

Hurricanes and Floods in the 21st Century

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Presbytery of Western North Carolina

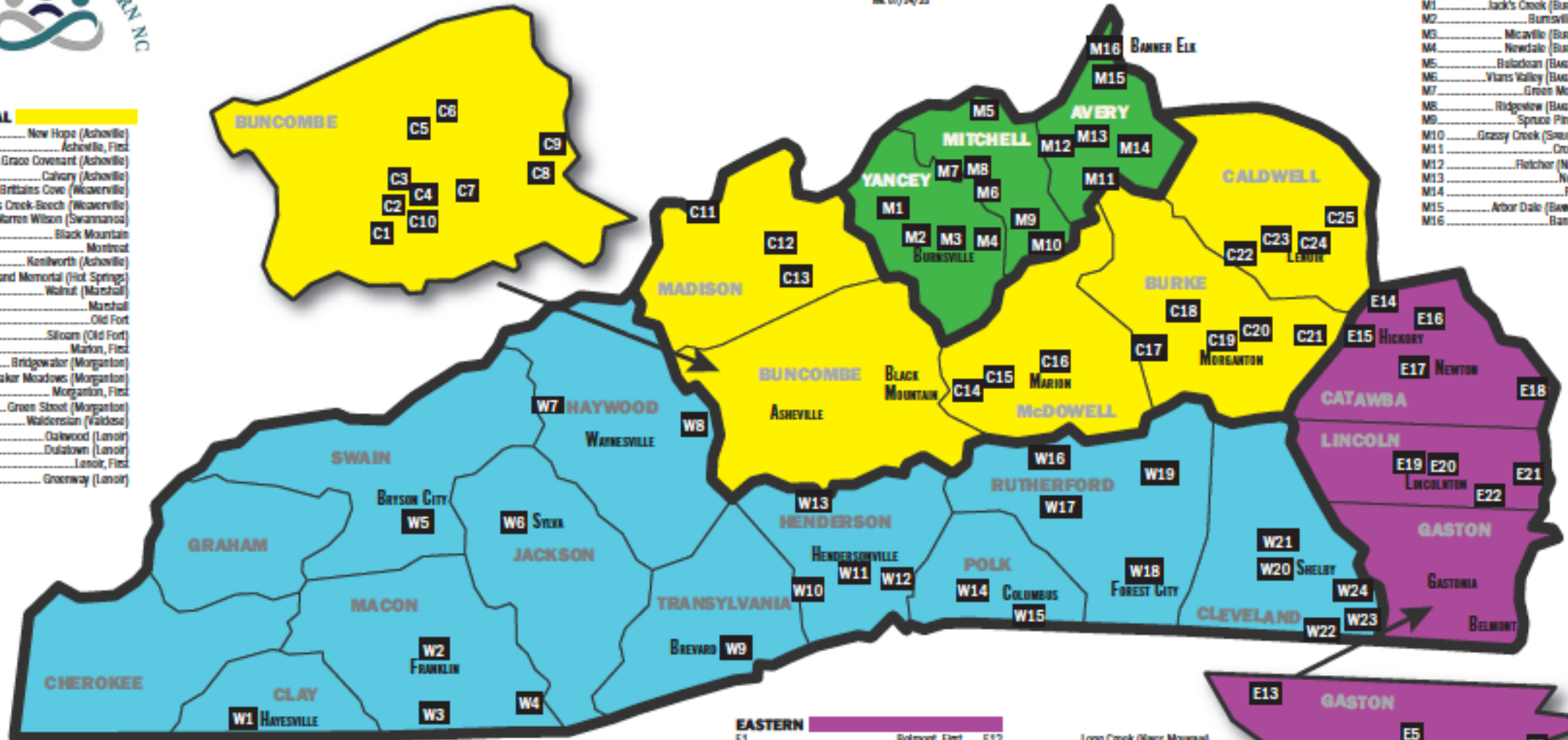
rev. 07/24/23

CENTRAL

- C1 New Hope (Asheville)
- C2 Asheville, First
- C3 Grace Covenant (Asheville)
- C4 Calvary (Asheville)
- C5 Britains Cove (Weaverville)
- C6 Reems Creek Beach (Weaverville)
- C7 Warren Wilson (Swannanoa)
- C8 Black Mountain
- C9 Montreat
- C10 Kenilworth (Asheville)
- C11 Dorland Memorial (Hot Springs)
- C12 Walnut (Marshall)
- C13 Marshall
- C14 Old Fort
- C15 Siloam (Old Fort)
- C16 Marion, First
- C17 Bridgewater (Morganton)
- C18 Quaker Meadows (Morganton)
- C19 Morganton, First
- C20 Green Street (Morganton)
- C21 Waldersian (Valdese)
- C22 Oakwood (Lenoir)
- C23 Dulaown (Lenoir)
- C24 Lenoir, First
- C25 Greenway (Lenoir)

MAYLAND

- M1 Jack's Creek (Banner Elk)
- M2 Burnsville, First
- M3 Micaville (Burnsville)
- M4 Newdale (Burnsville)
- M5 Babadon (Banner Elk)
- M6 Vians Valley (Banner Elk)
- M7 Green Mountain
- M8 Ridgeway (Banner Elk)
- M9 Spruce Pine, First
- M10 Grassy Creek (Spruce Pine)
- M11 Crossnore
- M12 Fletcher (Newland)
- M13 Newland
- M14 Pineola
- M15 Arbor Dale (Banner Elk)
- M16 Banner Elk



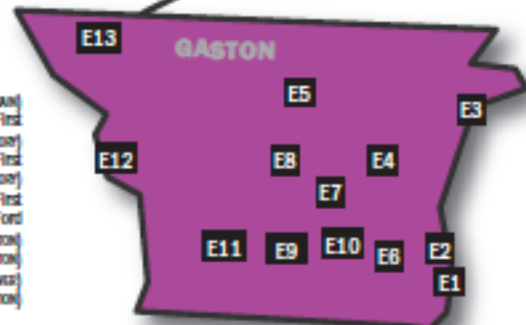
State Map Copyright © Free Vector Maps.com

