

Hurricane Ike Timber Damage Assessment

Texas Forest Service

17 September 2008

Hurricane Ike made landfall on Saturday, 13 September 2008, at 2:10 am CDT as a Category 2 storm with 105 mph winds on Galveston Island. Ike made his way up through East Texas into Northeast Texas, then the storm continued through Arkansas and well beyond. Damage from the storm was evident throughout much of East Texas, with Liberty County in Southeast Texas sustaining the worst timber damage. On 15 September, Texas Forest Service began to implement a rapid Timber Damage Assessment.

Two Texas Forest Service foresters conducted an aerial survey of the impacted area on Monday, 15 September. The aerial survey refined the damage boundaries that were projected by Southern Research Station of the USDA Forest Service on a potential damage map, which was produced on 14 September based on wind and rainfall data. Thirteen East Texas counties were surveyed aurally.

Refining the estimated damage zone boundaries led to the creation of the Timber Damage Assessment map, shown in Figure 1. This map shows three zones of severity:

- **Scattered Light** – approximately 3 percent of timber stands damaged or affected
- **Light** – approximately 5 percent of timber stands damaged and 5 to 10 percent affected
- **Moderate** – approximately 15 to 25 percent of timber stands damaged and 20 to 30 percent affected

Damaged includes trees that are uprooted, snapped off, leaning more than 45 degrees, or otherwise are likely to die within 12 months and thus will need to be salvaged. **Affected** includes trees that are leaning less than 45 degrees, have lost only part of their crown, have only a loss of foliage, or otherwise are not likely to die. However, future growth of affected trees will likely be impaired, and these trees will likely be more susceptible to insects and disease.

Seven Texas Forest Service Forest Inventory and Analysis (FIA) field crews collected ground-truthing data on 275 plots in the Light and Moderate zones on 15 – 17 September. Field crews collected the following data:

- forest type
- percent of pine damaged
- percent of hardwood damaged
- percent of pine affected
- percent of hardwood affected
- average stand diameter

The percentages of pine and hardwood damaged and affected as collected by the FIA crews are shown in Table 1. On September 17, this data was applied to the 2007 Texas FIA plot data in each damage zone to produce Tables 2 – 6.

Total volume of timber damaged and affected was estimated to be 612 million cubic feet for a total stumpage value of \$351 million. Total damaged and affected acres were 473,000 acres. For perspective, East Texas contains more than 17 billion cubic feet of growing stock timber in 43 counties. Total damaged and affected volume by Hurricane Ike was about nearly 4 percent of the total East Texas growing stock.

Total timber volume **damaged** by Hurricane Ike was 289 million cubic feet worth approximately \$167 million. This timber damage occurred over 235,000 acres. Total timber volume **affected** was 323 million cubic feet worth approximately \$184 million. This timber affected occurred over 238,000 acres.

Total poletimber **damage** was 0.60 million cords, while sawtimber damage was 1.1 billion board feet. Total poletimber **affected** was 0.64 million cords, while sawtimber affected was 1.2 billion board feet. For perspective, one billion board feet is enough to frame over 60,000 homes two-thousand square feet in size.

Sawtimber-size trees are at least 9.0 inches in diameter at breast height (4.5 feet above the ground) for pine and at least 11.0 inches in diameter for hardwood. Poletimber-size trees are at least 5.0 inches in diameter, but smaller than sawtimber size.

Texas Forest Service coordinated with USDA Forest Service Southern Research Station FIA Unit to ensure methods and procedures were based on the best science available to produce the timber damage estimates. Questions about the Timber Damage Assessment should be directed to:

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This report can also be downloaded from the Texas Forest Service web site at <http://texasforests.tamu.edu/>. Texas Forest Service is a Member of The Texas A&M University System.

