

Behavioral Health Effects of Climate Change: Impact and Solutions

Jose Calderon-Abbo, M.D. FASAM

Med.Dir. UHC C&S LA CEA Optum

September 2021.



Disclaimers

No conflict of interest to declare.

Helping People Live Healthier Lives

Objectives

1. Brief overview
2. Behavioral Healthscape
3. BH Impacts
4. BH Opportunities
5. Appendix

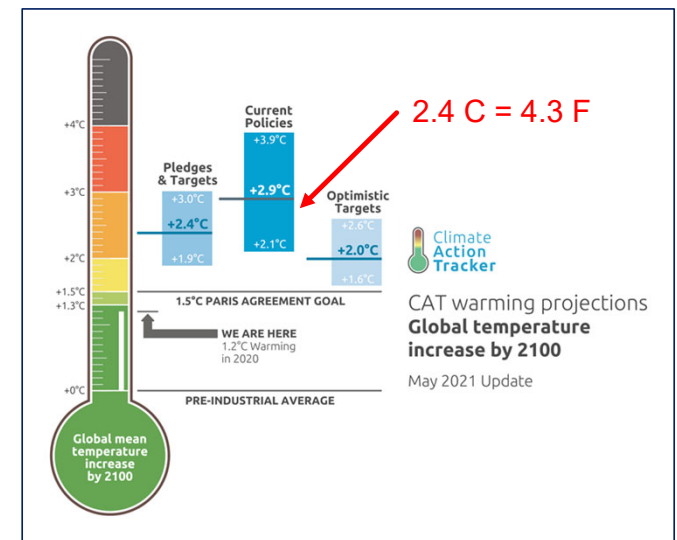
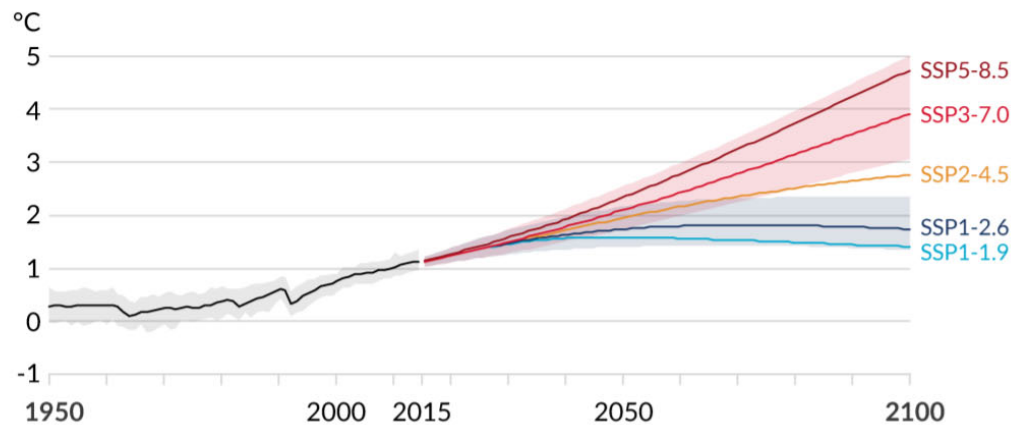


Climate Change

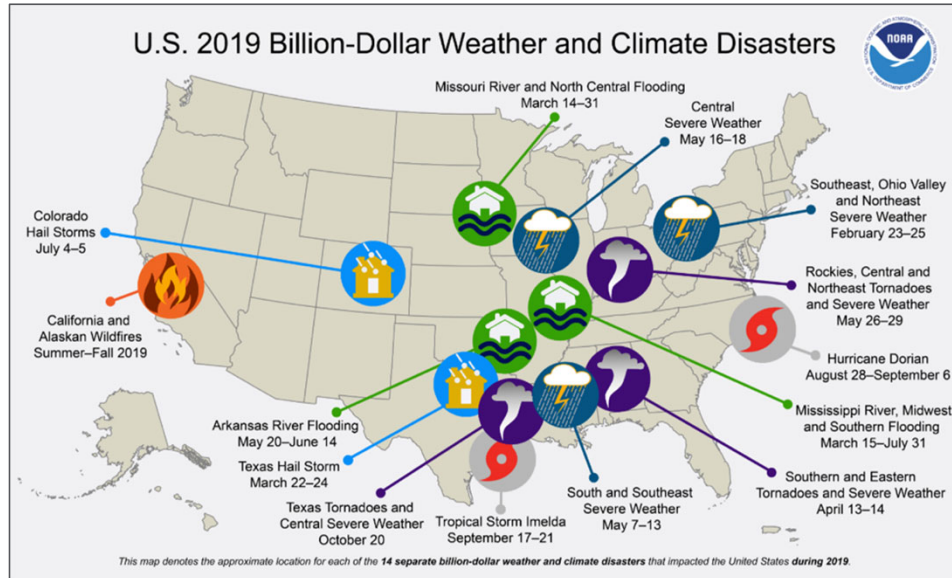
The basics

Human activities affect all the major climate system components, *Figure SPM.8*
with some responding over decades and others over centuries

a) Global surface temperature change relative to 1850-1900



Why now? The Heat of Managing Care



Q1: How is weather affecting
Your life?
Our members?
Our employees?
Our customer's expectations?

How are **Climate Change** trends affecting
Our member's?
Our employees?
Our projections?
Our customers?

Since 1980, the U.S. has sustained 258 weather and climate disasters

Overall costs exceeding \$1 billion per event, cumulative cost exceeding \$1.75 trillion (NCEI 2020)

SE U.S. sea level rise and more frequent/stronger storms will cost an estimated \$4-6 billion/year in property damage. (USGAO 2017)

Multi-layered events:

National Centers for Environmental Information, NOAA 2020. <https://www.ncdc.noaa.gov/billions/>
United States Government Accountability Office USGAO 2017. Climate change: information on potential economic effects could help guide federal efforts to reduce fiscal exposure. <https://www.gao.gov/assets/690/687466.pdf>

"What do you mean you won't paddle any more??!
-I'm surprised Hernandez!!
Are we or are we not in the same boat??"
Quino



- ¿¿CÓMO QUE NO REMA MÁS?? ¿¿ME EXTRAÑA, FERNÁNDEZ!!!
¿¿ESTAMOS O NO ESTAMOS TODOS EN LA MISMA BARCA??

Climate Instability as an Environmental Determinant of Health

- Climate change and extreme weather events are *risk multipliers*
- We are all exposed,...but not equally exposed.
- Vulnerable populations:
 - By geography, and socio-economic status
 - Children
 - +65
 - Women
 - Minorities, racial, ethnic
 - subgroups hard accessing health (migrants, LGBT)
 - Those with chronic relapsing conditions
 - SMI, SUD's, anxiety disorders, PTSD and trauma spectrum, DD, grief
 - By affecting the most vulnerable, climate driven events are magnifiers of existing socio-economic, racial and health inequities. (Watts 2018; Ragavan 2020)
- Health Equity



Photo: Chris Granger / The Times-Picayune / New Orleans Advocate

Watts, N., et al (2018). The 2018 report of the Lancet Countdown on health and climate change: shaping the health of nations for centuries to come. *Lancet*, 392(10163), 2479-2514.

Ragavan, MI et al (2020). Climate Change as a Social Determinant of Health. *Pediatrics*, 145(5).

Behavioral Health Effects of Climate Change & Opportunities

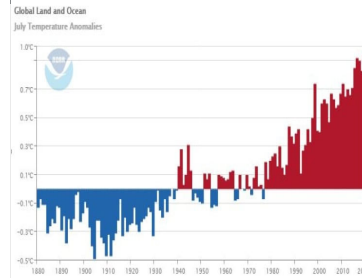
Direct Effects



Indirect Effects



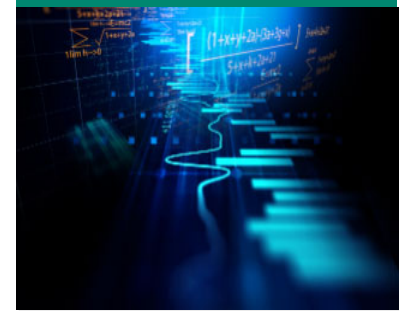
Overarching Effects



Communications



Predictive Analytics



Climate Related Health Effects

1. Asymptomatic
 2. Acute
 3. Sub-acute
 4. Chronic
- 

- Direct**
- Heat illness
 - Dehydration
 - Injury
 - Decompensation of medical and BH
 - **Anxiety, stress**
 - **Trauma, PTSD**
 - **Worsening of medical and BH conditions**
 - **Grief (direct losses)**
 - Water/food born disease