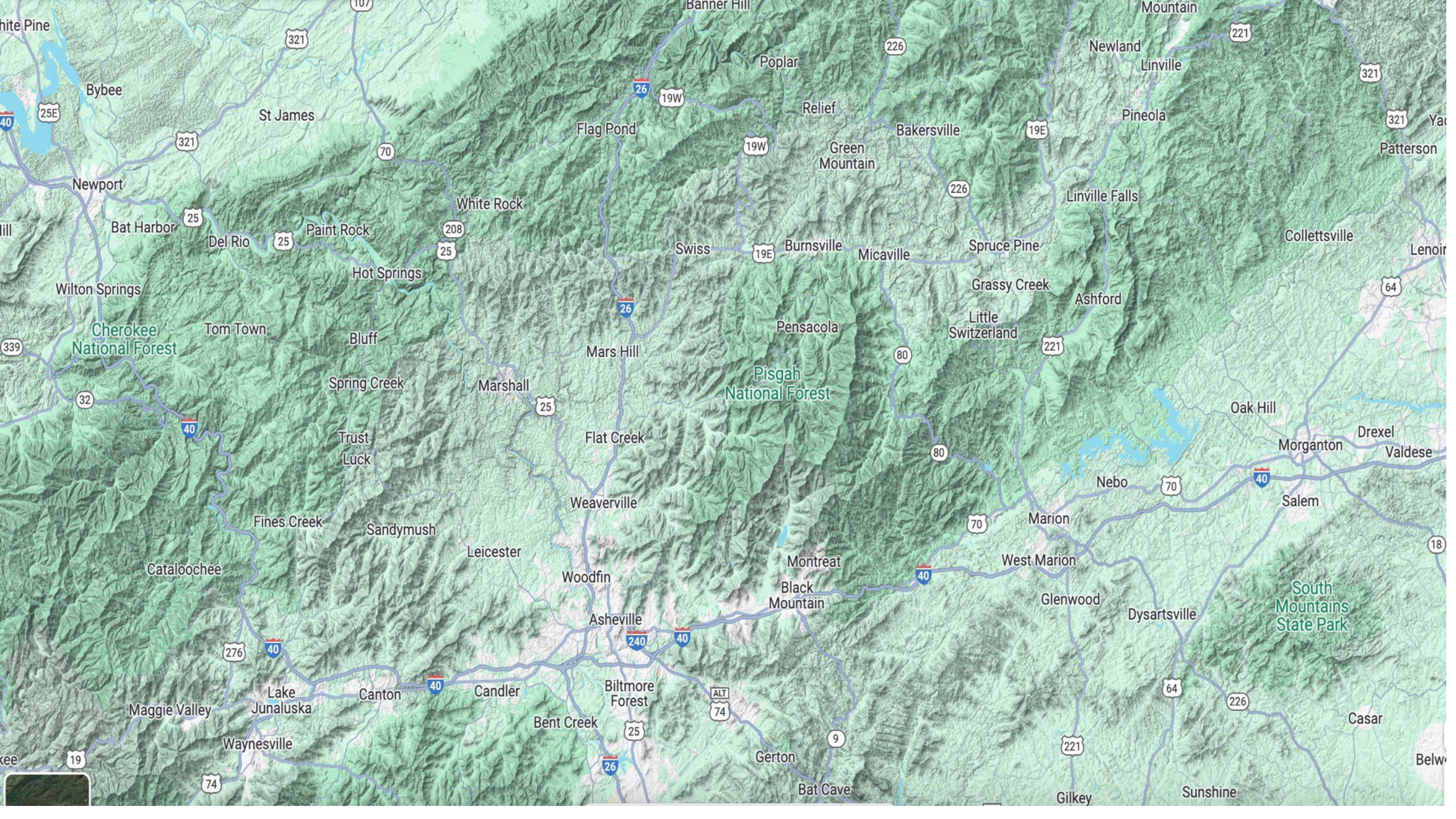
WESTERN

- | | | |
|-----------------------------|---------------------------------|-----------------------------------|
| W1 Haywood | W9 Brevard-Davidson River | W17 Rutherfordton |
| W2 Franklin, First | W10 Elawah | W18 Forest City, First |
| W3 Morrison (Fiswick) | W11 Trinity (Hickory) | W19 Britain (Roxboro) |
| W4 Highlands, First | W12 Hendersonville, First | W20 Shelby |
| W5 Bryson City | W13 Mills River | W21 Ryburn Memorial (Siler) |
| W6 Sylva, First | W14 Tryon | W22 Shiloh (Greene) |
| W7 Waynesville, First | W15 Columbus | W23 Dixon (Knox-Monroe) |
| W8 Canton | W16 Union Mills | W24 Good Hope (Knox-Monroe) |

EASTERN

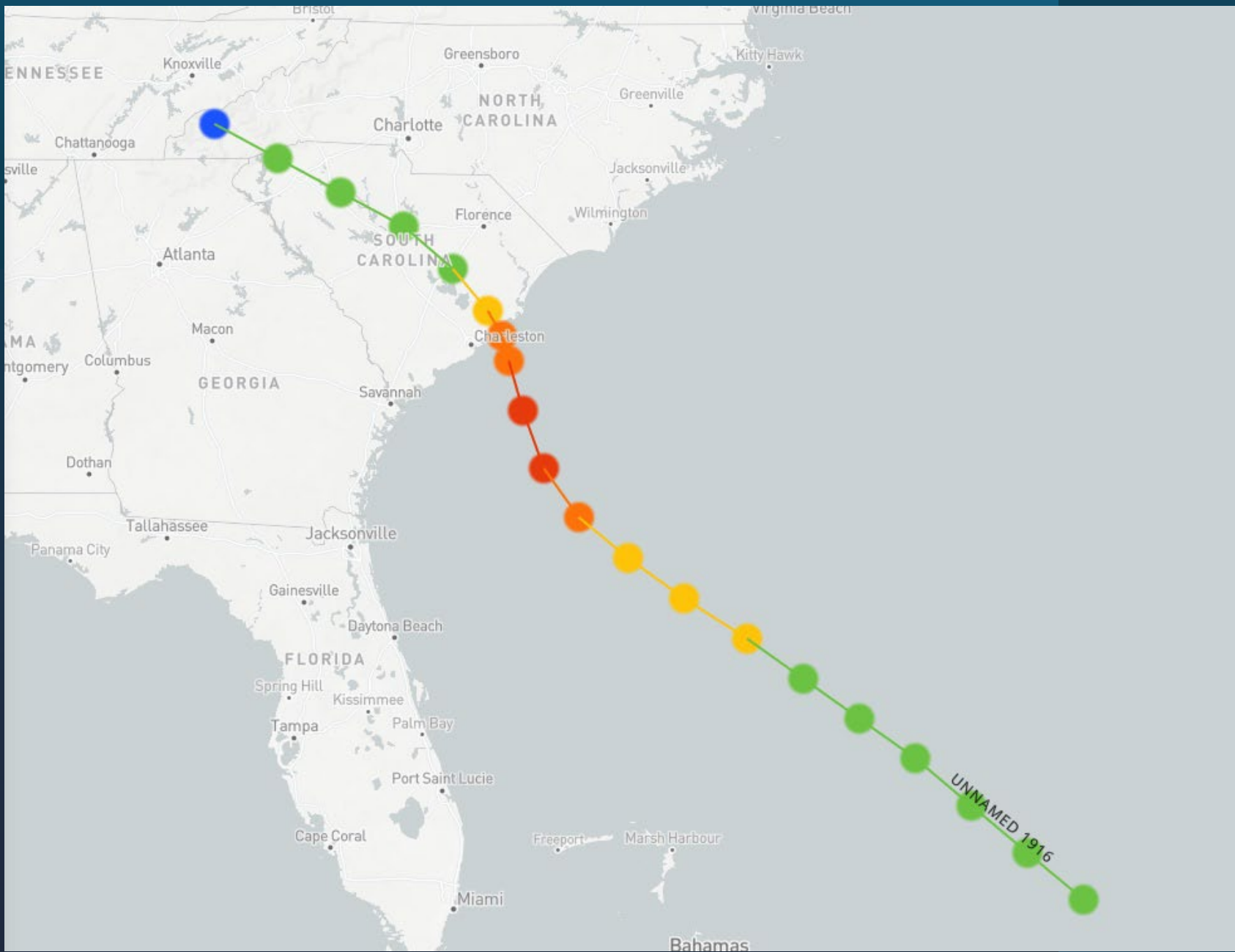
- | | |
|-------------------------------------|------------------------------------|
| E1 Belmont, First | E12 Long Creek (Knox-Monroe) |
| E2 Love's Chapel (Blount) | E13 Cherryville, First |
| E3 Mount Holly, First | E14 Northminster (Hico) |
| E4 Lowell | E15 Hickory, First |
| E5 Dallas, First | E16 Sweetwater (Hico) |
| E6 New Hope (Greene) | E17 Newton, First |
| E7 Gastonia, First | E18 Sherrill's Ford |
| E8 Third Street (Greene) | E19 Artisan NWC (Lincolnton) |
| E9 Robinson Memorial (Greene) | E20 Pine Street (Lincolnton) |
| E10 Southminster (Greene) | E21 Unity (Dowd) |
| E11 Olney (Greene) | E22 Ironton (York-Spencer) |



