

# Forest Health Highlights for Colorado 2016



Figure 1. ground survey



Figure 2. Aerial survey airplane

**Ground (Fig. 1) and Aerial detection surveys (Fig. 2) of tree killing or damaging insects and diseases were conducted in 2016 over Colorado's forest lands. This is a cooperative effort between the US Forest Service and the Colorado State Forest Service. In 2016, 28 million acres were surveyed by federal and state surveyors. the damaging agents were of insects or pathogens kill and/or defoliate trees (Fig. 3).**



Figure 3. Older and recent dead conifers



## Spruce Beetle

Since 1996, spruce beetle has affected approximately 1,715,000 acres to varying degrees in Colorado.

Spruce beetle activity was detected on 350,000 acres in Colorado in 2016. Of these, 136,000 acres are in areas not previously mapped as having spruce beetle activity (new acres\*). This epidemic continues to expand (Figures 4 & 5). A heavily impacted stand with current beetle activity is shown in Figure 3.

The spruce beetle epidemic is expanding most rapidly in southern Colorado's forests and impacts many thousands of acres. Areas affected are found from the New Mexico border to north of Cottonwood Pass. Aerial survey in south central Colorado showed spruce beetle epidemics expanded on the San Juan (12,000 new acres on 36,000 active acres\*\*), Rio Grande (22,000 new acres on 93,000 active acres), Gunnison (30,000 new acres on 72,000 active acres), and San Isabel (24,000 new acres on 46,000 active acres) National Forests. 660 acres of new windthrown Engelmann spruce trees in the Wet Mountains will continue to provide ideal habitat for expanding spruce beetle populations (Figure 6).

In northern Colorado, spruce beetle caused new tree mortality from the Rabbit Ears Range and east through the southern Medicine Bow Mountains and into northern Rocky Mountain National Park. Spruce beetle is found on 19,000 new acres and is active on 47,000 acres in Grand, Jackson, and Larimer Counties.

New acres are those of insect or disease activity not previously mapped during aerial detection survey.

Active acres indicate the entirety of an area of insect or disease activity including areas that may have been impacted in previous years.

