

Climate change in TEXAS



While climate change is often talked about in the future tense, our climate is already changing in both averages and the number and intensity of extremes. Texas has already experienced record-breaking temperatures, increased drought and flash flooding, and rapid sea level rise in recent years. As global temperatures continue to rise, Texas is expected to experience more heat waves, droughts, floods, sea level rise and intensified hurricanes. The Southern Climate Impacts Planning Program (SCIPP) is a climate hazards research program whose mission is to help Texas residents increase their resiliency and level of preparedness for weather extremes now and in the future.

Climate Change: Observations

Temperature

While "global warming" implies rising temperatures, climate change isn't quite that simple. In Texas, temperatures have increased in recent decades, but not as steadily as in the rest of the country.



In the last 20 years, temperature increases across Texas have ranged from 0.5° Fahrenheit in the northeast and 1.5 degrees in the southwest. Temperatures throughout the Great Plains have increased by 1.5 degrees since the 1960s (NCA).

Mosquito-borne illnesses, like Malaria and Dengue fever, spread in the southeast during the last decade as freezing days and annual frosts gradually decreased (CDC). Since 1990, Texas and the Great Plains have had only a few periods cold enough to kill large numbers of pests (NCA).



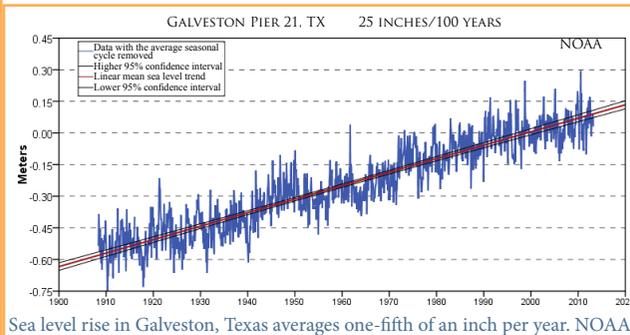
 Exposure to excessive heat (temperatures 90 degrees or above) killed 150 people in Texas in 2011. In west Texas, there are now between 70-100 days over 90 degrees (NCA). Each year, heat waves kill more people than hurricanes, floods, tornadoes, blizzards, and lightning combined (CDC).

All of the environmental changes observed in the last 150 years resulted from a 2 degree global temperature rise. Temperatures in the southern Great Plains are projected to increase another 3-9 degrees by 2100 (NCA).

Sea Level Rise

Sea level rose 8 inches during the last century, inundating the Texas coastline, as a result of both sea level rise and subsidence. The current rate of erosion in Texas is now five times faster than the average rate of the last 4,000 years (Texas Sea Grant).

The Texas coastline is now eroding at an average rate of 2-10 feet per year, depending on local subsidence (CSC). Freeport is experiencing a sea level rise rate of 17 inches per 100 years, Rockport at 22 inches per 100 years, and Galveston (below) at 25 inches per 100 years, one of the highest sea level rise rates in the country (NOAA).



Quick Fact: Subsidence is a term used to describe what happens when land begins to sink or lose elevation as the result of natural and human processes (USGS).

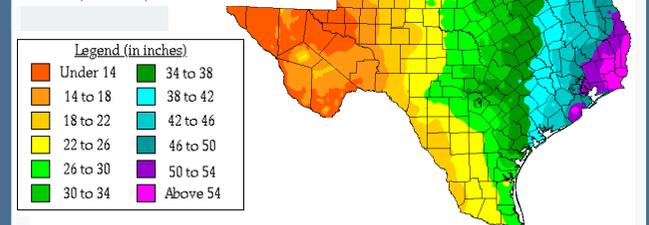
Precipitation

Precipitation across Texas varies each year but shows an overall rising trend. Summer and winter rainfall has increased and extreme precipitation events are becoming more frequent (NCA). Overall, precipitation totals have increased 10 percent in the last century.

Even though overall rainfall has increased across the state, mostly in eastern Texas, drought in west Texas is becoming more frequent, more severe, and lasting longer (NCA).

The most severe drought on record occurred in 2011. Texas received only 14.98 inches of rain across the state for the entire year, and 4,809 temperature records were broken. The drought resulted in \$7.62 billion losses in agriculture (NOAA, FEMA).

Changes in the amount of rain Texas receives each year varies across state - from an overall decrease in west Texas to an overall increase in east Texas. Much of the precipitation east Texas gets comes from tropical storms (NOAA).



Overview

The models scientists use to project future climate change are extremely thorough, consider the unique geography and climate of every region, and look forward 25 and 100 years (NOAA).

