Climate change, migration, and the future of Cascadia

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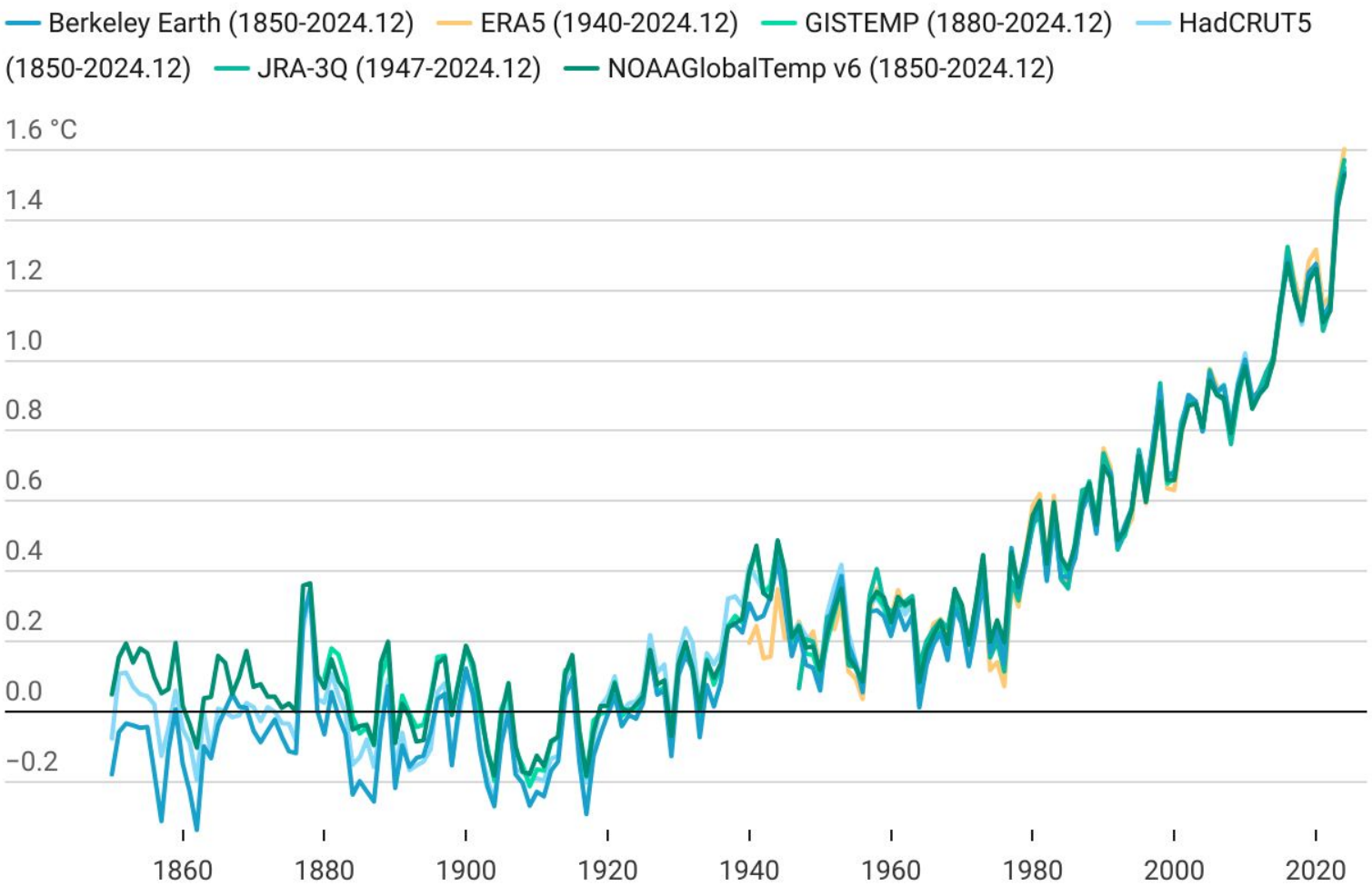
Overview

- Key climate metrics
- Risk
- Hazard, exposure, vulnerability
- Examples of climate risks PNW (Cascadia) faces
- Climate-related migration & displacement as it may affect Cascadia
- Climate-resilient development pathways
- Opportunities for Cascadian economists

