GOVERNOR'S HURRICANE CONFERENCE®

Challenges with Peripheral and/or Distant Hurricanes

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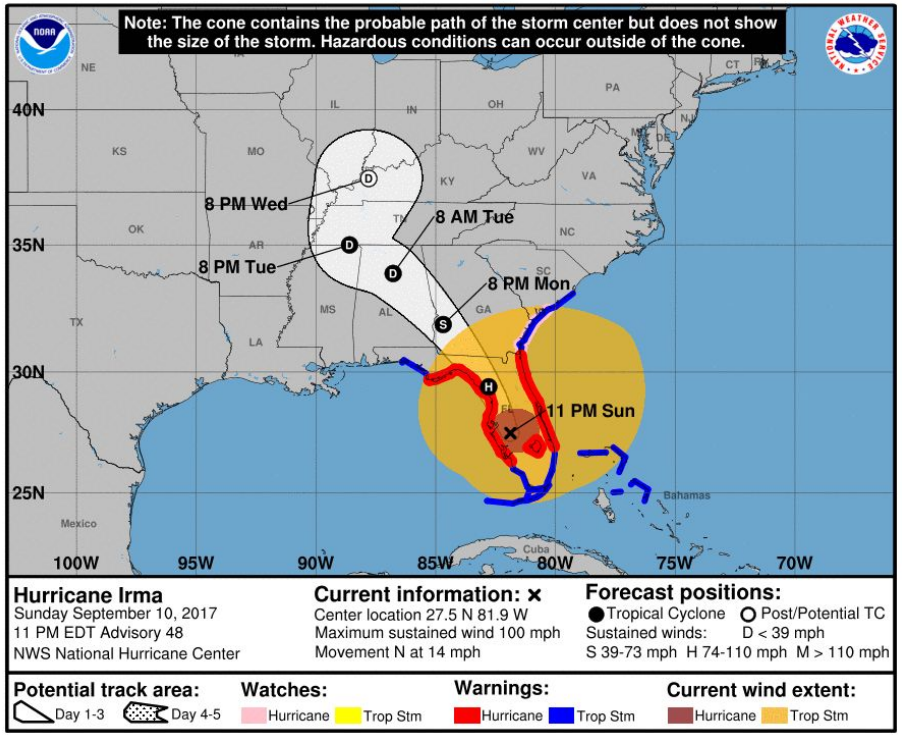
Training Session 20, The School of Hard Knocks - Tough Lessons from Past Hurricanes

Distant Hurricanes

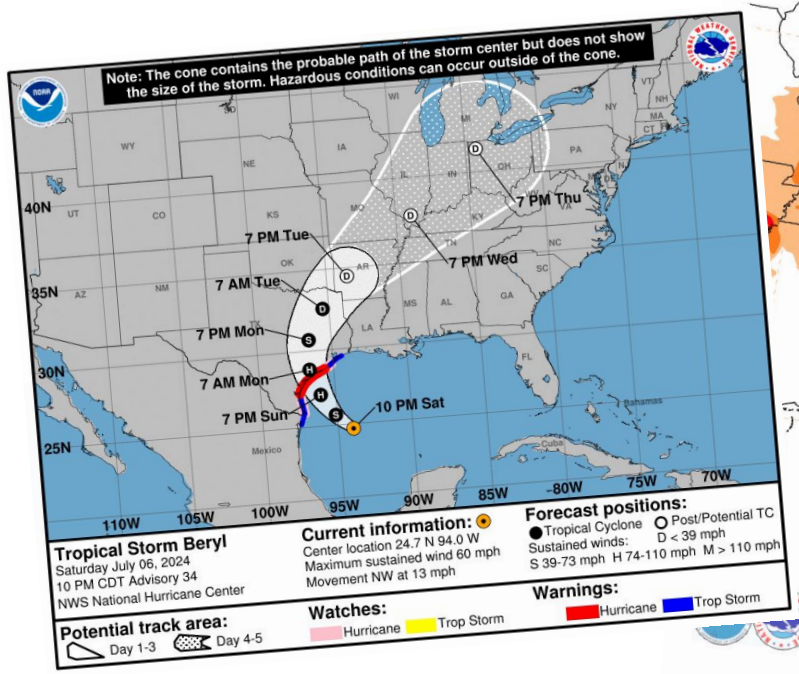
Hazards extend hundreds of miles from the center

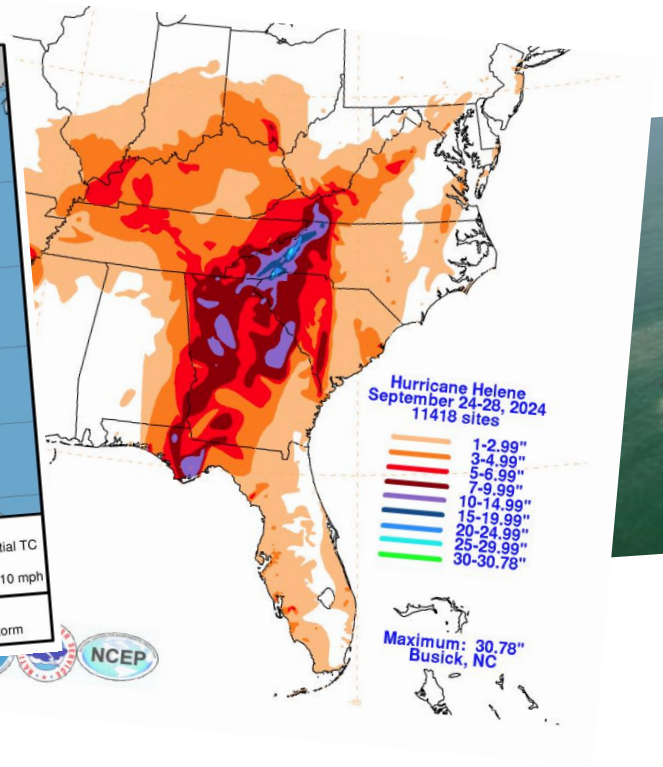
Not In The Cone ≠ No Impacts



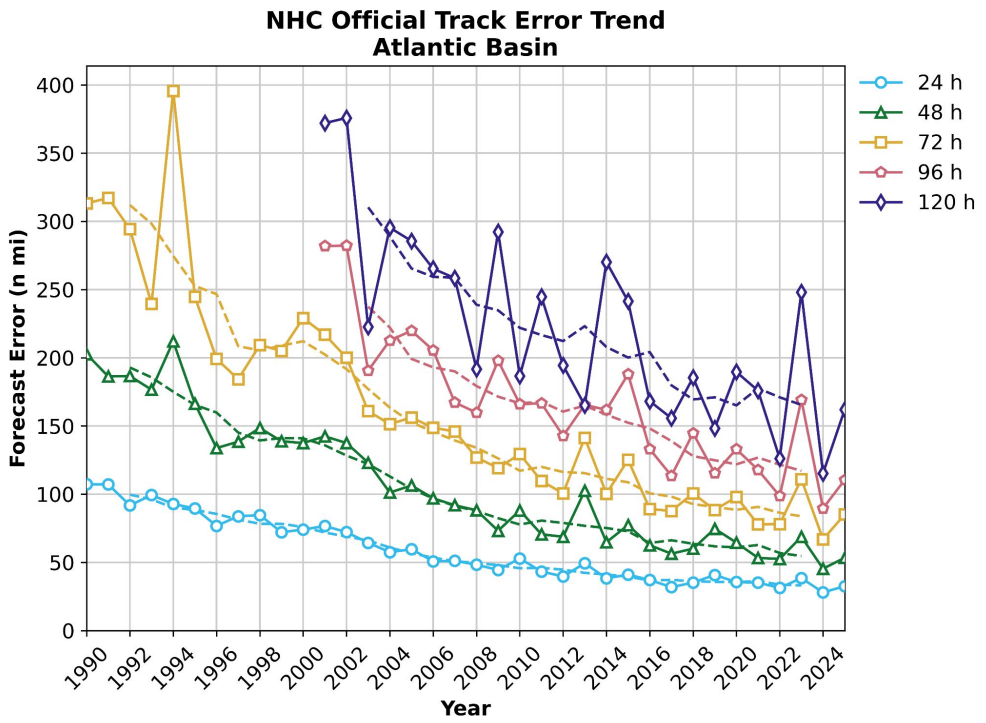
Distant Storms? Why do they matter to me?

