Climate Change: The IPCC Special Report on 1.5ºC

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JULIE'S BICYCLE
TAKING THE HEAT OUT OF MUSIC

EXECUTIVE SUMMARY

First Step
UK Music Industry Greenhouse Gas Emissions for 2007

"The UK music industry is a pivotal cultural and creative industry, nationally and internationally; it therefore has the power – and the responsibility – to be a proactive leader in taking and driving climate change action"

Conducted by

UNIVERSITY OF OXFORD
ENVIRONMENTAL CHANGE INSTITUTE

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Recent Climate Change Reports

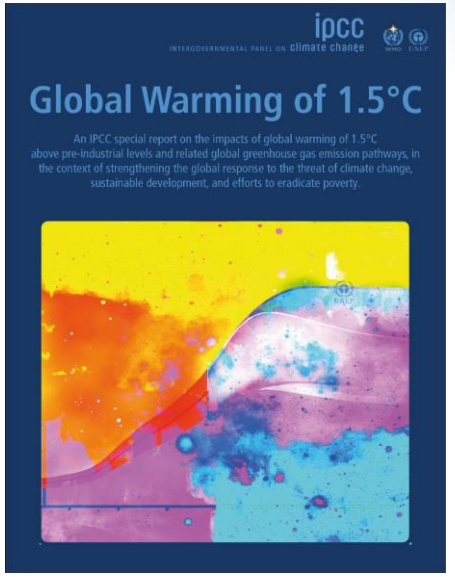
IPCC Special Report on Global Warming of 1.5ºC

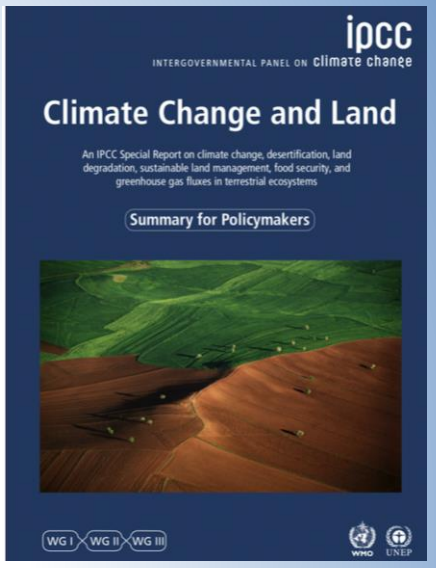
- https://www.ipcc.ch/report/sr15/
- IPCC Reports on Land, Oceans and Cryosphere

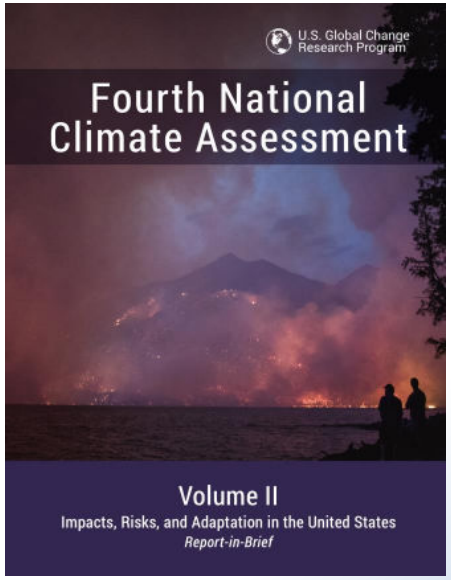
4th US National Climate Assessment

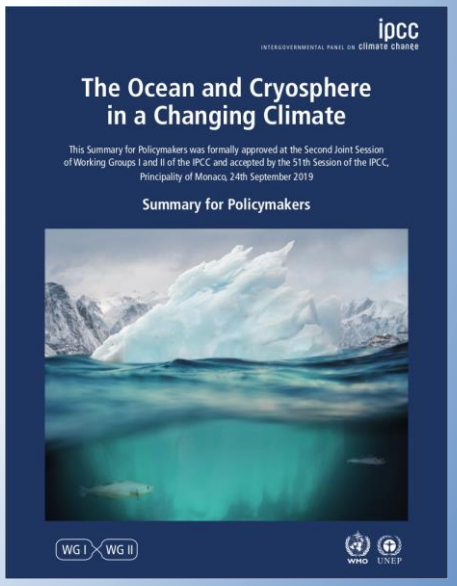
- https://nca2018.globalchange.gov/

- IPCC 6th Assessment is underway









The IPCC 1.5C report

Requested by vulnerable countries in the 2015 Paris Agreement

91 authors,40 countries, 38% women, mostly unpaid volunteers nominated by governments

18 month timeline with 5 international meetings on 4 continents

TASK

Assess the latest scientific literature of 6000+ papers

Respond to 42,000 review comments

Get the report approved by governments

- How much warming has already happened and what are the impacts?
- What is a ‘safe’ level of warming?
  - 1.5ºC/2.7ºF vs 2ºC/3.6ºF
- How do we limit warming to safe levels by reducing emissions
- How do we adapt to warming already underway?

Island of Kiribati

https://cop23.com.fj/cop23-pacific-photo-competition/humans-of-kiribati/

IPCC report main messages

- Climate has warmed almost 1ºC from preindustrial and without further action temperatures could rise above 3.5°C (6.3F)
- Every bit of warming matters, losses increase significantly from 1.5ºC to 2ºC
- Limiting warming to 1.5ºC requires deep cuts in emissions (~50% by 2030)
- Even a warming of 1.5ºC undermines many development goals

The world has already warmed

- Since pre-industrial times (~1850), human activities have caused approximately 1°C of global warming
- Observed warming has been greater than 1°C near poles, over land, and at night
- *Arizona has already warmed 1.5ºC ..*

