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Impacts of Hurricanes Katrina and Rita on the U.S. Demand for Building Products and the Impact on Southern Forest Inventories

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Introduction

During September 2005, Hurricanes Katrina and Rita struck the south central U.S. causing major destruction and loss of life. Katrina impacted the southeastern part of Louisiana, southern Mississippi and parts of southwestern Alabama. Rita came ashore along the Texas-Louisiana border. This note examines the impact of these major disasters on the U.S. demand for building products, due to the destruction and damage to housing units, and the effect of wind damage to the region's forest resources and the potential future effect on the region's timber supply.

The analysis begins with a review of the estimated number of housing units destroyed by Hurricane Katrina followed by estimates of the building material requirements need to reconstruct or repair the affected housing units. Next the reconstruction requirements are contrasted to total US demand and the potential effect of the additional reconstruction demand on building product prices is linked to assumptions on the rate of reconstruction.

The large-scale destruction of forest resource inventory in the south-central U.S. is then examined. The potential for salvage and the future impacts on timber supply are then discussed. The note ends with a historical review of the frequency of hurricanes in the US that suggests the U.S. is entering a cyclical period of heightened hurricane activity.

Housing Units Destroyed or Damaged

The storm surge that accompanied Hurricane Katrina caused breaches of the dike system that surrounds the city of New Orleans that resulted in massive urban damage. The storm surge also struck coastal Mississippi caused significant damage. Table 1 below provides an estimate of the number of housing units destroyed or damaged by Hurricane Katrina conducted by the U.S. Red Cross Disaster Operations Center.

The American Red Cross estimates that approximately 353,000 housing units were destroyed and a further 497,000 damaged or affected by the storm. Contrast this with the Hurricane Andrew, the hurricane that previously was the most damaging storm in US history, which destroyed approximately 28,000 homes. Thus, the damage from Hurricane Katrina was approximately twelve times that of Hurricane Andrew.

As shown in Table 1, the destruction and damage is concentrated in the detached single-family housing units that on average are larger and have a higher requirement, for wood-based building products such as lumber and structural panels. Table 1 also presents the damage estimates by state. As anyone who has followed the storm knows the damage was concentrated in Louisiana (80%) due the tragedy that befell New Orleans.

TABLE 1
Housing Units Destroyed or Damaged by Hurricane Katrina

Dwelling Type	Dwellings Destroyed	Major Damage	Minor Damage	Affected	Total
Single-Family Detached	310,353	102,297	135,879	127,290	675,819
Manufactured Homes	1,815	3,388	6,022	5,834	17,059
Apartments	40,762	33,691	27,881	52,551	154,885
Total	352,930	139,376	169,782	185,675	847,763
State Totals					
Louisiana	283,838	73,172	69,093	178,245	604,348
Mississippi	68,729	65,237	100,318	7,430	241,714
Alabama	363	967	371	0	1,701

Source: Red Cross Disaster Operations Summary Reports as of September 27, 2005

Estimates of the housing units destroyed by Hurricane Rita have not yet been released. However, because this storm came ashore in a relatively unpopulated area, the damage estimates are not expected to be near the same magnitude as the damage caused by Katrina. Nevertheless the destruction from Rita will further expand the need for reconstruction in the region.

Impact on Housing Demand

To place housing destruction caused by Hurricane Katrina in perspective the total housing starts in the US during 2004 was 1,956 thousand units while single family housing starts were 1,611 thousand. The housing units destroyed thus represents 18% of total starts and 19% of single-family unit starts. However, the eventual impact of the reconstruction on total US demand will depend on the rate of reconstruction in the affected areas and changes in demand in the other regions of the U.S. Table 2 shows the increase in housing demand for different lengths for the reconstruction period under the assumptions that the demand in the rest of the US remains and the 2004 level and that reconstruction is spread out evenly across the given period.

Housing demand in the U.S. has been exceptionally strong over the past five years and analysts have been forecasting (wrongly) that overall demand would begin to cool. Analysts continue to expect demand to decline in 2006 and armed with a gradual rise in U.S. interest rates their predictions may finally come true. Should the predicted downturn materialize then the hurricane damage may simply help to maintain overall U.S. demand rather than increase overall demand.

TABLE 2
Potential Impact on U.S. Housing Demand as a Function of Reconstruction Period

Length of Reconstruction	Single Family Units	Percent Increase In 2004 Demand
(years)	(thousands of units)	(%)
2	155.2	9.63
3	103.5	6.42
4	77.6	4.82
5	62.0	3.85
6	51.7	3.21
7	44.3	2.75

Impact on Building Product Demand

Based on the estimated number of housing units destroyed and damaged by Hurricane Katrina the Engineered Wood Products Association has produced estimates of the wood product requirements need for reconstruction and repair.[1] Their estimates are given in Table 3. Also shown is the total U.S. consumption of softwood lumber and structural panels in 2004. The total wood-based building product requirements due to the storm is 9.2% and 11.5% of 2004 consumption for lumber, and panels respectively.

