

Climate Resilience: Vulnerable Populations

HIGHER TEMPERATURES, HEALTH RISKS, AND NEW OPPORTUNITIES

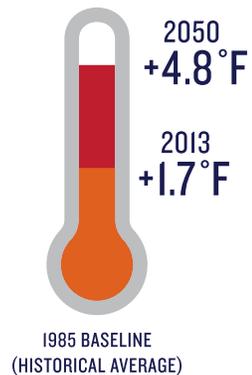


San Diego County is a beautiful place to live where one can enjoy the outdoor environment year round. However, temperatures have been steadily rising and this poses a threat to the natural beauty of our region and the health of our residents. If temperatures continue to rise at the current rate, the quality of life San Diegans are accustomed to will not be available for future generations.

Rising Temperatures in San Diego County

Global average temperature has been steadily rising. It is now 1.7°F hotter than it was in 1985, and it is expected to rise to 4.8°F by 2050. This changing climate brings with it new health risks which could be more problematic for our most vulnerable populations. This report identifies who our most vulnerable residents are and where they live in San Diego County, as well as summarizes the potential detrimental effects of rising temperatures on their health. We will also highlight solutions from local agencies and organizations that are working together to address these challenges.

ANNUAL AVERAGE TEMPERATURE IS INCREASING AND WILL CONTINUE TO INCREASE BETWEEN NOW AND 2050:



Perspectives from Local Leaders:

"In 2015, San Diego saw a greater number of heat alerts than in any other past years. The impact of extreme heat has a significant risk to one's health, especially the most vulnerable populations. These incidents resulted in increased health-related illnesses for humans and animals, as well as damage to the environment by wildfires."

Wilma Wooten, MD, MPH

Public Health Officer, Health and Human Services Agency, County of San Diego

What Makes a Population Vulnerable?

There are many different variables that are used to classify populations as vulnerable:

- Working outdoors
- Low income
- No access to air conditioning
- Limited transportation
- Over 65 and living alone
- Living near pollution
- Pregnant
- Under age five
- Living near a flood zone
- Chronically ill

Perspectives from Local Leaders:

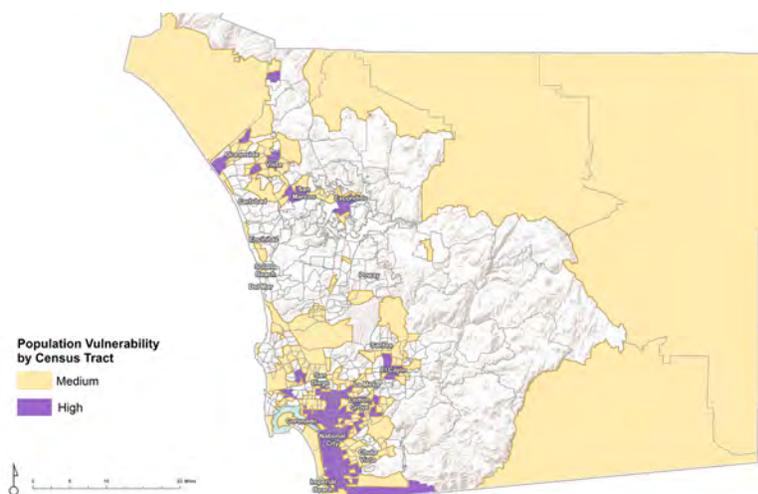
“Climate change will impact all of us no matter where we live. However there are some people who will feel these effects more than others. Our most vulnerable populations are usually our children and elderly residents as well as those living in poverty or who are sick. This disproportionate impact on our most vulnerable populations makes climate change an important issue for all of us.”

Paula E. Stigler Granados, PhD, MSPH
University of Texas School of Public Health, San Antonio Regional Campus



Vulnerable areas in San Diego County

Policy makers, community leaders, and decision makers are becoming more aware that climate change impacts on communities are not equal. Some communities need more education and resources to address their particular health risks. For example, cities having cooling centers available to residents in communities with fewer air conditioners help prevent heat strokes.



