

FLORIDA FOREST SERVICE

Hurricane Idalia 2023

Initial Estimate of Altered, Damaged or Destroyed Timber in Florida

Starting as a low-pressure system that crossed Central America from the eastern Pacific Ocean, Idalia gradually developed in the west Caribbean Sea before intensifying as it crossed the Gulf of Mexico. Idalia rapidly intensified before making landfall on August 30, 2023, at 7:45 am ET at Keaton Beach, FL as a strong Category 3 hurricane with maximum sustained winds of 125 mph, onshore gusts as high as 85 mph and 3-10 feet of storm surge. After landfall, Idalia rapidly weakened into a Category 1 hurricane as it made its way through southeastern Georgia, before further weakening into a tropical storm as it grazed the coastlines of South and North Carolina. This rapidly moving storm created an 8.9 foot storm surge at Cedar Key and a 4.6 foot surge in Tampa's East Bay. Also, due to the storm's pace across Florida, rainfall amounts were lesser around the landfall area than experienced in other states.

The methods described here pertain to timber damages from wind, but more timber damage and mortality can be expected from flooding events and saltwater intrusion, which is particularly deadly to coastal and upland pine forests. Negative impacts from both fresh and saltwater inundation can take months or even years to be fully revealed.

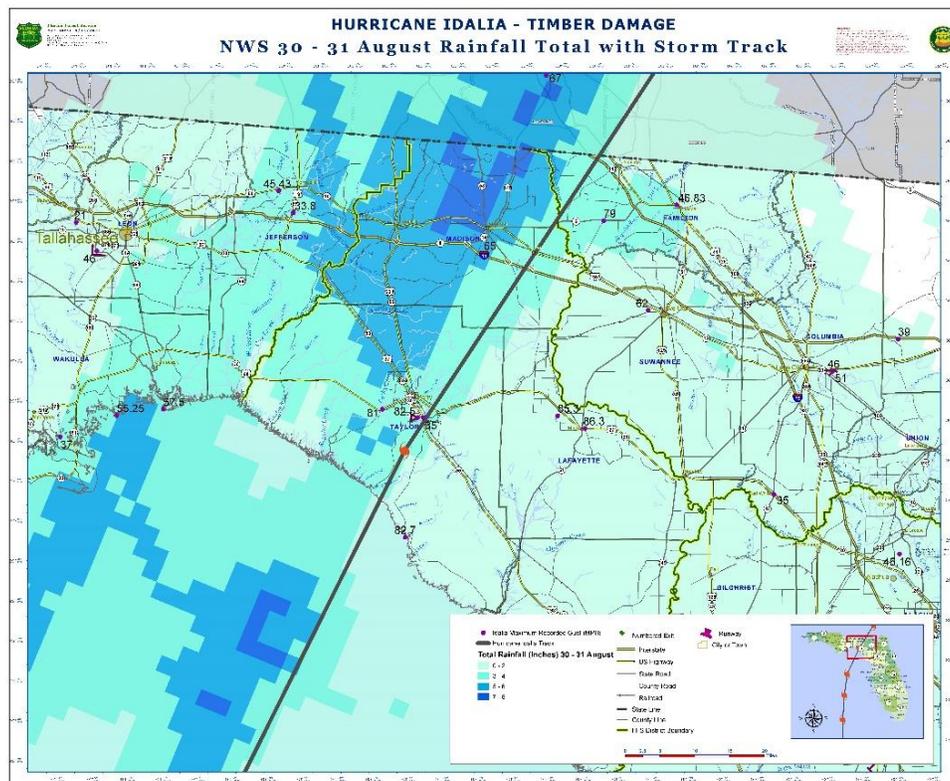


Figure 1 Map showing the path of Hurricane Idalia and the recorded rainfall amounts in Florida.

Methodology

Following landfall, maps were prepared using available wind speed data to calculate potential affected areas. These maps were further refined using available aerial imagery, aerial surveys, and ground reconnaissance. Damage estimates are based on categories listed as catastrophic, severe, moderate, and light based on wind speed estimates, modeling, and observations. Catastrophic damage are forests showing more than 50% of a stand being altered, damaged, or destroyed. Severe damage was assigned to forests having between 33% and 50% damage. Moderate damage was assigned to forests having between 25% and 33% damage. Light damage was assigned to forests having less than 25% damage.



Figure 2 Catastrophic damage of a pine stand in Taylor County following Hurricane Idalia.



Figure 3 Light damage of a pine stand in Taylor County following Hurricane Idalia.

A team of Florida Forest Service employees utilized the ESRI applications Survey123 and Field Maps to collect and document ground observations. A two kilometer by two kilometer grid layer was included in the map and the team attempted to log an observation point in as many grid squares as possible to get a representative sample of the impact area. Each time a survey point was taken, a team member recorded the time, date, and location of the point as well as the primary forest type and the timber damage category: catastrophic, severe, moderate, light, or none. The Florida Forest Service team was able to collect a total of 792 survey points within the six-county area closest to the path of Hurricane Idalia.

