Forest Health Annual Report 2025

Minnesota DNR Forest Health Team

DEPARTMENT OF
NATURAL RESOURCES

The Minnesota Department of Natural Resources (DNR) Forest Health Annual Report was created by the Forestry Division's Forest Health Program. All complete annual reports can be found in the program's annual reports webpage.

Cover photo: Aftermath of the Jenkins Creek Fire, which burned through forests in northeastern Minnesota in May 2025. This area sustained heavy damage from spruce budworm for several years prior to the fire.

Back cover photo: A rare decay fungus called *Sarcodontia amplissima* decaying a dead hardwood tree in Whitewater Wildlife Management Area, Winona County, August 2025. Many thanks to Professor Robert Blanchette at the University of Minnesota for identifying this fungus.

Photo credits: Photos and other images are from DNR Forest Health staff unless indicated otherwise.

Some projects were funded in whole or in part through a grant awarded by the U.S. Department of Agriculture Forest Service, St. Paul Field Office, State, Private, and Tribal Forestry.

Contents

Minnesota DNR Division of Forestry Forest Health Program

Regional forest health specialists investigate tree health problems, trouble-shoot concerns of professional foresters, conduct field trials for further investigation, and provide trainings. The Forest Health team also monitors overall tree health across Minnesota's forests. Data is analyzed and summaries are compiled into reports and presentations. This team plays a key role in training professional foresters in tree health diagnostics and influencing forest health management.

Annual reports from 1969 to the present, and informational resources on a wide variety of forest threats, are available on the forest health webpages.

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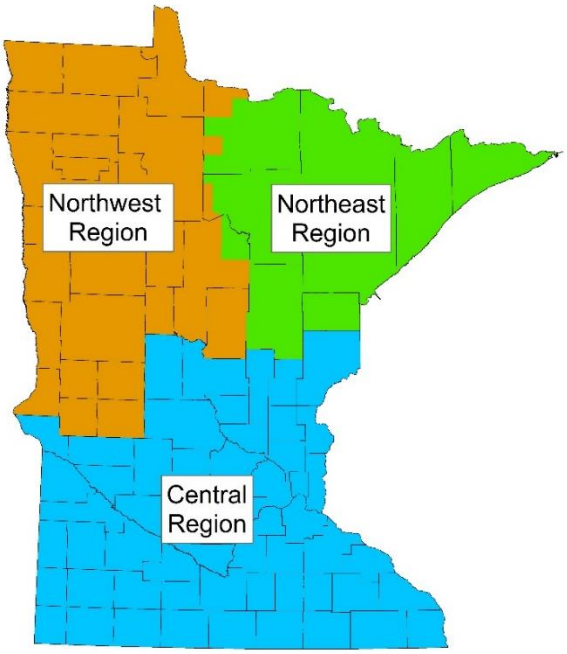


Forest Health Highlights of 2025

- Forest health staff collaborated with the DNR Resource Assessment unit to aerially survey 13.5 million acres of Minnesota for damage to forests. The U.S. Forest Service (USFS) provided funding, survey software, and data storage for these surveys.
- From January through mid-December 2025, staff directly responded to over 1,040 requests for forest health assistance, including in-depth field investigation requests, emailed inquiries, media interviews, training requests, and requests for assistance from researchers. Over 3,580 people attended our many presentations or trainings.
- The state's forests received sufficient precipitation in growing season 2025 to limit oak and aspen-birch decline.
- Spruce budworm damage dipped in 2025, although how much it declined is impossible to determine due to delayed and poor survey conditions from wildfire smoke. Despite the dip in defoliation, the outbreak still damaged at least 182,000 acres.
- Prior spruce budworm damage in northeast Minnesota helped fuel two large wildfires in May that consumed about 28,000 acres of land.
- Eastern larch beetle killed tamaracks on over 100,000 acres for the 9th consecutive year. We have mapped damage from this native bark beetle since 2001 on almost 1,950 square miles (1,244,000 acres) of forest. Most of the mature tamarack on much of this area has been killed.
- Emerald ash borer was confirmed for the first time in six counties in 2025, increasing the number of counties with known EAB infestation to 59. Through 2025, the vast majority of Minnesota's ash forests are uninfested, and only 2% of DNR-managed ash stands are in areas considered generally infested.
- There were no counties confirmed with oak wilt for the first time in 2025. The number of counties with known oak wilt remains at 33.
- A derecho in late June devastated at least 11,600 acres of forest in the Bemidji area.

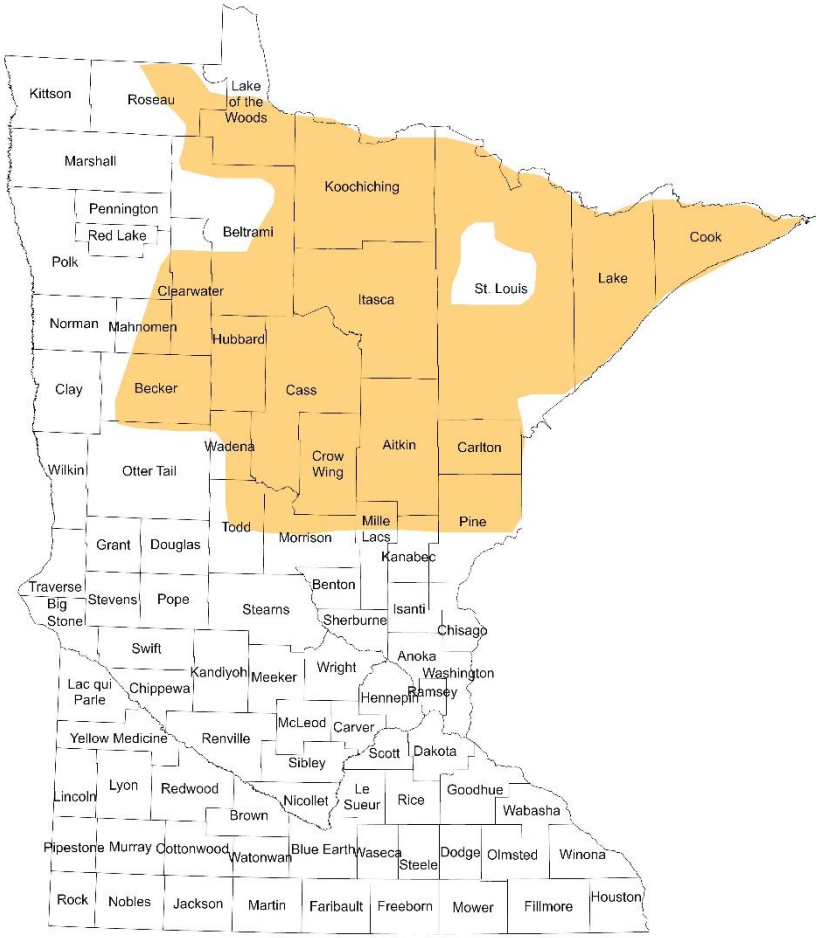
Annual Aerial Survey of Forest Canopy

Since the early 1950s, aerial survey has been a valuable tool for monitoring forest canopy health across the approximately 17.7 million acres of forestland in the state. Surveys consistently record events like large defoliating insect outbreaks and severe wind events. Other problems such as root diseases, wilts, and widespread tree declines cannot be consistently detected from the air and are not reliably recorded in surveys. Aerial surveys provide data used in forest management planning, research, prioritization of research topics, and they occasionally provide early detection of threatening issues like oak wilt and emerald ash borer.

A major change happened in 2023 with aerial survey. Eastern Region U.S. Forest Service (USFS) leadership ended forest health aerial surveys by USFS surveyors. Traditionally, USFS forest health surveyors surveyed the bulk of northeastern Minnesota, covering all of the Superior National Forest, Grand Portage Reservation, Bois Forte Reservation, and much state, county, and private forestland. Those federal surveys made up about 25 percent of the total forest health survey in Minnesota, and DNR covered the remaining 75 percent. Since this change, the total length of all aerial survey flights has decreased about 15 percent even though DNR's efforts have increased 15 percent.

Another change took place in 2024. Both USFS State, Private, and Tribal Forestry and DNR Forest Health wanted to ensure Indigenous sovereignty was being honored when it came to collecting survey data over tribal lands. This resulted in some reservations not being surveyed every year like they were before. It also resulted in some survey data only being shared with tribal government.

Survey results for 2016–2025 can be found in the Minnesota Geospatial Commons (keywords "forest health"), although no aerial survey occurred in 2020 due to COVID-19-related restrictions.



Area covered by aerial survey in 2025 is shaded.

Comparison of aerial survey results*, 2023-2025

Damage agent	Acres affected in 2023	Acres affected in 2024	Acres affected in 2025
Aspen and birch decline	4,600	12,600	19,300
Pine bark beetles	1,350	210	670
Eastern larch beetle	262,000	232,000	299,000
Flooding	3,300	6,700	6,600
Forest tent caterpillar	13,300	79,100	41,200
Greenstriped mapleworm	0	0	1,550
Jack pine budworm	0	710	0
Larch casebearer	42,600	44,800	36,700
Spruce budworm	665,000	708,000	182,000
Twolined chestnut borer	2,300	710	400
Wind	1,600	6,400	23,800

*Mapped acreages are rounded. A zero does not necessarily mean that the damaging agent was not present or did no damage that year. It only means it was not detected in aerial survey. This table shows general trends.

Forest Health Report

The annual forest health report provides information about significant damage to forests recorded in our aerial and ground surveys. The report is of special interest to foresters and land managers who can use it to learn what is threatening the forests they manage.

