Geospatial Products Developed as Foundation for Agricultural Statistics

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USDA National Agricultural Statistics Service
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The findings and conclusions in this presentation are those of the authors and should not be construed to represent any official USDA or U.S. Government determination or policy.

Acknowledgment

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Hurricane Helene: Event Summary

- Hurricane Helene was a large, deadly catastrophic hurricane, which caused high storm surge, hurricane-force wind gusts, and rainfall-triggered flooding in FL, GA, SC, NC, TN, and VA.
  - Made landfall on Thursday, September 26, 2024 as a Category 4 hurricane near Perry, FL.
  - Degenerated to a post-tropical cyclone on Friday, September 27, 2024 over TN.
  - Dissipated on Sunday, September 29, 2024 over TN.

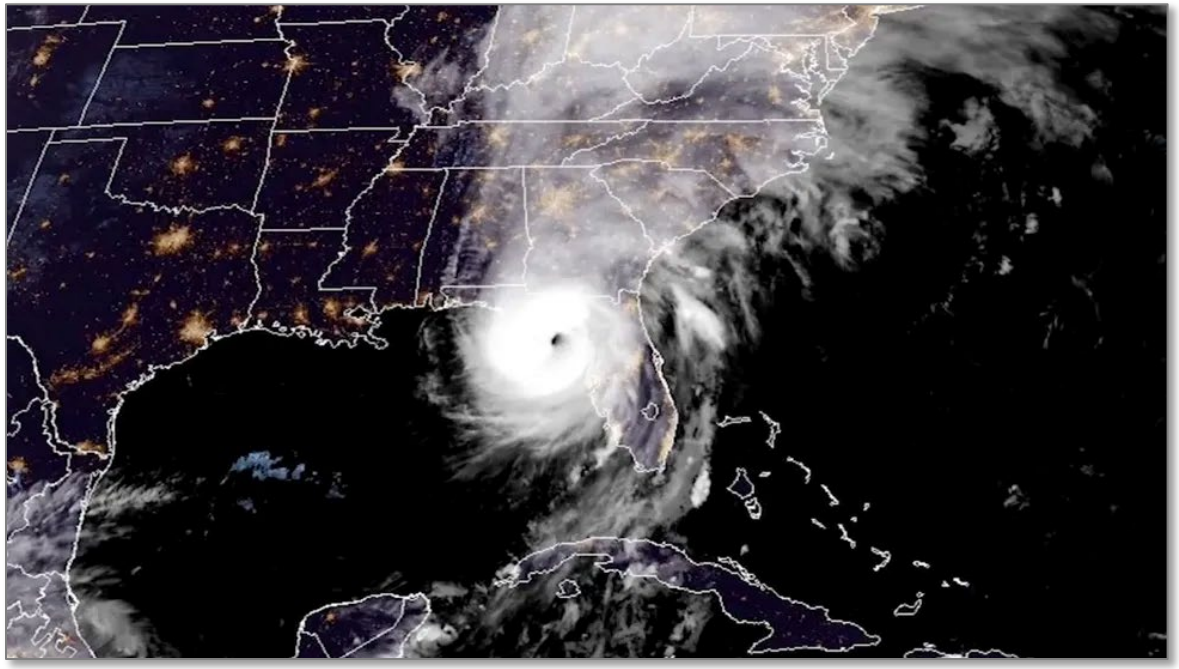
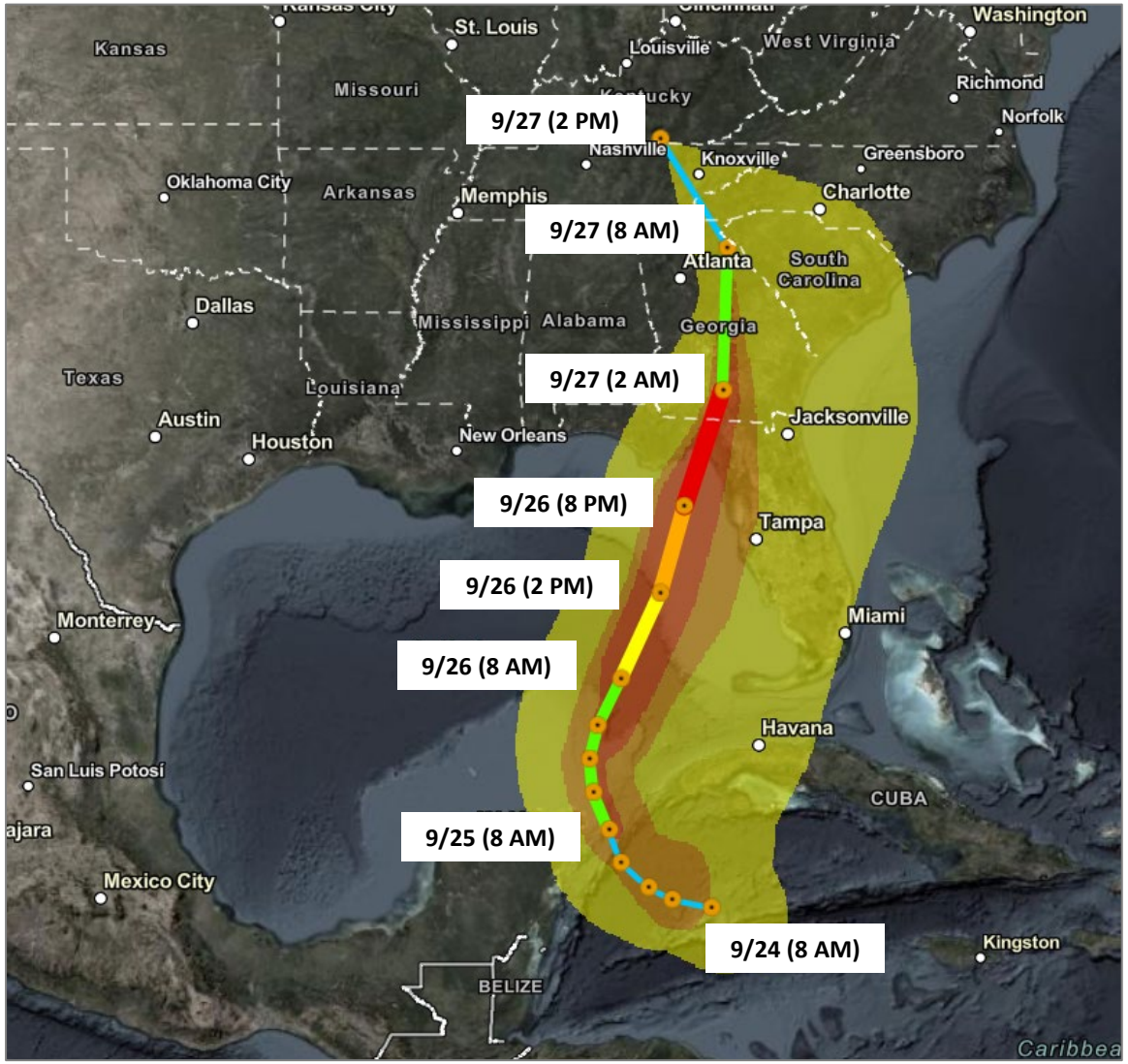


Image Source: NOAA, Space.com

Hurricane Helene: Observed Storm Positions, Track, and Wind Swath



Recent Hurricanes, Cyclones and Typhoons

Observed Position

Observed Track

- Low
- Remnant Low
- Disturbance
- Subtropical Storm
- Tropical Wave
- Tropical Depression
- Tropical Storm
- Hurricane1
- Hurricane2
- Hurricane3
- Hurricane4
- Hurricane5

