UNIFIED RESPONSE: LEVERAGING ACADEMIC AND OPERATIONAL EXPERTISE FOR HURRICANE PREPAREDNESS AND RECOVERY IN FLORIDA

University of Florida Department of Emergency Management

UF | Business Affairs
UNIVERSITY of FLORIDA

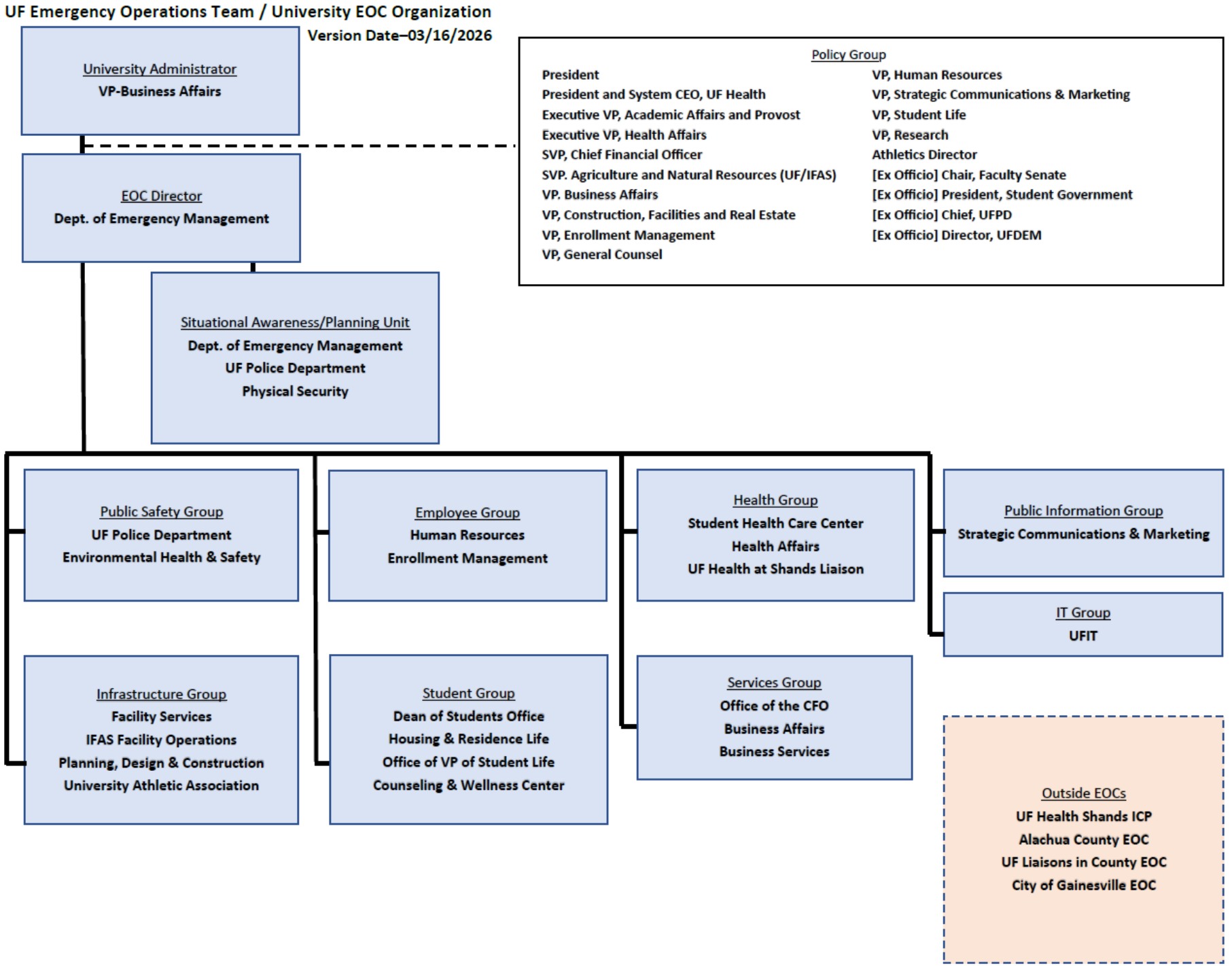
University of Florida
Department of Emergency Management

- Part of UF Public Safety within Business Affairs
- Responsible for coordinating a **comprehensive, all-hazards approach** to preparedness through prevention, protection, mitigation, response, and recovery.
- 3 Emergency Management staff, 1 Administrative Assistant

University Emergency Operations Team and Policy Group

- Composed primarily of AVP and Director-level representatives from key areas across the institution
- Provides Information and Resource Management, Planning, and Coordination for the institution before, during and after incidents
- Organized using the departmental model from NIMS
- Policy Group composed of the University President and select cabinet members (SVPs and VPs)
  - Functions include making policy decisions and determining priorities

University of Florida EOT/EOC Organization



University Emergency Operations Center

- New (2023) Public Safety Building
- Dedicated, hardened Emergency Operations Center and breakout rooms

UF | Business Affairs
UNIVERSITY of FLORIDA

IFAS and Veterinary Medicine on the EOT

- Both IFAS and College of Veterinary Medicine (Vet Med) play critical roles in the state's response to incidents
- IFAS has a dedicated representative in the EOC during activations
  - Provides information on the status of their facilities and operations around the state to the EOT and Policy Group during incidents
- Vet Med is represented in the EOC through Health Affairs
- Close planning coordination between UFDEM, IFAS and Vet Med
- IFAS utilizes a Microsoft Teams site to coordinate their statewide operations
  - UFDEM staff are members of the Teams site to maintain situational awareness

UF Coordination with Counties

- UF has a presence in all 67 counties
- Strive to maintain direct relationships with emergency management in counties containing large UF footprints
- In Alachua County, UF staffs a liaison (LNO) position when their EOC is activated
- Many UF Extension Agents serve as key stakeholders in their local County EOCs (ESF 17, PIOs, Shelters, etc.)

UF Coordination with the State EOC

- Participate in State/County briefings during incidents
- Coordinate through our Florida Division of Emergency Management (FDEM) Regional Coordinator and Board of Governors representative in the State EOC, who serves as liaison for all 12 state universities.

Requesting UF IFAS and Vet Med Resources

Identify Need and Input Request

- Input request to State WebEOC
- Mission is added to DEMES Mutual Aid System

Call UFDEM

- Give us a heads up so we can start working on your request
- If you have a UF Extension Agent in your EOC, they can assist with communication

Mobilization and Deployment

- If UF can fill the request, we will work with IFAS and Vet Med partners to mobilize and deploy their resources
- All mission tracking in DEMES

University of Florida
Department of Emergency Management

emergencymanagement@ufl.edu

(352) 273-2100

Kenneth Allen

Director

kfallen@ufl.edu

Brady Nettina

Assistant Director

bradynettina@ufl.edu

UF Business Affairs
UNIVERSITY of FLORIDA

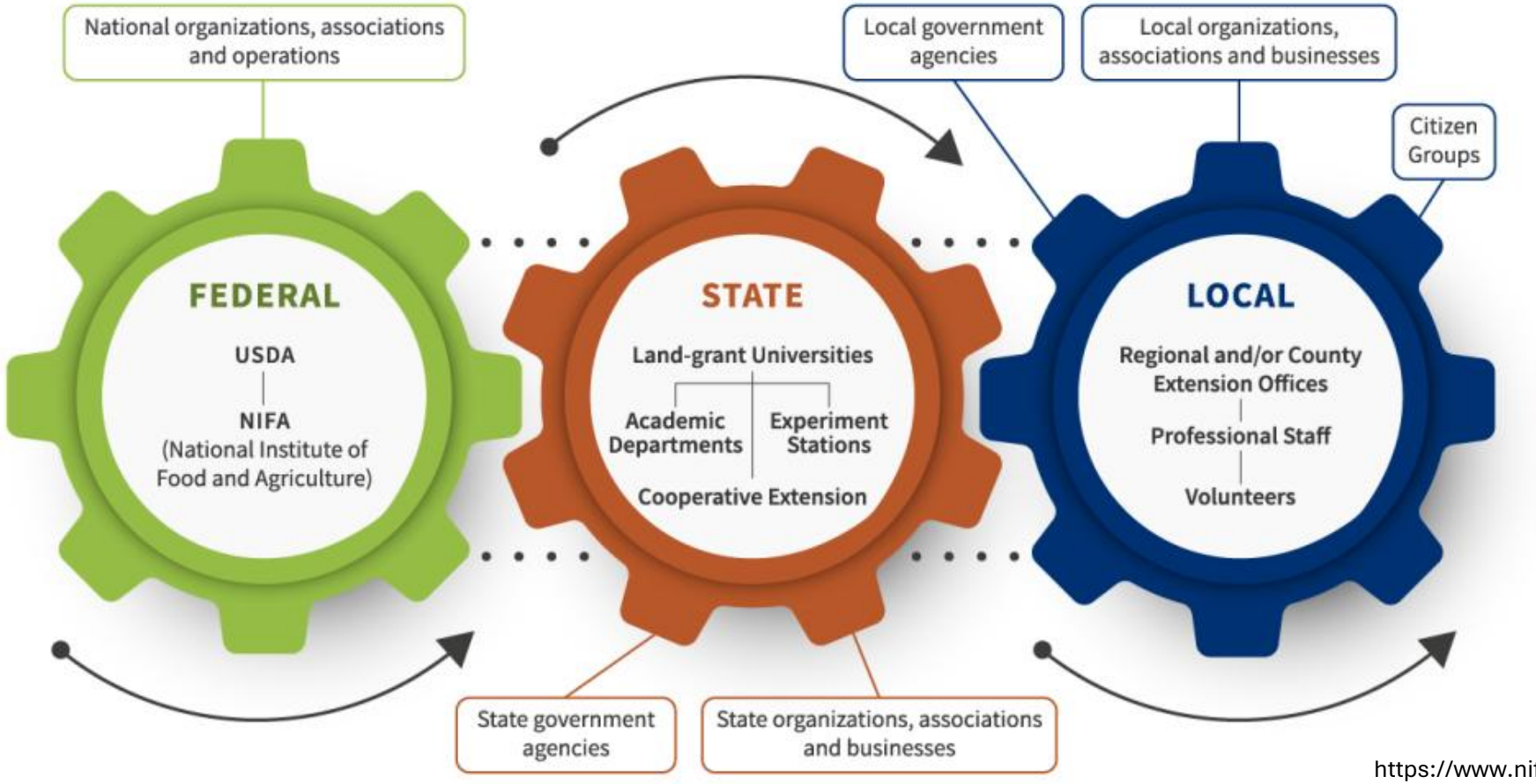
UF | IFAS Extension
UNIVERSITY of FLORIDA

UF/IFAS Extension Preparation, Mitigation, Response, & Recovery Efforts

Angie B. Lindsey, Ph.D.

What is Extension?

FLORIDA EDEN // EXTENSION DISASTER EDUCATION NETWORK



https://www.nifa.usda.gov/about-nifa/what-we-do/extension/cooperative-extension-system

Program Areas

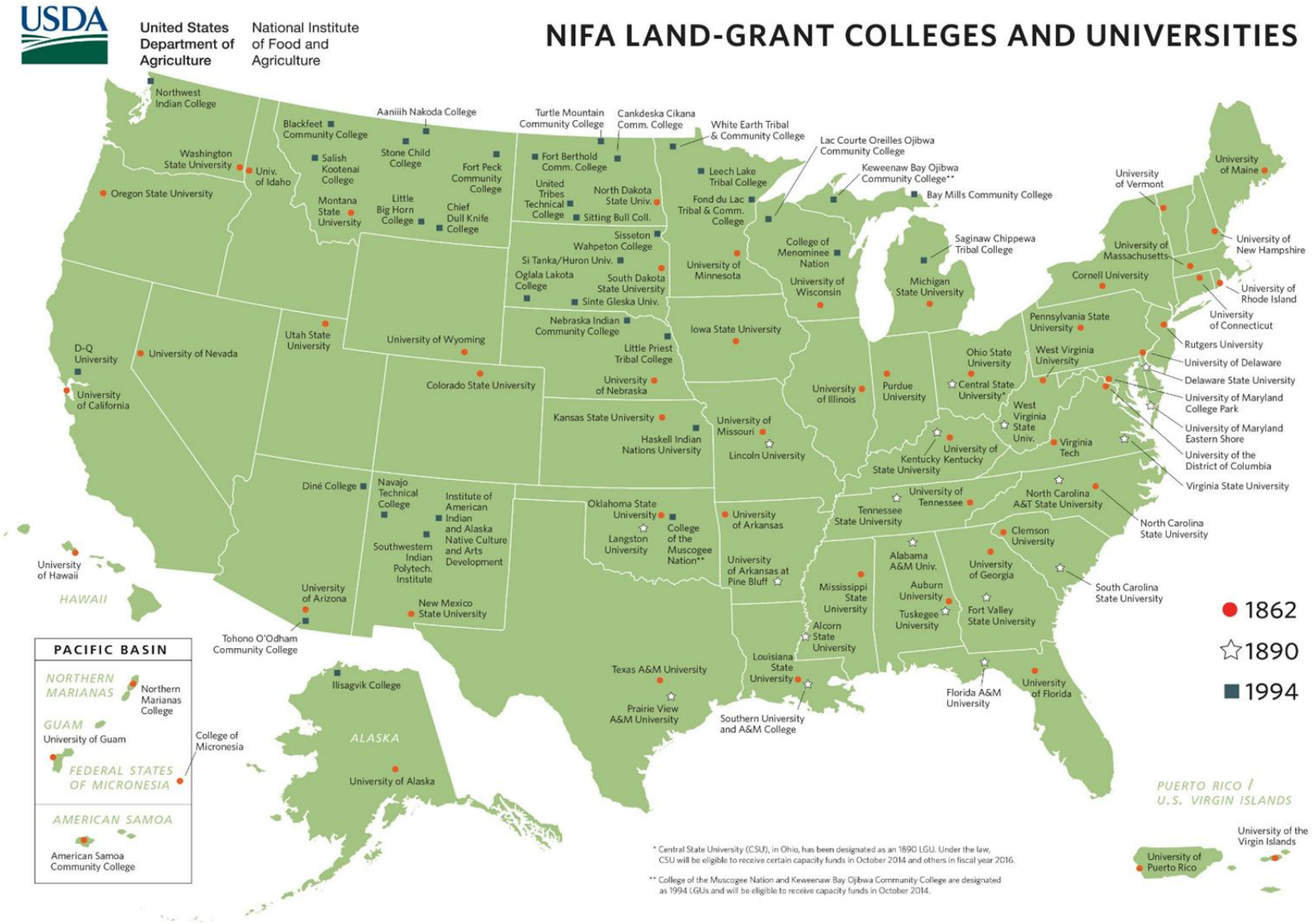
- Production Agriculture
- Natural Resources
- Sea Grant
- Horticulture
- Family & Consumer Sciences
- Youth Development (4-H)

EDEN
EXTENSION DISASTER EDUCATION NETWORK

What is EDEN?

Extension Disaster Education Network

A collaborative multi-state effort by Cooperate Extension Services across the country to improve the delivery of services to citizens affected by disaster. Over 400 delegates representing 77 Extension systems.



