WATER, WASTEWATER, AND STORMWATER

Texas Climate Factsheet

February 3rd, 2025

SOUTHWEST ENVIRONMENTAL FINANCE CENTER

SOUTH CENTRAL CLIMATE ADAPTATION SCIENCE CENTER

Climate change affects both typical and extreme weather.

Averages

- Temperature Increase
- Precipitation Change
- Sea Level Rise & Tidal Flooding

Extremes

- Extreme Rainfall & Storms
- Extreme Heat & Cold
- Wildfire
- Drought
- Hurricanes
- All

This can have multiple impacts on utilities. Climate change can . . .

...make it harder to meet community needs for water.

There may be reduced water supply, caused by:

- Change from snow to rain, streamflow timing
- Increased evapo-ration & transpiration by plants
- Decreased surface water
- Decreased infiltration & recharge to ground water
- Dry, hydrophobic soils with increased run-off, less capture

There may be decreased water quality, caused by:

- Biological/microbial growth, e.g., HABs
- Heavy runoff and high winds causing erosion, contamination*
- Smoke & contamination*
- Loss of vegetation, heavy runoff causing erosion, contamination*
- Less dilution, higher concentrations of contaminants
- Salt water intrusion

There may be increased demands for water, used for:

- Human consumption
- Gardens, trees, other plants
- Cooling

**Chemical, mineral, organic, and particulate contamination, depending on source*

...affect utility infrastructure.

Extreme weather can lead to:

- Damage to physical infrastructure (wells, pipes, treatment, storage, etc.)
- Dry soils, pipe breaks

Infrastructure may be inadequate for:

- Stormwater or combined storm-water/wastewater overflow
- Firefighting

It can affect infrastructure operations tied to:

- Reservoir levels
- Wastewater evaporation
- Water and wastewater treatment chemistry
- Electrical power
- Telecommuni-cations service & transportation access

...affect utility administration and operations.

There may be inadequate funding for operations and improvements, associated with:

- Population decline, fewer ratepayers
- Population increase, causing greater infrastructure needs
- Financing linked to to climate vulnerability, such as bond ratings

Staff and board member availability may decrease due to:

- Population decline
- Risks to worker safety & health
- Extreme events limiting availability

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Climate Change Projections

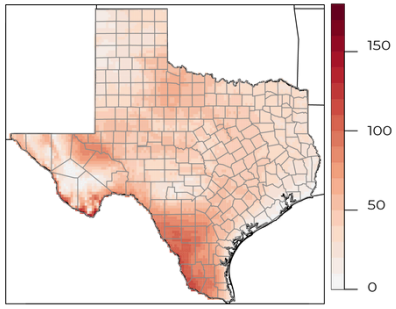
Climate science uses models to project temperature and precipitation, considering them in relation to a historical period (1981-2005) and in the future at mid-century (2035-2065) and the end of the century (2070-2099). The conditions are averaged over the entire time period being considered.

Climate science considers more than one possibility for future climate, based on scenarios developed by scientists and adopted by an international organization, the Intergovernmental Panel on Climate Change. The scenarios incorporate different levels of emissions of greenhouse gases, known as "representative concentration pathways" or RCPs. The levels of emissions are dependent on policy decisions and other factors. RCP 4.5 is considered a "moderate" climate change scenario and RCP 8.5 is considered a "high" climate change scenario.

Climate science uses global climate models to project changes at global scales and downscaling to project changes at local scales. The South Central Climate Adaptation Science Center has used methods known as statistical downscaling on projections from three global climate models from the Intergovernmental Panel on Climate Change in its fifth phase of the Coupled Model Intercomparison Project (CMIP5) to produce regional and local scale projections for the south central United States.

Source: Dixon K.W., A.M. Wootten, M.J. Nath, J. Lanzante, D.J. Adams-Smith, C.E. Whitlock, C.F. Gaitán, R.A. McPherson, 2020: South Central Climate Projections Evaluation Project (C-PrEP), South Central Climate Adaptation Science Center, Norman, Oklahoma, USA. DOI: https://doi.org/10.21429/12gk-dh47

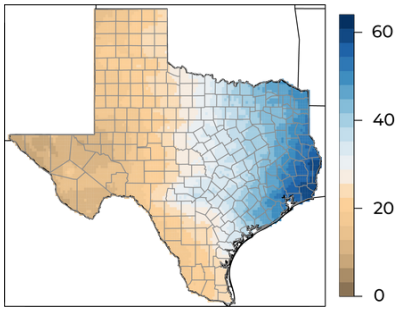
Historical and Projected Future Temperatures and Precipitation Across Texas



Historical Temperature Data

Over the historical period in Texas, the total number of days in a year **over 95˚F** has ranged from **less than 1 to 141 days** and the projected total number of days in a year **over 100˚F** has ranged from **less than 1 to 86 days**, both depending on location.

