New Mexico Forest Health Conditions

2024

NEW MEXICO FORESTRY DIVISION

GREAT SEAL OF THE STATE OF NEW MEXICO · 1912 ·

NEW MEXICO

emnrd

Energy, Minerals and Natural Resources Department

CONTENTS

Acknowledgement: Funding for this publication is supported by the USDA – Forest Service. Cover Photo: Crystal Tischler, USFS

2024 FOREST HEALTH SUMMARY

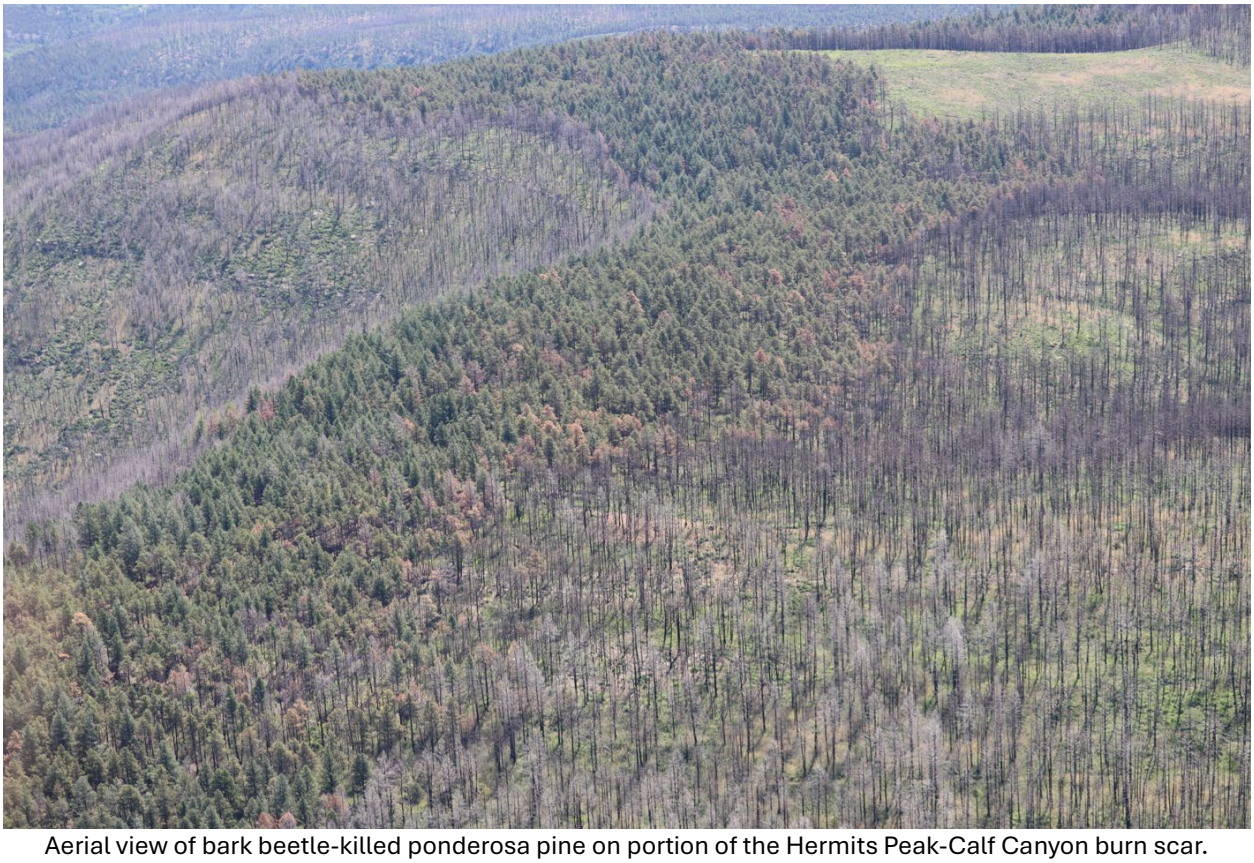
The New Mexico Forestry Division cooperates with the United States Department of Agriculture, Forest Service, Forest Health Protection, New Mexico Zone to conduct aerial surveys to map insect and disease activity across state, private, Tribal, and federal forests and woodlands. The total number of forest and woodlands mapped in 2024 with damage from insects, disease and abiotic conditions was 406,000 acres on all landownership types in New Mexico, an *increase* of 42,000 acres or 12% since 2023. There was an *increase* of 27,000 acres mapped with damage to state and privately-owned forests and woodlands compared to 2023 levels. Mortality to conifer trees by all species of bark beetles more than *doubled* in 2024 when 70,000 acres were mapped with mortality, compared to 33,000 acres mapped with mortality in 2023. There was significant mortality mapped in and around burn scars from 2022 wildfires in forests and woodlands that impacted the number of acres with bark beetle mortality. Statewide defoliation *increased* by 93,000 acres or 39% from 2023 where 235,000 acres experienced defoliation, compared to the 327,000 acres mapped with defoliation in 2024. Caterpillars of the Douglas-fir tussock moth defoliated 18,000 acres of mixed conifer forests, a significant *increase* from the 2,600 acres defoliated in 2023. Piñon needle scale defoliated 16,000 acres in 2024. Piñon pine mortality *decreased* by 56% on all landownership types in 2024. Forest and woodland acres impacted by drought and heat *decreased* by 65% statewide.

