



TEXAS A&M UNIVERSITY

Meteorology

Concurrent, Collocated Wind and Water Hazards: What, When, Where?

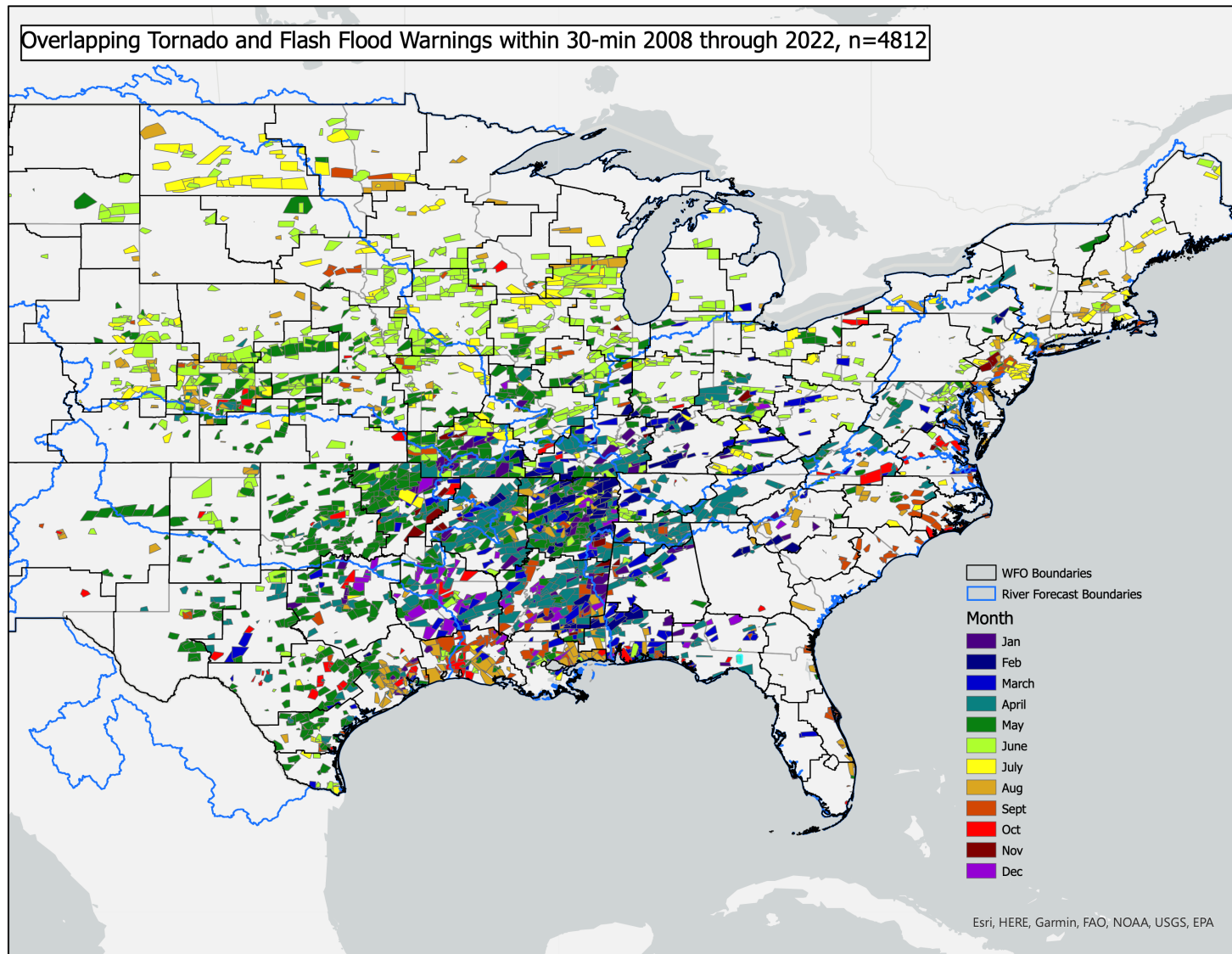
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June 7th, 2023

