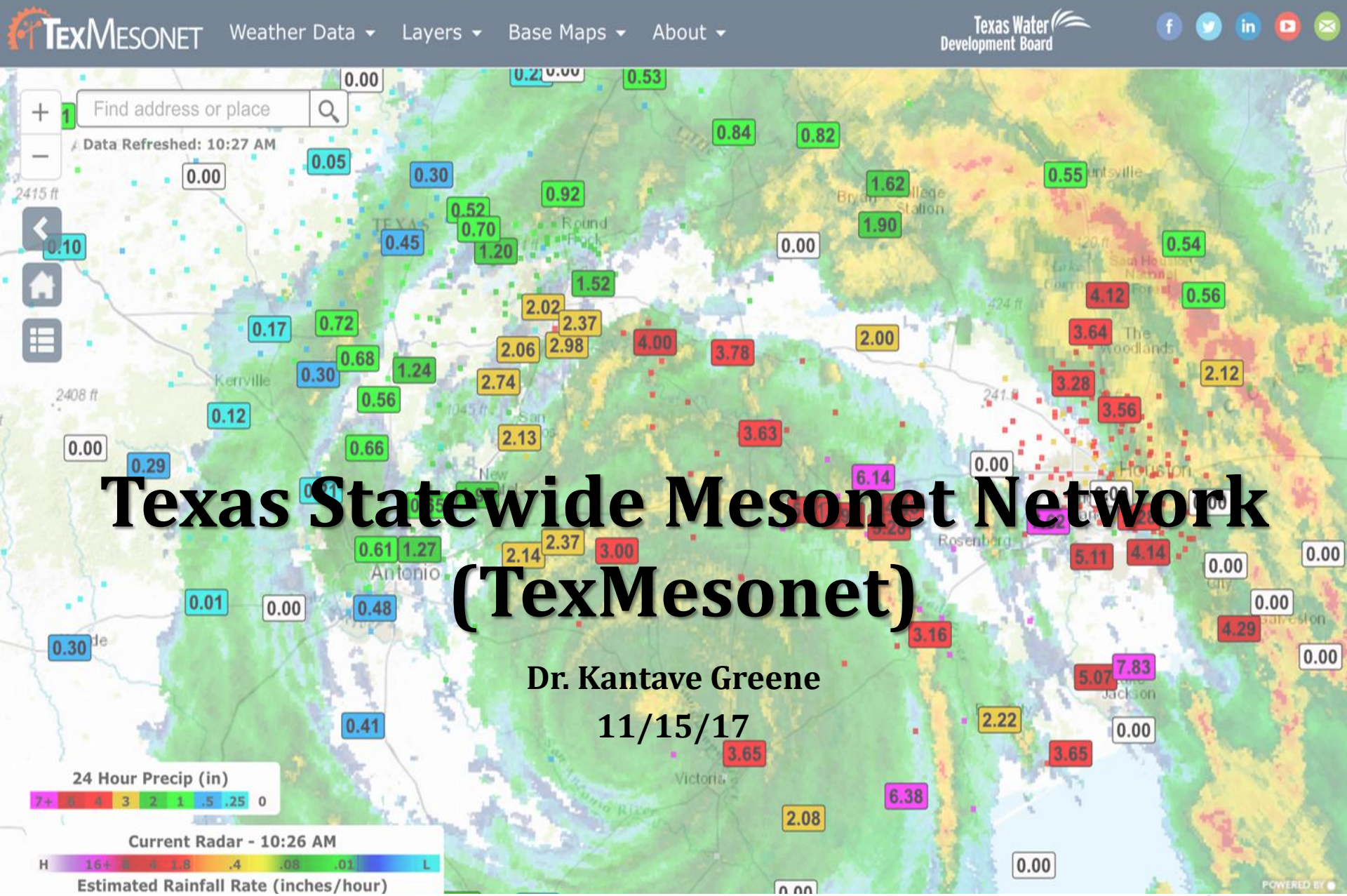


Texas Statewide Mesonet Network (TexMesonet)

Dr. Kantave Greene

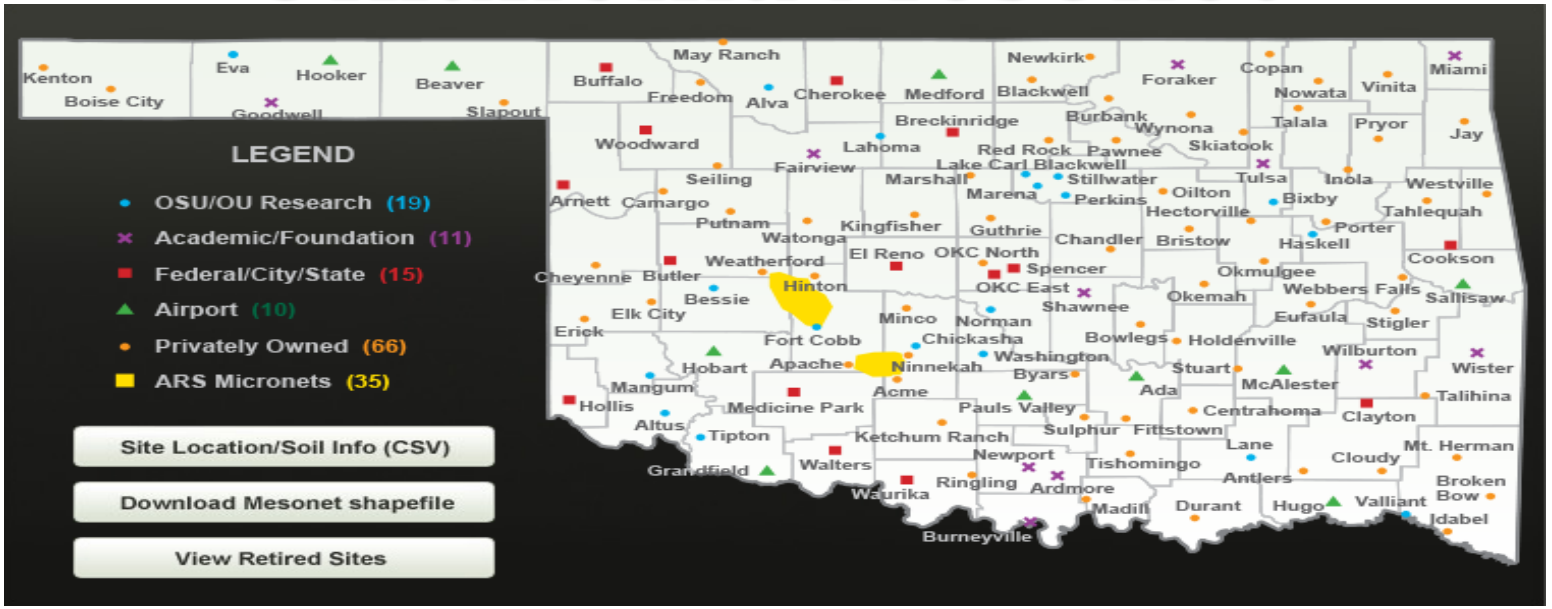
11/15/17

Why Mesonets?

- Observe weather features
  - Thunderstorms
  - Dry-lines
  - Squall lines
  - Sea breezes
- Improve weather & flood forecasts
- Drought monitoring
- Assist crop productivity
  - Irrigation scheduling
  - Prescribe burn advisories
  - Planting and harvesting
- Near real-time data for school
- Recreation

Under-sampling of urban, coastal, and mountainous regions leaves large populations at risk in areas where there is wide variability in local weather.

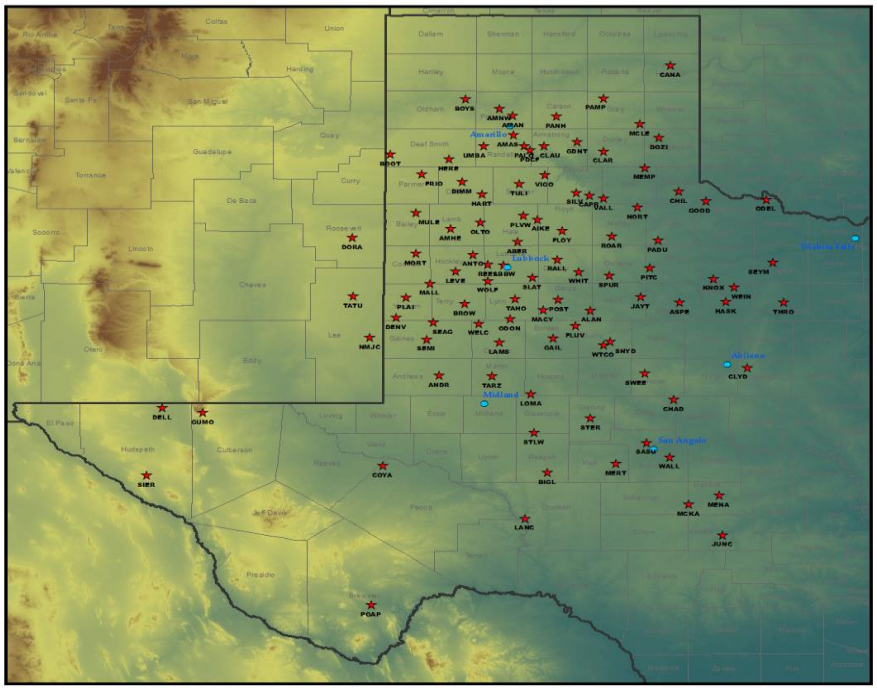
Oklahoma Mesonet



- Standard bearer: Oklahoma
  - 121 stations – at least one station per 77 counties
  - 10m towers with 5 mins obs
  - Standard measurements include: temp, RH, winds, press, rainfall, solar radiation & soil temp (cover/bare)

West Texas Mesonet - Texas Tech University

- Established in 1999
- Concentrated in the Texas Panhandle
- 109 sites in 61 counties & New Mexico
- 5 min obs



TexMesonet - Rationale

- Population growth: more lives at risk
  - "Flash Flood Alley" in Central Texas
  - Memorial Day Floods - Houston 2015 & 2016
  - Hurricane Harvey 2017