2024 FOREST HEALTH CONDITIONS AT A GLANCE

Acres with Bark Beetle-Killed Trees	**Climate**	**Acres with Defoliation**
State and Private Lands 14,000	Mean Temperature 56.3 °F	State and Private Lands 106,000
National forest Lands 53,000	Mean Precipitation 12.85”	National Forest Lands 218,000
Tribal Lands 3,000		Tribal Lands 9,000

AERIAL DETECTION SURVEY

The New Mexico Forestry Division's Forest Health Program Coordinator works with the Unites States Forest Service's, Forest Health Protection Zone personnel to survey New Mexico's forests and woodlands. Approximately 14 million acres of forests and woodlands were surveyed in 2024 by Aerial Detection Survey (ADS) methods. Most of the information and data in this report were collected through ADS flights over forests and woodlands. In addition to ADS, ground surveys are conducted to determine unknown conditions mapped by aerial observations. Annual ADS flight lines are similar, allowing for consistent areas to be surveyed and evaluated for trends in forest health conditions. The information in this report is not a complete picture of forest health because not every acre of forest and woodland in New Mexico is surveyed, especially on state and private lands.



Aerial view of bark beetle-killed ponderosa pine on portion of the Hermits Peak-Calf Canyon burn scar.

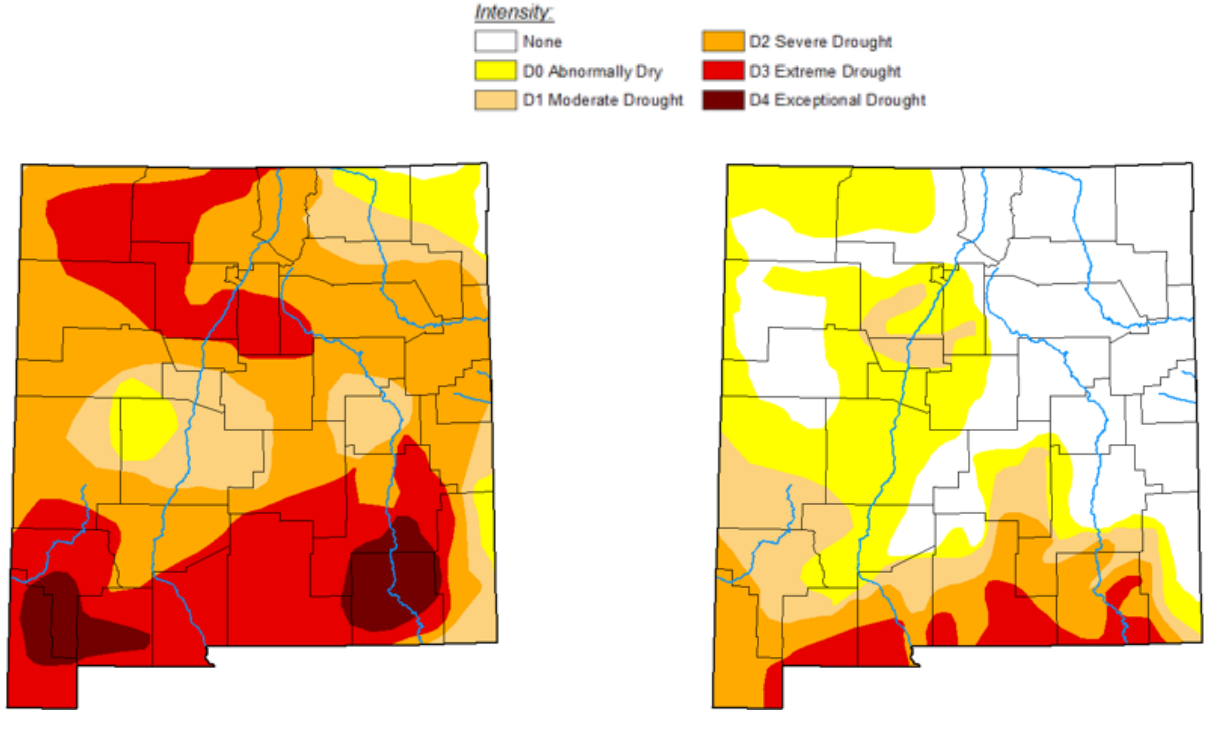
INTERACTIVE MAP

Quickly access, search, and query the 2024 New Mexico aerial survey data map by clicking here

https://nm-emnrd.maps.arcgis.com/apps/dashboards/2f247884241f40038bdb8000139f0b10

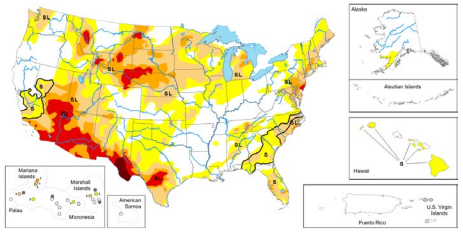
DROUGHT AND WARMING

