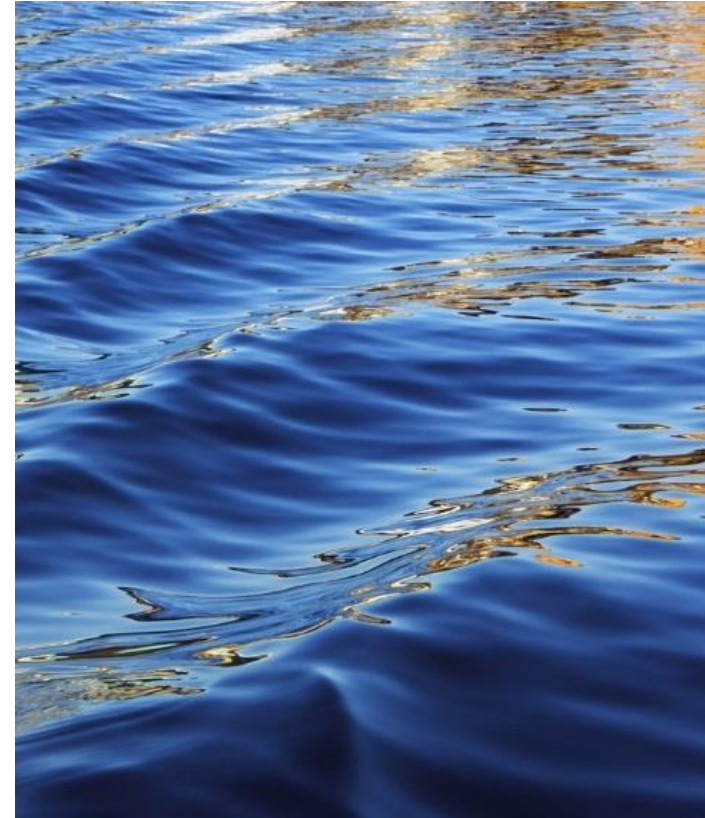


Changing Climate Exposures and Impacts; Temperature Extremes & Wildfire

Tribal Climate and Health Adaptation Webinar #2



Since Last Webinar

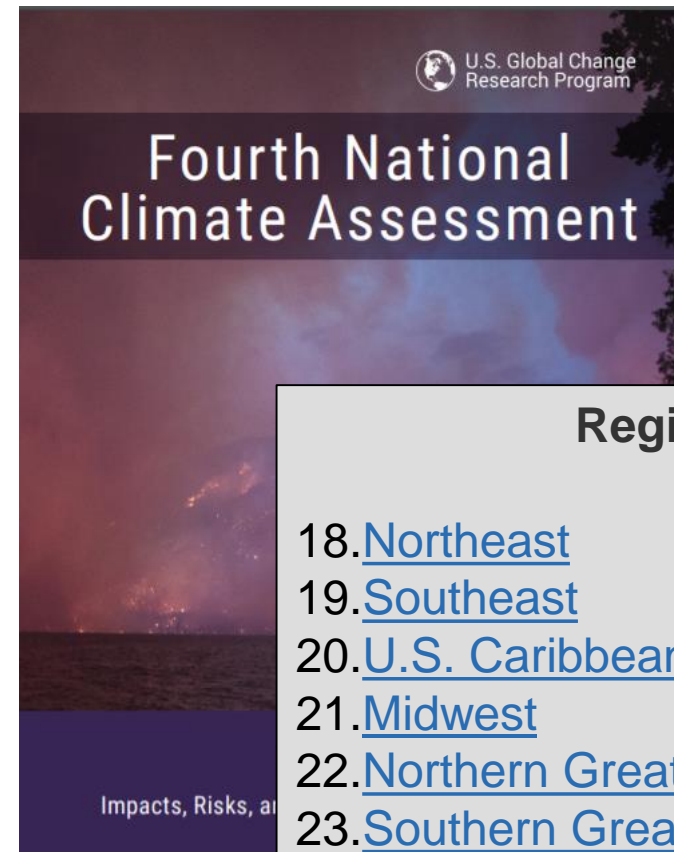
- Pre-assessment survey
- Groups.io
 - Accept invitation

Suggested action steps (complete before next webinar)

- Identify other members of your team or region that may benefit from taking the training
- Connect with your local Tribal Epidemiology Center
- Review work being done by tribes in your region on the BIA's U.S. Indigenous Peoples Resilience Actions [Map](#)

Suggested reading (complete before next webinar)

- [Fourth National Climate Assessment: Regional Reports](#)



Regions

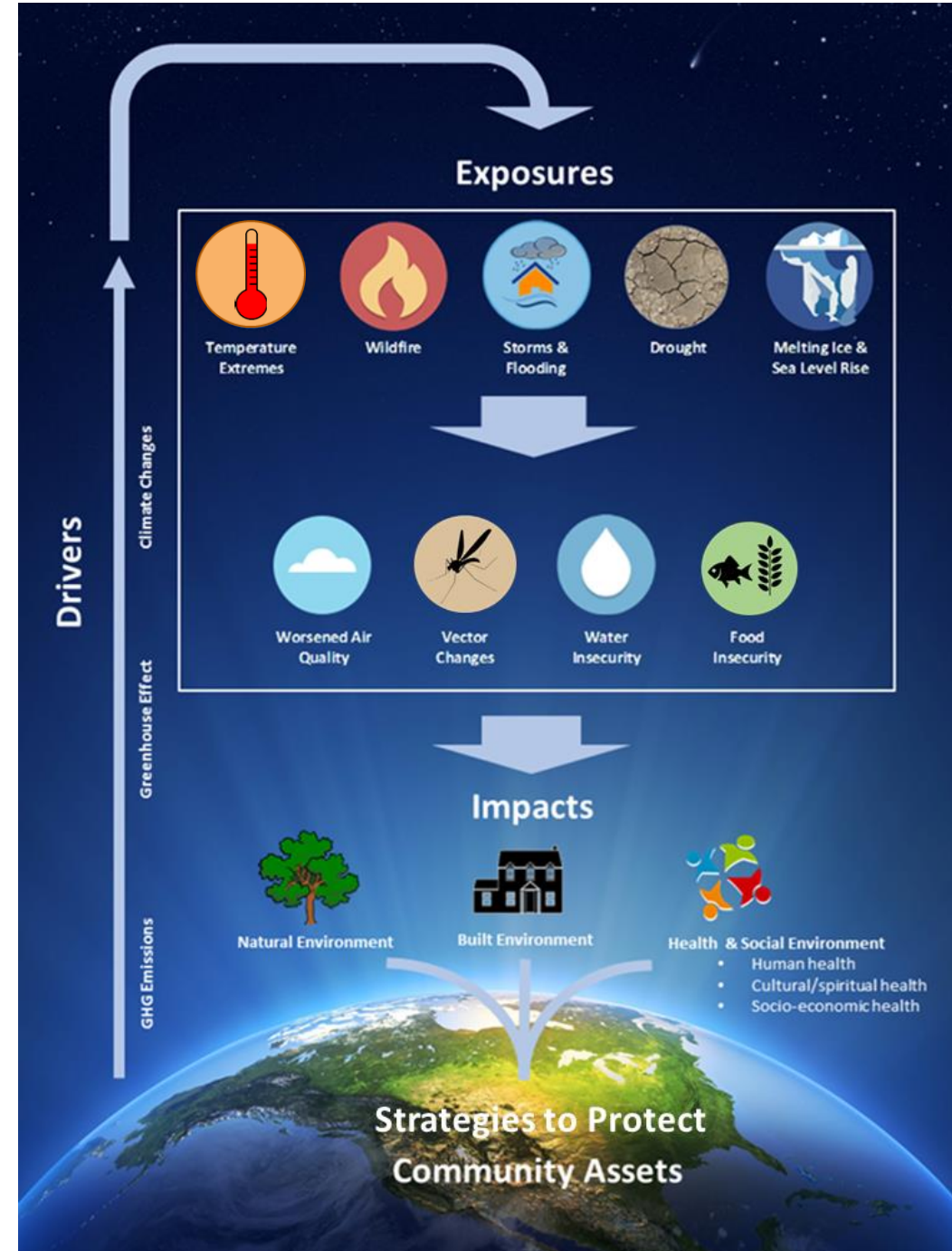
18. [Northeast](#)
19. [Southeast](#)
20. [U.S. Caribbean](#)
21. [Midwest](#)
22. [Northern Great Plains](#)
23. [Southern Great Plains](#)
24. [Northwest](#)
25. [Southwest](#)
26. [Alaska](#)
27. [Hawai'i & U.S.-Affiliated Pacific Islands](#)

Chat Discussion:

Did you make contact with your TEC? What did you read about that surprised you?

TCHP Framework

- Illustrates the cascading effects of climate change and how communities can protect assets against harmful impacts (basis for training)
- For example, communities that expect greater levels of flooding may look out for contaminated water and indoor mold spores.
- Not every exposure is applicable to every community, or to the same extent



TCHP Framework

Secondary exposures



Worsened Air Quality

- Ozone
- Smoke/Particulate matter
- Dust/Fungus
- Allergens
- Indoor mold



Vector Changes

- Disease-carrying ticks
- Disease-carrying mosquitos
- Disease carrying mice
- Forest Pests



Water Insecurity

- Contamination
- Supply shortage
- Distribution disruption



Food Insecurity

- Supply shortage
- Distribution disruption

What is Health and Wellbeing?

Western and tribal communities often define health differently

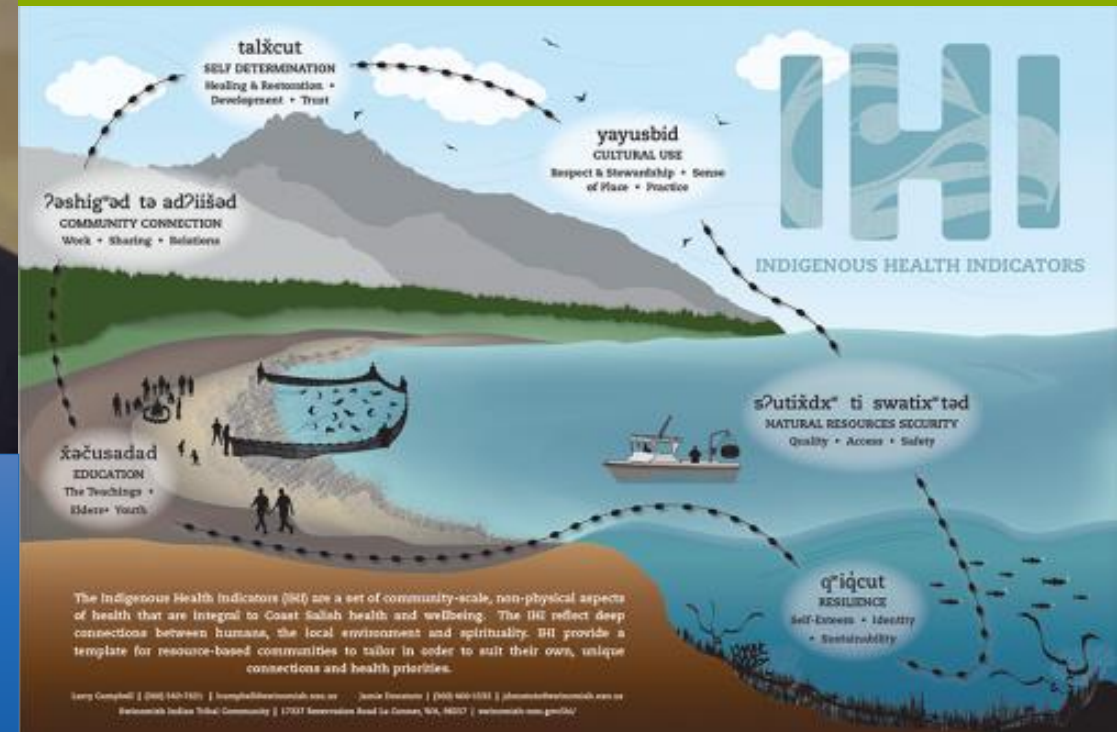


“Mission: By providing whole-person health services in medical care, preventative wellness programs, rural community infrastructure development and statewide solutions, we are able to protect and perpetuate our Alaska Native culture and traditions”

Alaska Native Tribal Health Consortium

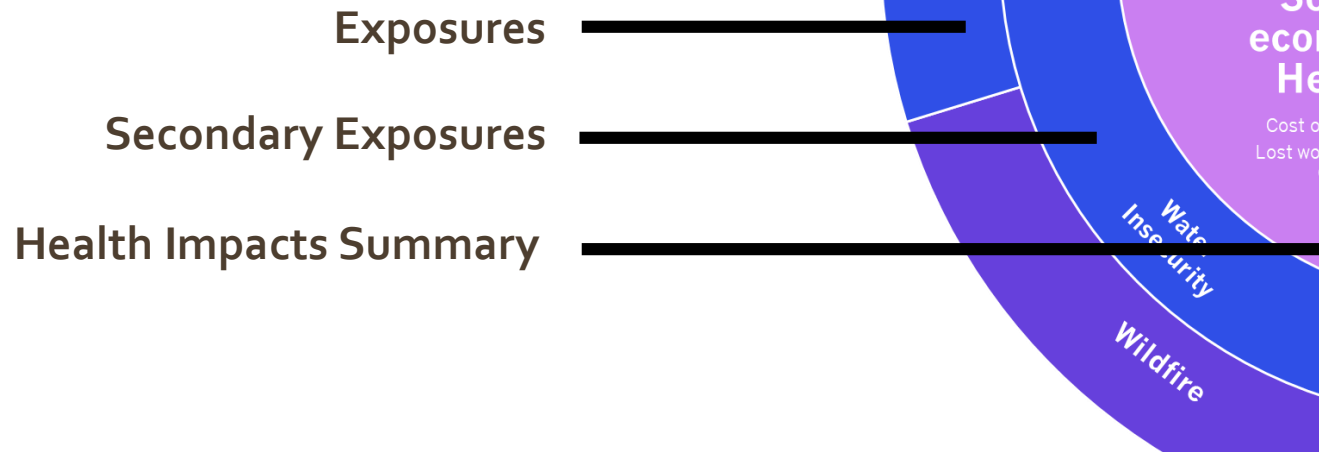
“Nobody can be in good health if he does not have all the time fresh air, sunshine and good water.”