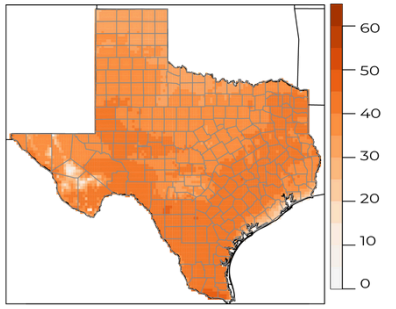
Map 1: *Total Number of Days Over 95˚F, Average from 1981-2005*



Historical Precipitation Data

Over the historical period in Texas, the **total precipitation** over a year has ranged **from 8 inches to 60 inches**, and the **maximum precipitation in one day** has ranged from **less than 1 inch to almost 4 inches**, both depending on location.

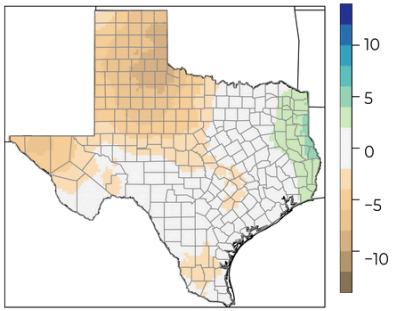
Map 1: *Total Annual Precipitation, Average from 1981-2005*



Moderate Climate Change Scenario

The number of days **over 95˚F** will increase to 3 to 170 days **(an additional 2 to 46 days)**, and the number of days **over 100˚F** will increase to less than 1 to 127 days **(an additional 0 to 44 days)** at mid-century in Texas, depending on location.

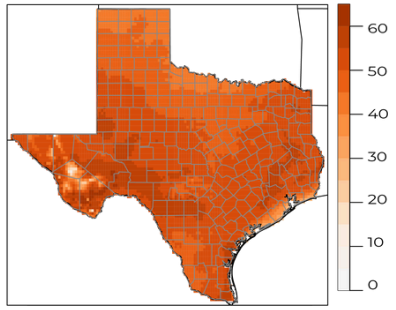
Map 2: *Increase in Number of Days Over 95˚F, Moderate Climate Scenario, Average from 2035-2065*



Moderate Climate Change Scenario

Precipitation change will range from a decrease of two inches to an increase of two inches, or **a percentage decrease of 9% to an increase of 5%**, and the **maximum precipitation in a day** could **decrease or could increase up to 12%** at mid-century in Texas, depending on location.

Map 2: *Percentage Change in Total Annual Precipitation, Moderate Climate Scenario, Average from 2035-2065*

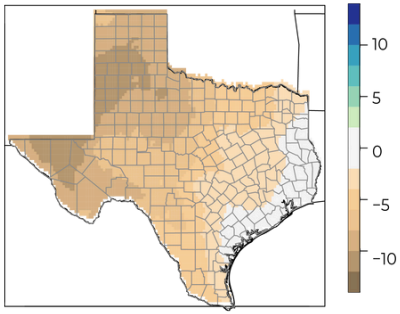


**Note that the scale changes from historical to projected data.*

High Climate Change Scenario

The number of days **over 95˚F** will increase to 4 to 181 days **(an additional 4 to 61 days)**, and the number of days **over 100˚F** will increase to less than 1 to 141 days **(an additional 0 to 60 days)** at mid-century in Texas, depending on location.

Map 3: *Increase in Number of Days Over 95˚F, High Climate Scenario, Average from 2035-2065*



**Note that the scale changes from historical to projected data.*

High Climate Change Scenario

Precipitation change will range from a decrease of two inches to an increase of two inches, or **a percentage decrease of 9% to an increase of 5%,** and the **maximum precipitation in a day** could **decrease or could increase up to 13%** at mid-century in Texas, depending on location.

Map 3: *Percentage Change in Total Annual Precipitation, High Climate Scenario, Average from 2035-2065*