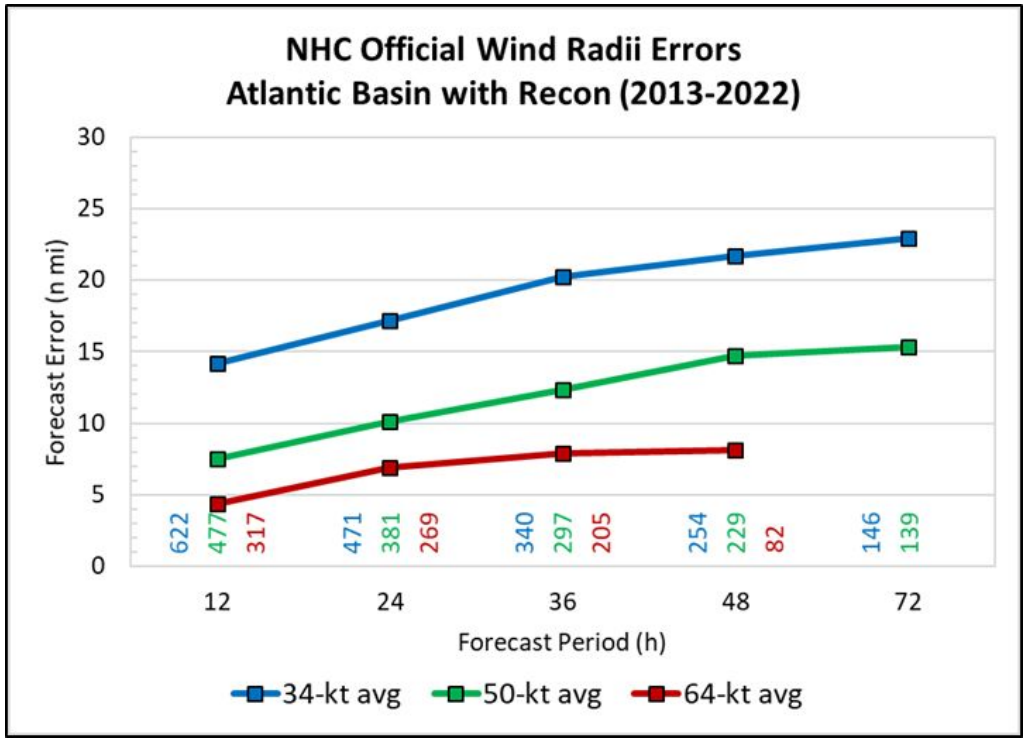
Even when a hurricane is hundreds or thousands of miles away, it can still affect you in real ways—sometimes more than people expect.





Track and Size Uncertainty

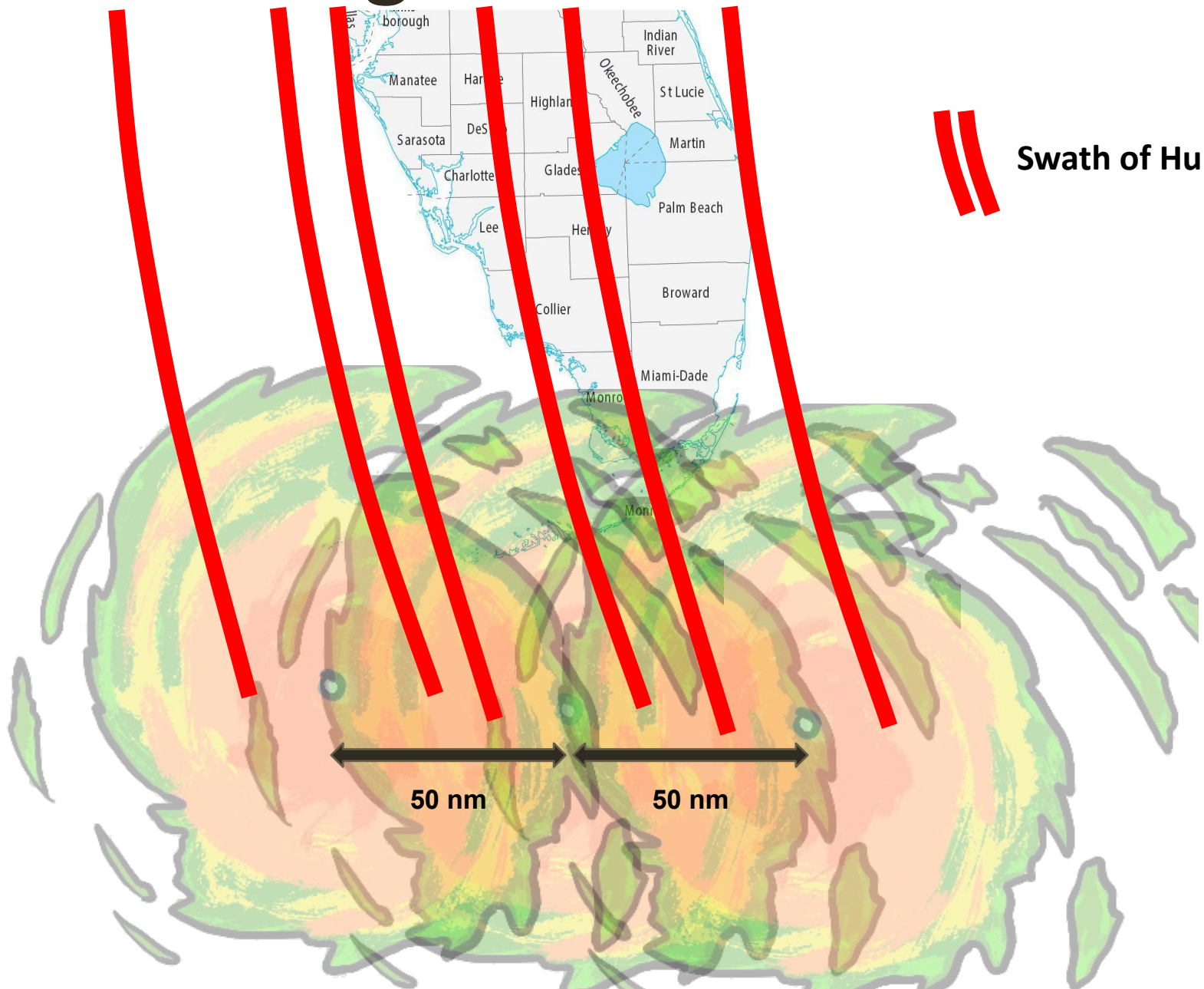




48-hour NHC errors (Watch Lead Time): **Track: 45-50 nm** **TS Radii: 20-25 nm** **HU Radii: 5-10 nm**

36-hour NHC errors (Warning Lead Time): **Track: 35-40 nm** **TS Radii: ~20 nm** **HU Radii: 5-10 nm**

