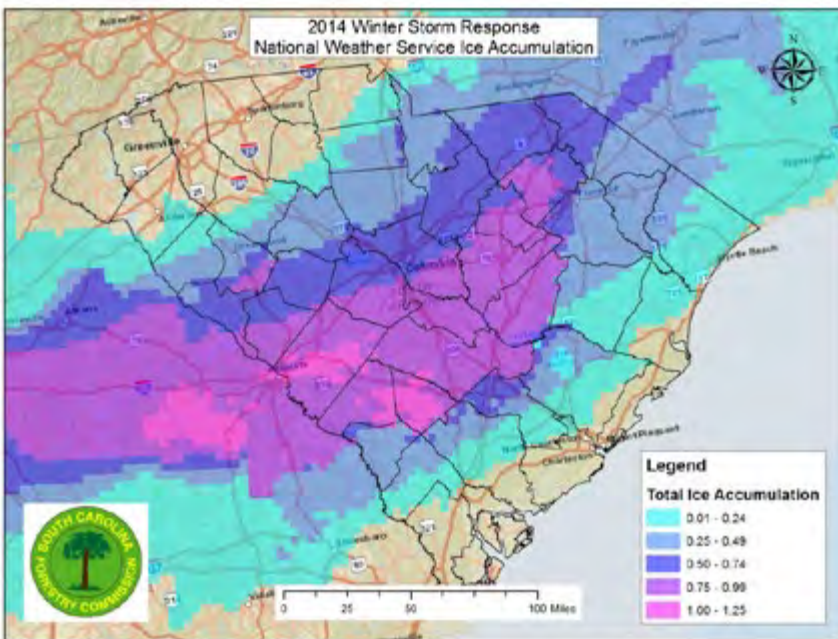




South Carolina Forestry Commission 2014 Winter Storm Timber Damage Assessment

STORM'S ARRIVAL

South Carolina found itself in the path of a major weather event on February 11th. The winter storm carried heavy precipitation and cold temperatures which straddled the freezing mark. Rain, snow, and ice fell on most of the state, with the latter two forms of precipitation taking a heavy toll on South Carolina's forests. **Ice and snow damage to timber is estimated at \$360 million.**



The storm lasted three days and left hundreds of thousands of utility customers without power and shut down state and local governments, schools, and countless businesses. Major roads statewide were impassable. The storm triggered a disaster declaration by Governor Nikki Haley.

SCFC EMERGENCY RESPONSE

Personnel with the South Carolina Forestry Commission immediately went to work aiding in storm recovery at the request of state and local officials. SCFC crews assisted in removing debris from roads utilizing heavy equipment and chainsaws.

DAMAGE ASSESSMENT

KEY FINDINGS

After extensive aerial and ground surveying, SCFC defined a 170-mile-long, 70-mile-wide corridor extending from Edgefield, Aiken, Barnwell, and Allendale counties on the Savannah River to Dillon and Horry counties on the North Carolina border. Timber losses are estimated at \$360 million on 1.5 million acres of forestland.

AERIAL ASSESSMENT *of damaged area*

As soon as conditions allowed, SCFC pilots flew initial damage surveys. Based on this preliminary glance, more detailed assessment was flown on February 17- 21. This

survey yielded a 10% sampling and established the foundation for “ground truthing” work to follow.

Utilizing a digital sketch mapper, observers drew outlines of affected timber stands. Downloading this data into a GIS database greatly aided foresters in locating these areas on the ground.

Aerial observers also recorded the latitude and longitude of each damaged stand they found as well as the size class of the timber (pre-

commercial, pulpwood, or sawtimber), and whether the area had been thinned or not.

- Damage was categorized as either *light, moderate, or heavy*
- 1,019 observations were made over the 24-county focus area

GROUND ASSESSMENT *of aerial survey*

Forest Management staff developed a protocol for ground checks designed to assess the accuracy of the aerial findings. Ground checks were also critical to determine the scope of the need for reforestation across the affected area.

