

# Climate Science Special Report

## Fourth National Climate Assessment (NCA4), Volume I

This report is an authoritative assessment of the science of climate change, with a focus on the United States. It represents the first of two volumes of the Fourth National Climate Assessment, mandated by the Global Change Research Act of 1990.

▣ Recommended Citation

**[science2017.globalchange.gov](https://science2017.globalchange.gov)**

*Volume I is the most comprehensive and up-to-date assessment of the state of climate science today.*

*Volume 1 is the most comprehensive and up-to-date assessment of the state of climate science today.*

*12 federal agencies, 50 authors, almost 500 pages*

*\* It was subject to public review, two agency reviews, and a National Academy review*

# *VOLUME I TELLS US THAT*

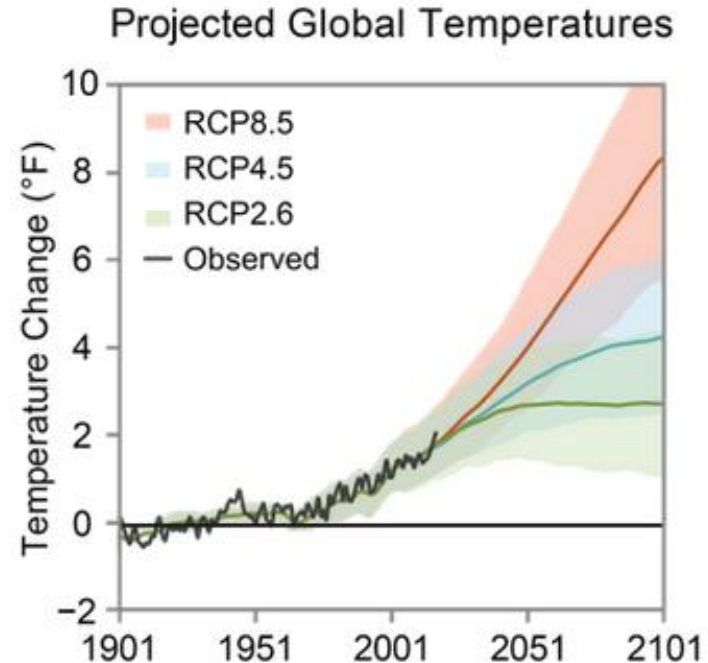
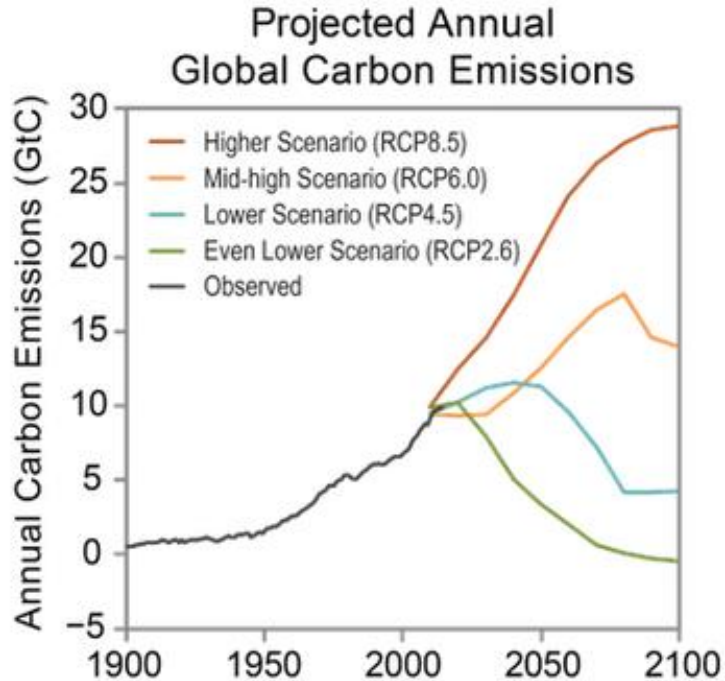
*It's real*