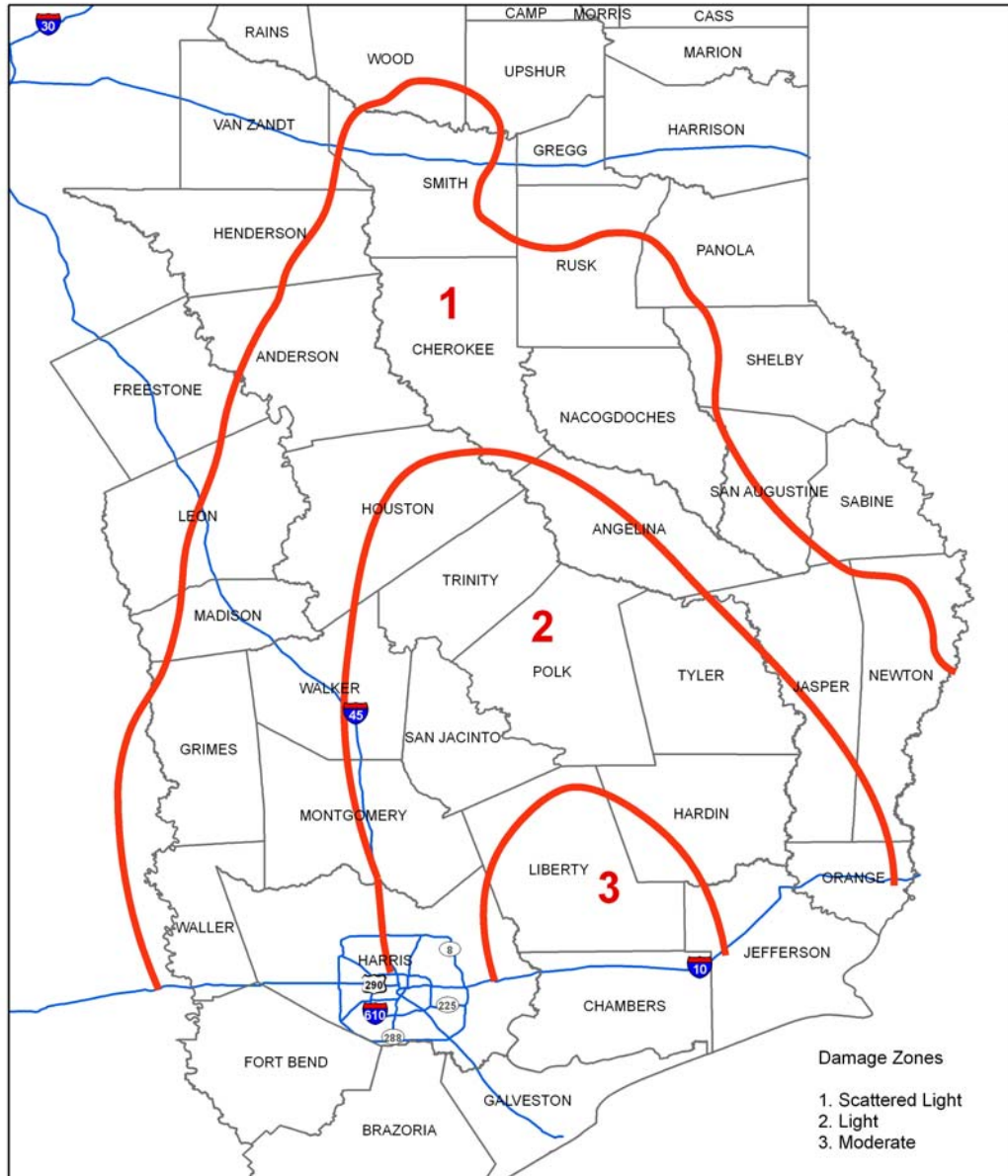


Figure 1. Hurricane Ike Timber Damage Zones

Table 1. Hurricane Ike Timber Damage Percents

Zone	Forest Type	Pine		Hardwood	
		Damaged (%)	Affected (%)	Damaged (%)	Affected (%)
2 (Light)	Hardwood	4.9	7.3	13.0	8.7
	Mixed	4.1	6.3	6.3	9.0
	Pine	3.3	4.8	3.8	6.9
3 (Moderate)	Hardwood	14.0	30.4	19.4	27.1
	Mixed	23.1	24.9	21.3	30.8
	Pine	22.0	14.5	49.6	16.2

