



# 2021 Forest Health Highlights: Colorado

Understanding forest disturbance is integral to forest management. Explore the insect disturbances recorded for Colorado

Colorado State Forest Service

## Aerial Detection Survey

A key part of forest management is the regular monitoring for damage caused by forest pests. In Colorado, the primary source of information on forest pest conditions is an annual Aerial Detection Forest Health Survey. This is a cooperative program led by the U.S. Forest Service (USFS) with Colorado State Forest Service (CSFS) participation. Trained aerial observers from both agencies typically fly over the majority of the state's approximate 24 million acres of native forests in small fixed-wing aircraft to map and classify the intensity of the current year's damage. When necessary, some areas flown also are ground-checked to verify the agent (i.e., insect) responsible for the damage and/or the severity of damage.

## Forested Acres Surveyed

The 2021 Aerial Detection Survey monitored approximately 29.2M acres (shown in pink) compared to 16.3M in 2020 (grey). \*Caution should be exercised when comparing acreages between 2020 and any other year, for reasons described below. Throughout this Storymap, comparisons were therefore conducted to pre-pandemic disturbance in 2019.

Due to COVID-19 pandemic safety protocols in 2020, trained aerial observers from both the CSFS and USFS flew over designated priority areas. Forested areas across Colorado were designated as having a "high", "moderate", or "low" likelihood of widespread, destructive forest disturbance (tree mortality). Areas identified as "high" priority were flown first, followed by "moderate" priority areas. As a result, fewer acres were surveyed in 2020.

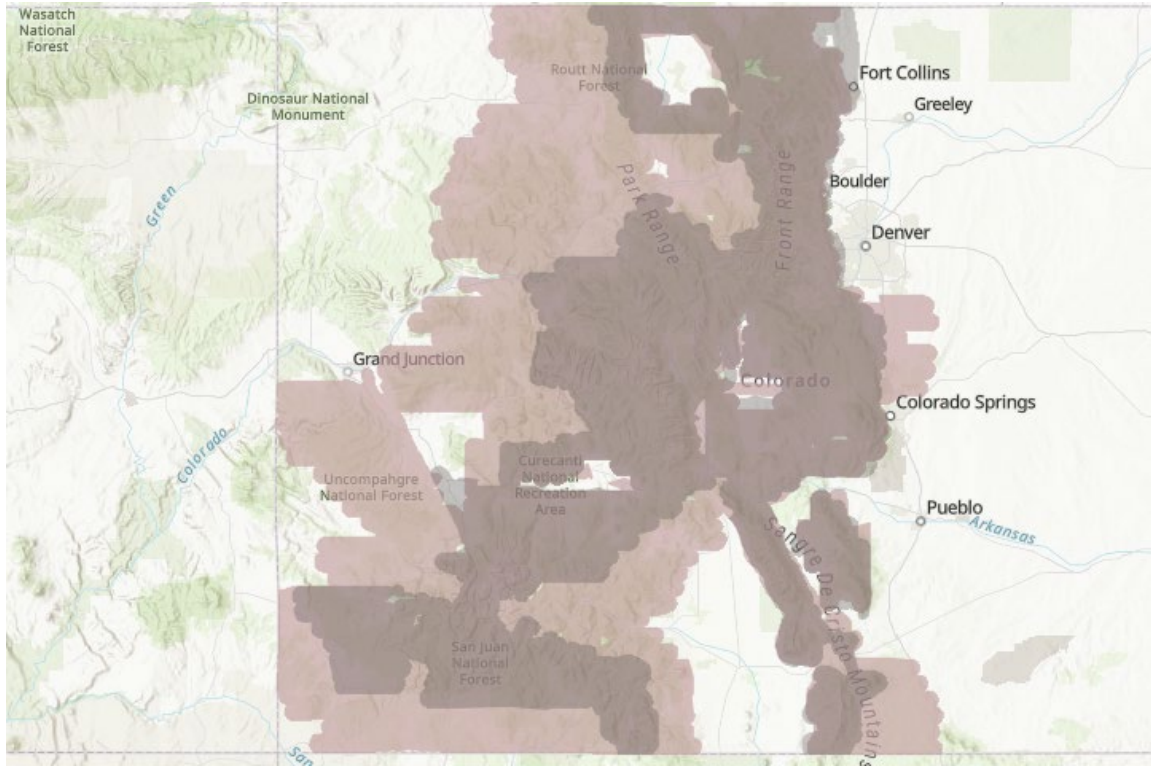


Figure 1. Areas flown in 2020 (grey) was 16M acres compared to 29M acres in 2021 (pink).