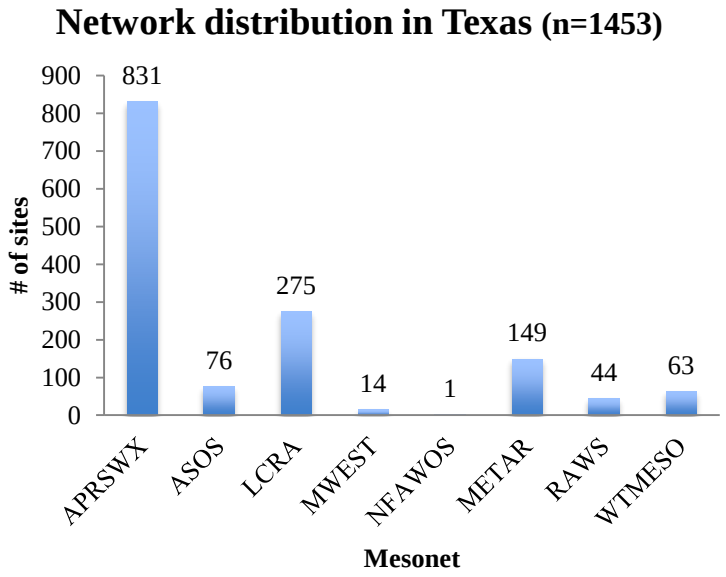
- Extreme Weather Events
  - Shift in weather events
  - Increase frequency/intensity of events
  - Increase socio-economic impact to daily lives

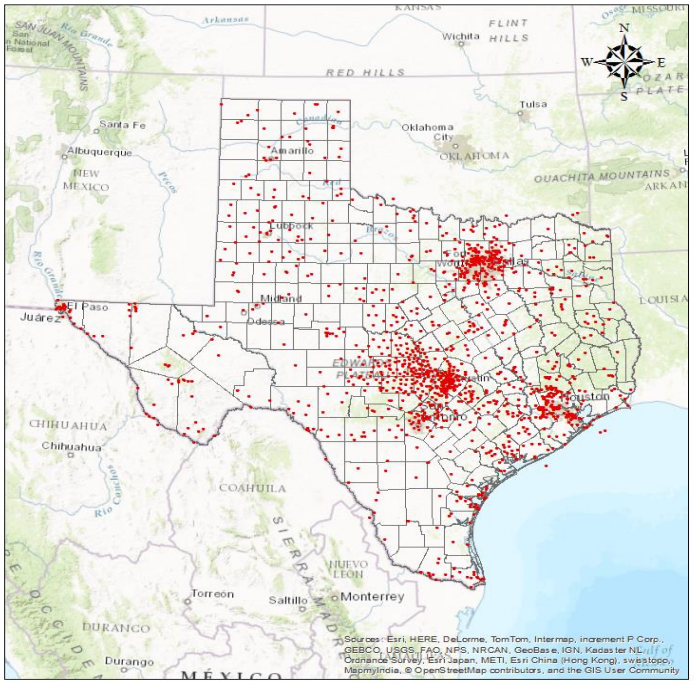
TexMesonet - Goals

- TWDB does surface & groundwater monitoring
  - Close the cycle to include atmospheric monitoring
- Build on existing networks
  - (LCRA, EAA, TCEQ, GCDs, Parks & Wildlife)
- Integrate local and regional networks
  - NWS, MesoWest
- Develop a statewide mesonet
  - Provide real-time, quality data
    - Forecasters
    - Modelers
    - General public

THE ISSUE

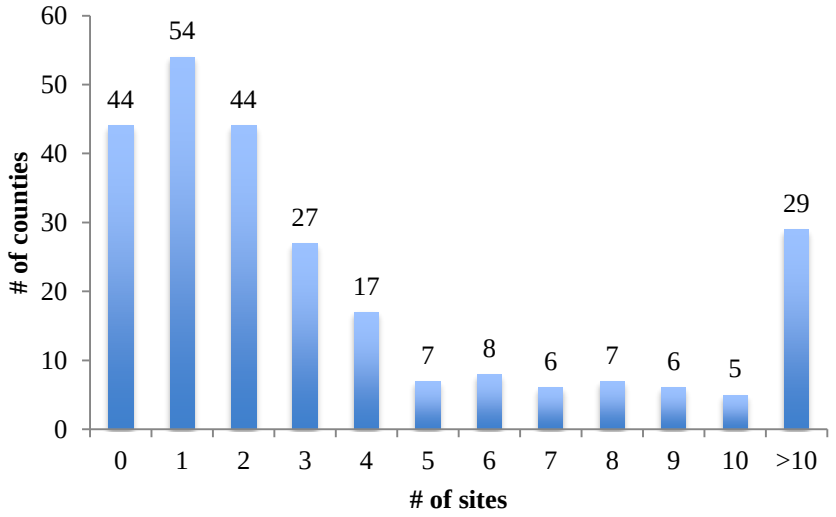
Observational Points in Texas



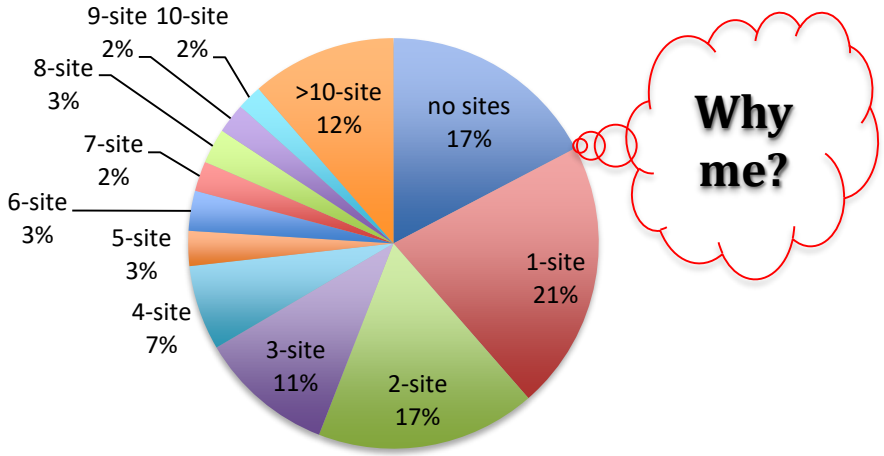


- Federal system (ASOS/METAR) comprise 15% of the network
- University run network (WTMESO/MWEST) comprise 6% of the network
- Largest network comprise of local citizens
  - Data reliability and usability to forecasters and modelers

Distribution of the number of sites per county in Texas



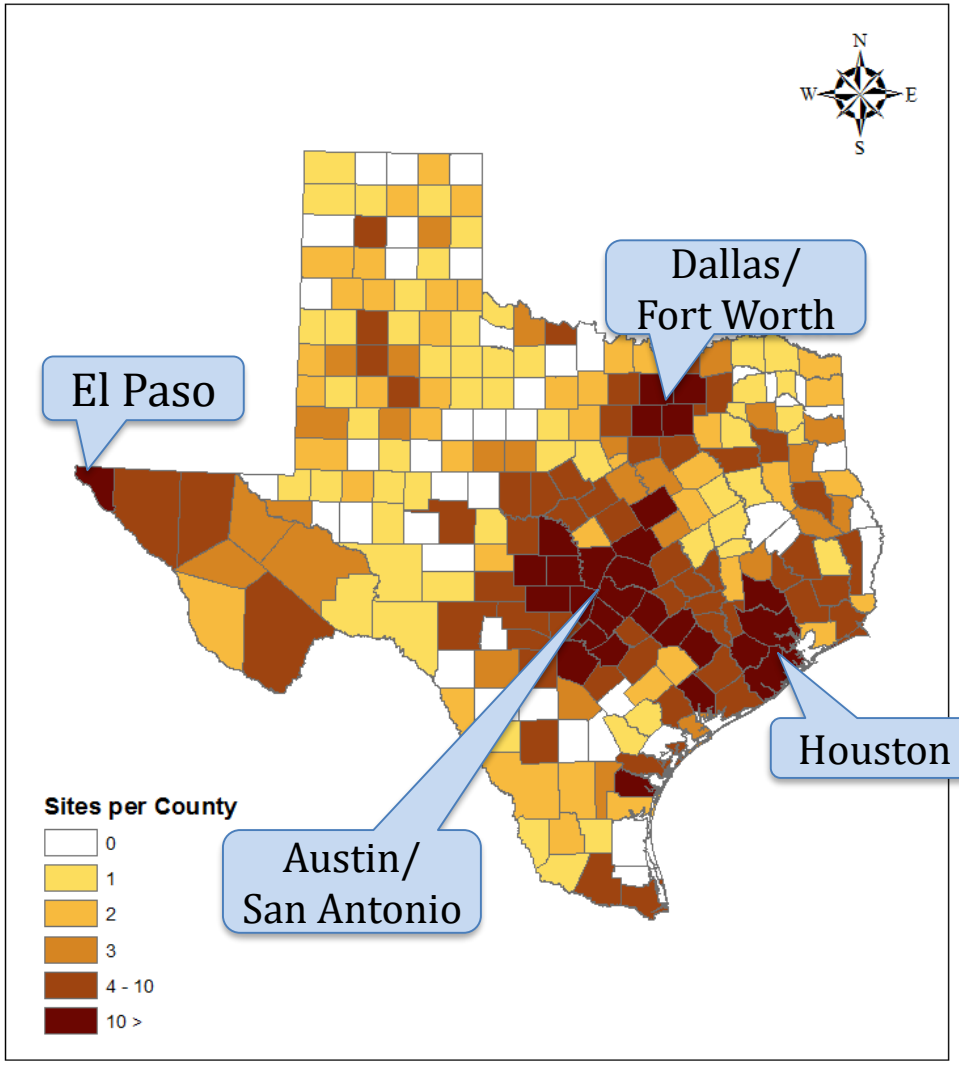
Percent distribution of the number of sites per county in Texas



- 44 counties or 17% of the state have no observational site
- 49% of the state has at least 3 obs. sites within a county
- Sites are concentrated within 29 counties or 12% of the state
- Counties with >10-sites are:
  - Metro areas (Austin, San Antonio, Dallas/Fort Worth, Houston)
  - Large flood monitoring networks (LCRA & HCFCD)