*It's us*

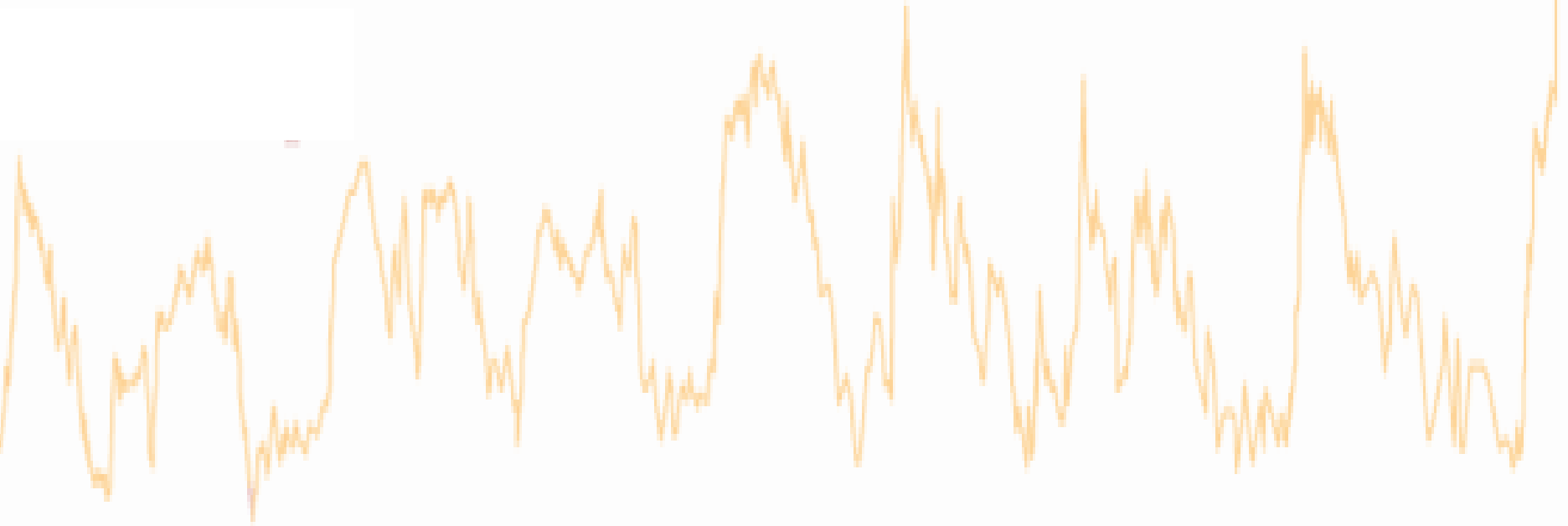
*It's serious*

*.. and the window of time to prevent widespread dangerous impacts is closing fast.*

Climate change beyond the next few decades depends primarily on the **heat-trapping gases emitted** and the remaining uncertainty in the **sensitivity of Earth's climate** to those emissions.



CO<sub>2</sub> concentration has now passed 400 ppm, a level that last occurred about **3 million years ago**, when global average temperature and sea level were significantly higher than today.



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Continued growth in CO<sub>2</sub> emissions over this century and beyond would lead to an atmospheric concentration not experienced in **tens of millions of years**.

The present-day emissions rate of nearly 10 GtC per year suggests that there is no climate analog for this century any time in at least the last 50 million years. (update: now **100 million years**)

*MOST PEOPLE DON'T REALLY HAVE A  
PROBLEM WITH...*

*THE SCIENCE THAT EXPLAINS WHY  
CLIMATE IS CHANGING.*



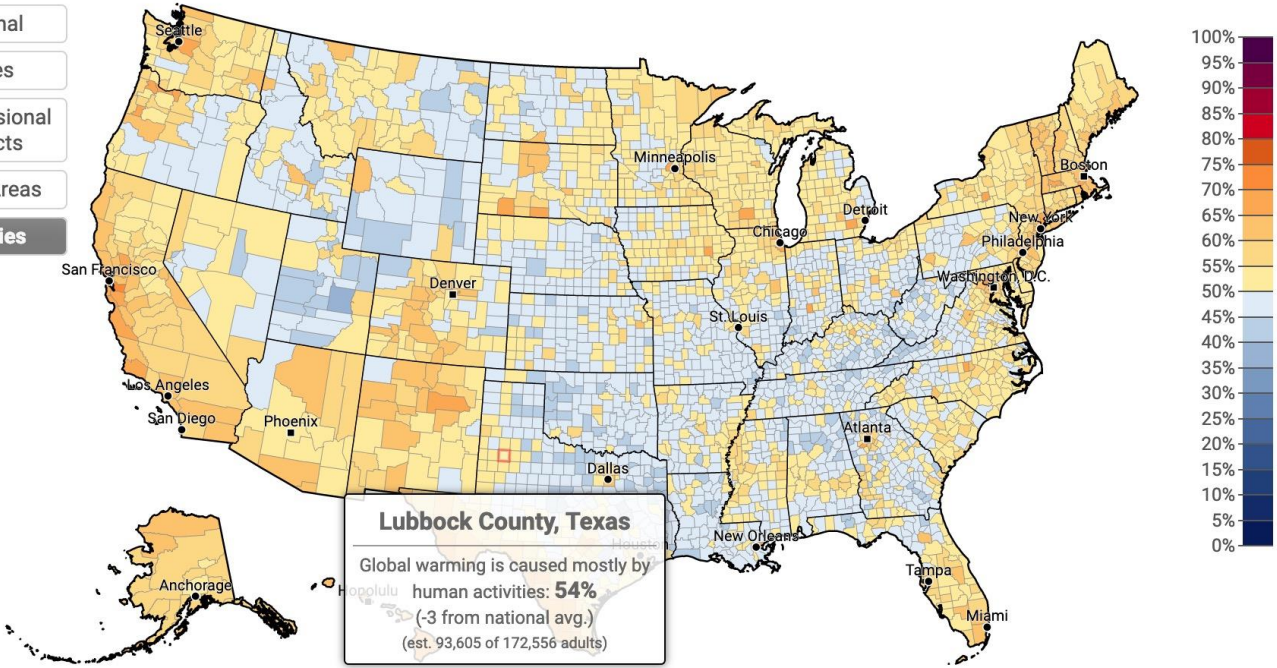
# Estimated % of adults who think global warming is mostly caused by human activities, 2018