Insects

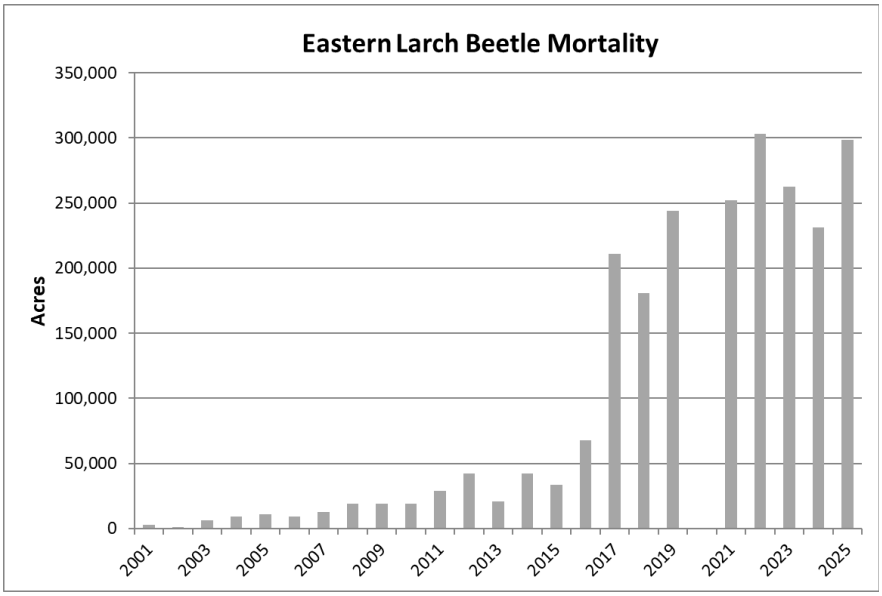
Eastern larch beetle continues to damage tamarack

Eastern larch beetle (ELB) (*Dendroctonus simplex*) is a small native beetle. Since 2001, it has caused widespread mortality in tamarack trees across Minnesota. As an adult, it is about 4 millimeters long and dark brown. These beetles spend most of their lives under the bark of tamarack trees. Due to abundant, larger tamarack trees; stress on these trees from floods and droughts; lengthening spring, summer, and fall seasons due to climate change; and the beetle's ability to reproduce quickly, their populations have been able to overwhelm tamarack trees across the landscape. The result has been significant mature tamarack mortality on over 1.2 million acres.

In 2025 we mapped 298,700 acres with damage from ELB, the highest amount since 2022. Of this impacted area, 35 percent sustained significant damage from ELB for the first time, most of which was in Koochiching County. It is probable that this outbreak has peaked in terms of the size of area that is newly infested each year, but we still anticipate this outbreak to continue for several more years.

While ELB cannot be controlled across the landscape, the DNR continues to manage tamarack stands in a sustainable manner for both timber salvage and sustained future forest cover. See our 2024 annual report for more details on management.

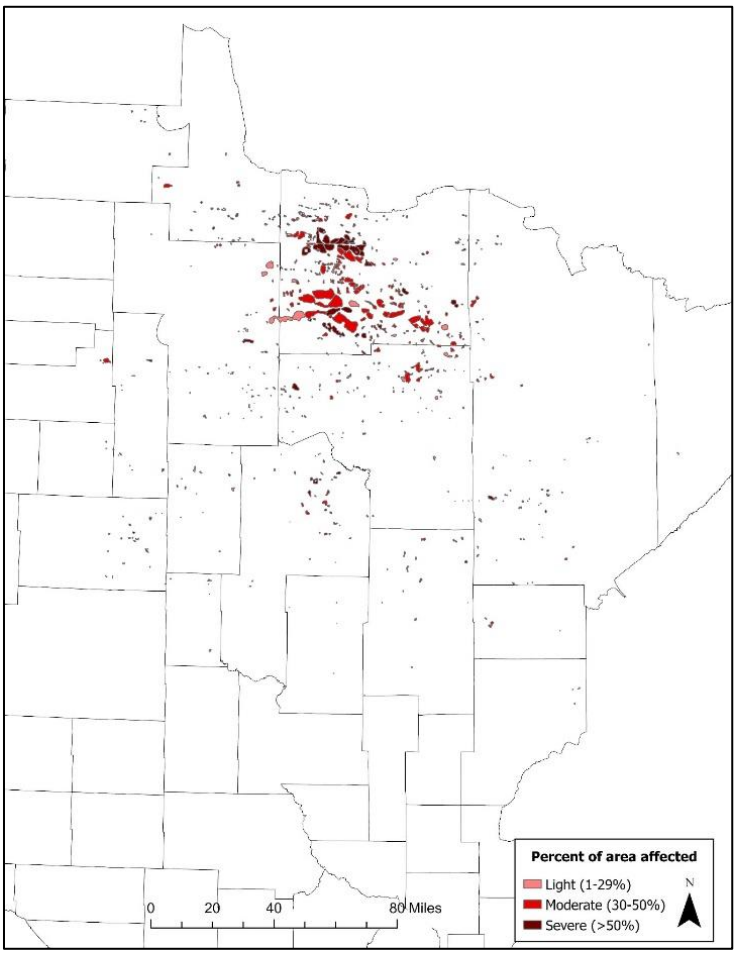
Fortunately, in several studied stands where active management has not happened, tamarack and other tree species are naturally regenerating, and small-diameter tamarack are not susceptible to ELB. Even though ELB will continue to kill larger tamarack, this species is still well suited for Minnesota forests.



Total affected acres of eastern larch beetle damage from 2001 to 2025. Aerial survey data was not collected in 2020 due to the COVID-19 pandemic.

Large forest re-inventory effort to correct for losses from larch beetle

With the vast amount of mortality that has occurred due to ELB, the DNR's forest inventory needed to be updated to better represent what is currently on the landscape. DNR Forestry's Littlefork Area team spearheaded a project to update the tamarack inventory across an area that encompassed 76% of DNR's tamarack covertype.



Areas with eastern larch beetle mortality in 2025.

Updating the inventory involved resetting the age bracket of tamarack stands based on the year they first appeared mostly killed from ELB, as seen in aerial photographs. Aerial imagery was from the National Agriculture Imagery Program (NAIP), typically captured every other year. Current plans call for some ground corroboration of the updated inventory in 2026.

Most stands that sustained intense mortality were still classified as tamarack stands after the update. This corroborated some results of prior ground-based research that examined forest recovery from ELB. Stands that already converted to another covertype or were not expected to regenerate back to tamarack were reclassified accordingly, such as to black spruce or lowland brush. Stands with a notably mixed composition were left as mature tamarack stands and will be evaluated on the ground over time.

Overall, most tamarack stands that sustained heavy mortality due to larch beetle were reset to the youngest age bracket, while 8% of the original inventory typed as tamarack forest was reclassed to a different covertype. Prior to this effort across these DNR Areas, 61% of tamarack acreage was between 30 and 120 years old. After the update, only 16% of tamarack acres are between 30 and 120 years old, while 76% is between 1 and 10 years old. This decreased age diversity increases the vulnerability of the tamarack resource to future insect outbreaks as they reach maturity.

Emerald ash borer discovered in six more counties in 2025

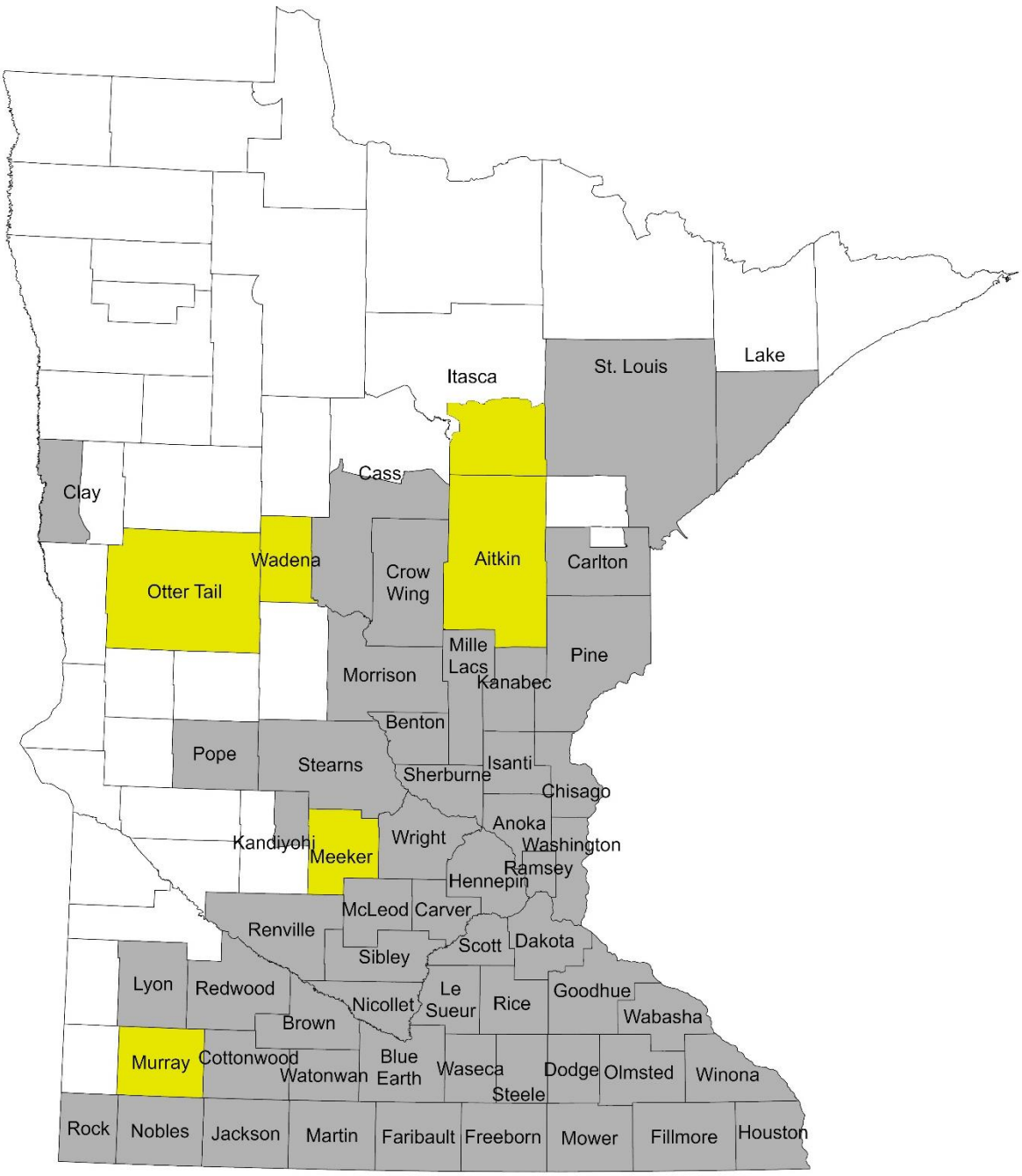
Emerald ash borer (EAB) (*Agrilus planipennis*) is an invasive beetle that feeds on ash trees' inner bark and cambium, killing them after several years of feeding. It was first discovered in North America in 2002 and Minnesota in 2009. Since that time, it has become entrenched throughout most of southeastern Minnesota and the Twin Cities Metro, and 59 of Minnesota's 87 counties have at least one confirmation of EAB infestation. Six counties were confirmed with EAB for the first time in 2025 through mid-December (Aitkin, Itasca, Meeker, Murray, Otter Tail, and Wadena).