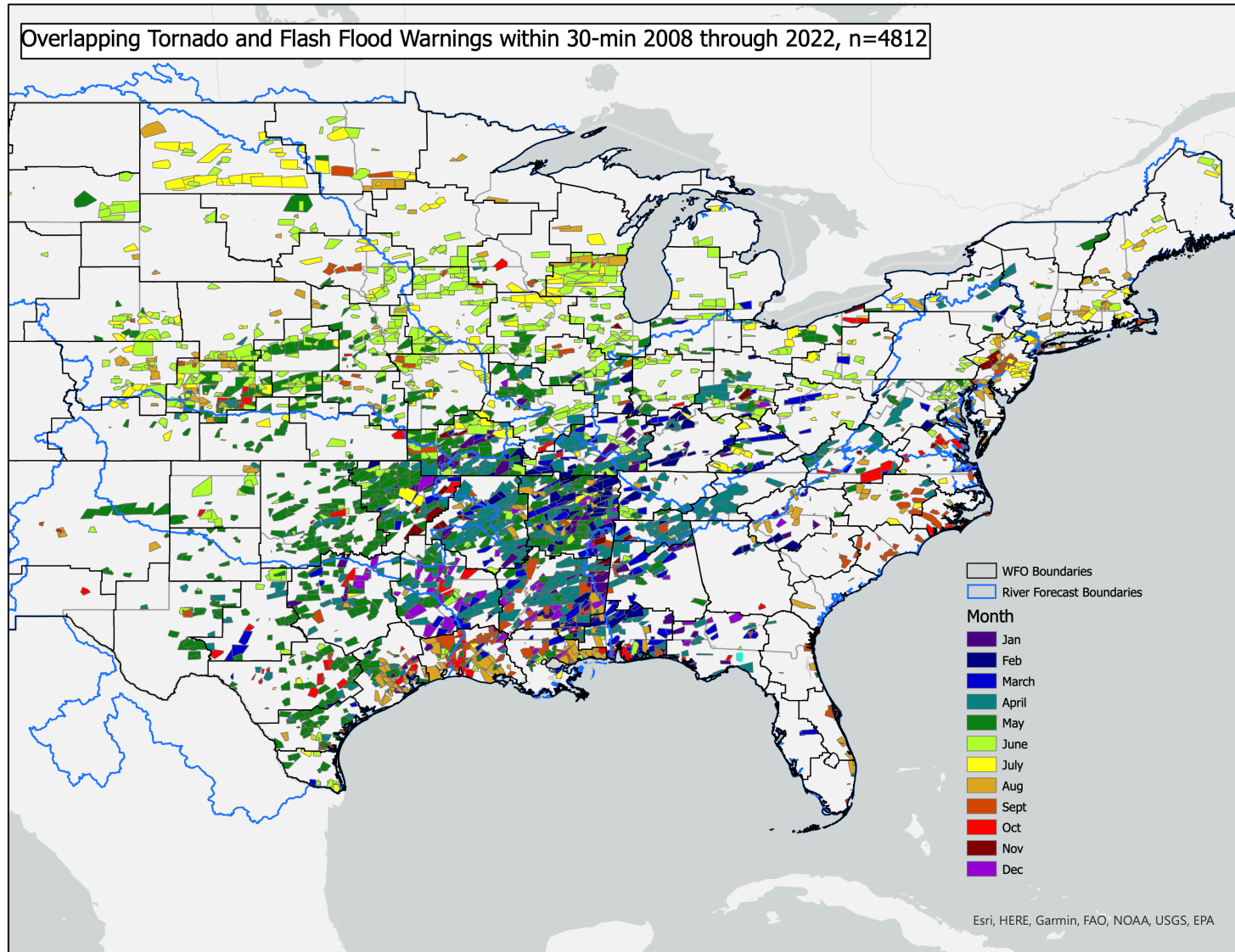
Research Knowledge Transitions and Compound Hazards Workshop

Background – “TORFF”



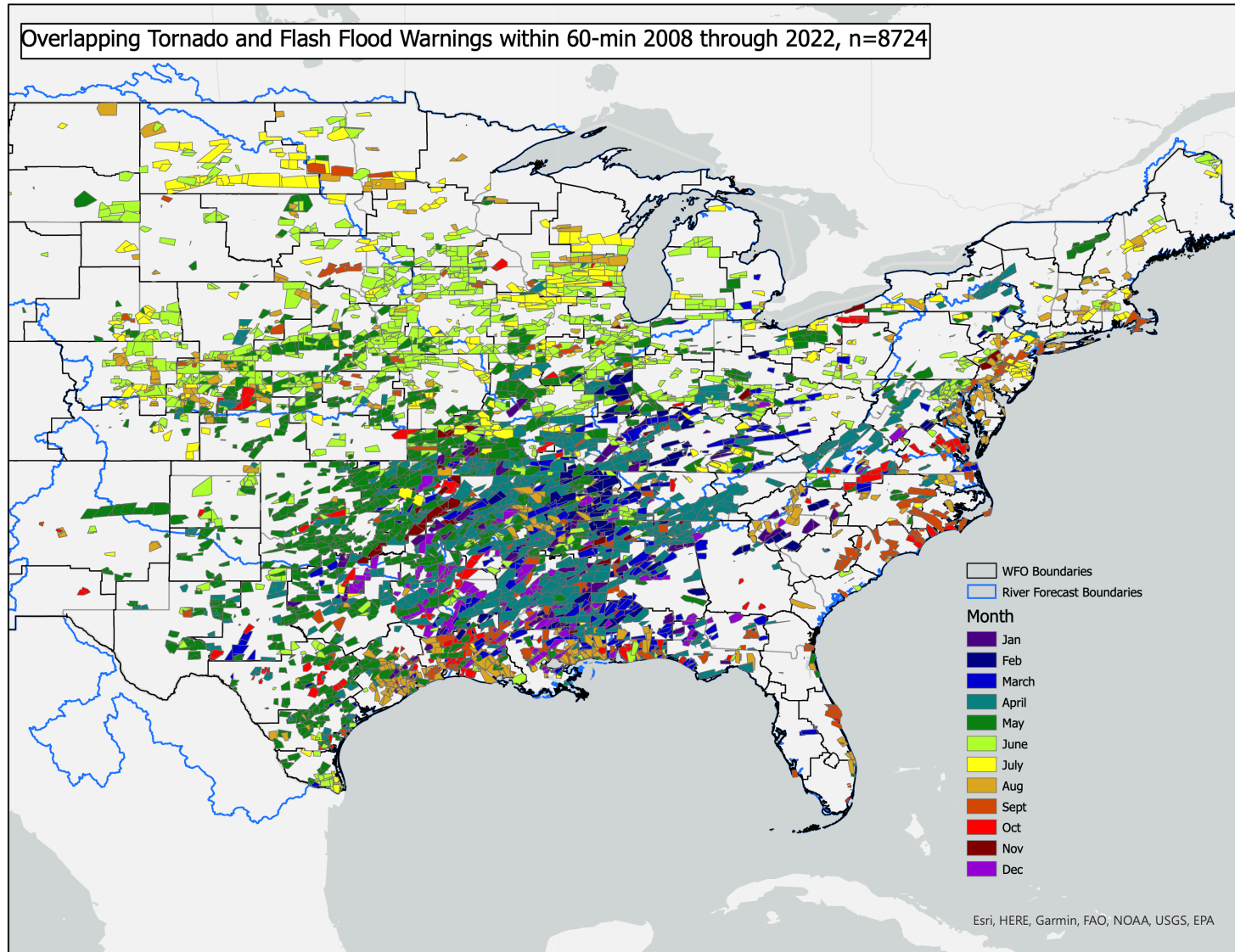
- As with any phenomena that is researched, you must have a background knowledge on how often it occurs
- If you are looking for situations where multiple hazards are happening at the same time, you must deal with multiple dimensions (i.e., what threats over what length of time)
- These choices are somewhat arbitrary...
- Initially we said tornado and flash flood warnings being issued within 30-minutes
- The result was that this overlap at this time threshold is quite common (~350+ times a year)