## Drought Conditions Persist

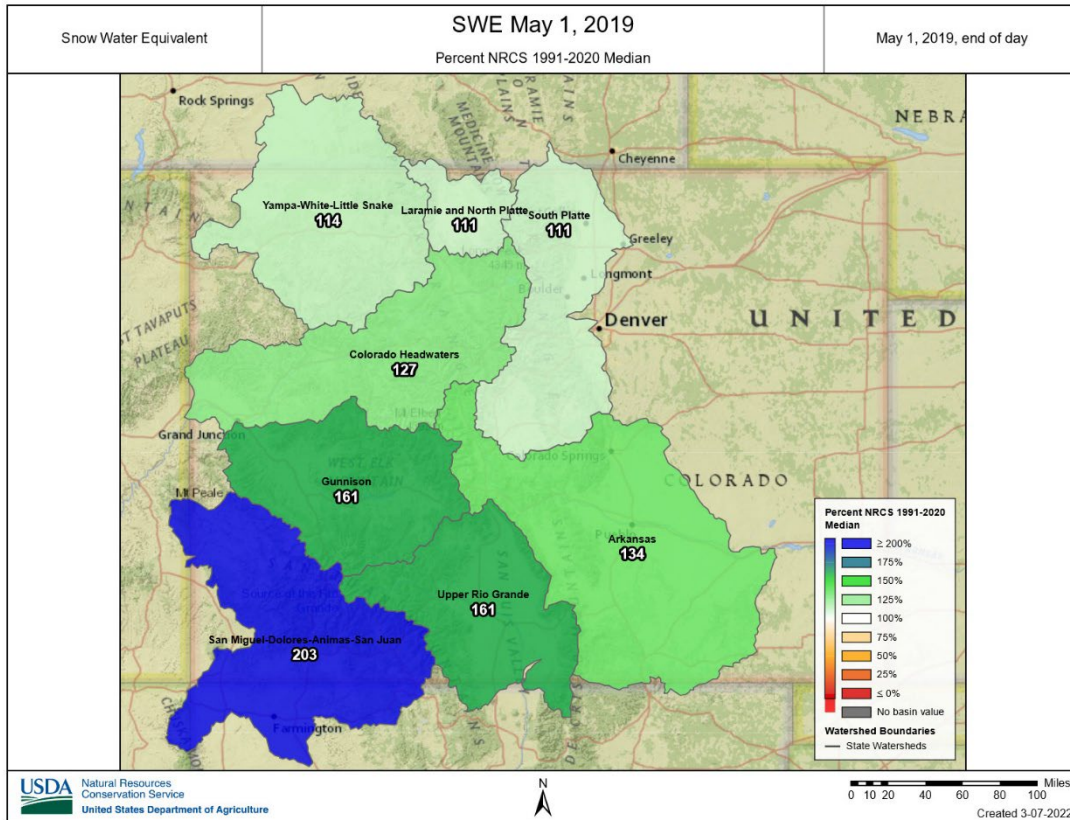


Figure 2. Snow pack at the end of the winter, 2019



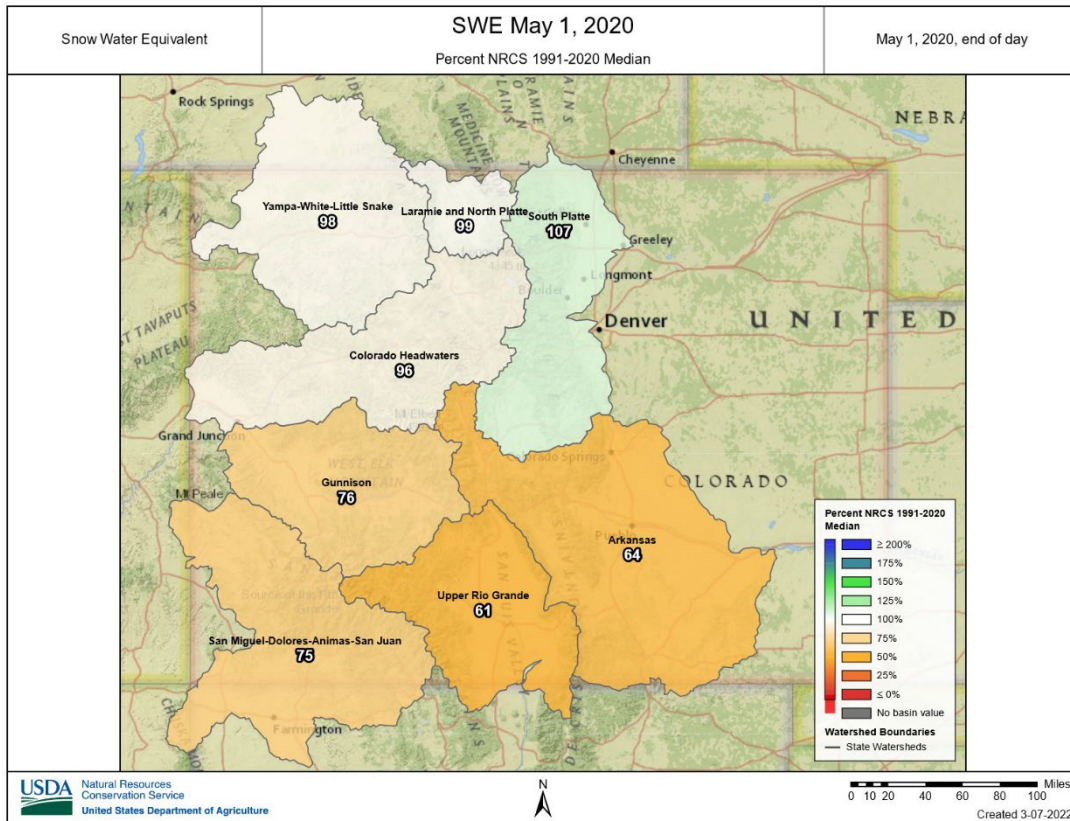