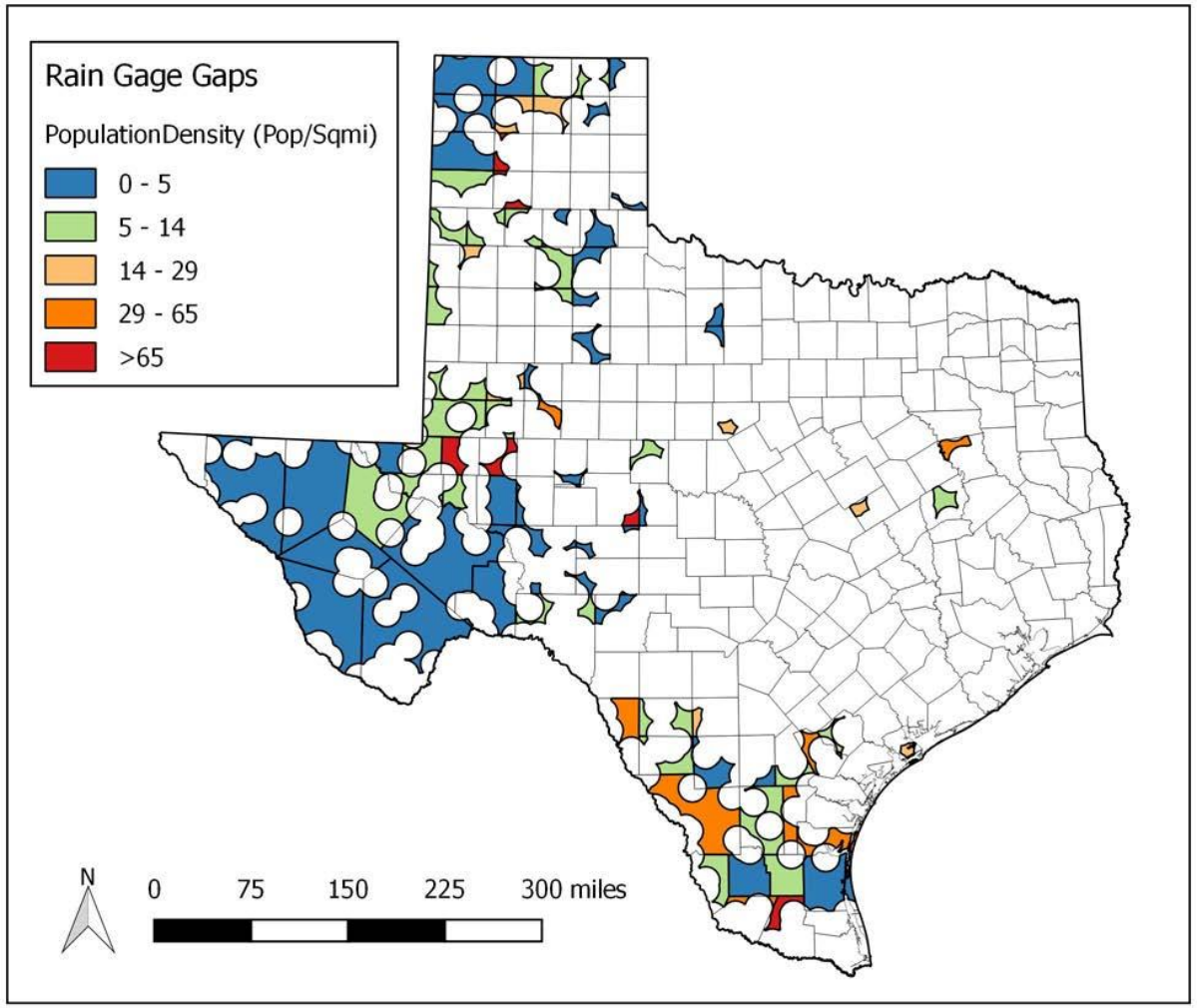
Site Distribution per County in Texas

- Is their significance for counties with no sites?
- Is it due to population density?
- Are these counties *now* significant to the evolving weather pattern?

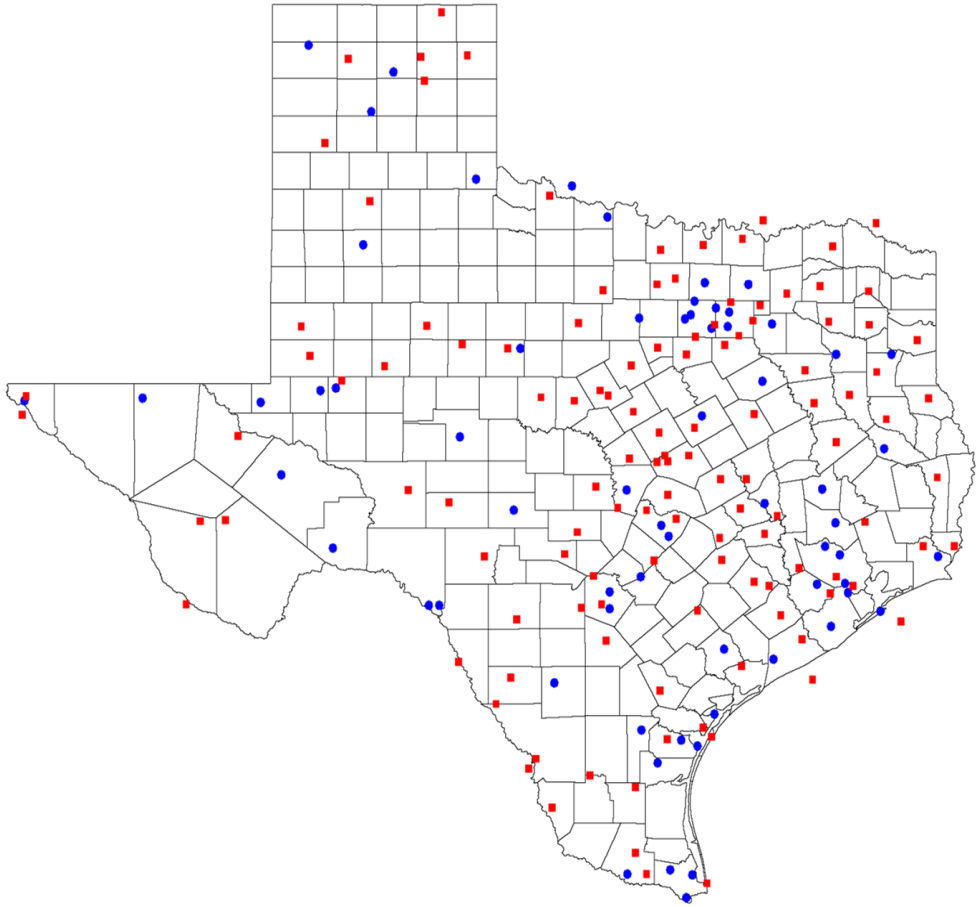


Lack of Rainfall Coverage

Source:
http://www.twdb.texas.gov/publications/reports/contracted_reports/doc/1600012027_aquaStrategies.pdf



Location of Federal Sites within Texas



TexMesonet - Current Status

www.texmesonet.org

TexMesonet

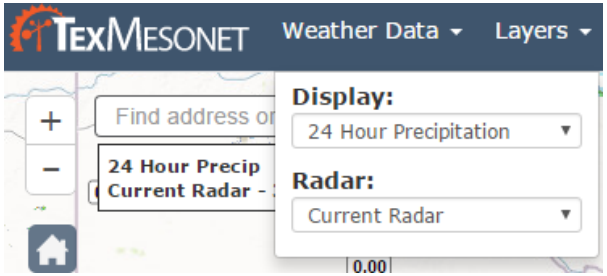
- 16 stations installed across 8 counties
- Est. 4 more by end of year 2017
  - Objective
    - 1 primary station per County
    - *(est. 20 mile separation between sites)*
    - Several secondary (rain gage) stations per County to get denser rainfall measurement
    - *(est. 11 mile separation between sites)*
- Full time staff
  - Three field staff and two IT staff

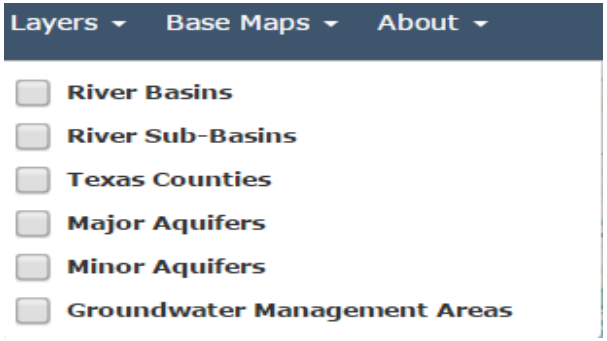
TexMesonet - Current Status

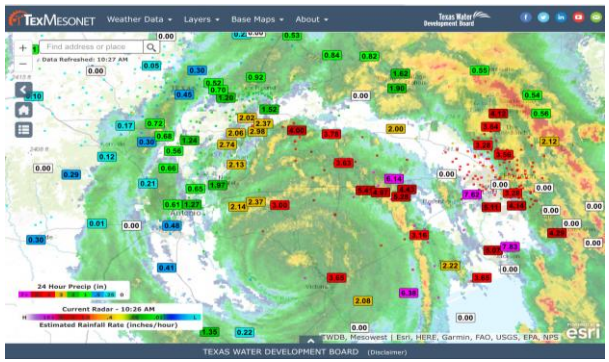
www.texmesonet.org

Network-of-Network

- Web viewer utilizing ArcGIS serving surface and weather layers
- Over 2200 existing stations from 13 mesonets
- Over 1000 stations within Texas at any given time
- Data ingestion via Mesowest