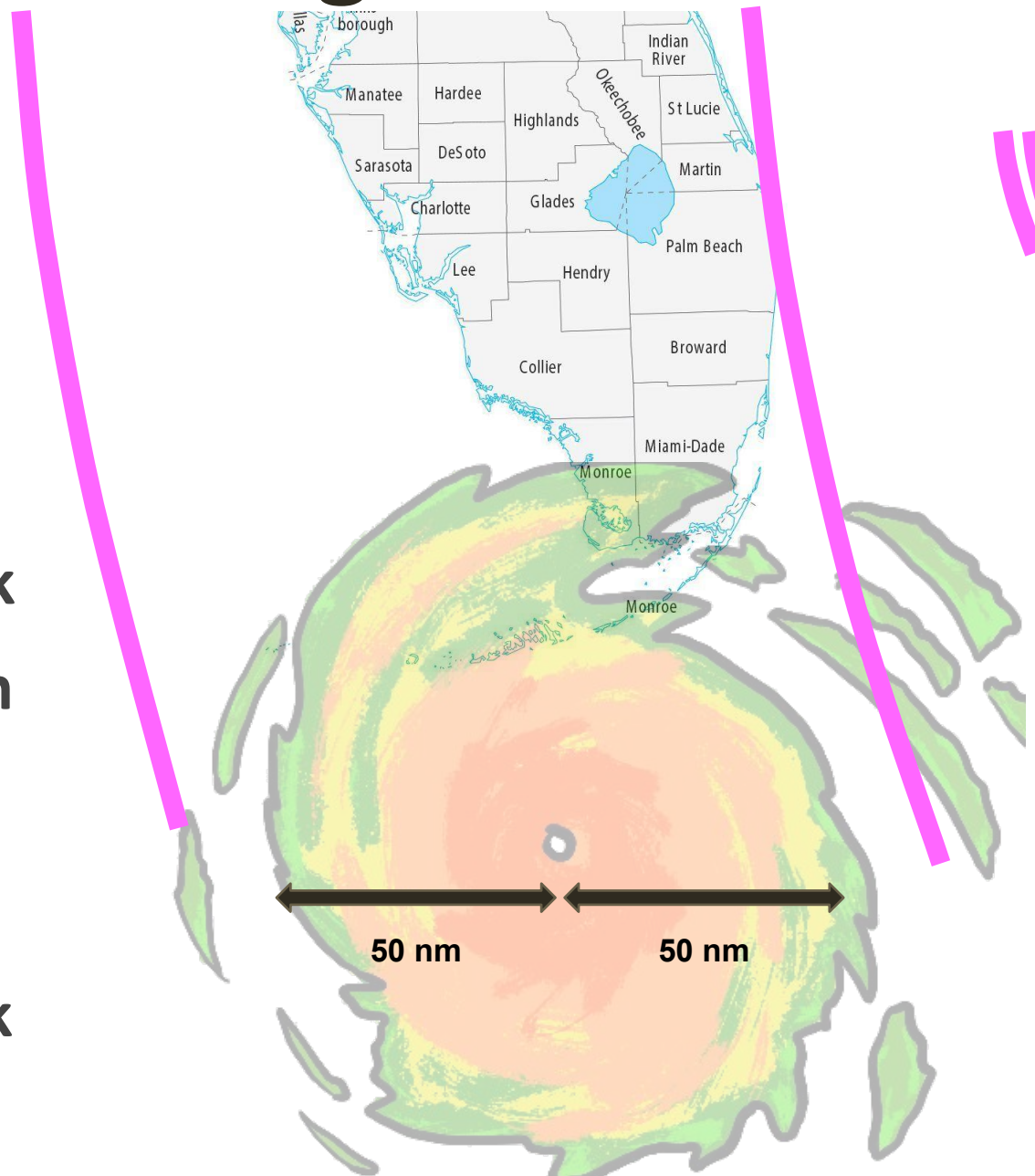
Watches and Warning: Parallel Tracks



Watches and Warning: Parallel Tracks

A track parallel to shore could:

- Put ***more*** area under a watch or warning than a perpendicular track
- Potentially result in no one in the watch/warning area getting the hazard (but the risk is still there!)

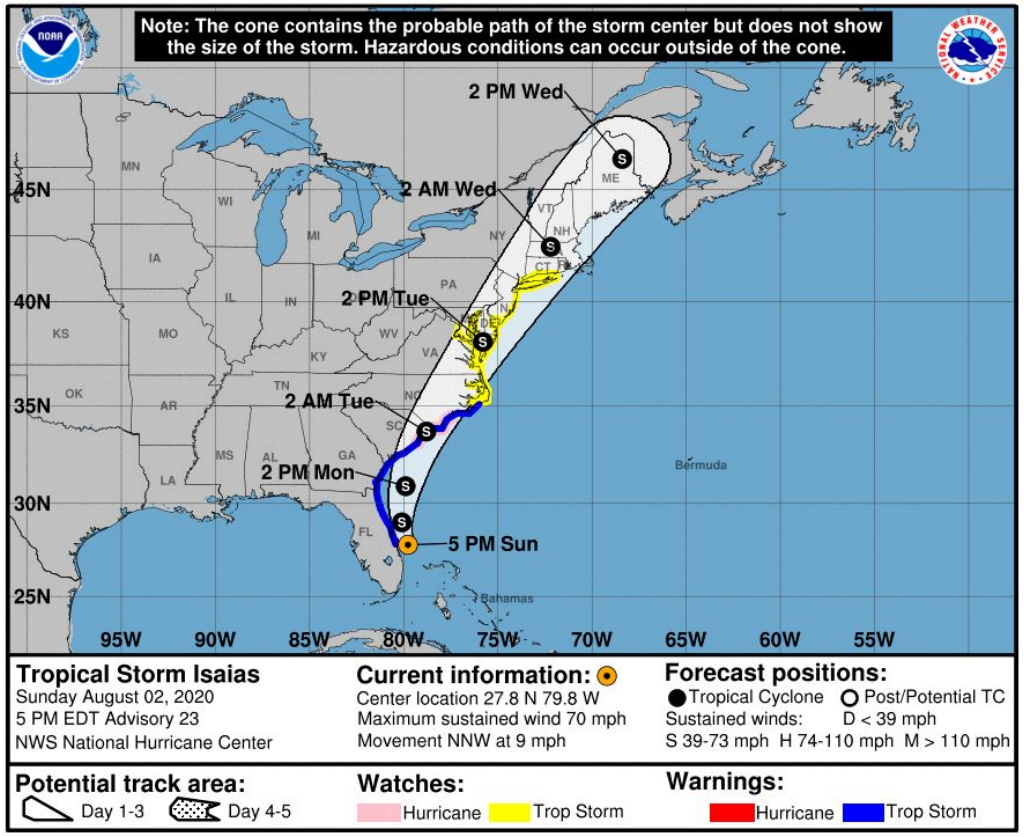


Potential Swath of Hurricane-Force Winds Where a Hurricane Warning Should be Issued

Utilization of Hurricane Watches

Can be used to message the threat of near-hurricane winds even when 64-kt winds are not explicitly forecast

Isaias - Hurricane Watch was used to indicate expected higher-end wind impacts in the Carolinas even when the system was forecast to remain a high-end tropical storm



Hazards

Inland Hazards

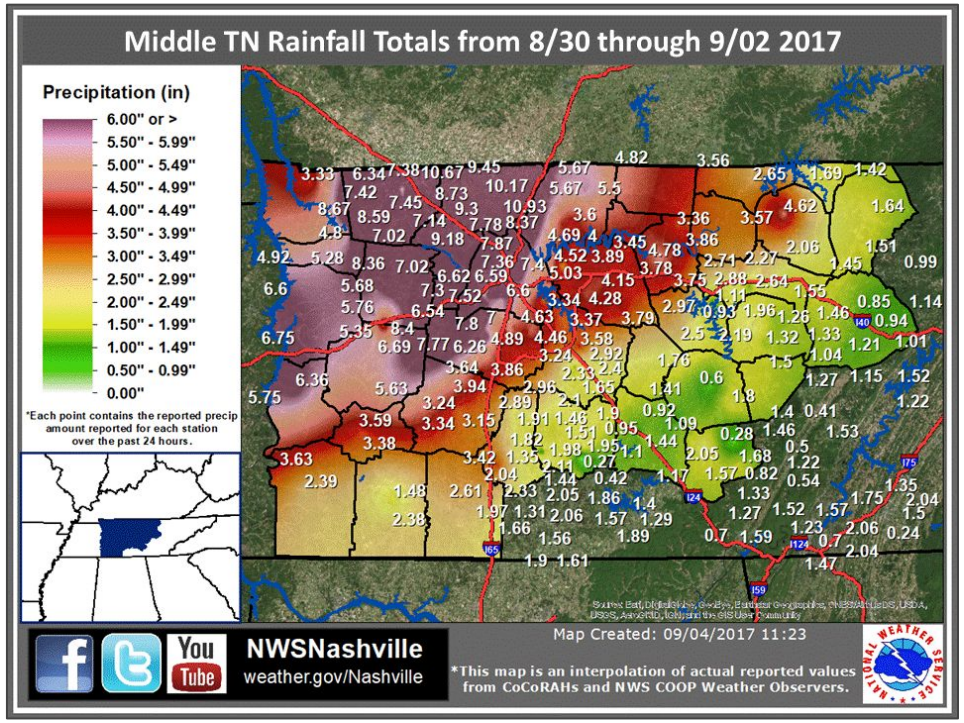
- Heavy Rainfall/Flooding
- Tornadoes

Coastal Hazards

- Rip Currents
- High Surf
- Marine

Rainfall & Flooding

- Deep tropical moisture spreads far inland
- Rainfall can be enhanced by fronts or terrain
- Slow moving or large storms = prolonged impacts
- Widespread impacts can persist days after landfall