Figure 3. Snow pack at the end of the winter, 2020

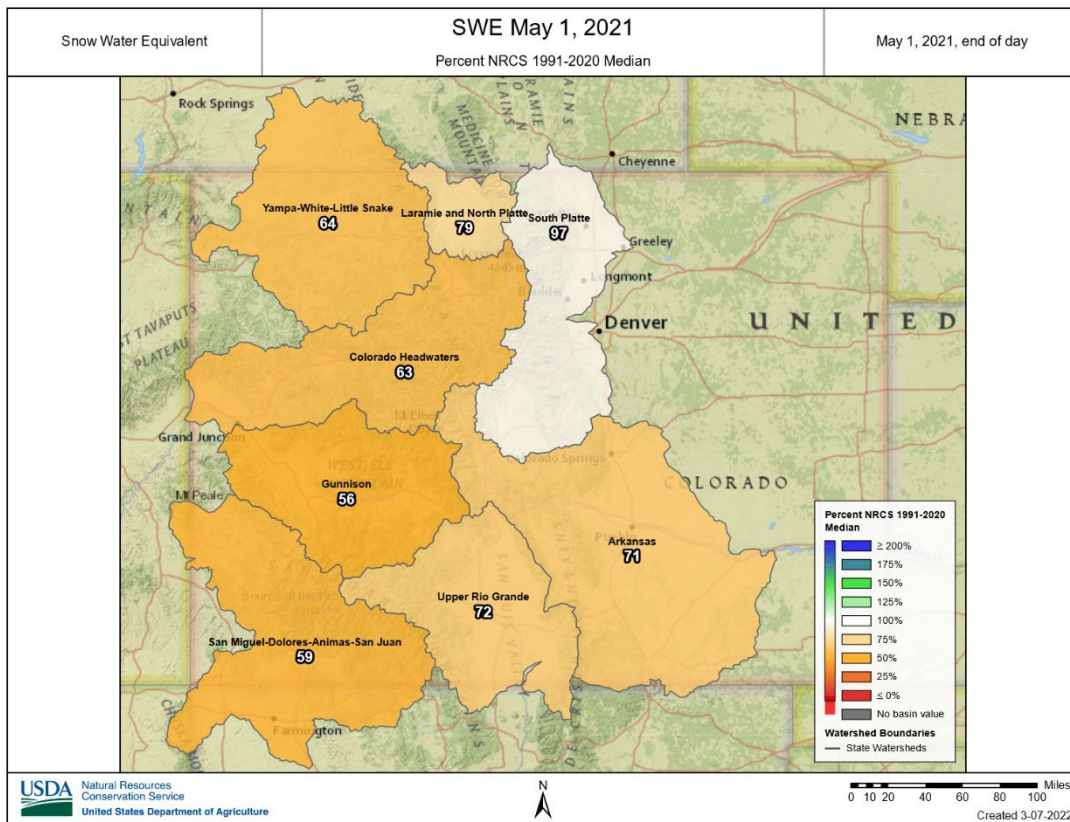
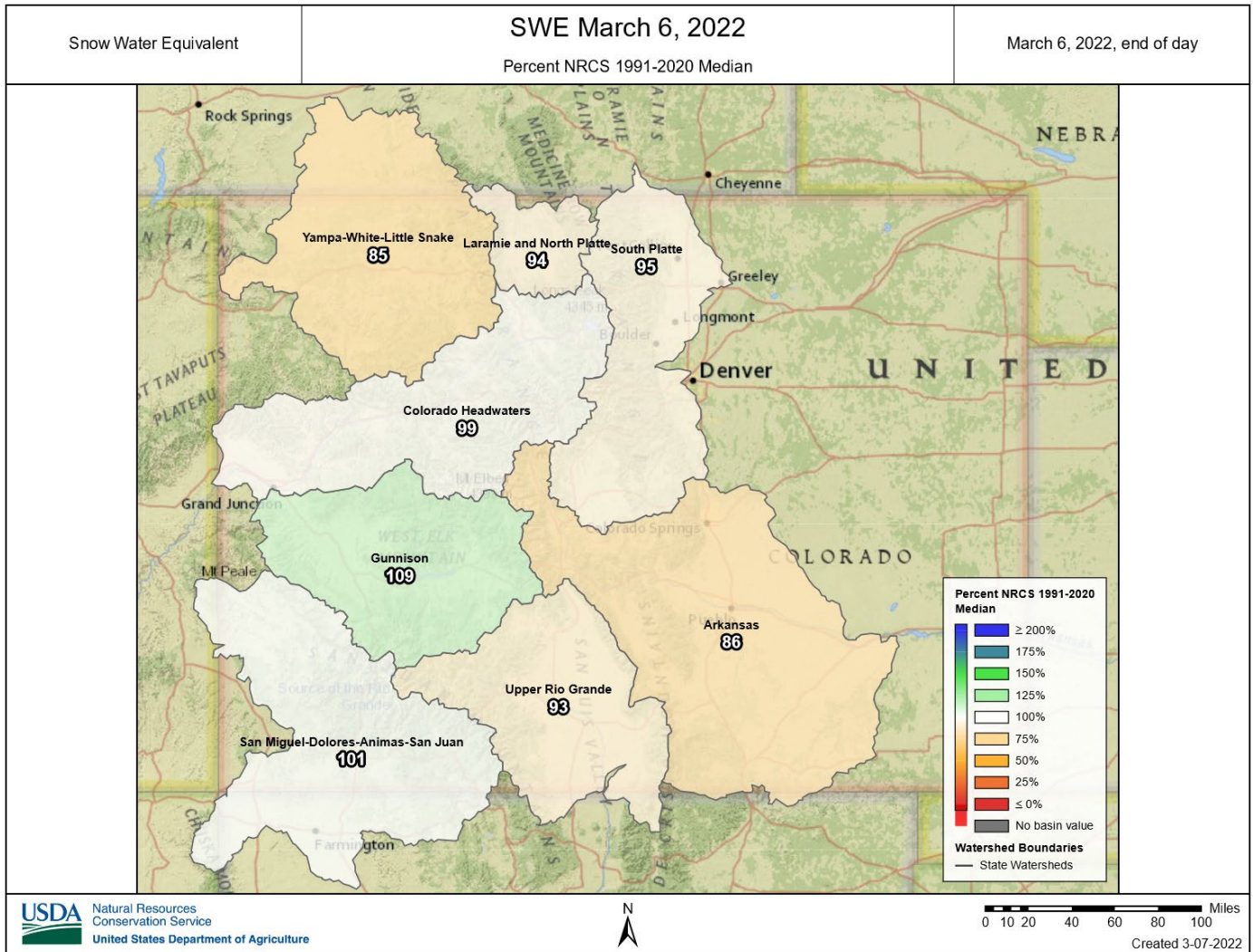