We did not aerially map EAB's impact in 2025. The impact from EAB is typically mapped every other year and was started in 2016. Up through 2024, we had aerially mapped 30,700 acres heavily impacted by EAB in rural forestland from central Chisago County down through southeast Minnesota.

Even though several counties have been discovered to have small EAB infestations during the last few years, EAB has yet to make a significant impact on the majority of Minnesota's forests. The grand majority of Minnesota's 1.5 million acres of lowland forests, dominated by black ash, have yet to have severe infestation and mortality. Only 2 percent of DNR-managed ash stands are in areas considered generally infested.

Besides tracking overall damage to forests, the DNR Forestry Division is engaged in a wide array of activities related to EAB:

- Outreach to various professionals and landowners on EAB management
- Support for research on EAB
- Distribution of community forestry grants from federal and state government
- Published silvicultural guidance for professional foresters
- Tree diversification projects in ash-dominated stands in DNR-managed state forests
- Tree seedling production for forest diversification projects on both public and private forests
- Timber permit sales in ash-dominated state forests, facilitating diversification projects, and utilizing timber prior to EAB infestation
- Market analysis and market outreach for facilitating management of ash forests
- Aiding the Minnesota Department of Agriculture to release wasps to serve as biological control agents in the Chippewa National Forest



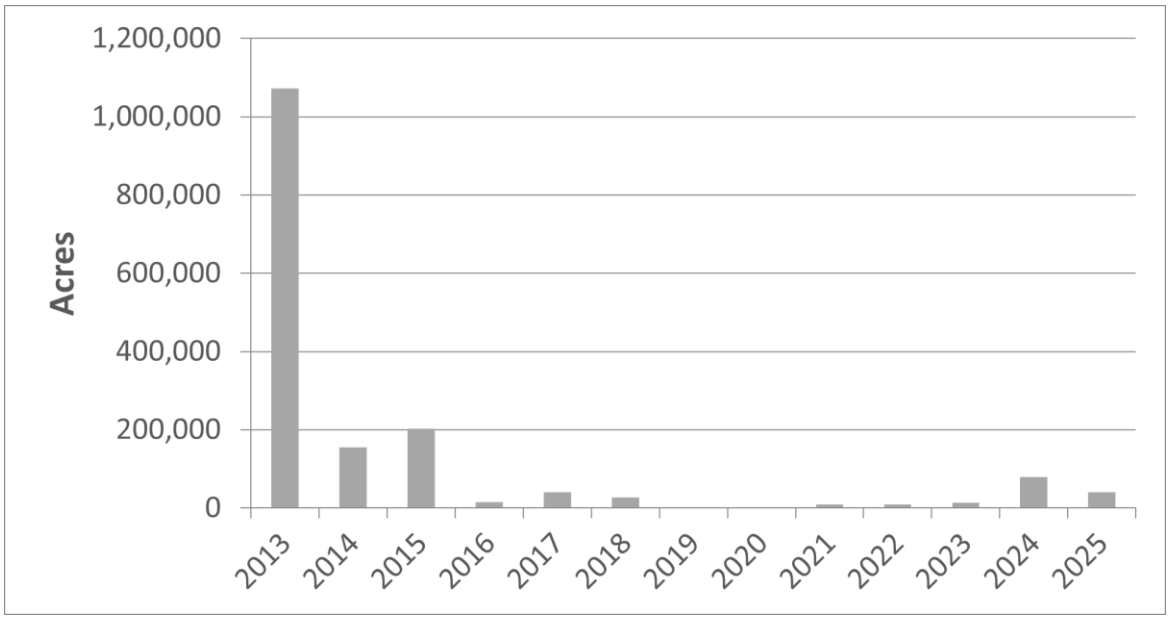
Emerald ash borer quarantine counties through mid-December 2025. Yellow counties or areas were quarantined for the first time in 2025 by Minnesota Department of Agriculture.

Forest tent caterpillar defoliation centered over Aitkin County

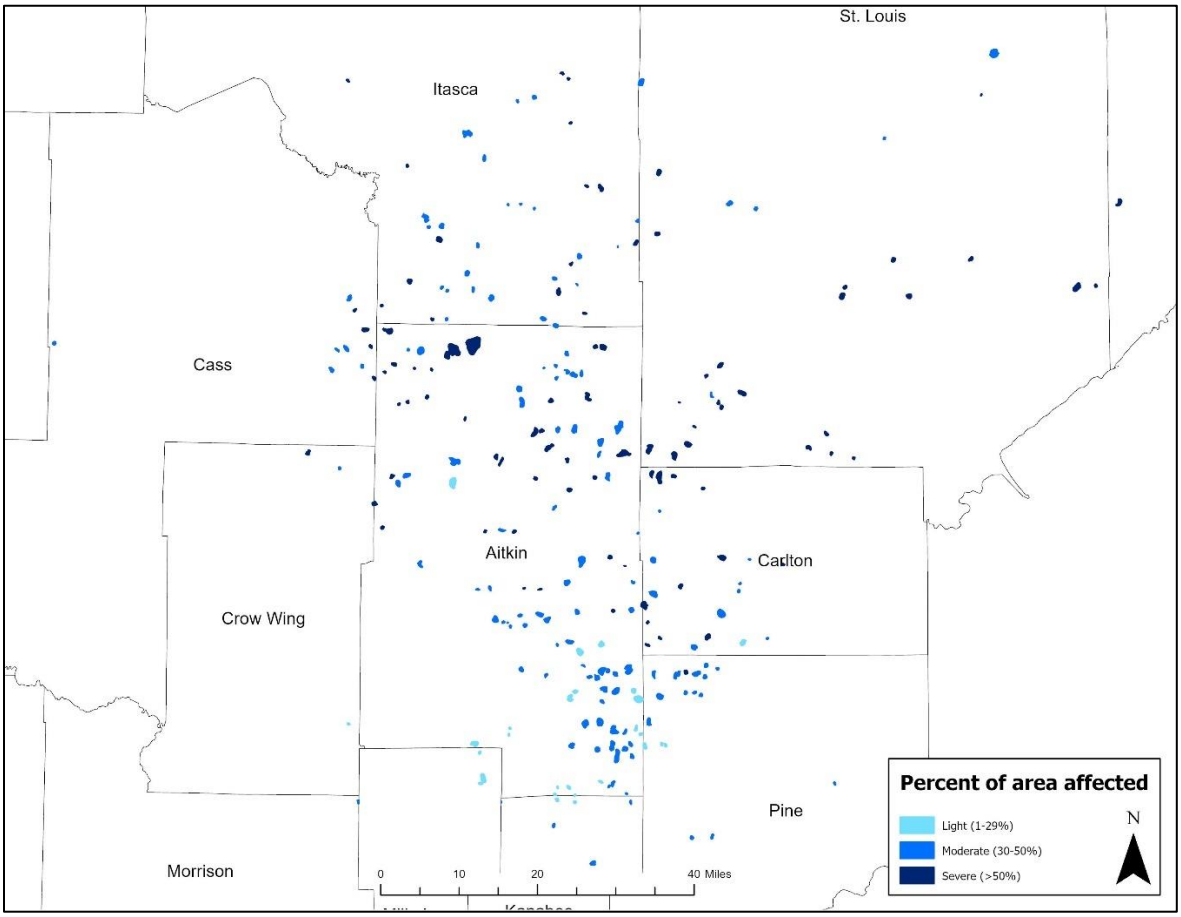
Forest tent caterpillar (FTC) (*Malacosoma disstria*) is a native caterpillar that feeds on a variety of deciduous trees. Common host species include aspen, oak, birch, and basswood. Defoliation appeared to be the greatest on basswood compared to other species in 2025, but heavy defoliation can occur on other hosts (see photo below). Defoliated acreage by FTC decreased about 50 percent from the 2024 total. It's possible that some poplar leaf disease was mistaken for FTC defoliation from the air in 2024 when 79,100 acres were mapped. However, the general trend in FTC activity clearly is upward from a population crash in 2019. In 2025, over 50 percent of the FTC activity was mapped in Aitkin County (24,400 acres). The intensity of the FTC impact to the landscape decreased with distance from Aitkin County.

Heavy defoliation of red oak trees near McGrath in 2025.

The last year with a significant amount of defoliated acres from FTC was 2013, but the majority of that defoliation was very light. Forest tent caterpillar populations peak about every 10–15 years in Minnesota. Thus, the population could be gradually nearing a peak in the next few years.



Acres with forest tent caterpillar defoliation from 2013 to 2025. No aerial survey was conducted in 2020.



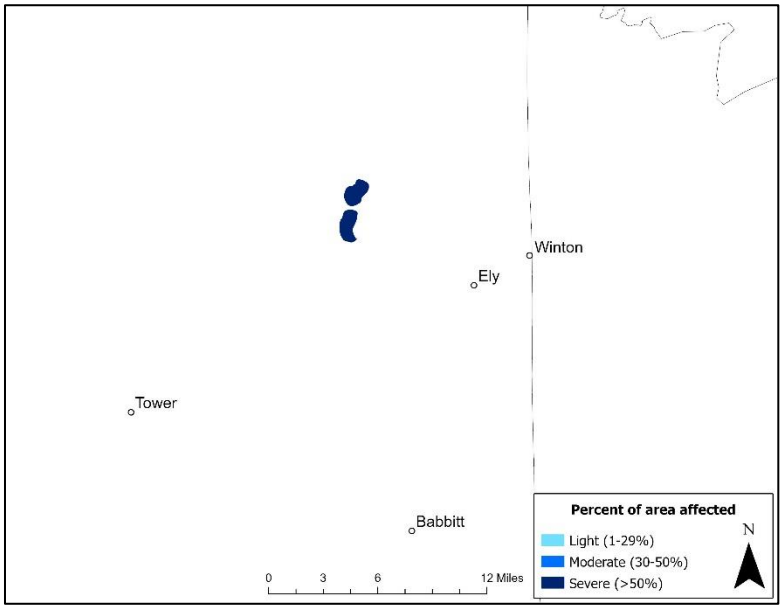
Areas with defoliation from forest tent caterpillar in 2025.

Greenstriped mapleworm defoliates red maples near Ely

In mid- to late summer, greenstriped mapleworm (*Dryocampa rubicunda*) defoliated 1,550 acres of red maple northwest of Ely in St. Louis County. This is an underestimate of the extent of defoliation from this caterpillar. The initial defoliation was reported by a DNR forester when doing field work in the area. Even though it apparently will feed on sugar maple and oak, we only noted feeding on red maple leaves. We do not expect this outbreak to last long, nor do we anticipate any significant forest damage from it.

