Forest health considerations:

Ice storm clean-up and salvage

May 2025

Purpose:

These forest health recommendations are to help forest managers plan and prioritize cleanup and salvage operations following the severe damage from the ice storm March 28-30, 2025 to mitigate future forest health impacts to these forests. Bullet points address priority forest health concerns associated with the three main forest cover types and species affected by the damage – red pine, oak, aspen and hardwoods.

Pine Salvage

Recommendation: Prioritize pine for salvage operations. Damaged pines will quickly begin to stain; insects and diseases will rapidly infest trees. Consider below risks with major concerns including bark beetle outbreaks, spread of Heterobasidion root disease and aboveground spread of oak wilt when oak is present in pine stands, adjacent to pine or along access roads or landing zones.

- Fresh pine debris in early spring poses a serious risk for buildup of native pine bark beetle populations.
    - Salvage and cleanup as much impacted pine as possible before June. Avoid piling slash, which slows drying and allows extended opportunities for bark beetle development.
    - Bark beetles can produce three or more generations a year. Weather this spring and summer will determine the severity of impacts to remaining trees.
    - Additional bark beetle-induced mortality is possible in intact pine nearby, particularly if weather this spring and summer is dry.
    - The most severely impacted trees will be most attractive to bark beetles. However, consider efficiencies for salvage/cleanup to hasten response and reduce future impacts.
        - Highest priority: Snags with limited to no live branches as well as tipped-over pines (roots intact or not)
        - Lower priority: Severely bent pines
        - Lowest priority: Address remaining affected pine that sustained more than 25% canopy loss
    - During spring harvest operations with drought conditions, we recommend hauling logs within 15 days after they are cut from the stump to avoid bark beetle issues. After the storm, we have ample slash on the ground that would have a similar effect.
    - Beetle activity usually starts when temperatures consistently exceed 50 degrees with first flights in late April or early May. Ample slash and stressed pine will be first hit by emerging adults laying eggs. In normal years, broods take 40 to 55 days to emerge as adults, however stressed trees and drying slash can expedite development.
- Review Heterobasidion root disease-positive locations on the HRD viewer (Look for Heterobasidion Root Disease). Within the 12 counties that have severe ice storm impacts, Emmet County has many positive locations and Montmorency County has one known positive location. Within a 5-mile advisory zone, we recommend stumps should be treated with approved chemicals to prevent new infections (currently only Cellu-Treat is labeled for this use). Where this is impractical during emergency salvage, those

locations in closest proximity to an HRD-positive location are at greatest risk of stump infection.
- Armillaria root disease may become evident in 1 to 3 years in impacted trees and stands.
- Native white-spotted pine sawyer beetles will also attack dead and dying pines and may be confused with Asian longhorned beetle.
- When salvaging red pine with intent to replant, all trees should be cut to avoid planting red pine under or near a red pine overstory. This helps prevent Diplodia damage.
- Wait at least until the second year to replant any pine sites after salvage to avoid planting failure due to pales weevil (a salvage this spring should not be replanted before spring 2027)
- Be mindful of any oak present within the stand, in adjacent stands, along access roads or landing sites. Make considerations to reduce the risk of spreading oak wilt in these cases. See oak salvage section for additional recommendations when oak is present.

Oak Salvage:

Recommendation: Deterioration of storm damaged oak will occur slower than pine, providing more time to plan. Postpone salvage and cleanup until after the oak wilt high risk period ending on July 15 when possible. Oak wilt spread should be mitigated if salvage occurs when infection risk is present. Consider these forest health concerns when addressing damage with an oak component:

- Consider the oak wilt high-risk period (April 15-July 15). We don't know where all the current oak wilt infections are in the storm damaged areas, and beetles carrying spores may fly at least a mile.
- Oak wounds are only vulnerable to infection for 3 to 4 days. Trees damaged directly by the storms are at less risk of infection than trees sustaining fresh wounds later this spring.
- When addressing damage to non-oak cover types, consider potential for wounding oaks in adjacent stands, along access roads and landing zones.
    - Ideally, prune or remove these oaks prior to April 15.
    - In emergency situations when pruning/wounding is necessary after April 15, try to complete work prior to May 1. When possible, immediately coat wounds with paint. Painting wounds will not eliminate all risk; it is easy to miss wounds or wound adjacent trees in inaccessible locations for treatment.
    - Oak wilt infection risk peaks during May and June. When wounds are unavoidable, immediately coat the wound with paint to prevent infection. When fresh wounds are not painted, removing the entire tree is better than leaving the tree in place where this is possible without damaging additional oaks.
- Native two-lined chestnut borer may attack storm-damaged trees and build up to girdle and kill branches and entire trees. Impacts may be most significant in areas where other factors also contribute to oak decline.
- Armillaria root rot, Hypoxylon canker, other diseases and insects may also become more prevalent, particularly in older or low vigor stands and stands subjected to additional tree stressors.