Select Question:  Absolute Value

[Permalink](#)

Click on map to select geography, or:

- National
- States
- Congressional Districts
- Metro Areas
- Counties**

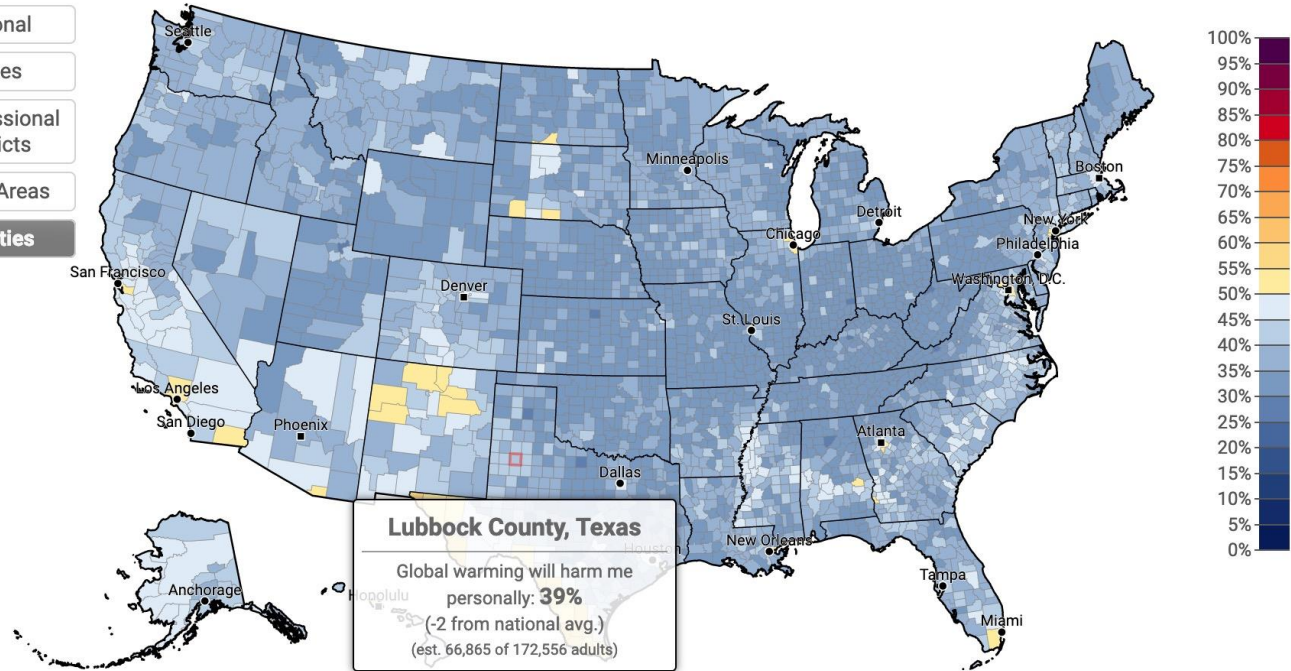


# Estimated % of adults who think global warming will harm them personally, 2018

Select Question:  Absolute Value  [Permalink](#)

Click on map to select geography, or:

- National
- States
- Congressional Districts
- Metro Areas
- Counties**









EXTRA HIGH TIDE FLOODS ROAD, FUNAFUTI, TUVALU (PACIFIC OCEAN) © 2005 GARY BRAASCH  
RISING SEA LEVEL DOCUMENTED BY WORLD VIEW OF GLOBAL WARMING

*THE MOST DANGEROUS MYTH WE'VE  
BOUGHT INTO IS ...*

*CLIMATE CHANGE IS A DISTANT ISSUE, ONLY  
AFFECTING FUTURE GENERATIONS + PLACES  
THAT ARE FAR AWAY.*

# VOLUME 2

## FOURTH NATIONAL CLIMATE ASSESSMENT

Volume II: Impacts, Risks, and Adaptation in the United States

The National Climate Assessment (NCA) assesses the science of climate change and variability and its impacts across the United States, now and throughout this century.