A red maple stripped of its leaves by the greenstriped mapleworm

Greenstriped mapleworm caterpillars in July 2025 (photo by Victoria Jari, Minnesota DNR).



Areas with defoliation in 2025 from the greenstriped mapleworm.

Hackberry engraver-caused mortality observed in Stearns and Nicolett County

Hackberry engraver (*Scolytus muticus*) is a bark beetle native to North America that infests common hackberry (*Celtis occidentalis*). Typically, hackberry engraver is considered a secondary pest, or one that does not cause significant damage to the host tree. Damage caused by this insect frequently occurs in individual branches of unthrifty or stressed trees, and management is usually not warranted.

In 2025, we received a report of hackberry mortality occurring across approximately 1/4 acre at a Stearns County park. Over 60% of hackberry in this stand were killed, and most of the surviving trees exhibited signs of partial infestation (e.g., strip attacks and branch death). Many of the galleries we observed appeared to be at least a year old, suggesting that the peak of the outbreak was not in 2025, but possibly in 2023 or 2024. We surmise that this outbreak may have been incited by severe summer drought conditions in 2023. At the time of observation in 2025, there were no actively invading beetles found in living trees, suggesting that a return to more typical precipitation in 2025 may have halted the perpetuation of this localized outbreak.

Hackberry engraver galleries on the exposed sapwood of a dead hackberry tree.

Additionally, at Fort Ridgely State Park in Nicolett County, numerous (but scattered) dead understory hackberry trees were discovered with abundant hackberry engraver galleries. As in Stearns County, the damage appeared to be at least two years old, and no active infestation was observed in 2025.

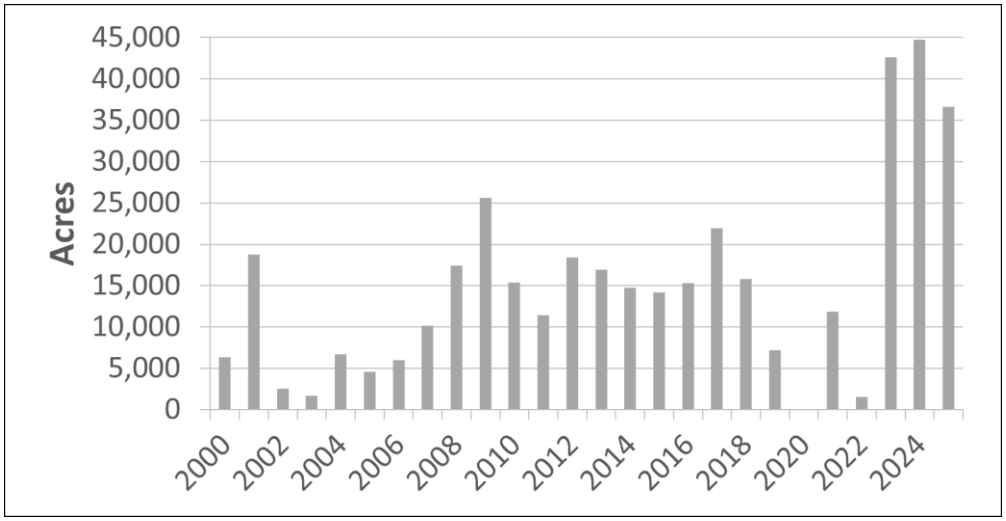
Larch casebearer continues with historic defoliation levels

Larch casebearer (*Coleophora laricella*) is a non-native caterpillar that feeds on tamarack needles and can cause extensive defoliation when populations are high. Records for larch casebearer defoliation started in 2000. In 2025 we mapped about 36,700 acres of defoliation by larch casebearer across 12 counties. This was a slight decrease from 2024 when we mapped approximately 44,800 acres.

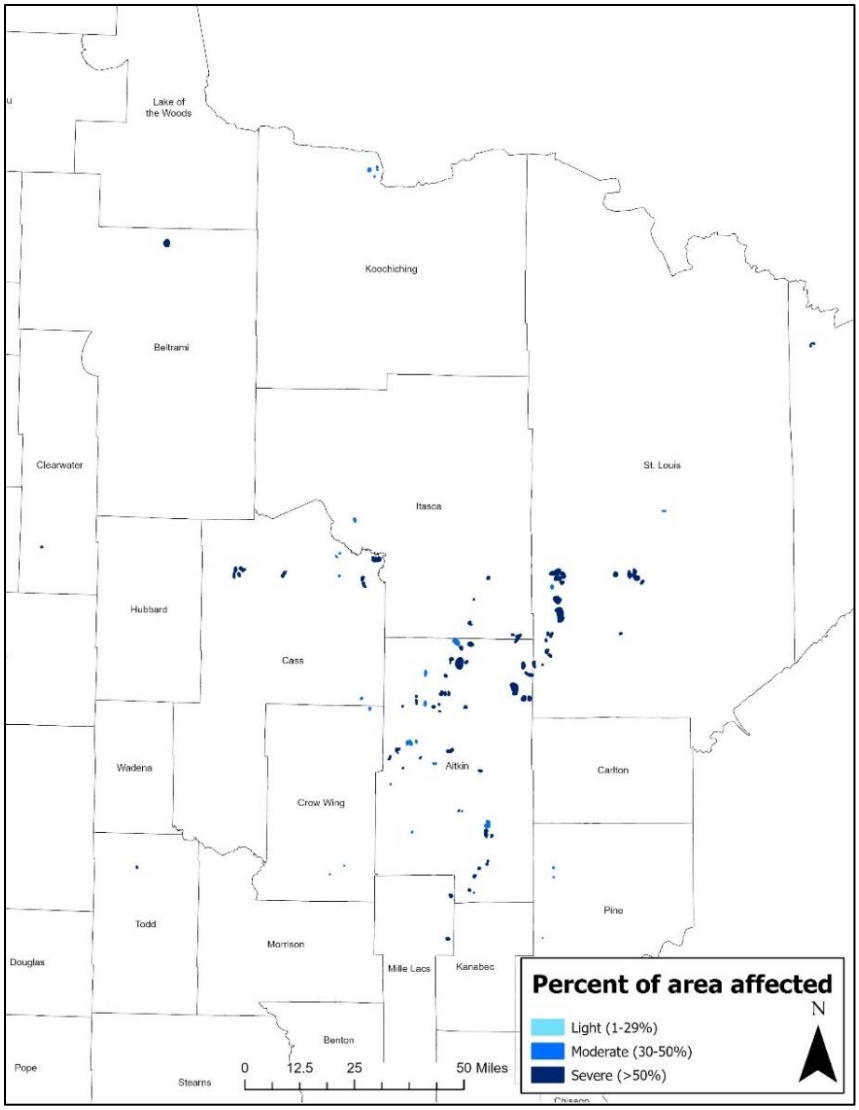
However, defoliation mapped in the past three years is a significant increase over all prior years (see graph on next page). This may be due to higher temperatures the prior growing season, higher precipitation in spring, and warmer late falls and winters. According to recent research, these climatic factors, along with decreasing natural enemy populations, may have resulted in the recent larch casebearer population increase.

We expect to map defoliation from larch casebearer next year. Defoliation stresses trees, but we have not documented any mortality directly due to repeated defoliation by casebearer. It is possible that stress from casebearer defoliation could predispose tamaracks to mortality from eastern larch beetle.

Larch casebearer defoliation is shown in the foreground along Highway 2 in Itasca County, June 2025.



Acres with larch casebearer defoliation from 2000 to 2025. No aerial survey was conducted in 2020.



Areas with larch casebearer defoliation in 2025.

Sawfly defoliation on aspen in northwest Minnesota

In late summer, a patch of young aspen on the south end of Elm Lake Wildlife Management Area in Minnesota's northwest Marshall County showed noticeable defoliation caused by a sawfly, likely a *Fallocampus* species. This damage was seen across an estimated 2–3 acres. The affected saplings displayed the characteristic thinning and skeletonized leaves typical of sawfly feeding, with some stems nearly stripped of foliage. While late-season defoliation often allows trees a chance to recover the following year, the concentration and extent of feeding in this stand suggest that continued monitoring will be important. Assessing foliage growth next spring and looking for repeated defoliation in the late summer will help determine whether the young aspen experience any lasting stress or growth impacts from the sawfly feeding. While sawfly defoliation on aspen is unusual, it is not unheard of in Minnesota. In 1992, *Nematus salicisodoratus* larvae defoliated about 2 acres of aspen in Crow Wing County, and in 1991, a *Nematus* species was reported feeding on poplars in the Metro Area.

Sawflies actively defoliating aspen, Marshall County, 2025.

Pine bark beetles not a big problem in 2025

Pine bark beetles (*Ips* spp.) are common pests of pine, and in Minnesota the eastern five-spined ips (*Ips grandicollis*) and the pine engraver (*Ips pini*) are common in pine stands throughout the state. *Ips* species tend to be non-aggressive, preferring trees that are stressed by drought, disease, overcrowding, or other insects. When conditions are right, *Ips* beetle populations can achieve regional outbreaks, at which point they are capable of killing patches or pockets of host trees.

Because symptoms of bark beetle infestation often don't become visible until autumn (after aerial surveying is conducted), newly infested pines usually cannot be detected by aerial survey until the following year. Outbreaks often occur during years of extreme drought, as was observed and reported in 1976, 1987, 1988, and 2021. Despite heightened drought conditions in 2023, no extensive pine bark beetle damage was recorded in 2024. From 2022–2023, recorded acres of pine bark beetles fell by 50 percent, and from 2023–2024 recorded acres fell again by 84 percent. In 2025, there were approximately 668 acres of pine bark beetle damage recorded, mostly in central Minnesota. This represents a slight increase in activity, which may be due in part to latent drought stress from previous years.

Ips grandicollis*, viewed through a microscope, collected from an infested pine in Pine County.*

Spongy moth trapping and treatment summary

Spongy moth (*Lymantria dispar dispar*) is an invasive forest pest that feeds on many plant species, including aspen, oak, and birch. Populations of this invasive are slowly encroaching upon Minnesota from the east, but they have not yet established to defoliate large, forested areas. However, very small pockets of defoliation have been discovered. One location was at Palisade Head along the North Shore in 2021. Once populations are large enough, outbreaks can occur every 8 to 12 years. Defoliation stresses trees, and heavy and repeated defoliation kills trees.

