |

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| National Forest | 2008 Acres Affected | 2009 Acres Affected | 1996-2008 Cumulative Acres Affected | 1996-2009 Cumulative Acres Affected |
|----------------------------------|------------------------------------|------------------------------------|--|--|
| Arapaho National Forest | 710 | 3,500 | 900 | 4,200 |
| Bighorn National Forest | 1,500 | 1,300 | 17,000 | 18,000 |
| Black Hills National Forest | 0 | 0 | 100 | 100 |
| Bridger-Teton National Forest* | 100 | 5,000 | 6,900 | 12,000 |
| Caribou-Targhee National Forest* | 0 | 0 | 170 | 170 |
| Grand Mesa National Forest | 420 | 3,400 | 6,200 | 9,300 |
| Gunnison National Forest | 310 | 780 | 4,200 | 4,800 |
| Medicine Bow National Forest | 4,100 | 9,700 | 63,000 | 72,000 |
| Pike National Forest | 4 | 20 | 30 | 50 |
| Rio Grande National Forest | 39,000 | 80,000 | 108,000 | 144,000 |
| Roosevelt National Forest | 1,300 | 4,400 | 10,000 | 14,000 |
| Routt National Forest | 2,400 | 4,700 | 144,000 | 147,000 |
| San Isabel National Forest | 180 | 10 | 4,200 | 4,200 |
| San Juan National Forest | 14,000 | 14,000 | 56,000 | 66,000 |
| Shoshone National Forest | 24,000 | 9,900 | 224,000 | 232,000 |
| Uncompahgre National Forest | 100 | 10 | 7,600 | 7,600 |
| Wasatch-Cache National Forest* | 0 | 0 | 2 | 2 |
| White River National Forest | 4,300 | 2,100 | 20,000 | 22,000 |

* Includes only those portions of these forests within the state of Wyoming

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2009 Douglas-fir Beetle Activity

| State | 2008 Acres Affected | 2009 Acres Affected | 1996-2008 Cumulative Acres Affected | 1996-2009 Cumulative Acres Affected |
|----------|---------------------|---------------------|-------------------------------------|-------------------------------------|
| Colorado | 27,000 | 23,000 | 259,000 | 277,000 |
| Wyoming | 22,000 | 3,800 | 416,000 | 416,000 |

| Colorado County | 2008 Acres Affected | 2009 Acres Affected | 1996-2008 Cumulative Acres Affected | 1996-2009 Cumulative Acres Affected |
|-----------------|---------------------|---------------------|-------------------------------------|-------------------------------------|
| Alamosa | 0 | 0 | 20 | 20 |
| Archuleta | 3,500 | 3,500 | 27,000 | 29,000 |
| Boulder | 40 | 6 | 270 | 280 |
| Chaffee | 150 | 80 | 2,700 | 2,800 |
| Clear Creek | 0 | 8 | 820 | 830 |
| Conejos | 2,600 | 20 | 5,600 | 5,700 |
| Costilla | 4 | 70 | 1,500 | 1,600 |
| Custer | 30 | 30 | 6,200 | 6,200 |
| Delta | 450 | 250 | 2,700 | 2,900 |
| Dolores | 100 | 280 | 2,800 | 3,000 |
| Douglas | 20 | 3,100 | 23,000 | 25,000 |
| Eagle | 1,400 | 80 | 6,400 | 6,400 |
| El Paso | 100 | 340 | 4,100 | 4,400 |
| Fremont | 210 | 440 | 14,000 | 14,000 |
| Garfield | 2,500 | 450 | 25,000 | 26,000 |
| Gilpin | 4 | 0 | 60 | 60 |
| Grand | 350 | 50 | 770 | 820 |
| Gunnison | 3,700 | 3,000 | 15,000 | 17,000 |
| Hinsdale | 1,200 | 1,700 | 5,200 | 6,600 |
| Huerfano | 9 | 3 | 2,100 | 2,100 |

Due to the nature of aerial surveys, data will only provide rough estimates of location, intensity and the resulting trend information for agents detectable from the air. Data presented should only be used as a partial indicator of insect and disease activity, and should be validated on the ground for actual location and casual agent. Insect and disease data are available digitally from the USDA Forest Service, Region Two Forest Health Management group. The cooperators reserve the right to correct, update, modify or replace GIS products. Using these data for purposes other than those for which it was intended may yield inaccurate or misleading results.

| Colorado County | 2008 Acres Affected | 2009 Acres Affected | 1996-2008 Cumulative Acres Affected | 1996-2009 Cumulative Acres Affected |
|------------------------|----------------------------|----------------------------|--|--|
| Jackson | 60 | 0 | 240 | 240 |
| Jefferson | 110 | 680 | 5,000 | 5,600 |
| La Plata | 270 | 1,800 | 7,600 | 9,200 |
| Lake | 0 | 0 | 80 | 80 |
| Larimer | 60 | 0 | 2,500 | 2,500 |
| Las Animas | 10 | 3 | 5,900 | 5,900 |
| Mesa | 1,500 | 900 | 4,700 | 5,500 |
| Mineral | 770 | 850 | 5,400 | 6,200 |
| Moffat | 0 | 850 | 50 | 900 |
| Montezuma | 240 | 530 | 6,700 | 7,300 |
| Montrose | 430 | 640 | 3,600 | 4,100 |
| Ouray | 120 | 380 | 1,200 | 1,500 |
| Park | 50 | 30 | 1,400 | 1,400 |
| Pitkin | 2,200 | 420 | 4,500 | 4,700 |
| Pueblo | 20 | 620 | 3,100 | 3,700 |
| Rio Blanco | 40 | 60 | 7,400 | 7,500 |
| Rio Grande | 400 | 40 | 7,300 | 7,300 |
| Routt | 40 | 70 | 4,000 | 4,100 |
| Saguache | 1,100 | 330 | 29,000 | 29,000 |
| San Juan | 0 | 50 | 120 | 170 |
| San Miguel | 3,600 | 1,300 | 12,000 | 13,000 |
| Summit | 0 | 0 | 300 | 300 |
| Teller | 0 | 20 | 1,600 | 1,600 |

| Wyoming County | 2008 Acres Affected | 2009 Acres Affected | 1996-2008 Cumulative Acres Affected | 1996-2009 Cumulative Acres Affected |
|-----------------------|----------------------------|----------------------------|--|--|
| Albany | 620 | 20 | 5,300 | 5,300 |
| Big Horn | 3,300 | 590 | 32,000 | 33,000 |
| Carbon | 330 | 1 | 8,900 | 8,900 |

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| Wyoming County | 2008 Acres Affected | 2009 Acres Affected | 1996-2008 Cumulative Acres Affected | 1996-2009 Cumulative Acres Affected |
|----------------|---------------------|---------------------|-------------------------------------|-------------------------------------|
| Converse | 0 | 8 | 4 | 10 |
| Fremont | 5,200 | 130 | 54,000 | 54,000 |
| Hot Springs | 980 | 50 | 25,000 | 25,000 |
| Johnson | 1,100 | 270 | 1,200 | 1,500 |
| Lincoln | 420 | 190 | 32,000 | 32,000 |
| Natrona | 20 | 6 | 130 | 140 |
| Park | 5,400 | 1,200 | 191,000 | 192,000 |
| Sheridan | 240 | 300 | 600 | 860 |
| Sublette | 300 | 0 | 11,000 | 11,000 |
| Teton | 770 | 230 | 45,000 | 45,000 |
| Uinta | 0 | 10 | 950 | 950 |
| Washakie | 3,800 | 770 | 5,800 | 6,100 |

| National Forest | 2008 Acres Affected | 2009 Acres Affected | 1996-2008 Cumulative Acres Affected | 1996-2009 Cumulative Acres Affected |
|----------------------------------|---------------------|---------------------|-------------------------------------|-------------------------------------|
| Arapaho National Forest | 0 | 0 | 490 | 490 |
| Bighorn National Forest | 4,000 | 1,200 | 25,000 | 26,000 |
| Bridger-Teton National Forest* | 750 | 200 | 72,000 | 73,000 |
| Caribou-Targhee National Forest* | 380 | 150 | 14,000 | 14,000 |
| Grand Mesa National Forest | 420 | 450 | 1,100 | 1,500 |
| Gunnison National Forest | 3,300 | 2,900 | 14,000 | 16,000 |
| Medicine Bow National Forest | 640 | 30 | 11,000 | 11,000 |
| Pike National Forest | 90 | 2,900 | 28,000 | 31,000 |
| Rio Grande National Forest | 3,200 | 280 | 35,000 | 36,000 |
| Roosevelt National Forest | 40 | 0 | 1,800 | 1,800 |
| Routt National Forest | 70 | 0 | 2,000 | 2,000 |
| San Isabel National Forest | 200 | 210 | 16,000 | 16,000 |
| San Juan National Forest | 5,900 | 8,600 | 44,000 | 52,000 |

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| National Forest | 2008 Acres Affected | 2009 Acres Affected | 1996-2008 Cumulative Acres Affected | 1996-2009 Cumulative Acres Affected |
|--------------------------------|----------------------------|----------------------------|--|--|
| Shoshone National Forest | 7,200 | 1,200 | 199,000 | 199,000 |
| Uncompahgre National Forest | 1,500 | 1,600 | 8,800 | 9,900 |
| Wasatch-Cache National Forest* | 0 | 3 | 570 | 570 |
| White River National Forest | 4,400 | 630 | 15,000 | 16,000 |

* Includes only those portions of these forests within the state of Wyoming
Due to the nature of aerial surveys, data will only provide rough estimates of location, intensity and the resulting trend information for agents detectable from the air. Data presented should only be used as a partial indicator of insect and disease activity, and should be validated on the ground for actual location and casual agent. Insect and disease data are available digitally from the USDA Forest Service, Region Two Forest Health Management group. The cooperators reserve the right to correct, update, modify or replace GIS products. Using these data for purposes other than those for which it was intended may yield inaccurate or misleading results.

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2009 Western Balsam Bark Beetle Activity

| State | 2008 Acres Affected | 2009 Acres Affected |
|--------------|------------------------------------|------------------------------------|
| Colorado | 346,000 | 184,000 |
| Wyoming | 69,000 | 86,000 |

| Colorado County | 2008 Acres Affected | 2009 Acres Affected |
|----------------------------|------------------------------------|------------------------------------|
| Alamosa | 20 | 20 |
| Archuleta | 550 | 130 |
| Boulder | 8,300 | 5,500 |
| Chaffee | 7,900 | 2,500 |
| Clear Creek | 3,500 | 6,000 |
| Conejos | 7,300 | 3,100 |
| Costilla | 3,700 | 590 |
| Custer | 5,200 | 2,200 |
| Delta | 8,000 | 3,300 |
| Dolores | 5,300 | 4,400 |
| Eagle | 24,000 | 6,300 |
| El Paso | 10 | 0 |
| Fremont | 1,300 | 310 |
| Garfield | 26,000 | 7,500 |
| Gilpin | 3,300 | 3,000 |
| Grand | 7,600 | 5,600 |
| Gunnison | 54,000 | 23,000 |
| Hinsdale | 9,100 | 4,900 |
| Huerfano | 3,100 | 1,000 |
| Jackson | 8,000 | 3,400 |
| Jefferson | 40 | 40 |
| La Plata | 230 | 420 |
| Lake | 3,400 | 760 |
| Larimer | 34,000 | 22,000 |
| Las Animas | 1,400 | 1,200 |

Due to the nature of aerial surveys, data will only provide rough estimates of location, intensity and the resulting trend information for agents detectable from the air. Data presented should only be used as a partial indicator of insect and disease activity, and should be validated on the ground for actual location and casual agent. Insect and disease data are available digitally from the USDA Forest Service, Region Two Forest Health Management group. The cooperators reserve the right to correct, update, modify or replace GIS products. Using these data for purposes other than those for which it was intended may yield inaccurate or misleading results.

| Colorado County | 2008 Acres Affected | 2009 Acres Affected |
|------------------------|----------------------------|----------------------------|
| Mesa | 14,000 | 6,100 |
| Mineral | 13,000 | 12,000 |
| Moffat | 630 | 140 |
| Montezuma | 1,200 | 2,100 |
| Montrose | 760 | 180 |
| Ouray | 2,100 | 400 |
| Park | 10,000 | 9,100 |
| Pitkin | 26,000 | 18,000 |
| Pueblo | 390 | 80 |
| Rio Blanco | 13,000 | 4,700 |
| Rio Grande | 8,700 | 4,000 |
| Routt | 5,500 | 4,400 |
| Saguache | 3,900 | 7,200 |
| San Juan | 7,700 | 450 |
| San Miguel | 6,700 | 2,900 |
| Summit | 5,400 | 4,800 |

| Wyoming County | 2008 Acres Affected | 2009 Acres Affected |
|-----------------------|----------------------------|----------------------------|
| Albany | 4,000 | 940 |
| Big Horn | 7,300 | 9,900 |
| Carbon | 8,400 | 3,700 |
| Converse | 690 | 110 |
| Fremont | 11,000 | 14,000 |
| Hot Springs | 260 | 40 |
| Johnson | 3,600 | 8,200 |
| Lincoln | 1,700 | 930 |
| Natrona | 1,200 | 380 |
| Park | 3,800 | 7,700 |
| Sheridan | 5,600 | 4,300 |
| Sublette | 11,000 | 4,600 |
| Teton | 10,000 | 31,000 |
| Uinta | 0 | 120 |
| Washakie | 800 | 270 |

Due to the nature of aerial surveys, data will only provide rough estimates of location, intensity and the resulting trend information for agents detectable from the air. Data presented should only be used as a partial indicator of insect and disease activity, and should be validated on the ground for actual location and casual agent. Insect and disease data are available digitally from the USDA Forest Service, Region Two Forest Health Management group. The cooperators reserve the right to correct, update, modify or replace GIS products. Using these data for purposes other than those for which it was intended may yield inaccurate or misleading results.

| National Forest | 2008 Acres Affected | 2009 Acres Affected |
|----------------------------------|------------------------------------|------------------------------------|
| Arapaho National Forest | 9,600 | 11,000 |
| Bighorn National Forest | 17,000 | 23,000 |
| Bridger-Teton National Forest* | 17,000 | 31,000 |
| Caribou-Targhee National Forest* | 100 | 740 |
| Grand Mesa National Forest | 15,000 | 7,000 |
| Gunnison National Forest | 52,000 | 20,000 |
| Medicine Bow National Forest | 9,900 | 4,300 |
| Pike National Forest | 11,000 | 9,300 |
| Rio Grande National Forest | 32,000 | 21,000 |
| Roosevelt National Forest | 29,000 | 19,000 |
| Routt National Forest | 17,000 | 9,100 |
| San Isabel National Forest | 23,000 | 10,000 |
| San Juan National Forest | 13,000 | 8,000 |
| Shoshone National Forest | 14,000 | 21,000 |
| Uncompahgre National Forest | 13,000 | 7,900 |
| White River National Forest | 87,000 | 40,000 |

* Includes only those portions of these forests within the state of Wyoming

Due to the nature of aerial surveys, data will only provide rough estimates of location, intensity and the resulting trend information for agents detectable from the air. Data presented should only be used as a partial indicator of insect and disease activity, and should be validated on the ground for actual location and casual agent. Insect and disease data are available digitally from the USDA Forest Service, Region Two Forest Health Management group. The cooperators reserve the right to correct, update, modify or replace GIS products. Using these data for purposes other than those for which it was intended may yield inaccurate or misleading results.

