Department of Environment & Conservation

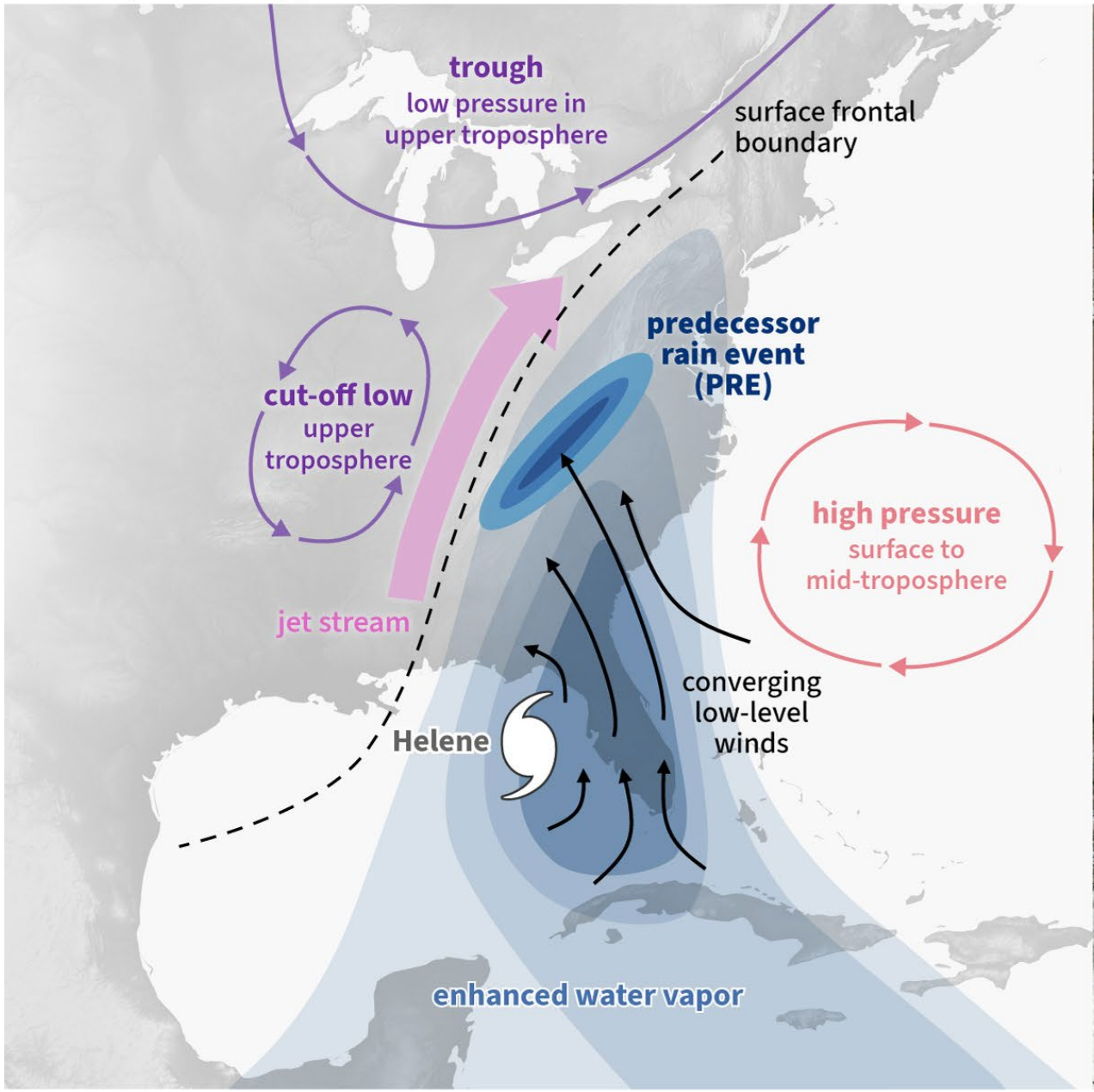
Hurricane Helene Impacts & Recovery

Southern Section A&WMA Annual Conference

Larry Yocom | August 27, 2025

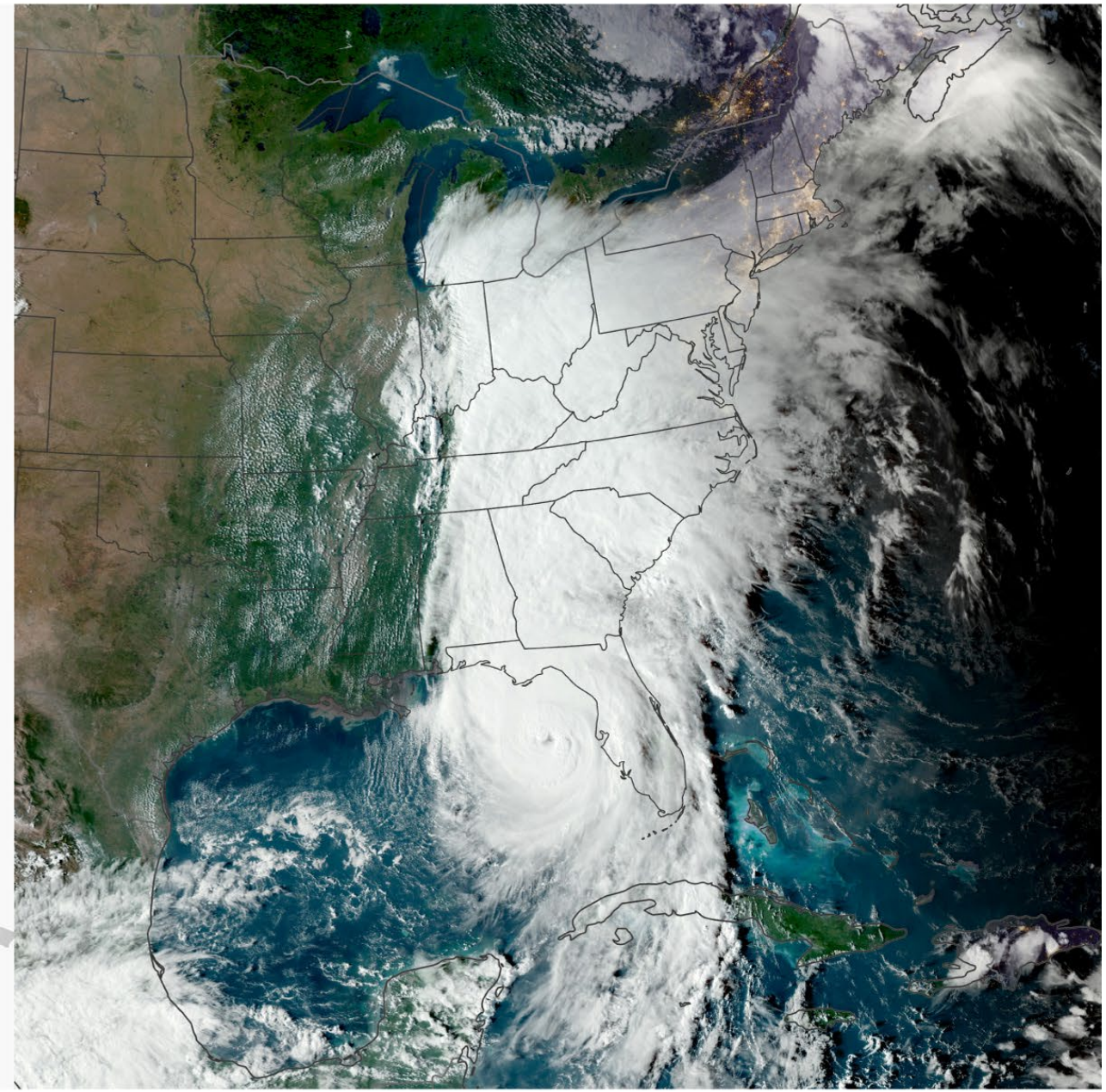

Tallahassee
23 Sep. 2024, 0000 UTC
NASA IMERG Accumulation since 23 Sep. 2024, 0000 UTC
(mm) 50 150 300
(~inches) 2 6 12
NHC track
Depr. / Storm
Cat. 1
2
3
4
5
NASA IMERG Precipitation Rate
(mm/hr) 0.5 7.0 25
(~inches/hr) 0.02 0.3 1.0