Observed Wind Swath

- Tropical Storm Force (34kts)
- Strong Tropical Storm (50kts)
- Hurricane Force (64kts+)

Data Source: [Recent Hurricanes, Cyclones and Typhoons | FEMA Geospatial Resource Center (arcgis.com)]

Evans County GA: Uprooted Pecan Trees

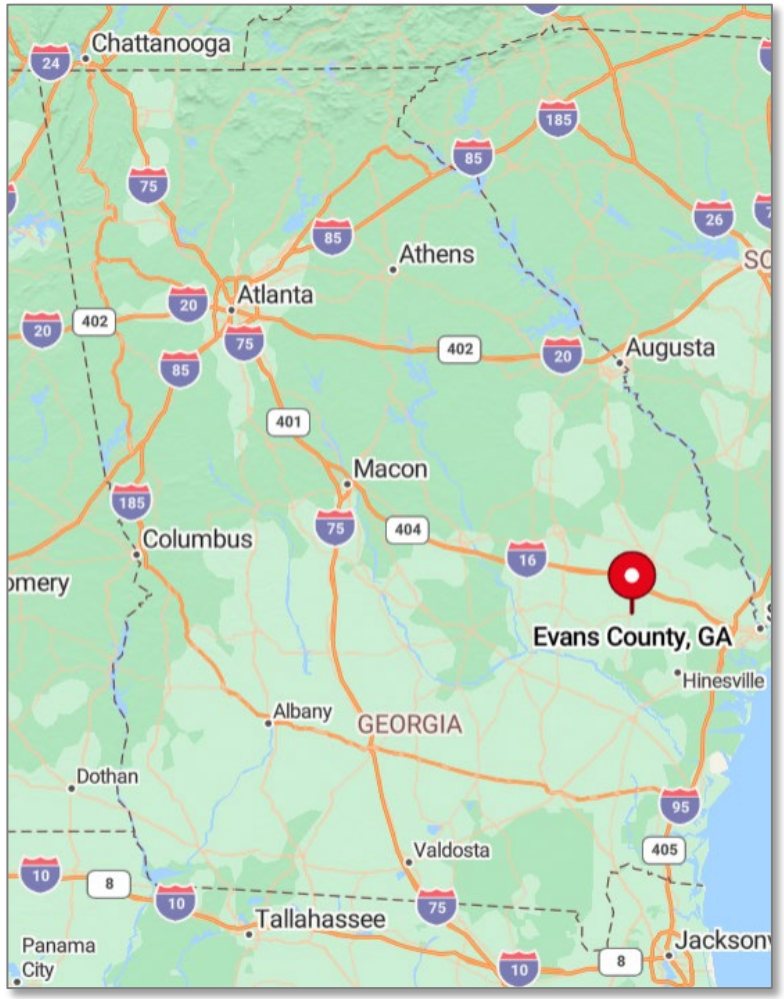


Photo Credit: Gary Bell

Media Source: Georgia Farm Bureau (Hurricane Helene: First Ag Damage Reports are Bleak)

Coffee County, GA: Blown Over/Tangled Cotton Field

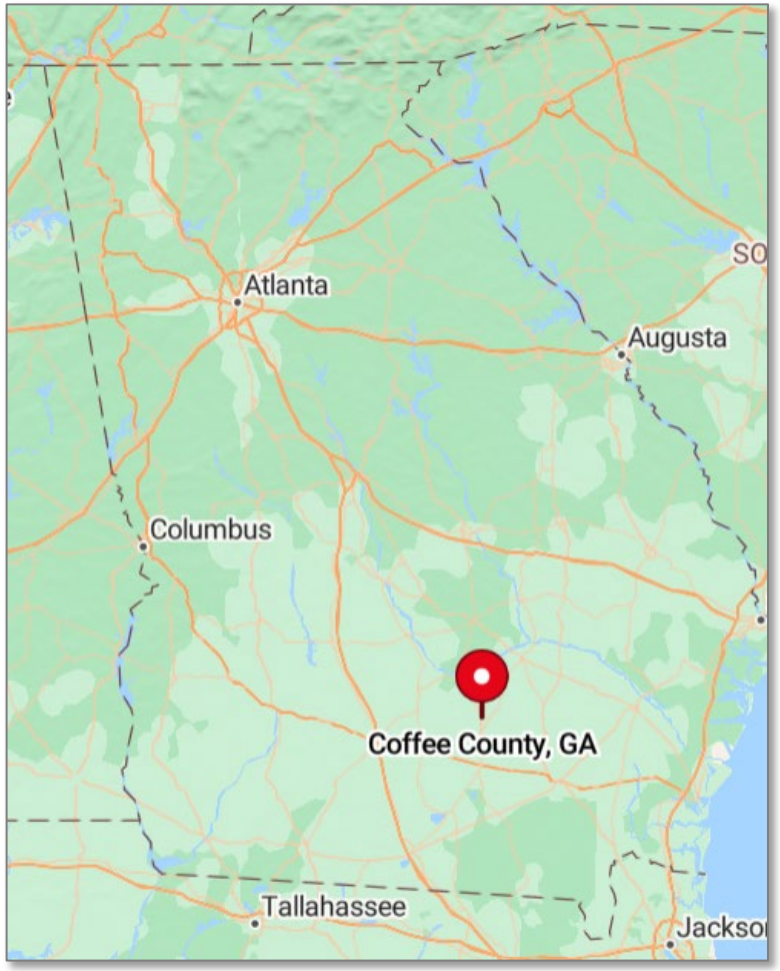


Photo Credit: Angie O'Steen

Media Source: Georgia Farm Bureau (Hurricane Helene: First Ag Damage Reports are Bleak)