Flying Hawk (Chief) 1854 – 1931, Oglala Lakota



What is Health?

Tribal Climate Health Project defines health more broadly than the absence of medical disease:



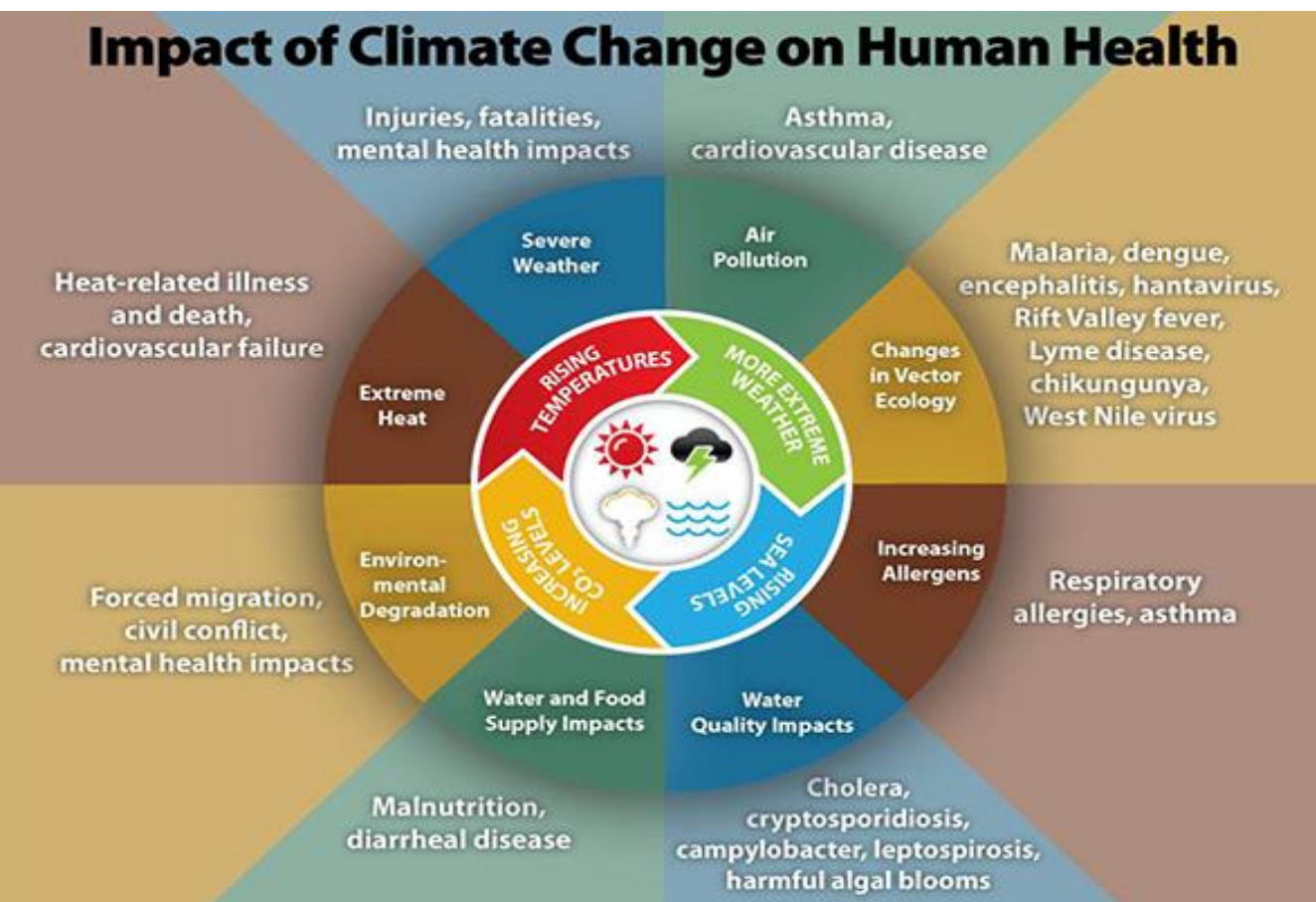
Poll

Group Discussion:

Please share stories, observations and examples about climate related health impacts for your tribe

Climate Change and Human Health

Climate change is increasing the number of people at greater risk of human health threats such as **illness, injury, death, trauma and other mental and psychosocial consequences**



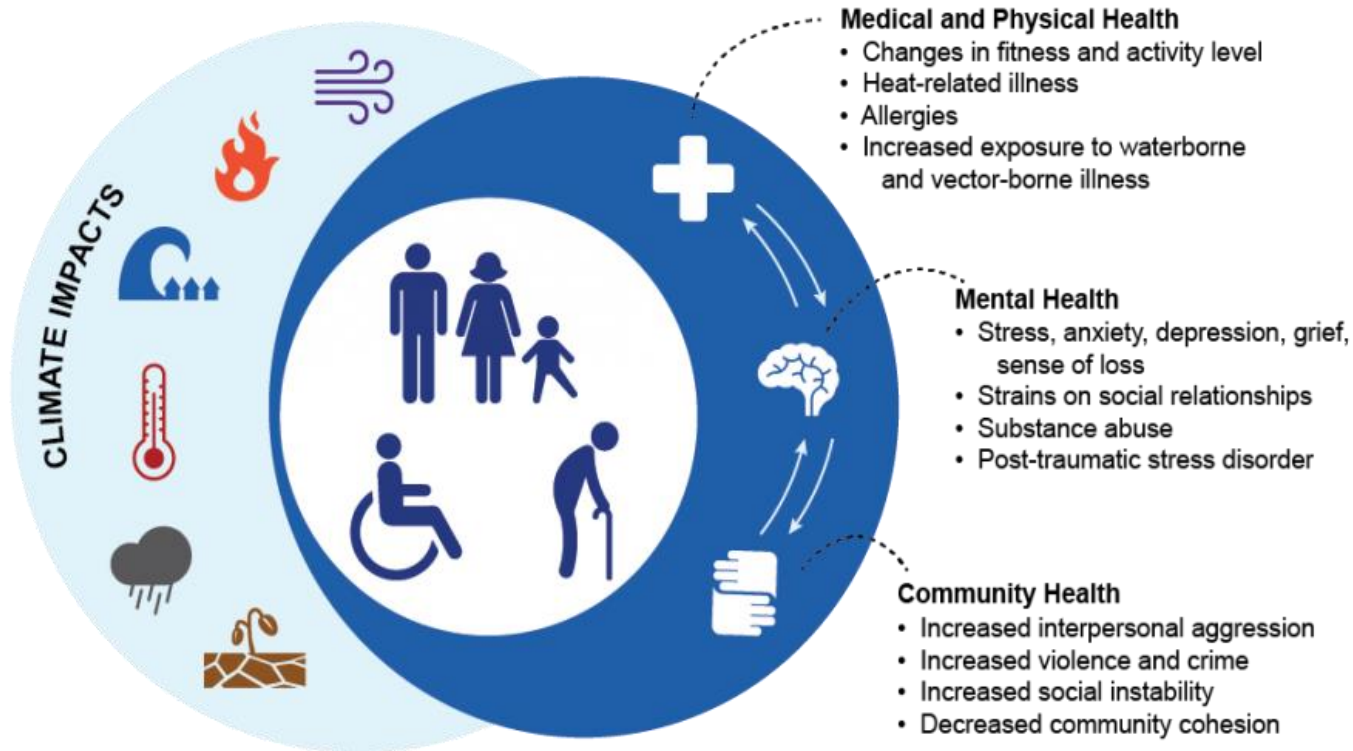
USGCRP Climate and Health Assessment Key Findings

- Increased exposure to extreme events and coastal flooding will effect health
- Disruptions to essential infrastructure can limit access to healthcare and emergency response services

“Our environment was rich in the wealth of natural resources, providing all our needs, allowing us to live healthy happy lives!”