SUMMARY FINDINGS

REPORT CHAPTERS

OVERVIEW

DOWNLOADS

Volume I presents an assessment of the physical science underlying this report: [science2017.globalchange.gov](https://science2017.globalchange.gov)

**[nca2018.globalchange.gov](https://nca2018.globalchange.gov)**

*Volume II is the most comprehensive and up-to-date assessment of how climate change is affecting the U.S. and how we are responding.*

*12 federal agencies, 350 authors, over 1600 pages*

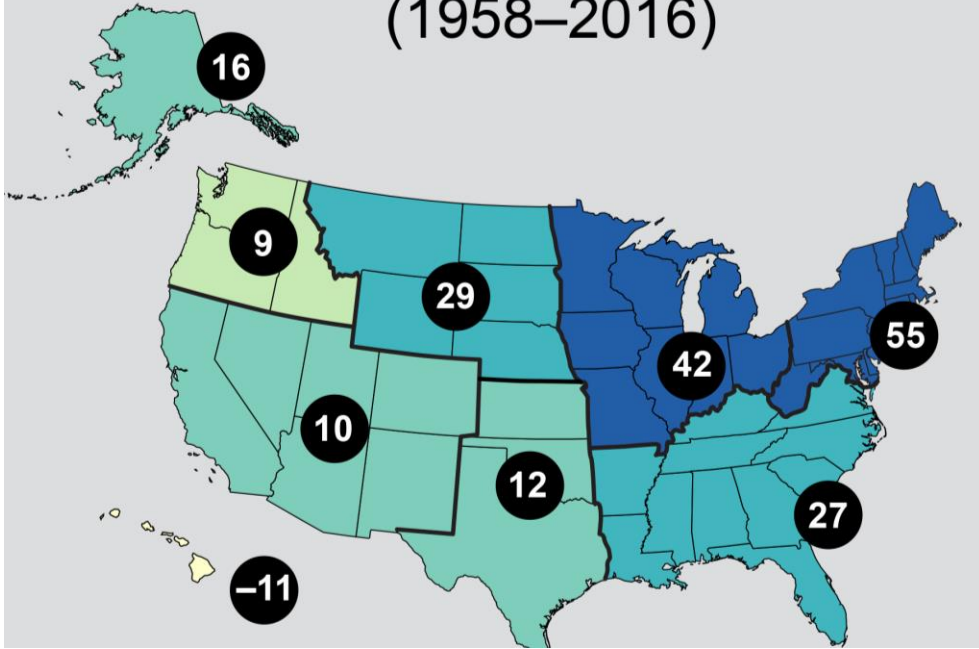
## *VOLUME 11 TELLS US THAT*

*Climate change isn't a distant issue any more.  
It's affecting every single one of us, in every part of  
the U.S., across almost every sector.*

*And the more climate changes, the more serious and  
even dangerous the impacts will be come.*



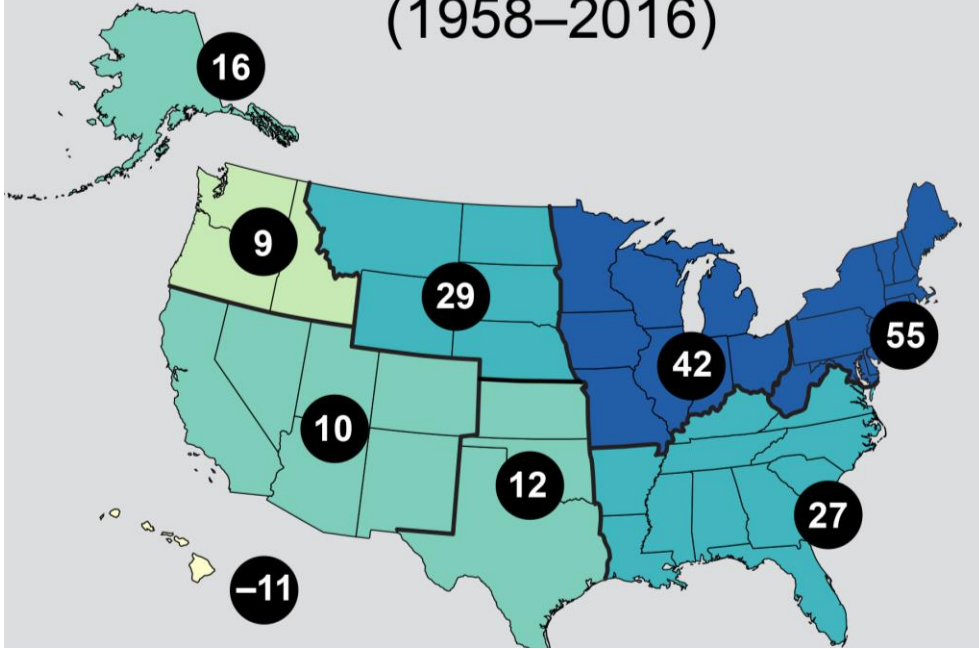
## 99th Percentile Precipitation (1958–2016)