Figure 4. Snow pack at the end of the winter, 2021



*Figure 5. Current snow pack conditions - March 2022*

## Spruce Beetle

Acreage affected in 2021: 53,400

Spruce beetle continues to infest high-elevation Engelmann spruce throughout much of Colorado. Since 2000, this small, native bark beetle has affected at least 1.89 million cumulative acres of forest. Newly infested forests within eastern Gunnison and western Chaffee counties in the Collegiate Peaks continue to experience severe, intense infestations. Infestations straddling Park and Chaffee counties in the Mosquito Range have intensified. However, spruce beetle populations within and near Rocky Mountain National Park appear to have slowed intensity in 2021. Beetle outbreaks in the San Juan Mountains, in Dolores, La Plata, Ouray and San Juan counties continue to expand, though the intensity has slowed.



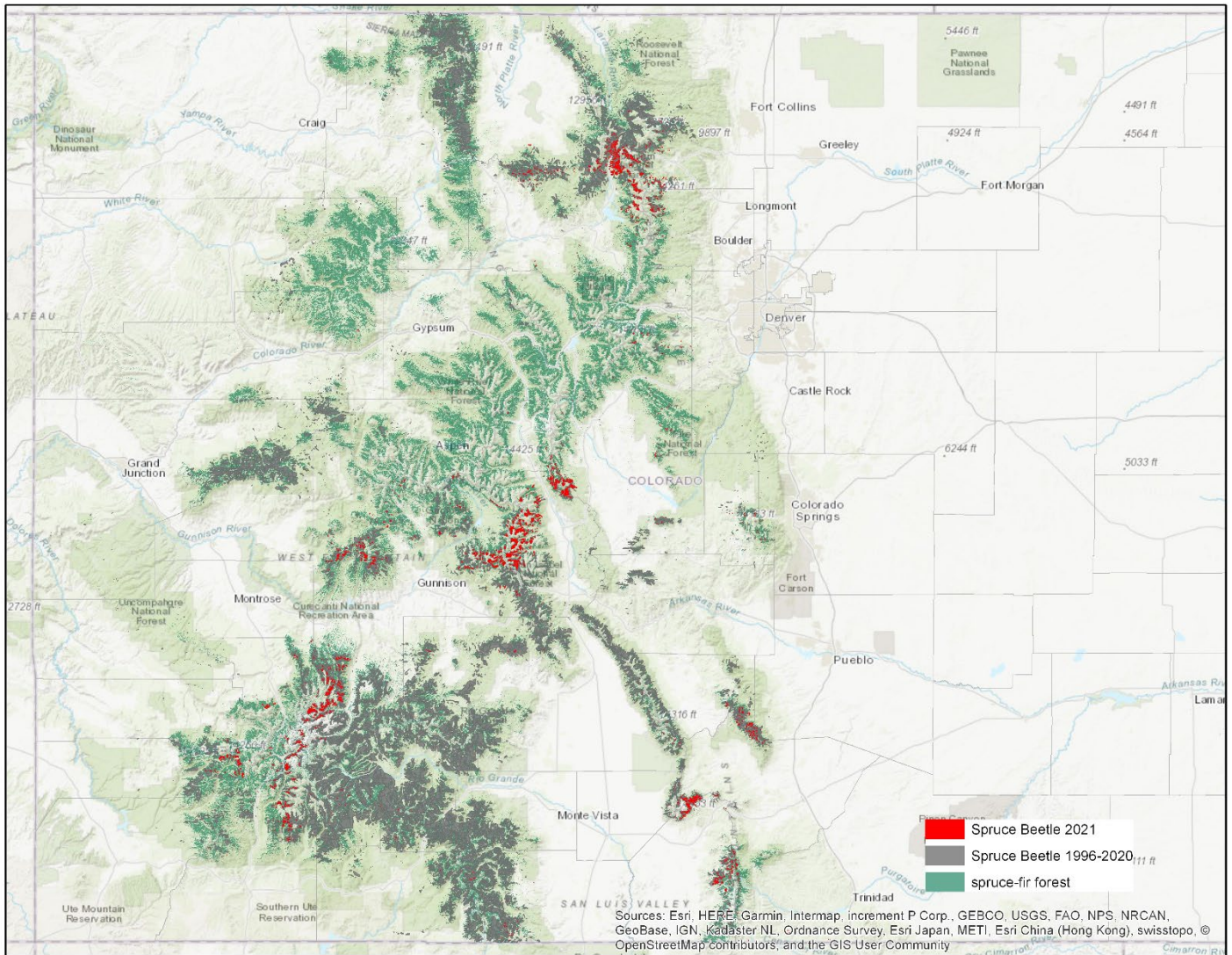
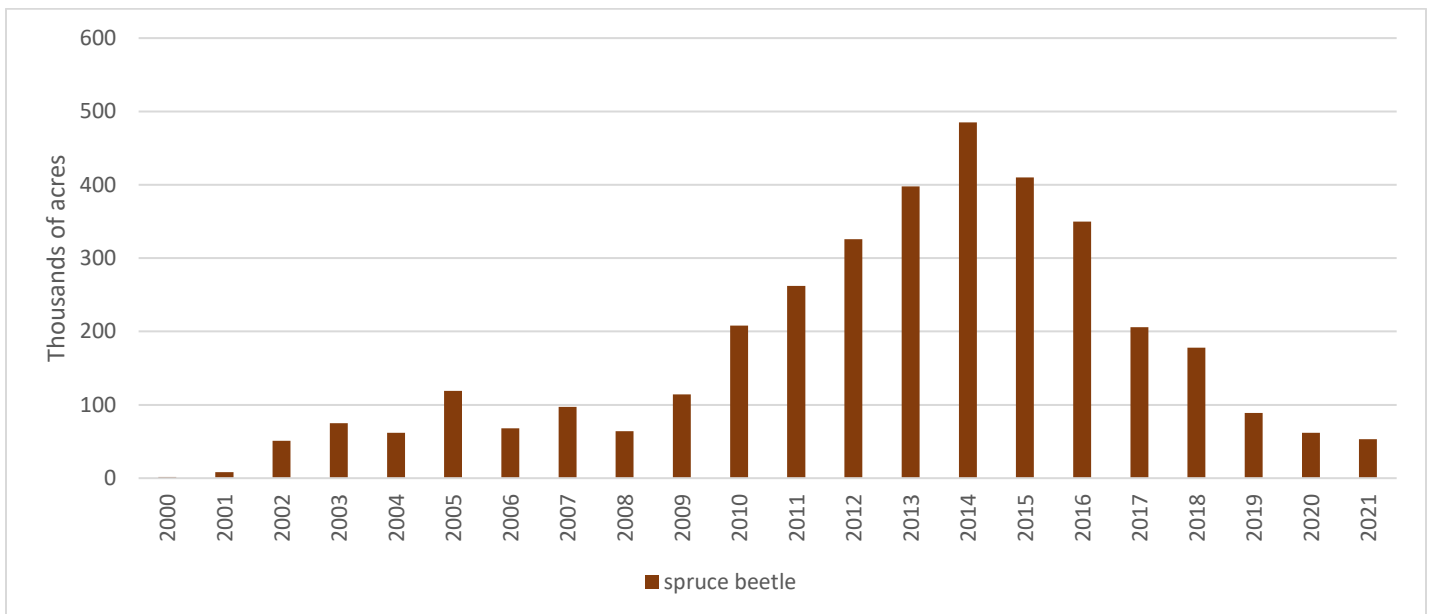
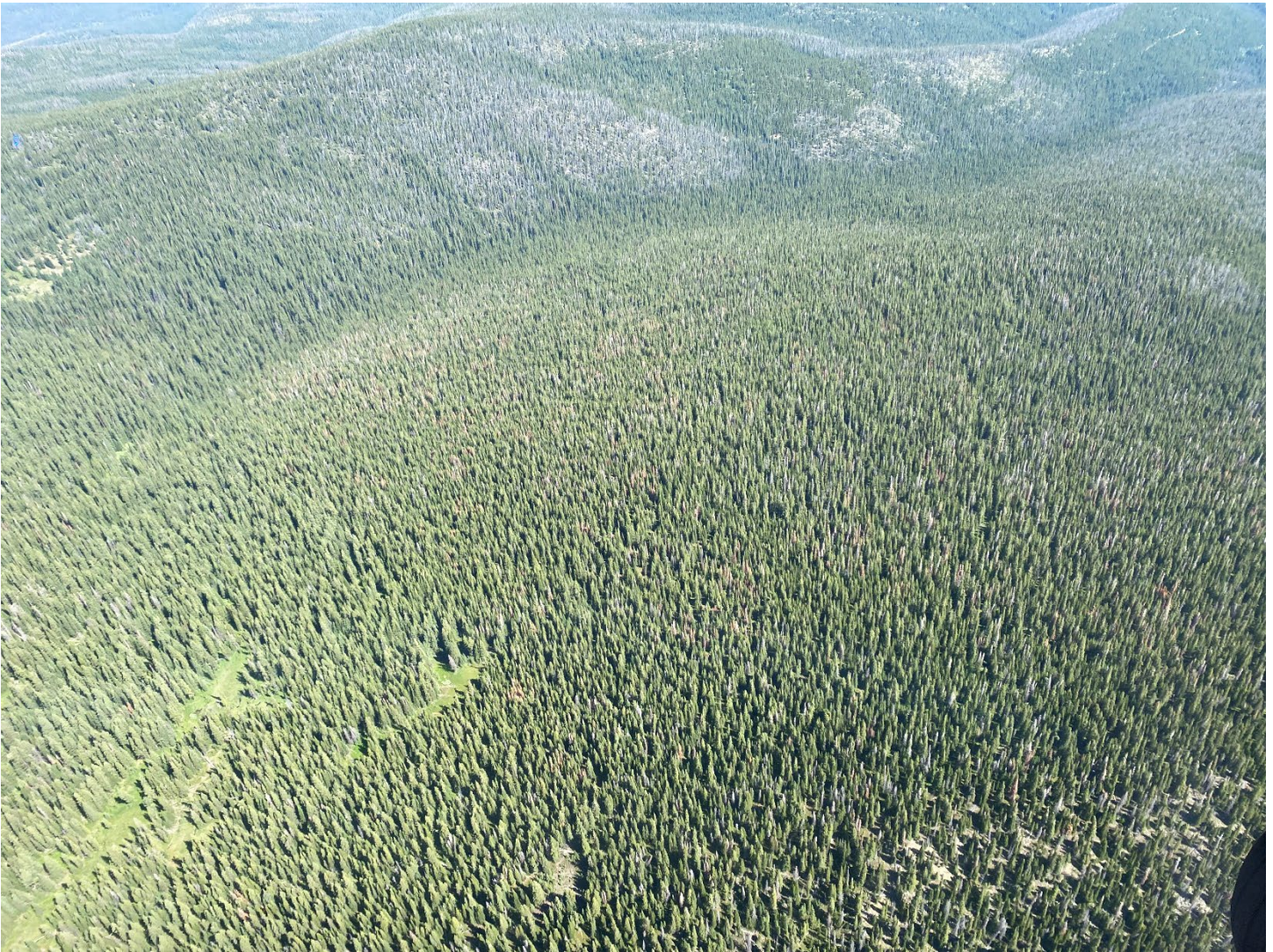