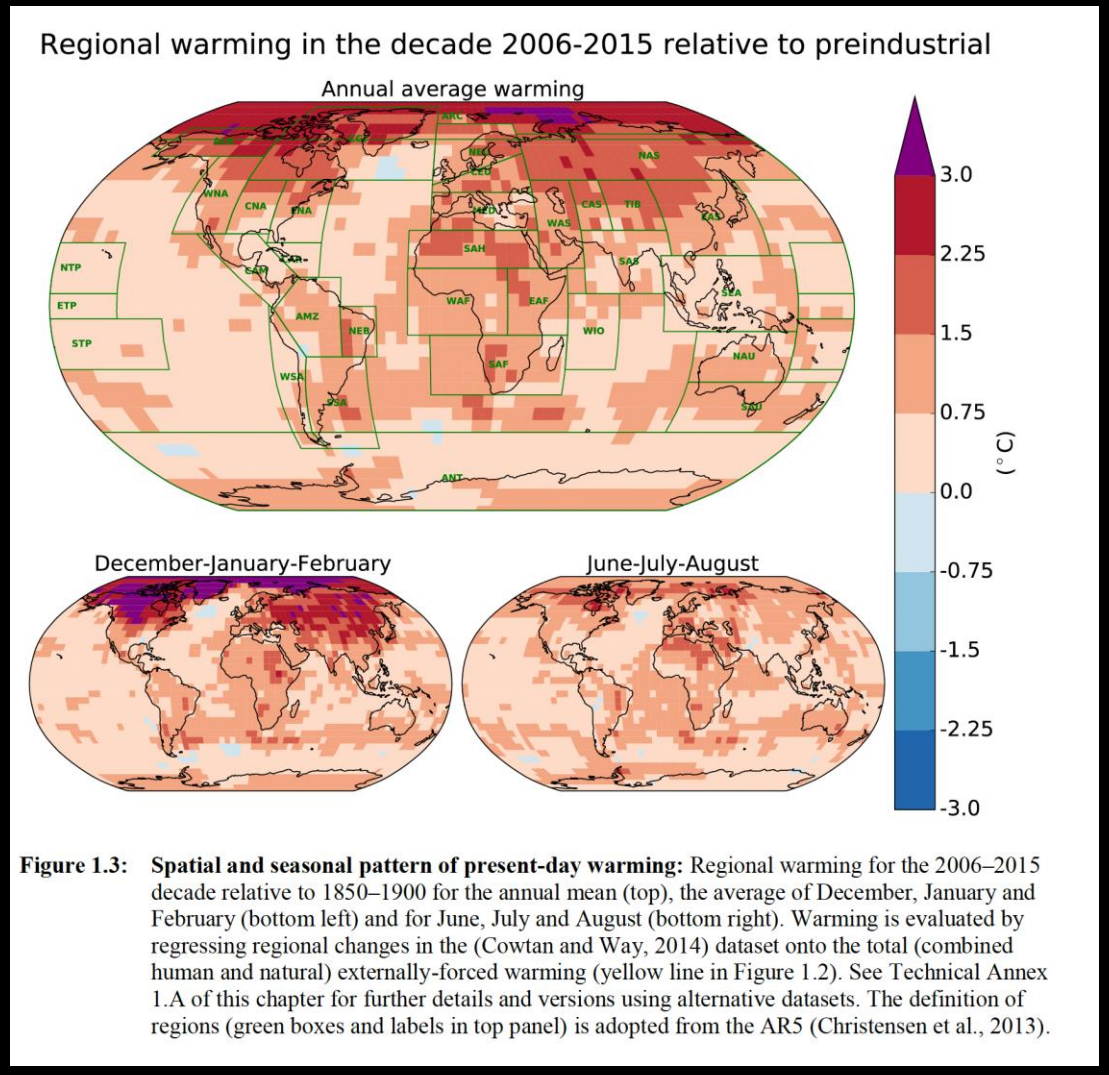
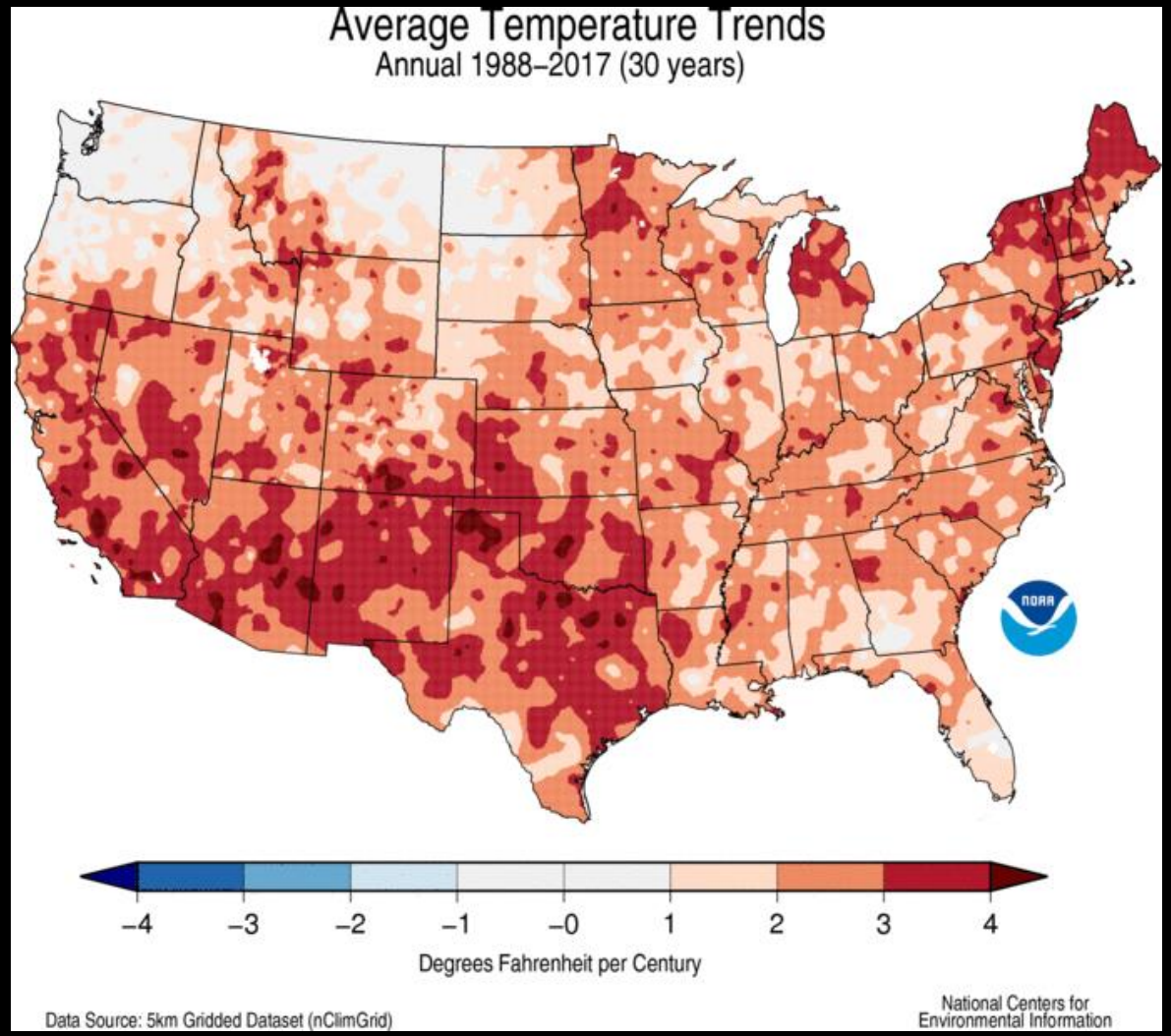
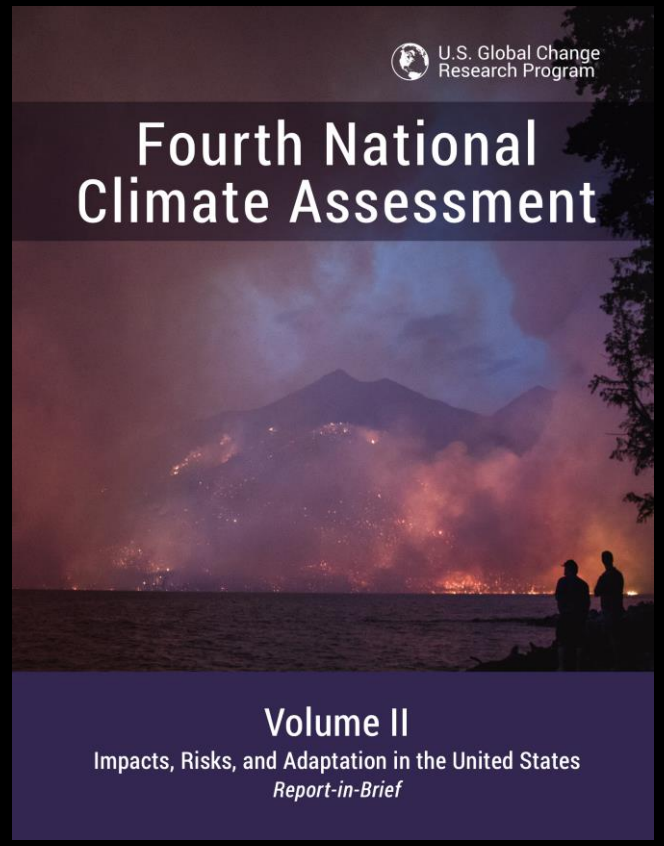


Figure 1.3: **Spatial and seasonal pattern of present-day warming:** Regional warming for the 2006–2015 decade relative to 1850–1900 for the annual mean (top), the average of December, January and February (bottom left) and for June, July and August (bottom right). Warming is evaluated by regressing regional changes in the (Cowtan and Way, 2014) dataset onto the total (combined human and natural) externally-forced warming (yellow line in Figure 1.2). See Technical Annex 1.A of this chapter for further details and versions using alternative datasets. The definition of regions (green boxes and labels in top panel) is adopted from the AR5 (Christensen et al., 2013).