The frequency + intensity of

- Extreme high temperature events are *virtually certain* to increase
- Extreme precipitation events are *very likely* to continue to increase

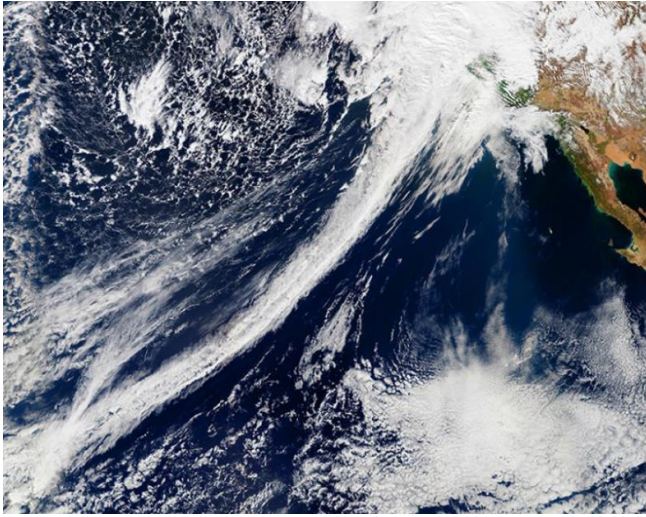
## 99th Percentile Precipitation (1958–2016)



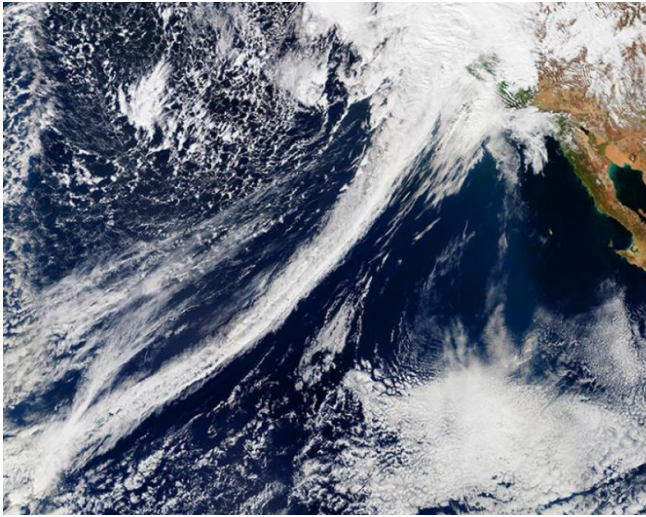
The frequency + intensity of

- Extreme high temperature events are *virtually certain* to increase
- Extreme precipitation events are *very likely* to continue to increase

***Climate models tend to underestimate the observed trends, especially for the increase in extreme precipitation events***



The frequency and severity of land-falling “atmospheric rivers” on the U.S. West Coast will increase.



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Hurricanes aren't more frequent: but they are stronger, bigger, slower, and their rainfall is much more intense than it used to be.