Weather patterns tapped Helene's moisture well before landfall

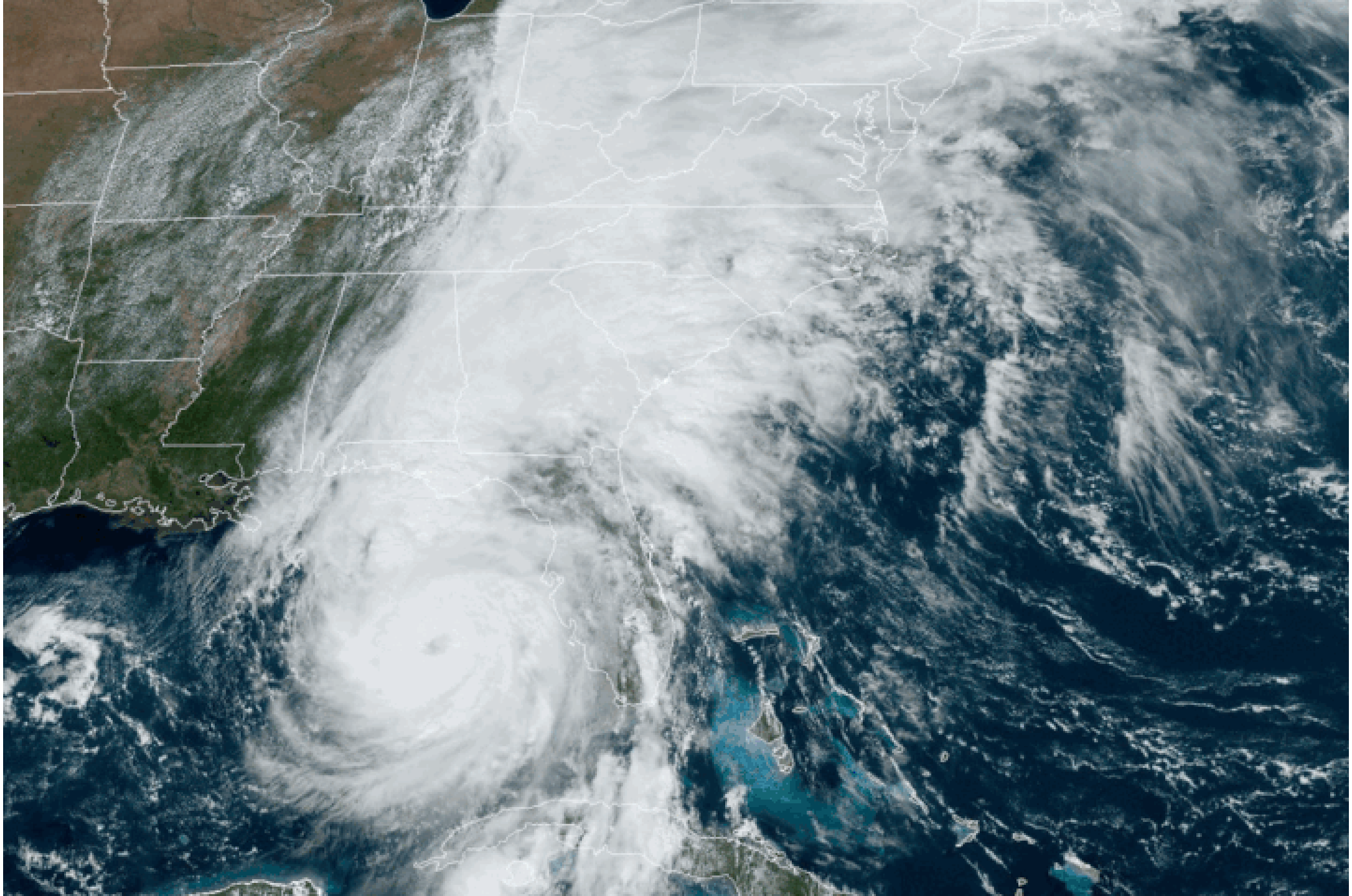


NOAA Climate.gov
Data: CW3E, adapted from
schematic by J. Cordeira

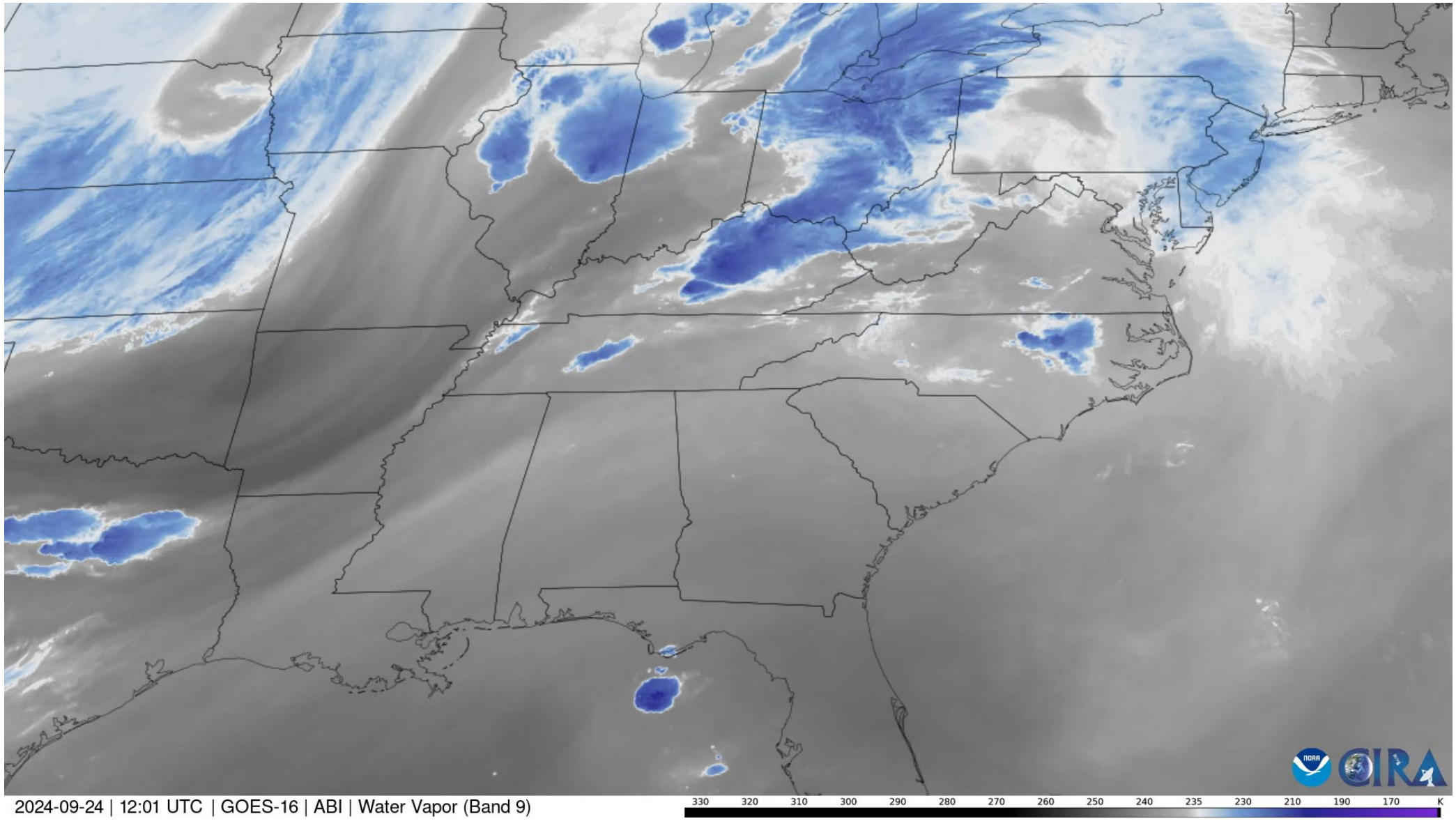
Clouds and rain stretched hundreds of miles north of Helene on September 26



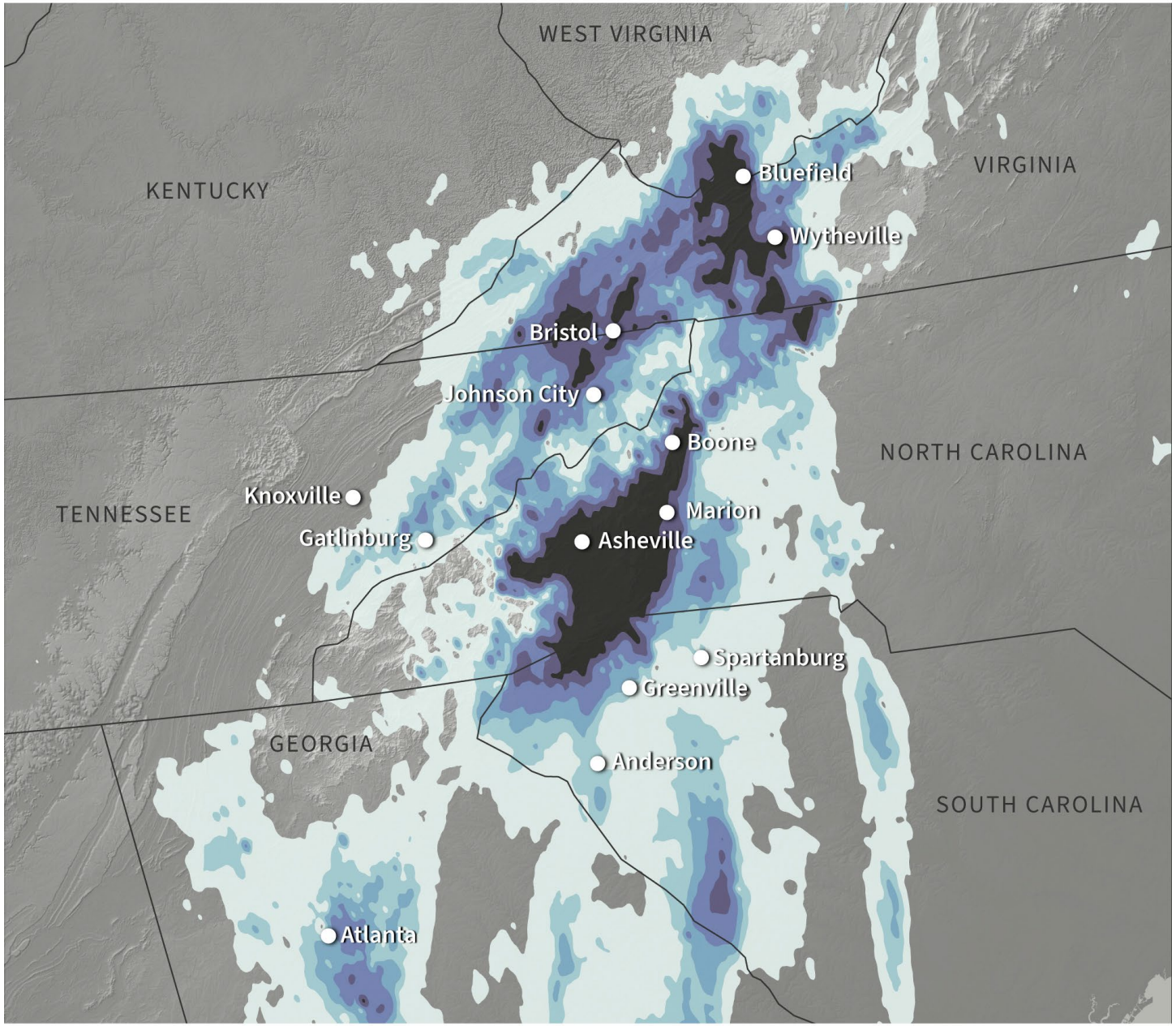
NOAA Climate.gov
Data: NOAA GOES-16



Water Vapor (9-24 through 9-28)



How unlikely were the highest 3-day rainfall totals associated with Helene?

