

# The End of the World

Climate Change

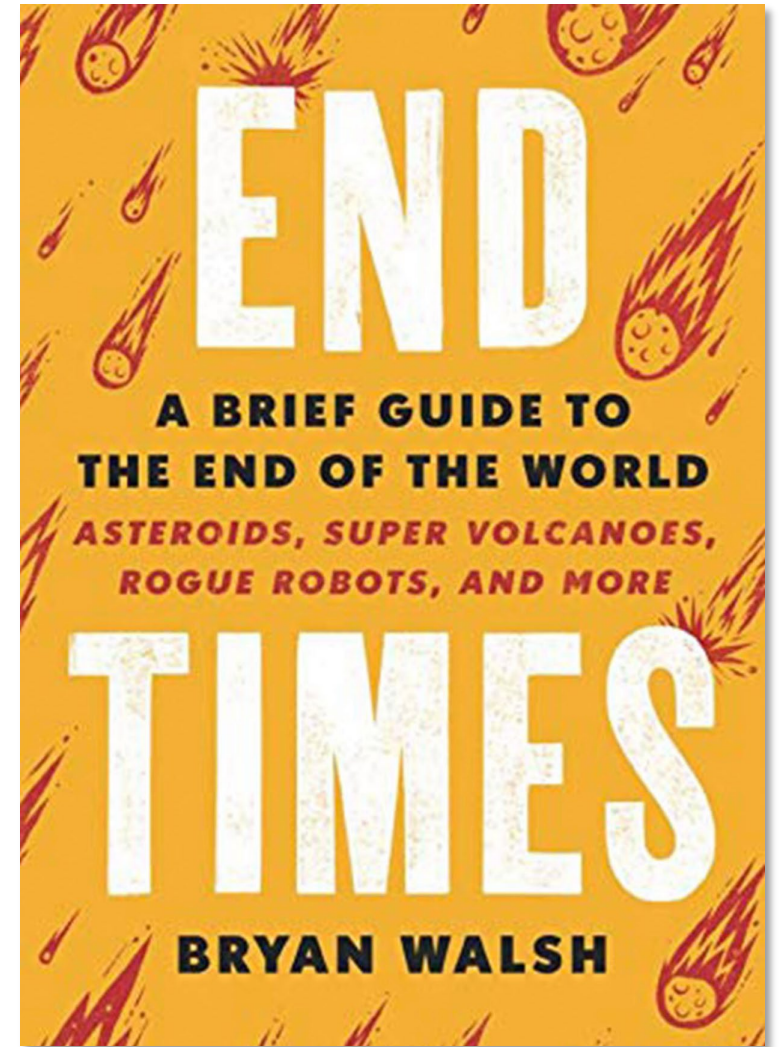
Week 10 Lecture | Professor Crews  
Religious Studies 357 W



In *End Times: A Brief Guide to the End of the World*, author Bryan Walsh takes us through a wide range of possible end of the world scenarios, from asteroids and super volcanoes to killer robots and climate apocalypse.

Walsh explores many common end times scientific worries and asks how realistic these threats are and what we can do to address them. As he noted in the introduction:

“If we don’t appreciate the present, it’s in part because we don’t fully understand the past— even as we make the mistake of assuming the future will be like the present... Risks that are most available to the mind are the ones that we care about, which is why so much of our regulation is driven by crisis, rather than by reason.”



What do we mean by global warming or climate change?

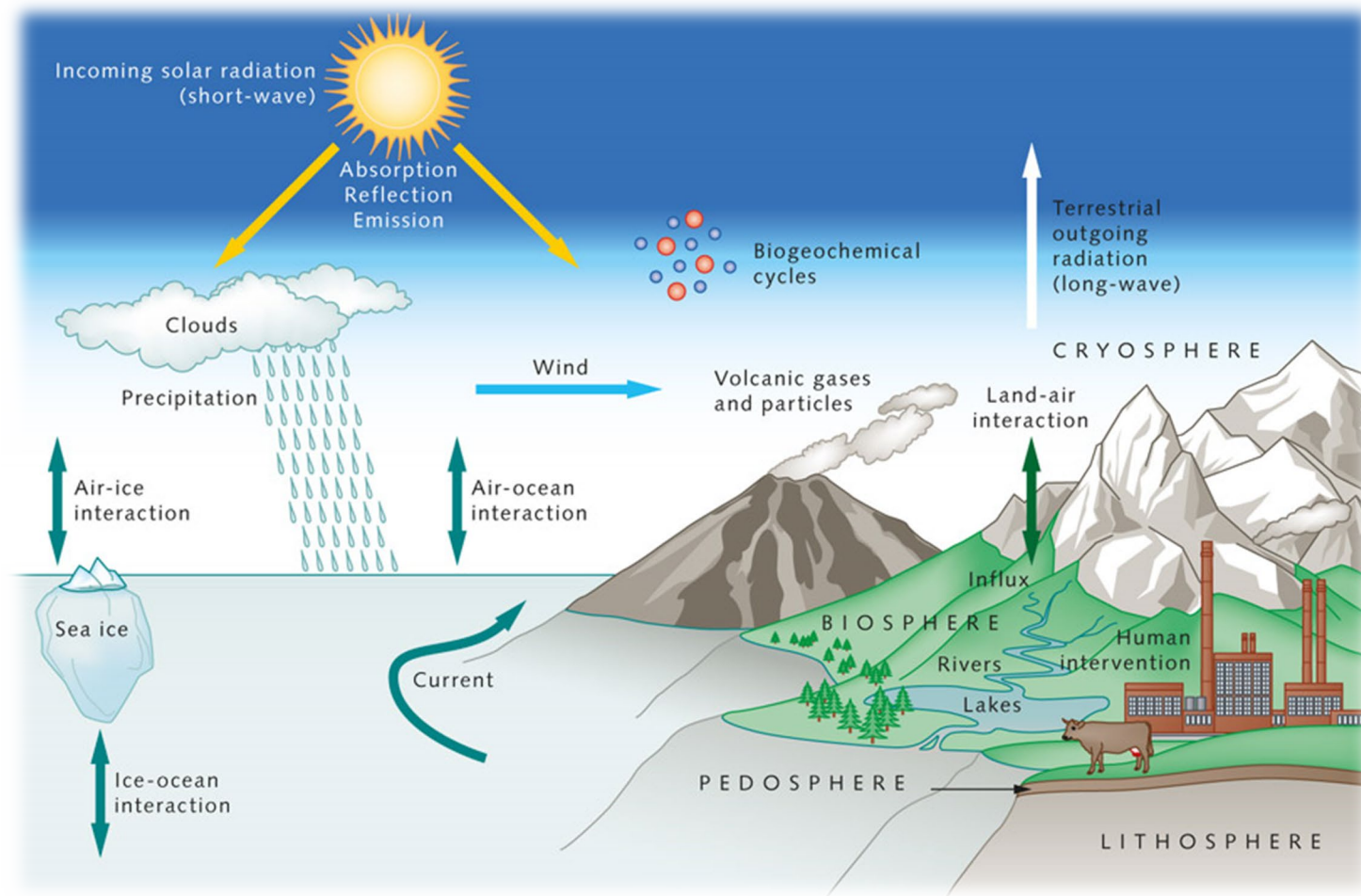
The UN defines the climate system as the ["totality of the atmosphere, hydrosphere, biosphere, and geosphere and their interactions."](#) The [United Nations Framework Convention on Climate Change](#) (UNFCCC), the body responsible for climate policy, defines global warming as ["a change of climate which is attributed directly or indirectly to human activity that alters the composition of the global atmosphere and which is in addition to natural climate variability observed over comparable time periods."](#)

Before talking about climate change, there are a few basic science points we need to review:

- The concentration of greenhouse gases (GHG) in the atmosphere (e.g. carbon dioxide, methane) is directly linked to the average global temperature on Earth.
- GHG have increased since the Industrial Revolution and mean global temperatures along with them.
- CO<sup>2</sup> is the most abundant GHG (2/3 of all GHG), the largest source of CO<sup>2</sup> is from burning fossil fuels.

As NASA notes on its climate change page: ["Multiple studies published in peer-reviewed scientific journals show that \*\*97 percent or more\*\* of actively publishing climate scientists agree: Climate-warming trends over the past century are extremely likely due to human activities."](#)

# Earth's Climate System



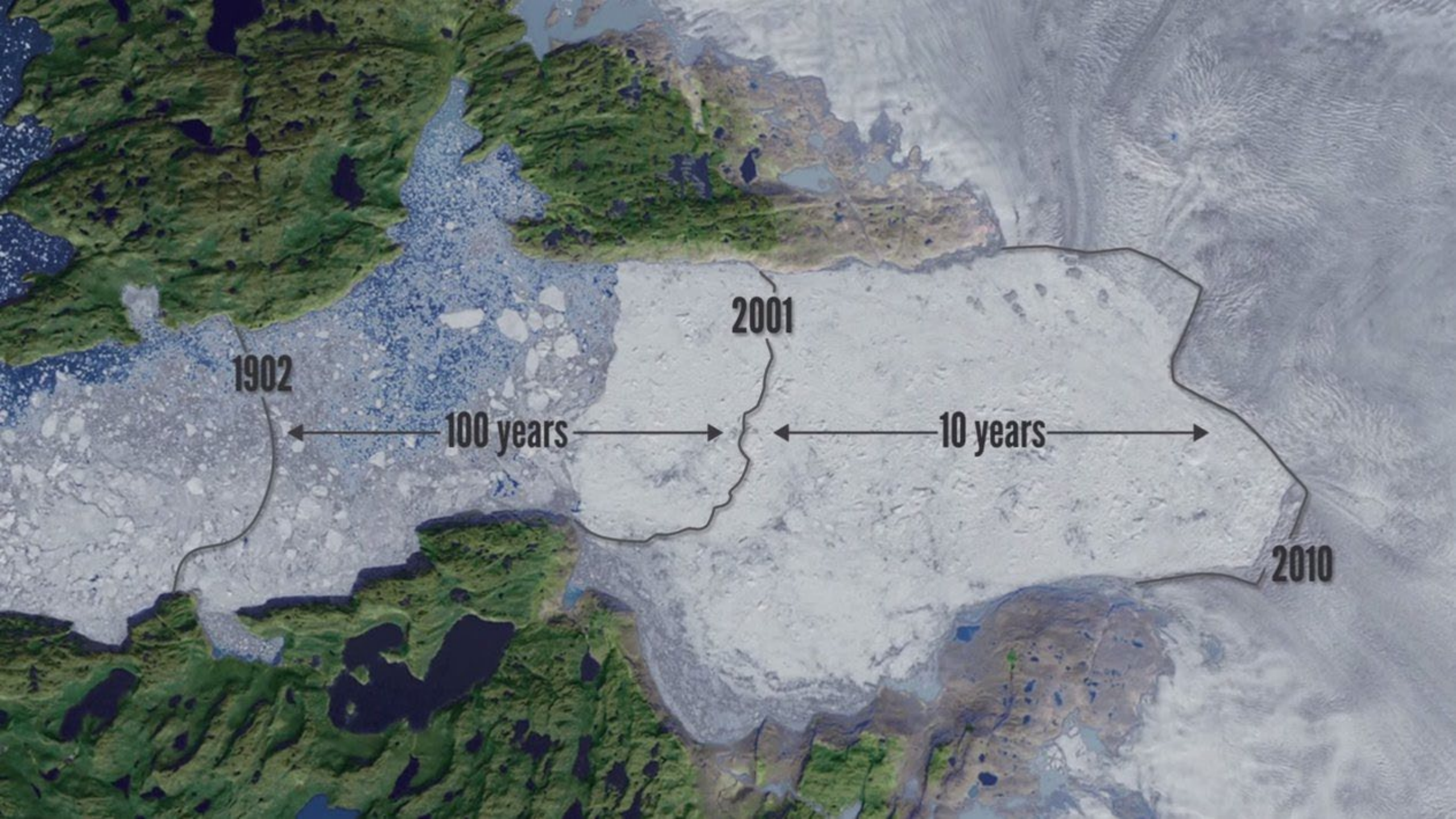
## 7 Global Climate Indicators

Temperature and Energy	Atmospheric Composition	Ocean and Water	Cryosphere
Surface Temperature	Atmospheric CO <sub>2</sub>	Ocean Acidification	Glaciers
Ocean Heat		Sea Level	Arctic and Antarctic Sea Ice Extent

The Global Climate Indicators describe our changing climate beyond just temperature and capture key data relevant to most domains of climate change: temperature and energy, atmospheric composition, ocean and water, and the cryosphere. These are used by both the WMO and the UNFCCC.