Drought conditions in New Mexico improved during 2024. For example, 99% of the state was abnormally dry (D0 drought category) and 38% of the state's area was experiencing extreme drought (D3-D4 category) at the beginning of January. By the end of December 2024, abnormally dry conditions were reduced to 55% and extreme drought was recorded at 5%. The 2024 Mean Temperature in New Mexico was 56.3 °F making it the 2nd warmest year on record. The 2024 Mean Precipitation in New Mexico was 12.85", making it the 44th driest year on record. In 2024, New Mexico was warmer compared to 2023 but recorded 2.1" more precipitation than 2023.



January 2, 2024 **December 31, 2024**

Fig. 1 Comparison of drought at the beginning and at the end of 2024.



View the current U.S. Drought Monitor map by clicking Current Map | U.S. Drought Monitor

PEST HIGHLIGHTS

The following sections highlight the major pests that caused damage to New Mexico's forest and woodlands in 2024.

MORTALITY AGENTS

Native bark beetles are an important part of the forest and woodland ecosystems of New Mexico. In most cases, bark beetles selectively attack stressed trees when forest and woodland stands are unhealthy as the result of overstocked conditions, root disease, drought or other stress related factors. Bark beetle- killed trees are eventually replaced by juvenile trees that resist disturbance, recover more quickly, and maintain structure and function better than forest stands with old trees. Furthermore, canopy structure disturbance from bark beetle-caused tree mortality can increase the amount of sunlight reaching the forest floor and increase the number of snags and woody debris. This, in turn, can increase species richness of flora and fauna in an area.

The number of acres mapped in 2024 with insect related mortality in New Mexico was 67,000 acres, an increase of 34,000 acres compared to 33,000 acres mapped with insect related mortality in 2023.