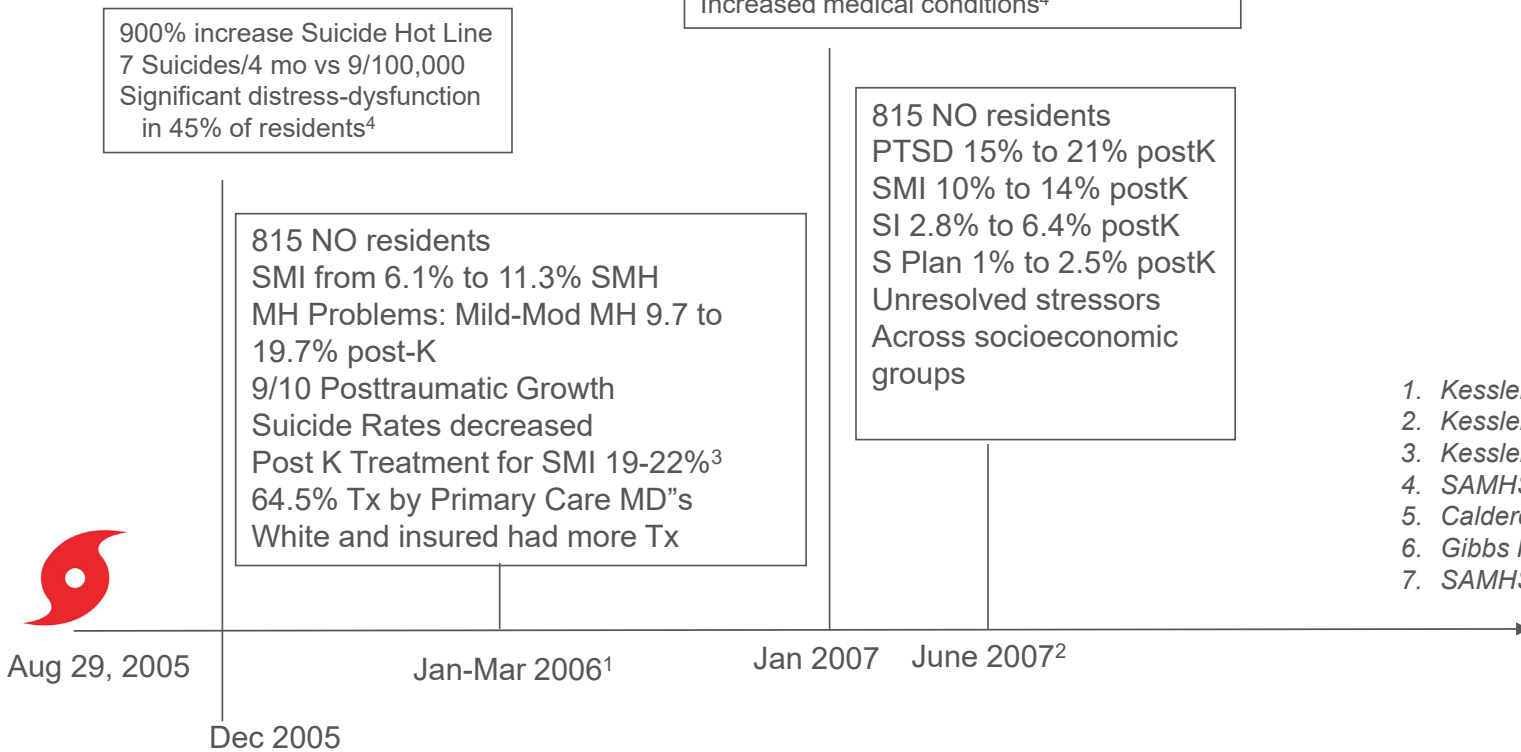
- Indirect**
- Power loss
 - Income loss
 - Potable water
 - Nutrition
 - Food production
 - Wastewater
 - **Depression**
 - **Substance use**
 - **Despair, suicide**
 - **BH access**
 - **Response capacity**
 - Altruism, cooperativeness, PT growth
 - Vector born diseases (Lyme, Zika)
 - **Violence**

- Overarching**
- **Psychotheratic Syndromes**
 - **Anticipatory Grief**
 - **Ecoanxiety/ eco-distress**
 - **Ecoparalysis**
 - **Denial**
 - **Solastalgia & Grief**
 - Migration
 - Human trafficking/ exploitation
 - Conflict
 - Polarization
 - Action, activism

Int J Pub Health 2010; 55(2): 123-32
 Int J Pub Health Syst 2018(12):28

Berry, HL et al (2010). Climate change and mental health: a causal pathways framework. International journal of public health, 55(2), 123-132.
 Hayes K et al (2018). Climate change and mental health: Risks, impacts and priority actions. Int J Mental health sys, 12(1), 1-12.
 Centers for Disease Control and Prevention (2014). <https://www.cdc.gov/climateandhealth/effects/default.htm>
 Cunsolo A et al Ecological grief as a mental health response to climate change-related loss. Nat Clim Change. 2018; 8: 275-281.

Mental Health Post-Katrina

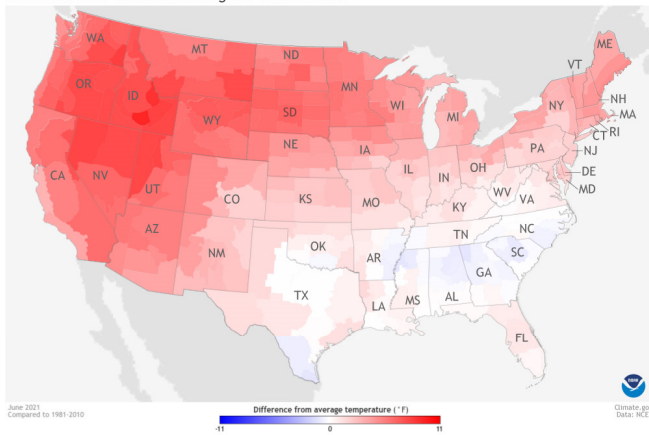


1. Kessler, WHO 2007
2. Kessler M Psych 2008
3. Kessler Am J Psych 2007
4. SAMHSA, CDC 2006
5. Calderon Psych Serv 2008
6. Gibbs Public Forum 2006
7. SAMHSA 2015

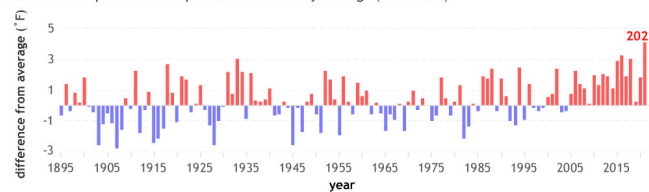
Heat, Heat Waves, Behavioral Health Impact

Heat spikes lasting days above normal average.

Hottest June on record for contiguous United States



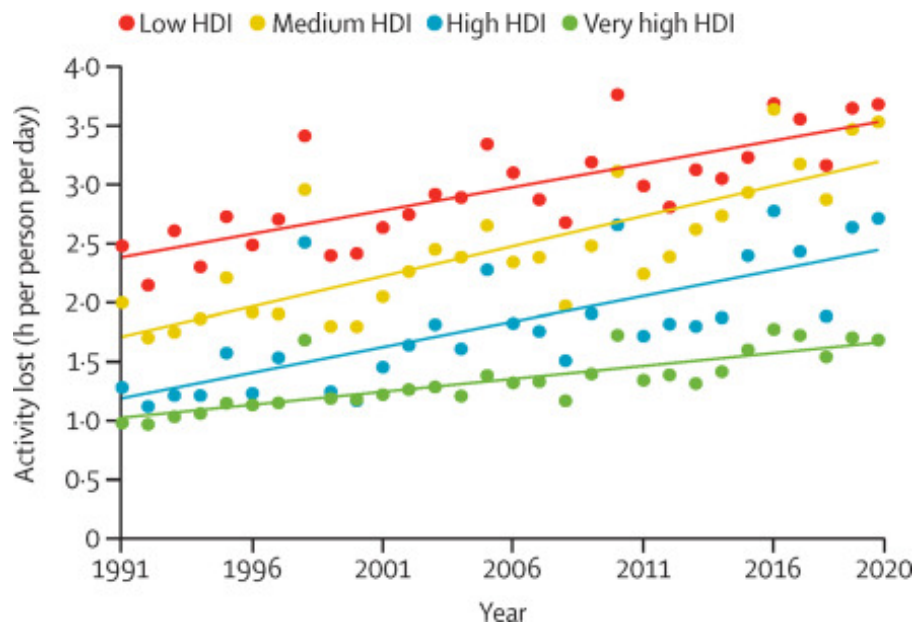
U.S. June temperatures compared to 20th-century average (1895-2021)



- **SMI x3 risk of death during HW**
Direct exposure, workers (construction and agriculture)
Psychotropic medications & drugs
Socio-economic status, age, gender, race (work-type)
- **Suicides 0.7% and declining mental wellbeing talk on social media per 1°C above average** Nat Climate Change 2018; 8(8): 723-9
- **4% IT aggression , 14% violence between groups** Science 2013; 34[6151]: 1235367

APA (2017) Mental Health and Our Changing Climate: Impacts, Implications and Guidance. Washington, DC.

Indirect & Long-Term BH Effects on SDoH



Average hours of safe physical activity lost per person due to high wet bulb globe temperature by 2019 HDI country group (1980–2020)

Work hrs./income loss: 295 billion hrs. of potential work lost across the globe in 2020 due to heat exposure—(i.e., 88 work h per employed person).

Outdoor workers and outdoor recreational activates are most impacted.

Romanello M et al (2021):The 2021 report of the Lancet Countdown on health and climate change: code red for a healthy future. Vol 398 (10311): 1619-1662. [https://www.thelancet.com/journals/lancet/article/PIIS0140-6736\(21\)01787-6/fulltext](https://www.thelancet.com/journals/lancet/article/PIIS0140-6736(21)01787-6/fulltext)

Climate Change and Extreme Weather Events

Impact on Behavioral Health

- Extreme weather events increase depression, anxiety, stress, trauma, worsening of medical conditions (Hayes 2018)
- Local heatwave exposure found to increase 155% negative expressions on Twitter.
- Baton Rouge, Louisiana–area flood (August 2016) caused a
 - 66% and 44% increase in substance use and depression related health visits
 - BH services residential (+249%), inpatient (+98%), outpatient (+59%)
 - Accruing an 8-10%% increase in payments over a 10-month period. (Phillippi 2019)
- Elderly survivors of hurricane Katrina who had PTSD, showed a 70% higher risk of hospitalization 12-24 months. (Lenane 2019)

Hayes K et al (2018). Climate change and mental health: Risks, impacts and priority actions. Int J Mental health sys,

Phillippi, SW et al (2019). Medicaid utilization before and after a natural disaster in the 2016 baton rouge–area flood. Am J Psychiatry.