Jakobshavn Glacier, Greenland



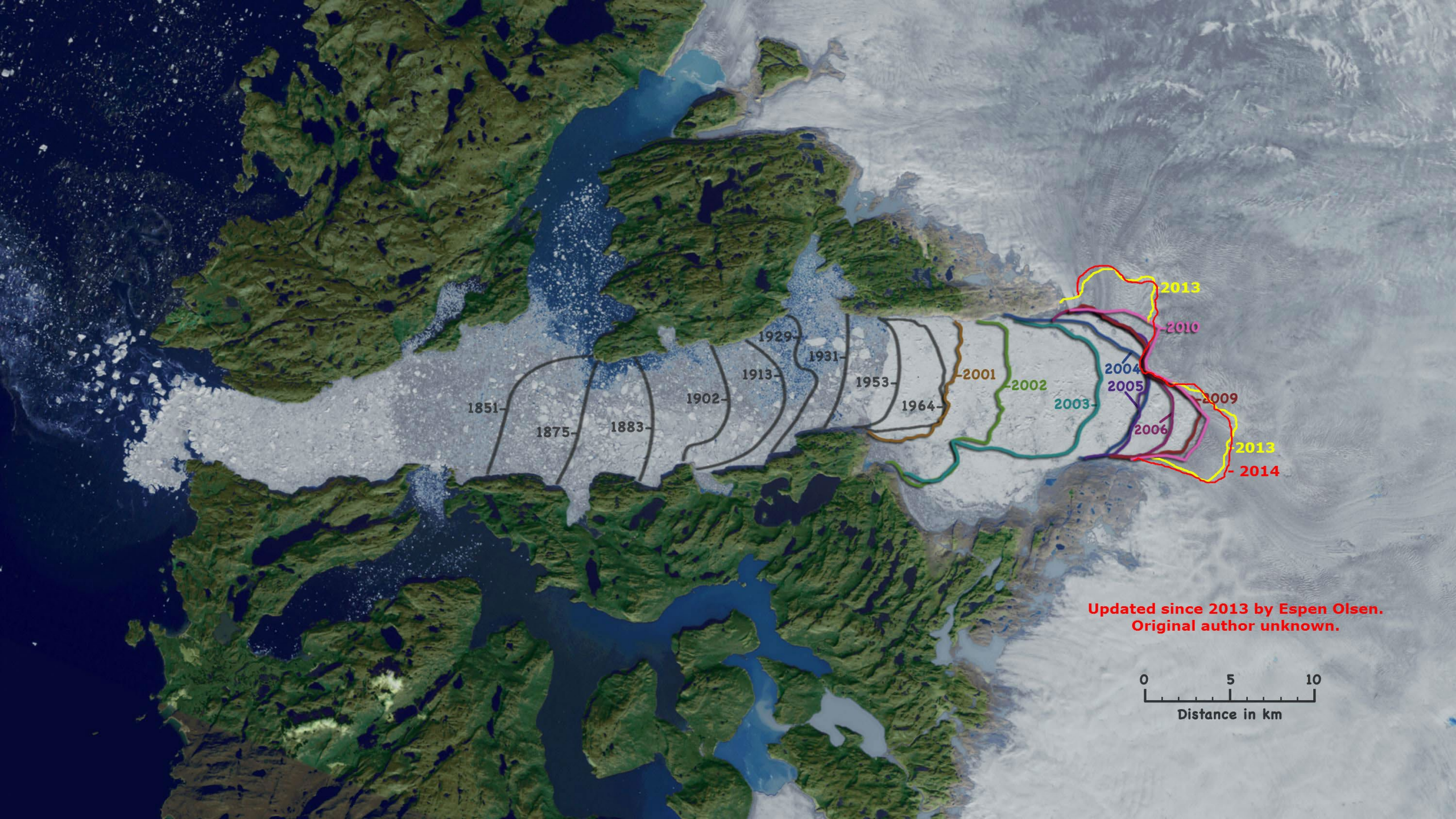
1902

2001

2010

100 years

10 years



1851-

1875-

1883-

1902-

1913-

1929-

1931-

1953-

1964-

2001-

2002-

2003-

2004-

2005-

2006-

2009-

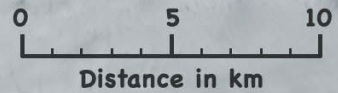
2013

2010

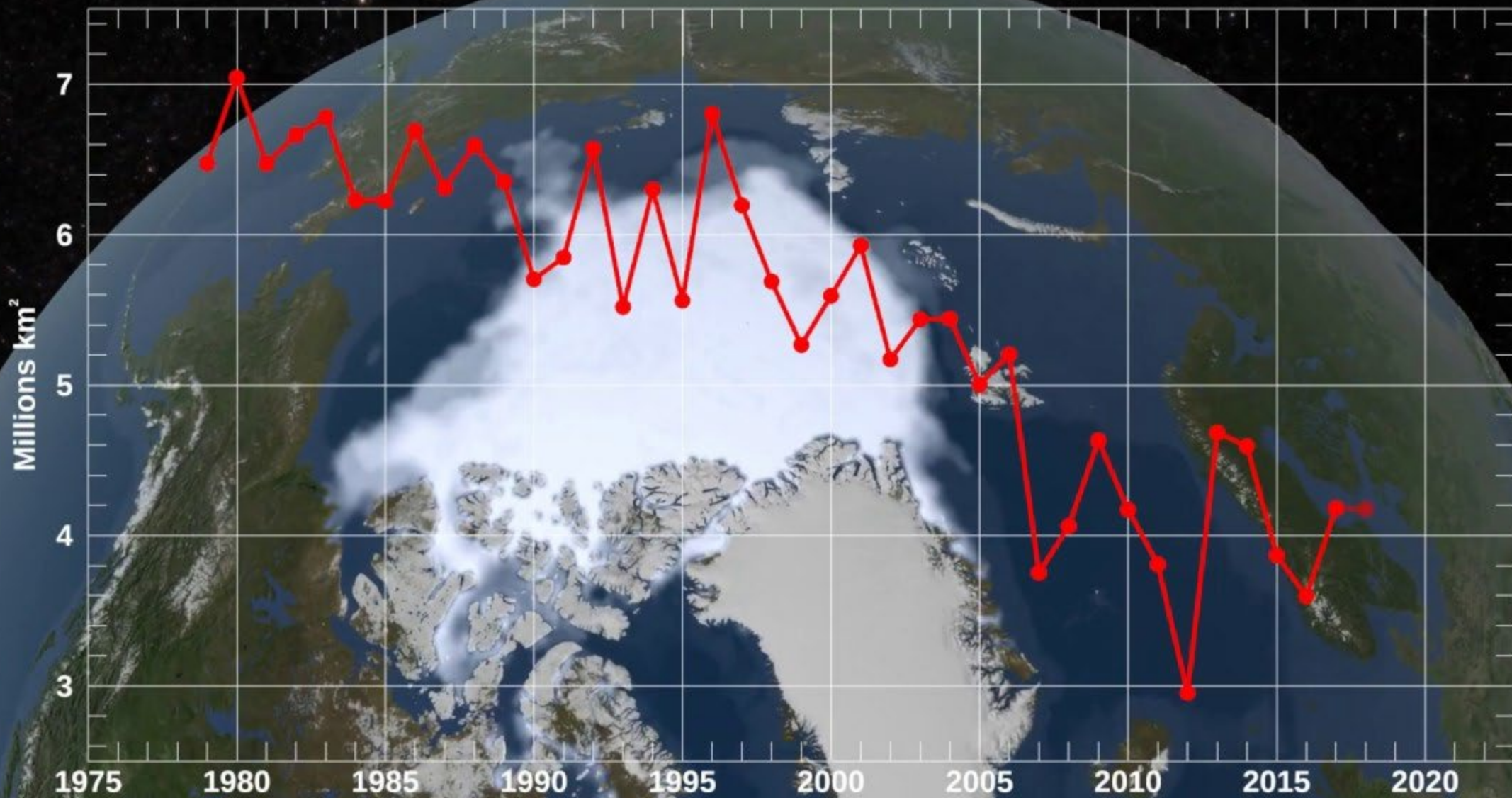
2013

2014

Updated since 2013 by Espen Olsen.  
Original author unknown.



# Annual Arctic Sea Ice Minimum Area





Sep 18, 2019

1981-2010 Avg Min



Bryan Walsh uses the story of the Jakobshavn Glacier in Greenland as a cautionary tale about climate change. Before we delve into the nuts and bolts of climate change, it is worth reviewing some of the basic global frameworks and important climate policy milestones that got us to where we are today.

- 1988 – Intergovernmental Panel on Climate Change (IPCC) established by UNEP and WMO.
- 1990 – First IPCC Assessment Report released
- 1992 – Rio Earth Summit held in Brazil – UNFCCC created as part of negotiations
- 1994 – United Nations Framework Convention on Climate Change (UNFCCC) established
- 1995 – First Conference of Parties (COP1) takes place under the UNFCCC framework
- 1997 – Kyoto Protocol builds on UNFCCC, first globally binding climate treaty
- 2009 – COP15 in Copenhagen hyped as key meeting, but nothing achieved
- 2014 – Fifth IPCC Assessment Report released (AR5)
- 2015 – COP 21 in France. Paris Agreement sets non-binding CO<sup>2</sup> goal in 2016
- 2018 – Global Warming of 1.5°C (SR15) report released
- 2019 – Green New Deal resolution by Senator Markey and Rep. Ocasio-Cortez
- 2021 – COP26 scheduled in UK (postposed from 2020 due to Covid-19)
- 2022 – Sixth IPCC Assessment Report scheduled for release (AR6)





HOT  
TOPIC

PBS  
NEWS  
HOUR

#PBSNEWS

Bryan Walsh argues that:

“Climate change is unlike any of the other existential risks in this book. It’s neither purely natural nor solely man-made, but rather the product of an interaction between the mechanics of the planet and our own actions as an industrialized species...While natural risks like supervolcanic eruptions are surpassingly rare and the probabilities of coming man-made risks like artificial intelligence are all but unknowable, scientists can forecast the next several decades of global warming with chilling accuracy. And what they’re learning is frightening.”

So could climate change bring about the end of the world? I’ll suggest the answer is both yes and no.

Yes, because we have enough data about past climate regimes to know that the Earth went through phases that are not conducive to most species. The possibility that the Earth could be pushed into one of these previous climate states is what drives fears of a climate apocalypse and a sixth mass extinction.

No, because life on Earth has existed through every major climatic change in recorded history. So life will continue, but possibly not human civilization as we know it today. Our current model of industrial civilization might come to an end, but some life forms on Earth are more resilient and would survive.

As Bryan Walsh discussed, there are many factors that must be considered for climate change today:

- Average temperatures have risen 1.6 degrees Celsius since 1800s
- 10 hottest years on record have occurred since 2005, with last 5 years setting new record highs
- Sea levels have risen 8 inches over the past decade, and this trend is speeding up
- Arctic sea ice shrunk 13% per decade since the 1980s (2<sup>nd</sup> lowest levels ever in 2020)
  
- Increasing heat waves from rising global temperatures
- Increasing extremes and intensity of wildfires, storms, and other weather events
- Increasing coastal flooding and storm surges, decreasing mountain snowpack and water recharge
- Increasing economic costs and damages and increasing climate migrants and refugees

Perhaps most important of all are the political obstacles to addressing global climate change, especially in the leading polluters like the US. As we will see, the story of climate change in the US is deeply tied up with American cultural beliefs, religious values, and political ideologies.

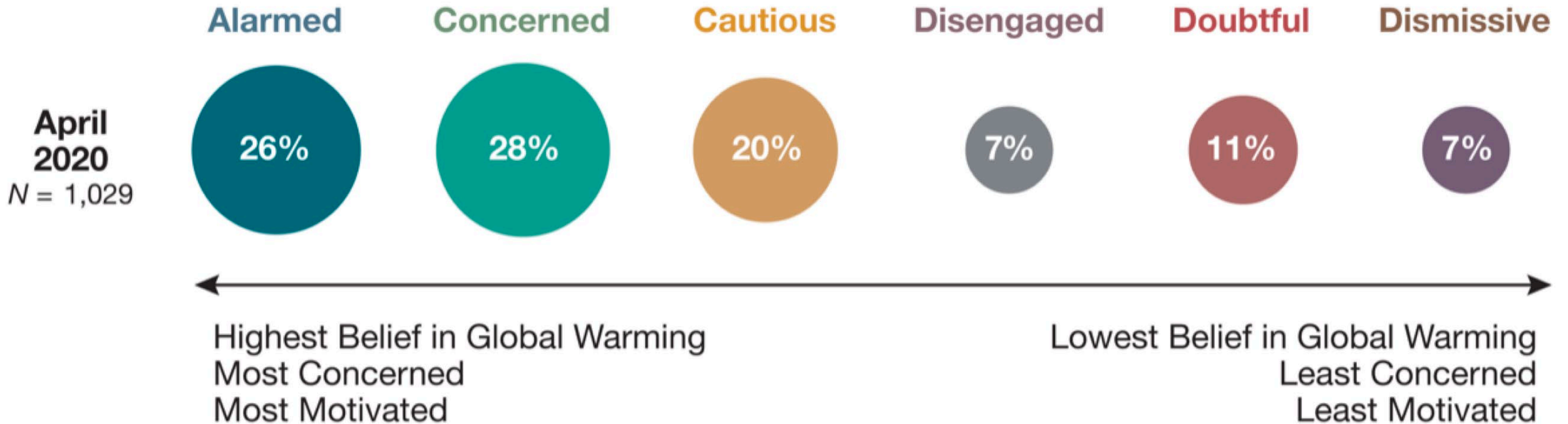


# EESI

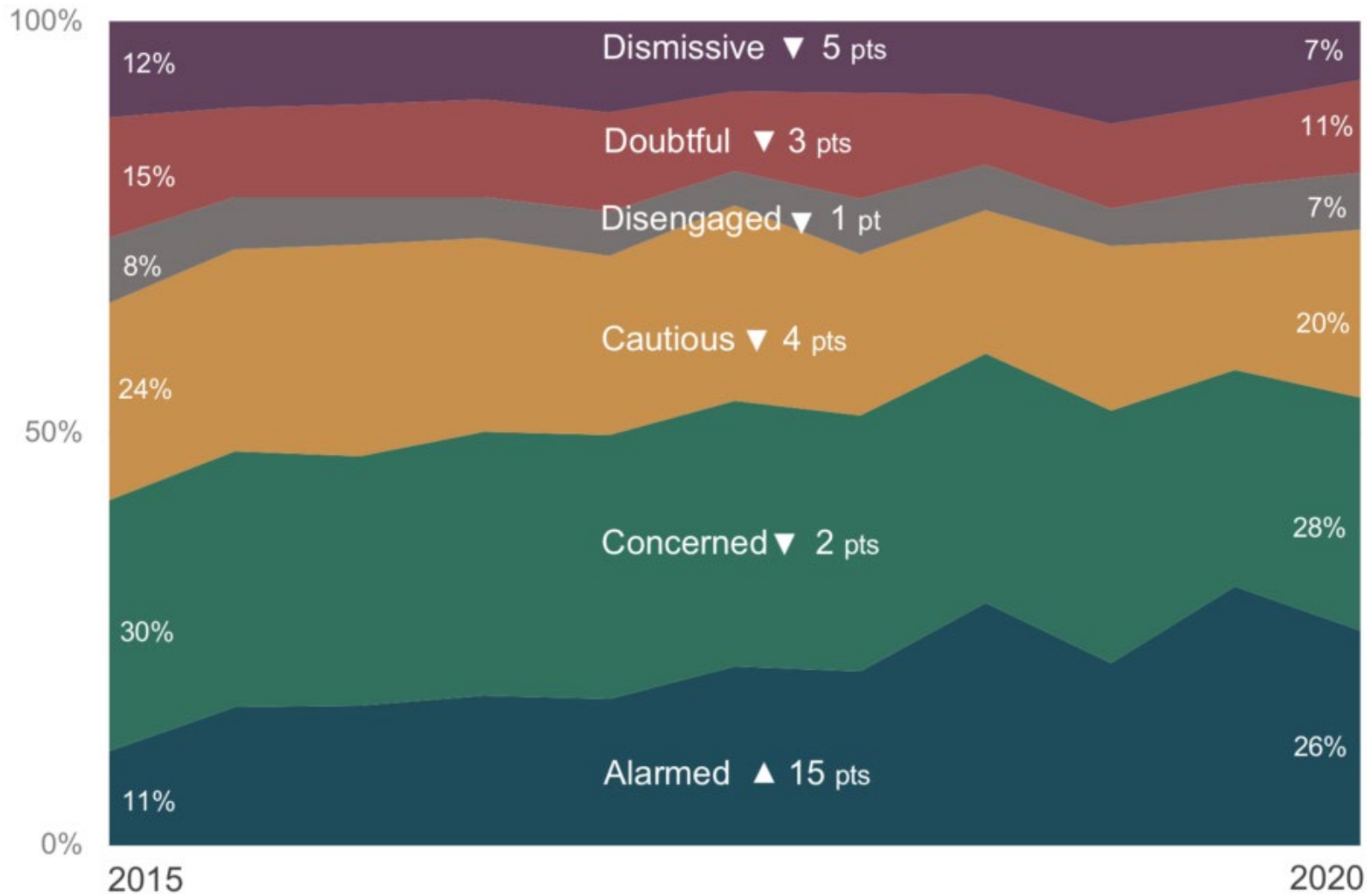
Environmental and  
Energy Study Institute

[www.eesi.org](http://www.eesi.org)

# Global Warming's Six Americas



## Global Warming's Six Americas: Five Year Trend



The Global Warming's Six America's report notes:

“There has been a significant change in the distribution of the Six Americas over the past five years. The Alarmed segment has more than doubled in size (from 11% to 26% of the U.S. adult population) between 2015 and 2020, while the Dismissive segment has decreased by nearly half (from 12% to 7%). Overall, Americans are becoming more worried about global warming, more engaged with the issue, and more supportive of climate solutions.”

Data from 11 national surveys (N = 13,609) from March 2015 to April 2020.