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2009 Western Spruce Budworm Activity

| State | 2008 Acres Affected | 2009 Acres Affected |
|----------|---------------------|---------------------|
| Colorado | 155,000 | 382,000 |
| Wyoming | 34,000 | 30,000 |

| Colorado County | 2008 Acres Affected | 2009 Acres Affected |
|-----------------|---------------------|---------------------|
| Alamosa | 520 | 3,800 |
| Archuleta | 4,700 | 7,700 |
| Conejos | 16,000 | 3,800 |
| Costilla | 26,000 | 67,000 |
| Custer | 6,500 | 2,300 |
| Dolores | 3,300 | 13,000 |
| Douglas | 18,000 | 22,000 |
| Eagle | 150 | 60 |
| El Paso | 80 | 17,000 |
| Fremont | 1,300 | 6,100 |
| Garfield | 0 | 1,600 |
| Grand | 130 | 240 |
| Gunnison | 20 | 2,100 |
| Hinsdale | 3,700 | 3,900 |
| Huerfano | 17,000 | 57,000 |
| Jackson | 1,700 | 2,200 |
| Jefferson | 0 | 0 |
| La Plata | 3,100 | 8,600 |
| Las Animas | 14,000 | 42,000 |
| Mineral | 6,100 | 25,000 |
| Montezuma | 3,000 | 8,700 |
| Montrose | 0 | 0 |
| Ouray | 2,300 | 7,700 |
| Park | 0 | 0 |

Due to the nature of aerial surveys, data will only provide rough estimates of location, intensity and the resulting trend information for agents detectable from the air. Data presented should only be used as a partial indicator of insect and disease activity, and should be validated on the ground for actual location and casual agent. Insect and disease data are available digitally from the USDA Forest Service, Region Two Forest Health Management group. The cooperators reserve the right to correct, update, modify or replace GIS products. Using these data for purposes other than those for which it was intended may yield inaccurate or misleading results.

| Colorado County | 2008 Acres Affected | 2009 Acres Affected |
|------------------------|----------------------------|----------------------------|
| Pitkin | 120 | 0 |
| Rio Blanco | 110 | 2,700 |
| Rio Grande | 11,000 | 22,000 |
| Routt | 0 | 2,100 |
| Saguache | 8,100 | 35,000 |
| San Juan | 3,900 | 3,600 |
| San Miguel | 2,600 | 13,000 |
| Summit | 200 | 350 |
| Teller | 0 | 2,700 |

| Wyoming County | 2008 Acres Affected | 2009 Acres Affected |
|-----------------------|----------------------------|----------------------------|
| Albany | 4,300 | 510 |
| Carbon | 1,600 | 920 |
| Fremont | 1,300 | 1,300 |
| Hot Springs | 0 | 0 |
| Johnson | 70 | 0 |
| Lincoln | 740 | 0 |
| Park | 25,000 | 24,000 |
| Sheridan | 920 | 10 |
| Teton | 0 | 3,700 |

Due to the nature of aerial surveys, data will only provide rough estimates of location, intensity and the resulting trend information for agents detectable from the air. Data presented should only be used as a partial indicator of insect and disease activity, and should be validated on the ground for actual location and casual agent. Insect and disease data are available digitally from the USDA Forest Service, Region Two Forest Health Management group. The cooperators reserve the right to correct, update, modify or replace GIS products. Using these data for purposes other than those for which it was intended may yield inaccurate or misleading results.

| National Forest | 2008 Acres Affected | 2009 Acres Affected |
|-----------------------------------|------------------------------------|------------------------------------|
| Bighorn National Forest | 930 | 10 |
| Bridger-Teton National Forest* | 40 | 0 |
| Caribou -Targhee National Forest* | 710 | 0 |
| Gunnison National Forest | 40 | 1,200 |
| Medicine Bow National Forest | 5,800 | 1,100 |
| Pike National Forest | 14,000 | 40,000 |
| Rio Grande National Forest | 37,000 | 78,000 |
| Routt National Forest | 740 | 4,200 |
| San Isabel National Forest | 21,000 | 47,000 |
| San Juan National Forest | 18,000 | 45,000 |
| Shoshone National Forest | 0 | 2,800 |
| Uncompahgre National Forest | 5,400 | 19,000 |
| White River National Forest | 490 | 3,200 |

* Includes only those portions of these forests within the state of Wyoming

Due to the nature of aerial surveys, data will only provide rough estimates of location, intensity and the resulting trend information for agents detectable from the air. Data presented should only be used as a partial indicator of insect and disease activity, and should be validated on the ground for actual location and casual agent. Insect and disease data are available digitally from the USDA Forest Service, Region Two Forest Health Management group. The cooperators reserve the right to correct, update, modify or replace GIS products. Using these data for purposes other than those for which it was intended may yield inaccurate or misleading results.

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2009 Aspen Dieback and Mortality

| | Acres Affected Low | Acres Affected Moderate | Acres Affected High | Acres Affected Total |
|---------------------|---------------------------|--------------------------------|----------------------------|-----------------------------|
| Colorado | 860 | 164,000 | 177,000 | 342,000 |
| Wyoming | 70 | 8,900 | 9,300 | 18,000 |
| South Dakota | 0 | 30 | 170 | 200 |

| Colorado County | 2009 Acres Affected Low | 2009 Acres Affected Moderate | 2009 Acres Affected High | 2009 Acres Affected Total |
|------------------------|--------------------------------|-------------------------------------|---------------------------------|----------------------------------|
| Alamosa | 0 | 0 | 10 | 10 |
| Archuleta | 0 | 680 | 910 | 1,600 |
| Boulder | 0 | 0 | 0 | 0 |
| Chaffee | 0 | 1,800 | 1,100 | 2,900 |
| Clear Creek | 0 | 60 | 20 | 80 |
| Conejos | 0 | 0 | 960 | 960 |
| Costilla | 20 | 180 | 160 | 350 |
| Custer | 0 | 1,300 | 2,000 | 3,300 |
| Delta | 0 | 5,800 | 7,100 | 13,000 |
| Dolores | 120 | 2,200 | 7,200 | 9,500 |
| Douglas | 0 | 0 | 0 | 0 |
| Eagle | 0 | 9,000 | 5,000 | 14,000 |
| El Paso | 0 | 3 | 0 | 3 |
| Fremont | 0 | 570 | 610 | 1,200 |
| Garfield | 0 | 14,000 | 14,000 | 28,000 |
| Gilpin | 0 | 3 | 0 | 3 |
| Grand | 0 | 2,200 | 4,100 | 6,300 |
| Gunnison | 20 | 16,000 | 8,900 | 25,000 |
| Hinsdale | 0 | 1,500 | 210 | 1,700 |
| Huerfano | 70 | 1,600 | 4,300 | 5,900 |
| Jackson | 20 | 5,200 | 4,800 | 10,000 |
| Jefferson | 0 | 40 | 190 | 230 |

Due to the nature of aerial surveys, data will only provide rough estimates of location, intensity and the resulting trend information for agents detectable from the air. Data presented should only be used as a partial indicator of insect and disease activity, and should be validated on the ground for actual location and casual agent. Insect and disease data are available digitally from the USDA Forest Service, Region Two Forest Health Management group. The cooperators reserve the right to correct, update, modify or replace GIS products. Using these data for purposes other than those for which it was intended may yield inaccurate or misleading results.

| Colorado County | 2009 Acres Affected Low | 2009 Acres Affected Moderate | 2009 Acres Affected High | 2009 Acres Affected Total |
|------------------------|--------------------------------|-------------------------------------|---------------------------------|----------------------------------|
| La Plata | 0 | 1,300 | 3,200 | 4,500 |
| Lake | 0 | 70 | 0 | 70 |
| Larimer | 0 | 530 | 2,200 | 2,700 |
| Las Animas | 0 | 450 | 380 | 830 |
| Mesa | 0 | 27,000 | 20,000 | 47,000 |
| Mineral | 0 | 890 | 330 | 1,200 |
| Moffat | 0 | 7,500 | 7,100 | 15,000 |
| Montezuma | 0 | 90 | 9,600 | 9,700 |
| Montrose | 0 | 8,700 | 11,000 | 20,000 |
| Ouray | 0 | 3,300 | 4,400 | 7,700 |
| Park | 0 | 5,100 | 4,800 | 9,800 |
| Pitkin | 0 | 3,300 | 5,600 | 8,800 |
| Pueblo | 0 | 0 | 640 | 640 |
| Rio Blanco | 470 | 16,000 | 8,500 | 25,000 |
| Rio Grande | 0 | 670 | 430 | 1,100 |
| Routt | 0 | 19,000 | 24,000 | 43,000 |
| Saguache | 140 | 3,400 | 2,300 | 5,900 |
| San Juan | 0 | 360 | 0 | 360 |
| San Miguel | 0 | 4,400 | 9,100 | 14,000 |
| Summit | 0 | 430 | 1,100 | 1,600 |
| Teller | 0 | 120 | 150 | 260 |

Due to the nature of aerial surveys, data will only provide rough estimates of location, intensity and the resulting trend information for agents detectable from the air. Data presented should only be used as a partial indicator of insect and disease activity, and should be validated on the ground for actual location and casual agent. Insect and disease data are available digitally from the USDA Forest Service, Region Two Forest Health Management group. The cooperators reserve the right to correct, update, modify or replace GIS products. Using these data for purposes other than those for which it was intended may yield inaccurate or misleading results.

| Wyoming County | 2009 Acres Affected Low | 2009 Acres Affected Moderate | 2009 Acres Affected High | 2009 Acres Affected Total |
|-----------------------|--------------------------------|-------------------------------------|---------------------------------|----------------------------------|
| Albany | 0 | 360 | 530 | 880 |
| Bighorn | 0 | 30 | 0 | 30 |
| Carbon | 0 | 4,700 | 5,100 | 9,900 |
| Converse | 0 | 940 | 1,100 | 2,100 |
| Crook | 0 | 110 | 280 | 400 |
| Fremont | 0 | 370 | 40 | 410 |
| Johnson | 0 | 20 | 40 | 60 |
| Laramie | 0 | 0 | 0 | 0 |
| Natrona | 0 | 1,600 | 710 | 2,300 |
| Park | 70 | 110 | 0 | 180 |
| Sheridan | 0 | 50 | 60 | 110 |
| Sublette | 0 | 0 | 140 | 140 |
| Teton | 0 | 150 | 830 | 970 |
| Uinta | 0 | 400 | 440 | 830 |
| Washakie | 0 | 0 | 0 | 0 |
| Weston | 0 | 80 | 40 | 110 |

| South Dakota County | 2009 Acres Affected Low | 2009 Acres Affected Moderate | 2009 Acres Affected High | 2009 Acres Affected Total |
|----------------------------|--------------------------------|-------------------------------------|---------------------------------|----------------------------------|
| Custer | 0 | 0 | 0 | 0 |
| Lawrence | 0 | 10 | 20 | 30 |
| Meade | 0 | 20 | 60 | 80 |
| Pennington | 0 | 0 | 80 | 80 |

Due to the nature of aerial surveys, data will only provide rough estimates of location, intensity and the resulting trend information for agents detectable from the air. Data presented should only be used as a partial indicator of insect and disease activity, and should be validated on the ground for actual location and casual agent. Insect and disease data are available digitally from the USDA Forest Service, Region Two Forest Health Management group. The cooperators reserve the right to correct, update, modify or replace GIS products. Using these data for purposes other than those for which it was intended may yield inaccurate or misleading results.

| National Forest | 2009 Acres Affected Low | 2009 Acres Affected Moderate | 2009 Acres Affected High | 2009 Acres Affected Total |
|-----------------------------------|--|---|---|--|
| Arapaho National Forest | 0 | 690 | 670 | 1,400 |
| Bighorn National Forest | 0 | 40 | 9 | 50 |
| Black Hills National Forest | 0 | 190 | 230 | 420 |
| Bridger-Teton National Forest* | 0 | 0 | 640 | 640 |
| Caribou -Targhee National Forest* | 0 | 150 | 0 | 150 |
| Grand Mesa National Forest | 0 | 10,000 | 6,700 | 17,000 |
| Gunnison National Forest | 20 | 15,000 | 9,000 | 24,000 |
| Medicine Bow National Forest | 0 | 2,900 | 1,300 | 4,300 |
| Pike National Forest | 0 | 2,700 | 2,600 | 5,300 |
| Rio Grande National Forest | 0 | 3,700 | 1,700 | 5,400 |
| Roosevelt National Forest | 0 | 130 | 1,300 | 1,400 |
| Routt National Forest | 90 | 13,000 | 14,000 | 27,000 |
| San Isabel National Forest | 0 | 4,300 | 6,700 | 11,000 |
| San Juan National Forest | 120 | 2,800 | 17,000 | 20,000 |
| Shoshone National Forest | 0 | 40 | 50 | 90 |
| Uncompahgre National Forest | 0 | 17,000 | 18,000 | 35,000 |
| White River National Forest | 410 | 28,000 | 25,000 | 54,000 |