Database



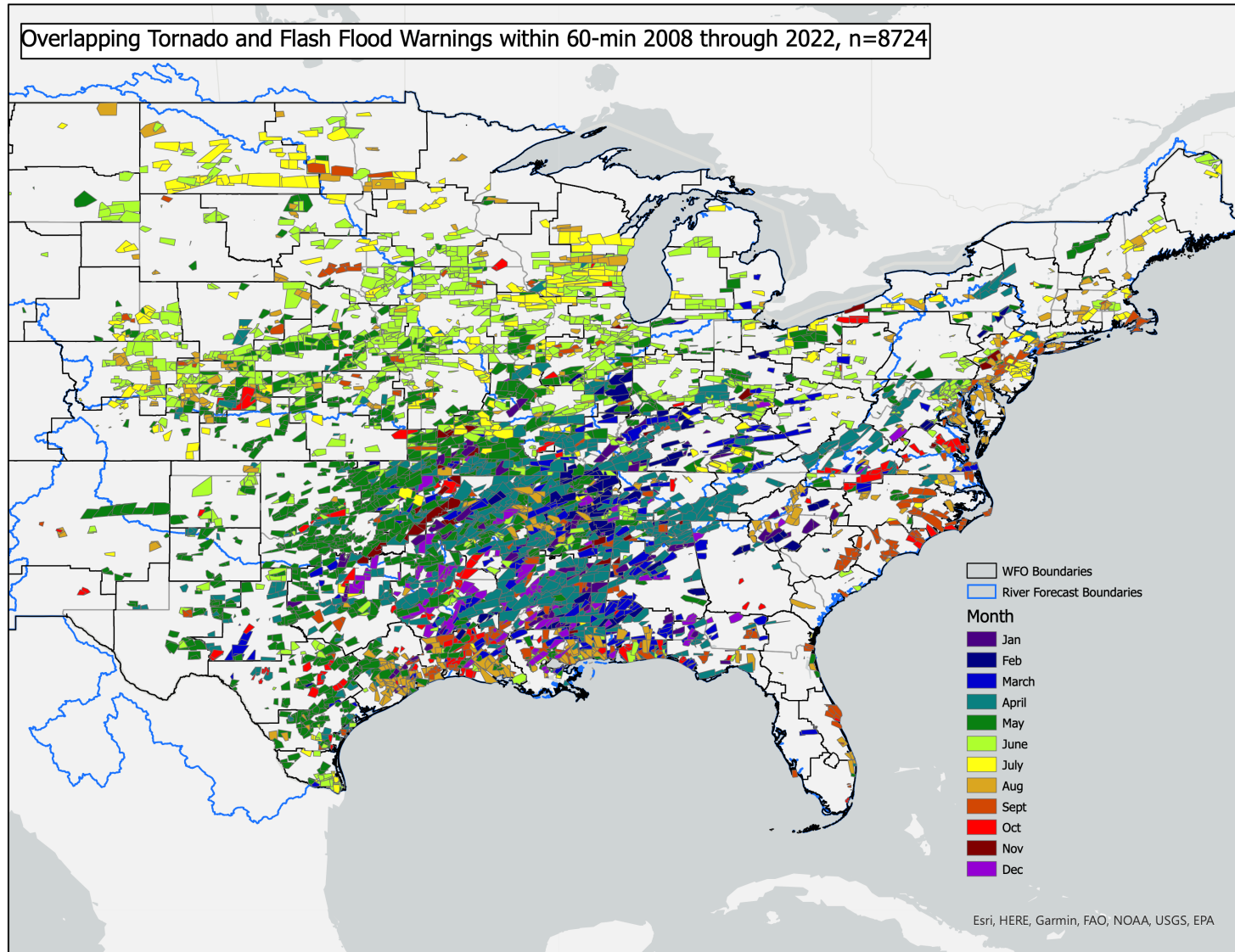
- While this initial definition might pick up on the most acute overlap of wind and water threats, it does not pick up on all situations where wind and water threats overlap.
- What if we change the map to the left to Tornado Warnings and Flash Flood Warnings issued within 60-minutes of one another over the same period?