YALE PROGRAM ON  
Climate Change  
Communication

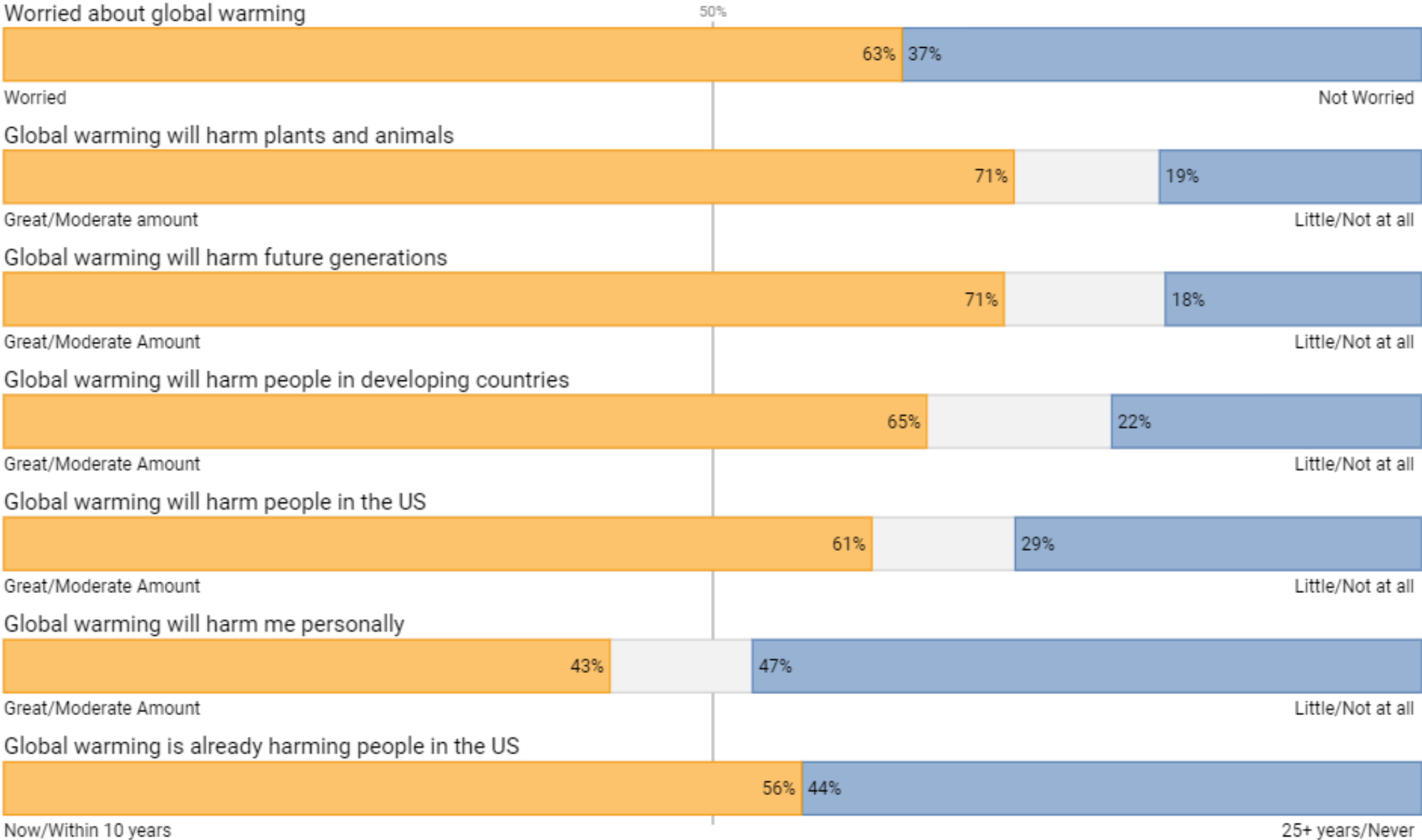


GEORGE MASON UNIVERSITY  
CENTER for CLIMATE CHANGE  
COMMUNICATION



# Yale Climate Opinion Maps 2020

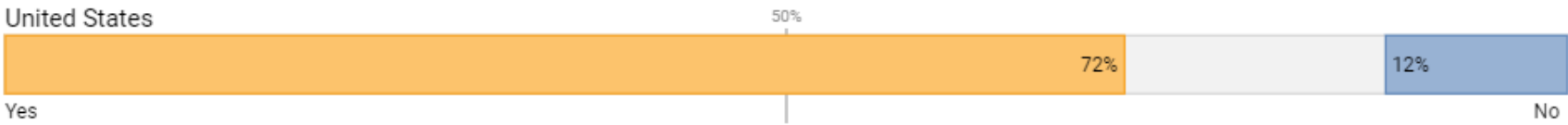
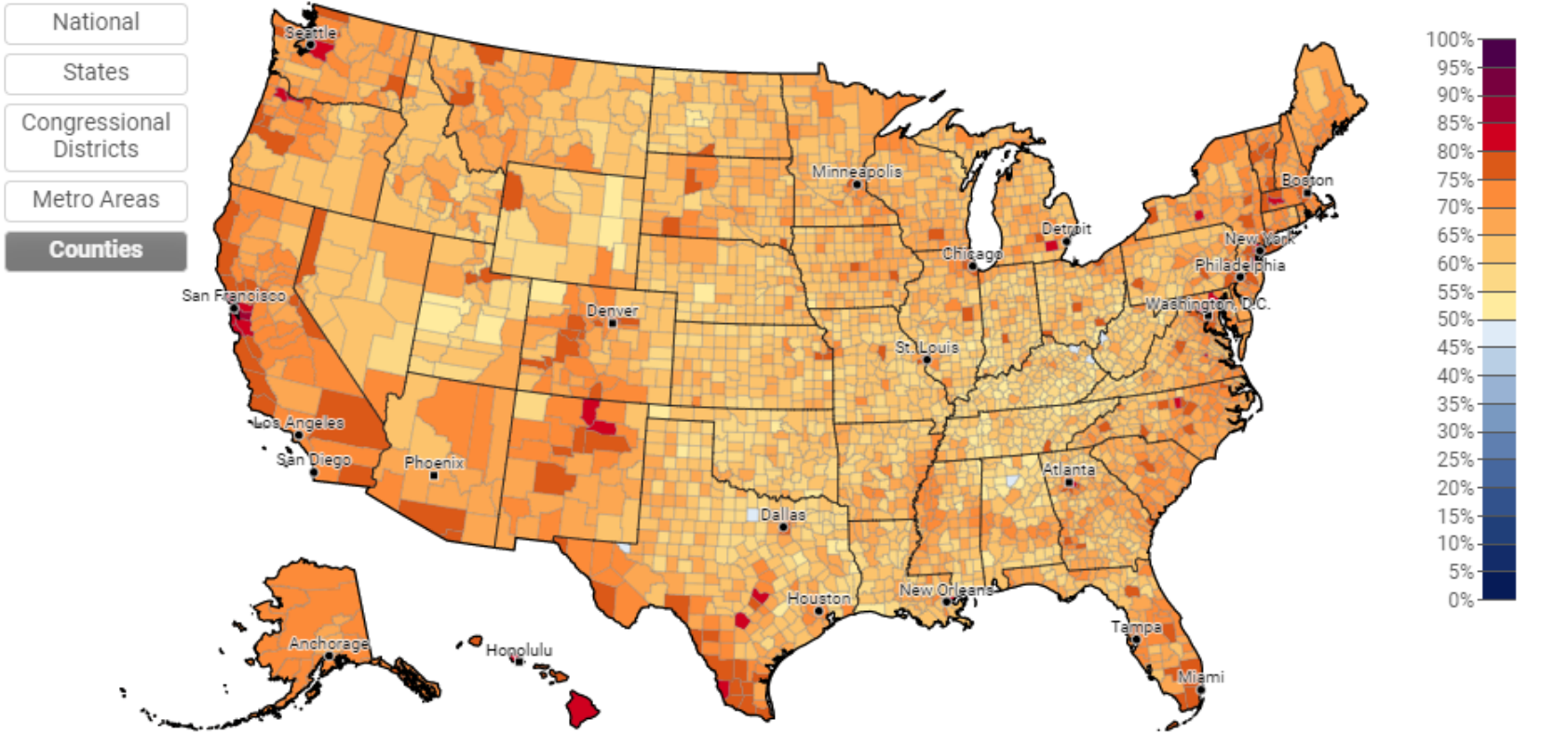
## RISK PERCEPTIONS



# Estimated % of adults who think global warming is happening (72%), 2020

Select Question:  Absolute Value

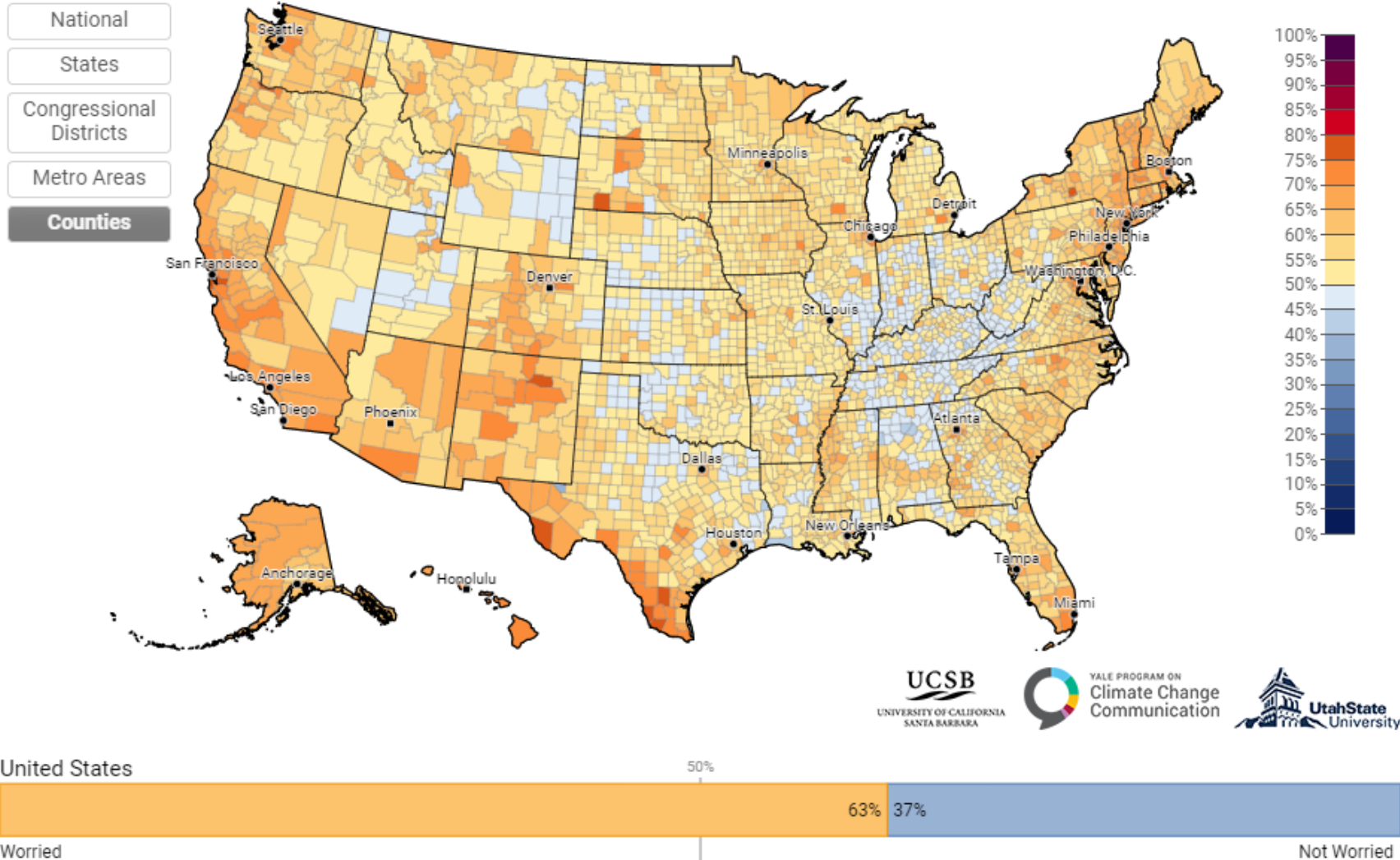
Click on map to select geography, or:



# Estimated % of adults who are worried about global warming (63%), 2020

Select Question:  Absolute Value

Click on map to select geography, or:



UCSB  
UNIVERSITY OF CALIFORNIA  
SANTA BARBARA

YALE PROGRAM ON  
Climate Change  
Communication

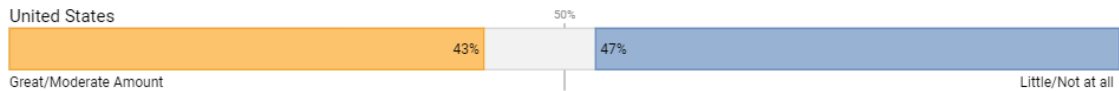
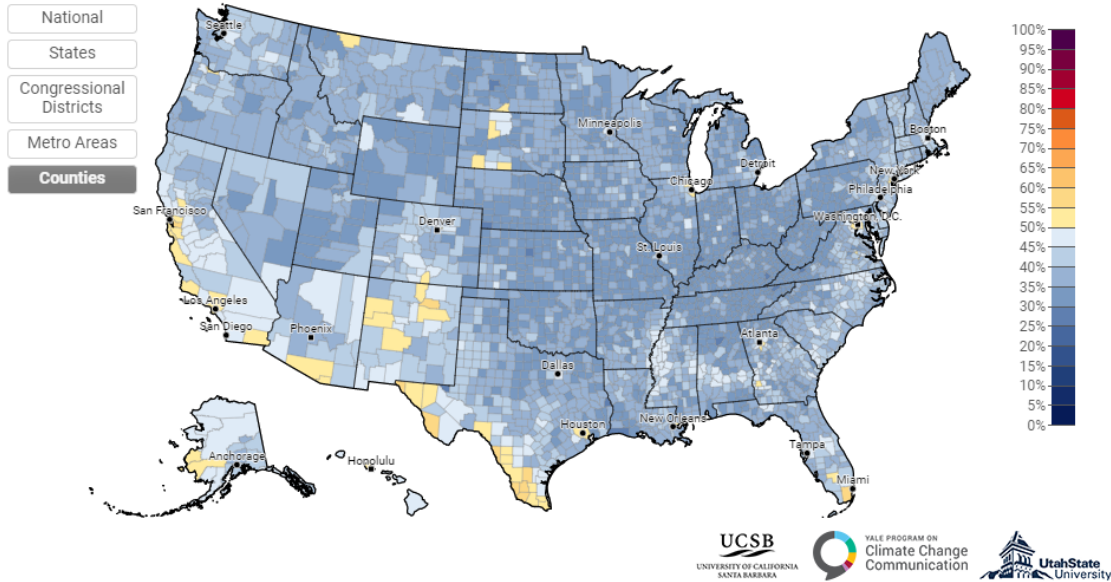
UtahState  
University

# Personal Climate Harms (43 %)

Estimated % of adults who think global warming will harm them personally (43%), 2020

Select Question:  Absolute Value

Click on map to select geography, or:

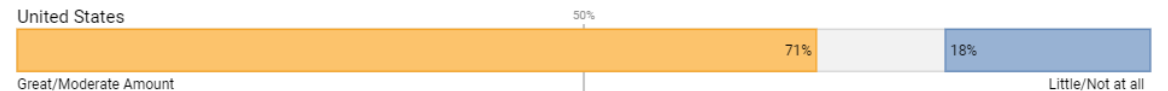
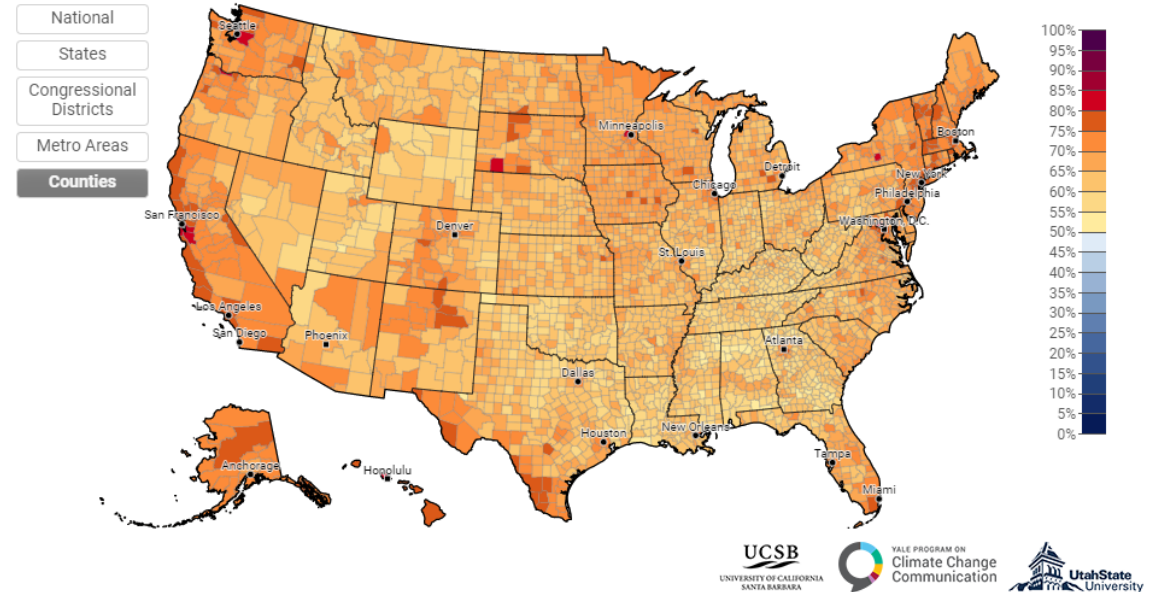


# Future Climate Harms (71 %)

Estimated % of adults who think global warming will harm future generations (71%), 2020

Select Question:  Absolute Value

Click on map to select geography, or:

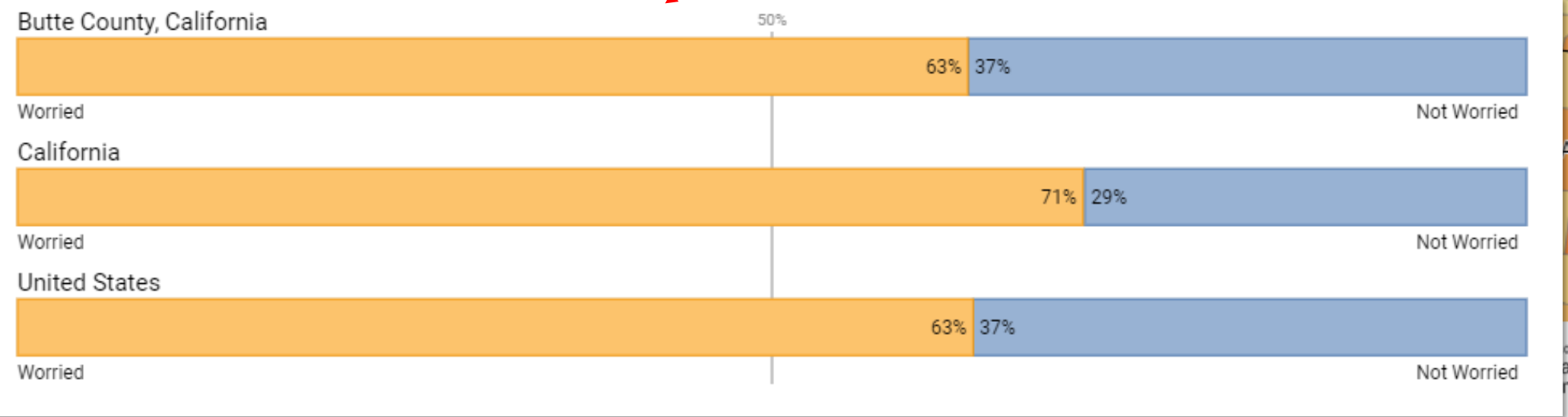
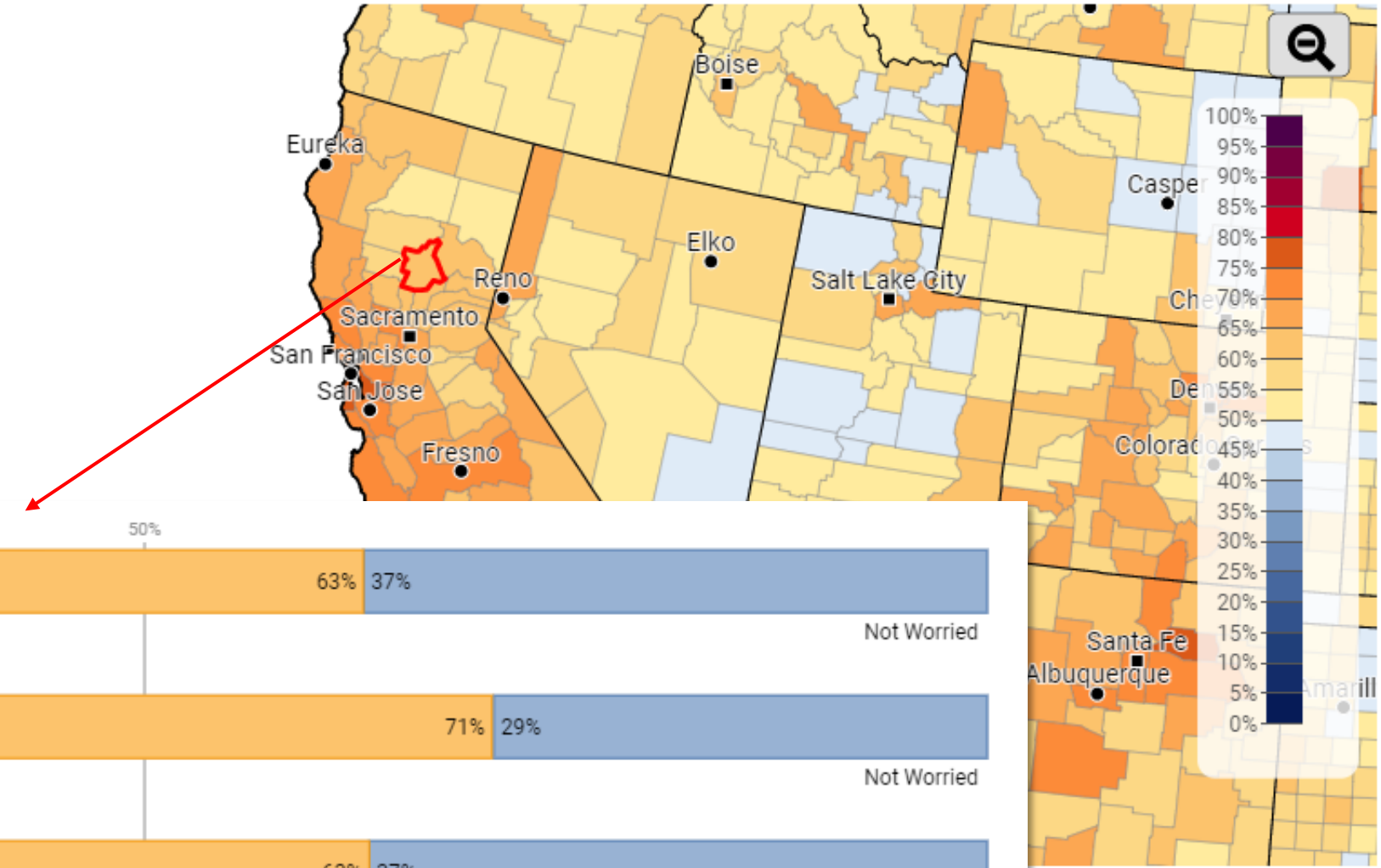