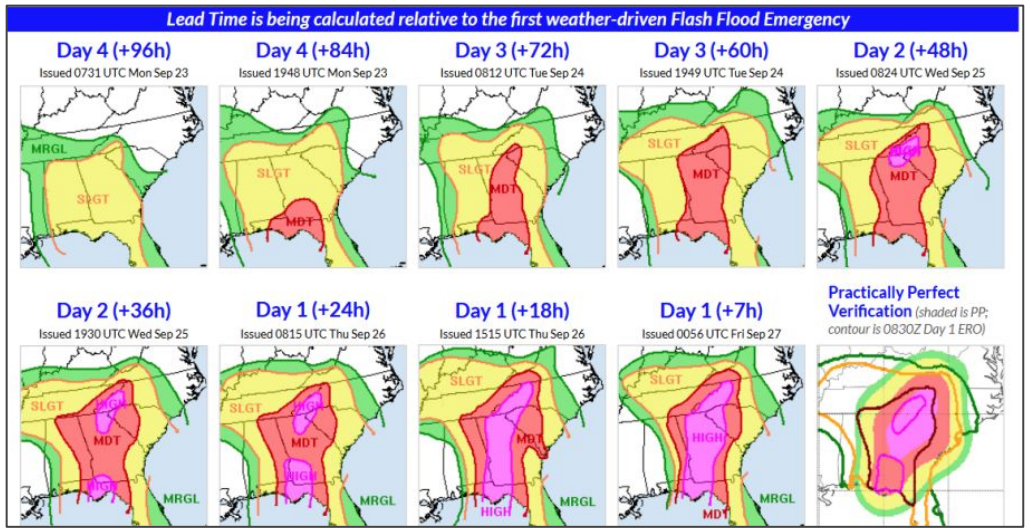


Harvey made landfall August 26th in Houston

Distance from landfall does NOT reduce flood risk

Rainfall Messaging Challenge

- Public anchors on the track/cone, not the rainfall footprint
- “We’re not in the cone” = a false sense of safety
- Rainfall forecasts are probabilistic and evolving, not a single line
- Heaviest rain often occurs well away from landfall point
- Impacts continue after the storm weakens or moves inland