Database



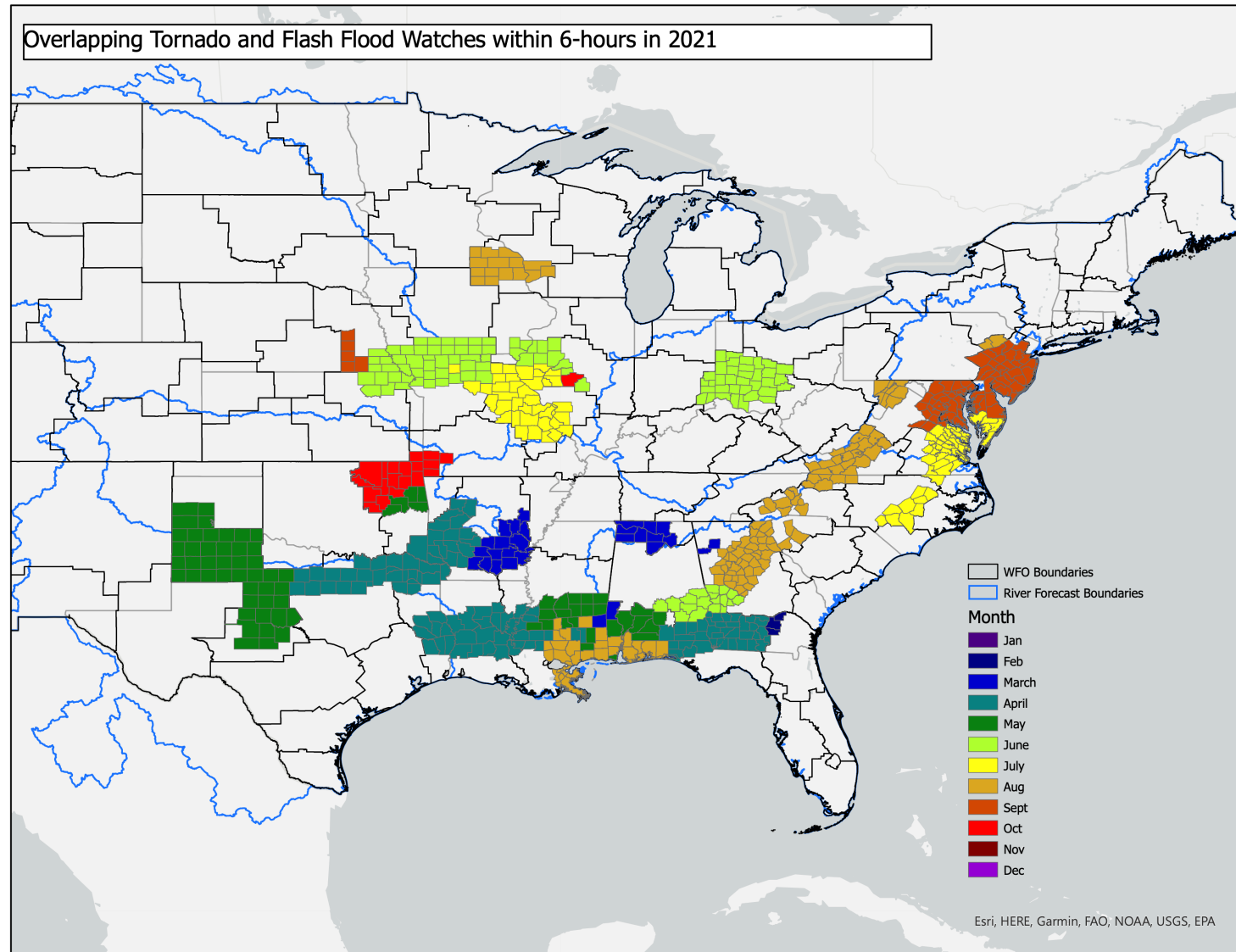
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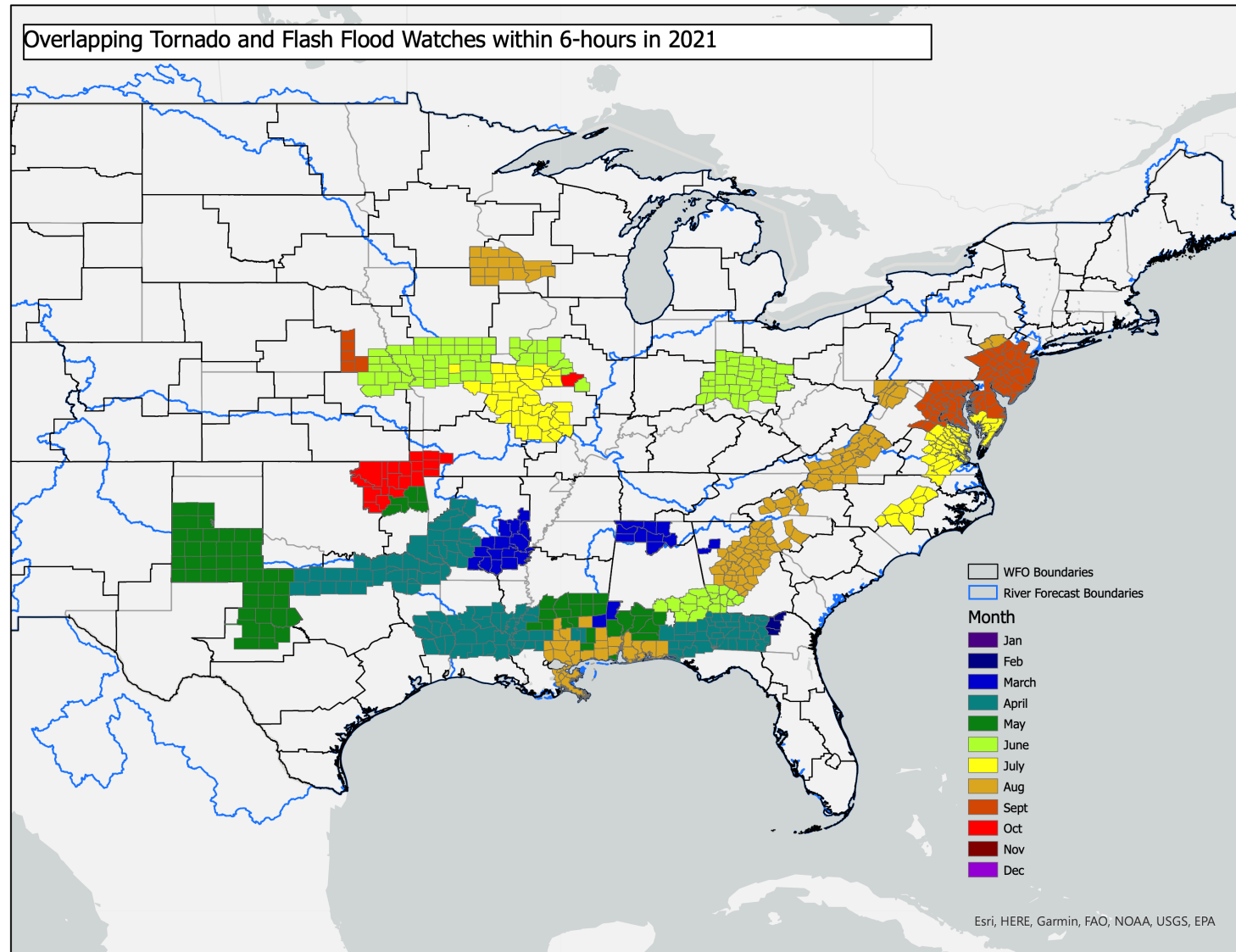
- While this initial definition might pick up on the most acute overlap of wind and water threats, it does not pick up on all situations where wind and water threats overlap?
- What if we change the map to the left to Tornado Warnings and and Flash Flood Warnings issued within 60-minutes of one another over the same period?
- What if we change the map to the left to Tornado watches and and Flash Flood watches issued within 6-hours of one another in 2021?

