

STATEMENT ON CLIMATE CHANGE AND ITS IMPLICATIONS FOR OKLAHOMA

“Warming of the climate system is unequivocal, as is now evident from observations of increases in global average air and ocean temperatures, widespread melting of snow and ice, and rising global average sea level.”

– the Fourth Assessment of the Intergovernmental Panel on Climate Change (IPCC).

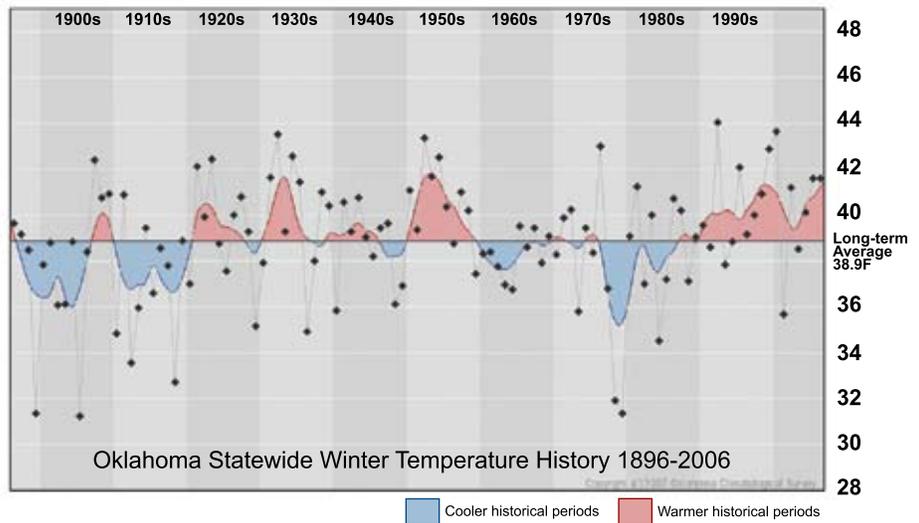
That statement reflects the essence of a vast amount of observational data and climate research: the earth’s climate has warmed on average during the last 100 years and will continue to warm through the 21st century. Further, ample evidence from observational data and climate modeling studies indicates that this global-scale warming is not attributable to natural variability. The Oklahoma Climatological Survey (OCS) has been mandated by the Oklahoma legislature to provide climate information and expertise which could be of value to the public, as well as to state policy- and decision-makers. In accordance with that directive, OCS has conducted a review of the current assessments of climate change research and concludes the following to be true:

- The earth’s climate has warmed during the last 100 years;
- The earth’s climate will continue to warm for the foreseeable future;
- Much of the global average temperature increases over the last 50 years can be attributed to human activities, particularly increasing greenhouse gases in the atmosphere;
- Oklahoma will be impacted.

Across the globe, a warming climate will be beneficial to some and detrimental to others. Anticipating how this climatic shift will impact Oklahoma is of vital importance to state decision-makers. One of the greatest impacts will be the exposure of Oklahoma’s growing population and economy to water stress. Oklahoma’s future requires access to fresh water. Thus, due diligence in protecting our water resources and adapting to future climate variability is paramount if we are to maintain and improve the quality of life and the economy of Oklahoma.

The Science of Global Climate Change

The earth’s climate is always changing. Evidence such as tree ring and ice core studies indicates large and sometimes abrupt climate changes have occurred in the earth’s distant past, lasting centuries to millennia. These climate swings are attributed to natural variations, such as changes in the output of the sun or shifts in the earth’s orbit. Oklahoma has exhibited distinct climate periods attributable to natural variability in the last 100 years, from the decadal-scale droughts of the 1910s, 1930s and 1950s to an extended period of abundant precipitation during the 1980s and 1990s. Mounting evidence continues to indicate, however, that human activities have begun to impact the earth’s climate through the release of greenhouse gases. Ice core studies show carbon dioxide and methane are at their greatest levels within the last 650,000 years. Due to the extended

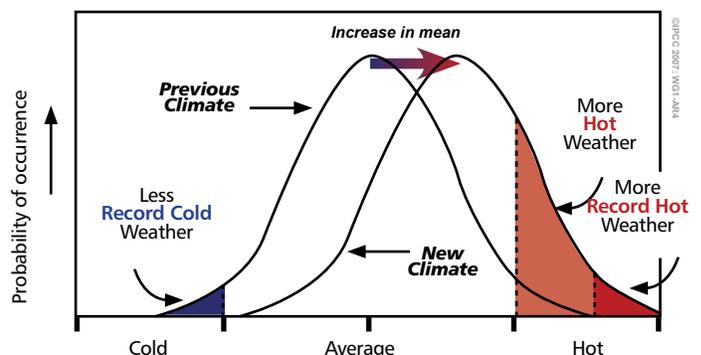


Oklahoma statewide average winter temperatures since 1896. The warming trend evident since the late 1980s has occurred during an extended drought-free period.

periods required for these gases to be removed from the atmosphere, further emissions during the 21st century will cause additional warming for more than a millennium. In fact, even if greenhouse gas concentrations were held steady since the year 2000, the earth is committed to decades of warming from heat already absorbed by the oceans.

Global Climate Change Impacts for Oklahoma

The continued warming of the climate averaged across the globe will create a cascade of climatic shifts which could impact Oklahoma’s climate. These shifts will not mean an end of year-to-year natural variability – hot years and cold years will continue, as will wet years and dry years. The projected changes will be seen at time scales averaged over a decade or more. Little is known of the effects climate change will have on severe weather. The ingredients required for severe weather involve complex combinations that do not exhibit clear changes in a warming climate. Further, global climate models are unable to accurately simulate small scale weather events like thunderstorms or tornadoes.