- Ground survey included samples from all categories of damage, but excluded hardwood stands, since no reforestation was anticipated in these areas
- This ground survey checked 5% of the aerial observations
- Concluded that approximately 1/3 of aerial observations underestimated the level



of damage in affected stands

- 13% of the acres checked need to be reforested

FIA ASSESSMENT of volume and value damaged

Forest Inventory and Analysis Plots

- SCFC FIA staff utilized a systematic random sample protocol developed by the NC Forest Service to generate damage estimates
- surveyed all counties in the affected area
- 248 plots – 20 trees per plot – a total of 4,960 trees were measured
- recorded average diameter of the trees in each plot as well as the size and age of the stand and the product class (pulpwood or sawtimber)



For more information on FIA: <http://www.fia.fs.fed.us/>

FOREST MANAGEMENT IMPLICATIONS

None or Light damage – no salvage is needed; stand should fully recover, although some growth loss and future yield impacts are possible

Moderate damage - may warrant a salvage harvest to remove damaged trees

Heavy damage - salvage harvest or clearcut and replanting will most likely be needed

Forest Stand Damage Scale:

None

Less than 10% of crop trees were damaged

Light

10% to 20% of crop trees were damaged

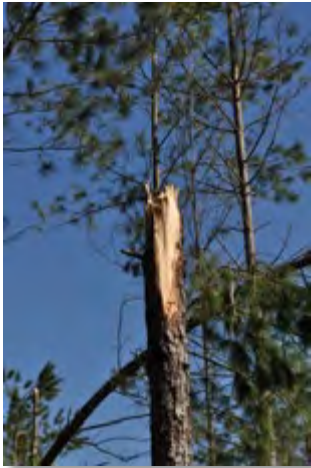
Moderate

20% to 50% of crop trees were damaged

Heavy

Greater than 50% of crop trees were damaged

*Pictures Representing Types
of Forest Stand Damage*



Heavy damage

Heavy damage, recently thinned loblolly



Moderate damage, young longleaf



Moderate damage, loblolly



Light damage

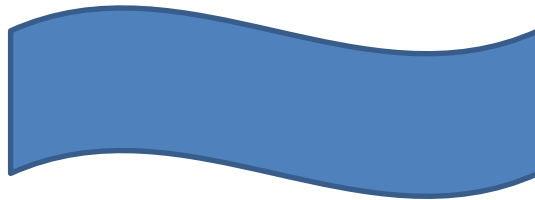


County Timber Losses by County/Damage Classification

Summary of acres damaged and value by County

COUNTY	Acres In Damage Areas	Acres by Damage Class			Value of Timber Damaged (\$)
		Light	Moderate	Heavy*	
Aiken	291,837	89,878	12,955	1,856	\$ 24,419,005
Allendale	130,034	42,999	6,198	888	\$ 11,682,381
Bamberg	148,446	58,980	8,501	1,218	\$ 16,024,200
Barnwell	238,408	74,953	10,803	1,548	\$ 20,364,064
Berkeley	331,598	103,642	14,938	2,141	\$ 28,158,514
Calhoun	101,882	41,337	5,958	854	\$ 11,230,814
Clarendon	174,697	54,540	7,861	1,126	\$ 14,818,078
Colleton	238,508	74,639	10,758	1,542	\$ 20,278,781
Darlington	77,274	25,736	3,710	532	\$ 6,992,311
Dillon	108,561	38,461	5,544	794	\$ 10,449,431
Dorchester	199,859	64,707	9,327	1,336	\$ 17,580,192
Edgefield	6,364	1,860	268	38	\$ 505,266
Florence	245,527	85,980	12,393	1,776	\$ 23,360,048
Georgetown	220,217	84,647	12,201	1,748	\$ 22,997,767
Hampton	110,023	35,475	5,113	733	\$ 9,638,317
Horry	239,484	82,877	11,946	1,712	\$ 22,516,976
Lee	18,853	5,509	794	114	\$ 1,496,853
Lexington	35,681	11,566	1,667	239	\$ 3,142,275
Marion	172,106	61,153	8,814	1,263	\$ 16,614,666
Marlboro	29,299	8,562	1,234	177	\$ 2,326,233
Orangeburg	325,979	105,855	15,257	2,186	\$ 28,759,725
Richland	31,064	24,771	3,570	512	\$ 6,730,074
Sumter	119,338	37,598	5,419	777	\$ 10,214,942
Williamsburg	298,510	122,890	17,713	2,538	\$ 33,388,074
Total:	3,893,546	1,338,614	192,942	27,648	\$ 363,688,989

