



Department of Forestry

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General Forestry Information

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Hurricane Damage to Hardwood Stands: Frequently Asked Management Questions

Hurricane Katrina caused extensive damage to hardwood stands in south and central Mississippi leaving landowners with numerous questions about future management of the stands. The purpose of this Technical Note is to provide information to landowners to assist in answering those questions. However, landowners are strongly encouraged to seek the advice of a professional forester or others knowledgeable about hardwood management before making final decisions about individual stand management. A list of agencies that can be contacted for advice and articles that may provide useful information to the landowner are presented at the end of this Note.

Before addressing particular questions about management of the hardwood stands, it is necessary to understand the types of damage to individual trees caused by hurricanes and the resulting effects on the tree (i.e., mortality, growth rate, value). The types of damage generally occurring are: **uprooting (blow down), broken stems, broken limbs, leaning trees, bent trees, and trees with major wounds.** Damage is very often a combination of these damage types.

Uprooting is often the primary damage to hardwood stands resulting from hurricane winds, and in the worst cases almost all stems of any commercial value can be lost. In such cases, salvage and a complete harvest to regenerate the stand is the only viable choice. The questions then become how and when the salvage should be done and how the stand will be regenerated. These decisions will be discussed later. One fortunate aspect of blow down or uprooting is that there is most often less damage to the bole of the tree than from other type damages. It is often possible to utilize the tree for the same products it would be used for if normally harvested. Therefore, the decrease in value will not be as great as from broken stems and other forms of damage.

Broken stems, while not as common in hardwoods as in pine, do occur, often as the result of one tree falling against another tree. Broken stems usually result in far greater value loss in

hardwood trees of sawtimber size than does uprooting. This greater value loss is the result of splintering, fiber pull, and reduction in merchantable lengths, all of which limits use of the tree for higher value products such as lumber and veneer. Also, logging cost for salvage is greater when the trees are broken.

Broken limbs, including the top, generally is not as serious a problem in hardwoods as in pine. Previous experience has shown that hardwood trees may suffer a 50-75% loss of crown and be able to survive and establish a new crown (USDA Forest Service, 1998). However, this depends somewhat on the type of breakage. If very large limbs are broken and cause major wounding to the bole of the tree, the tree is not likely to survive for long periods (years) because of decay and/or future stem breakage.

Leaning trees are an indication of partial uprooting. If the lean is less than about 45 degrees and there is no other major damage, such as severe wounding, these trees are very likely to survive and grow at an acceptable rate. It is not necessary to remove them in a hurricane salvage operation, although they would likely be removed in the next harvest operation in the stand. Bent trees are most common in younger stands of saplings and pole-sized trees. These trees are also capable of recovery and should receive a low priority for removal in a salvage operation.

Boles of standing trees can be severely wounded by falling trees and blowing objects during hurricane winds. These wounds will result in degrade of the stems but usually do not result in immediate death of the tree. Except in the case of very severe wounds, the trees will continue to grow and may be important as a component of stands that can be managed following the hurricane damage.

Can my damaged hardwood stands be managed or should I harvest the standing timber along with the salvage operation?

Hardwood stands damaged by hurricane winds look terrible! Often, the first impression is that there is not enough left to manage, but to automatically make that decision could be a big mistake. The guideline should be to move with caution and only make the decision after a thorough financial and biological assessment as described below.

A simple salvage operation to utilize dead trees or those not capable of responding and growing should almost always be employed provided it is economically feasible. However, the question here really is – do I have stocking of desirable species that will continue to grow and meet my objectives for the stand? There are many things that should be considered when making this decision, including the severity and type of damage, age and past history of the stand, and landowner's long-term objectives. Generally, the primary consideration is the type and severity of damage. Hurricane damage may vary from complete blow down of all commercial timber to simple limb and top breakage.

To make this decision, a thorough assessment of the stand should be made. Observations from the air or from the edges of the stand may not be adequate to make the decision. The assessment should concentrate primarily on the standing trees and not what should be salvaged, although that can be evaluated at the same time. It should involve observations/measurements of stocking (trees per acre), composition (are the standing trees desirable for my management objectives?), type and severity of damage, and distribution of the damage (i.e., is it uniform throughout the stand or in patches?). The assessment can best be made by a professional forester with experience in hardwood management.

For any given stand condition, no one decision is best for all landowners. The appropriate decision will vary depending on landowner objectives. However, if continued production of hardwood timber is a major objective, some general guidelines can be given. If an assessment of the stand indicates that there are 35 or more trees per acre of desirable species with the capability of responding and producing good crowns and acceptable growth rate, the stand should be managed. These trees should have minimal damage to the bole. The ability to respond is determined primarily by the condition of the crown. Previous work (Barry et al 1998) has shown that trees with less than 50% crown loss are capable of full recovery with little loss in growth. At 50-75% crown loss, many hardwood trees will completely recover, but will have loss of growth, and all can be retained for several years. If providing wildlife habitat (especially hard mast producing trees) is a major landowner objective, the decision to manage rather than harvesting the standing trees may be appropriate with less than 35 trees per acre. In either case, the landowner or manager should realize that management techniques will be altered in these stands as discussed below.

More than 50% of trees in my hardwood stand have either been uprooted or severely damaged. What are the disadvantages of harvesting the remainder of the trees in conjunction with the salvage operation?

The biggest disadvantage may be a large financial loss. Because of the large volume of material on the market as a result of salvage operations, stumpage values are likely to be low. Furthermore, when harvested with the salvage material the higher value trees are likely to be sold at prices established for salvage material. If the residual stand can be managed for a few years, even though the stocking is less than desirable, stumpage value is likely to be far higher than during the hurricane salvage period.

Another distinct disadvantage of complete harvest of the residual stand is that it may eliminate the possibility of natural regeneration for the next hardwood stand. If a complete harvest of the stand is done and there is no advance regeneration of the desirable species, then natural regeneration becomes an impossibility. If a residual stand, even at low density, can be maintained it may serve as the seed trees for a new stand. This is very similar to shelterwood regeneration.

One condition where complete stand removal may be a viable choice is when ample

advanced regeneration of desirable species is present. In that case, the removal would be essentially the same as the final harvest and regeneration cut for a managed stand.

How can I determine if I have adequate advanced regeneration of desirable species to initiate a new hardwood stand?

This decision can best be made by a professional forester or others with experience in hardwood management. However, there is a simple model developed by the Forestry Department at Mississippi State University that can be used by landowners to help make that decision. The model and instructions are available on CD and can be obtained by contacting the Forestry Department at MSU.

How much time do I have for the salvage operation?

Highest priority for salvage should be given to the highest value products. If the landowner has both pine and hardwood, highest priority should be given to pine sawtimber trees because of the probability of rapid degrade by blue stain. Second priority should go to hardwood sawtimber. Salvage of pine and hardwood pulpwood may be delayed as long as 8-12 months. Uprooted or broken hardwood sawtimber trees should be salvaged as quickly as possible but, depending on the weather, salvage can take place after 4-6 months.

In addition to uprooted and broken trees, what type of standing trees should be removed in the salvage operation?

Trees that are unlikely to survive to the next harvest operation in the stand (5-10 years) should be removed. This is determined primarily by crown condition and damage to the bole of the tree. As a general rule, trees with more than 75% of the crown destroyed should be removed, but some of these could be left for wildlife habitat purposes. Trees with severe enough wounding to make loss likely because of breakage or decay should be removed.

Additional Sources of Information

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