Initial Estimates of Hurricane Katrina Impacts on Mississippi Gulf Coast Forest Resources

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Focus Area

Hurricane Katrina pummeled the Gulf Coast of Mississippi on August 29, 2005. The eye wall of the storm passed directly over Hancock and Pearl River Counties. Harrison, Jackson, Stone, and George Counties on the windward side of the hurricane's path sustained severe damage before the storm's strength dissipated as it moved farther inland (fig. 1).

Current estimates indicate that these counties contain about 1.7 million acres of forest land and account for 9 percent of the total forested acreage within the State.

Hurricane Katrina approaching the Gulf Coast, August 29, 2005. (Photo courtesy of NASA/JAXA)

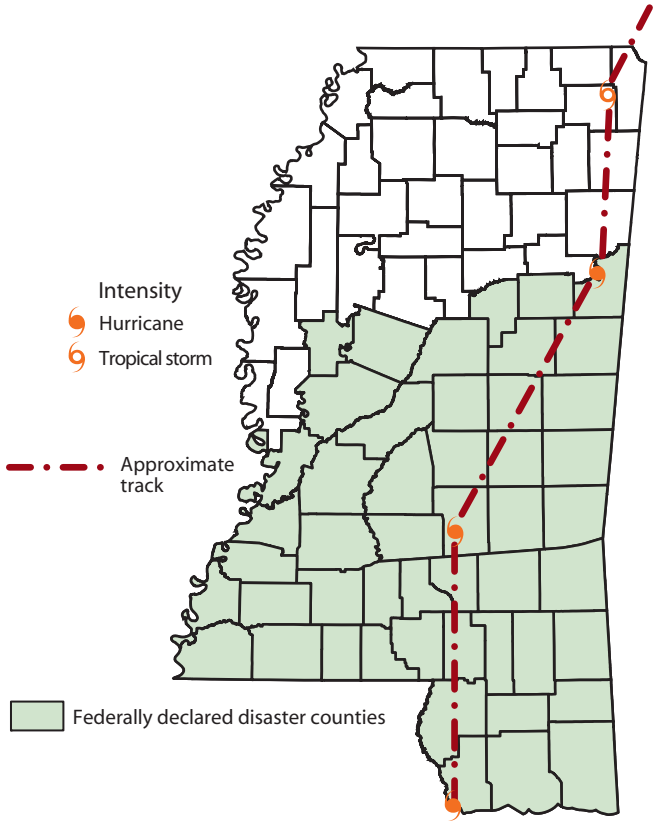

Figure 1—Hurricane Katrina's path through Mississippi with initial damage projections.

Assessment Methods

Damage assessment was an immediate priority for federal, State, and local governments. Development of policy and aid packages was of paramount concern to mitigate impacts to local and regional economies resulting from the destruction of forest resources. To successfully accommodate these mandates the U.S. Department of Agriculture Forest Service, Forest Inventory and Analysis (FIA) unit from the Southern Research Station employed remeasurement methods of previous (1994) forest inventories, along with protocols for establishing a new, annualized sampling frame. Working in conjunction with FIA, the Mississippi Institute for Forest Inventory (MIFI) and Mississippi Forestry Commission (MFC) also implemented their standard protocols for assessing timber inventory.

Sample Size and Estimation Procedures

The combined efforts of MFC-MIFI and FIA resulted in 1,349 sample plots in the 6 focus-area counties in southeastern Mississippi. Crews measured a total of 33,634 trees (>1 inch d.b.h.). The estimates and descriptive statistics presented herein were not compiled utilizing traditional FIA processing systems. Therefore, they are not intended to replace or supplant the inventory analysis results that will be published upon conclusion of the FIA effort in Mississippi. Nor are they intended to take precedence over the MIFI regional publications projected for completion in 2007.

Trees per acre values derived from FIA inventory information were obtained by dividing the number of trees in the category of interest by the area sampled for that category rather than using a standard expansion factor, therefore, per acre values will change once FIA phase one forest area estimates have been generated. Condition class proportions were incorporated during sample area computations. The estimates presented are based on the current inventory and do not include tree mortality or any other remeasurement statistics from previous inventory cycles.