Global mean temperature 1850-2024

Difference from 1850-1900 average

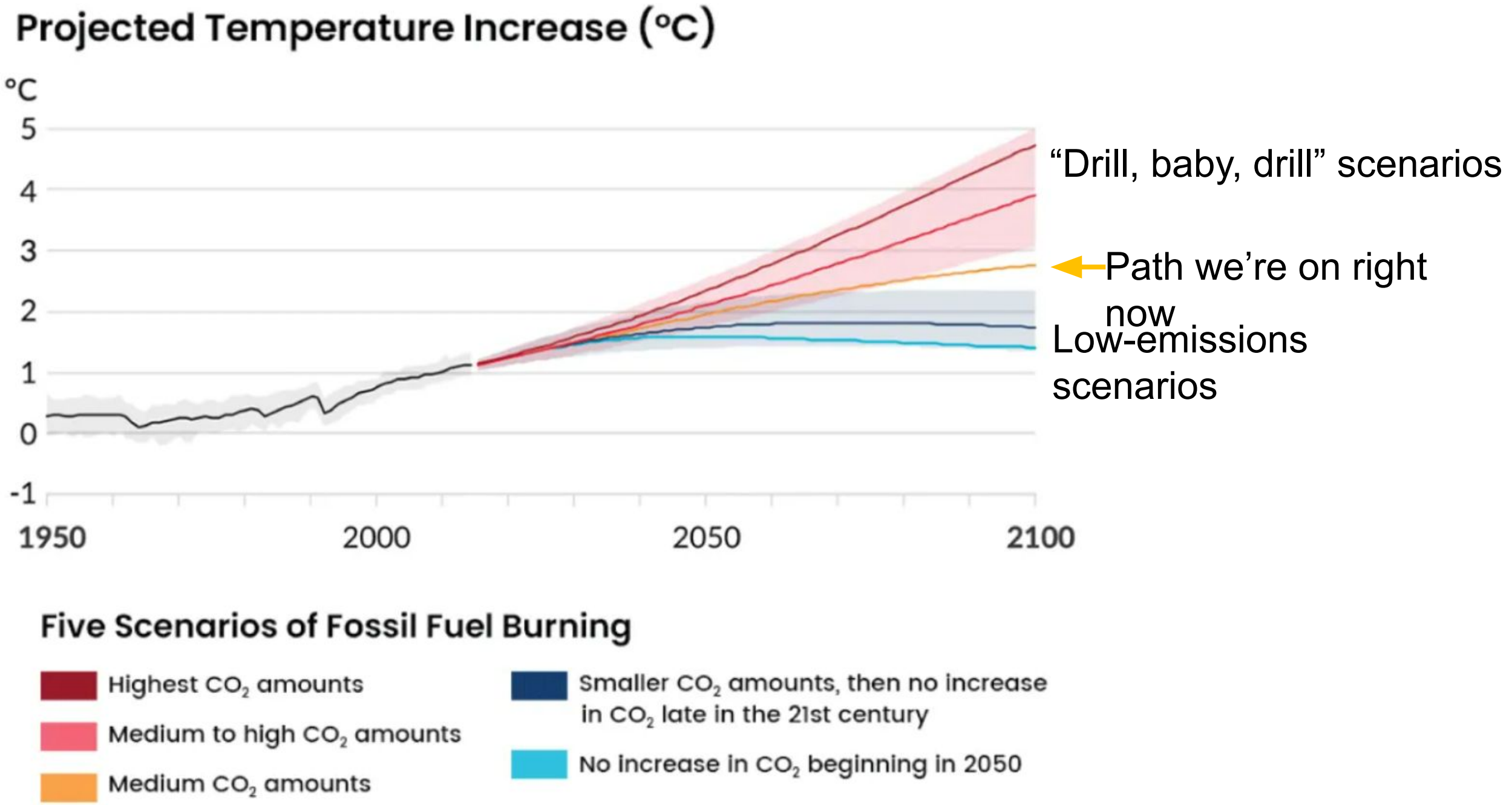


Annual global mean temperature anomalies relative to a pre-industrial (1850–1900) baseline shown from 1850 to 2024