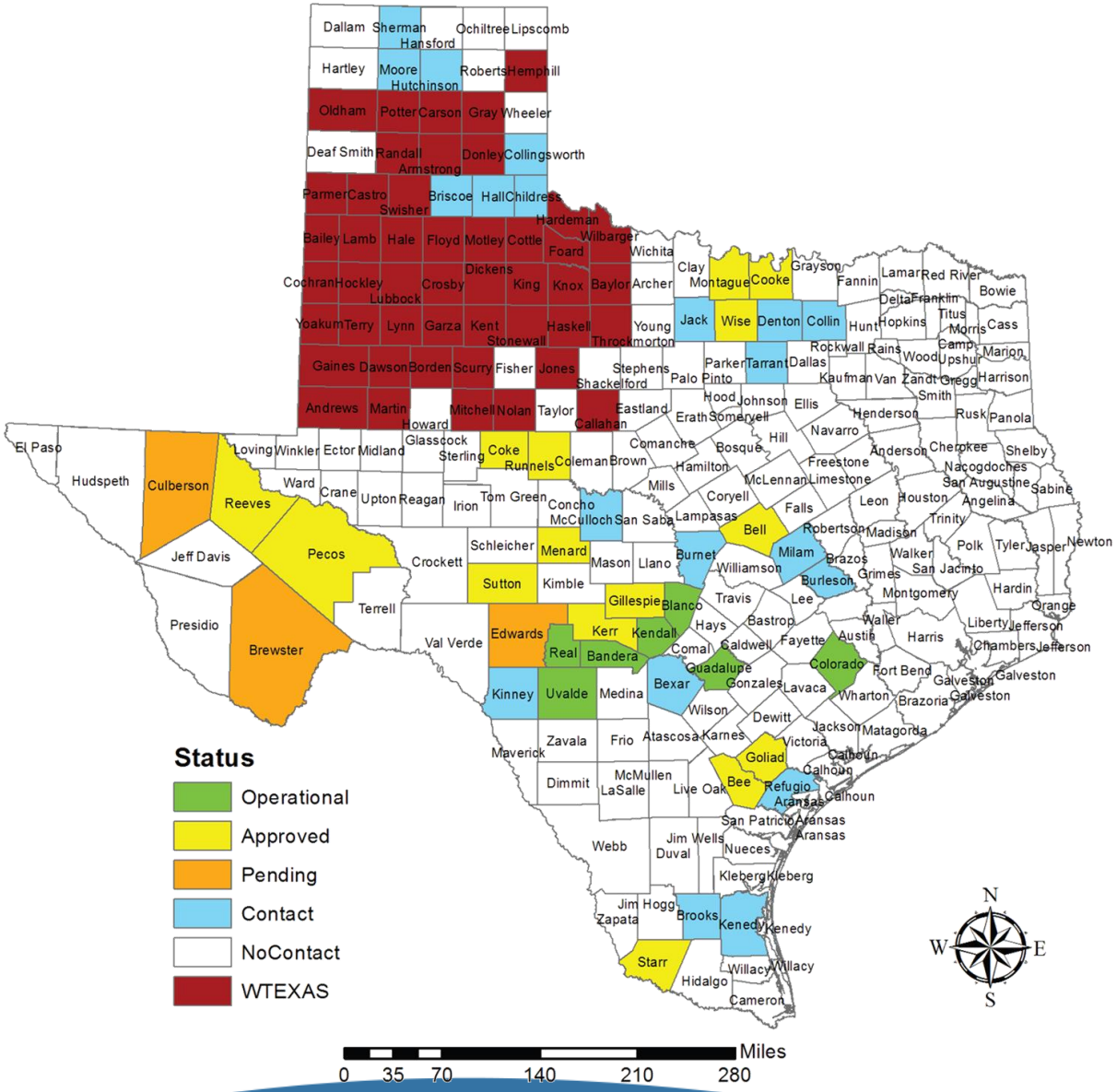






Texas Water Development Board

TexMesonet Status Map –Nov 2017

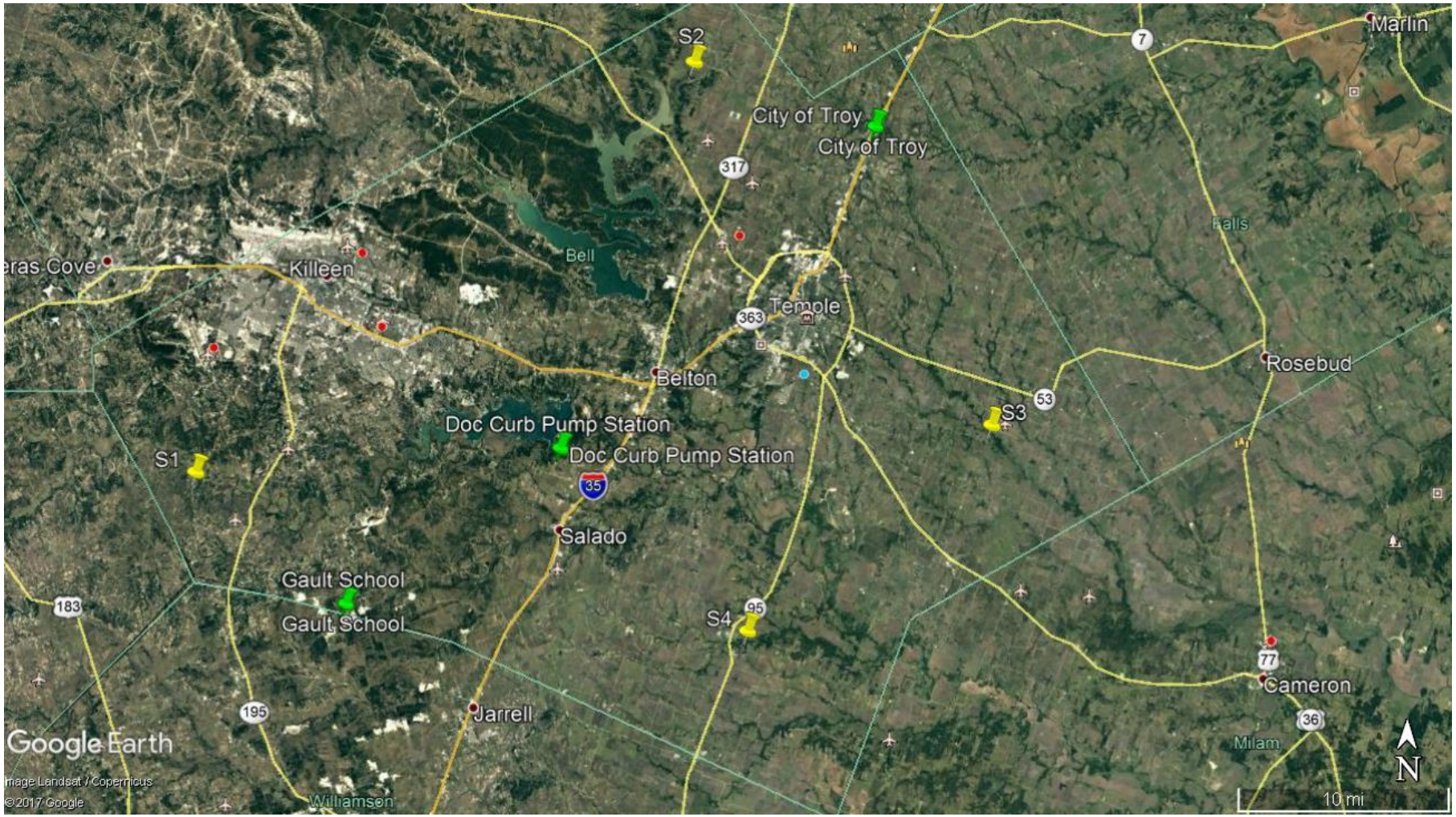


Counties

Operational	8
Approved	17
Pending	4
Contact	21
WTEXAS	46
No Contact	153

Bell County Earth Observation Network

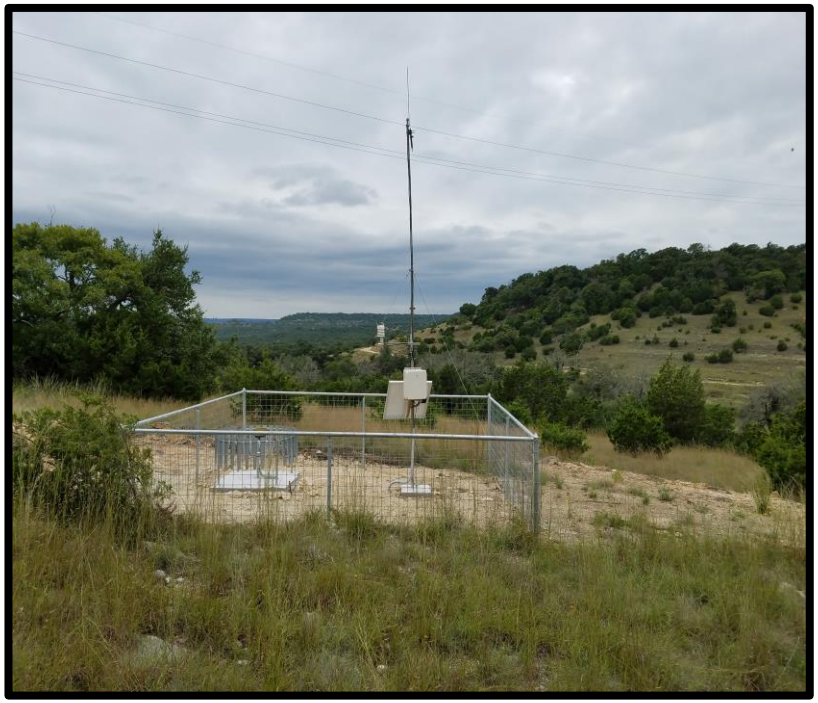
Red: NWS/FAA **Blue**: RAWS **Green**: TexMesonet Yellow: Potential Sites



TexMesonet Sites

Colorado County

Blanco County



Primary Site

- ❑ 40 x 40 foot hog panel fenced area
- ❑ 30 foot tower
- ❑ Monitoring at 30 feet and 5 feet

Secondary Site

- ❑ 24 x 24 foot fenced area
- ❑ 10 foot tower
- ❑ Monitoring at 5 feet

Monitoring: Temperature, winds, rainfall, and soil temperature/moisture

* Optional: Pressure, solar radiation, well water depth

TexMesonet

HOW CAN WE HELP YOU???

- ❑ Clearinghouse for statewide weather data
- ❑ Repository for: Reliable, Accurate, Trustworthy data
- ❑ Automate the collection, storage & dissemination of near, real-time rainfall data
- ❑ Reduce man hours collecting rainfall and in some cases well data
- ❑ Provide district wide, customizable, and downloadable maps and data

WHERE CAN WE COLLABORATE???

