Texas and Climate Change

No Climate Crisis in the Lone Star State

CO2 COALITION

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EXECUTIVE SUMMARY

This report will examine the scientific basis for claims of harmful effects from climate change in Texas. Assertions have been made that many areas around the world are experiencing negative impacts from unusual and unprecedented warming driven by increasing human emissions of carbon dioxide (CO_2). Texas is no different. Promotion of the need to achieve "net zero" emissions is predicated on fear of existing and future devastating calamities resulting from CO_2-enhanced warming.

The Fifth National Climate Assessment (NCA5) report (USGCRP, 2023) says that climate change is "putting us at risk from climate hazards that degrade our lands and waters, quality of life, health and well-being, and cultural interconnectedness." The NCA5 report lists "warmer temperatures, more erratic precipitation, and sea level rise," as well as "drier conditions" and "extreme heat and high humidity," as the "climate hazards" affecting the Southern Great Plains, which encompasses the State of Texas (Figure 1).

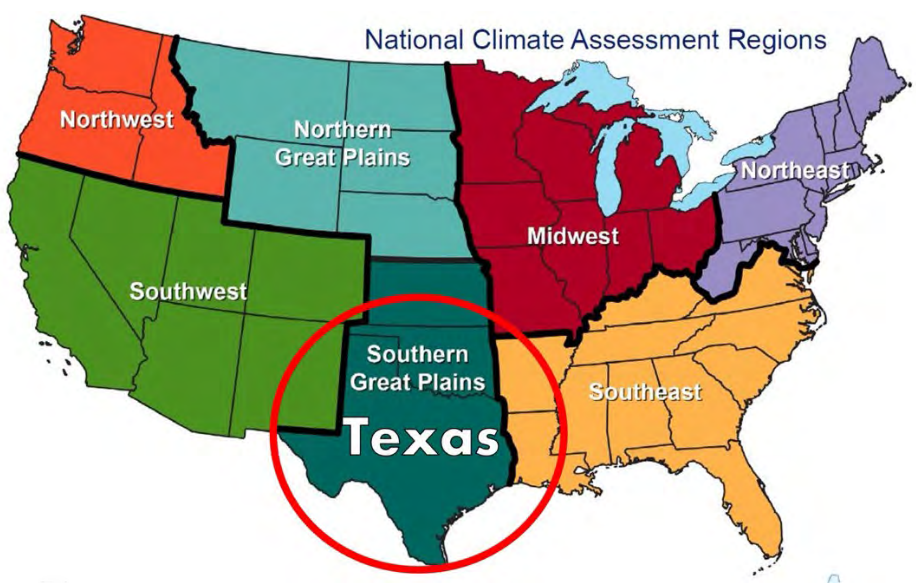

Figure 1: *National Climate Assessment Regions. USGCRP (2018)*

In addition, Texas A&M University has published a Texas-specific report, *Future Trends of Extreme Weather in Texas* (Nielsen-Gammon et al., 2024), which warns of future harm to the citizens of Texas from man-made climate change. Predicted effects include increasing temperature, precipitation, drought, floods, storms, sea-level rise and wildfires.

Within this report, we analyze scientific data from various sources, including the National Oceanic and Atmospheric Administration (NOAA), the United States Environmental Protection Agency (U.S. EPA), the National Aeronautics and Space Administration (NASA), the United States Department of Agriculture (USDA) and reports published in peer-reviewed journals.

Based on these data, we arrived at the following key findings:

- The temperature in Texas has shown no unprecedented or unusual warming, despite increasing atmospheric carbon dioxide (CO_2). Recent temperatures in Texas are similar to those found more than 100 years ago.
- The annual number of 100 °F days in Texas has an overall decreasing trend.
- Texas has had a modest increase of 0.0245 inches per year of precipitation during 1850–2023, which means that Texas is in no immediate danger of becoming drier.
- Droughts in Texas are not becoming more severe or numerous.
- Tornadoes, hurricanes, and floods are not becoming more frequent in Texas.
- Sea-level rise and coastal subsidence are not threatening or inundating the Texan coast.
- Wildfires are not becoming more frequent or severe in the United States.
- Air quality in the United States is generally good and getting better.
- Agriculture in Texas is thriving.
- Carbon dioxide (CO_2) is essential and beneficial for life on Earth, as CO_2 greens the Earth and more CO_2 allows plants to grow bigger, produce more food and better resist drought.

The evidence presented here is clear: there is no climate crisis in Texas. Not only is CO_2 beneficial, but it is essential for life on Earth. Therefore, any measures for combating a purported climate crisis and for reducing CO_2 emissions are not only unnecessary and costly but would also cause considerable harm to agriculture with no benefit.

PHYSICAL SCIENCE BASIS—CLIMATE CHANGE IN TEXAS

TEMPERATURE

The primary alleged negative consequence of increasing atmospheric CO_2 is that its so-called greenhouse effect will increase temperatures to unusual, unprecedented and dangerous levels. For instance, according to the National Climate Assessment and the Texas A&M report:

> *"Across all regions of the US, people are experiencing warming temperatures and longer-lasting heatwaves." (USGCRP (2023)*

> *"The long-term trend in the number of triple-digit days marches upward. 2023 witnessed record-high temperatures across the state continuing the trend…" (Nielsen-Gammon et al., 2024).*

Claims of climate catastrophes such as those above are driving policy decisions to spend trillions of dollars. All are based on mathematically complicated climate models that predict a significant rise in future temperatures. These models have been shown to be highly unreliable and ill-suited as justifications to enact economically crippling policies. For a deeper exploration of the climate models used and their ability to forecast far into the future, see Appendix A: *Modeling Future Climate*.

To determine the validity of claims of unusual and unprecedented warming in Texas, we will rely on data for the state from the National Oceanic and Atmospheric Administration's (NOAA's) U.S. Historical Climatology Network (USHCN) (Menne et al., 2009; NOAA National Centers for Environmental Information, 2025d). The USHCN consists of 1,218 stations located in the contiguous United States and is a subset of the NOAA Cooperative Observer Program (COOP). NOAA's selection of these stations avoids the stations most corrupted by the man-made warming of the urban heat island effect—a phenomena whereby local temperature is influenced by the retention of heat by such things as buildings and pavements and by heat generation sources like air conditioning and vehicles.

Texas has 49 USHCN stations spread throughout the state (Figure 2) that record temperature and precipitation data.

This report will utilize data beginning in 1895, as there were only a handful of stations in Texas collecting information prior to that date.

Figure 2: *Locations of the USHCN Stations in Texas. NOAA National Centers for Environmental Information (2025d)*

Temperature Adjustments and Fabrication of Data

The sites for the USHCN stations were selected by NOAA based on "their spatial coverage, record length, data completeness, and historical stability" (Menne et al., 2009). The data from USHCN are the highest quality, long-term, direct thermometer records available for Texas. Even so, there are several factors intrinsic to the data that serve to overstate modern warming and reduce temperatures of earlier periods:

- Urban heat island effect is reduced but not eliminated (Watts, 2022).
- Adjustments are made to raw historical temperatures (Menne et al., 2009; NOAA National Centers for Environmental Information, 2025d).
- Data are fabricated for stations that no longer exist or are no longer reporting (Heller, 2022).

Average Temperatures in Texas

Figure 3 is an examination of over 130 years of USHCN data for the annual average mean temperature in Texas, revealing several interesting decadal trends. The 1920s and 1930s were the "Dust Bowl" era when some of the highest recorded temperatures occurred. Then, for the next several decades, Texas temperatures varied greatly, but exhibit a significant decline until the mid-to-late 1970s, falling nearly 3 °F.

> **Note:** The high temperatures of the Dust Bowl years occurred during very low levels of CO_2. Importantly, the 30-year-plus era of falling temperature from the mid-1930s to 1978 coincided with a steadily increasing concentration of CO_2 in the atmosphere.

Beginning in the late 1970s, temperature in Texas and globally began increasing, but recent temperatures have been nearly identical to those 80 and 90 years ago.

Minimum Temperatures in Texas

Minimum daily temperatures (usually at night) are important metrics, particularly for agriculture, as they determine when the last killing frosts occur in the spring and the first ones arrive in the autumn. This, of course, determines the length of the growing season.

In other states and regions that we have investigated, a distinct long-term trend of warmer minimum temperatures is recognized dating back to the late 1800s. In Texas, the coldest daily temperatures (Figure 4) of the Dust Bowl were very similar to those of recent years. The recent warming trend that began in the late 1970s is significant, with the coldest temperatures increasing approximately 4 °F over the last five decades.

We will discuss the beneficial aspects of this warming in a later section on agriculture.

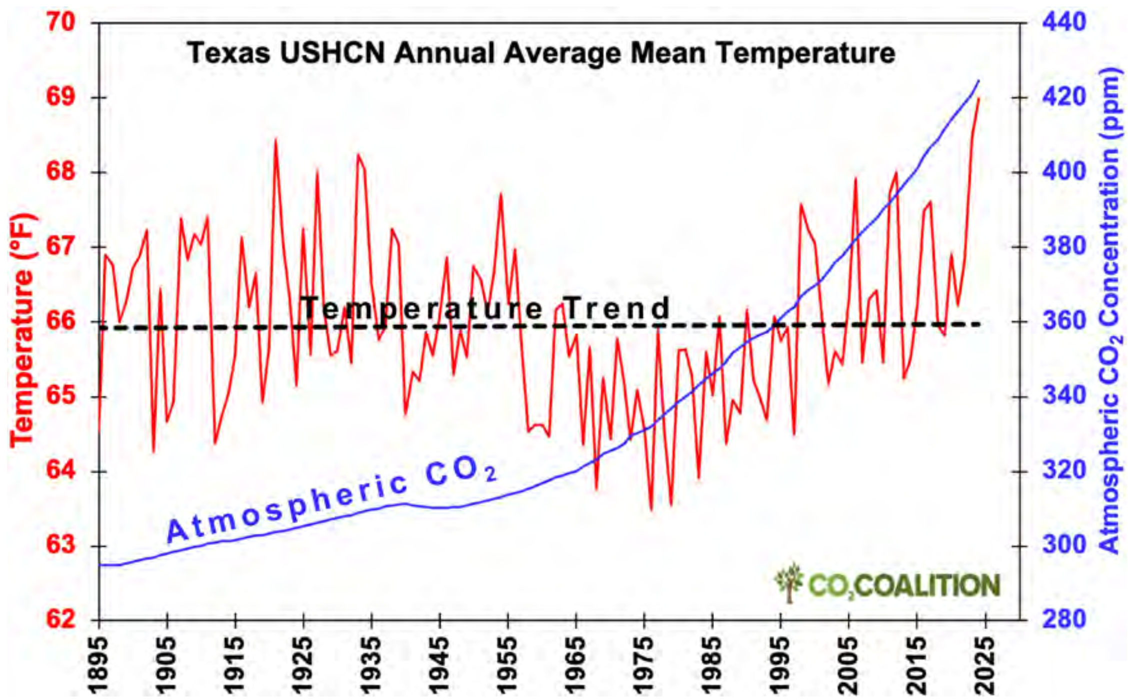

Figure 3: *USHCN Corrected Annual Average Mean Temperature in Texas, Plotted With the Atmospheric CO_2 Concentration. Temperature: NOAA National Centers for Environmental Information (2025d), CO_2 concentration (1958 and prior): NASA Goddard Institute for Space Studies (2018), CO_2 concentration (1959 onward): Lan and Keeling (2025) (NOAA)*