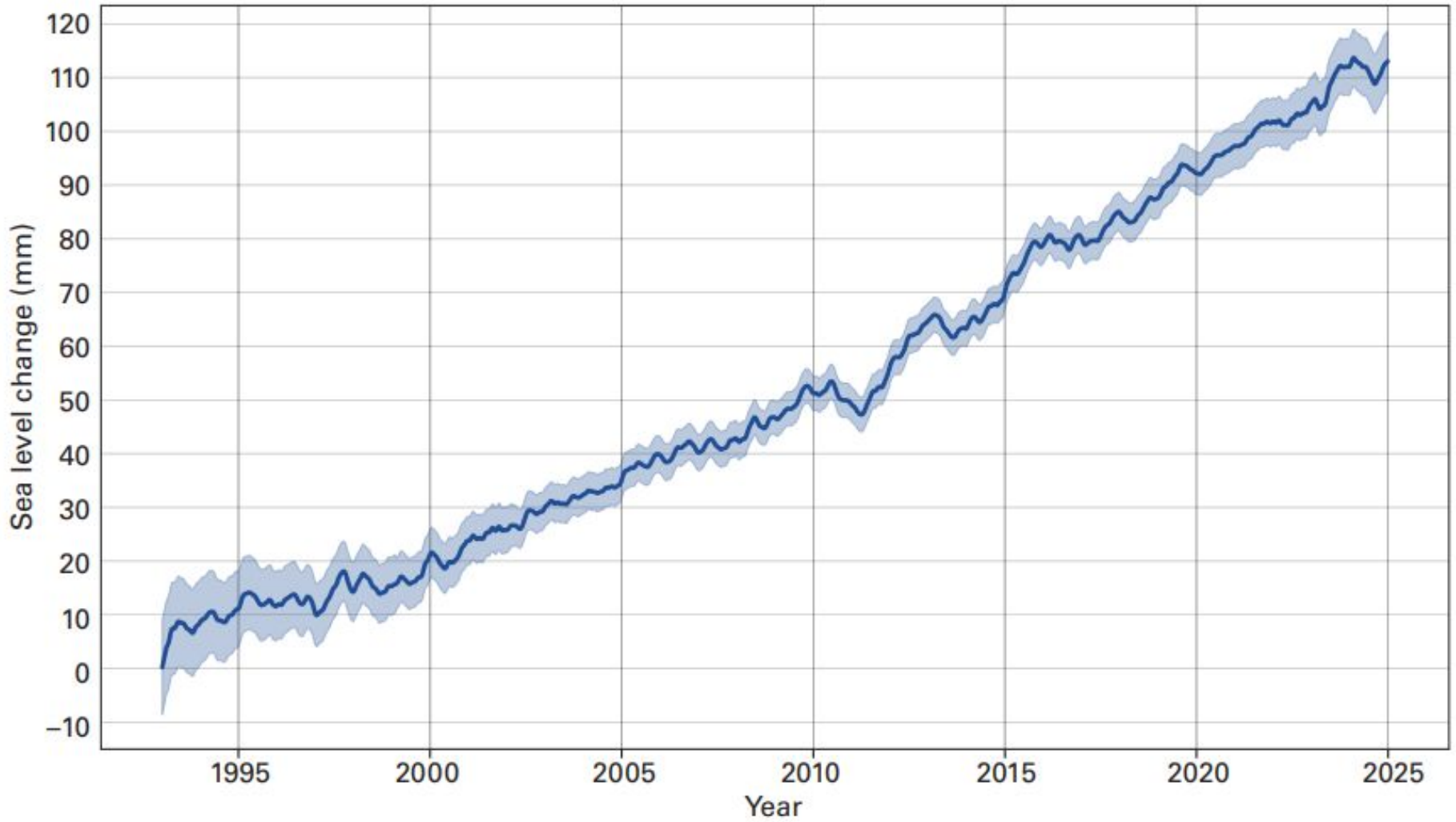
Chart: WMO • Created with Datawrapper

The ten hottest years recorded in the US have all occurred since 1998

Y-axis = ºF warmer than the average since 1850s. Source: Climate


Projected Temperature Increase (°C)
°C
5
4
3
2
1
0
-1
1950
2000
2050
2100
“Drill, baby, drill” scenarios
Path we’re on right now
Low-emissions scenarios
Five Scenarios of Fossil Fuel Burning
Highest CO_2 amounts
Medium to high CO_2 amounts
Medium CO_2 amounts
Smaller CO_2 amounts, then no increase in CO_2 late in the 21st century
No increase in CO_2 beginning in 2050

Change in global mean sea level, past 30 years



Source: World Meteorological Organization 2024 state of the climate report

Climate change risks

“Risk propellor” conceptual model used by Intergovernmental Panel on Climate Change (IPCC)

Climate hazards in Cascadia

Increased frequency & severity of:

- Extreme heat events
- Wildfires (+smoke)
- Floods
- Atmospheric rivers
- Marine heat waves

+ sea level rise (for low lying coastal areas)

What is exposed to climate hazards?

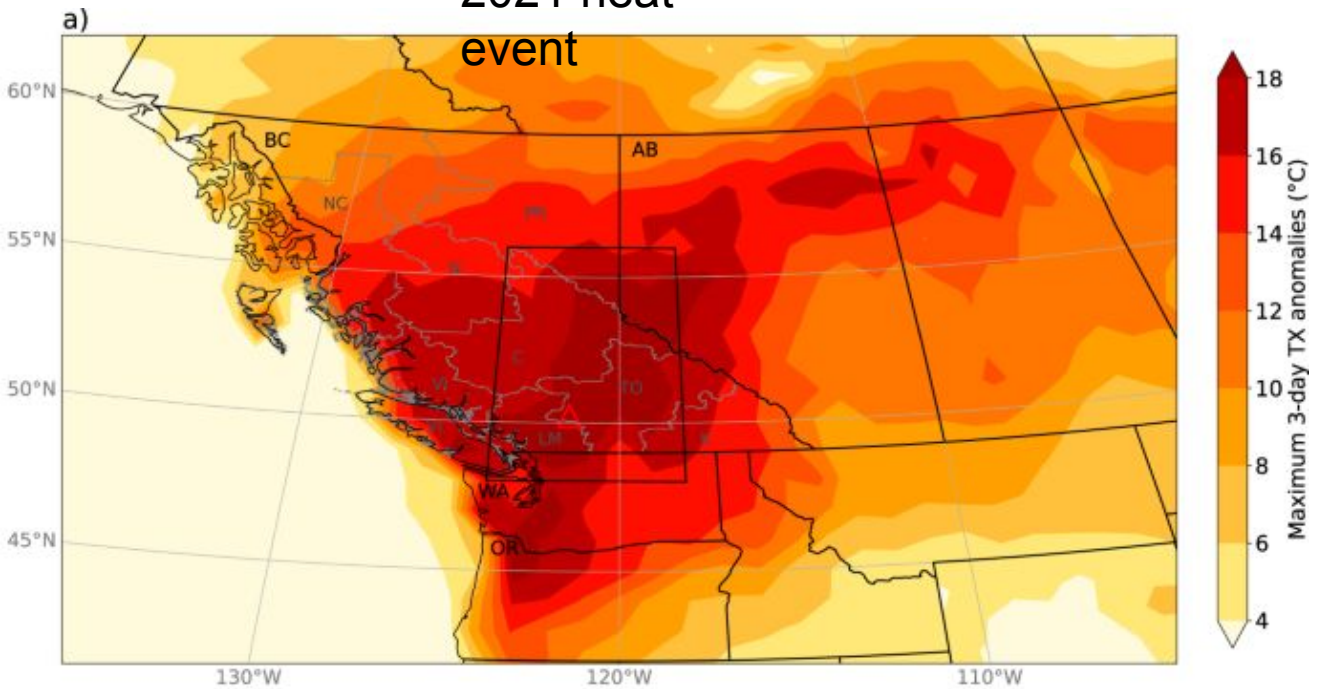
- Biodiversity
- Infrastructure
- Housing
- Livelihoods
- Health & health systems
- Cultural & social assets
- Coastal & floodplain settlements

Who/what is most vulnerable?