- ❑ Find landowners willing to have a site on their property
- ❑ Identify locations that will capture rainfall distributions in the county or district
- ❑ Improve and or expand existing networks

CONTACT US

www.texmesonet.org

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  512-475-0465
- Mark Olden
  mark.olden@twdb.texas.gov
  512-468-8090
- Maureen Sanders
  maureen.sanders@twdb.texas.gov
  512-475-0267

Email Support
texmesonet@twdb.texas.gov
512-936-0871

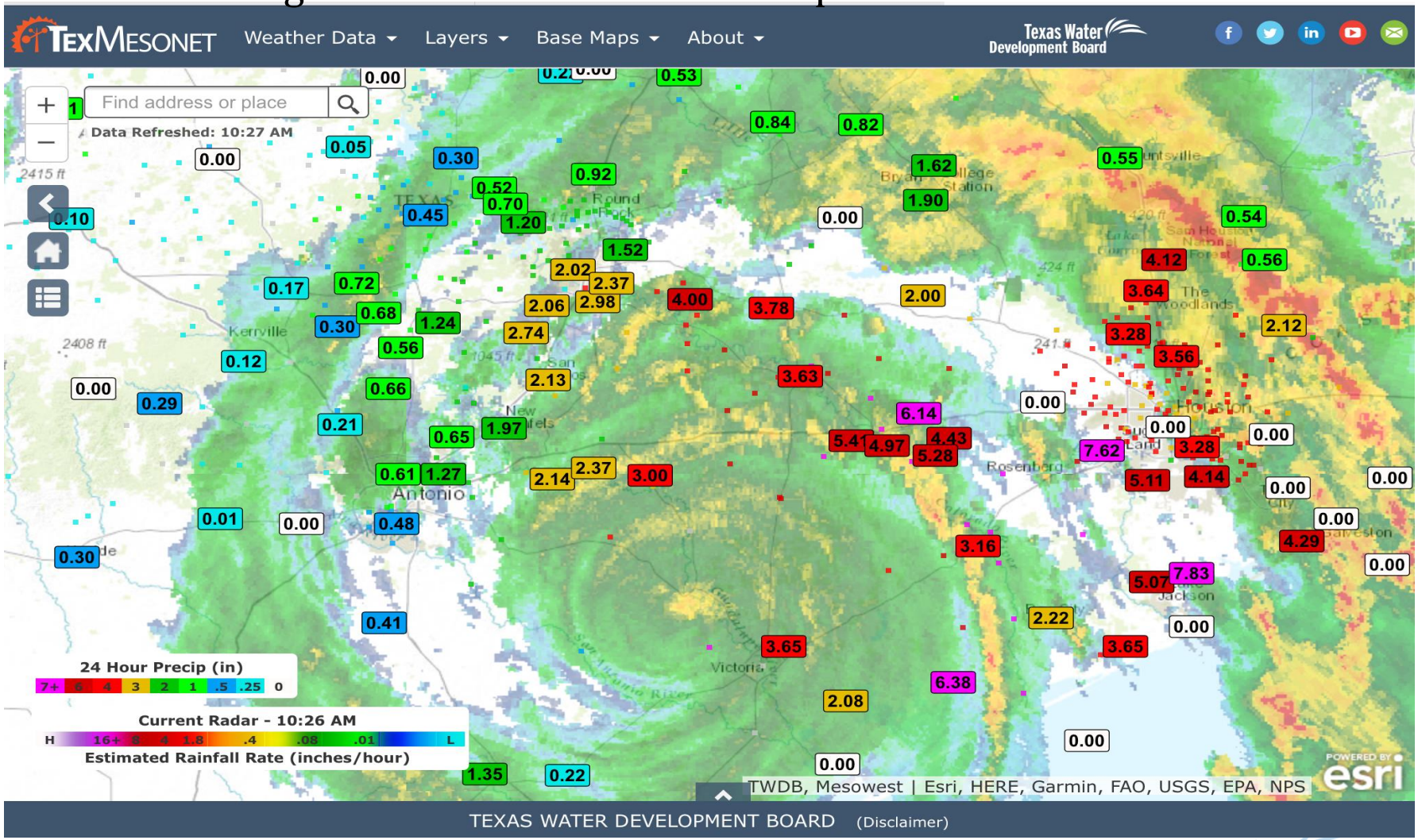
Physical Address:
P.O. Box 13231
1700 N. Congress Ave.
Austin, TX 78711-3231

The End

Hurricane Harvey at 10:26am CDT on August 26th 2017.

Locate 115 MI SE of Corpus Christie. Max winds 110 MPH

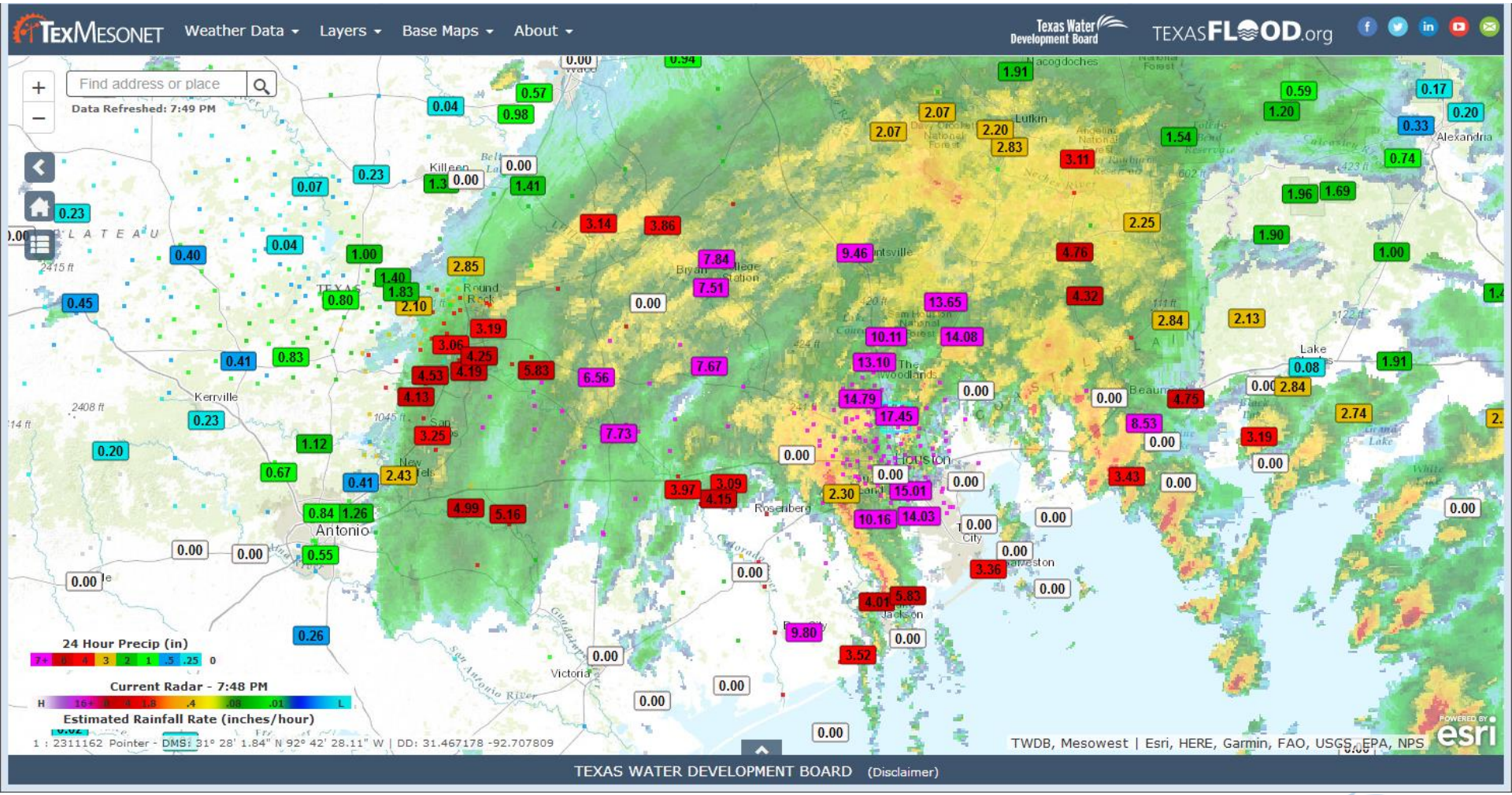
Moving NW at 10 MPH with central pressure 947 millibars



Tropical Storm Harvey at 7:00pm CDT August 27th 2017.

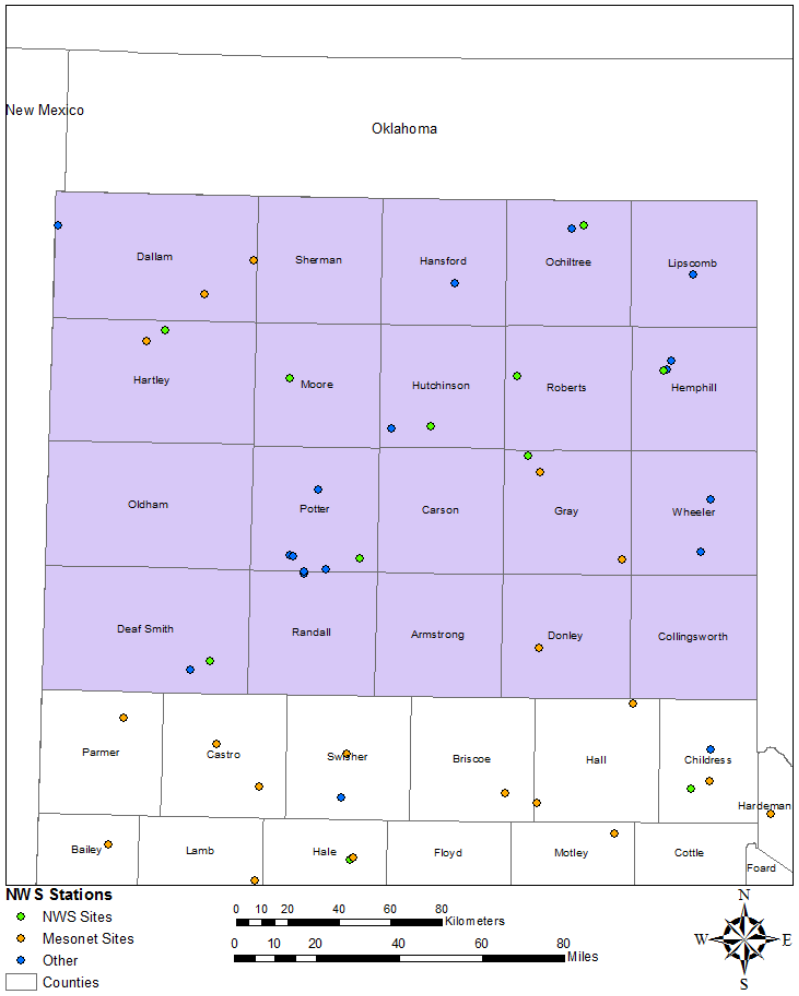
Located 10 miles NE of Victoria, TX. Max winds 40 MPH