# Estimated % of adults who are worried about global warming (63%), 2020

Select Question:  Absolute Value

Click on map to select geography, or:

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

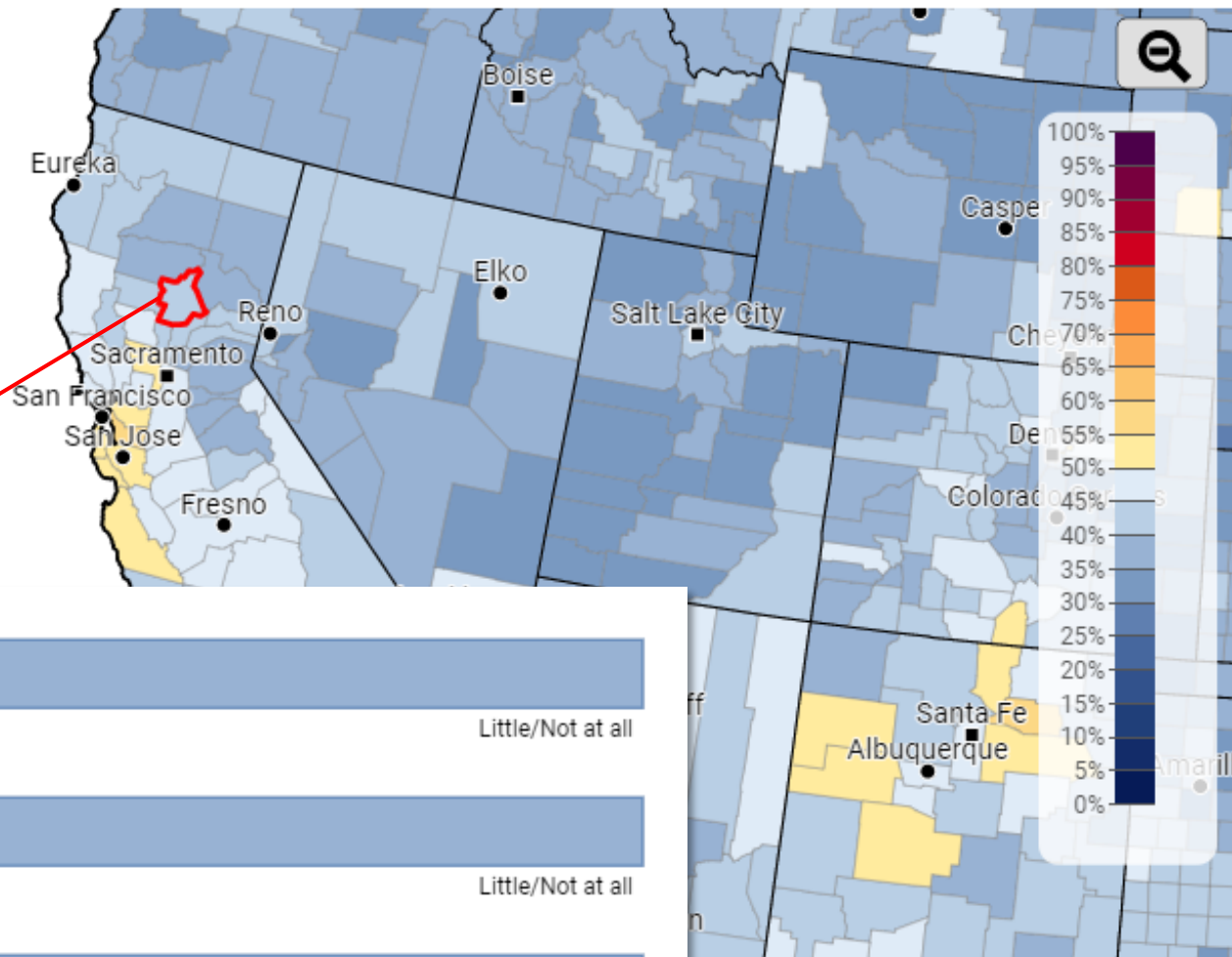


# Estimated % of adults who think global warming will harm them personally (43%), 2020

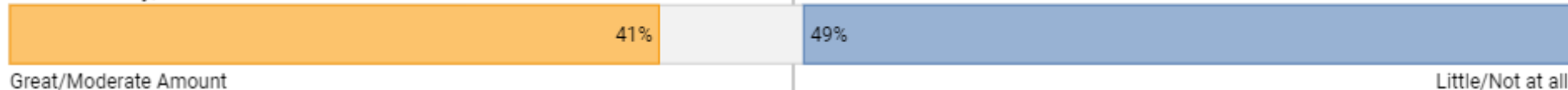
Select Question:  Absolute Value

Click on map to select geography, or:

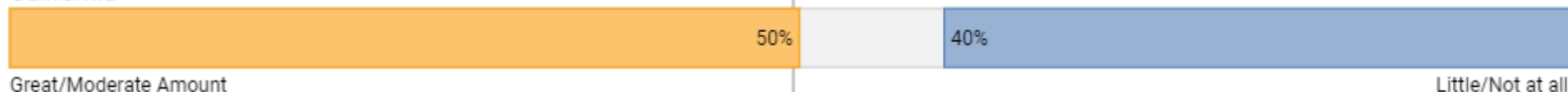
- National
- States
- Congressional Districts
- Metro Areas
- Counties**



Butte County, California



California

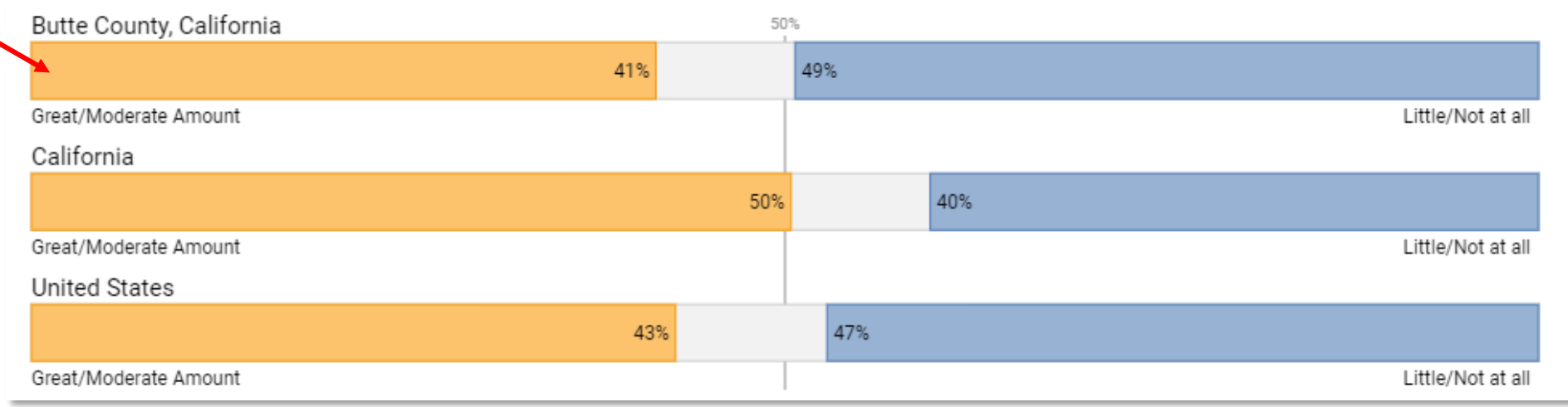
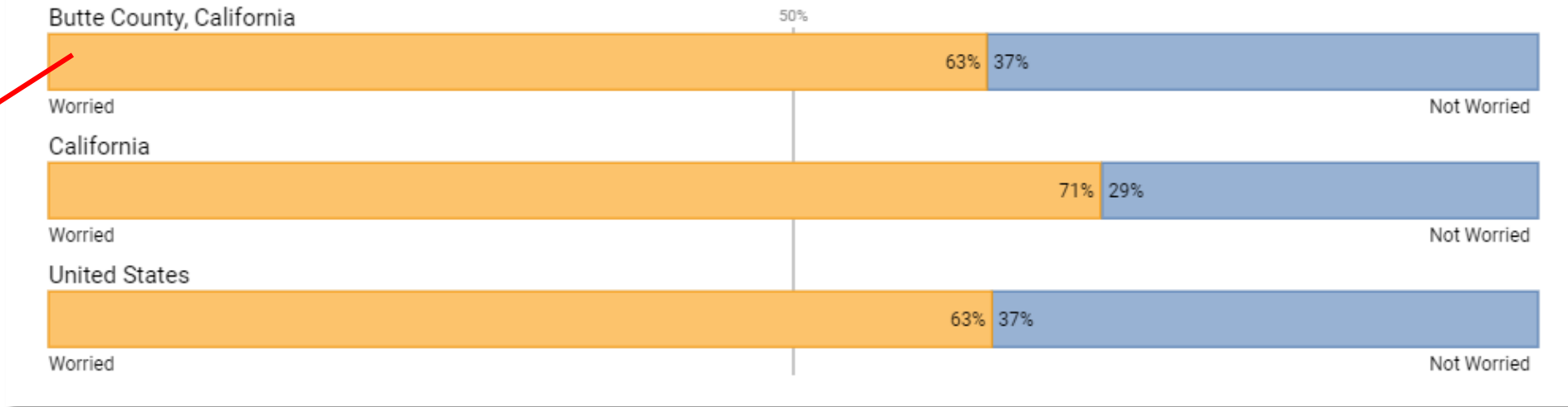


United States

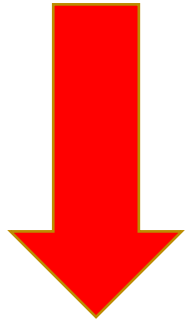


### Estimated % of adults who are worried about global warming (63%), 2020

Select Question:  Absolute Value  
Click on map to select geography, or:



**General Concern**  
**- 22%**



**Personal Impacts**

### Estimated % of adults who think global warming will harm them personally (43%), 2020

Select Question:  Absolute Value  
Click on map to select geography, or:

# Adults who think global warming will harm them personally, difference from national average (43%), 2020

Select Question: Global warming will harm me personally

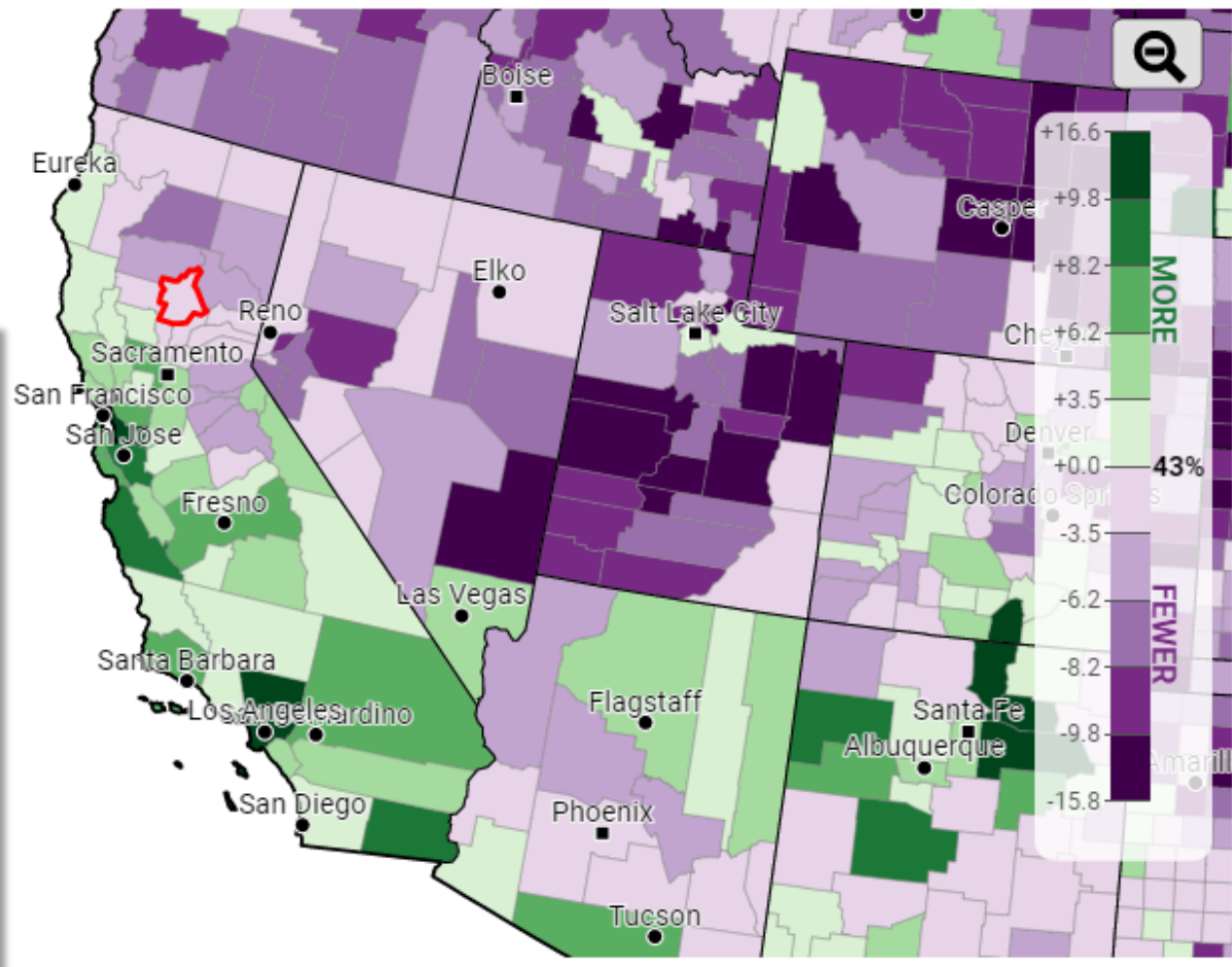
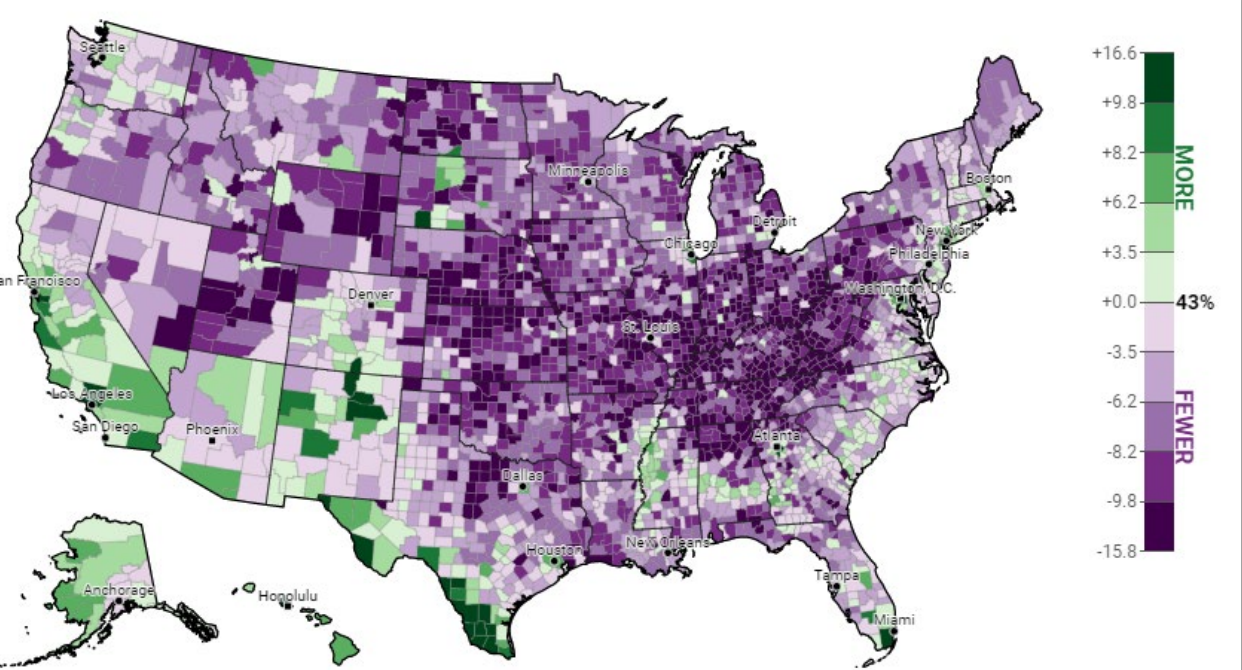
Difference from National Avg.

