UF IFAS UNIVERSITY of FLORIDA

ECONOMIC IMPACT ANALYSIS PROGRAM

Economic Losses for Florida Agriculture Resulting from Hurricane Michael

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Hurricane Michael made landfall near Mexico Beach, FL on October 10, 2018 as a category four hurricane with peak sustained winds of 155 miles per hour, making it the strongest hurricane on record to make landfall in the Florida panhandle. Hurricane Michael significantly impacted Florida agriculture, causing widespread crop, livestock, and timber losses across Northwest Florida. This report provides estimates of agricultural losses for the state of Florida.

Hurricane and tropical storm force winds from Hurricane Michael were mapped according to information from the National Hurricane Center, as shown in Figure 1. The windspeed zones were overlaid on geospatial data compiled from the Cropland Data Layer (CDL) from United States Department of Agriculture National Agricultural Statistics Service (USDA-NASS) and the Florida Statewide Agricultural Irrigation Demand Geodatabase (FSAID) available from the Florida Department of Agriculture and Consumer Services to determine the area of various field and row crops within each windspeed zone.[1] In addition, secondary data sources were used for specialty crops such as vegetables, fruits, tree nuts, and nursery/greenhouse, that are not represented well for this region in the geodatabases, to allocate losses by county and windspeed zone.

Estimated loss values for field and row crops were based on the area affected (acres) together with average yields per acre and commodity prices from USDA-NASS crop surveys for the past three years, seasonal factors derived from crop conditions reports and Florida's planting seasons, and percentage loss estimates collected via online survey from University of Florida-IFAS Extension faculty within the region.[2] Seasonal factors represent the approximate share of the annual production period that was likely disrupted by hurricane damages. Losses for annual winter vegetable crops that were early in their season at the time of the storm reflected 30 percent of the average annual value to account for a shortened production season and expected market distortions due to later production dates. Loss estimates were not included for crops not generally in production at the time of the storm.

Regional crop area, average value per acre, and seasonal factors for field and row crops are shown in Table 1. The total field and row crop area impacted by Hurricane Michael was nearly 750 thousand acres, comprised of approximately 247,000 acres of hay, 245,000 acres of peanuts, 148,000 acres of cotton, 67,000 acres of corn, 30,000 acres of oats, and 11,000acres of soybeans.

Estimated loss values for specialty crops and animal production were based on the latest available data on annual revenues from the 2016 IMPLAN© database (Implan Group, LLC) together with the seasonal factors for specialty crops and percentage loss estimates from UF Extension faculty. Regional revenues

[1] CDL data available at https://nassgeodata.gmu.edu/CropScape/ and FSAID data available at https://www.freshfromflorida.com/Business-Services/Water/Agricultural-Water-Supply-Planning. Valuable assistance in the preparation of the geospatial database for field and row crops was provided by Kyle Ferris (FDACS) and Daniel Dourte (Balmoral Group).

[2] Crop area, yield and price data retrieved from USDA-NASS Quick Stats website: https://quickstats.nass.usda.gov/.

for specialty crops and animal production along with seasonal factors for specialty crops are shown in Table 2. In 2016, total sales revenues in the 25 counties that were significantly impacted by Hurricane Michael[3] were $233 million for specialty crops including vegetables and melons, fruits, tree nuts, and greenhouse/nursery, and $432 million for animals and animal products, including beef and dairy cattle, , milk, poultry, eggs, deer, honeybees, etc.

Percentage losses of agricultural commodities in each hurricane windzone were informed by survey responses by UF-IFAS Extension faculty as shown in Table 3.

Estimated annual crop losses are summarized in Table 4. Total losses for crops and animals/animal products were estimated at $158 million, including $80 million for field crops, $55 million for specialty crops, and $23 million for animals/animal products.