Moving SE at 3 MPH with Central pressure 1000 millibars



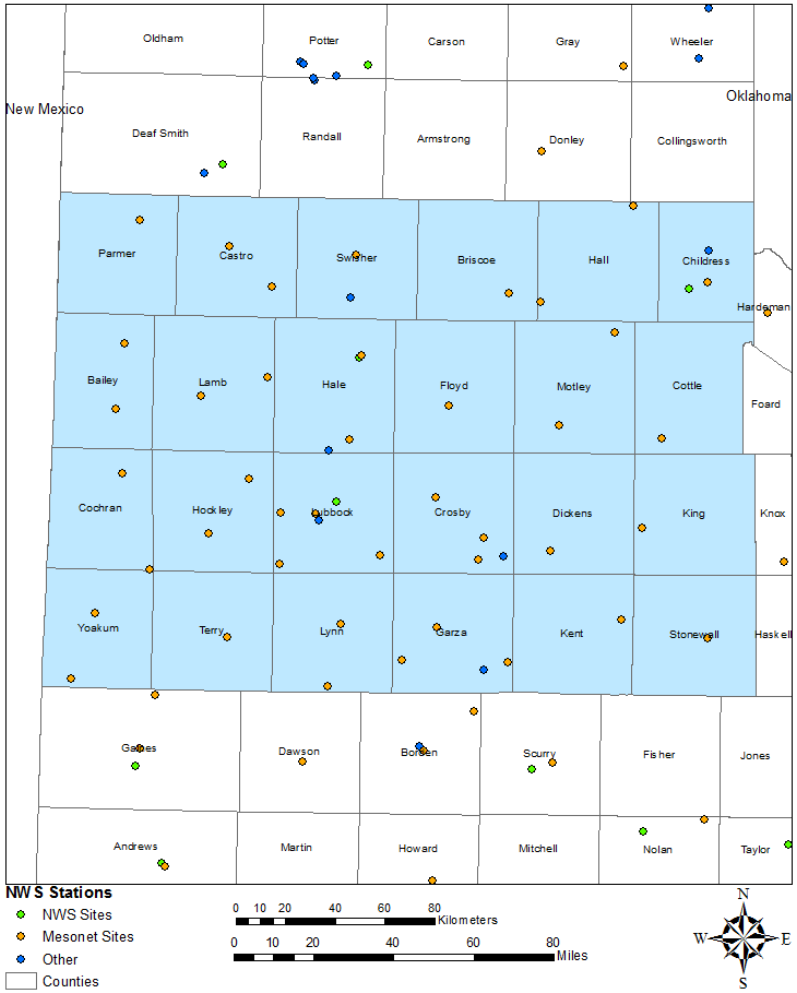
NWS - Amarillo

(Panhandle)



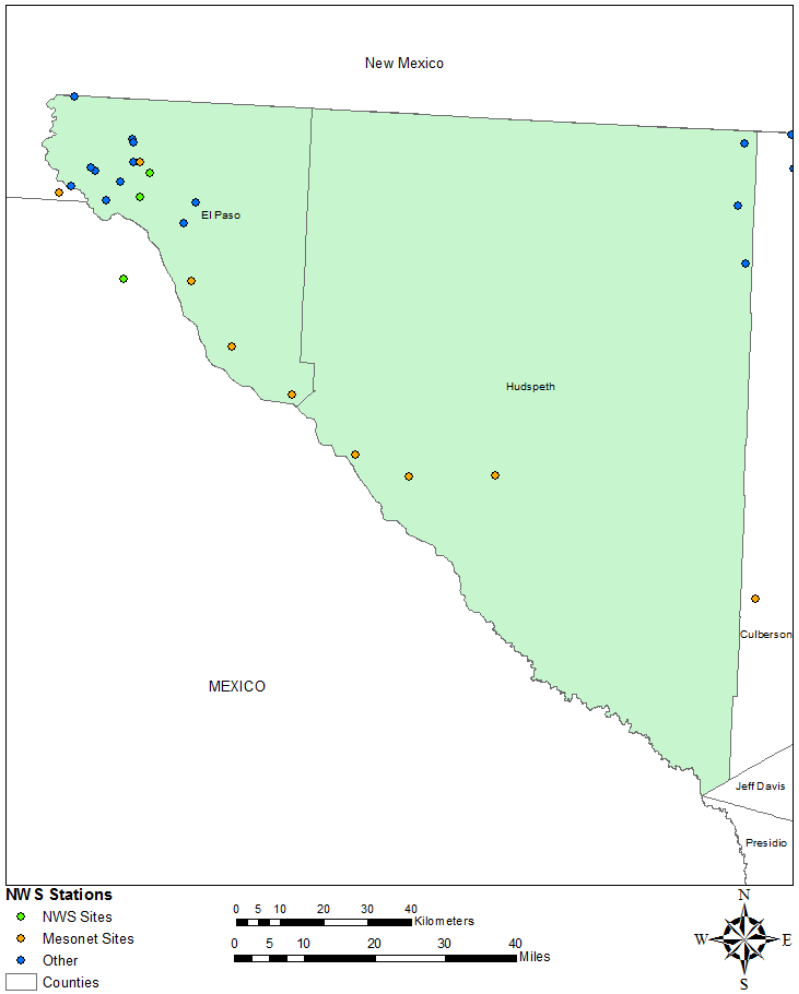
NWS - Lubbock

(North West Texas)



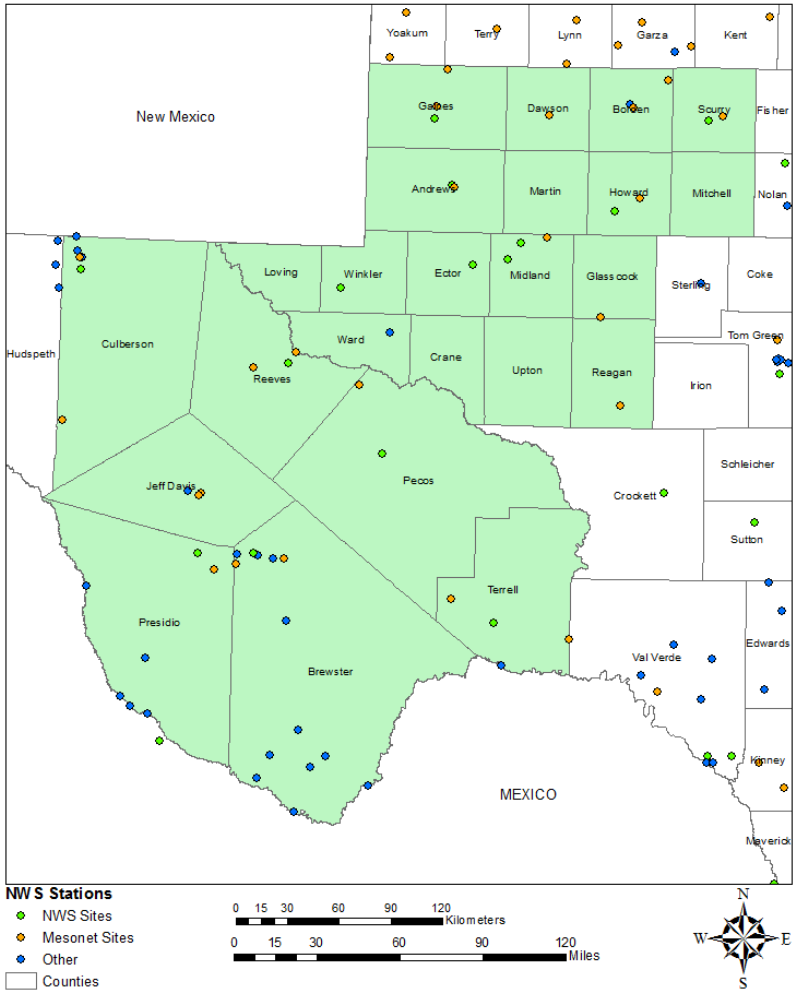
NWS - El Paso

(West Texas)



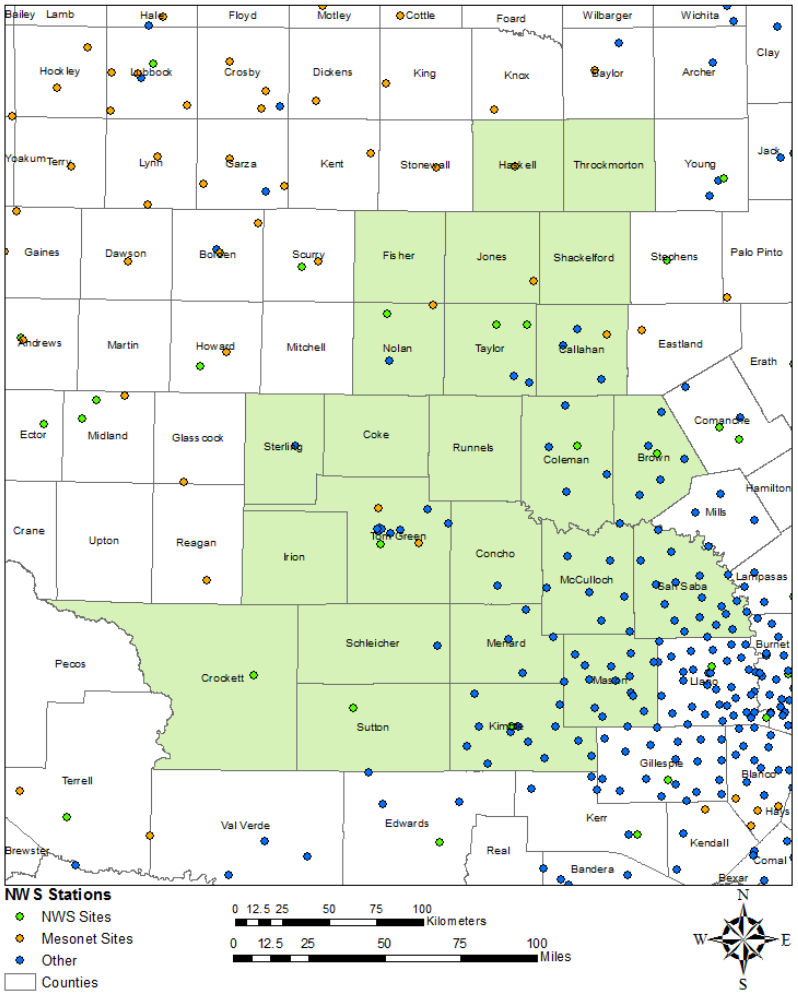
NWS - Midland, Odessa

(West Texas)