Information collected from these survey points showed a variability in the damage pattern across the affected counties and, at times, differed significantly from the modeled damage map. Based on these two facts, the ground-based surveys proved to be a valuable component of the methodology used to determine the extent of timber damage caused by Hurricane Idalia and provided crucial insight necessary for estimating the total value of the damaged timber.

However, this method of data collection depends on the availability and accessibility of roads and there were some areas within the affected counties where the team was unable to collect any observation points. By aggregating the data from these points and comparing that information with aerial flight observations, TreesDIP modeling provided by the United States Forest Service, and Forest Inventory and Analysis data, an estimate of damaged acres by forest type could be generated for the impact area. 2022 Florida Cooperative Land Cover data was used to ascertain the acreage and cover types of forest land in each affected county along with the FIA timber volume per acre of each forest type.

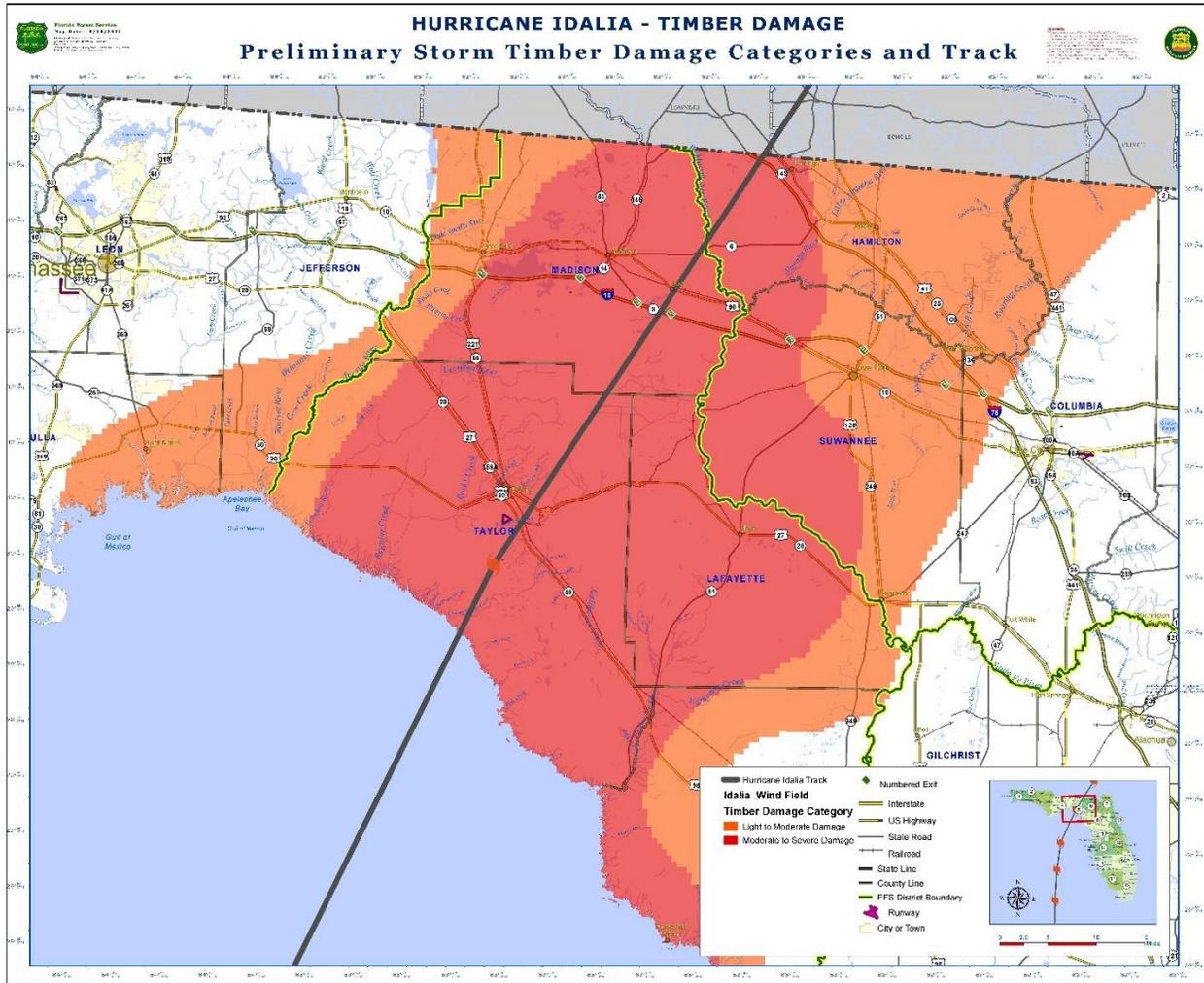


Figure 4 Timber damage maps showing storm track and estimated damage categories based on ground observations and wind speeds.