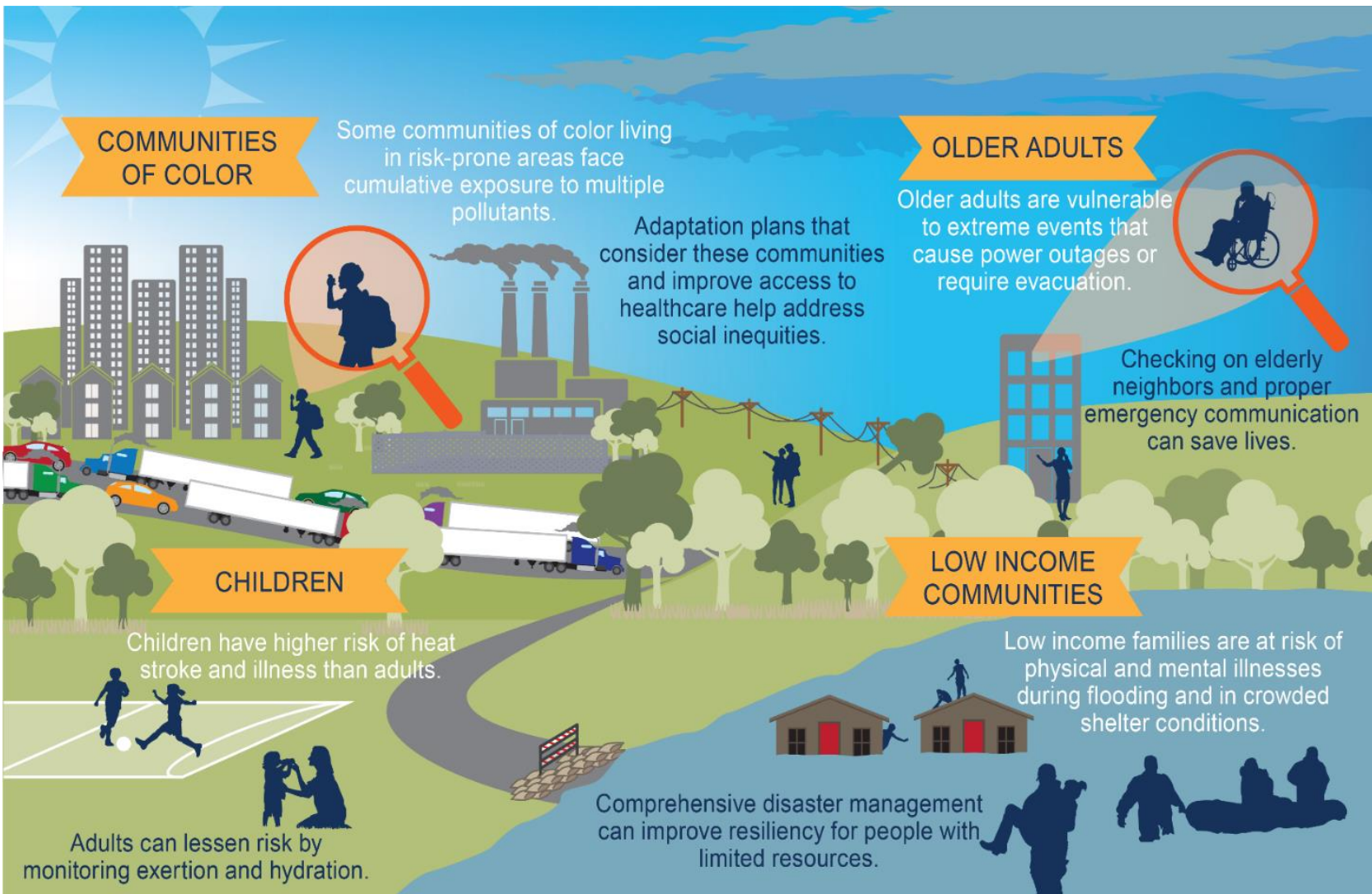
Puyallup Tribe

Climate Change and Human Health



	Climate Driver	Exposure	Health Outcome	Impact
Extreme Heat	More frequent, severe, prolonged heat events	Elevated temperatures	Heat-related death and illness	Rising temperatures will lead to an increase in heat-related deaths and illnesses.
Outdoor Air Quality	Increasing temperatures and changing precipitation patterns	Worsened air quality (ozone, particulate matter, and higher pollen counts)	Premature death, acute and chronic cardiovascular and respiratory illnesses	Rising temperatures and wildfires and decreasing precipitation will lead to increases in ozone and particulate matter, elevating the risks of cardiovascular and respiratory illnesses and death.
Flooding	Rising sea level and more frequent or intense extreme precipitation, hurricanes, and storm surge events	Contaminated water, debris, and disruptions to essential infrastructure	Drowning, injuries, mental health consequences, gastrointestinal and other illness	Increased coastal and inland flooding exposes populations to a range of negative health impacts before, during, and after events.
Vector-Borne Infection (Lyme Disease)	Changes in temperature extremes and seasonal weather patterns	Earlier and geographically expanded tick activity	Lyme disease	Ticks will show earlier seasonal activity and a generally northward range expansion, increasing risk of human exposure to Lyme disease-causing bacteria.
Water-Related Infection (Vibrio vulnificus)	Rising sea surface temperature, changes in precipitation and runoff affecting coastal salinity	Recreational water or shellfish contaminated with <i>Vibrio vulnificus</i>	<i>Vibrio vulnificus</i> induced diarrhea & intestinal illness, wound and blood-stream infections, death	Increases in water temperatures will alter timing and location of <i>Vibrio vulnificus</i> growth, increasing exposure and risk of water-borne illness.
Food-Related Infection (Salmonella)	Increases in temperature, humidity, and season length	Increased growth of pathogens, seasonal shifts in incidence of <i>Salmonella</i> exposure	<i>Salmonella</i> infection, gastrointestinal outbreaks	Rising temperatures increase <i>Salmonella</i> prevalence in food; longer seasons and warming winters increase risk of exposure and infection.
Mental Health and Well-Being	Climate change impacts, especially extreme weather	Level of exposure to traumatic events, like disasters	Distress, grief, behavioral health disorders, social impacts, resilience	Changes in exposure to climate- or weather-related disasters cause or exacerbate stress and mental health consequences, with greater risk for certain populations.

Vulnerable Populations



The Good News

Adaptation is the process of taking actions to reduce or manage risks associated with climate change.



Report prepared by:

Michael Brubaker, MS
Raj Chavan, PE, PhD

ANTHC recognizes all of our technical advisors for this report. Thank you for your support:

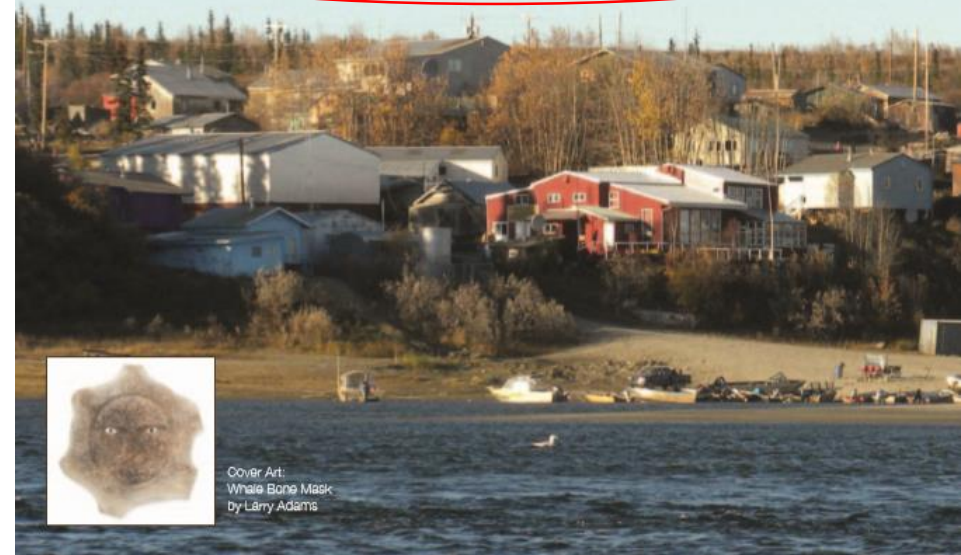
Gloria Shellabarger, Kiana Tribal Council
Linda Stotts, Kiana Tribal Council
Dale Stotts, Kiana Tribal Council
Sharon Dundas, City of Kiana
Crystal Johnson, City of Kiana
Brad Reich, City of Kiana
John Chase, Northwest Arctic Borough
Paul Eaton, Manillaq Association
Millie Hawley, Manillaq Association
Jackie Hill, Manillaq Association
John Monville, Manillaq Association
James Berner, ANTHC

Mike Black, ANTHC
Brad Blackstone, ANTHC
Jay Butler, ANTHC
Eric Hanssen, ANTHC
Oxenia O'Domin, ANTHC
Desirae Roehl, ANTHC
Jeff Smith, ANTHC
Mark Spafford, ANTHC
Moses Tcheripanoff, ANTHC
John Warren, ANTHC
Steve Weaver, ANTHC

© Alaska Native Tribal Health Consortium (ANTHC), October 2011.

Funded by United States Indian Health Service Cooperative Agreement No. AN 08-X59

Through adaptation, negative health effects can be prevented.



Chat Discussion:

What has kept your tribe from acting on climate and health threats?



Temperature Extremes





Temperature Extremes

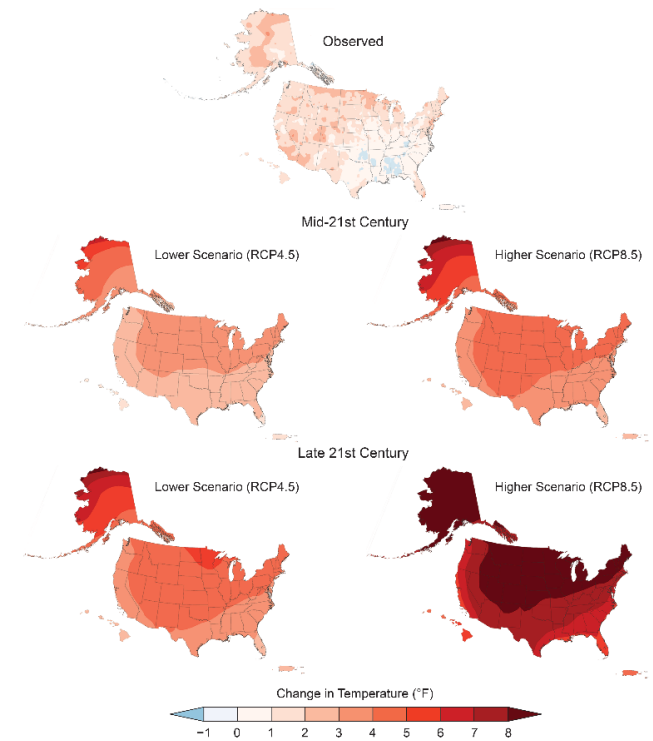
Key Climate Exposure Facts

- Increased **1.8 degrees F** from 1895 - 2016
- Projected to increase **2.8 – 7.3 degrees F** by 2071 – 2100
- Season shifts, more extreme heat and extreme cold events, sea temperatures

Regions Affected

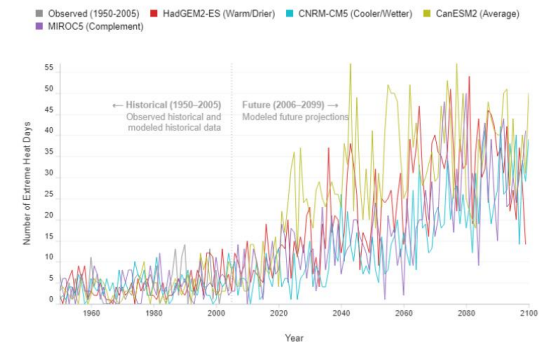
All – Southwest particularly vulnerable to extreme heat

Group Discussion:
What health impacts can you anticipate?



Number of Extreme Heat Days by Year

This chart shows number of days in a year when daily maximum temperature is above the extreme heat threshold of 97.1 °F. Data is shown for Boulevard under the RCP 4.5 scenario in which emissions peak around 2040, then decline.



• Source: Cal-Adapt Data: LOCA Downscaled Climate Projections (Scripps Institution of Oceanography), Gridded Historical Observed Meteorological and Hydrological Data (University of Colorado, Boulder)
• Four models have been selected by California's Climate Action Team Research Working Group as **priority models** for research contributing to California's Fourth Climate Change Assessment. Projected future climate from these four models can be described as producing:

- A warm/dry simulation (HadGEM2-ES)
- A cooler/wetter simulation (CNRM-CM5)
- An average simulation (CanESM2)
- The model simulation that is most unlike the first three for the best coverage of different possibilities (MIROC5)

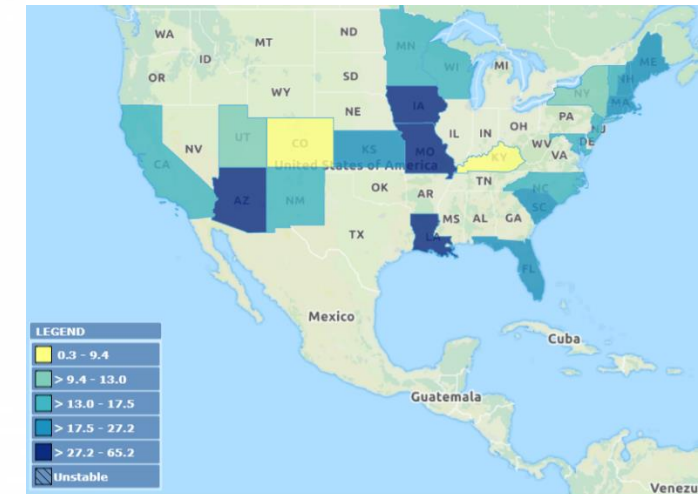
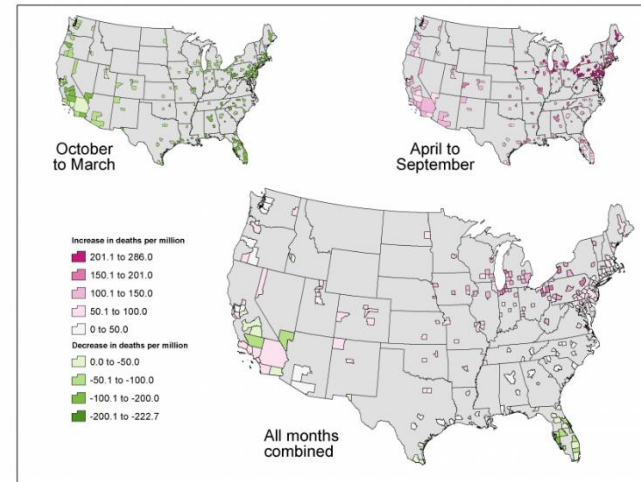
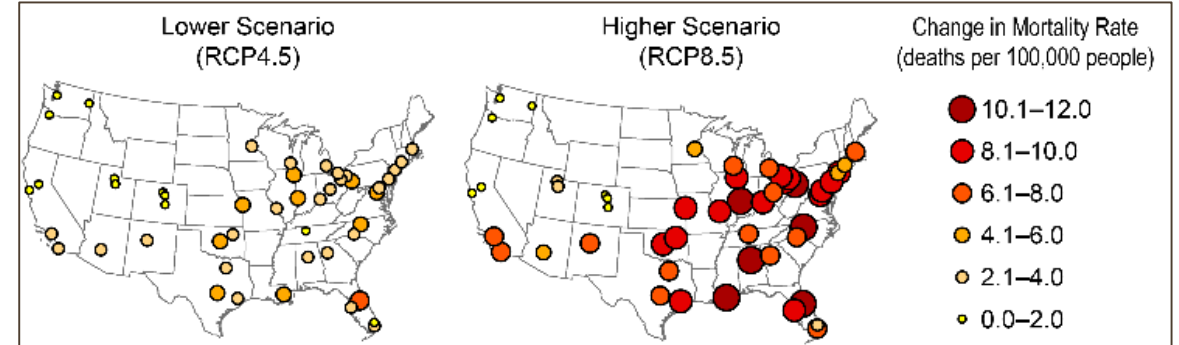