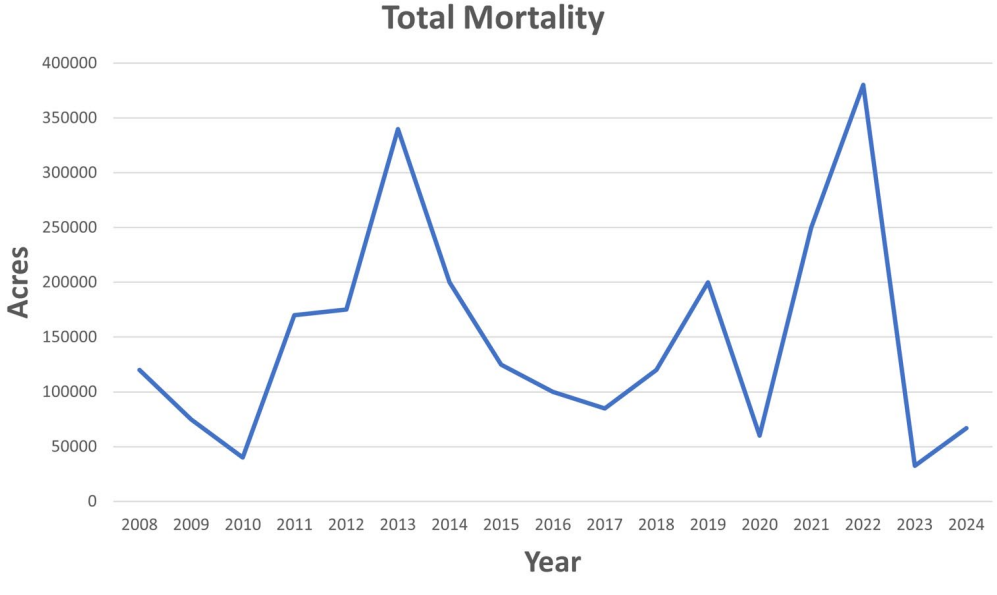


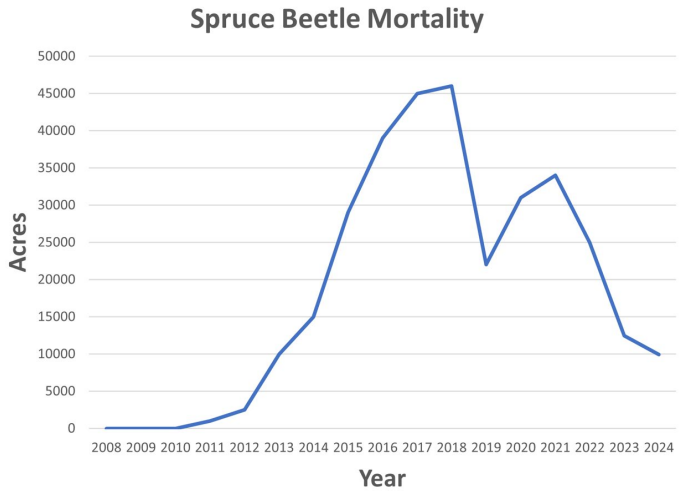
Figure 2. Trend of statewide forest mortality mapped on all types in New Mexico from 2008 - 2024.
Since 2015, 1.4 million acres have been mapped with bark beetle-killed trees.

Spruce Beetle

(*Dendroctonus rufipennis*)

Approximately 9,900 acres of high elevation Engelmann spruce Forests in New Mexico were mapped with spruce beetle related tree mortality in 2024 (Fig.3) resulting in a 20% decrease from 2023 (12,000 acres). Most of the spruce mortality occurred on the Santa Fe (4,700 acres) and Carson (5,200 acres) National Forests. Spruce mortality was not detected on tribal lands. 90 acres of spruce mortality was detected on private lands in northern Rio Arriba County. It is important to note that high elevation large diameter stands of Engelmann spruce, the preferred host of spruce beetles, have been significantly reduced by spruce beetle attacks and wildfires.

Figure 3. Trend of statewide spruce mortality mapped on all land types in New Mexico from 2008 – 2024.



Spruce beetle killed trees in the Pecos Wilderness, 2024. Photo by Crystal Tischler, USFS.

Over the last decade, 293,00 acres have been mapped with spruce beetle-killed trees in New Mexico.

Ponderosa Pine Bark Beetles

(southwestern pine beetle; *Dendroctonus* barberi)
(roundheaded pine beetle; *D. adjunctus*)
(red turpentine beetle; *D. valens*)
(pine engraver; *Ips pini*)
(sixspined ips; *I. calligraphus*)

There were approximately 32,000 acres of forests in the state mapped with ponderosa pine mortality caused by bark beetles, a significant increase from the 5,500 acres mapped in 2023. (Fig. 4). The majority (23,500 acres) of mapped acres with ponderosa mortality was on National Forests (NF) with 6,000 acres in the Gila NF, 5,500 acres in the Cibola NF, 3,000 acres in the Lincoln NF, 8,000 acres in the Santa Fe NF, and 1,000 acres on the Carson NF. Ponderosa mortality mapped on state and private lands increased significantly from 2,000 acres in 2023 to 9,000 acres in 2024, especially in areas near burn scars from 2022 wildfires. Ponderosa mortality on tribal lands increased from 40 acres in 2023 to 1,200 acres in 2024.