The effect on the frequency of extreme temperatures in a warming climate.

OCS expects the following climate change scenarios and the associated impacts to be realistic should the projected range of warming materialize for the remainder of the 21st century:

- The frequency of hot extremes and heat waves will increase.
- Cold extremes and cold air outbreaks will decrease.
- Atmospheric water content will increase.
- The jet stream and its associated storms will move poleward.

Implications for Oklahoma:

- The warm season becomes longer and arrives earlier.
- The cool season warms and shortens which leads to a longer frost-free period and growing season.
- Earlier maturation of winter wheat and orchard crops leave them more vulnerable to late freeze events.
- Increased year-round evaporation from the ground and transpiration from green vegetation.
- Drought frequency and severity increases, especially during summer.
- Drier and warmer conditions will increase the risk of wildfires.
- Rain-free periods will lengthen, but individual rainfall events will become more intense.
- More runoff and flash flooding will occur.

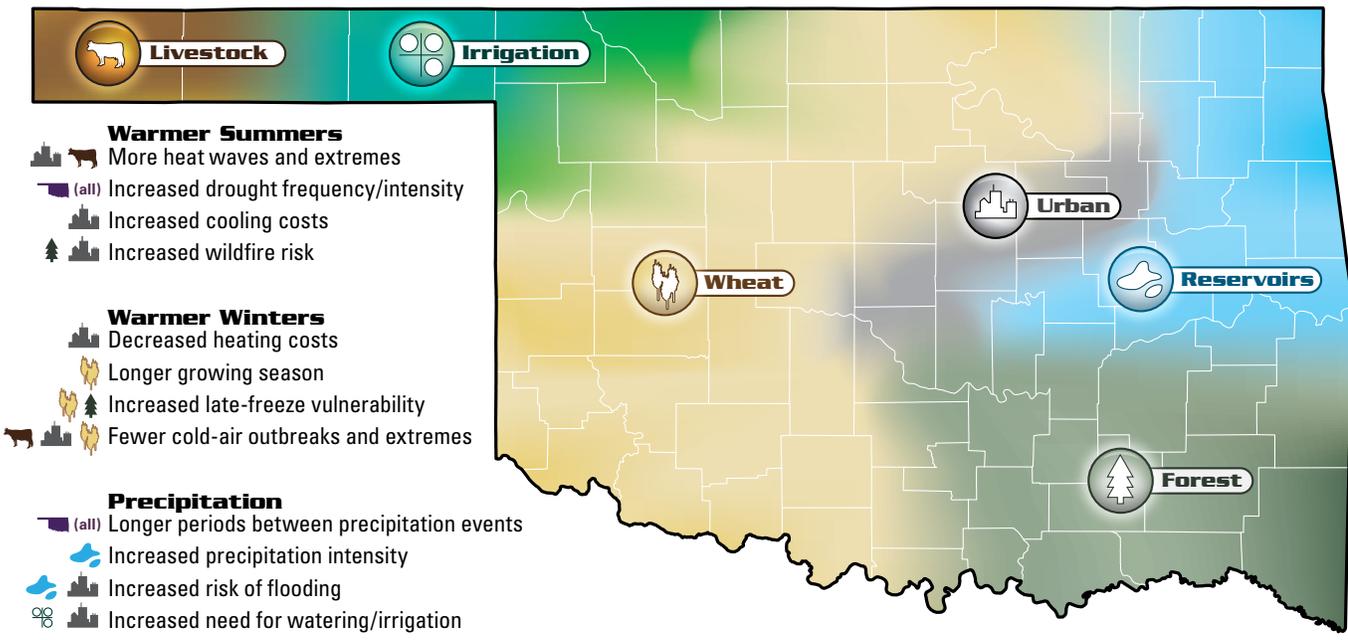
Recommendations

OCS recommends that Oklahoma aggressively pursue four initiatives to address the risks of both climate variability and climate change. First, the state should undertake a comprehensive assessment of

Oklahoma’s social and economic vulnerability to climate variability as well as climate change. Learning to adapt to nature’s extremes now will yield benefits in reduced disaster losses, regardless of the future trajectory of climate change. Climate change may also bring economic opportunities that would be identified in such an assessment. Second, OCS recommends immediate funding of the Oklahoma Water Resources Board’s Comprehensive Water Plan study to identify existing as well as projected needs for water. Third, OCS encourages efficiency programs to reduce our growing demand for energy. Fourth, OCS recommends investment in renewable energy technology and production. Oklahoma has already demonstrated the successes of wind energy; similar efforts should be undertaken to advance development of solar and sustainable bio-energy as well as fostering further research and development of wind energy.

Even if climate does not evolve as expected, these steps will yield long-term benefits to Oklahoma’s society and economy through reduced losses to existing climate and weather threats and cost-savings through reduced energy use. If climate does evolve as expected, Oklahoma will be better positioned to adapt to those changes without rapid social upheaval. Furthermore, building resilience to climate and weather events will help position Oklahoma at a relative advantage to neighboring states, especially in attracting businesses that are dependent upon a continuous water supply.

This statement is the first in a series issued by OCS which delineates the impacts, both beneficial and detrimental, of a warming climate system on the economy of Oklahoma and the quality of life for Oklahomans. Future statements will illuminate possible impacts to specific industries, such as water management and agriculture.



Climate Change Impacts

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