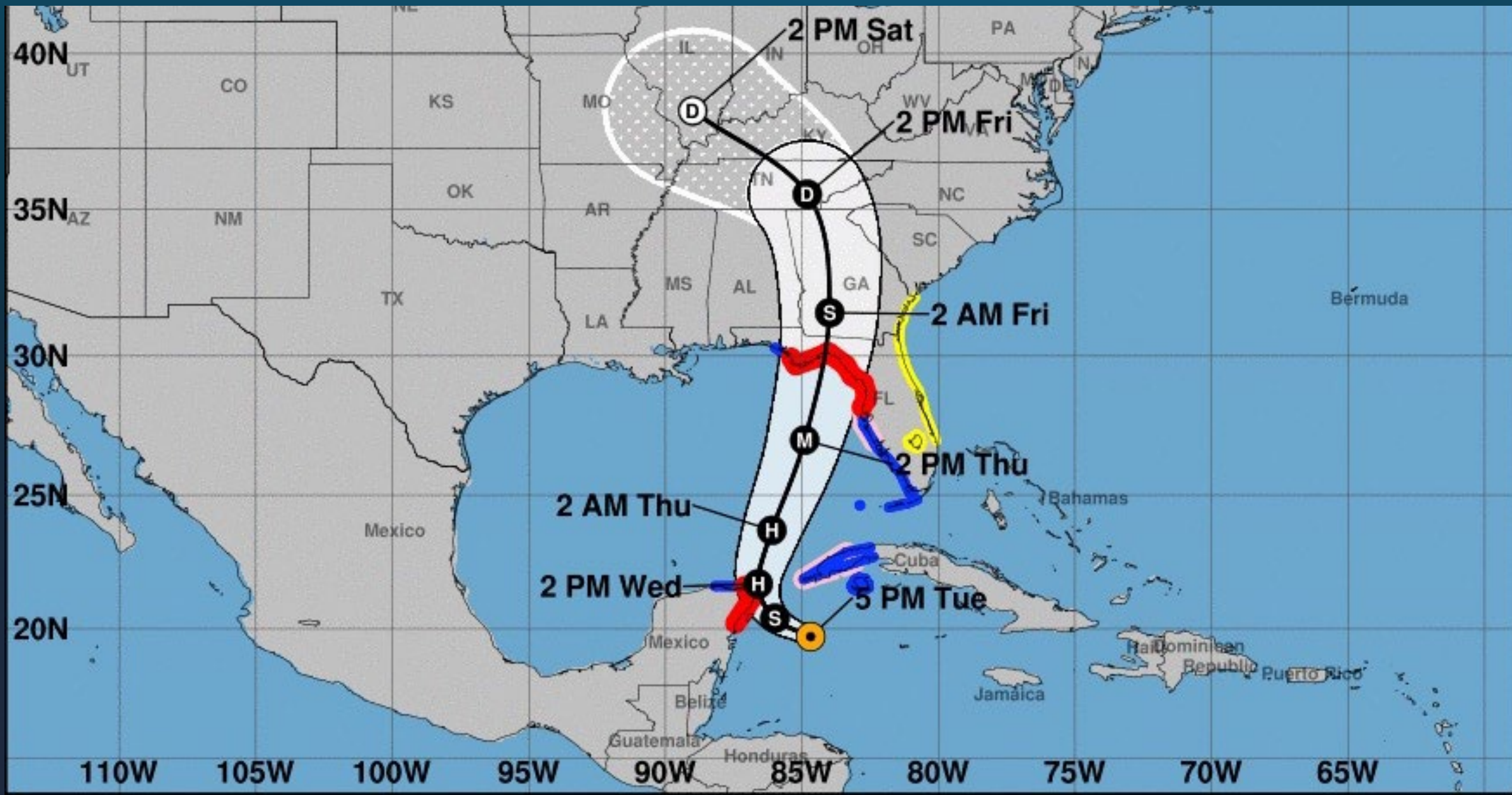




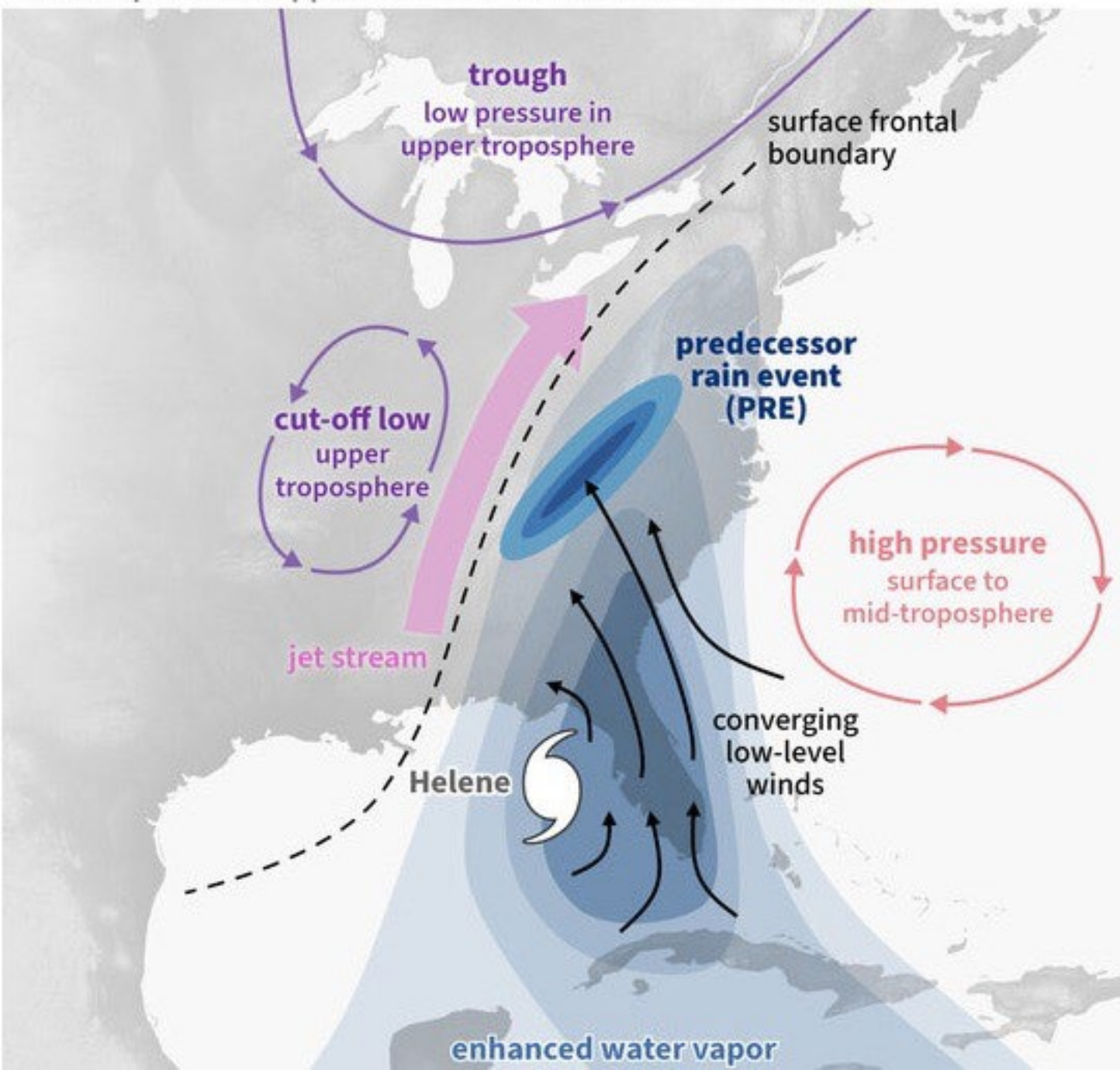
The Asheville Citizen, using a borrowed gasoline engine to run its presses, described the devastation caused by The Flood in its July 17, 1916, edition: “Exacting an unknown toll of death, with a property loss exceeding three million dollars, Asheville today is absolutely isolated from the outside world, is a city of darkness void of ordinary transportation facilities, and finds herself helpless in the grasp of the most terrible flood conditions ever known here.”