Daily Precipitation:
September 26, 2024

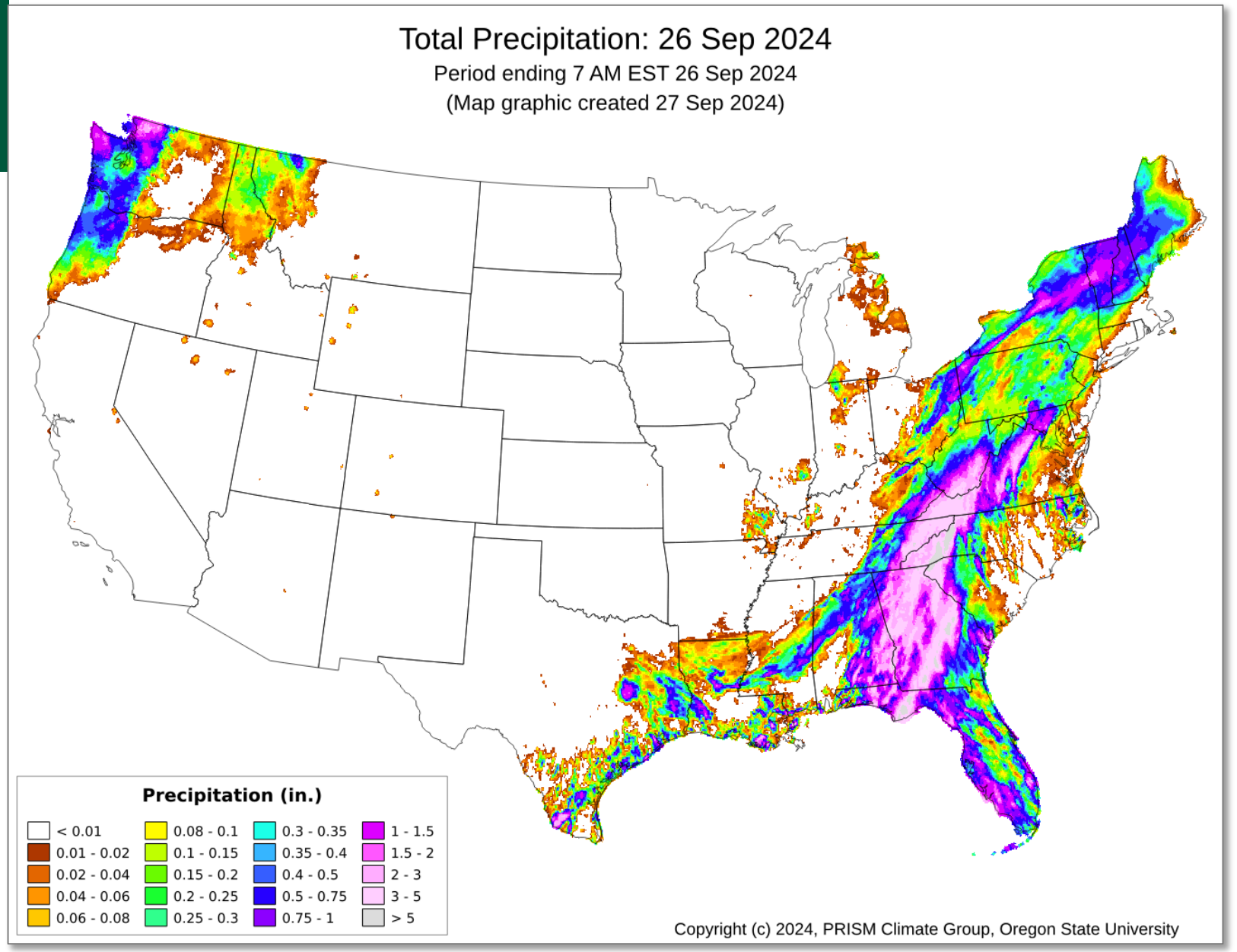


Image Source: [PRISM Climate Group at Oregon State University]

Daily Precipitation:
September 27, 2024

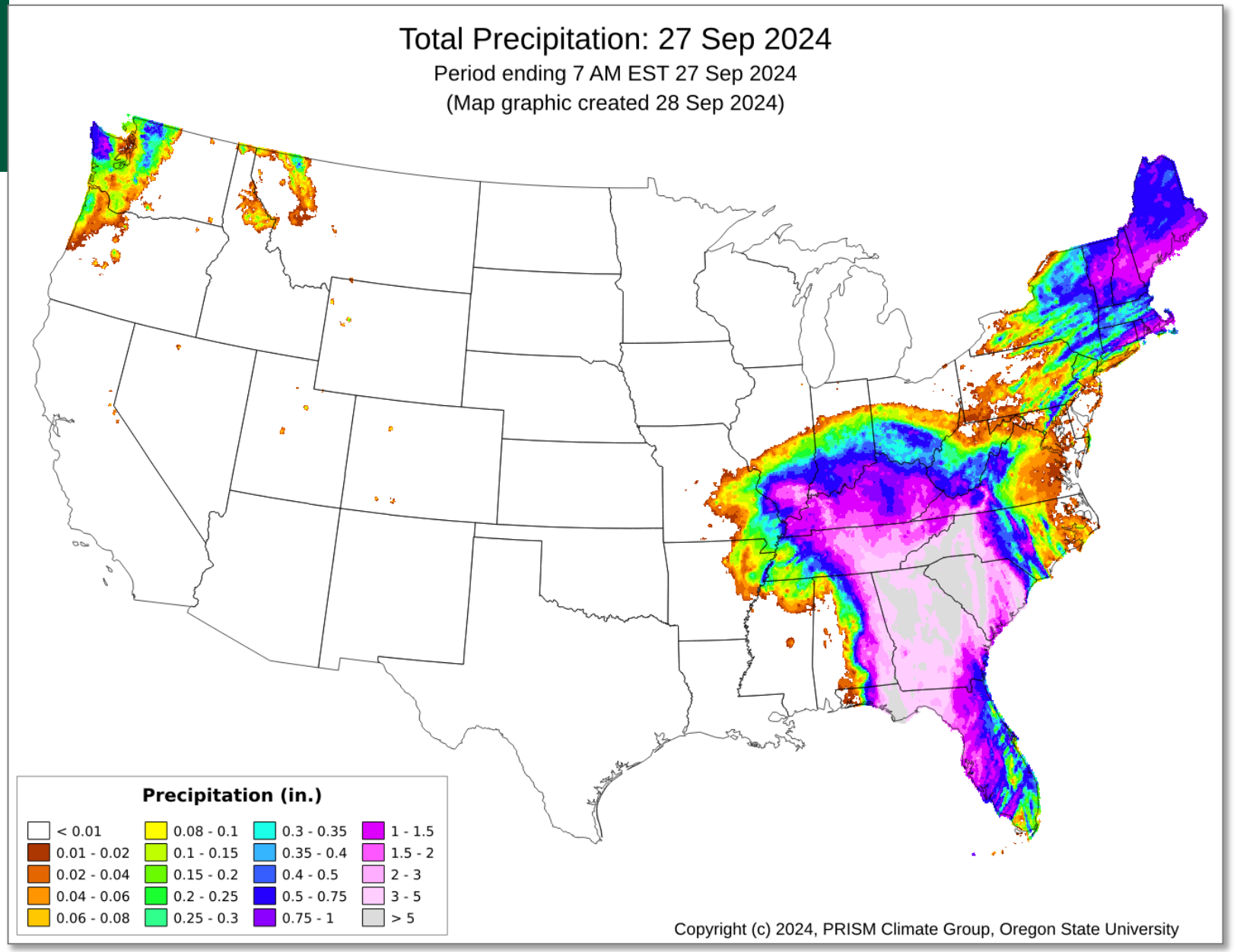


Image Source: [PRISM Climate Group at Oregon State University]