- Aging/poorly sited infrastructure
- Natural resource-based industries & livelihoods (farms, forestry, fishing)
- Older people
- Indigenous communities
- Low-income & unhoused people
- People with pre-existing health conditions
- Outdoor recreation economy
- Emergency responders
- Outdoor workers

Examples of what Cascadia can expect

2021 heat event

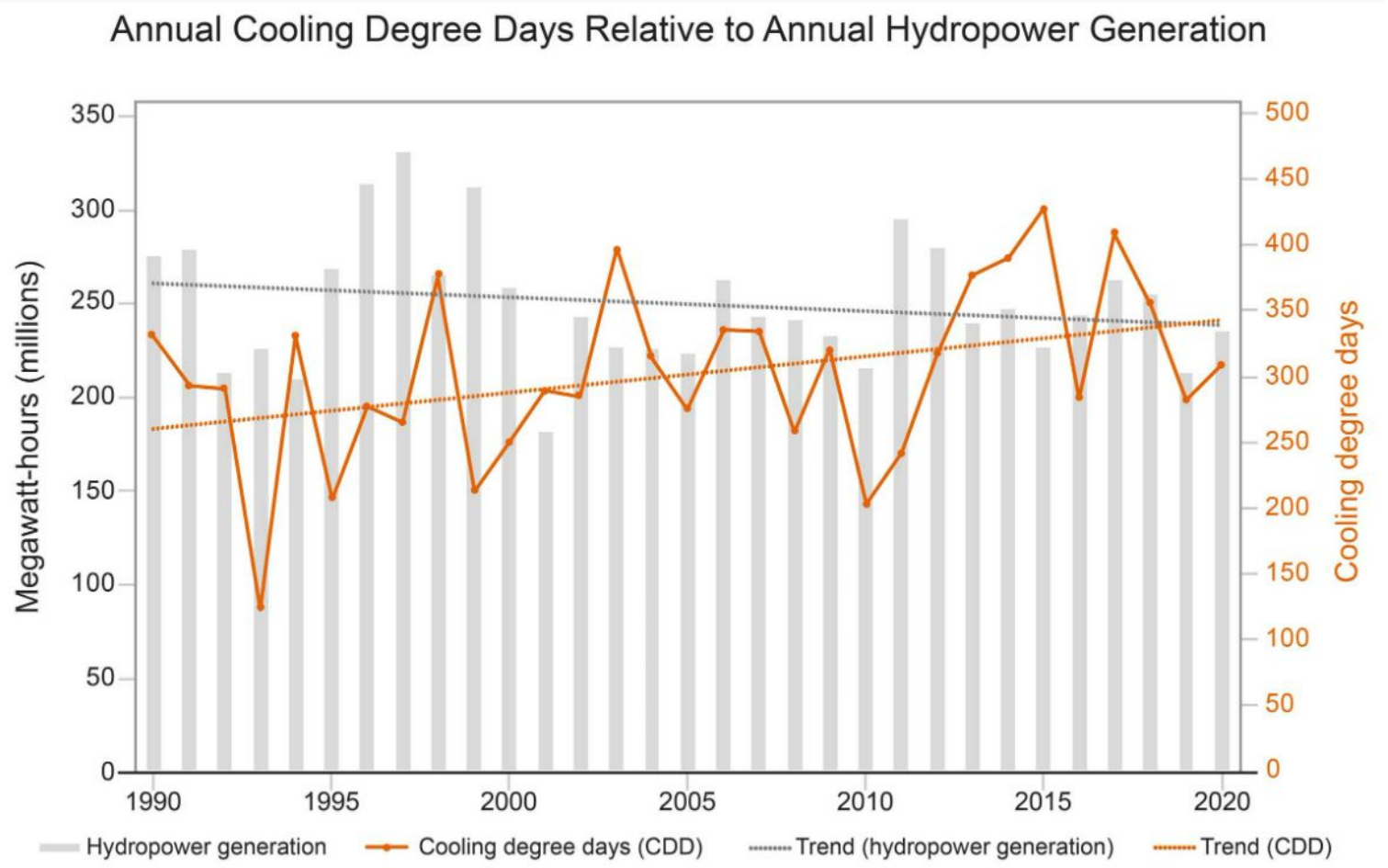


More frequent & severe heat events

- BC Coroner's office reported >600 heat related deaths in July 2021 (112 deaths in WA,116 deaths in OR)
- Temperatures reached 49ºC (120ºF) in Lytton BC, town burned down the following day

Sources: NASA Earth Observatory, Free et al 2022

Examples of what Cascadia can expect



- Greater demand on electrical generation capacity during hotter periods
- Is housing stock in Cascadian cities air conditioned?

Source: 5th National Climate Assessment – Northwest USA Report

Examples of what Cascadia can expect

Kelowna BC, 2023

communications earth & environment

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Article | Open access | Published: 05 September 2023

Abrupt, climate-induced increase in wildfires in British Columbia since the mid-2000s