Figure 6. Current Spruce Beetle affected acreage with historic areas infested and high-elevation Engelmann spruce-fir forests.







*Figure 7. Spruce beetle-caused mortality amidst recent blowdown in Grand County.*

## **Douglas-fir Beetle**

Acreage affected in 2021: 8,000

Douglas-fir beetle continues to cause significant Douglas-fir tree mortality predominately in the central and southern forests of Colorado, having depleted many of the largest trees in these forests over the past decade. Eagle, Garfield, Gunnison, Mesa, Montrose, Pitkin and Saguache counties continue to see severely affected Douglas-fir stands.



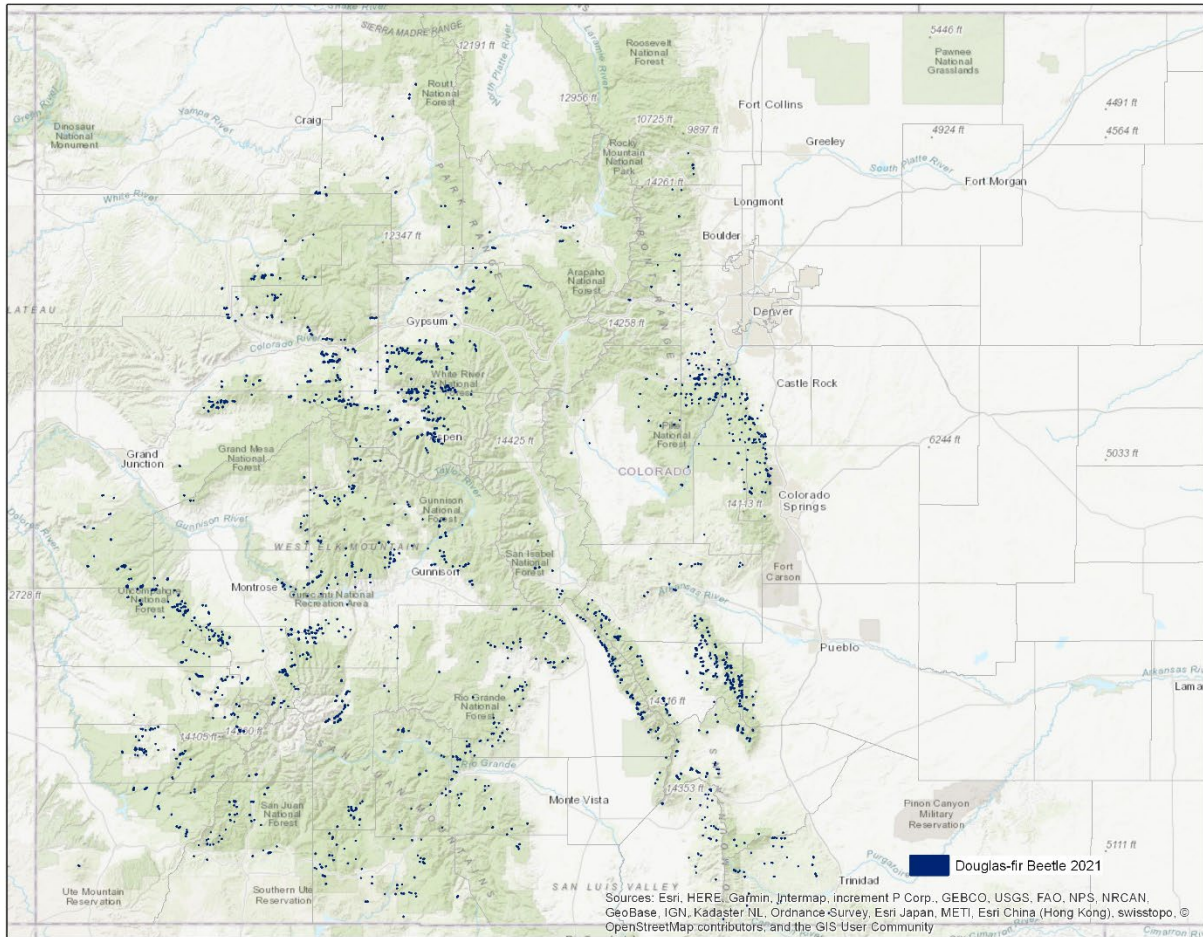


Figure 8. Douglas-fir beetle affected acres in Colorado



Figure 9. Groups of Douglas-fir Beetle-caused mortality from several recent years



# Roundheaded Pine Beetle and associated native bark beetles

Acreage affected in 2021: 7,300

Roundheaded pine bark beetle (*D. adjunctus*) and associated native bark beetles (western pine beetle, mountain pine beetle, Ips engraver beetles) continued to attack previously uninfested stands and groups of 5-10 trees within ponderosa pine forests in Dolores County. Intensity of beetle activity continues to remain high in localized areas of the San Juan National Forest. To the northeast of Dolores County, affected areas within San Miguel County, just to the south of Norwood, are seeing pockets of affected trees expanding from 2020, though incidence and intensity remains low.



*Figure 10. Roundheaded pine bark beetle-caused mortality in Dolores County in July, 2021.*



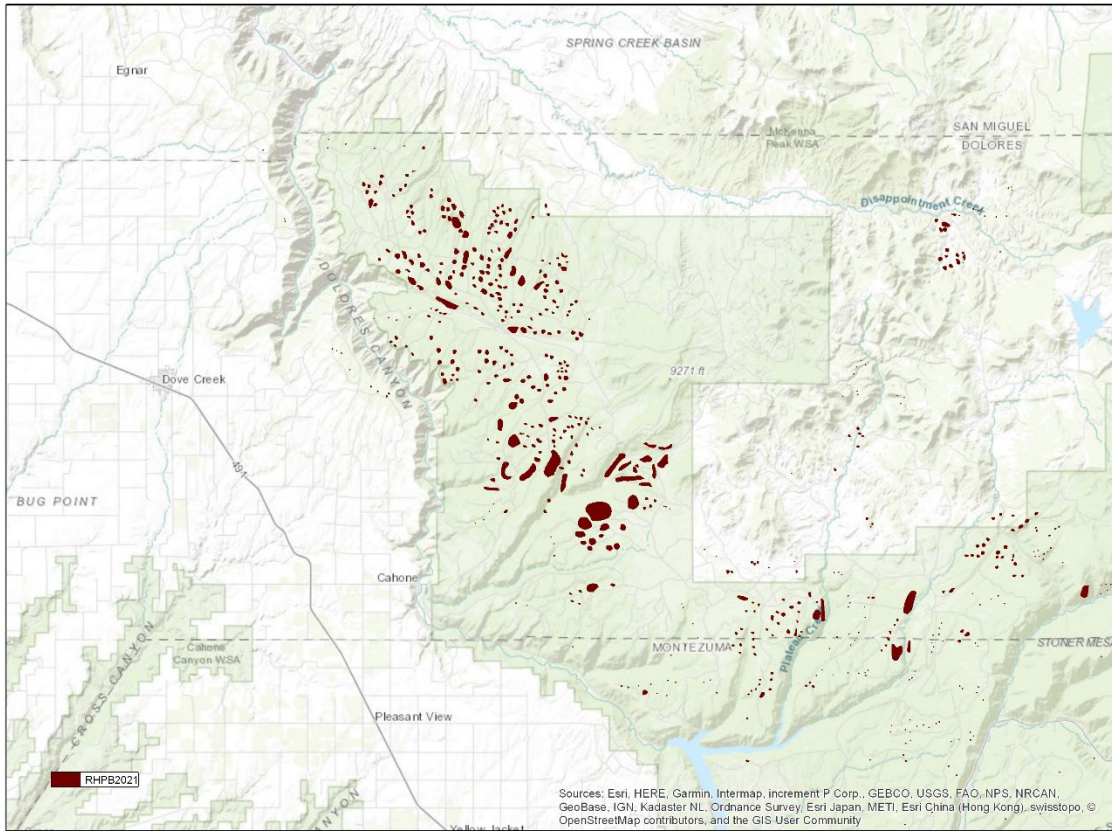


Figure 11. Roundheaded Pine Bark Beetle detected acreage in southwest corner of Colorado

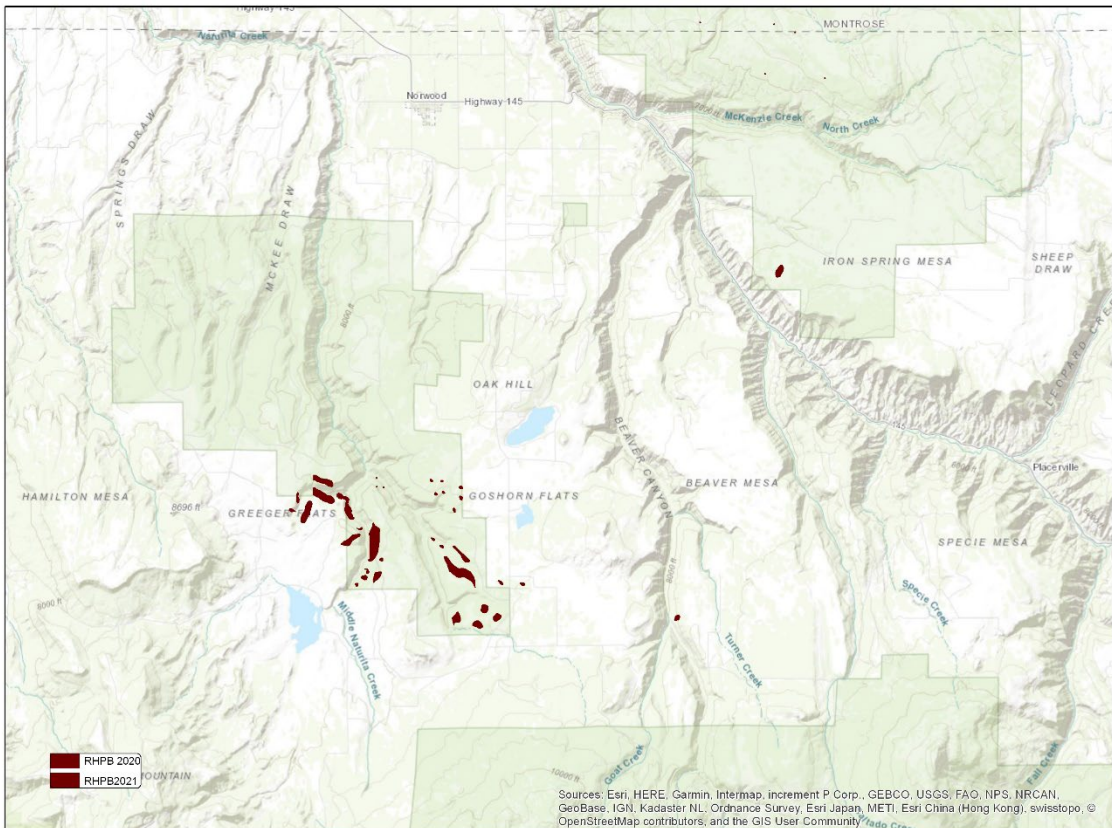


Figure 12. Bark beetles in ponderosa pine in San Miguel County detected from the Aerial Survey in 2021.