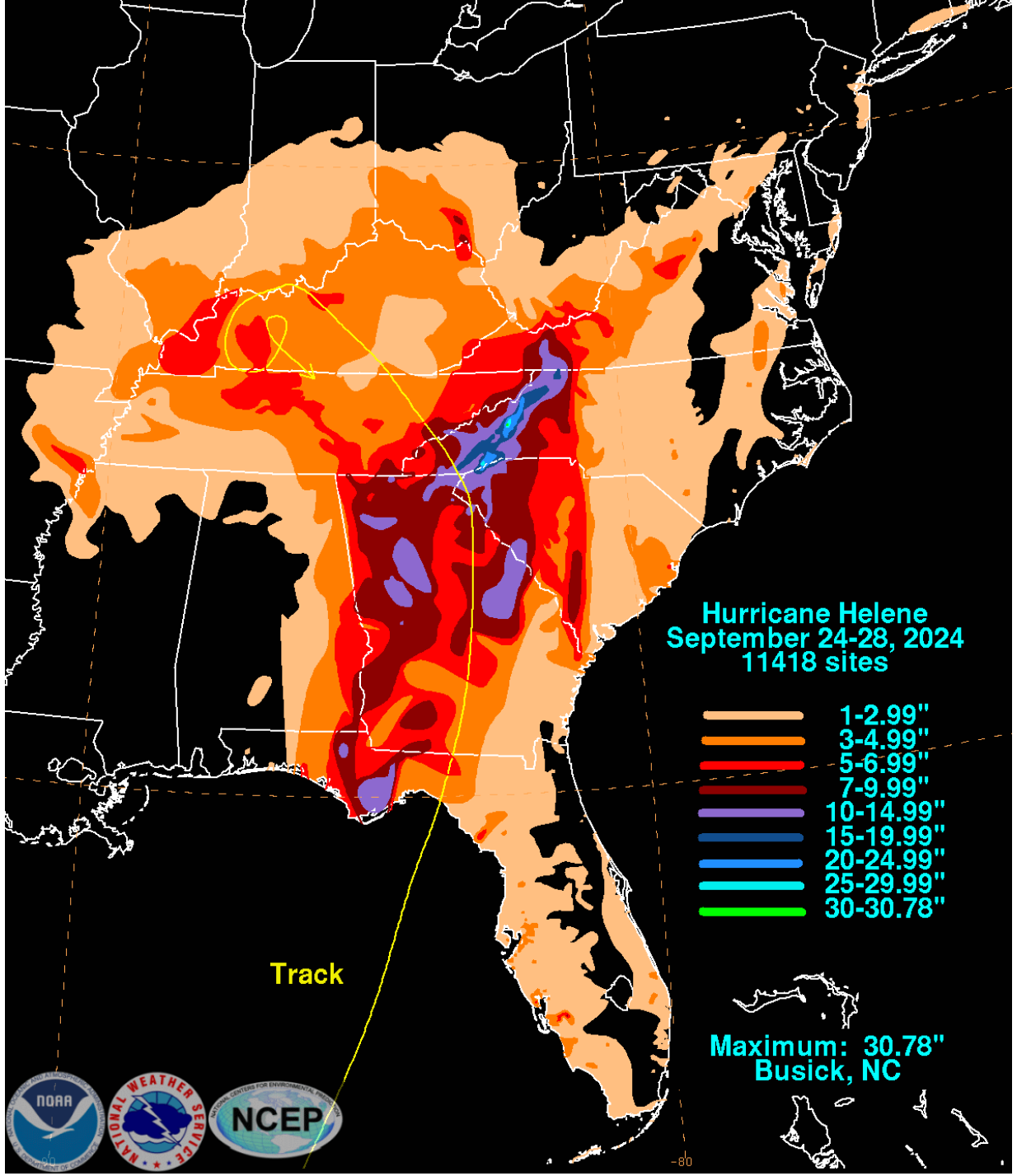


September 23–28, 2024

chances of exceeding observed rainfall in an average year

1/10 1/50 1/100 1/200 1/500 1/1000

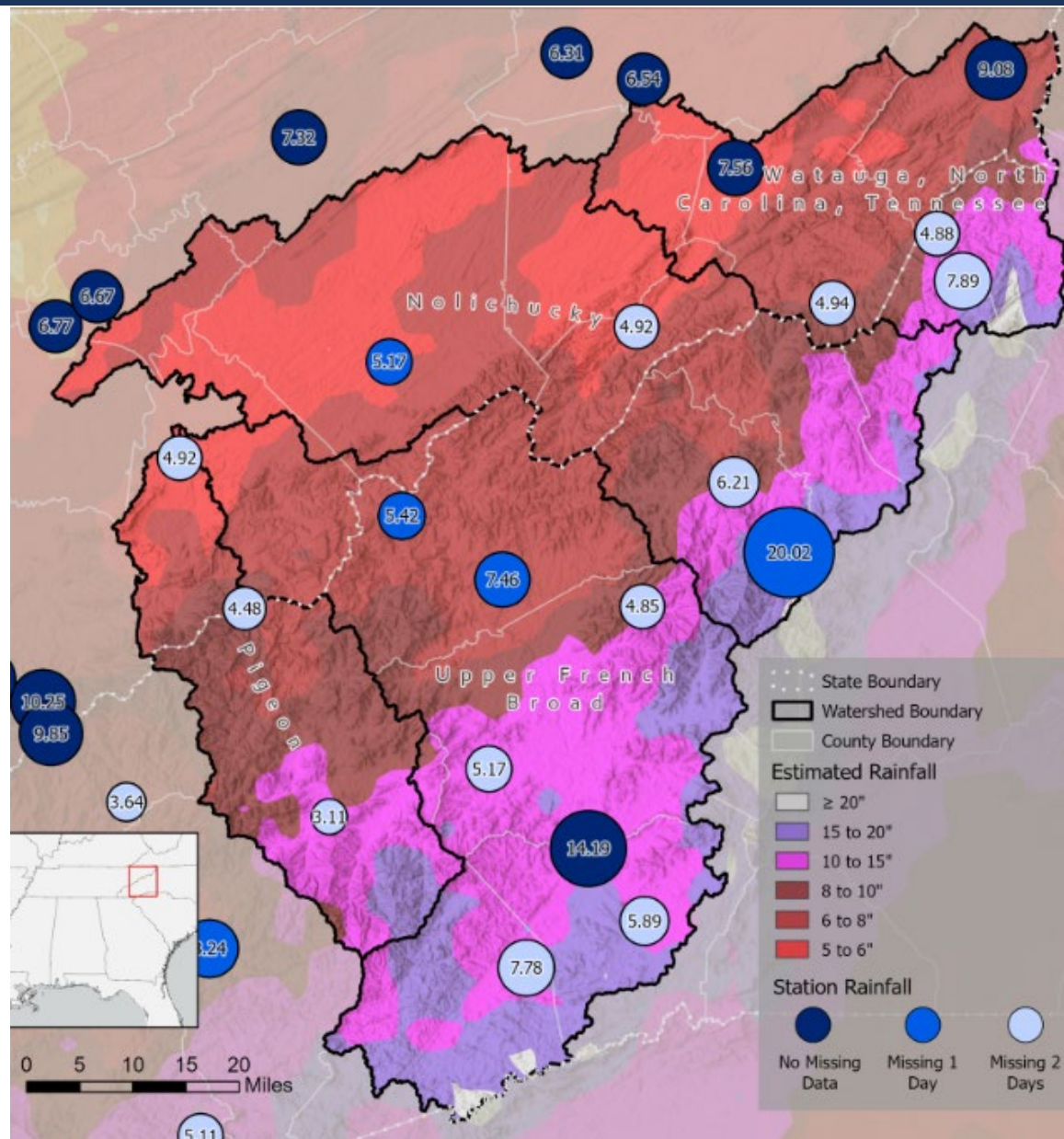
NOAA Climate.gov
Data: NOAA

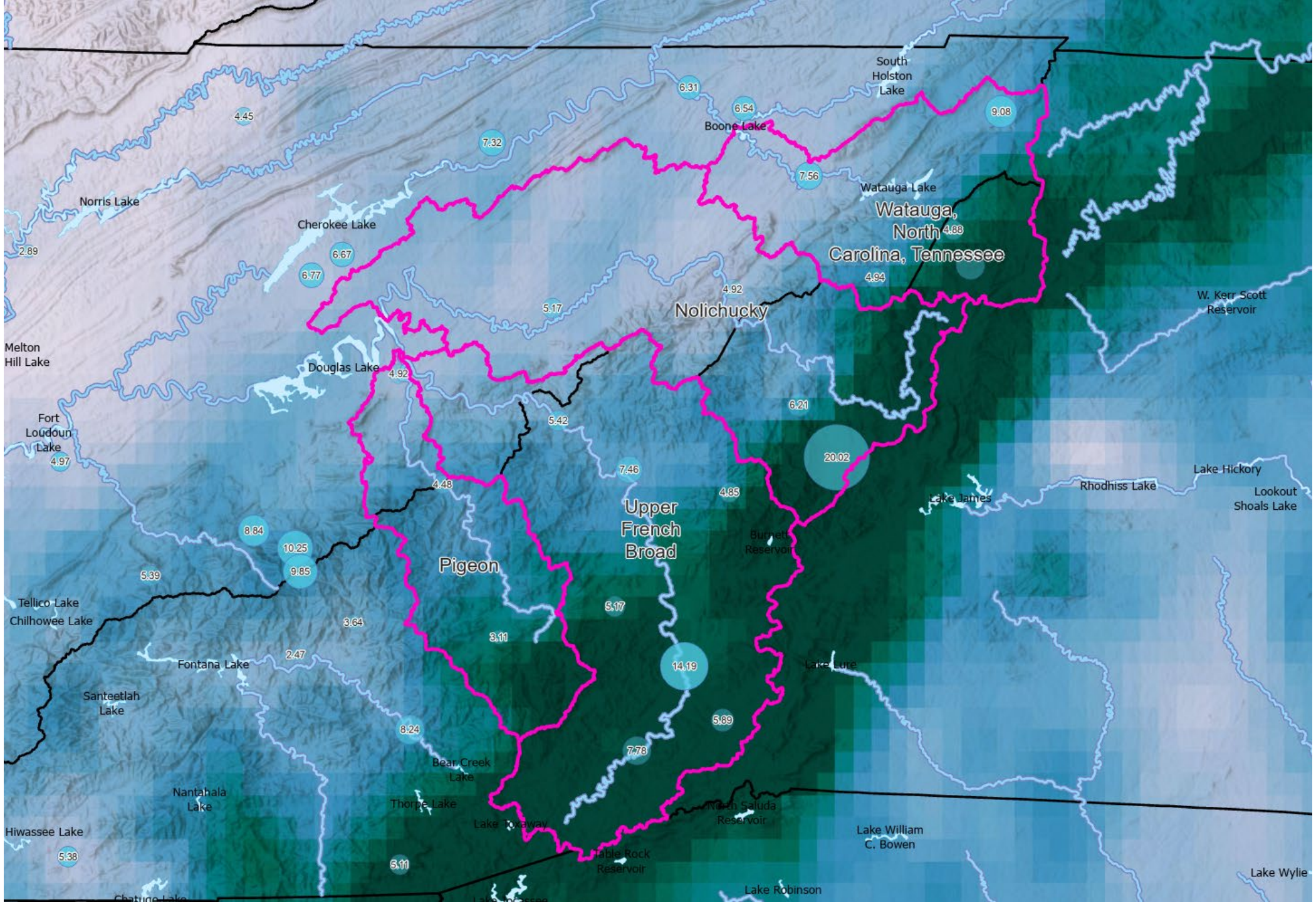

Hurricane Helene
September 24-28, 2024
11418 sites
1-2.99"
3-4.99"
5-6.99"
7-9.99"
10-14.99"
15-19.99"
20-24.99"
25-29.99"
30-30.78"
Track
Maximum: 30.78"
Busick, NC
NOAA
NATIONAL WEATHER SERVICE
NCEP
-80