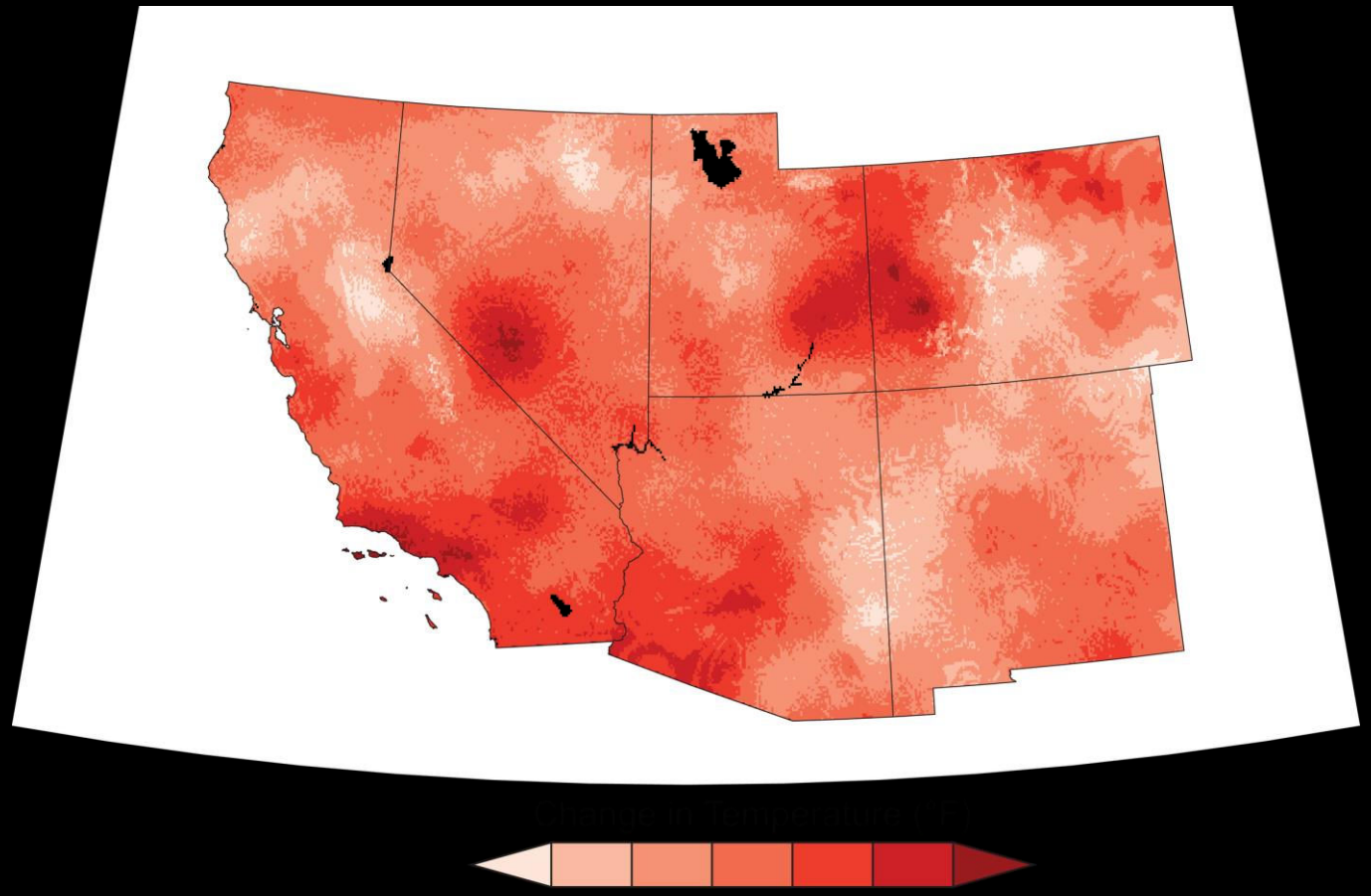


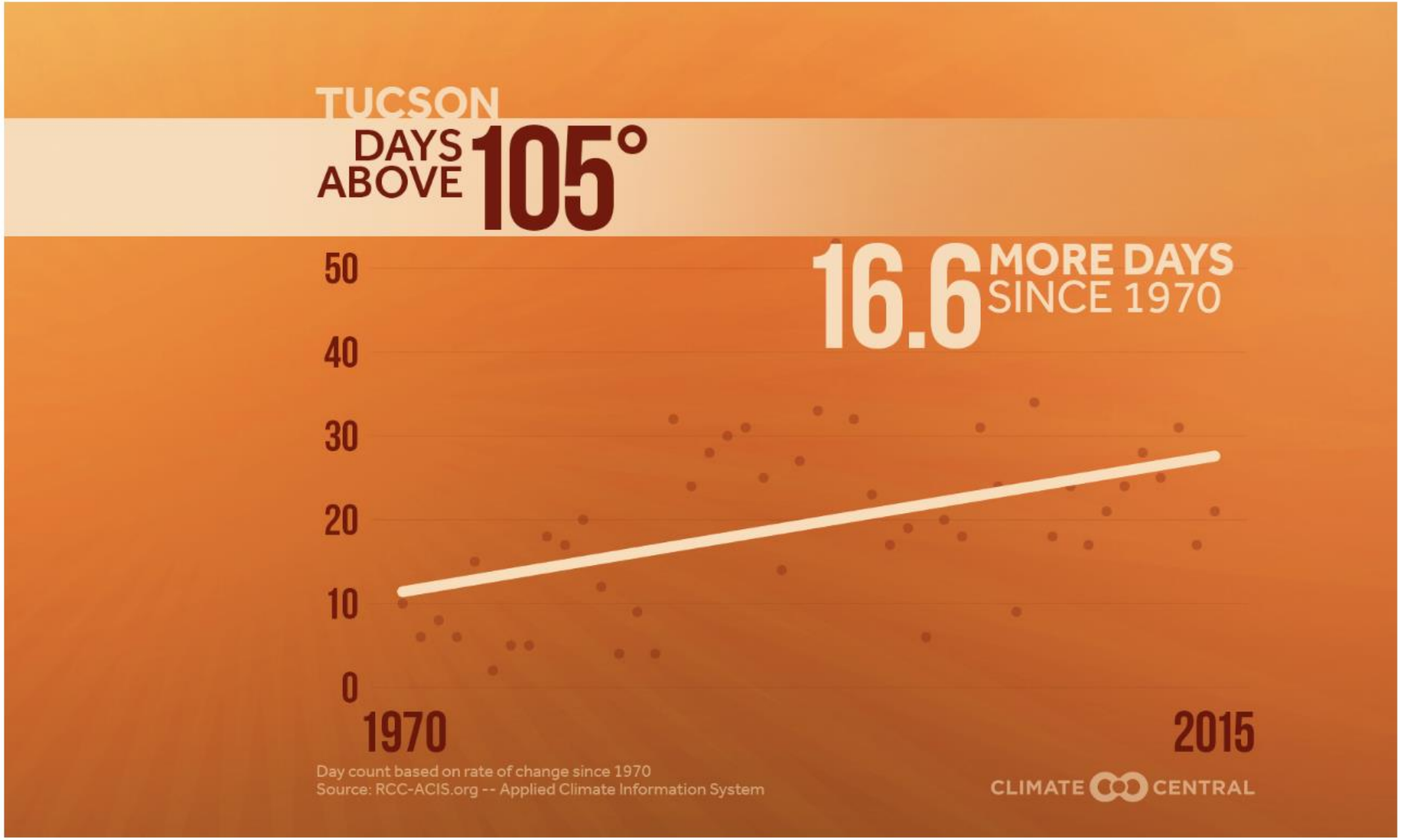
What has happened in the SW USA?