Temperature Extremes

Possible Health Impacts

- Heat-related illness and death
- Decrease in fitness activity level
- Mental, behavioral and cognitive wellbeing
 - Increased conflict violence and aggression

IMPACTS



CLIMATE CHANGE | HEAT STRESS EMERGENCY DEPARTMENT VISITS | AGE-ADJUSTED RATE OF EMERGENCY DEPARTMENT VISITS FOR HEAT STRESS PER 100,000 POPULATION | ALL STATES | 2013



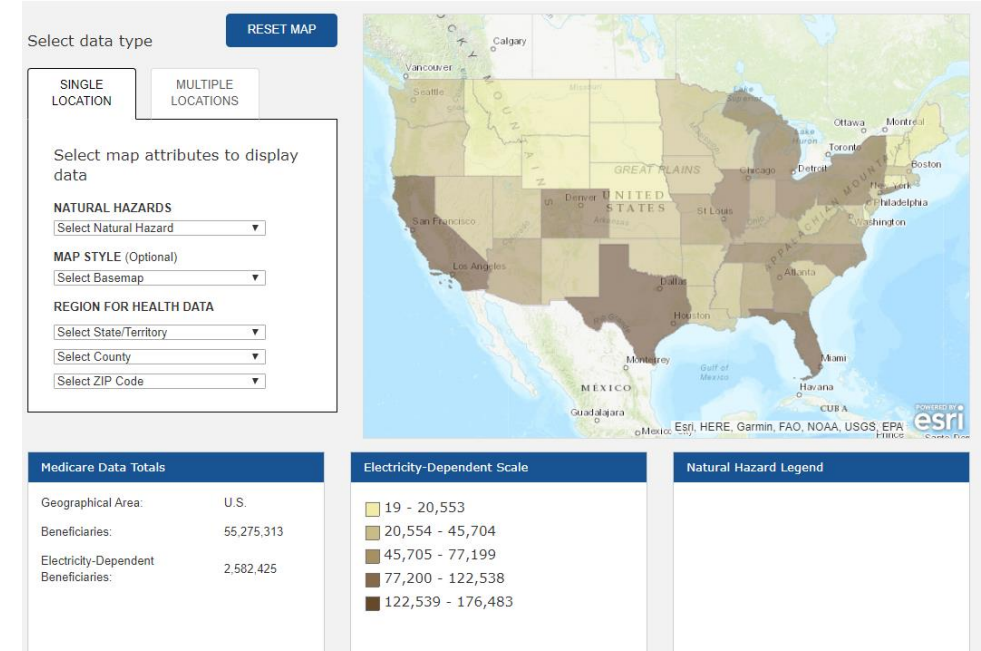
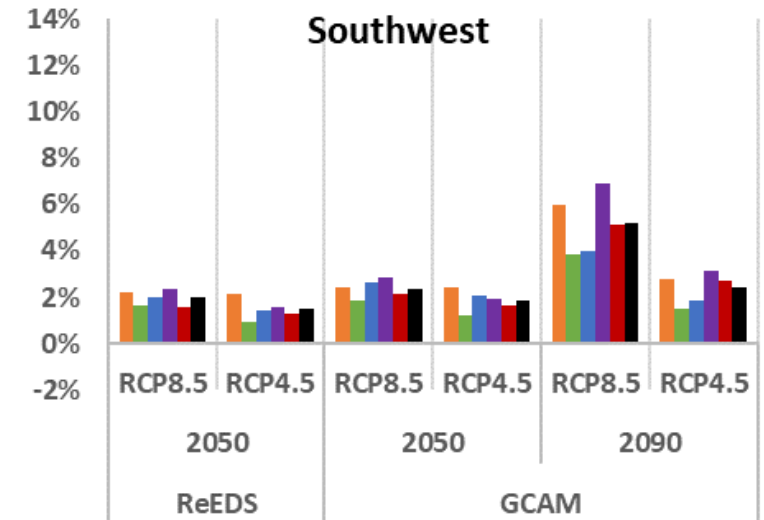
Explore more data at ephtracking.cdc.gov/DataExplorer



Temperature Extremes

Possible Health Impacts

- Power outages limit access to health services, can result in carbon monoxide poisoning
 - E.g. Those that rely on electricity-dependent medical equipment (e.g. ventilator, dialysis) are especially vulnerable





Temperature Extremes

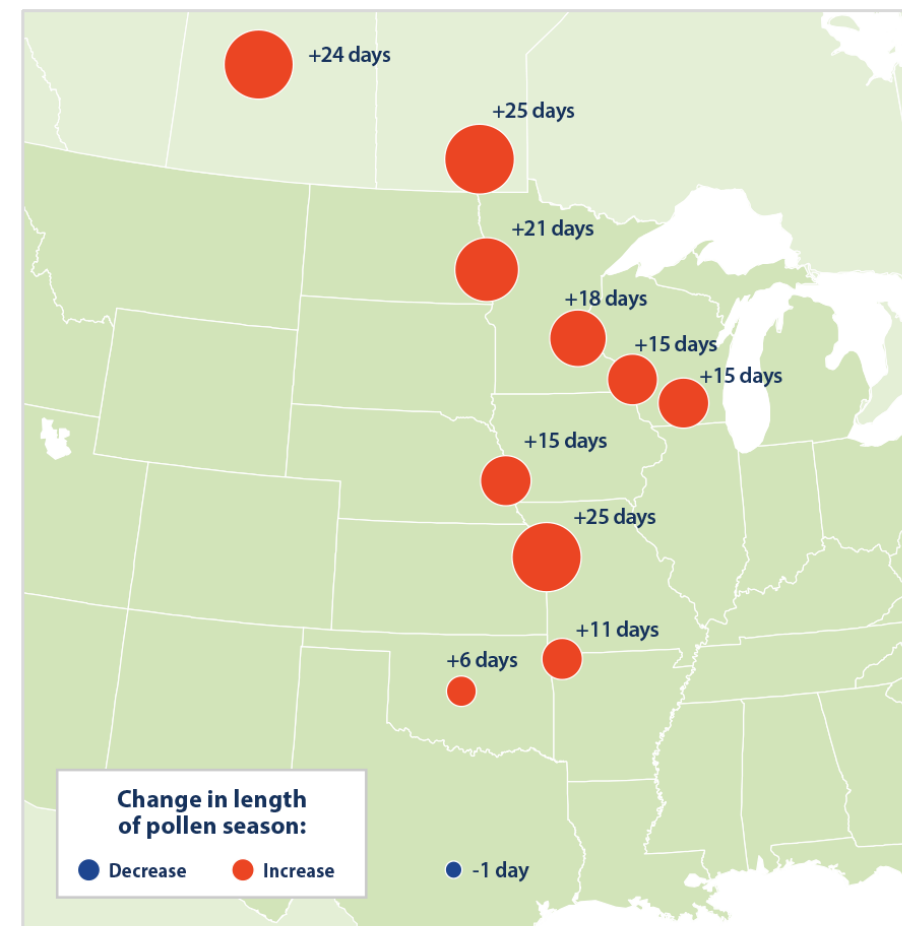
Related Exposures

- Contributes to wildfire and drought
- Triggers the following **secondary exposures**:



- Ozone
- Allergens
- Ticks, Mosquitos
- Water contamination and supply disruption
- Food contamination and supply disruption

Change in Ragweed Pollen Season, 1995–2015



Data source: Ziska, L., K. Knowlton, C. Rogers, National Allergy Bureau, Aerobiology Research Laboratories, Canada. 2016 update to data originally published in: Ziska, L., K. Knowlton, C. Rogers, D. Dalan, N. Tierney, M. Elder, W. Filley, J. Shropshire, L.B. Ford, C. Hedberg, P. Fleetwood, K.T. Hovank, T. Kavanaugh, G. Fulford, R.F. Vrtis, J.A. Patz, J. Portnoy, F. Coates, L. Bielory, and D. Frenz. 2011. Recent warming by latitude associated with increased length of ragweed pollen season in central North America. P Natl. Acad. Sci. USA 108:4248–4251.

For more information, visit U.S. EPA's "Climate Change Indicators in the United States" at www.epa.gov/climate-indicators.

Chat Discussion:
What health impacts can you anticipate?



Temperature Extremes

Possible Health Impacts

- Respiratory illness
- Allergic symptoms from pollen

Figure 3.2. Change in Ozone-Related Premature Deaths

Maps show county-level estimates for the average change in ozone-related premature deaths over the summer months in 2050 (2045-2055) and 2090 (2085-2095) compared to 2000 (1995-2005).

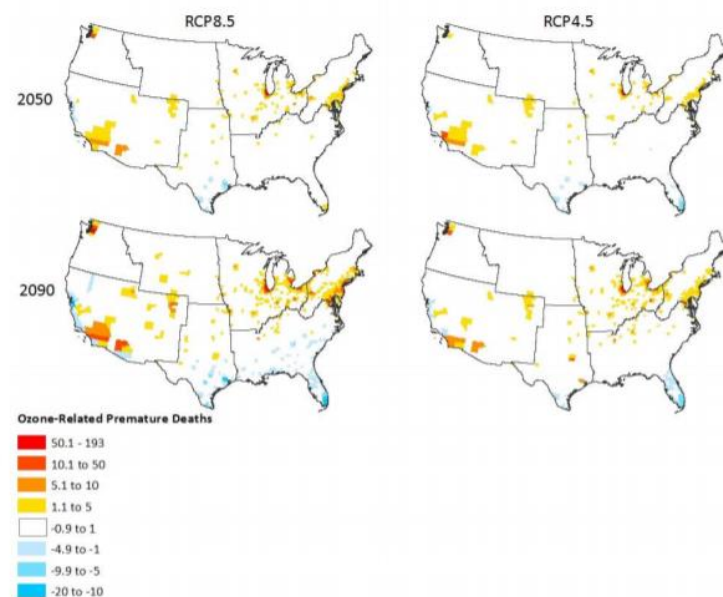
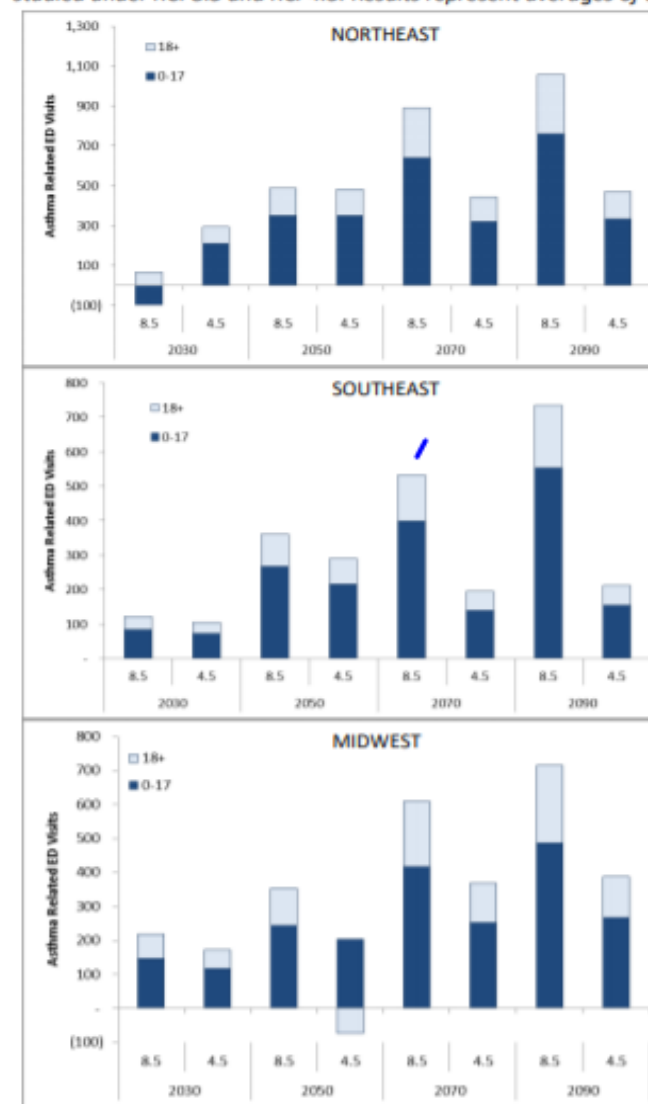


Figure 4.2. Change in Asthma-Related Emergency Department Visits

The graphs show change from the reference period (1994-2010) by age groups for the three regions studied under RCP8.5 and RCP4.5. Results represent averages of the five GCMs.