* Includes only those portions of these forests within the state of Wyoming

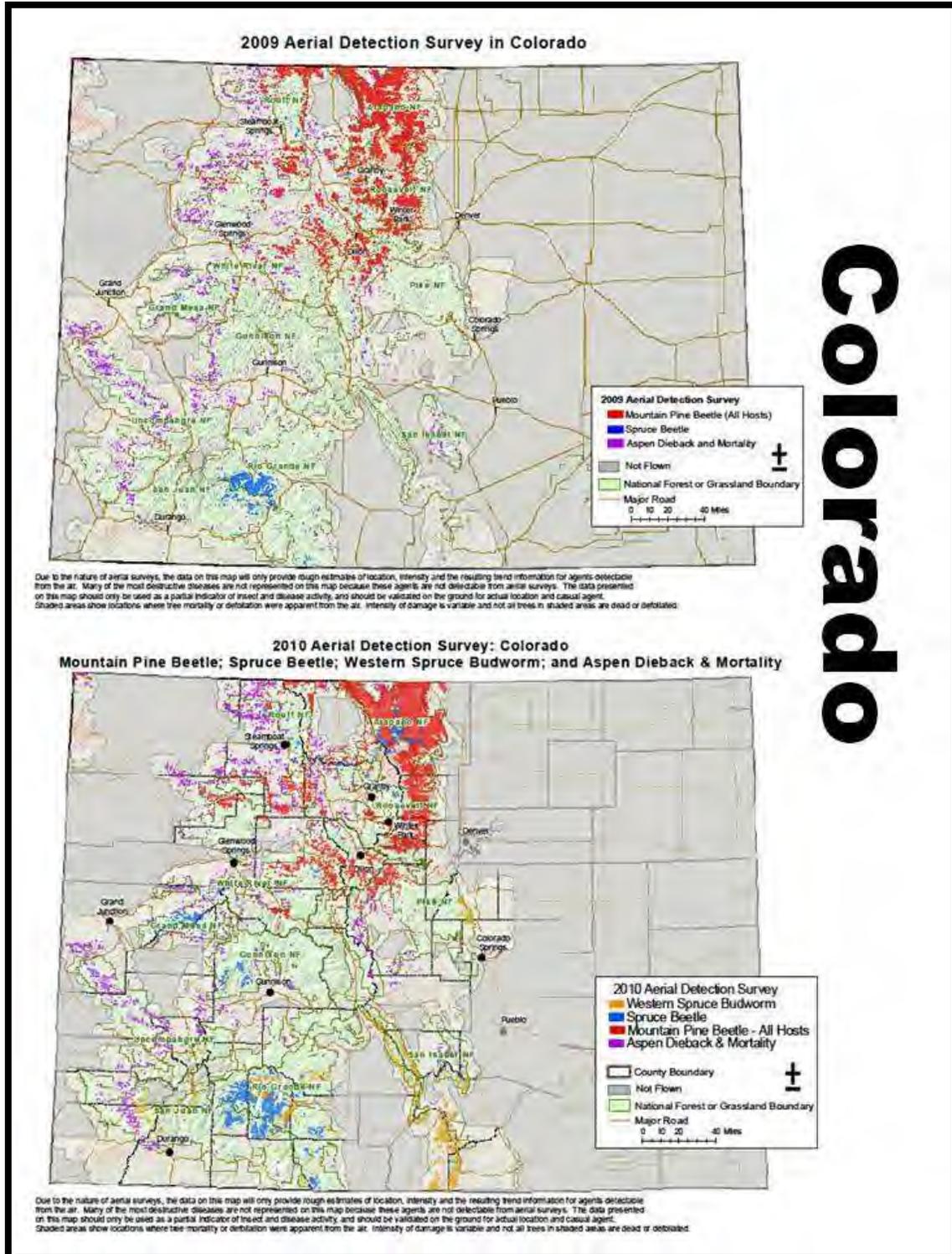
Due to the nature of aerial surveys, data will only provide rough estimates of location, intensity and the resulting trend information for agents detectable from the air. Data presented should only be used as a partial indicator of insect and disease activity, and should be validated on the ground for actual location and casual agent. Insect and disease data are available digitally from the USDA Forest Service, Region Two Forest Health Management group. The cooperators reserve the right to correct, update, modify or replace GIS products. Using these data for purposes other than those for which it was intended may yield inaccurate or misleading results.

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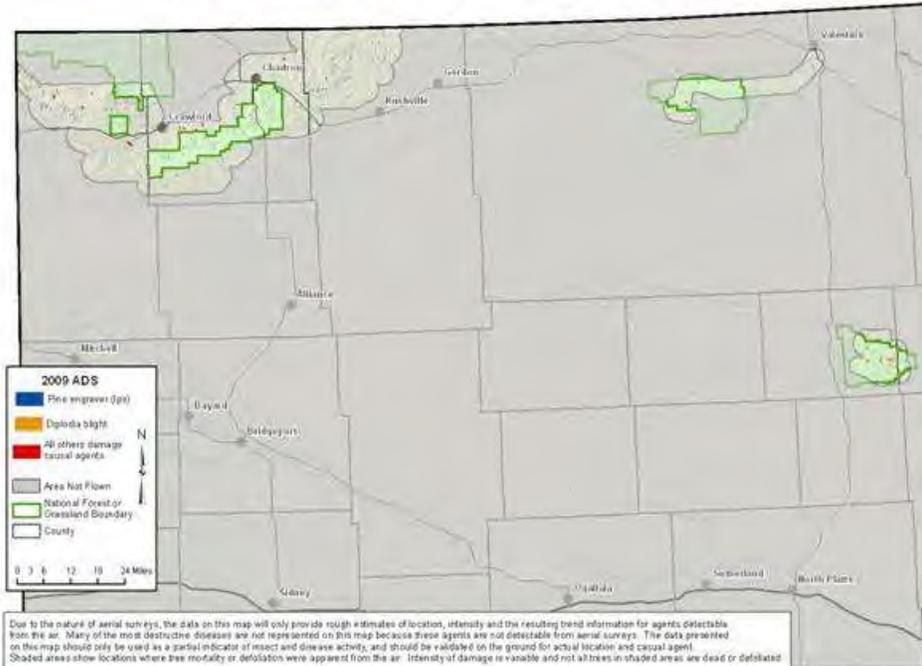
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Appendix D.

2009 and 2010 Aerial Detection Survey maps for Colorado, Nebraska, South Dakota, and Wyoming



2009 Aerial Detection Survey: Nebraska's National Forests



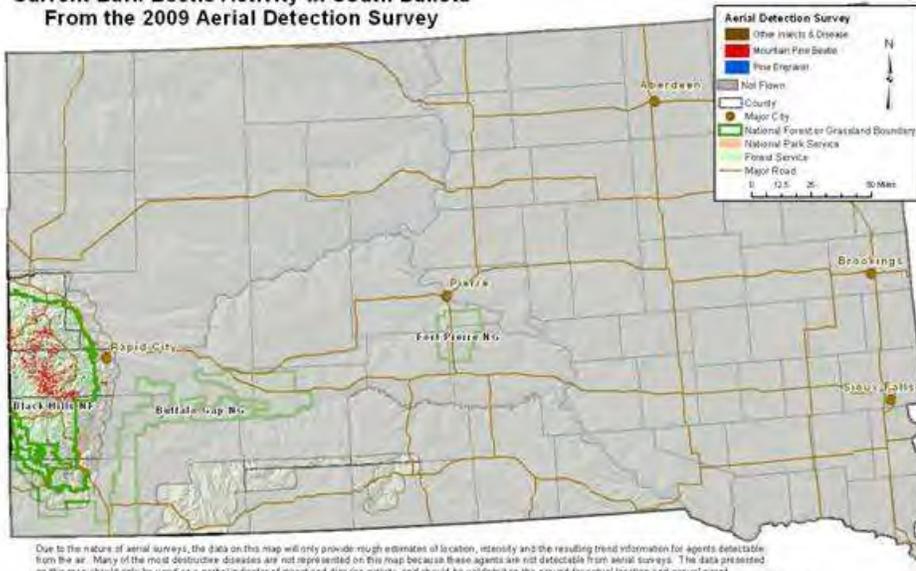
Nebraska

Current Bark Beetle Outbreaks in Nebraska From 2010 Aerial Detection Survey



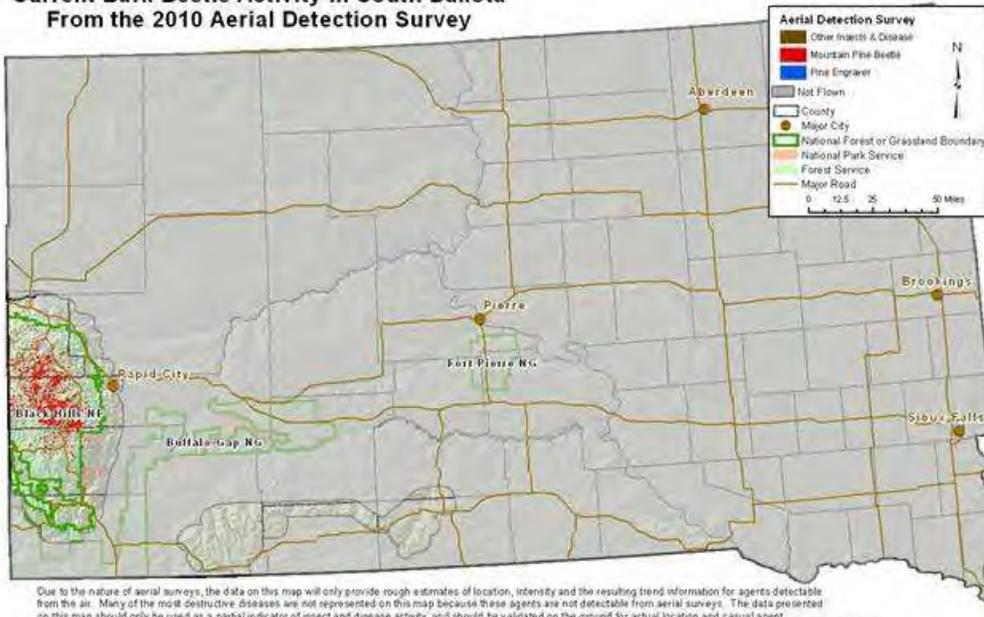
South Dakota

**Current Bark Beetle Activity in South Dakota
From the 2009 Aerial Detection Survey**

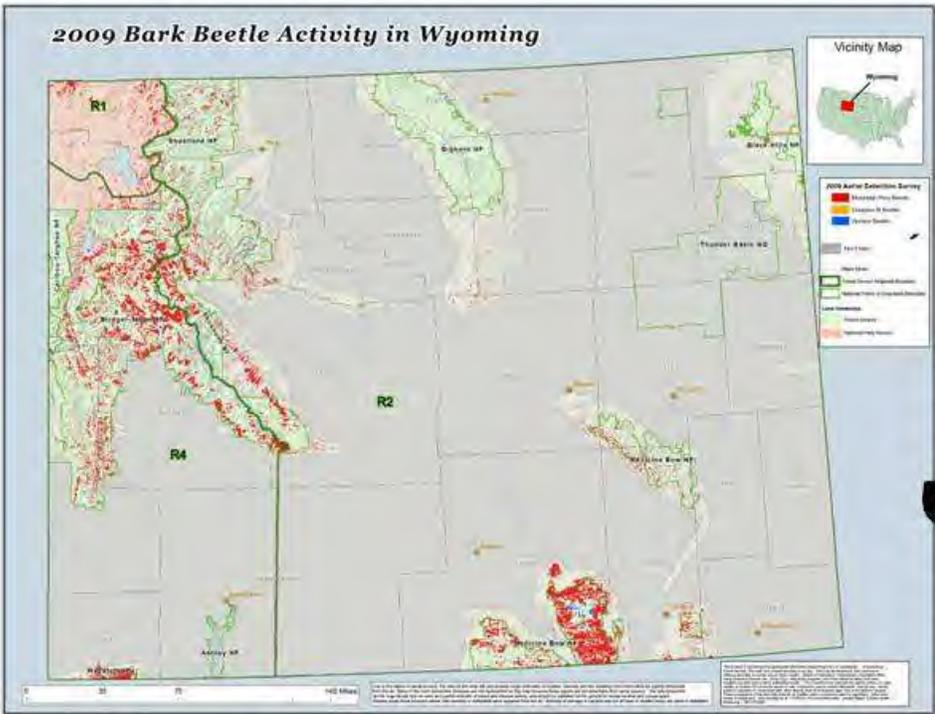


Due to the nature of aerial surveys, the data on this map will only provide rough estimates of location, intensity and the resulting trend information for agents detectable from the air. Many of the most destructive diseases are not represented on this map because these agents are not detectable from aerial surveys. The data presented on this map should only be used as a partial indicator of insect and disease activity, and should be validated on the ground for actual location and causal agent. Shaded areas show locations where tree mortality or defoliation were apparent from the air. Intensity of damage is variable and not all trees in shaded areas are dead or defoliated.

