

Pima County, Arizona

Summary

Climate change is expected to exacerbate extreme heat, drought, and flooding in Pima County, Arizona, which will negatively impact local human health and infrastructure without appropriate mitigative and adaptive measures.

Pima County will experience more frequent and prolonged extreme heat events in the future, and the region has already seen increases in heat-related illness and mortality. Heat-related deaths more than doubled in the county from 2022 to 2023, increasing from 54¹ to 126², excluding the deaths of undocumented border crossers. By mid-century, the City of Tucson can expect a 135-193% increase in dangerous heat days, which translates to an additional 1-2 months of dangerous heat annually. Heat-related illness and mortality affect poor, aging, minority, and unsheltered people to a greater magnitude. Decreased tree cover and increased impervious surfaces are much more prevalent in lower-income and Latino-majority neighborhoods of Tucson, creating higher localized temperatures and greater potential for heat stress compared to more affluent and vegetated parts of the city.³

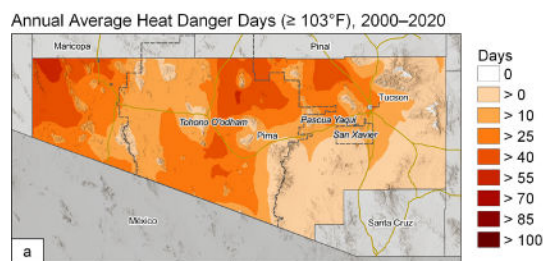
The likelihood of extreme drought is projected to increase by 10-25 percentage points⁴ by 2050 across Pima County. This means that by mid-century, the region can expect to experience extreme drought between 20-35%⁵ of the time.

Climate change is altering precipitation patterns, resulting in a decrease in the number of days with measurable precipitation and an increase in intensity of extreme precipitation events. Prolonged periods of drought coupled with more intense rainfall events will exacerbate flooding events in Pima County, especially in areas with a high percentage of impervious surfaces such as asphalt and hard-packed desert soil.

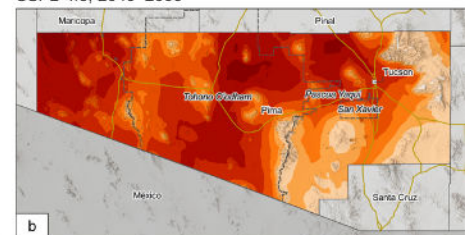
Pima County has already enacted many adaptation strategies to cope with some of the challenges that climate change has presented. The county utilizes Green Stormwater Infrastructure (GSI), such as basins filled with mulch and native vegetation, to divert water from city streets to prevent flooding and recharge groundwater. Expansion of GSI and other adaptation strategies will be important in the future to minimize damage to infrastructure and health across all risk factors.

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SSP2-4.5, 2040–2060



SSP5-8.5, 2040–2060

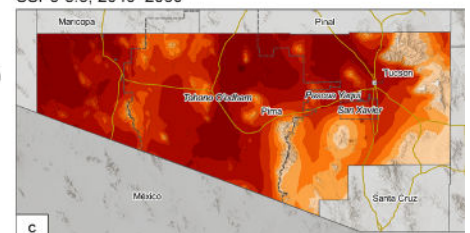
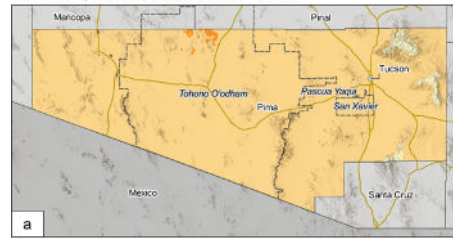


Figure 1. Heat danger days. (a) 2000–2020, (b) 2040–2060, SSP2,⁶ (c) 2040–2060, SSP5.⁷



Additional Increase in Extreme Drought
SSP2-4.5, 2040–2060 vs. 2000–2020



SSP5-8.5, 2040–2060 vs. 2000–2020

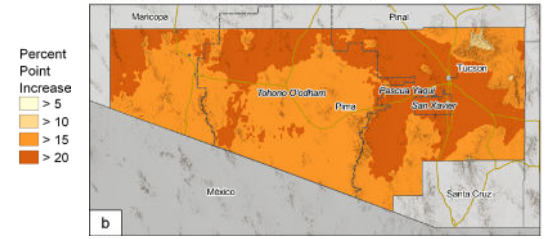


Figure 2. Additional increase in extreme drought relative to baseline period (2000–2020) by 2040–2060. (a) SSP2. (b) SSP5.

¹ Keith, Ladd. [Improving Urban Heat Planning and Media Coverage of Extreme Heat](#) [Powerpoint Slides].

² [Heat Related Deaths](#). (2023). Pima County Office of the Medical Examiner.

³ Davis, T. (2024, May 28). [Tucson's south side gets hotter than other parts of city, and not just because of elevation](#). Tucson.Com.

⁴ Expected to increase 10–15% under SSP2 and 15–25% under SSP5.

⁵ 20–25% under SSP2, 25–35% under SSP5.

⁶ “SSP2-4.5 is an intermediate greenhouse gas emissions scenario where carbon dioxide emissions continue around current levels until 2050, then decrease but do not reach net zero by 2100.” [Climate Model - Surface Temperature Change: SSP2 \(Middle of the Road\) - 2015–2100](#). (2021, Dec. 17). *Science on a Sphere*, NOAA.

⁷ “SSP5-8.5 is an extreme scenario in which CO2 emissions double by 2050, the economy continues to grow by exploiting fossil fuel resources, and the temperature in 2100 is 4.4° higher than pre-industrial levels.” Januta, Andrea, [Explainer: The U.N. climate report's five futures - decoded](#). (2021, Aug. 9). Reuters.

Woodwell's Climate Risk Assessments

The way that Earth's natural systems respond to a rapidly warming climate will impact our quality of life for generations to come. Communities to countries worldwide must be armed with the most up-to-date science so that planning, zoning, and adaptation decisions can be made in the near term to protect against future climate-driven risks. Understanding the scale and nature of climate risks can also be an important motivator of mitigation action.

Combining technical expertise with local knowledge creates the most complete climate risk profile—one that is intentionally created to actually be used by local decision makers. Woodwell has already cultivated municipal partnerships with cities and towns throughout the world that have long-term sustainability goals, providing them with the science they need to make climate-smart decisions.



Communities for which Woodwell Climate has completed or is preparing municipal risk assessments.

We have expertise studying a wide range of climate hazards

Drought
Heat Stress
Wildfires

Flooding
Hurricanes
Storm Surge

Water Scarcity
Agriculture Yield
Precipitation

Sea Level Rise
Permafrost Loss



Woodwell Climate conducts science for solutions at the nexus of climate, people and nature. We partner with leaders and communities for just, meaningful impact to address the climate crisis. Our scientists helped to launch the United Nations Framework Convention on Climate Change in 1992, and in 2007, Woodwell Climate scientists shared the Nobel Prize awarded to the Intergovernmental Panel on Climate Change. For 40 years, Woodwell Climate has combined hands-on experience and policy impact to identify and support societal-scale solutions that can be put into immediate action. This includes working with municipalities on the frontlines of the climate crisis.

For more information about this analysis, or Woodwell Climate's other climate risk assessments, please contact us at: policy@woodwellclimate.org

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