Spongy moth egg masses found at Judge C.R. Magney State Park.

The Minnesota Department of Agriculture (MDA) implements a national program in Minnesota to slow the advancing front of the spongy moth population. Program details, including survey results and proposed treatment zones, can be found on MDA's spongy moth website.

Trapping surveys

Survey staff from MDA trap male moths annually. In 2025, over 21,000 traps were set across the state, more than the prior year. Despite more traps, about 85% fewer moths were captured in 2025 than in 2024. Over half of all captured moths were from traps placed in Houston County, St. Louis County, or Winona County.

The MDA, DNR, and others are finding more spongy moth egg masses in northeast Minnesota over time, which indicates northeast Minnesota could experience outbreaks in certain areas. The DNR Forest Health Program utilizes aerial surveys and reports from forestry professionals to detect outbreaks. If there were larger outbreaks, we would report them here. In 2025, just a small number of egg masses were found during surveys in Cook and Lake counties.

Slow the Spread treatments

MDA aerially applied treatments to suppress spongy moth populations in 2025 as part of the national Slow the Spread program. They treated populations with mating disruption pheromones in 30 spray blocks, totaling about 105,000 acres, in Aitkin, Carlton, Fillmore, Houston, Itasca, Pine, St. Louis, and Winona counties during July 2025.

Mapped area impacted by spruce budworm takes a big dive in 2025

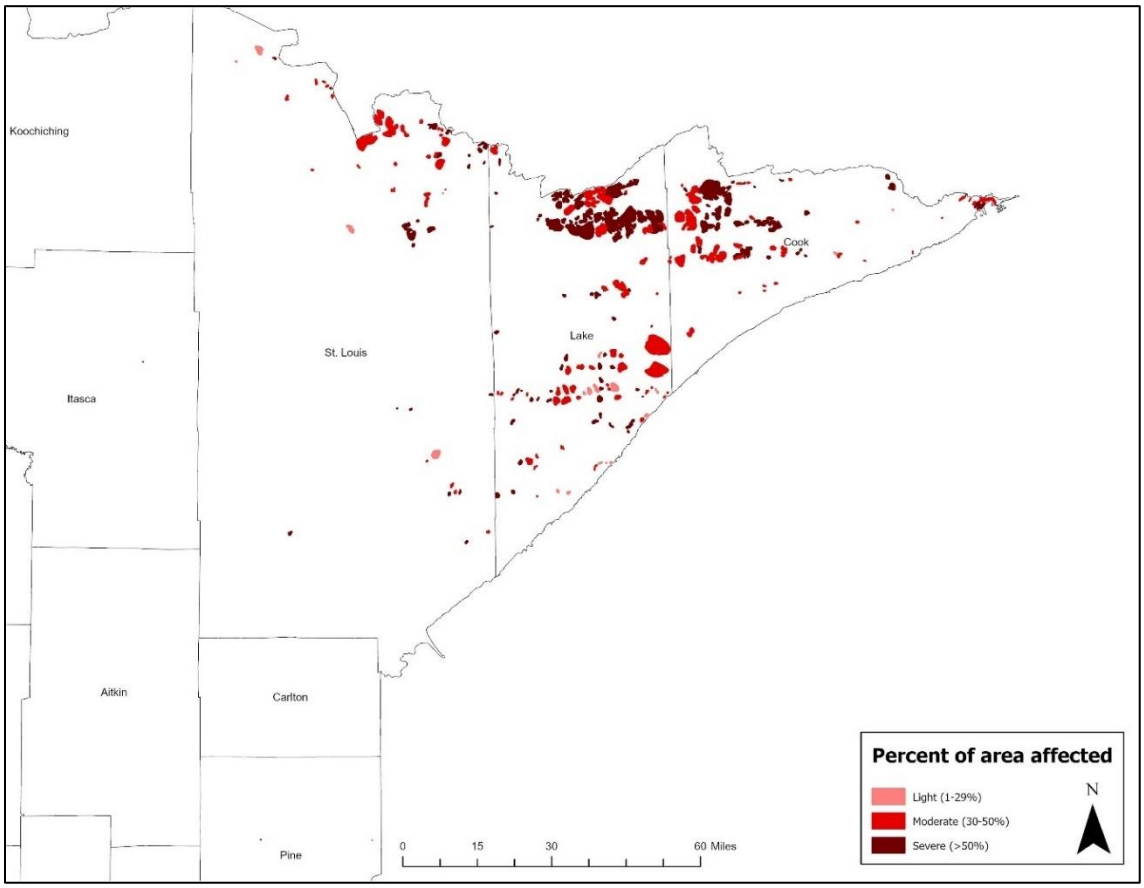
Spruce budworm (*Choristoneura fumiferana*) is a native caterpillar that defoliates balsam fir and white spruce. Its recorded impact was around 182,000 acres in 2025. This is most likely a significant underestimate of the actual impact, primarily due to poor survey timing and conditions. Smoke from Canadian wildfires delayed surveys past the optimum time to see spruce budworm damage, and during surveys, smoke decreased visibility. The true impact is suspected to be similar to that of 2024 based on field work and reports from field staff.

In 2024, 708,000 acres of spruce budworm damage was recorded. That was the highest amount of damage mapped since 1961. The main outbreak is still in the northeastern counties of St. Louis, Lake, and Cook. This insect has caused defoliation and mortality on 1.4 million acres since 2021. Prior to that, an outbreak impacted 537,000 acres from 2014–2019 over far eastern St. Louis County and western Lake County. The Camp House and Jenkins Creek fires in May 2025 were in this area that had older spruce budworm-caused tree mortality. This mortality created fuels, which likely exacerbated fire conditions.

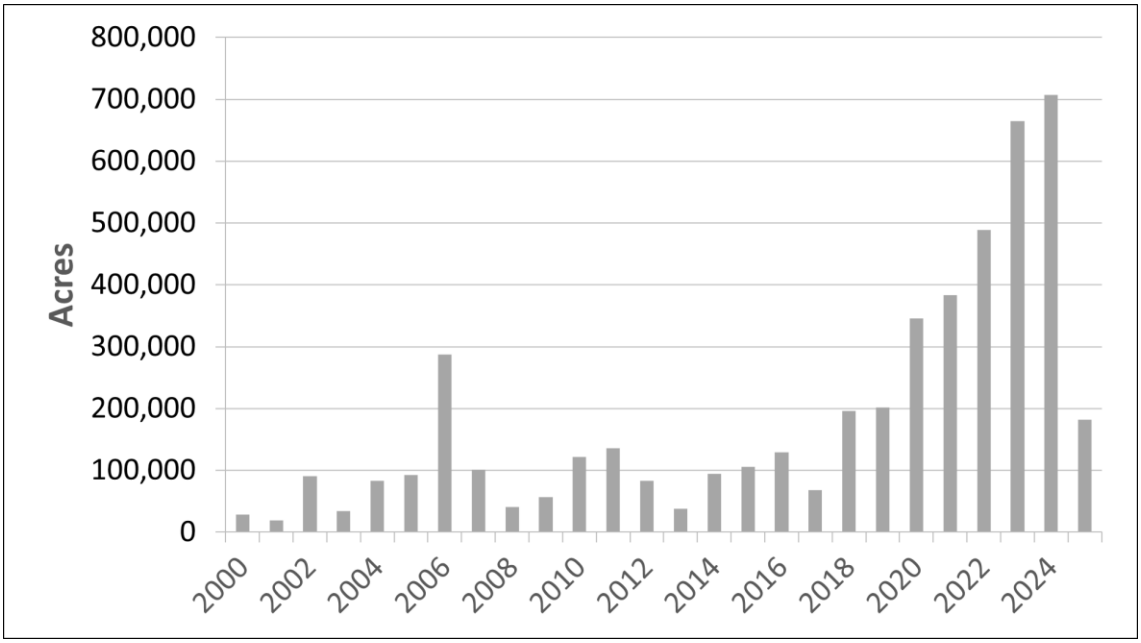
Outbreaks in a specific area in Minnesota typically last 6–10 years, which is about the amount of time balsam fir and white spruce can withstand feeding. After outbreaks subside in specific locations, budworm will cycle back about 30–60 years later. Outbreaks of spruce budworm occurred in the past and now may be exacerbated by 20th and 21st century fire suppression. Fire suppression allows fir and spruce forests to grow denser and older, benefiting spruce budworm.

Damage is expected to continue for the next 5 to 7 years in Lake and Cook counties.

Potential fire fuels due to spruce budworm-caused tree mortality near Boot Lake in the Boundary Waters Canoe Area.



Spruce budworm defoliation and mortality in 2025.

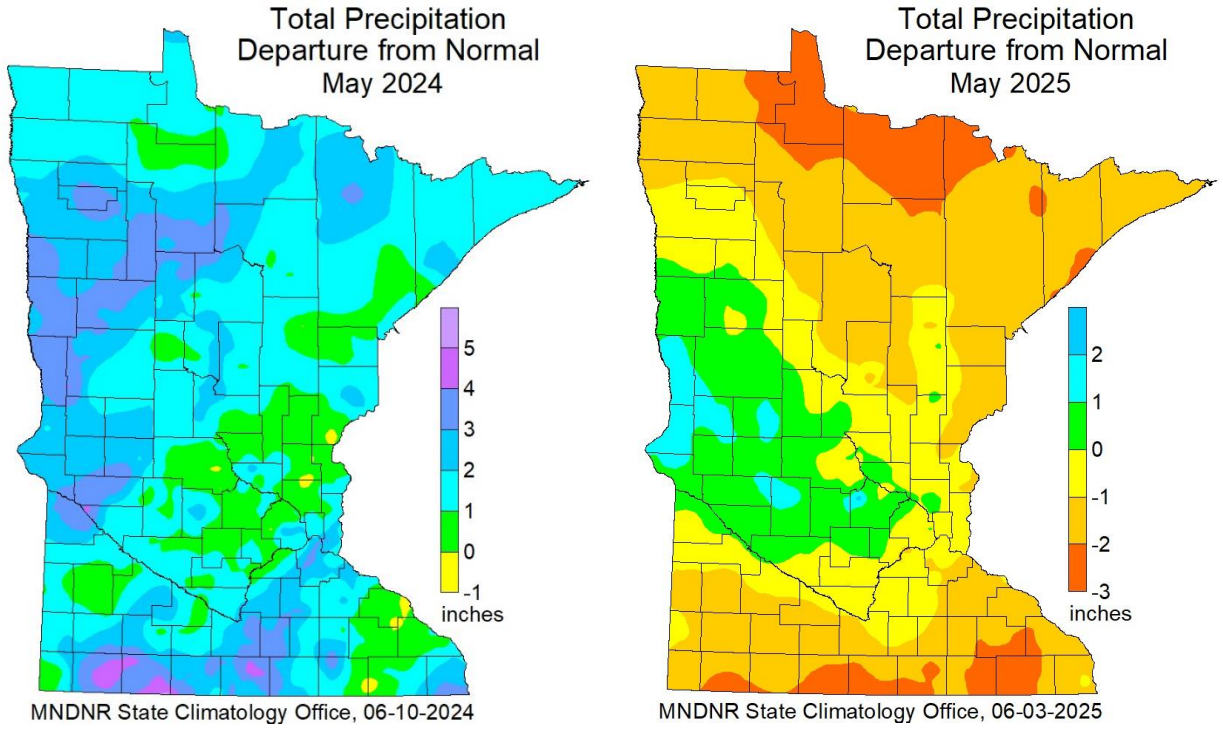


Acres with spruce budworm defoliation and mortality from 2000 to 2025. Impacted acreage in 2025 is an underestimate