Daily Precipitation:
September 28, 2024

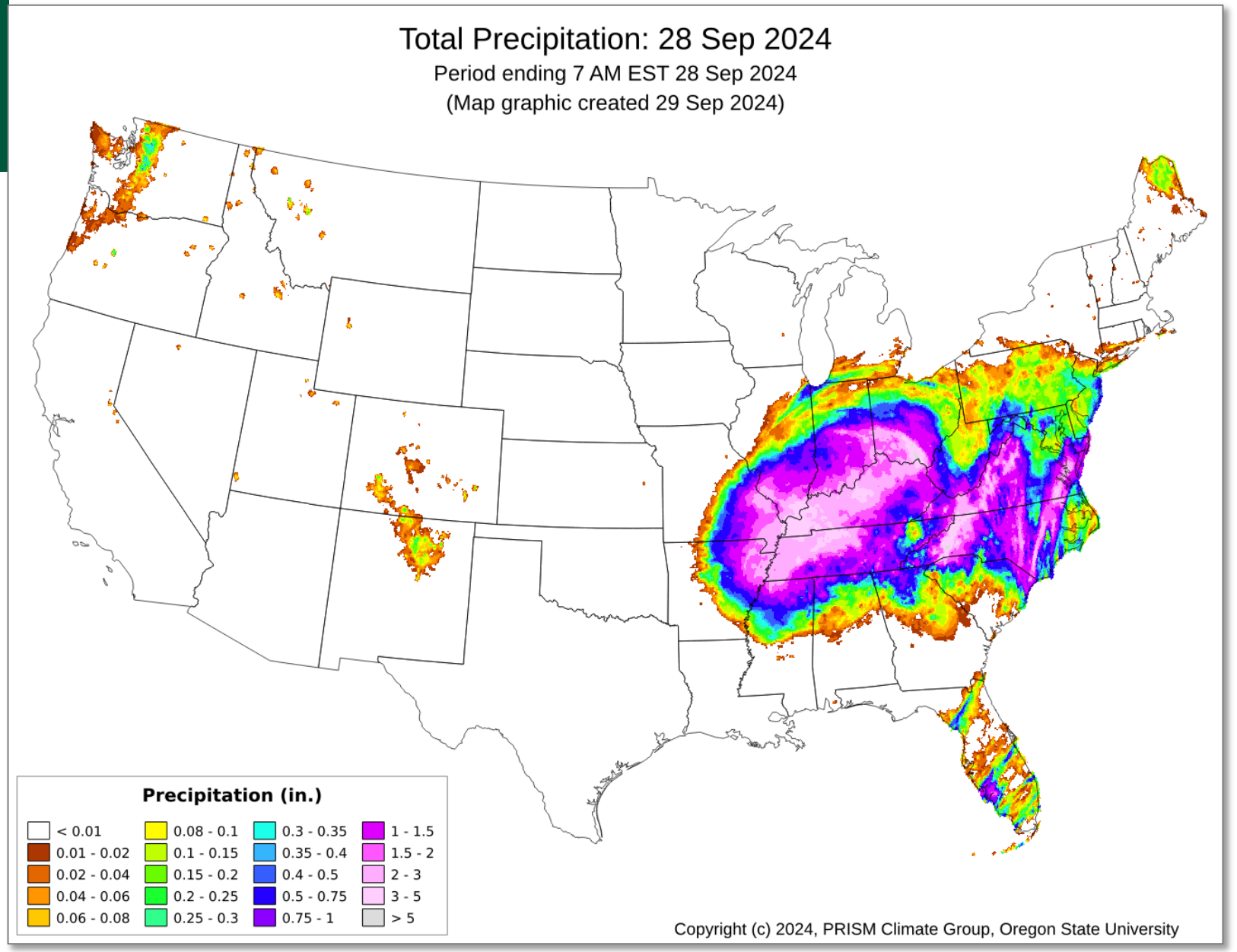


Image Source: [PRISM Climate Group at Oregon State University]

Daily Precipitation:
September 29, 2024

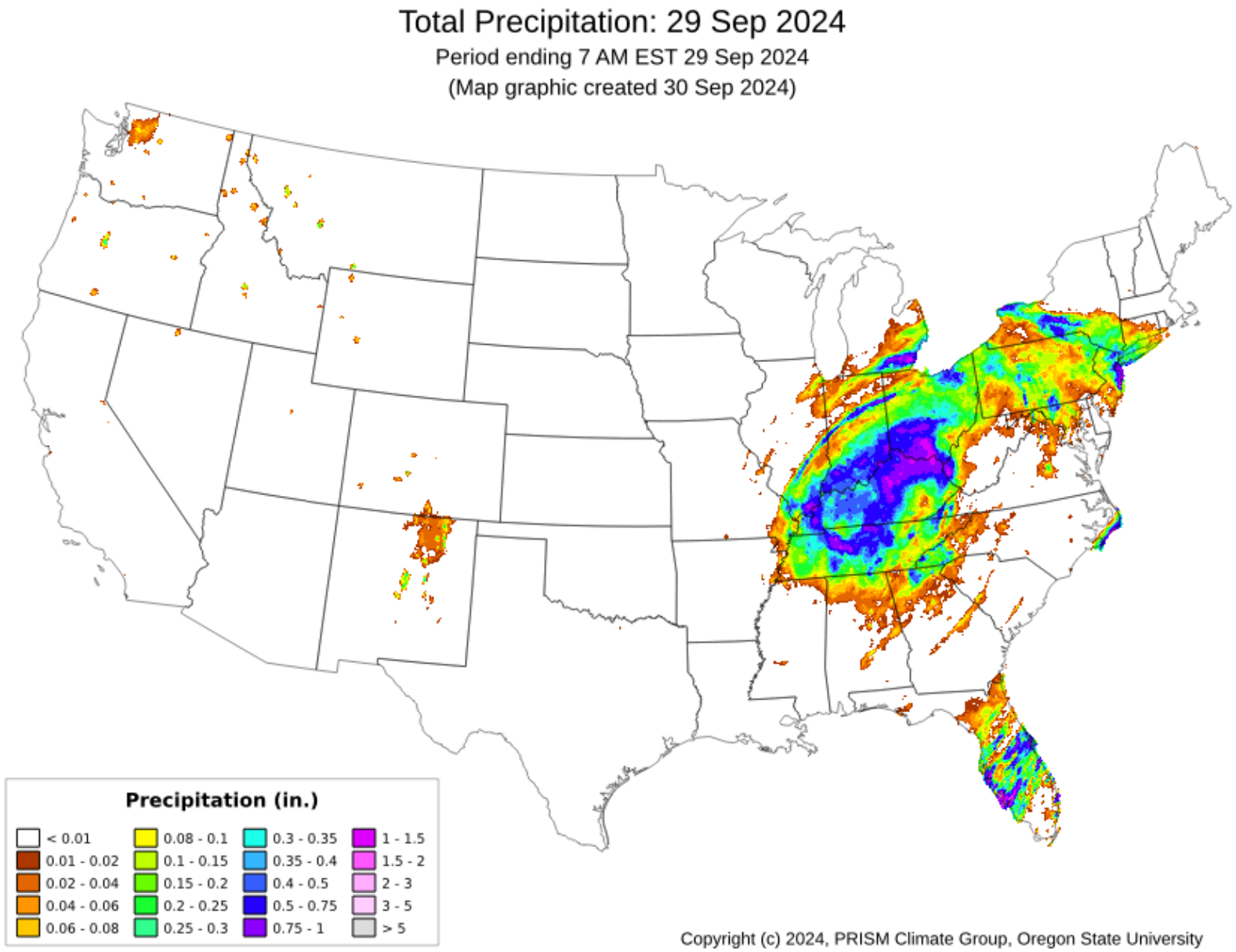
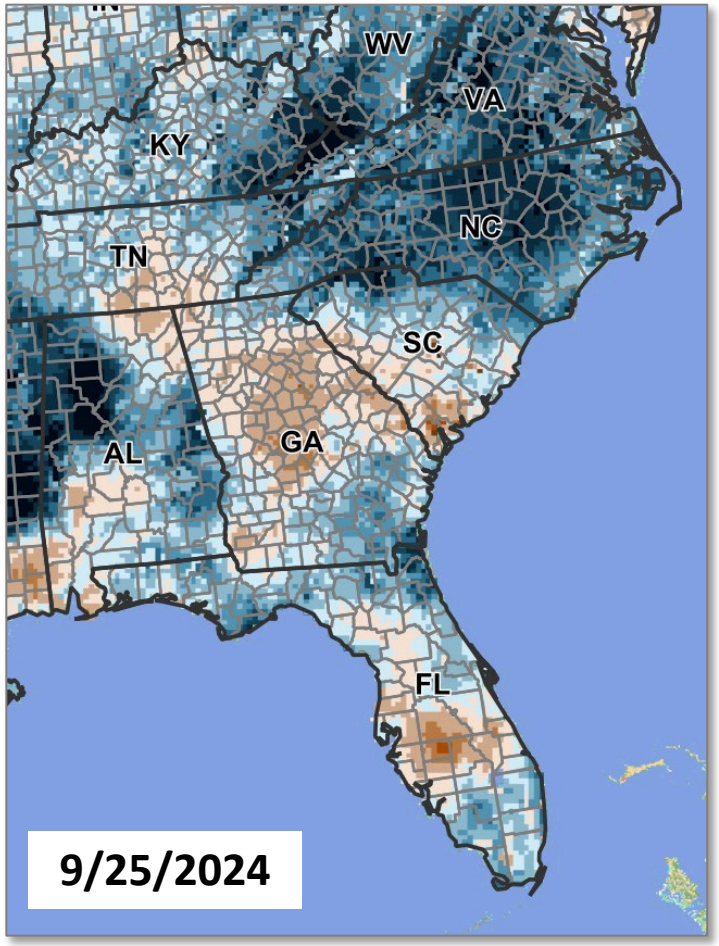
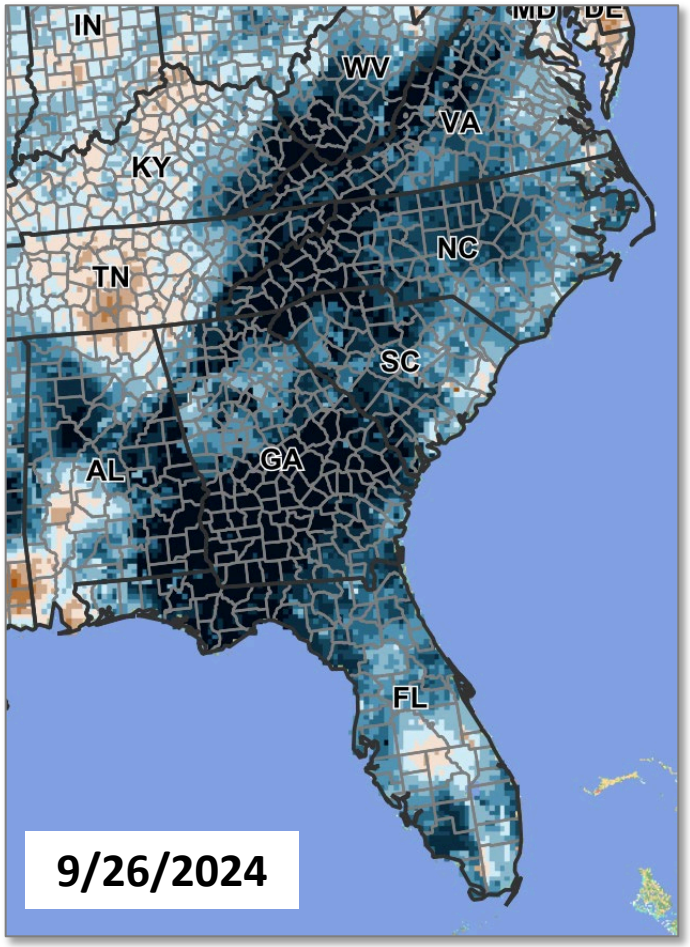
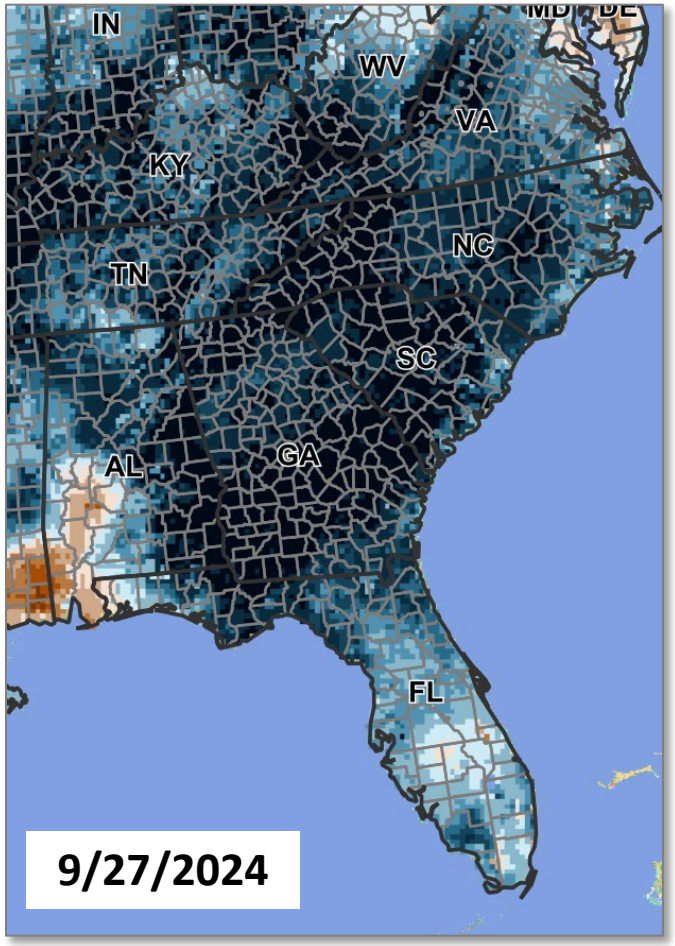