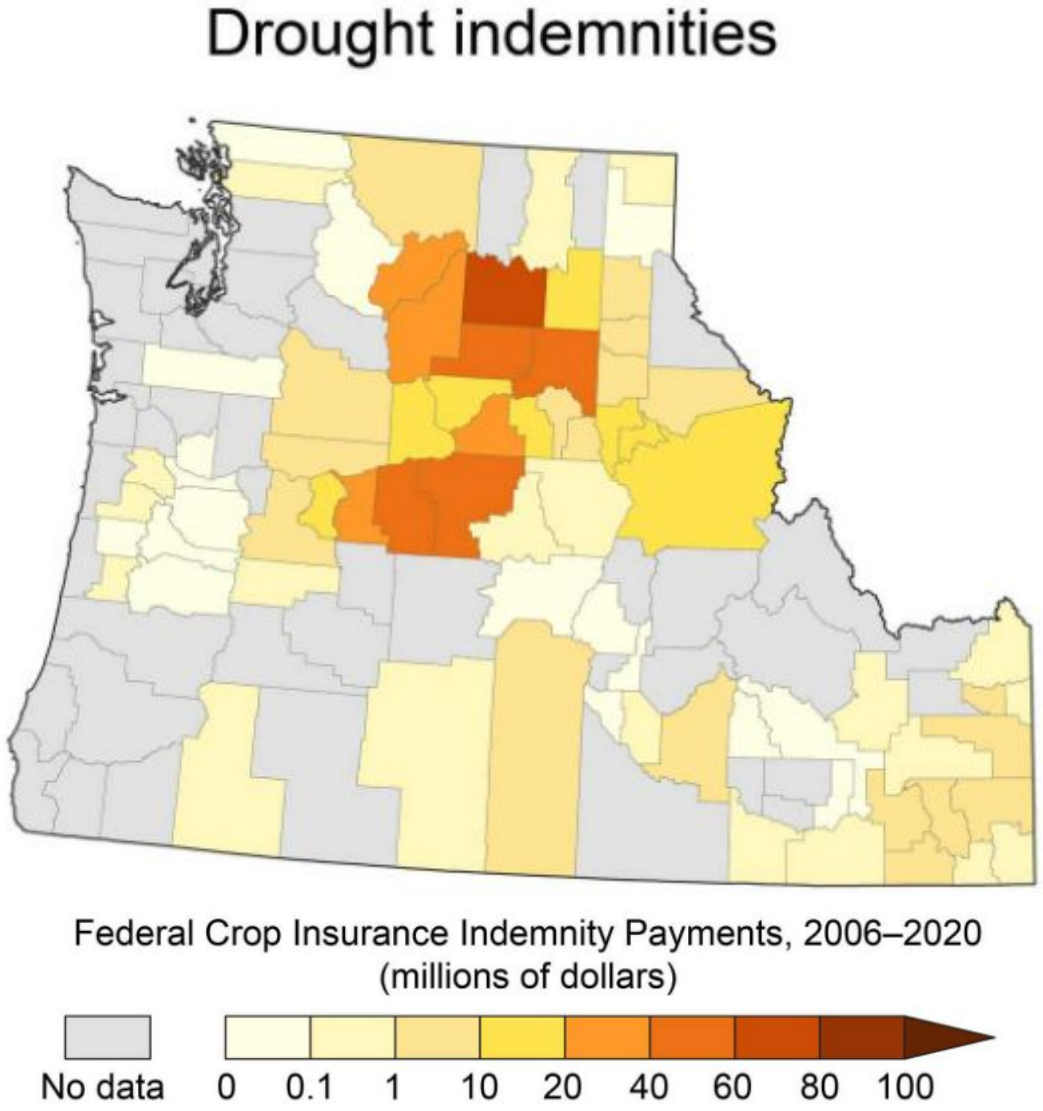
Marc-André Parisien ✉, Quinn E. Barber, Mathieu L. Bourbonnais, Lori D. Daniels, Mike D. Flannigan, Robert W. Gray, Kira M. Hoffman, Piyush Jain, Scott L. Stephens, Steve W. Taylor & Ellen Whitman

Communications Earth & Environment **4**, Article number: 309 (2023) | Cite this article

More frequent & severe wildfires & exposure to smoke

- Clear evidence that the number and size of wildfires in western Canada = rapidly increasing
- Due to hotter, drier conditions + climate-related insect damage to forests
- WA Surveying & Rating Bureau estimates 160,000 properties in WA are in wildfire risk areas

