



## Gypsy Moth Silvicultural Considerations for Minnesota TATUM GUIDE



Gypsy moths produce two types of damage with the potential to affect land-use objectives, defoliation and tree mortality. Different factors influence whether or not a stand is at risk of defoliation or of tree mortality, and different strategies are used to minimize their impacts. Understanding the distinction between susceptibility to defoliation and vulnerability to mortality is important in the selection of appropriate management strategies. Species composition is the primary factor determining the risk of defoliation (see Table 1). Stands dominated by preferred host species are likely to experience more frequent and longer outbreaks during which they are defoliated more severely than stands dominated by less preferred and avoided species. The primary factors determining the risk of mortality are the intensity and duration of defoliation and the condition of individual trees prior to defoliation. Condition is a function of site quality, competition and past history. Trees growing on less than optimal sites are at more risk of damage. Disturbed sites are also at more risk of damage. A thorough understanding of stand composition, stand history, and site-specific growing conditions is necessary for appropriate gypsy moth management.

There are two silvicultural strategies in forest management that can help mitigate future damage due to gypsy moth defoliation. The first involves reducing the likelihood of defoliation by reducing the percent of preferred host species found in a stand. This strategy is appropriate where the importance of nonpreferred host species can be increased, while still maintaining adequate stocking levels of important preferred host species. Doing so reduces the severity and frequency of gypsy moth population outbreaks, which in turn lessens the impact on recreation and aesthetic values. In stands heavily dominated by preferred host species, or in stands where site conditions or land use limit silvicultural options, diversifying the stand may not be an option.

The second strategy is to reduce the vulnerability to mortality associated with gypsy moth defoliation-related stress by increasing stand vigor. In general, damaged and suppressed trees are removed. Crop trees are favored. Less preferred host species are encouraged where appropriate and healthy preferred host species are maintained as an important component of the stand.

How and where these strategies apply depends on site-level risks and the values and land use that may be affected. Recreation managers may not be concerned with tree mortality, but may be very concerned about defoliation levels affecting tourism. While growth losses may be noticeable, timber production isn't severely affected until tree mortality begins to reduce merchantable stand volumes. The management threshold for aesthetic and wildlife values tends to fall somewhere between tourism and timber needs. Once the risk of damage has been determined, these values provide the basis for determining which if any, silvicultural practices are appropriate for a particular stand.

### **Steps for Gypsy Moth Management:**

1. Review the risk model and determine which areas are at high to moderately high risk.
2. Determine which stands within those areas need an updated stand inventory.
3. Prioritize needed inventory work lacking or outdated and schedule as budgets allow.
4. Review the inventory data for all stands at high to moderately high risk and evaluate site and tree conditions.
5. Review land-use objectives, site-level guidelines, and desired future conditions.
6. Determine which species are best suited for each site.
7. Determine what adjustments need to be made in the composition and/or quality of each stand (see Table 2). For each stand answer:
  - Will defoliation alone impact land-use objectives? If so, how much can or can't be tolerated?
  - Will tree mortality impact land-use objectives? If so, how much can or can't be tolerated given site conditions?
8. Prioritize needed stand work and schedule as budgets allow.

<b>Table 1. Gypsy Moth Host Preferences</b>		
<b>Note: * ornamental species not normally used in woodland settings, ** invasive species</b>		
<b>Category</b>	<b>Overstory Species</b>	<b>Understory Species</b>
<b>Preferred</b> Species readily eaten by all caterpillar stages	All oak, bigtooth and quaking aspen, basswood, paper and river birch, larch, mountain ash, tamarack, willow, red alder, and apple	Hawthorn, hazelnut, hop hornbeam, hornbeam, serviceberry, witch-hazel
<b>Less preferred</b> Species fed upon by older caterpillar stages	Yellow birch, box elder, butternut, black walnut, sweet and black cherry, eastern cottonwood, American, Siberian** and Chinese elm, hackberry, hickory, Norway**, red and sugar maples, pine, spruce, buckeye* and pear*	Blueberries, pin cherry, chokecherry, sweet fern
<b>Avoided</b> Species that are rarely fed upon	All ash, E. red cedar, balsam fir, silver maple, slippery elm, N. catalpa*, horse chestnut*, Kentucky coffeetree*, sycamore*, black** and honey locusts*, and red mulberry**	Dogwood, elderberry, grape, greenbrier, juniper, mountain and striped maple, raspberry, viburnum, and buckthorn**

<b>Table 2. Silvicultural Practices Useful in Limiting Gypsy Moth Damage</b>			
<b>Practices</b>	<b>To reduce defoliation</b>	<b>To reduce mortality</b>	<b>To maintain diversity</b>
Intermediate thinnings	<ul style="list-style-type: none"> <li>• Reduce proportion of preferred host species to <math>\leq 50\%</math></li> <li>• Reduce the proportion of aspen within oak stands</li> <li>• Thin sprout clumps to one or two sprouts</li> <li>• Enhance mouse habitat</li> </ul>	<ul style="list-style-type: none"> <li>• Harvest stands a minimum of two yrs after a stress event</li> <li>• Harvest stands three yrs prior to any defoliation event</li> <li>• Remove weak, suppressed, or damaged trees</li> <li>• Thin to a B stocking level or less</li> <li>• Remove aspen within bur oak savannas and goat prairies</li> <li>• Where consistent with desired future conditions, consider stand conversions to pine or native grass or shrub land</li> </ul>	<ul style="list-style-type: none"> <li>• Retain large-diameter healthy preferred host trees</li> <li>• Leave snags and large woody debris</li> <li>• If defoliation is imminent, protect white pine growing under susceptible host types</li> <li>• Provide wildlife habitat in adjacent less-susceptible stands</li> </ul>
Pine releases	<ul style="list-style-type: none"> <li>• Reduce proportion of preferred hosts (particularly aspen)</li> </ul>	<ul style="list-style-type: none"> <li>• Where feasible, locate away from high-risk stands</li> <li>• If defoliation is imminent, protect white pine growing under susceptible host types</li> </ul>	<ul style="list-style-type: none"> <li>• Maintain large-diameter, healthy preferred hosts (particularly oaks)</li> </ul>
Regeneration cuts	<ul style="list-style-type: none"> <li>• Where adjacent stands are comprised of predominately preferred host species, create openings <math>&gt;25</math> acres</li> </ul>	<ul style="list-style-type: none"> <li>• Harvest stands before sprout capabilities decline</li> <li>• Use a shelterwood harvest to ensure sufficient regeneration</li> <li>• Protect susceptible advanced regeneration if defoliation likely</li> </ul>	<ul style="list-style-type: none"> <li>• Leave snags and large woody debris</li> <li>• Provide wildlife habitat in adjacent less-susceptible stands where possible</li> </ul>
Planting projects	<ul style="list-style-type: none"> <li>• Plant a mixture of less-preferred or avoided species</li> </ul>	<ul style="list-style-type: none"> <li>• Protect susceptible understory stock if defoliation likely</li> </ul>	<ul style="list-style-type: none"> <li>• Plant a mix of species appropriate to the site, with up to 50% preferred host species</li> </ul>

See the *DNR Silvicultural Tipsheet* for a brief overview of the potential risks. See the *Gypsy Moth Silvicultural Considerations for Minnesota, Aug 2003*, for a more thorough discussion of the risk of potential damage and areas of the state where moderate to high-risk stands occur.