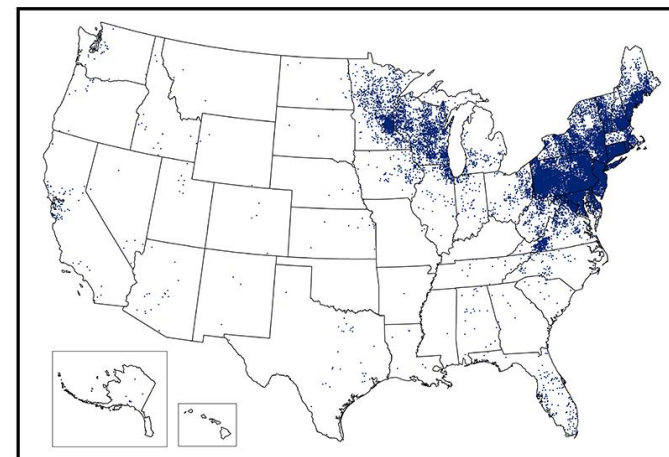


Temperature Extremes

Possible Health Impacts

Vector-borne disease (e.g. Lyme, West-Nile, Zika, Dengue)

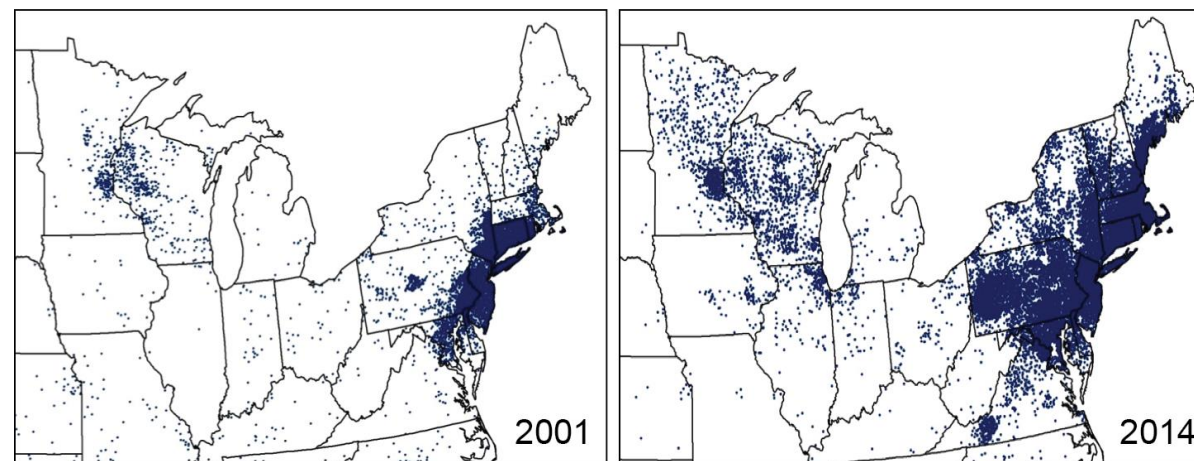
Reported Cases of Lyme Disease — United States, 2017



1 dot placed randomly within county of residence for each confirmed case

In 2016, Massachusetts transitioned to a surveillance method that relies primarily on laboratory reports. This method does not currently align with the national surveillance case definition as set by the Council of State and Territorial Epidemiologists (CSTE). Therefore, information on most Lyme disease cases occurring in Massachusetts is not sent to CDC. Please contact the [MA Department of Public Health](#) for case numbers.

Changes in Lyme Disease Case Report Distribution





Temperature Extremes

Possible Health Impacts

- Infections and illness from contaminated water and food (e.g. algal blooms)
- Lack of nutritional and medicinal abundance

"Climate change is very likely to affect global, regional, and local food security by disrupting food supply availability, decreasing access to food, and making utilization more difficult." - [EPA](#)

IMPACTS

Figure 21.1. Projected Percent Change in National Crop Yields

Results shown represent the average of the five GCMs under RCP8.5 and RCP4.5 compared to the reference period (1986-2005). Results are weighted averages of the individual irrigated and rainfed values from the EPIC model.

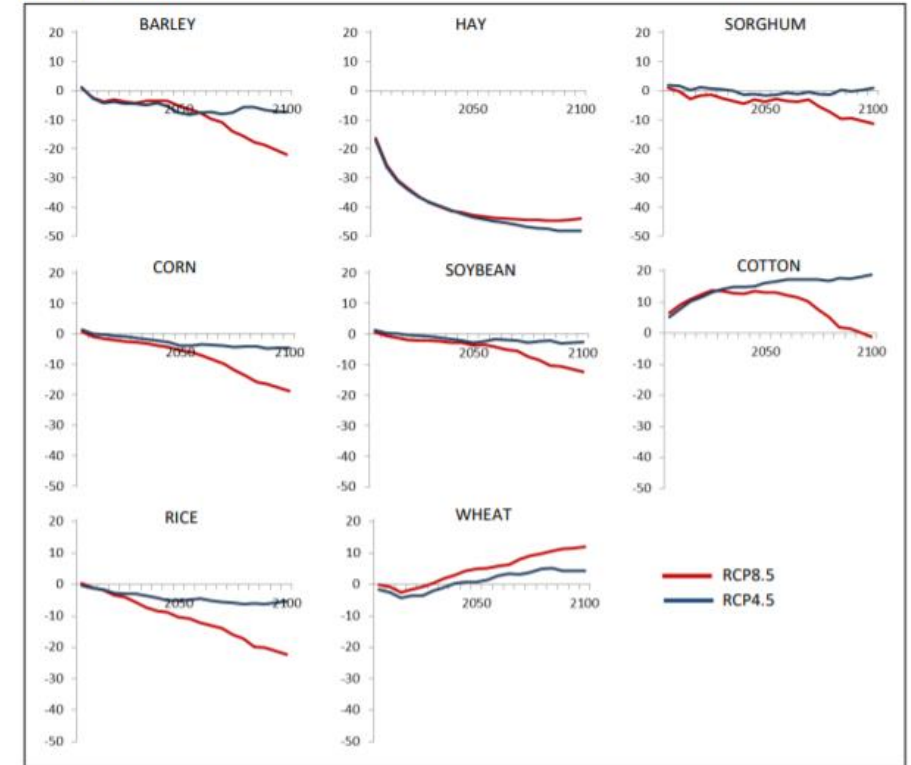


Figure 21.2 shows the projected change in national yield under RCP8.5 for the three largest U.S. crops (by area and production volume, not including hay) under the five different climate models, along with the ensemble average. In general, there is agreement in the direction of yield effects across the GCMs, although the magnitude of change varies by climate model and crop. In addition, the magnitude of change, whether positive or negative, increases over time in almost all cases. The largest change from reference yields is projected under the HadGEM2-ES model, which is the hottest model used in this analysis, with the exception of wheat where yield changes under this GCM are the most positive.



Temperature Extremes

Vulnerable Populations

- Children and elders
- Neighborhoods lacking green space
- People susceptible to health impacts from poor air quality
- People with mental, behavioral, and cognitive disorders
- Populations lacking access to AC
- Residents living in older homes
- Electricity-dependent populations
- Outdoor workers

Sample of Population Sensitivity and Adaptive Capacity Factors

- Urban heat island
- Tree canopy
- Households with air-conditioning
- Population size of vulnerable individuals



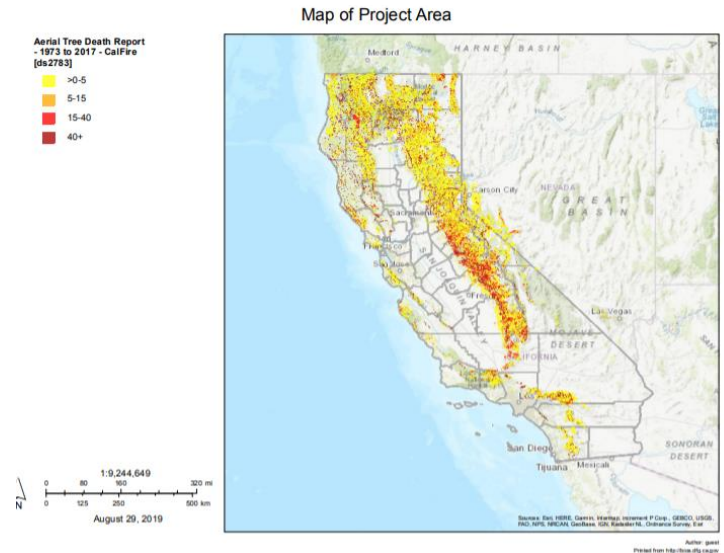
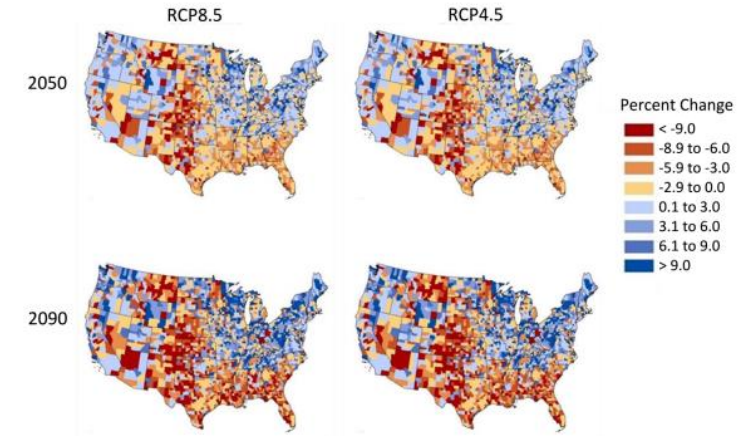
Temperature Extremes

Possible Impacts to Social, Economic and Cultural Health

- Displacement
- Lost school days and business revenues
- Disruptions to culturally important activities and species (e.g. outdoor traditional events, Oak loss)
- Economic damage
 - E.g. In CA by 2050
 - \$50 billion/year associated with human mortality from high temperatures
 - Increased electricity demand = \$200M/year

Figure 9.1. Climate Change-Induced Domestic Migration

Relative net differences in county-level population projections by RCP and year. Values represent the average percentage change across the five GCMs compared to a "no climate change" control scenario.



Chat Discussion:

How might cultural wellbeing and traditional ways of life be disrupted by temperature extremes?



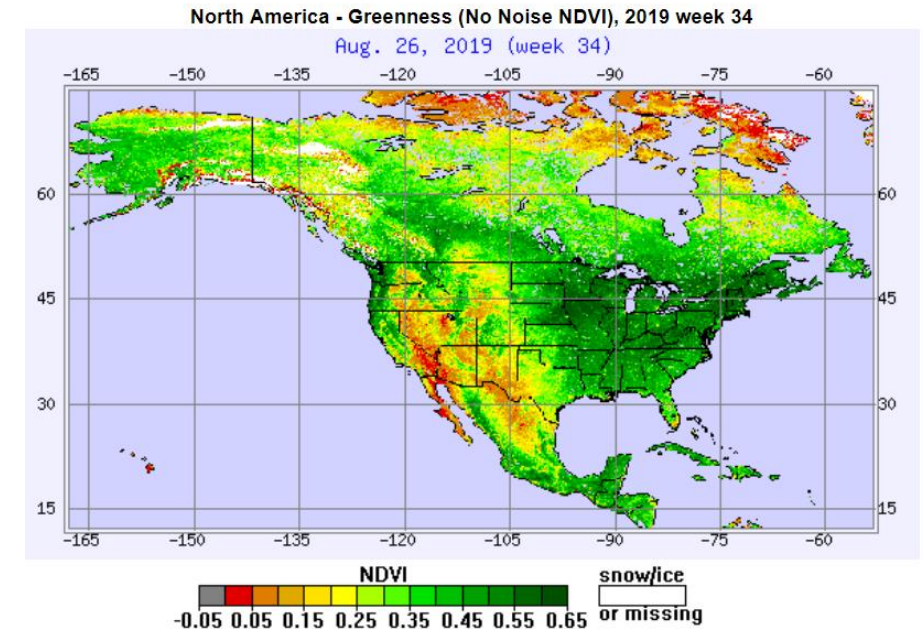
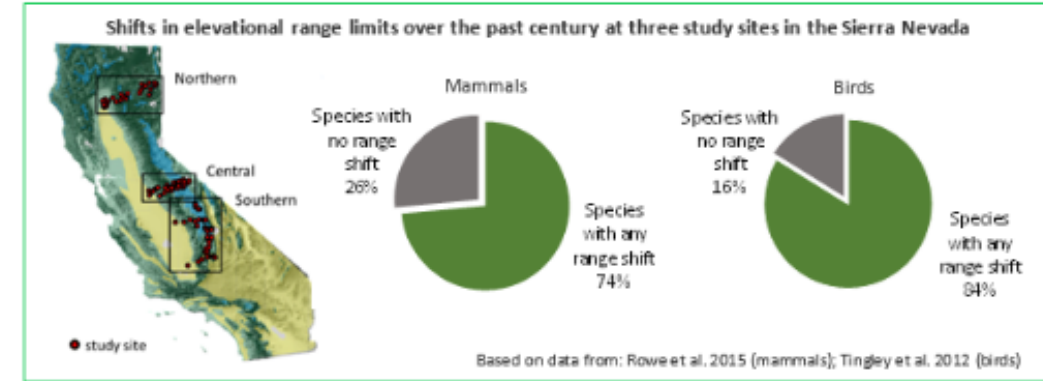
Temperature Extremes

Possible Natural Environment Impacts

- Heat or season shift related disruptions, declines and stresses to habitats, waterways, and important or sensitive plant and wildlife species
 - E.g. tree mortality, global vegetative health, range shifts, algal blooms, increases in the presence and prevalence of invasive species)

Possible Built Environment Impacts

- Disruption to public services and infrastructure (e.g. power outages)
- Disruption to agricultural operations



Chat Discussion:

What adaptation strategies may be able to reduce negative impacts to your community?