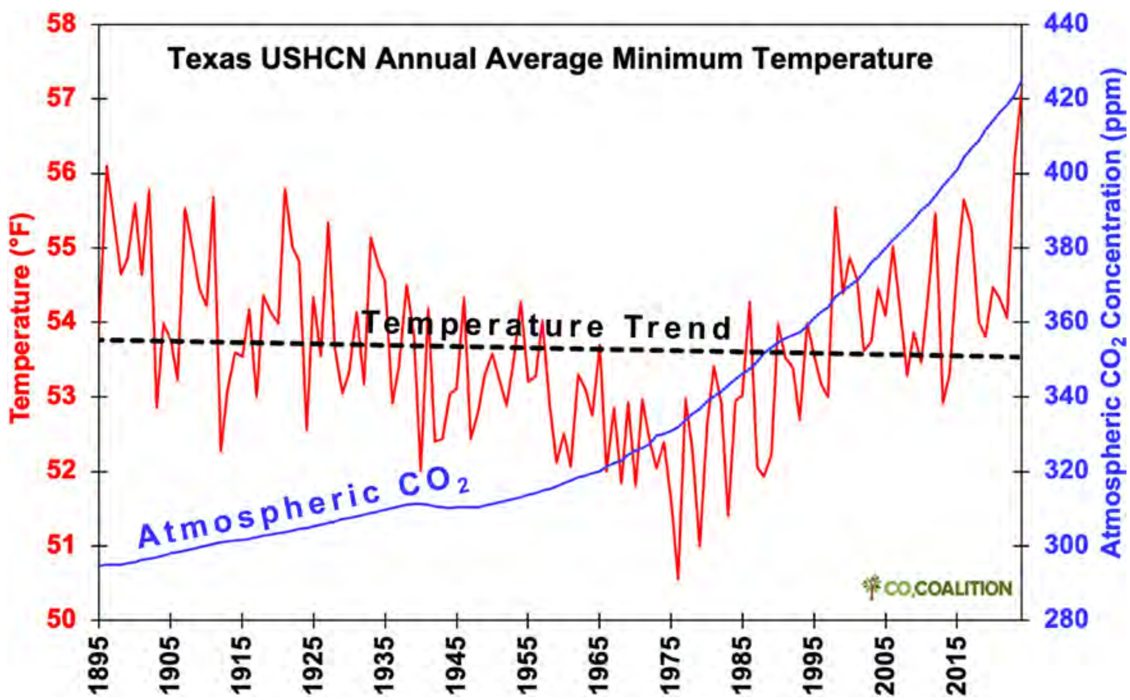

Figure 4: *USHCN Corrected Annual Average Minimum Temperature in Texas, Plotted With the Atmospheric CO_2 Concentration. Temperature: NOAA National Centers for Environmental Information (2025d), CO_2 concentration (1958 and prior): NASA Goddard Institute for Space Studies (2018), CO_2 concentration (1959 onward): Lan and Keeling (2025) (NOAA)*

Maximum Temperatures and Heatwaves In Texas

The Texas A&M report claims that there is an increase in the annual number of days with temperatures of 100 °F or higher:

> *"Over the past 50 years, the linear trend shows an approximate tripling of the number of triple-digit days at stations in three of four regions. Given past and projected temperature trends, an overall quadrupling of the number of 100-degree days between the 1970s–1980s and 2036 appears to be a reasonable projection."* (Nielsen-Gammon et al., 2024)

The researchers of this Texas A&M study based this conclusion on temperature data that were recorded at 19 stations, with 11 of these stations located in airports, which have strong urban heat island effects (Tzavali et al., 2015). In fact, these same researchers admitted that the urban heat island effect could play a significant role in causing temperature readings to increase.

> *"…the existence of **urban heat islands** has likely led to an enhancement of 100 °F days in urban areas." (emphasis added).* (Nielsen-Gammon et al., 2024)

Based on a recent study (Spencer et al., 2025), during 1895–2023 in the contiguous United States, the urban heat island effect contributed 8% and 65% to the increase in the raw average temperatures reported in rural and suburban/urban stations, respectively.

In response, using the less biased USHCN data (Figure 5), we find that, rather than a dangerous increase in the numbers of days over 100 °F, a slight decline is noted over the last century, despite the rising atmospheric CO_2 concentration.

Confirming that the high temperatures in Texas (Figure 5) are not dangerously increasing, the annual average maximum temperature in Texas is essentially flat with no trend either increasing or decreasing despite steadily rising levels of CO_2 (Figure 6). The maximum temperature in recent decades is nearly identical to that experienced in the 1920s and 1930s.

PRECIPITATION AND FLOODS IN TEXAS

Texas A&M University reports that extreme rainfall has been increasing in Texas:

> *"Many studies have documented an increase in extreme rainfall in Texas and surrounding areas for a variety of durations and thresholds."* (Nielsen-Gammon et al., 2024)

The USHCN precipitation data indicate that Texas has experienced a very slight increase (1 to 2 inches per year) in precipitation since 1895 (Figure 7), contradicting the predictions of significant increases in rainfall.

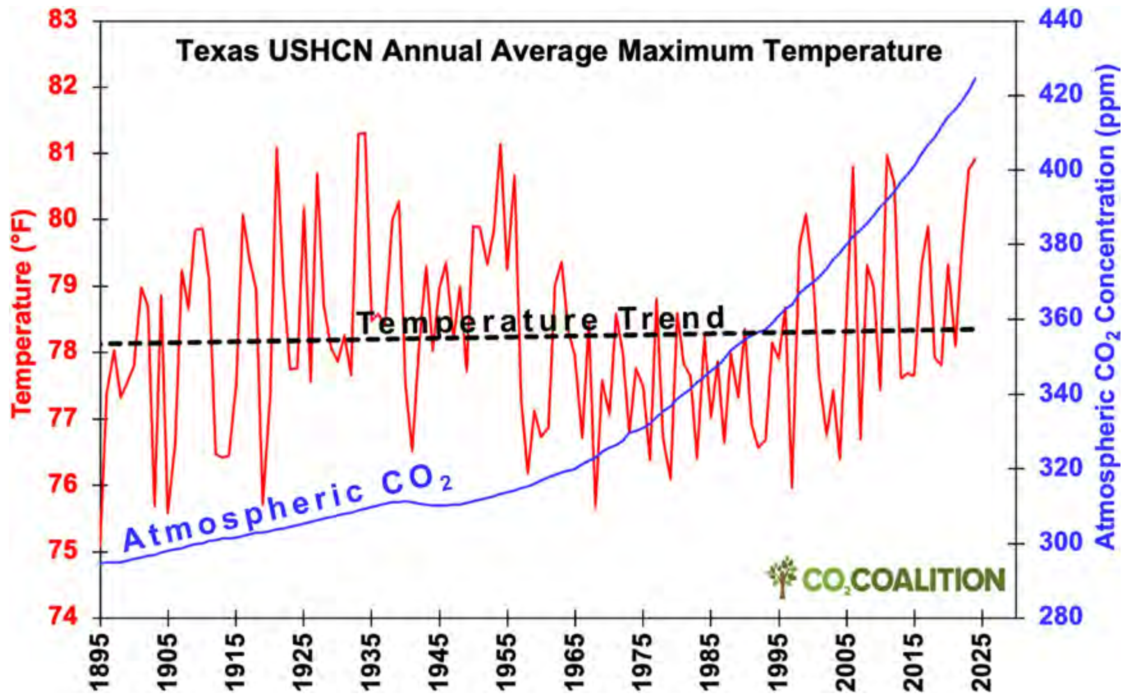

Figure 5: *Annual Percentage of 100 °F Days in Texas, Plotted With the Atmospheric CO_2 Concentration. 100 °F days: NOAA National Centers for Environmental Information (2025b), CO_2 concentration (1958 and prior): NASA Goddard Institute for Space Studies (2018), CO_2 concentration (1959 onward): Lan and Keeling (2025) (NOAA)*

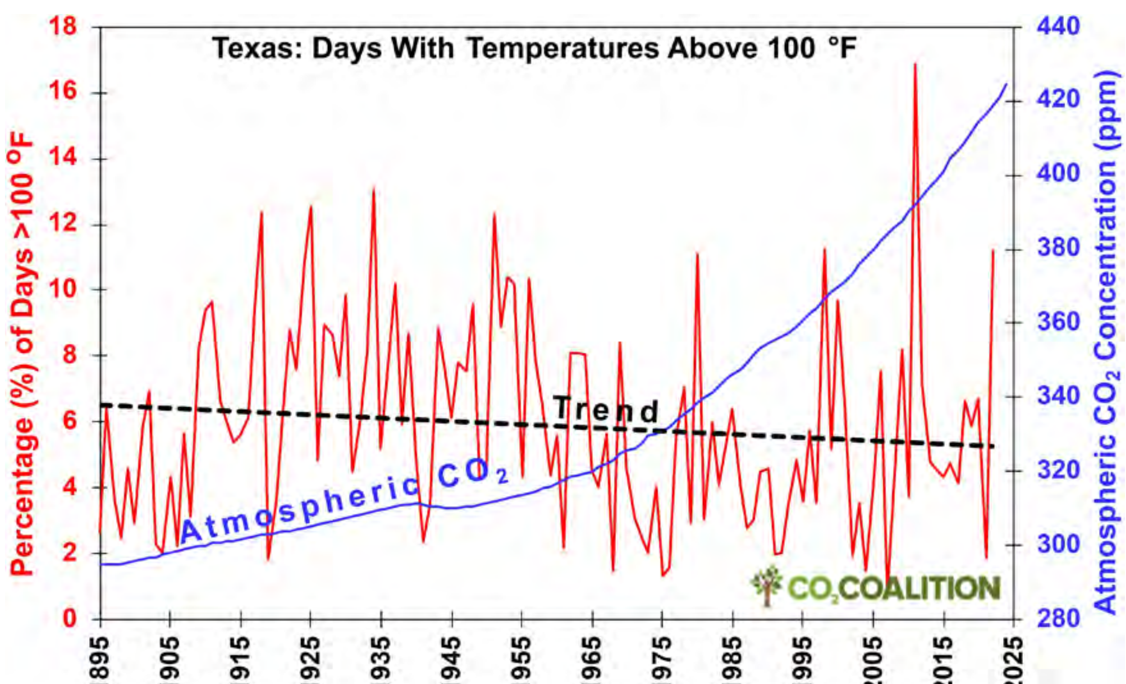

Figure 6: *USHCN Average Maximum Temperature in Texas, Plotted With the Atmospheric CO_2 Concentration. Temperature: NOAA National Centers for Environmental Information (2025d), CO_2 concentration (1958 and prior): NASA Goddard Institute for Space Studies (2018), CO_2 concentration (1959 onward): Lan and Keeling (2025) (NOAA)*

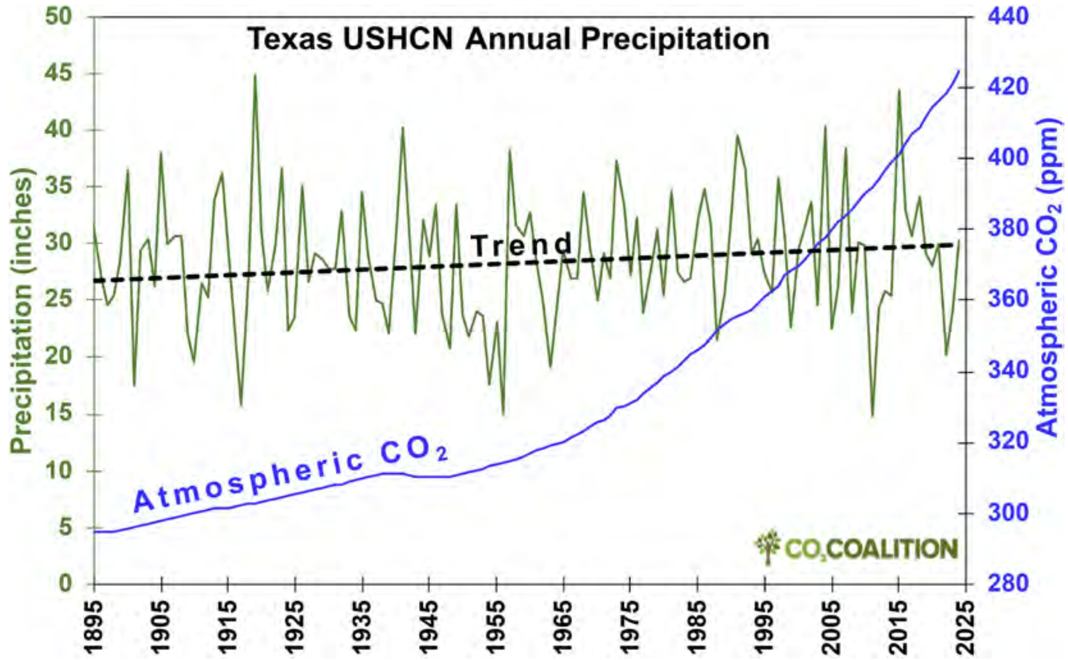

Figure 7: *Annual Precipitation in Texas, Plotted With the Atmospheric CO_2 Concentration. Precipitation: NOAA National Centers for Environmental Information (2025d), CO_2 concentration (1958 and prior): NASA Goddard Institute for Space Studies (2018), CO_2 concentration (1959 onward): Lan and Keeling (2025) (NOAA)*

A swath of Texas, from Uvalde in the south to Dallas in the north, is prone to flash flooding, so much so that it has been dubbed "Flash Flood Alley" (Figure 8) (Carnett, 2023). The combination of the area's unique geology and its proximity to the Gulf of America is the reason for the common flash floods.