TABLE 3
Structural Wood Products Requirements Resulting from Hurricane Katrina

Dwelling Type	Lumber Million Bd. Ft.	Engineered Wood Million Bd. Ft.	Structural Panels Million Sq. Ft. 3/8"
Single-Family Detached	5,367	433	4,291
Manufactured Homes	42	3	39
Apartments	33	67	303
Total	5,742	513	4,633
Total 2004 US Consumption	62,654	n.a.	40,130
Percent of 2004 Total	9.2%	%	11.5%

Lumber: Structural softwood lumber.
Engineered Wood: Glulam beams, Wood I-joists, Laminated Veneer Lumber & other structural composite wood products.
Structural Panels: Softwood plywood and Oriented Strand Board.
Source: APA-The Engineered Wood Association September 27, 2005.

As with housing demand the additional demand for wood products due to the storms will potentially be spread out over several years. Table 4 presents a reconstruction scenario

[1] The APA data was prepared by Craig Adair, Market Research Director for the APA, and is available on the APA website www.apawood.org.

developed by the Engineered Wood Association for the damage by Hurricane Katrina. It shows reconstruction spread out over the next five years with repairs naturally occurring more quickly. Note that this is but one possible scenario. The table also present the estimated building products required per year under the given scenario. The annual requirement as a percent of total 2004 consumption is also provided for lumber and panels. This again suggests that the impact of the additional demand on total U.S. consumption may be small.

TABLE 4
Reconstruction Scenario and Impact on Wood-based Building Product Demand

	2005	2006	2007	2008	2009	2010	Total
Rebuilding Rate							
Destroyed	3%	10%	22%	25%	25%	10%	100%
Major Damage	15%	35%	40%	10%			100%
Minor Damage	20%	50%	30%				100%
Affected	30%	60%	10%				
Lumber (MMBF)	372	998	1,459	1,183	1,081	649	5,742
% of 2004 Demand	0.6%	1.6%	2.3%	1.9%	1.7%	1.0%	9.2%
Eng. Wood (MMBF)	34	91	131	105	95	57	512
Panels (million ft²)	301	807	1,178	953	870	522	4,632
% of 2004 Demand	0.8%	2.0%	2.9%	2.4%	2.2%	1.3%	11.5%

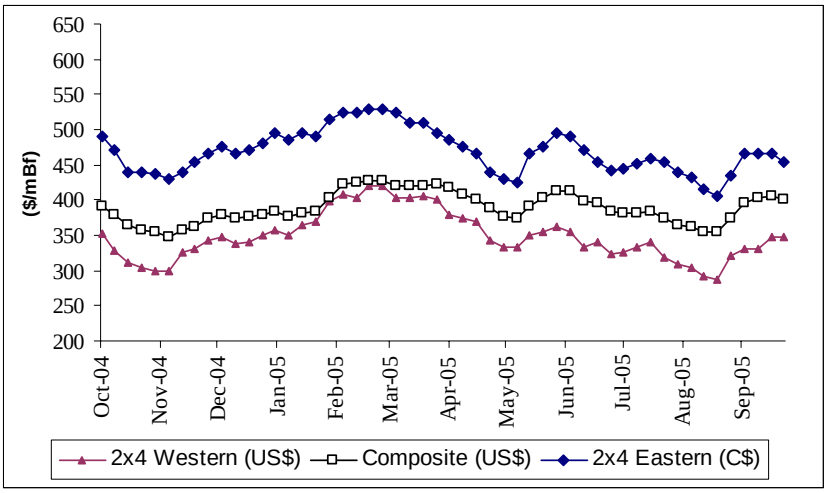
Source: APA – The Engineered Wood Association

Short and Long Term Impacts on Building Product Prices

As has occurred and was expected, the price for wood products increased sharply following the storm. This has resulted from an immediate increase in the demand for products to undertake emergency repairs coupled with the loss of building product inventories in the affected areas plus the temporary closure of production facilities within the region. Figures 1 and 2 below graph the recent run up in lumber and panel prices. For lumber the run up has halted a generally cyclical decline but has till not brought prices up the levels experienced at the start of the year. In addition the initial run up has halted and prices have began a gradual decline. For structural panels the price increase has been significantly stronger due to the special needs for roof and other emergency repairs.