Lenane, Z. et al (2019). Association of post-traumatic stress disorder symptoms following Hurricane Katrina with incident depression among older adults with hypertension. Am J Psychiatry. 27(3), 310-321.

Romanello M et al (2021):The 2021 report of the Lancet Countdown on health and climate change: code red for a healthy future



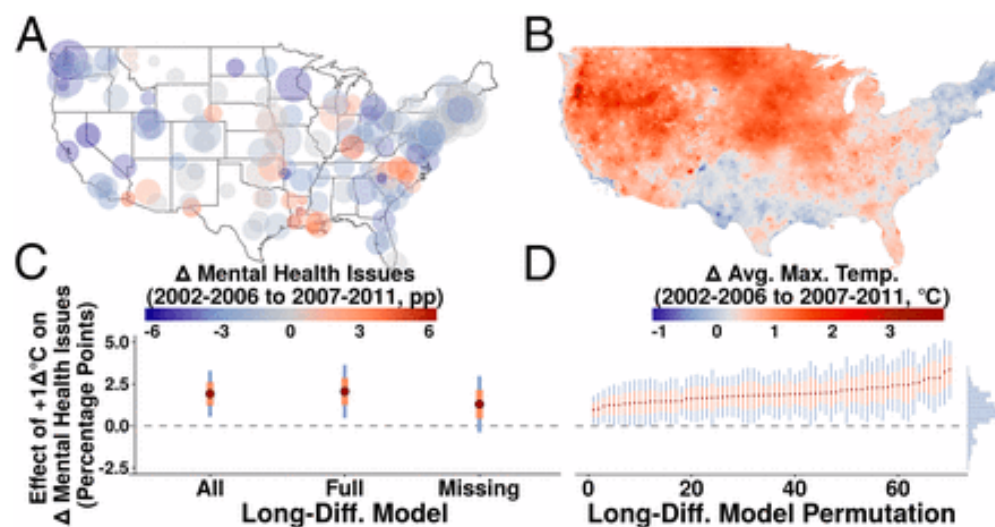
The Discrete and Gradual BH Effects

- historical climatic conditions and the mental health of 2 million randomly sampled US residents (2002 and 2012)
- Center for Disease Control and Prevention's Behavioral Risk Factor Surveillance System (BRFSS) + pairing meteorological data
- "Now thinking about your mental health, which includes stress, depression, and problems with emotions, for how many days during the past 30 days was your mental health not good?"
- short-run meteorological exposure, multiyear warming, and acute exposure to natural disasters.

Obradovich, N.(2018). Empirical evidence of mental health risks posed by climate change. PNAS, 115(43), 10953-10958.

Empirical evidence of mental health risks posed by climate change

- Monthly average max. temp. $>30\text{ }^{\circ}\text{C}$ increases probability of mental health issues by over 0.5% ($P < 0.001$)
- 5-year warming of $1\text{ }^{\circ}\text{C}$ above average is associated with 2% increase in prevalence of reported mental health issues ($p = 0.007$).
- Months $>25\text{ d}$ of precipitation increase the probability of mental health issues by 2% ($P < 0.001$).



Obradovich, N.(2018). Empirical evidence of mental health risks posed by climate change. PNAS, 115(43), 10953-10958.

Green Space and positive wellbeing



Wood, L et al (2017). Public green spaces and positive mental health—investigating the relationship between access, quantity and types of parks and mental wellbeing. *Health & place*, 48, 63-71.

Barton, J. et al (2017). The importance of greenspace for mental health. *BJPsych international*, 14(4), 79-81.

Psychoterratic states (mind-earth states)¹ and other.

- Solastalgia¹: existential and psychological feelings people have when their environment undergoes profound change or degradation.
- Eco-Grief², Anticipatory Grief³ Anticipatory Anxiety, Pre-Traumatic Stress
- Eco-anxiety and Eco-paralysis
- Existential dread (i.e., #Birthstrike)
- Phases of active engagement ⁴

Idealism → guilt → nihilism → self care → hope → efficacy → resilience

1. Wen, Y. et al (2019). Medical empirical research on forest bathing (Shinrin-yoku): A systematic review. Environmental health and preventive medicine, 24(1), 1-21.

2. Albrecht Glenn Earth Emotions: New Words for a New World. Ithaca, NY. Cornell U. Press. 2019.

3. Counselo A, Ellis Neville (2018): Ecological Grief as a mental health response to climate change –related loss. Nat Clim Change. 8: 275-81.

4. Spark Amy (2016): Mourning the Ghost. Ecological Grief in the Ghost River Valley. Master's Thesis . U. Edinburgh.

5. Ray Sarah J (2020): A Field Guide to Climate Anxiety. U. of California Press..

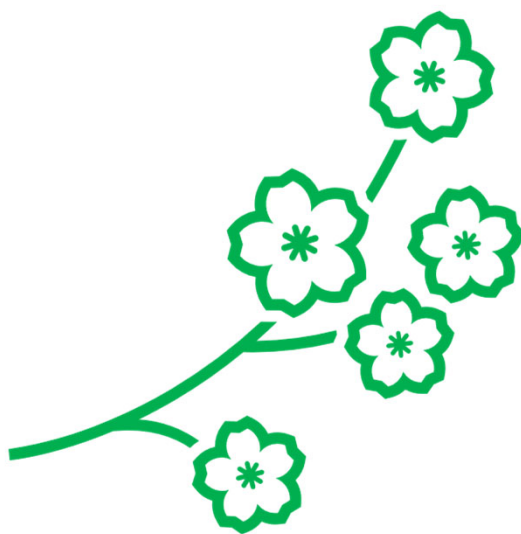
Supporting Resilient Communities



Photo: Carolyn Van Houten/National Geographic

<http://www.isledejeancharles.com/our-resettlement>

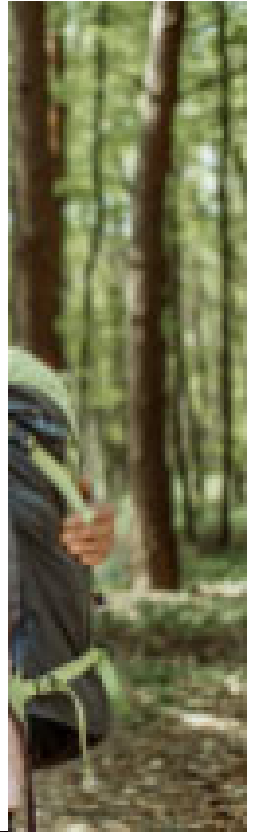




C.C. Behavioral Health Solutions

Although the wind
blows terribly here,
the moonlight also leaks
between the roof planks
of this ruined house.

Izumi Shikibu, "Although the wind" Trans. Jane Hirshfield and Mariko Aratani. The Ink Dark Moon. Copyright © 1990 Vintage Books 1990.



“If you think you are too small to make a difference, try sleeping with a mosquito”

H.H. Dalai Lama

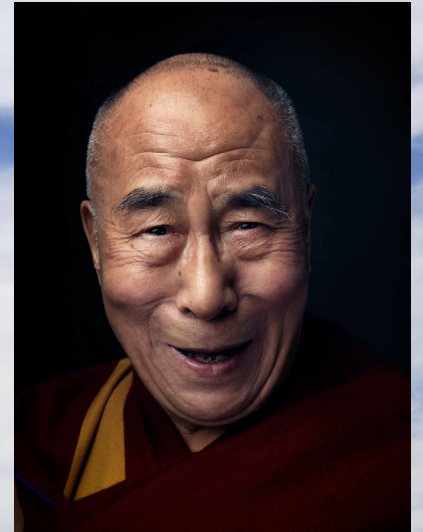
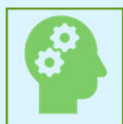


Photo: Marco Grob for TIME , 2014.