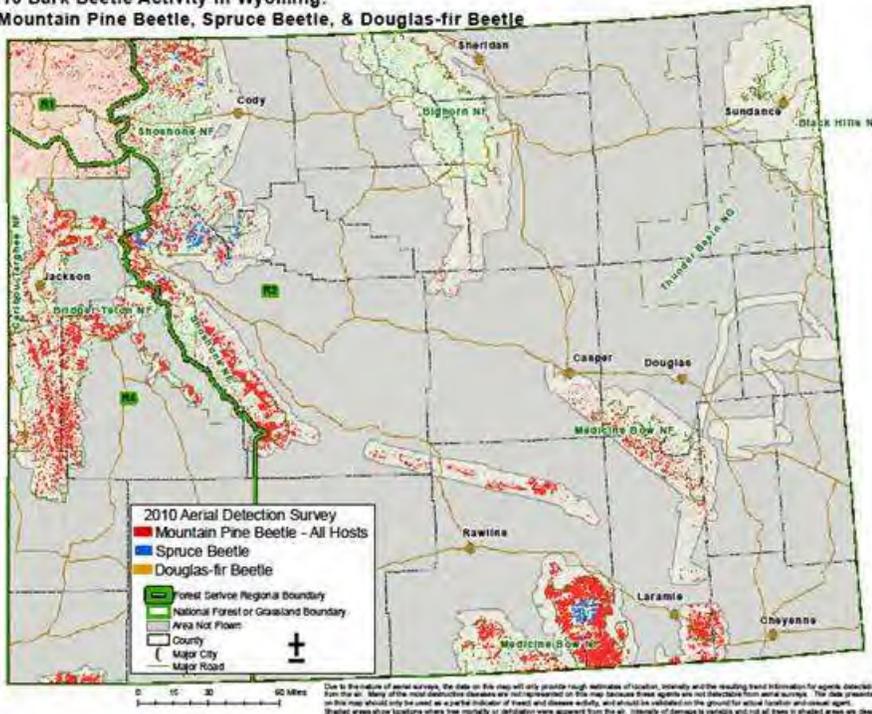
**Current Bark Beetle Activity in South Dakota
From the 2010 Aerial Detection Survey**



Due to the nature of aerial surveys, the data on this map will only provide rough estimates of location, intensity and the resulting trend information for agents detectable from the air. Many of the most destructive diseases are not represented on this map because these agents are not detectable from aerial surveys. The data presented on this map should only be used as a partial indicator of insect and disease activity, and should be validated on the ground for actual location and causal agent. Shaded areas show locations where tree mortality or defoliation were apparent from the air. Intensity of damage is variable and not all trees in shaded areas are dead or defoliated.



**2010 Bark Beetle Activity in Wyoming:
Mountain Pine Beetle, Spruce Beetle, & Douglas-fir Beetle**



Wyoming

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Appendix E.

The 2010 Aerial Detection Survey Summary for the Rocky Mountain Region (R2) of the US Forest Service

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Aspen Defoliation, Mt. Lindsey (Sierra Blanca), Colorado

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Last updated: 1/19/2011

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Introduction

Acreage figures are rounded as follows:

X < 10 acres- to the nearest acre
10 < X < 1,000 acres- to the nearest 10 acres
1,000 < X < 10,000 acres- to the nearest 100 acres
X > 10,000 acres- to the nearest 1,000 acres

These tables provide summaries for the major damage agents detected in the 2010 aerial detection survey for the Rocky Mountain Region (R2) of the Forest Service.

Counties or National Forests that have zero mapped acres for all categories in the tables are omitted.

Wyoming acres include only acres within the R2 portion of Wyoming. The acres for Fremont, Park, Sublette, Teton counties include only the portion of the county which falls in R2.

CO plus S.WY numbers include all of Colorado and the six Wyoming counties that encompass the Medicine Bow NF: Albany, Carbon, Converse, Laramie, Natrona, and Platte.

Certain calculations using these data should be avoided. Adding numbers from different categories in an attempt to produce a total of acres impacted by multiple agents, for example will produce inaccurate, inflated results because acres experiencing multiple damages are double-counted. Producing totals for multiple agents is a separate GIS exercise.

Caution should be exercised when making year to year comparisons using these data, the survey area is not identical from year to year and extent flown each year may not equal 100 % of the forested acres in a given area. A GIS dataset of area flown is available and provides information on the spatial extent of the aerial survey for a particular year.

The county summaries include all ownerships within the county boundary. National Forest summaries are based on the Forest's proclamation boundary and include inholdings of all ownership types.

Interpreting the 2010 Aerial Detection Survey Summary Tables

The 2010 aerial detection survey summary tables for the Rocky Mountain Region of the USDA Forest Service have been prepared to answer the majority of questions concerning the aerial survey data and to provide consistent answers to questions from our clients. Raw GIS files are available for analysis; however minor differences in query structure can result in multiple “correct” answers to the same question. Therefore the numbers provided in these tables are to be considered final. The numbers reported here are the results of GIS queries that remain consistent from year to year. In these tables, the major forest pests that were detected in the region’s forests are summarized by state, county, and national forest. County totals include all ownerships within a counties’ boundary. Forest totals include all acres within the forest’s proclamation boundary.

For bark beetles including mountain pine beetle, spruce beetle and Douglas-fir beetle the aerial survey tables provide the number of acres where some level of trees were detected that were currently dying (fading) from bark beetle attack. Fading occurs one year after initial attack so trees mapped in a given year were killed by bark beetles the previous year. Information from the prior year (2009 Acres Affected) is also provided to assess the trend of the epidemic over the last year in a given area. Because bark beetles may be active in an area for multiple years there is considerable overlap of acres from year to year. Cumulative acres affected since 1996 through the current and through the prior year are provided to determine the area affected by the ongoing epidemic. By subtracting the current cumulative acres (1996-2010 Cumulative Acres Affected) for a given area from the prior year’s cumulative acres (1996-2009 Cumulative Acres Affected) for that area, the expansion of the beetle epidemic onto new (not previously mapped) acres can be determined. .

For western balsam bark beetle and associated subalpine fir disease problems, western spruce budworm, aspen defoliation, and aspen dieback and mortality caused by a combination of insects and diseases only the current and prior years acres detected are provided. For these pests, general trend information about the population of the insect or disease affects can be determined by comparing acres affected with the prior year

2010 Mountain Pine Beetle Activity

| State | 2009 Acres Affected | 2010 Acres Affected | 1996-2009 Cumulative Acres Affected | 1996-2010 Cumulative Acres Affected |
|----------------------|----------------------------|----------------------------|--|--|
| Colorado | | | | |
| Lodgepole Pine | 1,021,000 | 716,000 | 2,344,000 | 2,519,000 |
| Ponderosa Pine | 22,000 | 234,000 | 572,000 | 775,000 |
| 5-Needle Pines | 32,000 | 14,000 | 104,000 | 115,000 |
| All Hosts | 1,046,000 | 878,000 | 2,903,000 | 3,188,000 |
| Wyoming – R2 | | | | |
| Lodgepole Pine | 458,000 | 478,000 | 834,000 | 994,000 |
| Ponderosa Pine | 24,000 | 53,000 | 108,000 | 151,000 |
| 5-Needle Pines | 156,000 | 195,000 | 750,000 | 872,000 |
| All Hosts | 595,000 | 617,000 | 1,571,000 | 1,790,000 |
| CO plus S. WY | | | | |
| Lodgepole Pine | 1,357,000 | 1,036,000 | 2,935,000 | 3,186,000 |
| Ponderosa Pine | 45,000 | 285,000 | 609,000 | 852,000 |
| 5-Needle Pines | 53,000 | 42,000 | 199,000 | 233,000 |
| All Hosts | 1,416,000 | 1,257,000 | 3,601,000 | 3,999,000 |
| South Dakota | | | | |
| Lodgepole Pine | 0 | 0 | 0 | 0 |
| Ponderosa Pine | 22,000 | 44,000 | 358,000 | 369,000 |
| 5-Needle Pines | 0 | 0 | 0 | 0 |
| All Hosts | 22,000 | 44,000 | 358,000 | 369,000 |
| Nebraska | | | | |
| Ponderosa Pine | 0 | 5 | 0 | 5 |

Due to the nature of aerial surveys, data will only provide rough estimates of location, intensity and the resulting trend information for agents detectable from the air. Data presented should only be used as a partial indicator of insect and disease activity, and should be validated on the ground for actual location and casual agent. Insect and disease data are available digitally from the USDA Forest Service, Region Two Forest Health Management group. The cooperators reserve the right to correct, update, modify or replace GIS products. Using these data for purposes other than those for which it was intended may yield inaccurate or misleading results.

| Colorado County | Host Tree | 2009 Acres Affected | 2010 Acres Affected | 1996-2009 Cumulative Acres Affected | 1996-2010 Cumulative Acres Affected |
|-----------------|----------------|---------------------|---------------------|-------------------------------------|-------------------------------------|
| Adams | Lodgepole Pine | 0 | 0 | 0 | 0 |
| | Ponderosa Pine | 1 | 0 | 1 | 1 |
| | 5-Needle Pines | 0 | 0 | 0 | 0 |
| | All Hosts | 1 | 0 | 1 | 1 |
| Alamosa | Lodgepole Pine | 0 | 0 | 0 | 0 |
| | Ponderosa Pine | 0 | 0 | 430 | 430 |
| | 5-Needle Pines | 0 | 0 | 10 | 10 |
| | All Hosts | 0 | 0 | 430 | 430 |
| Archuleta | Lodgepole Pine | 0 | 0 | 1 | 1 |
| | Ponderosa Pine | 3 | 10 | 16,000 | 16,000 |
| | 5-Needle Pines | 0 | 0 | 0 | 0 |
| | All Hosts | 3 | 10 | 16,000 | 16,000 |
| Boulder | Lodgepole Pine | 46,000 | 57,000 | 77,000 | 102,000 |
| | Ponderosa Pine | 1,600 | 36,000 | 22,000 | 54,000 |
| | 5-Needle Pines | 3,400 | 5,200 | 11,000 | 15,000 |
| | All Hosts | 50,000 | 68,000 | 97,000 | 123,000 |
| Chaffee | Lodgepole Pine | 1,700 | 770 | 5,400 | 5,600 |
| | Ponderosa Pine | 50 | 60 | 77,000 | 77,000 |
| | 5-Needle Pines | 0 | 0 | 1,700 | 1,700 |
| | All Hosts | 1,700 | 830 | 83,000 | 83,000 |
| Clear Creek | Lodgepole Pine | 46,000 | 32,000 | 63,000 | 73,000 |
| | Ponderosa Pine | 120 | 4,400 | 4,100 | 8,500 |
| | 5-Needle Pines | 120 | 770 | 8,300 | 9,000 |
| | All Hosts | 46,000 | 33,000 | 68,000 | 78,000 |
| Conejos | Lodgepole Pine | 0 | 0 | 0 | 0 |
| | Ponderosa Pine | 1 | 3 | 4,800 | 4,800 |
| | 5-Needle Pines | 0 | 0 | 0 | 0 |
| | All Hosts | 1 | 3 | 4,800 | 4,800 |

Due to the nature of aerial surveys, data will only provide rough estimates of location, intensity and the resulting trend information for agents detectable from the air. Data presented should only be used as a partial indicator of insect and disease activity, and should be validated on the ground for actual location and casual agent. Insect and disease data are available digitally from the USDA Forest Service, Region Two Forest Health Management group. The cooperators reserve the right to correct, update, modify or replace GIS products. Using these data for purposes other than those for which it was intended may yield inaccurate or misleading results.

| Colorado County | Host Tree | 2009 Acres Affected | 2010 Acres Affected | 1996-2009 Cumulative Acres Affected | 1996-2010 Cumulative Acres Affected |
|-----------------|----------------|---------------------|---------------------|-------------------------------------|-------------------------------------|
| Costilla | Lodgepole Pine | 0 | 0 | 0 | 0 |
| | Ponderosa Pine | 0 | 0 | 4,600 | 4,600 |
| | 5-Needle Pines | 0 | 0 | 7 | 7 |
| | All Hosts | 0 | 0 | 4,600 | 4,600 |
| Custer | Lodgepole Pine | 0 | 0 | 160 | 160 |
| | Ponderosa Pine | 4 | 2 | 34,000 | 34,000 |
| | 5-Needle Pines | 20 | 70 | 790 | 850 |
| | All Hosts | 20 | 70 | 35,000 | 35,000 |
| Delta | Lodgepole Pine | 0 | 0 | 2 | 2 |
| | Ponderosa Pine | 0 | 0 | 6 | 6 |
| | 5-Needle Pines | 0 | 0 | 0 | 0 |
| | All Hosts | 0 | 0 | 8 | 8 |
| Dolores | Lodgepole Pine | 0 | 0 | 0 | 0 |
| | Ponderosa Pine | 0 | 0 | 550 | 550 |
| | 5-Needle Pines | 0 | 0 | 0 | 0 |
| | All Hosts | 0 | 0 | 550 | 550 |
| Douglas | Lodgepole Pine | 0 | 0 | 270 | 270 |
| | Ponderosa Pine | 5 | 200 | 33,000 | 34,000 |
| | 5-Needle Pines | 0 | 0 | 0 | 0 |
| | All Hosts | 5 | 200 | 34,000 | 34,000 |
| Eagle | Lodgepole Pine | 57,000 | 44,000 | 172,000 | 181,000 |
| | Ponderosa Pine | 550 | 1,200 | 4,100 | 4,600 |
| | 5-Needle Pines | 20 | 0 | 190 | 190 |
| | All Hosts | 57,000 | 45,000 | 176,000 | 185,000 |
| El Paso | Lodgepole Pine | 0 | 0 | 2 | 2 |
| | Ponderosa Pine | 510 | 20 | 13,000 | 13,000 |
| | 5-Needle Pines | 0 | 0 | 0 | 0 |
| | All Hosts | 510 | 20 | 13,000 | 13,000 |

Due to the nature of aerial surveys, data will only provide rough estimates of location, intensity and the resulting trend information for agents detectable from the air. Data presented should only be used as a partial indicator of insect and disease activity, and should be validated on the ground for actual location and casual agent. Insect and disease data are available digitally from the USDA Forest Service, Region Two Forest Health Management group. The cooperators reserve the right to correct, update, modify or replace GIS products. Using these data for purposes other than those for which it was intended may yield inaccurate or misleading results.