Warming since 1901 in SWUS

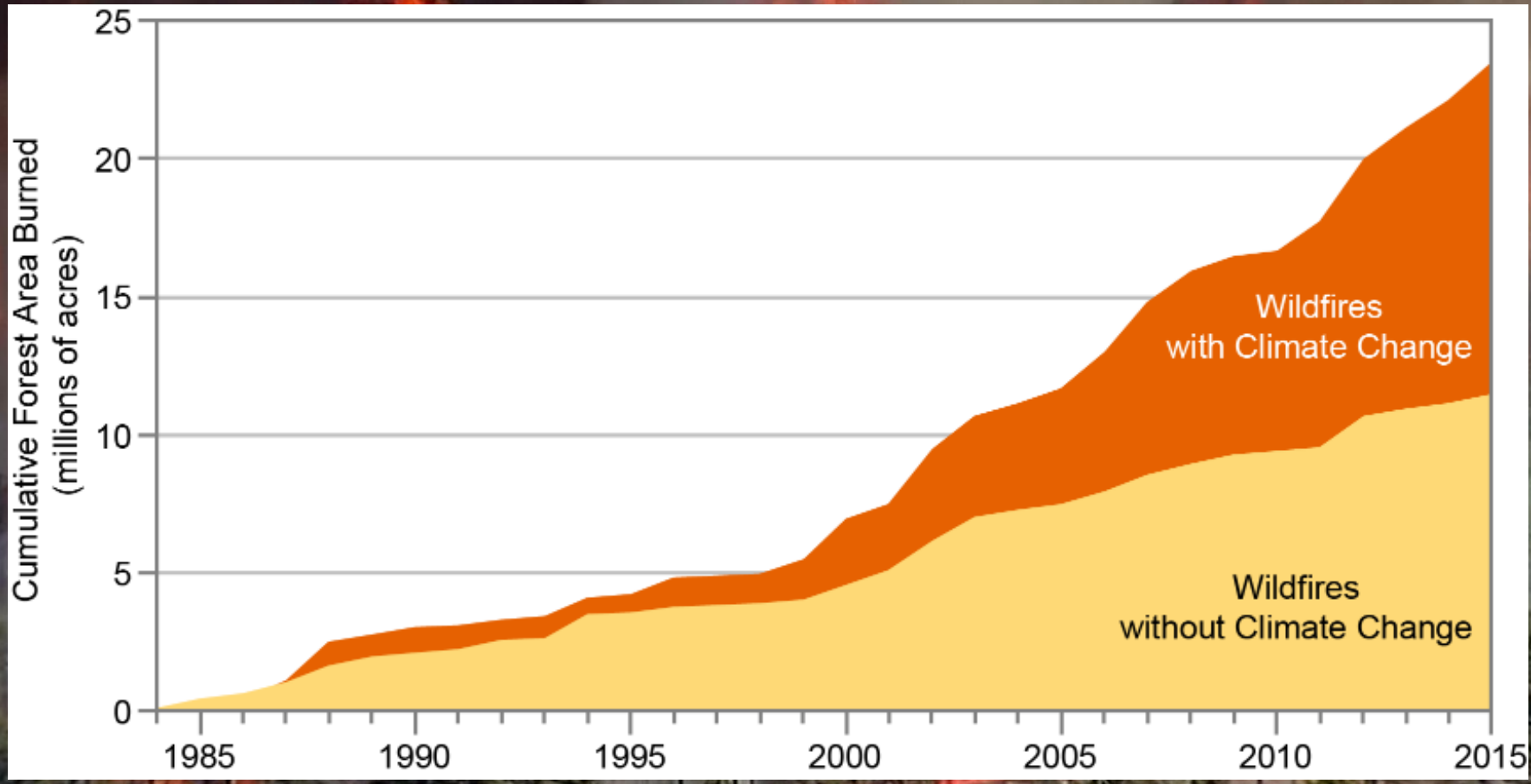
Source: NCA4

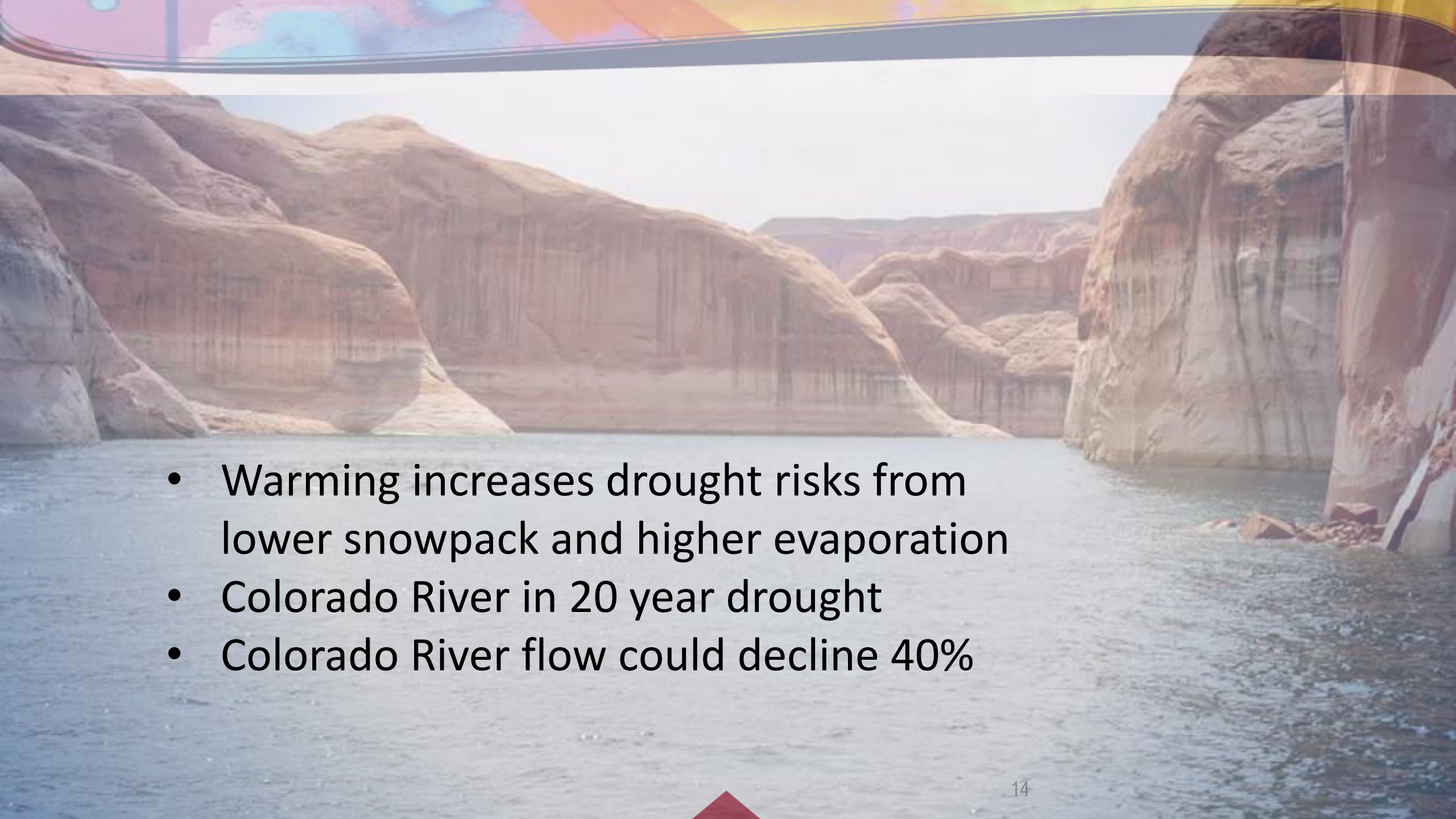




More extreme heat days since 1970

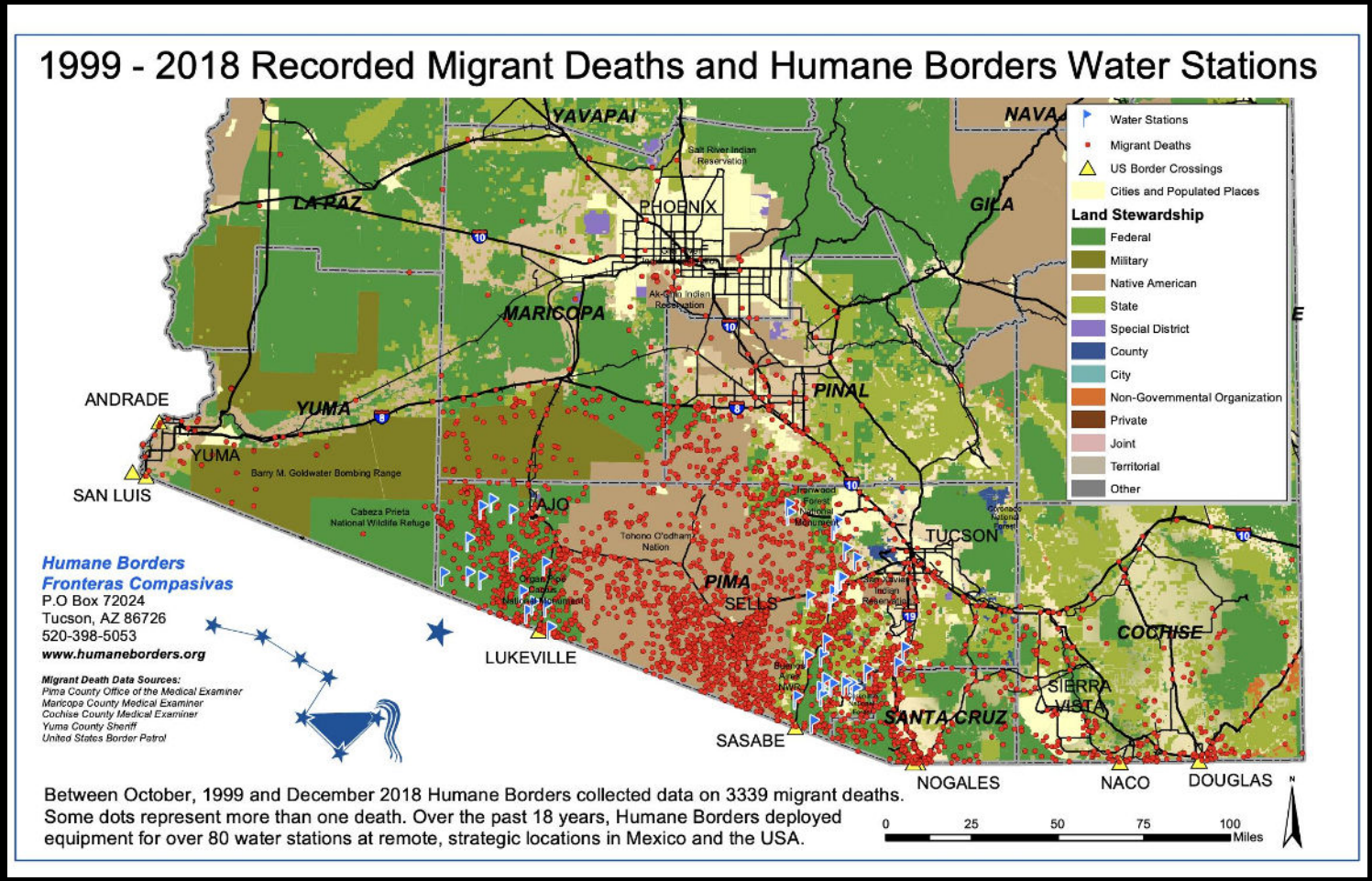
Climate change has increased wildfire in western US Forests