The colors indicate levels of population vulnerability to climate change, from high (purple) to medium (yellow).¹

Health Impacts of Climate Change



AIR POLLUTION

- Reduced lung function
- Asthma
- Premature death from prolonged exposure
- Cardiovascular illness
- Respiratory illness
- Diabetes
- Absence from school/work



EXTREME HEAT

- Heart related diseases & failure
- Kidney function
- Dehydration
- Gastrointestinal illness
- Preterm delivery
- Stillbirth
- Mental health stress
- Heat stroke
- Premature death
- Infant mortality



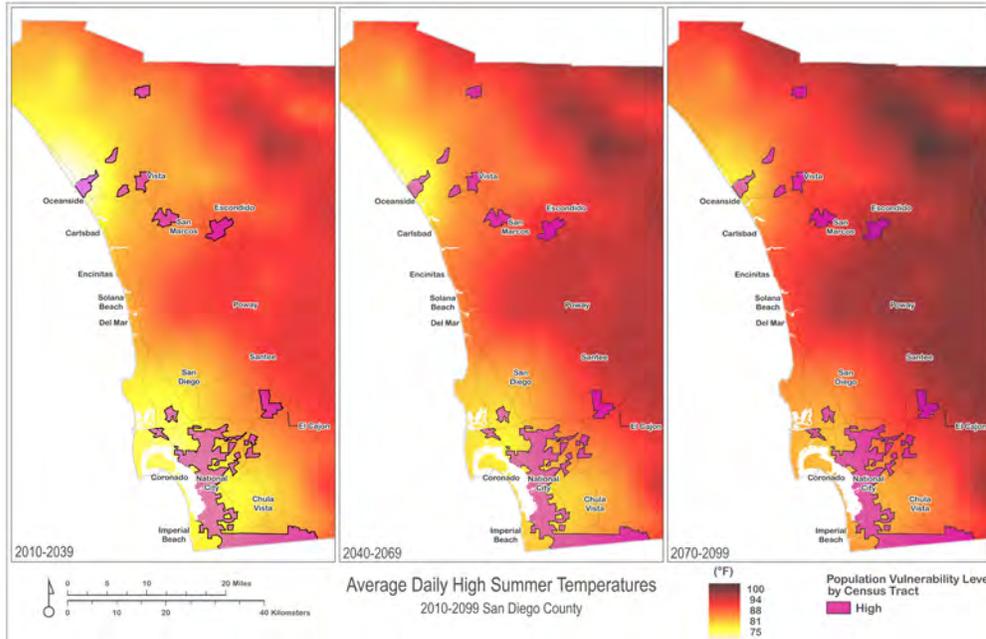
WILDFIRES AND SMOKE

- Burn injury
- Respiratory & cardiovascular illness
- Mental health stress
- Adverse birth outcomes

¹ The vulnerability index value was calculated by combining 29 different socio-economic, land use and other demographic variables from two different screening methods: Environmental Justice Screening Method (EJSM) & the Social Vulnerability Index (SoVi). Additional Variables were added and a cumulative impact score was determined. Each discrete indicator was ranked into quintiles and scored 1 (low vulnerability) to 5 (high vulnerability). A final score for each census tract was created by averaging across indicator rankings.

Future Summer Temperatures and Vulnerable Populations

Along with hotter average temperatures, climate change is expected to increase the frequency and magnitude of heat waves in San Diego County. By 2050, scientists expect that we will have about seven times as many days of extreme heat than we do now. **This means that, whereas today we have about two heat wave days per summer, by 2050 we are expected to have about 15 heat wave days per summer.** Heat waves are harmful to human health and can be deadly, especially for our most vulnerable populations.



Heatwaves Defined Across the Region

For this analysis, a heat wave is defined as the occurrence of very hot temperatures that are exceeded on average only about two days per summer. For example, for the coastal community of Ocean Beach, a heat wave is defined as at least one day with the temperature reaching 88°F or higher. For the inland community of El Cajon, a heat wave is 99°F or higher. For the desert community of Campo, a heat wave is 103°F or hotter.²

What Can We Do?

Here are a few ways to take care, be aware, and stay safe during extreme heat events:

- Keep children hydrated
- Know warning signs of heat related illness
- Check on elderly neighbors
- Assist those without transportation
- Take frequent breaks if working outdoors, hydrating early and often
- Be mindful of pre-existing conditions that increase vulnerability to heat, such as cardiac disease, diabetes or asthma
- Know where your cooling center is and educate others

² The data are from ten selected models from the fifth Climate Model Intercomparison Project (CMIP5), which were statistically downscaled using Localized Constructed Analogs (LOCA). Our analysis defines a historical period as 1981-2010, and considers three future climate periods throughout the century under the RCP8.5 (business as usual) scenario. Reference for the LOCA downscaling: David W. Pierce, Daniel R. Cayan, and Bridget L. Thrasher, 2014: Statistical Downscaling Using Localized Constructed Analogs (LOCA). *J. Hydrometeorol.*, 15, 2558–2585. doi: <http://dx.doi.org/10.1175/JHM-D-14-0082.1> References for CMIP5: http://cmip-pcmdi.llnl.gov/cmip5/cmip5_references.html