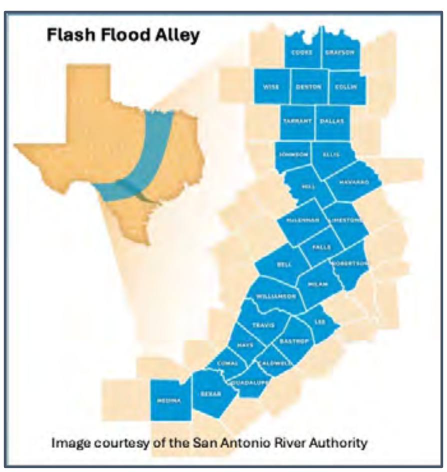

Figure 8: *Flash Flood Alley. Carnett (2023)*

The shaded area in the map to the left (Figure 8) is the Balcones Escarpment. This is an inactive fault zone and is the transition from the low-lying topography of the Gulf Coast to the higher topography of the Hill Country of West Texas—an elevation rise of more than 500 feet. The area has thin soil due to its geological bedrock and the steep slopes, so very little rainfall is absorbed during heavy downpours.

On July 4, 2025, tragic flash flooding of the Guadalupe River occurred in Flash Flood Alley and killed more than 120 people, many of them young girls that were at Camp Mystic, a summer Christian camp. Nearly immediately, climate fearmongers linked the disastrous event to man-made climate change.

> *"The Texas Flash Flood is a Preview of the Chaos to Come"* (Lustgarten, 2025) (ProPublica, July 9, 2025)

"Floods are Getting More Dangerous Around the Country" (Hersher and Sommer, 2025) (NPR, July 15, 2025)

"Climate Change Helped Fuel Heavy Rains that Led to Devastating Texas Flood" (Martin, 2025) (Houston Public Media, July 11, 2025)

While the flooding that hit the area on Independence Day, 2025 was extreme and unusual, it is not unprecedented. According to Harris County meteorologist Jeff Lindner, the July 4th flood of the Guadalupe River at Kerrville peaked at 34.29 feet, making it the third-highest flood on record for the city. The 2025 flood crest trails the 39.0-foot flood crest from 1932 and the 37.72-foot flood crest from in 1987 (Galvan, 2025) (KHOU-TV 2025).

Figure 9 reveals that over the last 28 years, flash floods, while varying greatly from year to year, have actually been in slight decline.

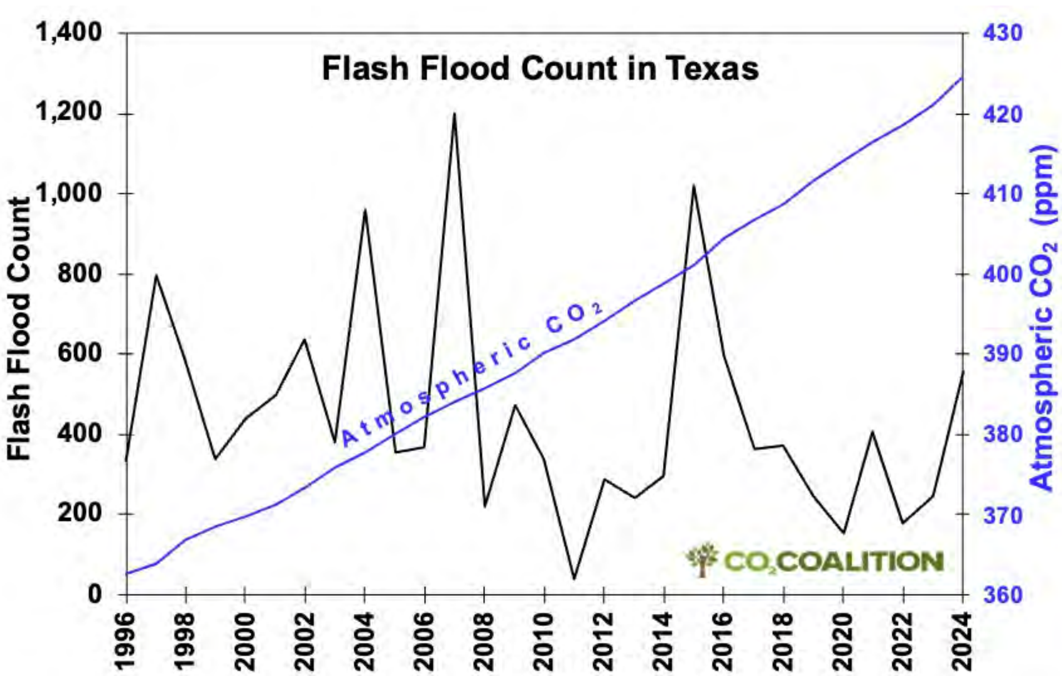

Figure 9: *Annual Reported Number of Flash Floods in Texas, Plotted With the Atmospheric CO_2 Concentration. Flash floods: NOAA National Centers for Environmental Information (2025c), CO_2 concentration (1958 and prior): NASA Goddard Institute for Space Studies (2018), CO_2 concentration (1959 onward): Lan and Keeling (2025) (NOAA)*

DROUGHT IN THE LONE STAR STATE

Drought is the single greatest threat to the agricultural sector in Texas and around the world. According to the Food and Agriculture Organization of the United Nations (2021), "drought has been established as the single greatest culprit of agricultural production loss." This UN report estimated a cost of $37 billion in agricultural losses from drought. While drought can make life difficult for the general population, it is agriculture that bears 82% of the economic impacts.

Claims of falling agricultural productivity due to drought are standard fare for those promoting climate fear. Since the economic and human toll from sustained droughts are enormous, we will review the data to learn if they are increasing or decreasing in Texas.

Drought is driven by a regional decrease in soil moisture. The two drivers of drought are extreme heat and a decrease in precipitation. We have seen in the previous sections that extreme heat is not increasing and that precipitation is modestly increasing, so it should come as no surprise to learn that droughts are not increasing.

The Palmer Drought Severity Index (PDSI) is an indicator of long-term drought conditions. According to the NOAA National Integrated Drought Information System (2025), "the PDSI is a standardized index based on a simplified soil-water balance and estimates relative soil moisture conditions."

Based on data from NOAA (Figure 10), since 1895, the Texas PDSI values have fluctuated greatly from year to year, with no discernible trend—upward or downward—in the severity of drought. This observation stands in direct contradiction to claims of increasing drought by the Texas A&M report (Nielsen-Gammon et al., 2024) and the 5th National Climate Assessment.

Where it occurs, drought is the primary scourge of crop growth throughout the world. However, the modest increase in Texas precipitation (Figure 7) should have beneficial effects on the state's agricultural yields. Although flooding during the spring planting season and the fall

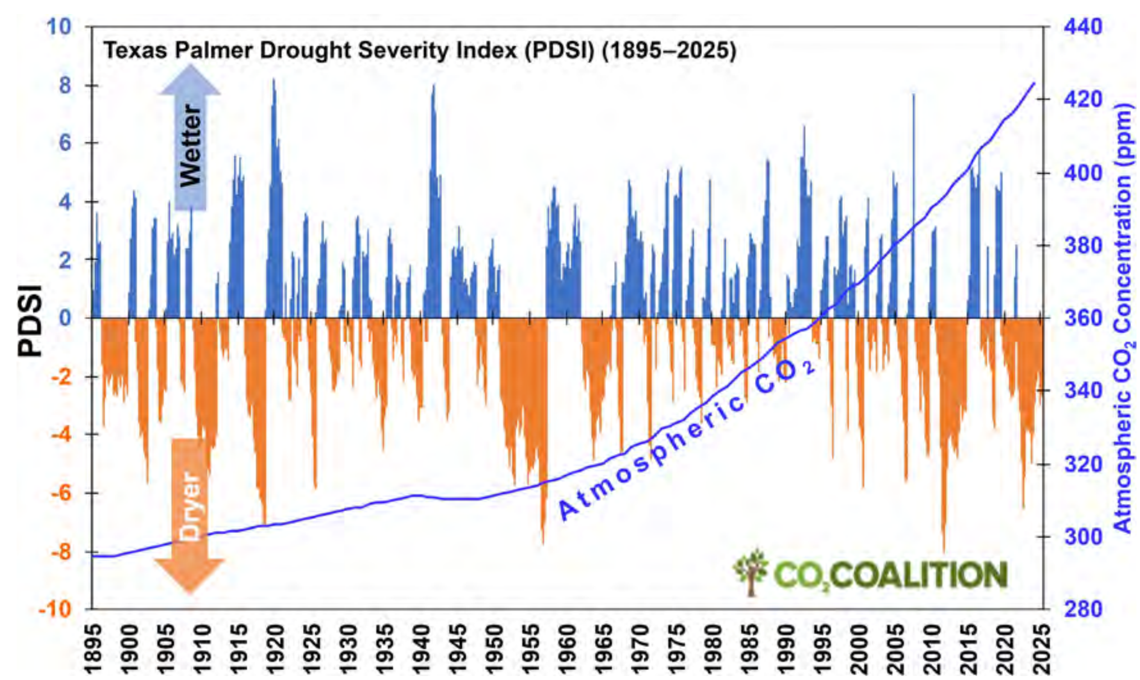

Figure 10: *The Palmer Drought Severity Index (PDSI) in Texas, Plotted With the Atmospheric CO_2 Concentration. PDSI: NOAA National Centers for Environmental Information (2025a), CO_2 concentration (1958 and prior): NASA Goddard Institute for Space Studies (2018), CO_2 concentration (1959 onward): Lan and Keeling (2025) (NOAA)*

harvest can have significant negative impacts on production, its negative effect pales in comparison to drought.

Summer agriculture responds both to shorter and longer periods of moisture. Corn yield is significantly correlated with summer rainfall (Hatfield, 2012). It is a rare year where excessive wetness suppresses yields over the corn belts of North America and Europe. We provide more data on the beneficial agricultural results of increasing CO_2 in a later section on agricultural productivity.

TORNADOES IN THE LONE STAR STATE

Tornadoes are particularly feared in Texas. While many other states and countries are spared the twisters' wrath, the United States is the world leader in the number of tornadoes per year—1,250—and more tornadoes (1,337) touch down each year in Texas than in any other state.

The geography of the Texas and the central United States makes the region tornado-prone. The Rocky Mountains and the Gulf of America provide key ingredients for severe thunderstorms that spawn tornadoes: warm, moist air close to the ground; cool, dry air aloft; and horizontal winds that travel faster aloft than near the surface.