Bark beetle killed ponderosa, Montezuma, New Mexico.
Over the last decade, 520,000 acres have been mapped with bark-beetle killed ponderosa.

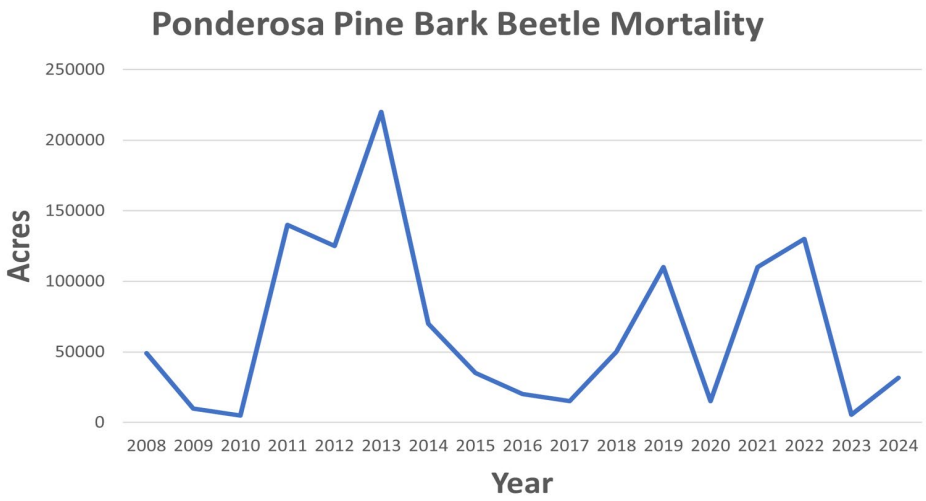


Figure 4. Trend of statewide ponderosa pine mortality on all land types in New Mexico from 2008 – 2024

Mixed Conifer Bark Beetles

(Douglas-fir beetle; *Dendroctonus pseudotsugae*)
(fir engraver; S*colytus ventralis*)

Approximately 19,000 acres of mixed conifer forests in New Mexico were mapped with mortality from Douglas-fir beetle and fir engraver beetle, a 65% increase from 2023 (11,000 acres). Mixed conifer mortality on state and private lands increased in 2024 (3,800 acres) compared to 2023 levels (1,200 acres). Tribal lands mapped with mixed conifer mortality decreased by 45% in 2024 (650 acres) compared to 2023 (1,200 acres). Most of the mixed conifer mortality was mapped on National Forests (15,000 acres) especially near burn scars from 2022 wildfires. Douglas-fir beetles were the primary damage causing agent in 2024 contributing to 13,500 acres of mortality. Fir engraver beetles caused 5,200 acres of mortality in 2024 compared to 4,000 acres in 2023.

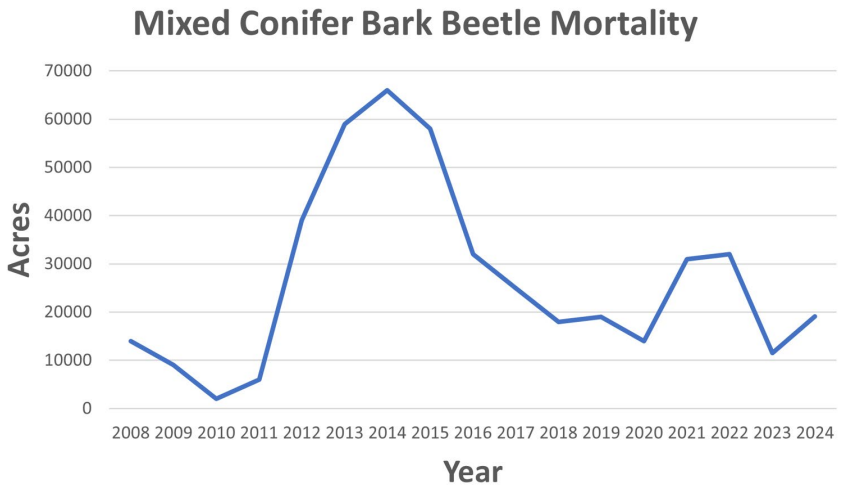


Fig. 5 Trend of statewide mixed conifer bark beetle mortality on all land types in New Mexico from 2008–2024.

Douglas-fir mortality on the Carson NF. Photo: Crystal Tishler, USFS.

