Climate Projections for the City of Austin

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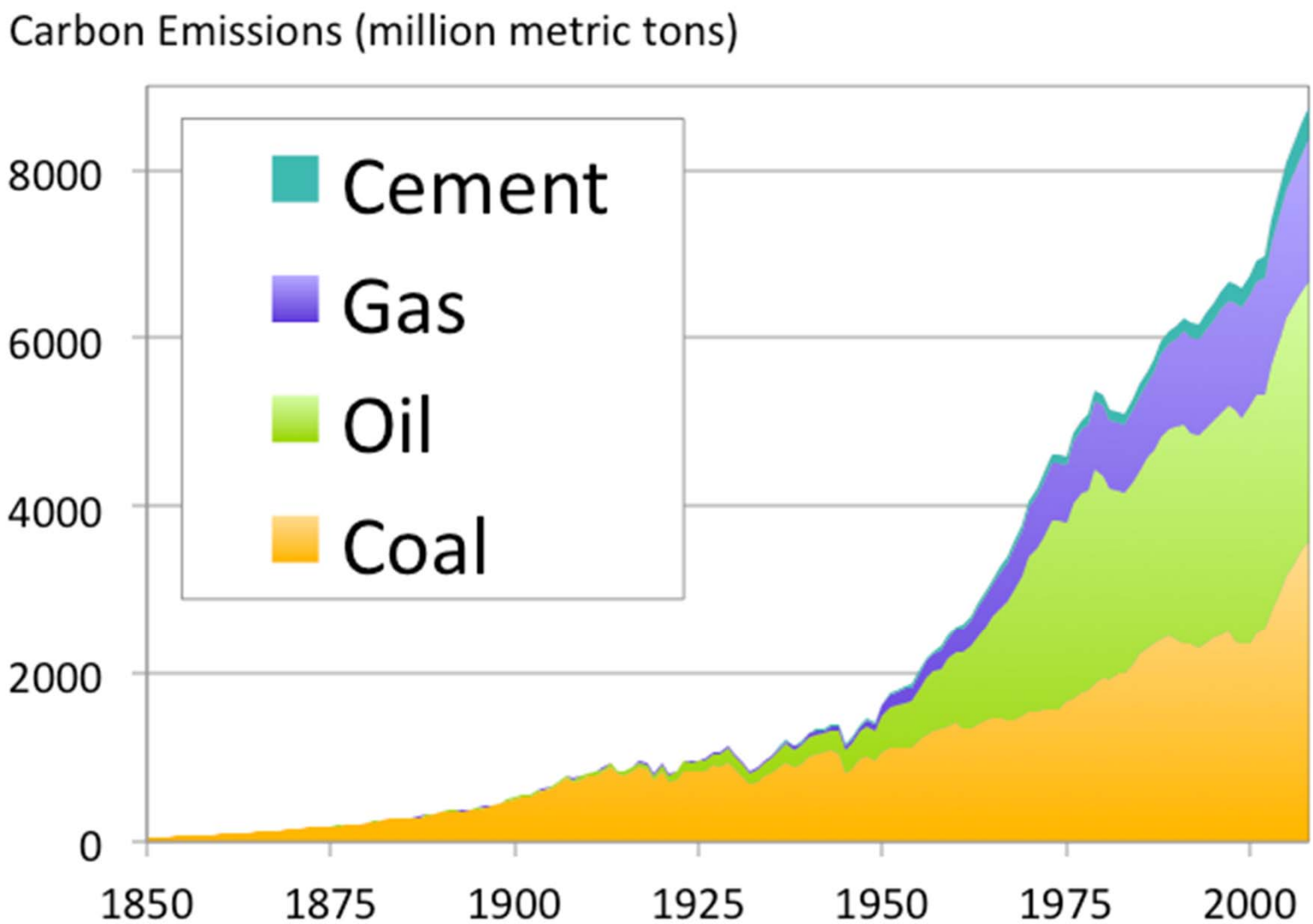
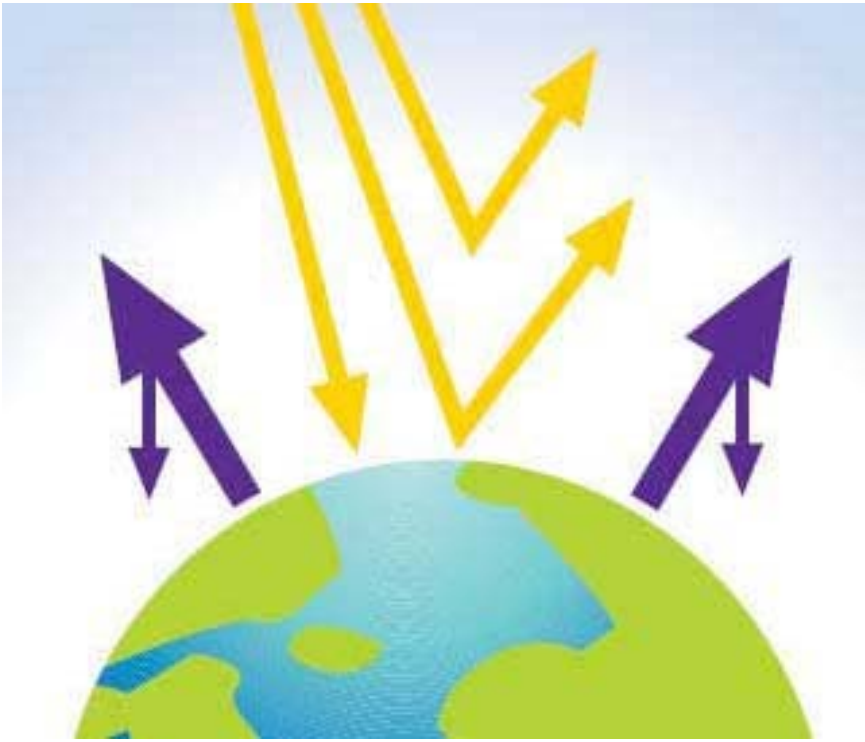
ATMOS Research & Consulting