Click on map to select geography, or: California

Butte County, California

Un-Select

- National
- States
- Congressional Districts
- Metro Areas



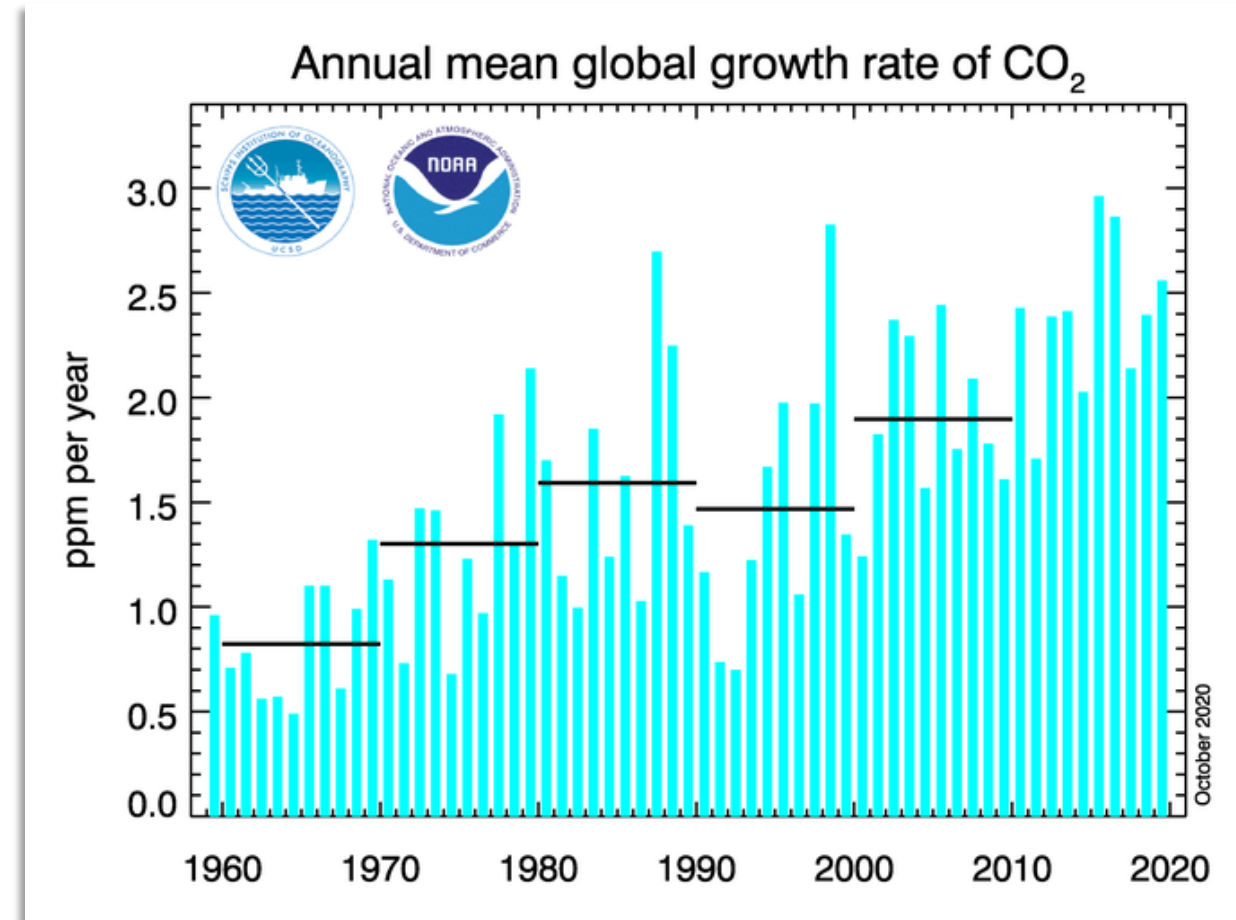
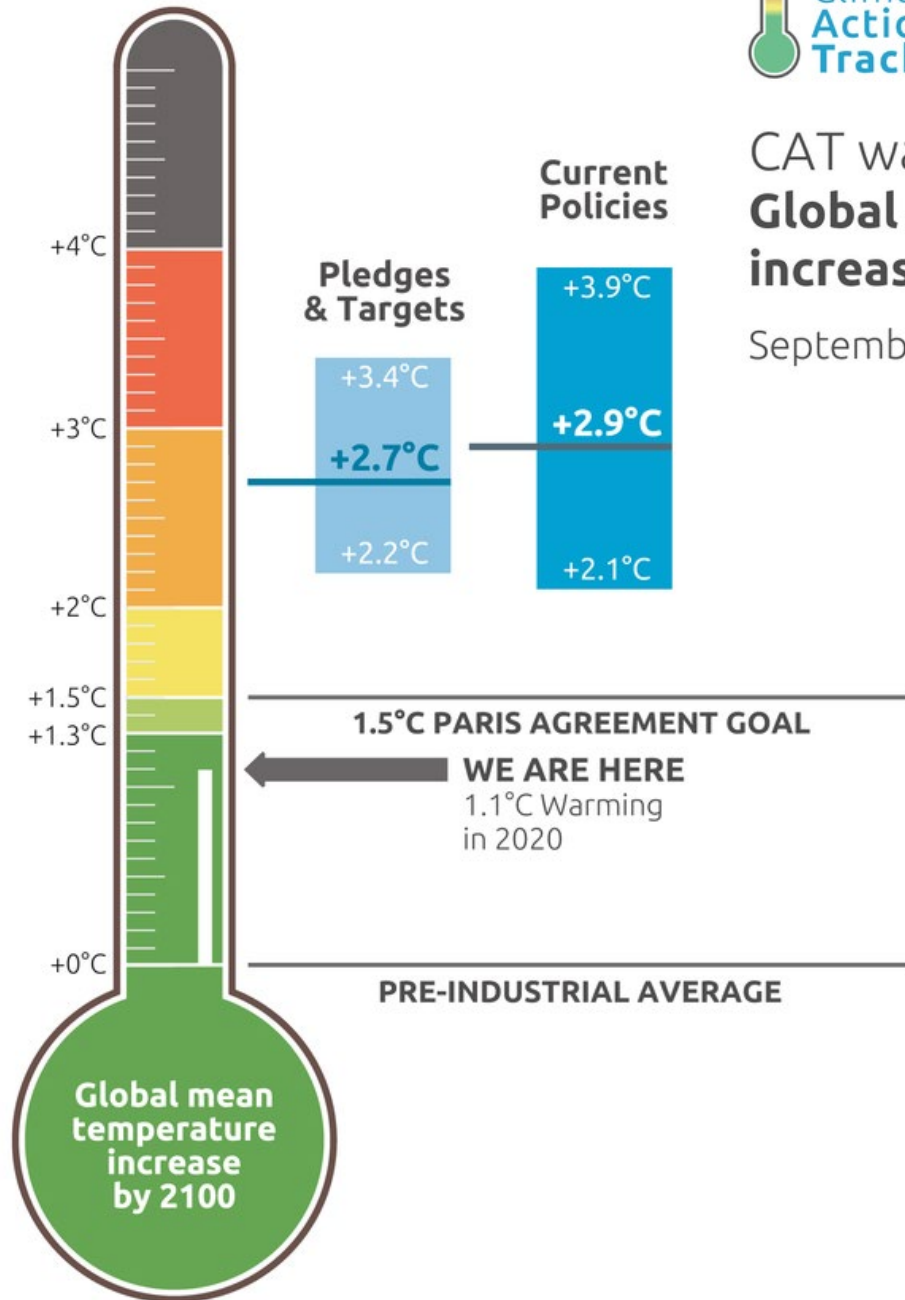


In 2018 the IPCC released its *Special Report: Global Warming of 1.5 °C*, highlighting the latest climate science research on impacts from continued impacts to the global climate and related Earth systems. The report looked at possible impacts of a 1.5 °C rise in temperature above pre-industrial levels and was the result of a decision reached at the COP21 meetings in 2015 as part of the Paris Agreement.

- Human activities are estimated to have caused approximately 1.0°C of global warming above pre-industrial levels, with a likely range of 0.8°C to 1.2°C. Global warming is likely to reach 1.5°C between 2030 and 2052 if it continues to increase at the current rate (*high confidence*).
- Warming from anthropogenic emissions from the pre-industrial period to the present will persist for centuries to millennia and will continue to cause further long-term changes in the climate system, such as sea level rise, with associated impacts (*high confidence*), but these emissions alone are unlikely to cause global warming of 1.5°C (*medium confidence*).
- Climate-related risks for natural and human systems are higher for global warming of 1.5°C than at present, but lower than at 2°C (*high confidence*). These risks depend on the magnitude and rate of warming, geographic location, levels of development and vulnerability, and on the choices and implementation of adaptation and mitigation options (*high confidence*).

## CAT warming projections Global temperature increase by 2100

September 2020 Update

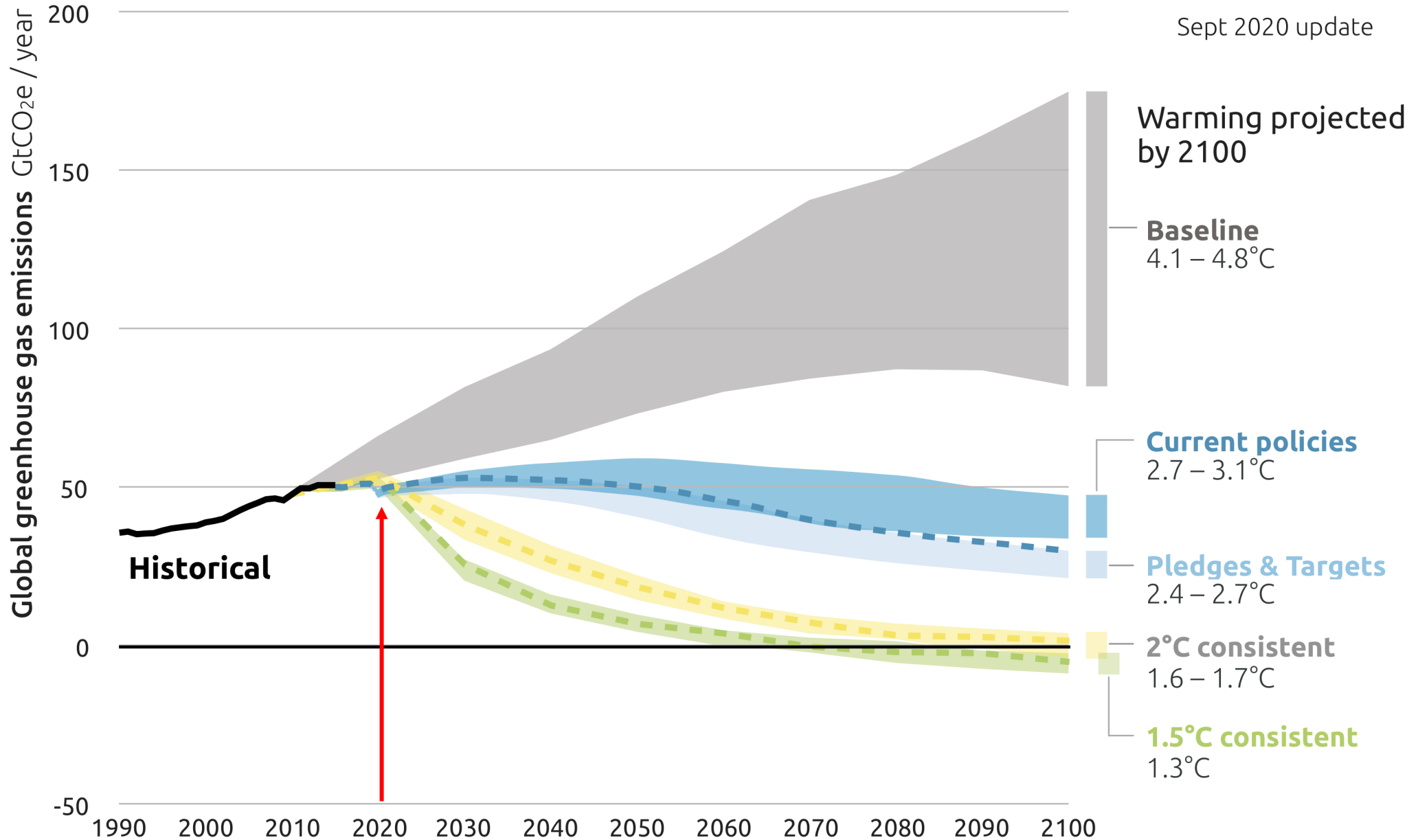


# 2100 WARMING PROJECTIONS

Emissions and expected warming based on pledges and current policies



Sept 2020 update

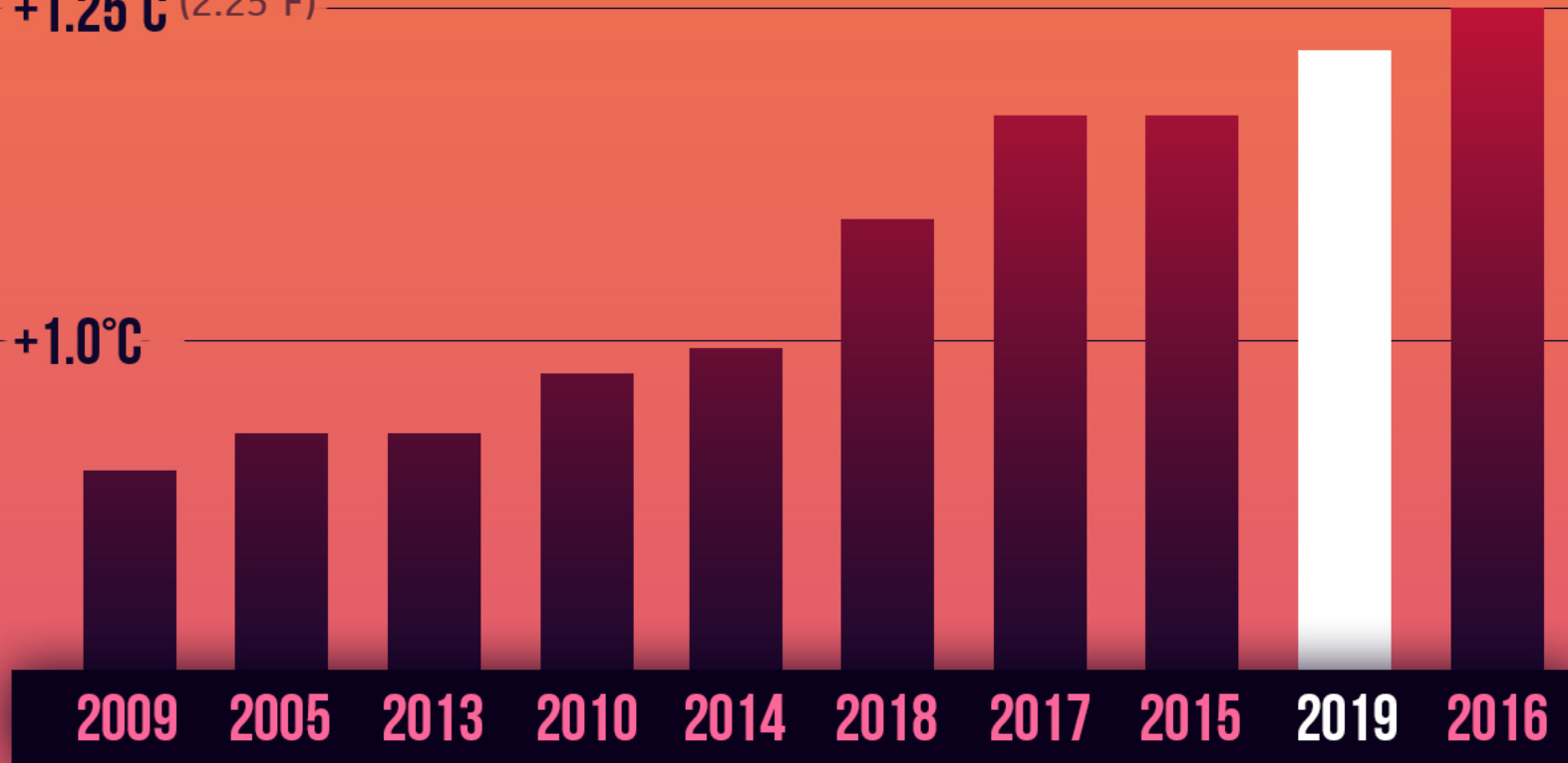


# 10 HOTTEST YEARS ON RECORD GLOBALLY

Last 5 = Hottest 5

+1.25°C (2.25°F)

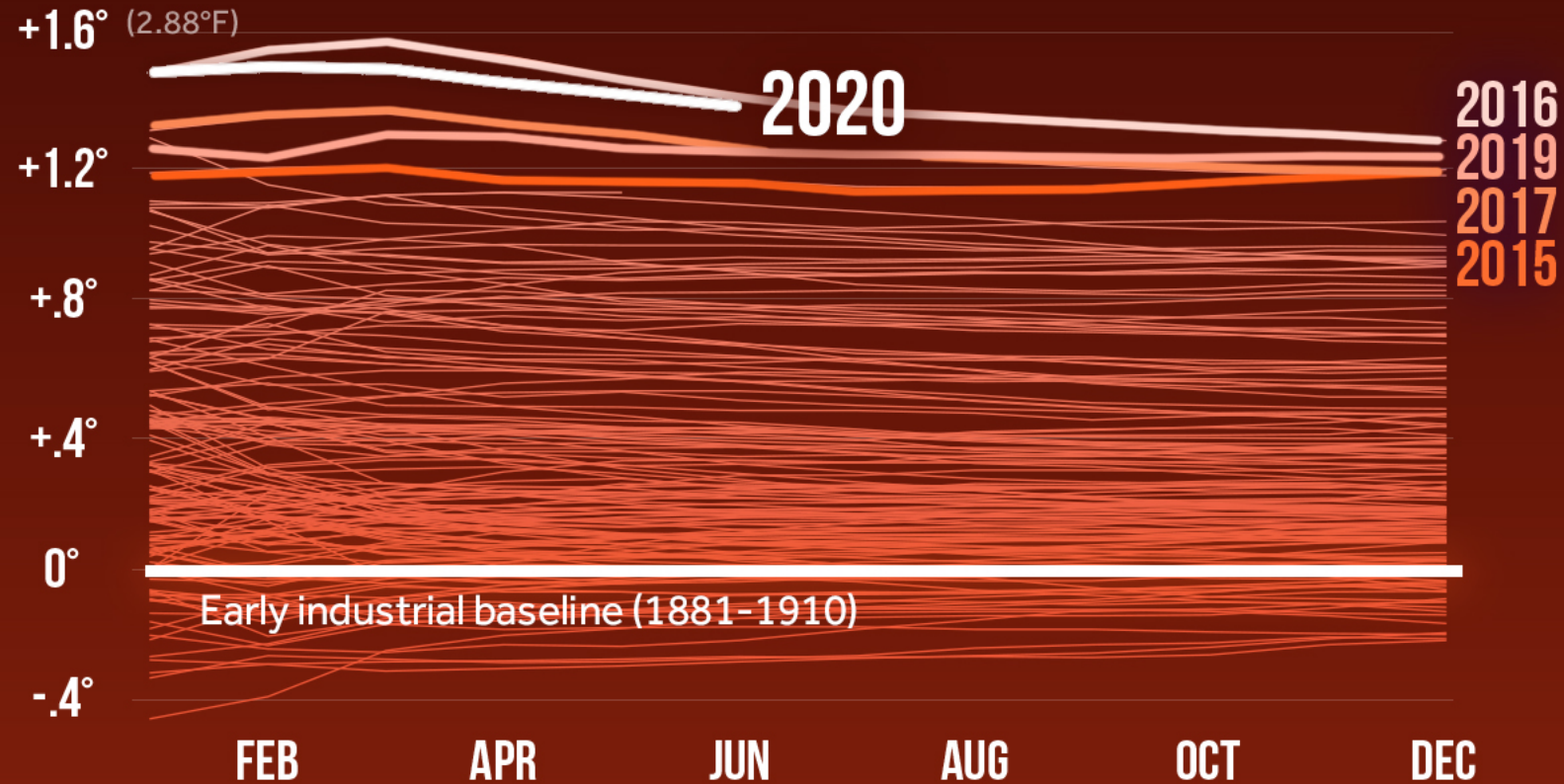
+1.0°C



Source: NASA GISS & NOAA NCEI global temperature anomalies (°C) averaged and adjusted to early industrial baseline (1881-1910). Data as of 1/15/2020.