Examples of what Cascadia can expect



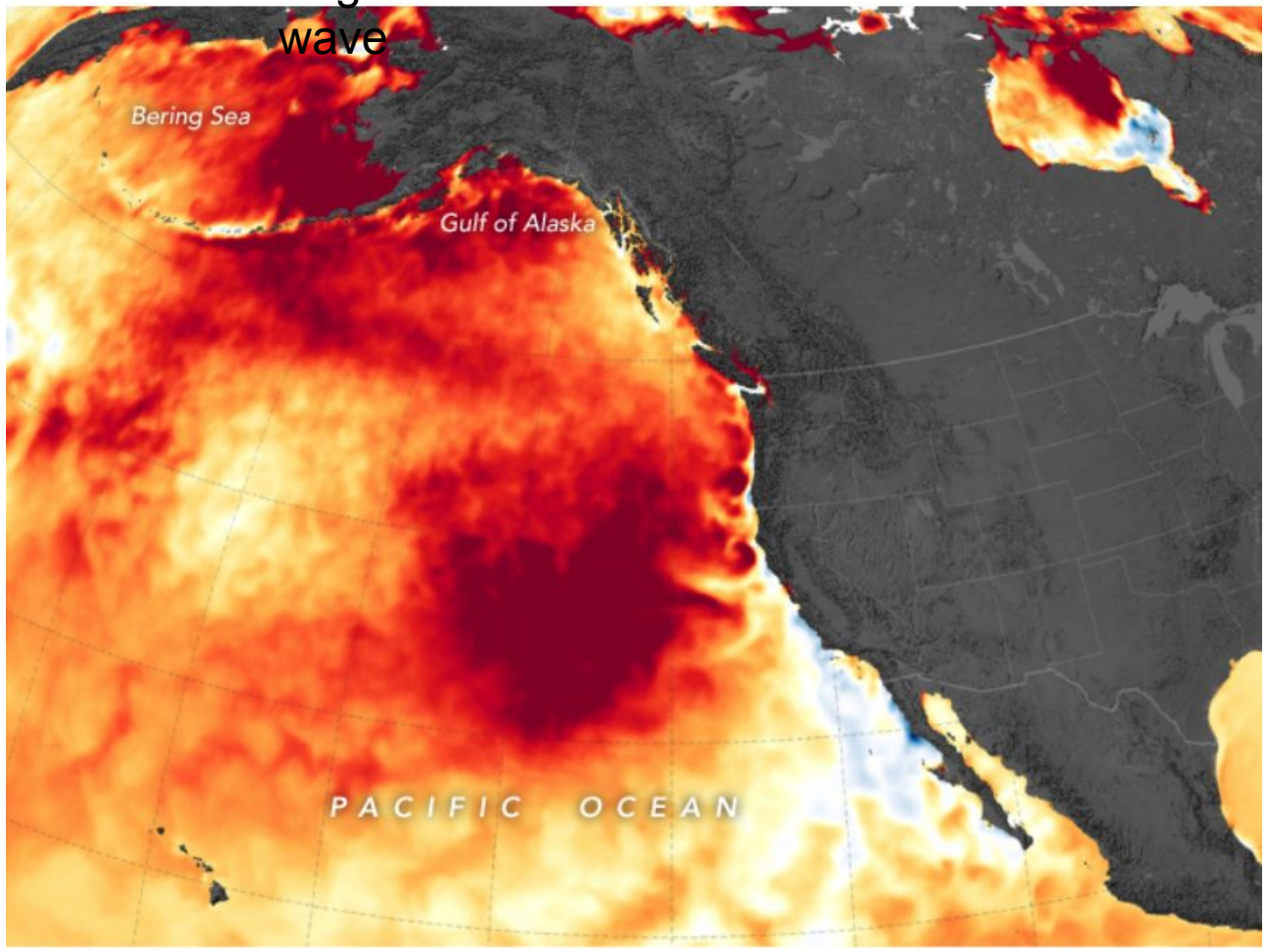
Increasingly frequent & severe droughts

- Implications for farming areas, communities with poor water infrastructure

Source: 5th National Climate Assessment – Northwest USA Report

Examples of what Cascadia can expect

August 2019 marine heat wave



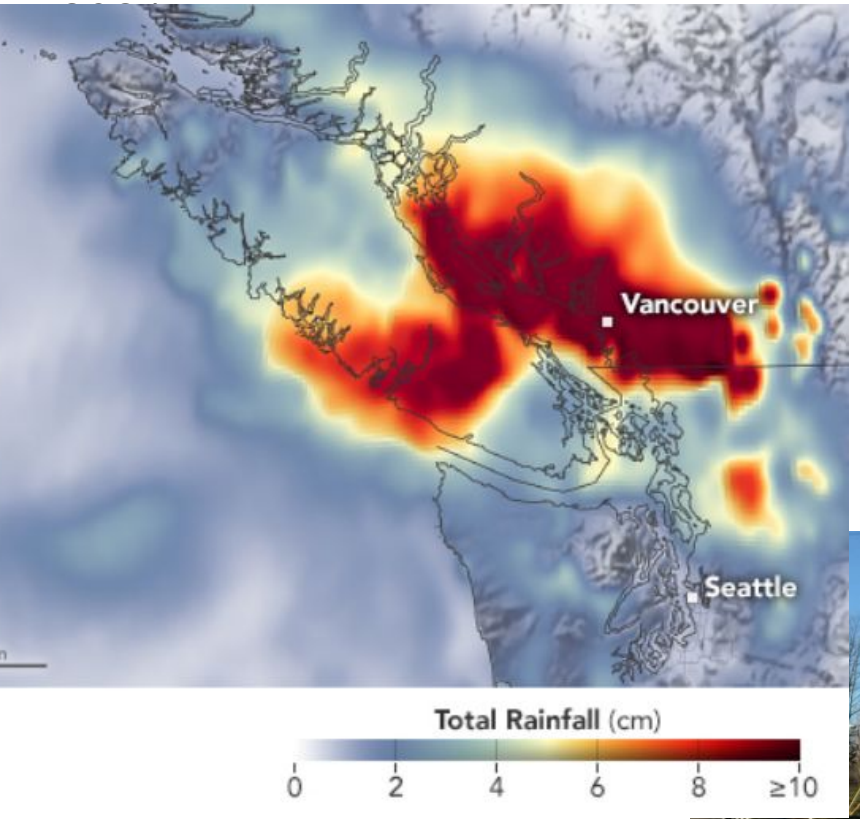
More marine heat waves

- Marine heat wave 2014-2016 led to decline in chinook salmon runs, closure of Pacific cod, crab & sardine fisheries

Sources: NASA Earth Observatory, Free et al 2022

Examples of what Cascadia can expect

Rainfall on November 14,



More frequent flood events

- Atmospheric rivers expected to become more common (Zhang et al 2024)
- Nov. 2021 atmospheric river floods in Cascadia cost ~US$2B damages

Bellingham, November 16, 2021

Economic risks of climate change for Cascadia

- Greater health costs & health system demand
- Lower productivity of outdoor workers
- Greater demand on energy infrastructure
- Greater infrastructure costs for local, state/prov governments
- Episodic economic losses across sectors
- Greater losses for insurers/re-insurers

As Western Wildfires Worsen, FEMA Is Denying Most People Who Ask For Help

JULY 1, 2021 · 5:10 AM ET

HEARD ON MORNING EDITION

By Sean McMinn, April Ehrlich

Gates OR, 2020

Migration, displacement in Cascadia in a changing climate

- Greater risk of displacements from fires, floods
- Most of those displaced resettle in same general region
- Duration of displacement linked to housing damage, tenancy vs ownership, insurance, FEMA support
- Impacts of climate hazards on outdoor work, farming, resource industries could generate incremental changes in labor migration within Cascadia

OREGONLIVE
The Oregonian

What the heat dome tells us about Oregon's future climate

Updated: Jun. 25, 2022, 9:59 a.m. | Published: Jun. 25, 2022, 6:00 a.m.

Emergency cooling shelter, Portland, June 2021

Will Cascadia become a “climate refuge”?