A study conducted by the Florida Department of Agriculture and Consumer Services-Forest Service estimated damages to timber stands in Florida using a similar methodology, based on wind maps, together with forestland area of pine, hardwood, cypress, and other species from the USDA-Forest Inventory and Analysis. According to their analysis, a total of 2.809 million acres of forest land area was damaged, including nearly 347,000 acres in the catastrophic category (95%+ damaged), 1.043 million acres in the severe category (75-94% damaged), and 1.419 million acres in the moderate category (15-74% damaged). The value of damage was estimated at $1.289 billion at current average timber stumpage prices. This value represents timber that would normally be harvested over several years. Adjusting for average annual harvest levels and assuming a 10 percent timber salvage rate, the annual loss for the 2018-19 season was determined to be $147 million.

[3] The 25 counties significantly impacted by Hurricane Michael were: Baker, Bay, Calhoun, Columbia, Dixie, Escambia, Franklin, Gadsden, Gulf, Hamilton, Holmes, Jackson, Jefferson, Lafayette, Leon, Liberty, Madison, Nassau, Okaloosa, Santa Rosa, Suwannee, Taylor, Wakulla, Walton, and Washington.

Figure 1. Map of wind speed zones for Hurricane Michael, October 2018

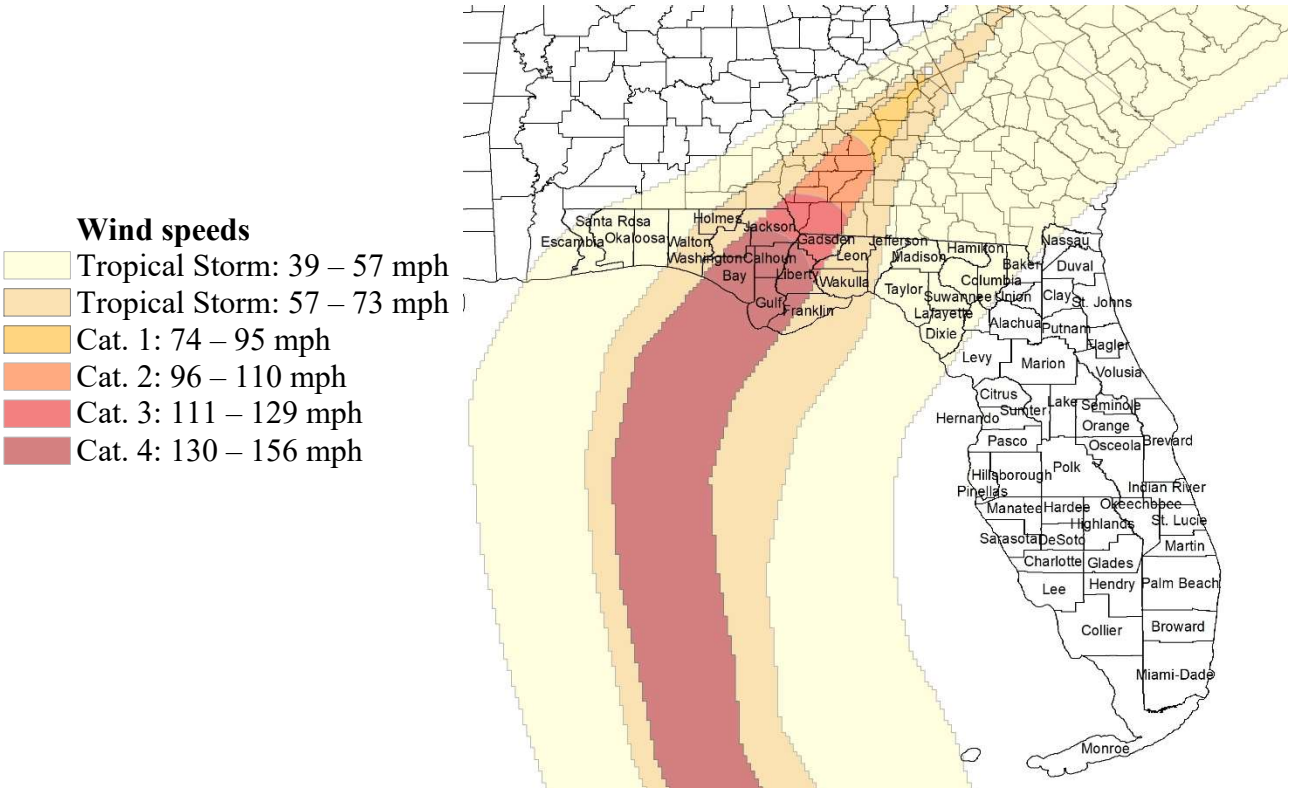

Table 1. Northwest Florida field crop production area, value per acre and seasonal production factors

Crop	Production Area (Acres)	Average Value Per Acre	Seasonal Production Factor
Peanuts	245,093	$733	40%
Cotton	147,834	$597	93%
Corn	66,805	$591	30%
Oats	30,415	$132	60%
Soybeans	10,654	$307	60%
Hay	247,659	$415	10%
Total	748,460		

Sources: USDA-NASS, Cropland Data Layer; FDACS, Florida Statewide Agricultural Irrigation Geodatabase

Table 2. Northwest Florida total sales revenue for specialty crops and animals/animal products in 2016 and seasonal production factors for specialty crops

