

A New Hurricane Evacuation Order Database for Societal Impacts Research

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Motivation - Personal

- I needed evacuation order data for Hurricanes Laura & Marco (2020), Henri (2021), and Ian (2022) for a longitudinal panel study of hurricane information seeking, risk perception, and response¹
- I was unable to find any sort of consolidated archive of evacuation orders issued – I could only find web archives from individual sources (typically local and state government) and channels (government websites, social media posts, local and national news websites)

Motivation – Big Picture

- Evacuation order data is needed for many types of studies conducted in the social, economic, behavioral, and public health sciences. Examples:
 - Factors that affect evacuation intentions²
 - Hurricane risk perceptions and evacuation behavior during the COVID-19 pandemic³
 - Impacts of hurricane evacuations on mental and physical health⁴
- Evacuation order data collected for past studies may still be in project archives and available by contacting the PIs. But that data likely consists of:
 - Individual / limited cases
 - Non-uniform data formats
 - Lacking time specificity, since many studies only need to know if an evacuation was ordered, not necessarily when
- Web archives are at risk of disappearing at any time, making evacuation orders a perishable dataset with an unknown and/or unpredictable "shelf-life"

So why doesn't this dataset already exist? As I collected hurricane evacuation orders for my own project, I started to get a clearer picture as to why this hasn't been done yet...

- Inconsistent terminology
 - "mandatory", "voluntary", "recommended", "encouraged"
 - "evacuation zones" vs. "evacuation levels"
- Confusing terminology
 - Evacuation zones vs. historical flood zones (FL)
- Legal authority varies by state (Kruger et al. 2020)
 - Found to vary from governor and state emergency management officials to individual townships and local officials
- Even centralized lists (e.g., FL Division of Emergency Management had a centralized list) were found to have missing and/or incomplete data

The Vision

- Public, accessible, and searchable database**
- Use consistent data collection methods
- Use consistent definitions of terms
- Record time of issuance and time of lifting of order, if available (for time varying studies)
- Documentation of the *sources* of the orders and *channels* from which the orders were obtained
- Outputs in usable format for various disciplines (CSV and/or shapefiles)