# HOTTEST YEARS ON RECORD

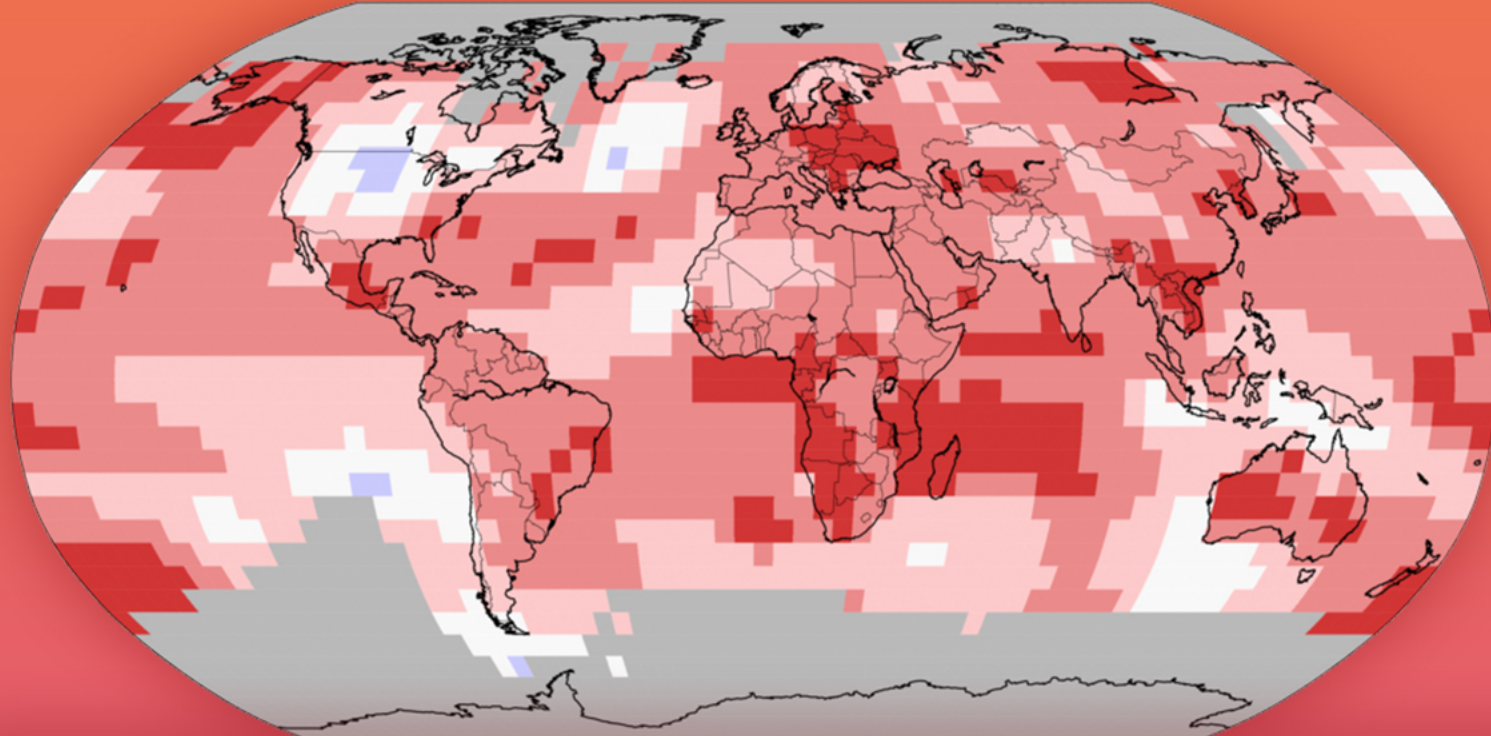
GLOBAL YEAR-TO-DATE ANOMALIES (°C) SINCE 1880



Source: NASA GISS & NOAA NCEI global temperature anomalies averaged and adjusted to early industrial baseline (1881-1910). Data as of 7/13/2020

# 2019 GLOBAL TEMPS

## Land and Ocean Temperature



RECORD  
COLDEST

MUCH  
COOLER

COOLER

NEAR  
AVERAGE

WARMER

MUCH  
WARMER

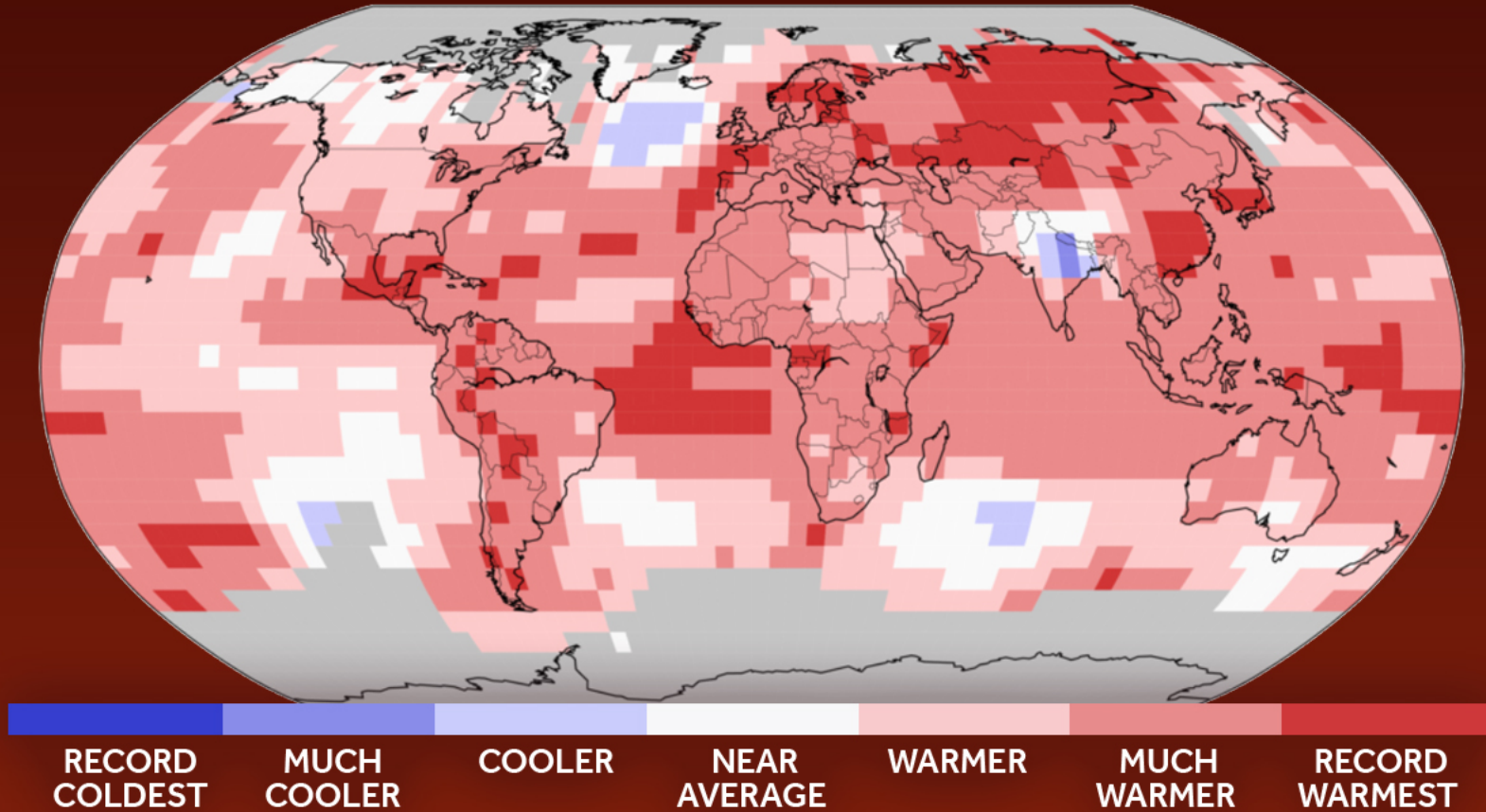
RECORD  
WARMEST

Data as of 1/15/2020  
Source: NOAA/NCEI Climate at a Glance

CLIMATE  CENTRAL

# 2020 GLOBAL TEMPS

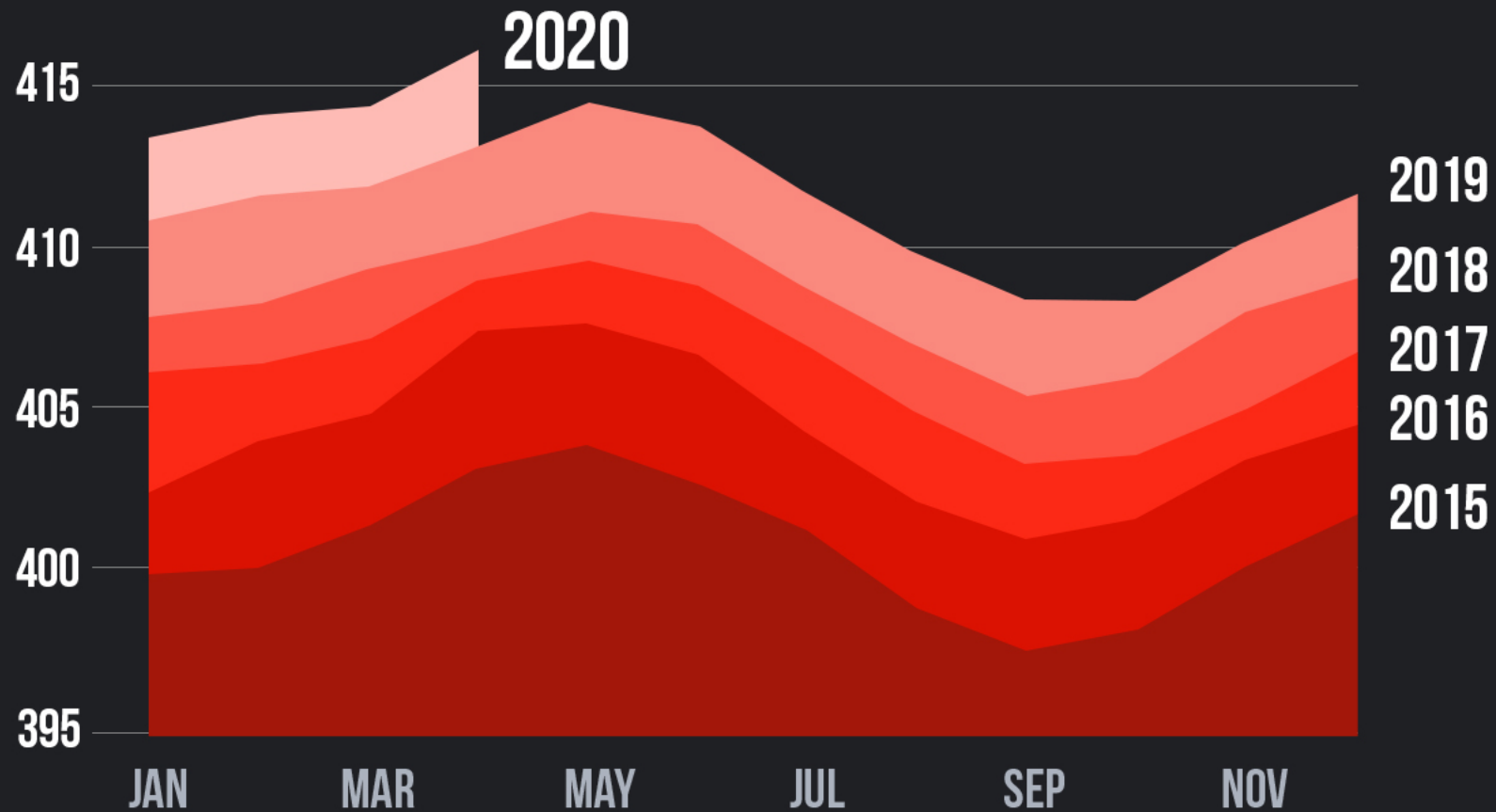
JAN-JUNE LAND & OCEAN TEMPERATURE



Data as of 7/13/2020  
Source: NOAA/NCEI Climate at a Glance

# A NEW HIGH FOR CO<sub>2</sub>

## Monthly Concentration in Parts Per Million



Source: NOAA Earth System Research Laboratory Global Monitoring Division

CLIMATE  CENTRAL



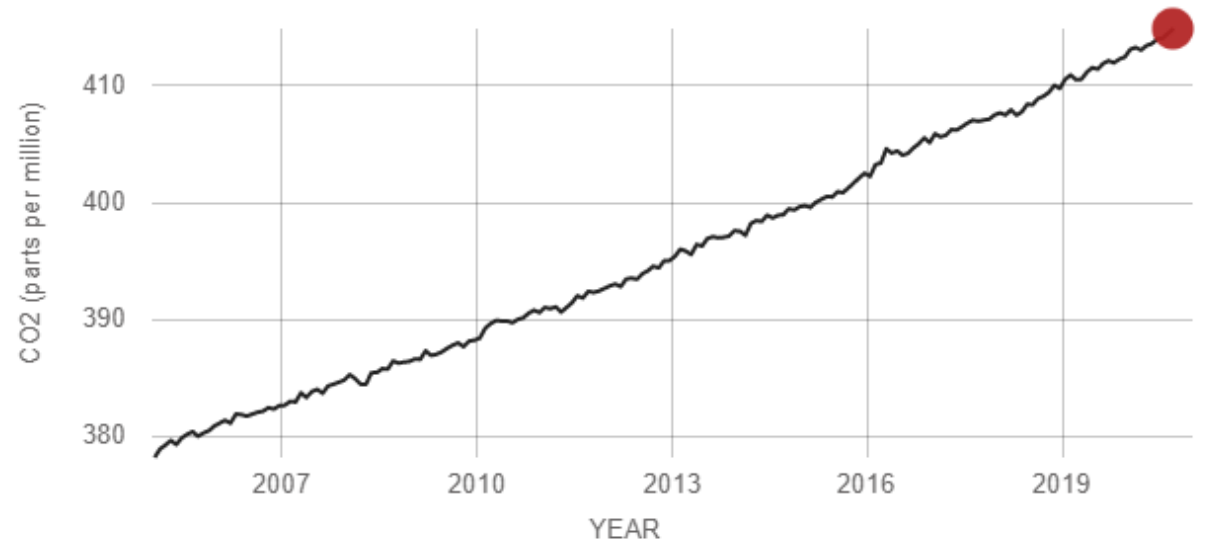
**CARBON DIOXIDE**↑ **415** parts per million**GLOBAL TEMPERATURE**↑ **2.0** °F since 1880**ARCTIC ICE MINIMUM**↓ **13.1** percent per decade**ICE SHEETS**↓ **427** billion metric tons per year**SEA LEVEL**↑ **3.3** millimeters per year

# Carbon Dioxide

LATEST MEASUREMENT: September 2020

**415 ppm**[DOWNLOAD DATA](#)

Carbon dioxide (CO<sub>2</sub>) is an important heat-trapping (greenhouse) gas, which is released through human activities such as deforestation and burning fossil fuels, as well as natural processes such as respiration and volcanic eruptions. The first graph shows atmospheric CO<sub>2</sub> levels measured at Mauna Loa Observatory, Hawaii, in recent years, with average seasonal cycle removed. The second graph shows CO<sub>2</sub> levels during the last three glacial cycles, as reconstructed from ice cores.