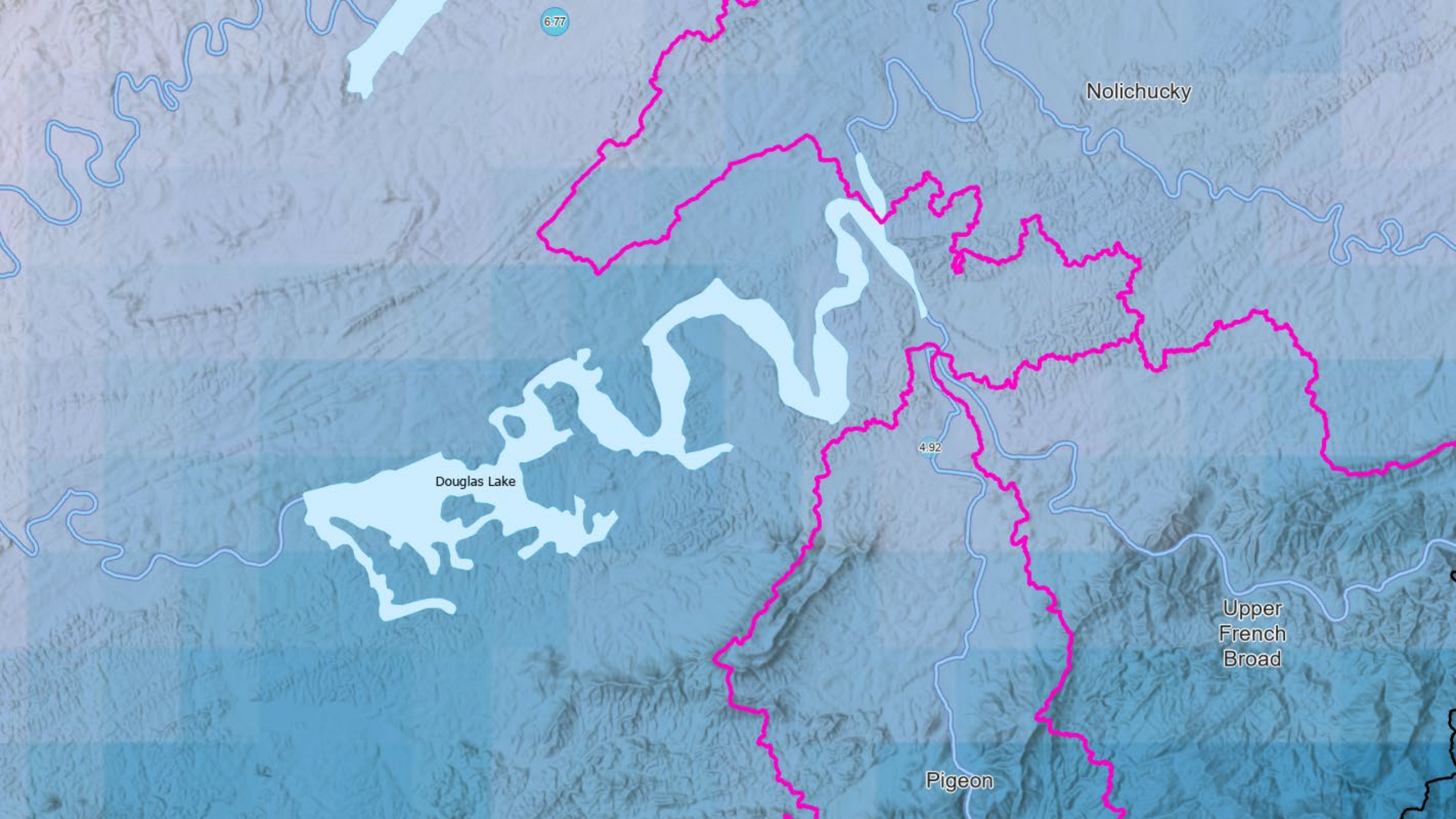
Frontal + Helene Storm Total Rainfall

Radar Estimated Rainfall (8am EDT Sep 24 – 8 am EDT Sep 29)
Station Rainfall (7am EDT Sep 24 – 7 am EDT Sep 28)

Map by Wil Tollefson, Tennessee Climate Office
Data from: Esri, TomTom, Garmin, FAO, NOAA, USGS, EPA, USFWS, Esri, NASA, NGA, USGS, National Oceanic and Atmospheric Administration (NOAA), National Weather Service (NWS), Office of Dissemination (ODIS), and XM-ACIS




South Holston Lake
Boone Lake
Watauga Lake
Watauga, North Carolina, Tennessee
Norris Lake
Cherokee Lake
Nolichucky
W. Kerr Scott Reservoir
Melton Hill Lake
Douglas Lake
Fort Loudoun Lake
Upper French Broad
Pigeon
Lake James
Rhodhiss Lake
Lake Hickory
Lookout Shoals Lake
Tellico Lake
Chilhowee Lake
Fontana Lake
Santeetlah Lake
Lake Lure
Bear Creek Lake
Nantahala Lake
Thorpe Lake
Lake Fairfield
Hiwassee Lake
Table Rock Reservoir
Lake William C. Bowen
Lake Wylie
Lake Robinson
6.31
6.54
9.08
4.45
7.32
7.56
4.88
2.89
6.67
6.77
4.94
4.92
5.17
4.92
6.21
5.42
20.02
4.97
7.46
4.48
4.85
8.84
10.25
9.85
5.39
5.17
3.64
3.11
2.47
14.19
5.89
8.24
7.78
5.38
5.11

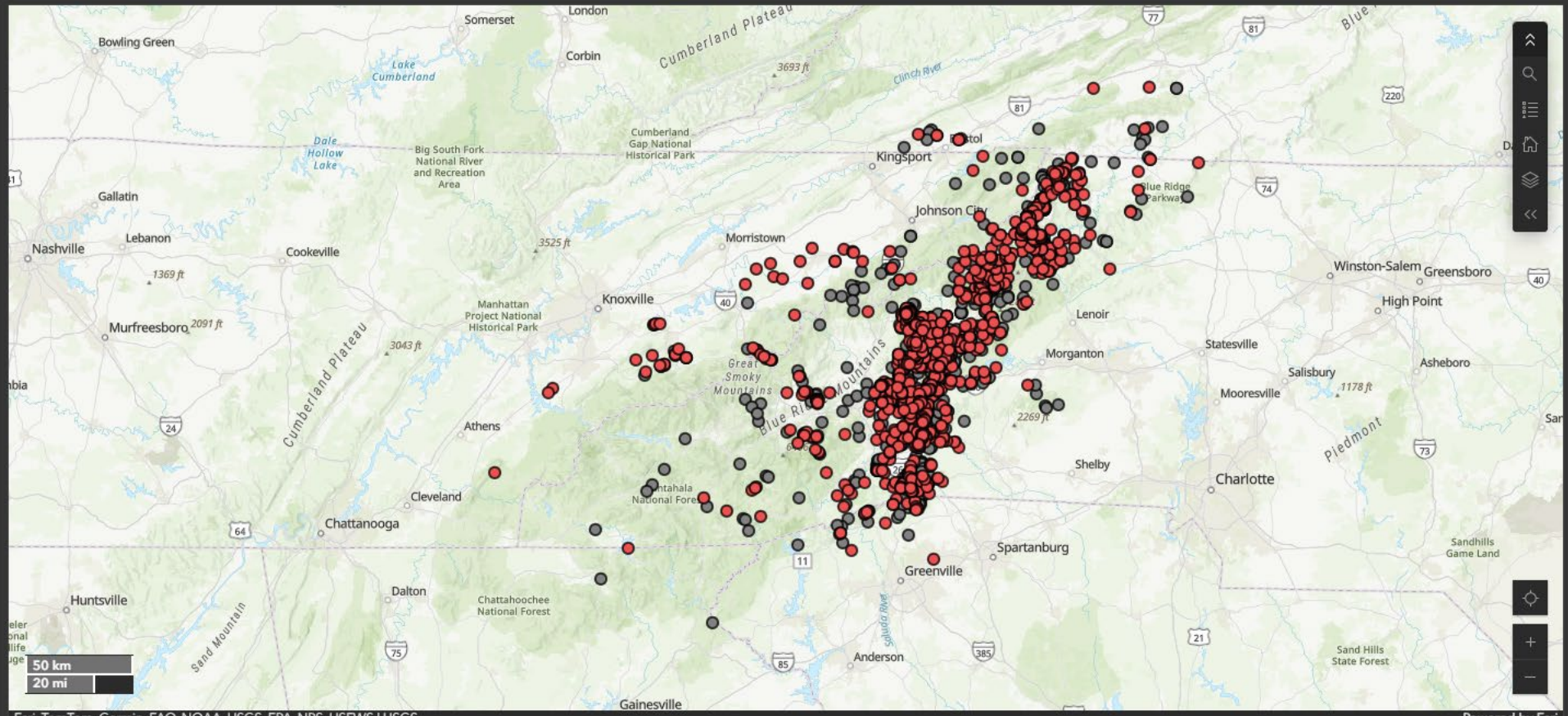

6.77
Nolichucky
Douglas Lake
4.92
Upper
French
Broad
Pigeon

Hurricane Helene Landslide Observations Dashboard

Ground Failure Points

Flag?

- Yes
- No



Flagged landslides include those that impacted rivers, roads, and structures. This may not reflect the current situation, only the status at the time of mapping.

Click on a point for more information.

This is an ongoing, multi-agency effort to map landslides associated with Hurricane Helene. This dashboard will be updated as more information is obtained.

Flagged Landslides

1,064

Last update: 3 minutes ago

Total Landslides

2,015

Last update: 3 minutes ago


NEWPORT
UTILITIES


Nolichucky
River

Preparedness & Coordination

What is TEMA?

Tennessee Emergency Management Agency (TEMA) is responsible for preparedness, response, mitigation and recovery from disasters.

- TN Department of Military
- Headquarters in South Nashville
- Director: Patrick Sheehan
- Social Media: @TennesseeEMA

TN Department of Military | TEMA

Mission Statements

TEMA Mission

To coordinate preparedness, response, and recovery from man-made, natural, and technological hazards in a professional and efficient manner in concert with our stakeholders.