| Colorado County | Host Tree | 2009 Acres Affected | 2010 Acres Affected | 1996-2009 Cumulative Acres Affected | 1996-2010 Cumulative Acres Affected |
|-----------------|----------------|---------------------|---------------------|-------------------------------------|-------------------------------------|
| Elbert | Lodgepole Pine | 0 | 0 | 0 | 0 |
| | Ponderosa Pine | 0 | 0 | 390 | 390 |
| | 5-Needle Pines | 0 | 0 | 0 | 0 |
| | All Hosts | 0 | 0 | 390 | 390 |
| Fremont | Lodgepole Pine | 2 | 0 | 170 | 170 |
| | Ponderosa Pine | 660 | 20 | 32,000 | 32,000 |
| | 5-Needle Pines | 40 | 200 | 1,800 | 1,900 |
| | All Hosts | 700 | 220 | 34,000 | 34,000 |
| Garfield | Lodgepole Pine | 2,100 | 2,700 | 8,100 | 9,300 |
| | Ponderosa Pine | 0 | 0 | 60 | 60 |
| | 5-Needle Pines | 90 | 0 | 480 | 480 |
| | All Hosts | 2,200 | 2,700 | 8,600 | 9,800 |
| Gilpin | Lodgepole Pine | 32,000 | 33,000 | 42,000 | 50,000 |
| | Ponderosa Pine | 160 | 7,800 | 2,700 | 10,000 |
| | 5-Needle Pines | 1,200 | 1,100 | 14,000 | 15,000 |
| | All Hosts | 33,000 | 35,000 | 46,000 | 54,000 |
| Grand | Lodgepole Pine | 150,000 | 27,000 | 576,000 | 578,000 |
| | Ponderosa Pine | 20 | 7 | 490 | 500 |
| | 5-Needle Pines | 600 | 10 | 3,700 | 3,700 |
| | All Hosts | 151,000 | 27,000 | 579,000 | 581,000 |
| Gunnison | Lodgepole Pine | 270 | 100 | 2,700 | 2,800 |
| | Ponderosa Pine | 20 | 20 | 1,300 | 1,300 |
| | 5-Needle Pines | 0 | 0 | 0 | 0 |
| | All Hosts | 290 | 120 | 4,100 | 4,200 |
| Hinsdale | Lodgepole Pine | 0 | 0 | 3 | 3 |
| | Ponderosa Pine | 5 | 0 | 3,200 | 3,200 |
| | 5-Needle Pines | 0 | 0 | 0 | 0 |
| | All Hosts | 5 | 0 | 3,200 | 3,200 |

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| Colorado County | Host Tree | 2009 Acres Affected | 2010 Acres Affected | 1996-2009 Cumulative Acres Affected | 1996-2010 Cumulative Acres Affected |
|-----------------|----------------|---------------------|---------------------|-------------------------------------|-------------------------------------|
| Huerfano | Lodgepole Pine | 0 | 0 | 50 | 50 |
| | Ponderosa Pine | 0 | 0 | 26,000 | 26,000 |
| | 5-Needle Pines | 0 | 0 | 220 | 220 |
| | All Hosts | 0 | 0 | 26,000 | 26,000 |
| Jackson | Lodgepole Pine | 128,000 | 49,000 | 360,000 | 362,000 |
| | Ponderosa Pine | 290 | 320 | 980 | 1,200 |
| | 5-Needle Pines | 6,800 | 240 | 13,000 | 13,000 |
| | All Hosts | 129,000 | 49,000 | 362,000 | 364,000 |
| Jefferson | Lodgepole Pine | 1,800 | 1,800 | 3,500 | 5,200 |
| | Ponderosa Pine | 90 | 1,900 | 27,000 | 28,000 |
| | 5-Needle Pines | 0 | 290 | 5 | 300 |
| | All Hosts | 1,900 | 2,900 | 30,000 | 32,000 |
| La Plata | Lodgepole Pine | 0 | 0 | 0 | 0 |
| | Ponderosa Pine | 10 | 0 | 12,000 | 12,000 |
| | 5-Needle Pines | 0 | 0 | 0 | 0 |
| | All Hosts | 10 | 0 | 12,000 | 12,000 |
| Lake | Lodgepole Pine | 960 | 930 | 9,900 | 11,000 |
| | Ponderosa Pine | 20 | 0 | 320 | 320 |
| | 5-Needle Pines | 0 | 0 | 560 | 560 |
| | All Hosts | 980 | 930 | 10,000 | 11,000 |
| Larimer | Lodgepole Pine | 398,000 | 367,000 | 454,000 | 531,000 |
| | Ponderosa Pine | 16,000 | 181,000 | 65,000 | 220,000 |
| | 5-Needle Pines | 19,000 | 6,300 | 46,000 | 51,000 |
| | All Hosts | 412,000 | 510,000 | 499,000 | 682,000 |
| Las Animas | Lodgepole Pine | 0 | 0 | 10 | 10 |
| | Ponderosa Pine | 0 | 0 | 12,000 | 12,000 |
| | 5-Needle Pines | 0 | 0 | 6 | 6 |
| | All Hosts | 0 | 0 | 12,000 | 12,000 |

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| Colorado County | Host Tree | 2009 Acres Affected | 2010 Acres Affected | 1996-2009 Cumulative Acres Affected | 1996-2010 Cumulative Acres Affected |
|-----------------|----------------|---------------------|---------------------|-------------------------------------|-------------------------------------|
| Mesa | Lodgepole Pine | 0 | 0 | 0 | 0 |
| | Ponderosa Pine | 180 | 160 | 5,400 | 5,500 |
| | 5-Needle Pines | 0 | 0 | 0 | 0 |
| | All Hosts | 180 | 160 | 5,400 | 5,500 |
| Mineral | Lodgepole Pine | 0 | 0 | 0 | 0 |
| | Ponderosa Pine | 0 | 130 | 710 | 840 |
| | 5-Needle Pines | 0 | 0 | 3 | 3 |
| | All Hosts | 0 | 130 | 710 | 840 |
| Moffat | Lodgepole Pine | 2,600 | 3,700 | 13,000 | 16,000 |
| | Ponderosa Pine | 380 | 60 | 380 | 440 |
| | 5-Needle Pines | 2 | 0 | 100 | 100 |
| | All Hosts | 2,800 | 3,700 | 13,000 | 16,000 |
| Montezuma | Lodgepole Pine | 0 | 0 | 0 | 0 |
| | Ponderosa Pine | 3 | 20 | 670 | 690 |
| | 5-Needle Pines | 0 | 0 | 0 | 0 |
| | All Hosts | 3 | 20 | 670 | 690 |
| Montrose | Lodgepole Pine | 0 | 0 | 0 | 0 |
| | Ponderosa Pine | 200 | 160 | 2,100 | 2,300 |
| | 5-Needle Pines | 0 | 0 | 0 | 0 |
| | All Hosts | 200 | 160 | 2,100 | 2,300 |
| Ouray | Lodgepole Pine | 0 | 0 | 5 | 5 |
| | Ponderosa Pine | 60 | 10 | 240 | 250 |
| | 5-Needle Pines | 0 | 0 | 0 | 0 |
| | All Hosts | 60 | 10 | 250 | 260 |
| Park | Lodgepole Pine | 27,000 | 22,000 | 34,000 | 47,000 |
| | Ponderosa Pine | 90 | 450 | 89,000 | 90,000 |
| | 5-Needle Pines | 30 | 80 | 300 | 380 |
| | All Hosts | 27,000 | 22,000 | 124,000 | 136,000 |

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| Colorado County | Host Tree | 2009 Acres Affected | 2010 Acres Affected | 1996-2009 Cumulative Acres Affected | 1996-2010 Cumulative Acres Affected |
|-----------------|----------------|---------------------|---------------------|-------------------------------------|-------------------------------------|
| Pitkin | Lodgepole Pine | 2,800 | 10,000 | 13,000 | 21,000 |
| | Ponderosa Pine | 10 | 0 | 90 | 90 |
| | 5-Needle Pines | 4 | 0 | 4 | 4 |
| | All Hosts | 2,800 | 10,000 | 13,000 | 21,000 |
| Pueblo | Lodgepole Pine | 0 | 0 | 0 | 0 |
| | Ponderosa Pine | 0 | 1 | 21,000 | 21,000 |
| | 5-Needle Pines | 0 | 0 | 0 | 0 |
| | All Hosts | 0 | 1 | 21,000 | 21,000 |
| Rio Blanco | Lodgepole Pine | 11,000 | 16,000 | 31,000 | 39,000 |
| | Ponderosa Pine | 6 | 2 | 40 | 40 |
| | 5-Needle Pines | 0 | 0 | 100 | 100 |
| | All Hosts | 11,000 | 16,000 | 31,000 | 39,000 |
| Rio Grande | Lodgepole Pine | 0 | 0 | 0 | 0 |
| | Ponderosa Pine | 0 | 10 | 3,300 | 3,400 |
| | 5-Needle Pines | 0 | 0 | 0 | 0 |
| | All Hosts | 0 | 10 | 3,300 | 3,400 |
| Routt | Lodgepole Pine | 68,000 | 30,000 | 339,000 | 343,000 |
| | Ponderosa Pine | 80 | 150 | 240 | 380 |
| | 5-Needle Pines | 120 | 0 | 540 | 540 |
| | All Hosts | 68,000 | 30,000 | 339,000 | 344,000 |
| Saguache | Lodgepole Pine | 6 | 0 | 790 | 790 |
| | Ponderosa Pine | 490 | 260 | 39,000 | 39,000 |
| | 5-Needle Pines | 0 | 0 | 330 | 330 |
| | All Hosts | 500 | 260 | 40,000 | 40,000 |
| San Miguel | Lodgepole Pine | 0 | 0 | 10 | 10 |
| | Ponderosa Pine | 180 | 6 | 2,900 | 2,900 |
| | 5-Needle Pines | 0 | 0 | 10 | 10 |
| | All Hosts | 180 | 6 | 2,900 | 2,900 |

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| Colorado County | Host Tree | 2009 Acres Affected | 2010 Acres Affected | 1996-2009 Cumulative Acres Affected | 1996-2010 Cumulative Acres Affected |
|------------------------|------------------|----------------------------|----------------------------|--|--|
| Summit | Lodgepole Pine | 46,000 | 20,000 | 138,000 | 141,000 |
| | Ponderosa Pine | 20 | 0 | 40 | 40 |
| | 5-Needle Pines | 130 | 5 | 580 | 580 |
| | All Hosts | 47,000 | 20,000 | 138,000 | 142,000 |
| Teller | Lodgepole Pine | 0 | 0 | 10 | 10 |
| | Ponderosa Pine | 100 | 6 | 9,700 | 9,700 |
| | 5-Needle Pines | 0 | 0 | 20 | 20 |
| | All Hosts | 100 | 6 | 9,700 | 9,700 |

| Nebraska County | Host Tree | 2009 Acres Affected | 2010 Acres Affected | 1996-2009 Cumulative Acres Affected | 1996-2010 Cumulative Acres Affected |
|------------------------|------------------|----------------------------|----------------------------|--|--|
| Scotts Bluff | Ponderosa Pine | 0 | 5 | 0 | 5 |

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| Wyoming County | Host Tree | 2009 Acres Affected | 2010 Acres Affected | 1996-2009 Cumulative Acres Affected | 1996-2010 Cumulative Acres Affected |
|----------------|----------------|---------------------|---------------------|-------------------------------------|-------------------------------------|
| Albany | Lodgepole Pine | 126,000 | 127,000 | 157,000 | 185,000 |
| | Ponderosa Pine | 15,000 | 35,000 | 20,000 | 47,000 |
| | 5-Needle Pines | 13,000 | 13,000 | 41,000 | 51,000 |
| | All Hosts | 144,000 | 163,000 | 202,000 | 251,000 |
| Big Horn | Lodgepole Pine | 150 | 50 | 1,500 | 1,500 |
| | Ponderosa Pine | 0 | 0 | 1,200 | 1,200 |
| | 5-Needle Pines | 770 | 300 | 21,000 | 21,000 |
| | All Hosts | 930 | 350 | 23,000 | 24,000 |
| Campbell | Lodgepole Pine | 0 | 0 | 0 | 0 |
| | Ponderosa Pine | 0 | 0 | 180 | 180 |
| | 5-Needle Pines | 0 | 0 | 0 | 0 |
| | All Hosts | 0 | 0 | 180 | 180 |
| Carbon | Lodgepole Pine | 205,000 | 190,000 | 427,000 | 474,000 |
| | Ponderosa Pine | 3,300 | 4,900 | 6,400 | 10,000 |
| | 5-Needle Pines | 3,600 | 11,000 | 18,000 | 28,000 |
| | All Hosts | 212,000 | 199,000 | 444,000 | 497,000 |
| Converse | Lodgepole Pine | 3,000 | 2,400 | 3,500 | 5,200 |
| | Ponderosa Pine | 1,000 | 860 | 3,400 | 4,200 |
| | 5-Needle Pines | 1,600 | 1,200 | 3,900 | 4,700 |
| | All Hosts | 5,000 | 4,300 | 10,000 | 13,000 |
| Crook | Lodgepole Pine | 0 | 0 | 0 | 0 |
| | Ponderosa Pine | 210 | 250 | 31,000 | 31,000 |
| | 5-Needle Pines | 0 | 0 | 0 | 0 |
| | All Hosts | 210 | 250 | 31,000 | 31,000 |
| Fremont | Lodgepole Pine | 91,000 | 127,000 | 150,000 | 221,000 |
| | Ponderosa Pine | 3 | 1,300 | 120 | 1,400 |
| | 5-Needle Pines | 83,000 | 120,000 | 234,000 | 312,000 |
| | All Hosts | 148,000 | 173,000 | 328,000 | 408,000 |
| Goshen | Lodgepole Pine | 0 | 10 | 0 | 10 |
| | Ponderosa Pine | 0 | 40 | 20 | 60 |
| | 5-Needle Pines | 0 | 0 | 0 | 0 |
| | All Hosts | 0 | 50 | 20 | 70 |