Product Group	Product	Sales Revenue ($millions)	Seasonal Production Factor
Specialty Crops	Vegetables and melons	$111.363	30%
	Fruits	$19.061	100%
	Tree nuts	$9.363	100%
	Greenhouse, nursery, and floriculture	$93.394	90%
	Total	$233.181	
Animals and Animal Products	Beef cattle	$98.092	
	Dairy cattle and milk	$124.151	
	Poultry and eggs	$199.215	
	Animals, except cattle and poultry and eggs	$12.415	
	Total	$433.873	

Source: IMPLAN Group, LLC, IMPLAN data for northwest Florida counties, 2016

Table 3. Agricultural product percentage losses to Hurricane Michael, by product group and windspeed zone

Product Group	Product	Category 4: 130-156 mph	Category 3: 111-129 mph	TS 2: 57-73 mph	TS 1: 39-57 mph
Field and Row Crops	Peanuts	50%	40%	30%	25%
	Cotton	100%	100%	30%	30%
	Corn	100%	100%	100%	30%
	Oats	90%	90%	30%	10%
	Soybeans	90%	80%	50%	10%
	Hay	50%	30%	20%	10%
Specialty Crops	Vegetables and melons	100%	100%	30%	10%
	Fruits	90%	90%	30%	10%
	Tree nuts	100%	90%	50%	10%
	Greenhouse, nursery, and floriculture	90%	90%	30%	10%
Animals and Animal Products	Beef cattle	10%	10%	5%	5%
	Dairy cattle and milk	10%	10%	5%	5%
	Poultry and egg	10%	10%	5%	5%
	Animals, except cattle and poultry and eggs	10%	10%	5%	5%

Source: Survey of UF-IFAS Extension faculty

Table 4. Estimated annual agricultural losses for the state of Florida from Hurricane Michael

Product Group	Product	Estimated Loss Value ($millions)
Field and Row Crops	Peanuts	$22.050
	Cotton	$50.777
	Corn	$4.502
	Oats	$0.600
	Soybeans	$0.635
	Hay	$1.771
	Total	$80.335
Specialty Crops	Vegetables and melons	$8.501
	Fruits	$4.341
	Tree nuts	$2.932
	Greenhouse, nursery and floriculture	$39.195
	Total	$54.968
Total Crops		$135.303
Animals/Products	Beef cattle	$5.757
	Dairy cattle and milk	$6.435
	Poultry and eggs	$10.026
	Animals, except cattle and poultry and eggs	$0.707
	Total	$22.925
Total Crops and Animals/Products		$158.228

Source: Authors' estimates based on data available as of October 26, 2018