Temperature Extremes

Sample Strategies to Address Impacts

- Develop an emergency or heat health management plan to anticipate and prepare public services for heat risks.
- Notify community about heat events, heat-related illness systems, cooling centers and tips
- Promote food sovereignty and resilience through tribal food cooperatives, seed banks, and protected gardens
- Stress test facilities for heat tolerance
- Increase urban forestry and green infrastructure
- Implement advanced surveillance of air and water quality
- Improve energy resilience to avoid power outages (e.g. microgrid)

The infographic is titled "CLIMATE CHANGE PREPAREDNESS" and "EXTREME HEAT & PALA". It features a "BEAT the HEAT" section with icons for a person, a child, a medical cross, and a lightning bolt. Below this, it lists "Who's at RISK in EXTREME HEAT?" including adults over 65, children under 4, people with existing medical conditions, and those without access to air conditioning. It then provides "What can you DO?" with sections for "Stay Cool" (find air-conditioned shelter, avoid direct sunlight, wear lightweight clothing, take cool showers or baths), "Stay Hydrated" (drink more water than usual, don't wait until you're thirsty to hydrate, avoid alcohol or liquids containing caffeine, remind others to drink enough water), and "Stay Informed" (visit Cal OES's Heat Resources page to learn you can protect yourself and your loved ones, www.caloes.ca.gov). A "Heat Safety for Pets" section lists: Don't leave pets in vehicles, Keep water bowls filled at all times, Limit outdoor activities, and Keep paws off hot surfaces. A "TEMPERATURES" section states that in the US, temperatures are projected to increase 2.8 – 7.3 degrees Fahrenheit on average by 2071 – 2100. At the bottom, it says "VISIT PALA ENVIRONMENTAL DEPARTMENT'S WEBSITE FOR MORE INFO: <http://ped.pala.gov>".

PALA'S HIGH-RISK HEALTH IMPACTS
Below are health impacts considered high or medium risk for residents of Pala.

- Heat-related stress, illness, and death
- Consequences for mental, behavioral and cognitive wellbeing
- Decline of culturally important plants and animals
- Lost work, school, or business days
- Decrease in fitness activity level
- Disruptions of community functions or ceremonies
- Carbon monoxide poisoning (e.g. from generators during a power outage)
- Respiratory and cardiovascular illness
- Worsened allergies
- Food shortage due to global production and price fluctuations
- Illness and death caused by Lyme, West Nile Virus, and Zika

WHAT IS PALA DOING TO ADAPT AND PREPARE?
Pala completed an Adaptation Plan with a full list of strategies to help safeguard the health and wellbeing of the Pala community. Below are a few examples of ways we plan to address elevated temperature threats.

- Build alternative power supplies e.g. building or community-scale battery storage and microgrids incorporating renewables to avoid power outages for critical facilities during exposure-event
- Conduct education to encourage community members to prepare for exposure

TIPS FOR STAYING SAFE DURING EXTREME HEAT

- Get inside. Pala's cooling centers are located at the Pala Resort and Casino and the Fitness Center
- Stay hydrated and rested
- Never leave anyone in a closed vehicle
- Check on elders and other vulnerable neighbors
- Don't forget your pets!
- Take advantage of medical and emotional care services
- Recognize the symptoms of heat stroke.
- Set up a family emergency plan.
- Follow [Pala Environmental Department on Facebook](#) for climate updates and information.
- Sign up for [San Diego County's Alert System](#)



Temperature Extremes

Tribal Case Study

Mescalero Apache Tribe (New Mexico)

- Some of the highest temperatures ever recorded in the region all occurred since 2011.
- Working with a range of federal, state, and local government agencies and academia to maintain forest health and resiliency.
- Constructed hoop houses and greenhouses to protect produce from climate extremes and solar systems at the fish hatchery





Temperature Extremes

Trainee Examples

“Just in the last 100 years the temperature has changed. My grandmothers **never had AC** and we did fine, but now the elderly do not work like they used too. Its too hot for everyone. We really do not have long periods of freezing weather here anymore which increases the **bug population.**” - *Paula Wayman, Choctaw Nation Health Services (Southeast Oklahoma)*

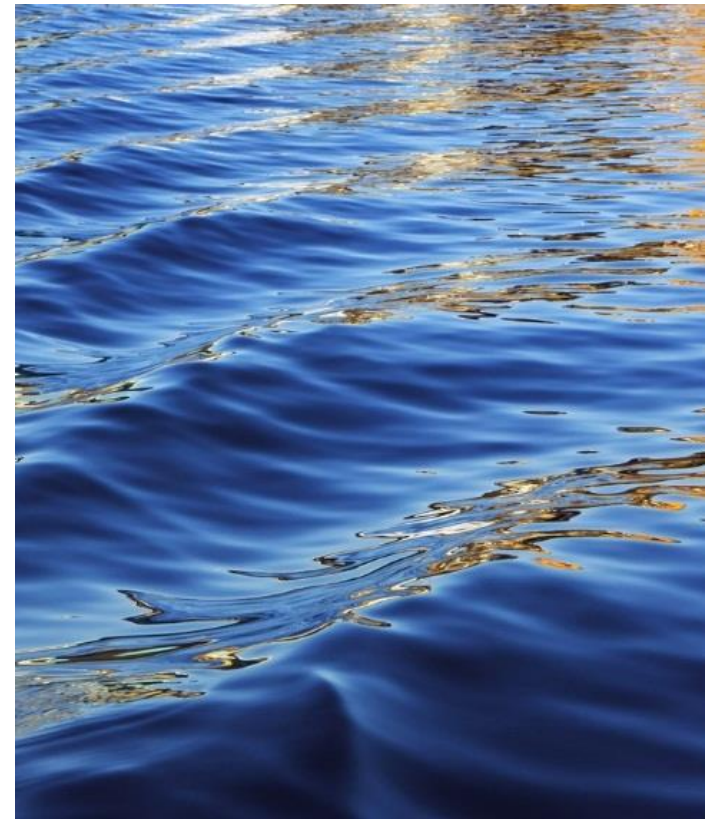
“My family's village (Kotzebue, AK) which I frequent, has been experiencing an increase in **summer heatwaves** over the years.” - *Ethan Lawton, SNH*

“Extreme temperatures impact me physically as I have a **disease that is worsened** by high temperatures.” – *Laurie Montserrat, OEHHA*

“Temperatures have been all over the place and has become **less predictable** than in the past.” – *Natalene Cummings, Forest Couty Potawatomi Community (Crandon, WI)*



Wildfire





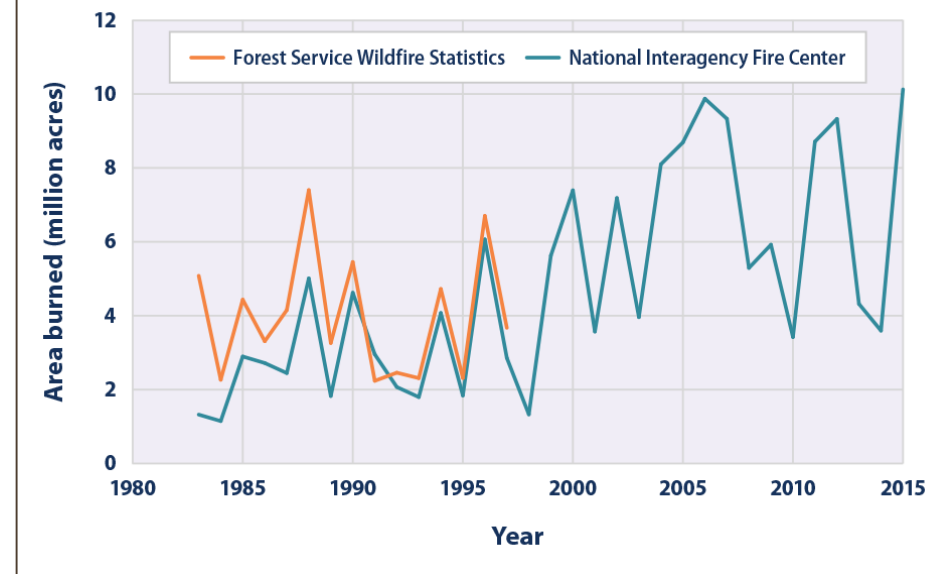
Wildfire

Key Climate Exposure Facts

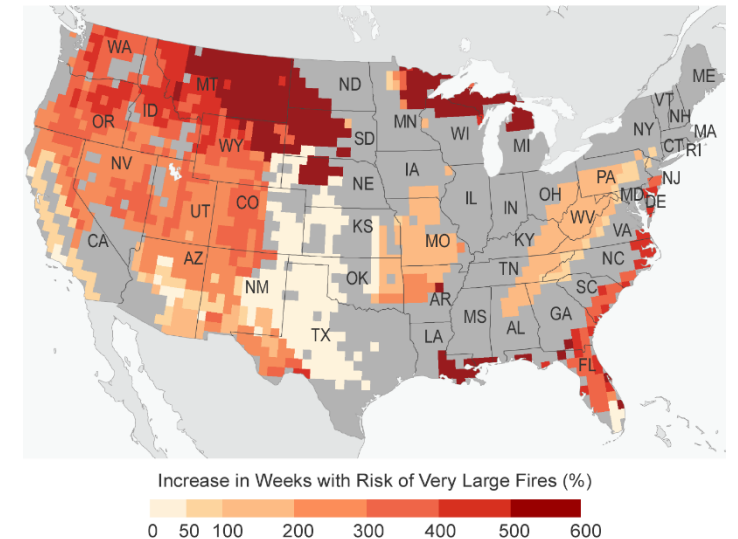
- Incidence of large forest fires in the western US and Alaska increased since early 1980s
- Projected to further increase (frequency and intensity) in those regions as the climate warms/dries, with profound changes to certain ecosystems (e.g. more fuel)
- Longer burn season

Regions Affected

Alaska, Northwest, Southwest



Projected Increase in Risk of Very Large Fires by Mid-Century



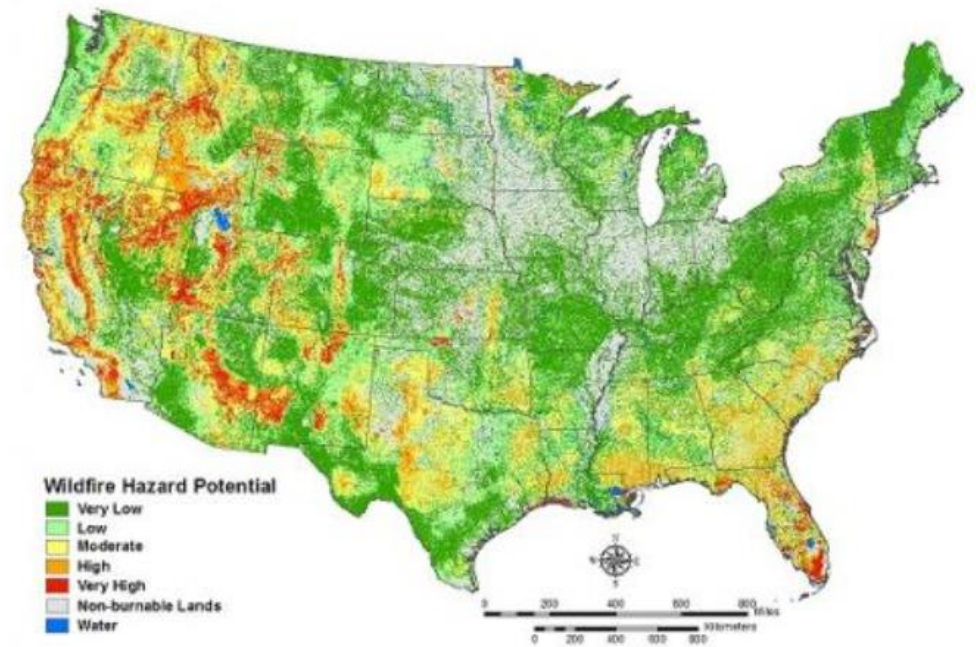
Group Discussion:
What health impacts can you anticipate?