Solutions, Mitigation and Resilience Supporting Individuals and Populations



Build belief in one own's resilience
Practice Gratitude, Distress Tolerance
Disaster Preparedness



Health Behaviors
Maintain practices that provide a sense of
meaning



Promote social connection to family, friends,
sponsors, peer support, place, culture, food,
and community



Cultivate active coping skills for emotional regulation
Mind-Heartfulness ,MBM-Skills Groups
Good Grief Groups
Network for Grateful Living



Volunteerism
Meaningful emotional investments

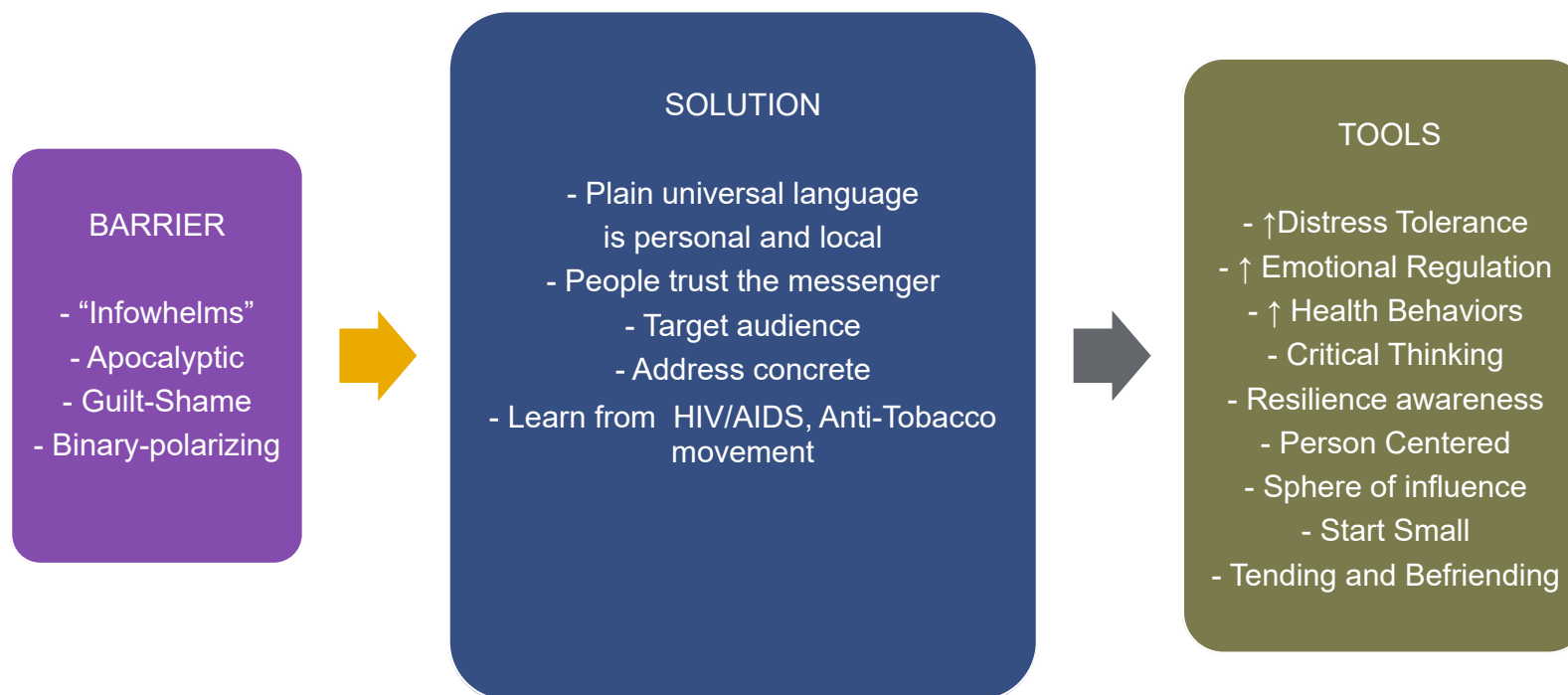


Behavioral Health Screening
Behavioral Health Access
Equity

1. Clayton, S. et al. (2017). Mental health and our changing climate: Impacts, implications, and guidance. Washington, DC:
2. American Psychological Association and ecoAmerica.
3. Cunsolo A et al (2020) Ecological grief and anxiety: the start of a healthy response to climate change? Lancet Psychiatry 4(7): E261-E263.
4. Jones, L. et el (2020). Mind-Body Skills Groups: A Possible Approach for Addressing Adolescent Depression in Primary Care. J Adolesc Health, 66(2), S5-S6.

Solutions, Mitigation and Resilience

The Activation Narrative



1.Funk C., Tyson A. Pew Research Center. <https://pewrsr.ch/3p0c7jR>

2.Ray SJ A field guide to climate anxiety. U.C Press 2021.

3.John Marshall TED “3 strategies for effectively talking about Climate change”.

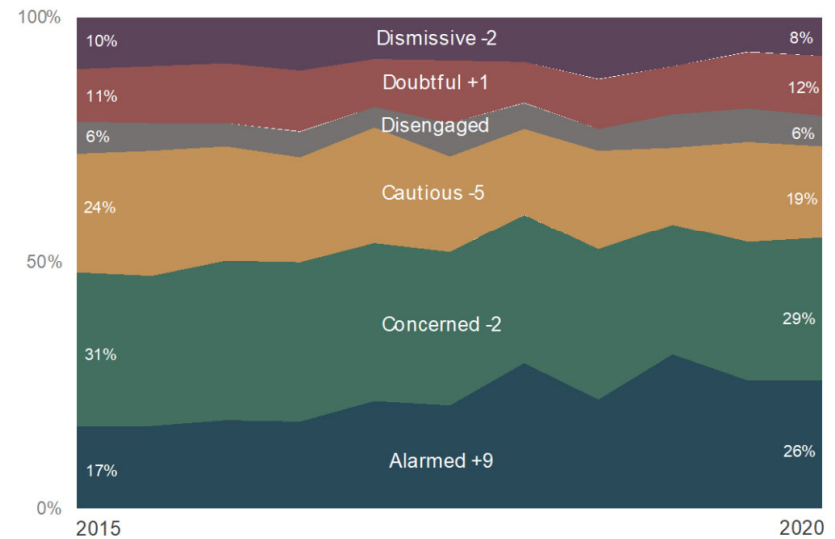
https://www.ted.com/talks/john_marshall_3_strategies_for_effectively_talking_about_climate_change?language=en

Six America's Project

Yale Program on Climate Change Communication



**Global Warming's Six Americas
five-year trend**



Data from 11 waves of the *Climate Change in the American Mind* national survey.

Maibach, EW et al. (2011). Identifying like-minded audiences for global warming public engagement campaigns: An audience segmentation analysis and tool development. *PLoS one*, 6(3), e17571.

<https://climatecommunication.yale.edu/about/projects/global-warnings-six-americas/>

Solutions, Mitigation and Resilience

What Can Healthcare Professionals Do?

01

Become
climate-literate

02

Engage with
public and health
professionals,
build resilient
systems

03

Be vocal, cast a
shadow, educate,
shape narrative,
“avoid
infowhelming” and
catastrophizing

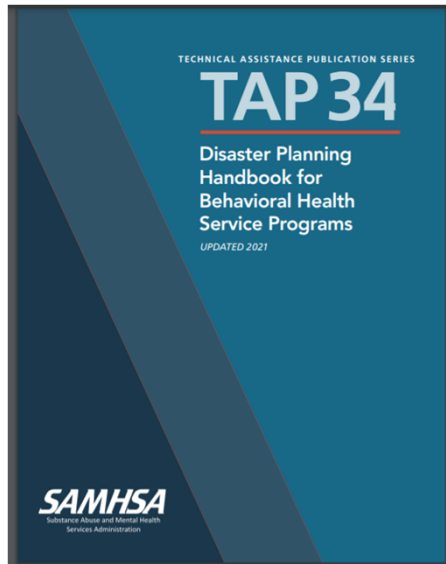
04

Start where you
are: Professional
organizations,
local, national and
international
climate-health
solutions

05

Self
Care

Provider Disaster Planning and Adaptation Tools



Climate Change and Health
Vulnerability and Adaptation
Assessments
(CCHVAA) -WHO

[Emergency Preparedness Toolkit
Primary Care Providers.ashx
\(diversitypreparedness.org\)](https://diversitypreparedness.org)



- [Resources for Emergency Health Professionals|Emergency Preparedness & Response \(cdc.gov\)](https://www.cdc.gov/emergency-preparedness-response-recovery/)
- [Public Health Emergency www.phe.gov](https://www.phe.gov)

SAMHSA Disaster Mobile App. <https://store.samhsa.gov/product/samhsa-disaster>
<https://www.samhsa.gov/dtac/webinars-podcasts/resiliency-in-disaster-behavioral-health>

The Latest...

The 2021 report of the Lancet Countdown on health and climate change: code red for a healthy future

Executive summary

The Lancet Countdown is an international collaboration that independently monitors the health consequences of a changing climate. Publishing updated, new and improved indicators each year, the Lancet Countdown represents the consensus of leading researchers from 41 academic institutions and UN agencies. The 44 indicators of this report expose an unabated rise in the health impacts of climate change and the current health consequences of the delayed and inconsistent response of countries around the globe—providing a clear impetus for accelerated action that puts the health of people and planet above all else.

The 2021 report coincides with the UN Framework Convention on Climate Change 26th Conference of the Parties (COP26), at which countries are facing pressure to realise the ambition of the Paris Agreement to keep the global average temperature rise to 1.5°C and to mobilise the financial resources required for all countries to have an effective climate response. These negotiations unfold in the context of the COVID-19 pandemic—a global health crisis that has claimed millions of lives, affected livelihoods and communities around the globe, and exposed deep fissures and inequities in the world's capacity to cope with, and respond to, health emergencies. Yet, in its response to both crises, the world is faced with an unprecedented opportunity to ensure a healthy future for all.