* Acres in heavy damage class likely need reforestation



ICE DAMAGE RESPONSE FOR SOUTH CAROLINA'S FOREST LANDOWNERS

Small acreage (less than 5 acres)

Contact a certified arborist for assessment of damage to individual trees. For assistance in locating a tree care professional, go to:

<http://www.trees.sc.gov/urbanpr.htm>

Financial assistance is not available for this type of damage. Landowners with small tracts can try to pool acreages to accomplish harvesting and replanting.

Larger tracts (5 acres or more)

1. If damage is limited to broken branches (no damage to the top of the tree), trees should fully recover, and no salvage harvest is needed. Monitor the area monthly during the growing season for signs of insect attack – yellowing needles in the crown and pitch tubes on the bark of pine trees. Financial assistance is not available for this type of damage.

2. If the tops and/or main stem of a significant number of their trees are damaged, contact a forestry consultant (<http://www.trees.sc.gov/consult.htm>), a SC Forestry Commission forester (<http://www.trees.sc.gov/sc.htm>), or another registered forester.

Landowners are urged to seek professional advice before conducting any salvage harvest. Some heavily-damaged stands of trees can be retained until timber prices improve. **Note: Landowners in the Conservation Reserve Program (CRP) are required to contact the Farm Services Agency before harvesting.**

3. If a salvage harvest (clearcut) is necessary, cost-share assistance may be available to help establish a new stand of trees. Before harvesting begins, go to the local Farm Services Agency (FSA) office (<http://offices.sc.egov.usda.gov/locator/app?state=sc&agency=fsa>) and sign up for the Emergency Forest Restoration Program (EFRP). Bring a plat of the property and a letter from a registered forester stating that due to heavy ice damage a salvage harvest and replanting is necessary. A map showing the area needing reforestation can help, too. For more information, go to (<https://www.fsa.usda.gov/FSA/webapp?area=home&subject=diap&topic=efrp>). The signup period for EFRP in South Carolina began on March 5 and ends on May 9 for the affected counties.

DAMAGE TO THE URBAN FOREST

In addition to the damage sustained by stands of trees across rural South Carolina, the winter storm also took a major toll on the state's urban forest. Trees in cities, towns, and communities in a 70-mile corridor from Aiken to Dillon suffered the heaviest damage. For example, the city of Orangeburg continues to recover and has already removed an amount of debris that is twice that of the 2004 ice storm. The city of Aiken reported that 5,000 of their 7,000 publicly-owned trees experienced varying degrees of ice damage. Untold amounts of debris from yards and privately-owned properties have added to the mountains of biomass that will ultimately tax the resources of the municipalities affected by the storm.

The weight of ice and snow combined with windy conditions proved too much for many of the evergreen hardwoods such as live oaks and magnolias as their increased surface area exacerbated their vulnerability to breakage. Older hardwood trees that have not been properly pruned often develop internal disease and rot that weakens the structure and leads to failure, especially when the weight of ice is added. Many of these trees along the path of the storm show evidence of severe damage, often including the main stem (trunk) and/or major limbs that support a high percentage of the canopy. Even though no trees are completely immune to ice storm damage, healthy, vigorous, properly-pruned trees show less damage and will likely recover more readily than those that have not been maintained properly.

Homeowners and municipal employees across much of coastal South Carolina now face difficult decisions regarding whether or not to remove storm-damaged trees. Fortunately, most trees that have lost less than half of their crown stand an excellent chance of recovery. Those that have sustained more heavy damage will need to be evaluated for possible removal or monitored for declining health during the summer. For more information on urban tree care, go to: <http://www.trees.sc.gov/urban.htm>



Live oak, Colleton County



Live oak, Aiken County