Florida EDEN

Collaborative Effort across Extension offices in all 67 counties

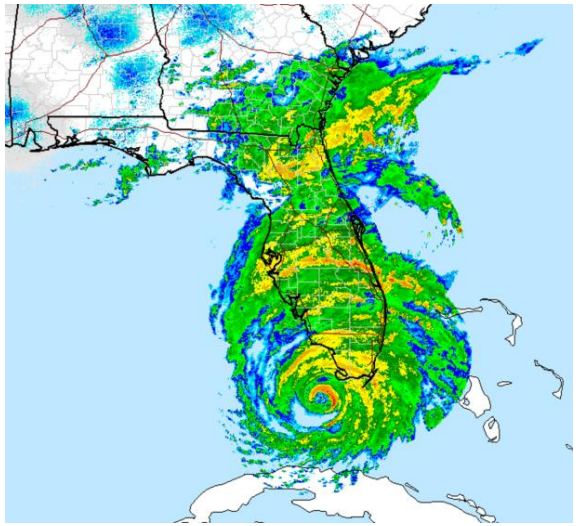
- 3 Points of Contact (POC)
  - 1 overall (Lindsey)
  - 1 from FAMU (Davis)
  - 1 representing FL Sea Grant (Ropicki)
- Over 20 delegates with representatives from all over the state

Our Work

- Align with national mission to reduce the impact of disasters through research-based education
- Work with all 67 counties on programs, education, & tools involved at all levels of disaster management - preparedness, mitigation, response, & recovery

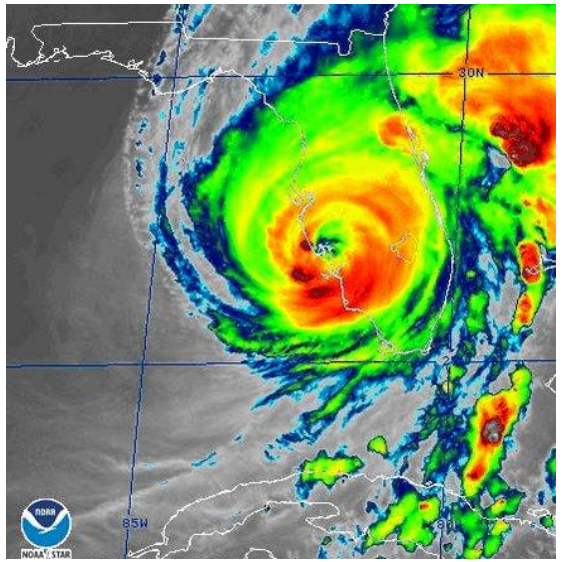
Experience Can Be Our Greatest Teacher

FLORIDA EDEN // EXTENSION DISASTER EDUCATION NETWORK



Hurricane Irma – 2017
Category 3

Hurricane Michael – 2018
Category 5

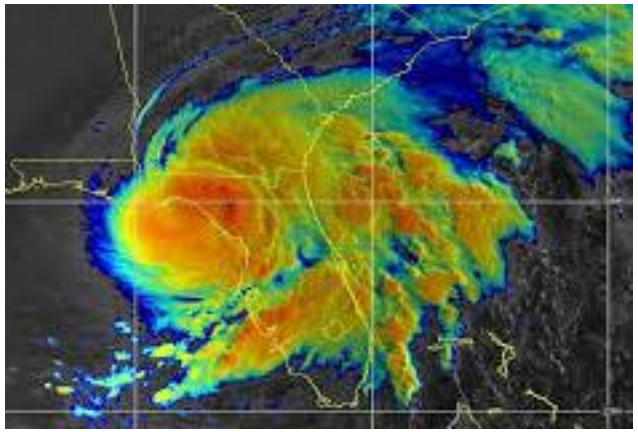


Hurricane Ian – 2022
Category 4

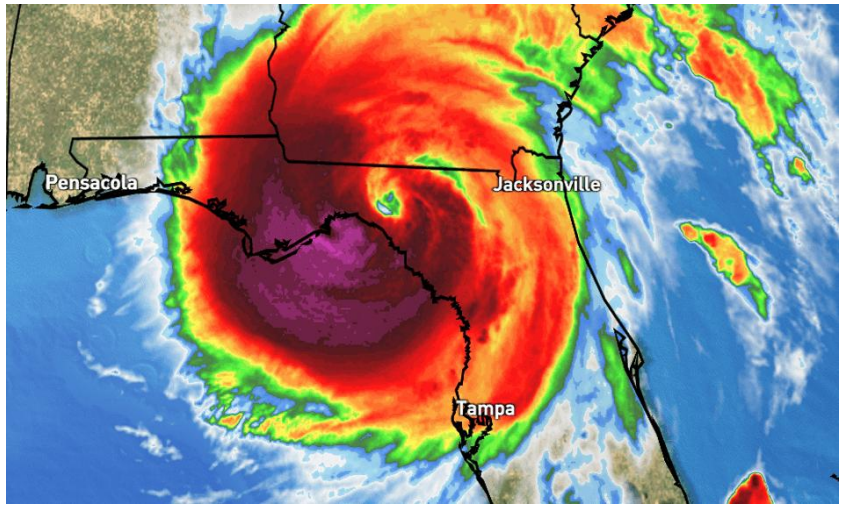
Hurricane Idalia – 2023
Category 3

Experience Can Be Our Greatest Teacher

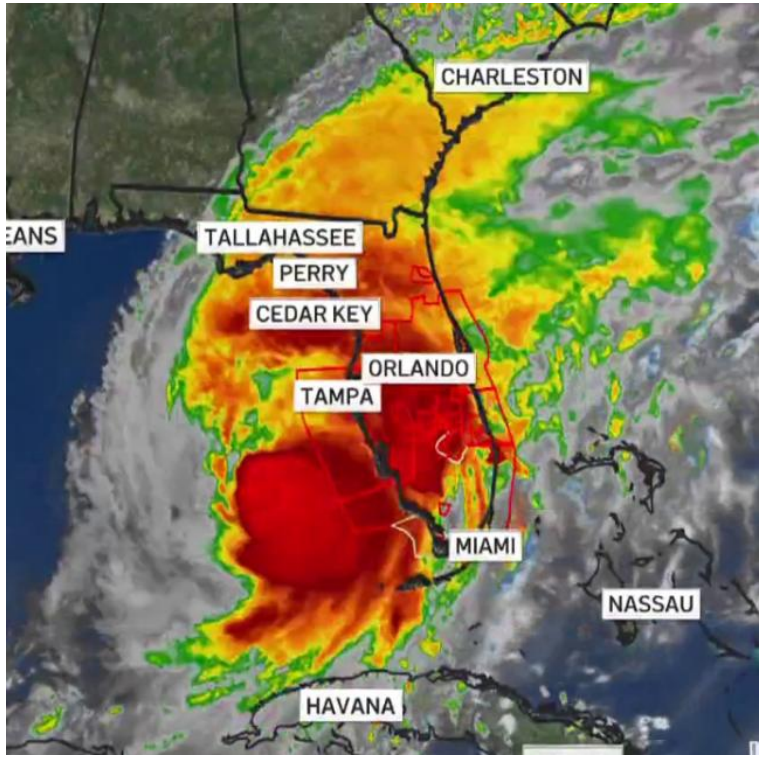
FLORIDA EDEN // EXTENSION DISASTER EDUCATION NETWORK



Hurricane Debby – 2024
August
Category 1



Hurricane Helene – 2024
September
Category 4



Hurricane Milton – 2024
October
Category 3

Work of Florida EDEN

FLORIDA EDEN // EXTENSION DISASTER EDUCATION NETWORK

Combining research, current Extension programs, & recent experience with Hurricanes Irma (2017), Michael (2018), Sally (2020), Ian (2022), Idalia (2023), Helene & Milton (2024)

Active involvement in:

Preparation	Mitigation	Response	Recovery

So What Does This Look Like?

FLORIDA EDEN // EXTENSION DISASTER EDUCATION NETWORK

Some examples of roles of Extension in Counties

- Provide research-based education in disaster management including preparation, mitigation, response, and recovery
- Year-round programs
- Emergency Support Functions (ESF) representatives (ESF 17)
- State Agriculture Response Team (SART) representative
- Public Information officers
- First Responders
- Working in Emergency Operations Centers
- Working in shelters
- Damage assessments
- And many more!

Work in Preparation

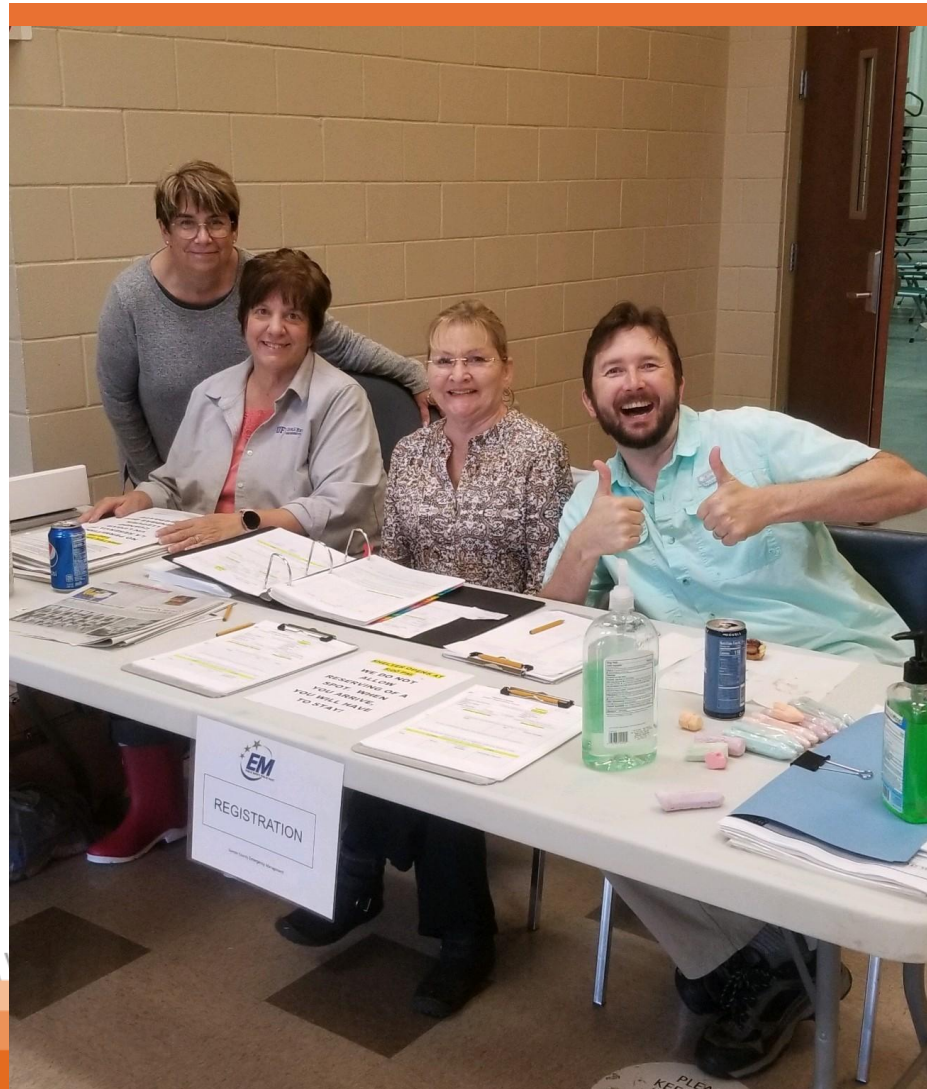
Few days prior to impending storm

FLORIDA EDEN // EXTENSION DISASTER EDUCATION NETWORK

- Participate in daily calls with Florida Department of Agricultural and Consumer Services (FDACS) State Agricultural Response Team (SART)
- Develop a “TEAMS team” to communicate internally with UF/IFAS colleagues
  - Disaster leadership team and beyond
- Leverage UF/IFAS and EDEN national networks to compile relevant resources
- Start daily a.m. internal calls which includes our partners including UF College of Veterinary Medicine and Sea Grant
- Share relevant resources with County Extension faculty as well as Research and Education Centers throughout the state to push out to their local communities
  - UF/IFAS Agricultural Damage and Loss Assessment Tool
  - Resources specific to preparation and response for hurricanes and flooding
    - Web-based links and physical copies
- Communication of what’s “at risk” in terms of agriculture in areas expected to receive impacts

Work in Mitigation

- Work year around to prepare for roles in Response & Recovery
  - UF/IFAS Extension agents serve in their county Emergency Operations Centers (EOCs) before, during, & after
  - UF/IFAS faculty and staff serve in shelters
  - Several county office are used as shelters
- Develop relationships w/in and outside of county to best meet needs following an event
  - Where possible, UF/IFAS works with partners to provide water, ready-to-eat perishable meals, ice, feed, and hay immediately following the storm



Work in Response

- Agents in impacted areas visit farms & other sites to assess damages and help with clean-up
- Assist with hard-to-get resources such as gas, groceries, water, etc.
- Representative with the Incident Command Post (ICP) for ESF 17 & State Agricultural Response Team (SART) to assist with donations and coordination for UF/IFAS
- County 4H offices work together to get supplies to 4H in impacted areas –
- Distribution of Inzecto mosquito traps
- Secure animal feed and donations for distribution and assist in delivering to those that are not able to come to area
- Assist with industry partners (FL Cattlemen's Association, FL State Beekeepers Association, FFVA, etc.) on meeting needs of members

Work in Recovery

- Provide information on federal, state, & local assistance programs
  - As soon as possible after an event
  - Throughout the year
- Provide industry stakeholder resources (donation & pick-up locations, recovery centers)
  - Farm Recovery Centers in 2023 & 2024
- Faculty & staff arranged clean-ups of gardens & landscapes
- Assisting with post-hurricane applications of herbicides to crops

Work in Recovery

- Pushed information from partners, local, state, & federal agencies to Extension offices for distribution within communities:
  - Florida Wildlife Commission
  - Department of Health
  - Volunteer Florida
  - Florida Small Business Emergency Bridge Loans
  - Visit Florida
  - Florida Department of Economic Opportunity
  - Division of Emergency Management
  - FDACS

OUR ROLE

FLORIDA EDEN // EXTENSION DISASTER EDUCATION NETWORK

To Support Extension and ultimately the counties in work you are doing in disaster management

- Assist with preparing Continuing of Operations (COOP) plans for offices if needed
- Manage UF/IFAS internal communications before, during, and after the storm
- Gathering/acquiring fact sheets and resources needed
- Provide training and/or work to get training
- Serve as liaisons with state and federal to make connections to meet needs and gaps
- Share information from government agencies and industry partners
- Provide us feedback ALL YEAR re: resources needed, support needed, gaps, needs
- Damage assessment training and assistance

UF | IFAS Extension
UNIVERSITY of FLORIDA

Angie B. Lindsey, Ph.D.
ablindsey@ufl.edu

UF IFAS
UNIVERSITY of FLORIDA

Agricultural Impacts of Disaster Events and Data Tools for Threat Assessment

Prepared for 2026 Governor's Hurricane Conference
West Palm Beach, FL

DR. CHRISTA D. COURT, ASSOCIATE PROFESSOR

DEPARTMENT OF FOOD AND RESOURCE ECONOMICS
UF/IFAS ECONOMIC IMPACT ANALYSIS PROGRAM
UNIVERSITY OF FLORIDA

May 14, 2026

UF/IFAS Economic Impact Analysis Program

- Integrated research and extension program housed within the Food and Resource Economics Department
- Expertise in the areas of regional economic modeling, economic impact analysis, economic contribution studies, disaster impact analysis
- Provide technical assistance to industry groups, academic units, government agencies, and local communities.
- Conduct sponsored research projects involving detailed analyses of particular industries, regions, or situations.