TDEC Mission

The Tennessee Department of Environment and Conservation (TDEC) exists to enhance the quality of life for citizens of Tennessee and to be stewards of our natural environment by:

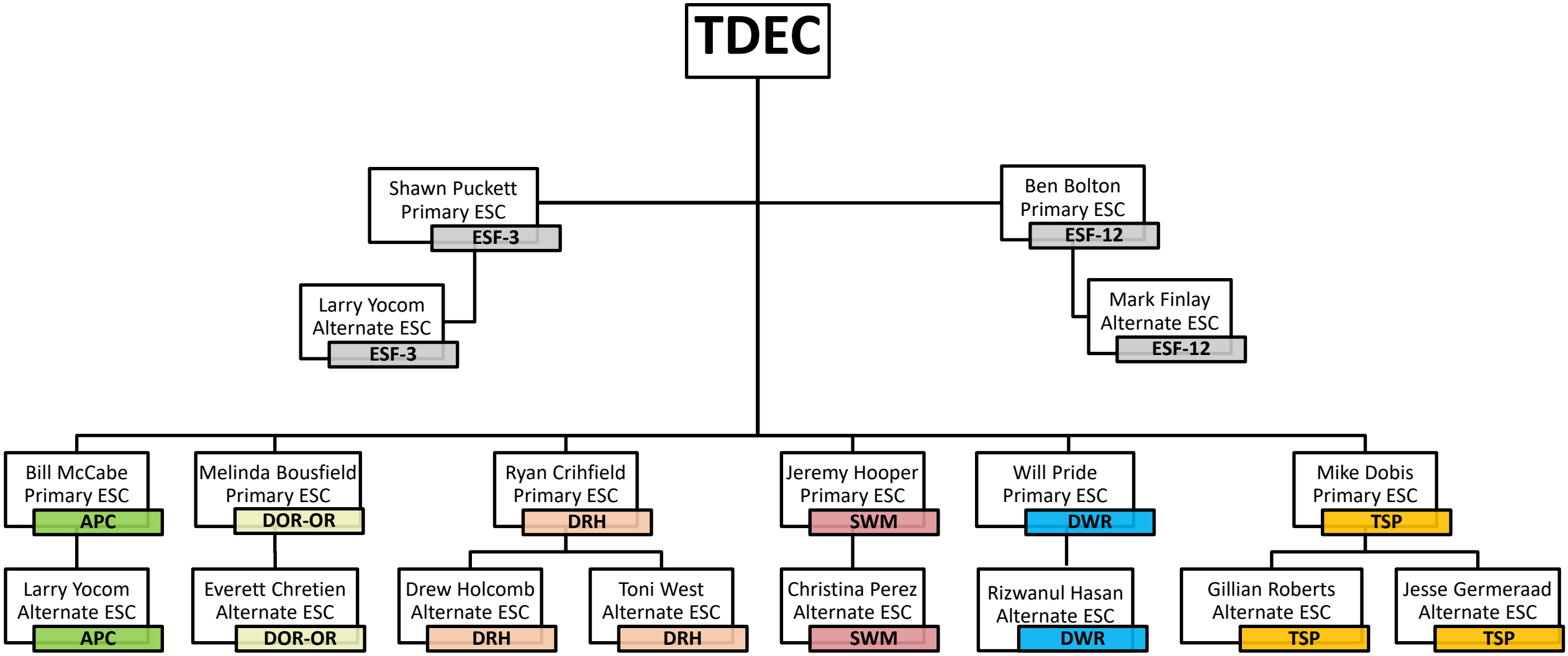
- Protecting and improving the quality of Tennessee's air, land, and water through a responsible regulatory system
- Protecting and promoting human health and safety
- Conserving and promoting natural, cultural and historic resources
- Providing a variety of quality outdoor recreational experiences

Emergency Services Coordinator (ESC)

Statewide Program (Not just TDEC) - **ESCs** are individuals selected from within an executive department or agency with authorization to act on behalf of their respective Commissioner/Agency Head when assisting the Agency in coordinating an effective response to the various types of emergencies and disasters. In support of TEMA's mission, these individuals may be consulted for subject matter expertise.

- **ESCs are Required by TN Code § 58-2-108**
  - Governor's Directive: Heads of executive departments/agencies **must** appoint Emergency Services Coordinators (ESCs) and alternates, as defined by TEMA in the **Tennessee Emergency Management Plan (TEMP)**
- Role of the ESC
  - During emergencies, TEMA manages disaster response efforts from the State Emergency Operations Center (SEOC) at its headquarters. The SEOC is staffed by TEMA personnel along with **ESCs** who represent various state and federal agencies, private sector organizations, and nonprofits.
  - Major responsibilities outlined in the TEMP

Emergency Services Coordinators (ESCs)



State Emergency Operations Center (SEOC)

SEOC Activation Levels

The SEOC Activation Levels are divided into five levels. Normal day-to-day operations start at Level 5 and escalate to a Level 1-Catastrophic Disaster.

The Director of TEMA, in consultation with the Governor's Office and the Adjutant General (TAG), determines the Activation Levels for the SEOC based on a review of actual or potential impacts, risks, local requests, resource gaps, and operational priorities.

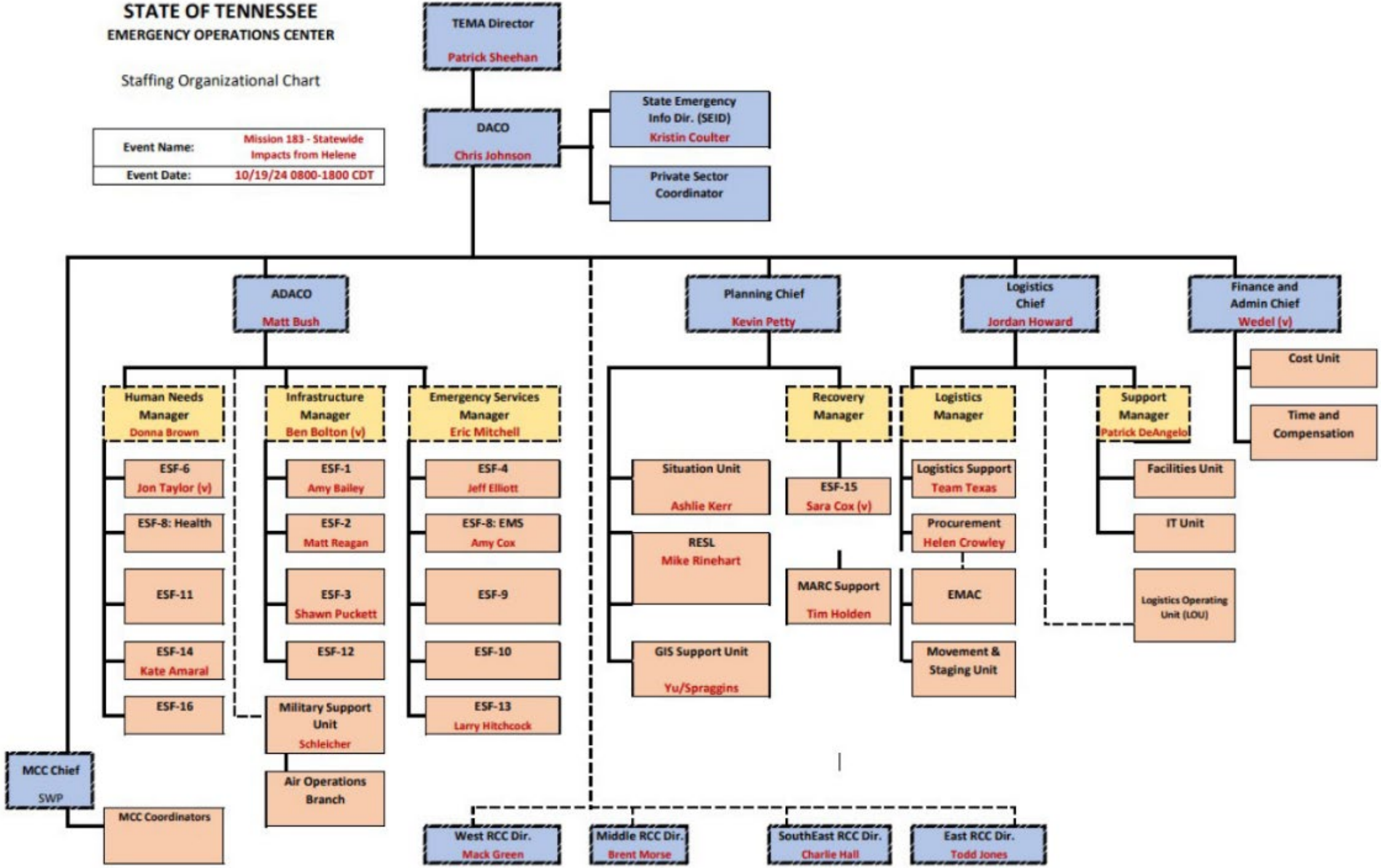
ESCs may be activated to the SEOC depending upon situation.

Activation Levels	Activation Classification	Actions and Triggers
Level 5	Normal Operations	• Normal Day-to-Day Operations. • The TEMP is **Not** Activated. • The SEOC is **Not** Activated.
Level 4	Monitoring or Localized Emergency	• The SEOC supports prevention/preparedness efforts and monitors localized emergency incidents with escalation potentials, imminent storm fronts, large mass gatherings, and other events. • The TEMP **may** or **may not** be Activated, and the TEMA Director will make this determination. Limited resources may be staged, and support coordinators may be deployed to assist with prevention, preparedness, and response actions. • The SEOC **may** or **may not** be staffed, and the TEMA Director will make this determination. Partners may be staffed in the SEOC, supporting local government prevention/preparedness efforts, and maintaining situational awareness.
Level 3	Disaster to State	• A potential disaster requiring significant state resources and support has or may occur in Tennessee. • The TEMP is **Activated.** TEMA Director or designees will determine what ESF Annexes need to be executed. • The SEOC is **Activated.** TEMA Director or designees will determine what ESF roles need to be staffed.
Level 2	Major Disaster to State	• A major disaster in Tennessee will require substantial state resources and support. Major Disasters will most likely require resources from outside Tennessee, including federal government support and support from other states through mutual aid requests. • The TEMP is **Activated** along with the majority of ESF Annexes. • The SEOC is **Activated** with the majority of ESF roles staffed. Major Disasters will likely require 24-hour operations within the SEOC.
Level 1	Catastrophic Disaster to State	• A catastrophic disaster in Tennessee will require emergency support and resources from entities across the United States. • The TEMP is **Activated** along with all ESF Annexes. • The SEOC is **Activated** with full staffing of all ESF roles on a 24-hour operational basis. The SEOC will require significant support from entities outside of Tennessee.