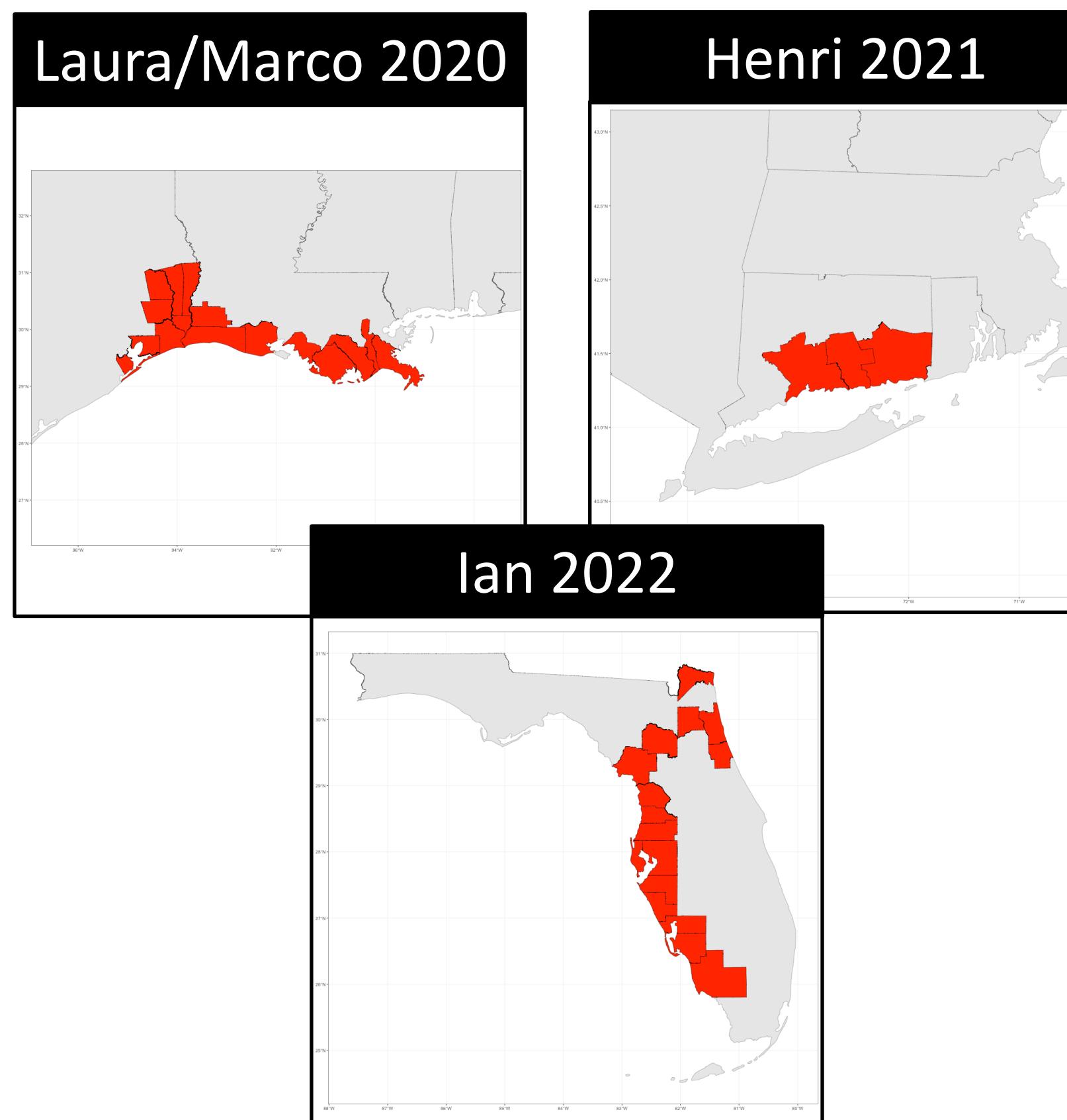
Current Fields Collected

- Storm name
- ATCF ID
- State (2-letter abbreviation)
- County name
- FIPS (5-digit code unique to each state/county)
- Start time (UTC and local time)
- End time, if available (UTC and local time)
- Area under evacuation
- Specific residents under evacuation
- Special orders, if any
- Source/channel URL(s)
- Supplementary file names (if screenshots or documents are saved)
- Vulnerability tags (e.g., "mobile homes", "flood-prone areas", "those needing special assistance")
- Notes