2024-2025 Disaster Impact Analysis Team

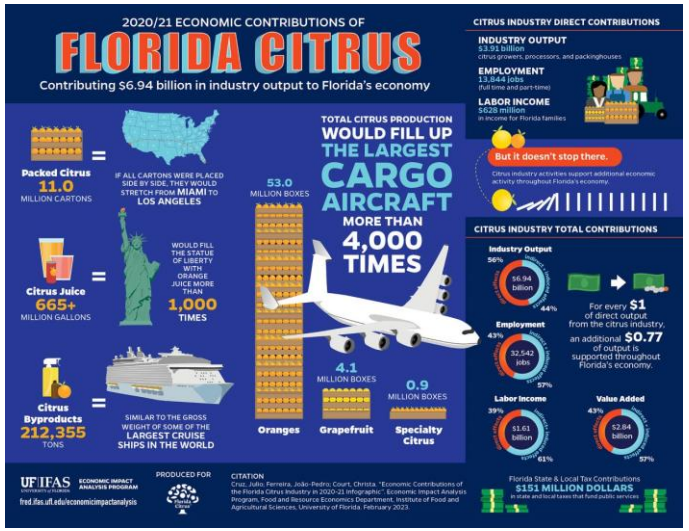
Source: *Photo by Michelle Baldwin, UF/IFAS*

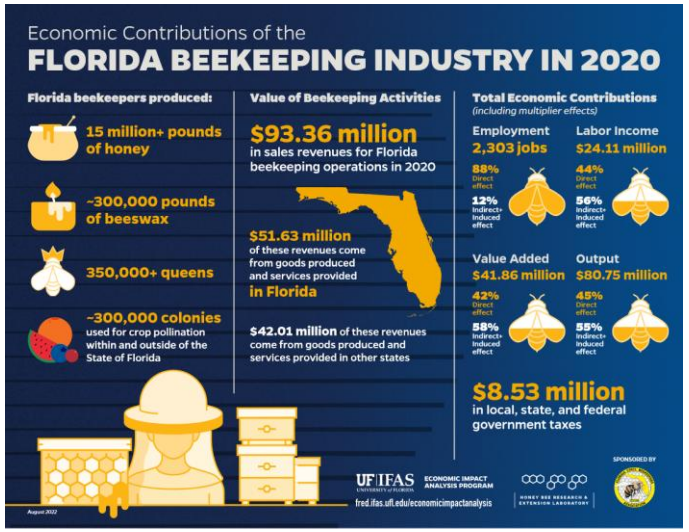
UF IFAS UNIVERSITY of FLORIDA

Regional Economic Analysis

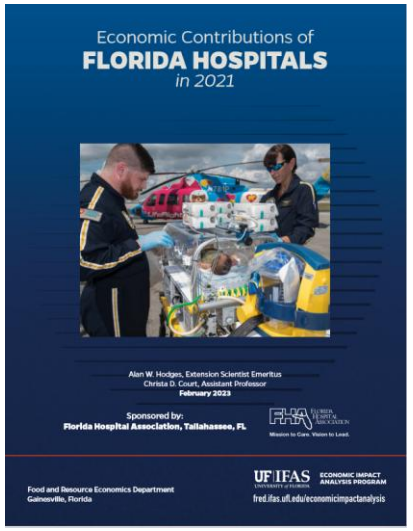
https://go.ufl.edu/eiap

Production Agriculture

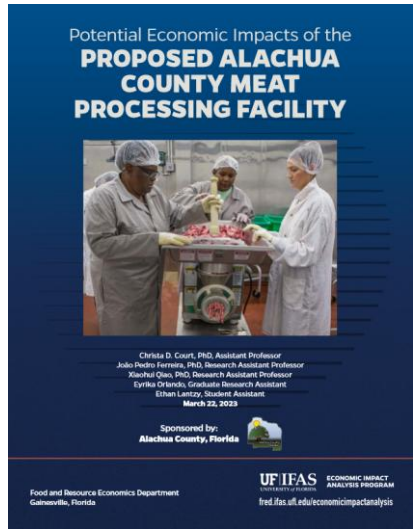


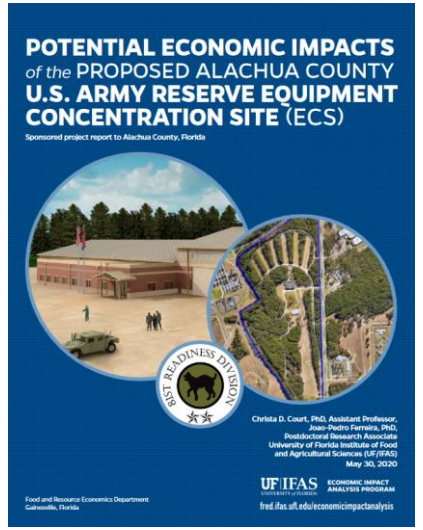


Other Industries



Local Economic Development



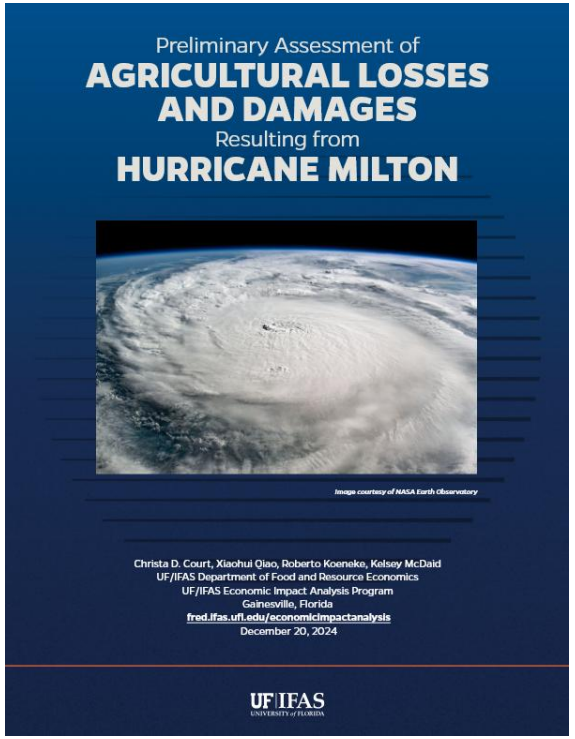


UF IFAS
UNIVERSITY of FLORIDA

Disaster Impact Analysis

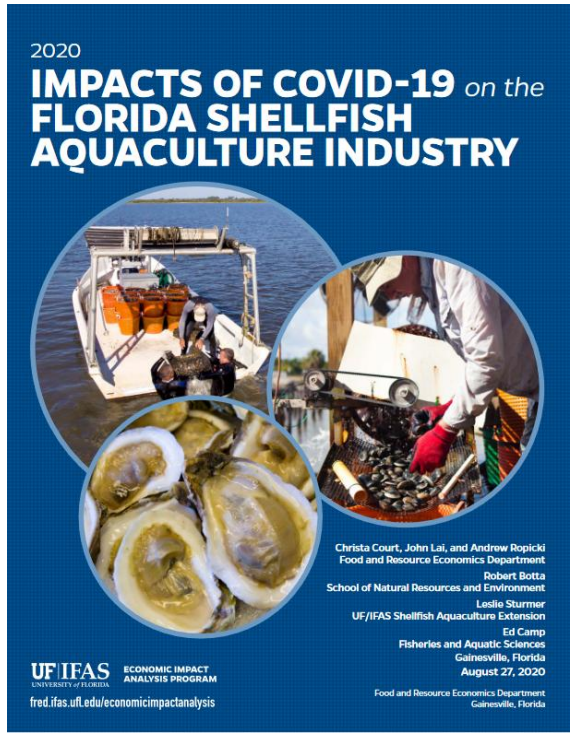
https://go.ufl.edu/disasters

Rapid Assessment of Agricultural Losses



Water Quality

Other



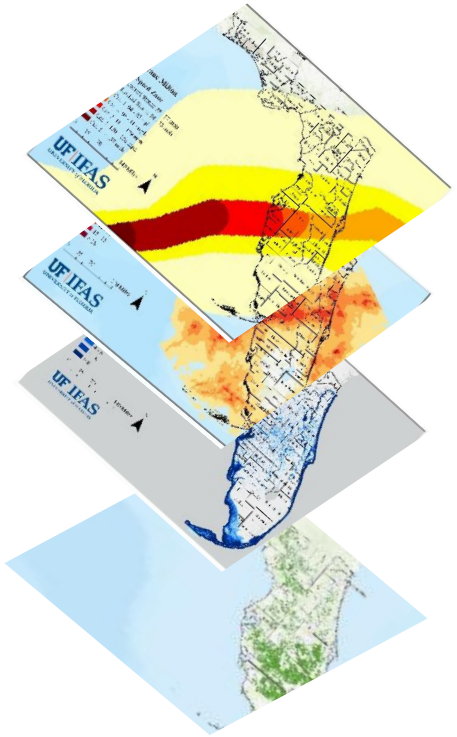
UF IFAS UNIVERSITY of FLORIDA

Methodology for Estimating Agricultural Losses

UF IFAS UNIVERSITY of FLORIDA

ECONOMIC IMPACT ANALYSIS PROGRAM

Adapted from:
FAO Damage and Loss Methodology



Wind Speed

Precipitation

Flood Depth

Event Data

Crops, Livestock, Aquaculture

Crop Growth Stage

Value Per Acre

Baseline Data

Loss Percentage

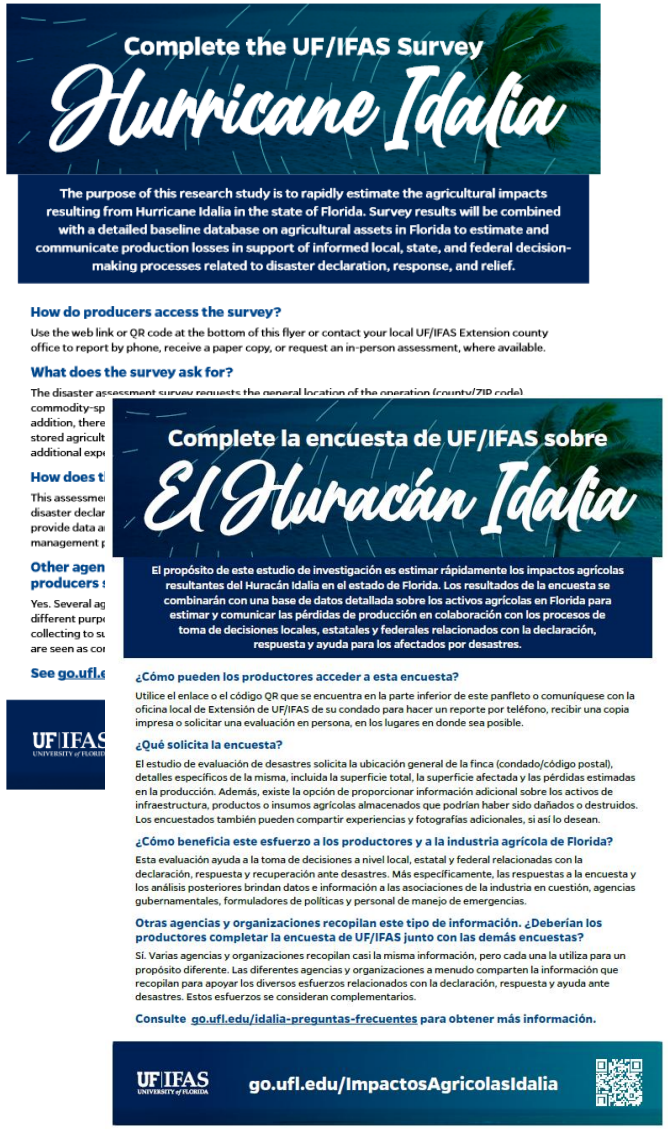
Surveys and Reports

Statewide estimates of agricultural losses

UF IFAS UNIVERSITY of FLORIDA

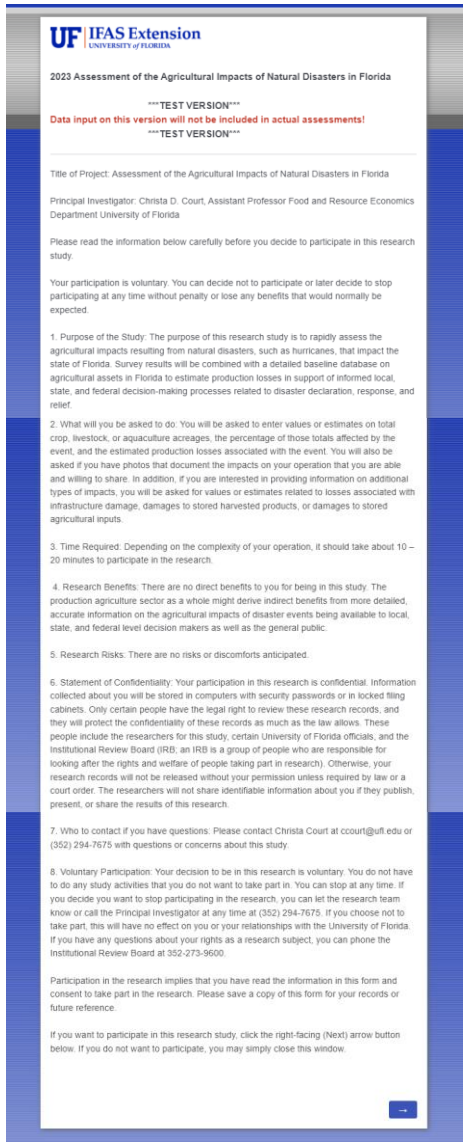
UF/IFAS Assessment Distributed Widely with Assistance from Extension, Industry Associations, and Government Agencies

Flyers with Short Weblinks and QR codes



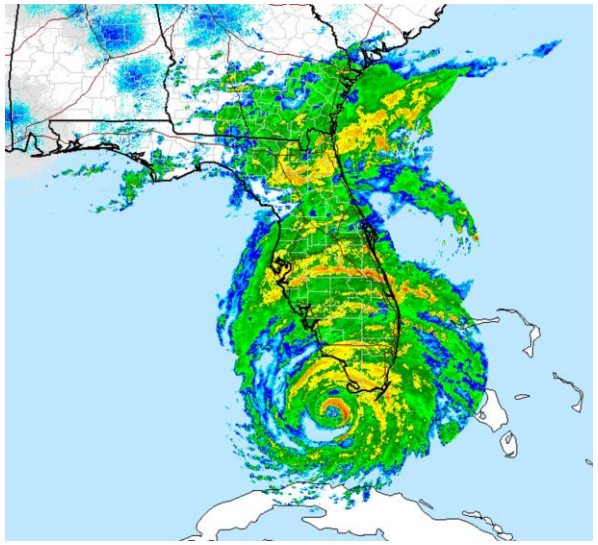
Social Media Posts

Survey Consent Form



UF IFAS
UNIVERSITY of FLORIDA

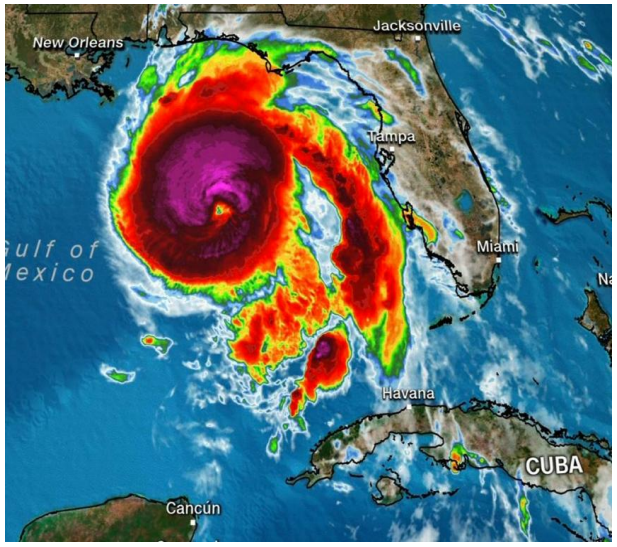
Previous Work on Tropical Cyclone Assessment



Hurricane Irma (2017)
Category 3

- First assessment for UF/IFAS
- Windshield surveys
- Strong assumptions on loss %

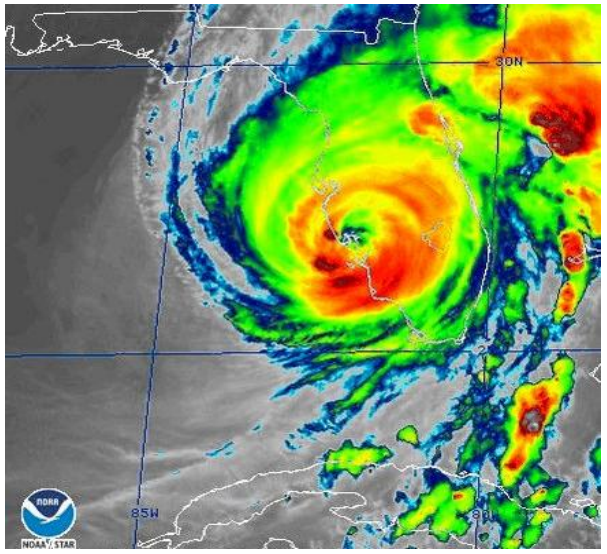
Agricultural Losses:
~$1.313 billion



Hurricane Michael (2018)
Category 5

- Harmonized collection of data
- Struggles with power/internet

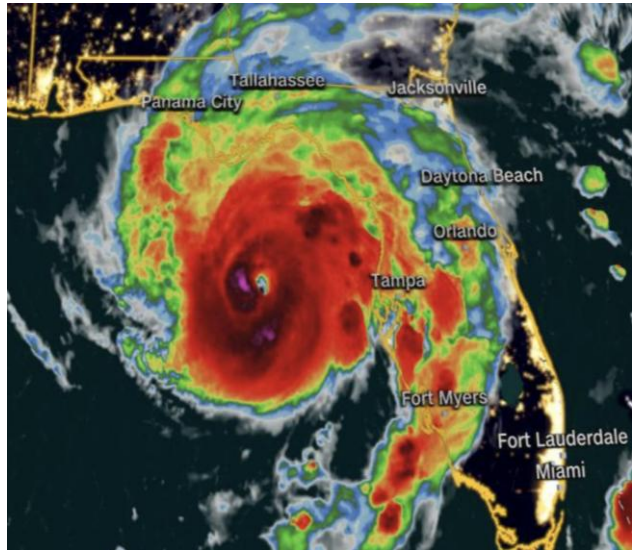
Agricultural Losses:
~$138 million



Hurricane Ian (2022)
Category 4

- Survey improvements
- Addition of precipitation and flooding within analyses

Agricultural Losses:
~$1.035 billion



Hurricane Idalia (2023)
Category 3

- Additional survey improvements
- Spanish translations

Agricultural Losses:
~$276 million

Losses should not be compared across events due to changes in methodology over time.