**DIRECT MEASUREMENTS: 2005-PRESENT**Data source: Monthly measurements (average seasonal cycle removed). Credit: [NOAA](#)

Click+drag to zoom

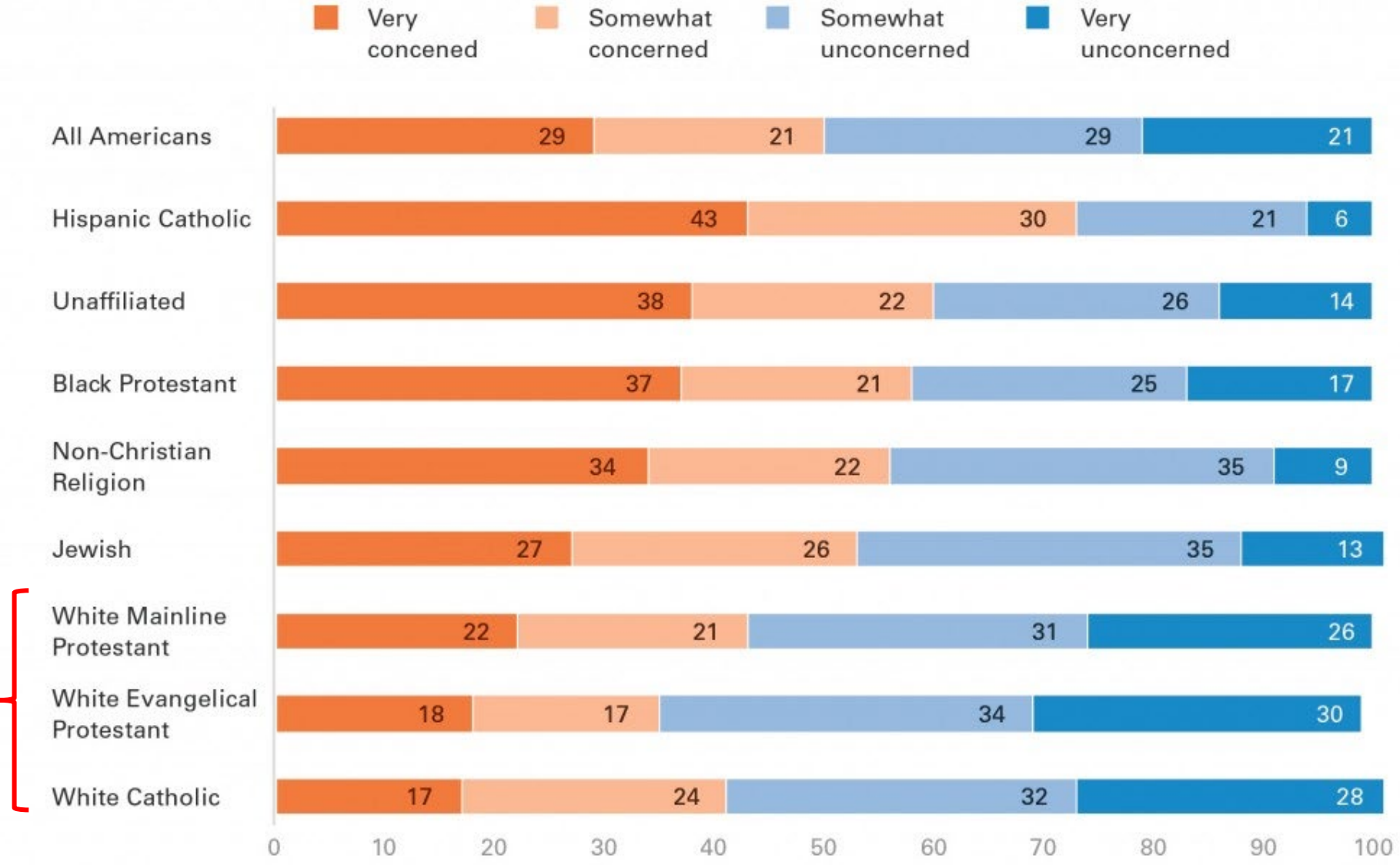
[RESET](#)Get Data: [FTP](#) | Snapshot: [PNG](#)



**CLIMATE CHANGE AFFECTS US ALL**

**PEOPLE OF FAITH CALL ON ALL PARTIES TO UNITE FOR CLIMATE ACTION**

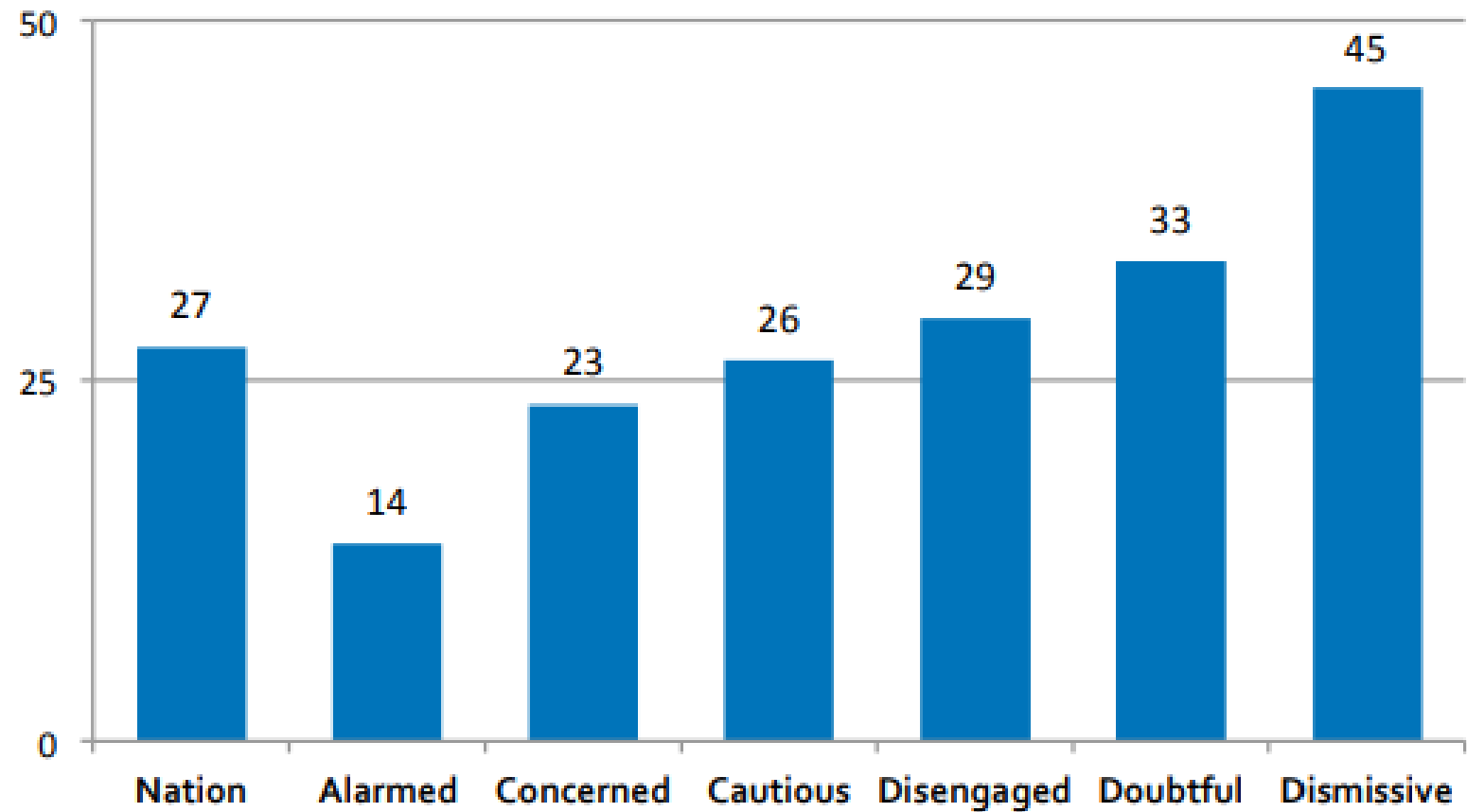
**FIGURE 3. Climate Change Concern Index by Religious Affiliation**



Source: PRRI/AAR, Religion, Values, and Climate Change Survey, November 2014

Evangelicals and "born-again" Christians are much more likely to belong to a disbelieving segment, and much less likely to belong to a concerned segment; they're particularly unlikely to belong to the Alarmed segment.

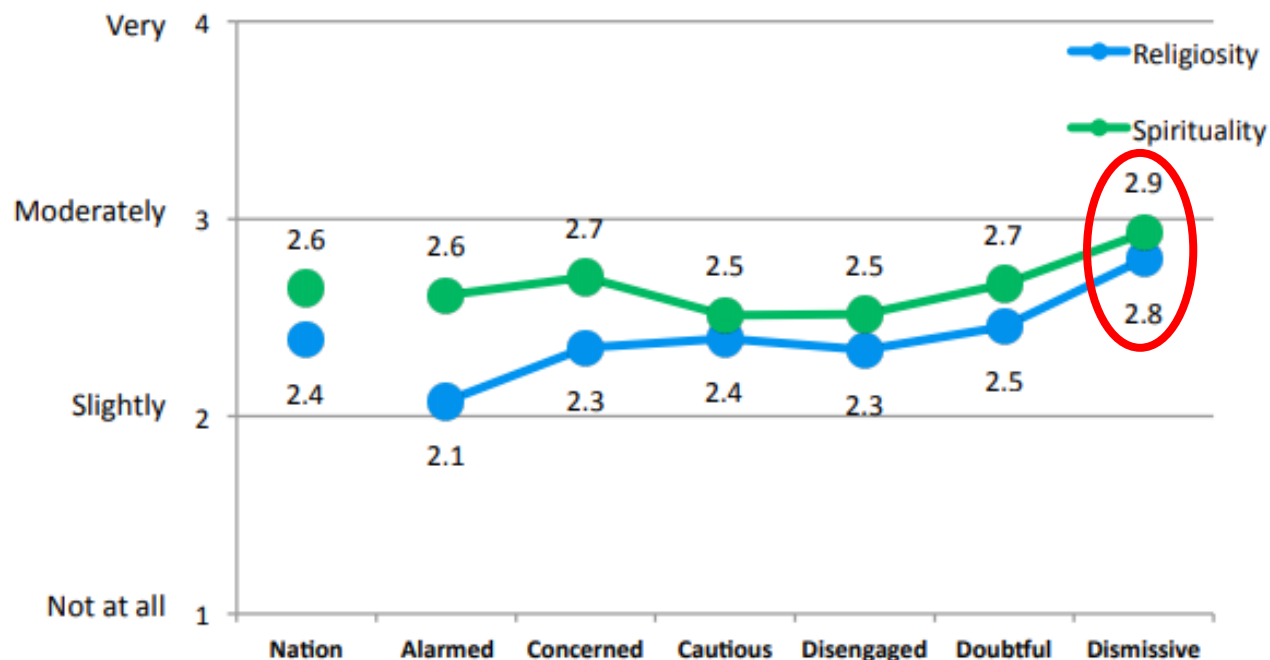
**Figure 2 : Proportion of Segment Members Who are Evangelical or "Born-Again"**





**Figure 3: Religiosity and Spirituality**

*To what extent do you consider yourself a religious person? a spiritual person?*



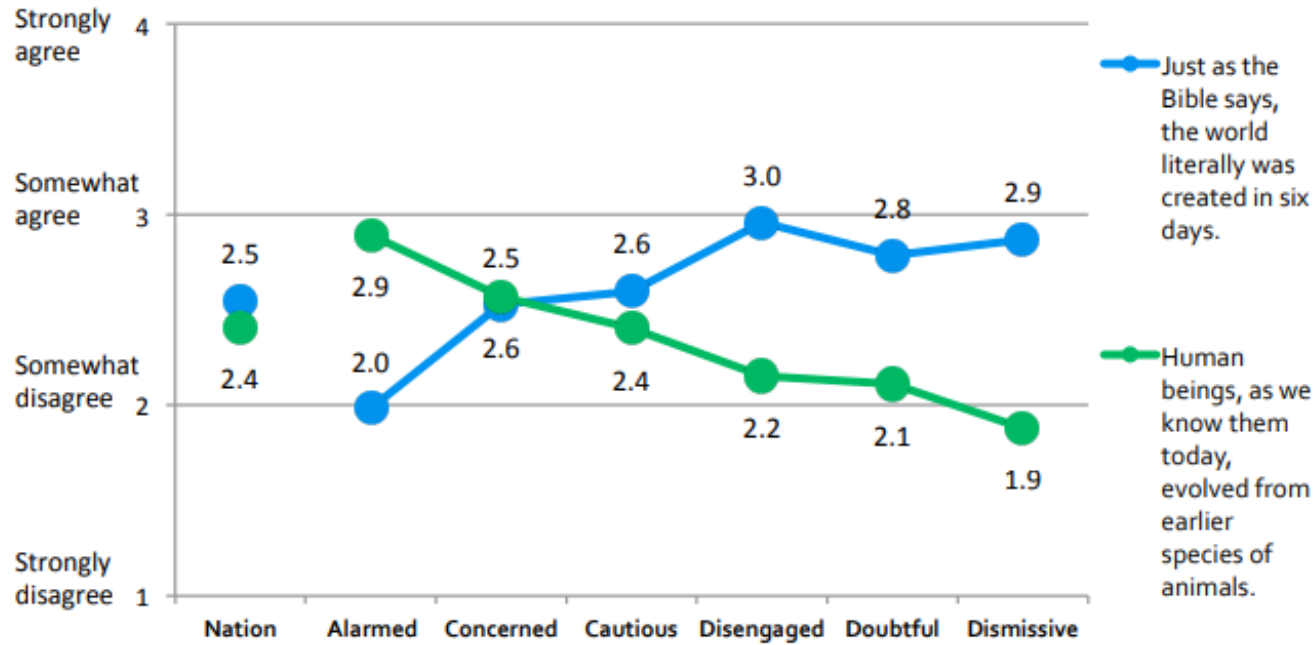
“Members of some religious denominations are more likely to belong to the more disbelieving segments of the public, while others tend to belong to the more concerned segments:

Protestants, Baptists and Mormons tend to belong to the more disbelieving segments, while Catholics, agnostics and atheists are more likely to belong to the more concerned segments.

The Disengaged are the most likely to say they have no affiliation to any of the groups listed.”

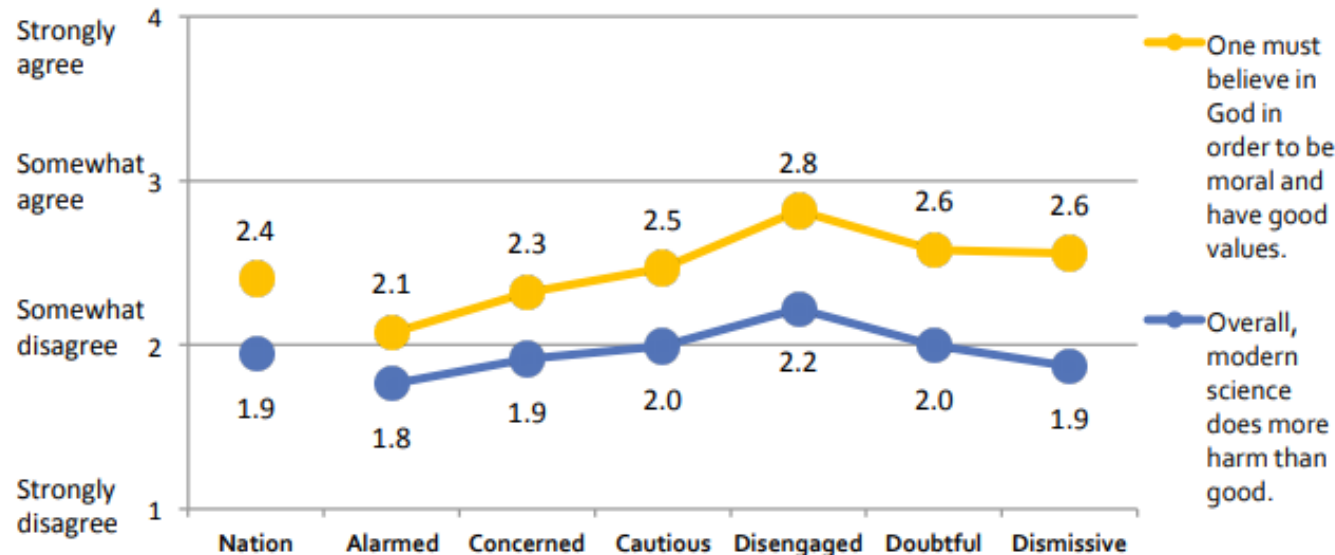
<i>How often do you attend religious services?</i>							
	<i>Nation</i>	<i>Alarmed</i>	<i>Concerned</i>	<i>Cautious</i>	<i>Disengaged</i>	<i>Doubtful</i>	<i>Dismissive</i>
More than once a week	12	5	12	10	13	14	26
Once a week	20	16	17	19	21	22	31
Once or twice a month	7	5	7	11	2	9	4
A few times a year	16	15	18	17	10	14	11
Once a year or less	18	22	18	18	21	21	7
Never	27	36	29	25	32	21	20

**Figure 4 : Biblical Literalism & Evolution**



“Climate is changing and climate has always changed and always will...The hoax is that there are some people who are so arrogant to think they are so powerful they can change climate. Man can't change climate.”