Image Source: [PRISM Climate Group at Oregon State University]

Daily Top-Soil Moisture Anomaly: 9/25 – 9/27

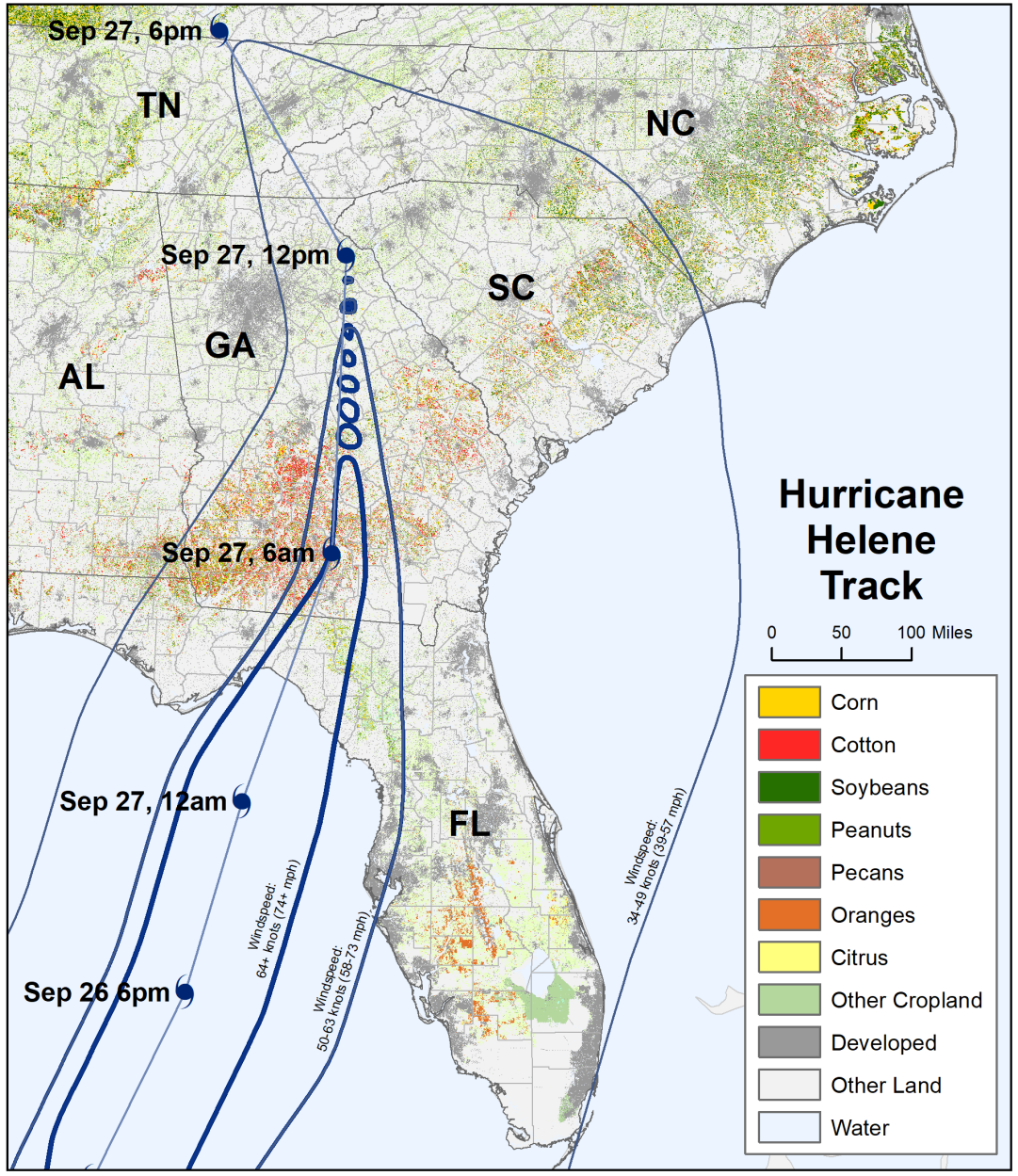






Soil Moisture Anomaly is a measure of deviation of the current soil moisture value from the "normal" soil moisture level, which is represented by a historical average soil moisture value (from 2015 to current). **Top-Soil** (surface soil) is defined as the top 6 inches. **Data Source:** Crop-CASMA

U.S. Agriculture Affected by Hurricane Helene Winds - September 2024



North Carolina				
Crop Type	Statewide Total Acres	Percent within 64+ knots	Percent within 50+ knots (includes 50-63, 64+ knots)	Percent within 34+ knots (includes 34-49, 50-63, 64+ knots)
Corn	950,000	N/A	N/A	14.85%
Cotton	380,000	N/A	N/A	6.33%
Peanuts	124,000	N/A	N/A	0.76%
Soybeans	1,640,000	N/A	N/A	10.62%

South Carolina				
Crop Type	Statewide Total Acres	Percent within 64+ knots	Percent within 50+ knots (includes 50-63, 64+ knots)	Percent within 34+ knots (includes 34-49, 50-63, 64+ knots)
Corn	365,000	N/A	N/A	99.64%
Cotton	210,000	N/A	N/A	99.97%
Peanuts	77,000	N/A	N/A	99.91%
Soybeans	395,000	N/A	N/A	99.64%

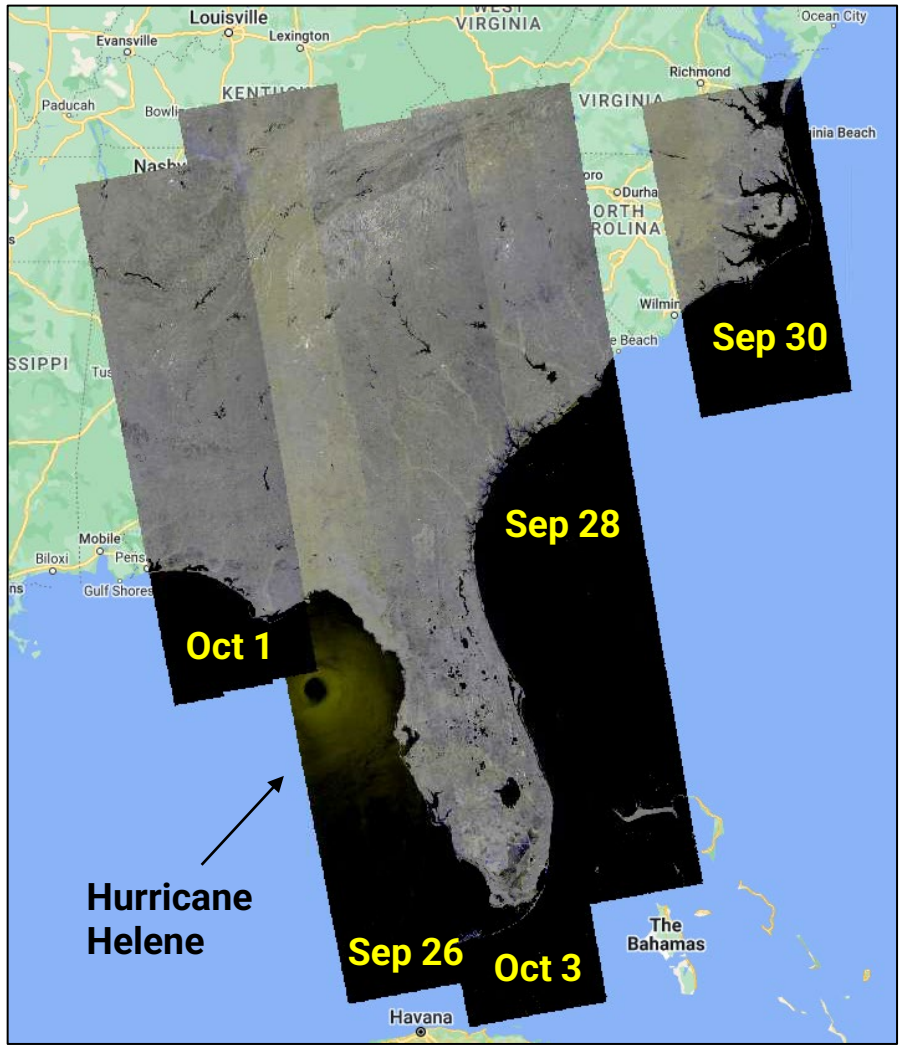
Georgia				
Crop Type	Statewide Total Acres	Percent within 64+ knots	Percent within 50+ knots (includes 50-63, 64+ knots)	Percent within 34+ knots (includes 34-49, 50-63, 64+ knots)
Corn	485,000	8.04%	21.22%	95.23%
Cotton	1,110,000	9.27%	27.55%	98.52%
Peanuts	775,000	11.31%	28.83%	99.23%
Pecans	148,000	8.81%	17.54%	99.47%
Soybeans	160,000	10.55%	26.22%	89.16%

Florida				
Crop Type	Statewide Total Acres	Percent within 64+ knots	Percent within 50+ knots (includes 50-63, 64+ knots)	Percent within 34+ knots (includes 34-49, 50-63, 64+ knots)
Citrus	20,100	0.00%	0.07%	99.99%
Corn	90,000	30.36%	59.07%	82.37%
Cotton	89,000	4.17%	6.21%	52.87%
Oranges	278,300	0.00%	0.03%	100.00%
Peanuts	160,000	13.41%	37.68%	72.77%