Per acre values developed from MIFI inventory information were obtained using classical expansion methods. Nested plots were used to sample according to product classification as defined through a surrogate of d.b.h. Both FIA and MIFI employ a hierarchical tally structure utilized to classify damage levels for both stand structure and individual tree occurrence.

Plot and Condition Level Damage

Incidence of damage recorded at the plot level was distributed consistently across forest types and ownership groups. Figure 2 illustrates the occurrence of damage as detected from remote sensing data represented by thematic classification of foliar signature for image differences from pre- and post-hurricane LandSat imagery.

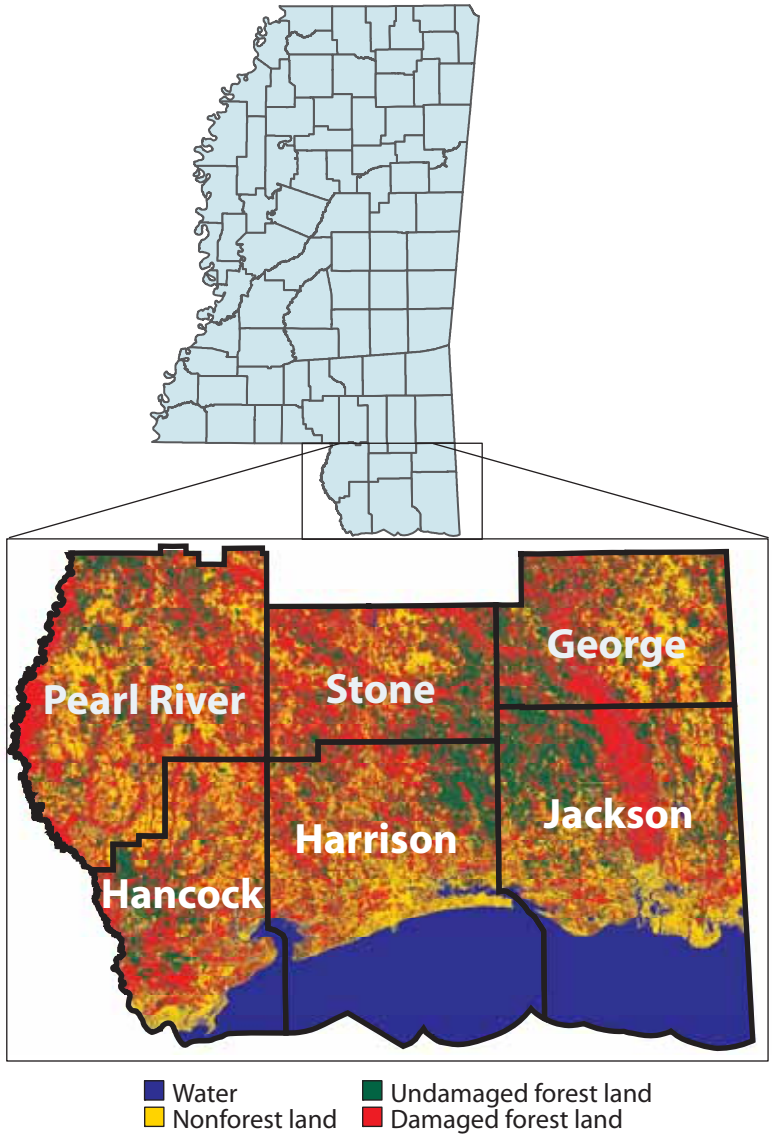

Figure 2—Thematic classification of damage upon forest land.

Eighty-eight percent of forested plots sampled contained some indication of hurricane damage. The largest percentage of plots containing damage fell in Harrison County while the lowest percentage fell in Jackson County.

Blowdown (windthrow) was the most common type of damage observed at the stand level. Although, this type of damage was more common in deciduous forest types, blowdowns did occur in stands of longleaf pine and denser stands of loblolly and slash pine. Wind-shear damage was the second most common type of damage and was experienced only in coniferous stands. Shearing took place most often between heights of 3 to 15 feet. Plots located in younger or denser stands appeared to be less susceptible to these significant types of damage, but sustained higher incidents of crown and foliar damage.