STATE OF TENNESSEE
EMERGENCY OPERATIONS CENTER

Staffing Organizational Chart

Event Name:	Mission 183 - Statewide Impacts from Helene
Event Date:	10/19/24 0800-1800 CDT



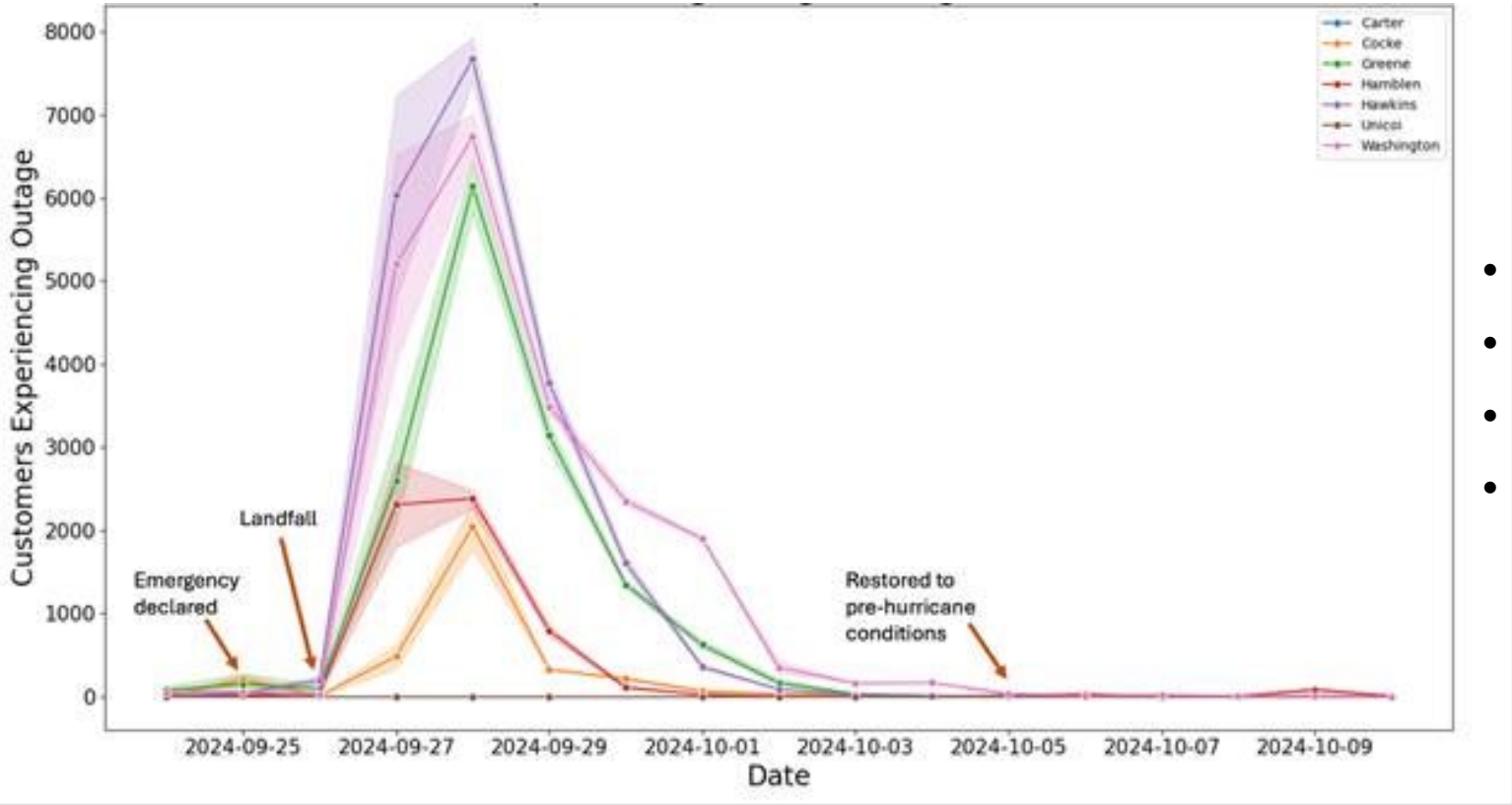
Impacts by the Numbers

Impact Peaks

Public drinking-water systems with operational issues (lost intakes/power outages/damaged lines)	25 systems (with 19 BWAs) >172,000 Tennesseans affected
Water Conservation Order	Mandatory conservation for parts of 9 Upper East TN counties
Wastewater impacts (bypass/overflow; line/intake/outfall issues; sewer river crossings damaged)	6 WWTPs (municipal) 7 Treatment Facilities (school, industry, park, etc.)
Water Contact Advisory	All surface waters in 5 watersheds (and other flood-affected waters)
Debris - waterways (state program)	Over 5.2 million cubic yards collected


HL225M DRI PRIME

Power Outages

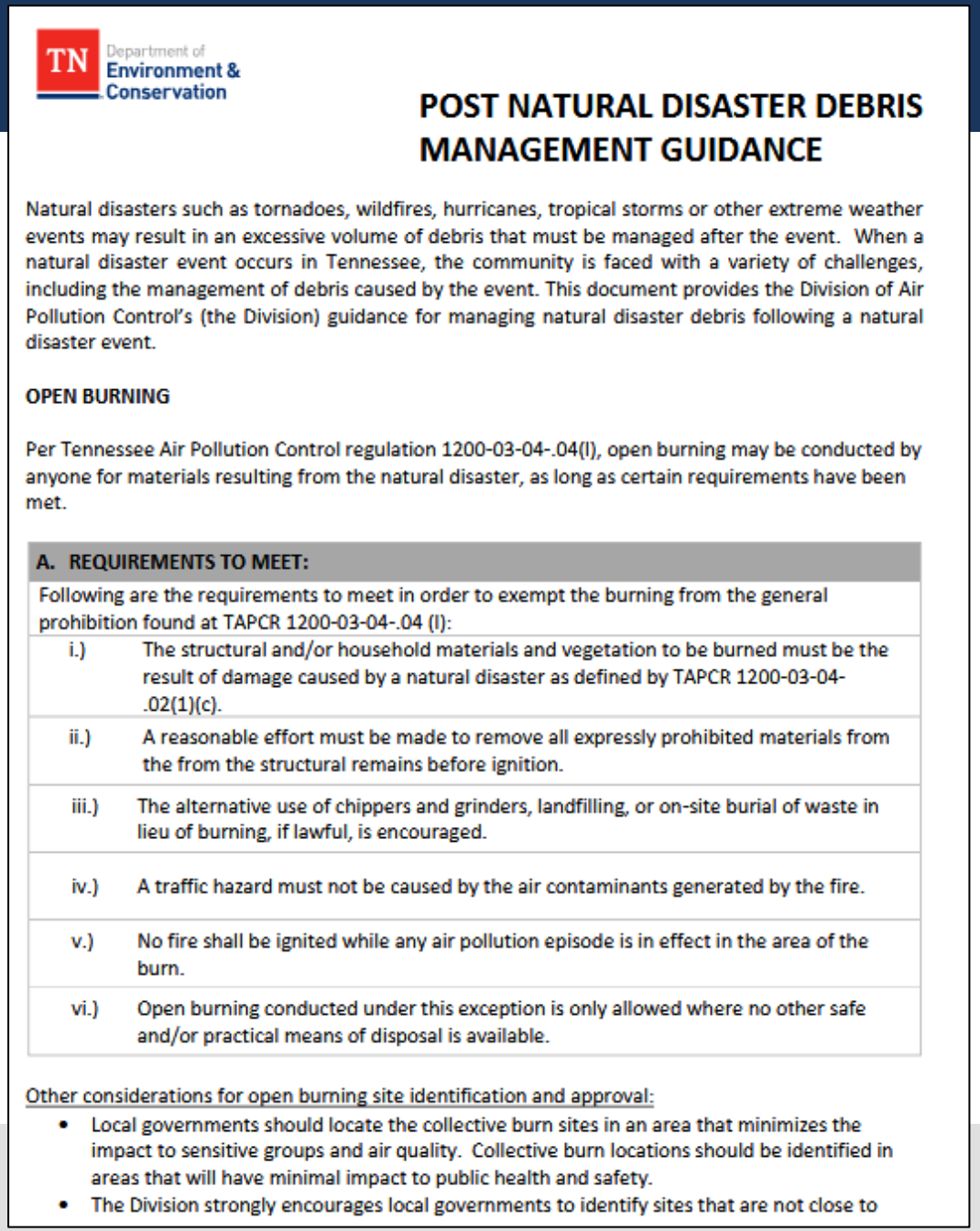


- TN outages peaked at 105,932 on Sep 27
- Declined to 10,268 by Sep 30
- Immediate spike at landfall
- Restored to pre-hurricane conditions Oct 5

Regulatory Debris Guidance

Air Pollution Control

- Post- natural disaster debris guidance - screen prohibited materials; encourage alternatives to burning (chipping/grinding).
- Governmental collective burn sites: notify APC (regional EFO) 3 days prior; site to minimize impacts to sensitive receptors.
- Temporary ACD/ACI in declared emergency areas; stop authority if emissions create hazards/nuisance.



TN Department of Environment & Conservation

POST NATURAL DISASTER DEBRIS MANAGEMENT GUIDANCE

Natural disasters such as tornadoes, wildfires, hurricanes, tropical storms or other extreme weather events may result in an excessive volume of debris that must be managed after the event. When a natural disaster event occurs in Tennessee, the community is faced with a variety of challenges, including the management of debris caused by the event. This document provides the Division of Air Pollution Control's (the Division) guidance for managing natural disaster debris following a natural disaster event.

OPEN BURNING

Per Tennessee Air Pollution Control regulation 1200-03-04-.04(l), open burning may be conducted by anyone for materials resulting from the natural disaster, as long as certain requirements have been met.

A. REQUIREMENTS TO MEET:	
Following are the requirements to meet in order to exempt the burning from the general prohibition found at TAPCR 1200-03-04-.04 (l):	
i.)	The structural and/or household materials and vegetation to be burned must be the result of damage caused by a natural disaster as defined by TAPCR 1200-03-04-.02(1)(c).
ii.)	A reasonable effort must be made to remove all expressly prohibited materials from the from the structural remains before ignition.
iii.)	The alternative use of chippers and grinders, landfilling, or on-site burial of waste in lieu of burning, if lawful, is encouraged.
iv.)	A traffic hazard must not be caused by the air contaminants generated by the fire.
v.)	No fire shall be ignited while any air pollution episode is in effect in the area of the burn.
vi.)	Open burning conducted under this exception is only allowed where no other safe and/or practical means of disposal is available.

Other considerations for open burning site identification and approval:

- Local governments should locate the collective burn sites in an area that minimizes the impact to sensitive groups and air quality. Collective burn locations should be identified in areas that will have minimal impact to public health and safety.
- The Division strongly encourages local governments to identify sites that are not close to

Solid Waste Management

- Emergency Debris Management guidance: TDMS siting/approvals; stormwater controls; run-on/runoff management.
- Segregate vegetative, C&D, white goods, electronics, HHW; allow compliant reduction (e.g., chipping/grinding).
- Document volumes/dates/destinations; dispose at approved facilities (supports regulatory and FEMA documentation).