UF IFAS
UNIVERSITY of FLORIDA

2024 Hurricane Season

Hurricane Debby
Category 1

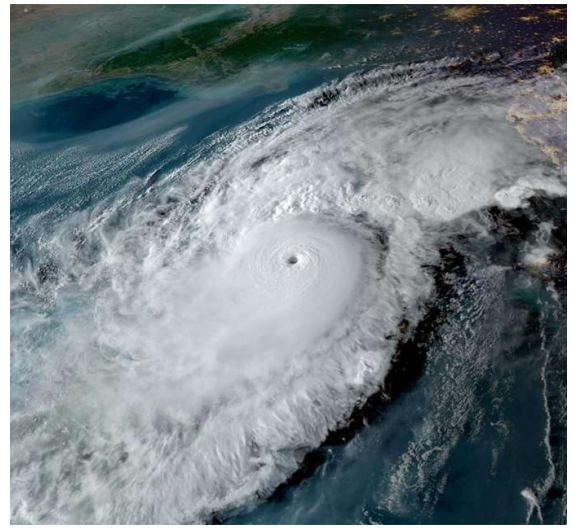
Agricultural Losses:
~$170 million

~7 weeks

Hurricane Helene
Category 4

Agricultural Losses:
~$116 million

~2 weeks



Hurricane Milton
Category 3

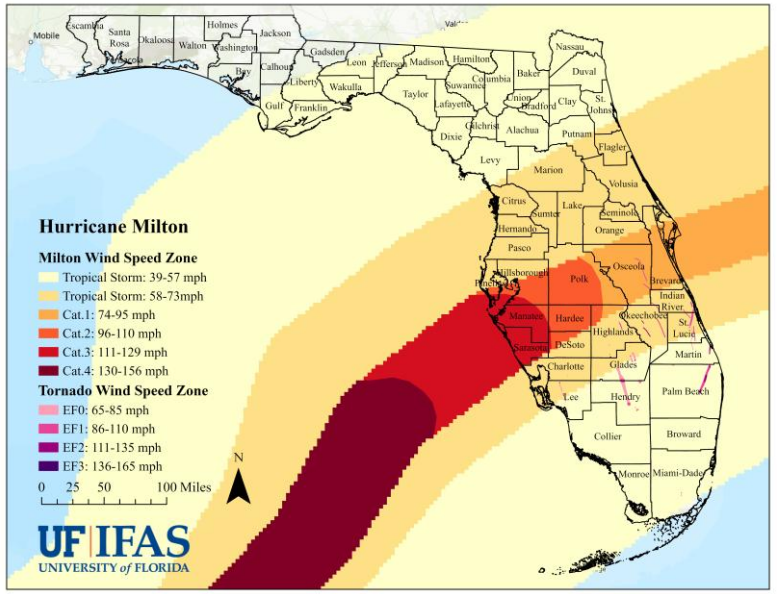
Agricultural Losses:
~$428 million

UF IFAS
UNIVERSITY of FLORIDA

Wind, Precipitation, and Flooding Conditions Associated with Hurricane Milton

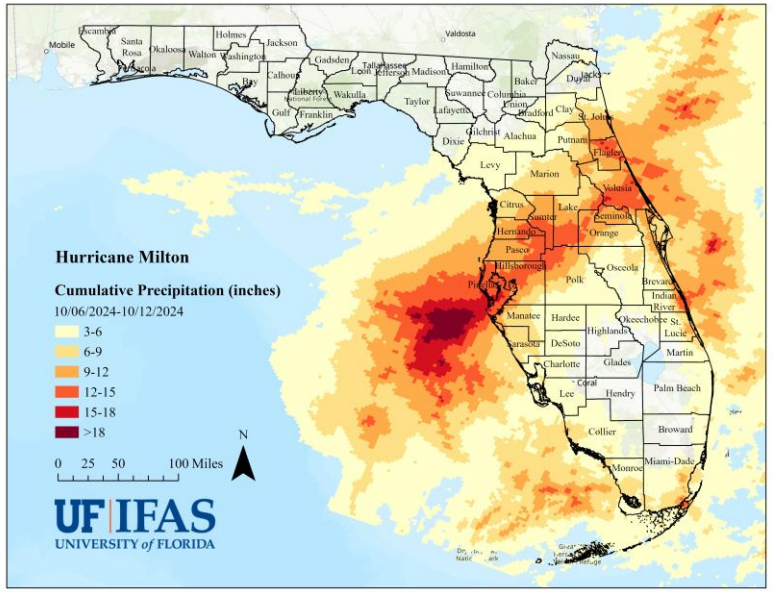
State of Florida

Wind



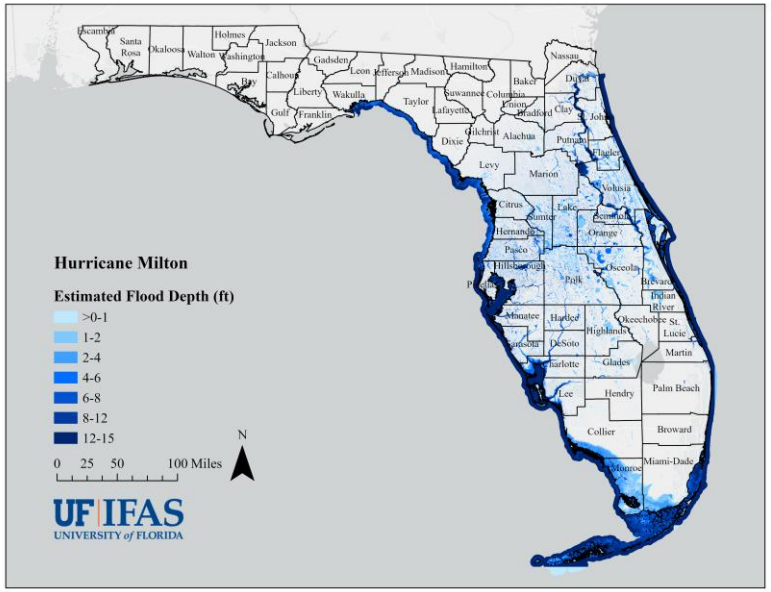
Source: Geospatial data on the wind swath of Hurricane Milton are retrieved from NOAA NHC (www.nhc.noaa.gov/gis/). Geospatial data on tornado wind speed zone are derived from NOAA NWS Damage Assessment Toolkit (apps.dat.noaa.gov/StormDamage/DamageViewer/).

Precipitation



Source: Precipitation data are retrieved from NOAA National Weather Service (water.weather.gov/precip/download.php).

Flooding



Source: Estimated flood inundation data are retrieved from Pacific Northwest National Laboratory's Rapid Infrastructure Flooding Tool (open-rift-pnnl.hub.arcgis.com/datasets/6ad56f6b56014fbfb0c492379bd78eeb/about).

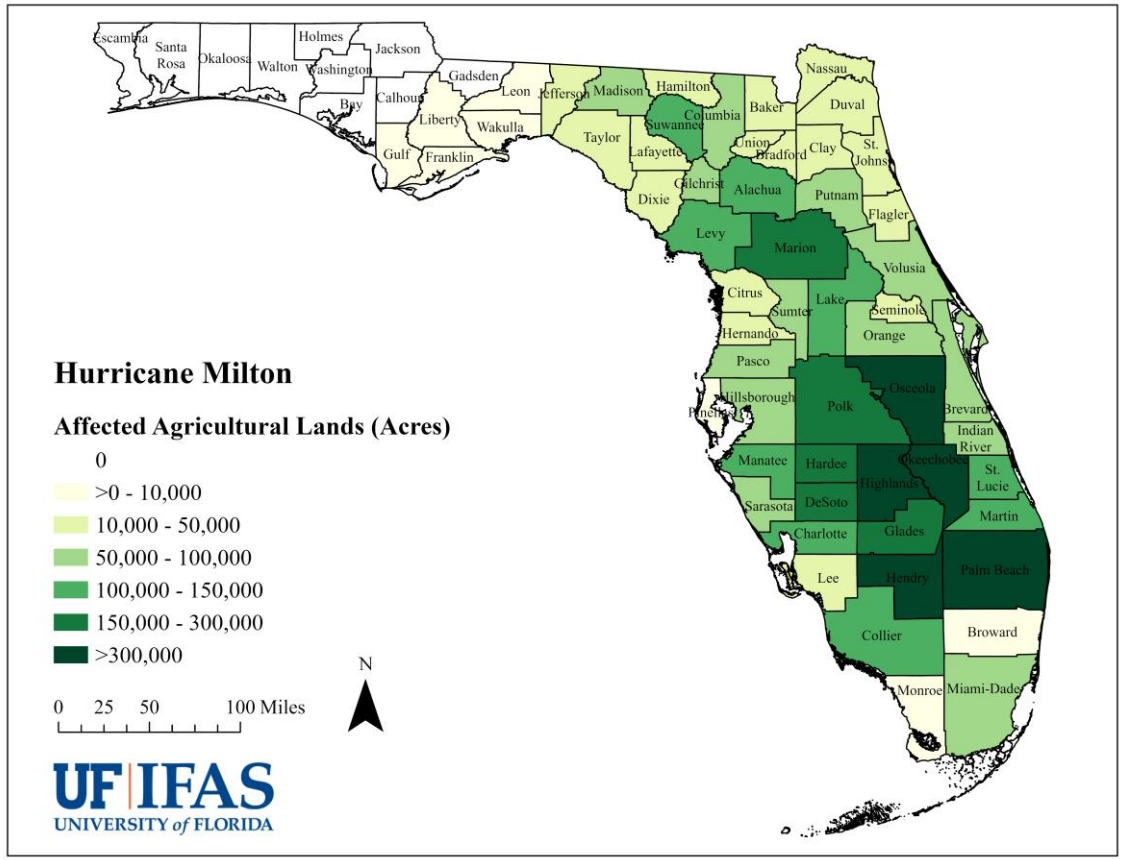
Note: Data for event characteristics come from three different sources. UF/IFAS EIAP is not responsible for any inaccuracies or inconsistencies within these sources. Additional information on the assumptions and methods associated with each data source can be found at the webpages provided above.

UF IFAS UNIVERSITY of FLORIDA

Agricultural Lands and Annual Value of Agricultural Production on Agricultural Lands Affected by Hurricane Milton

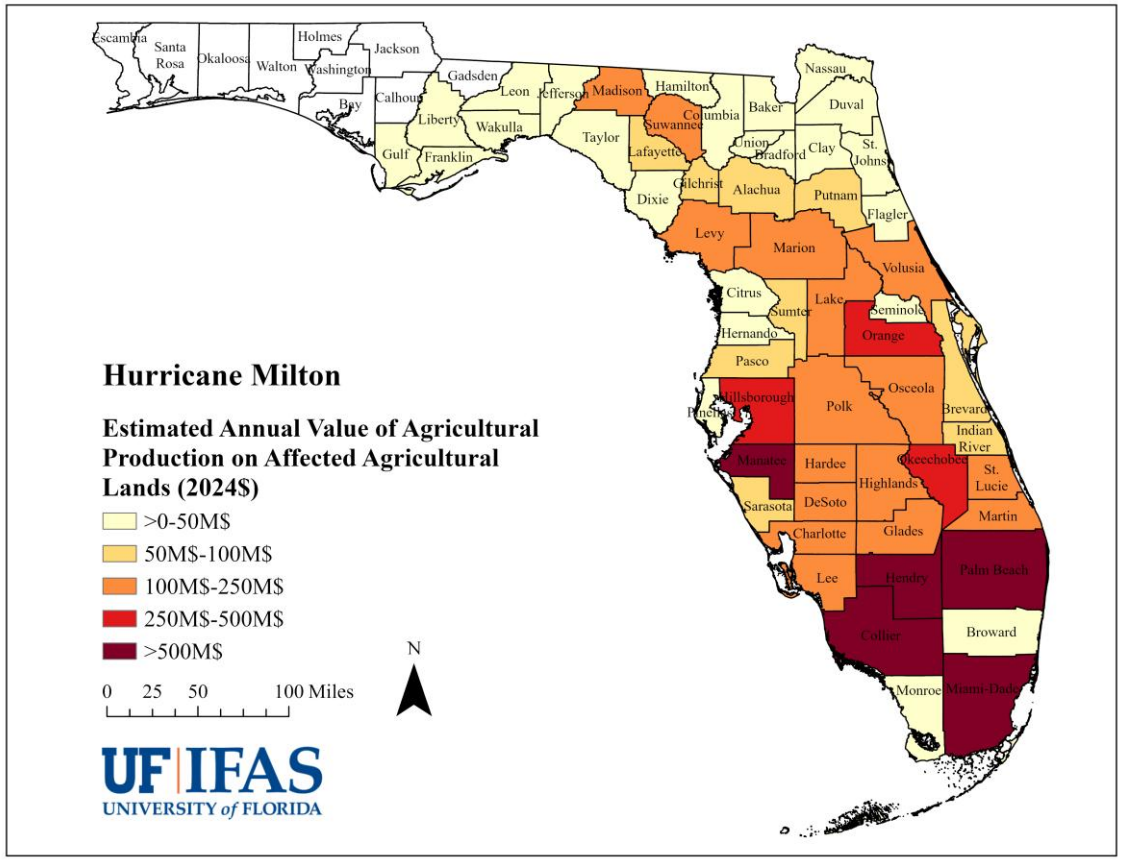
State of Florida

Affected Agricultural Lands



Source: The agricultural lands geospatial data are from the Florida Statewide Agricultural Irrigation Demand (FSAID) Agricultural Lands Geodatabase (ALG) developed by the Florida Department of Agriculture and Consumer Services (FDACS) (www.fdacs.gov/Agriculture-Industry/Water/Agricultural-Water-Supply-Planning).

Annual Value of Production on Affected Agricultural Lands (2024$)



Source: Authors' own calculations based on data from the United States Department of Agriculture National Agricultural Statistics Service (USDA-NASS) Quick Stats database, IMPLAN, and the St. Louis Federal Reserve Bank.
Note: Estimates of annual value of agricultural production have been adjusted to account for the effects of Hurricanes Debby and Helene.