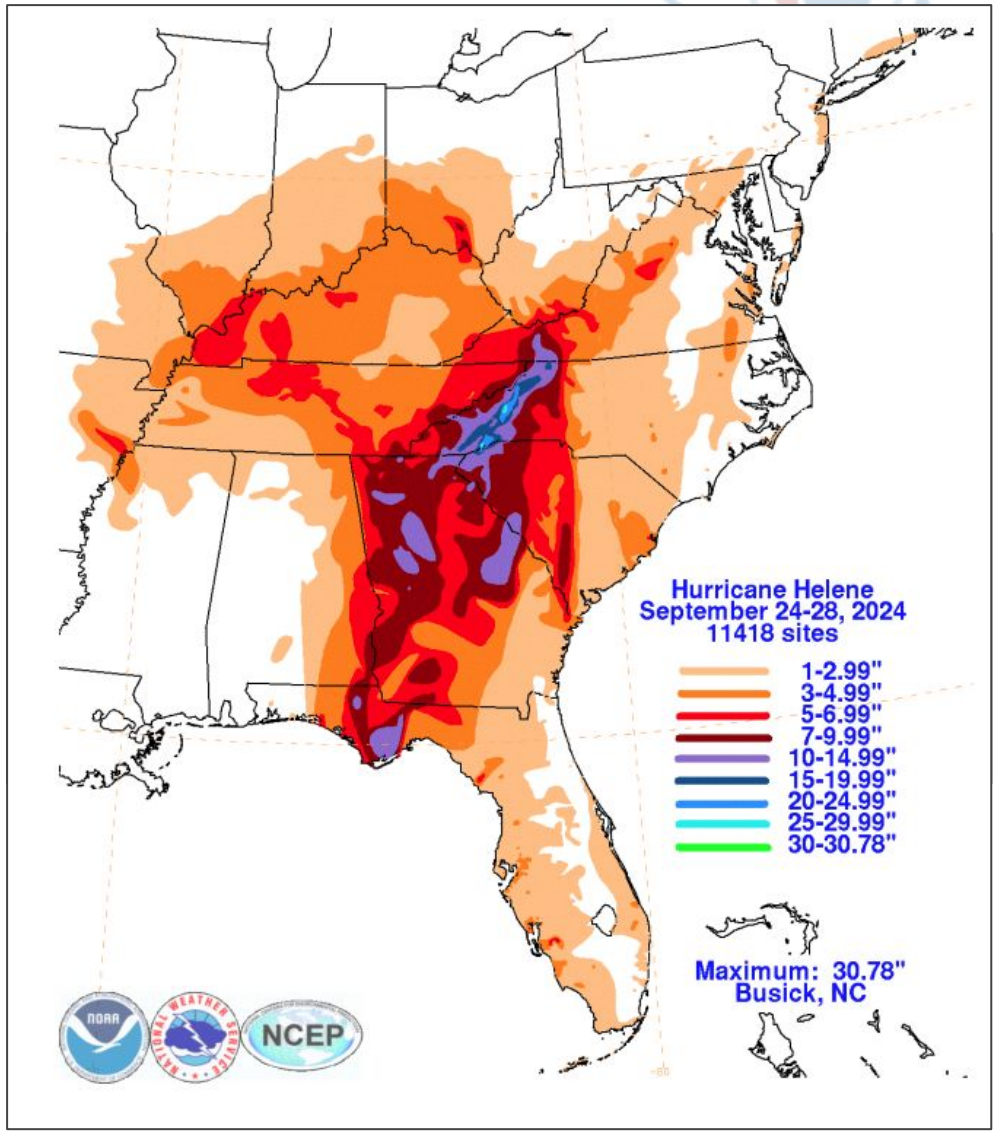
Rainfall Examples

Harvey (2017)
Landfall In TX Heavy flooding throughout the south

Florence (2018)
Slow Moving long-duration inland flooding

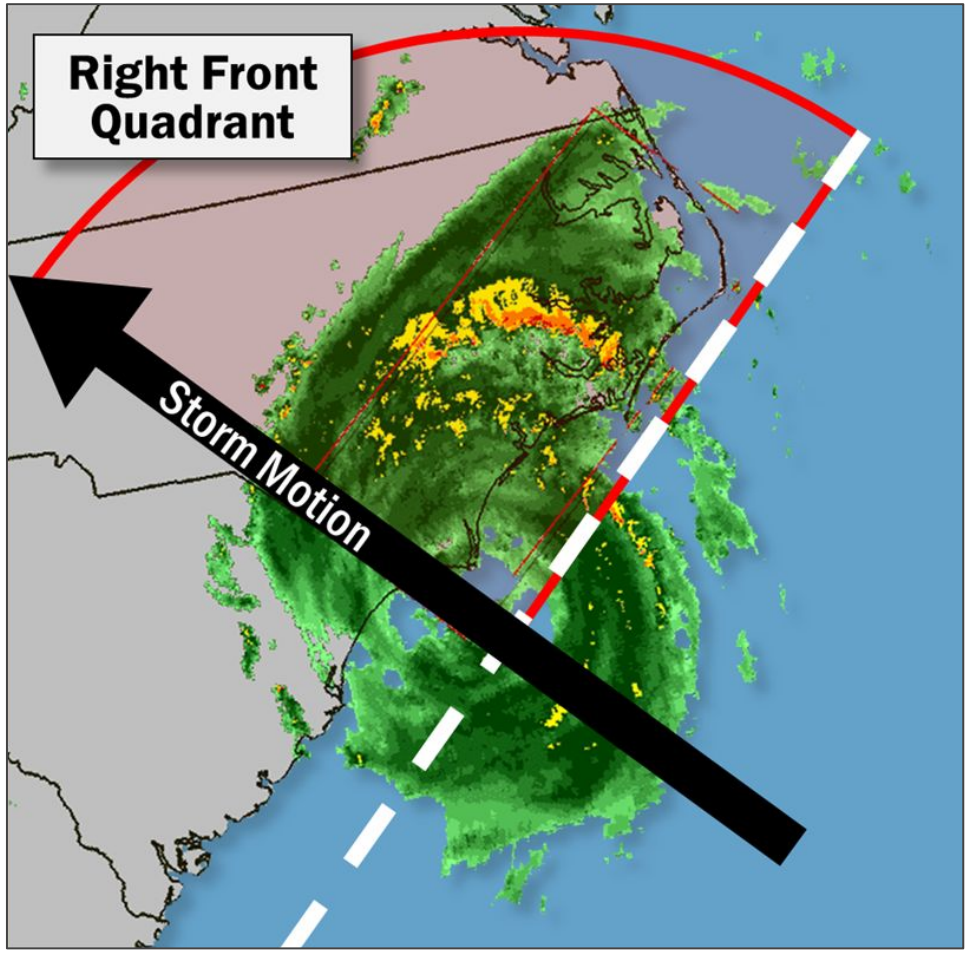
Ida (2021) Major Hurricane LA
Extratropical Transition Flooding & Fatalities in NE

Helene (2024) Major Hurricane FL
Flooding in Carolinas & southern Appalachia



Tornadoes

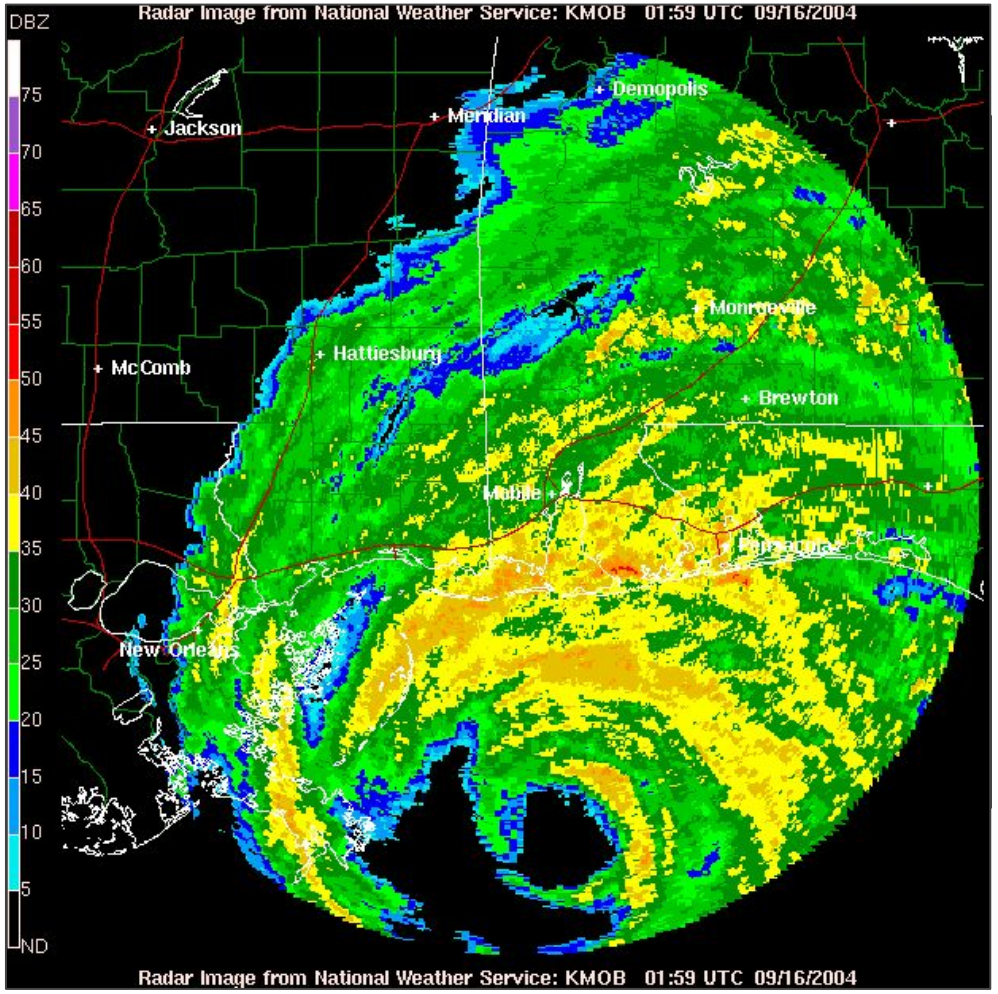
- Tornado threat is consistently under-recognized
- Public associates hurricanes with wind, surge, not usually tornadoes
- Risk often peaks inland after landfall
- Events are short-lived and fast-developing
- Tornadoes often occur outside the cone



Tornadoes

Landfalling Hurricanes:

- 70% produce at least one tornado
- 40% produce more than three tornadoes

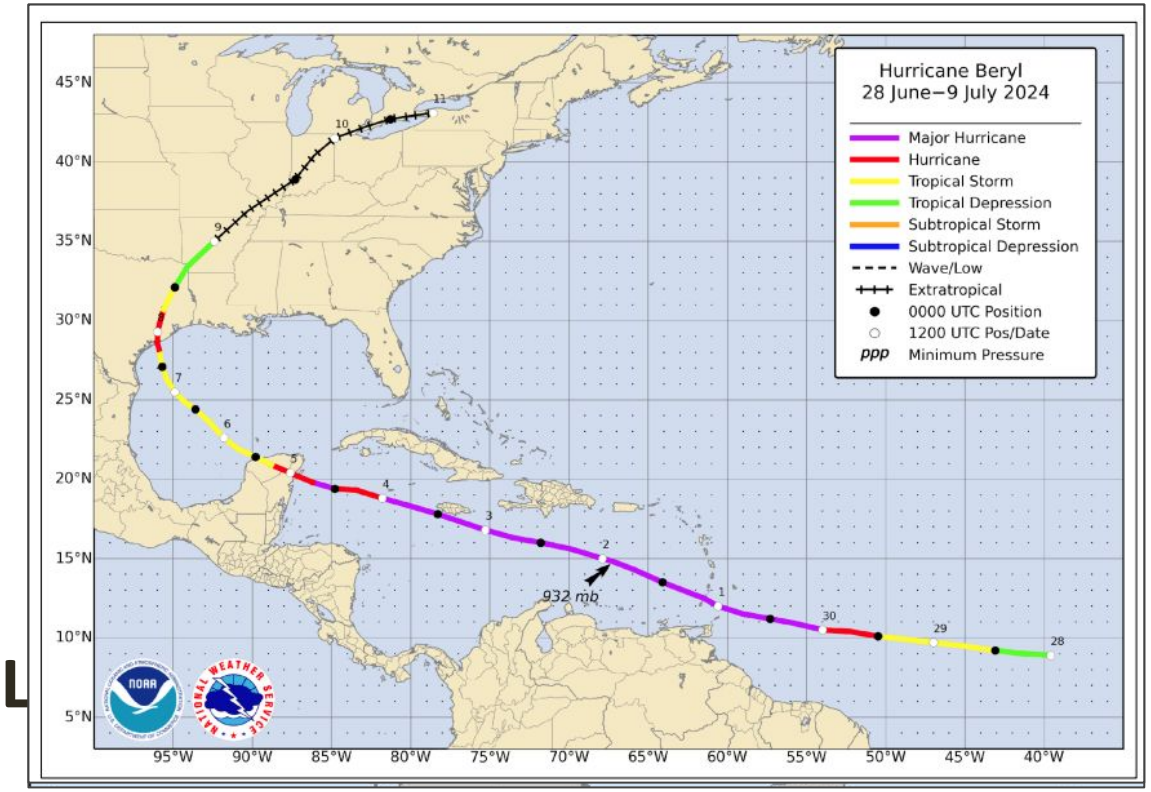


Beryl 2024

65 Tornadoes

- 10 EF-2
- 1 EF-3

Texas - 16
Louisiana - 22
Arkansas - 8
Indiana - 7
New York - 7
Kentucky - 2
3 others crossed state lines in Texas, L