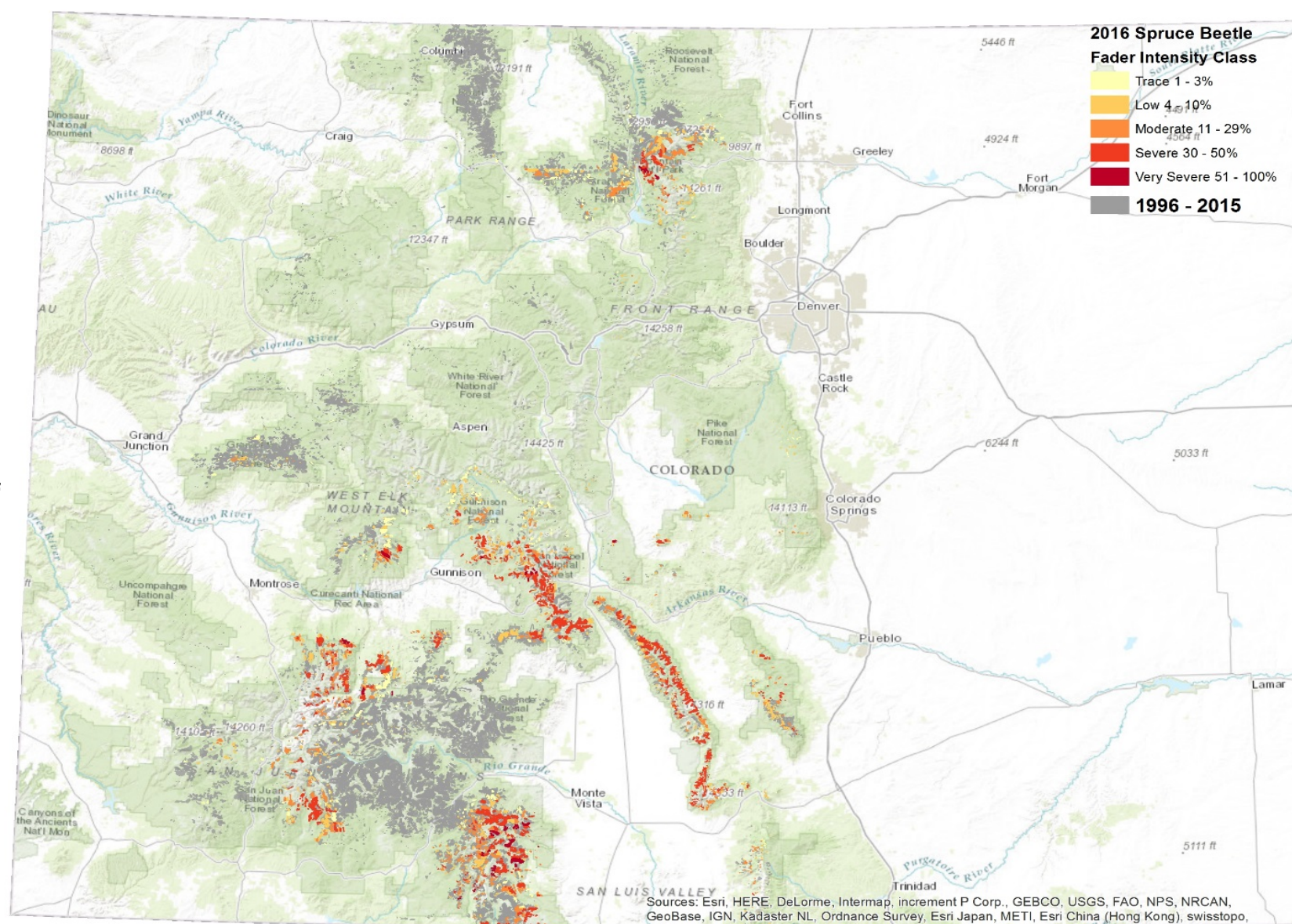


Figure 4. Aerial survey map of damaged spruce in Colorado

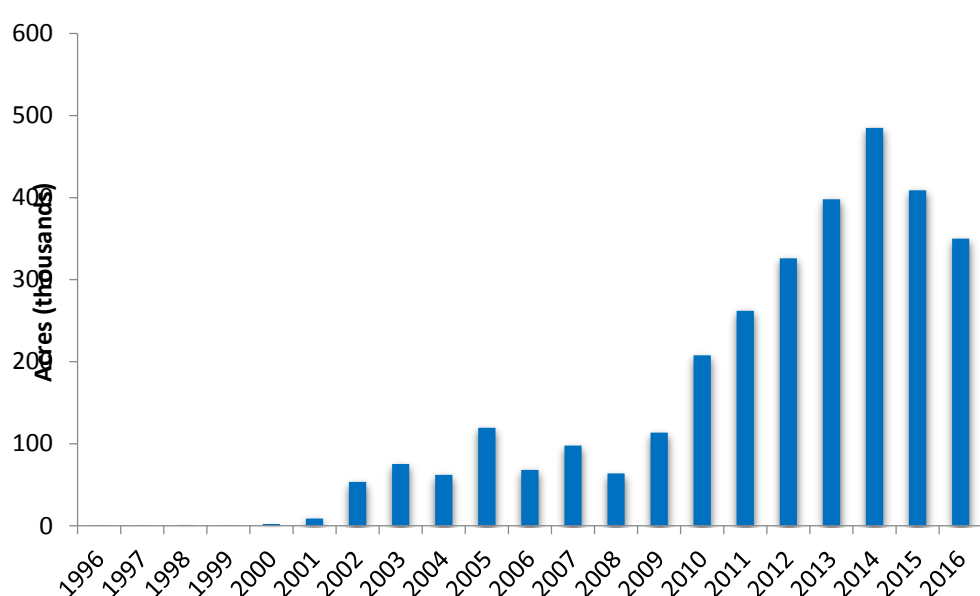