Diseases

Minimal bur oak blight in 2025

Bur oak blight was reported far less in 2025 than it was in 2024 and does not constitute a significant tree health concern in Minnesota. Higher than average precipitation in spring of 2024 throughout much of the state produced conditions conducive for extensive bur oak blight development, but with a return to more normal precipitation levels in 2025 we saw a reduction in bur oak blight occurrence. We have observed heavy bur oak blight infection defoliate individual bur oaks over many consecutive years without causing mortality. In such cases, bur oaks produce healthy leaves the following spring. It is possible that severe and repeated infections could make trees more susceptible to other agents of mortality. We have observed that previously weakened bur oaks (e.g., due to construction damage) are more susceptible to bur oak blight than their neighbors.



Maps comparing departure from normal precipitation levels in May of 2024 (left) and 2025 (right). Reduced May precipitation is associated with lower levels of bur oak blight, as was observed in 2025.

Diplodia survey results from the Minnesota State Forest Nursery

Diplodia collar rot and shoot blight, caused by the fungus *Diplodia sapinea*, are often lethal diseases to stressed outplanted red pine seedlings. This pathogen is endemic to Minnesota. Sources for Diplodia infection in outplanted red pine come from nearby pines, slash, or from the nursery itself. Diplodia can also cause latent, or hidden, infections that do not result in disease until trees become stressed. The Minnesota State Forest Nursery manages Diplodia by applying preventative fungicide, scouting for symptomatic trees, and culling sick pines.

From 2017–2024, the Forest Health team and University of Minnesota Plant Disease Clinic assessed the latent infection rate in red pine nursery stock. Due to long-term low latency testing rates and analysis by the Forest Health team showing that visual symptoms can be a better indicator of latent infections than the actual latency test, visual survey for shoot blight took place in 2025. Over half a million seedlings were surveyed for potential symptoms caused by Diplodia. We found that 0.5 percent of red pines had potential symptoms of Diplodia. Extrapolating from lab analyses, we estimated 0.04 percent of seedlings in nursery beds, on average, had Diplodia. These sick seedlings will be culled during packing.

To put the 2025 result into context, 24 percent of three-year-old seedings had shoot blight from Diplodia in 2016, which was the last year when Diplodia exceeded an acceptable threshold. That 2016 symptom rate well exceeds the 0.5 percent rate in 2025. The outbreak in 2016 was due to extreme weather events, promoting widespread Diplodia infection. This resulted in both Minnesota and Wisconsin state forest nurseries having to destroy entire infected fields of red pine.

Forest health staff planning the Diplodia assessment.

Oak wilt range did not expand significantly in 2025

Oak wilt is a non-native, fatal oak disease that has spread slowly northward in Minnesota since the 1940s. We estimate that the disease covers almost 50% of the state's red oak range (northern red, northern pin, and black oaks). It is common in east-central and southeast Minnesota (black area in map on next page). As an invasive species, oak wilt is unique in that it spreads very slowly across the state, and there are several different ways to control it on individual sites.

To slow the spread of oak wilt northward into uninfected forests, we prioritize early disease detection, outreach efforts, and management in areas north of where oak wilt is common.

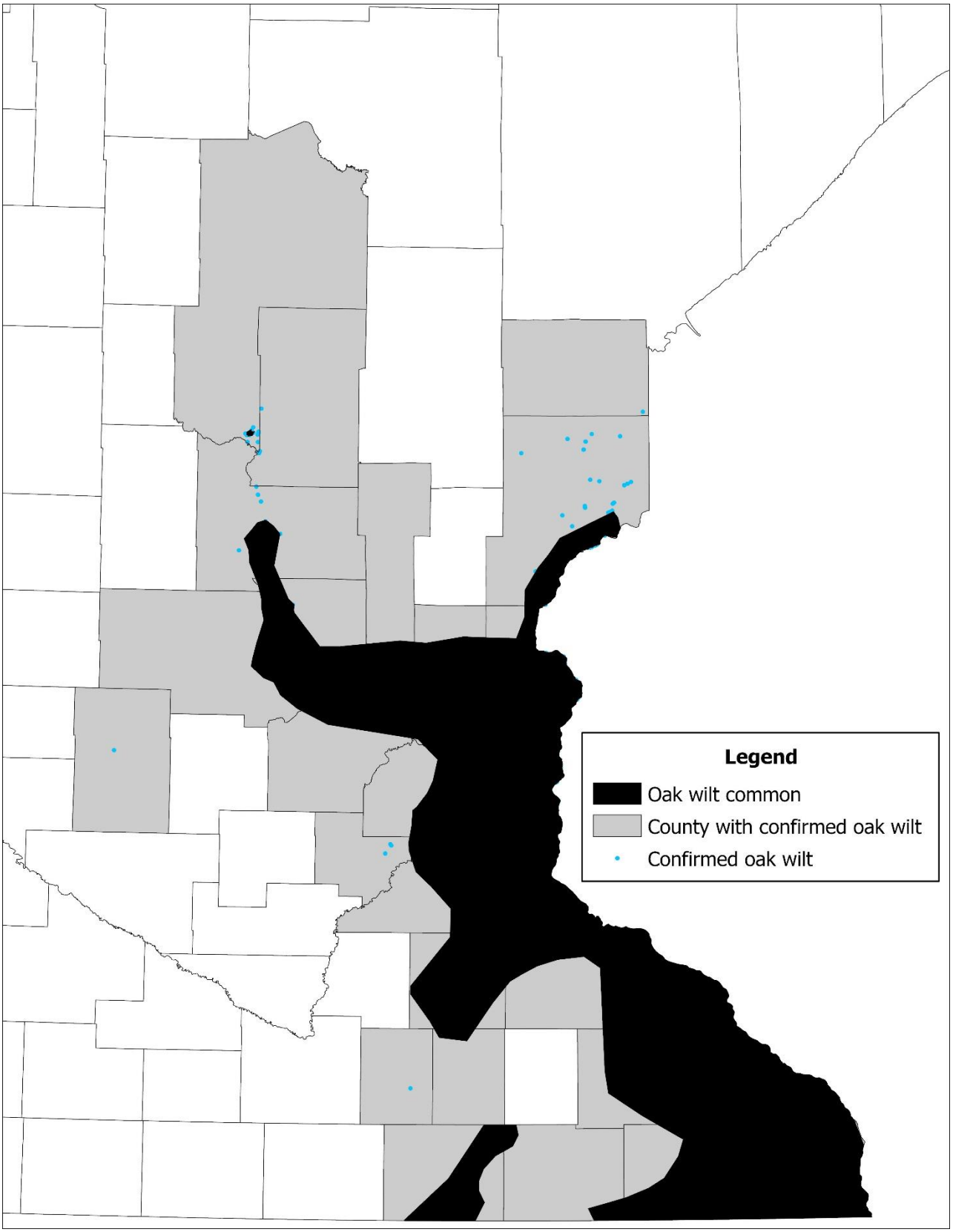
Early detection and management

Oak wilt was *not* found for the first time in any new counties in 2025. The most significant new finds of oak wilt were on the west side of the Mississippi River in Morrison County, approximately 3.5 miles southwest of the closest confirmed oak wilt, and 5 miles to the northeast of the closet confirmed oak wilt in east-central Pine County.

The private property owners in both newly detected areas of Morrison and Pine counties controlled the disease in autumn 2025, except for one pocket, for which management plans are still forming. Control efforts for several newly identified pockets also took place in Lake Maria State Park, while aboveground control took place at St. Croix State Park. Some newly identified pockets in St. Croix State Park are scheduled for control in 2026.

Rapid response project

Minnesota DNR Forest Health is partnering with the USFS, Michigan DNR, and Wisconsin DNR on research to evaluate the effectiveness of a rapid control procedure for single, isolated oaks infected aboveground by oak wilt. A total of 36 experimental treatments were applied in Minnesota from 2022 to 2024. Through 2025, over half have failed to contain oak wilt. These results mirror Wisconsin and Michigan's results. Just from the work done in Minnesota, we conclude that this procedure is unlikely to work for northern pin oaks. We will continue to monitor the effectiveness of the 16 treatments that have not failed yet.



Oak wilt is common in the black zone. Blue points represent oak wilt disease centers outside the black area. Many of these spots have been controlled and are being monitored.

Septorioides needle blight still present on white pine in northeast Minnesota

In 2023 a needle pathogen was commonly observed on white pine in northeast Minnesota. All the samples sent to the University of Minnesota's Plant Disease Clinic yielded the fungal pathogen *Septorioides strobi*. This pathogen is one of several responsible for white pine needle damage, which has been problematic in northeastern parts of the US.

Symptoms have been observed every year since it was first observed in 2023 in northeast Minnesota. Symptomatic trees were much less noticeable in 2024. In 2025, symptomatic trees were noticeable again, but not as evident as they were in 2023. For the past three years, trees displaying symptoms were in the same counties, which included Aitkin, Itasca, Koochiching, and St. Louis.

This disease causes chlorotic (yellowing) older needles and subsequent diseased needle loss. Above-normal precipitation during needle elongation in spring promotes infection by *Septorioides*. Disease then develops and is noticed the following spring and summer on the 1-year-old needles. May through July precipitation was above normal in 2022 and 2024 in the affected counties, which is why we observed a lot of Septorioides needle blight in 2023 and 2025.