Over the last decade, 260,00 acres have been mapped with bark beetle-killed mix conifer trees.

Piñon Ips

(*Ips confusus*)

Approximately 800 acres were mapped with bark beetle killed piñon trees in 2024, a decrease of 56% from 2023 when 2,000 acres were mapped with bark beetle killed piñon. Mortality mapped on state/private lands was 100 acres and 700 acres on National Forests. No piñon mortality was mapped on tribal lands in 2024. Many areas of New Mexico were fortunate to have piñon stands with a significant cone crop in 2024.

Piñon pine mortality in the east mountain area of Bernalillo County.

Over last decade, 311,000 acres have been mapped with beetle-killed piñon trees.

Figure 6. Trend of statewide bark beetle-induced pinon mortality on all land types in New Mexico from 2008-2024.

DEFOLIATION AGENTS

Over the last decade, defoliation agents (western spruce budworm, Douglas-fir tussock moth, western tent caterpillar, needleminers, scale insects) have damaged nearly 3 million acres of forests and woodlands throughout New Mexico. In 2024, there was a 40% increase of defoliation (Fig.7) across all land types where 327,000 acres were mapped statewide compared to 200,000 acres mapped with defoliation in 2023. Douglas-fir tussock moth defoliated 18,000 acres of mixed conifer forests in 2024 compared to 2,600 acres mapped in 2023. Aspen defoliation more than doubled in 2024 (18,000 acres) compared to 7,000 acres mapped in 2023.

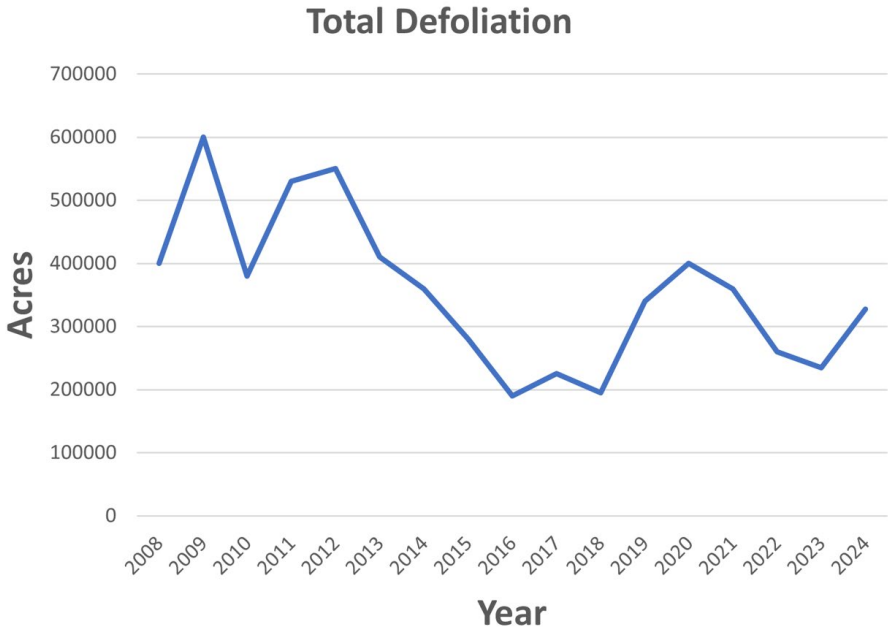


Figure 7. Trend of statewide forest defoliation mapped on all land types in New Mexico from 2008-2024. **Over the last decade, 3 million acres of trees have been mapped with defoliation.**

Douglas-fir tussock moth defoliation on the Sandia Mountains. Photo: Crystal Tischler, USFS.

Western Spruce Budworm

(*Choristoneura freemani*)

Western spruce budworm (WSBW) caterpillar activity was mapped on approximately 249,000 acres of forests in 2024. There was a 25% increase (50,000 acres) of WSBW on all land types between 2023 and 2024 (Fig. 8). Defoliation by WSBW was mapped on 92,000 acres on state and private lands, an increase of 18% from the 78,000 acres mapped in 2023. There were 6,500 acres mapped with WSBW defoliation on tribal lands in 2024. All national forests saw a combined 153,000 acres mapped with WSBW defoliation (an increase of 38,000 acres from 2023) with most of the activity occurring on the Santa Fe and Carson National Forests. Overstocked conditions in the mixed conifer forests throughout the state continue to favor WSBW populations. Trees annually defoliated by WSBW caterpillars become weakened and predisposed to attack from native bark beetles.