Table 2. Hurricane Ike Timber Damage Volume

Forest Type	Species	Damaged			Affected		
		Total (Million Cubic Feet)	Pole Timber (1,000 Cord)	Sawtimber (Million Board Feet)	Total (Million Cubic Feet)	Pole Timber (1,000 Cord)	Sawtimber (Million Board Feet)
Pine	Pine	99.2	199.4	384.9	126.1	238.9	507.1
	Hardwood	16.8	87.7	25.5	21.0	90.5	42.8
	All	116.0	287.1	410.4	147.1	329.4	549.9
Mixed	Pine	9.9	12.1	46.1	13.8	17.1	63.7
	Hardwood	14.1	28.1	48.5	20.1	40.3	69.4
	All	24.0	40.2	94.6	34.0	57.3	133.2
Hardwood	Pine	11.2	11.2	52.7	20.6	20.0	98.5
	Hardwood	137.8	259.5	522.2	120.8	232.4	455.0
	All	149.0	270.7	575.0	141.4	252.4	553.6
All	Pine	120.3	222.7	483.7	160.5	275.9	669.3
	Hardwood	168.7	375.2	596.2	161.9	363.1	567.2
	All	289.1	597.9	1,079.9	322.5	639.1	1,236.6

Table 3. Hurricane Ike Timber Damage Value

Value	Damaged			Affected		
	Total (Million \$)	Pole Timber (Million \$)	Sawtimber (Million \$)	Total (Million \$)	Pole Timber (Million \$)	Sawtimber (Million \$)
Pine	58.2	4.0	54.2	79.9	5.0	74.9
Hardwood	108.8	4.4	104.4	103.6	4.3	99.3
All	167.0	8.4	158.6	183.5	9.3	174.3

Table 4. Hurricane Ike Timber Damage by Zone

Zone	Forest Type	Total Timberland Area (1,000 acres)	Damaged Timberland Area (1,000 acres)	Affected Timberland Area (1,000 acres)	Total Volume (million CF)	Damaged Volume (million CF)	Affected Volume (million CF)
1 (Scattered Light)	Pine	1,452.7					
	Mixed	412.3					
	Hardwood	1,433.3					
	All	3,298.3					
2 (Light)	Pine	1,548.8	51.9	77.8	2,586.8	86.7	129.9
	Mixed	276.5	14.5	21.4	350.5	18.4	27.1
	Hardwood	703.4	84.3	60.0	868.7	104.1	74.0
	All	2,528.7	150.7	159.1	3,806.0	209.2	231.0
3 (Moderate)	Pine	82.9	38.6	13.3	117.0	29.3	17.2
	Mixed	38.8	8.6	10.7	25.0	5.6	6.9
	Hardwood	198.6	36.7	54.9	243.4	45.0	67.3
	All	320.3	83.9	78.9	385.4	79.8	91.4
All	Pine	3,084.3	90.5	91.1	2,703.8	116.0	147.1
	Mixed	727.6	23.2	32.1	375.5	24.0	34.0
	Hardwood	2,335.4	121.0	114.9	1,112.2	149.0	141.4
	All	6,147.3	234.7	238.0	4,191.4	289.1	322.5

Note: figures for damaged and affected timberland area are assuming 100% damaged or affected.

Zone 1 incurred scattered light damage less than 5% and its damage figures are not estimated.

Table 5. Hurricane Ike Timber Damage by County

County	Area (1,000 Acres)		Volume (Million Cubic Feet)	
	Damaged	Affected	Damaged	Affected
Angelina	10.9	11.1	20.3	20.8
Chambers	0.3	0.4	0.1	0.1
Cherokee	0.8	0.8	1.1	0.9
Hardin	31.3	32.2	35.8	39.9
Harris	2.5	3.4	2.9	4.5
Houston	10.8	10.5	15.5	18.1
Jasper	10.0	9.8	14.3	12.8
Jefferson	1.8	2.3	0.7	0.6
Liberty	68.3	62.7	66.4	73.6
Montgomery	10.7	11.0	13.4	15.0
Newton	1.9	1.7	0.6	0.6
Orange	4.1	3.8	2.4	2.8
Polk	25.2	27.1	28.8	34.3
San Jacinto	15.8	16.0	25.9	28.1
Trinity	12.8	15.2	24.4	29.6
Tyler	21.7	24.1	28.0	31.3
Walker	5.8	6.1	8.3	9.6
Total	234.7	238.0	289.1	322.5

Table 6. Hurricane Ike Timber Damage by Ownership

Ownership	Area (1,000 Acres)		Volume (Million Cubic Feet)	
	Damaged	Affected	Damaged	Affected
Public	12.8	17.9	34.1	47.9
Private	221.9	220.1	255.0	274.6
Total	234.7	238.0	289.1	322.5