According to NOAA, early historical records of tornadoes are unreliable:

> *"One of the main difficulties with tornado records is that a tornado, or evidence of a tornado must have been observed. Unlike rainfall or temperature, which may be measured by a fixed instrument, tornadoes are short-lived and very unpredictable. If a tornado occurs in a place with few or no people, it is not likely to be documented. Many significant tornadoes may not make it into the historical record since Tornado Alley was very sparsely populated during the 20th century."* (NOAA National Centers for Environmental Information, 2025e)

With increasing population, Doppler radar detection and better reporting, the number of tornadoes reported has significantly increased in recent years. Because of this, NOAA recommends only using the strongest tornadoes (F3/EF3 or stronger) as a measure of pre-radar numbers. These large and violent tornadoes are likely to have been identified even in days before better reporting was in place. Table 1 shows a tornado's rank using the Enhanced Fujita (EF) scale.

While tornadoes will continue to plague Texas, the most violent of these twisters have been in a decades-long decline both in Texas and in the United States (Figure 11). The likely reason for the decline is counterintuitive. Outside the tropics (and probably within the tropics, too), storminess of all kinds is expected to decrease with warmer weather in the higher latitudes, where warming is expected to occur. It is the temperature differentials between temperatures inside and outside equatorial regions and areas that cause storms. The warming reduces those differences between the tropics and regions approaching the poles. Whatever the reason, we should welcome the apparent reduction of these deadly storms.

Table 1: *Enhanced Fujita (EF) Scale Tornado Wind Speed. NOAA National Weather Service (2024)*

EF SCALE	
EF Rating	**3 Second Gust (mph)**
0	65-85
1	86-110
2	111-135
3	136-165
4	166-200
5	Over 200

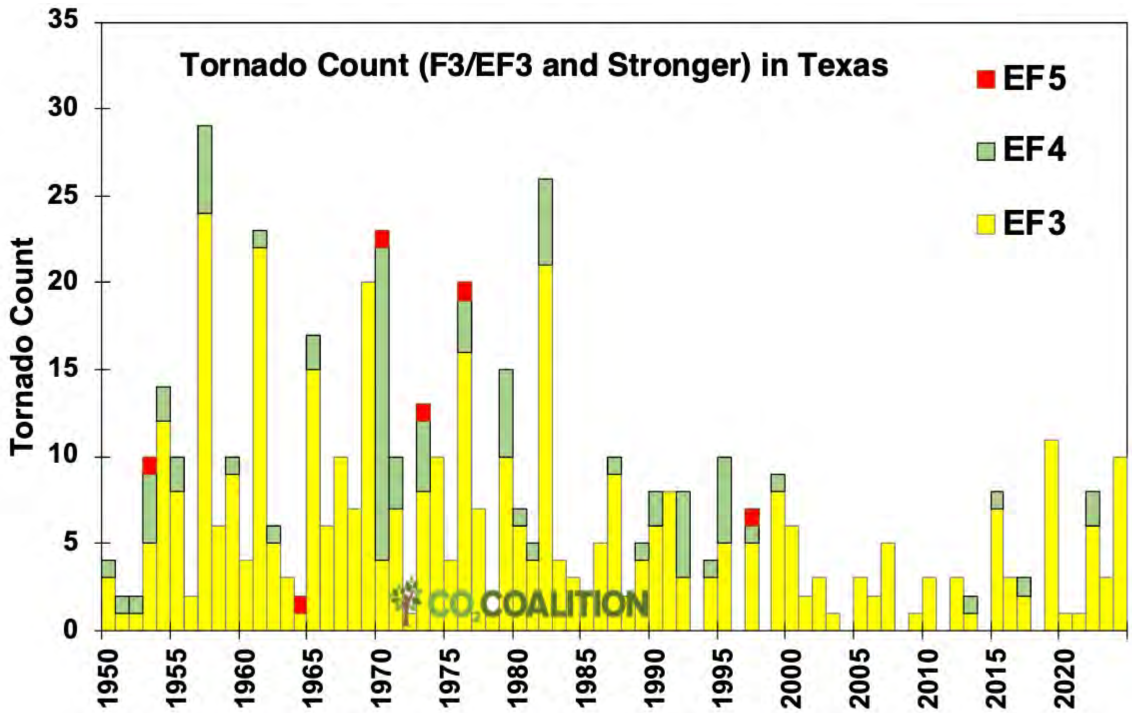

Figure 11: *Annual Reported Number of Tornadoes in Texas. NOAA National Centers for Environmental Information (2025c)*

HURRICANES AND TEXAS

Texans certainly have earned the right to be fearful of hurricanes and their terrible consequences. We have a good record of 60-plus hurricanes that made landfall in Texas going back to 1851, including 25 that were considered to be major (category 3 and up). Information regarding the different hurricane categories and their wind speeds are provided in Table 2.

Some of the worst storms include the 1900 Galveston Hurricane that killed an estimated 8,000 people, Hurricane Harvey that devastated the Houston area in 2017 and Hurricane Rita in 2005. Thankfully, the Lone Star state has never had a direct hit from a Category 5 hurricane.

Table 2: *Saffir-Simpson Hurricane-Scale Wind Speed. NOAA National Hurricane Center and Central Pacific Hurricane Center (2014)*

Saffir-Simpson Hurricane Scale		
Category	**Wind Speed**	**Type of Damage**
1	74–95	Some Damage
2	96–110	Extensive Damage
3	111–129	Devastating Damage
4	130–156	Catastrophic Damage
5	157 and Above	Catastrophic Damage

Claims of a linkage between man-made increases in temperature to an increase in the frequency, intensity and duration of hurricanes is common media fodder. We are guaranteed that every hurricane or tropical depression that makes landfall will be accompanied by extensive news coverage claiming a link between the latest storm tragedies and our emissions of CO_2.

The theory behind the connection between warming and hurricane activity is superficially plausible. Global warming raises ocean surface temperatures, fueling tropical cyclones and hurricanes. That seems to be a perfectly reasonable prediction. Yet the facts say otherwise.

Below is a chart showing global hurricane data compiled by Dr. Ryan Maue (Figures 12). The chart shows no increase for hurricanes and major hurricanes. In fact, a compelling argument could be made for a decline over the last 30 years or more.

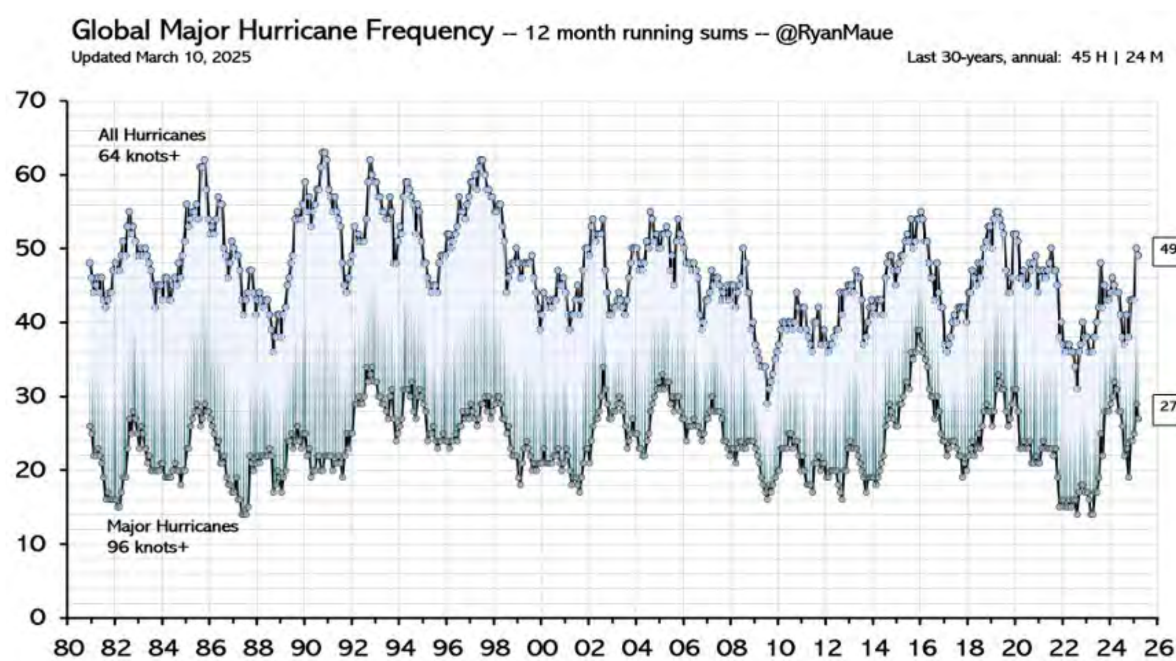

Figure 12: *Annual Global Hurricane Frequency (All & Major) 12-Month Running Sums. Maue R (2025) Global Tropical Cyclone Activity Weather Bell Models*

To assess Texas-specific hurricane information, we compiled the data from NOAA in Figure 13 for the annual number and total annual intensities of hurricane impacts and landfalls in Texas. Since 1851, according to the data, the frequency and intensities of hurricanes in Texas have not increased. These findings contradict the claims of increasing dangers in Texas from these powerful storms.

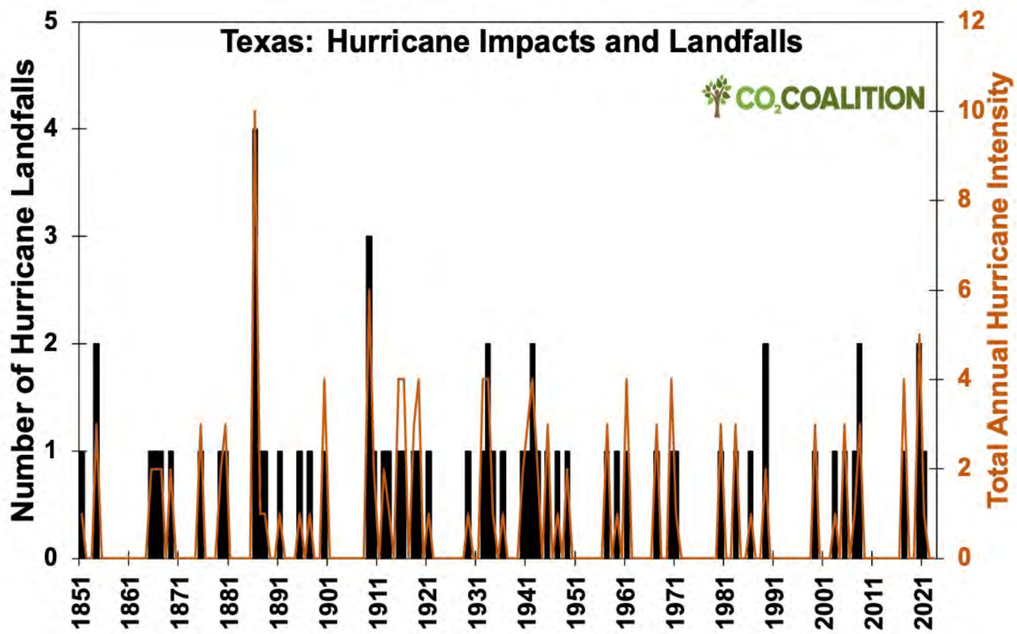

Figure 13: *Annual Number and Total Intensities of Hurricane Impacts and Landfalls in Texas. NOAA Atlantic Oceanographic & Meteorological Laboratory (2024)*

WILDFIRES

> *"The effects of global warming on temperature, precipitation levels, and soil moisture are turning many of our forests into kindling during wildfire season.*
>
> — Union of Concerned Scientists
>
> *No matter how hard we try, the fires are going to keep getting bigger, and the reason is really clear.... We should be getting ready for bigger fire years than those familiar to previous generations.*
>
> — Park Williams, Columbia University researcher

Along with other apocalyptic climate myths, there is wide acceptance among the media, "climate experts," and the general populace that forest fires are accelerating in frequency and size because of supposed man-made climate change. As with drought, desertification, and heat waves, a link between warmer weather and more forest fires seems to make sense.