Mixed conifer trees defoliated by WSBW, Carson NF.

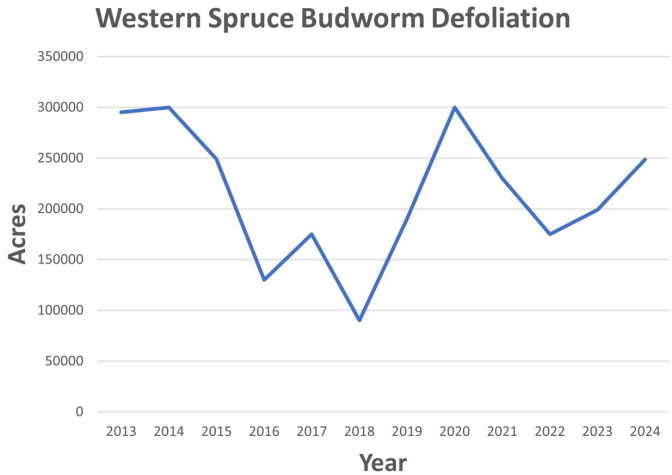


Figure 8. Trend of statewide WSBW activity on all land types in New from 2008 – 2024.

Ponderosa Needleminer

(*Coleotechnites ponderosae*)

Ponderosa needleminer was mapped on approximately 14,000 acres on all land types in 2024 representing a 21% increase from the 11,000 acres mapped in 2023. Most of the defoliation activity by this insect continues to be located on the Carson National Forests (10,000 acres) in northern New Mexico. State and private lands mapped with ponderosa needleminer decreased by 19% (4,000 acres) compared to 5,000 acres mapped in 2023. Ponderosa needleminer was not observed on tribal lands in 2024. Defoliation caused by ponderosa needleminer occurs when the small caterpillar feeds inside the needles of ponderosa pine trees which may predispose them to bark beetle attack.

The caterpillars of the ponderosa needleminer feed within the needle sheath of ponderosa pine causing discoloration of infested trees.

Douglas-fir tussock moth

(*Orgyia pseudotsugae*)

Defoliation of mixed conifer forests by caterpillars of the Douglas-fir tussock moth (DFTM) was mapped on approximately 18,000 acres in New Mexico in 2024, a significant increase from 2,600 acres mapped in 2023. Most of the defoliation occurred on the Cibola, Santa Fe, and Carson National Forests where 16,000 acres were mapped with heavy defoliation compared to 2,500 acres mapped in 2023. Defoliation by DFTM on state and private lands was mapped on approximately 2,000 acres compared to 400 acres mapped in 2023. DFTM was not mapped on Tribal lands in 2024. Trees defoliated by DFTM may re-foliate in the spring, however, severely defoliated trees be entirely killed or attacked by bark beetles.

Douglas-fir tussock moth outbreak at Hyde Memorial State Park defoliated trees and caused camp sites to close due to human and pet allergic reactions to the urticating hairs on all life stages of DFTM.

Mature larva, pupal cases and egg mass of DFTM found on or near Hyde Memorial State Park camp sites.

Piñon Needle Scale

(*Matsucoccus acalyptus*)

Piñon needle scale (PNS) is a sap-sucking insect that kills needles of piñon pine causing defoliation and thinning of the trees canopy. 2024 saw increased activity of PNS with approximately 16,000 acres of piñon woodlands mapped on all land ownership compared to 8,500 acres defoliated in 2023. Most of the acreage mapped with PNS defoliation was south of I-40 on National Forests (12,700 acres). Approximately 3,500 acres of PNS were mapped on state and private lands and 1,400 acres mapped on Tribal lands. Defoliated trees may become stressed and attacked by Piñon Ips bark beetles.

Aerial view of piñon pine stand defoliated by PNS, Lincoln National Forest. Photo: Crystal Tischler, USFS

Close up of piñon needles killed by PNS.