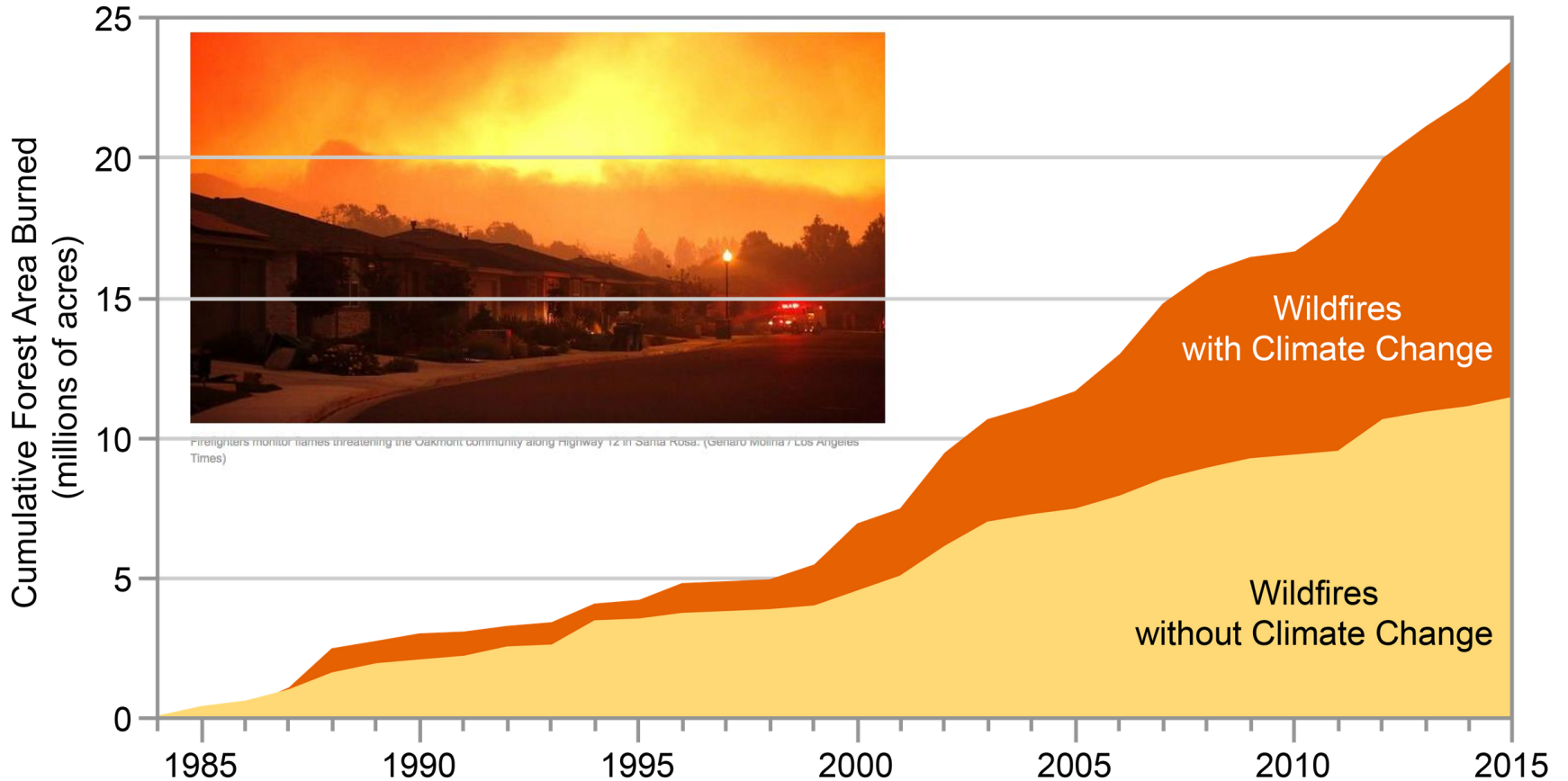
# On the Atlantic Coast ...