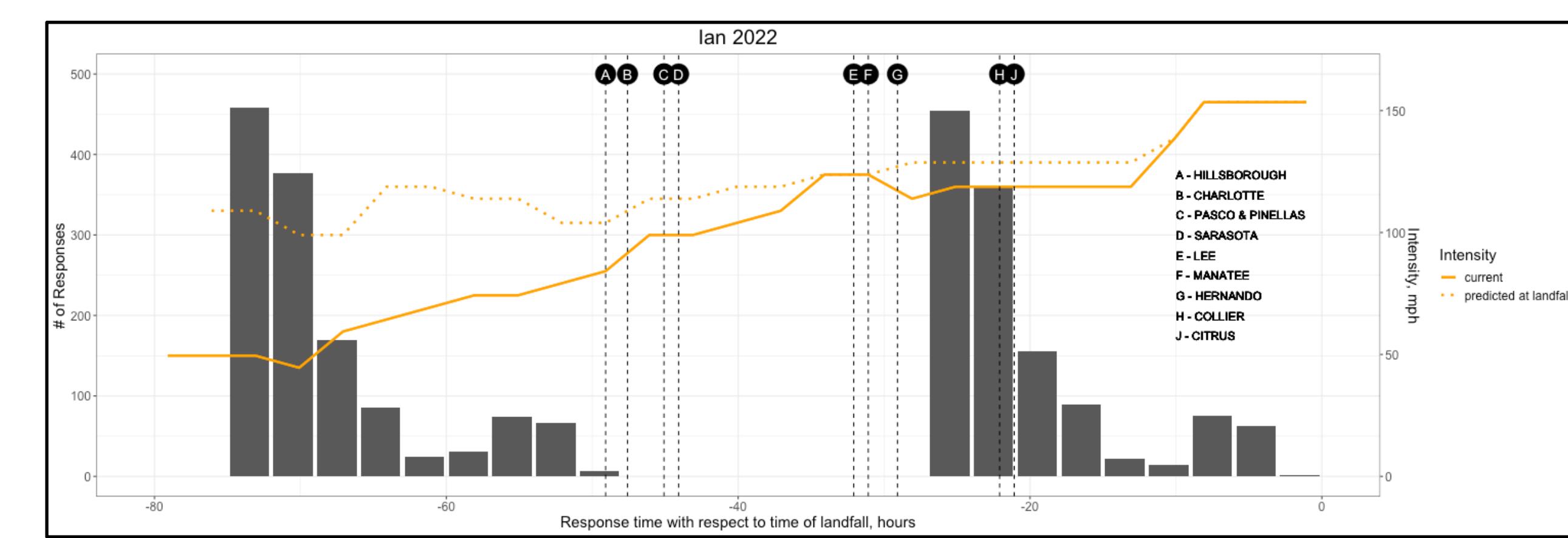
The Reality

- Version 1.0 – proof of concept
- Human curated (no way around this currently)
- Search methodology consists of prescribed web searches supplemented (flexible methods)
- Documenting mandatory evacuation orders only
- Limited to tropical cyclones impacting the mainland U.S. between 2020-2022