Database



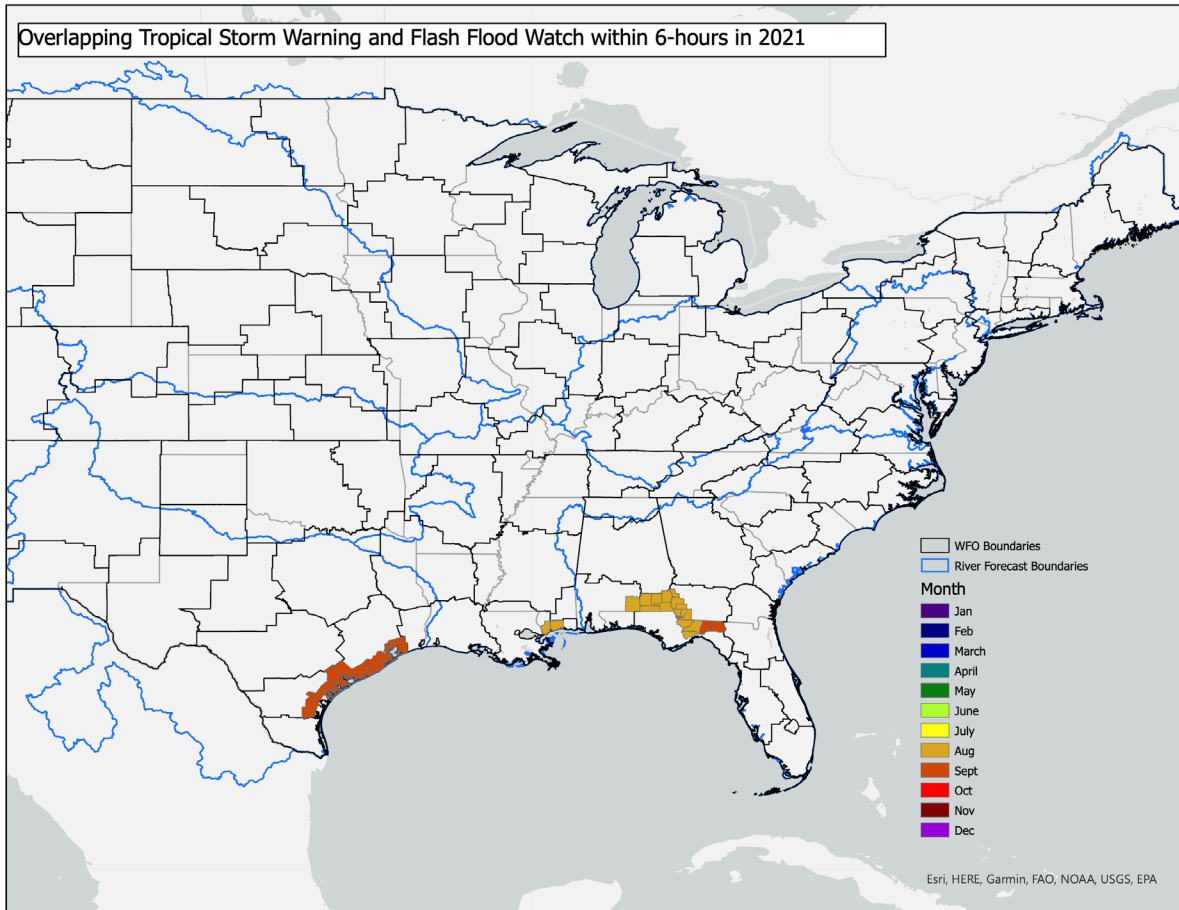
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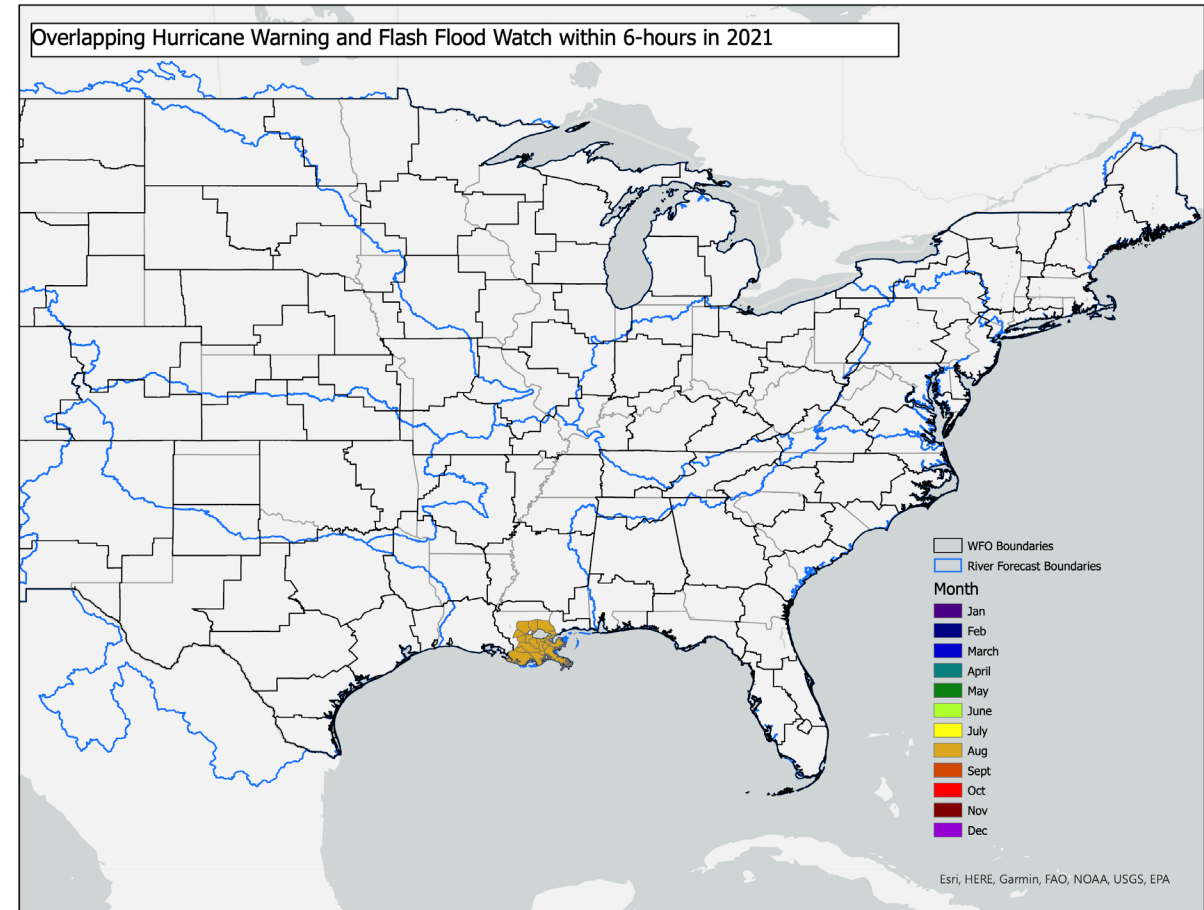


- While this initial definition might pick up on the most acute overlap of wind and water threats, it does not pick up on all situations where wind and water threats overlap?
- What if we change the map to the left to Tornado Warnings and Flash Flood Warnings issued within 60-minutes of one another over the same period?
- What if we change the map to the left to more tropical focused wind and water hazards in 2021?