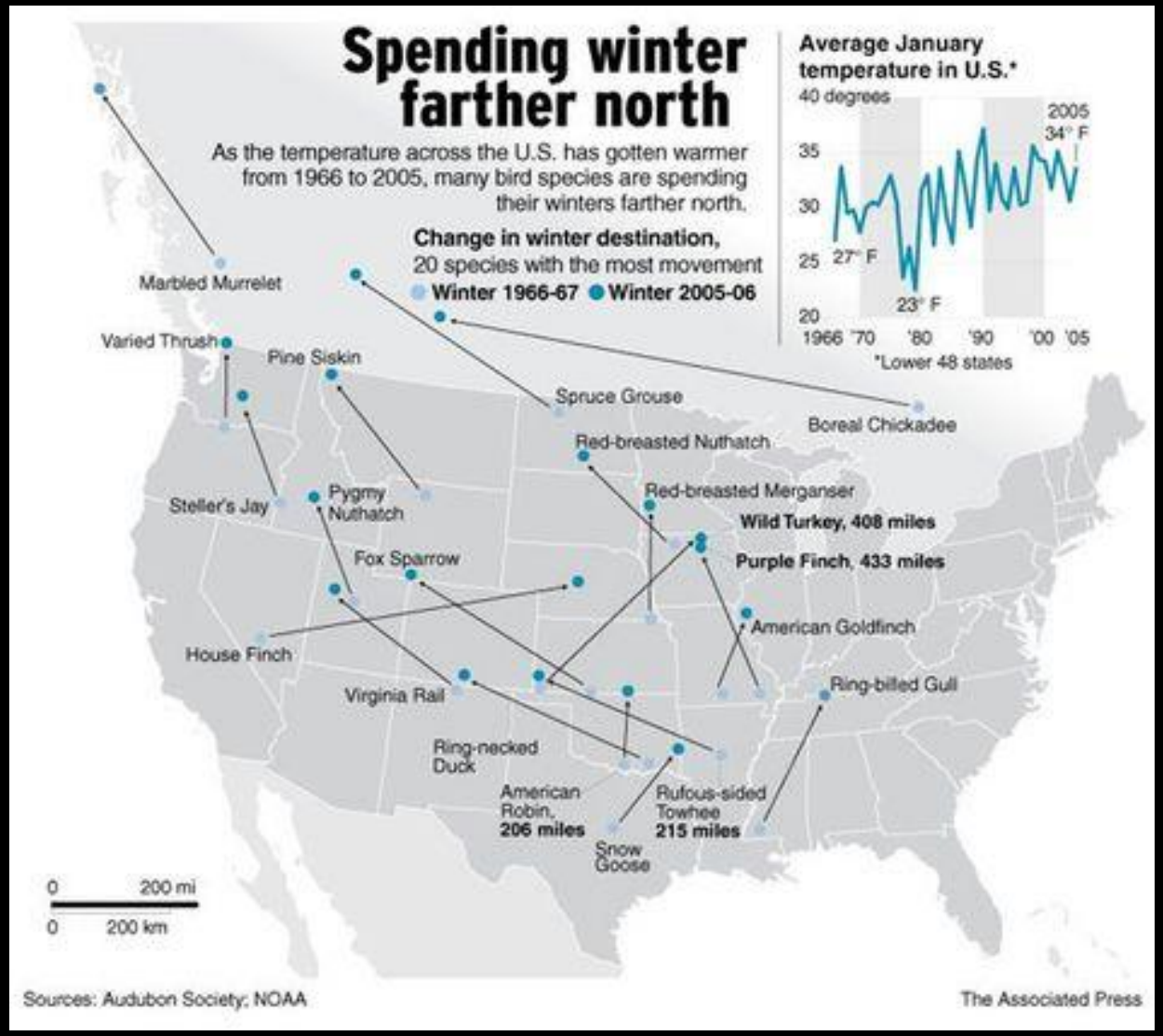




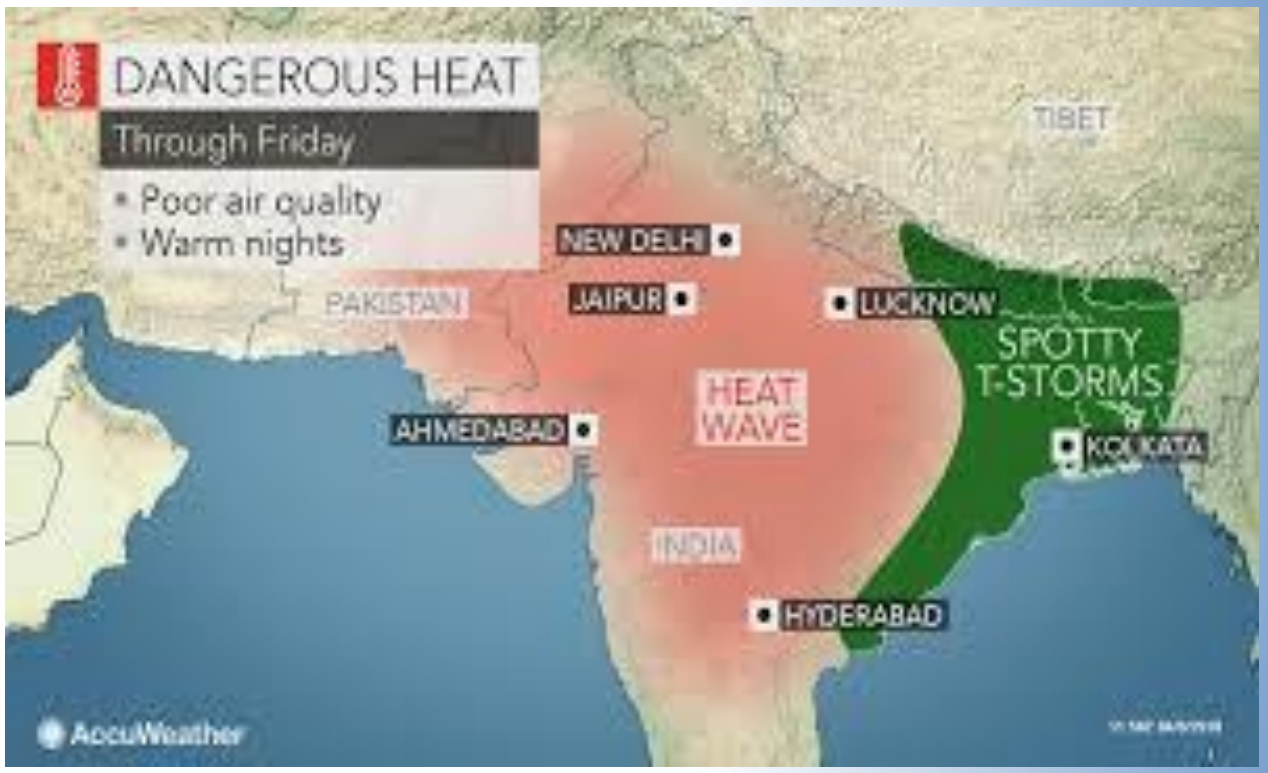
- Warming increases drought risks from lower snowpack and higher evaporation
- Colorado River in 20 year drought
- Colorado River flow could decline 40%

Th human cost of extreme heat




Spending winter farther north
As the temperature across the U.S. has gotten warmer from 1966 to 2005, many bird species are spending their winters farther north.
Change in winter destination,
20 species with the most movement
Winter 1966-67
Winter 2005-06
Average January temperature in U.S.*
40 degrees
35
30
25
20
27° F
23° F
2005
34° F
1966
'70
'80
'90
'00
'05
*Lower 48 states
Marbled Murrelet
Varied Thrush
Pine Siskin
Spruce Grouse
Boreal Chickadee
Red-breasted Nuthatch
Steller's Jay
Pygmy Nuthatch
Red-breasted Merganser
Wild Turkey, 408 miles
Purple Finch, 433 miles
Fox Sparrow
American Goldfinch
House Finch
Virginia Rail
Ring-billed Gull
Ring-necked Duck
American Robin, 206 miles
Rufous-sided Towhee 215 miles
Snow Goose
0 200 mi
0 200 km
Sources: Audubon Society; NOAA
The Associated Press