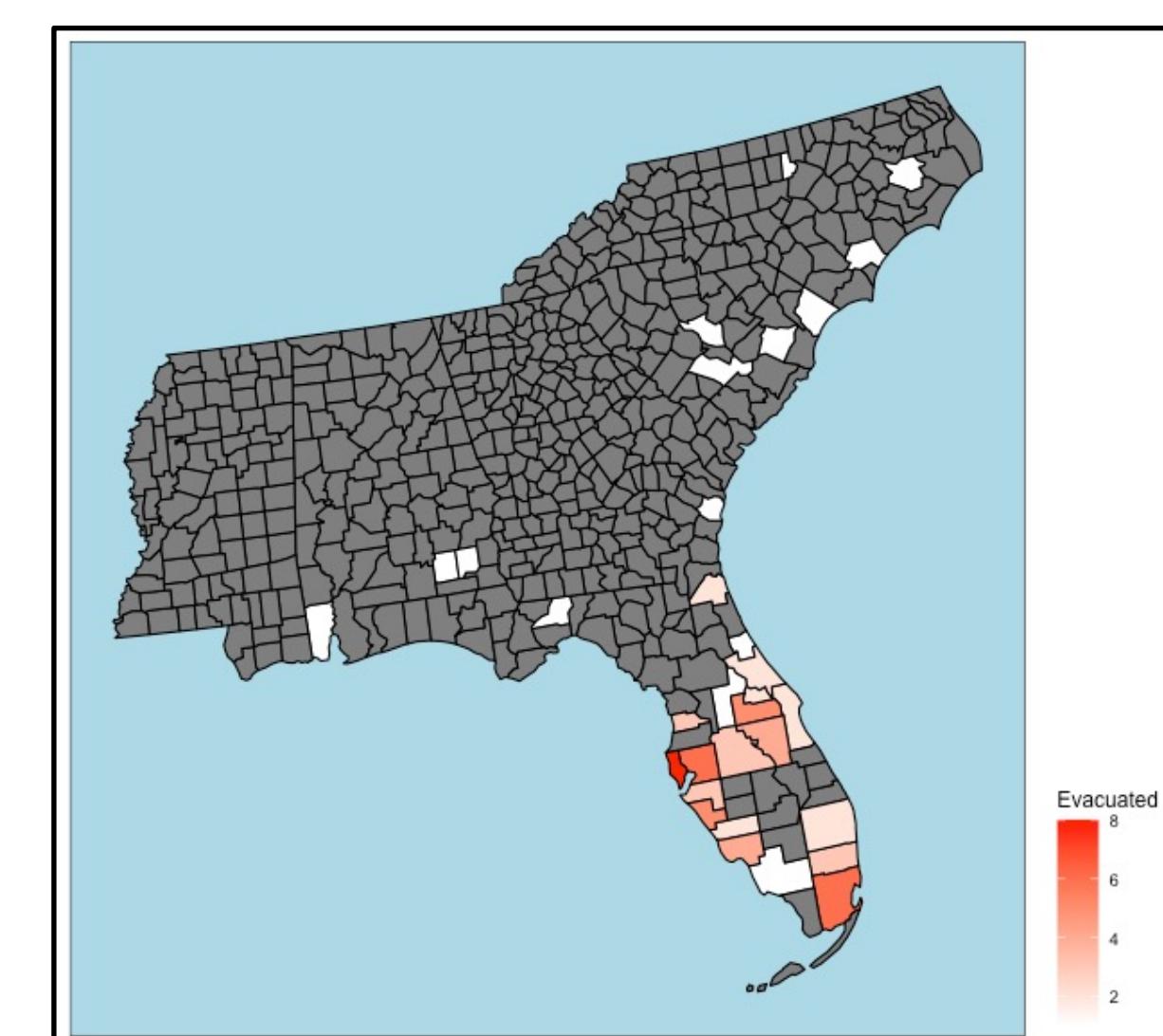
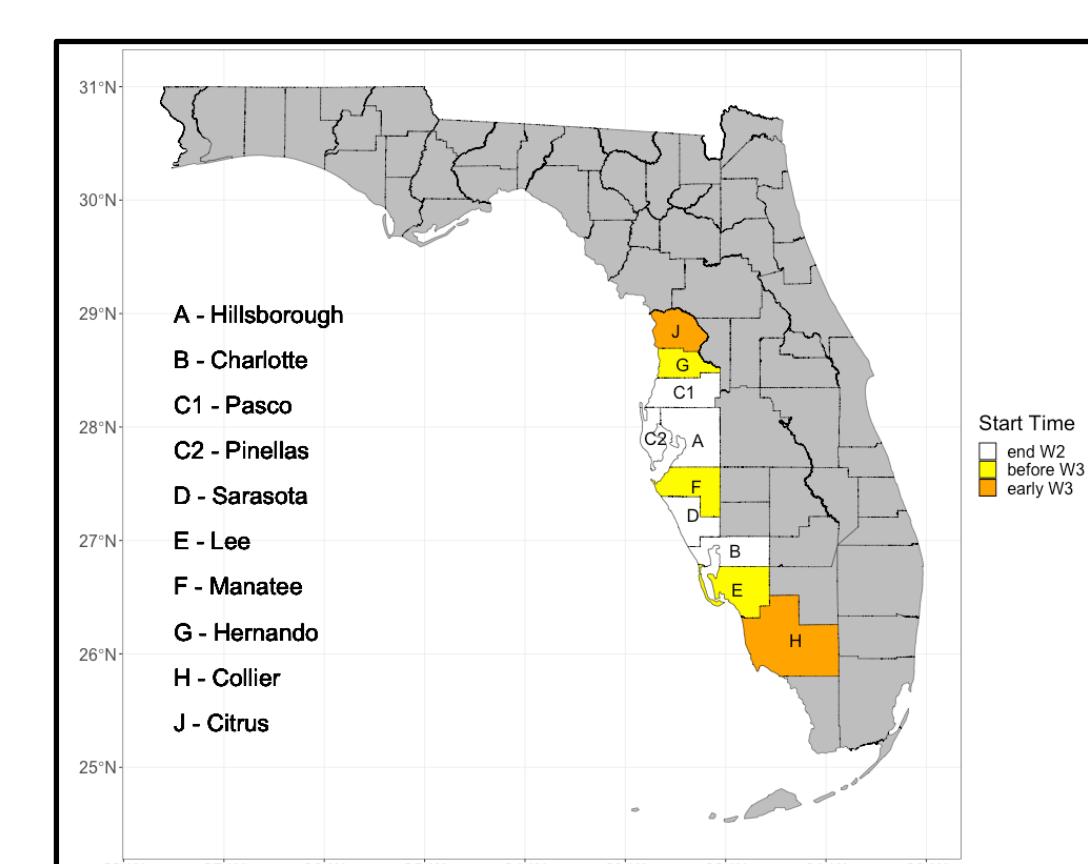
Counties with mandatory evacuation orders



Examples of how we can use this data



Add context about the timing of survey responses based on when mandatory evacuation orders were issued (above and right)



Compare locations people reported evacuating from (above) to where mandatory evacuation orders were issued (farther above)