Deepening inequities in a warming world

Record temperatures in 2020 resulted in a new high of 3.1 billion more person-days of heatwave exposure among people older than 65 years and 616 million more person-days affecting children younger than 1 year, compared with the annual average for the 1986–2005 baseline (indicator 1.2.2). Looking to 2021, people older than 65 years or younger than 1 year, along with people facing social disadvantages, were the most affected by the record-breaking temperatures of over 40°C in the Pacific Northwest area of the USA and Canada in June, 2021—an event that would have been almost impossible without

human-caused climate change. Although the exact number will not be known for several months, hundreds of people have died prematurely from the heat. Furthermore, populations in countries with low and medium levels of UN-defined human development index (HDI) have had the biggest increase in heat vulnerability indicators over the past 30 years, with risks to their health further exacerbated by the low availability of cooling mechanisms and urban green space (indicators 1.1.1, 2.1.2, and 2.1.3). Agricultural workers in countries with low and medium HDI were among the worst affected by exposure to extreme temperatures, bearing almost half of the 295 billion potential work hours lost due to heat in 2020 (indicator 1.1.6). These lost work hours could have devastating economic consequences to these already vulnerable workers—data in this year's report shows that the average potential earnings lost in countries in the low HDI group were equivalent to 4–8% of the national gross domestic product (indicator 4.1.3).

Through these effects, rising average temperatures, and altered rainfall patterns, climate change is beginning to reverse years of progress in tackling the food and water insecurity that still affects the most underserved populations around the world, denying them an essential aspect of good health. During any given month in 2020, up to 19% of the global land surface was affected by extreme drought; a value that had not exceeded 10% between 1950 and 1999 (indicator 1.2.2). In parallel with drought, warm temperatures are affecting the yield potential of the world's major staple crops—a 6.0% reduction for maize; 3.0% for winter wheat; 6.4% for soybean; and 1.8% for rice in 2020, relative to 1981–2010 (indicator 1.4.1)—exposing the rising risk of food insecurity.

Adding to these health hazards, the changing environmental conditions are also increasing the suitability for the transmission of many water-borne, air-borne, food-borne, and vector-borne pathogens. Although socioeconomic development, public health interventions, and advances in medicine have reduced the global



Lancet 2021, 398: 1619–612

Published online October 16, 2021
[https://doi.org/10.1016/S0140-6736\(21\)00446-4](https://doi.org/10.1016/S0140-6736(21)00446-4)
<https://www.thelancet.com/journal>

For the Chinese translation of the Executive Summary see Online Appendix 1.

For the French translation of the Executive Summary see Online Appendix 2.

For the German translation of the Executive Summary see Online Appendix 3.

For the Spanish translation of the Executive Summary see Online Appendix 4.

For the Arabic translation of the Executive Summary see Online Appendix 5.

For the Russian translation of the Executive Summary see Online Appendix 6.

For the Portuguese translation of the Executive Summary see Online Appendix 7.

For the Indonesian translation of the Executive Summary see Online Appendix 8.

For the Japanese translation of the Executive Summary see Online Appendix 9.

For the Korean translation of the Executive Summary see Online Appendix 10.

For the Thai translation of the Executive Summary see Online Appendix 11.

For the Vietnamese translation of the Executive Summary see Online Appendix 12.

For the Urdu translation of the Executive Summary see Online Appendix 13.

For the Bengali translation of the Executive Summary see Online Appendix 14.

For the Hindi translation of the Executive Summary see Online Appendix 15.

For the Telugu translation of the Executive Summary see Online Appendix 16.

For the Malayalam translation of the Executive Summary see Online Appendix 17.

For the Kannada translation of the Executive Summary see Online Appendix 18.

For the Marathi translation of the Executive Summary see Online Appendix 19.

For the Gujarati translation of the Executive Summary see Online Appendix 20.

For the Punjabi translation of the Executive Summary see Online Appendix 21.

For the Sinhala translation of the Executive Summary see Online Appendix 22.

For the Tamil translation of the Executive Summary see Online Appendix 23.

For the Malay translation of the Executive Summary see Online Appendix 24.

For the Indonesian translation of the Executive Summary see Online Appendix 25.

For the Javanese translation of the Executive Summary see Online Appendix 26.

For the Sundanese translation of the Executive Summary see Online Appendix 27.

For the Balinese translation of the Executive Summary see Online Appendix 28.

For the Acehnese translation of the Executive Summary see Online Appendix 29.

For the Minangkabau translation of the Executive Summary see Online Appendix 30.

For the Betawi translation of the Executive Summary see Online Appendix 31.

For the Palembang translation of the Executive Summary see Online Appendix 32.

For the Lampung translation of the Executive Summary see Online Appendix 33.

For the Bengkulu translation of the Executive Summary see Online Appendix 34.

For the Riau translation of the Executive Summary see Online Appendix 35.

For the Jambi translation of the Executive Summary see Online Appendix 36.

For the Sumatra translation of the Executive Summary see Online Appendix 37.

For the Kalimantan translation of the Executive Summary see Online Appendix 38.

For the Sulawesi translation of the Executive Summary see Online Appendix 39.

For the Maluku translation of the Executive Summary see Online Appendix 40.

For the Irian Jaya translation of the Executive Summary see Online Appendix 41.

For the Papua translation of the Executive Summary see Online Appendix 42.

For the West Papua translation of the Executive Summary see Online Appendix 43.

For the East Papua translation of the Executive Summary see Online Appendix 44.

For the North Maluku translation of the Executive Summary see Online Appendix 45.

For the South Maluku translation of the Executive Summary see Online Appendix 46.

For the North Sulawesi translation of the Executive Summary see Online Appendix 47.

For the South Sulawesi translation of the Executive Summary see Online Appendix 48.

For the West Sulawesi translation of the Executive Summary see Online Appendix 49.

For the East Sulawesi translation of the Executive Summary see Online Appendix 50.

For the North Sulawesi translation of the Executive Summary see Online Appendix 51.

For the South Sulawesi translation of the Executive Summary see Online Appendix 52.

For the West Sulawesi translation of the Executive Summary see Online Appendix 53.

For the East Sulawesi translation of the Executive Summary see Online Appendix 54.

For the North Sulawesi translation of the Executive Summary see Online Appendix 55.

For the South Sulawesi translation of the Executive Summary see Online Appendix 56.

For the West Sulawesi translation of the Executive Summary see Online Appendix 57.

For the East Sulawesi translation of the Executive Summary see Online Appendix 58.

For the North Sulawesi translation of the Executive Summary see Online Appendix 59.

For the South Sulawesi translation of the Executive Summary see Online Appendix 60.

For the West Sulawesi translation of the Executive Summary see Online Appendix 61.

For the East Sulawesi translation of the Executive Summary see Online Appendix 62.

For the North Sulawesi translation of the Executive Summary see Online Appendix 63.

For the South Sulawesi translation of the Executive Summary see Online Appendix 64.

For the West Sulawesi translation of the Executive Summary see Online Appendix 65.

For the East Sulawesi translation of the Executive Summary see Online Appendix 66.

For the North Sulawesi translation of the Executive Summary see Online Appendix 67.

For the South Sulawesi translation of the Executive Summary see Online Appendix 68.

For the West Sulawesi translation of the Executive Summary see Online Appendix 69.

For the East Sulawesi translation of the Executive Summary see Online Appendix 70.

For the North Sulawesi translation of the Executive Summary see Online Appendix 71.

For the South Sulawesi translation of the Executive Summary see Online Appendix 72.

For the West Sulawesi translation of the Executive Summary see Online Appendix 73.

For the East Sulawesi translation of the Executive Summary see Online Appendix 74.

ipcc
 INTERGOVERNMENTAL PANEL ON climate change

Climate Change 2021

The Physical Science Basis

Working Group I contribution to the Sixth Assessment Report of the Intergovernmental Panel on Climate Change

WHO | UNEP

UN CLIMATE CHANGE CONFERENCE UK 2021

2021 Global Conference on Health & Climate Change

Saturday, November 6th

Middle weekend of COP26

Hybrid format: online and in-person

at the Glasgow Caledonian University

<https://ukcop26.org/>

2021 Report - Lancet Countdown

AR6 Climate Change 2021: The Physical Science Basis — IPCC

<https://www.who.int/news-room/events/detail/2021/11/06/default-calendar/2021-global-conference-on-health-and-climate-change>

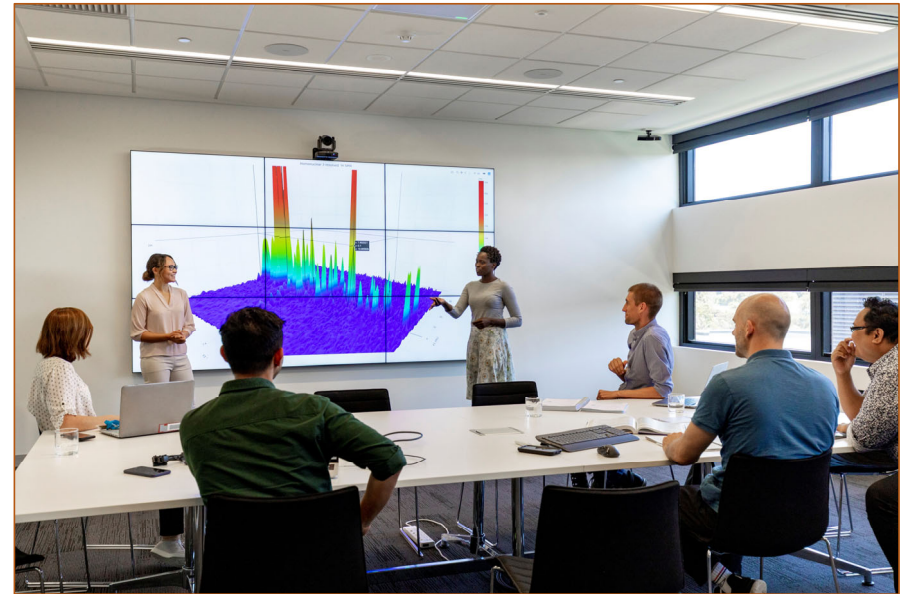


What can we do as an organization?