Are warmer temperatures and increasing CO_2 affecting the size and number of wildfires in Texas and the world? The surprising answer is that they most likely have decreased the threat of wildfires. For wildfires to occur, very arid conditions are required to sufficiently dry fuels like grass and wood to ignite. We have already noted that droughts are declining, and precipitation is increasing modestly. Combined, these are contributing to an overall increase in soil moisture, which is a powerful fire retardant.

The second greatest moisture loss in plants (the first is direct evaporation) is via transpiration. Transpiration is the process where plants "breath in" air through pores (stomata) to absorb CO_2 for photosynthesis and "exhale" oxygen-enriched air and water vapor. The increase in the atmospheric concentration of CO_2 over the last 150 years—and especially since about 1950—has boosted the fertilization effect of carbon dioxide in the air. This means that vegetation needs to transpire less, resulting in less water being lost through the stomata, resulting in increased soil moisture.

A study led by scientists with the Canadian Forest Service compared temperatures and CO_2 concentration versus frequency of forest fires over a nearly 150-year period since 1850 in North America and Europe (Flannigan et al., 1998). Their results contradict the predictions of the promulgators of doom. The authors demonstrated a link between more CO_2 in the air and fewer fires worldwide. They attributed the decline in forest fires to the combined effect of CO_2 fertilization leading to greater soil moisture.

To determine if wildfires are increasing or becoming more intense, we analyzed data from the National Interagency Fire Center for the area burned and the frequency of wildfires in the United States (Figure 14). The data indicate that, compared to the values prior to the mid-1900s, both the area burned and the number of fires in recent decades are approximately 20% of those in the first half of the twentieth century.

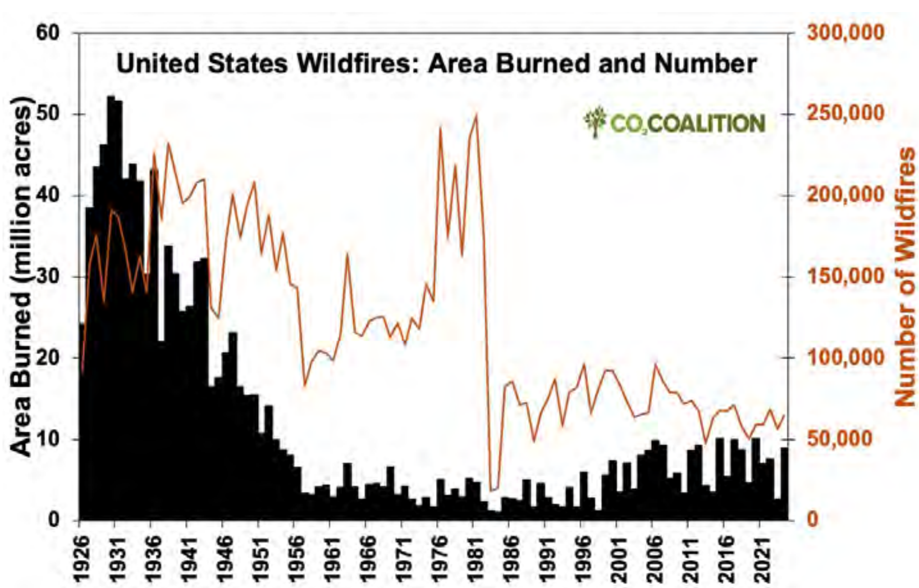

Figure 14: *Annual Area Burned and Frequency of Wildfires in the United States. National Interagency Fire Center (2020, 2025)*

THE BENEFITS OF CARBON DIOXIDE

The most significant positive consequence of a rising concentration of atmospheric carbon dioxide is that of greatly increased plant growth. Nearly all plants on Earth first appeared and thrived during periods of much higher CO_2, and their growth has been stunted over the last several million years by levels of the gas close to historic lows. Although CO_2 has increased in concentration by 50% over levels prior to the Industrial Revolution, the gas still remains at suboptimal levels for plant growth.

NASA satellites have confirmed that a great increase in vegetation (greening) is occurring across the globe from the near-polar regions to the equator. Since the early 1980s, NASA satellites, with enhanced infrared sensors, began measuring leaf area. Leaf area is the most important single measure of ecosystem health. It directly relates to the source of all food, habitat, water retention and cover, which provides safety for wildlife.

According to NASA, CO_2 increases explain about 70% of the greening (Hille, 2016; Schernikau and Smith, 2022; Zhu et al., 2016). In fact, a NASA study found that less than 4% of the Earth's surface had experienced decreasing leaf area during the period 1982–2009 (Figure 15, Zhu et al., 2016).The Texas A&M study confirms that carbon dioxide is beneficial:

> *"Elevated carbon dioxide levels improve the water use efficiency by plants, so would lead to increased soil moisture and decreased drought. Elevated carbon dioxide levels also increase biomass if plants are not otherwise water- or nutrient-limited, which might increase water use and decrease soil moisture."* (Nielsen-Gammon et al., 2024)

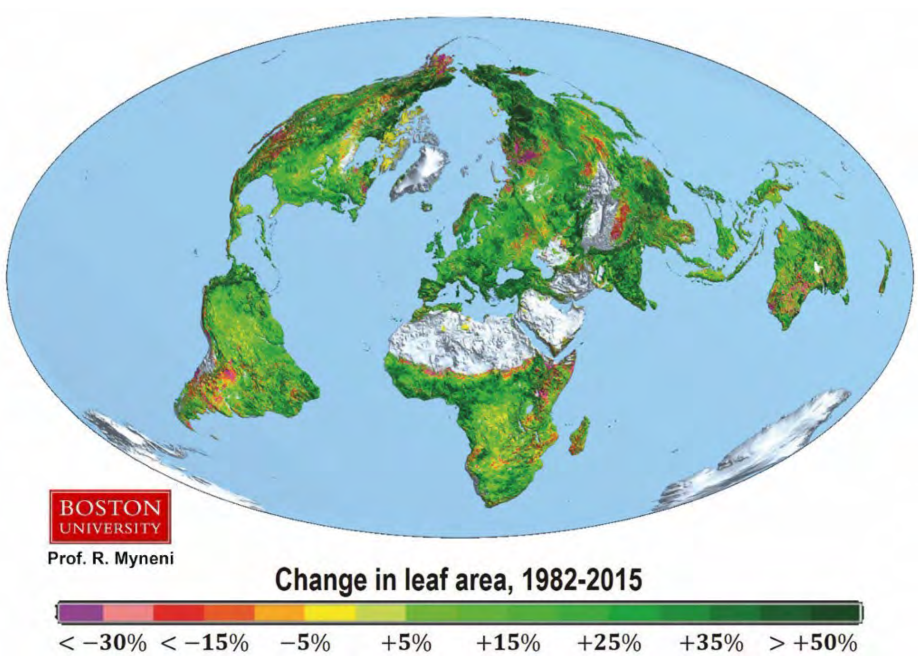

Figure 15: *Increasing CO_2 is Greening the Planet. Modified from Zhu et al. (2016), permission R Myneni*

In addition to boosting plant and crop growth, increased CO_2 also reduces the amount of water that plants lose during transpiration and thus increases resistance to drought. As discussed earlier in this report, transpiration is the process by which plants "breathe." They bring in CO_2, through their pores, or stomata, during the day and "exhale" oxygen primarily at night. During this process, water vapor is also expelled through the stomata. With more CO_2 in the air, transpiration is reduced, and water loss is minimized. This means that plants need less water and can better withstand arid conditions. It also leads to increased soil moisture, which may be a primary reason that wildfires are decreasing.

Research has also shown that increased CO_2 helps plants resist extreme heat, pollution and other environmental stresses. The gas has been long used to boost greenhouse yields. Optimal concentrations have been reported as between 800 and 1,200 ppm, more than twice our current atmospheric levels (Wang et al 2022).

TEXAS AGRICULTURE

> *The rising level of atmospheric CO_2 could be the one global natural resource that is progressively increasing food production and total biological output…The effects know no boundaries and both developing and developed countries are, and will be, sharing equally, [for] the rising level of atmospheric CO_2 is a universally free premium.*
>
> — Idso 2013

Crops of nearly all types are breaking annual production records worldwide, including those in hot nations, cold nations and nations in between. Global food production is outpacing population growth (Figure 16). The world's remarkable ability to increase food production year after year is attributable to agricultural innovation, CO_2 fertilization, CO_2-driven drought resistance, warmer weather and to pesticides and nitrogen fertilizer derived from fossil fuels.

> The world population doubled over the last 50 years to 7.5 billion people, while the share of the population suffering from food and nutrition insecurity fell from 15% in 2000 to around 11% today....The root cause of hunger and malnutrition today is poverty—often exacerbated by conflict—that inhibits access to food.
>
> — OECD 2024

Thanks, in part, to increasing atmospheric CO_2 concentration, global agricultural productivity and food production is outpacing population growth (Figure 16).

A valuable recent study, *Environmental Drivers of Agricultural Productivity Growth: CO_2 Fertilization of US Field Crops* (Taylor and Schlenker 2023), has quantified how much of the increase in crop growth is attributable to CO_2-driven enhancement. The subject of the study, the United States, is the world's biggest producer of corn and several other crops, accounting for 33% and 7% of the worldwide production of corn and wheat, respectively.

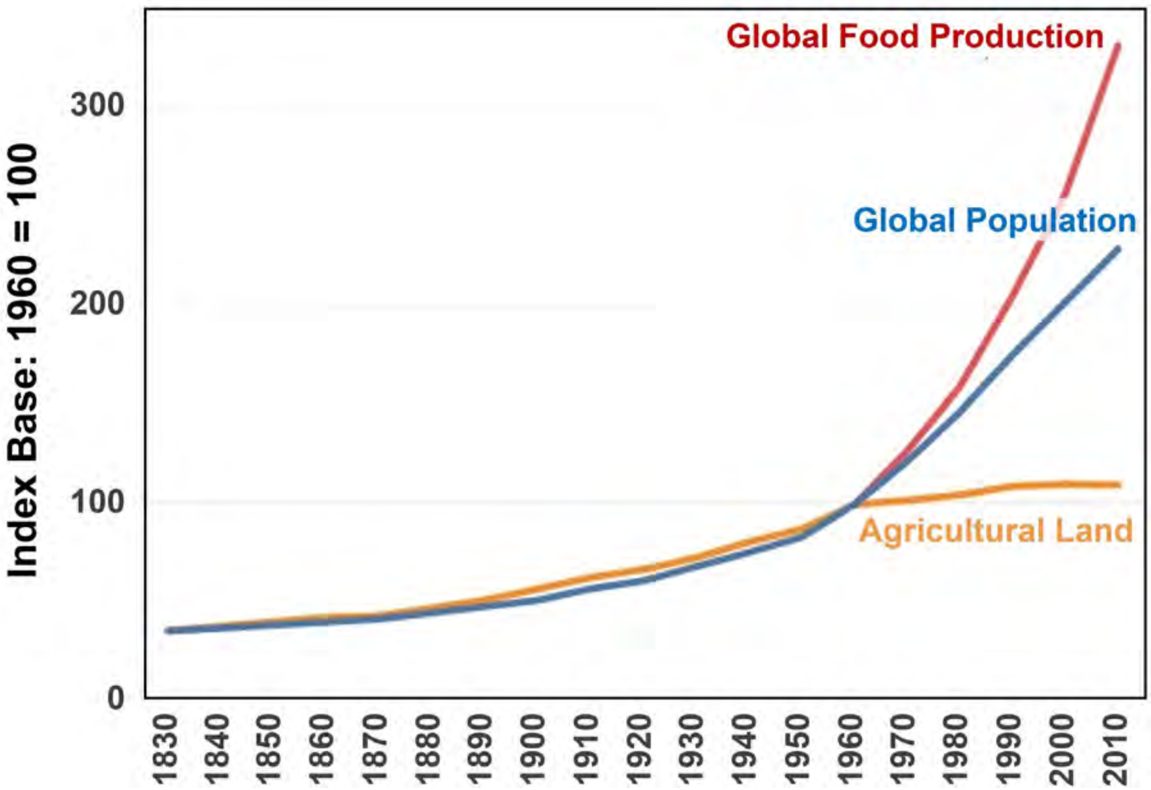

Figure 16: *A Comparison of the Growth in Worldwide Food Production, Population and Agricultural Land Use. OECD (2022) via Obekpa et al. (2025)*

The length of growing seasons in the contiguous United States has increased by more than two weeks since the beginning of the 20th century (Kunkel 2024). Killing frosts end earlier in the spring and arrive later in the fall, providing farmers the opportunity for more plantings. We saw in Figure 4 that the coldest (usually nighttime) temperatures in Texas have been warming significantly (approximately by more than 4 °F) since the mid-1970s. Modestly rising temperatures are benefiting the Texas agricultural sector by extending growing seasons.