SWM-SWP-G-117- Emergency Debris Management- 033021
Emergency Debris Management from Natural Disasters Guidance

SOLID WASTE STATUTORY CITATIONS

T. C. A. § 68-211-103(8) states:

"Solid waste" means garbage, trash, refuse, abandoned material, spent material, byproducts, scrap, ash, sludge, and all discarded material including solid, liquid, semisolid, or contained gaseous material resulting from industrial, commercial, and agricultural operations, and from community activities. Solid waste includes, without limitation, recyclable material when it is discarded or when it is used in a manner constituting disposal;

T. C. A. § 68-211-103(9) states:

"Solid waste disposal" means the process of permanently or indefinitely placing, confining, compacting, or covering solid waste;

T. C. A. § 68-211-104 states:

It is unlawful to:

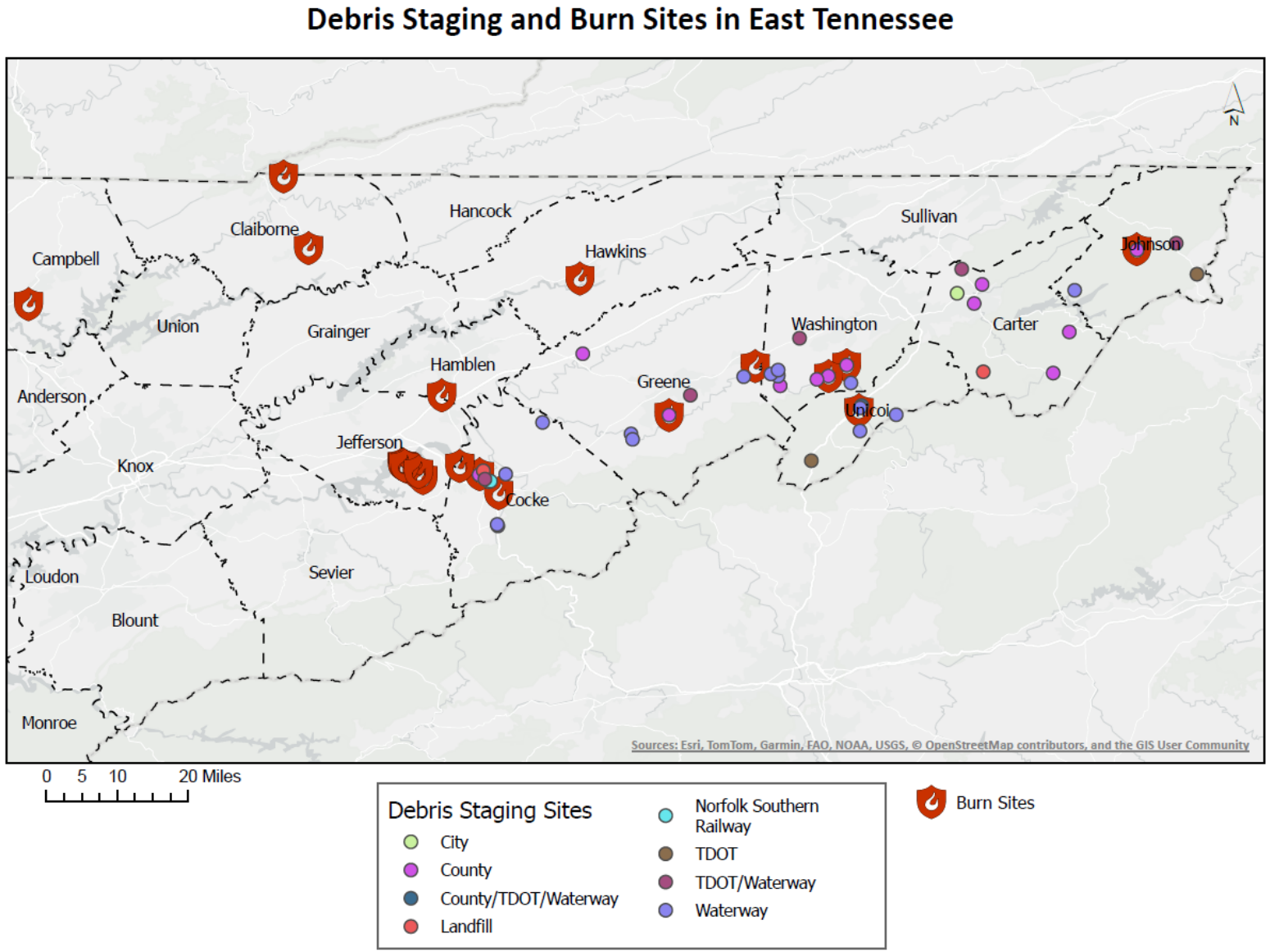
(1) Place or deposit any solid waste into the waters of the state except in a manner approved by the department or the Tennessee board of water quality, oil and gas;
(1) Place or deposit any solid waste into the waters of the state except in a manner approved by the department or the Tennessee board of energy and natural resources, created by § 69-3-104;
(2) Burn solid wastes except in a manner and under conditions prescribed by the department and the Tennessee air pollution control board;
(3) Construct, alter, or operate a solid waste processing or disposal facility or site in violation of the rules, regulations, or orders of the commissioner or in such a manner as to create a public nuisance; or
(4) Transport, process or dispose of solid waste in violation of this chapter, the rules and regulations established under this chapter or in violation of the orders of the commissioner or board.

T. C. A. § 68-211-815(b)(16) states:

Each Municipal Solid Waste Region shall have "a plan for managing solid waste generated as a result of disasters or emergencies."

Technology and Mapping

Debris Staging and Burn Sites



TN Public Water System - Emergency Status Dashboard

Last Updated 5/20/2025 @ 10:00am CST

Notes on Issues Reported

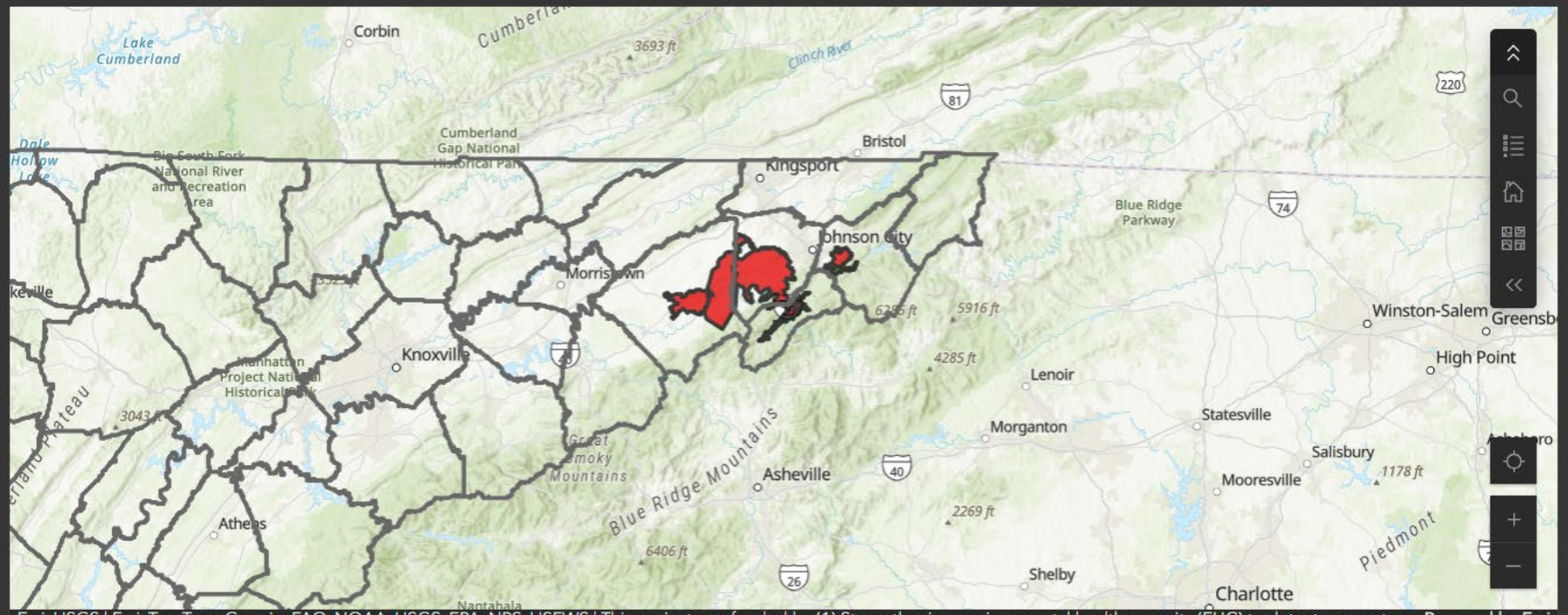
CHUCKEY UTILITY DISTRICT ----BWA and WCA lifted. Service restored system wide. Service restored to south side of river through temporary connections.

ERWIN UTILITIES AUTHORITY ----BWA lifted system wide. WCA remians in place system wide due to WWTP issues, expect to remain of several more weeks. Service restored system wide except S Industrial (no residential connections) which sustained major damage.

GREENEVILLE WATER & LIGHT COMM ----BWA and WCA lifted, service restored system wide, continued use of temporary raw water pumps at the water plant.

JONESBOROUGH WATER DEPT ----BWA lifted, service restored system wide to those customers with homes. Intake remains impacted but system is able to meet demand.

SOUTH ELIZABETHTON U.D. ----BWA lifted; Service restored. Temporary lines still in use.



Systems Reporting Issues

5

Active Boil Water Advisories

0

Active Water Conservation Orders

1

Customers Affected

12.2k

Survey 123 – Report Damage

TN Water and Wastewater Utility Damage Assessment Tool - Survey123

TDEC and TAUD collaborated to build an ArcGIS Survey123 to help water and wastewater utilities document damage to their assets as a result of Hurricane Helene. The tool can be used by utilities to collect geospatial location, descriptions, notes, and pictures of their damaged assets to assist in their record keeping process for recovery.

Learn more about the tool on this page

Emergency Operator Volunteers

Water/Wastewater Operator Volunteers

TDEC's Fleming Training Center conducted a survey and has compiled a list of water and wastewater operators who are willing to volunteer their time to assist with repair and operation of treatment and distribution systems in the affected region. An overwhelming number of volunteers have responded already and are available to assist when requested. Please use the link below if you are a TN certified water/wastewater operator who would like to be on the list of available volunteers.

TN Water/Wastewater Certified Operator Volunteer Sign-Up

Emergency Operator Support

1. Operator Volunteer | 2. SYSTEM THAT NEEDS ASSISTANCE

1. If you are a State certified Water & Wastewater Operators who is available to systems that have been affected by Hurricane Helene, please click the link above and register.