In Texas, models project increased hurricane intensity and storm surge, continued sea level rise, and changes in rainfall that will likely create more periods of heavy precipitation between long dry spells.

Climate change acts as a threat-multiplier, loading the dice for more intense hurricanes, heat waves, floods, droughts, and extreme weather.

Droughts will likely become more frequent, last longer and be more intense. Rains following droughts will often be quick and heavy, causing flash-flooding and destroying aging and vulnerable infrastructure (NCA).



With more dry periods, higher temperatures and more lightning, large wildfires are expected to become more common (Price 2012, NCA).

Warmer ocean temperatures mean stronger hurricanes (NASA). A recent study suggests that hurricanes may become more frequent and more intense - meaning more category 4 and 5 hurricanes forming each year (Emanuel 2013, NCA). Storm surge is also expected to become more severe as sea level rises and hurricanes become more intense (NOAA).



Sea levels are expected to rise between 1 and 6 feet in the next century (NOAA).

Growing seasons will likely become longer, the types of plants that can survive in Texas will begin to change and precipitation events will become more intense causing more flooding of agricultural areas (USDA).



Q: How will climate change affect drought and water resources in Texas?

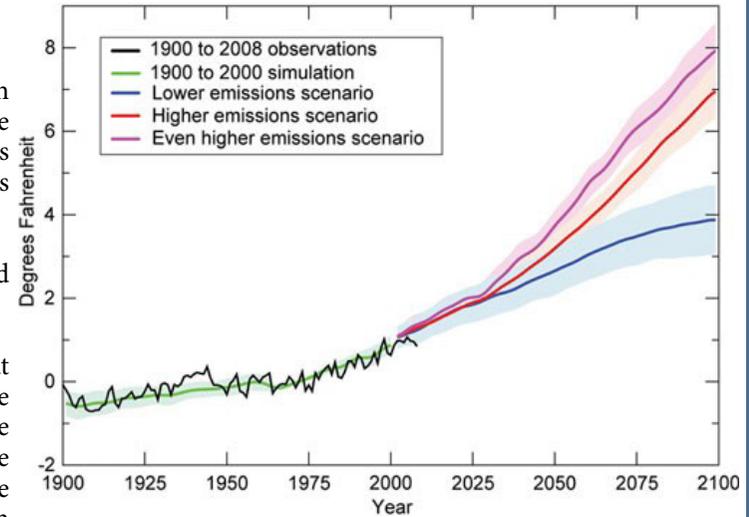
A: Rising temperatures and changing precipitation patterns are expected to cause more frequent and intense drought events, stressing water resources like the Ogallala aquifer. Extremes in precipitation will become more frequent and intense (USGS).

Temperature

Future temperature rise depends partly on the amount of greenhouse gasses added to the atmosphere in coming decades. Global temperatures are expected to increase another 3-12 degrees Fahrenheit by 2100 (IPCC).

Temperatures in the southern Great Plains are projected to increase another 3-9 degrees by 2100 (NCA).

The southern Great Plains experience about seven days per year above 100 degrees. These high temperatures are likely to occur much more frequently in the future - as much as four times more frequently. The impacts of such increases in extreme heat could include: increased evaporation from reservoirs, greater demand for air conditioning, and increases in the number of heat stress days (NCA).



Global temperature rise depends largely on future emissions scenarios, which range from low, 3°F increase, to high, 12°F or higher (IPCC).

Houston

Houston is the #1 municipal purchaser of green power in the United States (EPA). Houston has created a website (www.greenhoustontx.gov) to educate and help the public make Houston a "greener" city.

Austin

The EPA named Austin as a top 20 city for green power usage in the U.S. All power for city facilities comes from renewable energy, such as solar, hydro and wind power, and methane gas from landfills.

San Antonio

San Antonio is trying to promote sustainability and reduce the city's carbon footprint through solar arrays, recycling, efficient vehicles, bike and car sharing programs, and by declaring September as "Climate Change Awareness Month."

Dallas

Dallas is a leader in clean energy and climate change. A website (www.greendallas.net) helps educate the public on how to go green including the policies that have passed encouraging a greener Dallas.

Lubbock

A local news station in Lubbock has created a website to explain climate change, with suggestions and methods for becoming greener (KCBD 2013).

El Paso

El Paso has signed an agreement that urges federal and state government to reduce pollution 7% by 2012. It also states that the city will try to meet or exceed the goals of the Kyoto Protocol (City of El Paso Sustainability Program).