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| Wyoming County | Host Tree | 2009 Acres Affected | 2010 Acres Affected | 1996-2009 Cumulative Acres Affected | 1996-2010 Cumulative Acres Affected |
|----------------|----------------|---------------------|---------------------|-------------------------------------|-------------------------------------|
| Hot Springs | Lodgepole Pine | 3,400 | 3,000 | 4,000 | 5,600 |
| | Ponderosa Pine | 80 | 10 | 850 | 860 |
| | 5-Needle Pines | 7,200 | 2,300 | 40,000 | 41,000 |
| | All Hosts | 9,000 | 3,500 | 42,000 | 44,000 |
| Johnson | Lodgepole Pine | 30 | 230 | 3,300 | 3,600 |
| | Ponderosa Pine | 560 | 240 | 22,000 | 22,000 |
| | 5-Needle Pines | 1,500 | 160 | 35,000 | 35,000 |
| | All Hosts | 2,100 | 630 | 59,000 | 59,000 |
| Laramie | Lodgepole Pine | 20 | 0 | 20 | 20 |
| | Ponderosa Pine | 2,800 | 8,500 | 3,000 | 9,700 |
| | 5-Needle Pines | 270 | 260 | 340 | 580 |
| | All Hosts | 3,100 | 8,500 | 3,300 | 9,900 |
| Natrona | Lodgepole Pine | 2,200 | 380 | 3,000 | 3,300 |
| | Ponderosa Pine | 420 | 1,100 | 3,900 | 4,900 |
| | 5-Needle Pines | 2,900 | 1,900 | 32,000 | 34,000 |
| | All Hosts | 5,500 | 2,900 | 38,000 | 40,000 |
| Niobrara | Lodgepole Pine | 0 | 0 | 0 | 0 |
| | Ponderosa Pine | 0 | 10 | 90 | 100 |
| | 5-Needle Pines | 0 | 0 | 0 | 0 |
| | All Hosts | 0 | 10 | 90 | 100 |
| Park | Lodgepole Pine | 27,000 | 28,000 | 80,000 | 91,000 |
| | Ponderosa Pine | 20 | 4 | 30 | 40 |
| | 5-Needle Pines | 40,000 | 42,000 | 287,000 | 306,000 |
| | All Hosts | 61,000 | 58,000 | 333,000 | 355,000 |
| Platte | Lodgepole Pine | 0 | 0 | 9 | 9 |
| | Ponderosa Pine | 50 | 1,000 | 120 | 1,100 |
| | 5-Needle Pines | 7 | 110 | 20 | 120 |
| | All Hosts | 50 | 1,100 | 150 | 1,200 |

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| Wyoming County | Host Tree | 2009 Acres Affected | 2010 Acres Affected | 1996-2009 Cumulative Acres Affected | 1996-2010 Cumulative Acres Affected |
|----------------|----------------|---------------------|---------------------|-------------------------------------|-------------------------------------|
| Sheridan | Lodgepole Pine | 60 | 90 | 2,000 | 2,100 |
| | Ponderosa Pine | 470 | 460 | 6,400 | 6,600 |
| | 5-Needle Pines | 250 | 190 | 2,400 | 2,500 |
| | All Hosts | 780 | 730 | 11,000 | 11,000 |
| Sublette | Lodgepole Pine | 0 | 0 | 0 | 0 |
| | Ponderosa Pine | 0 | 0 | 0 | 0 |
| | 5-Needle Pines | 320 | 770 | 1,200 | 1,700 |
| | All Hosts | 320 | 770 | 1,200 | 1,700 |
| Teton | Lodgepole Pine | 20 | 220 | 170 | 390 |
| | Ponderosa Pine | 0 | 0 | 0 | 0 |
| | 5-Needle Pines | 650 | 220 | 2,400 | 2,400 |
| | All Hosts | 660 | 450 | 2,400 | 2,400 |
| Washakie | Lodgepole Pine | 20 | 60 | 2,100 | 2,200 |
| | Ponderosa Pine | 0 | 0 | 1,800 | 1,800 |
| | 5-Needle Pines | 1,800 | 230 | 32,000 | 32,000 |
| | All Hosts | 1,800 | 290 | 35,000 | 35,000 |
| Weston | Lodgepole Pine | 0 | 0 | 0 | 0 |
| | Ponderosa Pine | 70 | 150 | 7,900 | 8,000 |
| | 5-Needle Pines | 0 | 0 | 0 | 0 |
| | All Hosts | 70 | 150 | 7,900 | 8,000 |

| South Dakota County | Host Tree | 2009 Acres Affected | 2010 Acres Affected | 1996-2009 Cumulative Acres Affected | 1996-2010 Cumulative Acres Affected |
|---------------------|----------------|---------------------|---------------------|-------------------------------------|-------------------------------------|
| Butte | Ponderosa Pine | 0 | 0 | 120 | 120 |
| Custer | Ponderosa Pine | 2,400 | 2,700 | 42,000 | 43,000 |
| Fall River | Ponderosa Pine | 0 | 0 | 1,400 | 1,400 |
| Lawrence | Ponderosa Pine | 5,400 | 9,300 | 131,000 | 135,000 |
| Meade | Ponderosa Pine | 1 | 6 | 26,000 | 26,000 |
| Pennington | Ponderosa Pine | 15,000 | 32,000 | 157,000 | 164,000 |

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| National Forest | Host Tree | 2009 Acres Affected | 2010 Acres Affected | 1996-2009 Cumulative Acres Affected | 1996-2010 Cumulative Acres Affected |
|-----------------------------|----------------|---------------------|---------------------|-------------------------------------|-------------------------------------|
| Arapaho National Forest | Lodgepole Pine | 144,000 | 48,000 | 441,000 | 450,000 |
| | Ponderosa Pine | 70 | 1,900 | 1,700 | 3,500 |
| | 5-Needle Pines | 780 | 1,100 | 11,000 | 12,000 |
| | All Hosts | 145,000 | 49,000 | 444,000 | 454,000 |
| Bighorn National Forest | Lodgepole Pine | 220 | 160 | 5,200 | 5,400 |
| | Ponderosa Pine | 270 | 290 | 6,000 | 6,100 |
| | 5-Needle Pines | 760 | 390 | 14,000 | 15,000 |
| | All Hosts | 1,300 | 830 | 25,000 | 26,000 |
| Black Hills National Forest | Lodgepole Pine | 0 | 0 | 0 | 0 |
| | Ponderosa Pine | 22,000 | 44,000 | 372,000 | 384,000 |
| | 5-Needle Pines | 0 | 0 | 0 | 0 |
| | All Hosts | 22,000 | 44,000 | 372,000 | 384,000 |
| Grand Mesa National Forest | Lodgepole Pine | 0 | 0 | 2 | 2 |
| | Ponderosa Pine | 0 | 5 | 8 | 10 |
| | 5-Needle Pines | 0 | 0 | 0 | 0 |
| | All Hosts | 0 | 5 | 10 | 20 |
| Gunnison National Forest | Lodgepole Pine | 270 | 80 | 3,300 | 3,400 |
| | Ponderosa Pine | 70 | 40 | 2,100 | 2,100 |
| | 5-Needle Pines | 0 | 0 | 0 | 0 |
| | All Hosts | 340 | 120 | 5,400 | 5,500 |

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| National Forest | Host Tree | 2009 Acres Affected | 2010 Acres Affected | 1996-2009 Cumulative Acres Affected | 1996-2010 Cumulative Acres Affected |
|------------------------------|----------------|---------------------|---------------------|-------------------------------------|-------------------------------------|
| Medicine Bow National Forest | Lodgepole Pine | 309,000 | 286,000 | 544,000 | 598,000 |
| | Ponderosa Pine | 8,500 | 17,000 | 14,000 | 28,000 |
| | 5-Needle Pines | 7,100 | 6,000 | 28,000 | 33,000 |
| | All Hosts | 319,000 | 303,000 | 571,000 | 634,000 |
| Pike National Forest | Lodgepole Pine | 27,000 | 22,000 | 34,000 | 46,000 |
| | Ponderosa Pine | 360 | 640 | 100,000 | 101,000 |
| | 5-Needle Pines | 10 | 80 | 190 | 280 |
| | All Hosts | 27,000 | 22,000 | 135,000 | 147,000 |
| Rio Grande National Forest | Lodgepole Pine | 0 | 0 | 90 | 90 |
| | Ponderosa Pine | 240 | 220 | 35,000 | 35,000 |
| | 5-Needle Pines | 0 | 0 | 300 | 300 |
| | All Hosts | 240 | 220 | 35,000 | 36,000 |
| Roosevelt National Forest | Lodgepole Pine | 391,000 | 384,000 | 462,000 | 558,000 |
| | Ponderosa Pine | 14,000 | 187,000 | 70,000 | 231,000 |
| | 5-Needle Pines | 21,000 | 9,400 | 53,000 | 59,000 |
| | All Hosts | 407,000 | 512,000 | 515,000 | 697,000 |
| Routt National Forest | Lodgepole Pine | 166,000 | 65,000 | 605,000 | 610,000 |
| | Ponderosa Pine | 20 | 10 | 330 | 350 |
| | 5-Needle Pines | 5,800 | 220 | 9,900 | 10,000 |
| | All Hosts | 167,000 | 66,000 | 606,000 | 612,000 |
| San Isabel National Forest | Lodgepole Pine | 2,100 | 1,300 | 12,000 | 13,000 |
| | Ponderosa Pine | 90 | 70 | 134,000 | 134,000 |
| | 5-Needle Pines | 60 | 270 | 4,900 | 5,100 |
| | All Hosts | 2,300 | 1,600 | 150,000 | 150,000 |

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| National Forest | Host Tree | 2009 Acres Affected | 2010 Acres Affected | 1996-2009 Cumulative Acres Affected | 1996-2010 Cumulative Acres Affected |
|-----------------------------|----------------|---------------------|---------------------|-------------------------------------|-------------------------------------|
| San Juan National Forest | Lodgepole Pine | 0 | 0 | 1 | 1 |
| | Ponderosa Pine | 2 | 20 | 27,000 | 27,000 |
| | 5-Needle Pines | 0 | 0 | 3 | 3 |
| | All Hosts | 2 | 20 | 27,000 | 27,000 |
| Shoshone National Forest | Lodgepole Pine | 84,000 | 101,000 | 176,000 | 230,000 |
| | Ponderosa Pine | 20 | 7 | 30 | 40 |
| | 5-Needle Pines | 99,000 | 119,000 | 429,000 | 494,000 |
| | All Hosts | 164,000 | 167,000 | 536,000 | 605,000 |
| Uncompahgre National Forest | Lodgepole Pine | 0 | 0 | 20 | 20 |
| | Ponderosa Pine | 530 | 290 | 7,700 | 8,000 |
| | 5-Needle Pines | 0 | 0 | 0 | 0 |
| | All Hosts | 530 | 290 | 7,700 | 8,000 |
| White River National Forest | Lodgepole Pine | 114,000 | 88,000 | 338,000 | 365,000 |
| | Ponderosa Pine | 530 | 1,200 | 3,100 | 3,600 |
| | 5-Needle Pines | 240 | 5 | 1,300 | 1,300 |
| | All Hosts | 114,000 | 89,000 | 342,000 | 369,000 |

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2010 Spruce Beetle Activity

| | 2009 Acres Affected | 2010 Acres Affected | 1996-2009 Cumulative Acres Affected | 1996-2010 Cumulative Acres Affected |
|--------------|------------------------------------|------------------------------------|--|--|
| Colorado | 114,000 | 208,000 | 435,000 | 571,000 |
| Wyoming – R2 | 21,000 | 77,000 | 358,000 | 422,000 |
| CO plus S.WY | 124,000 | 224,000 | 508,000 | 656,000 |
| South Dakota | 0 | 0 | 100 | 100 |

| Colorado County | 2009 Acres Affected | 2010 Acres Affected | 1996-2009 Cumulative Acres Affected | 1996-2010 Cumulative Acres Affected |
|----------------------------|------------------------------------|------------------------------------|--|--|
| Archuleta | 990 | 1,900 | 5,400 | 6,900 |
| Boulder | 0 | 10 | 40 | 50 |
| Chaffee | 0 | 3 | 10 | 20 |
| Clear Creek | 0 | 0 | 30 | 30 |
| Conejos | 1,700 | 6,700 | 12,000 | 16,000 |
| Costilla | 0 | 0 | 1,400 | 1,400 |
| Custer | 6 | 210 | 830 | 950 |
| Delta | 880 | 12,000 | 3,700 | 15,000 |
| Dolores | 0 | 0 | 1,800 | 1,800 |
| Douglas | 0 | 0 | 20 | 20 |
| Eagle | 1,500 | 830 | 5,100 | 5,800 |
| El Paso | 0 | 0 | 10 | 10 |
| Fremont | 7 | 30 | 50 | 80 |
| Garfield | 20 | 80 | 4,100 | 4,100 |
| Gilpin | 20 | 0 | 20 | 20 |
| Grand | 3,800 | 4,700 | 5,600 | 10,000 |
| Gunnison | 340 | 14,000 | 5,200 | 19,000 |
| Hinsdale | 28,000 | 38,000 | 66,000 | 86,000 |
| Huerfano | 4 | 1,000 | 900 | 1,700 |

Due to the nature of aerial surveys, data will only provide rough estimates of location, intensity and the resulting trend information for agents detectable from the air. Data presented should only be used as a partial indicator of insect and disease activity, and should be validated on the ground for actual location and casual agent. Insect and disease data are available digitally from the USDA Forest Service, Region Two Forest Health Management group. The cooperators reserve the right to correct, update, modify or replace GIS products. Using these data for purposes other than those for which it was intended may yield inaccurate or misleading results.

| Colorado County | 2009 Acres Affected | 2010 Acres Affected | 1996-2009 Cumulative Acres Affected | 1996-2010 Cumulative Acres Affected |
|------------------------|----------------------------|----------------------------|--|--|
| Jackson | 1,700 | 1,800 | 64,000 | 66,000 |
| La Plata | 0 | 860 | 4,400 | 5,300 |
| Lake | 0 | 10 | 40 | 50 |
| Larimer | 4,500 | 20,000 | 16,000 | 33,000 |
| Las Animas | 0 | 0 | 650 | 650 |
| Mesa | 3,000 | 14,000 | 13,000 | 24,000 |
| Mineral | 63,000 | 80,000 | 109,000 | 151,000 |
| Moffat | 0 | 150 | 600 | 750 |
| Montezuma | 0 | 0 | 290 | 290 |
| Montrose | 0 | 0 | 500 | 500 |
| Ouray | 4 | 0 | 1,400 | 1,400 |
| Park | 0 | 30 | 10 | 40 |
| Pitkin | 210 | 320 | 7,300 | 7,400 |
| Pueblo | 0 | 250 | 2,100 | 2,200 |
| Rio Blanco | 0 | 140 | 3,600 | 3,700 |
| Rio Grande | 630 | 6,500 | 11,000 | 15,000 |
| Routt | 3,000 | 3,000 | 83,000 | 85,000 |
| Saguache | 0 | 1,300 | 2,800 | 3,400 |
| San Juan | 120 | 60 | 1,700 | 1,800 |
| San Miguel | 2 | 60 | 890 | 950 |
| Summit | 320 | 120 | 650 | 780 |

| Wyoming County | 2009 Acres Affected | 2010 Acres Affected | 1996-2009 Cumulative Acres Affected | 1996-2010 Cumulative Acres Affected |
|-----------------------|----------------------------|----------------------------|--|--|
| Albany | 3,100 | 5,300 | 17,000 | 21,000 |
| Big Horn | 1,000 | 370 | 11,000 | 11,000 |
| Carbon | 6,600 | 11,000 | 56,000 | 64,000 |
| Converse | 0 | 0 | 80 | 80 |
| Fremont | 3,600 | 39,000 | 18,000 | 53,000 |