Our activities produce heat-trapping gases

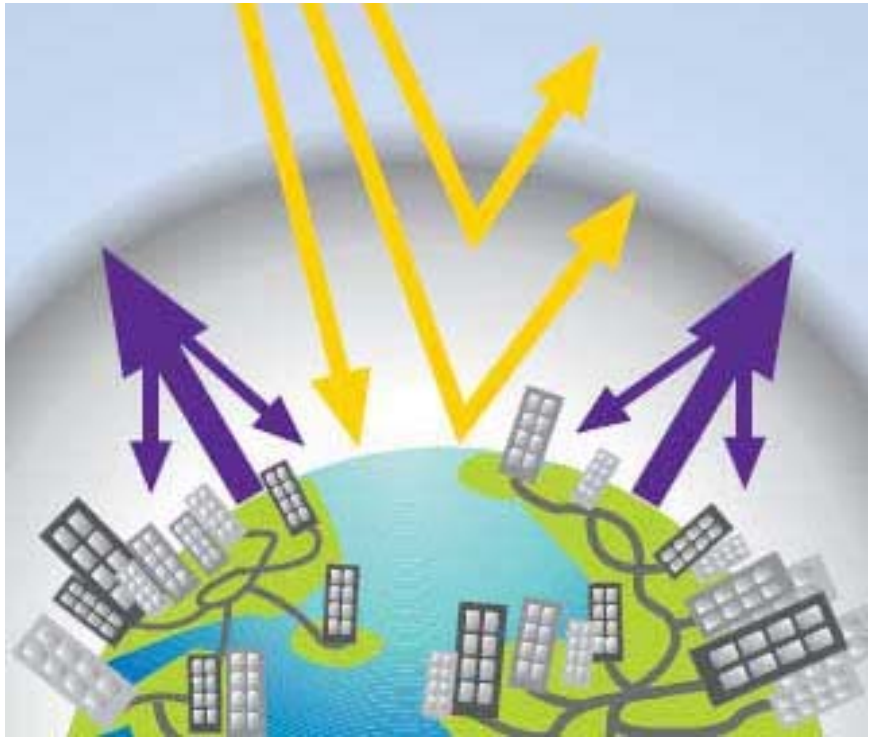


Source: K. Hayhoe for 2014 U.S. National Climate Assessment

… that are building up in the atmosphere

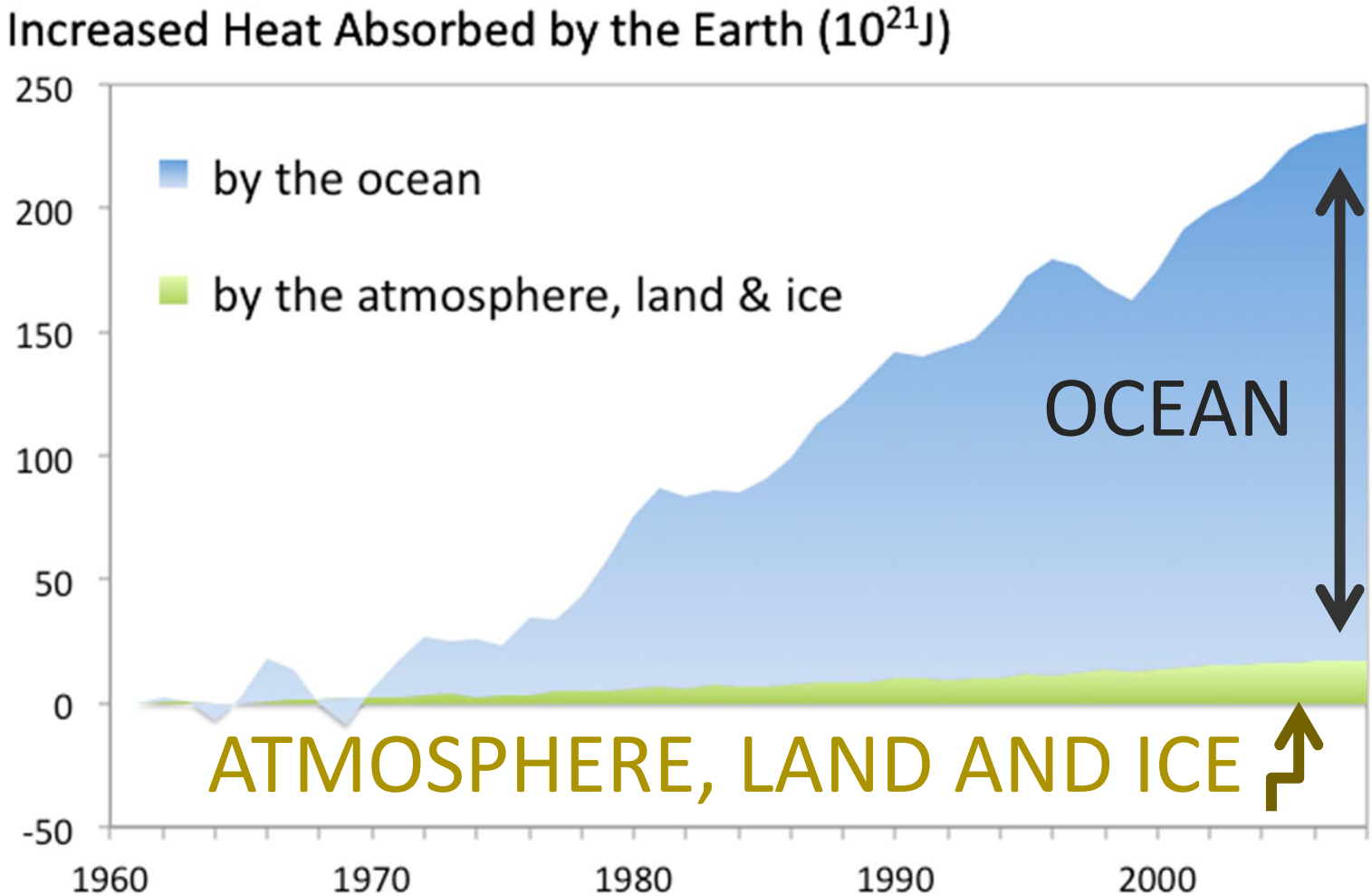


THE NATURAL GREENHOUSE EFFECT



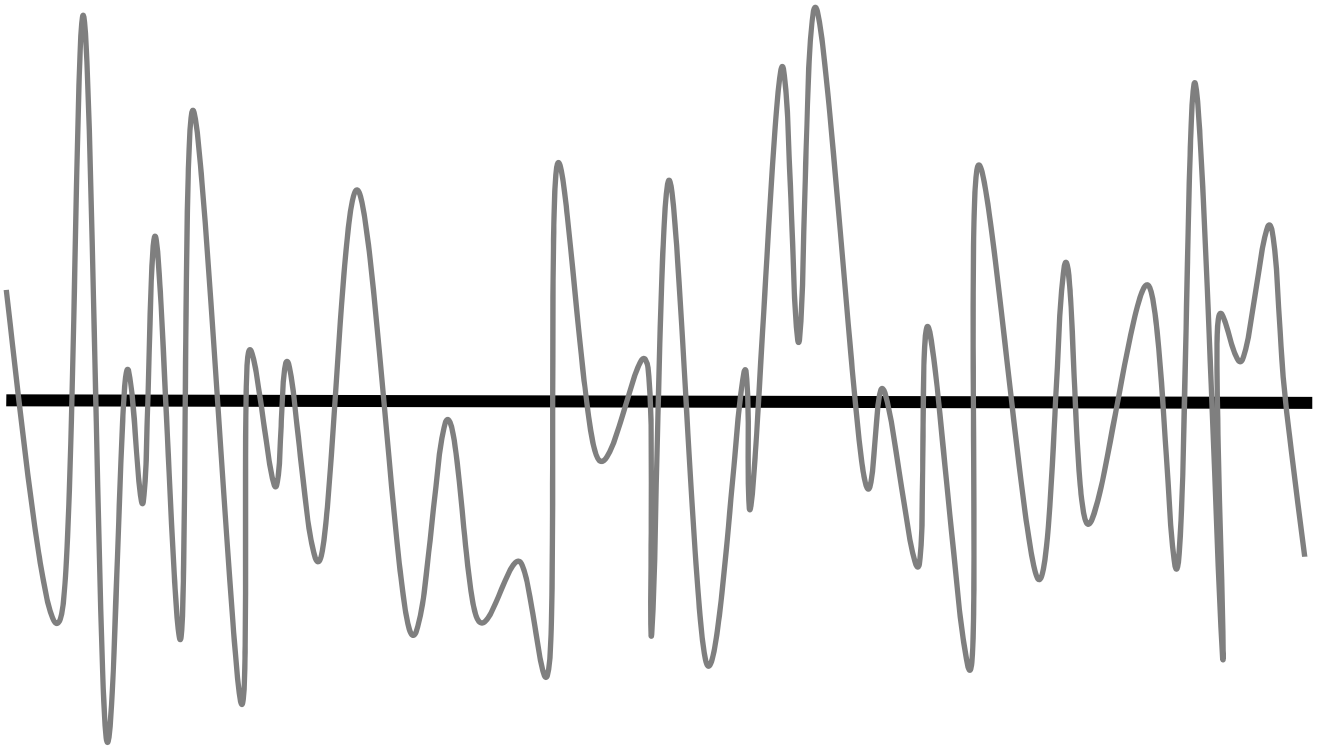
THE ARTIFICIAL HUMAN GREENHOUSE EFFECT

The entire planet is warming in response



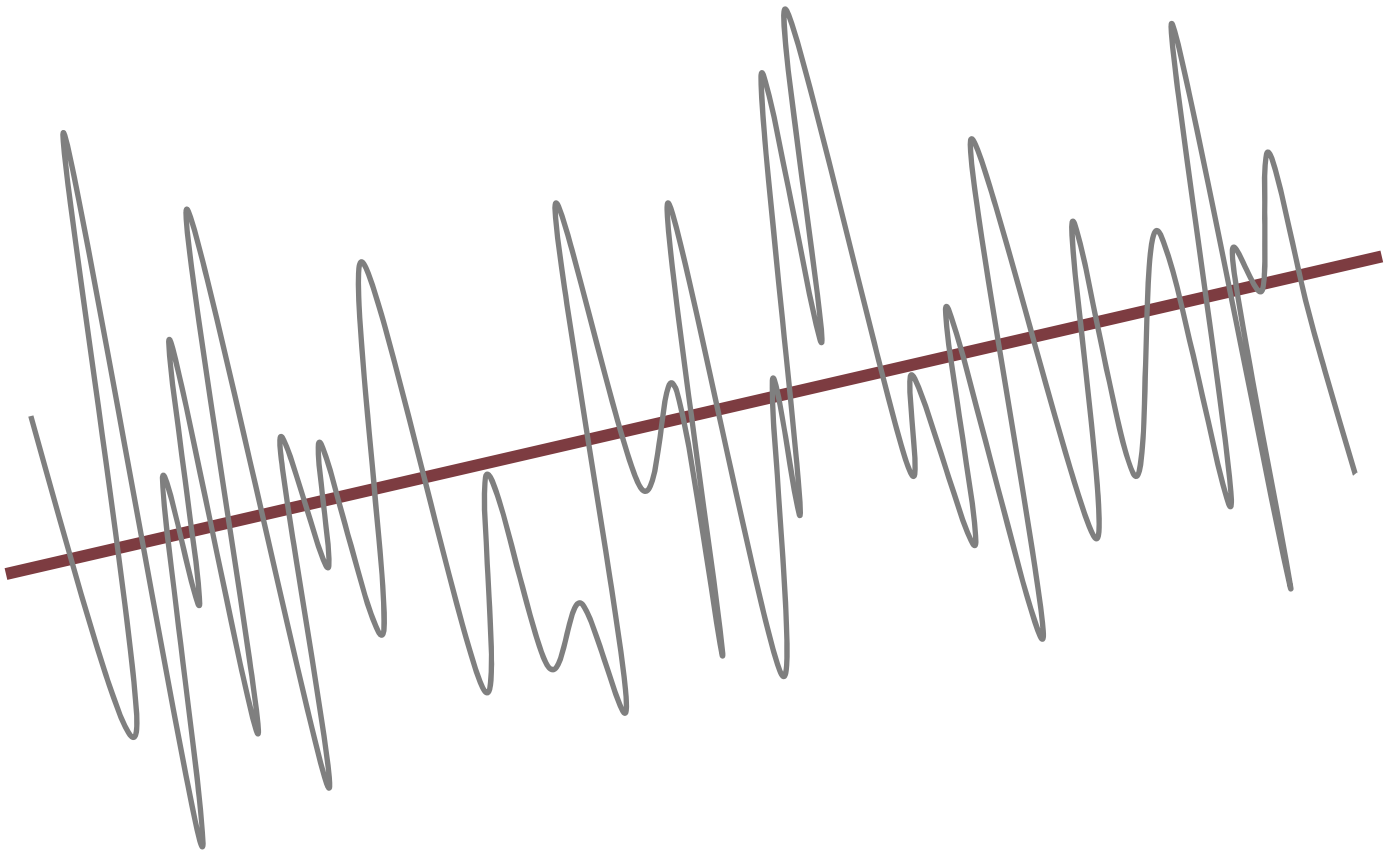
Hayhoe for FWS (2014)