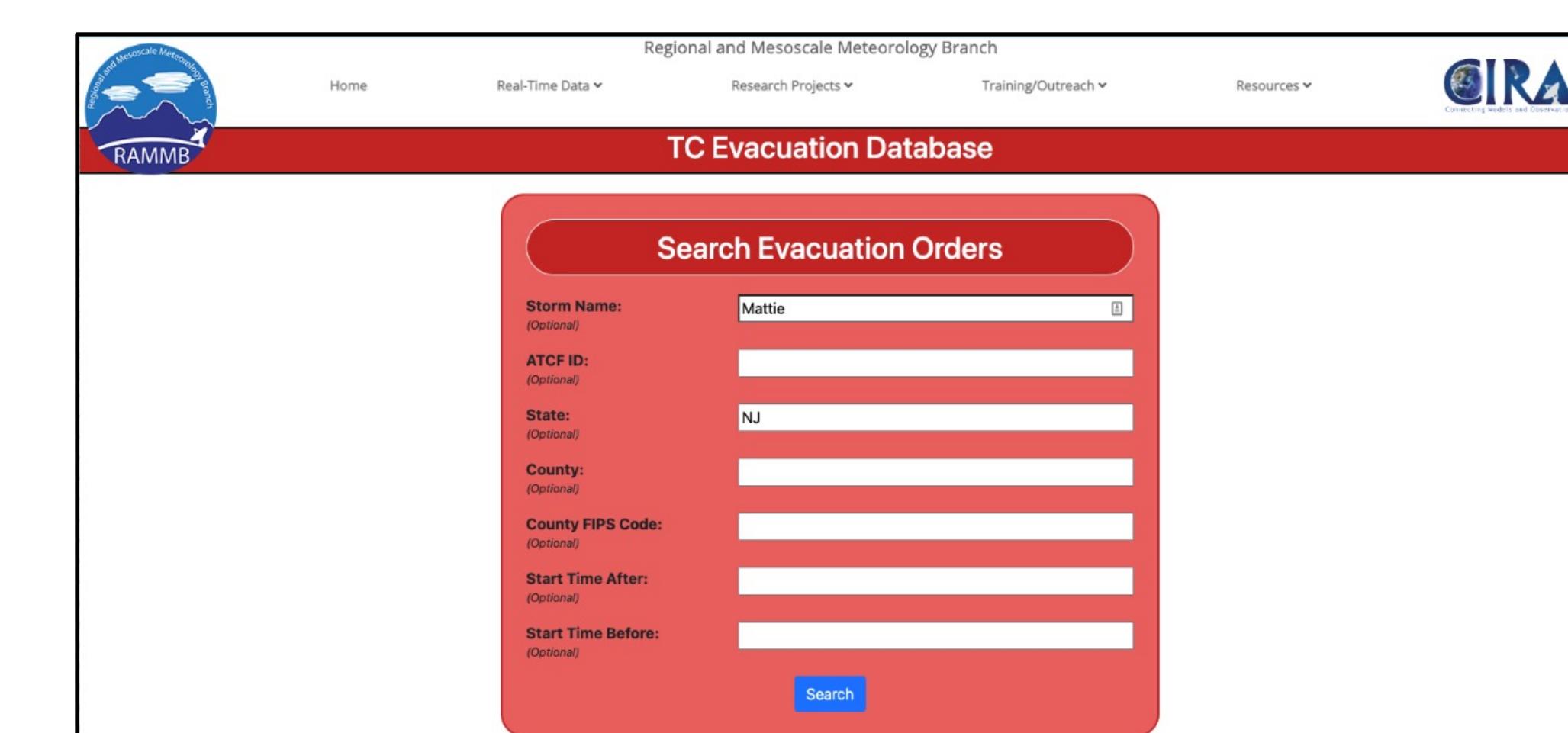
Access the data

- The first 3 cases (Hurricanes Laura & Marco 2020, Henri 2021, and Ian 2022) of mandatory evacuation order data have been posted to a public GitHub repository
- We will add more cases as time allows
- Scan the code below to go to our repo ↓



Future work

- Searchable web interface (in progress, example below)



- Add voluntary evacuations (data collected for three cases, currently working on QC and formatting)
- Post all 2020-2022 cases to GitHub (data collected, currently working on QC and formatting)
- Add coders (currently 2)
 - Develop robust coding scheme
 - Calibrate using intercoder reliability
- Refine evacuation areas beyond county level
 - Use predetermined zones for regions that have them (e.g., Florida)
 - Use GIS to draw polygons based on text descriptions, and release as shapefile

Last but not least...

We are looking for feedback, especially from potential users. Please contact andrea.schumacher@colostate.edu with any questions, comments, or suggestions.

Ideally, this will become a community collaboration!