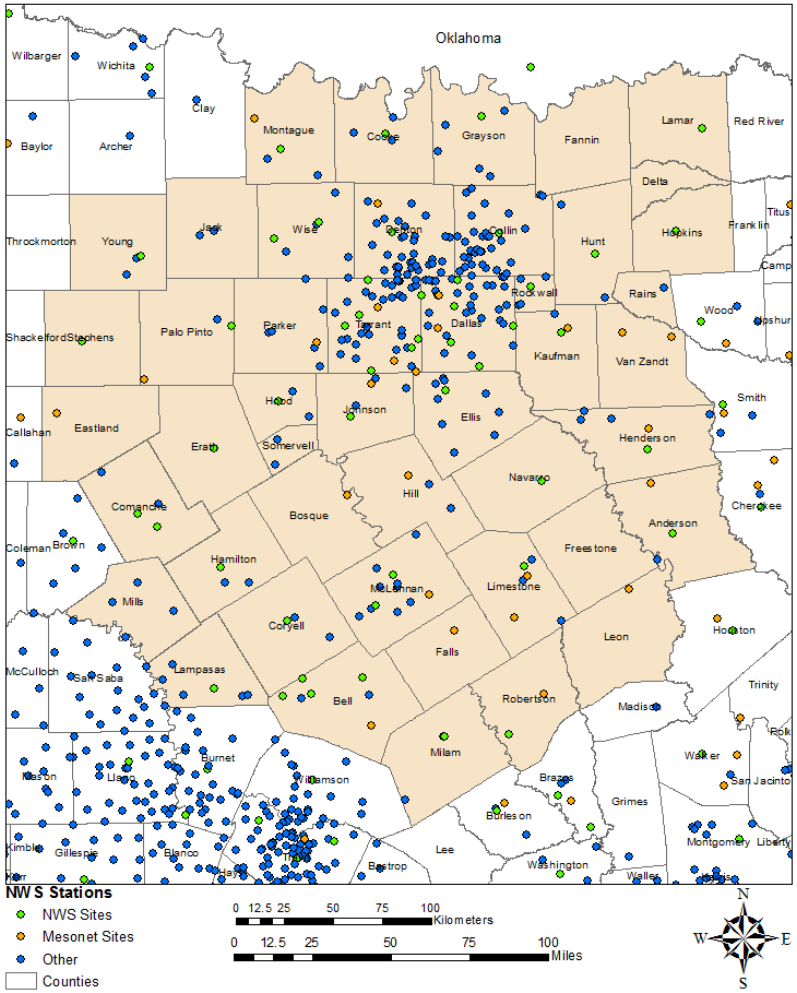
NWS - San Angelo

(Central Texas)



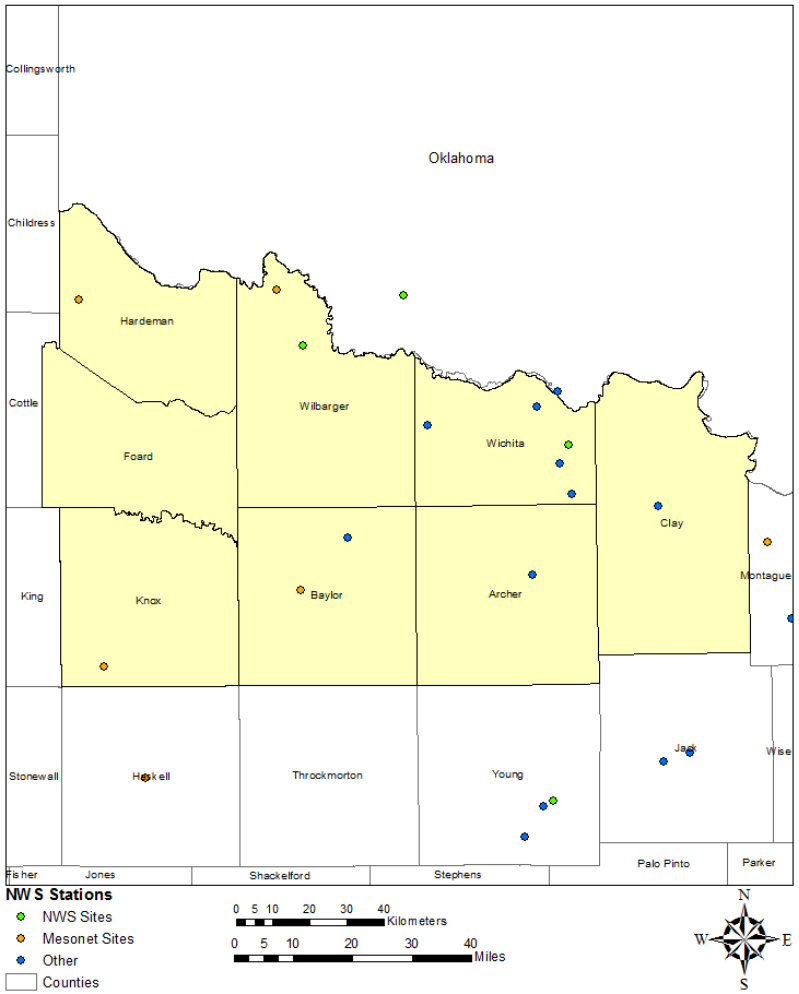
NWS - Fort Worth, Dallas

(North Central Texas)



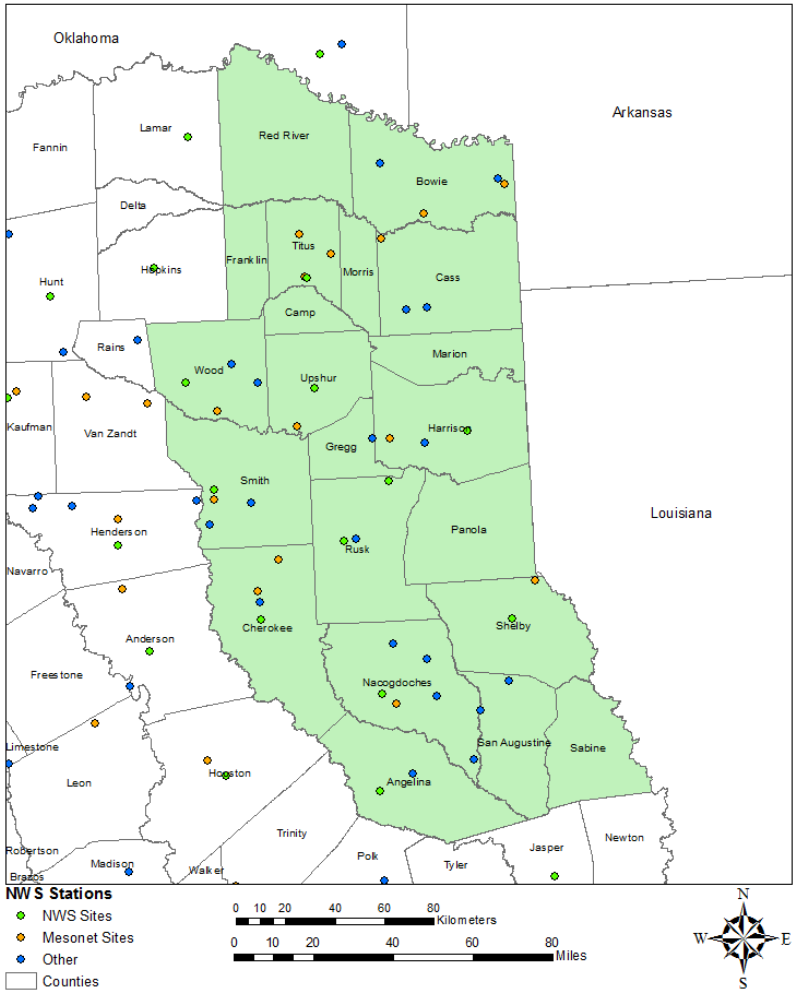
NWS - Norman, Oklahoma

(North Central Texas)



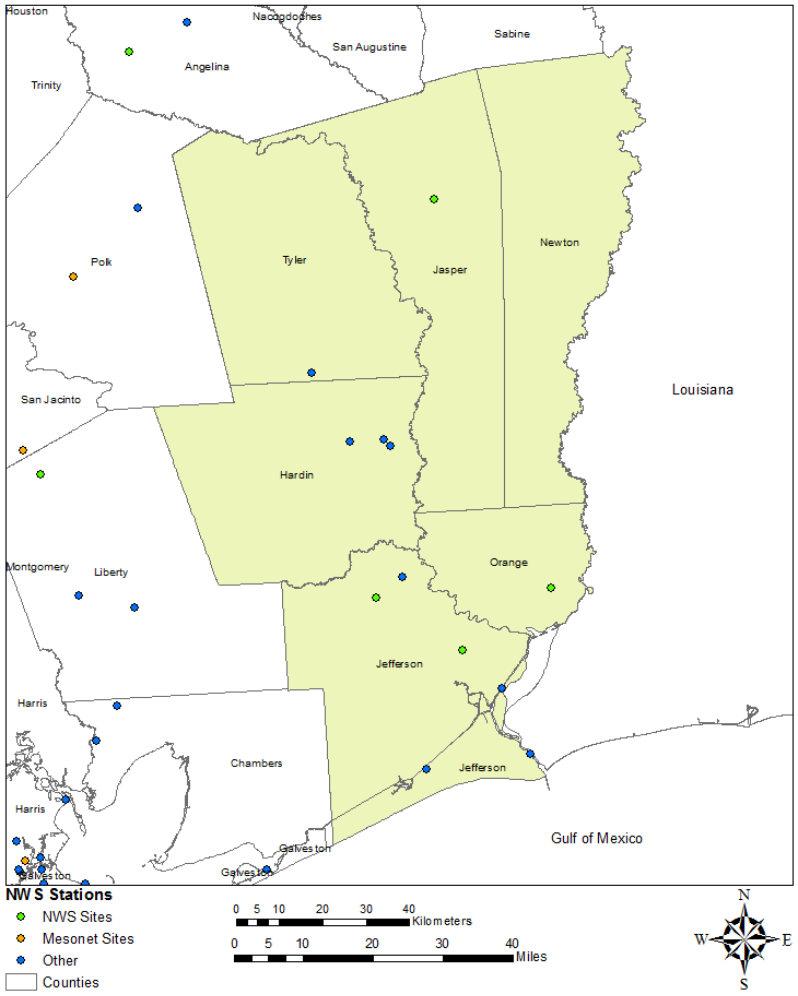
NWS - Shreveport

(North East Texas)