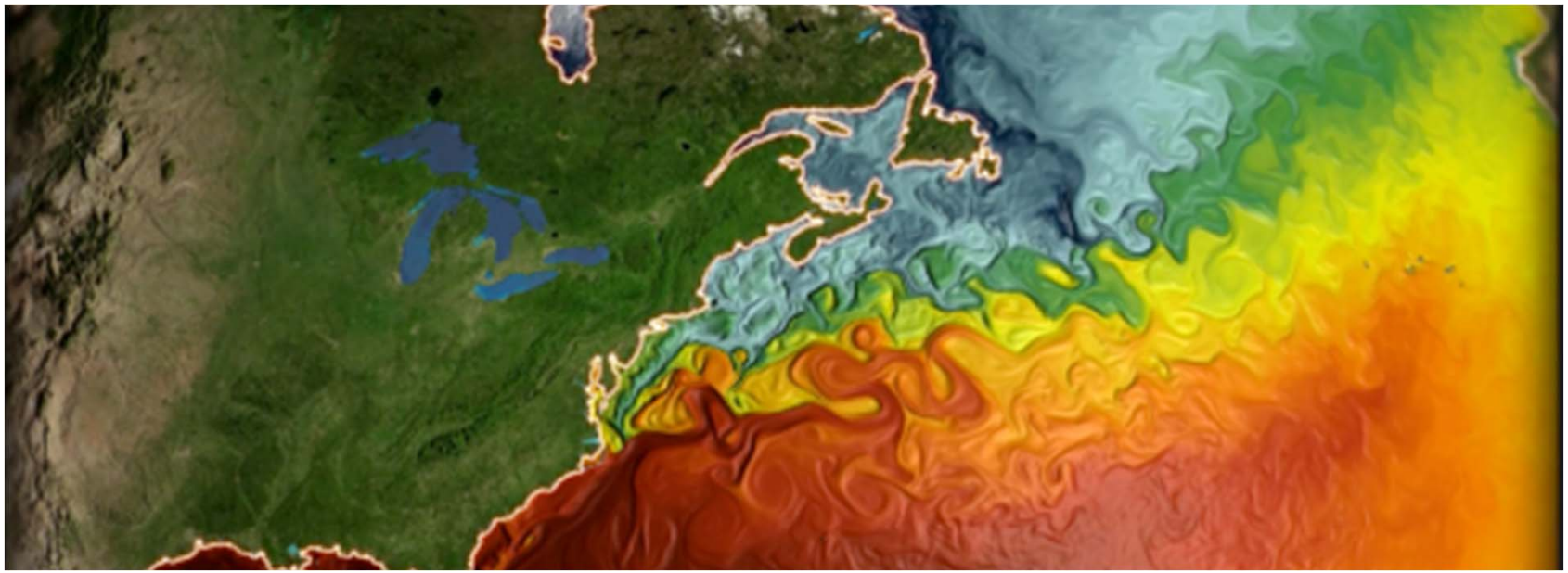
Why is this a problem?
Our civilization is built on a key assumption



A STABLE CLIMATE

What happens if that climate isn’t stable any more?

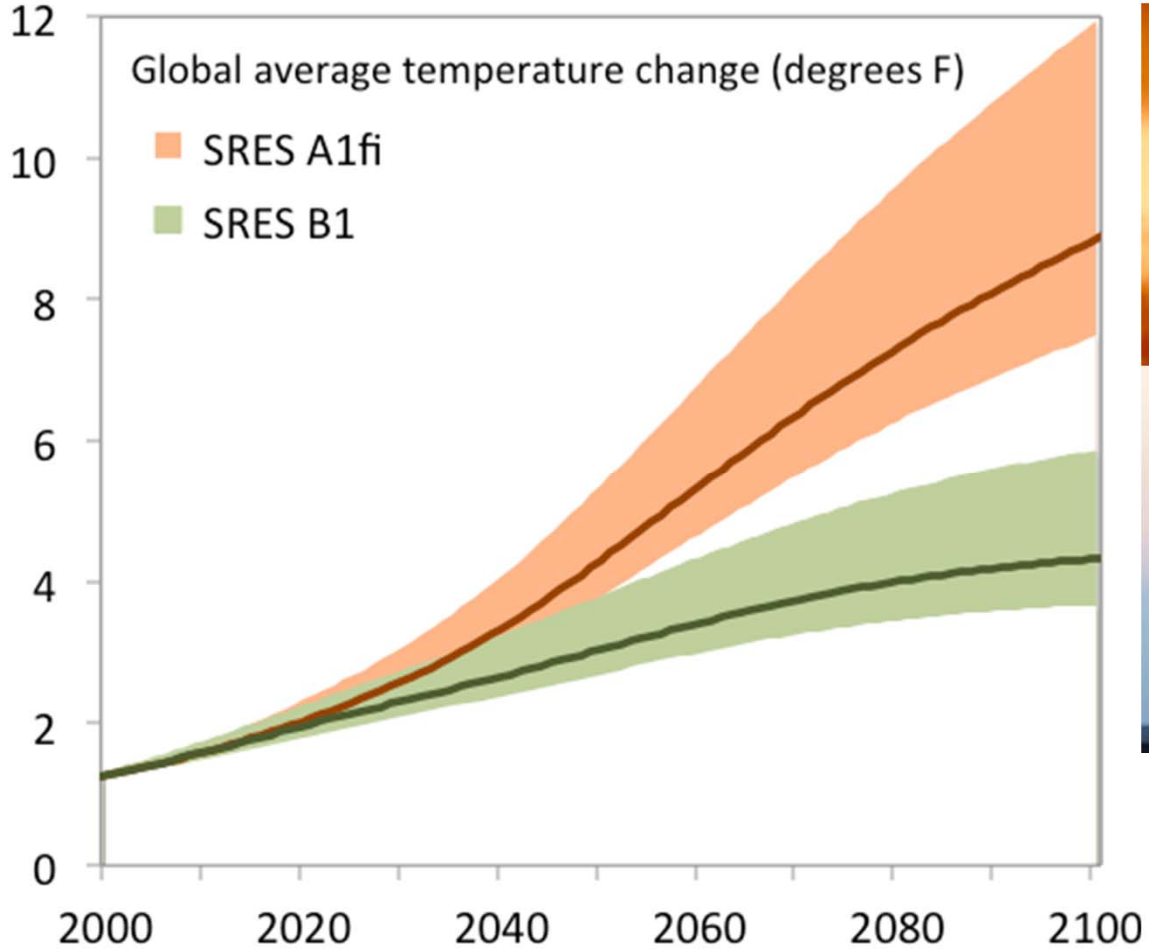




The Future

PART THREE

Future change depends on our choices now



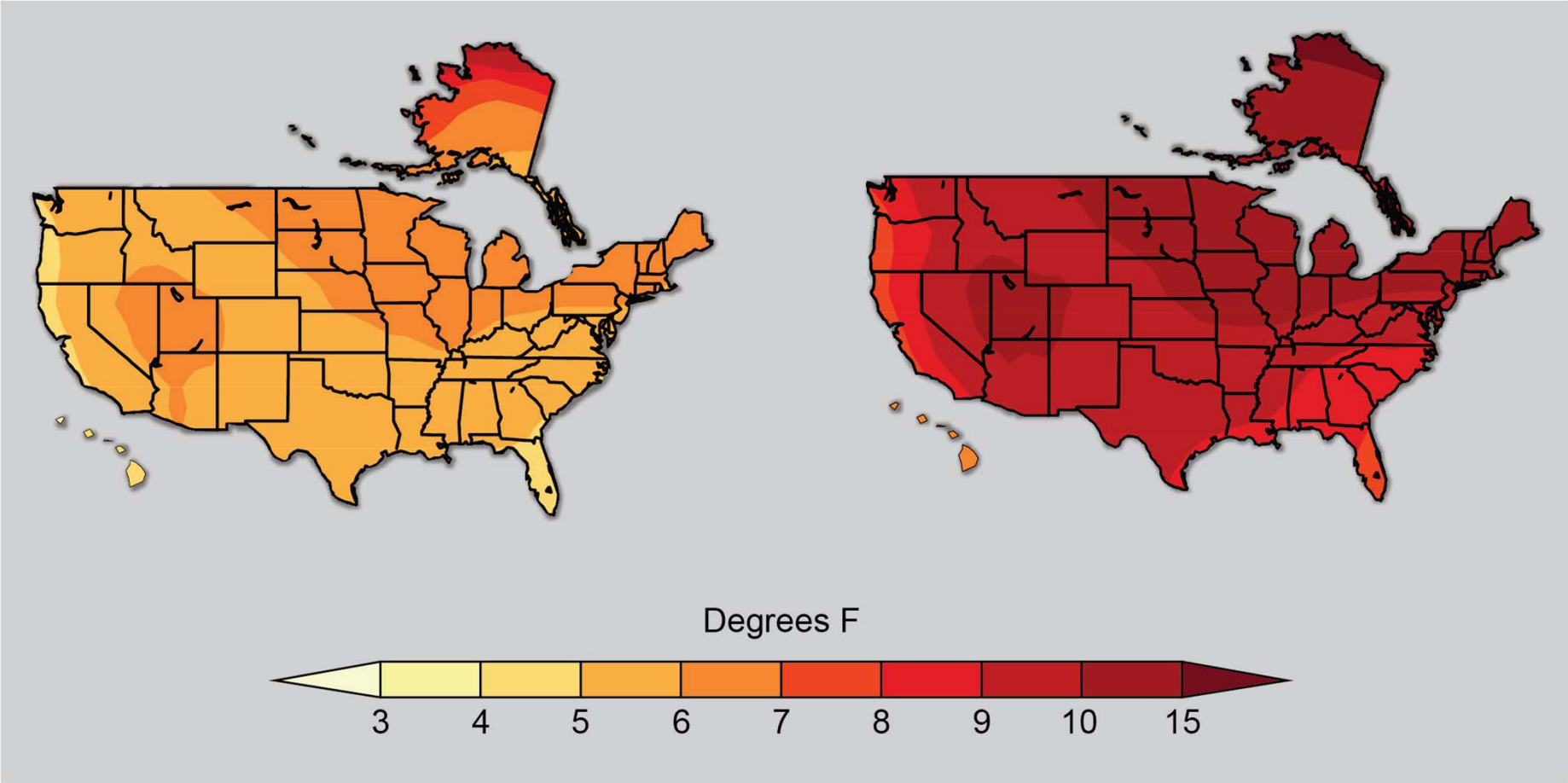
Zooming in on Austin…

- Based on latest generation of global climate model simulations (CMIP5)
- Higher (RCP 8.5) and lower (RCP 4.5) future scenarios
- Downscaled to the Camp Mabry weather station
- Daily temperature & precipitation + 10 other secondary climate indicators for 1960-2100