Due to the nature of aerial surveys, data will only provide rough estimates of location, intensity and the resulting trend information for agents detectable from the air. Data presented should only be used as a partial indicator of insect and disease activity, and should be validated on the ground for actual location and casual agent. Insect and disease data are available digitally from the USDA Forest Service, Region Two Forest Health Management group. The cooperators reserve the right to correct, update, modify or replace GIS products. Using these data for purposes other than those for which it was intended may yield inaccurate or misleading results.

| Wyoming County | 2009 Acres Affected | 2010 Acres Affected | 1996-2009 Cumulative Acres Affected | 1996-2010 Cumulative Acres Affected |
|----------------|---------------------|---------------------|-------------------------------------|-------------------------------------|
| Hot Springs | 520 | 3,300 | 1,500 | 4,700 |
| Johnson | 210 | 1,600 | 2,400 | 4,000 |
| Natrona | 5 | 0 | 40 | 40 |
| Park | 5,700 | 16,000 | 246,000 | 257,000 |
| Sheridan | 40 | 220 | 5,100 | 5,200 |
| Teton | 290 | 900 | 300 | 1,100 |
| Washakie | 6 | 5 | 660 | 670 |

| National Forest | 2009 Acres Affected | 2010 Acres Affected | 1996-2009 Cumulative Acres Affected | 1996-2010 Cumulative Acres Affected |
|------------------------------|---------------------|---------------------|-------------------------------------|-------------------------------------|
| Arapaho National Forest | 3,500 | 4,400 | 4,200 | 8,400 |
| Bighorn National Forest | 1,300 | 2,200 | 18,000 | 20,000 |
| Black Hills National Forest | 0 | 0 | 100 | 100 |
| Grand Mesa National Forest | 3,400 | 19,000 | 9,300 | 26,000 |
| Gunnison National Forest | 780 | 20,000 | 4,800 | 25,000 |
| Medicine Bow National Forest | 9,700 | 16,000 | 72,000 | 83,000 |
| Pike National Forest | 20 | 10 | 50 | 60 |
| Rio Grande National Forest | 80,000 | 103,000 | 144,000 | 196,000 |
| Roosevelt National Forest | 4,400 | 17,000 | 14,000 | 30,000 |
| Routt National Forest | 4,700 | 5,000 | 147,000 | 150,000 |
| San Isabel National Forest | 10 | 1,500 | 4,200 | 5,200 |
| San Juan National Forest | 14,000 | 32,000 | 66,000 | 86,000 |
| Shoshone National Forest | 9,900 | 53,000 | 232,000 | 278,000 |
| Uncompahgre National Forest | 10 | 60 | 7,600 | 7,700 |
| White River National Forest | 2,100 | 1,800 | 22,000 | 23,000 |

Due to the nature of aerial surveys, data will only provide rough estimates of location, intensity and the resulting trend information for agents detectable from the air. Data presented should only be used as a partial indicator of insect and disease activity, and should be validated on the ground for actual location and casual agent. Insect and disease data are available digitally from the USDA Forest Service, Region Two Forest Health Management group. The cooperators reserve the right to correct, update, modify or replace GIS products. Using these data for purposes other than those for which it was intended may yield inaccurate or misleading results.

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2010 Douglas-fir Beetle Activity

| State | 2009 Acres Affected | 2010 Acres Affected | 1996-2009 Cumulative Acres Affected | 1996-2010 Cumulative Acres Affected |
|---------------|---------------------|---------------------|-------------------------------------|-------------------------------------|
| Colorado | 23,000 | 37,000 | 277,000 | 306,000 |
| Wyoming – R2 | 3,300 | 5,600 | 321,000 | 326,000 |
| CO plus S. WY | 23,000 | 37,000 | 291,000 | 320,000 |

| Colorado County | 2009 Acres Affected | 2010 Acres Affected | 1996-2009 Cumulative Acres Affected | 1996-2010 Cumulative Acres Affected |
|-----------------|---------------------|---------------------|-------------------------------------|-------------------------------------|
| Alamosa | 0 | 0 | 20 | 20 |
| Archuleta | 3,500 | 4,400 | 29,000 | 33,000 |
| Boulder | 6 | 0 | 280 | 280 |
| Chaffee | 80 | 40 | 2,800 | 2,900 |
| Clear Creek | 8 | 220 | 830 | 1,100 |
| Conejos | 20 | 200 | 5,700 | 5,700 |
| Costilla | 70 | 20 | 1,600 | 1,600 |
| Custer | 30 | 10 | 6,200 | 6,200 |
| Delta | 250 | 230 | 2,900 | 3,000 |
| Dolores | 280 | 440 | 3,000 | 3,400 |
| Douglas | 3,100 | 9,700 | 25,000 | 33,000 |
| Eagle | 80 | 70 | 6,400 | 6,500 |
| El Paso | 340 | 60 | 4,400 | 4,500 |
| Fremont | 440 | 80 | 14,000 | 14,000 |
| Garfield | 450 | 550 | 26,000 | 26,000 |
| Gilpin | 0 | 0 | 60 | 60 |
| Grand | 50 | 90 | 820 | 900 |
| Gunnison | 3,000 | 3,300 | 17,000 | 19,000 |
| Hinsdale | 1,700 | 2,200 | 6,600 | 8,200 |
| Huerfano | 3 | 0 | 2,100 | 2,100 |

Due to the nature of aerial surveys, data will only provide rough estimates of location, intensity and the resulting trend information for agents detectable from the air. Data presented should only be used as a partial indicator of insect and disease activity, and should be validated on the ground for actual location and casual agent. Insect and disease data are available digitally from the USDA Forest Service, Region Two Forest Health Management group. The cooperators reserve the right to correct, update, modify or replace GIS products. Using these data for purposes other than those for which it was intended may yield inaccurate or misleading results.

| Colorado County | 2009 Acres Affected | 2010 Acres Affected | 1996-2009 Cumulative Acres Affected | 1996-2010 Cumulative Acres Affected |
|------------------------|----------------------------|----------------------------|--|--|
| Jackson | 0 | 0 | 240 | 240 |
| Jefferson | 680 | 2,400 | 5,600 | 7,900 |
| La Plata | 1,800 | 2,900 | 9,200 | 12,000 |
| Lake | 0 | 0 | 80 | 80 |
| Larimer | 0 | 0 | 2,500 | 2,500 |
| Las Animas | 3 | 3 | 5,900 | 5,900 |
| Mesa | 900 | 640 | 5,500 | 5,800 |
| Mineral | 850 | 1,300 | 6,200 | 7,300 |
| Moffat | 850 | 70 | 900 | 970 |
| Montezuma | 530 | 370 | 7,300 | 7,600 |
| Montrose | 640 | 860 | 4,100 | 4,900 |
| Ouray | 380 | 1,300 | 1,500 | 2,600 |
| Park | 30 | 140 | 1,400 | 1,600 |
| Pitkin | 420 | 830 | 4,700 | 5,300 |
| Pueblo | 620 | 20 | 3,700 | 3,700 |
| Rio Blanco | 60 | 170 | 7,500 | 7,600 |
| Rio Grande | 40 | 580 | 7,300 | 7,900 |
| Routt | 70 | 100 | 4,100 | 4,100 |
| Saguache | 330 | 820 | 29,000 | 30,000 |
| San Juan | 50 | 20 | 170 | 190 |
| San Miguel | 1,300 | 2,700 | 13,000 | 15,000 |
| Summit | 0 | 0 | 300 | 300 |
| Teller | 20 | 6 | 1,600 | 1,600 |

| Wyoming County | 2009 Acres Affected | 2010 Acres Affected | 1996-2009 Cumulative Acres Affected | 1996-2010 Cumulative Acres Affected |
|-----------------------|----------------------------|----------------------------|--|--|
| Albany | 20 | 0 | 5,300 | 5,300 |
| Big Horn | 590 | 250 | 33,000 | 33,000 |
| Carbon | 1 | 0 | 8,900 | 8,900 |

Due to the nature of aerial surveys, data will only provide rough estimates of location, intensity and the resulting trend information for agents detectable from the air. Data presented should only be used as a partial indicator of insect and disease activity, and should be validated on the ground for actual location and casual agent. Insect and disease data are available digitally from the USDA Forest Service, Region Two Forest Health Management group. The cooperators reserve the right to correct, update, modify or replace GIS products. Using these data for purposes other than those for which it was intended may yield inaccurate or misleading results.

| Wyoming County | 2009 Acres Affected | 2010 Acres Affected | 1996-2009 Cumulative Acres Affected | 1996-2010 Cumulative Acres Affected |
|----------------|---------------------|---------------------|-------------------------------------|-------------------------------------|
| Converse | 8 | 0 | 10 | 10 |
| Fremont | 130 | 490 | 48,000 | 49,000 |
| Hot Springs | 50 | 0 | 25,000 | 25,000 |
| Johnson | 270 | 40 | 1,500 | 1,500 |
| Natrona | 6 | 10 | 140 | 150 |
| Park | 1,200 | 4,300 | 192,000 | 195,000 |
| Sheridan | 300 | 140 | 860 | 970 |
| Washakie | 770 | 320 | 6,100 | 6,200 |

| National Forest | 2009 Acres Affected | 2010 Acres Affected | 1996-2009 Cumulative Acres Affected | 1996-2010 Cumulative Acres Affected |
|------------------------------|---------------------|---------------------|-------------------------------------|-------------------------------------|
| Arapaho National Forest | 0 | 0 | 490 | 490 |
| Bighorn National Forest | 1,200 | 600 | 26,000 | 26,000 |
| Grand Mesa National Forest | 450 | 230 | 1,500 | 1,600 |
| Gunnison National Forest | 2,900 | 3,000 | 16,000 | 17,000 |
| Medicine Bow National Forest | 30 | 0 | 11,000 | 11,000 |
| Pike National Forest | 2,900 | 9,700 | 31,000 | 39,000 |
| Rio Grande National Forest | 280 | 1,200 | 36,000 | 37,000 |
| Roosevelt National Forest | 0 | 0 | 1,800 | 1,800 |
| Routt National Forest | 0 | 10 | 2,000 | 2,100 |
| San Isabel National Forest | 210 | 70 | 16,000 | 16,000 |
| San Juan National Forest | 8,600 | 11,000 | 52,000 | 61,000 |
| Shoshone National Forest | 1,200 | 4,400 | 199,000 | 203,000 |
| Uncompahgre National Forest | 1,600 | 2,900 | 9,900 | 12,000 |
| White River National Forest | 630 | 1,300 | 16,000 | 17,000 |

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2010 Western Balsam Bark Beetle Activity

| State | 2009 Acres Affected | 2010 Acres Affected |
|--------------|---------------------|---------------------|
| Colorado | 184,000 | 265,000 |
| Wyoming – R2 | 49,000 | 67,000 |
| CO plus S.WY | 189,000 | 270,000 |

| Colorado County | 2009 Acres Affected | 2010 Acres Affected |
|-----------------|---------------------|---------------------|
| Alamosa | 20 | 20 |
| Archuleta | 130 | 20 |
| Boulder | 5,500 | 6,400 |
| Chaffee | 2,500 | 6,300 |
| Clear Creek | 6,000 | 5,100 |
| Conejos | 3,100 | 3,300 |
| Costilla | 590 | 870 |
| Custer | 2,200 | 2,700 |
| Delta | 3,300 | 4,300 |
| Dolores | 4,400 | 80 |
| Eagle | 6,300 | 14,000 |
| Fremont | 310 | 50 |
| Garfield | 7,500 | 9,100 |
| Gilpin | 3,000 | 5,000 |
| Grand | 5,600 | 12,000 |
| Gunnison | 23,000 | 44,000 |
| Hinsdale | 4,900 | 6,800 |
| Huerfano | 1,000 | 1,700 |
| Jackson | 3,400 | 3,300 |
| Jefferson | 40 | 30 |
| La Plata | 420 | 680 |
| Lake | 760 | 1,300 |
| Larimer | 22,000 | 17,000 |
| Las Animas | 1,200 | 1,000 |

Due to the nature of aerial surveys, data will only provide rough estimates of location, intensity and the resulting trend information for agents detectable from the air. Data presented should only be used as a partial indicator of insect and disease activity, and should be validated on the ground for actual location and casual agent. Insect and disease data are available digitally from the USDA Forest Service, Region Two Forest Health Management group. The cooperators reserve the right to correct, update, modify or replace GIS products. Using these data for purposes other than those for which it was intended may yield inaccurate or misleading results.

Western Balsam Bark Beetle¹⁰¹

| Colorado County | 2009 Acres Affected | 2010 Acres Affected |
|------------------------|----------------------------|----------------------------|
| Mesa | 6,100 | 4,800 |
| Mineral | 12,000 | 6,000 |
| Moffat | 140 | 260 |
| Montezuma | 2,100 | 1,000 |
| Montrose | 180 | 2,100 |
| Ouray | 400 | 1,200 |
| Park | 9,100 | 6,900 |
| Pitkin | 18,000 | 31,000 |
| Pueblo | 80 | 20 |
| Rio Blanco | 4,700 | 9,200 |
| Rio Grande | 4,000 | 5,300 |
| Routt | 4,400 | 5,400 |
| Saguache | 7,200 | 7,500 |
| San Juan | 450 | 6,300 |
| San Miguel | 2,900 | 22,000 |
| Summit | 4,800 | 11,000 |

| Wyoming County | 2009 Acres Affected | 2010 Acres Affected |
|-----------------------|----------------------------|----------------------------|
| Albany | 940 | 1,700 |
| Big Horn | 9,900 | 9,000 |
| Carbon | 3,700 | 3,200 |
| Converse | 110 | 100 |
| Fremont | 14,000 | 22,000 |
| Hot Springs | 40 | 0 |
| Johnson | 8,200 | 7,400 |
| Natrona | 380 | 2 |
| Park | 7,400 | 17,000 |
| Sheridan | 4,300 | 6,000 |
| Washakie | 270 | 90 |

Due to the nature of aerial surveys, data will only provide rough estimates of location, intensity and the resulting trend information for agents detectable from the air. Data presented should only be used as a partial indicator of insect and disease activity, and should be validated on the ground for actual location and casual agent. Insect and disease data are available digitally from the USDA Forest Service, Region Two Forest Health Management group. The cooperators reserve the right to correct, update, modify or replace GIS products. Using these data for purposes other than those for which it was intended may yield inaccurate or misleading results.