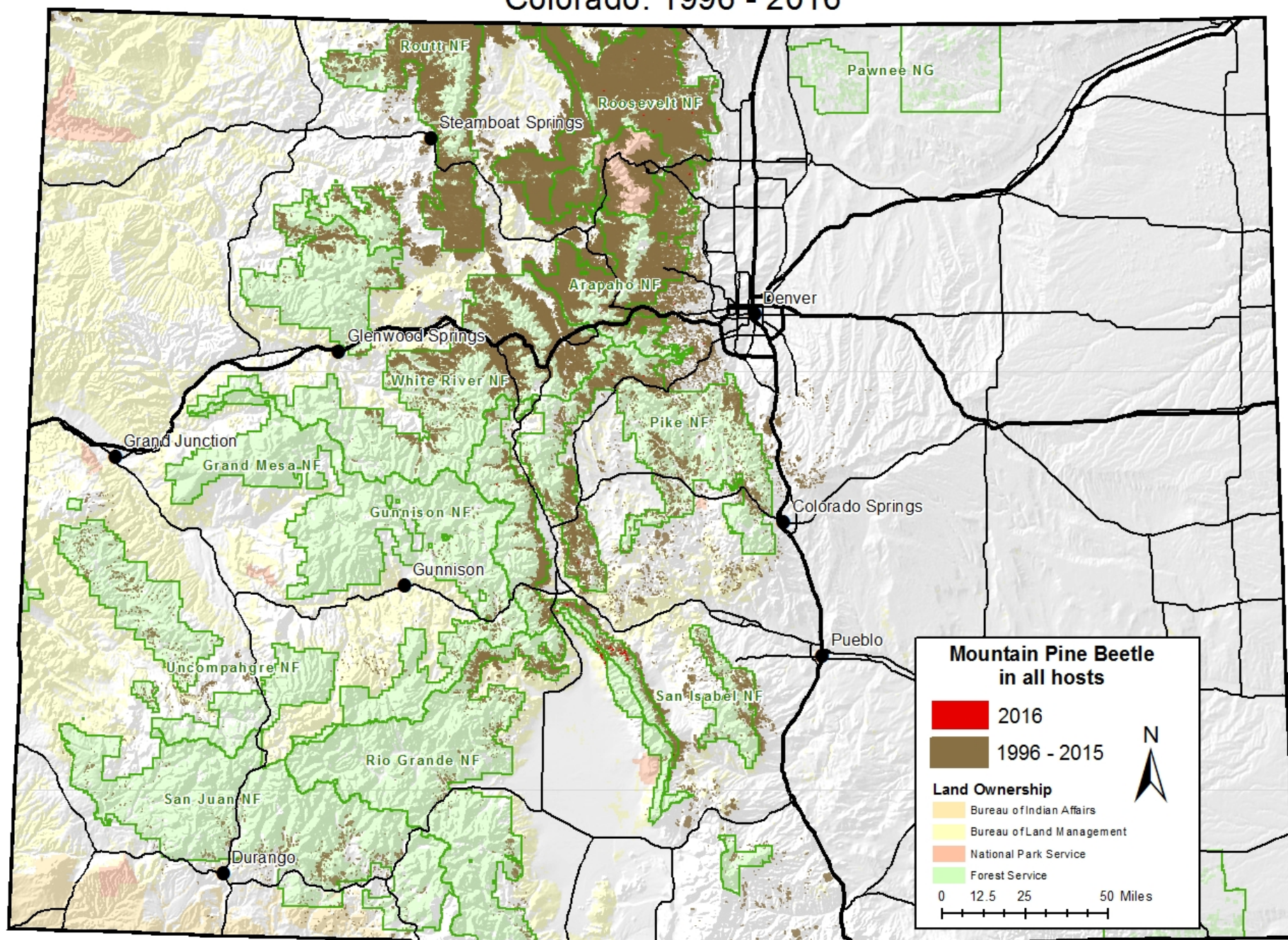
Figure 5. Bar chart of annual acres affected by spruce beetle in Colorado.