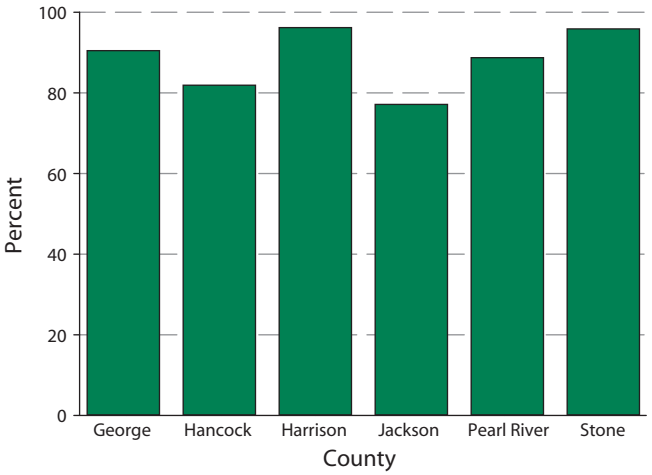

Figure 3—Percent of FIA plots containing some indication of damage by county, southeastern Mississippi, 2006.

Table 1—Plot level percentage categories of bole damage by county and type

County	Lean	Blowdown	Shear
		percent	
George	7.0	30.1	9.1
Hancock	4.8	21.8	18.4
Harrison	8.0	28.7	12.7
Jackson	8.0	15.5	6.1
Pearl River	4.3	25.5	18.4
Stone	9.3	21.9	15.9

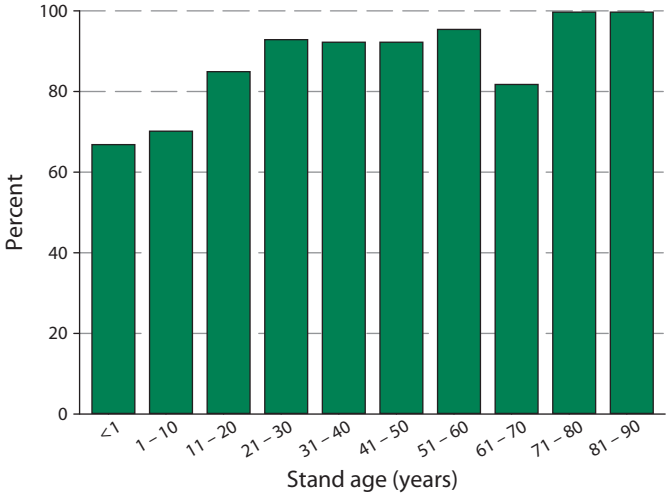

Figure 4—Percent of plots containing some indication of stand damage by stand age, southeastern Mississippi, 2006.

Merchantable Tree Damage

Though 88 percent of forested plots contained an indication of damage, only 34 percent (about 50 trees per acre) of merchantable live trees ≥5 inches d.b.h. showed signs of damage.

Only 18 percent of saplings (trees <5 inches d.b.h.) showed signs of damage. A higher percentage of saplings sustained damage in Pearl River and Stone Counties than in any of the other four counties. Remarkably, only 6 percent of saplings in Jackson County exhibited signs of damage.

Trees >5 inches d.b.h. contributed an average of 66 ft^2 per acre of basal area throughout the 6-county region studied. Pearl River County sustained about 26 ft^2 per acre of basal area damage to trees >5 inches d.b.h.

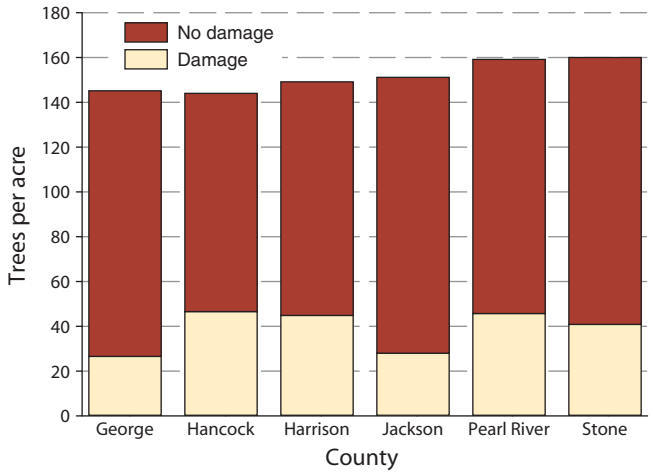

Figure 5—Damaged versus undamaged trees >5 inches d.b.h. per acre on southeastern Mississippi forest land, 2006.