# *Louisiana Climate Refugees*

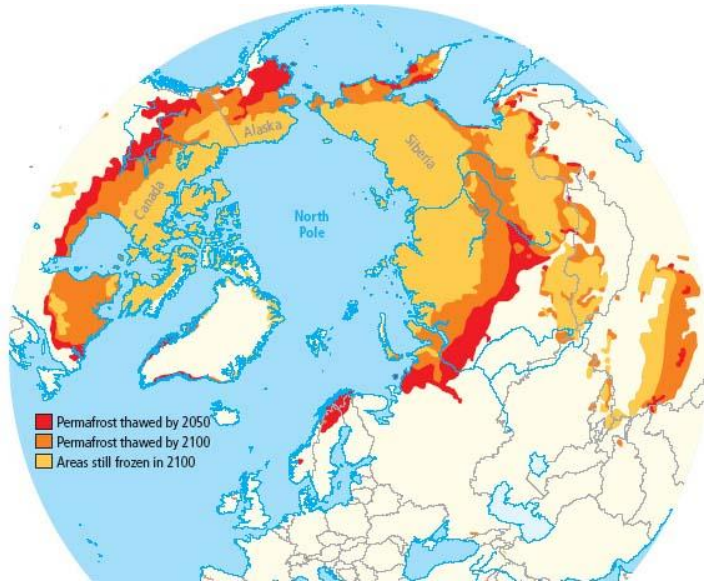


# *In the western states ...*



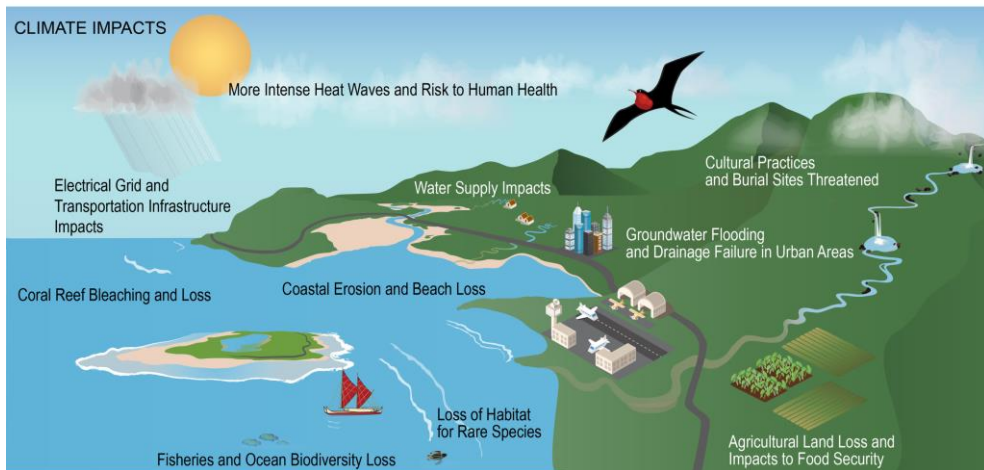


# *Up in Alaska ...*

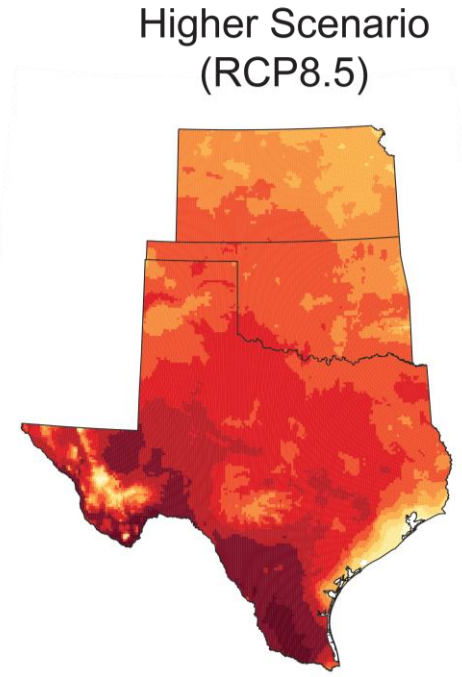
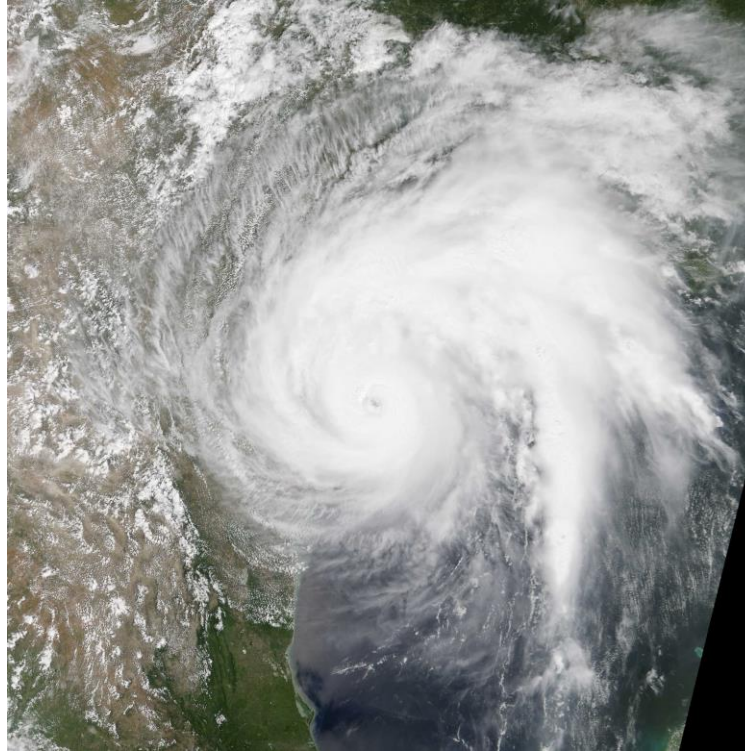
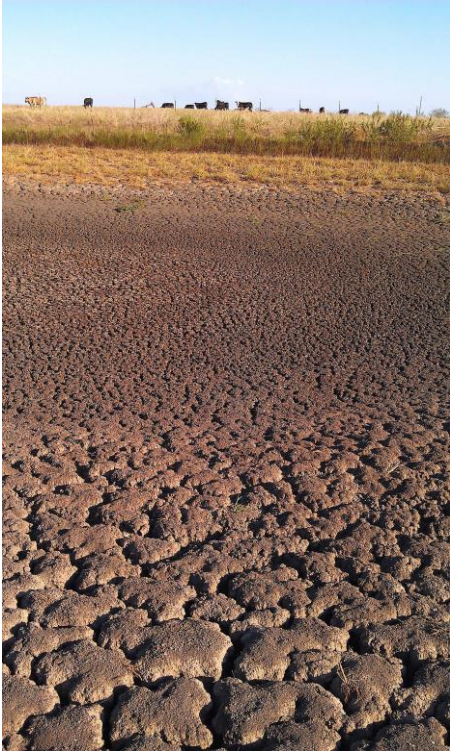