Figure 6. An October 2016 wind storm toppled spruce trees on 660 acres in the Wet Mountains creating potential habitat for spruce beetles. (Photo by Bob Cain.)



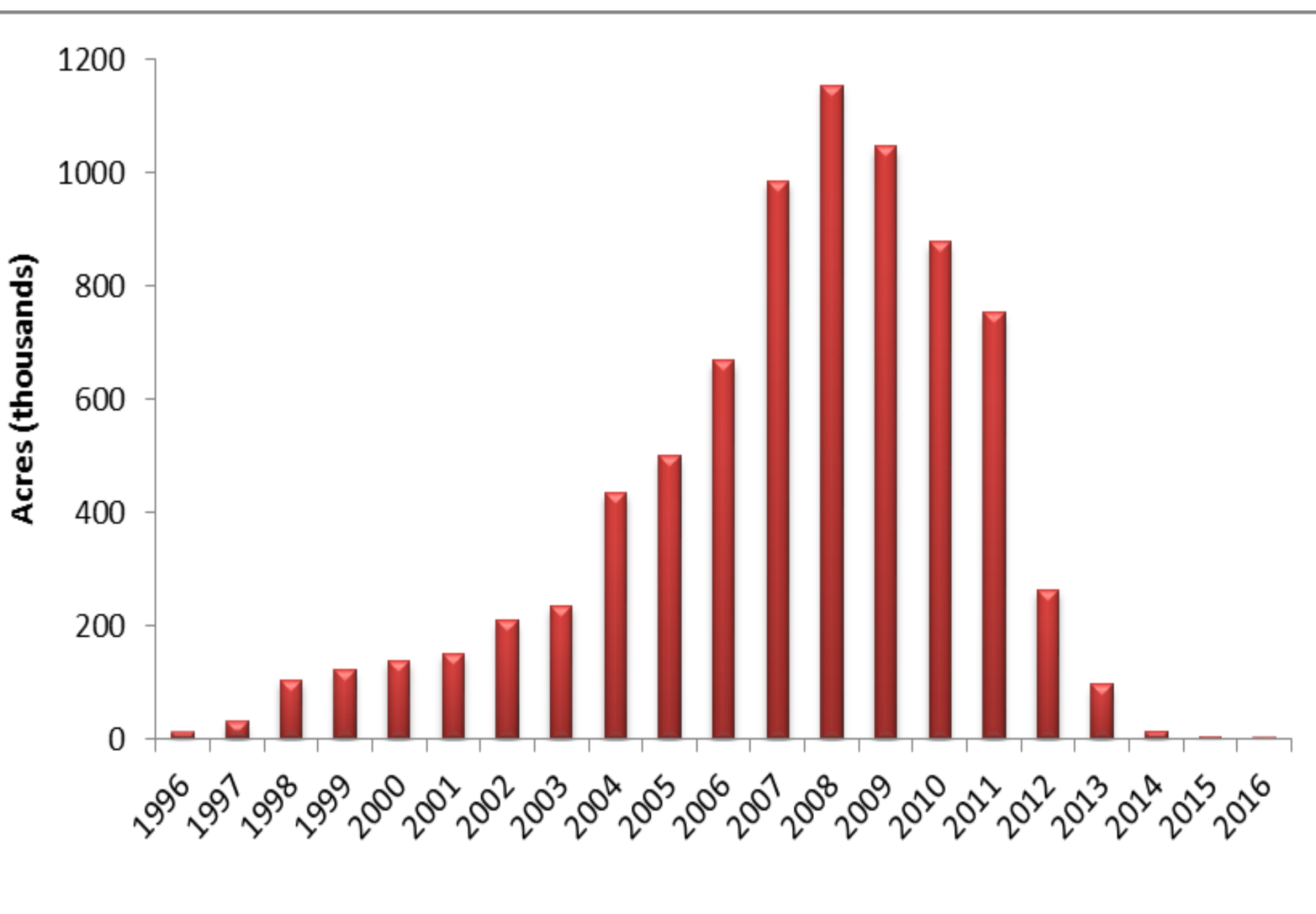
**Figure 7 A 2016 aerial survey map of Colorado showing mountain pine beetle activity in Colorado from 1996 to 2016.**