Thousands abandon villages in India to escape record 50 degree heat wave



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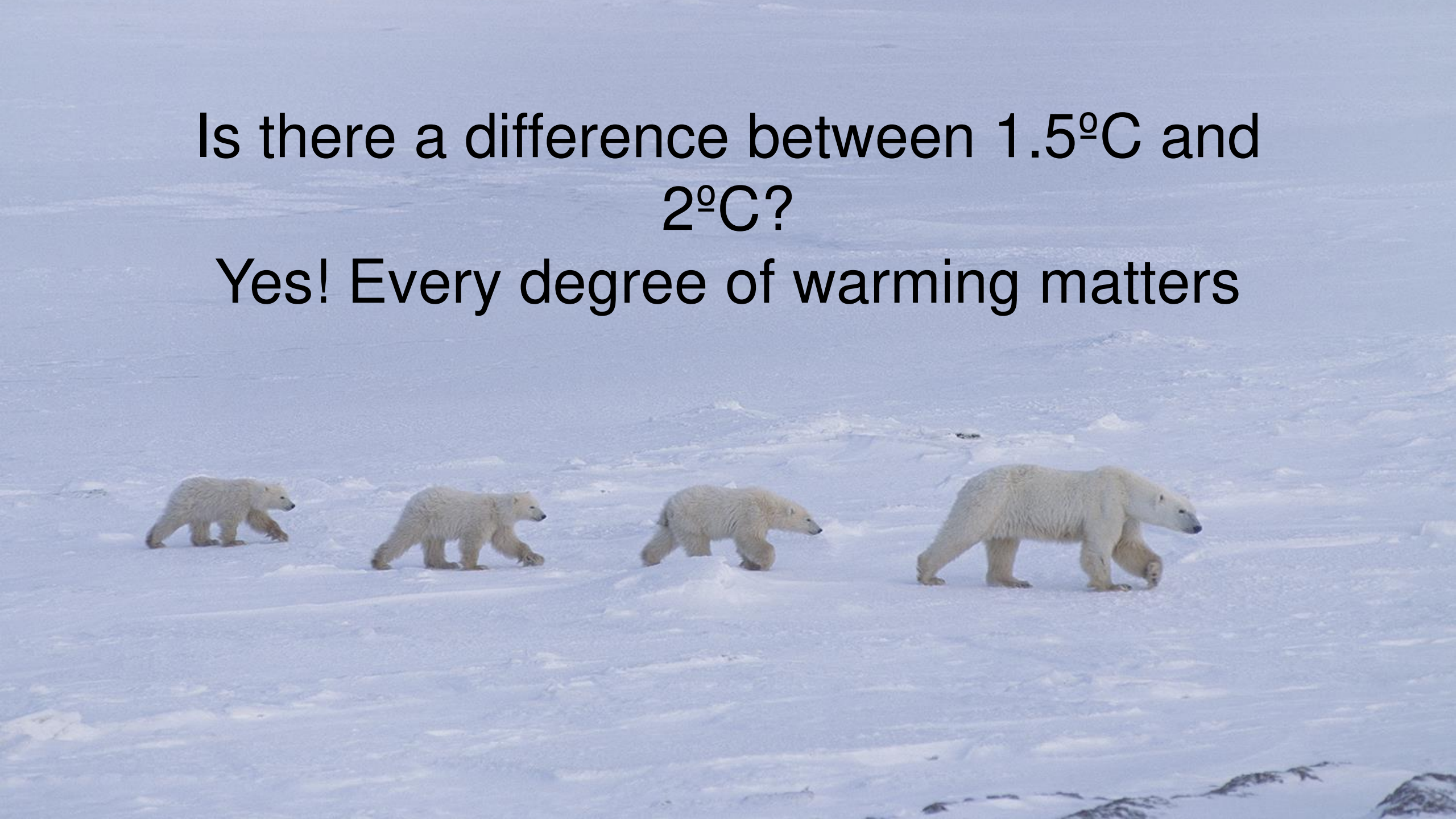
CLIMATE

Yes, Climate Change Did Influence Australia's Unprecedented Bushfires

Such an extreme fire season is at least 30 percent more likely because of global warming, a new analysis finds

Is there a difference between 1.5ºC and 2ºC?

Yes! Every degree of warming matters

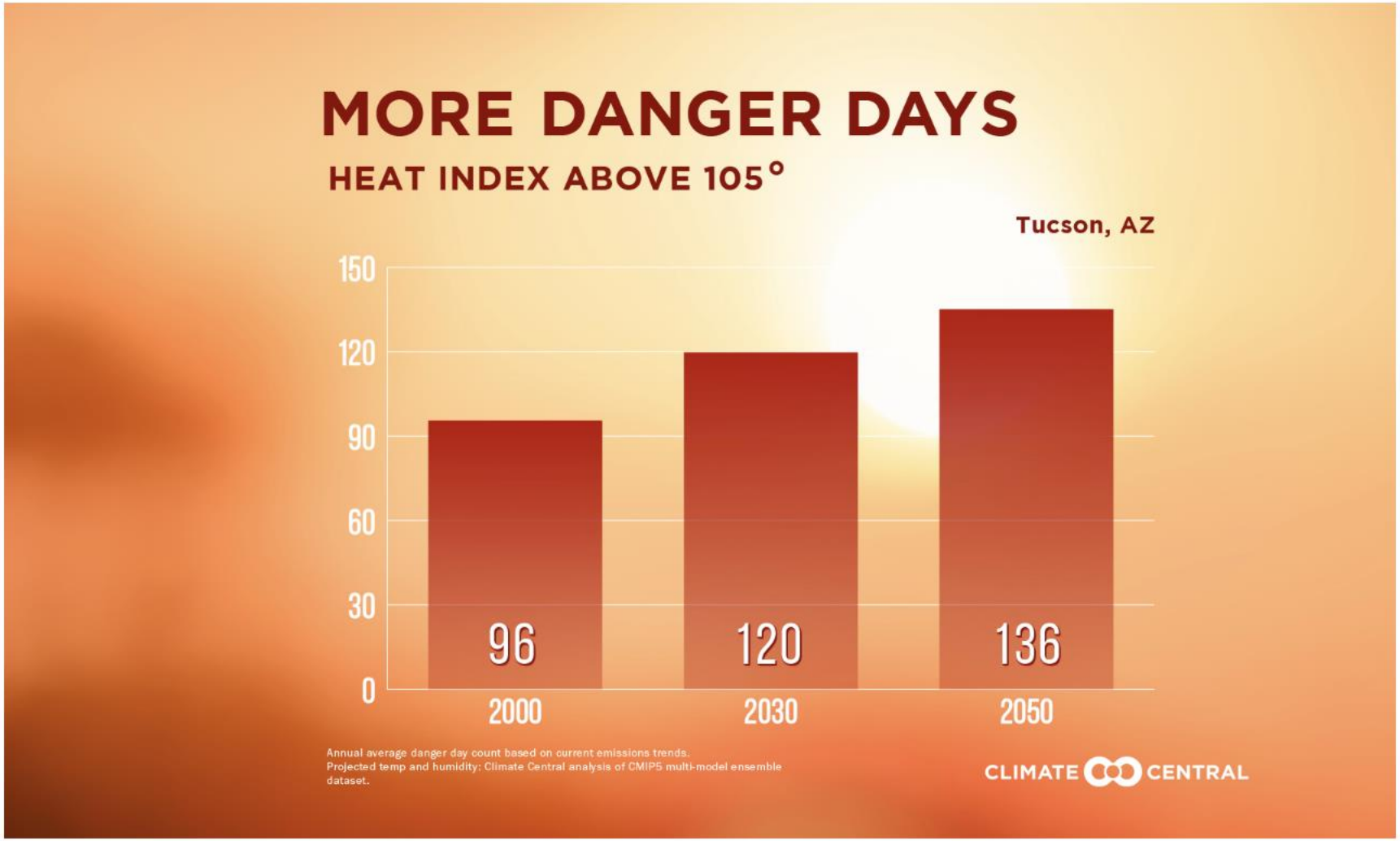


1.5ºC compared to 2ºC

- At 1.5°C *tropical corals* survive, at 2°C they disappear
- *Habitat loss* is 50% greater at 2°C than 1.5C
- The proportion of *people exposed to water stress and heatwaves* could double from 1.5°C to 2°C
- *Poverty* rises by 100+ million from 1.5°C to 2°C
- *Economic losses* increase