Perspectives from Local Leaders:

“Nighttime temperatures in San Diego County are also rising, and more records are being broken. For example, in October 2015 there were nine days where nighttime temperatures exceeded 70 degrees at San Diego Lindbergh Field, a climate reporting location with data back to the 1800s. Previously, there had never been more than two days in a row where these conditions occurred. Reduced nighttime cooling during heat waves means that residents won’t have a much needed respite from the daytime heat. Overall average temperatures in San Diego have been the warmest on record for 2014 and 2015. Some of the warming can also be attributed to warm nearby ocean temperatures which typically keep the region temperate. This can affect human health and exacerbate the impact of heat waves, especially for those without air conditioning. Climate change is expected to increase the magnitude and frequency of heat waves in our region. This is why the National Weather Service has collaborated with health experts and emergency responders in San Diego County to develop outreach tools and an improved heat warning system so that we can better monitor, predict (or warn) and improve health outcomes during heat waves.”



Alex Tardy

Warning Coordination Meteorologist, National Weather Service



DISCOVER MORE ABOUT REGIONAL HEAT, HEALTH AND CLIMATE RESOURCES

- Climate Education Partners & Climate Impact Movies
www.sandiego.edu/2050
www.youtube.com/user/ClimateEdPartners/
- Ready San Diego
www.readysandiego.org/alertsandiego/
- San Diego Office of the National Weather Service
www.wrh.noaa.gov/sgx/
- National Integrated Heat Health Information System (NIHHIS)
toolkit.climate.gov/nihhis/
- US Environmental Protection Agency
www.epa.gov/heat-islands
- Red Cross
www.redcross.org/mo2fp
- Public Health Alliance of Southern California
www.phasocal.org

Helping Alleviate the Cost

Currently assisting nearly 275,000 residents in San Diego County, SDG&E, the county's gas and electricity provider, offers bill reduction for low-income residents, elderly residents, and people with medical bills, as well as free energy-efficient home improvements through the CARE and FERA programs.

www.sdge.com

Perspectives from Local Leaders:

"The Public Health Alliance of Southern California (PHASC) recognizes



the importance of working collaboratively with local health departments to provide the tools and resources needed to respond to the needs of the communities they serve. By focusing efforts in policy systems and environmental change, PHASC works to address the health impacts of climate change that threaten the most vulnerable populations of Southern California."

Tracy Delaney, PhD, R.D.

Founding Director of the Public Health Alliance of Southern California

San Diego Climate Action Plan

The Environmental Health Coalition (EHC) engages policy makers on climate impacts in some of San Diego's most vulnerable communities such as Barrio Logan, City Heights, southeastern San Diego and other areas hit "first and worst." EHC promotes environmental justice by working together with San Diego community members on issues around public and environmental health primarily related to transportation, land use planning, clean energy, air quality, and waste and pollution.

www.environmentalhealth.org/index.php/en/

Breaking Up Heat Islands

San Diego is currently employing a Climate Protection Action Plan to reduce heat islands that affect mostly urban residents with little tree canopy to cool the heat. The plan includes developing and adopting an urban heat island mitigation policy; planting of 5,000 shade trees per year on public property; developing public policies to protect existing trees; and annually reviewing and revising standing tree planting, water reclamation, and open space preservation policies.

Find a summary of the Climate Protection Action Plan at www.epa.gov/heat-islands/heat-island-community-actions-database, as well as what other cities across the United States are doing to mitigate climate change.

Helping San Diego Stay Cool

San Diego's Aging & Independence Services has coordinated a special program called "Cool Zones", which helps seniors keep cool and safe during hot summer days. These Cool Zones are found in the hottest areas in San Diego and welcome seniors and all others to escape the heat and help lower energy cost in the County.

www.sandiegocounty.gov/hhsa/programs/ais/cool_zones

Climate Education Partners (CEP) is a collaborative team of multidisciplinary experts developing a new model for educating high-profile decision-makers, community leaders and the general public in the San Diego region about climate science. Climate vulnerability maps produced by Climate Education Partners in collaboration with the San Diego Foundation, Atkins Consulting Group, and Dr. Paula Stigler Granados, University of Texas School of Public Health, San Antonio Regional Campus. Discover more and watch our new climate impact movies which detail how climate change contributes towards increased risks in the San Diego region and how regional leaders are working together to improve quality of life for future generations. www.sandiego.edu/climate/discover-more/resources.php

Climate Education Partners is funded by the National Science Foundation (NSF) under award DUE1239797. Any opinions, findings and conclusions or recommendations expressed in this material are those of the author(s) and do not necessarily reflect the views of the National Science Foundation.