Like the rest of the world, Texas has been experiencing record-breaking growth in crop production over the last several decades (Figure 17). The primary crops in Texas are corn, cotton, wheat, sorghum and rice (Texas Department of Agriculture, 2025). Yields of these commodities have steadily increased over the years with the increase in atmospheric CO_2. This is no coincidence, as for every 1 part per million (ppm) of increase in CO_2 concentration, the yields of corn and wheat increase by 0.4% and 1%, respectively (Taylor and Schlenker, 2023). Based on these metrics, our 140-ppm increase in CO_2 since the beginning of the Industrial Revolution has led to 56%, 84% and 140% increases in corn, soybeans and wheat, respectively.

Exposure to increased CO_2 also promotes the growth of rice plants (Figure 18). These observations confirm the direct link between the increasing concentration of atmospheric CO_2 and agricultural yield.

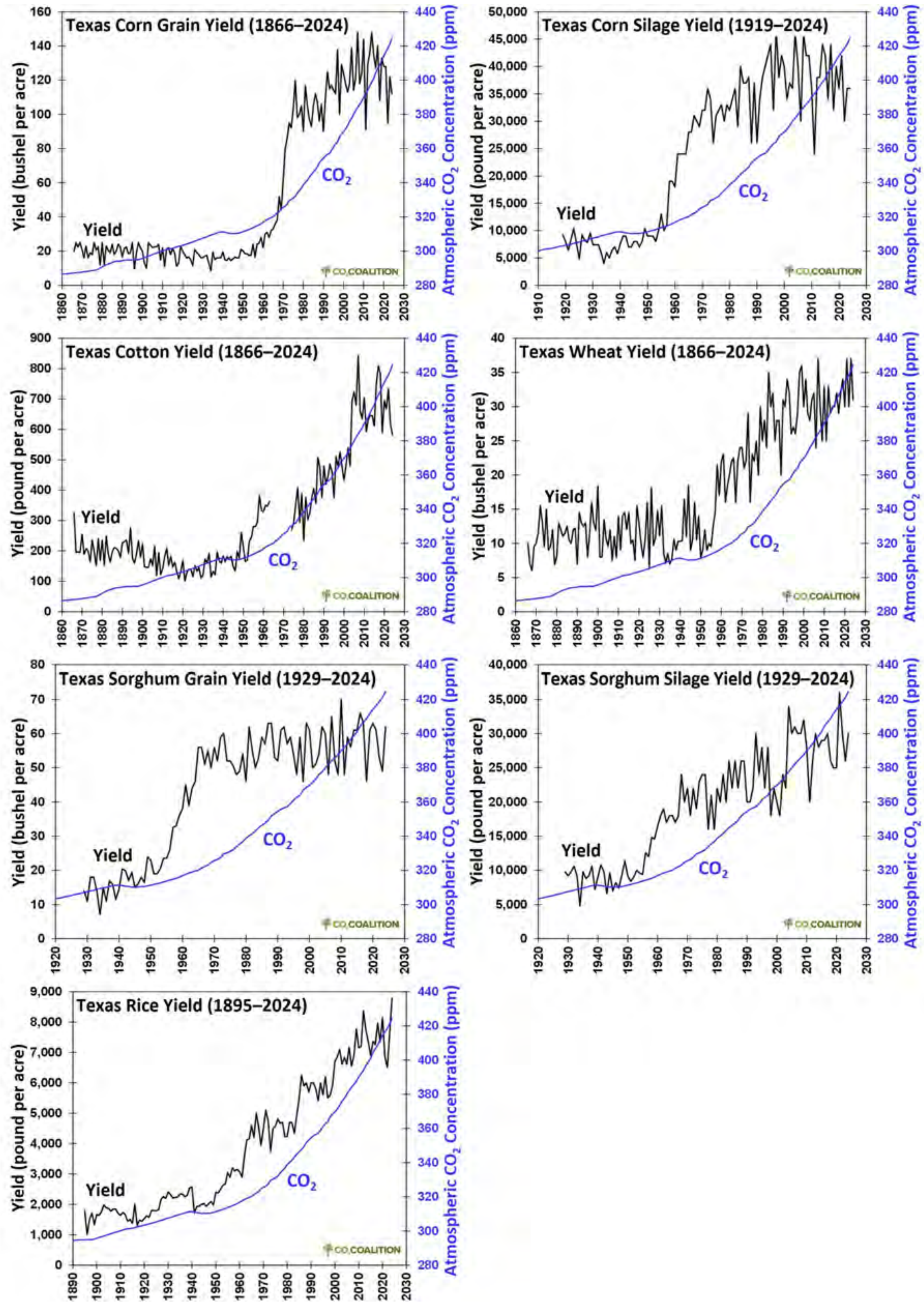

Figure 17: *Primary Crop Yields in Texas, Plotted With the Atmospheric CO_2 Concentration.*
Crop yield: USDA National Agricultural Statistics Service (2025),
CO_2 concentration (1958 and prior): NASA Goddard Institute for Space Studies (2018),
CO_2 concentration (1959 onward): Lan and Keeling (2025) (NOAA)

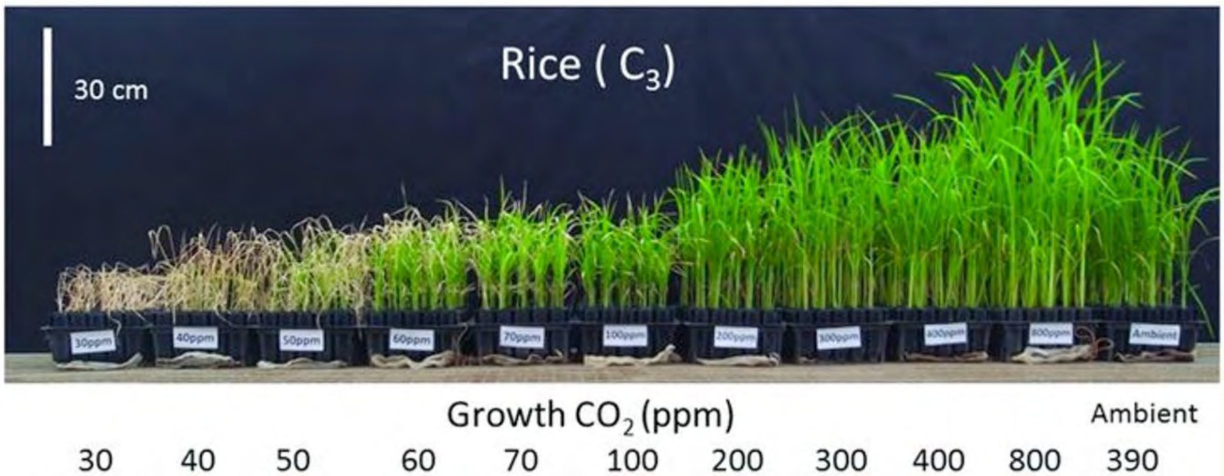

Figure 18: *Rice Plant Growth at 21 Days Under Different CO_2 Concentrations. von Caemmerer et al. (2012)*

CARBON DIOXIDE THROUGH TIME

To put modern atmospheric CO_2 concentrations into perspective, it is helpful to review how CO_2 levels have changed through time.

The current level of CO_2 in the atmosphere as measured at the Mauna Loa Observatory in Hawaii is about 430 parts per million (ppm) by volume (as of June 2025) (Lan and Keeling, 2025). This is an increase of 150 ppm from the pre-industrial concentration of about 280 ppm in the mid-1800s. This approximately 50% increase appears significant when viewed through the narrow time frame of a few decades or centuries (Figure 19).

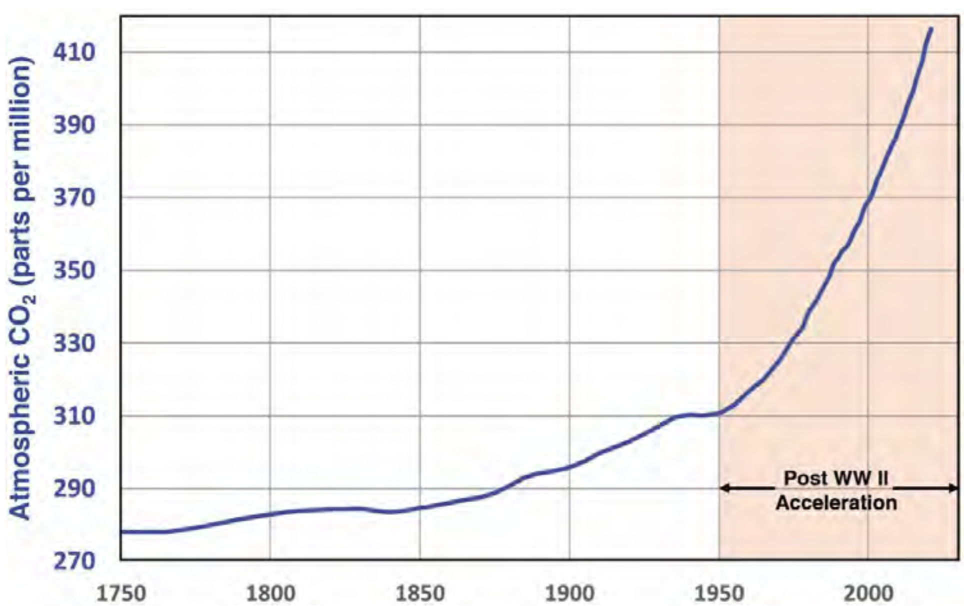

Figure 19: *Carbon Dioxide Concentration (1750 to 2022). European Environment Agency (2015, 2024)*

However, appearances are deceiving. Time scale is important. Put in a long geologic perspective, today's level of CO_2, while representing a recent increase, is significantly lower than it has been during nearly all of Earth's history. We shall see that today's CO_2 concentration—nearly at a historical low—is preventing crops, trees and other plants from reaching their full growth potential via photosynthesis.

Very low levels of CO_2 began increasing significantly in the mid-20th century during the economic boom following World War II (Figure 19). Our current concentration of 430 ppm represents an increase of approximately 50% over the last 200 years. Bear in mind that, if CO_2 were driving warming, it should be apparent in the period of the last 70-plus years when levels were increasing at a significant rate.

This recent increase in atmospheric CO_2 concentration is attributable to human emissions, primarily from the use of fossil fuels (Engelbeen et al., 2024). A simple analysis (Figure 20) shows that the amount of carbon dioxide being emitted by modern human activity is significantly greater than the amount of additional carbon dioxide appearing in the atmosphere. That is because a substantial amount of the gas being emitted through human activities is being sequestered—removed from the atmosphere—by natural processes such as photosynthesis and, to a lesser extent, by absorption into the oceans.