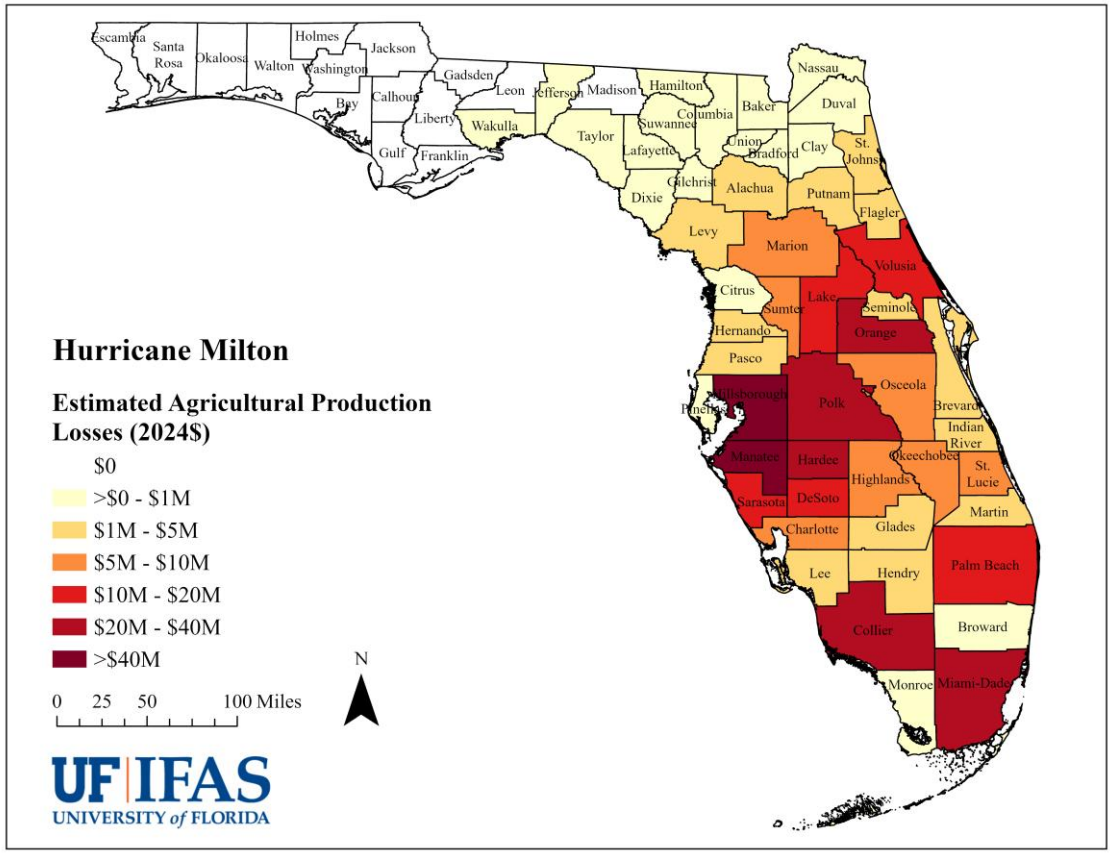
UF IFAS
UNIVERSITY of FLORIDA

Estimated Agricultural Losses Associated with Hurricane Milton

State of Florida

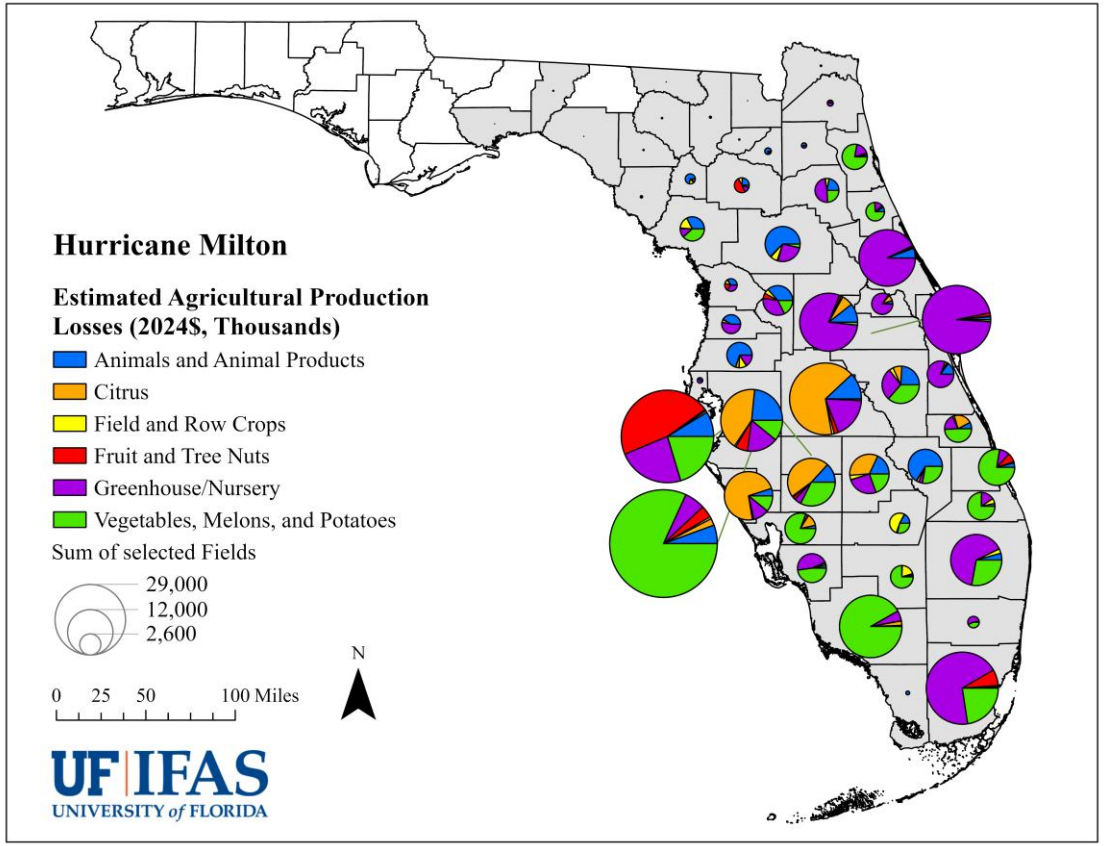
Agricultural production losses in Florida resulting from Hurricane Milton were estimated to be $428.0 million.

Agricultural Production Losses (2024$)



Source: Authors' calculations based on analysis of survey data along with observations from previously analyzed tropical cyclone events (Irma [2017], Michael [2018], Ian [2022], Idalia [2023], Debby [2024], and Helene [2024]).

Agricultural Production Losses (2024$) by Commodity Group



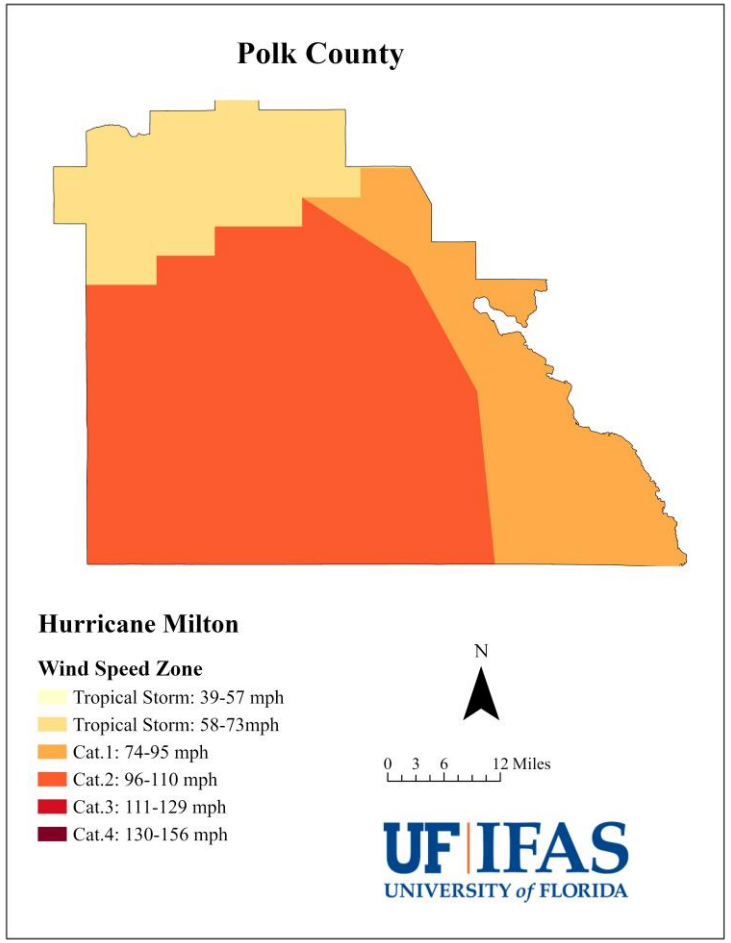
Source: Authors' own calculations based on analysis of survey data for Hurricane Milton along with observations from previously analyzed tropical cyclone events (Ian [2022], Idalia [2023], Debby [2024], and Helene [2024]).

UF IFAS
UNIVERSITY of FLORIDA

Wind, Precipitation, and Flooding Conditions Associated with Hurricane Milton

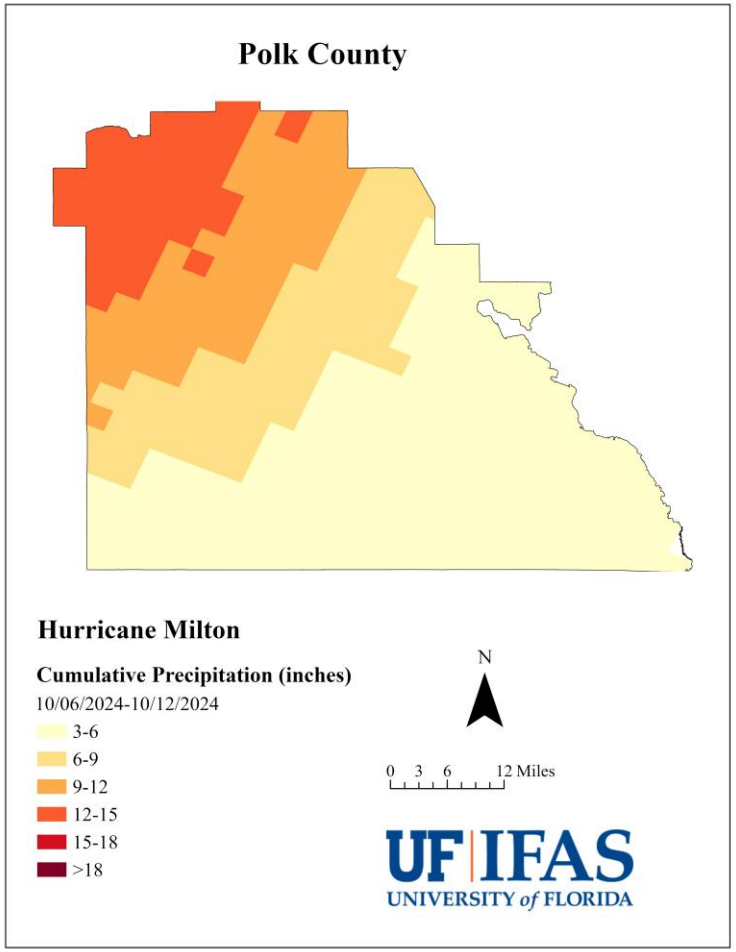
Polk County

Wind



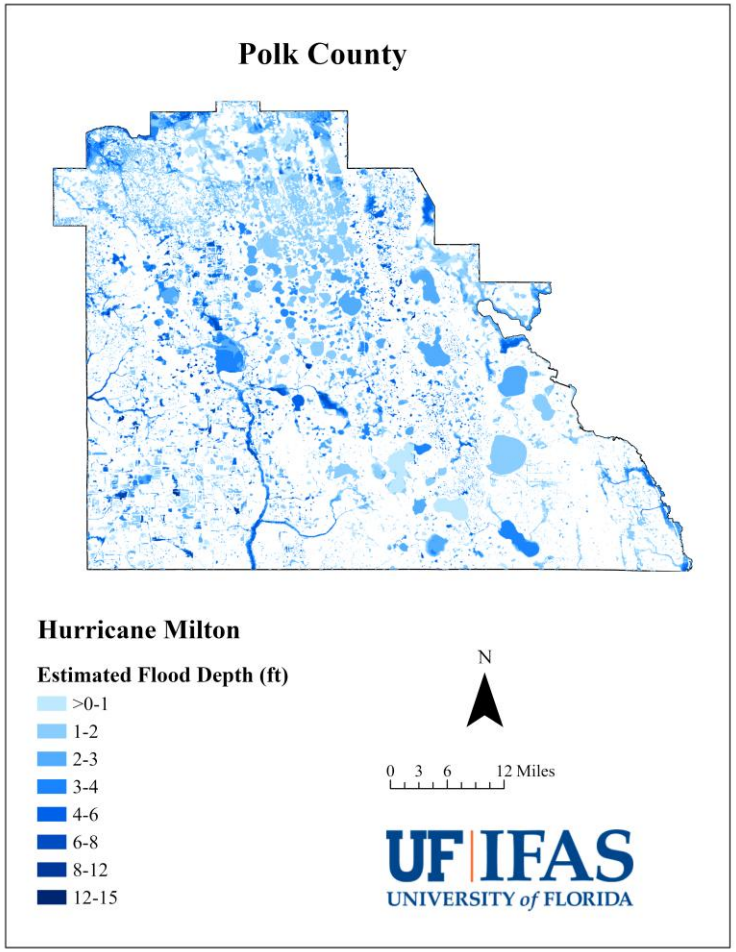
Source: Geospatial data on the wind swath of Hurricane Milton are derived from NOAA NHC (www.nhc.noaa.gov/gis/).

Precipitation



Source: Precipitation data are derived from NOAA National Weather Service (water.weather.gov/precip/download.php).

Flooding



Source: Estimated flood inundation data are retrieved from Pacific Northwest National Laboratory's Rapid Infrastructure Flooding Tool (open-rift-pnnl.hub.arcgis.com/datasets/6ad56f6b56014fbfb0c492379bd78eeb/about).

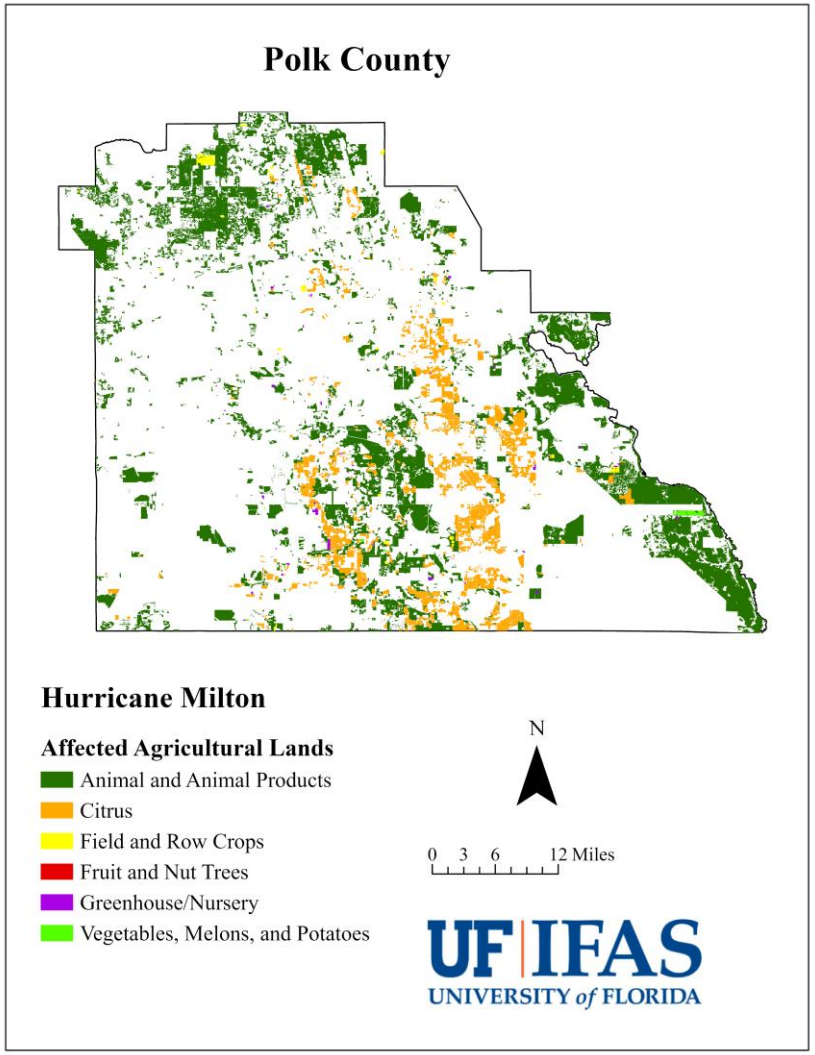
Note: Data for event characteristics come from three different sources. UF/IFAS EIAP is not responsible for any inaccuracies or inconsistencies within these sources. Additional information on the assumptions and methods associated with each data source can be found at the webpages provided above.