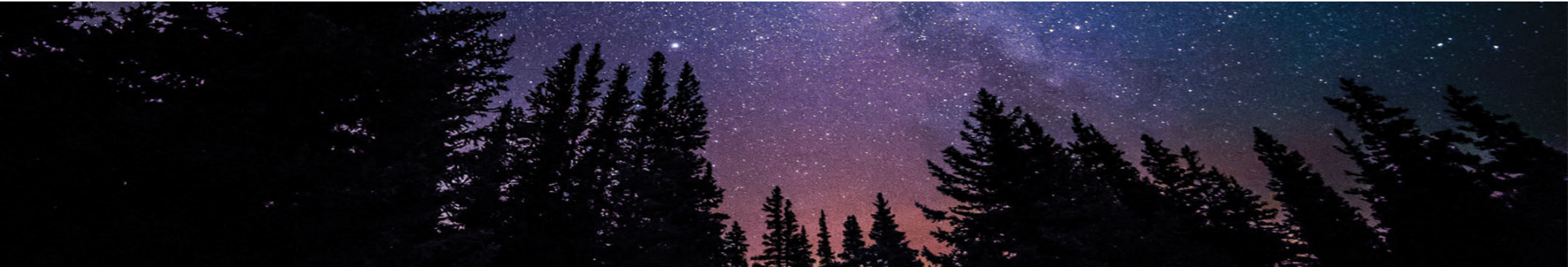
1. Being curious:

- Our members
- Our providers
- Our customer's expectations
- Our employees

2. Letting our values lead the way towards solutions



“The journey of a thousand miles starts with one step”



When despair for the world grows in me
and I wake in the night at the least sound
in fear of what my life and my children's lives may be,
I go and lie down where the wood drake
rests in his beauty on the water, and the great heron feeds.
I come into the peace of wild things
who do not tax their lives with forethought
of grief. I come into the presence of still water.
And I feel above me the day-blind stars
waiting with their light. For a time
I rest in the grace of the world, and am free.

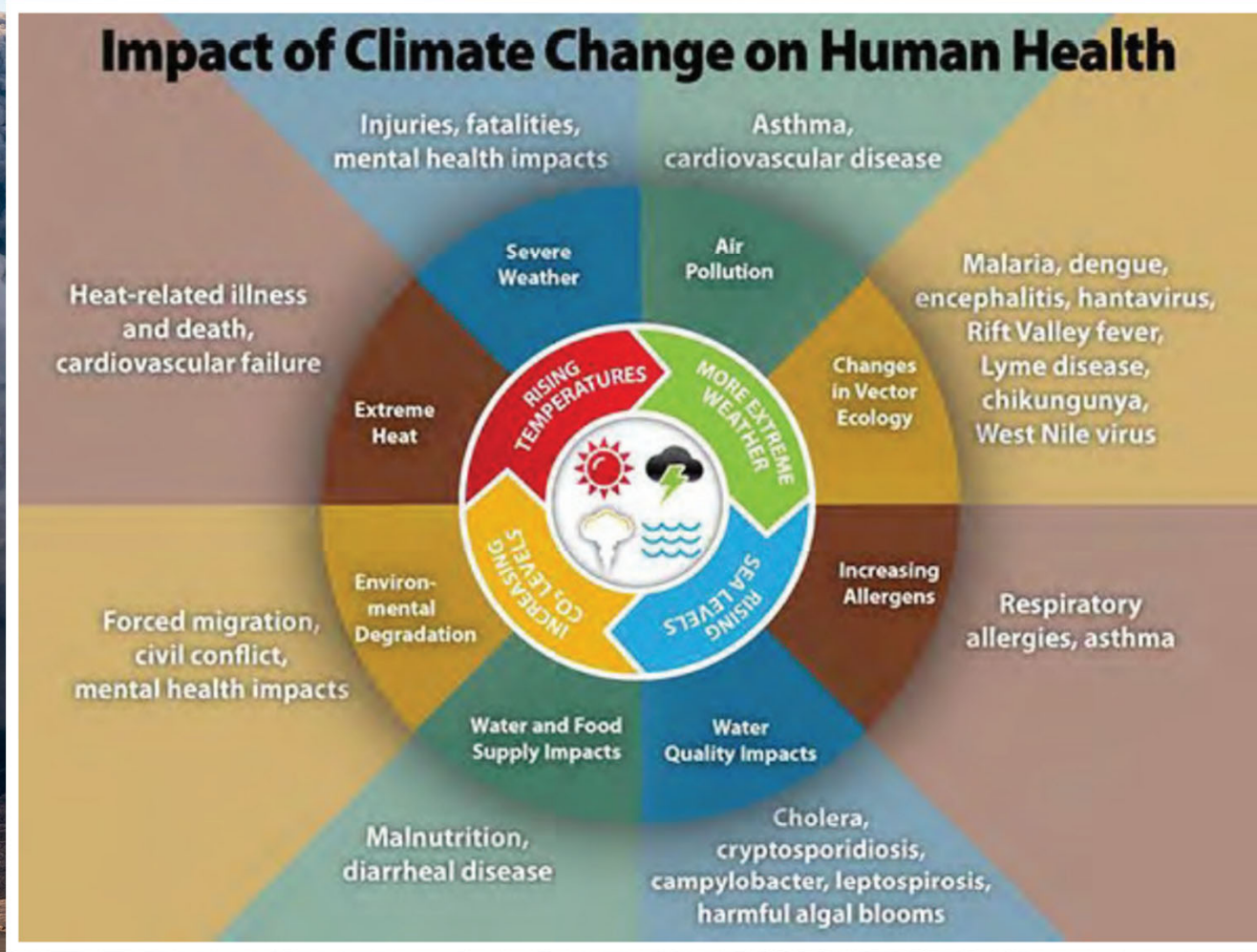
The Peace of Wild Things

© Wendell Berry. Excerpted from [*The Selected Poems of Wendell Berry*](#)

Appendix

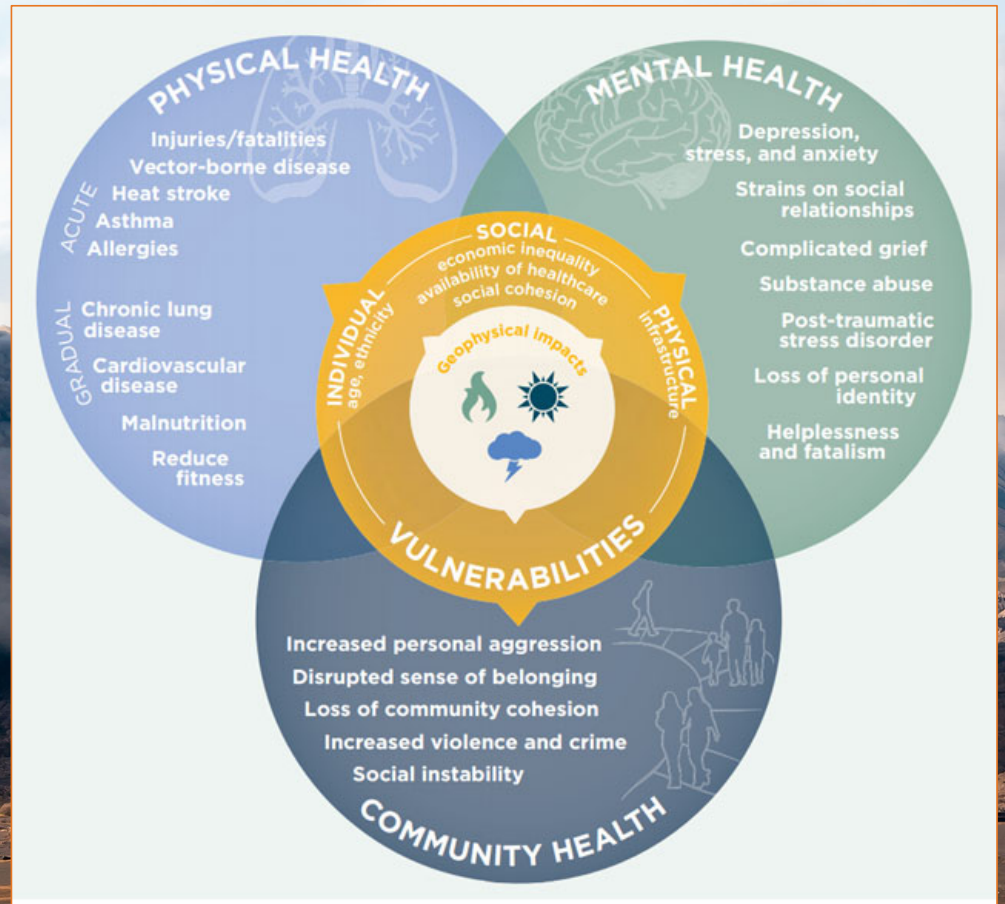
1. Health and climate
2. Disaster phases
3. Acute and long-term climate events
4. Professional organizations involved in climate change
5. General resources, organizations





Centers for Disease Control and Prevention (2014). <https://www.cdc.gov/climateandhealth/effects/default.htm>

Physical Impacts, Mental Health and Community Wellbeing.