Western Balsam Bark Beetle¹⁰²

| National Forest | 2009 Acres Affected | 2010 Acres Affected |
|------------------------------|---------------------------|---------------------------|
| Arapaho National Forest | 11,000 | 16,000 |
| Bighorn National Forest | 23,000 | 22,000 |
| Grand Mesa National Forest | 7,000 | 5,700 |
| Gunnison National Forest | 20,000 | 32,000 |
| Medicine Bow National Forest | 4,300 | 4,900 |
| Pike National Forest | 9,300 | 7,100 |
| Rio Grande National Forest | 21,000 | 18,000 |
| Roosevelt National Forest | 19,000 | 16,000 |
| Routt National Forest | 9,100 | 12,000 |
| San Isabel National Forest | 10,000 | 16,000 |
| San Juan National Forest | 8,000 | 6,400 |
| Shoshone National Forest | 21,000 | 37,000 |
| Uncompahgre National Forest | 7,900 | 34,000 |
| White River National Forest | 40,000 | 76,000 |

Due to the nature of aerial surveys, data will only provide rough estimates of location, intensity and the resulting trend information for agents detectable from the air. Data presented should only be used as a partial indicator of insect and disease activity, and should be validated on the ground for actual location and casual agent. Insect and disease data are available digitally from the USDA Forest Service, Region Two Forest Health Management group. The cooperators reserve the right to correct, update, modify or replace GIS products. Using these data for purposes other than those for which it was intended may yield inaccurate or misleading results.

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2010 Western Spruce Budworm Activity

| State | 2009 Acres Affected | 2010 Acres Affected |
|--------------|----------------------------|----------------------------|
| Colorado | 382,000 | 213,000 |
| Wyoming- R2 | 4,600 | 4,400 |
| CO plus S.WY | 383,000 | 216,000 |

| Colorado County | 2009 Acres Affected | 2010 Acres Affected |
|------------------------|----------------------------|----------------------------|
| Alamosa | 3,800 | 3,200 |
| Archuleta | 7,700 | 4,800 |
| Chaffee | 0 | 90 |
| Conejos | 3,800 | 1,900 |
| Costilla | 67,000 | 38,000 |
| Custer | 2,300 | 12,000 |
| Dolores | 13,000 | 4,700 |
| Douglas | 22,000 | 11,000 |
| Eagle | 60 | 0 |
| El Paso | 17,000 | 3,500 |
| Fremont | 6,100 | 3,000 |
| Garfield | 1,600 | 0 |
| Grand | 240 | 0 |
| Gunnison | 2,100 | 2,800 |
| Hinsdale | 3,900 | 820 |
| Huerfano | 57,000 | 22,000 |
| Jackson | 2,200 | 0 |
| Jefferson | 0 | 800 |
| La Plata | 8,600 | 7,200 |
| Las Animas | 42,000 | 17,000 |
| Mineral | 25,000 | 26,000 |
| Montezuma | 8,700 | 6,600 |
| Ouray | 7,700 | 4,000 |

Due to the nature of aerial surveys, data will only provide rough estimates of location, intensity and the resulting trend information for agents detectable from the air. Data presented should only be used as a partial indicator of insect and disease activity, and should be validated on the ground for actual location and casual agent. Insect and disease data are available digitally from the USDA Forest Service, Region Two Forest Health Management group. The cooperators reserve the right to correct, update, modify or replace GIS products. Using these data for purposes other than those for which it was intended may yield inaccurate or misleading results.

| Colorado County | 2009 Acres Affected | 2010 Acres Affected |
|------------------------|----------------------------|----------------------------|
| Pueblo | 0 | 1,200 |
| Rio Blanco | 2,700 | 0 |
| Rio Grande | 22,000 | 5,900 |
| Routt | 2,100 | 30 |
| Saguache | 35,000 | 28,000 |
| San Juan | 3,600 | 7,900 |
| San Miguel | 13,000 | 850 |
| Summit | 350 | 0 |
| Teller | 2,700 | 0 |

| Wyoming County | 2009 Acres Affected | 2010 Acres Affected |
|-----------------------|----------------------------|----------------------------|
| Albany | 510 | 350 |
| Big Horn | 0 | 200 |
| Carbon | 920 | 0 |
| Fremont | 1,300 | 1,500 |
| Park | 1,900 | 2,200 |
| Sheridan | 10 | 0 |
| Washakie | 0 | 70 |

Due to the nature of aerial surveys, data will only provide rough estimates of location, intensity and the resulting trend information for agents detectable from the air. Data presented should only be used as a partial indicator of insect and disease activity, and should be validated on the ground for actual location and casual agent. Insect and disease data are available digitally from the USDA Forest Service, Region Two Forest Health Management group. The cooperators reserve the right to correct, update, modify or replace GIS products. Using these data for purposes other than those for which it was intended may yield inaccurate or misleading results.

| National Forest | 2009 Acres Affected | 2010 Acres Affected |
|------------------------------|------------------------------------|------------------------------------|
| Bighorn National Forest | 10 | 200 |
| Gunnison National Forest | 1,200 | 1,300 |
| Medicine Bow National Forest | 1,100 | 350 |
| Pike National Forest | 40,000 | 13,000 |
| Rio Grande National Forest | 78,000 | 56,000 |
| Routt National Forest | 4,200 | 30 |
| San Isabel National Forest | 47,000 | 32,000 |
| San Juan National Forest | 45,000 | 28,000 |
| Shoshone National Forest | 2,800 | 3,600 |
| Uncompahgre National Forest | 19,000 | 6,000 |
| White River National Forest | 3,200 | 0 |

Due to the nature of aerial surveys, data will only provide rough estimates of location, intensity and the resulting trend information for agents detectable from the air. Data presented should only be used as a partial indicator of insect and disease activity, and should be validated on the ground for actual location and casual agent. Insect and disease data are available digitally from the USDA Forest Service, Region Two Forest Health Management group. The cooperators reserve the right to correct, update, modify or replace GIS products. Using these data for purposes other than those for which it was intended may yield inaccurate or misleading results.

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2010 Aspen Dieback and Mortality

| | Acres Affected Low | Acres Affected Moderate | Acres Affected High | Acres Affected Total |
|----------------|---------------------------|--------------------------------|----------------------------|-----------------------------|
| Colorado | 2,500 | 65,000 | 123,000 | 190,000 |
| Wyoming – R2 | 70 | 7,600 | 1,300 | 8,900 |
| CO. plus S. WY | 2,500 | 72,000 | 124,000 | 199,000 |
| South Dakota | 0 | 160 | 0 | 160 |

| Colorado County | 2010 Acres Affected Low | 2010 Acres Affected Moderate | 2010 Acres Affected High | 2010 Acres Affected Total |
|------------------------|--------------------------------|-------------------------------------|---------------------------------|----------------------------------|
| Alamosa | 0 | 0 | 60 | 60 |
| Archuleta | 8 | 180 | 660 | 850 |
| Boulder | 0 | 10 | 0 | 10 |
| Chaffee | 0 | 600 | 150 | 750 |
| Clear Creek | 0 | 120 | 0 | 120 |
| Conejos | 0 | 0 | 390 | 390 |
| Costilla | 0 | 20 | 20 | 30 |
| Custer | 0 | 370 | 800 | 1,200 |
| Delta | 0 | 3,800 | 1,200 | 5,000 |
| Dolores | 0 | 1,400 | 5,300 | 6,700 |
| Eagle | 0 | 890 | 2,100 | 3,000 |
| Fremont | 0 | 500 | 680 | 1,200 |
| Garfield | 0 | 2,200 | 3,200 | 5,400 |
| Grand | 0 | 1,200 | 5,300 | 6,500 |
| Gunnison | 1,600 | 5,600 | 1,900 | 9,100 |
| Hinsdale | 0 | 580 | 10 | 590 |
| Huerfano | 0 | 320 | 1,600 | 2,000 |
| Jackson | 0 | 510 | 3,800 | 4,300 |
| Jefferson | 0 | 70 | 0 | 70 |

Due to the nature of aerial surveys, data will only provide rough estimates of location, intensity and the resulting trend information for agents detectable from the air. Data presented should only be used as a partial indicator of insect and disease activity, and should be validated on the ground for actual location and casual agent. Insect and disease data are available digitally from the USDA Forest Service, Region Two Forest Health Management group. The cooperators reserve the right to correct, update, modify or replace GIS products. Using these data for purposes other than those for which it was intended may yield inaccurate or misleading results.

| Colorado County | 2010 Acres Affected Low | 2010 Acres Affected Moderate | 2010 Acres Affected High | 2010 Acres Affected Total |
|------------------------|--------------------------------|-------------------------------------|---------------------------------|----------------------------------|
| La Plata | 0 | 1,000 | 2,600 | 3,700 |
| Lake | 0 | 0 | 0 | 0 |
| Larimer | 0 | 1,400 | 420 | 1,800 |
| Las Animas | 0 | 0 | 80 | 80 |
| Mesa | 0 | 10,000 | 12,000 | 22,000 |
| Mineral | 0 | 30 | 70 | 100 |
| Moffat | 0 | 1,100 | 13,000 | 14,000 |
| Montezuma | 0 | 1,500 | 7,600 | 9,000 |
| Montrose | 0 | 5,700 | 6,800 | 12,000 |
| Ouray | 0 | 2,600 | 3,500 | 6,100 |
| Park | 0 | 9,000 | 1,600 | 11,000 |
| Pitkin | 0 | 2,500 | 2,100 | 4,500 |
| Pueblo | 0 | 30 | 10 | 50 |
| Rio Blanco | 0 | 2,300 | 5,400 | 7,800 |
| Rio Grande | 0 | 0 | 0 | 0 |
| Routt | 120 | 6,300 | 33,000 | 39,000 |
| Saguache | 0 | 1,500 | 300 | 1,800 |
| San Juan | 0 | 0 | 0 | 0 |
| San Miguel | 820 | 1,700 | 6,200 | 8,700 |
| Summit | 0 | 60 | 840 | 910 |
| Teller | 0 | 90 | 0 | 90 |

Due to the nature of aerial surveys, data will only provide rough estimates of location, intensity and the resulting trend information for agents detectable from the air. Data presented should only be used as a partial indicator of insect and disease activity, and should be validated on the ground for actual location and casual agent. Insect and disease data are available digitally from the USDA Forest Service, Region Two Forest Health Management group. The cooperators reserve the right to correct, update, modify or replace GIS products. Using these data for purposes other than those for which it was intended may yield inaccurate or misleading results.

| Wyoming County | 2010 Acres Affected Low | 2010 Acres Affected Moderate | 2010 Acres Affected High | 2010 Acres Affected Total |
|-----------------------|--------------------------------|-------------------------------------|---------------------------------|----------------------------------|
| Albany | 0 | 170 | 100 | 260 |
| Bighorn | 0 | 20 | 40 | 70 |
| Carbon | 0 | 5700 | 970 | 6,700 |
| Converse | 0 | 910 | 40 | 950 |
| Crook | 70 | 120 | 0 | 190 |
| Johnson | 0 | 30 | 40 | 80 |
| Natrona | 0 | 450 | 2 | 450 |
| Park | 0 | 30 | 70 | 100 |
| Sheridan | 0 | 80 | 7 | 90 |
| Washakie | 0 | 0 | 5 | 5 |
| Weston | 0 | 30 | 0 | 30 |

| South Dakota County | 2010 Acres Affected Low | 2010 Acres Affected Moderate | 2010 Acres Affected High | 2010 Acres Affected Total |
|----------------------------|--------------------------------|-------------------------------------|---------------------------------|----------------------------------|
| Custer | 0 | 6 | 0 | 6 |
| Lawrence | 0 | 30 | 0 | 30 |
| Meade | 0 | 9 | 0 | 9 |
| Pennington | 0 | 110 | 0 | 110 |

Due to the nature of aerial surveys, data will only provide rough estimates of location, intensity and the resulting trend information for agents detectable from the air. Data presented should only be used as a partial indicator of insect and disease activity, and should be validated on the ground for actual location and casual agent. Insect and disease data are available digitally from the USDA Forest Service, Region Two Forest Health Management group. The cooperators reserve the right to correct, update, modify or replace GIS products. Using these data for purposes other than those for which it was intended may yield inaccurate or misleading results.

| National Forest | 2010 Acres Affected Low | 2010 Acres Affected Moderate | 2010 Acres Affected High | 2010 Acres Affected Total |
|------------------------------|--|---|---|--|
| Arapaho National Forest | 0 | 160 | 1,200 | 1,400 |
| Bighorn National Forest | 0 | 10 | 60 | 70 |
| Black Hills National Forest | 50 | 160 | 0 | 210 |
| Grand Mesa National Forest | 0 | 4,100 | 2,100 | 6,300 |
| Gunnison National Forest | 1,600 | 4,800 | 1,700 | 8,100 |
| Medicine Bow National Forest | 0 | 4,700 | 280 | 5,000 |
| Pike National Forest | 0 | 5,700 | 360 | 6,100 |
| Rio Grande National Forest | 0 | 680 | 200 | 880 |
| Roosevelt National Forest | 0 | 360 | 240 | 600 |
| Routt National Forest | 0 | 2,400 | 19,000 | 21,000 |
| San Isabel National Forest | 0 | 1,900 | 2,000 | 3,900 |
| San Juan National Forest | 8 | 3,500 | 13,000 | 16,000 |
| Shoshone National Forest | 0 | 0 | 20 | 20 |
| Uncompahgre National Forest | 0 | 6,700 | 12,000 | 19,000 |
| White River National Forest | 0 | 6,200 | 7,600 | 14,000 |

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