UF IFAS
UNIVERSITY of FLORIDA

Agricultural Lands and Value Impacted by Hurricane Milton

Polk County

Commodity Group	Affected Agricultural Land (Acres)	Estimated Annual Value of Agricultural Production On Affected Agricultural Lands (2024$)
Animals and Animal Products	220,512	$56,505,000
Citrus	58,516	$116,193,000
Field and Row Crops	5,033	$3,537,000
Greenhouse/Nursery	1,312	$55,070,000
Vegetables, Melons, and Potatoes	238	$2,303,000
Fruit and Tree Nuts	175	$4,639,000
Total	**285,786**	**$238,247,000**

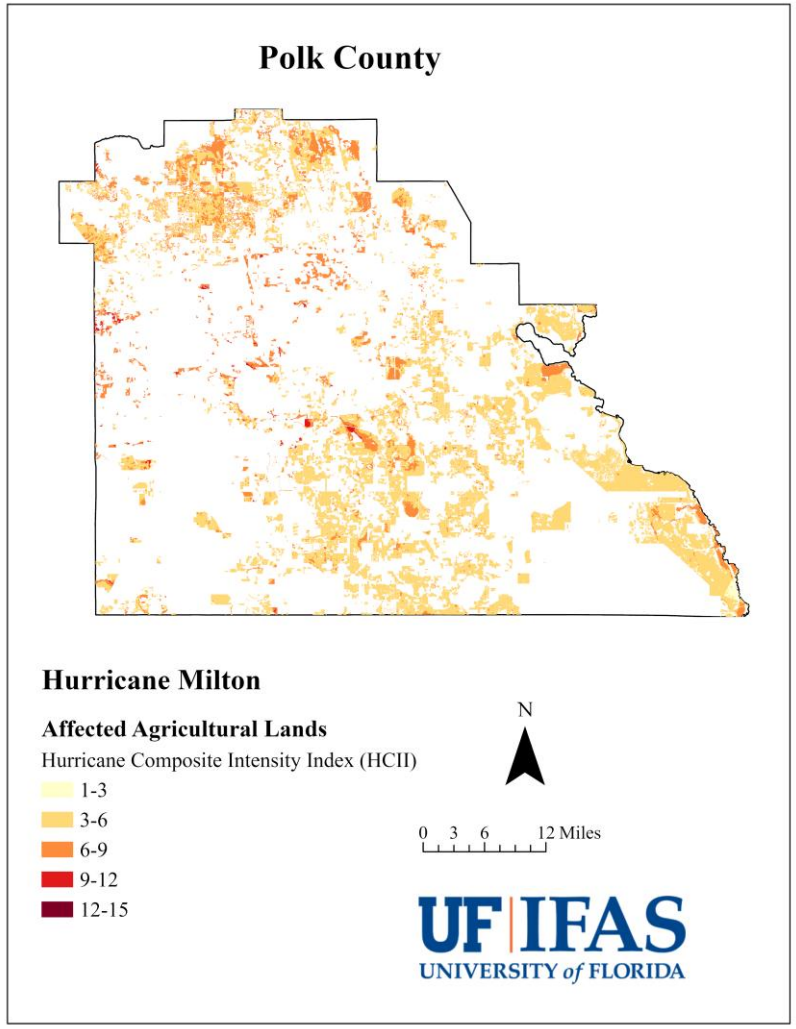


Source: The agricultural lands geospatial data are from the FSAID ALG developed by FDACS (www.fdacs.gov/Agriculture-Industry/Water/Agricultural-Water-Supply-Planning).

UF IFAS
UNIVERSITY of FLORIDA

Estimated Agricultural Losses Associated with Hurricane Milton

Polk County



Source: Authors' own calculations based on the FSAID ALG developed by FDACS, wind swath data from NOAA NHC, precipitation data from NOAA National Weather Service, and estimated flood inundation data from the Pacific Northwest National Laboratory's Rapid Infrastructure Flooding Tool.

Commodity Group	Production Losses (2024$)
Citrus	$19,827,000
Greenhouse/Nursery	$5,508,000
Animals and Animal Products	$3,592,000
Fruit and Tree Nuts	$584,000
Field and Row Crops	$322,000
Vegetables, Melons, and Potatoes	$241,000
Total	**$30,074,000**

UF IFAS
UNIVERSITY of FLORIDA

Asset and production damage

- **Survey respondents reported damage to or destruction of the following types of agricultural assets:**
  - Homes
  - Barns and storage structures
  - Livestock sheds and watering points
  - Greenhouse and other growing structures
  - Fencing (exterior and interior)
  - Irrigation systems
  - Conservation structures
  - Aquaculture structures and equipment
  - Honey bee boxes
  - Farm equipment (tractors, vehicles, greenhouse heating/cooling, etc.)
  - Perennial plantings
- **Survey respondents also reported damage to or destruction of stored harvested products and the following types of stored inputs:**
  - Stored animal products (e.g., eggs, meat, milk)
  - Stored food fishes
  - Fertilizer, pesticides, and animal medicine
  - Seeds
  - Fish feed, fingerlings, aquatic medicine
  - Honey bee feed
  - Stored hay, millet, and feed grain
  - Bird scratch/feed

Photos courtesy of survey respondents.

UF IFAS UNIVERSITY of FLORIDA

UF/IFAS EIAP Data Platform

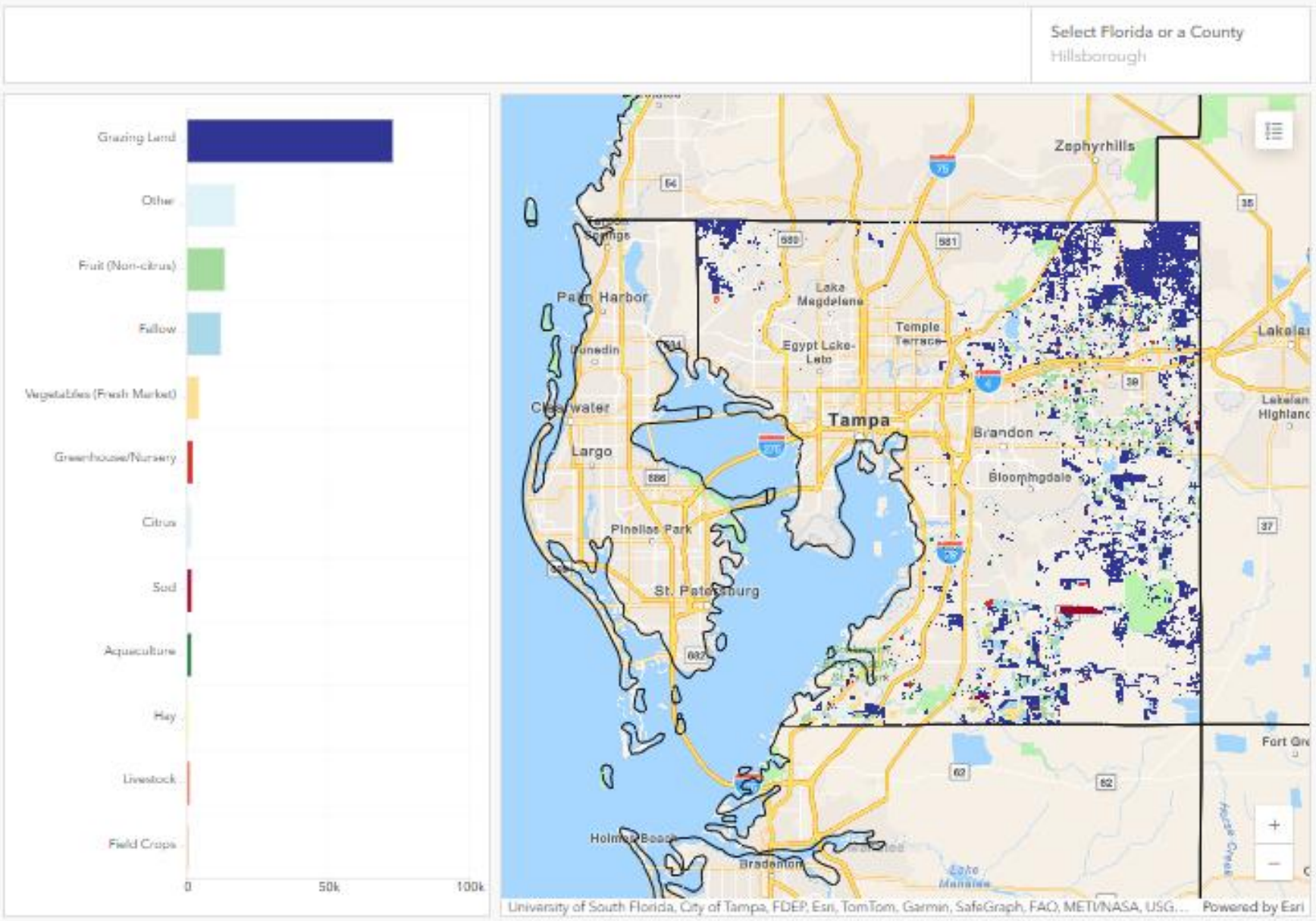
https://ffav-ufl.hub.arcgis.com/

- Providing information relevant to diverse audiences on the multiple climatic, biological, social, and economic contexts they function in is complex and necessitates a data-driven approach.
- Innovations in and use of interdisciplinary technologies (webGIS, AI, BI, etc.) can help.
- UF/IFAS EIAP Data Platform is an initial output of an effort to deepen our understanding of
  - Interactions between UF/IFAS Extension and its stakeholders
  - Local social, economic, and demographic conditions within which these interactions take place.
- Continued development to offer a permanent and comprehensive data visualization system supporting communication and decision-making within and outside of UF/IFAS Extension.

Data Tools for Threat Assessment

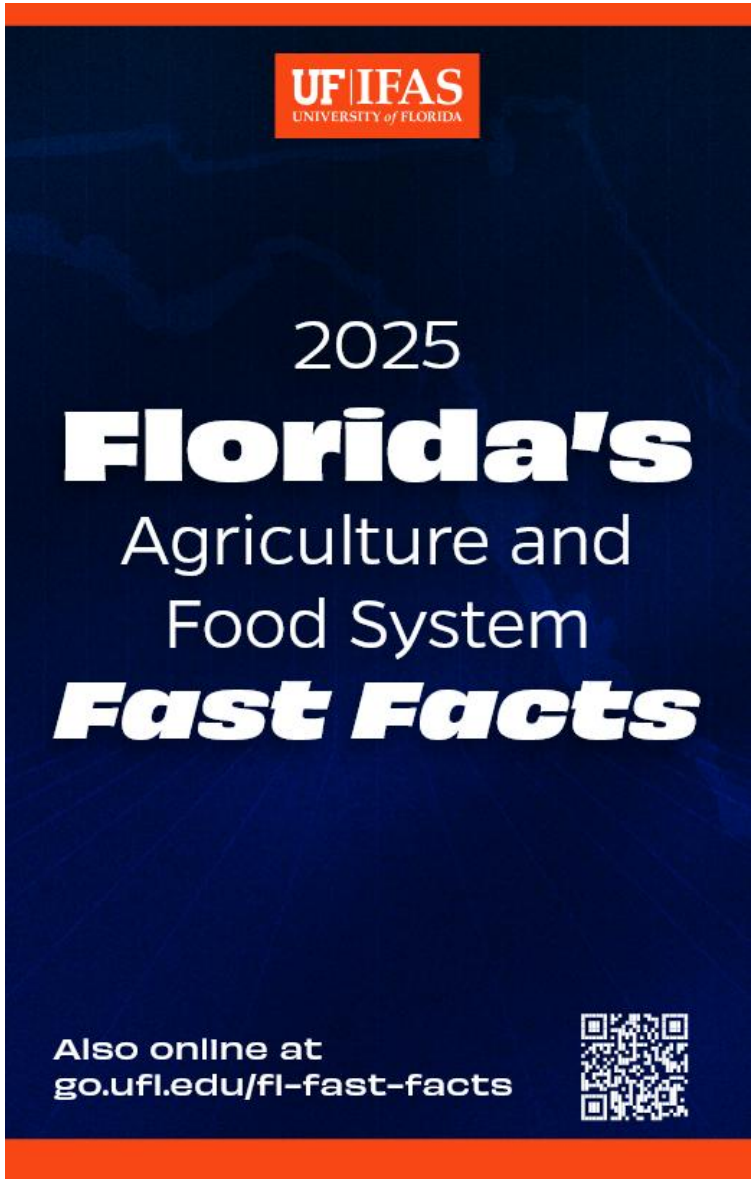
UF IFAS
UNIVERSITY of FLORIDA

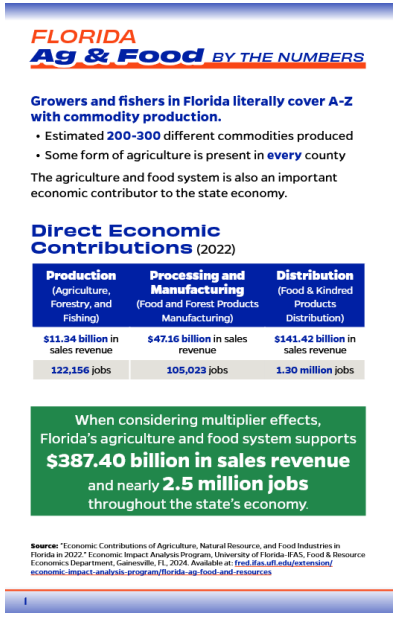
Agricultural Lands https://ffav-ufl.hub.arcgis.com/pages/cropprod



UF IFAS UNIVERSITY of FLORIDA

Florida's Agriculture and Food System Fast Facts





FLORIDA
Ag & Food BY THE NUMBERS

Growers and fishers in Florida literally cover A-Z with commodity production.

- Estimated **200-300** different commodities produced
- Some form of agriculture is present in **every** county

The agriculture and food system is also an important economic contributor to the state economy.

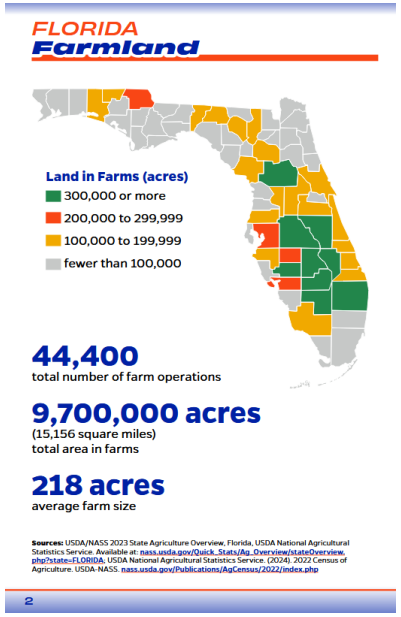
Direct Economic Contributions (2022)

Production (Agriculture, Forestry, and Fishing)	Processing and Manufacturing (Food and Forest Products Manufacturing)	Distribution (Food & Kindred Products Distribution)
$11.34 billion in sales revenue	**$47.16 billion** in sales revenue	**$141.42 billion** in sales revenue
122,156 jobs	**105,023** jobs	**1.30 million** jobs

When considering multiplier effects, Florida's agriculture and food system supports **$387.40 billion in sales revenue** and nearly **2.5 million jobs** throughout the state's economy.

Source: "Economic Contributions of Agriculture, Natural Resource, and Food Industries in Florida in 2022." Economic Impact Analysis Program, University of Florida-IFAS, Food & Resource Economics Department, Gainesville, FL, 2024. Available at: fred.ifas.ufl.edu/extension/economic-impact-analysis-program/florida-ag-food-and-resources

1



FLORIDA
Farmland

44,400
total number of farm operations

9,700,000 acres
(15,156 square miles)
total area in farms

218 acres
average farm size

Sources: USDA/NASS 2023 State Agriculture Overview, Florida, USDA National Agricultural Statistics Service. Available at: nass.usda.gov/Quick_Stats/Ag_Overview/stateOverview.php?state=FLORIDA, USDA National Agricultural Statistics Service. (2024). 2022 Census of Agriculture. USDA-NASS. nass.usda.gov/Publications/AgCensus/2022/index.php

2

Economic Contributions of Florida's Agriculture and Food System, 2022

Sales Revenue

CROPS, LIVESTOCK, FORESTRY, & FISHERIES
$11.34 billion

FOREST PRODUCTS MANUFACTURING
$12.05 billion

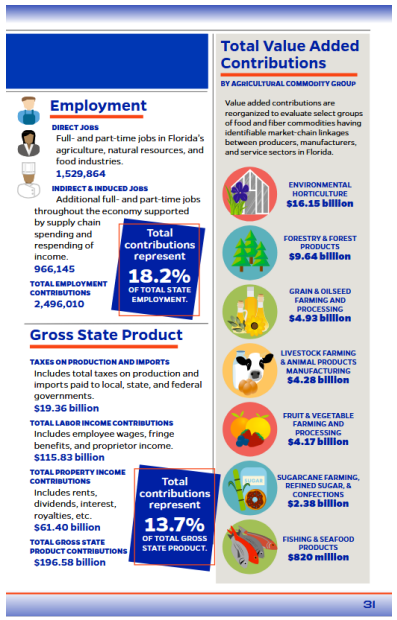
FOOD & RELATED PRODUCTS MANUFACTURING
$35.11 billion

FOOD & RELATED PRODUCTS DISTRIBUTION
$141.42 billion

Totaling $199.92 billion IN DIRECT SALES REVENUES.