Database

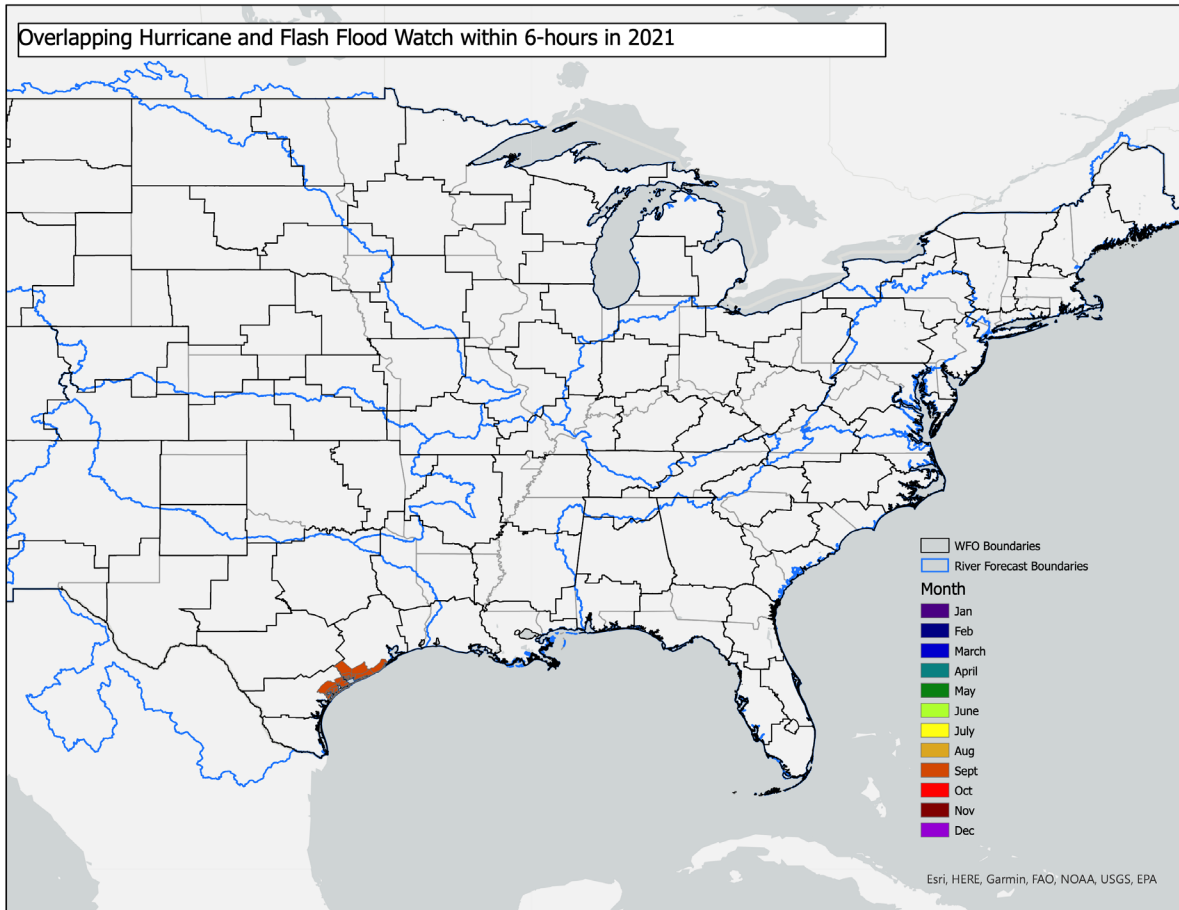


Tropical storm warning and flash flood watch overlap within 6-hours in 2021

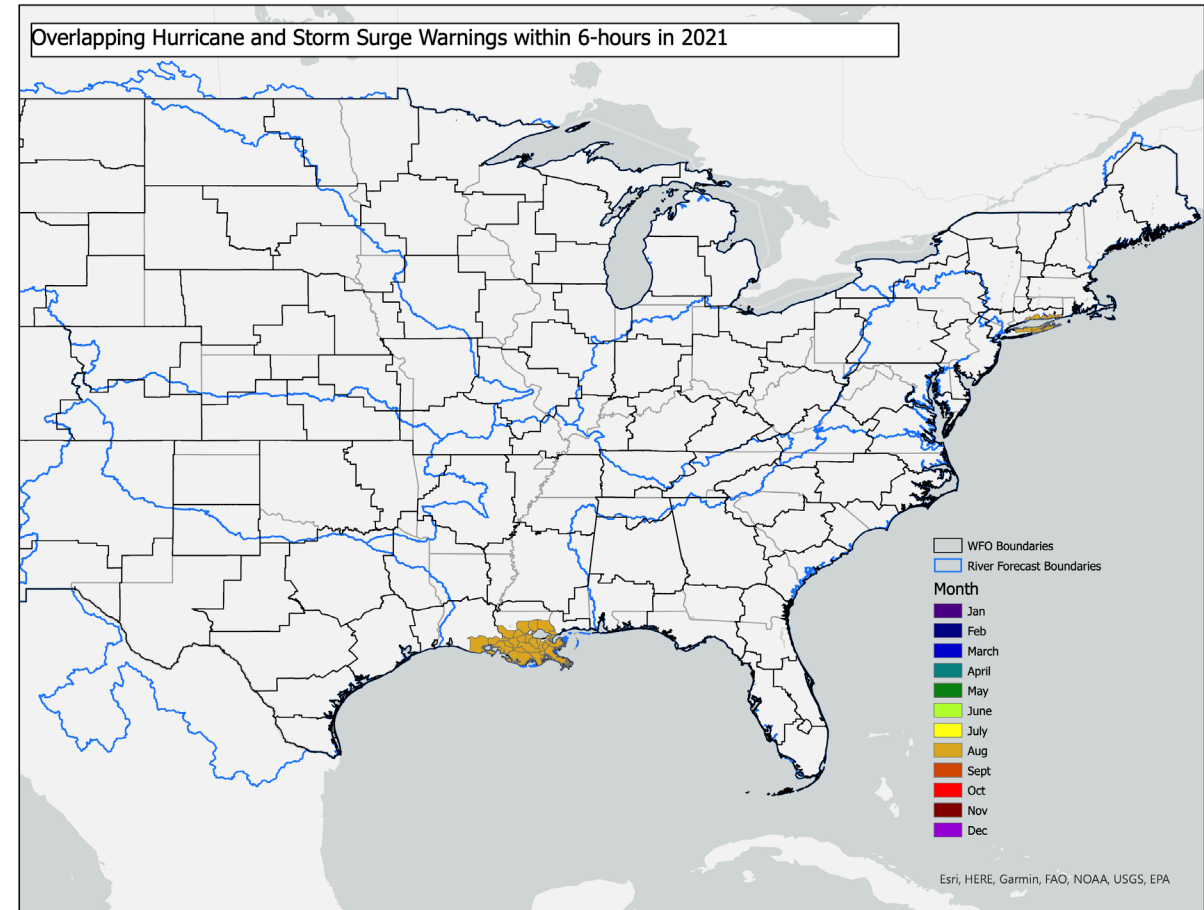


Hurricane warning and flash flood watch overlap within 6-hours in 2021

Database

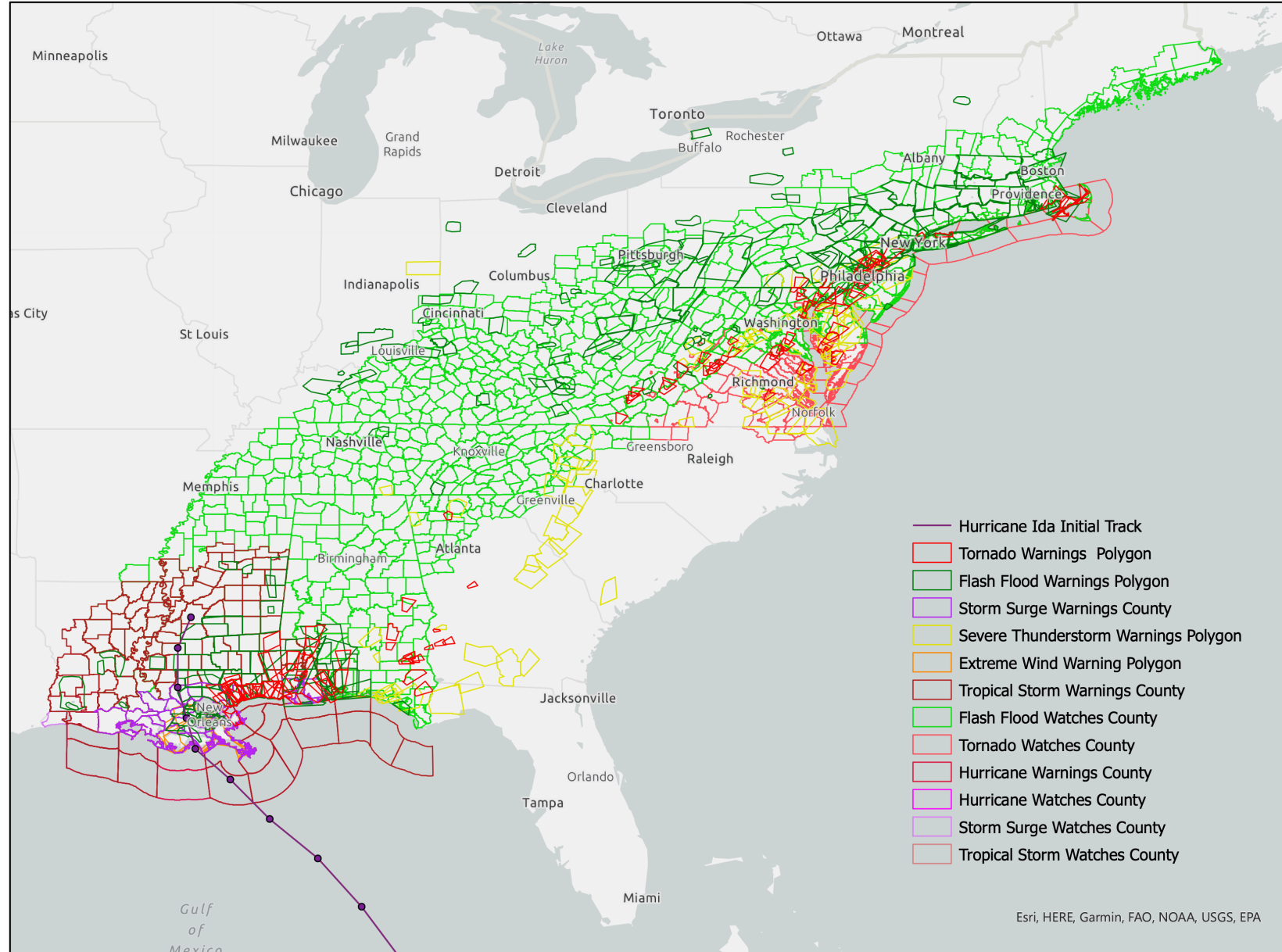


Hurricane watch and flash flood watch overlap within 6-hours in 2021



Hurricane warning and storm surge warning overlap within 6-hours in 2021

Hurricane Ida



- An example of how complex these situations can be...
- As far as I can tell, Hurricane Ida resulted in the first true overlap of a flash flood emergency and a tornado emergency (issued within 1-minute of each other)

Database Uses So Far

- Used to justify investigation of TORFFs in certain regions (i.e., Mississippi Valley) and certain storm modes (i.e., Tropical or non-tropical) ...thanks NOAA 😊
- Used to identify specific cases for targeted interviews (NWS, EM, and broadcasters)
- Climatology used in training materials
- General awareness in the research and operational community



How can this database be the most useful?

Audience:

- NOAA uses? BMET / EM uses?
 - Training
 - Warning structural changes*
- Situational awareness for practitioners?
- Public education or awareness?

Format:

- Is providing the code the most useful? (written in ArcGIS/python...output is a generic shapefile)
- Is it helpful to create climatology of various intersections?
- Other formats that would be helpful?

Content:

- How close is “concurrent” for overlaps?
- Does it matter the situation (e.g., long-fused tropical event vs. short-fused thunderstorm)?

Other hazards, timeframes, overlaps

- Throughout the forecast timeline overlapping hazard information can be communicated
- What type of threat overlaps are the most pertinent to investigate?
- Outside of watch/warning products is there a critical time frame in the threat messaging where hazard prioritization takes place?