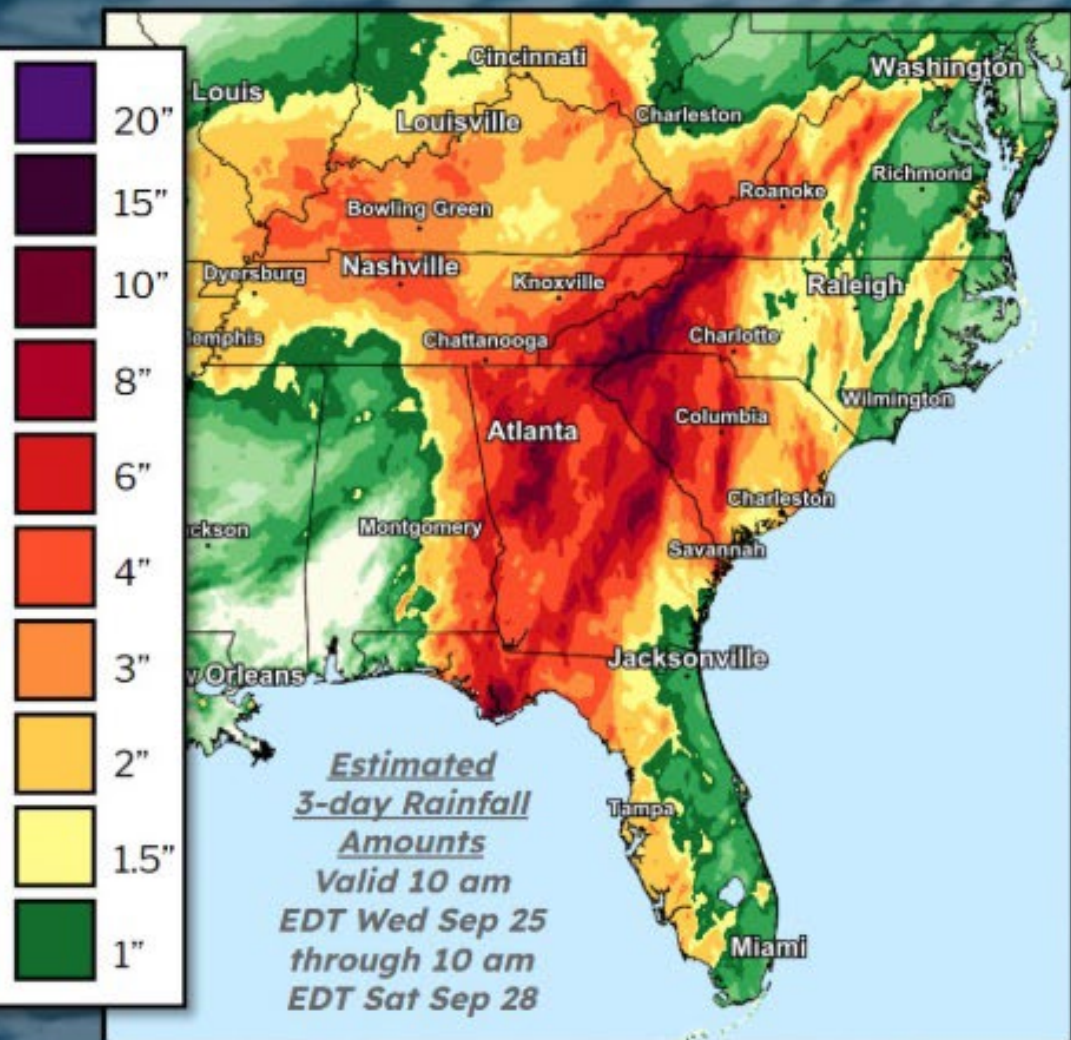


Weather patterns tapped Helene's moisture well before landfall



- 10-15 in of rain BEFORE Helene
- Mountains:
 - Enhanced rainfall
 - Funneled runoff

Selected Preliminary Storm Total Rainfall Associated with *HURRICANE HELENE (Valid Wed 9/25 - Sat 9/28)*



FLORIDA

Sumatra	15.91"
Wilma	11.94"
Apalachicola	9.20"

GEORGIA

Tallahassee	14.22"
Dillard 3.5 NE	14.06"
Atlanta International Arpt	11.13"

ALABAMA

Eufaula Municipal Arpt	9.42"
Pansy 1.6 NNE	8.50"
Auburn-Opelika Arpt	7.13"

KENTUCKY

Paducah	6.00"
Elizabethtown 6.5 N	5.98"
Fort Knox	4.58"

NORTH CAROLINA

Busick	30.78"
Mount Mitchell State Park	24.20"
Boone 3.8 ENE	20.12"

SOUTH CAROLINA

Table Rock	14.34"
Salem 1.8 NE	13.78"
Columbia 2.1 NNW	10.76"

TENNESSEE

Benton 2.3 ESE	9.92"
Sevierville 3.8 SE	7.22"
Bristol/Kingsport/Johnson City Arpt	5.79"

VIRGINIA

Independence 1.3 S	9.49"
Galax 5.3 SW	8.11"
Nora 4 SSE	7.55"

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NATIONAL WEATHER SERVICE
NATIONAL OCEANIC AND ATMOSPHERIC ADMINISTRATION
WEATHER PREDICTION CENTER



100+ deaths in WNC, 250 deaths across 7 states

120,000 homes destroyed or damaged in WNC

Asheville: 53 days without potable water.

**\$80b in total estimated damage
\$60b in WNC**

4% additional unemployment in the region, Mitchell County worst unemployment in the state – 10%



Public safety message

NCDOT: Travel is prohibited in Western North Carolina. Only emergency traffic is allowed past I-77. I-40 West is closed; local traffic only.

