Assessing Storm Damaged Forest Stands

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Severe thunderstorms, hail storms, hurricanes and tornadoes impact portions of our state almost every year and these weather events often impact both urban and rural forests. Land managers are often faced with evaluating these areas to determine if salvage is needed, partial removals or if the stand will recover without intervention. Damage within a give area can vary greatly so careful evaluation of the damaged area should always be the first step. Decisions are often made on the worst areas within the damaged areas, and damage can vary to the point where areas within the same stand must be treated differently. This information isn't meant to be a complete guide but rather some highlight points that should be considered when evaluating and managing storm damaged areas. Severe events such as tornadoes and severe hurricanes tend to cause tree breakage, and immediate losses, while less severe storms may leave trees damaged and standing or uprooted where the stems may live for a period after the event.

In general, storms that cause immediate breakage of the trees must be salvaged immediately, while those that cause less damage such as limb or top breakage, uprooting either partially (leaning trees) or completely (stem is close to ground with some roots intact) allow for much longer salvage windows. Trees with severe root damage, rarely survive the growing season but can last much longer if the weather event occurs during the cooler seasons of the year. Opportunistic insects and tree diseases will often find these weakened and stressed trees and hasten mortality so they should be considered when evaluating storm damaged stands

Each landowner will need the services of a reputable registered forester, an accountant well versed in timber taxation, and a reputable logger. The forester can assist with (1) a pre- and post-event timber appraisal where needed (where there is a timber basis; see section on casualty losses), (2) contacting loggers to start the timber salvage operation, and (3) recommendations on site preparation and planting (if applicable) after the salvage operation. The accountant can assist with claiming casualty losses, where appropriate, in the year that the casualty loss occurred. The logger will perform the salvage operation.

► Assess stand damage and categorization

(1) severe = so damaged that best option is a salvage operation, (≥ 50% of the stems with significant damage)
(2) moderate = enough crop trees per acre in good condition to provide a stand to manage with some silvicultural work (20-50% of the stems with significant damage)
(3) low = stands that are in a condition of needing little immediate care. Pine stands tend to occupy moderately well, well, and excessively well drained soils (upland sites) and therefore stem breakage and "leaners" and the common tree damage problems. (≤ 20% of stems with significant damage)

Merchantable pine stands (> age 15 to 20 years)-- Levels of damage:

SEVERE: (≥ 50% of the stems with significant damage) often <30 to 60 trees per acre standing and in good condition (little to no visible lean, small to no visible wounds). Note photos 1, 2 and the foreground of 3.

Option. Salvage operation as soon as possible to include removal of standing trees. Pile debris, limbs, and tops away for standing trees where feasible and burn piles with burn permit under appropriate weather conditions if within 2-3 months of weather event. Prescribe burn site to reduce debris level (fire breaks in place) and apply pre-plant site preparation in late summer or fall, plant seedlings December - February. Salvage operations conducted after late spring will likely have to be held over until the following growing season for site preparation and replanting due to vegetation resprouts must be 1+ growing season for proper chemical uptake and translocation to roots, and regeneration weevils could be problem with new seedlings if planted too soon after harvest.

MODERATE: (20-50% of the stems with significant damage)–Enough trees per acre standing and in good condition to carry to a final harvest with little to no visible lean, small to no visible wounds (> 60 to 250 trees per acre depending on size and value). Note photos 3 (background) and 4.
Option 1. Salvage operation when feasible leaving best standing trees if left with a low number of good trees (20 to 50 trees per acre depending on species, age, and size) to serve as seed trees for next rotation. Pile debris, limbs, and tops away for standing trees where feasible and burn piles under appropriate weather conditions if within 2-3 months of weather event. A September burn followed by a light disking in the year for natural seeding will enhance pine seed germination.
Option 2. Salvage operation removing broken stems and lean trees (trees with a visible lean) in cases where there are a sufficient number of good trees (125 to 250 trees per acre) to carry to a final rotation. Prescribe burn stand where feasible the first winter after the weather event with adequate firebreaks and good weather conditions. Grow stand out to desired rotation.

LOW: (≤ 20% of stems with significant damage) >250 trees per acre standing and in good condition (little to no visible lean, small to no visible wounds). Note photos 5 and 6.
Option1. In some cases there may not be enough broken, uprooted, or leaning trees to be worth the logger's effort. From a landowner's standpoint the damage may not be sufficient enough to warrant a salvage operation.
Option 2. There may be cases of high valued products (poles and sawtimber) where a salvage operation removing broken stems, uprooted and lean trees (trees with a visible lean) may be warranted. Prescribe burn stand where feasible the first winter after the weather event with adequate firebreaks and a burn permit and good weather conditions. Grow the stand out to a desired rotation age.