# Mountain Pine Beetle

Acreage affected in 2021: 1,500

## Mountain Pine Beetle in the heart of Colorado, yet again

Mountain pine beetle affected approximately 80% of the pine forests in Colorado from 1996-2014. Although not every tree was affected in every acre of pine forest, many of the largest, most susceptible ponderosa and lodgepole pines were depleted in this outbreak event. Mountain pine beetle is a native bark beetle that persists in weakened trees, particularly from drought in recent years. An outbreak started several years ago in mature lodgepole pine forests northeast of Gunnison, Co. These forests escaped infestation early in the 2000's, and are susceptible from the dearth of precipitation in recent years. The Taylor River drainage has been the focus of cross-boundary forest stewardship for three consecutive years in an attempt to reduce beetle impacts to residents.



*Figure 13. Mountain Pine Beetle-caused lodgepole pine mortality in Gunnison County. Wilder-Highlands Project area.*

Of note, approximately 200 acres of pine were noted in 2021 in the Mosquito Range, east of Buena Vista, Co. As below average precipitation persists, coupled with warmer temperatures, these beetle populations are expected to proliferate in the coming months.



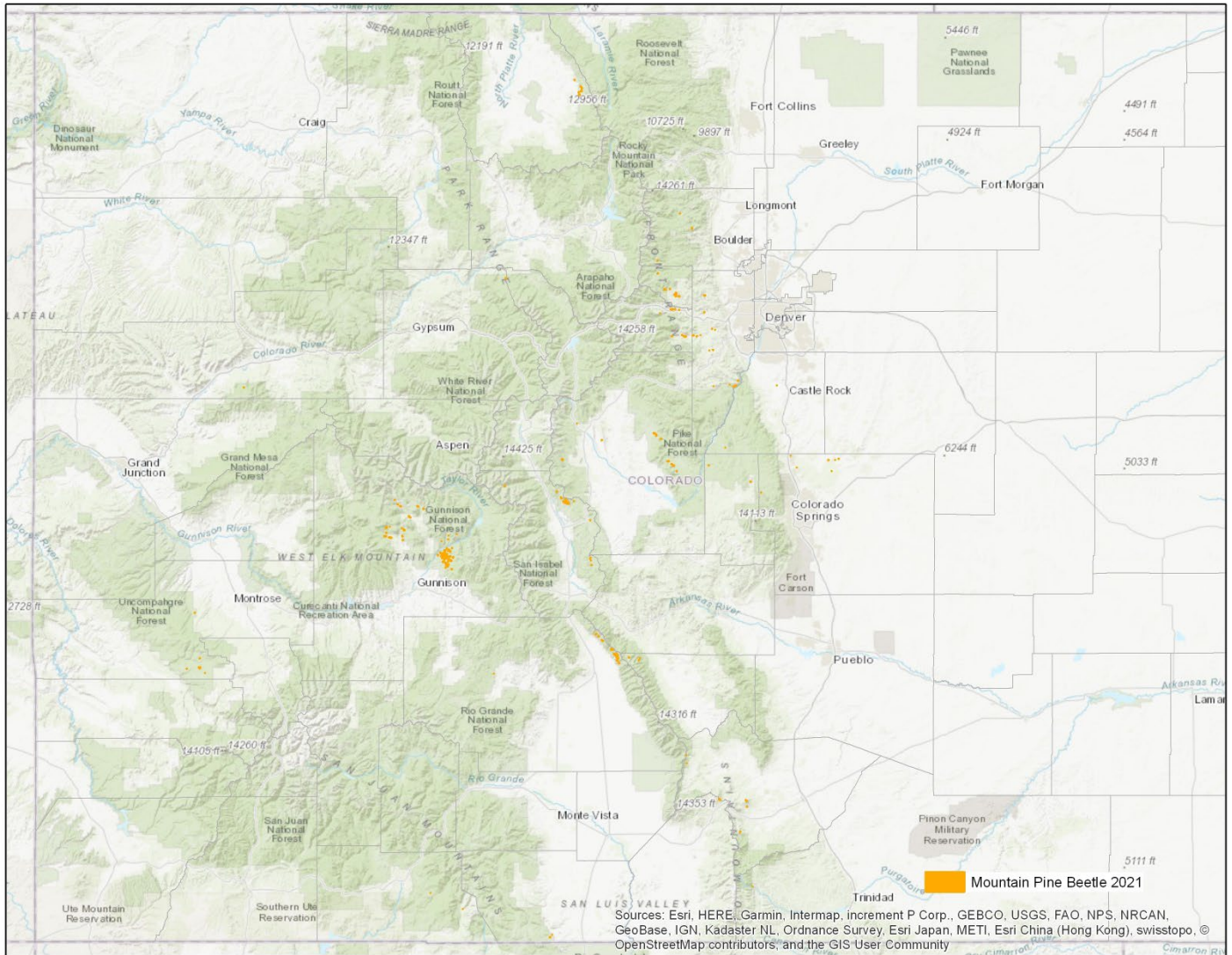


Figure 14. Mountain pine beetle-caused mortality detected from the aerial survey in 2021.

## Western Balsam Bark Beetle

Acreage affected in 2021: 28,400

Root disease and western balsam bark beetle historically occurred in forests of Colorado. These areas, along with drought-stressed forests comprising subalpine fir, are havens for populations of bark beetles. Populations of the beetles have grown in recent years due to water stress and warmer temps, and now infest otherwise healthy trees that have been predisposed by a lack of precipitation.