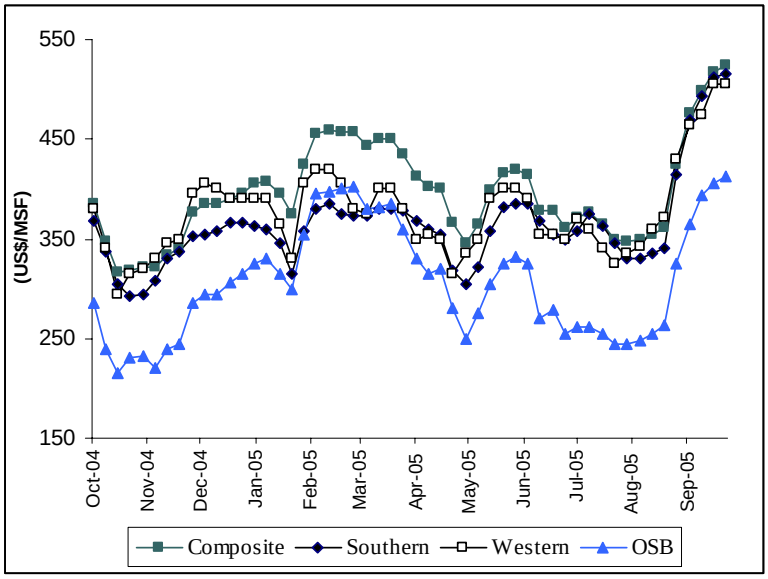
In the longer term the increased demand from the affected area is not expected to significantly impact prices. There is sufficient capacity in both the North American lumber and panel industries to handle any additional demand. In addition, offshore producers are ready to move additional product to the US in response to any price increase. As noted earlier, should housing demand begin to cool the effect of the hurricane damage demand will be to support rather than increase prices into the future.

FIGURE 1
Weekly Lumber Prices in North America
Eastern SPF 2x4 #2 & Btr., Western SPF 2x4 Std. & Btr., Kiln Dried, and Random Lengths Composite
($/Thousand Board Feet)



Source: Random Lengths

Figure 2
Weekly Panel Prices in North America
Random Lengths Structural Panels Composite, 15/32" 3-Ply Exterior Southern, 1/2" 4-Ply Exterior Western and 7/16" OSB (North Central)
(US$/Thousand Square Feet)



Source: Random Lengths

It is important to add two caveats to this forecast. First, the US government may accelerate construction efforts, which could potentially concentrate the additional demand into the next two years. This could further stimulate lumber and panel prices. Second, the potential for further hurricane damage remains, as the current hurricane season does not end until the end of November. Should another major hurricane make landfall in the US then further upward pressure on price will likely occur.

Southern Forest Inventories

Hurricanes, depending on their wind speed and duration, can cause significant timber damage in area covered by the storm's path. This is particularly true of areas in the northeast quadrant of the eye of the storm as that part of the storm will have the highest wind speed.

Hurricane Katrina

The US Forest Service has released an estimate of timber damage in the three Katrina affected states of Louisiana, Mississippi and Alabama. They estimate that 19 billion board feet of timber was damaged or destroyed. This is equivalent to approximately 120 million m^3 of timber. Of this total 60% is estimated to be softwood timber. The damage spread out over 5 million acres however approximately 90% of the damage occurred within 60 miles of the coastline.

Approximately 40% of the damaged timber is classified as 'down' with the remaining 60% classified as 'damaged or placed at risk.' Table 5 breaks the damaged timber estimated down by State. Mississippi suffered the greatest damage, followed by Louisiana with Alabama suffering relatively light damage.

By comparison the annual harvest for the entire South is approximately 258 million m^3, thus the damage in the three states is equivalent to 46% of the total annual harvest for the thirteen-state Southern forest region.

Growing stock

The total downed and damaged timber represents 14.7%, 4.9% and 1.4% of the total 1999 state-wide growing stock for Mississippi, Louisiana and Alabama respectively. For just the softwood timber growing stocks the percentages are even higher at 19.5%, 5.3% and 1.7% respectively. Naturally the impact on the affected counties would have been even more devastating.

TABLE 5
Timber Damaged Estimates for Hurricane Katrina by State
(million m^3)

	Softwood	Hardwood	Total
Downed Timber			
Mississippi	17.5	12.0	29.6
Louisiana	8.1	5.5	13.6
Alabama	3.6	2.6	6.1
Total	29.2	20.1	49.3
Damaged Timber			
Mississippi	33.3	22.9	56.2
Louisiana	6.8	4.6	11.4
Alabama	1.8	1.3	3.1
Total	41.9	28.8	70.7
Total Timber			
Mississippi	50.8	34.9	85.7
Louisiana	15.0	10.0	25.0
Alabama	5.3	3.9	9.2
Total	71.1	48.8	119.9

Source: USDA Forest Service

Hurricane Rita

The forest resources of Texas and Louisiana are clustered along their shared border and the storm path of Rita closely followed this border.