Increasing average temperatures

Lower Scenario

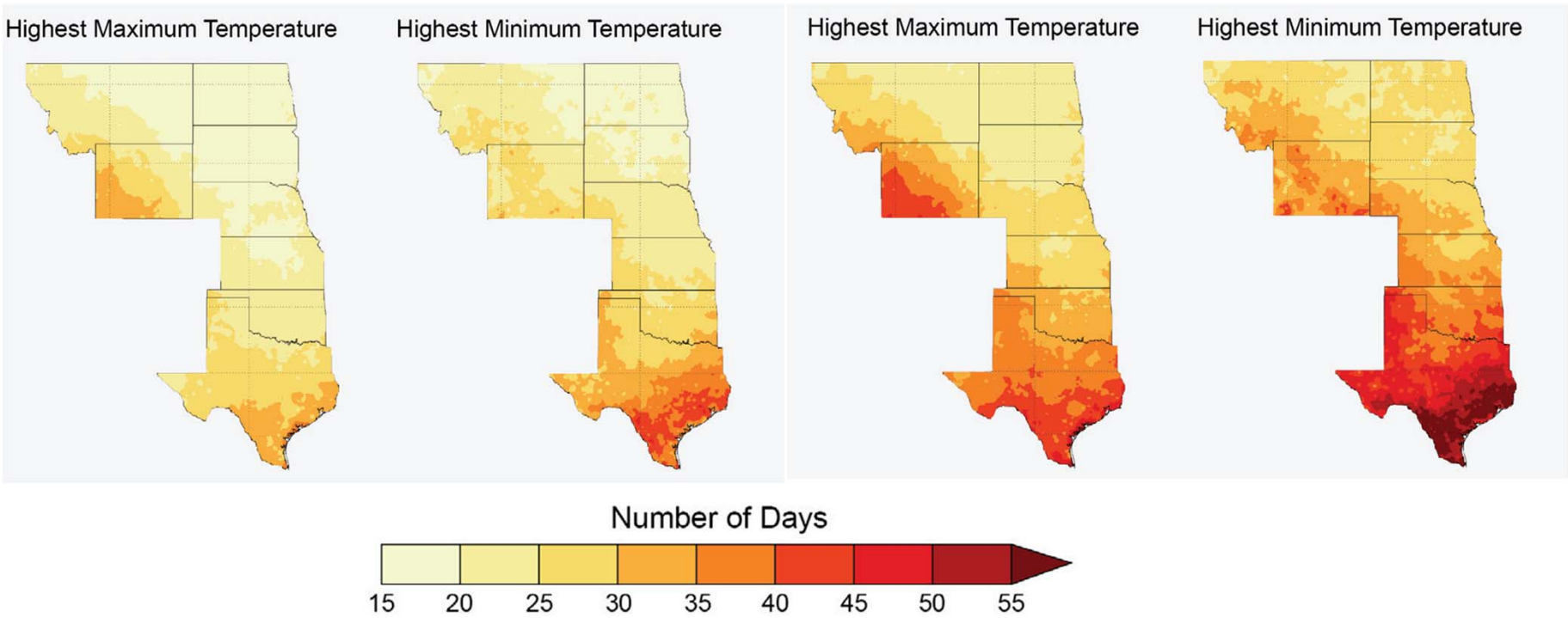
Higher Scenario



Increasing frequency of extremes

Lower Scenario

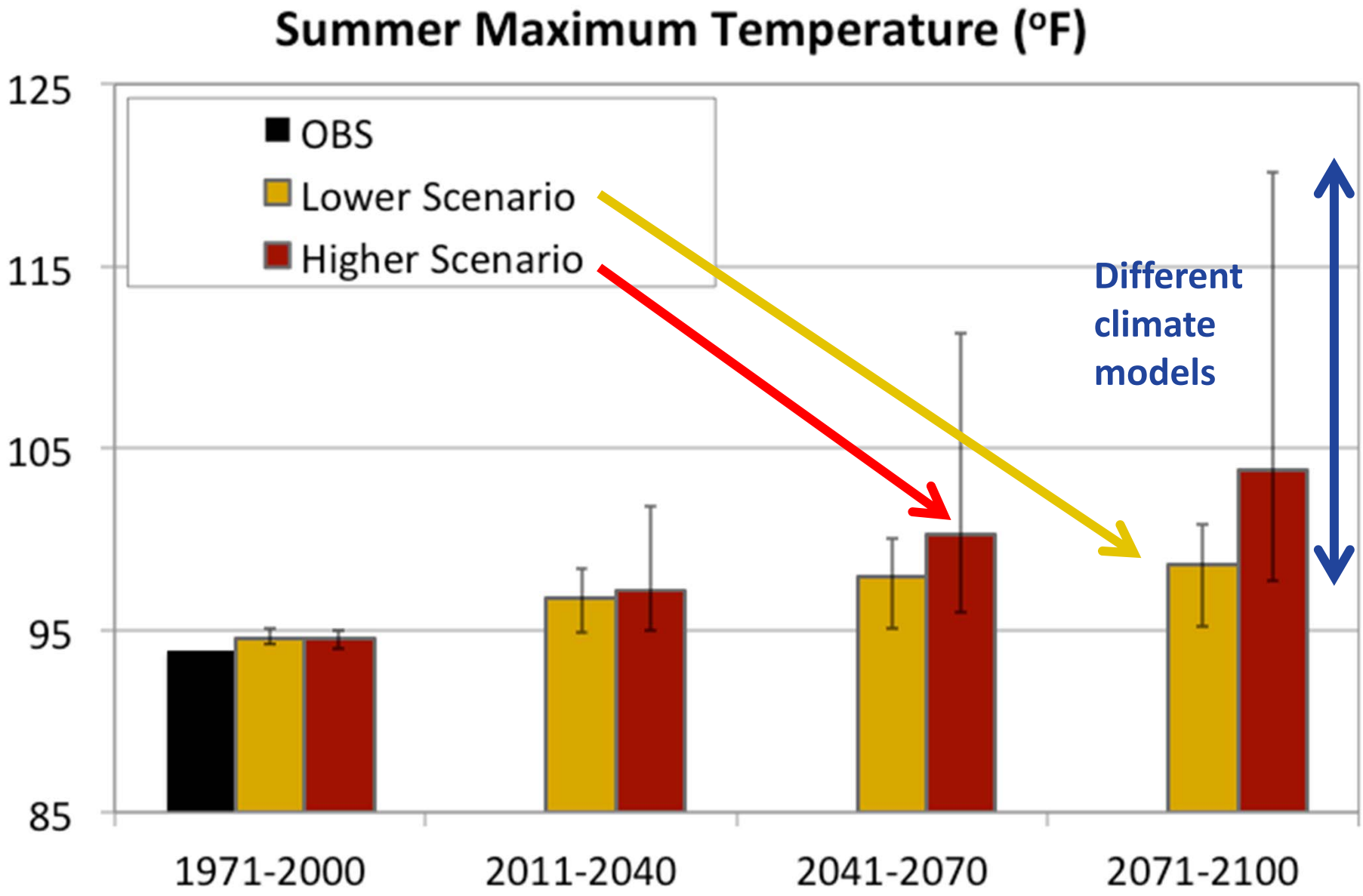
Higher Scenario



Days per year where 2041-2070 temperature will exceed historical hottest week of the year

Source: 2014 U.S. National Climate Assessment

For the Austin area …



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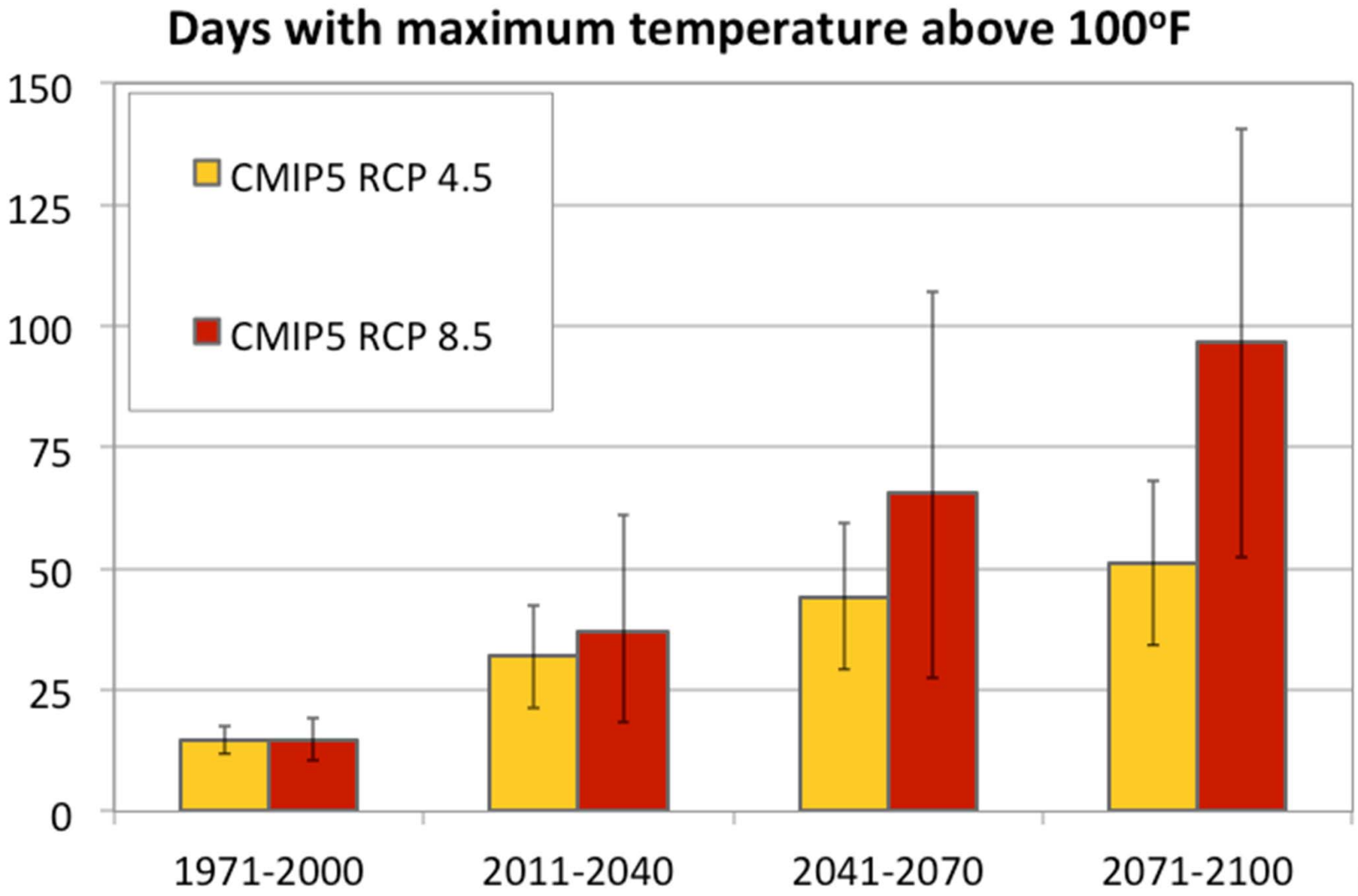