2. If you are a system that needs assistance, please click on the link above to e-mail your request.

TEMA Waterway Debris Removal Dashboard

Debris Type
No category selected

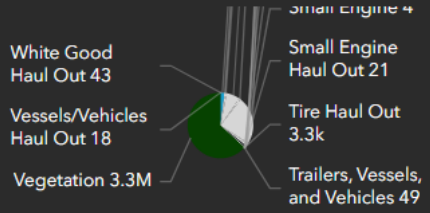
Load Date
No category selected

County
No County Selected

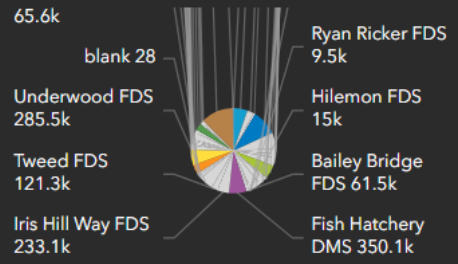
Cubic Yards
5.2M

Count of Tickets
116193

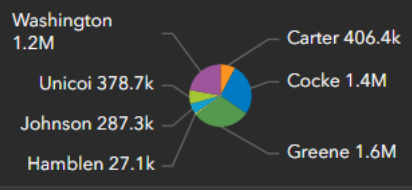
Cubic Yards Hauled by Debris Type

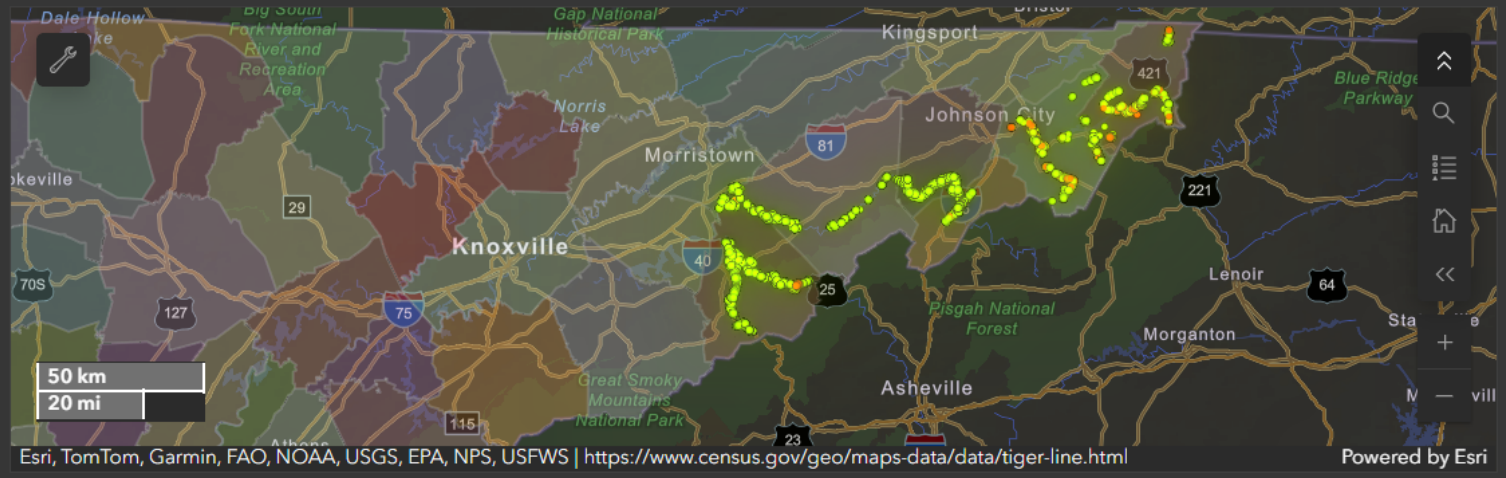


Cubic Yards Hauled by Disposal Site

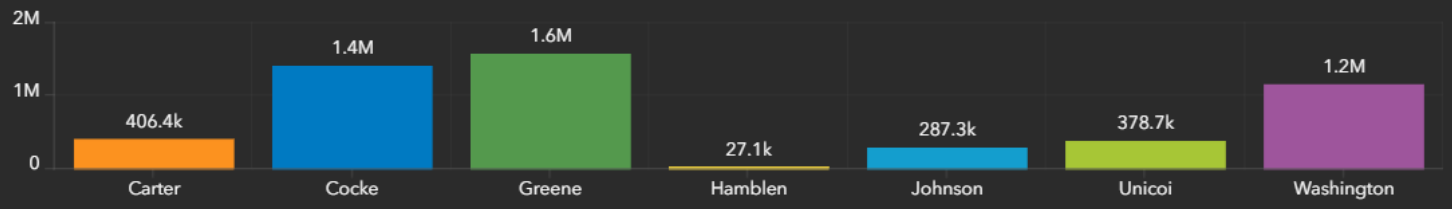


Cubic Yards Hauled by County

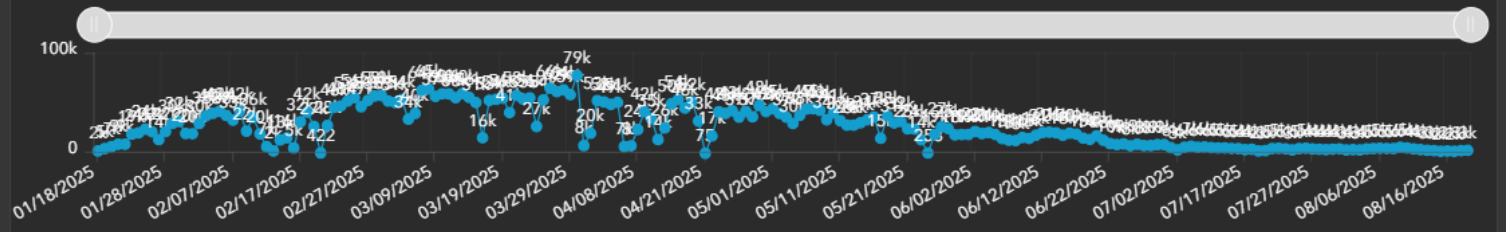




Cubic Yards Hauled by County



Cubic Yards Hauled by Date



Detail

Load Date: 02/17/2025
Cubic Yards Hauled: 38.25
Debris Type: Vegetation
Disposal Location: River Valley DMS
Road Name: TEMA Haul - Doe River - Segment 8
County: Carter

Load Date: 02/17/2025
Cubic Yards Hauled: 35.55
Debris Type: Vegetation
Disposal Location: River Valley DMS
Road Name: TEMA Haul - Doe River - Segment 8
County: Carter

Load Date: 02/17/2025
Cubic Yards Hauled: 42.50
Debris Type: Vegetation
Disposal Location: River Valley DMS
Road Name: TEMA Haul - Doe River - Segment 8
County: Carter

Load Date: 02/17/2025
Cubic Yards Hauled: 39.50
Debris Type: Vegetation
Disposal Location: River Valley DMS
Road Name: TEMA Haul - Doe River - Segment 8
County: Carter

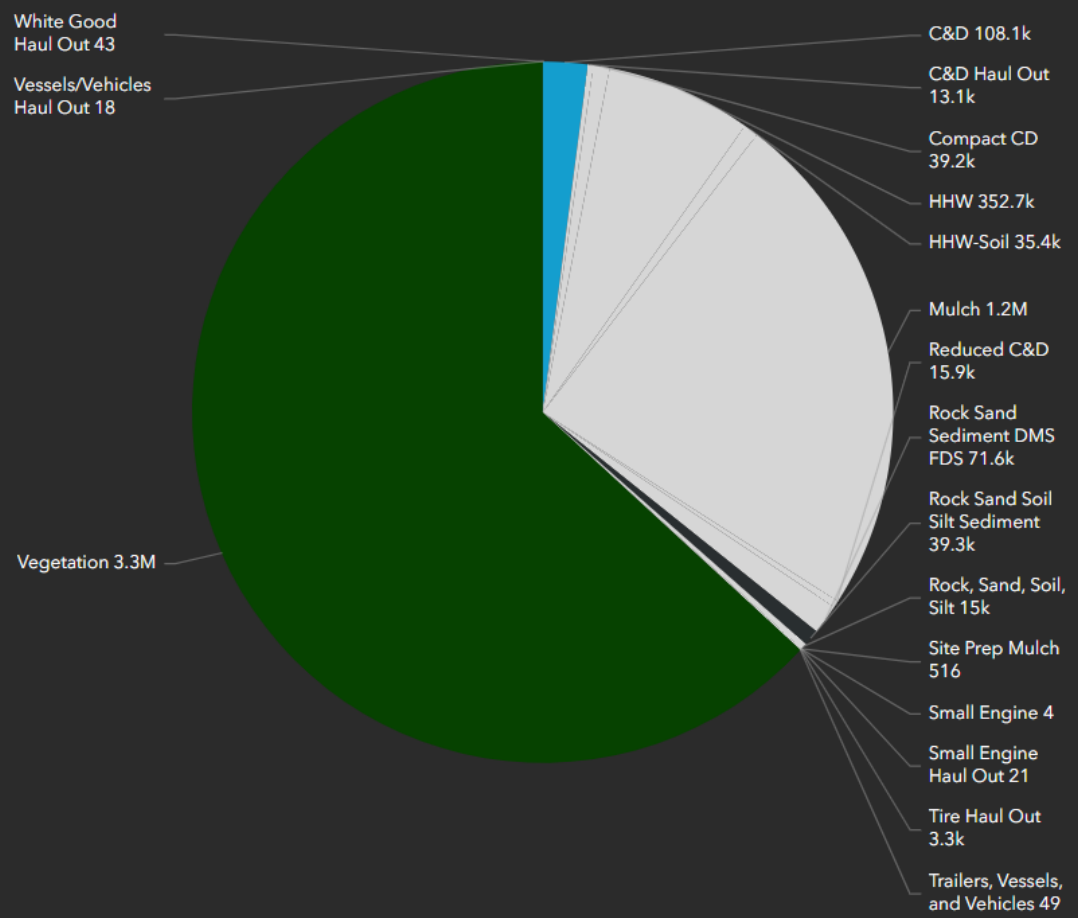
TEMA Waterway Debris Removal Dashboard

Debris Type
No category selected

Load Date
No category selected

County
No County Selected

Cubic Yards Hauled by Debris Type



Key Takeaways

Fast start: ESC program enabled a swift, coordinated response from day one.

Ready teams: TDEC staff were trained and pre-positioned before severe flooding.

Guidance documents: Enabled debris cleanup and approvals to happen safely and quickly.

Smart tools: Technology and mapping streamlined communication and decision-making.

Historic scale: Largest emergency response in Tennessee and TDEC history.

What’s next: As disasters rise and federal roles evolve, states need faster, better data analytics.

Contact

Larry Yocom

Monitoring Quality Assurance Manager

Emergency Services Coordinator

TDEC Division of Air Pollution Control

Work Cell: 615-483-4583

larry.yocom@tn.gov

tn.gov/environment

TN Department of Environment & Conservation