Adapted from: Economic Contributions of Agriculture, Natural Resource, and Food Industries in Florida in 2022." Economic Impact Analysis Program, University of Florida-IFAS, Food & Resource Economics Department, Gainesville, FL, 2024.

30



Employment

DIRECT JOBS
Full- and part-time jobs in Florida's agriculture, natural resources, and food industries.
1,529,864

INDIRECT & INDUCED JOBS
Additional full- and part-time jobs throughout the economy supported by supply chain spending and respending of income.
966,145

TOTAL EMPLOYMENT CONTRIBUTIONS
2,496,010

Total contributions represent **18.2%** OF TOTAL STATE EMPLOYMENT.

Gross State Product

TAXES ON PRODUCTION AND IMPORTS
Includes total taxes on production and imports paid to local, state, and federal governments.
$19.36 billion

TOTAL LABOR INCOME CONTRIBUTIONS
Includes employee wages, fringe benefits, and proprietor income.
$115.83 billion

TOTAL PROPERTY INCOME CONTRIBUTIONS
Includes rents, dividends, interest, royalties, etc.
$61.40 billion

TOTAL GROSS STATE PRODUCT CONTRIBUTIONS
$196.58 billion

Total contributions represent **13.7%** OF TOTAL GROSS STATE PRODUCT.

Total Value Added Contributions

BY AGRICULTURAL COMMODITY GROUP

Value added contributions are reorganized to evaluate select groups of food and fiber commodities having identifiable market-chain linkages between producers, manufacturers, and service sectors in Florida.

ENVIRONMENTAL HORTICULTURE
$16.15 billion

FORESTRY & FOREST PRODUCTS
$9.64 billion

GRAIN & OILSEED FARMING AND PROCESSING
$4.93 billion

LIVESTOCK FARMING & ANIMAL PRODUCTS MANUFACTURING
$4.28 billion

FRUIT & VEGETABLE FARMING AND PROCESSING
$4.17 billion

SUGARCANE FARMING, REFINED SUGAR, & CONFECTIONS
$2.38 billion

FISHING & SEAFOOD PRODUCTS
$820 million

31

UF IFAS UNIVERSITY of FLORIDA

New UF/IFAS Disaster-Related Resources

5 STEPS TO TAKE
FOR AGRICULTURAL DAMAGE AND LOSS ASSESSMENT AND REPORTING

1 Take photos or drone images BEFORE cleanup occurs with date, time, and location stamps enabled. Keep a work log of all hours that you or your employees spend on hurricane cleanup and repairs.

2 Be sure to contact your insurance agent about filing claims for any damages or losses covered by insurance. File a claim BEFORE any non-emergency cleanup or repairs are made.

3 REPORT

Report farm damages or crop/livestock losses to the United States Department of Agriculture (USDA) – Farm Service Agency (FSA) even if you are not currently enrolled in any USDA-FSA programs. Information reported to the USDA FSA is used to determine eligibility for agricultural disaster declarations.

4 Investigate available disaster assistance. A number of Disaster Assistance Programs may be available to you through organizations such as:

- USDA Farm Service Agency (FSA)
- USDA Natural Resource Conservation Service (NRCS)
- USDA Risk Management Agency (RMA)
- Florida Department of Agriculture and Consumer Services (FDACS)
- Your water management district

5 Take the UF/IFAS EIAP Disaster Assessment Survey. This survey is used to estimate the state- and later county-level production losses for agricultural operations in Florida and results are communicated to state and federal agencies to inform their decision-making processes. This survey is not formally used for disaster designations or disaster assistance eligibility, so it is critical to make sure you also are reporting losses and damages to the USDA-FSA (see step 3).

This infographic was adapted from UF/IFAS EDIS Article FE1147, "Disaster Assistance for Agriculture in Florida following Hurricane Idalia." To view the full article for more information, visit https://doi.org/10.32473/edis-fe1147-2024

UF IFAS UNIVERSITY of FLORIDA — UF/IFAS ECONOMIC IMPACT ANALYSIS PROGRAM — FLORIDA EDEN // EXTENSION DISASTER EDUCATION NETWORK

County-Level Agricultural Losses from Hurricane Milton

The tropical system that would eventually become Milton originated in the western Caribbean Sea and consolidated in the Bay of Campeche on October 5, 2024. Gradual intensification occurred as it slowly moved eastward, becoming a hurricane early on October 7 and undergoing explosive intensification to become a Category 5 hurricane with winds of 180 mph (285 km/h). Increasing wind shear caused the hurricane to weaken as it turned northeast towards Florida, falling to Category 3 status before making landfall near Siesta Key late on October 9. Afterwards, Milton rapidly weakened as it moved across the state into the Atlantic Ocean. Hurricane Milton was associated with a significant tornado outbreak, heavy rainfall, and flooding.

Hurricane Milton affected over 5.7 million acres of agricultural lands across 57 counties in Florida. The annual value of agricultural production on these affected lands is estimated at $8.6 billion statewide. Preliminary statewide estimates of agricultural production losses in Florida associated with Hurricane Milton range from $190.4 million to $642.7 million (Court, Qiao, Koeneke, & McDaid, 2024). The estimated losses vary across counties as illustrated in the map below. The highest estimated losses occurred in central and southern Florida, concentrated in areas with extensive, high value agricultural production and/or regions exposed to the most intense weather conditions.

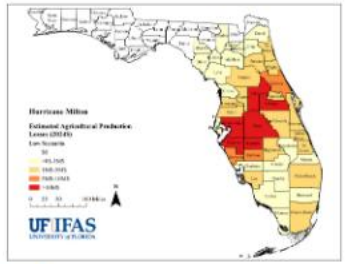


Figure 1. Estimated low scenario for agricultural losses (2024$) due to Hurricane Milton in each county of Florida.

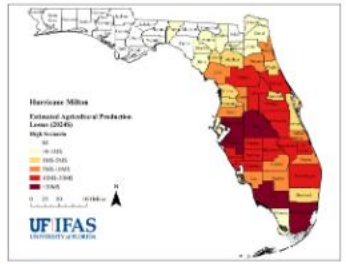


Figure 2. Estimated high scenario for agricultural losses (2024$) due to Hurricane Milton in each county of Florida.

UF IFAS UNIVERSITY of FLORIDA — go.ufl.edu/miltonagimpacts2024

Table 1. Estimated county-level affected acreage, value of annual production on affected lands (2024$, Thousands), and range of estimated agricultural production losses (2024$, Thousands) due to Hurricane Milton.

County (Listed in descending order by Estimated Agricultural Production Losses - High Scenario)	Affected Agricultural Lands (Acres)	Estimated Annual Value of Production on Affected Agricultural Lands (2024$, Thousands)	Estimated Agricultural Production Losses - Low Scenario (2024$, Thousands)	Estimated Agricultural Production Losses - High Scenario (2024$, Thousands)
Manatee	119,960	$530,917	$43,241	$94,295
Hillsborough	91,902	$403,647	$29,698	$74,032
Miami-Dade	55,072	$914,215	$4,845	$58,429
Collier	108,809	$566,698	$821	$45,879
Polk	285,786	$238,254	$14,746	$30,231
Orange	76,300	$273,018	$15,053	$29,919
Hardee	227,977	$240,769	$12,563	$28,329
Palm Beach	433,221	$1,171,220	$1,531	$24,464
Lake	110,959	$204,144	$11,127	$22,253
DeSoto	224,440	$226,802	$6,589	$21,655
Volusia	58,111	$192,223	$9,957	$19,825
Highlands	330,612	$244,176	$2,886	$17,581
Okeechobee	324,269	$273,724	$621	$15,096
St. Lucie	106,647	$145,548	$1,172	$13,818
Sarasota	67,863	$65,136	$6,526	$12,845
Marion	222,294	$155,229	$4,043	$12,647
Charlotte	116,817	$115,774	$444	$11,044
Osceola	457,204	$104,343	$3,842	$10,820
Martin	144,969	$216,643	$107	$9,819
Hendry	439,209	$621,195	$197	$9,578
Levy	144,365	$127,308	$284	$9,247
Lee	41,495	$102,758	$1,117	$8,616
Sumter	95,872	$62,598	$3,417	$7,474
Glades	256,844	$143,205	$390	$7,223
Indian River	71,157	$69,402	$1,510	$6,730
Pasco	84,185	$52,103	$2,838	$5,908
St. Johns	15,749	$48,727	$1,748	$5,769
Putnam	51,310	$51,548	$1,686	$5,029
Brevard	89,046	$51,585	$2,262	$4,905
Seminole	20,258	$25,389	$1,580	$3,044
Alachua	123,415	$91,097	$117	$2,996
Hernando	34,862	$26,730	$1,428	$2,956
Flagler	27,571	$20,901	$1,098	$2,931
Gilchrist	62,653	$94,059	<$100	$1,760
Broward	5,307	$45,346	<$100	$1,758
Citrus	29,832	$12,793	$626	$1,552
Bradford	25,306	$22,410	<$100	$649
Duval	14,012	$14,600	<$100	$502
Clay	15,851	$8,144	<$100	$405
Pinellas	533	$2,138	$123	$239
Monroe	5	$2,204	<$100	$172
Dixie	26,979	$11,784	<$100	$112
Columbia	64,533	$51,795	<$100	<$100
Nassau	18,140	$14,288	$-	<$100
Suwannee	119,772	$258,947	$-	<$100
Lafayette	38,182	$79,190	<$100	<$100
Union	23,789	$13,788	<$100	<$100
Jefferson	33,174	$46,104	$-	<$100

Note: Losses less than $100,000 are represented as '<$100' in the table.

Reference

Court, C. D., Qiao, X. Koeneke, R., & McDaid, K. (2024). Preliminary County-Level Assessment of Agricultural Production Losses Resulting from Hurricane Milton. UF/IFAS Economic Impact Analysis Program, Food and Resource Economics Department, University of Florida.

UF IFAS UNIVERSITY of FLORIDA

Thank You!

Dr. Christa D. Court
ccourt@ufl.edu

UF/IFAS Economic Impact Analysis Program (EIAP)
https://go.ufl.edu/eiap

UF/IFAS Economic Impact Analysis Program (EIAP)
https://go.ufl.edu/disasters

UF/IFAS EIAP Hurricane Debby Resources
https://go.ufl.edu/DebbyAgImpacts2024

UF/IFAS EIAP Hurricane Helene Resources
https://go.ufl.edu/HeleneAgImpacts2024

UF/IFAS EIAP Hurricane Milton Resources
https://go.ufl.edu/MiltonAgImpacts2024

University of Florida College of Veterinary Medicine
Veterinary Emergency Treatment Service (UF VETS) Team

Brandi Phillips

Director Animal Technical Rescue

Lawrence Garcia MS, DVM

Medical Director

UF Veterinary Emergency Treatment Service
College of Veterinary Medicine
UNIVERSITY of FLORIDA

UF College of Veterinary Medicine
UNIVERSITY of FLORIDA

UF VETS Team Background

- Founded in 2004 following several ad hoc missions assigned to the veterinary college
- Disaster response, animal technical rescue, and animal technical rescue training
- Hurricanes, wildfires, hoarding cases, disease outbreaks, oil spills, and technical rescues involving a variety of species
- Florida State Agricultural Response Team (SART) & Florida Department of Agriculture and Consumer services (FDACS)

UF Veterinary Emergency Treatment Service
College of Veterinary Medicine
UNIVERSITY of FLORIDA

UF College of Veterinary Medicine
UNIVERSITY of FLORIDA

Team Branches

- Animal Technical Rescue
  - Local response within 2-hour radius of UFCVM
  - Multiple levels of training
    - First responders, veterinarians, veterinary students

- Emergency/Disaster Response
  - State or Governor's request
  - Mutual aid agreement with other states

UF | Veterinary Emergency Treatment Service
College of Veterinary Medicine
UNIVERSITY of FLORIDA

UF | College of Veterinary Medicine
UNIVERSITY of FLORIDA

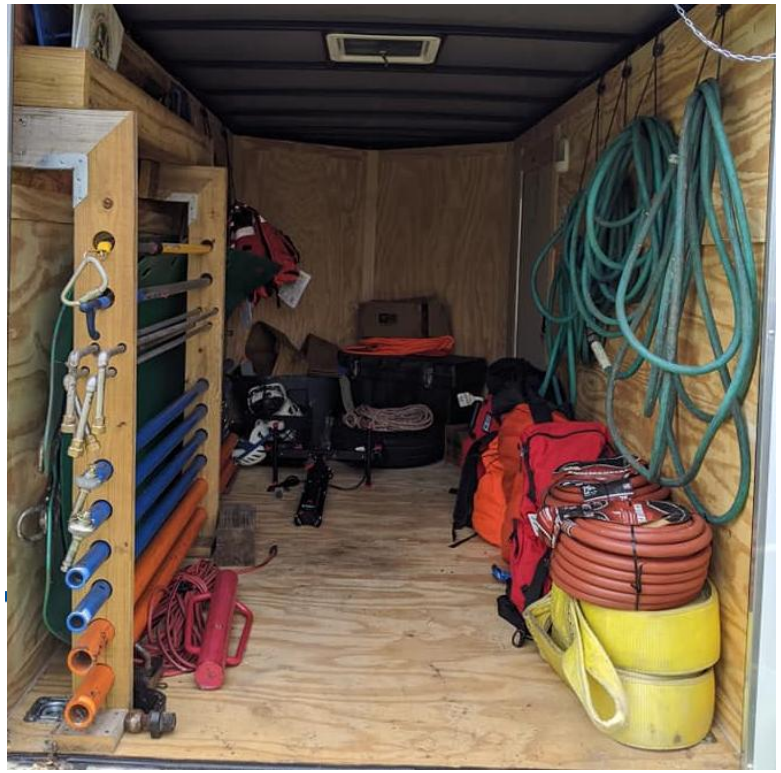
Animal Technical Rescue

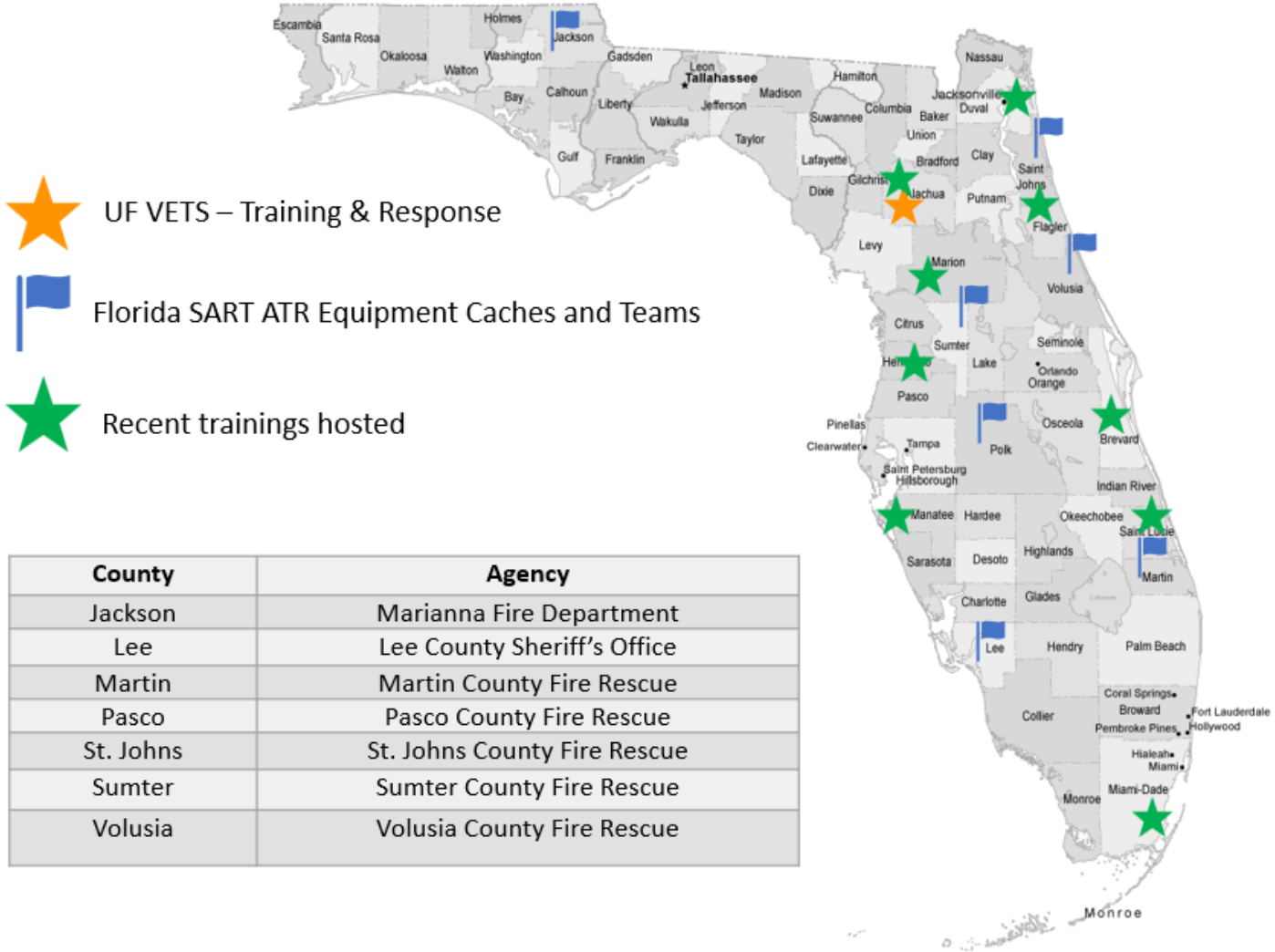
Awareness – 8 hours

Best for communities; law enforcement, fire/EMS, veterinarians, livestock industry stakeholders, commissioners