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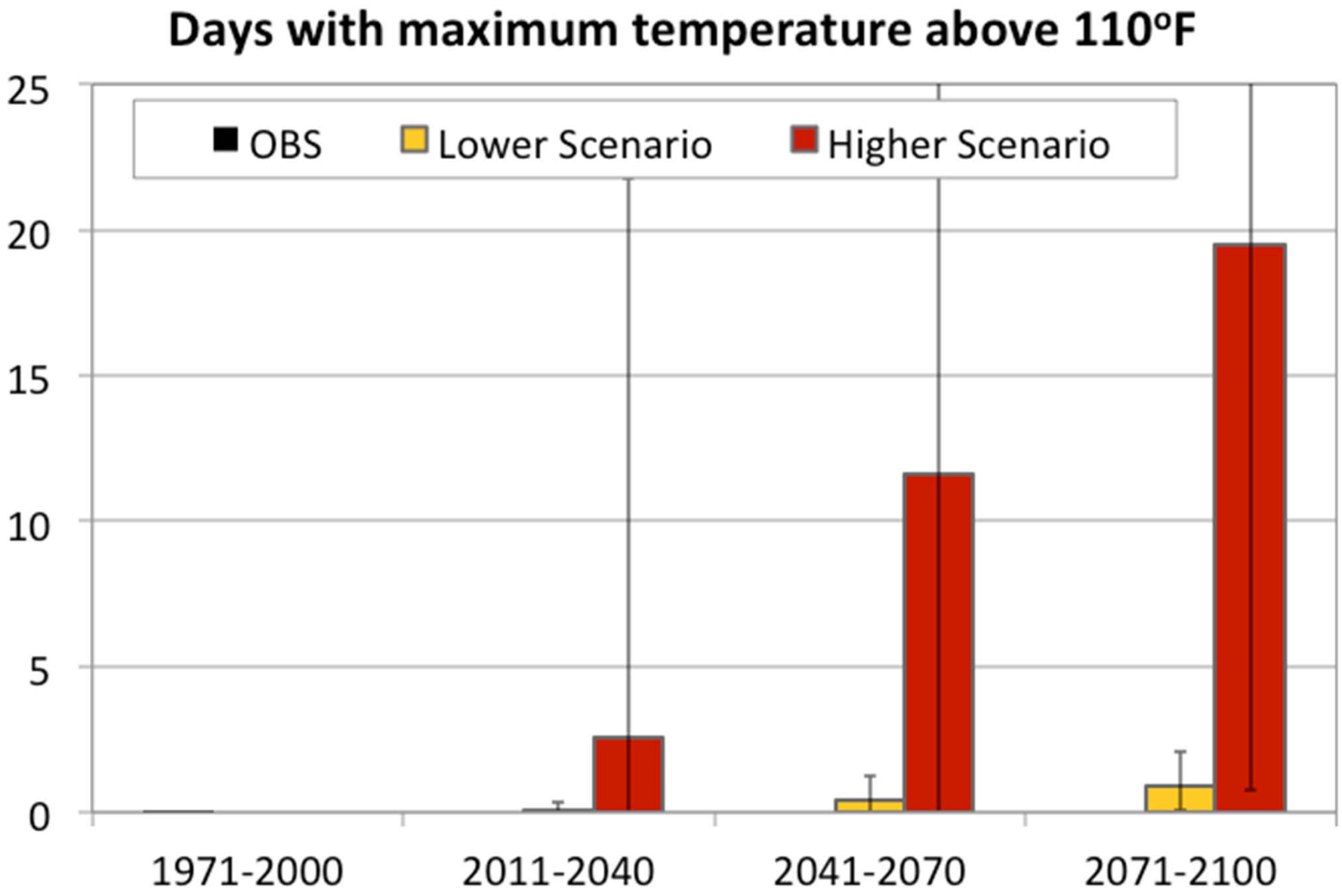

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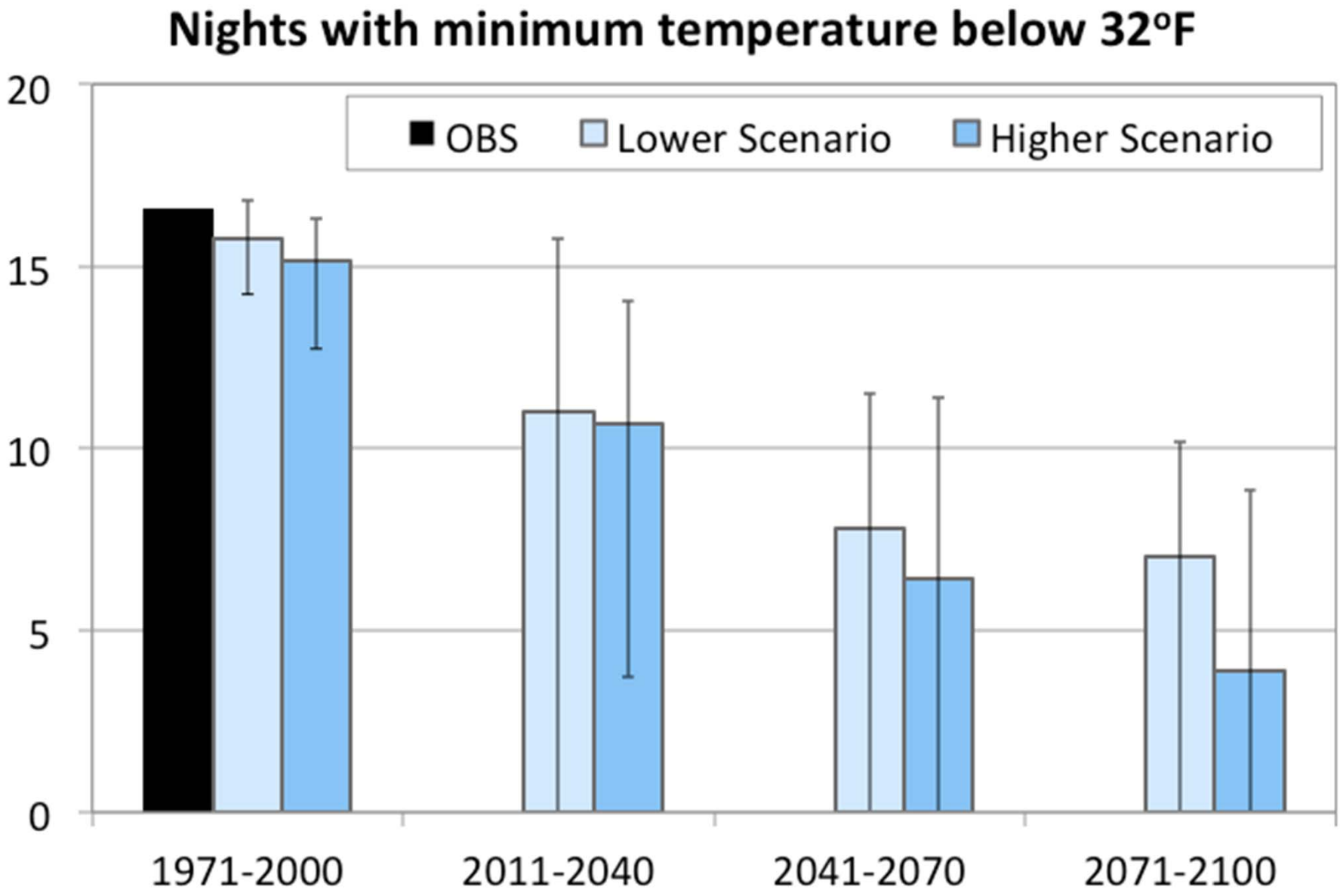

