“Improving Impact-Based Seasonal Outlooks for South Central Texas”

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Outline

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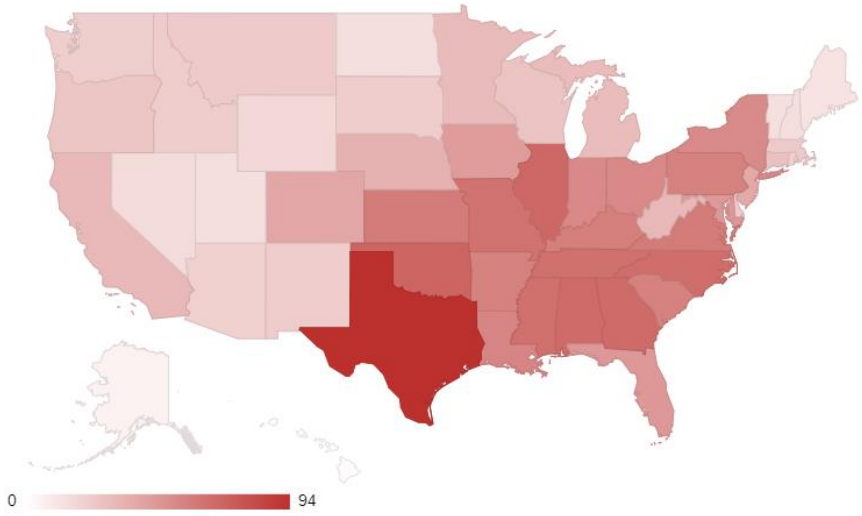
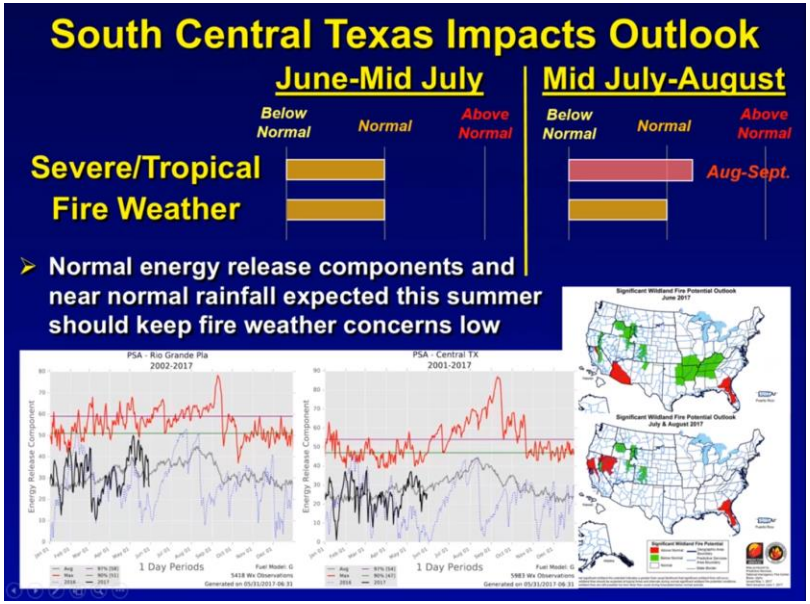
Motivations

- As of July 7, 2017, Texas leads the U.S. in CPI-Adjusted Billion-Dollar Weather and Climate Disasters
  - Record drought and subsequent flooding, most catastrophic wildfires and costliest hailstorm in state history since 2010
- Beginning fall 2015, EWX produced quarterly seasonal outlooks for stakeholders to inform potential for upcoming season to be above normal, near normal, or below normal





Objectives

- Verification Indices for:
  - Severe Weather
  - River and Flash Flooding
  - Fire Weather
  - Winter Weather
- Subjective vs. Objective forecasting
- Comparison of Subjective, Objective Hindcasts
  - Modified Heidke Skill Score
  - Ranked Probability Score

Background

- Separation into winter (DJF), spring (MAM), summer (JJA), fall (SON)
- One report day considered to be 12Z to 12Z the next day
  - Fire dataset did not have time listed, report day simply by date
- List all relevant co-collaborators, i.e. other students, your mentors and co-mentors, etc.
- Describe the approach or methodology
  - What assumptions were made
  - What is the anticipated outcome

Severe Weather

- Climatology: 1981-2010
  - Dataset obtained from NCEI Storm Events Database
- Indicators:
  - Occurrence
    - Number of reports
    - Number of days with a report
    - Total rainfall
    - Total tornado path length
  - Severity
    - Maximum tornado width
    - Maximum reported hail diameter
    - Maximum reported non-tornadic wind magnitude
  - Impacts
    - Fatalities, Injuries blend

River and Flash Flooding

- Climatology: 1981-2010
  - 1981-1995 compiled using storm events publications, office E-5s
  - 1996-2010 compiled using storm events database
- Indicators:
  - Occurrence
    - Number of reports
    - Number of days with a report
    - Total CWA rainfall
  - Severity
    - Maximum 1 day rainfall
    - Maximum 2 day rainfall
  - Impacts
    - Fatalities, Injuries blend
    - Number of times selected river gages went above moderate flood stage

Fire Weather

- Climatology: 2000-2014
  - Dataset obtained from Texas State Fire Marshal's Office
  - Dataset goes back to 1982, no reported acres burned 1982-1999
- Indicators:
  - Occurrence
    - Number of fire reports
    - Number of days with a fire report
    - Total CWA rainfall
  - Severity
    - Total acres burned
    - Keetch-Bynum Drought Index (spring, summer); number of dry frontal passages (fall, winter)
    - Average maximum temperature?
  - Impacts
    - Fatalities, Injuries blend

Winter Weather

- Climatology: 1981-2010
  - 1981-1996 compiled using storm events publications
  - 1996-2010 compiled using storm events database
- Indicators:
  - Occurrence
    - Number of reports
    - Number of days with a report
  - Severity
    - Maximum 1 day snowfall
    - Maximum 2 day snowfall
    - Number of days below freezing?
  - Impacts
    - Fatalities, Injuries blend

Summary

- Summarize your project and results.

Next Steps

- James Bruce Morehead Award at OU
  - Expand to individual states, Southern Plains
  - Integration into experimental developments of seasonal severe weather forecasts made by the SPC and CPC
  - Meeting with WFO DTW to discuss application of winter weather process to regions with more experience
- Use PRISM gridded data to eliminate assumptions made in using climate divisions
- Add downriver streamflow as an indicator to river flooding
- Expansion to WFOs across the U.S. in 2021

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Works Cited

- NOAA National Centers for Environmental Information (NCEI) U.S. Billion-Dollar Weather and Climate Disasters (2017). https://www.ncdc.noaa.gov/billions/