Severe Freeze Event Inflicts Extensive Damage on Florida Blueberry Production

Zhengfei Guan
Associate Professor
Food and Resource Economics
Citrus Research and Education Center
University of Florida
guanz@ufl.edu

Yi Li
Graduate Assistant
Food and Resource Economics Department
University of Florida
yi.li1@ufl.edu

Douglas Phillips
Blueberry Extension Coordinator
Horticultural Sciences Department
University of Florida
dal64372@ufl.edu

Jeffrey Williamson
Professor and Extension Specialist
Horticultural Sciences Department
University of Florida
jgrw@ufl.edu

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The cold front that swept across the state beginning January 31, 2026 unleashed a deep freeze across Florida, marking one of the most severe freeze events in recent decades. This event was particularly damaging to blueberry production, as it occurred during the most vulnerable phenological stage of Florida's early-season blueberry crop—the flowering and early fruit-set stage—during which very low plant tissue temperatures can cause flower and fruit death (Williamson and Phillips, 2023). The prolonged duration and intensity of the freeze, combined with sustained high winds, resulted in widespread crop losses across the primary blueberry-producing counties of Central, South Central, and North Central Florida.

Temperature Extremes Across Production Areas

Central Florida (Polk, Lake, Orange, Pasco, Hernando, and Hillsborough counties) accounts for approximately 50% of Florida commercial blueberry production (Williamson and Phillips, 2024). The area experienced sharp temperature drops with minimum air temperatures ranging from 16.65°F to 24.90°F (Table 1) at canopy height (60cm above ground). Tiger Creek in Polk County recorded the region's lowest temperature at 16.65°F.

The air was also extremely dry, as indicated by dew point temperatures as low as 7.45°F in Avalon, Orange County. Dry air further intensifies evaporative cooling, increasing heat loss from plant surfaces when overhead irrigation is applied, thereby reducing the effectiveness of freeze protection (Williamson and Phillips, 2023).

Lake County (Okahumpka) experienced the longest freeze, with temperatures below 32°F for 36 hours, including a continuous 13-hour freeze (Table 2). Polk County (Babson Park) recorded the longest period of extremely dry conditions (73 hours).

Wind further increased heat losses and added to plant stress. Maximum wind gusts in Central Florida reached 42.4 mph in Dade City (Pasco County) (Table 3). Sustained winds over 10 mph, a level at which overhead irrigation protection becomes significantly less effective, lasted for extended periods, reaching 30 hours or more in multiple monitored locations. The longest continuous high-wind event lasted 30.75 hours in Babson Park (Polk County).

North Central Florida (Alachua, Levy, Marion, Sumter, and Putnam counties), representing approximately 25% of state commercial production, encountered the most prolonged freeze conditions. Alachua recorded the lowest minimum temperature in the dataset at 16.43°F (Table 1) and endured 41.5 total hours below 32°F, including a continuous 15.25-hour freeze (Table 2).

Putnam County experienced especially dry conditions, with dew points below 32°F for nearly 78 hours, the longest recorded across all stations, including a continuous 68-hour event (Table 2). This extended period of dry air increased heat loss from evaporative cooling, reducing the effectiveness of overhead irrigation protection.

South Central Florida (Highlands, Hardee, DeSoto, Manatee, and Sarasota counties), contributing approximately 25% of commercial production, also faced damaging cold. Minimum

temperatures ranged from 20.6°F in DeSoto County to 26.85°F in Highlands County (Table 1), well below critical thresholds for blueberry flower and fruit survival. DeSoto recorded more than 30 hours below 32°F, while Hardee experienced the longest continuous freezing event of 12.5 hours.

Failure of Overhead Irrigation Protection

Florida blueberry growers rely on overhead irrigation as their primary method of freeze protection. As water freezes, it releases heat and keeps plant tissue near 32°F. Under typical Florida freeze conditions — 26–28°F with light winds — properly designed systems can protect flowers and young fruit.

This event was different.