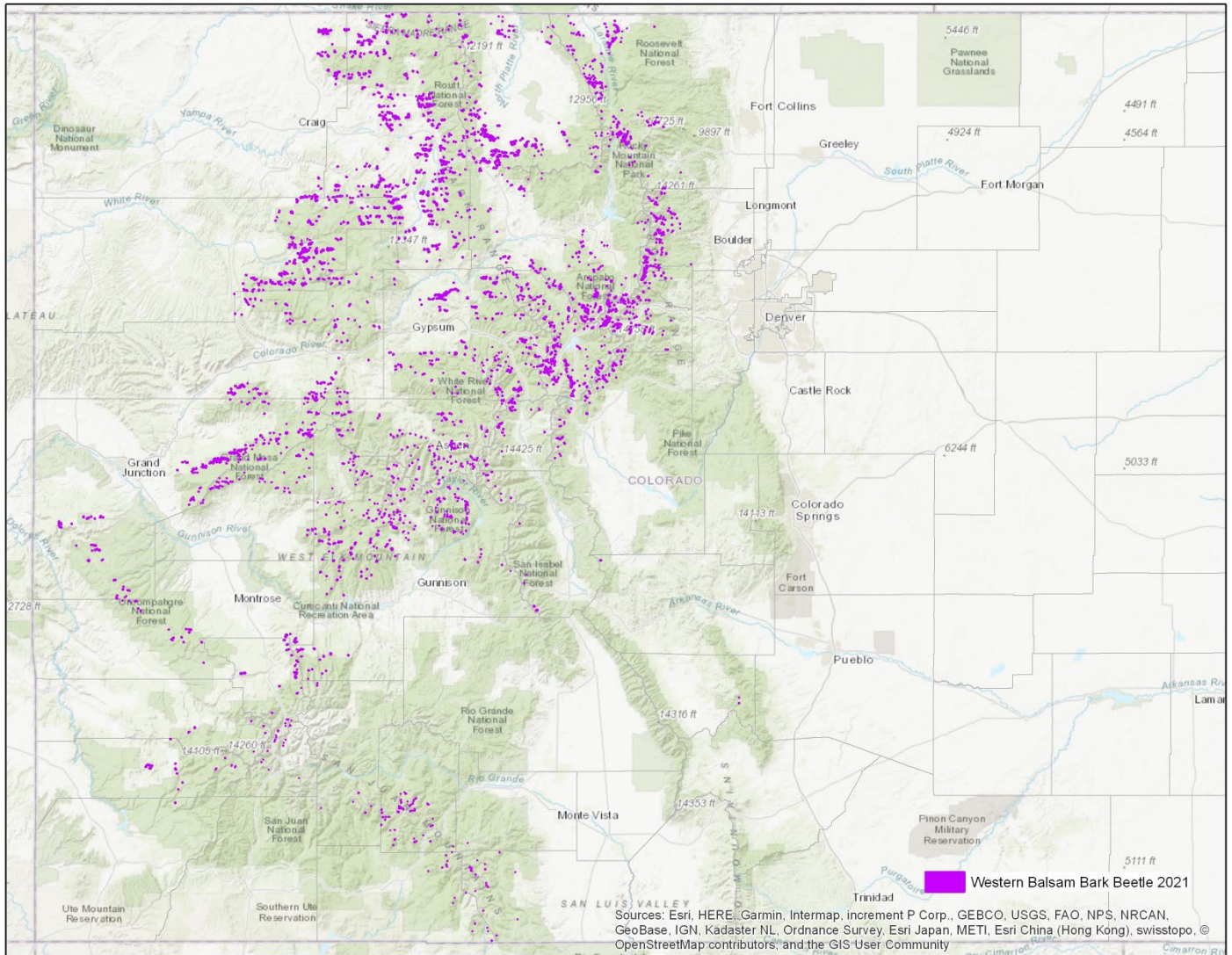


Figure 15. Western Balsam Bark Beetle-caused mortality detected in 2021 in Colorado.

## Piñon Ips and Juniper Mortality

Acreage affected in 2021: 17,600

Piñon Ips beetle is causing considerable die-off of piñon pines in parts of western and southeastern Colorado, spurred by persistent drought conditions. Populations of this native bark beetle are so high in some piñon-juniper forests, such as in the Glade Park and Gateway Canyon areas of Mesa county, that these forests are losing a significant number of their mature piñon trees.

The piñon Ips beetle also is spreading in the Cedaredge area of Delta County and around Rifle and Glenwood Springs in Garfield County. The Roaring Fork Valley has had substantial overstory mortality of mature piñon pines for the last five years. As these mature pines are depleted, and drought conditions persist, younger trees are suffering and becoming increasingly susceptible.



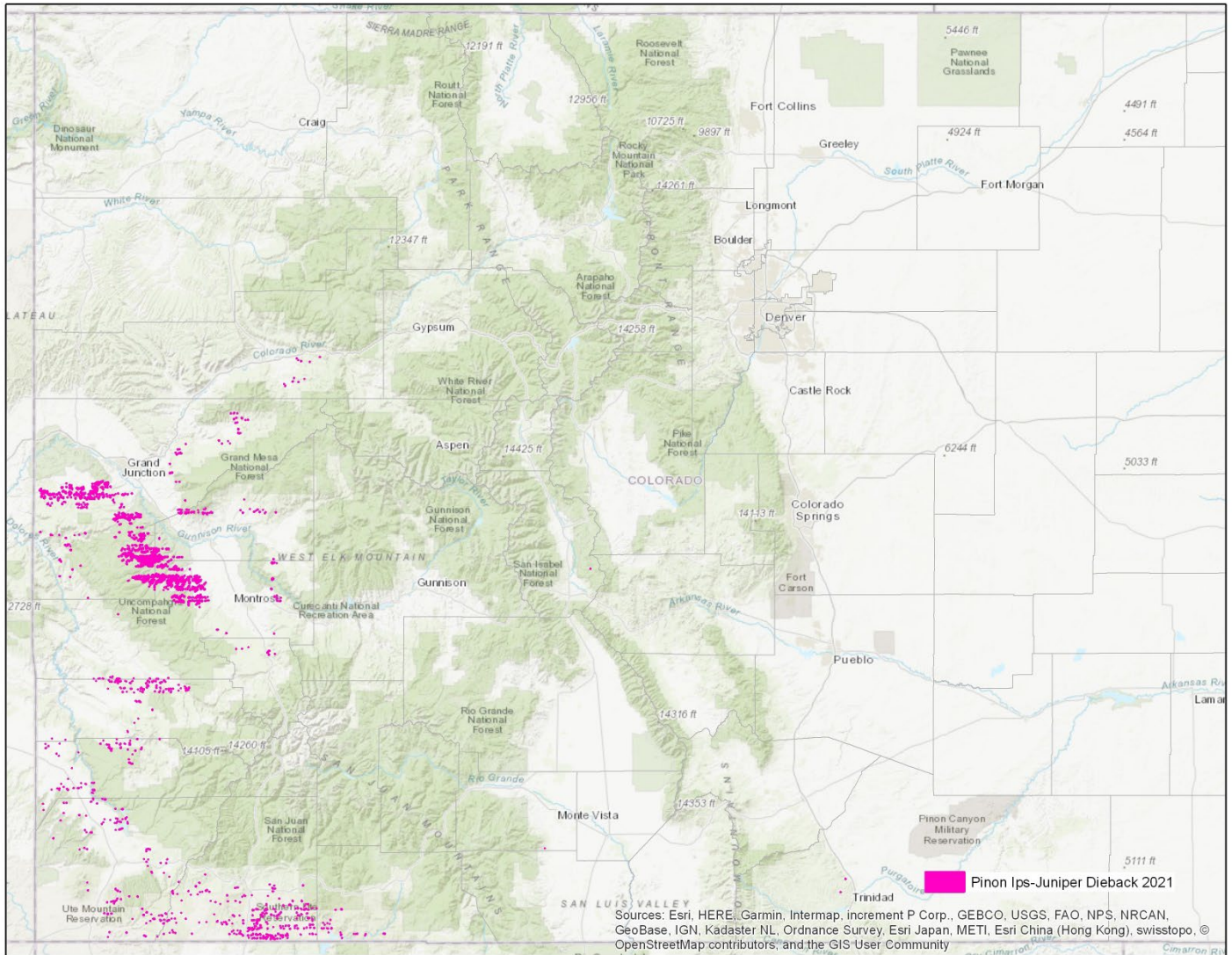


Figure 16. Piñon Ips beetle-caused mortality and Juniper dieback detected in 2021 in Colorado.

## Western Spruce Budworm

Acreage affected in 2021: 91,500

### Foliage feeding by the Western Spruce Budworm now causing tree death

The western spruce budworm is a native forest pest, primarily affecting Douglas-fir, true fir and Engelmann spruce trees. This defoliator is widespread throughout low-elevation mixed-conifer forests and spruce-fir forests in southern Colorado. A cooler, wet May in 2021 seems to have muted its activity last year, but forest conditions have not changed appreciably and consecutive years of budworm defoliation continue to leave drought-stressed trees susceptible to attack by Douglas-fir and other bark beetles. This insect is causing significant damage and tree death to forests in the Mosquito Range, West Elk mountains, much of Gunnison and Saguache counties, and the Sawatch Range.





Figure 17. Multiple years of caterpillar feeding has caused tree mortality and tree health decline throughout much of southern Colorado. Infested stands near the Buffalo Peaks show Douglas-fir trees affected by the pest.