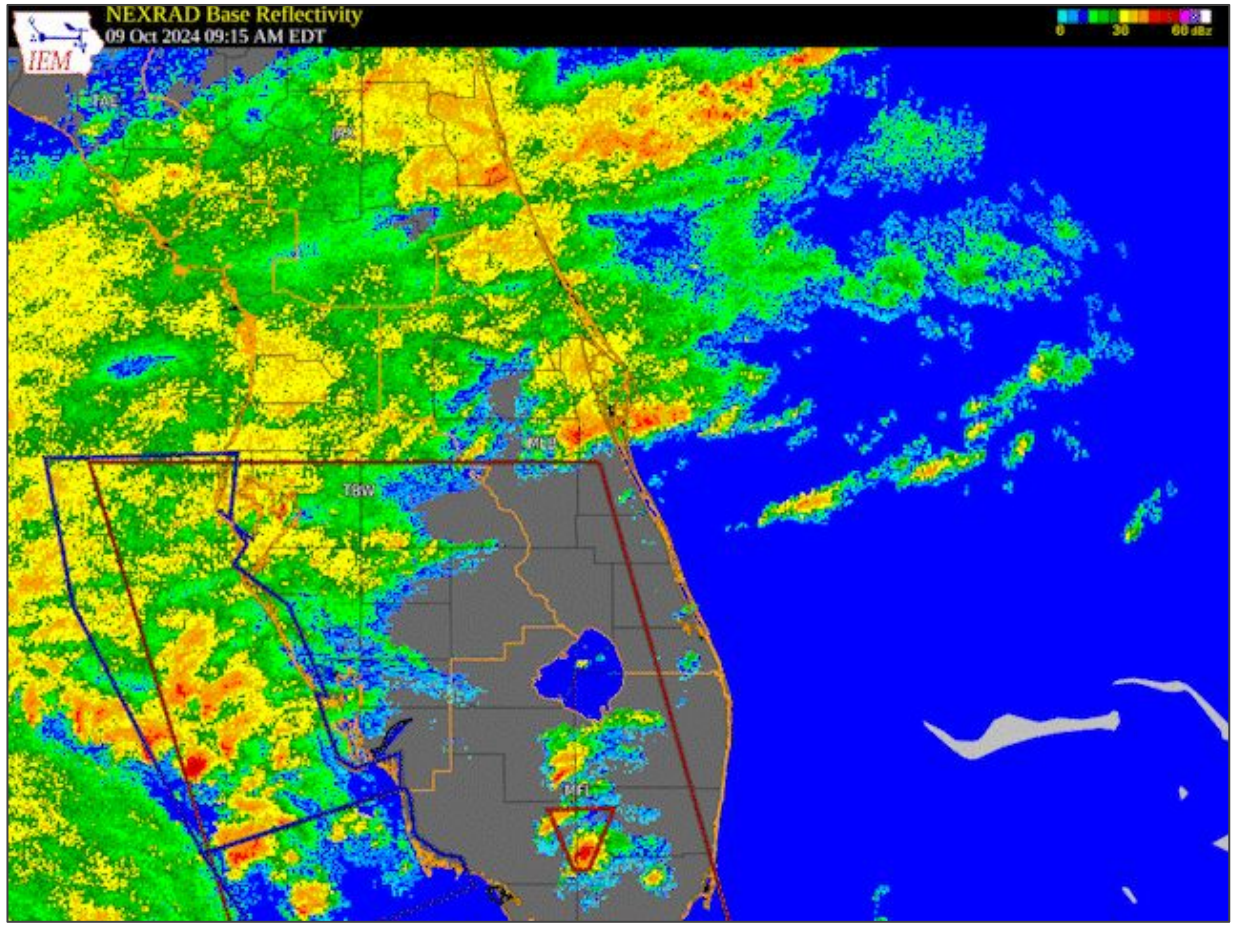
Milton 2024

45 Tornadoes

- 3 EF-3
- 6 EF-2

Most tornadoes occurred over southern and central Florida

Milton is the first tropical cyclone dating back to 1995 to produce more than 1 EF-3 Tornado



Coastal Impacts Beyond the Cone

Have you ever heard of hurricanes referred to as “FISH STORMS"?

This label is often used for hurricanes that develop over the open ocean waters and stay far from land

Common Misconception - Storms brewing in the open ocean are harmless

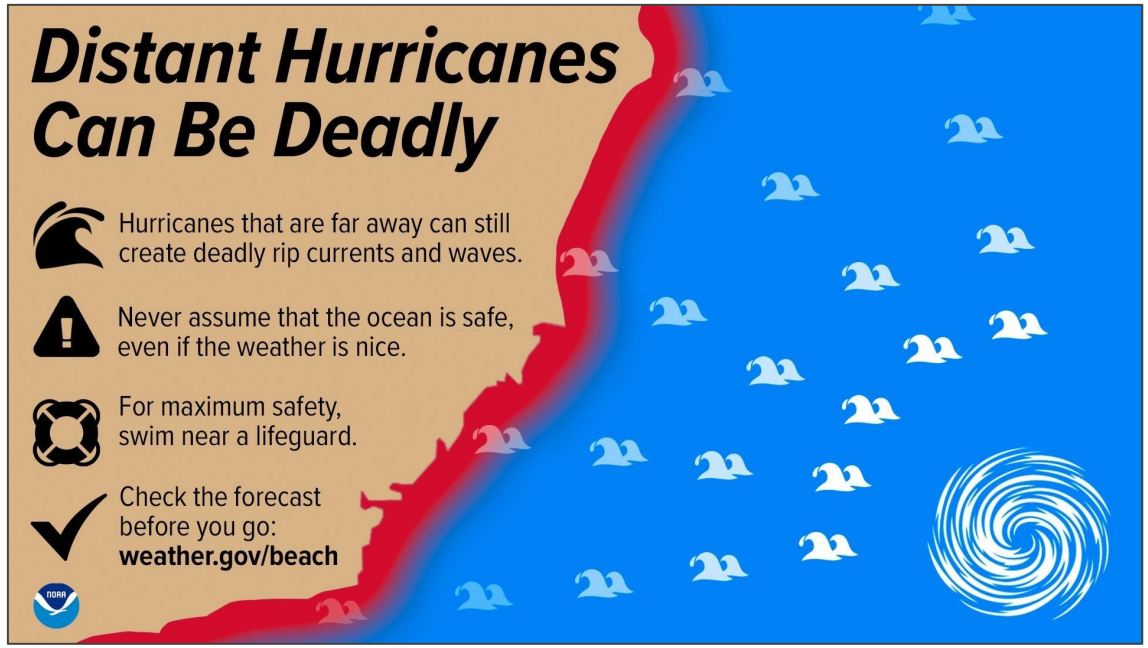
Not a Direct Hit ≠ No Impacts

Rip Currents + Fish Storms 🐠

“Fish storms” can send powerful wave energy to the coastline, causing deadly, hidden rip currents - this can be very dangerous because the risk often goes unnoticed