World Bank

Tucson



More danger days coming

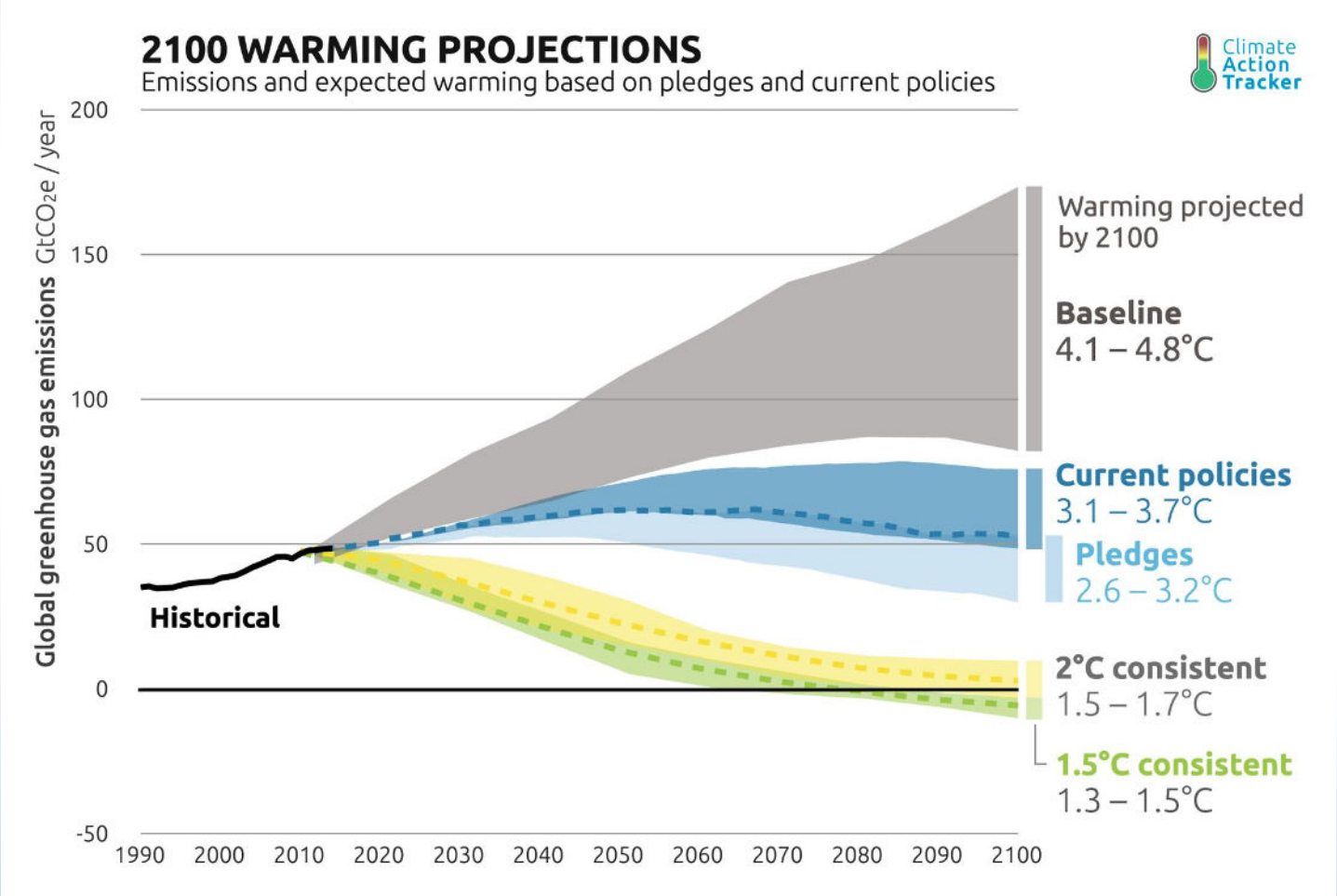
Global warming will undermine sustainable development

Climate impacts will make it difficult to achieve the Sustainable Development Goals (SDGs) - more so at 2ºC than 1.5ºC

- Eradicating poverty and hunger
- Securing health, wellbeing and clean water
- Reducing inequality between and within countries
- Protecting life below water and life on land

Implications of current policies

We are a long way from limiting warming to 1.5°C with current policies and commitments



IPCC SR1.5C Chapter 1

What are our options?

Climate change

We have 12 years to limit climate change catastrophe, warns UN

Urgent changes needed to cut risk of extreme heat, drought, floods and poverty, says IPCC

Overwhelmed by climate change? Here's what you can do

Can we limit warming to 1.5ºC?

- Yes, we can, but it is very challenging and requires steep cuts in emissions (50% by 2030, net zero by 2050)
- We also need negative emissions (capture CO2 in land or technology)
- Any delay makes it harder and/or increases chances of overshoot

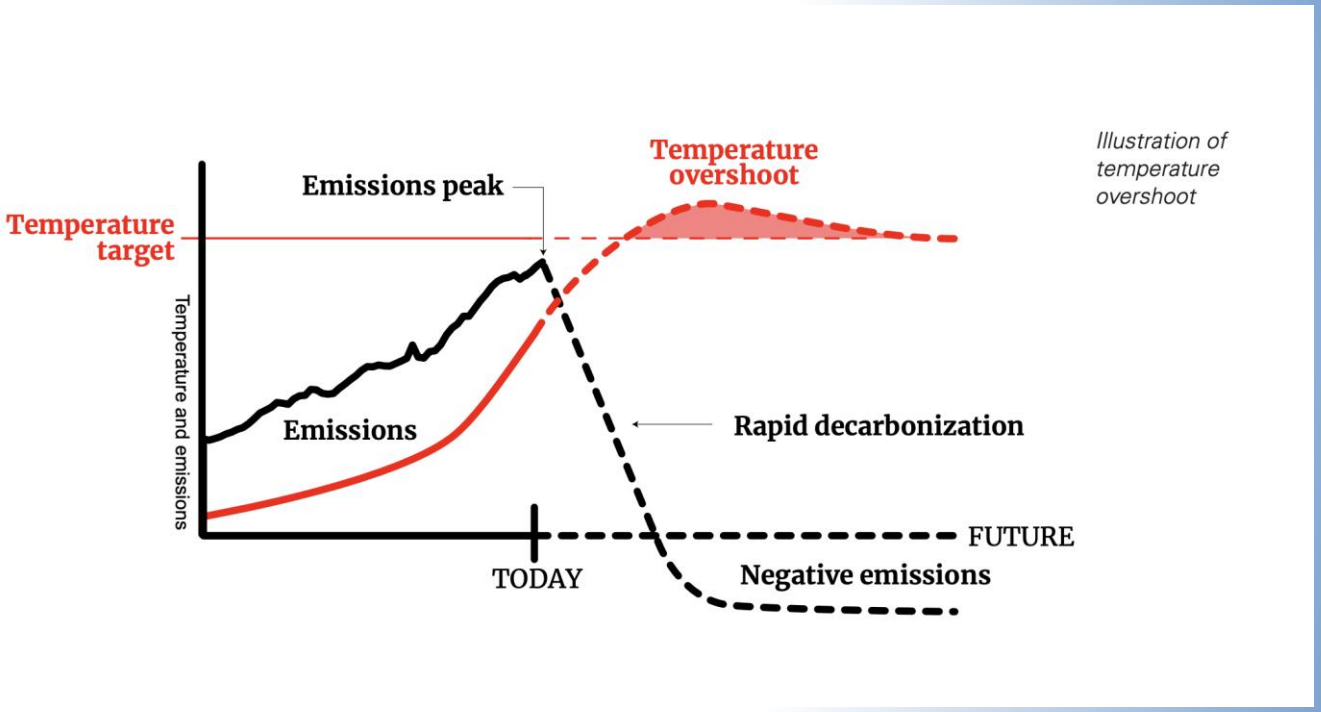


Illustration of temperature overshoot

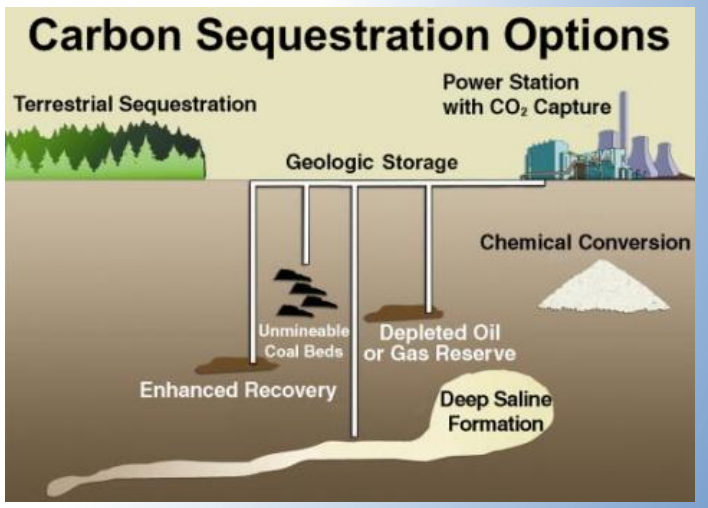
Options considered in IPCC report

- Rapid transition from fossil fuels to renewables, nuclear, and bioenergy
- Increases in energy efficiency
- Reduced energy demand
- Protection and expansion of forests and carbon sinks
- Dietary changes
- Carbon capture and storage (CCS) technology after 2030

Negative emissions?

- Planting trees and other practices that take up carbon (Agriculture, Forestry, other Land Use)
- Bioenergy for liquid fuels (BECCS)
- Carbon Capture and Storage

Tradeoffs, costs, and technical feasibility?