Aspen Defoliators

(western tent caterpillar; *Malacosoma californicum*)
(large aspen tortrix; *Choristoneura conflictana*)

In 2024, approximately 18,000 acres were mapped with defoliation across all land types, compared to 7,000 acres mapped in 2023. Approximately 14,000 acres of defoliation in 2024 were mapped on national forests with the majority on the Santa Fe and Carson National Forests. Aspen defoliation on state and private lands was mapped on approximately 3,600 acres in 2024 compared to 900 acres mapped in 2023. Tribal lands with aspen defoliation were mapped on approximately 700 acres in 2024 compared to 80 acres mapped in 2023. Aspen trees can survive an early season defoliation event as they are able to regenerate leaves before the end of the growing season allowing carbohydrate reserves to replenish. However, severe and repeated defoliation events can impact aspen tree growth, reduce carbon sequestration, and ultimately kill the tree.

Heavy aspen defoliation, Pecos Wilderness. Photo: Crystal Tischler, USFS.

A western tent caterpillar colony infected with a nuclear polyhedrosis virus (NPV), Santa Fe National Forest.

Noteworthy Defoliating Agents

Fall webworm (*Hyphantria cunea*)
Tamarisk leaf beetle (*Diorhabda* spp.)

Fall webworm is a defoliating insect that is most noticeable in the late summer and fall when the silken webs they build in deciduous trees become quite large. In 2024, this insect was very active in parts of northern New Mexico. Although this insect can cause extreme defoliation, damage is mainly aesthetic and does not affect the long-term health of the tree.

Defoliated cottonwood trees and large silken webs that contain numerous fall webworm caterpillars. San Miguel County.

Tamarisk (also known as salt cedar) is a non-native species that has become a dominant riparian tree in many areas of New Mexico. Tamarisk leaf beetle (TLB) was introduced in 2001 as a biological control agent* of tamarisk where both adults and larvae feed on foliage causing significant defoliation. In 2024, defoliation was observed in many parts of the state causing the tell-tale orange-brown defoliated look of tamarisk infestations along riparian areas in New Mexico. A concern to land managers is the potential that defoliated tamarisks may increase the threat of wildfire along bosque areas that could negatively impact native cottonwood, willows, and wildlife.

Tamarisk defoliation along the Rip Grande corridor in Socorro County. Note regrowth of tamarisk next to the mating pair of tamarisk leaf beetles. * *TLB entered New Mexico from Texas, Colorado and Utah*.

ABIOTIC DISTURBANCE

Drought and Heat

In the fall (September-October) of each year, the older interior canopy needles of ponderosa pine trees begin to turn yellow and are shed naturally from the tree. Trees that experience drought-heat stress, however, begin to display discolored yellow needles months before the needles shed naturally in the fall. Ponderosa pine forests impacted by drought and heat in 2024 was mapped on approximately 7,000 acres across all land types. This was a 65% decrease from the 20,000 acres mapped in 2023. Approximately 3,800 acres (74% decrease) of heat-drought discolored ponderosa were mapped on all National Forests, 3,000 acres (21% decrease) on state and private lands, and 380 acres (78% decrease) on Tribal lands. Ponderosa pines stressed by drought and heat may be more susceptible to attack from native bark beetles and twig beetles especially in overstocked forests due to soil moisture depletion that inhibits trees from producing resin, the trees natural defense against bark beetle attack.

Yellow crowns of drought- heat stressed ponderosa on the Zuni Mountains in the Cibola National Forest. Photo: Crystal Tishler, USFS.

CONCLUSIONS

Both temperature and precipitation impact the health of New Mexico's forests and woodlands. Because insects are cold blooded animals, warmer conditions, in general, increase insect activity. Prolonged dry conditions often stress and weaken trees, predisposing them to infestation from insects and infection to disease and pathogens. 2024 was the second warmest year and 44th driest year on record for New Mexico. Data from the National Weather Service showed New Mexico was warmer in 2024 than 2023 with an increase of 1.8 °F from the mean temperature of 54.5 °F. Although precipitation in 2024 was 0.9" below the mean precipitation of 13.75", New Mexico received 2.1" more precipitation in 2024 (12.85") than recorded in 2023 (10.75"). Areas near burn scars from large wildfires in 2022 saw significant bark beetle attack in 2024 to residual trees, a condition that may last for a few years. 2024 conditions were especially favorable for Douglas-fir tussock moth, and areas of mixed conifer forests defoliated by this insect may experience high levels of defoliation for the next 2 years.

For more information, contact:
Victor Lucero at Victor.Lucero@emnrd.nm.gov
Forest Health Program Coordinator
New Mexico Forestry Division

Special thanks for GIS support to:
Randall Fowler – Data Analyst
New Mexico Forestry Division