**Mountain Pine Beetle**

The mountain pine beetle epidemic in the early 2000’s has ended in Colorado (Figures 7 & 8). Larger lodgepole pine trees have been depleted in the core outbreak areas, but smaller trees and new regeneration remain. Larger pines that were not infested are most abundant south and west of the main epidemic area (Figure 6). Mountain pine beetle affected about 3.4 million acres in Colorado since 1996.

The mountain pine beetle-affected area in Colorado did not expand in 2016. Less than 1,000 acres of mountain pine beetle activity was observed statewide.

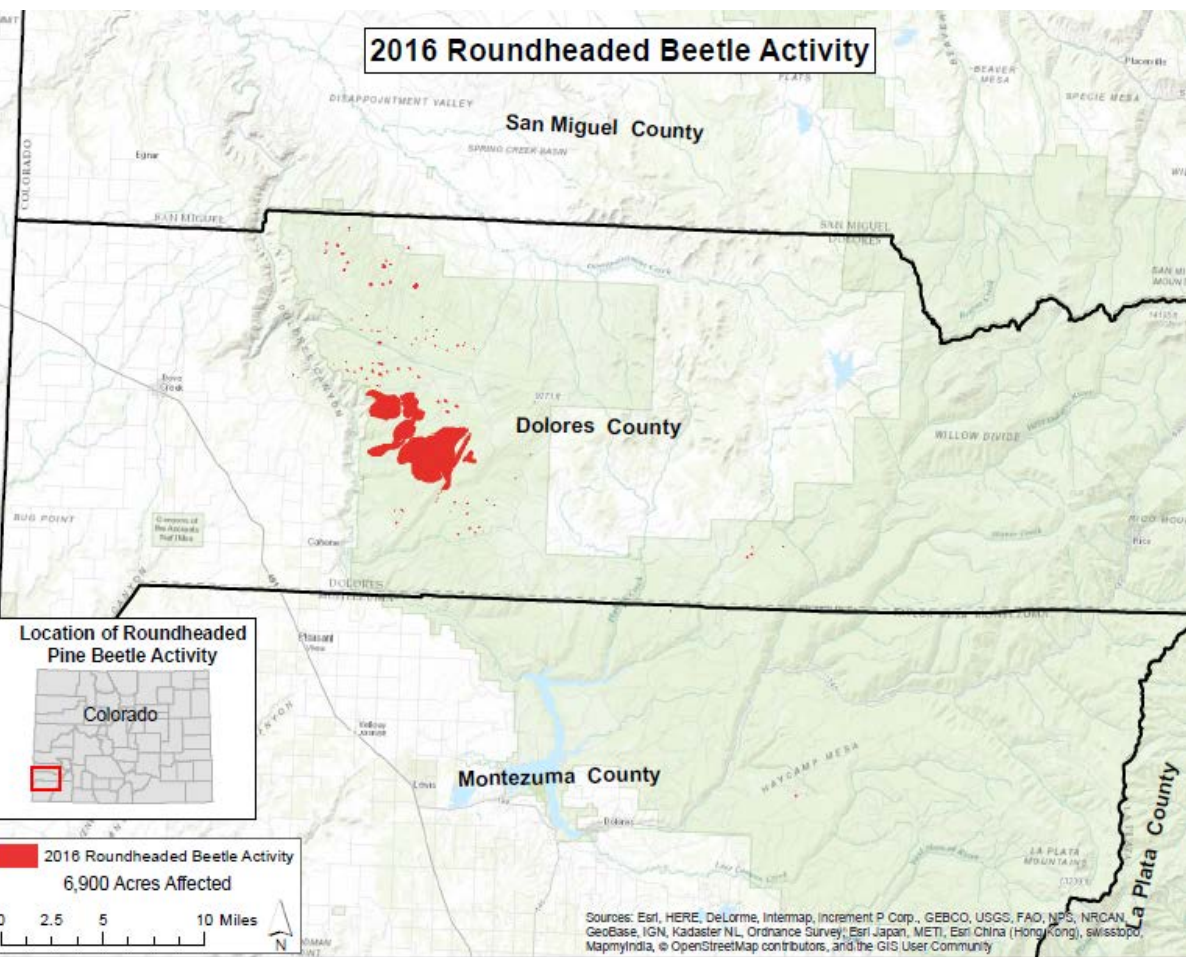


**Figure 8. Bar chart indicating the annual acres affected by mountain pine beetle in Colorado 1996-2016.**



## Roundheaded Pine Beetle

Roundheaded pine beetle has killed ponderosa pines in Dolores County for several years and affected nearly 7,000 acres in 2016 (Figure 9 & 10). In the state, this insect has only been reported from southwestern Colorado and epidemics tend to grow more slowly and are more localized than spruce beetle or mountain pine beetle. The persistence and expansion of this particular epidemic are notable.



**Figure 9.** Aerial survey map of roundheaded beetle activity in southwestern Colorado.



**Figure 10.** Ponderosa pines killed by roundheaded pine beetle in Dolores County. (Photo by Dan West)

## Defoliating Insects

Douglas-fir tussock moth populations collapsed from 26,000 acres in 2015 to only 30 acres detected in Douglas County in 2016. Natural enemies including a virus (NPV) contributed to population collapse. High value areas were treated (aerial spray) with *Bacillus thuringiensis* (BtK) outside of Colorado Springs on city property, private lands, and National Forest lands.

Localized areas defoliated in 2015 suffered significant tree mortality or top-kill depending on severity of defoliation (Figure 9). Other areas have recovered with minimal damage. Defoliation can increase susceptibility to other insects, such as Douglas-fir beetle.