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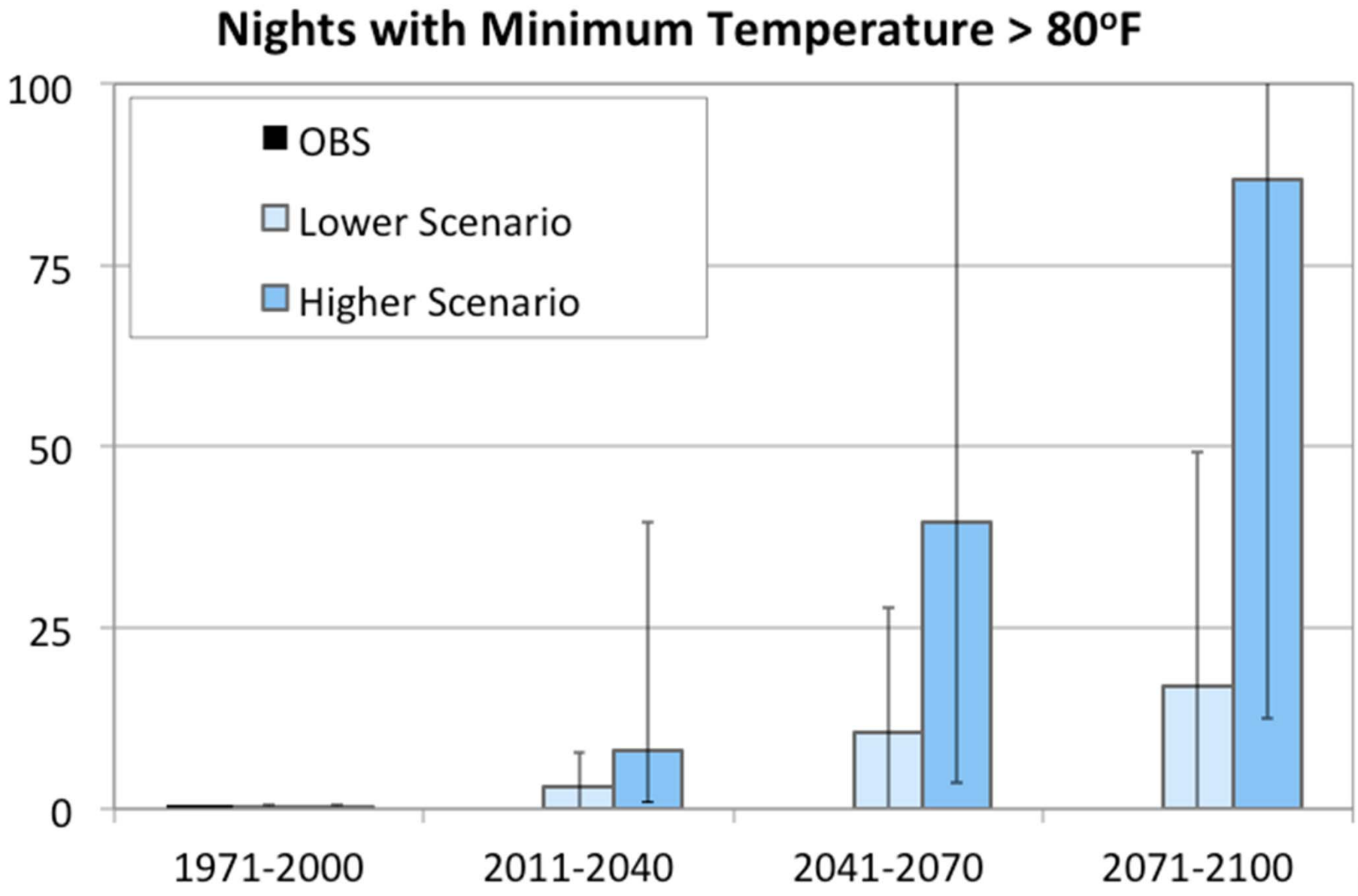
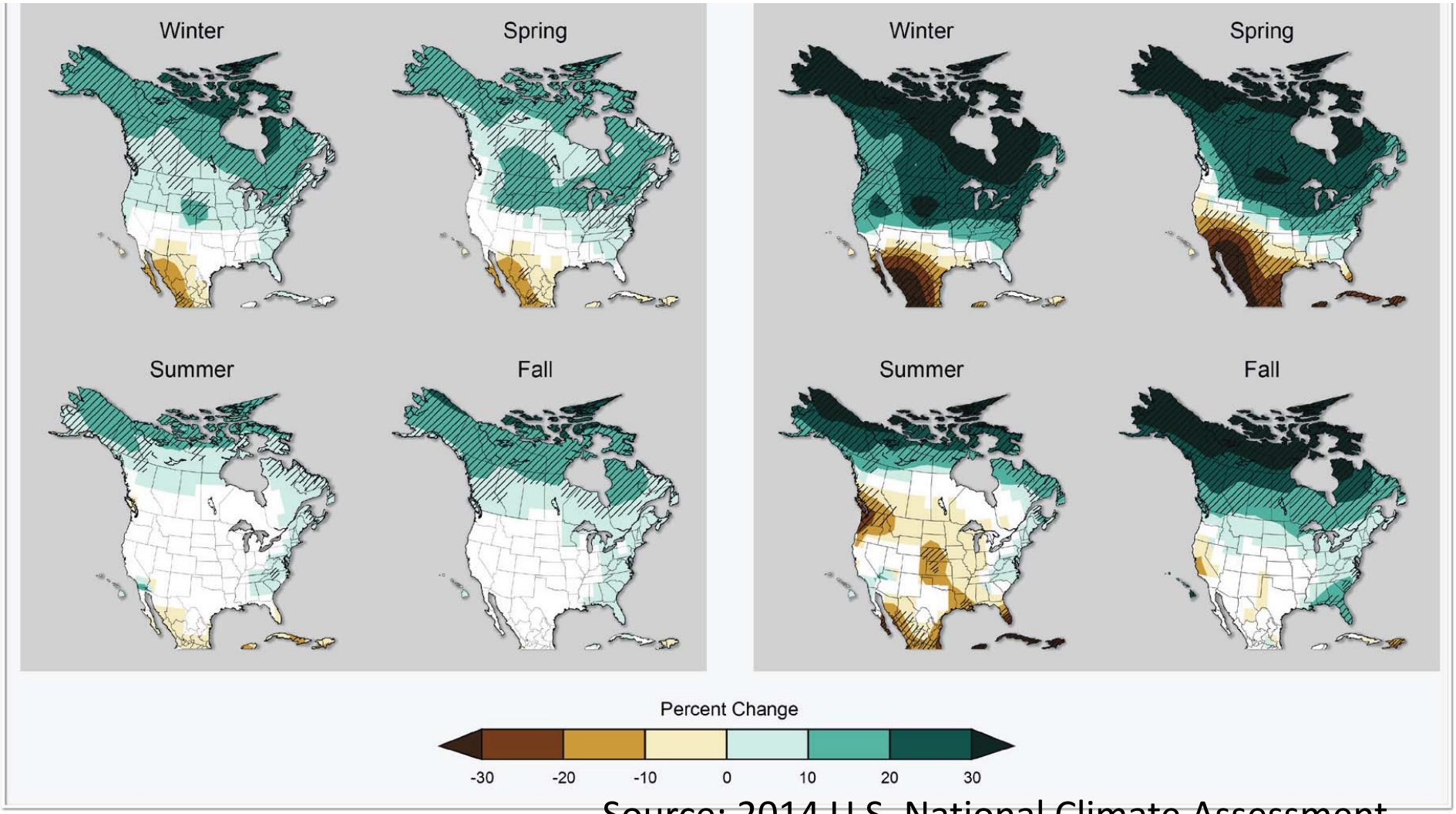