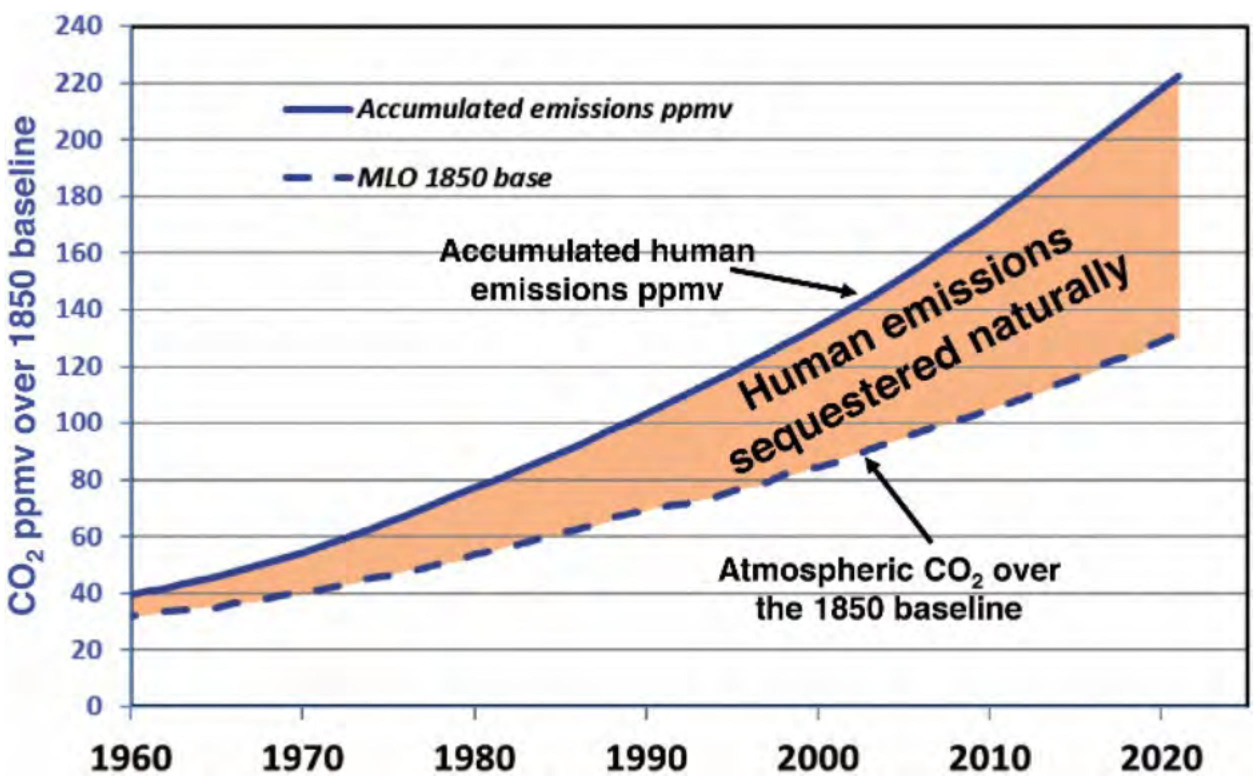

Figure 20: *Human CO_2 Emissions Since 1850 vs. Atmospheric CO_2 (Mauna Loa Observatory). Emissions: Friedlingstein et al. (2025), Global Carbon Budget (2025), Atmospheric CO_2 Concentration: Lan and Keeling (2025), (Data courtesy of Engelbeen, 2023)*

As explained above, increasing atmospheric CO_2 is leading to great increases in global vegetation and crop productivity. This is because the ancestors of most of the vegetation that populate our planet today first appeared when CO_2 levels were more than 2,500 ppm. The very low CO_2 concentrations of today do not provide enough CO_2 to maximize the growth potential of these plants.

While the CO_2 concentration increase in the recent past appears to be significant, it is necessary to place this increase in the context of geological history. In this longer view (Figure 21), we find that current CO_2 levels of slightly more than 400 ppm are one-sixth of the average concentration over the last 600 million years and only 5% of peak levels of about 8,000 ppm. Therefore, current levels are near a historic low.

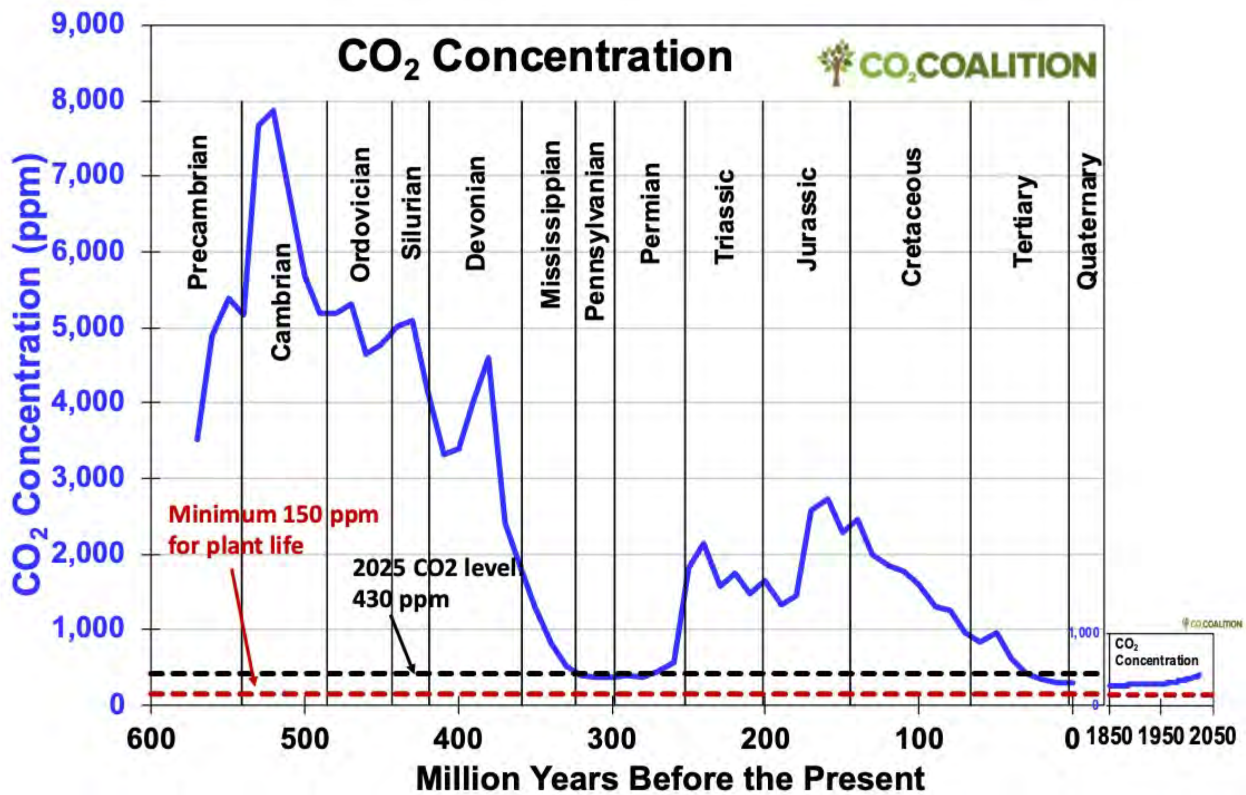

Figure 21: *Million Years of CO_2 Concentration, Plotted with the Recent CO_2 Concentration (Since 1850), for Comparison. Prehistoric CO_2 Concentration: Berner and Kothavala (2001a, 2001b) (NOAA), Recent CO_2 Concentration (1958 And Prior): NASA Goddard Institute for Space Studies (2018), Recent CO_2 Concentration (1959 Onward): Lan And Keeling (2025) (NOAA)*

Is there an optimal value of the CO_2 concentration for plant growth? Various investigators (e.g., Amthor, 2001; Grotenhuis et al., 1997; Papikhin et al., 2021; Wang et al., 2022) have reported different values, from an optimal CO_2 concentration ranging from 700 to more than 2,500 ppm, depending on the plant species. These observations indicate that there is no agreement regarding the optimal value of the CO_2 concentration for plant growth, but that this optimal value is significantly higher than the 2025 atmospheric CO_2 concentration of 430 ppm (Lan and Keeling, 2025).

WARMING DUE TO CARBON DIOXIDE (CO_2)

We used the Model for the Assessment of Greenhouse-Gas Induced Climate Change MAGICC) to estimate the effect of eliminating CO_2 emissions in Texas and the United States U.S. on global temperatures (Cato Institute, 2016; MAGICC IP Co, Inc., 2022; Michaels et al., 2023). MAGICC assumes a range of 1.5 to 4.5 °C (2.7 to 8.1 °F) for the equilibrium climate sensitivity, i.e., the amount of warming caused by a doubling of the atmospheric CO_2 concentration.

As shown in Table 3, in 2016, Texas contributed 12.7% to the total nationwide anthropogenic CO_2 emissions of 5,161 million metric tons. Assuming an equilibrium climate sensitivity of 2.0 °C, MAGICC estimates that if the State of Texas had ceased all CO_2 emissions by 2010, only 0.0093 °F of warming would have been averted by 2050, and only 0.0237 °F of warming would have been averted by 2100 (Table 3). These temperature changes are negligible and cannot be felt or measured. Therefore, any measures for reducing or stopping the emission of CO_2 in Texas are not only unnecessary but would also have no material effect on global temperature.

Table 3: *Amount of Temperature Rise Prevented by Stopping All CO_2 Emissions by 2010. Cato Institute (2016), MAGICC IP Co, Inc. (2022)*

How much temperature rise would be averted by 100% reduction in CO_2 emissions?						
Jurisdiction	**Anthropogenic CO_2 Emissions (2016) (million metric tons)**	**Percentage (%) of U.S. Emission**	**Temperature rise averted by reducing CO_2 emission by 100% by 2010 (climate sensitivity of 2.0 °C)**			
			By 2050 (°C)	**By 2050 (°F)**	**By 2100 (°C)**	**By 2100 (°F)**
United States	5,161.00	100.0%	0.041	0.0738	0.1040	0.1872
Texas	653.8	12.7%	0.0052	0.0093	0.0132	0.0237

To put these numbers in perspective, as of April 2025, Texas has four long-term coal power plants and fifteen long-term natural-gas combined-cycle (NGCC) power plants in the electric utility sector, i.e., these power plants have at least one turbine with no planned retirement year (U.S. Energy Information Administration, 2025). These coal and NGCC power plants have average combined capacities of 3.8 and 8.1 gigawatts (GW), respectively.

Based on the estimates provided by the National Energy Technology Laboratory (NETL) (Buchheit et al., 2023), retrofitting the above-mentioned coal power plants with 99% carbon capture could cost $6.2 billion ($2.2 billion per GW of net power output), which comes with a 26% reduction in net power output and a 47% increase in operation and maintenance costs. (Here, the term "carbon capture," rather than "CO_2 capture" is used, as NETL uses the mass of carbon in its calculations.)

Similarly, using the estimate from NETL (Schmitt et al., 2023), retrofitting the above-mentioned NGCC power plants with 97% carbon capture could cost $8.2 billion ($ 1.2 billion per GW of net power output), which comes with a 13% reduction in net power output and a near-doubling of the operation and maintenance costs.

These additional costs would be passed along to consumers in higher prices for electricity.

Based on the energy policies of countries such as India and China, global CO_2 emissions are expected to increase rather than decrease (Friedlingstein et al., 2025; Global Carbon Budget, 2025), which makes CO_2 emission reductions in Texas even more meaningless.