The Guardian Int

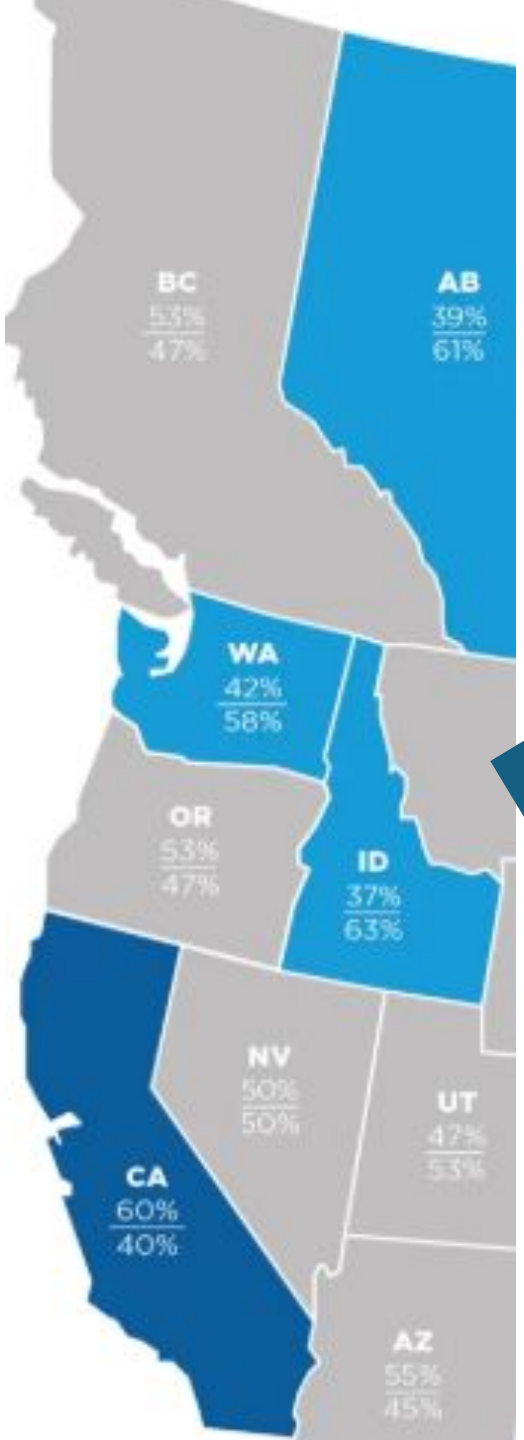
22 July 2021

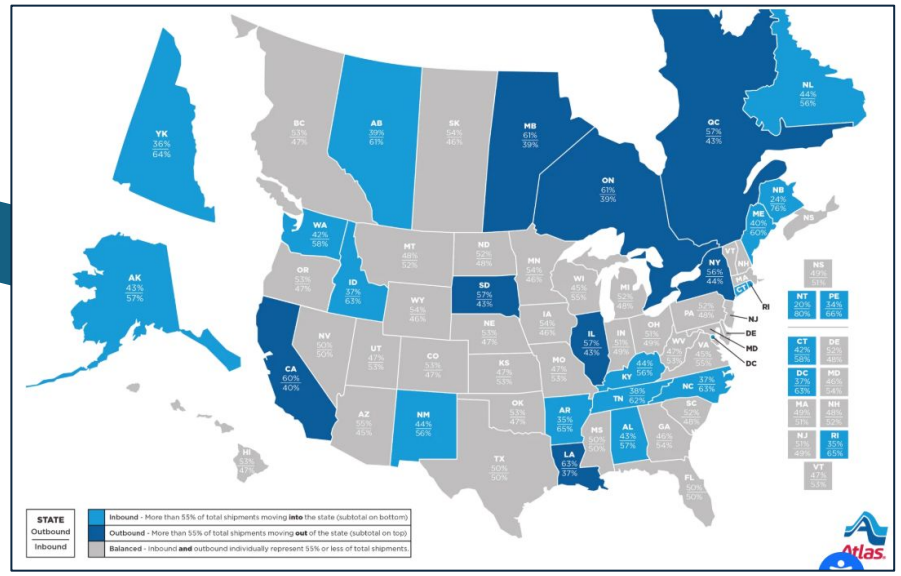
‘Nowhere is safe’: heat shatters vision of Pacific north-west as climate refuge

People sleep at a cooling shelter set up during an unprecedented heat wave in Portland on 27 June. Photograph: Maranie Staab/Reuters

Residents of the region, known for its mild weather, are facing a shifting reality

Atlas Van Lines 2024 report on where people are moving





More moving vans enter Cascadia than originate in Cascadia

	Inbound - More than 55% of total shipments moving **into** the state (subtotal on bottom)
	Outbound - More than 55% of total shipments moving **out** of the state (subtotal on top)
	Balanced - Inbound **and** outbound individually represent 55% or less of total shipments.