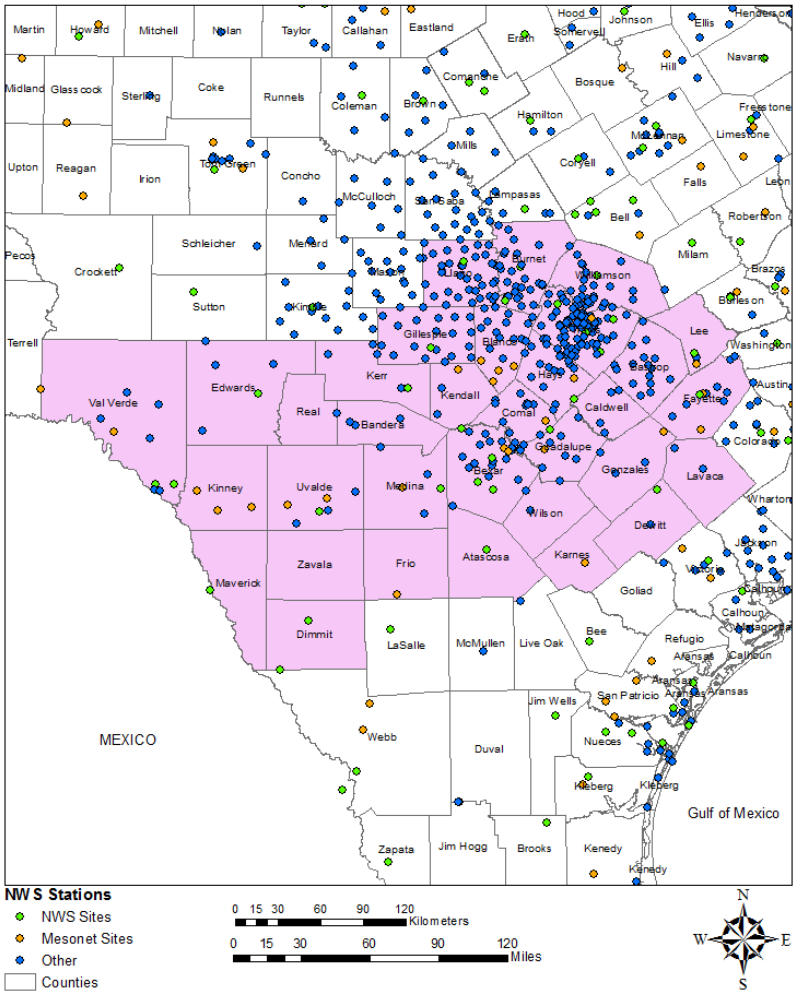
NWS - Lake Charles

(South East Texas)



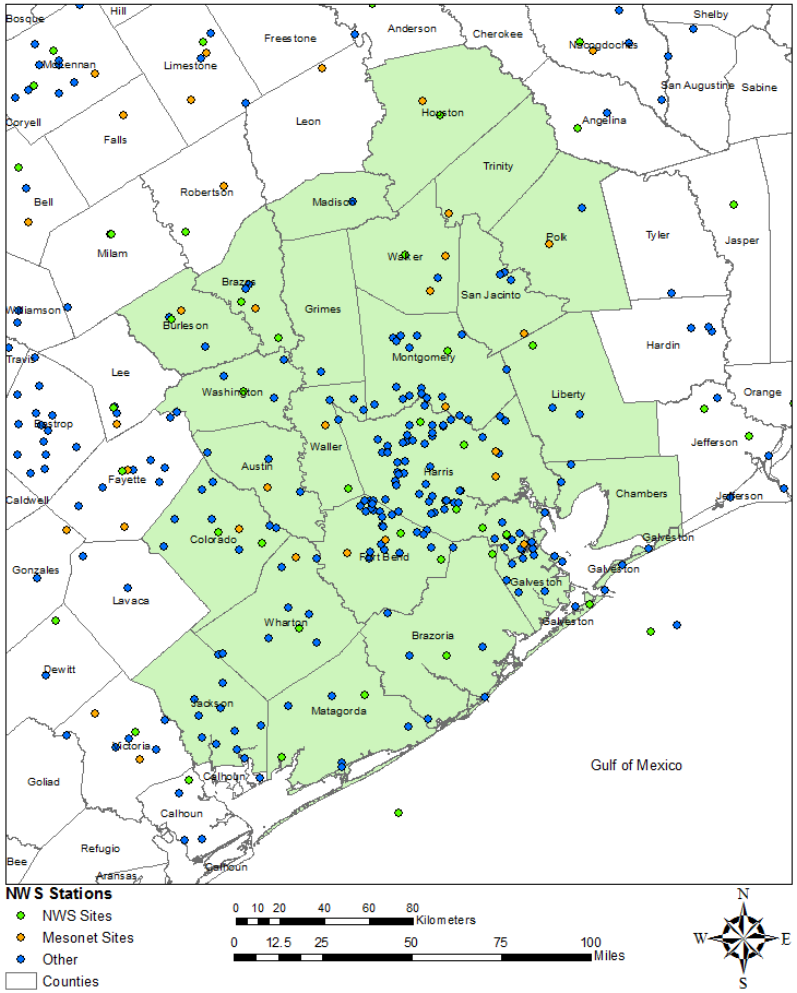
NWS - Austin, San Antonio

(South Central Texas)



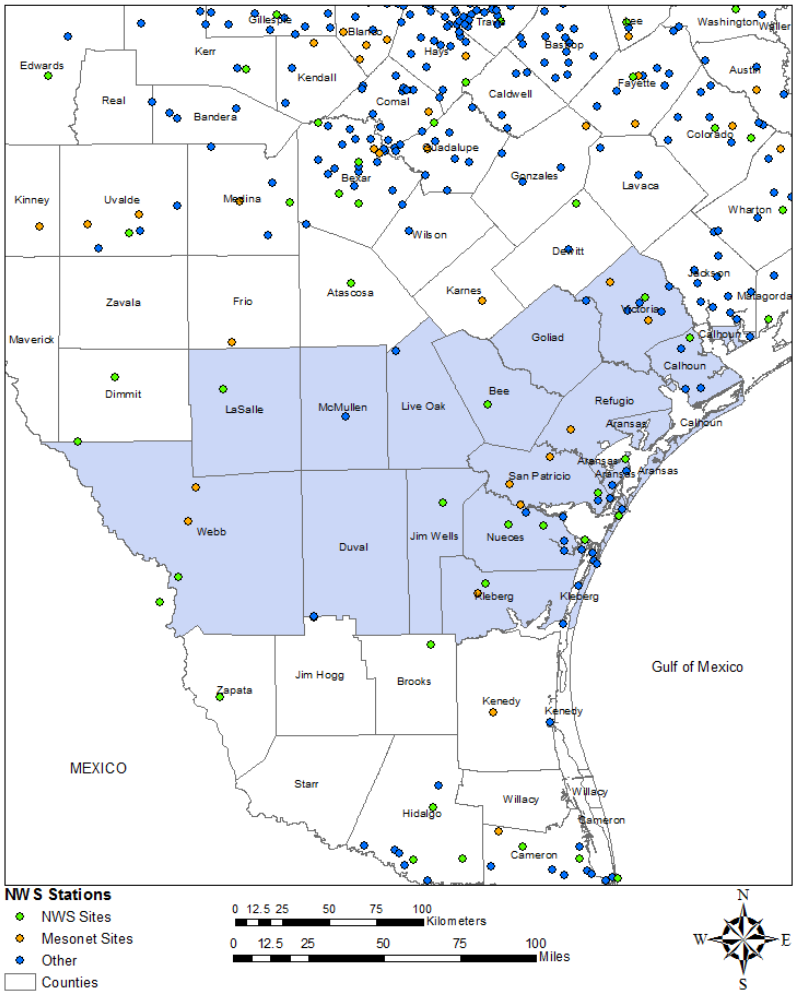
NWS - Houston, Galveston

(South Central Texas)



NWS - Corpus Christi

(South Texas)



NWS Stations

- NWS Sites
- Mesonet Sites
- Other
- Counties

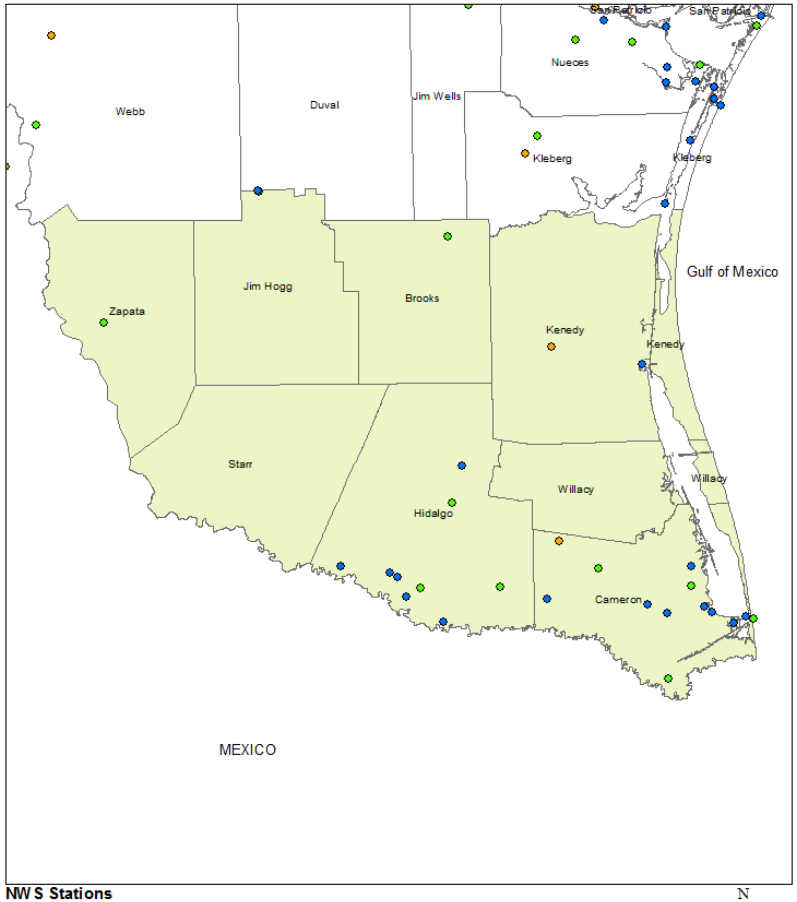
0 12.5 25 50 75 100 Kilometers

0 12.5 25 50 75 100 Miles

N W E S

NWS - Brownswille

(South Texas)



NWS Stations

- NWS Sites
- Mesonet Sites
- Other
- Counties

0 5 10 20 30 40 Kilometers

0 5 10 20 30 40 Miles

N W E S