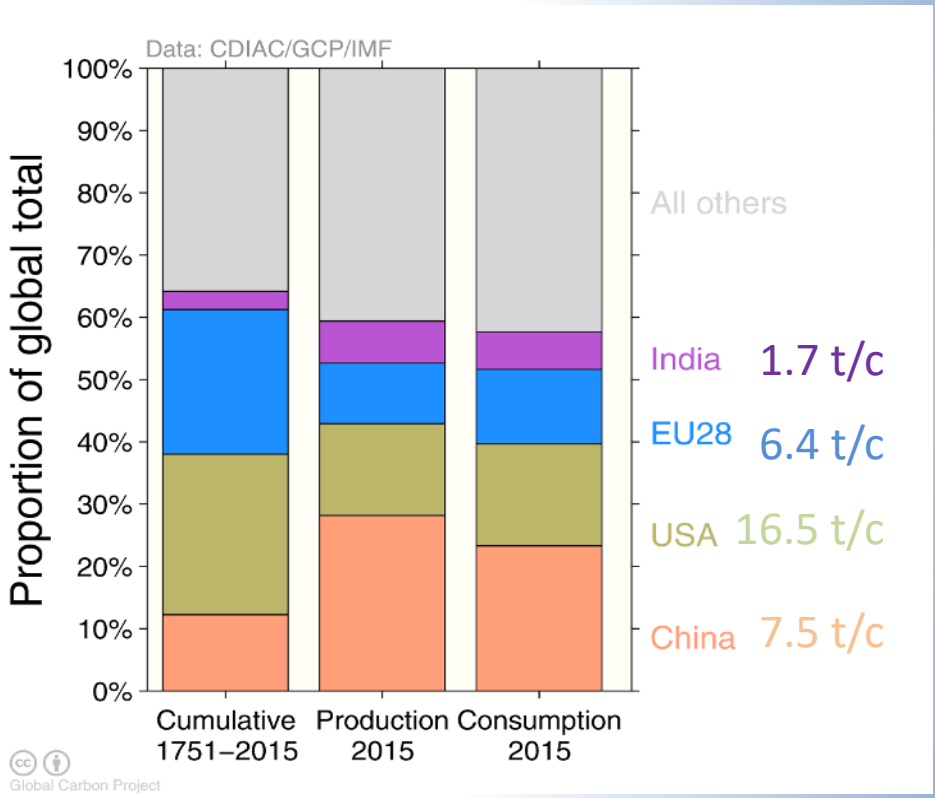
Possible pathway to 1.5C
Energy System change from 2010 to 2050

Action	2030	2050
Emissions	-47%	-95%
Energy Demand	-5%	2%
Energy from Coal	-61%	-77%
Energy from Oil	-13%	-50%
Energy from Gas	-20%	-53%
Energy from Nuclear	+83%	+98%
Energy from renewables (wind, solar, hydro, geothermal)	+470%	+1327%
Forests, CCS+Bioenergy	+348 GT	+151 GT

IPCC did not address equity in reducing emissions…

How to distribute a 50% cut?

- Equal percent
- Greater reductions for larger historical, per capita or importing emitters (such as USA)



Holz, C., Kartha, S. and Athanasiou, T., 2018. Fairly sharing 1.5: National fair shares of a 1.5 C-compliant global mitigation effort. International Environmental Agreements: Politics, Law and Economics, 18(1), pp.117-134.

Adapting to warming

- How are we adapting so far?
- Can we adapt to 1.5C?
- What if we need to adapt to higher temperatures and/or overshoot?
- What is just in adaptation?

The longer we wait….

- Larger and faster reductions will need to be made
- We rely more on bioenergy and CCS
- Higher the risk of overshoot and associated impacts
- Adaptation will be more difficult

1990

SO, THIS CLIMATE CHANGE THING COULD BE A PROBLEM...

1995

CLIMATE CHANGE: DEFINITELY A PROBLEM.

2001

YEP, WE SHOULD REALLY BE GETTING ON WITH SORTING THIS OUT PRETTY SOON...

2007

LOOK, SORRY TO SOUND LIKE A BROKEN RECORD HERE...

2013

WE REALLY HAVE CHECKED AND WE'RE NOT MAKING THIS UP.

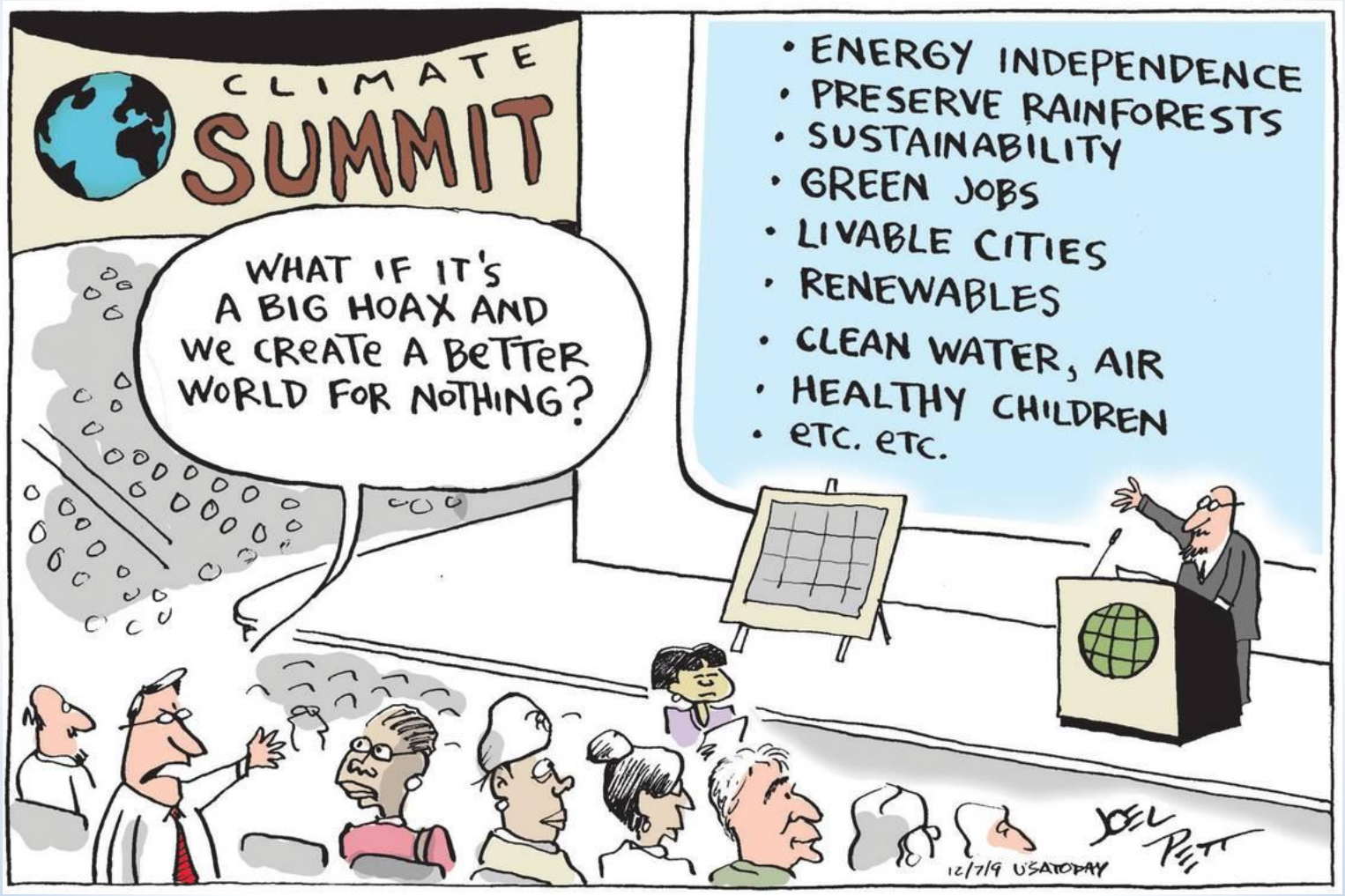
2019

IS THIS THING ON?

TAP TAP TAP

28/9/13

Thank you!


CLIMATE
SUMMIT
WHAT IF IT'S A BIG HOAX AND WE CREATE A BETTER WORLD FOR NOTHING?
• ENERGY INDEPENDENCE
• PRESERVE RAINFORESTS
• SUSTAINABILITY
• GREEN JOBS
• LIVABLE CITIES
• RENEWABLES
• CLEAN WATER, AIR
• HEALTHY CHILDREN
• ETC. ETC.
12/7/19 USATODAY
JOEL PETT

Problems with BECCS/Negative Emissions

Forest protection is challenging

Bioenergy requires large areas of land

CCS cost and feasibility at scale

Can undermine aspects of sustainable development (food, biodiversity)

Land use in P2 pathway by 2050

- 29% decrease in pasture -29%
- 18.5% decrease in cropland for food and feed
- 35% increased in land for bioenergy
- 34% increase in land for forests

© Greenway Grameen

A woman in Gokak,Karnataka state, in southwest India, cooks with an improved cookstove

We are the first generation that can put an end to poverty and we are the last generation that can put an end to climate change

Ban-ki Moon

You say you love your children above all else, and yet you're stealing their future in front of their very eyes

Greta Thunberg