- Some oak stands in this area may be recovering from recent spongy moth defoliation. Any areas affected by drought this spring and summer may also have more severe impacts.

Northern Hardwood Salvage:

Recommendation: Prioritize red pine. Consider monitoring hardwood stands for recovery. Be aware of the oak wilt high-risk period when addressing salvage in stands with an oak component.

- Downed hardwoods degrade in 1 to 2 years.
- Wound size and tree vigor, as well as wound position on the tree, will determine the amount and timeline for staining and decay. Branch breakage in the crown may not result in staining in the butt log for 3 or more years.
- Long-term implication may result in increased decline and associated insect and disease activity such as borers and Armillaria root rot.
    - Monitor impacted stands to assess risk of decline
    - Stands with recent severe insect defoliation events may be more vulnerable.
    - Any areas that experience drought this spring and summer will be more vulnerable.
- Take care during salvage operations not to damage residual trees. Sapstreak disease of sugar maple is more likely to occur through damage at the tree base and roots during logging operations than wounds higher on the bole or crown. Use spring bark slippage restrictions.
- Be mindful of any oak present within the stand, in adjacent stands, along access roads or landing sites. Considerations should be made to reduce the risk of spreading oak wilt in these cases. See oak salvage section for additional recommendations when oak is present.

Aspen Salvage:

Recommendation: Prioritize red pine. Be aware of the oak wilt high-risk period when addressing aspen salvage.

- No specific forest health implications were identified for special consideration during aspen salvage. We anticipate an increase in general symptoms of decline and potential for impacted trees to have a reduced lifespan. Stands that experienced recent heavy insect defoliation events or other stressors such as drought will be more vulnerable.
- Be mindful of any oak present within the stand, in adjacent stands, along access roads or landing sites. Considerations should be made to reduce the risk of spreading oak wilt in these cases. See oak salvage section for additional recommendations when oak is present.

What to salvage:

- Trees with completely broken tops will die. Standing trees with broken branches are a judgement call. A general rule is trees with more than 50% of the crown broken will have a more difficult time with recovery.
- Trees that were already stressed and lacking in vigor may decline rapidly in response to the additional storm-related stress as they are attacked by insects and diseases.

- Salvage activities will also result in additional tree stress for any remaining trees, known as “harvest shock.” Dieback and mortality may continue for several years, especially if additional stressors such as drought and insect defoliation occur in the next few years.

Invasive shrubs and trees risks

- Elevated risk of invasive shrubs (autumn olive, buckthorns, honeysuckles) and trees (Norway maple, Scots pine). For example, barberry outbreaks in salvaged pine stands are a particularly high risk, especially in the AuSable River watershed. Invasive species are a concern because of their effects on forest regeneration as well as wildlife habitat impacts.
- Due to this risk, it is important to recognize if invasive plants are present in the understory prior to a harvest. Treat if possible or plan for an eventual explosion of growth after harvest. Monitor these sites in subsequent years to ensure that regrowth is not being impacted by these invaders.
- For locations of previously mapped invasive species, see the Midwest Invasives Species Information Network: MISIN - Midwest Invasive Species Network

Other recommendations:

- **Firewood:** Be cognizant of the risks of invasive insect and disease spread with long-distance firewood movement.
- **Clean equipment and gear** prior to visiting a site, avoid (if possible), staging timber or equipment in invasive species populations, and leave clean by removing vegetation, mud, and seeds from equipment prior to leaving a site.
- **Moving vegetative debris** can spread invasive insects, plants and diseases. Monitor disposal sites in subsequent years and treat infestations or report to MISIN or other forest health apps found here: Forest Health: Protecting Forests from Pests and Diseases
- 17 public debris disposal sites have been opened to serve the 12-county disaster area. A map of these locations is included in the 2025 Northern Michigan Ice Storm dashboard at Michigan.gov/MSP.
    - Check the location listing for hours of operation and permissible items. Some locations are accepting tree debris only, and others will accept all vegetative debris.
    - It is unlawful to dump or dispose of debris on public lands or property.
- The Emergency Forest Restoration Program will be available to ice storm-affected private landowners. Landowners are encouraged to contact their local Farm Service Agency to determine if they are eligible.
  Emergency Forest Restoration Program | Farm Service Agency
  USDA Service Center Locator

Additional references:

- Forest pest considerations: Storm Damage to Forests | Pests | Wisconsin DNR
- HAIL DAMAGE - SYMPTOMS, SIGNS AND MANAGEMENT OPTIONS
- Tips from response to severe ice storm in 2022: A Look Back To The Blue Blizzard Of 2022

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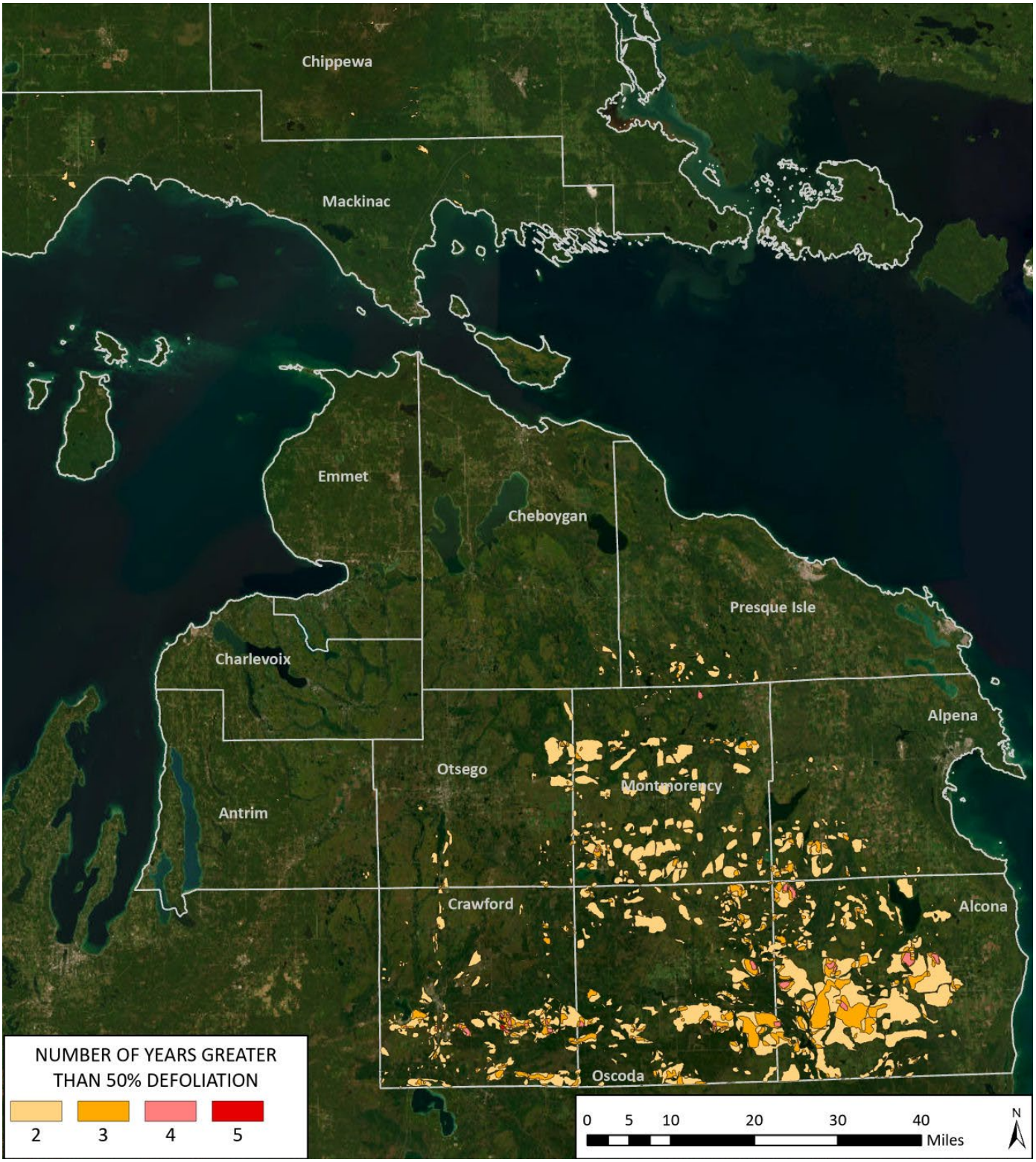
Defoliation across forest covertypes 2019 - 2025



Created by Ken Syers, DNR

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This map highlights forest areas with multiple years of defoliation mapped during annual aerial surveys. The aerial survey provides a snapshot greater than 50% defoliation at the time the survey took place during the middle of the growing season, and not all defoliation is mapped. This information helps identify stands that may have elevated levels of stress and reduced vigor, limiting recovery from ice storm damage.