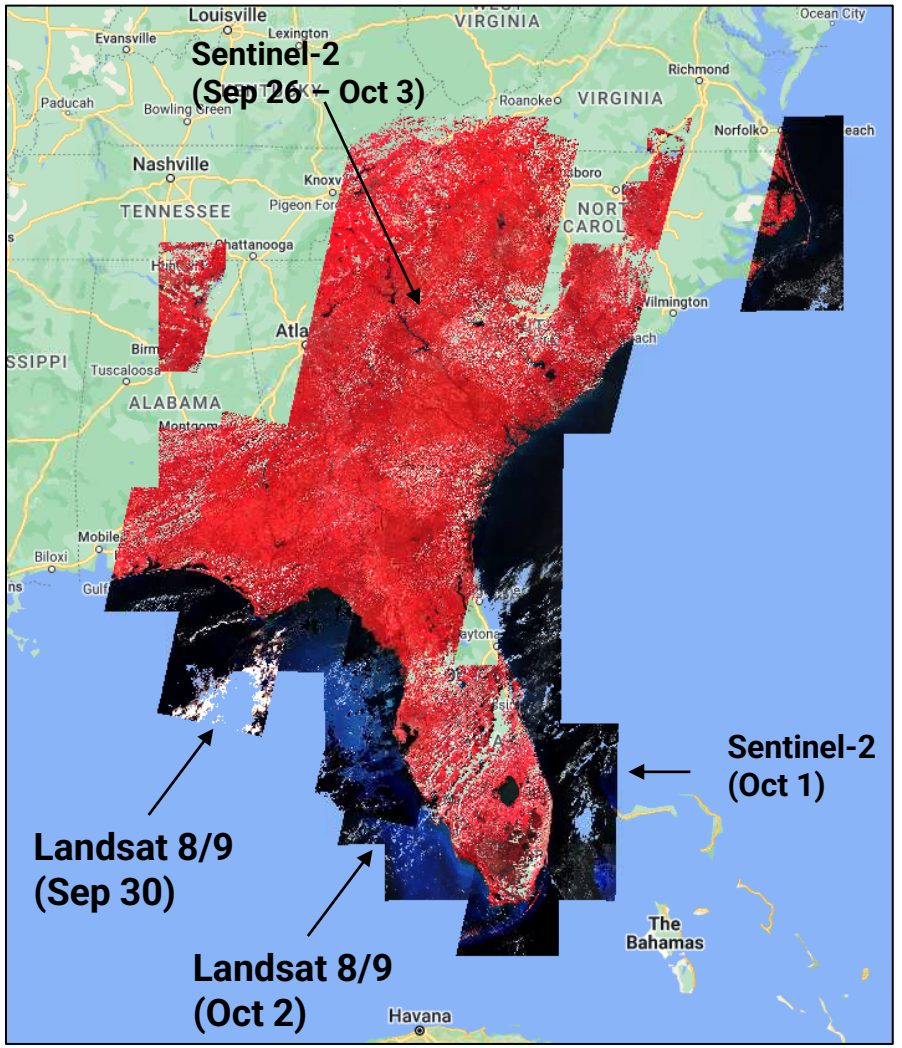
Total statewide acres based on 2023 NASS official estimates for planted acres for corn, cotton, soybeans, and peanuts, and bearing acres for pecans, oranges, and citrus (not including oranges).

Percentages based on raw pixel counts from the 2023 Cropland Data Layer and are not official NASS estimates. Hurricane wind swath data obtained from NOAA National Hurricane Center.

Satellite Image Coverage as of October 3, 2024
For Hurricane Helene Affected Areas

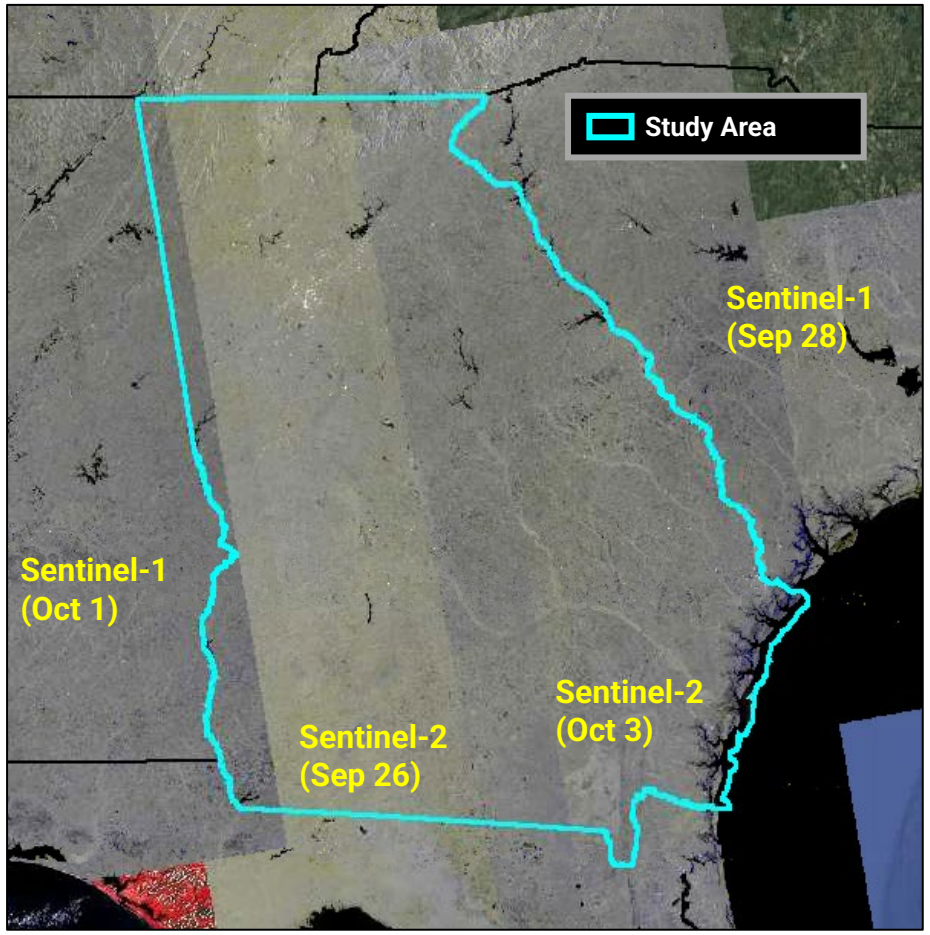


Sentinel-1 SAR image coverage
(Sep 26 – Oct 3, 2024)



Sentinel-2 and Landsat 8/9 image coverage
(median composite of Sep 26 – Oct 3, 2024)

Percent of Crop Acres Affected by Hurricane Helene, September 2024, Georgia



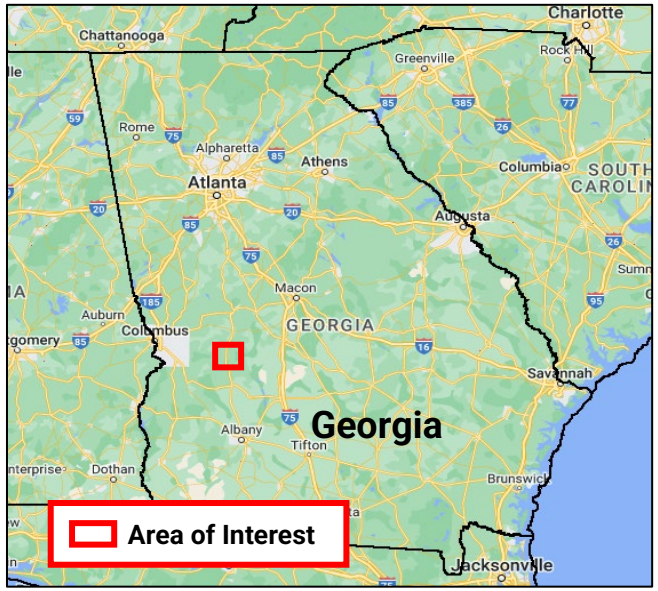
Assessment Dates (after inundation):
9/26/24 to 10/5/24
Reference Dates (before inundation):
8/26/24 to 9/26/24

Crop Type	Total Statewide Acres	Minimal Percent Inundated†
Corn*	485,000	0.31%
Cotton*	1,110,000	0.24%
Peanuts*	775,000	0.23%
Pecans***	148,000	0.19%
Soybeans*	160,000	0.21%
Total (selected commodities)	**2,678,000**	**0.25%**