**Figure 11.** Severely defoliated Douglas-firs in the Perry Park area. (Photo by Dan West.)



**Figure 12.** Western spruce budworm-larvae on Douglas-fir. (Photo by Brian Howell)

## Western Spruce Budworm

Western spruce budworm activity decreased in Colorado in 2016, but was locally abundant across the state. Aerial surveys detected 226,000 defoliated acres in the state in 2016 compared to 312,000 acres in 2015.

This insect feeds on the new needles of white fir, Douglas-fir and less notably on spruce and subalpine fir (Figure 10).

Activity was most notable on the White River, Pike-San Isabel, Gunnison, San Juan, and Rio Grande National Forests and adjoining lands.



**Emerald Ash Borer (EAB)** is one of the most destructive tree pest ever to be introduced into North America.

Infestations of this insect were first detected in Colorado in the City of Boulder, in September 2013. Approximately 15 percent of the trees in Colorado's urban and community forests are ash, making this insect a major threat to these forests statewide.

EAB was presumed to have infested the entire City of Boulder more than a year ago. Surveys in 2015 and 2016 in communities surrounding Boulder targeted ash trees exhibiting EAB symptoms, such as branch dieback and thinning crowns. A new detection in the City of Longmont was confirmed in 2016, as well as a detection in the community of Gunbarrel.

Approximately 15 percent of the trees in Colorado's urban and community forests are ash, making EAB a major threat to the forests statewide.



Figure 13. Adult emerald ash borer and associated feeding damage, Boulder County. (Photo: Dan West, CSFS)

[EAB report from the Report on the health of Colorado's forests.](#)

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