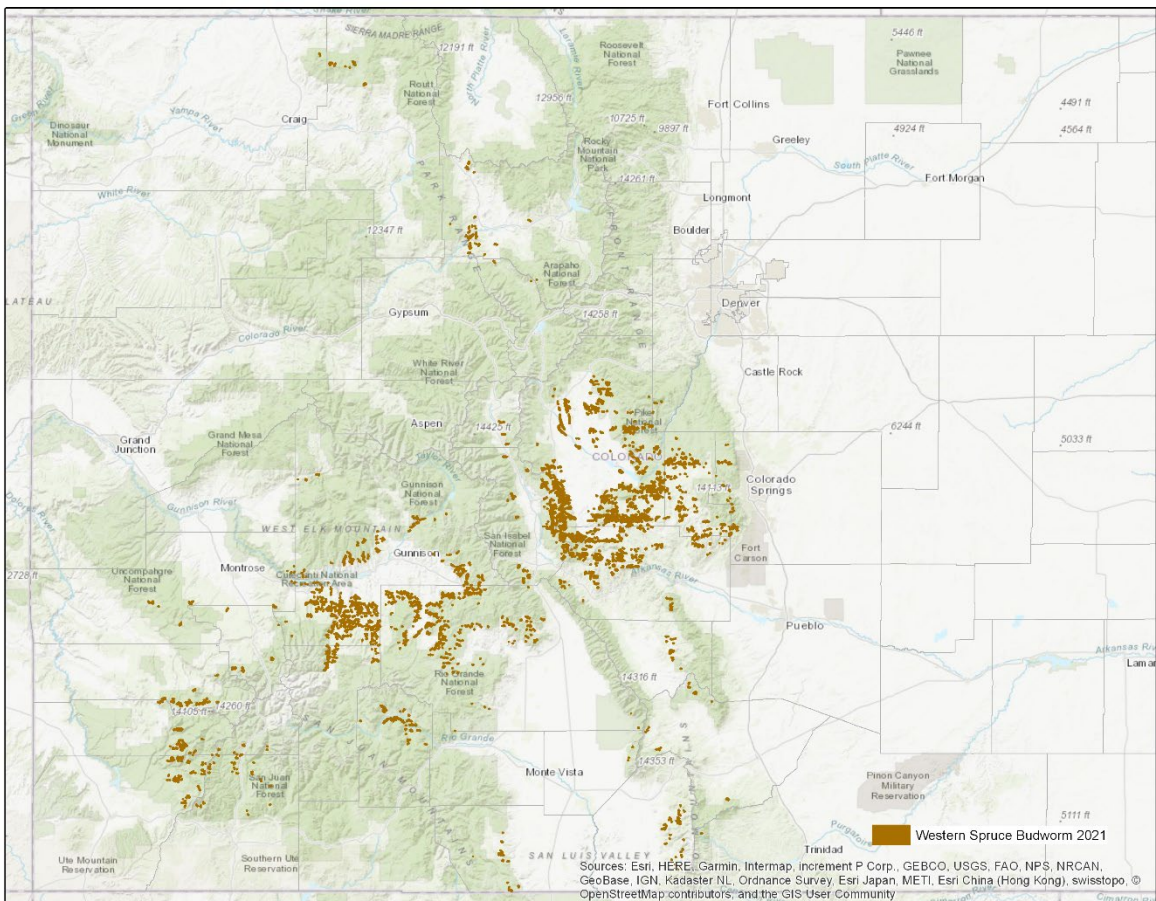


Figure 18. Western Spruce Budworm caused defoliation in Douglas-fir trees in Park County.



# Aspen Issues

Acreage affected in 2021: 19,000



*Figure 19. Aspen trees not fully leafed out on July 30, 2021 from environmental factors of drought and temperature fluctuations. Routt County, Co.*

**Caterpillars and fungi predominately affect the foliage affect aspens. Drought conditions persist.**

With severe and extreme drought conditions across much of the state, fungal issues in aspen stands were minimal. Aspen stands in Routt County had discolored and stunted growth, as a result of drought conditions.



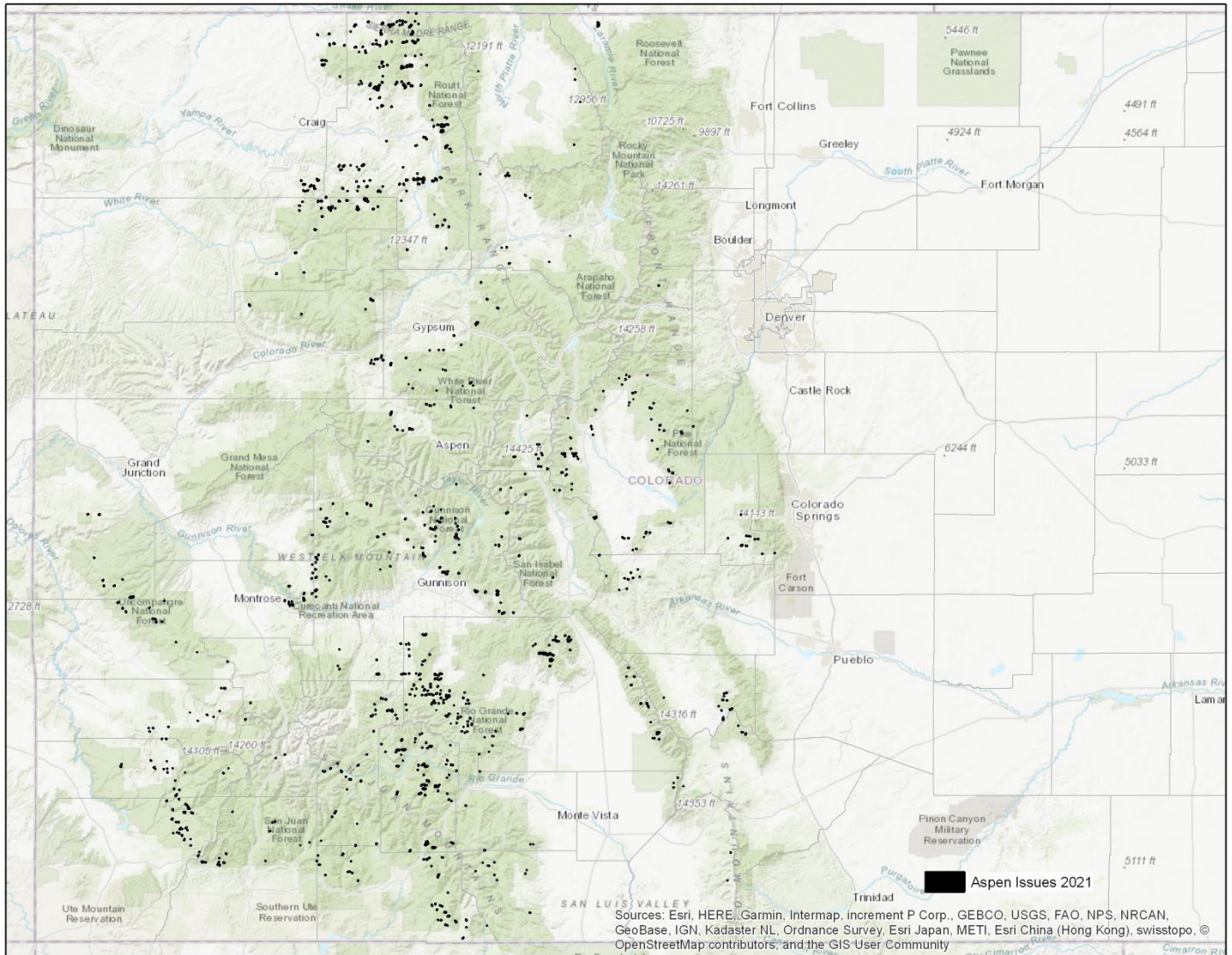


Figure 20. Aspen related issues detected in 2021 in Colorado.

For more information, contact your local Colorado State Forest Service field office, or contact Dan West.

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