Overall, needle diseases like Septorioides needle blight are not concerning unless they cause severe infection for several consecutive years. A small number of trees with heavy infection were observed in 2025 (see photo). This disease and possible other white pine needle diseases will be monitored in upcoming years.

A heavily infected white pine tree with Septorioides observed in Aitkin County.

Declines and Abiotic Problems

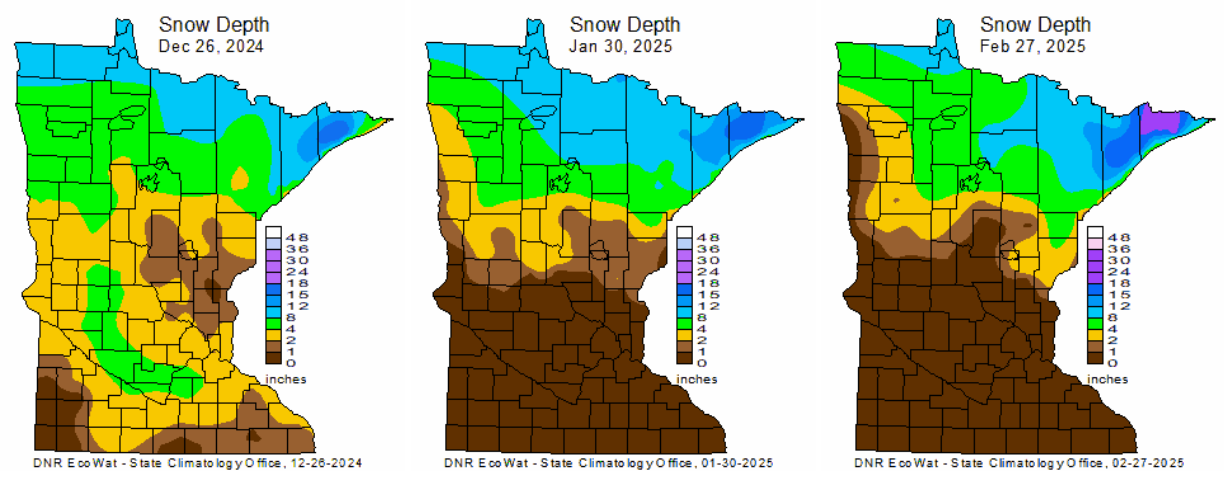
Spring die-off of some young ornamental trees

Urban foresters and residents in several Twin Cities-area communities, Rochester, and Moorhead noted a concerning die-off this spring of many catalpas, Kentucky coffeetrees, and redbuds, primarily planted in boulevards 5–10 years ago. These trees either didn't leaf out this spring, leafed out and then died, or developed severe dieback. They were all healthy-looking last year. Older specimens of these species were unscathed. The Forest Health team also received a few reports of similarly aged crabapples and maples leafing out and dying. There were a couple reports of 2024-planted trees dying, but those situations were less common.

A catalpa in Hennepin County that did not leaf out in spring 2025 (image courtesy of R. Morice, Minnesota DNR)

Given the fact that different tree species showed the same symptoms across a large area, we strongly suspect the cause was environmental. Several weather events challenged trees in impacted areas between summer 2024 and summer 2025: fall 2024 was amongst the driest and warmest, there was a heat wave in mid-March 2025, and winter 2024–2025 was essentially snowless.

The snowless winter is likely a major contributor to this spring die-off. Snow acts as an insulator, protecting roots from freezing and dying. Snowless winters (with below-normal or near-normal temperatures) are known for killing tree roots and causing landscape level declines of certain susceptible species. Experts hypothesize that the older trees weren't affected because they had large enough root systems to partially escape some of the freezing damage and to supply the needed energy for leaf-out in the spring.



Snow depth maps at the end of December 2024 (left), January 2025 (middle), and February 2025 (right). Dark brown represents 0–1 inch of snow (maps from the Minnesota State Climatology Office).

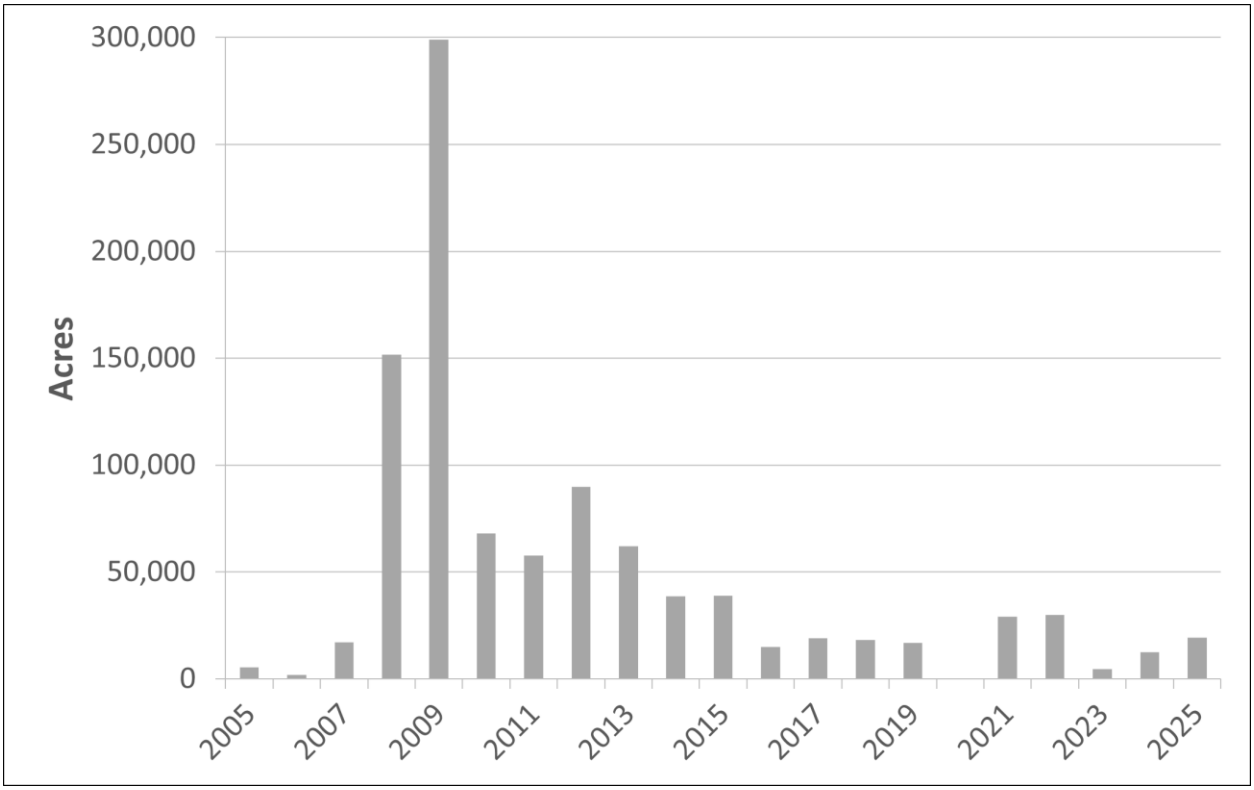
Aspen decline remains at low levels

Forests dominated by aspens are Minnesota's most common, representing almost 30 percent of our forests. Aspen decline at moderate levels is common in Minnesota, particularly in aspens over 80 years old. We mapped about 19,300 acres of aspen decline in 2025 during aerial surveys, an increase from 2024 when we mapped 12,600 acres, but close to the average amount in the last 10 years.

The causes of aspen decline are varied and cannot be attributed to one factor. Most fatal aspen declines occur in forests that are predisposed by older age or sub-optimal soils, incited by drought or heavy defoliation, and exacerbated by attack from opportunistic diseases and insects.

The large aspen decline event that took place in 2008 and 2009 mainly went from northern St. Louis County to Cook County. Aspen decline in that zone spiked the year following 14 straight months in drought and five years after four consecutive years of defoliation by forest tent caterpillar and large aspen tortrix (2000–2003).

The more recent 2020–2021 growing season drought in northeastern Minnesota was not as long as the 2006–2007 drought. Also, there has been no recent outbreak of any severe aspen defoliator. The last such outbreak in northeastern Minnesota ended in 2003.



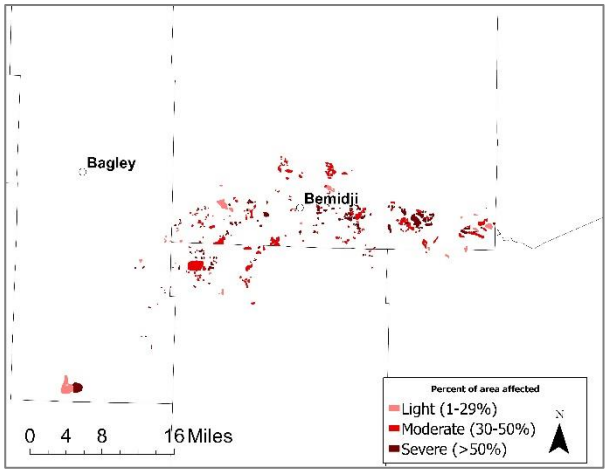
Acres mapped with aspen decline from 2005 to 2025. No aerial survey was conducted in 2020.

Derecho devastates forests near Bemidji and adds to the 2025 wind damage total

DNR and the USFS mapped approximately 23,800 acres of wind damage in 2025. This is an increase from 6,400 acres in 2024. This large increase is partly due to a blowdown event in the Bemidji area on June 20 and 21. This blowdown event severely damaged about 11,600 forested acres, mostly in Beltrami County (see map below). That total does not include most of the lightly or moderately damaged acres.

From 2000 to 2025, the average mapped wind damage in forests has been 5,900 acres per year, but it is highly variable. Peak years for wind damage in that timeframe are 2011, with 25,400 acres of damage, and 2025. These years are dwarfed by the wind damage mapped in 1999, which was over 465,000 acres.

The DNR Forestry team around Bemidji put forth serious efforts at salvaging much of the damaged timber on state-managed land. These salvage efforts do just that, salvage the value of timber that would otherwise be infested and degraded. In some instances, they can prevent localized outbreaks of bark beetles. Pine bark beetles (*Ips* species) and twolined chestnut borer are predicted to invade severely wind-damaged pines and oaks that remain unsalvaged past May 2026, but as long as severe drought is absent in 2026, undamaged forests shouldn't become significantly invaded.



Tree damage near Bemidji from blowdown event.