**Figure 5 : Morality, God and the Perceived Harm of Science**



Senator Jim Inhofe (R-OK)  
2015 address to Senate

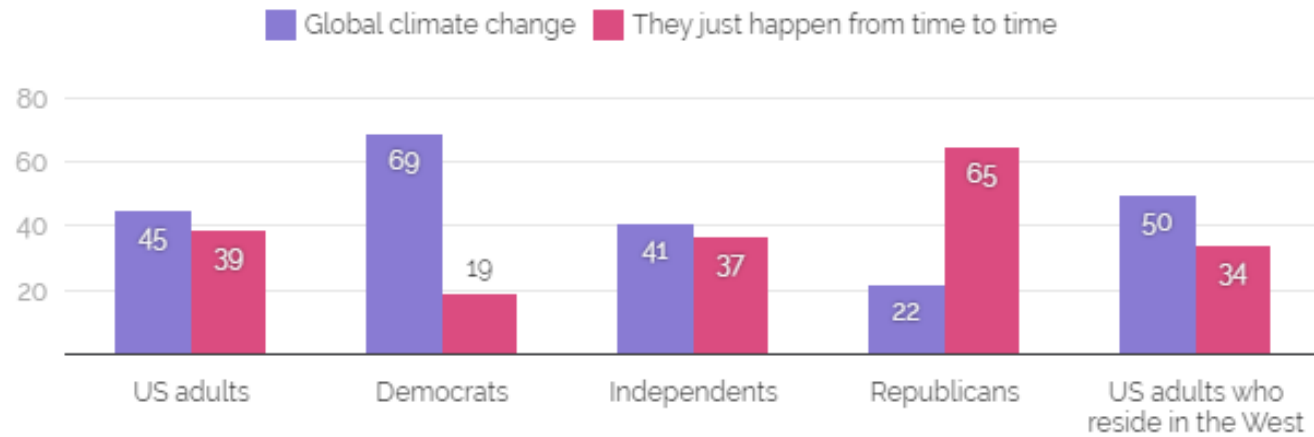






## Half of Americans living in the West say recent climate events in the US are caused by global climate change

Do you think the severity of recent hurricanes and Western wildfires is most likely the result of global climate change, or is it just the kind of severe weather events that happen from time to time? (%)



YouGov

The Economist / YouGov | September 13 - 15, 2020 | [Get the data](#)



JM Rieger   
@RiegerReport



Calif. Sec. for Nat. Resources WADE CROWFOOT: "If we... think it's all about vegetation management, we're not going to succeed..."

TRUMP: "Ok, it'll start getting cooler, you just watch."

CROWFOOT: "I wish science agreed with you."

TRUMP: "I don't think science knows, actually."

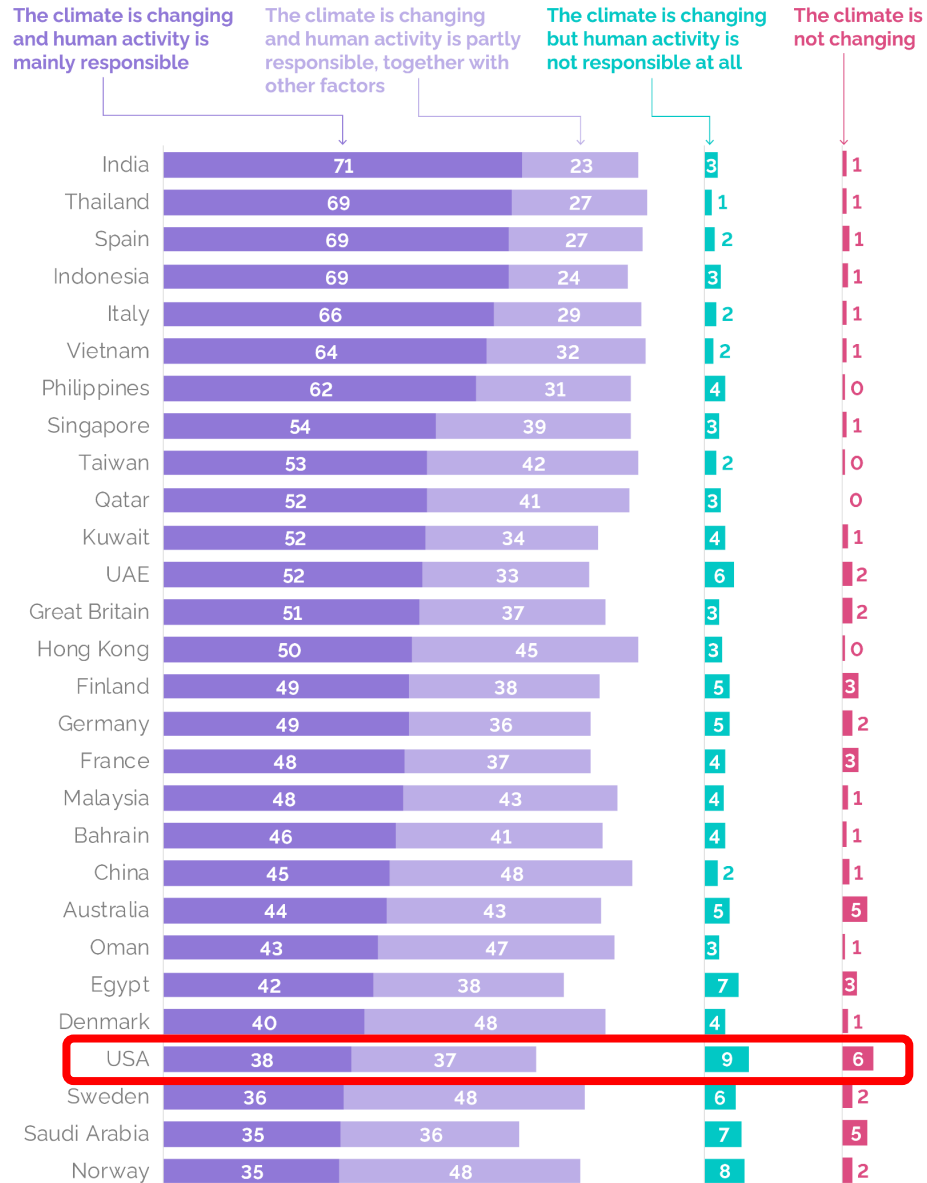


3:02 PM · Sep 14, 2020



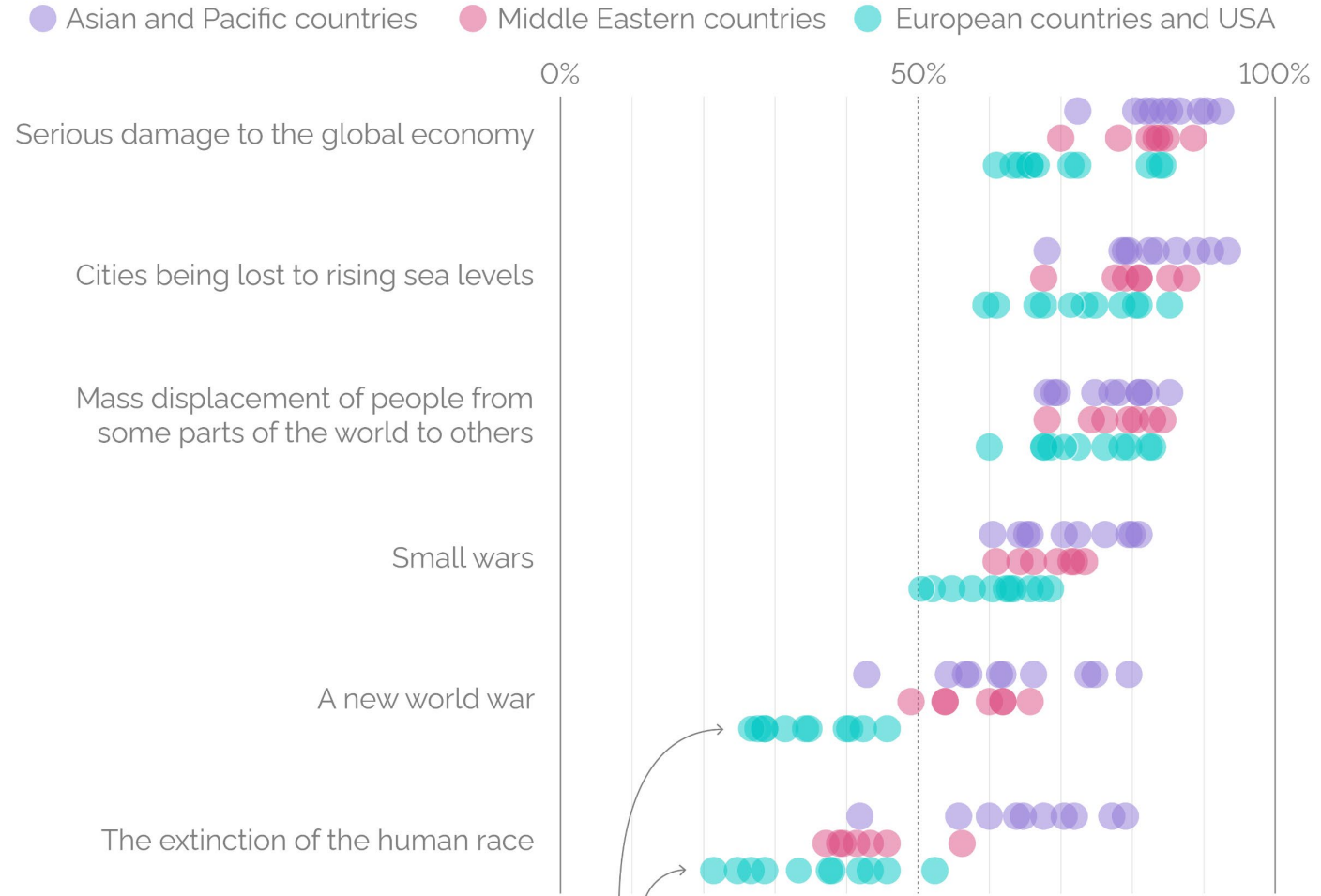
# That climate change is happening and that humanity is at least partly responsible is a view held by the majority across the world

Thinking about the global environment... In general, which of the following statements, if any, best describes your view? (%)



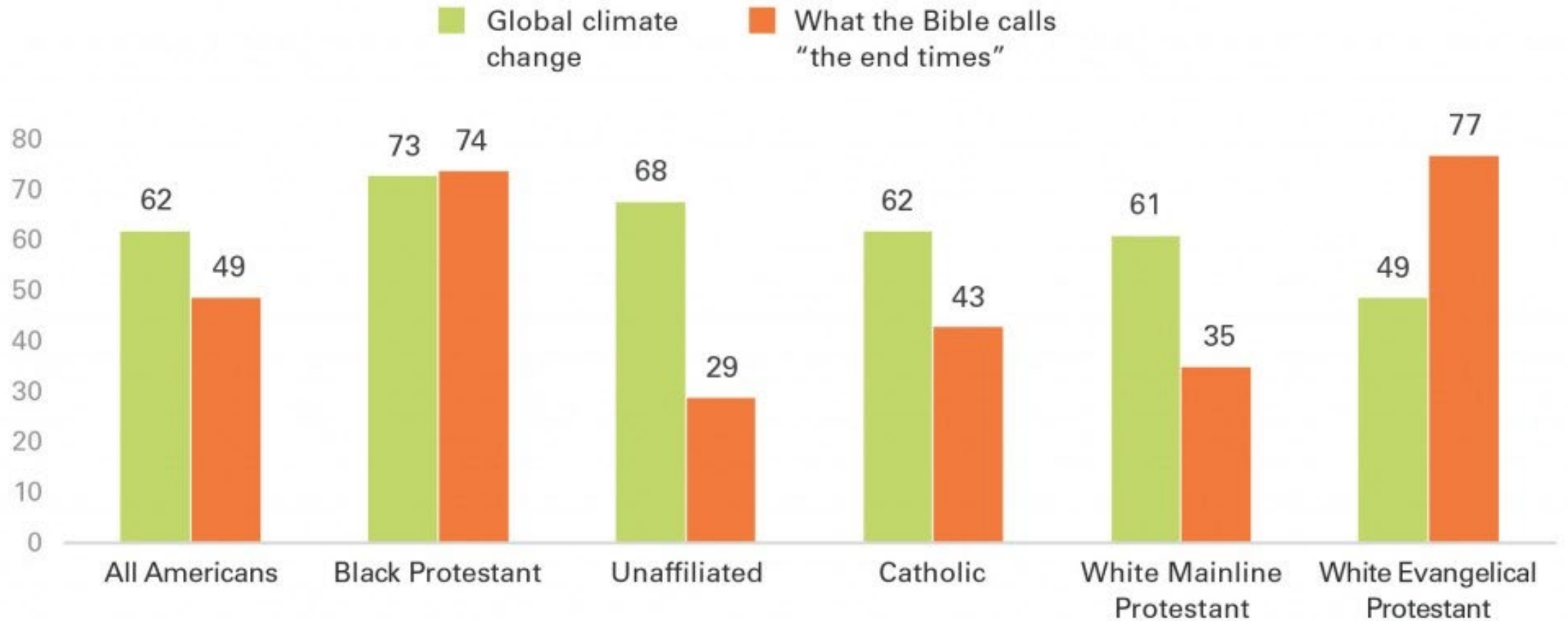
# A majority of people in 28 countries think climate change is likely to cause serious economic damage, destroy cities and start wars

How likely do you think it is that climate change will cause each of the following? (% in each country who said "very likely" or "quite likely")



People in European countries and the USA tend to be far less likely to think climate change will cause a new world war or human extinction

**FIGURE 9. The severity of recent natural disasters is evidence of...**



Source: PRRI/AAR, Religion, Values, and Climate Change Survey, November 2014

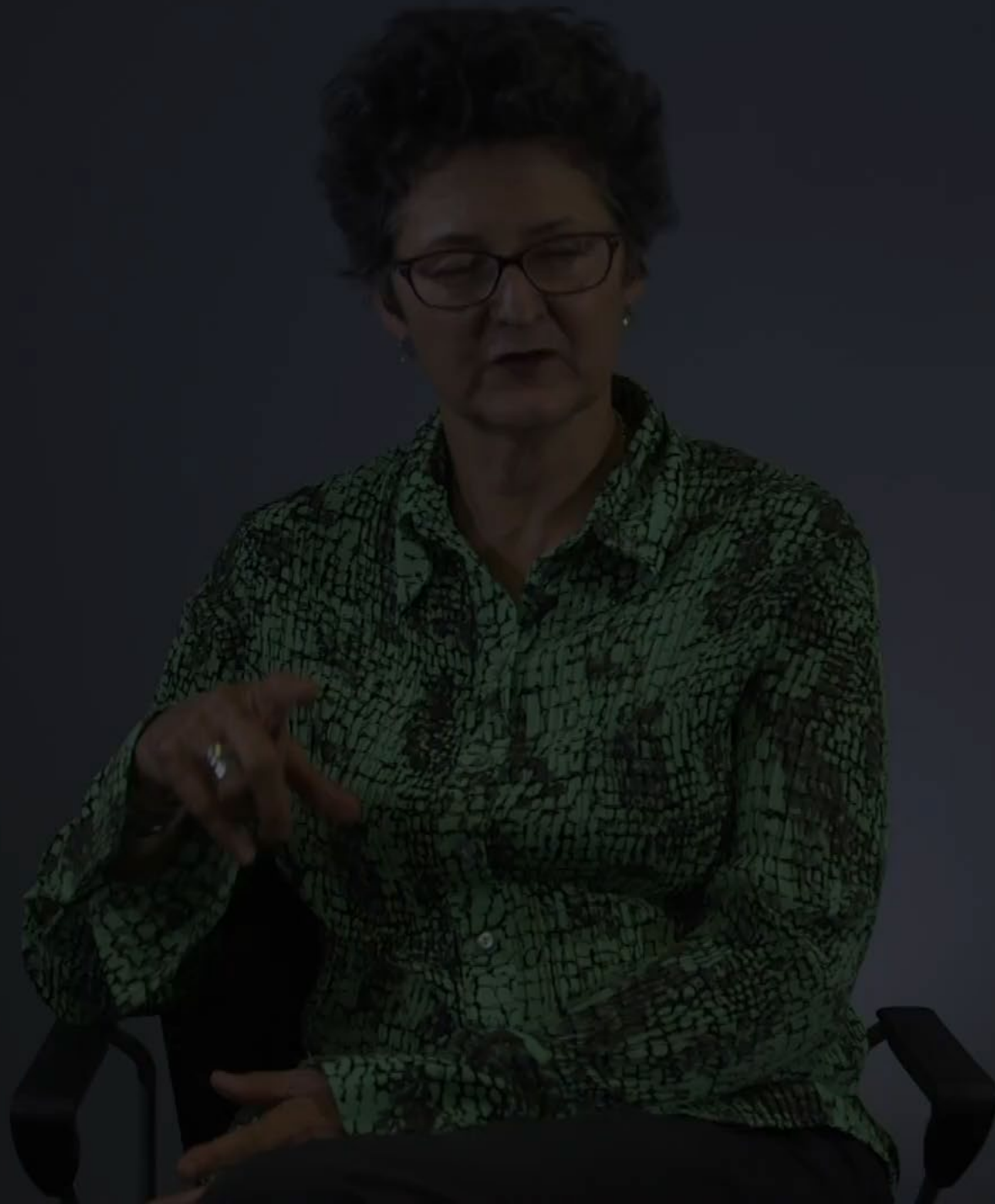
Okay, so we've looked at just how dire the global climate story is today, as well as some of the important dynamics driving both climate change itself, as well as our reactions towards it. But what are some of the things we can do to address these “wicked problems” of climate change?

### **Individual Action**

- Reduce our consumer footprint—energy use & material consumption
- Educate ourselves and those around us about climate change
- Support businesses that are committed to addressing climate change (consumer & producers)

### **Collective Action**

- Pressure our elected officials to take strong action on climate change
- Support policy changes that will move us away from fossil fuels and towards a just transition
- Continue to support research & development in sustainable technologies
- Get involved with groups working to address climate change (business, religious, civic, political)



# Weekly Assignment Reminder

- Remember to check our class Blackboard regularly for updates, announcements, and other related class information...
- Have you done the weekly readings and watched any associated videos? Weekly readings are listed on the Class Schedule page.
- Complete the weekly discussion post response. Initial post due Wed, Oct 28 by end of day, and peer response post due Fri Oct 30 by end of the day.