Clayton, S. et al. (2017). Mental health and our changing climate: Impacts, implications, and guidance. Washington, DC:

American Psychological Association and ecoAmerica.

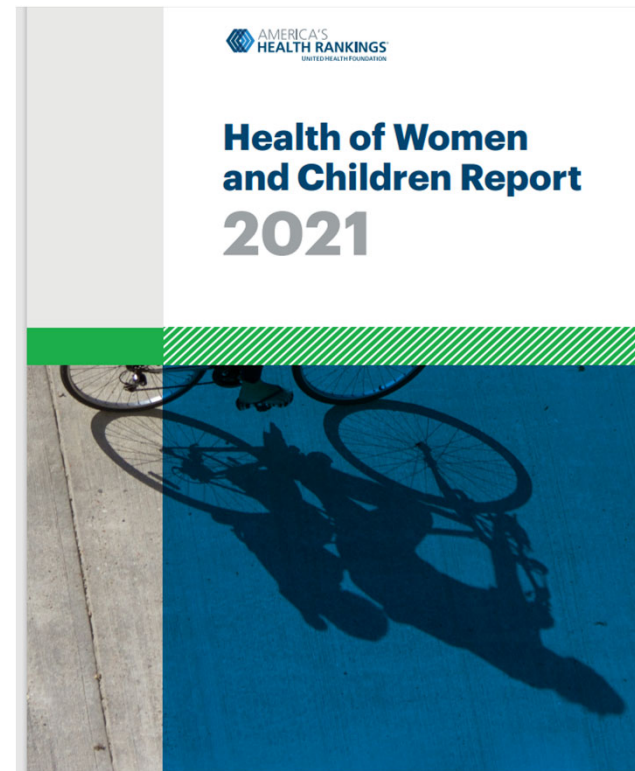
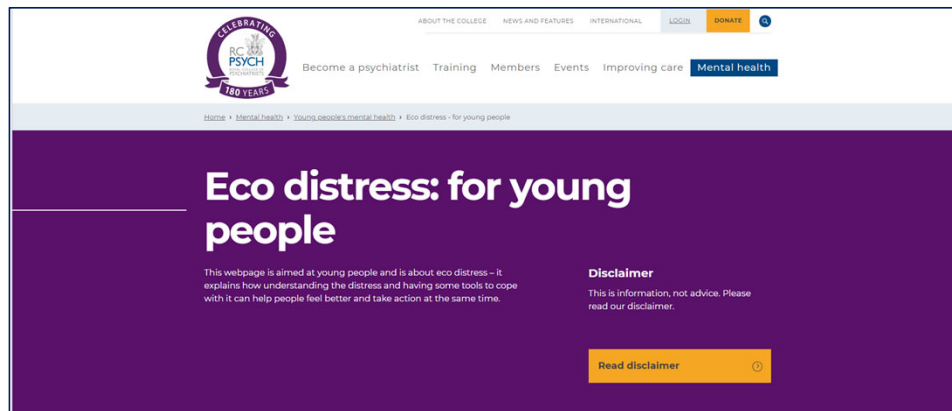
© 2020 Optum, Inc. All rights reserved. Confidential property of Optum. Do not distribute or reproduce without express permission from Optum.

Phases of Disaster



SAMHSA (2015): Crisis Counseling Assistance and Training Program Guidance. <https://www.samhsa.gov/sites/default/files/images/fema-ccp-guidance.pdf>

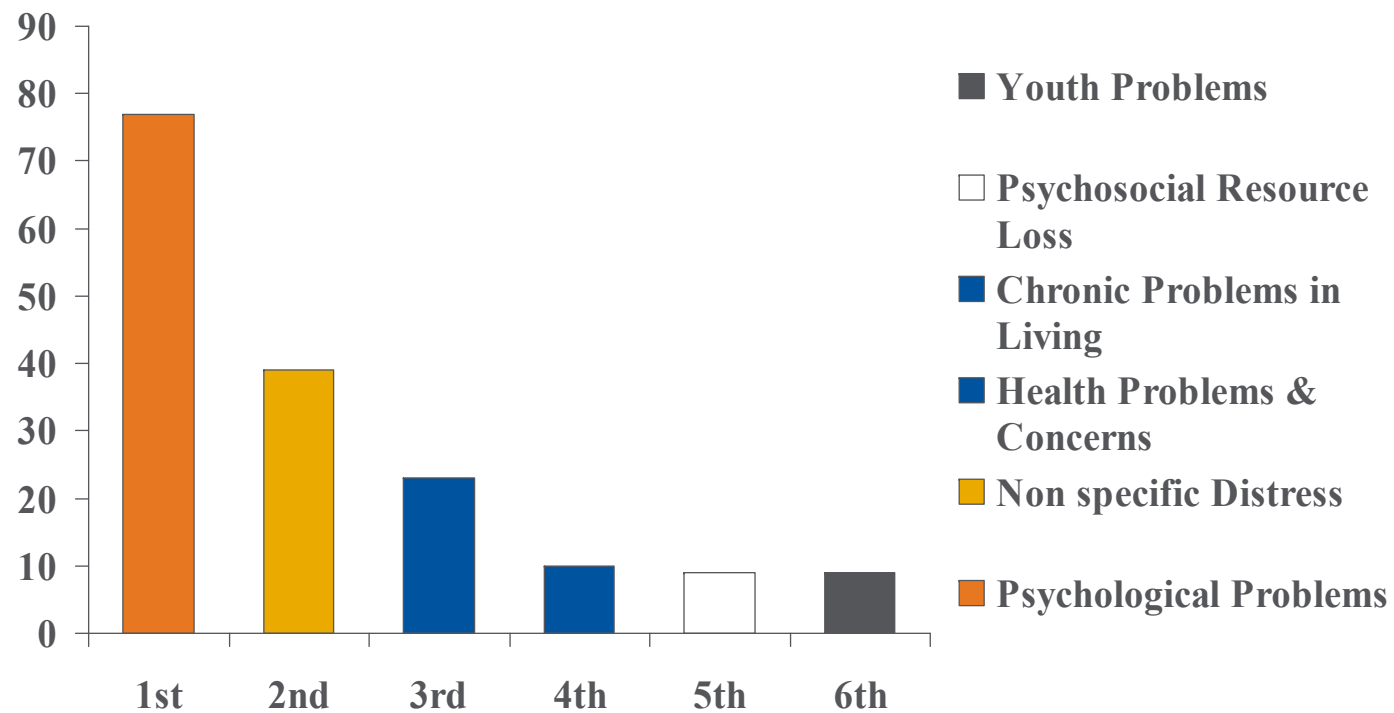
The Latest...



<https://www.rcpsych.ac.uk/mental-health/parents-and-young-people/young-people/eco-distress---for-young-people>

<https://assets.americashealthrankings.org/app/uploads/hwc2021-report.pdf>

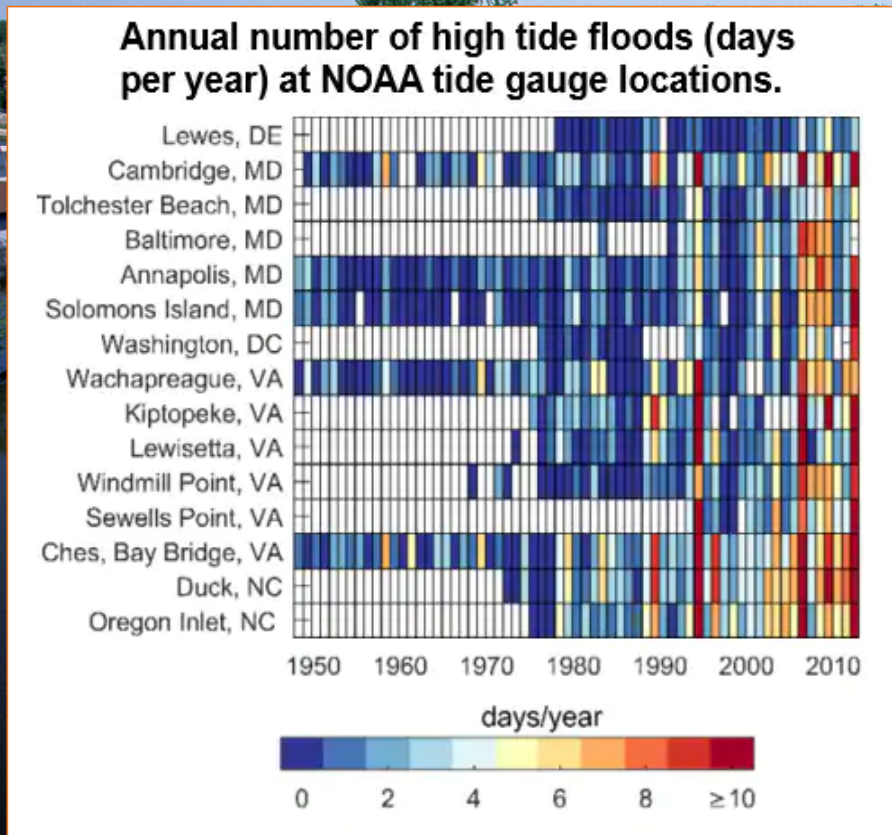
Six most common BH problems after disasters



Norris, FH et al . (2002). 60,000 disaster victims speak: Part I. An empirical review of the empirical literature, 1981–2001. *Psychiatry: Interpersonal and biological processes*, 65(3), 207-239.