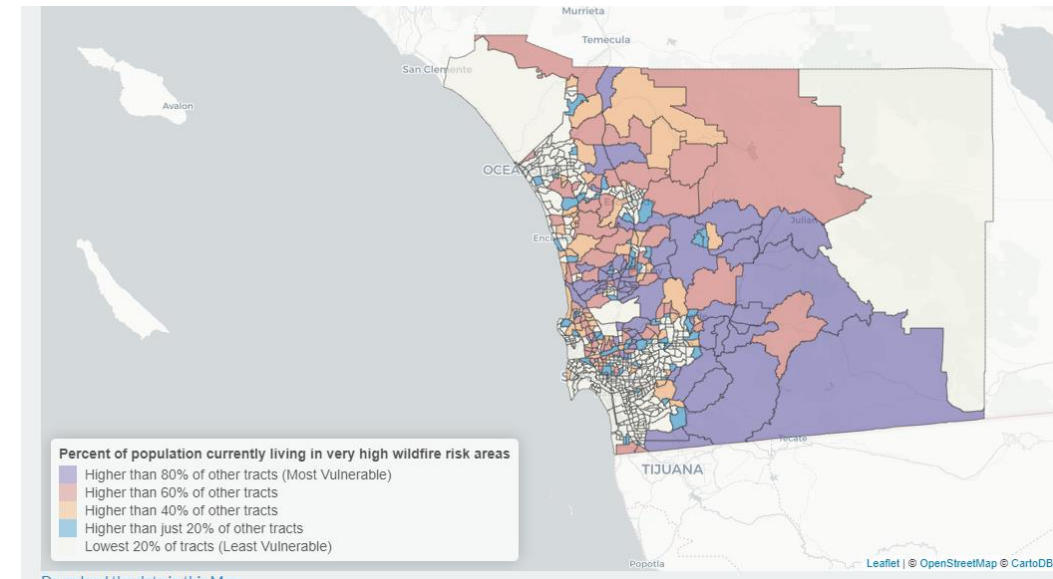
Wildfire

Possible Health Impacts

- Wildfire-related injury and death
 - E.g. Camp Fire, Paradise, CA 2018
 - Deadliest fire in CA history = 86 people died



Classified wildfire hazard potential map



[Download the data in this Map](#)



Wildfire

Possible Health Impacts

- Mental health impacts including post-traumatic stress, depression, anxiety and grief
 - A Rand [study](#) found that one-third of the adult survivors of California wildfires in 2003 suffered depression and one-quarter suffered PTSD.

IMPACTS

What happens when people experience a disaster or traumatic event?

Shock and denial are typical responses to large-scale natural disasters, especially shortly after the event. Both shock and denial are normal protective reactions.

Once the initial shock subsides, reactions vary from one person to another. The following are common responses to a traumatic event:

- **Feelings become intense and sometimes are unpredictable.** You may become more irritable than usual, and your mood may change back and forth dramatically. You might be especially anxious or nervous, or even become depressed.
- **Thoughts and behavior patterns are affected.** You might have repeated and vivid memories of evacuating or seeing the fire approach. These flashbacks may occur for no apparent reason and may lead to physical reactions such as rapid heartbeat or sweating. You may find it difficult to concentrate or make decisions, or become more easily confused. Sleep and eating patterns also may be disrupted.
- **Recurring emotional reactions are common.** Reminders or "triggers" such as smoke, ash, sirens or fire trucks can create anxiety.
- **Interpersonal relationships can become strained, particularly if you are living in temporary housing.** You may experience arguments with family or friends. On the other hand, you might become withdrawn and isolated and avoid your usual activities.
- **Physical symptoms may accompany the extreme stress.** For example, headaches, nausea and chest pain may result and may require medical attention. Pre-existing medical conditions may worsen due to the stress.

It is important to realize that there is no one 'standard' pattern of reaction to the extreme stress of traumatic experiences.



Wildfire

Possible Health Impacts

- Damage to infrastructure limits access to health services, can result in carbon monoxide poisoning
 - Power outages & de-energization
 - Road closures
 - Damaged health and emergency facilities
 - Emergencies can overwhelm health and emergency services
 - Can also lead to school and business closures and economic damages





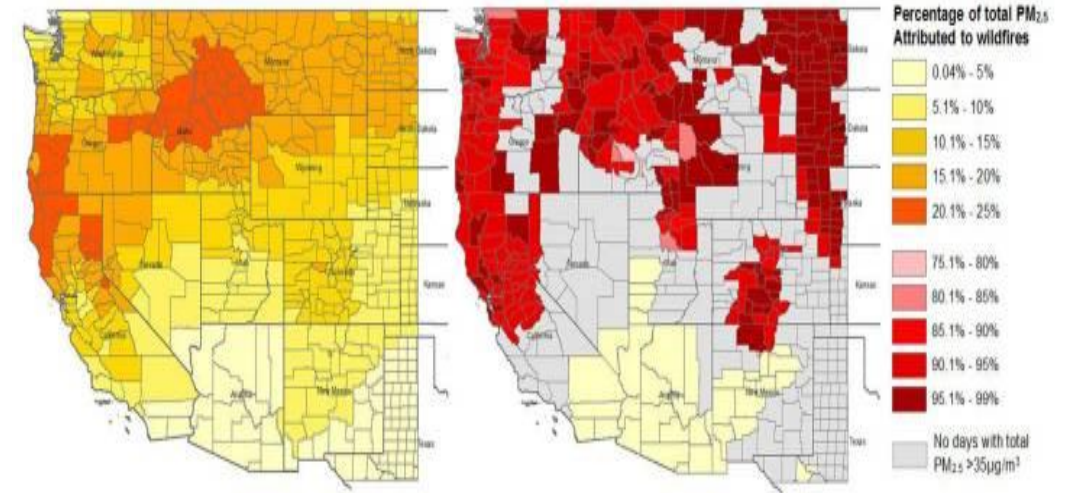
Wildfire

Related Exposures

- Contributes to storms and flooding (increased risk of landslides, erosion and mudslides)
- Triggers the following secondary exposures:



- Smoke/particulate matter
- Ticks, Forest Pests
- Water contamination and supply disruption
- Food contamination and supply disruption



Chat Discussion:

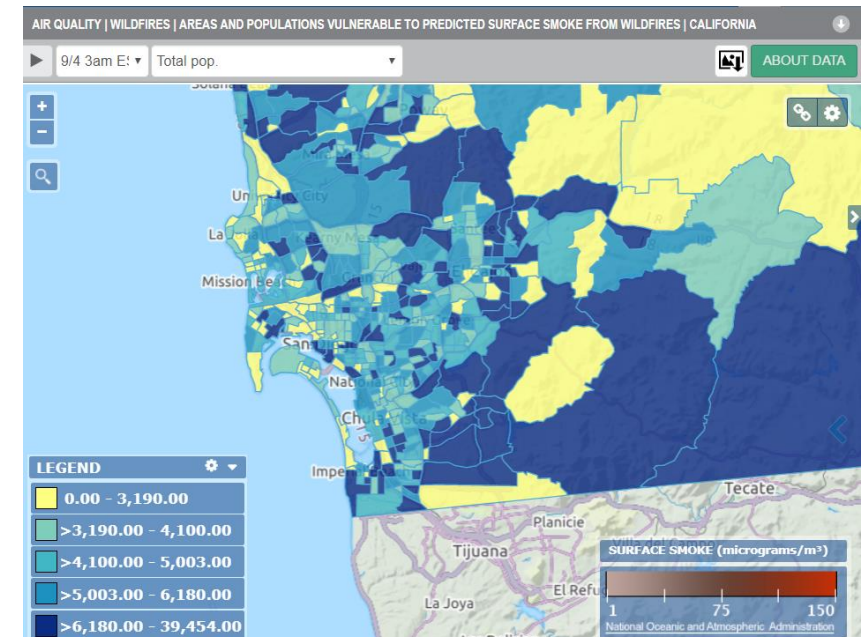
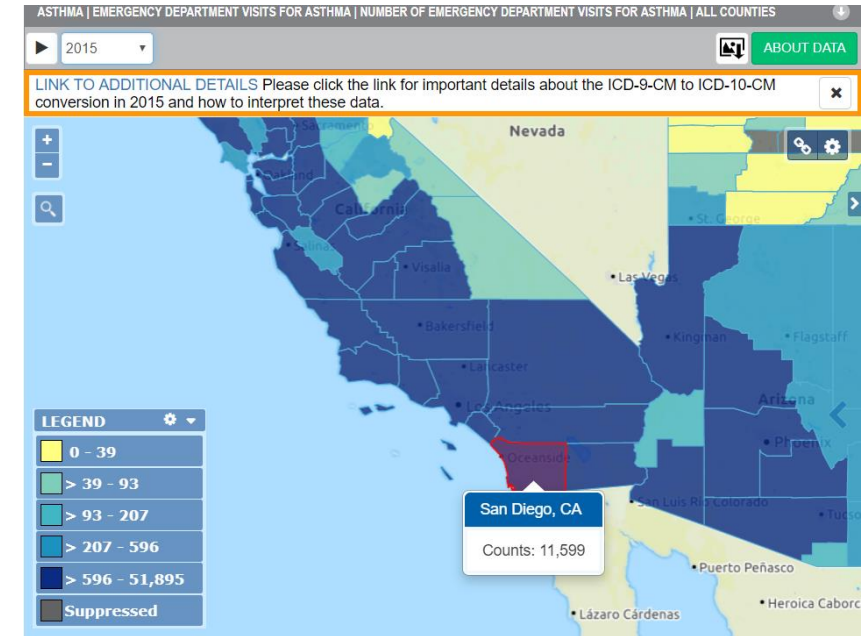
What health impacts can you anticipate?



Wildfire

Possible Health Impacts

- Respiratory and cardiovascular illness
 - Exposure to smoke-related air pollutants, including particulate matter (PM) from wildfires has been associated with a wide range of human health effects
 - Smoke hazard can last for weeks
- Valley Fever





Wildfire

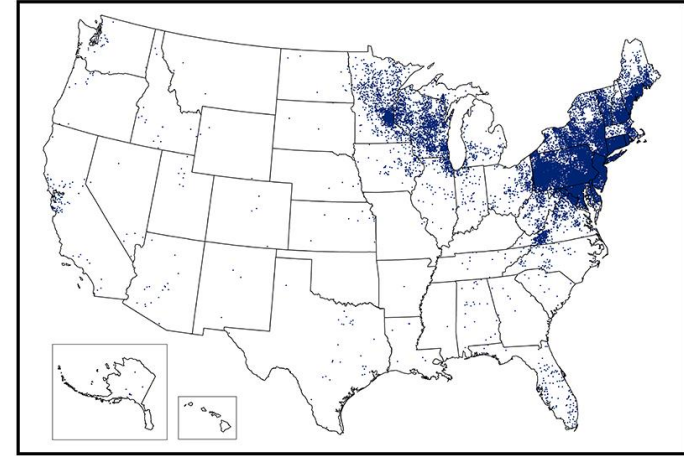
Possible Health Impacts

- Vector borne disease (Lyme)



IMPACTS

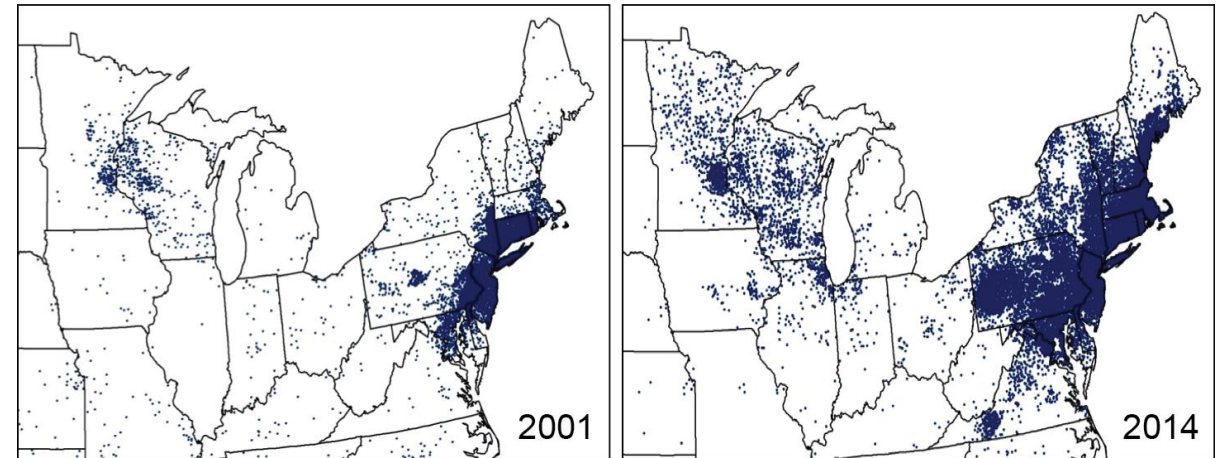
Reported Cases of Lyme Disease — United States, 2017



1 dot placed randomly within county of residence for each confirmed case

In 2016, Massachusetts transitioned to a surveillance method that relies primarily on laboratory reports. This method does not currently align with the national surveillance case definition as set by the Council of State and Territorial Epidemiologists (CSTE). Therefore, information on most Lyme disease cases occurring in Massachusetts is not sent to CDC. Please contact the [MA Department of Public Health](#) for case numbers.