Temperatures fell well below 26°F, and strong winds persisted for many hours. Research shows that when temperatures drop into the low 20s °F with sustained winds of 10–12 mph, the water needed for protection increases sharply—approaching 0.4 inches per hour at 24°F and 0.6 inches per hour at 22°F (Gerber and Martsolf, 1965; Williamson and Phillips, 2023). Under these severe freeze conditions, the required application rates exceed the capacity of most Florida overhead irrigation systems.

The simultaneous occurrence of freezing temperatures, high winds, and dry air pushed standard overhead irrigation systems beyond their protective limits (Tables 4). These conditions persisted for many hours. In Apopka (Orange County), freezing temperatures coincided with sustained winds above 10 mph for 12 hours, while Putnam County recorded more than 14 hours of freezing conditions accompanied by strong wind gusts. Growers reported that operating irrigation under these extreme conditions was not only ineffective for freeze protection but also led to heavy ice accumulation that broke branches, and in some cases toppled entire plants.

Crop Damage and Risk Management

Preliminary field assessments from Central Florida indicate widespread and severe losses. On one farm in Central Florida, approximately 90% of blooms were found to have been killed by freezing temperatures. The remaining 10% of blooms, while physiologically alive, present growers with a difficult economic decision. For blueberry farms in this situation, attempting to maintain and rehabilitate heavily damaged plants through intensive management is unlikely to be cost-effective, since a 10% harvest would not recover the basic costs of crop management and harvesting. Instead, hedging the plants and terminating the season may be the more economically rational choice. Maintaining the crop would require many of the same pre-harvest expenses as in a normal year while significantly reducing picking efficiency and increasing labor costs per pound harvested. Under these conditions, continuing the season could result in additional financial losses.

Florida cultivated approximately 5,500 acres of blueberries. The industry depends heavily on capturing premium early-season prices, before competing imports from Mexico and domestic production from other regions enter the market. Severe freeze events therefore pose a significant threat to the industry, underscoring the need for effective risk management and policy solutions.

References

Williamson, J. G., & Phillips, D. A. (2023). Protecting blueberries from freezes in Florida. EDIS Publication HS968/HS216, UF/IFAS Extension. https://doi.org/10.32473/edis-hs216-2004

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Notes for Tables

1. 60cm Air Temp (Air Temperature at 60cm): This refers to the temperature measured 60cm (2ft) above the ground and is used because it better reflects blueberry canopy conditions.

2.Dew Point (Dew Point Temperature): The temperature to which air must be cooled to become saturated with water vapor. It serves as a measure of atmospheric moisture; a low dew point indicates very dry air, which increases the potential for rapid evaporation and heat loss from the plant surface during a freeze event.

3.Wet Bulb (Wet Bulb Temperature): The lowest temperature that can be reached by evaporating water into the air. It approximates the temperature a wet plant surface may approach under active evaporation. Growers use this as a key decision-making metric during freeze events. When the wet bulb temperature is below 32°F evaporative cooling increases heat loss from plant surfaces. If irrigation is insufficient under these conditions, plant tissue temperature can drop below the freezing point despite irrigation.

4.Wind Speed (10m Sustained Wind): The average speed of air movement measured at the standard meteorological height of 10 meters. Sustained winds influence the steady-state heat loss from the field and influence the required irrigation application rate; as wind speed increases, more water must freeze to offset additional heat loss, meaning higher irrigation rates are needed to maintain protective conditions.

5.Wind Gust (10m Wind Max): The maximum instantaneous wind speed recorded during a specific interval. For blueberry growers, high gusts are a primary cause of protection failure as they physically blow irrigation water away from the target plants (wind drift), reduce uniform ice coverage, and increase heat loss.

