

SILVICULTURAL GUIDELINES FOR FOREST STANDS THREATENED BY THE GYPSY MOTH: A SUMMARY¹

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INTRODUCTION

Silvicultural treatments that may minimize gypsy moth impacts on host hardwood stands are recommended based on ecological and silvicultural information on their interactions. Decision charts are presented that match the proper prescription to existing stand and insect population conditions. Preoutbreak prescriptions focus on reducing stand susceptibility and vulnerability by increasing stand vigor, removing trees most likely to die, reducing gypsy moth habitat, reducing preferred gypsy moth food sources, improving predator and parasite habitats, and regenerating stands that are close to maturity or understocked. Regeneration cuttings before defoliation preserve: seed production, established advanced regeneration, and stump sprouting potential. Outbreak prescriptions prioritize stands for possible insect population control actions and regenerate stands that are close to maturity or understocked. Postoutbreak prescriptions rely on efficient salvage of dead trees and the regeneration of stands that are either understocked due to excessive mortality or are close to maturity. Information on utilization of dead trees is provided. While these guidelines have not been tested, they represent the current knowledge of the impacts of gypsy moth defoliation on forest stands.

METHODS AND MATERIALS

The use of these guidelines requires a stand examination, analysis of stand and insect characteristics, determination of the proper prescription using decision charts, and implementation of the prescription. The guidelines have been developed based on literature review of pertinent research and incorporation of this information into guidelines.

RESULTS AND DISCUSSION

Appropriate intermediate stand treatment prescriptions are determined by the proximity

of infestation and when defoliation may be expected, coupled with stand characteristics and economic maturity. If the stand is not under immediate threat and defoliation is not expected within the next 5 years, there is adequate lead time in which to take preventive action. Seven silvicultural prescriptions have been described that may aid in reducing timber losses under these conditions. If the stand is poorly stocked (less than C-level; 35 percent) or if the stand is adequately stocked (C-level or better; 35 percent) but is within 5 years of maturity, you may wish to consider stand regeneration.

Shortening the stand cycle will allow you to market the current stand, avoid lost value in the sale of dead salvage material, and assure adequate regeneration through seed production and stump sprouting from the living trees. If advanced regeneration stocking and stump sprouting potentials are adequate, you can regenerate the stand with a presalvage harvest. For stands where these sources of regeneration are not adequate, then a presalvage shelterwood or sanitation conversion may be considered. If the stand is highly vulnerable or susceptible, then a conversion to nonpreferred species will help prevent the spread and establishment of gypsy moths. On lower quality sites, conversion will usually be to a pine species; higher quality sites can be converted naturally to mixed hardwoods using shelterwood or selection cutting. When stand susceptibility and vulnerability are low, then presalvage shelterwood cutting can develop adequate advanced regeneration but without requiring drastic change in composition.

If the stand is fully stocked but will not reach maturity for another 6 to 15 years, it is advisable to defer cutting for 6 to 15 years, or re-examine for possible protection, early harvest, or salvage need after mortality has occurred. Fully stocked stands that may be 16 or more years from maturity and with less than 80 percent stand density may be handled best by deferred cutting for 10 to 15 years or re-examining status as defoliation becomes an immediate threat. Experience has shown that the stresses created by thinning or cutting remain for 3 to 5 years after treatment. Reduced vigor resulting from this stress, coupled with gypsy moth-caused defoliation stress, may yield much higher mortality losses. Thus, these higher value, highly stressed stands should be closely observed and possibly sprayed with insecticides if an outbreak is expected during the recovery period. For fully stocked stands that are 16 or more years from maturity and have greater than 80 percent stand density, sanitation thinning or presalvage thinning may be considered, depending upon the percentage of the basal area that is in preferred food species. Sanitation thinning is designed to prevent the spread and establishment of damaging organisms, to reduce stand susceptibility by removing preferred food species and refuges for the gypsy moth, and promote predator and parasite habitat. The treatment is best applied in stands where less than 50 percent

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of the stand basal area is in preferred foodspecies, and where other management objectives will allow. Presalvage thinning reduces defoliation-caused losses by removing the most vulnerable trees before they are defoliated and killed. The major objective is to reduce stand vulnerability by early removal of those trees that are most likely to die. Presalvage thinning is best suited for those stand conditions described above, but in which more than 50 percent of the basal area is in preferred food species. The most vulnerable trees are poor crown oaks, poor crown other species, and fair crowned trees, particularly on poorer, drier sites. Good crowned trees are least likely to die.

If defoliation is currently taking place or expected within the next 5 years, the most appropriate action is to protect foliage through insecticide application, to closely monitor and evaluate current conditions through stand examinations, or to move ahead with stand regeneration plans as described above. Stand priorities for insecticide application may be based on stand maturity, condition, and value of the stand; the severity of the gypsy moth threat; and planned management objectives. Under certain conditions of low stand value or low risk, the best course of action may be to delay direct treatment and to re-examine the stand after defoliation to assess current condition, extent of damage, and salvage potential.

If defoliation has recently occurred, wait 1 to 3 years to allow resulting mortality to occur. At that time, the stand can be re-evaluated to consider stand regeneration if damage levels are high and current stocking levels are poor, or stand maturity is within 10 years. Salvage harvest can be used when regeneration stocking is adequate. When it is not adequate, then salvage shelterwood or salvage conversion can be used to obtain adequate regeneration or convert the stand to nonpreferred species as in the presalvage prescriptions. If damage levels are low to moderate, current stocking levels are adequate

to maintain the stand, and the stand is more than 10 years from maturity, then several intermediate treatments are possible. Salvage thinning is used to salvage dead trees and thin live trees that are present until the stand reaches the proper residual stand density (B-level stocking). If the stocking of live trees is between B- and C-level and there is at least 30 percent mortality, then a salvage cutting is called for. Otherwise, stands with the same stocking levels but less than 30 percent mortality should have deferment of further cutting until they increase in stocking. A more complete description of guides for silvicultural treatment is presented by Gottschalk³.

Dying trees may be utilized for sawtimber if cut within 1 to 3 years of mortality. Increasing time after death will decrease the stumpage value, the quality of the lumber, and increase drying problems and checks. Veneer trees generally are downgraded to sawtimber status when they die. Trees dead up to 5 years are useable for pulpwood with no loss in quality or yield if bought by weight because the increased volume per ton of the dead trees offsets the increased fines and decay losses.

CONCLUSIONS

While these guidelines have not been tested, they represent the current knowledge of the impacts of gypsy moth defoliation on forest stands. Opportunities exist to manage forests in areas where the gypsy moth is or will be present in an economical manner without sacrificing management objectives or allowing the insect to dominate management actions as has happened in many areas of Pennsylvania, New York, and other infested areas. Eventually the forest, forest managers, and this exotic insect pest may approach a state of tolerable coexistence.

³Gottschalk, Kurt W. Silvicultural guidelines for forest stands threatened by the gypsy moth. USDA For. Serv. Gen. Tech. Rep. In Press.