OK

- Roughly 10 churches in the presbytery damaged significantly
- Three are completely gutted and unusable: Marshall, Green Mountain, Micaville





Grace Covenant PC:

Over \$4.5m in rent assistance



Presbyterian Disaster Assistance/PWNC

- **THREE host sites for volunteer teams in the Presbytery**
 - Canton PC
 - First Pres Spruce Pine
 - New Hope PC in South Asheville

Working with:

- United Methodists Committee on Relief (UMCOR)
- Appalachian Service Project
- Habitat, Adventures in Mission, Rebuild Haywood and more.



A FEW STATS for 2025!

Number of volunteer teams: 40

Number of states represented: 18

Number of volunteers: 475

Number of homes worked on: 30+

In number of WNC counties: 9

Number of work partners: 8



Climate Change impact on Hurricane Helene?

- Rainfall totals over the 3-day period (predecessor event plus Helene) were made about 70 percent more likely by climate change.

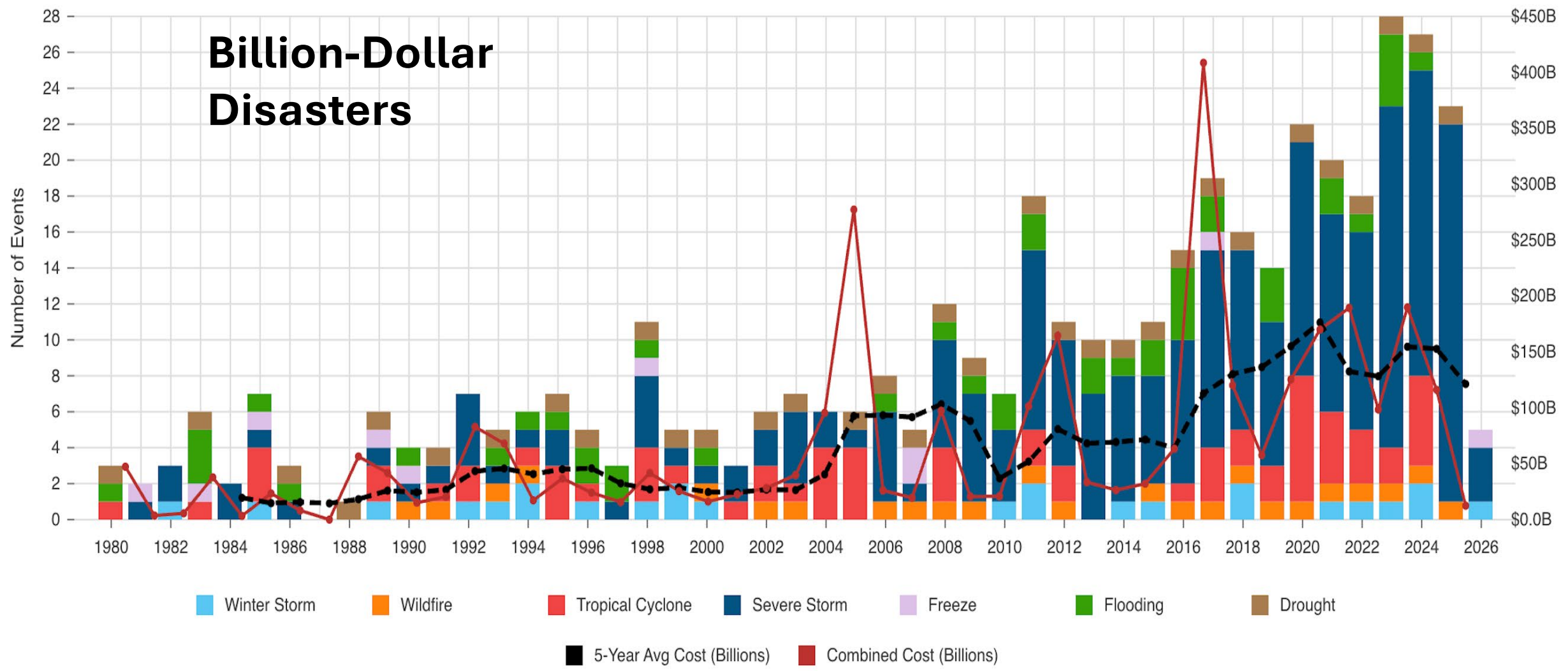
Observed change: Hurricanes

- No significant long term trend in the frequency globally
- Some increase in the Atlantic Basin since 1970 (cat 4&5)

However...

- Intensifying more rapidly
- Stalling or slowing in their track (17% reduction)
- Losing energy over land more slowly
- Increased rainfall
 - Harvey (2017) – 60 in
 - Florence (2018) – 35 in
 - Imelda (2019) – 44in