Table 1: Minimum Temperatures and Maximum Wind Velocities (January 31 - February 3, 2026)

Region	County	Station	Min 60cm Air Temp (°F)	Min Dew Point (°F)	Min Wet Bulb (°F)	Max Wind Speed (mph)	Max Wind Gust (mph)
Central	Hernando	Brooksville South	20.06	9.45	16.81	12.9	32.5
Central	Hillsborough	Balm	22.56	13.96	23.02	22.5	34.7
Central	Hillsborough	Dover	24.9	11.53	21.59	16.2	36.1
Central	Lake	Okahumpka	21.05	8.2	18.79	26.5	41.5
Central	Lake	Umatilla	22.18	9.34	19.17	15.3	32.3
Central	Orange	Apopka	23.92	8.94	19.28	22.1	39.6
Central	Orange	Avalon	22.01	7.45	18.44	16.5	40.3
Central	Pasco	Dade City	22.47	8.22	18.89	19.3	42.4
Central	Polk	Babson Park	24.17	11.17	20.72	25.9	40.5
Central	Polk	Lake Alfred	22.9	10.45	19.5	15.8	33.0
Central	Polk	Tiger Creek	16.65	10.9	20.14	17.0	35.9
North Central	Alachua	Alachua	16.43	8.22	17.65	17.2	36.2
North Central	Levy	Bronson	17.37	7.27	15.43	22.8	41.4
North Central	Marion	Citra	18.85	7.59	16.91	13.3	14.7
North Central	Marion	Ocklawaha	21.13	10.78	18.58	6.0	26.1
North Central	Putnam	Putnam Hall	21.3	7.18	17.86	16.3	31.6
South Central	DeSoto	Arcadia	24.99	12.63	25.22	21.9	37.0
South Central	DeSoto	Joshua	20.6	15.26	23.18	15.2	28.1
South Central	Hardee	Ona	21.54	13.89	22.08	16.9	37.7
South Central	Highlands	Sebring	26.85	12.88	24.24	17.0	38.6
South Central	Sarasota	North Port	22.83	16.25	23.49	16.4	33.9

Table 2: Duration of Sub-Freezing Temperature Events (Hours: Temperature < 32℉)

Region	County	Station	Total Hours: 60cm Temp	Total Hours: Dew Point	Total Hours: Wet Bulb	Longest Event: 60cm Temp	Longest Event: Dew Point	Longest Event: Wet Bulb
Central	Hernando	Brooksville South	33.75	63.75	43.25	12.5	63.75	17.25
Central	Hillsborough	Balm	28.75	64.25	31.5	10.75	30.75	12.0
Central	Hillsborough	Dover	30.0	65.75	39.25	12.25	61.75	14.0
Central	Lake	Okahumpka	36.0	69.75	44.5	13.0	63.5	19.0
Central	Lake	Umatilla	26.5	63.75	39.25	12.25	40.25	18.5
Central	Orange	Apopka	22.5	67.25	36.75	12.0	48.75	19.0
Central	Orange	Avalon	21.25	71.75	36.25	11.75	62.5	18.25
Central	Pasco	Dade City	28.0	64.5	42.75	11.0	37.5	17.25
Central	Polk	Babson Park	11.25	73.0	23.0	9.25	60.25	14.5
Central	Polk	Lake Alfred	24.75	70.25	33.5	11.0	61.25	16.0
Central	Polk	Tiger Creek	20.25	54.0	27.25	11.0	41.25	14.75
North Central	Alachua	Alachua	41.5	67.75	48.75	15.25	67.25	20.75
North Central	Levy	Bronson	36.0	68.25	47.25	14.5	68.25	20.5
North Central	Marion	Citra	34.25	70.0	46.25	13.75	52.0	20.75
North Central	Marion	Ocklawaha	27.0	63.25	36.75	11.0	62.75	17.25
North Central	Putnam	Putnam Hall	34.5	77.75	52.0	14.5	68.0	22.75
South Central	DeSoto	Arcadia	26.0	68.0	31.5	11.0	59.5	12.0
South Central	DeSoto	Joshua	30.75	66.5	37.5	12.25	60.25	13.5
South Central	Hardee	Ona	28.75	72.5	35.25	12.5	60.25	13.25
South Central	Highlands	Sebring	9.25	67.5	13.0	7.5	53.5	10.5
South Central	Sarasota	North Port	22.75	60.0	22.75	11.5	37.25	11.25