Wet will get wetter; dry areas, drier

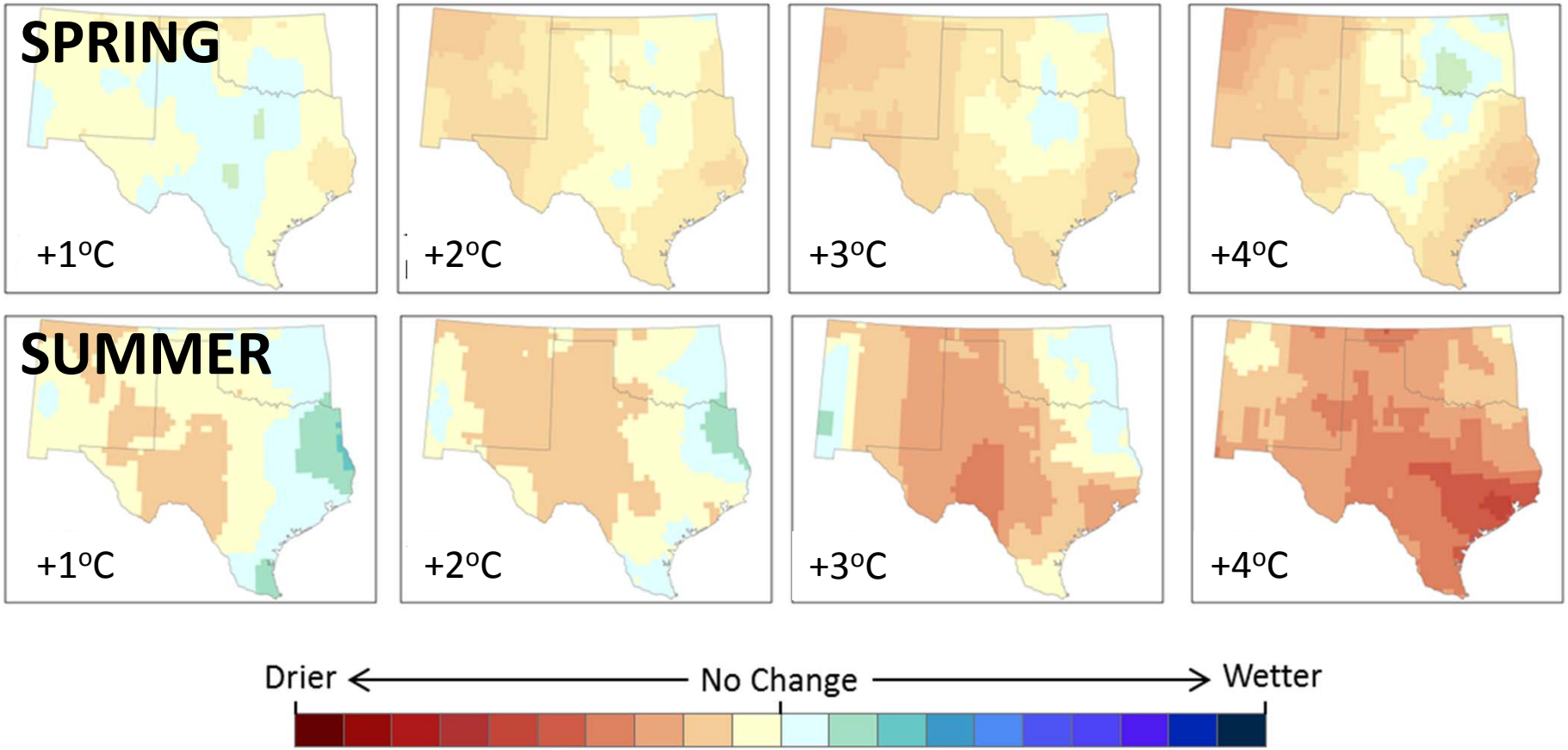
Lower Future

Higher Future



Source: 2014 U.S. National Climate Assessment

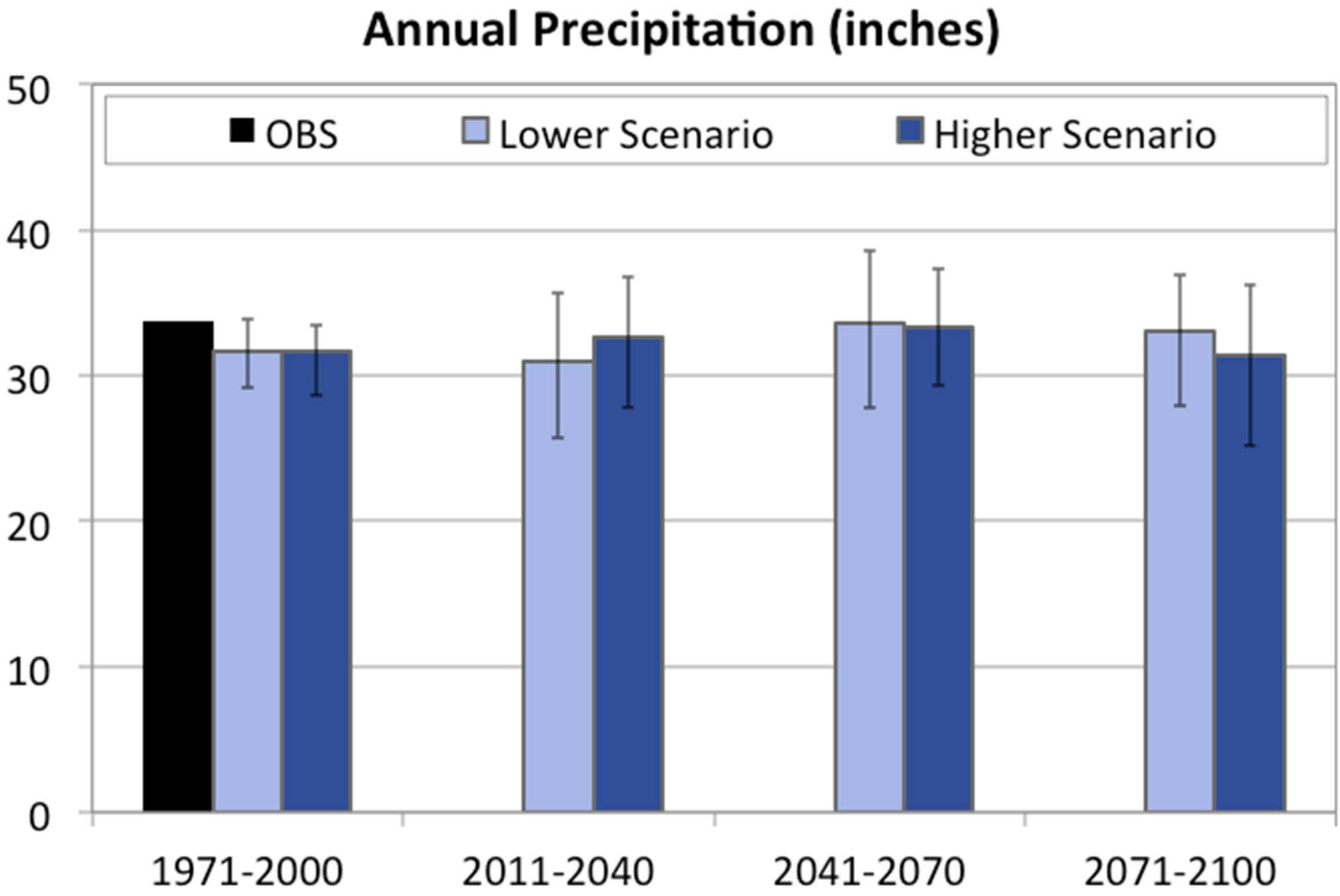
More frequent summer drought conditions



Projected change in Standardized Precipitation Index (the metric used by the National Drought Migitation Center) for each degree Celsius that the planet warms.

Source: Swain & Hayhoe, submitted to Climate Dynamics, 2014

For the Austin area …



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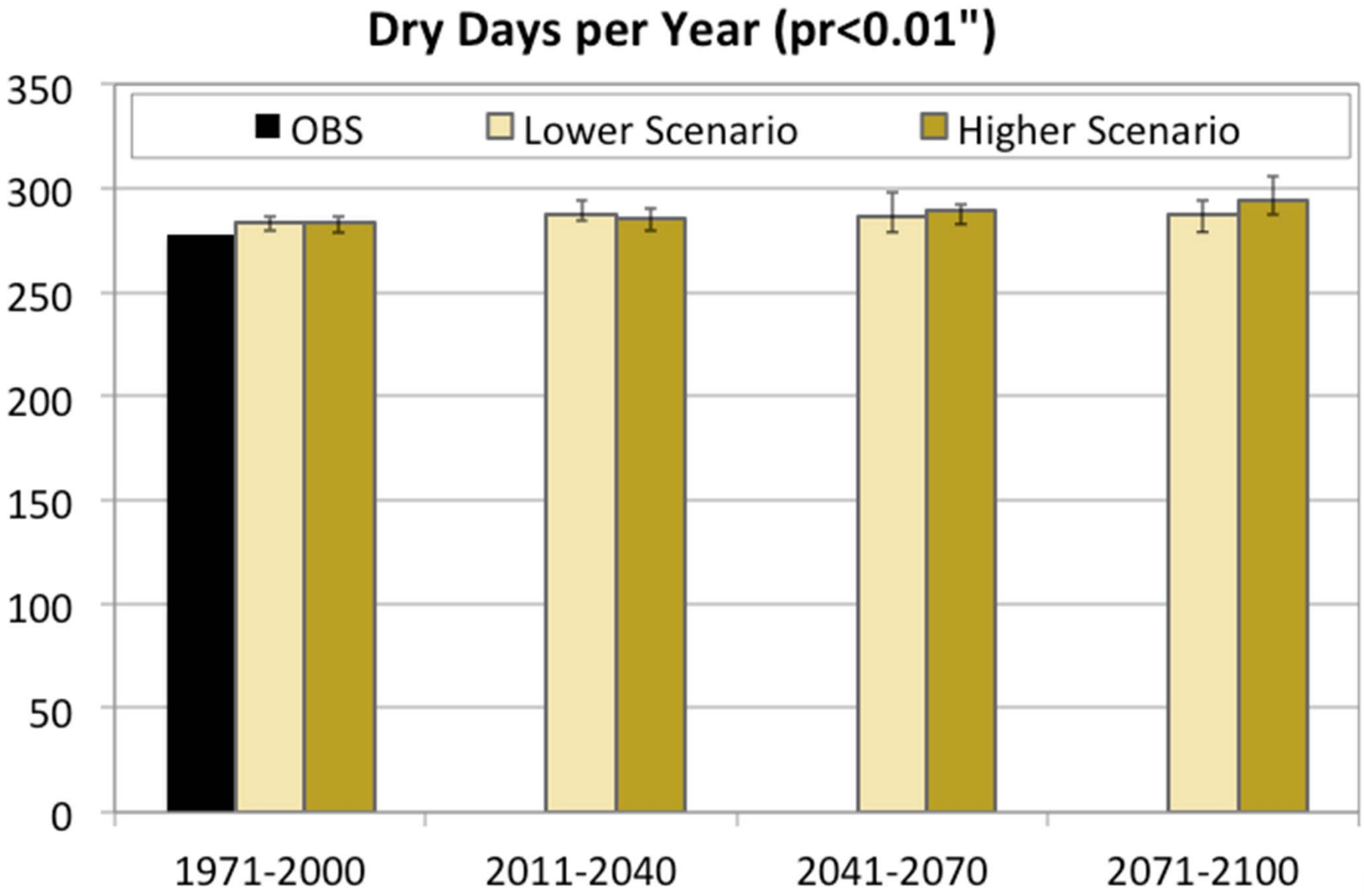

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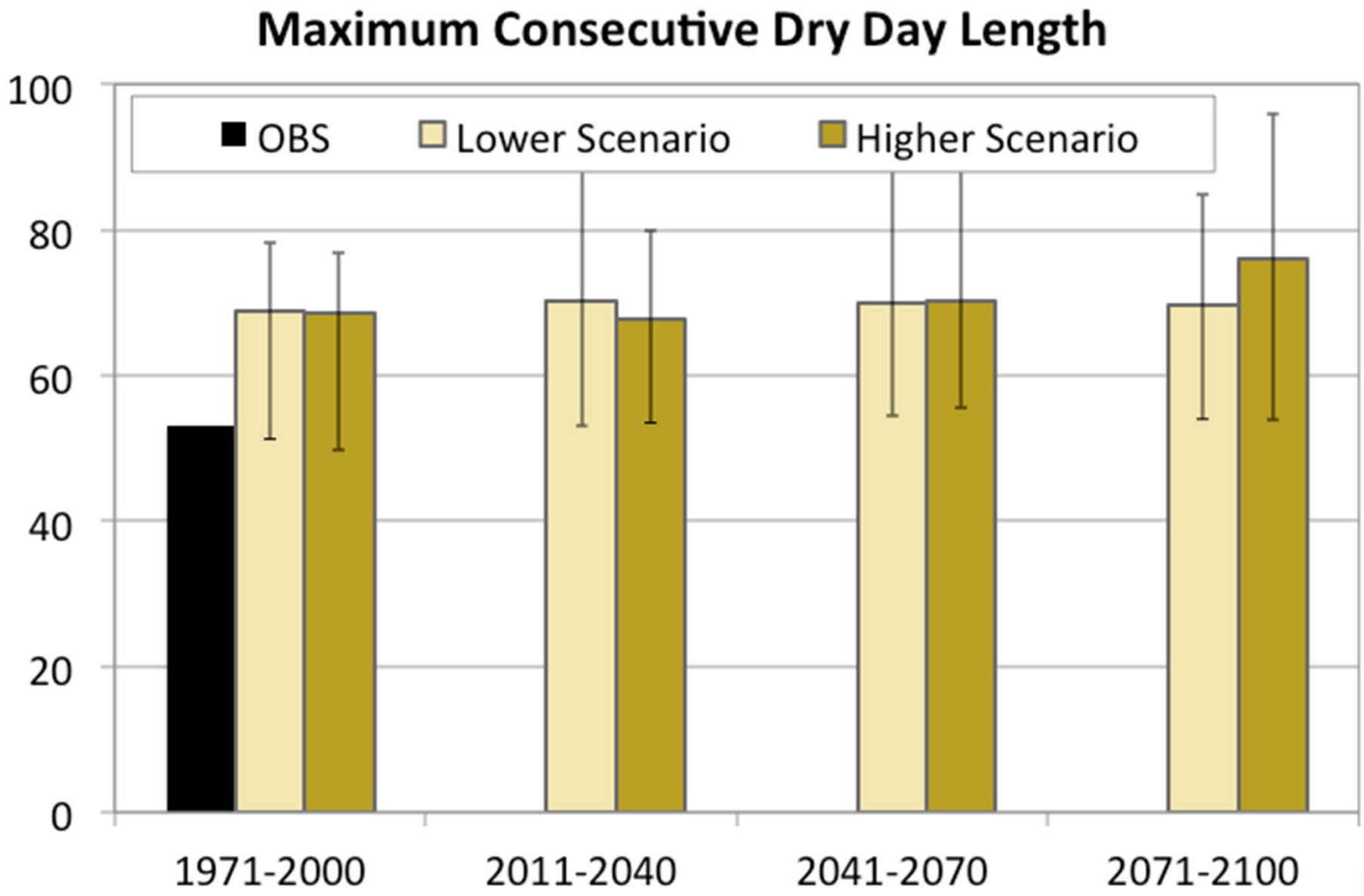