Changes in Lyme Disease Case Report Distribution





IMPACTS

Wildfire

Possible Health Impacts

- Infections and illness from water
- Drinking water supply interruption
 - Tribe may need to use water supply to fight fire
 - Further stress to many tribes that rely on limited groundwater sources
 - Wildfire may limit transport of water supplies
- Lack of nutritional and medicinal abundance
 - Wildfire may limit transport of food supplies





Wildfire

Vulnerable Populations

- Children and elders
- Transit-dependent populations
- Neighborhoods in a fire severity zone or wildland urban interface
- Households lacking defensible space
- People susceptible to health impacts from poor air quality
- People with mental, behavioral, and cognitive disorders
- Electricity-dependent populations
- Outdoor workers

Sample of Population Sensitivity and Adaptive Capacity Factors

- Population in high-risk wildfire area
- Percent of land covered by forest
- Hospitals per 100,000
- Economic hardship or social vulnerability index
- Size of water supply



Wildfire

Possible Impacts to Social, Economic and Cultural Health

- Displacement, destruction of historical or cultural sites/assets
- Disruptions to culturally important activities and species (e.g. outdoor traditional events, Oak loss)
- Lost school days and business revenues
- Economic damage (e.g. wildfire response and recovery costs; timber losses, insurance premiums)



Chat Discussion:

How might cultural wellbeing and traditional ways of life be disrupted by wildfire?



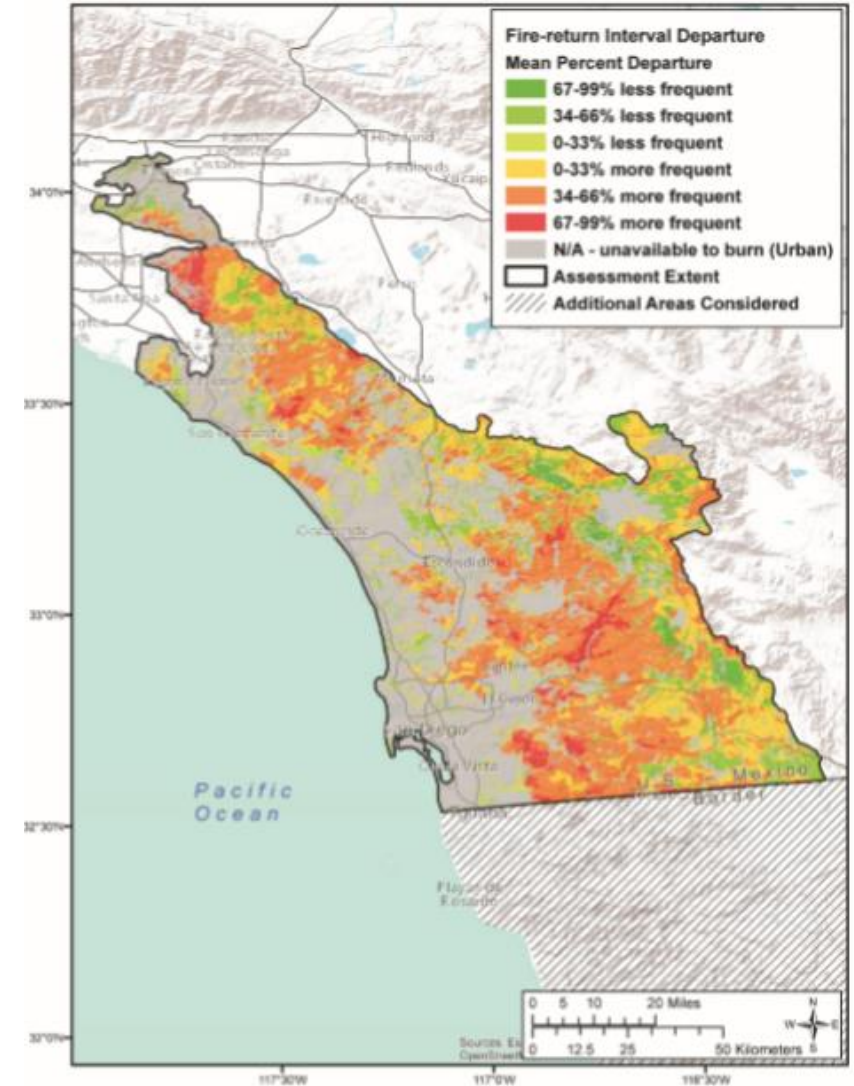
Wildfire

Possible Natural Environment Impacts

- As many tribes know, wildfire is part of a natural cycle
- Wildfire related disruptions, declines and stresses to habitats, waterways, and important or sensitive plant and wildlife species (e.g. invasive forest pests, conversion to flammable grasses, wildlife migration)

Possible Built Environment Impacts

- Damage to homes, business, and critical facilities
Disruption to public services and infrastructure (e.g. power, telecommunications, roads)
- Stress on water supplies



Chat Discussion:

What adaptation strategies may be able to reduce negative impacts to your community?



Wildfire

STRATEGIES

Sample Strategies to Address Impacts

- Develop an emergency or health management plan to anticipate and prepare public services and evacuation plans for wildfire risks. Include procedures for post-disaster repairs and needs.
- Update air quality improvement plans to include exposure to wildfire
- Conduct outreach to encourage residents to sign up for emergency communication resources
- Conduct wildfire management strategies in adjacent forest lands such as prescribed burns and thinning to reduce wildfire risk
- Collaborate to enhance training and capacity of emergency tribal response teams

The screenshot shows the homepage of the Healthcare Foundation Northern Sonoma County website. The header includes the organization's logo and navigation links: WHO WE ARE, OUR SUPPORTERS, NEWS & EVENTS, GET INVOLVED, CONTACT, and a DONATE button. The main content area features a headline about free mental health help for wildfire victims. Below this, there are six resource cards arranged in a 2x3 grid:

- MYSONOMASTRONG.COM**: Learn techniques to cope more effectively with post-disaster stress. Link: VISIT MYSONOMASTRONG.COM.
- SONOMA RISES APP**: Build resilience and well-being with our free app. Links: DOWNLOAD FOR IPHONE, DOWNLOAD FOR ANDROID.
- FREE INDIVIDUAL COUNSELING**: Find the support you deserve and start your recovery with free, private counseling. Link: CALL OR TEXT 866.960.6264.
- PRIVATE GROUP SESSIONS**: Bring a mental health professional to your location. Link: EMAIL TO SCHEDULE A SESSION.
- TRAUMA INFORMED YOGA**: Aid your recovery with trauma-informed yoga classes. Link: FIND A FREE CLASS.
- DROP-IN COUNSELING**: Start getting the help you need with group counseling sessions. Link: SEE FREE DROP IN COUNSELING LOCATIONS.

Group Discussion:

What partners in your community are already working on wildfire response?

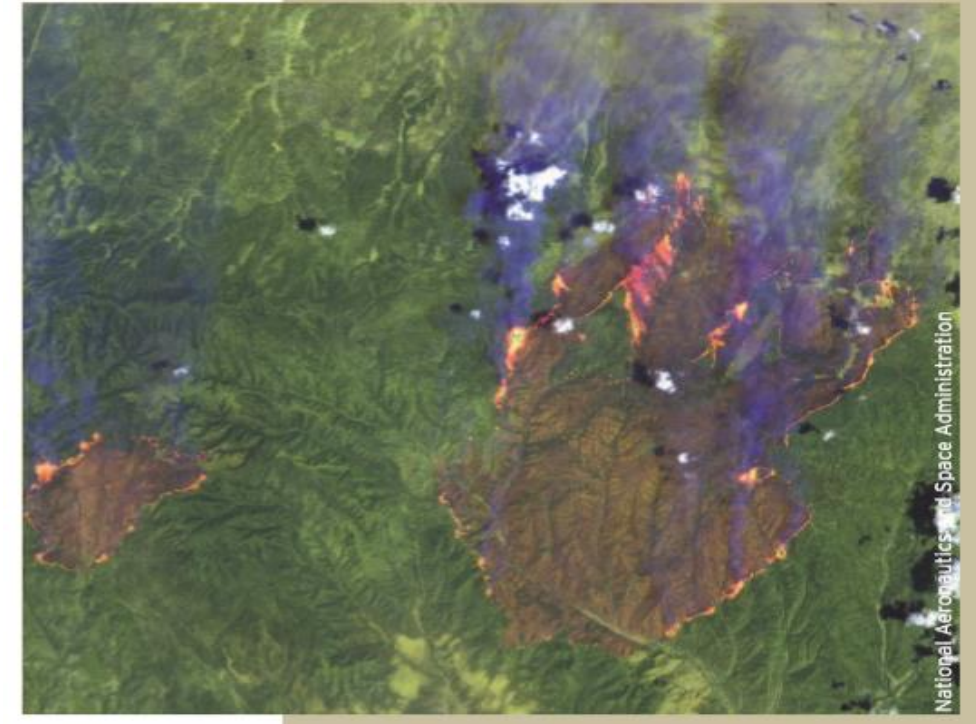


Wildfire

Tribal Case Study

White Mountain Apache Tribe (Arizona) and the Rodeo Chediski Fire

- Reputation for skilled fire management
- Apache tribe burned approximately 462,000 acres, 59% on Fort Apache Reservation
- Burned half of Tribe's timber lands (valued at \$237M)





Wildfire

Trainee Examples

“In this area wildfires have increased dramatically in **intensity and size**. The fires burn hotter and quicker.” – *Teresa Romero, Santa Ynez Band of Chumash Indians (Santa Barbara area, CA)*

“I work for the Shoalwater Bay Indian Tribe in Tokeland, WA; they have over 4,000 acres including the re-location site that is mostly **timbered**. Wildfire is a concern for the Tribe and they are working on strategies to address the wildfire danger.” – *Cynthia Toop, Shoalwater Bay Indian Tribe (Tokeland, WA)*

“In Alaska, our worst fire season was in 2004, where we lost **6,523,182 acres** to wildfires.” *Ethan Lawton, SHN*

“I watched the pine/tree mortality rate climb in areas across the state, (but saw the worst of it happening in my limited experiences in the "North Bay" division). Much of the tree decline was contributable to the **bark beetle**... all of those dead trees are fuel for the increased wildfires we've been seeing in the last few years... We all **smelled and felt** the effects of the fires that burned in CA this season... even though most of them were outside of our county lines.” – *Stephanie Smith, Tejon Indian Tribe (Kern County, CA)*

Wrapping Up

Thank you for being part of our training community!

Suggested action steps (complete before next webinar)

- Identify which temperature and wildfire related indicators are being tracked for your region (e.g. tribal environment or health department, intertribal health organization, or other agency)
- Take a moment to talk to elders and consider how wildfire and temperature changes have affected your tribe.
- *Activity:* Input your location into [The Climate Explorer](#) to see temperature data and projections for your community

Suggested reading (complete before next webinar)

- Pick one chapter (2-8) of [Impacts of Climate Change on Human Health in the United States](#)

Next webinar:

March 17, 2019 (10AM PST / 1pm EST)

Drought, Melting Ice & Sea Level Rise, Storms

& Flooding (Module 2)

Questions?