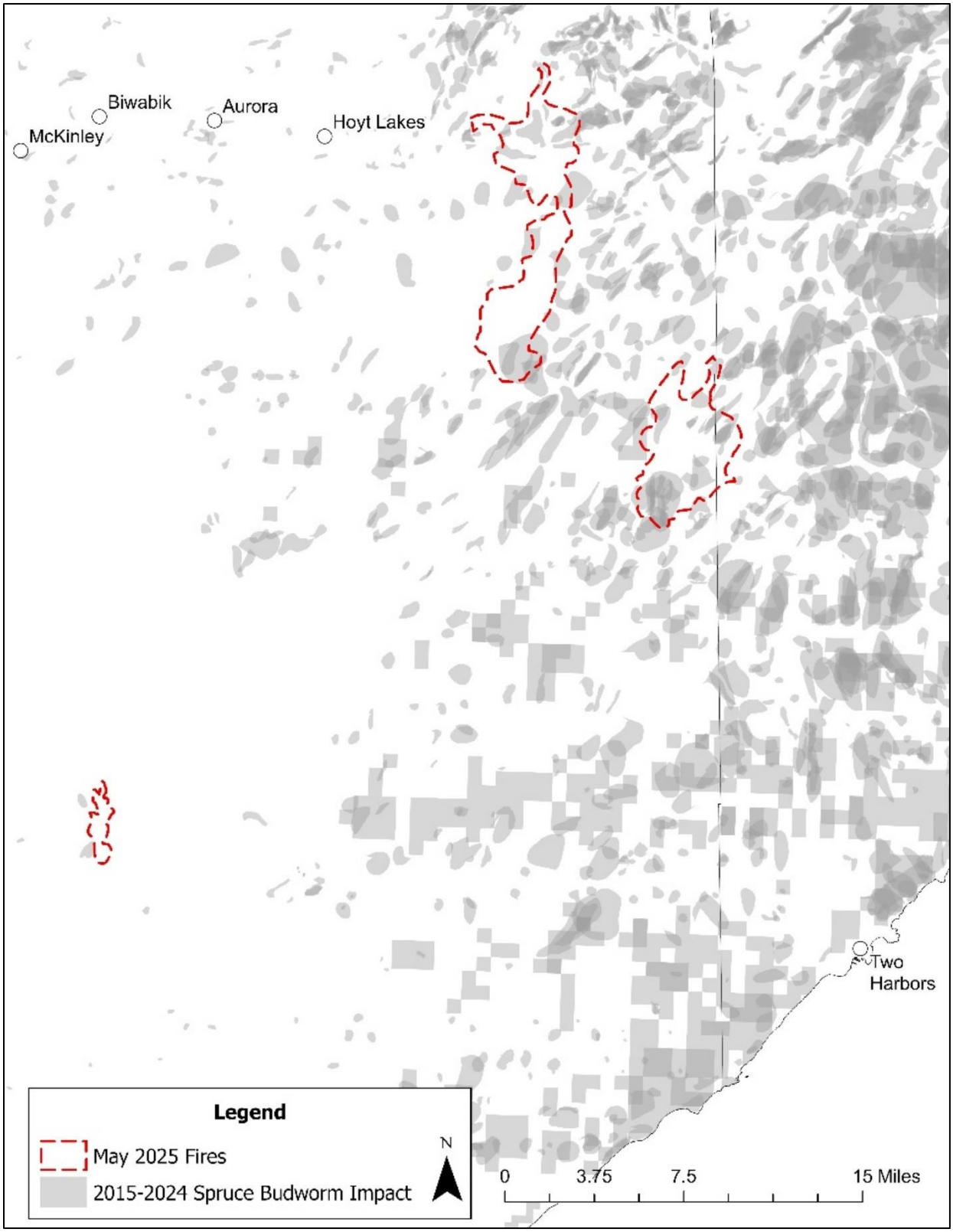
Large wildfires in northeast Minnesota in May 2025

From January through mid-November 2025, databases held a tally of approximately 1,350 wildfires in Minnesota, burning about 49,500 acres. This is significantly more than in 2024 when 13,000 acres burned.

Three large wildfires in May 2025 called the Munger Shaw, Camp House, and Jenkins Creek fires burned 1,600, 12,100, and 16,500 acres respectively. These fires started in central and southeastern St. Louis County during dry, windy, and record-breaking warm conditions in mid-May. The severity of the two larger fires, Camp House and Jenkins Creek, was undoubtedly made worse by abundant standing dead fir and spruce from prior spruce budworm-caused mortality (see map on next page). Specifically, the Camp House Fire burned concurrent with the highest theoretical wildfire risk from prior spruce budworm defoliation, according to research summarized in the 1987 article "Fire potential in the spruce budworm-damaged forests of Ontario." This maximum fire potential is approximately 5-8 years after trees die, resulting in crown breakage and an arrangement of fuels that maximizes fire potential. The fire potential peak would have been present in the area that the Camp House Fire burned from 2022 to 2025.

The Greenwood Fire of 2021 also burned through prior spruce budworm-caused tree mortality when the fire fuels from budworm would have been at their theoretical maximum.

Camp House Fire (photo courtesy T. Krueger).



Areas from 2015 to 2024 that sustained defoliation from spruce budworm in relation to the three large May 2025 fires. The darker the gray area, the more years of defoliation it sustained. Both of the larger fires started in areas that had sustained spruce budworm defoliation for many years.

Case study examining northern red oak recovery from logging damage

A state-managed forest on a wildlife management area sustained ample damage from logging during a winter 2014–2015 thinning operation. The stand is in northern Kanabec County, dominated by northern red oaks estimated at 85 years old and averaging about 14.5 inches in diameter at 4.5 feet above the ground, and is part of a central dry-mesic oak-aspen forest (MHc26) native plant community. Some damage from harvesting operations is acceptable and unavoidable, even desirable for cavity-dwelling wildlife, but too much promotes excessive decay, reducing timber value and lifespan of trees. Forest health staff established a study to understand logging wounding impacts to northern red oaks.

A general assessment of the stand in 2018 found wounding was not associated with increased mortality rates or dieback. In 2022 we tallied and measured wounds in fixed-radius plots throughout the stand to quantify wounding and assess recovery from wounds. We found that 35 percent of oaks had sustained wounds, and the average initial wound size was 87 in^2. In 2022, 25 percent of the wounded trees had completely compartmentalized the logging wounds.

In 2025, we again measured wound healing on a random selection of oaks. The initial average wound size was 114 in^2 (excludes an outlier). By 2025, 63 percent of the trees had completely compartmentalized their wounds, up from 25 percent only 3 years prior. Of the wounds that were not yet compartmentalized, the average closure was 80% (i.e., mostly healed).

Also in 2025, we analyzed decay on a subset of wounded and unwounded oaks with an instrument called a resistograph, which measures the resistance of the wood. For wounds where the resistograph measured resistance equal to or greater than the non-wounded control trees, we assumed no decay was present. Half of the wounds we tested were fully closed by woundwood rolls and callus tissue, where the original wound size ranged from 63–115 in^2. The other half were not yet compartmentalized, and original wound size ranged from 90–564 in^2. Ten years after logging, all of the compartmentalized wounds had no associated decayed wood, even on trees with multiple closed wounds. On the other hand, all wounds not yet compartmentalized had associated decay. In one instance where the original wound was 90 in^2, decay was very advanced (i.e. no resistance detected by the resistograph) 5.5 inches into the sapwood.

This is a small and informal study. It suggests the majority of 85-year-old northern red oaks will not have decay from logging wounds made 10 years prior when wounds average 87–114 in^2. However, it suggests that for a little over 1/3 of wounded northern red oaks, decay from logging damage to the lower trunk will have started within 10 years after wounding, and some of that decay will be significant, reducing the lifespan of the tree.

Trunk damage from logging operations in 2015 (left). Woundwood rolls growing over two logging wounds (right).

A northern red oak that has completely compartmentalized two logging wounds after 10 years.

Other tree pest, disease, and tree health events noted in 2025

Pest or event	Pest stage or cause	Timing and county of observation	Notes
Ash: sudden leaf drop	Anthracnose	5/30–6/2 (Aitkin, Crow Wing)	Significant leaf loss in Aitkin County
Bigtooth and quaking aspen: shoot blight	Venturia shoot blight	June–July (Itasca, Lake, Pine)	
Bur oak: dieback	*Discula quercina* and a *Tubakia* species	Spring and summer (Beltrami)	Samples collected from scattered declining oak
Bur oak: stem decay and breakage	*Kretzschmaria duesta*; *Ganoderma applanatum*; *Grifola frondosa*	September 17 (Stearns)	Numerous oaks in a park in eastern Stearns County with advanced stem decay in live trees
European pine or red pine sawfly	Early instar larvae	5/22 (Dakota)	Only one observation on one ornamental hard pine
Forest tent caterpillar	Appearance of early instar larvae	May 19 (Itasca)	
Forest tent caterpillar	Caterpillars, > 1”	June 25 (Aitkin)	
Forest tent caterpillar	Moths	July 11 (Itasca)	
Shagbark hickory mortality	Hickory bark beetle	June-July (Houston)	Continued mortality caused by hickory bark beetle; damage in 2025 was not notably worse than in prior years
Maple leaf drop	Maple petiole borer	June 6 (Crow Wing)	Several observations of heavy leaf drop from maple petiole borer in the Deerwood area
Oak wilt	Wilting noted for the first time	June 25 (Dakota)	
Paper birch: defoliation	Birch leafminer	6/27 (Itasca)	Small amount of mining; less than 2–4 years ago
Red oak: leaf deformity and leaf drop	Anthracnose	June 10 (Rice)	
Red pine with shoot blight	Red pine shoot moth	none	First year in several where no significant shoot blight was noticed from this pest

Pest or event	Pest stage or cause	Timing and county of observation	Notes
Spruce budworm	Early instars 2–4	5/23 (Lake)	
Spruce budworm	Moths	7/1 (Itasca)	
Sugar maple: branch flagging	Squirrel damage	Summer (Carlton, Crow Wing)	
Tamarack defoliation	Larch sawfly	July 5 (Itasca)	Very localized observation
White pine: distorted shoots	Pine leaf adelgid	June 17 (Lake)	
White pine: tip blight	Cytospora	Early July (Todd)	Scattered tip blight due to Cytospora on an ornamental pine
White pine blister rust	Aecia	May 14 (Itasca)	

DEPARTMENT OF NATURAL RESOURCES