Operations – 24 hours

Best for first responders and veterinarians; scenario-based skill building for safer outcomes

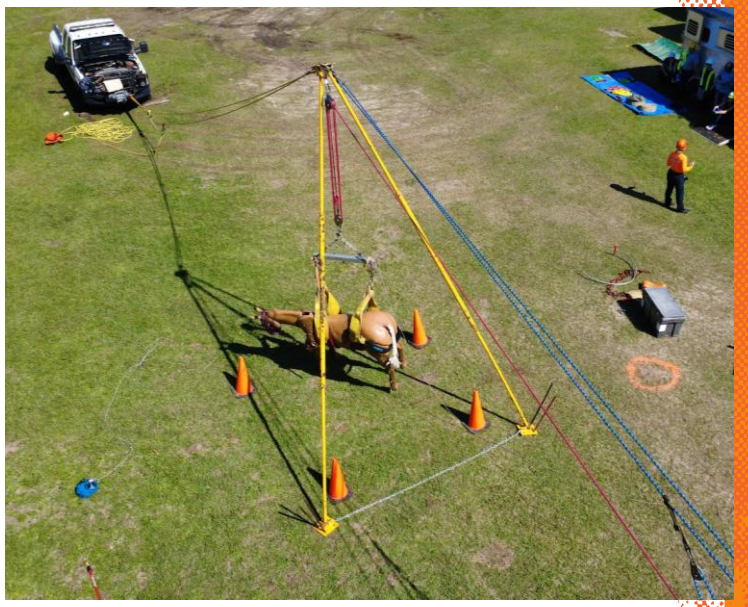




County	Agency
Jackson	Marianna Fire Department
Lee	Lee County Sheriff's Office
Martin	Martin County Fire Rescue
Pasco	Pasco County Fire Rescue
St. Johns	St. Johns County Fire Rescue
Sumter	Sumter County Fire Rescue
Volusia	Volusia County Fire Rescue

UF | College of Veterinary Medicine
UNIVERSITY of FLORIDA

Animal Technical Rescue Training

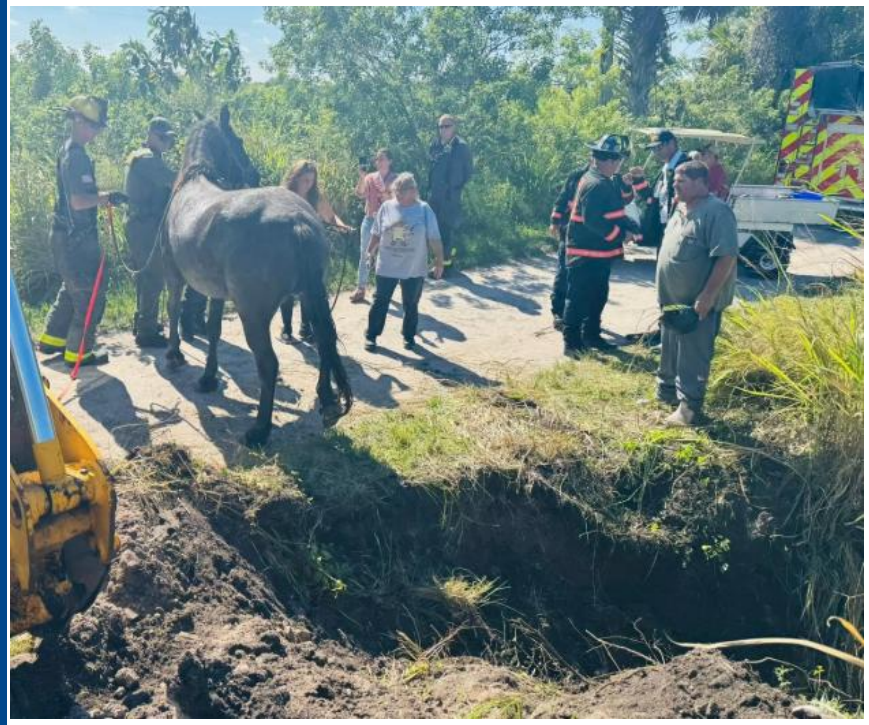


- High emphasis on human life safety
- Techniques for promoting animal welfare
- National Fire Protection Association Standards 1006 and 2500
- SART-Sponsored classes available at Florida State Fire College

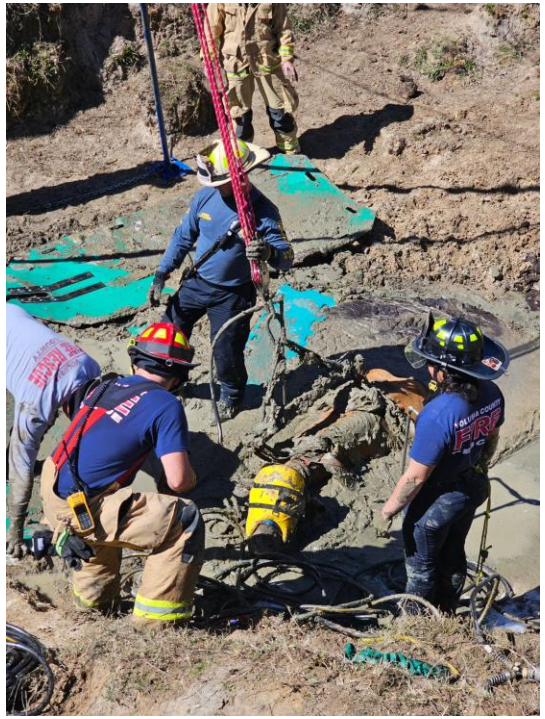
UF Veterinary Emergency Treatment Service
College of Veterinary Medicine
UNIVERSITY of FLORIDA

UF College of Veterinary Medicine
UNIVERSITY of FLORIDA

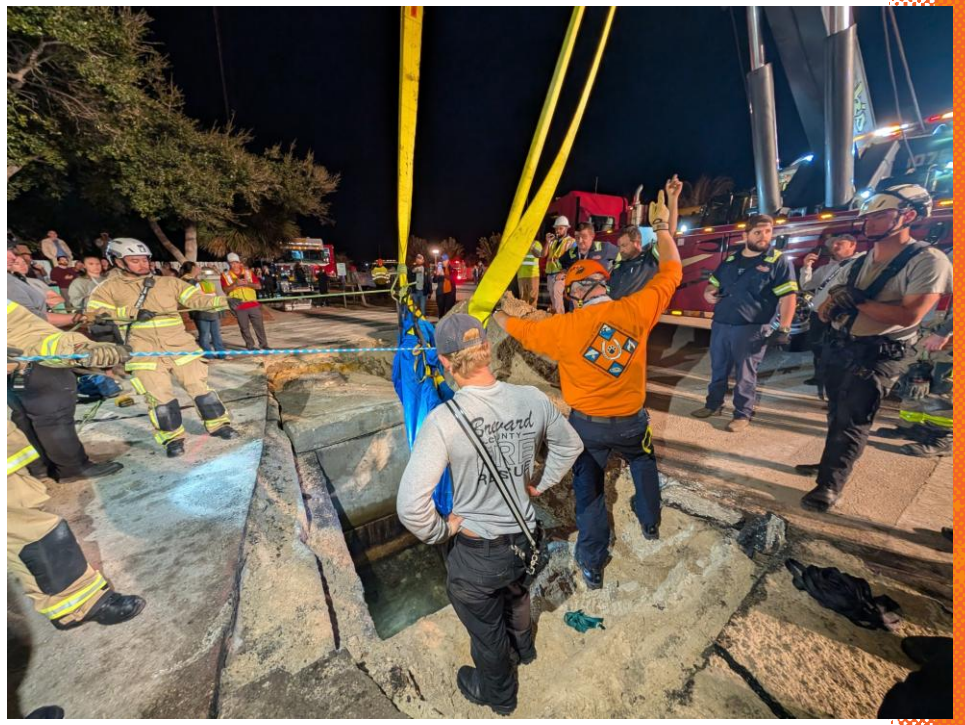
Animal Technical Rescue Responses



St. Lucie County
Horse Rescue
6 Months Post Training



Volusia County
Cow Rescue
State ATR Team



Brevard County
Manatee Rescue
1st Day of Training

UF Veterinary Emergency Treatment Service
College of Veterinary Medicine
UNIVERSITY of FLORIDA

UF College of Veterinary Medicine
UNIVERSITY of FLORIDA

Animal Disaster Response

Natural

- Hurricane
- Blizzard
- Earthquake
- Flood
- Drought
- Tsunami
- Wildfire
- Landslide
- Volcanic eruption
- Disease outbreak

Man-Made

- Animal hoarding
- Explosion
- Traffic incidents (train, plane, automobile)
- Terrorism
- Bioterrorism
- Foreign animal disease
- Confined space entrapment

UF Veterinary Emergency Treatment Service
College of Veterinary Medicine
UNIVERSITY of FLORIDA

UF College of Veterinary Medicine
UNIVERSITY of FLORIDA

Equipment

UF Veterinary Emergency Treatment Service
College of Veterinary Medicine
UNIVERSITY of FLORIDA

UF College of Veterinary Medicine
UNIVERSITY of FLORIDA

Equipment

Veterinary Emergency Treatment Service
College of Veterinary Medicine
UNIVERSITY of FLORIDA

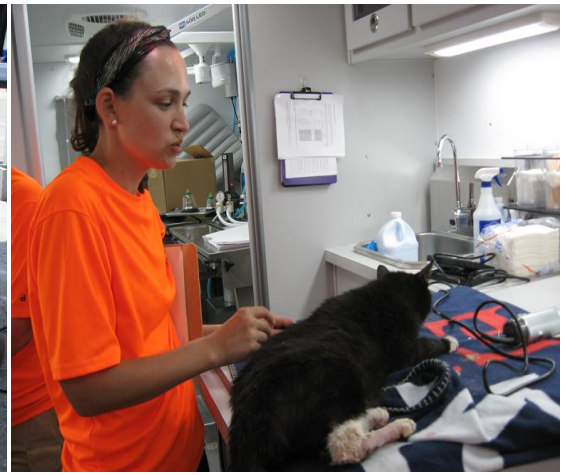
UF College of Veterinary Medicine
UNIVERSITY of FLORIDA

Deployments

- 2004 – ad hoc missions for Hurricanes Charley, Frances, Ivan, and Jean
- 2006 - Florida Equine Herpes outbreak support
- 2007 - Evacuation of animals from Bugaboo Fires of North Florida
- 2009, 2010, & 2011- Medical support for three different hoarding cases
- 2010- Medical support for Deepwater Horizon oil spill in Florida Panhandle
- 2016- Full-scale hurricane response exercise in Bay County
- 2016- Hurricane Matthew supply distribution to veterinary practices and shelters
- 2017- Hurricane Irma field hospital response in Florida Keys
- 2020- Medical support for hoarding case
- 2022- Hurricane Ian field hospital response in Fort Myers
- 2024- Hurricane Helene medical support in North Florida

Hurricane Irma






UF | Veterinary Emergency Treatment Service
College of Veterinary Medicine
UNIVERSITY of FLORIDA

UF | College of Veterinary Medicine
UNIVERSITY of FLORIDA

Partners

- State ESF-17 & County ESF-17
- UF Faculty, staff and students
- Florida Veterinary Medical & Florida Veterinary Technician Associations
  - Volunteers
  - Resources
  - Local veterinary practices and practitioners
- UF Institute of Food and Agricultural Sciences (IFAS)
- Local veterinary practitioners
- Pharmaceutical distributers
- Local pharmacies
- Regional animal medical emergency facilities

UF Veterinary Emergency Treatment Service
College of Veterinary Medicine
UNIVERSITY of FLORIDA

Florida VETERINARY MEDICAL ASSOCIATION
UF College of Veterinary Medicine
UNIVERSITY of FLORIDA

Hurricane Ian Field Hospital







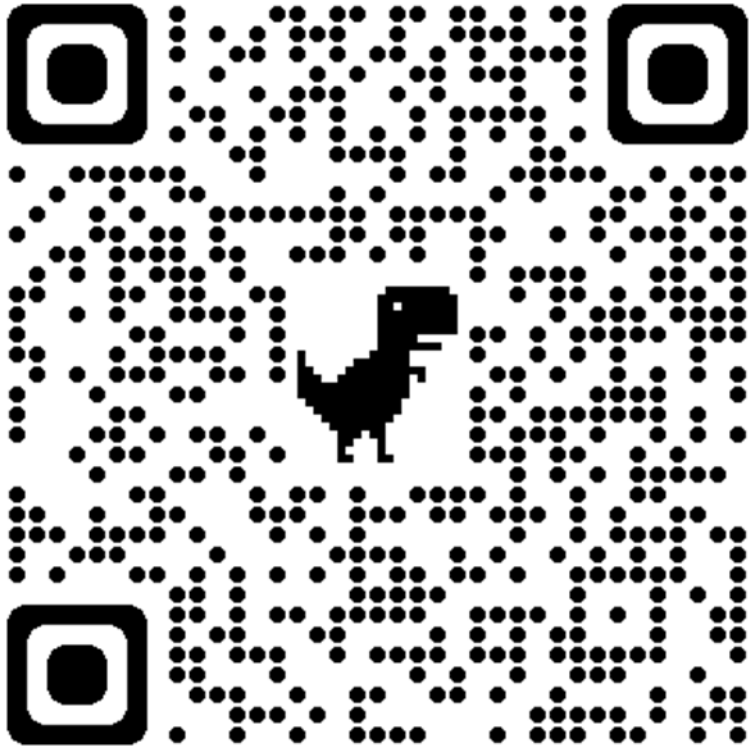

UF | Veterinary Emergency Treatment Service
College of Veterinary Medicine
UNIVERSITY *of* FLORIDA

UF | College of Veterinary Medicine
UNIVERSITY *of* FLORIDA

Questions??

- Brandi Phillips
  Technical Rescue Branch Director
  brandikphillips@ufl.edu

- Dr. Larry Garcia
  Medical Director
  garciln@ufl.edu



UF Veterinary Emergency Treatment Service
College of Veterinary Medicine
UNIVERSITY of FLORIDA

UF College of Veterinary Medicine
UNIVERSITY of FLORIDA