The counties included for this preliminary timber damage assessment report are Dixie, Hamilton, Lafayette, Madison, Suwannee, and Taylor. Timber categories were divided into pine, pine/hardwood, hardwood, and cypress. Prices were based on Timber Mart South average Florida prices for the second quarter of 2023. This report provides overall damage and loss calculations that reflect pre-storm values and does not reflect post-storm salvage rates which may be much lower. Further, these figures represent all timber damaged, regardless of potential to be marketed for products. **No urban land use classifications were used in calculating the damaged timber acreage.**

Hurricane Idalia Timber Damaged Area, Volume and Value Based for the 6 Affected Counties							
Forest Type	Timber Damage Category	Avg Damage to Timber	Merchantable Private Acres	Merchantable Public Acres	Merchantable Total Acres	Damaged Total Timber Tons	Damaged Total Timber Value \$
Pine	Catastrophic	0.50	1,674.27	0.00	1,674.27	26,553.92	\$ 669,335.87
	Severe	0.33	93,531.38	2,425.42	95,956.80	1,004,437.42	\$ 25,318,519.11
	Moderate	0.25	75,525.40	7,727.01	83,252.41	660,191.63	\$ 16,641,230.33
<i>Total</i>			170,731.05	10,152.43	180,883.48	1,691,182.97	\$ 42,629,085.31
Mixed P/H	Catastrophic	0.50	590.94	0.00	590.94	13,006.57	\$ 201,341.76
	Severe	0.33	24,398.07	139.18	24,537.25	356,442.82	\$ 5,517,734.91
	Moderate	0.25	13,180.15	1,089.40	14,269.55	157,036.40	\$ 2,430,923.42
<i>Total</i>			38,169.16	1,228.58	39,397.74	526,485.79	\$ 8,150,000.09
Hardwood	Catastrophic	0.50	192.03	0.00	192.03	4,056.70	\$ 62,797.78
	Severe	0.33	18,844.24	1,975.69	20,819.93	290,281.90	\$ 4,493,563.88
	Moderate	0.25	35,060.05	8,670.60	43,730.65	461,905.02	\$ 7,150,289.69
<i>Total</i>			54,096.33	10,646.29	64,742.62	756,243.63	\$ 11,706,651.35
Cypress	Catastrophic	0.50	59.74	0.00	59.74	3,390.90	\$ 56,492.34
	Severe	0.33	2,000.17	57.34	2,057.50	77,084.10	\$ 1,284,221.06
	Moderate	0.25	1,571.18	384.62	1,955.80	55,510.51	\$ 924,805.16
<i>Total</i>			3,631.08	441.96	4,073.04	135,985.51	\$ 2,265,518.56
TOTAL			266,627.62	22,469.26	289,096.88	3,109,897.90	\$ 64,751,255.30

Table 1 An estimate of the amount of timber damage caused by Hurricane Idalia and the total value of the damaged timber.

The pattern of timber damage caused by Hurricane Idalia is different and unique from other storms that have impacted Florida over the last several years. As opposed to the relatively uniform patterns of timber damage left behind by recent storms such as Hurricane Michael in 2018, Hurricane Sally in 2020, and Hurricane Ian in 2022, the damage caused by Hurricane Idalia has been observed to be highly variable within the damage category zones. There are pockets of heavy damage spread throughout the impact area and some of the ground surveys found places with moderate and even severe damage outside of where it would be expected based on other observation points. Areas of catastrophic damage will likely be found sporadically within several damage zones due to downdrafts and tornados.

This was considered a relatively dry storm in terms of precipitation, as it moved rapidly across the state; highest rainfall totals were recorded in Desoto County, 7.11 inches. Radar indicated rainfall in portions of Madison County were comparable. Along the gulf coast significant storm surge created broad areas of flooding.

Another noteworthy observation found during these ground surveys is that mature live oaks seem to have been disproportionately impacted by Hurricane Idalia. While live oak is usually considered to be a wind resistant and sturdy tree, a view supported by observations from Hurricane Michael, Hurricane Sally, and Hurricane Ian, many mature live oaks lost scaffold branches or main trunks due to this storm. There have not been any statistical analyses done to quantify how many live oaks specifically were damaged or lost, but several observers made comments about how much damage they noticed on large live oaks.



Figure 5 Photo showing tree damage caused by Hurricane Idalia. Many mature live oaks experienced significant damage.

Urban and Community Forest Impacts

Hurricane Idalia made landfall within a predominately rural region of Florida. However, there are several communities and cities located within the impact area and the extreme wind and storm surge associated with this storm has led to the widespread destruction of their tree canopies. Continued tree mortality due to storm damage can be expected for months and years to come. In the absence or reduction of tree canopy, the impacted areas can expect to see higher average temperatures, increased stormwater runoff, and lower air quality among other issues related to sudden deforestation. To quantify what was lost and to make informed reforestation decisions, tree canopy assessments can be used to analyze the pre-storm tree canopy and compare it against what is remaining. Street tree inventories should be utilized to target specific areas most affected by Hurricane Idalia. When used in combination, inventories, assessments, and targeted tree plantings are highly effective tools to help community forests recover from extreme weather events.