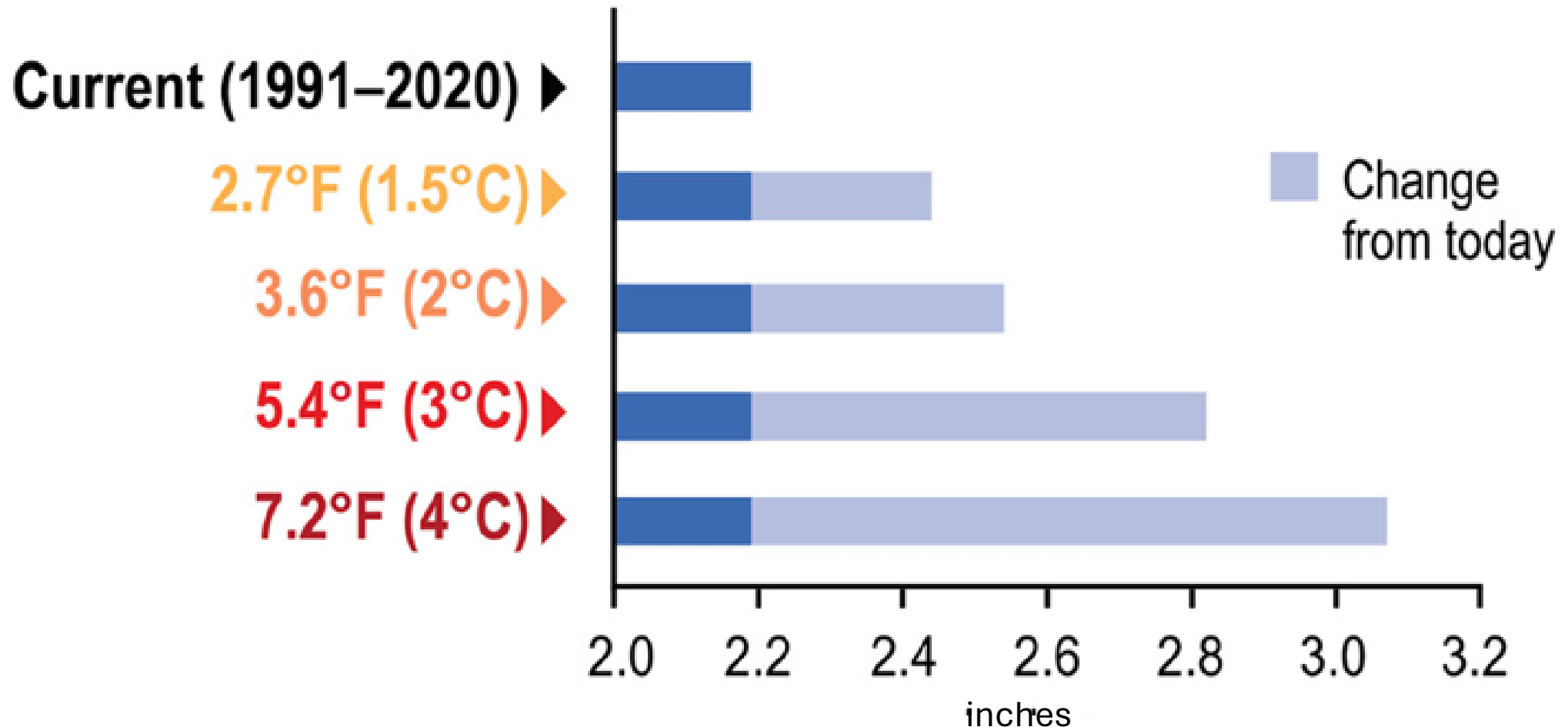
Billion-Dollar Disasters



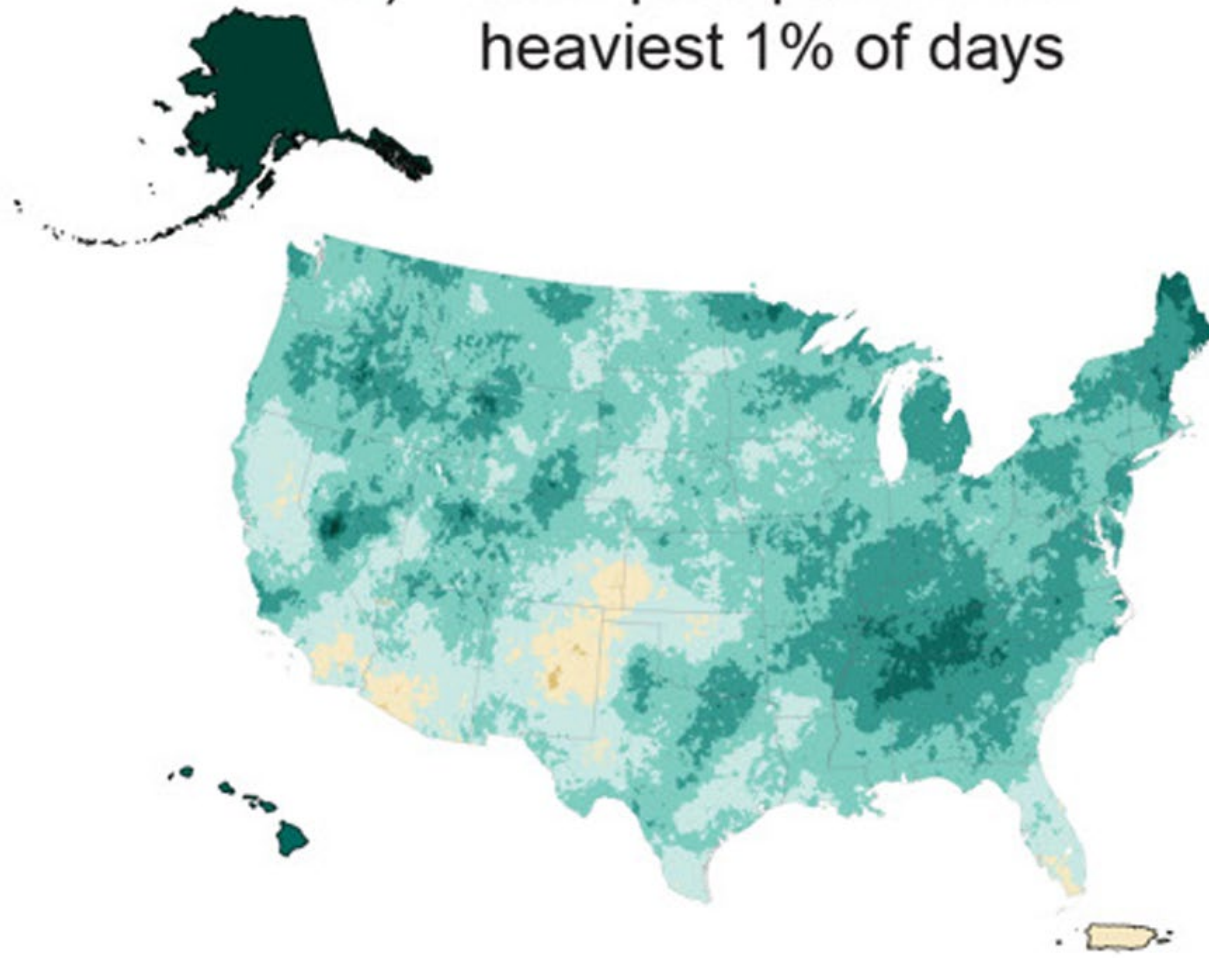
Future potential change

Extreme precipitation events

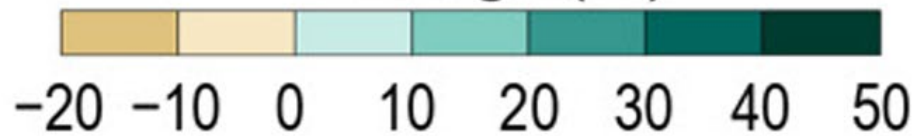
More rain falls during the most extreme precipitation events.



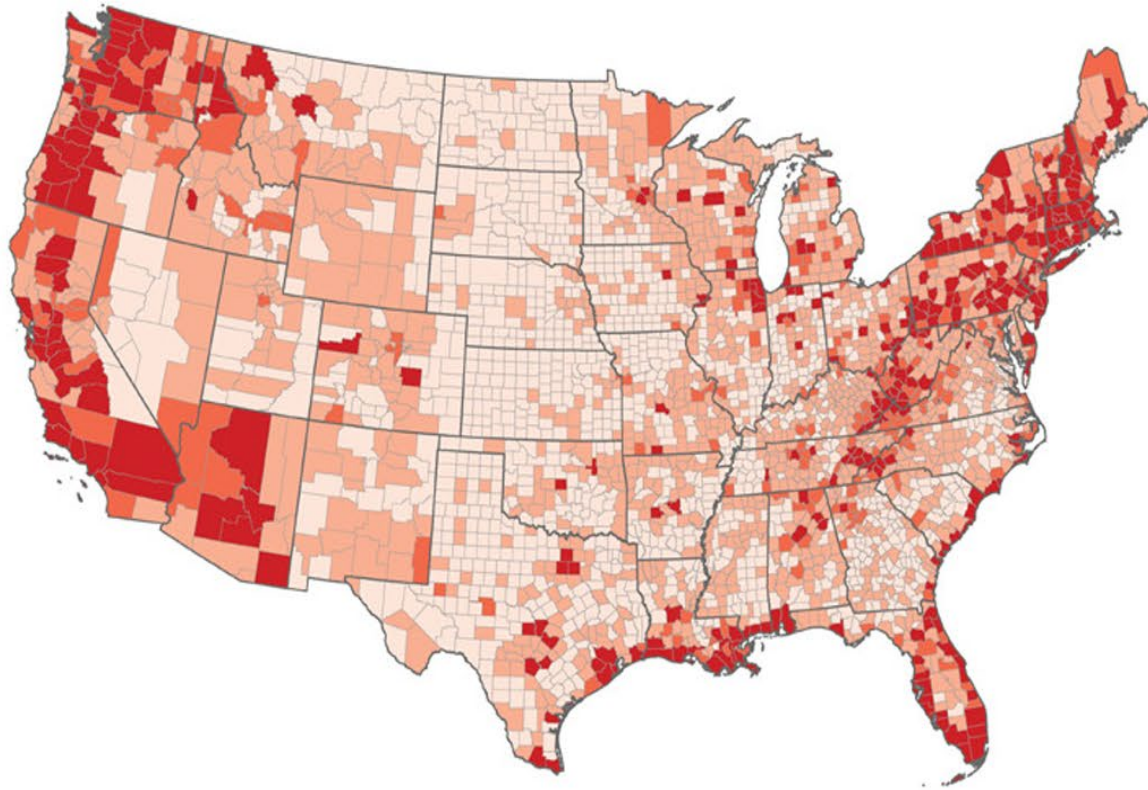
a) Total precipitation on heaviest 1% of days