Table 3: Duration of High-Velocity Wind Events (Hours: Wind Speed > 10 mph)

Region	County	Station	Total Hours: Sustained Wind	Total Hours: Max Gust	Longest Event: Sustained Wind	Longest Event: Max Gust
Central	Hernando	Brooksville South	3.75	34.0	3.0	14.5
Central	Hillsborough	Balm	28.75	44.25	13.75	16.0
Central	Hillsborough	Dover	18.75	41.5	11.25	32.0
Central	Lake	Okahumpka	29.75	44.5	19.25	21.0
Central	Lake	Umatilla	2.25	42.25	2.0	19.75
Central	Orange	Apopka	32.0	46.25	25.25	35.5
Central	Orange	Avalon	13.75	45.5	11.75	32.75
Central	Pasco	Dade City	25.75	49.5	12.0	33.0
Central	Polk	Babson Park	36.75	64.5	30.75	38.0
Central	Polk	Lake Alfred	9.5	42.5	7.0	31.25
Central	Polk	Tiger Creek	17.5	43.25	7.75	31.25
North Central	Alachua	Alachua	18.5	43.5	7.5	21.75
North Central	Levy	Bronson	18.25	43.5	12.0	21.5
North Central	Marion	Citra	11.75	14.25	4.5	5.0
North Central	Marion	Ocklawaha	0.0	12.75	0.0	2.0
North Central	Putnam	Putnam Hall	14.75	48.25	4.0	33.0
South Central	DeSoto	Arcadia	28.75	47.25	13.75	16.0
South Central	DeSoto	Joshua	16.25	39.25	5.75	15.0
South Central	Hardee	Ona	14.25	39.0	7.75	15.75
South Central	Highlands	Sebring	5.25	42.75	2.5	30.75
South Central	Sarasota	North Port	23.0	45.75	11.5	30.0

Table 4: Concurrent Duration of Sub-Freezing Temperatures and High Winds (Hours: Wind Speed > 10 mph and Temperature < 32℉)

Region	County	Station	Total Hours: Wind & 60cm Temp	Total Hours: Max Gust & 60cm Temp	Longest Event: Wind & 60cm Temp	Longest Event: Max Gust & 60cm Temp
Central	Hernando	Brooksville South	0.0	4.75	0.0	1.75
Central	Hillsborough	Balm	3.5	7.5	1.5	5.25
Central	Hillsborough	Dover	3.25	9.75	1.25	9.75
Central	Lake	Okahumpka	10.25	12.5	7.25	8.5
Central	Lake	Umatilla	0.0	12.5	0.0	8.75
Central	Orange	Apopka	12.0	12.25	12.0	12.0
Central	Orange	Avalon	4.75	12.0	3.25	11.75
Central	Pasco	Dade City	6.5	11.0	2.0	11.0
Central	Polk	Babson Park	9.25	10.25	9.25	9.25
Central	Polk	Lake Alfred	0.75	11.25	0.25	11.0
Central	Polk	Tiger Creek	2.25	9.0	1.0	9.0
North Central	Alachua	Alachua	6.5	13.5	2.0	10.5
North Central	Levy	Bronson	8.0	12.5	3.5	10.0
North Central	Marion	Citra	0.0	0.0	0.0	0.0
North Central	Marion	Ocklawaha	0.0	3.5	0.0	0.75
North Central	Putnam	Putnam Hall	7.25	18.0	2.5	14.5
South Central	DeSoto	Arcadia	1.0	6.25	1.0	2.5
South Central	DeSoto	Joshua	1.0	4.5	1.0	1.5
South Central	Hardee	Ona	0.0	2.0	0.0	1.0
South Central	Highlands	Sebring	0.0	7.5	0.0	7.5
South Central	Sarasota	North Port	0.0	0.25	0.0	0.25