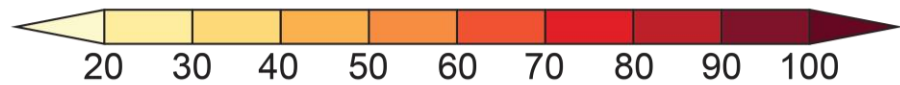
# *On the islands*



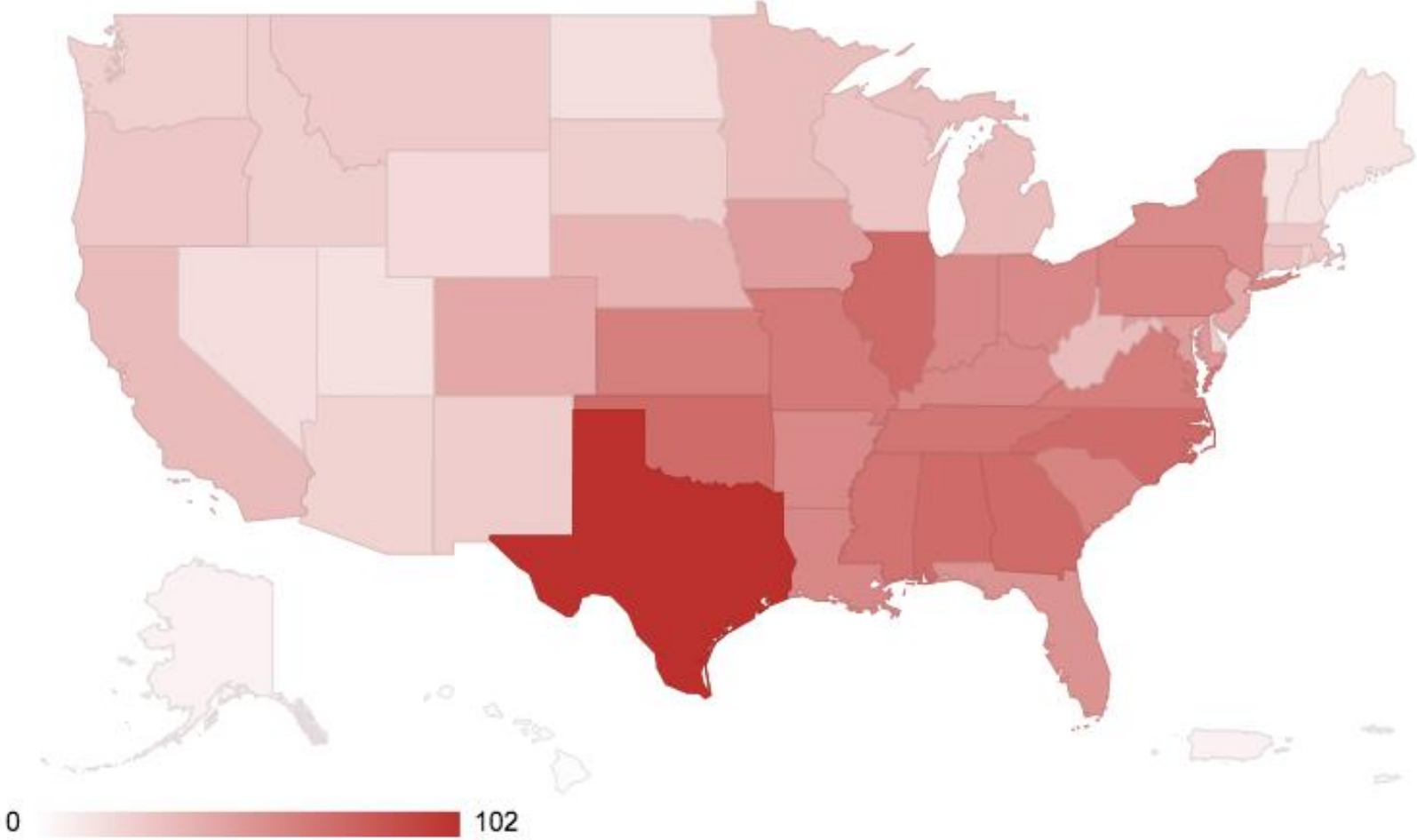
# Even down in Texas ...



Change in Number of Days



# NOAA billion-dollar weather and climate events (1980-2018)







*We care about a changing climate  
because it exacerbates the risks  
we already face today.*



[www.katharinehayhoe.com](http://www.katharinehayhoe.com)