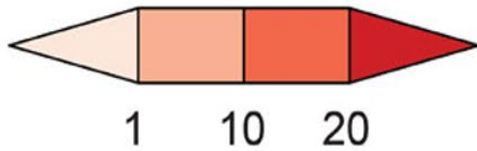
Change (%)



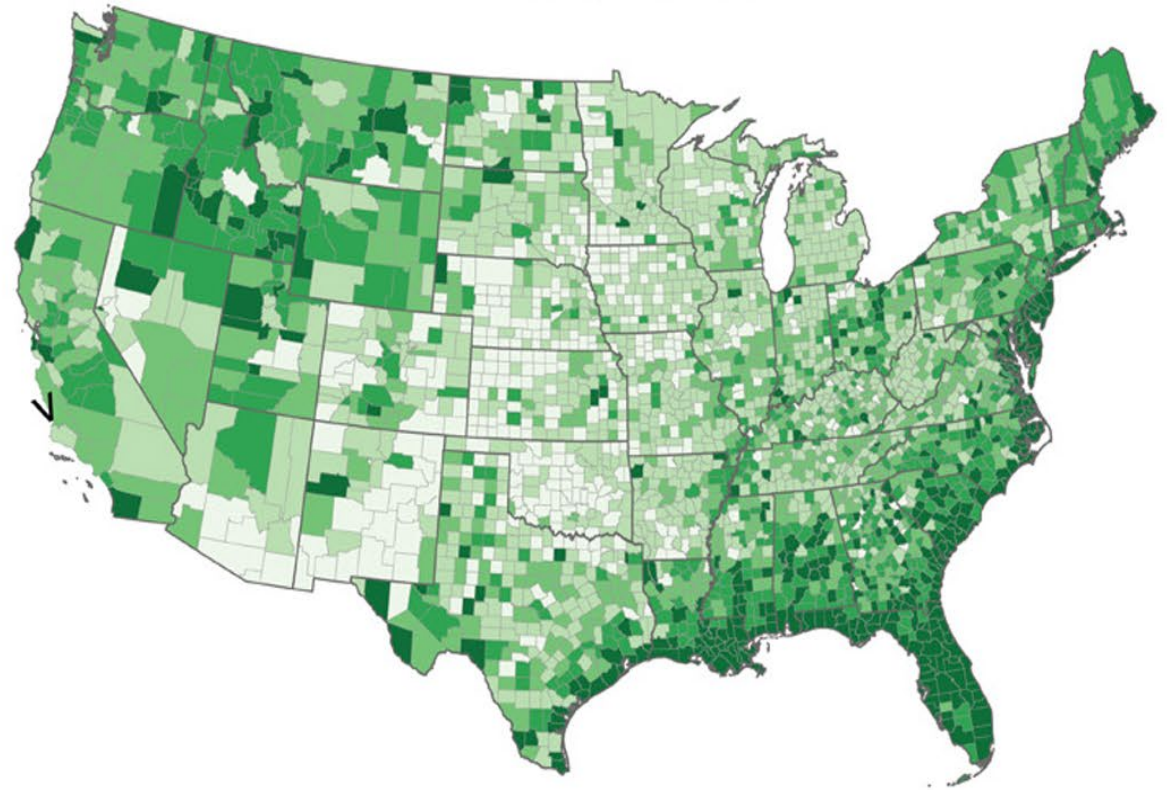
c) Annual average loss from all types of flooding, 2020



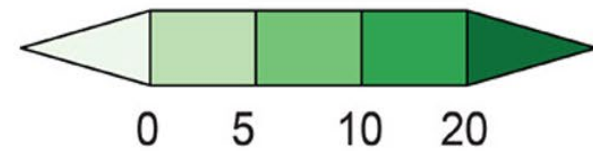
Millions of 2020 Dollars



d) Projected percent change in average annual loss, 2020 to 2050



Percent Change



Projections for Hurricanes:

At 2°C:

- Increased ocean water temperatures are *very likely* to lead to an increase in tropical cyclone strength globally with winds 5% faster (3% for the Atlantic Basin).
- Increase in the number of category 3 & 4 hurricanes (likely)
- Overall decline in the number of hurricanes (likely)
- Increased precipitation (very likely)

Climate Change impact on Hurricane Helene?

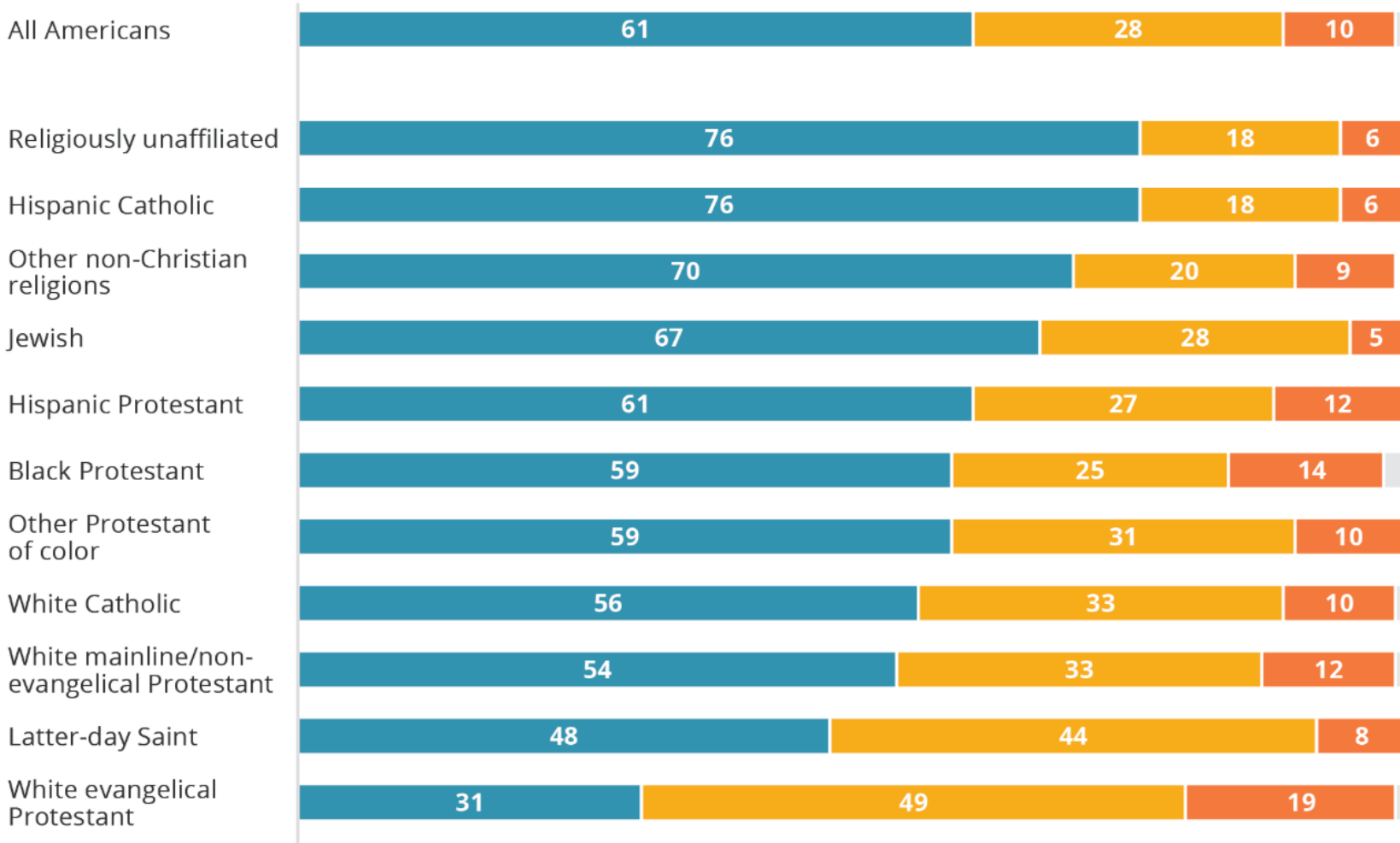
- If we reach 2 degrees Celsius above pre-industrial levels (globally), devastating rainfall events like those experienced with Helene will become another 15 to 25 percent more likely.