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Hurricane Katrina damage to planted pine, Picayune, MS, 2005. (Photo courtesy of Ricky Layson, Forest Resource Consultants, Inc., www.forestryimages.org)

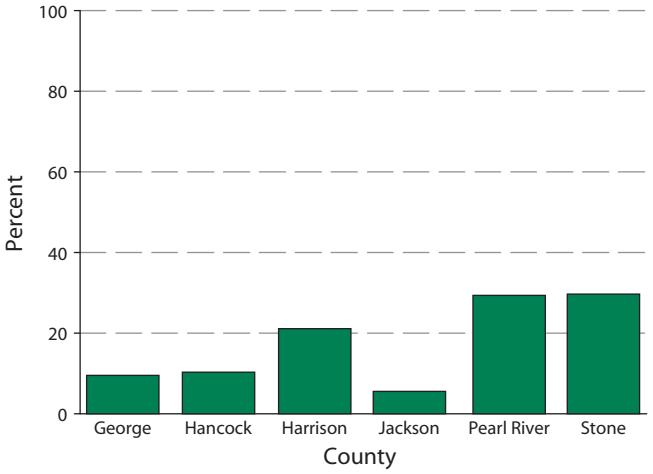

Figure 6—Percent of saplings (trees <5 inches d.b.h.) containing some indication of damage by county, southeastern Mississippi, 2006.

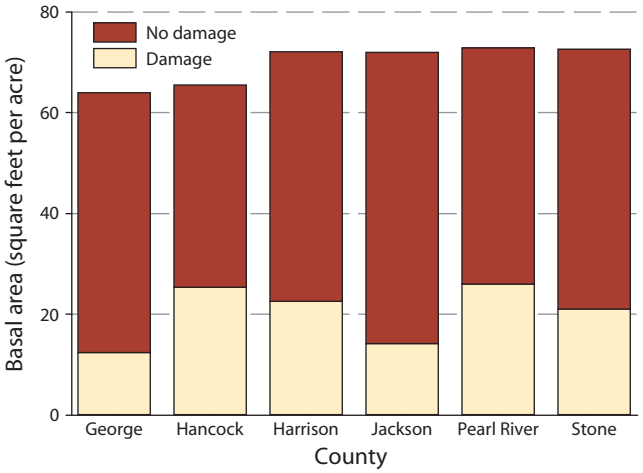

Figure 7—Basal area by damage and county, southeastern Mississippi, 2006.

Slightly more than 50 percent of the basal area in the oak-pine, oak-hickory, and elm-ash-cottonwood forest-type groups sustained some degree of hurricane damage. Only 28 percent of the basal area in the longleaf-slash pine type sustained damage. Overall, damage levels were highest in oak-gum-cypress stands with about 40 percent of the basal area in that forest-type group impacted.

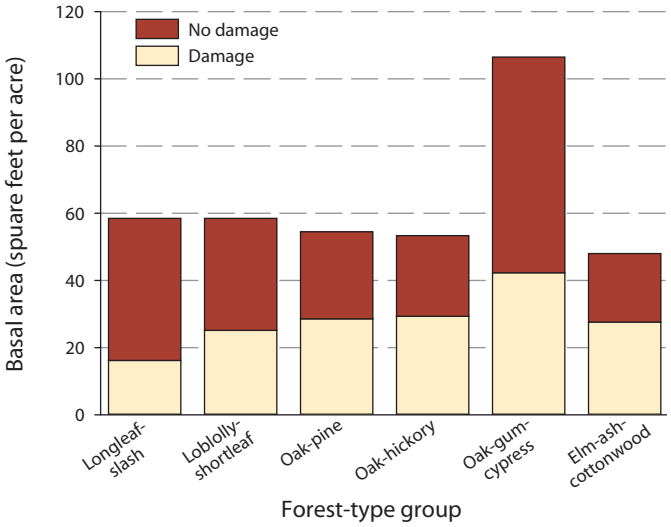

Figure 8—Basal area by damage and forest-type group, southeastern Mississippi, 2006.

Caveat

The data presented in this document are preliminary and subject to revision when field data collection, validation, and processing procedures are completed. Readers are cautioned that statistical error increases as domain size decreases. Therefore, estimates at the state and multi-county level are more reliable than estimates at the individual county level.

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