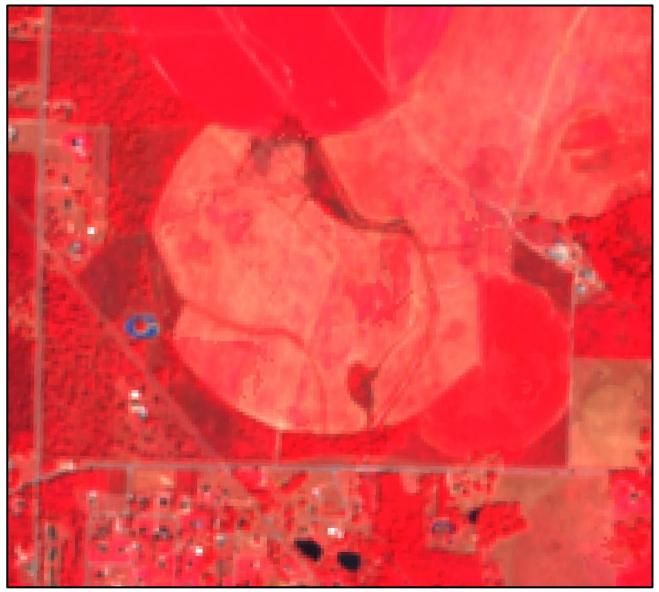
***Acres Planted, NASS 2023**

****Acres Bearing, NASS 2023**

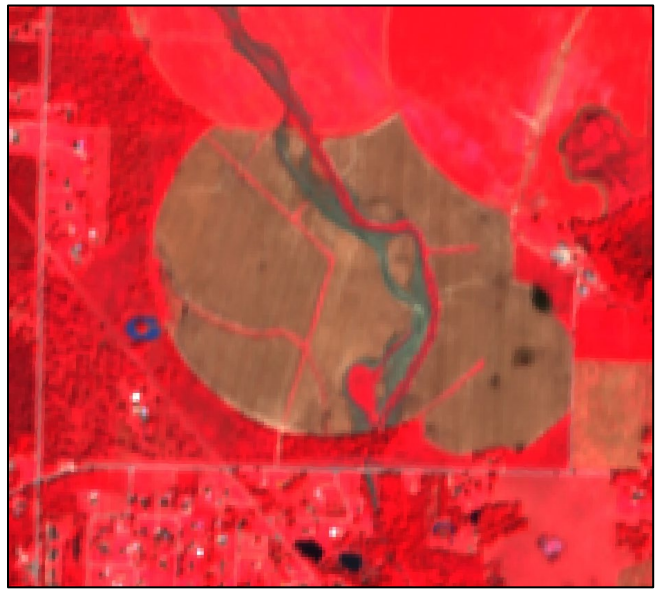
†Percent of acres impacted based on 1) all available post-event image acquisitions as of October 5, 2024, and 2) raw pixel counts from the 2023 CDL which are not official NASS estimates. Therefore, the amount of cropland affected by storm inundation may be different than these estimates indicate.



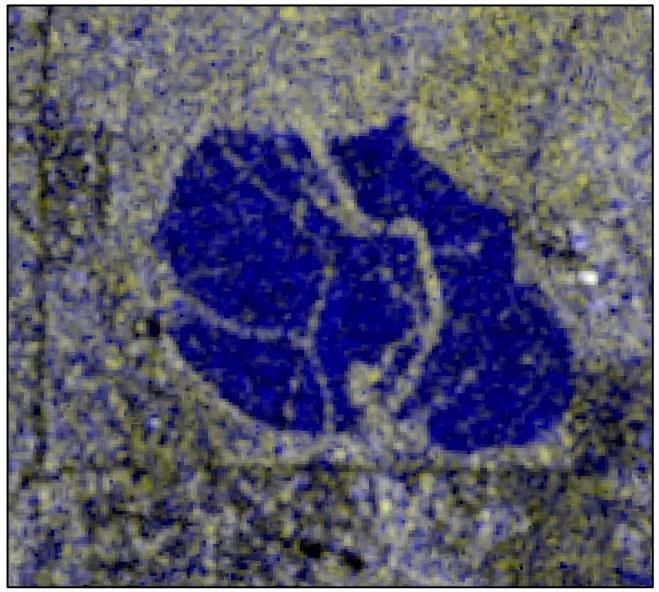
Georgia



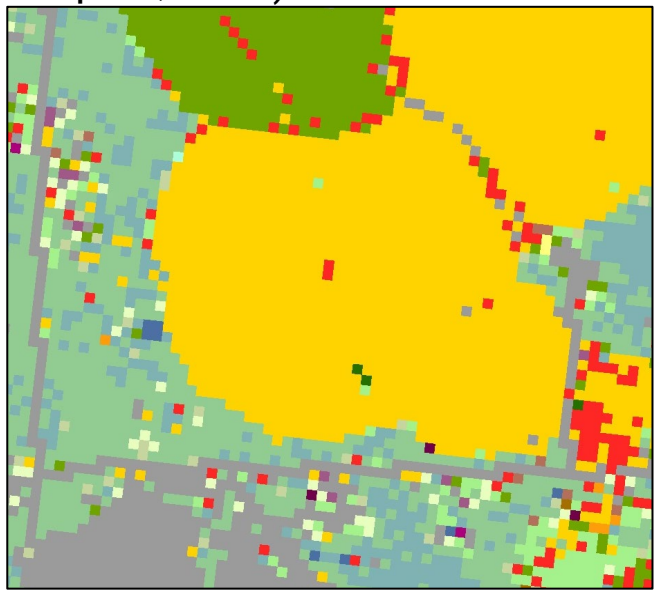
Sentinel-2 image before event (median composite of Aug 26 – Sep 26, 2024)



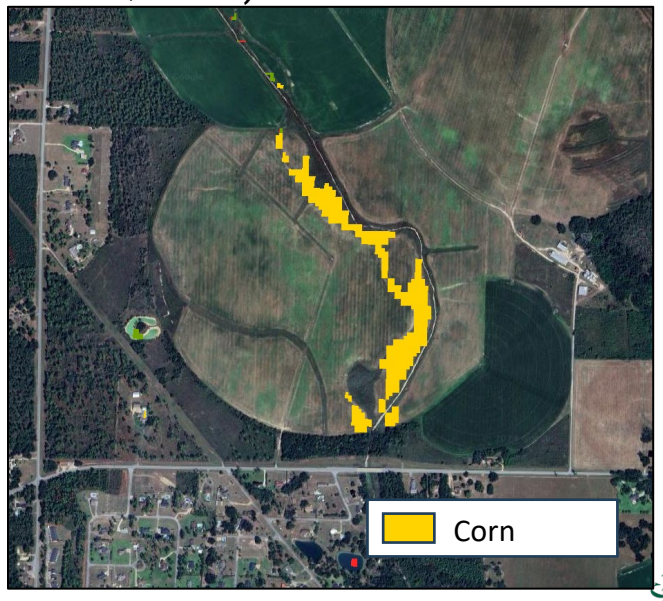
Sentinel-2 image after event (median composite of Sep 26 – Oct 1, 2024)



Anomaly detected from Sentinel-1 SAR image acquired on Sep 26, 2024



Cropland Data Layer **2023**



Inundated crops

Additional Thoughts

- Provided information on the potential agricultural impacts for counties in the designated disaster areas based on 2022 Census of Agriculture data
- None of these measures are precise
  - Cotton bolls were open in much of Georgia—5 inches of rain ruins the crop
  - How long can peanuts stay in water-saturated soil before being ruined?
- Following Tukey, imprecise information to the correct question is better than precise estimates to the wrong question.

Thank You!

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