10-15% of U.S. fatalities from tropical storms and hurricanes were caused by rip currents

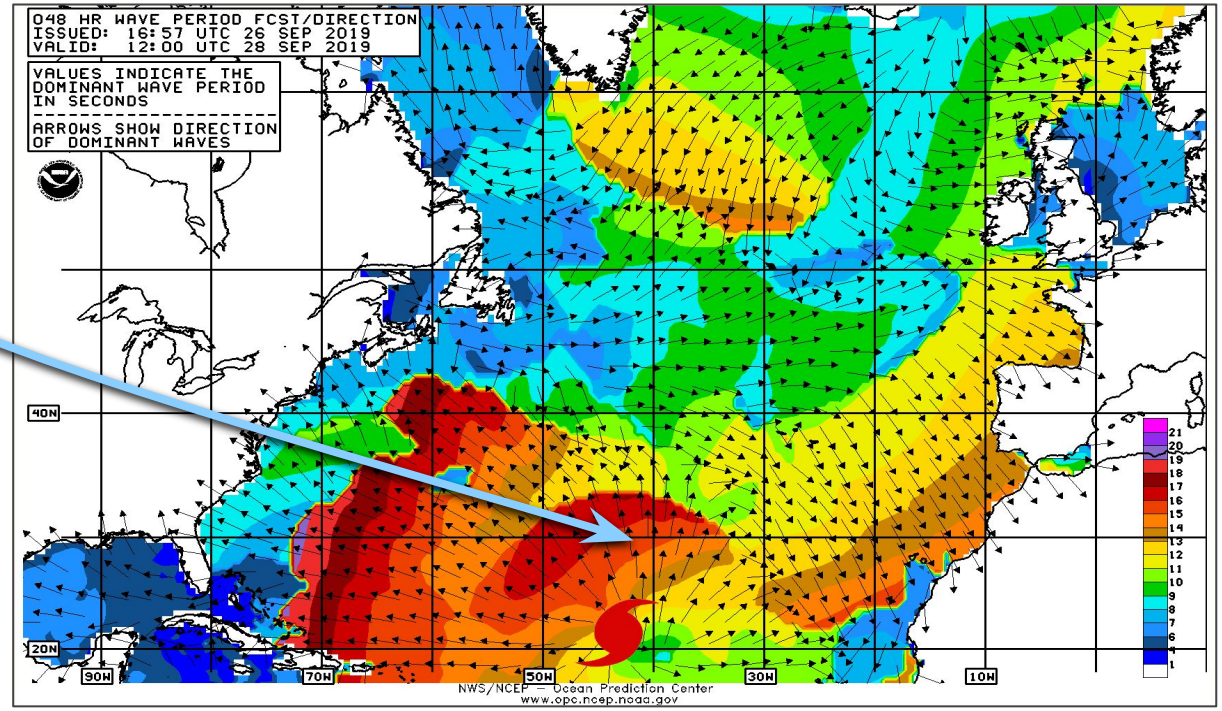
Want more hurricane safety + preparedness content like this infographic?



Rip Currents From Distant Hurricanes

There were **EIGHT** fatalities along the East Coast due to rip currents and rough surf from Hurricane Lorenzo (2019)

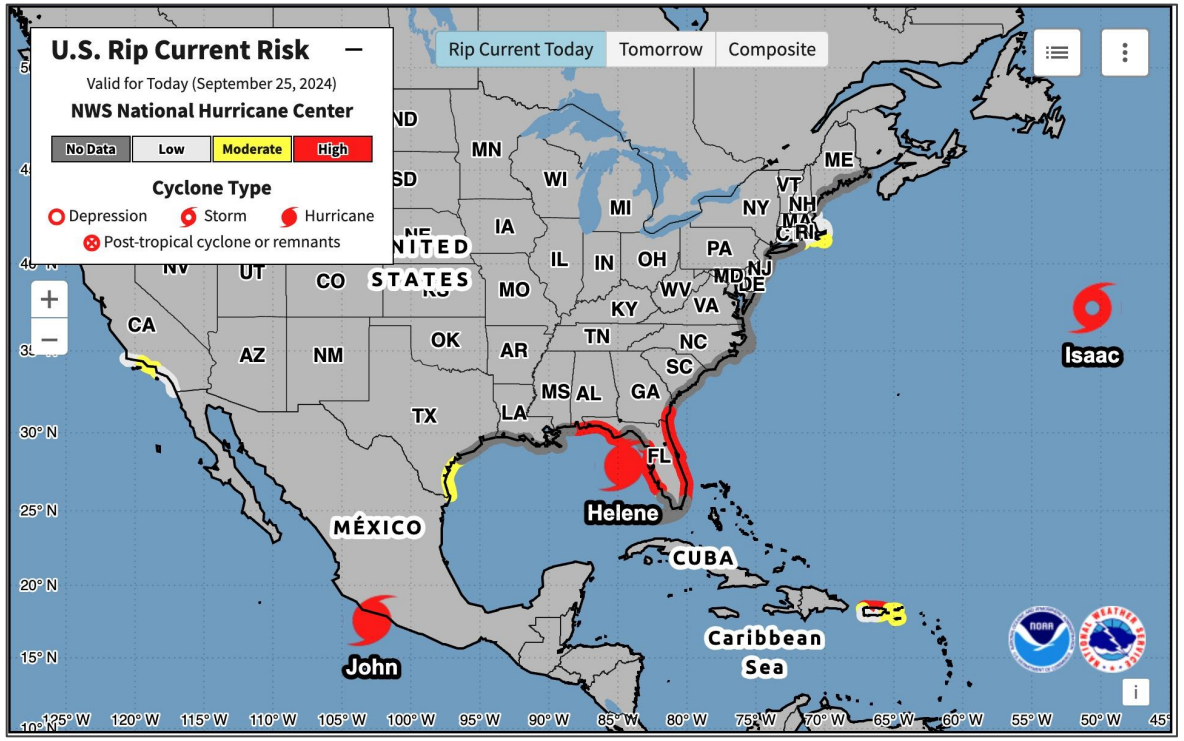
Lorenzo was nearly 2,000 miles away from the coastline, but dangerous swells from this fish storm led to an enhanced threat of rip currents



In 2021, there were **FIVE** fatalities due to rip currents and rough surf from Hurricane Larry

Rip Currents For Active Tropical Cyclones

NEW!! NHC now provides rip current risk information that originates from local National Weather Service Weather Forecast Offices in a National Rip Current Risk Map when at least one active tropical system is present



Want to learn more? Visit NHC's webpage on Rip Currents: The Hidden Hurricane Hazard.

Rip Currents - The Hidden Threat

Rip currents are a messaging challenge on nice weather days outside of hurricane season… and are even more of a challenge during hurricane season given the influx of tourists

High Surf - The Not-So-Hidden Threat

Rip currents and rough surf are the **3rd highest cause** of direct U.S. fatalities from tropical systems (2013-2023), many of which occur due to storms that are well offshore

Hazards like high surf and rip currents often don't trigger the same urgency as the wind or storm surge

High Surf - The Not-So-Hidden Threat

Impacts can begin days before the “local threat perception” increases

High surf can lead to overwash and beach erosion due to wave runup

Beach Morphology Issues - High surf and repeated wave action can eventually reshape sandbars creating new rip current channels and drop-offs near the shoreline