Pre-merchantable pine stands (age 1 - 15 to 20-years) -- Levels of damage:

Generally stands with heights less than 30 feet and lean less than 45% will recover. Assess level of lean and stem breakage. If there are > 300 to 350 stems that are in good condition (lean < 45% and no breakage) the stand can be carried out to thinning age.

► Table 1 lists a timeline for salvaging timber.
► In all damaged stand cases, keep an eye on the site every 2-3 weeks for beetle outbreaks or disease (root rot, pitch canker, etc.). Table 2 lists timeline for insect and disease infestations.
► Broken pines will loose about 25% of their weight in the first week and since wood is typically sold by weight, salvage operations in severely damaged, high valued stands should occur as quickly as possible.
► Timber prices and revenues from salvage operations are typically 10% to 50% of their normal value due to a number of factors: more difficult logging conditions, a larger supply of wood on the market, the potential for unseen wood defects (interior splitting, cracking, etc), and weight losses.

Hardwood and mixed pine-hardwood stands

Hardwood and mixed pine hardwood stands tend to occupy lower slope positions with soils ranging from somewhat poorly to very poorly drainage classes. In these cases most damage to from uprooting and tree tops and branch breakage. Assess that stands in a similar manner as pine stands from severe, moderate to low and prioritorize what stands need salvage first and what stands can wait.

Table 1. Timeline for timber to be salvaged to prevent degradation (NC Forest Service Division of Forest Resources. 2000)

Product	**Harvest window**	**Comments**
Pine and hardwood veneers	4 – 6 weeks	Blue stain prohibits use if left longer
Pine dimension lumber	3 – 4 months	Should be kiln dried to prevent emergence of secondary pests
Pine posts	4 – 6 weeks	Blue stain will affect toughness and preservative treatment
Pine and hardwood pulp, fiberboard, particleboard and OSB	8 – 12 months	As wood begins to decay, pulping process will be affected.

Table 2. Timeline for invasion of damaging insects and diseases (NC FS Div. of Forest Resources 2000)

Species	**Year one**	**Year two**
Pine	Bark beetles, ambrosia beetles, sawyers, blue stain fungi, soft rot fungi	Decay fungi
Oak and Hickory	Wood borers, ambrosia beetles, sawyers, soft rot fungi	Sapwood decay fungi
Other hardwoods	Wood borers, ambrosia beetles, sawyers, soft rot fungi	Sapwood and heartwood decay fungi

► Does the stand qualify as a “casualty loss” for tax purposes?

First a casualty loss is a sudden loss. Strong wind, tornado, and hurricane damaged stands qualify as casualty losses. Casualty losses are deductible the year of the casualty on IRS Form 4684, Casualty and Thefts (Gaddis and Dicke 2006). The wind damaged stand qualifies as a casualty loss as the lesser of the fair market value (FMV) loss in timber and the timber basis. Timberland owned for more than one rotation will often have a zero basis whereas timberland recently purchased (i.e., $1800 per acre for 100 acres of loblolly in 2000 with $500 in a land basis and $1300 in the timber basis) may have some timber basis. If the landowner has a timber basis, then a registered forester will need to (1) estimate the FMV of the timber pre-casualty, (2) the FMV following the casualty (# 1 and 2 by timber cruise) with the FMV loss = FMV before – FMV after (often the salvage value), The FMV loss is deductible up to the timber basis, and (3) the basis in timber.

Literature Cited

Gaddis, D.A. and S.G. Dicke. 2006. Frequently asked questions about timber casualty losses. Miss. State Univ., Starkville, MS. 7. p.

NC Forest Service Division of Forest Resources. 2000. Timber salvage guidelines. Raleigh, NC. 2 p.

Photo 1. A merchantable pine stand in Johnson County, Georgia with severe damage from an 11 May 2008 storm.

Photo 2. A merchantable pine stand in Johnson County, Georgia with severe wind/tornado damage (11 May 2008 storm).

Photo 3. A merchantable pine stand in Johnson County, Georgia with severe (foreground) to moderate (background) wind/tornado damage (11 May 2008 storm).

Photo 4. A merchantable slash pine stand in Emanuel County, Georgia with moderate wind/tornado damage (11 May 2008 storm).

Photo 5. A natural longleaf pine stand in Emanuel County, Georgia with low wind/tornado damage (11 May 2008 storm).

Photo 6. A merchantable loblolly pine stand in Johnson County, Georgia with low wind/tornado damage (11 May 2008 storm).