East Coast storm bringing worst coastal flooding since 2003 to parts of Mid-Atlantic

Matthew Cappucci *The Washington Post*. Oct 29, 2021



<https://www.cleveland.com/news/2021/08/us-army-corps-of-engineers-project-will-prevent-flooding-of-the-cuyahoga-river-in-independence.html>

© 2020 Optum, Inc. All rights reserved. Confidential property of Optum. Do not distribute or reproduce without express permission from Optum.

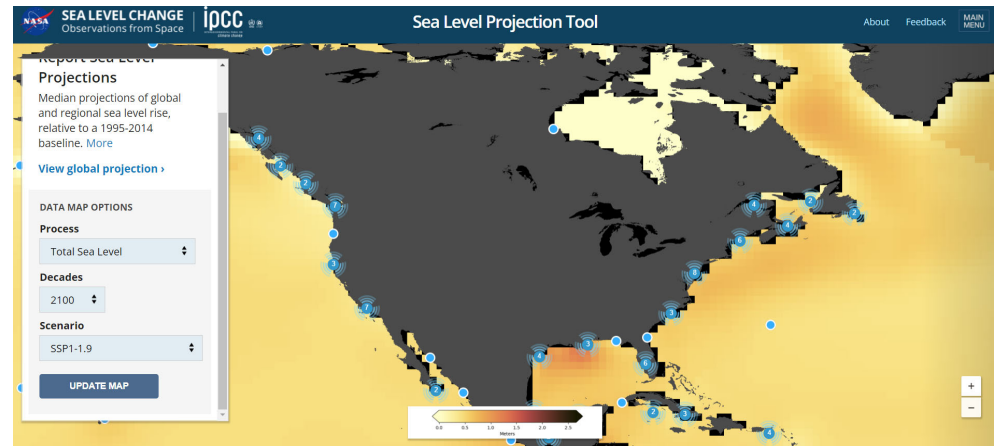
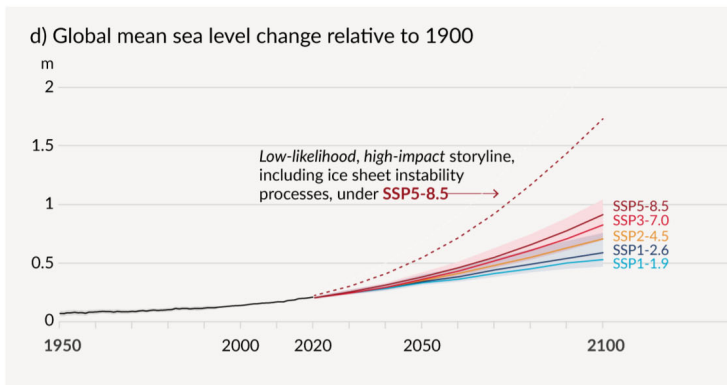
IPCC AR6

Sea Level Rise

SIXTH ASSESSMENT REPORT
Working Group I – The Physical Science Basis



Human activities affect all the major climate system components, with some responding over decades and others over centuries *Figure SPM.8*



IPCC AR6 Report (2021) <https://www.ipcc.ch/report/ar6/wg1/#SPM>

NASA IPCC AR6 Sea Level Projection Tool (2021) <https://sealevel.nasa.gov/ipcc-ar6-sea-level-projection-tool>

<https://www.fema.gov/flood-insurance/risk-rating>

Environmental pollution & Behavioral Health

55 oil spills post Ida.

10 M gallons in the Gulf since 2005 (same as Exxon Valdez)

Deep Water Horizon 120M gallons

Psychological Adversity from:

- ❖ Negative media coverage
- ❖ Harm to ecosystems/wildlife (fisheries)
- ❖ Disruption of local industry (fishing, oil exploration, tourism)
- ❖ Physical health effects
- ❖ Previous disasters (Katrina & Rita 2005; Isaac 2008; Ida 2021)
- ❖ Deep Water Horizon associated with increased PTSD and depression; both in residents AND cleaning crews.



Osofsky, H. et al (2011). Deepwater Horizon Oil Spill: Mental Health Effects on Residents in Heavily Affected Areas.

Disaster Med Public Health Prep 5(4), 280-286.

Kwok, R. K. et al (2017). Mental health indicators associated with oil spill response and clean-up: cross-sectional analysis of the Gulf STUDY cohort.

Lancet Pub Health, 2(12), e560-e567.

Air Pollution and COVID-19: A Double Whammy for African American and Impoverished Communities in Cancer Alley

Terrell K; Wesley J 2020.

- PM 2.5 is a leading factor associated with excess deaths. (Cohen 2017; Burnett 2018)
- Higher pollution burdens (PM2.5) highest for African Americans; higher unemployment rates, higher poverty rates, and larger percentages of seniors (aged 65+) living in poverty. Disparities in Cancer Alley.
- Highest covid mortality in 8/10 parishes in Cancer Alley, not driven by diabetes prevalence, obesity prevalence, smoking, age, or socioeconomic factors.

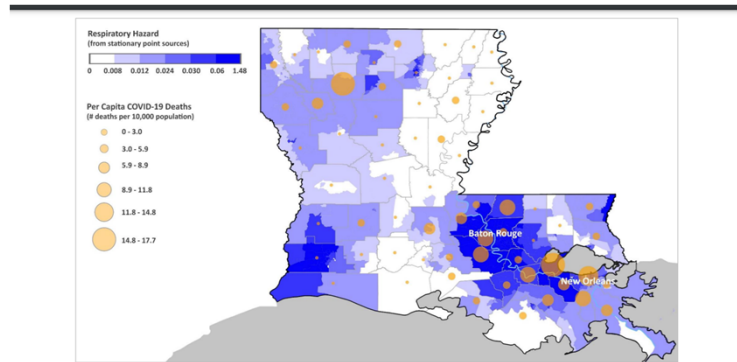


Figure 1. Respiratory Hazard (purple shading) by census tract, relative to parish-level per capita COVID-19 death rates through May 12, 2020 (circles). Hazard values are from stationary point sources of pollution only (i.e. excluding vehicles and other mobile or nonpoint sources). See methods for data sources.

Cohen et al Estimates and 25-year trends of the global burden of disease attributable to ambient air pollution: an analysis of data from the Global Burden of Diseases Study 2015. *Lancet* 2017;389:1907–1918.

Burnett et al Global estimates of mortality associated with long-term exposure to outdoor fine particulate matter. *Proc Natl Acad Sci* 2018;115:9592–9597.

Terrell, K. A., & James, W. (2020). Racial Disparities in Air Pollution Burden and COVID-19 Deaths in Louisiana, USA, in the Context of Long-Term Changes in Fine Particulate Pollution. *Environmental Justice*.

Wu, X., et al , 2020. Air pollution and COVID-19 mortality in the United States: Strengths and limitations of an ecological regression analysis.

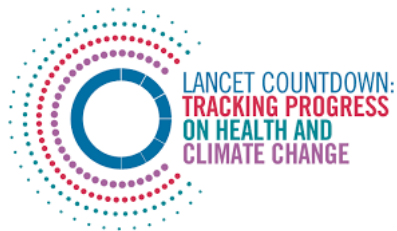
Science advances, 6(45), p.eabd4049.

Solutions, Mitigation and Resilience

What Healthcare Professionals Can Do



What Healthcare Professionals Can Do



Healthy Climate Prescription
<https://healthyclimateletter.net/>

Solutions, Mitigation and Resilience

Supporting Individuals



Citizens' Climate Lobby



Appendix

Getting involved.



Climate Change Action

- > 350.org
- > Citizens Climate Lobby
- > Climate Reality Project
- > Climate Solutions
- > ConservAmerica
- > Earth Justice
- > ecoAmerica
- > GreenPeace USA
- > iMatter
- > Moms Clean Air Force
- > Mothers Out Front
- > NextGen Climate
- > Union of Concerned Scientists



Climate Change Education

- > ACE – Alliance For Climate Education
- > CAMEL Climate Adaption Mitigation E-Learning
- > CCEP – Climate Change Education Partnership
- > Climate Reality Project – Presentations
- > I See Change – Community Climate & Weather



Wildlife/Ecosystem Conservation

- > Audubon Society
- > Conservation International
- > Conservation Land Foundation
- > Environmental Defense Fund (EDF)
- > Land Trust Alliance
- > National Wildlife Federation (NWF)
- > Natural Resources Defense Council (NRDC)
- > Nature Conservancy
- > Polar Bears International
- > Rainforest Action Network (RAN)
- > Sierra Club
- > The Wilderness Society
- > World Wildlife Federation (WWF)

Appendix

Climate and Weather Resources

1. Justice Map: race and income

<http://www.justicemap.org/>

2. FEMA Flood map service

<https://msc.fema.gov/portal/home>

3. US Drought Monitor

<https://droughtmonitor.unl.edu/>

4. World Weather Attribution

<https://www.worldweatherattribution.org/>

5. . City Heat 20 cities

<https://www.geotab.com/heat-in-the-city/#>

6.. States at Risk: Climate-driven weather events impact on 50 US cities and projections

<https://statesatrisk.org/>

7.. Heat Index forecast US

<https://www.drought.gov/data-maps-tools/national-weather-service-heat-index-forecasts>

8.. NYC Environment Health data portal

<https://a816-dohbesp.nyc.gov/IndicatorPublic/Infographic.aspx>

9. ProPublica Climate Maps

<https://projects.propublica.org/climate-migration/>

10. Entergy (Energy vendor) outage map

<https://www.entergy.com/view-outages/>