High Surf - The Not-So-Hidden Threat

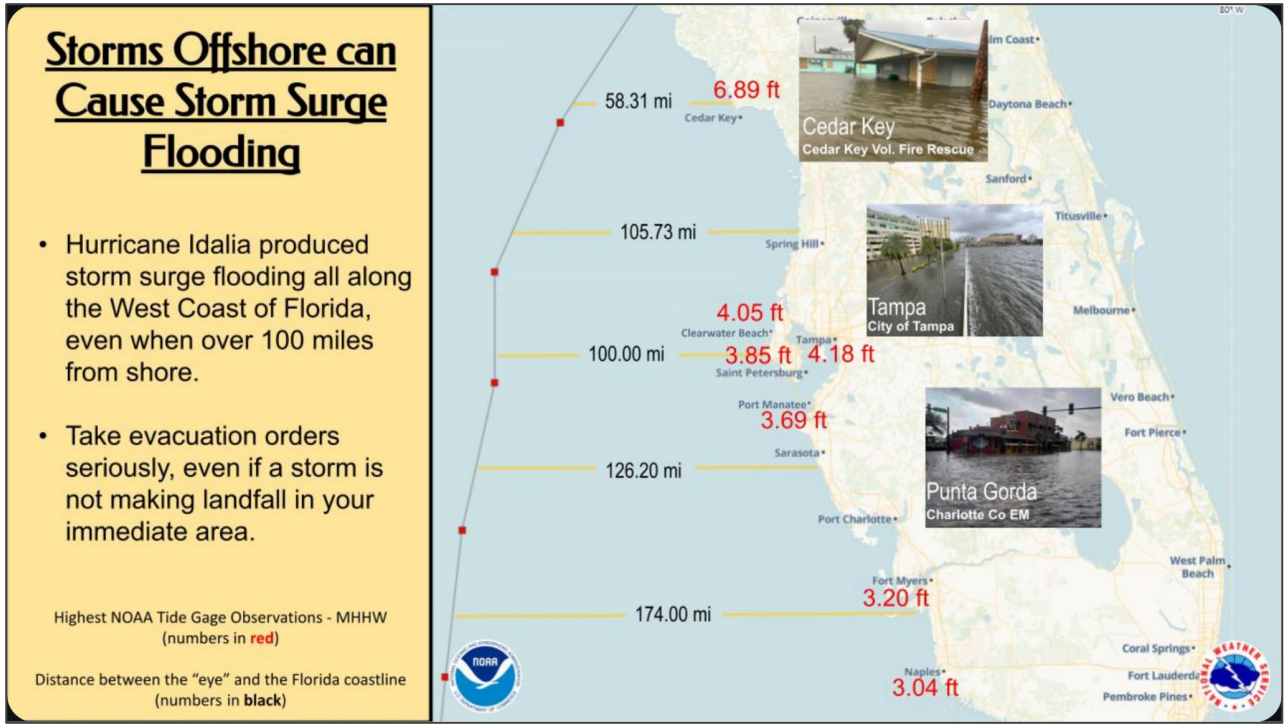
High surf lasting several days can lead to “warning fatigue” in fish and periphery storms

Deceiving Scenario - Bright, sunny day at the beach is dangerous due to the deadly rip currents and high surf from the tropical system well offshore

Extended Duration = Resource Strain

Coastal Flooding - The Perception Problem

Persistent onshore flow from storms well offshore or fringe/periphery storms can elevate water levels for multiple tidal cycles and flood vulnerable low-lying roads and coastal areas



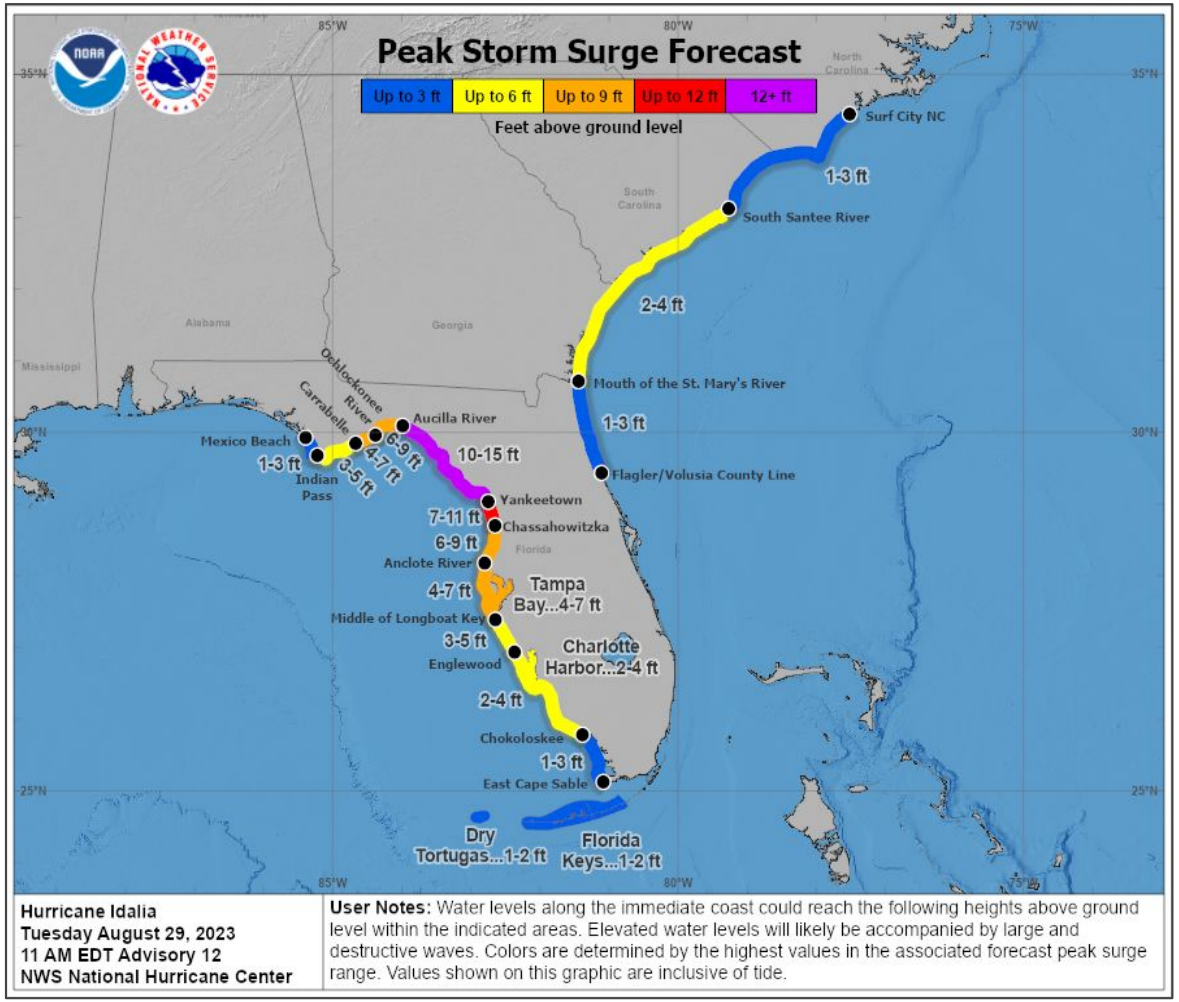
Hurricane Idalia (2023) made landfall near Keaton Beach, but produced flooding issues along the coast all the way down into the Keys

Coastal Flooding - The Perception Problem

Impacts often occur far outside where the public perceives the storm threat to be

Flooding can occur outside tropical headlines without dramatic weather conditions, which leads to…

- **“Why are roads flooding?”**
- **“There aren’t even warnings here”**
- **“But it’s sunny outside”**



Timing Makes It Worse…

🏖️ What The Public Sees…

😬 Reality…

Timing Makes It Worse…

✅ Easy To Message This…

😬 Difficult To Message This…

Sometimes the worst rip current/surf days occur with the best weather

The Holiday Problem

Coastal impacts from a fish storm overlapping with peak tourist season and/or a holiday

Messaging Challenge - tourists are totally unfamiliar with rip currents, high surf, and crashing waves

Bonus (Emerging) Challenge - over-reliance on social media, non-official, and AI sources

Highest exposure when awareness is lowest

Pensacola Beach Blue Angels Airshow Weekend

Messaging Challenges

- Public focus remains heavily tied to the cone/track
- The “No Headlines ≠ No Impact” problem: no tropical headlines can create a false sense of safety
- The “Nice Weather = Safe Ocean” misconception: beach hazards are highly underestimated
- Widespread impacts can begin before – and persist long after – landfall
- Slow-moving or distant storms create prolonged risk and warning fatigue

Not In The Cone ≠ No Impacts

Questions?

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