A Few Words About the Faith-Based Role in Disasters and Climate Change...

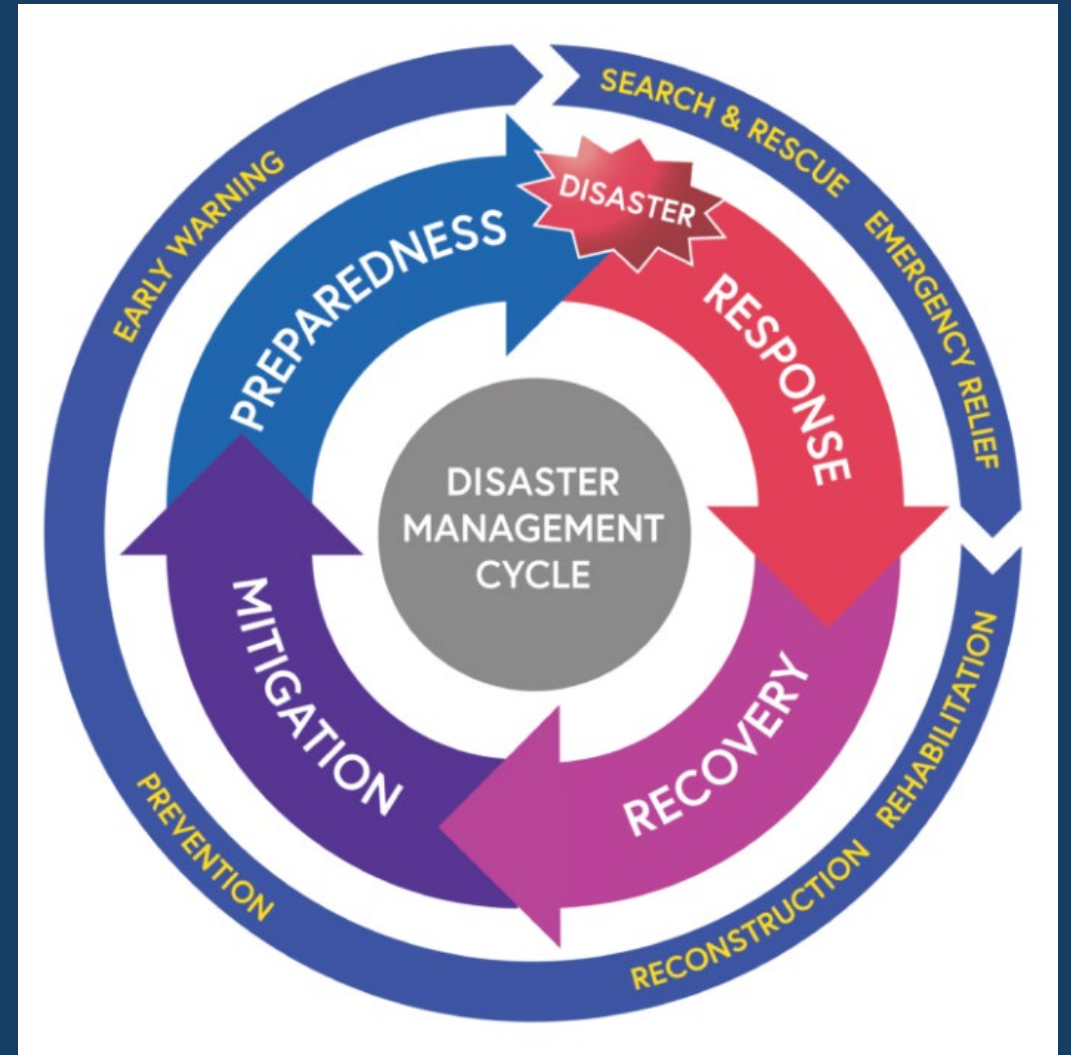
FIGURE 1. Views on Climate Change, by Religious Affiliation and Importance of Religion

Percent who say:

- Climate change is caused mostly by human activity such as burning fossil fuels
- Climate change is mostly caused by natural patterns in the earth's environment
- There is no solid evidence that climate change is happening
- Don't know/Skipped



- Faith-based organizations are **CRITICAL** in the relief, response, and recovery phases of disaster management
- BUT, our criteria for who to help and how differs dramatically between denominations. **Suggest ecumenical or interfaith consensus principles**



Also....we are rebuilding homes in the flood plain.

- **What is our role in bringing science-based and climate-adaptive approaches to the recovery efforts?**
- **What is our role in disaster mitigation and preparedness?**

I would argue:

- **Our obligation is to reduce human suffering not just in the disaster response and recovery, but also for FUTURE events**
- **Our churches can again become community hubs and trusted locations in disaster AND in peaceful times, if our mission includes building resilient, climate-adaptive communities**

FEMA identifies 32 core competencies for communities dealing with disaster.

- At most, we could say we are focused on two:
 - Mass Care (feeding, sheltering, housing evacuees etc)
 - Housing (rebuilding after a disaster)
- Resilience building, public information, community planning, long-term vulnerability reduction, hazard assessment – we can be in all these and more.


Why should we play a role?

Holistic, human-centered care.

- Whole person, whole community.
- Blends emotional and spiritual care along with basic needs
- **Belonging**

...regardless of faith, political affiliation, immigration status, race, economic situation etc.





"My people
will dwell in
a peaceful
habitation, in
secure dwellings, &
in quiet resting
places.
Isaiah
32:18

THANK YOU!

Anne Waple

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