SUMMARY AND CONCLUSIONS

By every metric reviewed concerning the effect of climate change in Texas, we find that the state's ecosystems are thriving, and its citizens are benefiting from increasing atmospheric levels of the "miracle molecule" carbon dioxide. In summary:

- The average temperature in Texas over the last 130 years shows no alarming increase and is not rising at alarming rates. The temperatures of the last several decades are nearly identical to those experienced in the early 1900s.
- Maximum temperature shows no trend of either increasing or declining since the late 1800s.
- The annual number of 100 °F days in Texas has been decreasing.
- Droughts in Texas are not increasing or becoming more severe.
- In Texas, the most violent tornadoes have been in a 70-year decline.
- Hurricanes and floods are not becoming more frequent in Texas.
- Acreage burned, both in the United States and globally, have been in significant decline.
- Agriculture in Texas is thriving due to the combination of increasing CO_2 concentration, nitrogen fertilizer and lengthening growing seasons.
- Carbon dioxide (CO_2) is necessary for life on Earth. Increasing CO_2 concentration greens the Earth and allows plants to grow bigger, produce more food and better resist drought.

In conclusion, there is no evidence of a climate crisis in Texas and none can be reasonably expected. CO_2 is not only beneficial, but essential for life on Earth. Therefore, any measures for combating a purported climate crisis and for reducing CO_2 emissions are not only unnecessary but would also cause considerable harm with no measurable benefit.

ACKNOWLEDGMENTS

This report is the sixth in a series of state and regional studies by the CO_2 Coalition on the effects of climate change on various parts of the United States of America. Previous regional and state reports include:

- Pennsylvania's Regional Greenhouse Gas Initiative Relies on Faulty Data: Why RGGI is a "Solution in Search of a Problem" (July 2021)
- Virginia and Climate Change: Separating Fact from Fiction (June 2022)
- The American Midwest and Climate Change: Life in America's Breadbasket is Good and Getting Better (June 2023)
- Wyoming and Climate Change: CO_2 Should Be Celebrated, Not Captured (February 2024)
- Arkansas and Climate Change: No Warming. No Crisis. No Problem. (July 2025)

This report is based principally on the work of the following:

- Gregory Wrightstone, MS Geology, CO_2 Coalition Executive Director
- Frits Byron Soepyan, PhD Chemical Engineering, CO_2 Coalition Science and Research Associate
- Martin Cornell, BS Chemistry, CO_2 Coalition Member
- John Andrew May, BS Geology, CO_2 Coalition Member
- Maaneli Derakhshani, PhD Physics, CO_2 Coalition Senior Science Advisor
- William Happer, PhD Physics, CO_2 Coalition Cofounder and Chair

These and other contributors to this evaluation represent the fields of climatology, meteorology, physics, chemistry, geology, agronomy, engineering and more.

About the CO_2 Coalition

The CO_2 Coalition was established in 2015 as a non-partisan educational foundation operating under Section 501(c)(3) of the IRS code for the purpose of educating thought leaders, policy makers and the public about the important contribution made by carbon dioxide (CO_2) to our lives and economy. The organization seeks to engage in an informed and dispassionate discussion of climate change, humans' role in the climate system, the limitations of climate models and the consequences of mandated reductions in CO_2 emissions.

The CO_2 Coalition is comprised of more than 180 experts in various fields of science, engineering, physics and more who promote the many benefits of modest warming and increasing carbon dioxide.

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APPENDIX A

Modeling Future Climate

The current rush to "net zero" and the plans to spend enormous sums of money are based on mathematically complicated climate models that predict a significant rise in future temperatures. If we are to base policy decisions on predictive models, we should first determine if the models are capable of forecasting accurately.

Accordingly, a short explanation of how climate models work is in order: The models are based on assessments of climate sensitivity, which is the estimated temperature response to a doubling of atmospheric CO_2 concentrations. In other words, if our current ~ 430 ppm CO_2 level doubled to 860 ppm, what increase in temperature could we expect?

On top of this greenhouse-induced warming, these models assume that the direct warming effect of CO_2 is multiplied by a large and positive "feedback factor" from CO_2-induced changes in water vapor and clouds, which supposedly contribute much more to the greenhouse warming of the Earth than CO_2. But there is observational evidence that the feedback factor is small and may likely even be negative.

The most recent collection of over 100 climate models from the Coupled Model Intercomparison Project (2025a, 2025b) (CMIP Phase 6, or CMIP6) projects that a doubling of CO_2 would cause warming ranging from 1.8–5.6 °C (3.2–10.1 °F). Contrast that to the climate sensitivities calculated by respected physicists Dr. Happer, Dr. Lindzen and Dr. van Wijngaarden in their CO_2 Coalition publications (Lindzen, 2019; van Wijngaarden and Happer, 2022a, 2022b). In these, they estimate that the climate sensitivity is less than 1.5 °C and most likely below 1.0 °C.

A detailed examination by Dr. John R. Christy, Distinguished Professor of Atmospheric Science and Director of the Earth System Science Center at The University of Alabama in Huntsville (The University of Alabama in Huntsville, 2025), provides a stark assessment of the validity (or non-validity) of the models that are used in support of efforts to attain net zero emissions (Figures A-1 and A-2). For instance, Figure A-2 shows that the average of the modeled temperatures predict a warming rate of 0.42 °C per decade, while the measured temperature shows an increase of 0.17 °C per decade. That means that the models are overpredicting temperature increase by about 2.5 times. If natural temperature drivers were responsible for 50% of the measured warming, then, the overprediction would rise to five times too high.

A report published in the journal *Nature* (Hausfather et al., 2022) by climate modelers from NASA, Columbia University, Texas A&M and Lawrence Livermore National Laboratory confirms that the CMIP6 models used by the IPCC significantly overpredict warming:

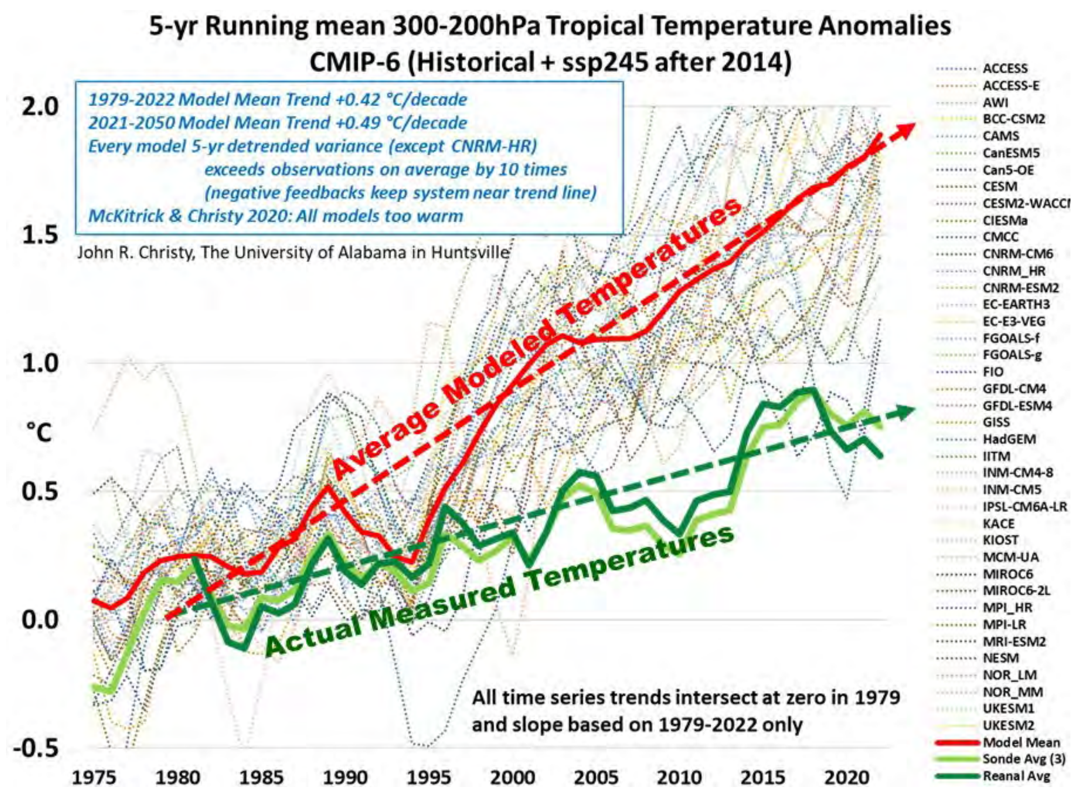

Figure A-1: *Average of Modeled Tropical Temperature Anomalies vs. Real-World Temperatures. Modified from Christy (2023)*

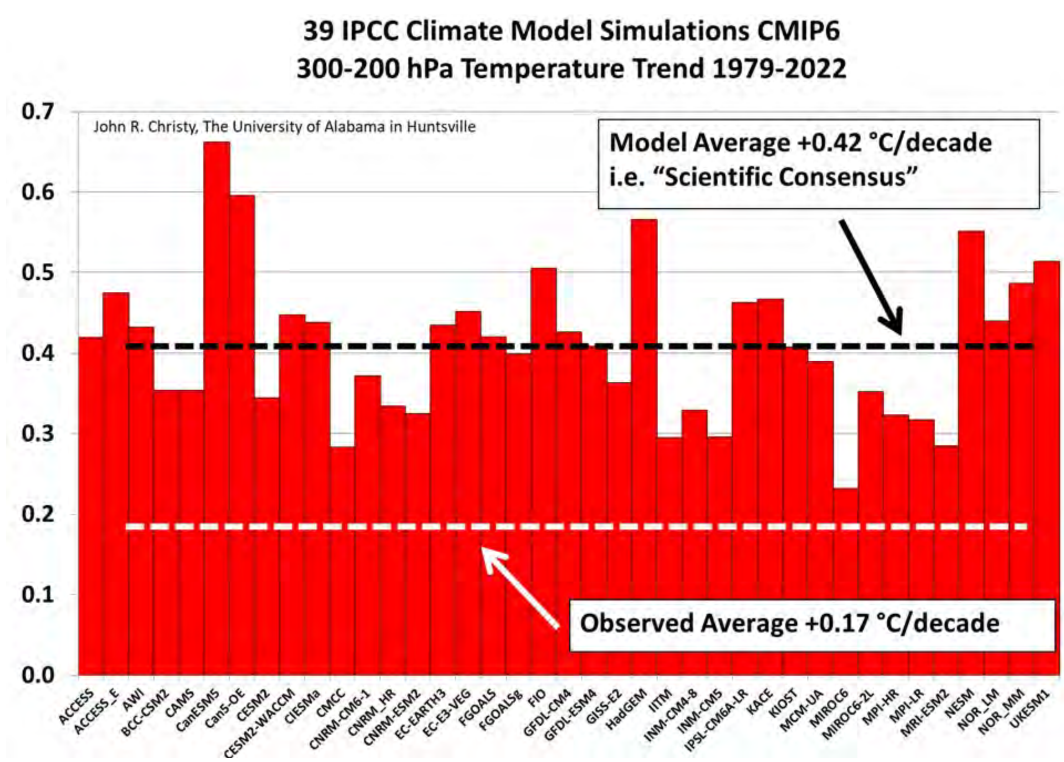

Figure A-2: *Predictions From 39 CMIP6 Models for the Temperature Increase During 1979–2022, Compared to the Observed Temperature Increase. Christy (2023), accessible via Tedethson2 (2023) (YouTube)*

> *…a subset of the newest generation of models are ‘too hot’ and project climate warming in response to carbon dioxide emissions that might be larger than that supported by other evidence*
>
> — Hausfather et al 2022

Governments are enacting polices that rely on complex computer programs, using an array of complicated equations “tweaked” by the scientists who built them to arrive at a temperature forecasted some 100 years into the future. We cannot confidently forecast temperature a mere 10 days in the future but are asked to base climate policies and risk trillions of dollars on models that have failed and failed again the test of prediction versus observation.