The Texas Forest Service (TFS) has produced an initial damage estimate that classifies timber as 'damaged' or 'affected':

- Damaged timber includes trees that have been uprooted, snapped off, leaning more than 45° or likely to die within 12 months;
- Affected timber includes trees that are leaning less than 45°, have lost only part of their crown and are otherwise not likely to die. Nevertheless the future growth of these trees will likely be impaired and are more susceptible to insect attack and disease.

The TFS estimates that 15.1 million m^3 of timber were damaged and a further 12.3 million m^3 were affected for a total of 27.4 million m^3. Damaged and affected timber occurred over an area of approximately 300,000 hectares. Texas' total timber harvest in 19.8 million m^3 thus the total timber damage represents 1.25 times the annual harvest. In addition, the downed and damaged timber represents 6 percent of the state's total growing stock

The timber damage assessment in Louisiana is still unreported. However, the Louisiana Forestry Association reports approximately 8.3 million m^3 of damaged softwood, 3.0

million m^3 of hardwood for a total damage of 11.3 million m^3. This is in addition to the Hurricane Katrina damage suffered in eastern Louisiana.

Effects on Short and Long Term Timber Supply

In the short-run the large quantity of downed timber has the potential to cause a sharp increase in harvest levels in the four affected states. Working against this opportunity is that the timber must be quickly harvested in order to avoid degrade due to blue stain and rot. Downed timber in the south has a much shorter window of opportunity for salvage than does BC's mountain pine beetle killed timber. Other factors potential impeding salvage is the higher cost of extracting wind thrown timber, potential access problems and labour shortages due to the general demand for reconstruction labour.

As an example of the limited ability to salvage timber consider Hurricane Hugo a Class IV hurricane that struck South Carolina in 1989 and destroyed 20% of standing timber on South Carolina's coastal plain. It is estimated that only 35% of the volume of downed timber was salvaged. However, due to the degrade of the downed timber to pulplog status, only 10% of the pre-storm timber value was recovered.

Cumulative Impact

Note that we cannot consider these two storms in isolation. The south was hit by four hurricanes in 2004 that did damage in Alabama, Florida and in the Carolina's. Finally if this trend of heightened hurricane activity continues then the cumulative impact must eventually significantly reduce the region's timber inventory and, just as substantially, affect the profitability of timber investments in the south.

Hurricane Cycles and the Potential for Further Damage to the Southern U.S.

The US National Weather Service website notes that Atlantic hurricane activity follows strong multi-decadal patterns of alternating above normal and below normal activity. Table 6 below shows this pattern. During 1995-2004 the index of hurricane activity (called the accumulated cyclone energy index) was 159% of the median. In addition the 2005 season will be the seventh year of hyperactivity in the last eleven years. By contrast the period 1970-1994 had a hurricane activity index of only 75%.

Forecasting future hurricane activity over the nest decade is impossible, but if we are in a multi-decadal period of above-normal activity then future hurricane seasons similar to this year's season is a definite possibility. Although not yet scientifically confirmed, should global warming contribute to increased hurricane activity then future seasons may be even worse than this season. This might lead to several possibilities. First the strong US population migration to the US south may be reversed. Significant future housing stock damage may be expected in the US south. And the forest resources of the regional would continue to sustain potentially sizable damage. The cumulative effects of the latter could reduce southern timber production and the profitability of timberland investments.

TABLE 6
Number of Hurricanes by Saffir-Simpson Category
to Strike the Mainland U.S. by Decade

Decade	Saffir-Simpson Category					All 1,2,3,4,5	Major 3,4,5
	1	2	3	4	5		
1851-1860	8	5	5	1	0	19	6
1861-1870	8	6	1	0	0	15	1
1871-1880	7	6	7	0	0	20	7
1881-1890	8	9	4	1	0	22	5
1891-1900	8	5	5	3	0	21	8
1901-1910	10	4	4	0	0	18	4
1911-1920	10	4	4	3	0	21	7
1921-1930	5	3	3	2	0	13	5
1931-1940	4	7	6	1	1	19	8
1941-1950	8	6	9	1	0	24	10
1951-1960	8	1	5	3	0	17	8
1961-1970	3	5	4	1	1	14	6
1971-1980	6	2	4	0	0	12	4
1981-1990	9	1	4	1	0	15	5
1991-2000	3	6	4	0	1	14	5
2001-2004	4	2	2	1	0	9	3
Average Per Decade	7.1	4.7	4.6	1.2	0.2	17.7	6.0

Source: U.S. National Hurricane Center