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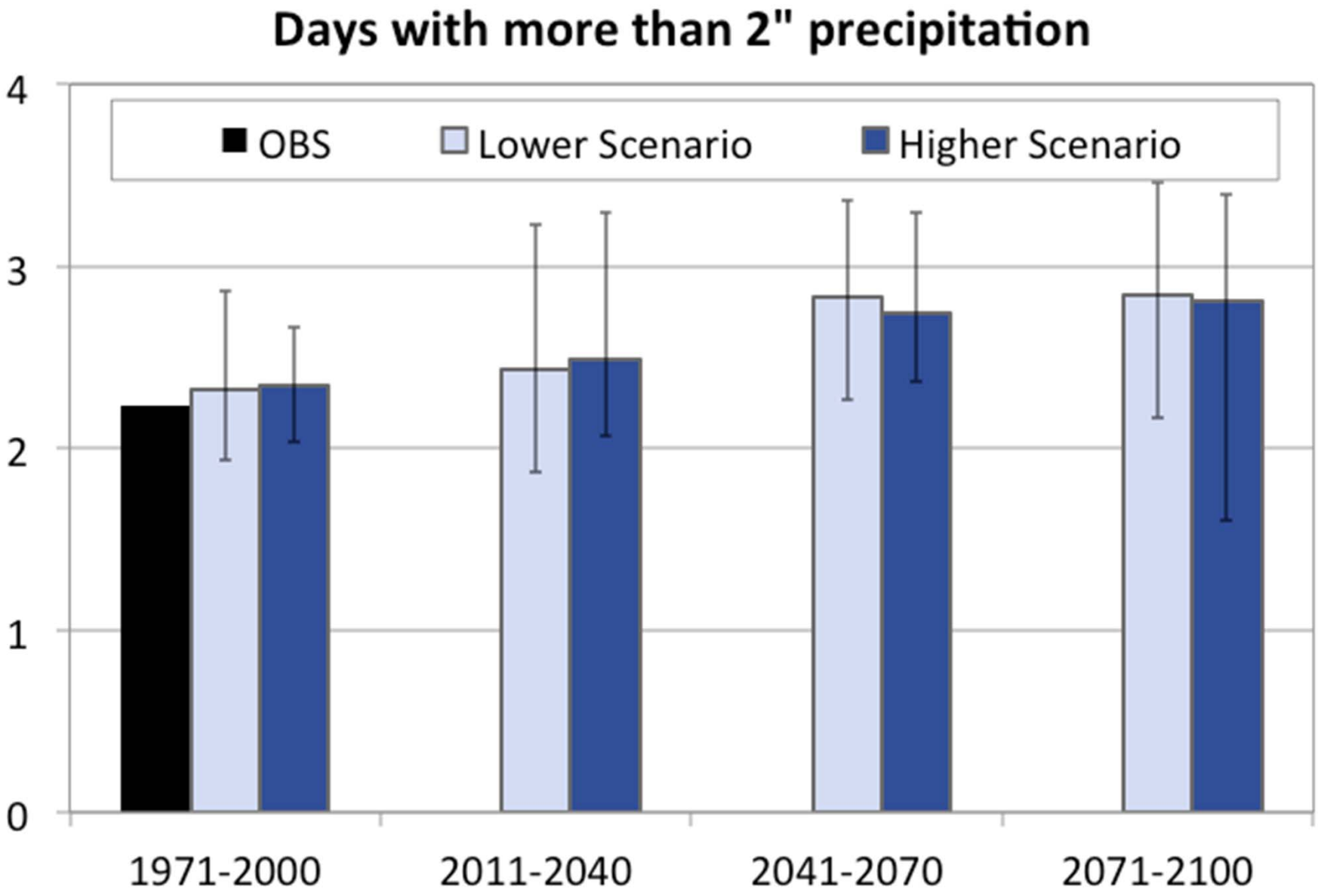

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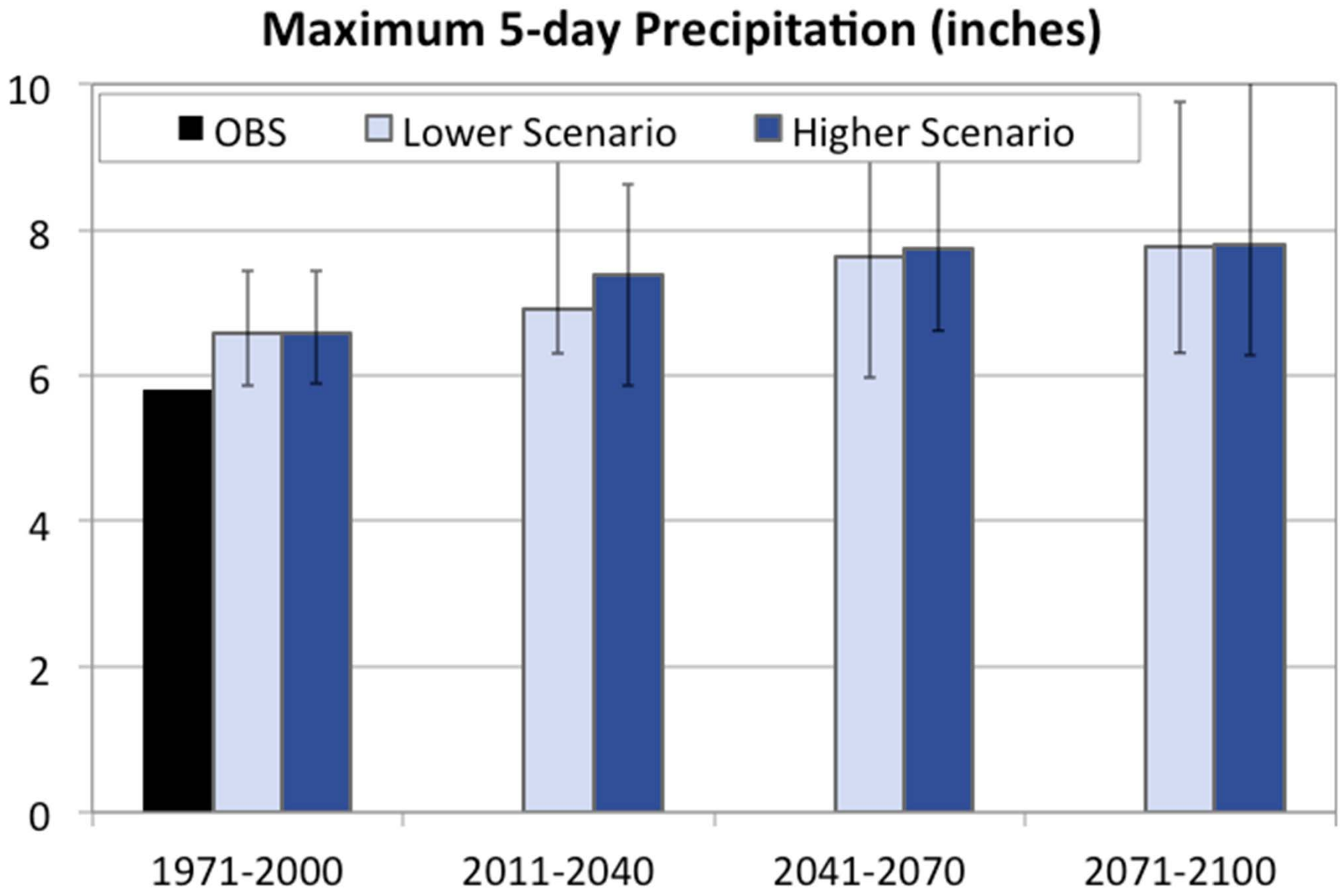

SUMMARY

Our climate is already changing, consistent with larger-scale trends observed across the U.S. and the world

In the future, we are pretty sure about:

- Increases in annual and seasonal average temperatures
- More frequent high temperature extremes
- More frequent extreme precipitation and more drought conditions in summer due to hotter weather

We are moderately sure about:

- Little change in annual average precipitation
- Increase in humidity and heat index
- Increase in the strength (but not frequency) of hurricanes

We might be able to find out more (with some research and analysis) about:

- Specific meteorological phenomena like dry lines, santa-ana like winds

We can't really say much about:

- Tornadoes, wind storms, supercell thunderstorms, hail, etc., hurricane trajectories and frequency

END