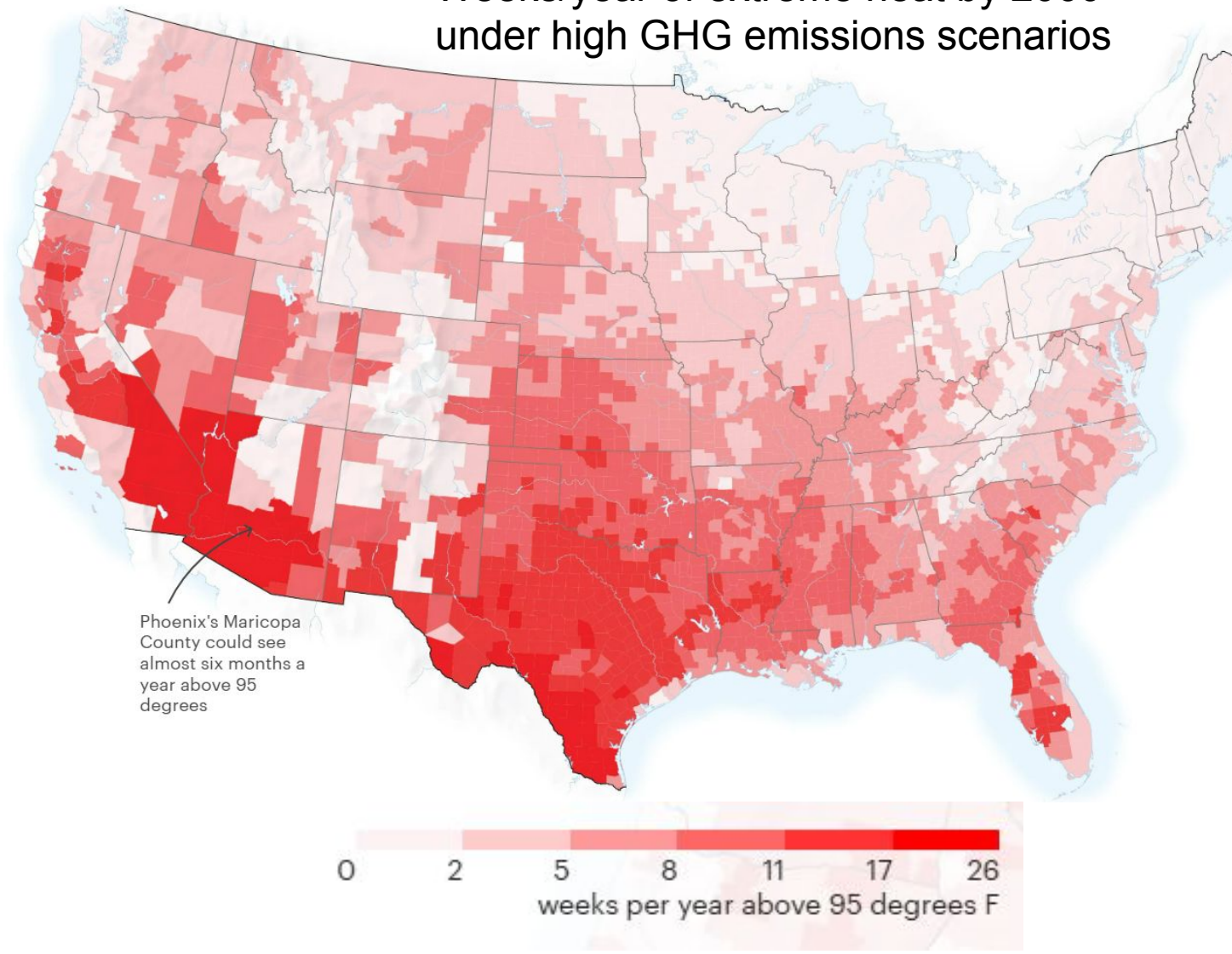
Interstate/interprovincial migration to Cascadia

- BC, ID, OR & WA have been net recipients of migrants over last 30+ years
- Most migration into Cascadia is for economic, social, cultural reasons
- Will climate change cause more people from CA & southwestern US to move to Cascadia?

Climate change & California

- Heat, drought, fires, sea level rise risks for CA are greater than for Cascadia
- Is there a threshold at which parts of California become economically unlivable? If so, will people move to Cascadia?

Weeks/year of extreme heat by 2060 under high GHG emissions scenarios



CLIMATE IMPACTS GROUP | COLLEGE OF THE ENVIRONMENT UNIVERSITY of WASHINGTON

CLIMATE-RELATED MIGRATION TO THE PACIFIC NORTHWEST

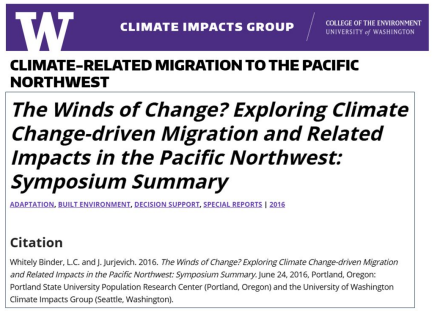
The Winds of Change? Exploring Climate Change-driven Migration and Related Impacts in the Pacific Northwest: Symposium Summary

ADAPTATION, BUILT ENVIRONMENT, DECISION SUPPORT, SPECIAL REPORTS | 2016

Citation

Whitely Binder, L.C. and J. Jurjevich. 2016. *The Winds of Change? Exploring Climate Change-driven Migration and Related Impacts in the Pacific Northwest: Symposium Summary.* June 24, 2016, Portland, Oregon: Portland State University Population Research Center (Portland, Oregon) and the University of Washington Climate Impacts Group (Seattle, Washington).

Link: https://cig.uw.edu/projects/climate-related-migration-to-the-pacific-northwest/



Link: https://cig.uw.edu/projects/climate-related-migration-to-the-pacific-northwest/

2016 symposium findings…

- Migration to Cascadia will be driven primarily by non-climatic factors for next 20-30 years
- Could be some incremental extra migration due to climate hazards in other states/regions
- Even a small, extra increment in migration due to climate could cause serious planning & development challenges
- Why? Lead time for infrastructure builds = 20+ years

Climate-resilient development pathways

- Many of the things we need to be doing to prepare for a climate-disrupted future = things we should be doing anyway

Examples include:

- Better emergency preparedness
- Investment in health systems
- Improving & increasing housing stock
- Limiting new developments at the forest interface, high risk floodplains
- Better water management systems
- Increasing non-fossil fuel electrical generation capacity

Roles for Cascadian economists

Many possibilities, examples include…

- What will be the future direct & indirect costs of adverse impacts of climate change on Cascadia?
- Scenario planning for costs of accommodating & providing infrastructure for additional in-migrants
- Threshold identification: at what threshold (cost? frequency? type of impact? etc) does climate-related migration initiate or accelerate?

Time for questions/discussion

Thanks!

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