

Preparing for cascading climate risks

ASU researchers help outline what communities need to do to safeguard against interconnected climate hazards

By Gabriela Harrod, ASU News
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Arizona communities already understand that climate hazards rarely occur in isolation.

Extreme heat can drive up electricity demand, drought can increase wildfire risk, and flooding can disrupt transportation, water systems, housing and local economies.

Because these systems are connected, a disruption in one can quickly threaten public health and safety.

A new paper outlines the research needed to help communities prepare for these interconnected challenges. Written by 175 volunteer authors, many of whom participated in previous U.S. climate assessment efforts, the paper calls for climate science to be assessed and shared more quickly, continuously and collaboratively.

Three Arizona State University professors were among the paper's authors: [Nancy Grimm](#), [David Hondula](#) and [Abigail York](#). The paper, titled "[Research Priorities for Robust Climate Assessments in the United States](#)," was published in the journal *Earth's Future*.

The paper identifies several priorities for the Southwest, including understanding water-supply extremes, preparing infrastructure for multiple hazards, strengthening agricultural resilience and tracking ecosystem changes.

Nancy Grimm, a Regents Professor and Virginia M. Ullman Professor of Ecology in Arizona State University's School of Life Sciences, contributed to the paper's discussion of urban areas. Grimm studies how cities can become more resilient by considering their social, ecological and technological systems together.

Here, Grimm explains why climate assessments matter and how this work could help Arizona communities make better-informed decisions.

Question: For readers unfamiliar with climate assessments, what are they, and how do they influence everyday decisions?

Answer: Climate assessments provide up-to-date information on climate change, including its impacts on different sectors and regions, and mechanisms for responding. They are meant to be

accessible to households, communities, businesses, organizations and governments, providing the information needed to make decisions in response to the ever-increasing impacts of climate change.

Q: What are “compound” and “cascading” climate risks, and what are some examples Arizona communities may face?

A: Compound events are caused by two or more climatic factors, such as when drought increases the likelihood of wildfire. Their risks can be greater than those of individual events.

Cascading risks involve an interconnected chain of events. A heat wave, for example, could contribute to a power failure, which could then disrupt water delivery because of increased electricity demand on hot days.

These risks are especially common in urban areas because infrastructure, social systems and ecological systems are interdependent. We need to understand how interacting hazards affect policies, infrastructure and institutions designed around historical climate conditions or individual extreme events.

Q: Which of the challenges identified in the paper are most urgent for urban Arizona?

A: I believe the cascading risk involving extreme heat and power delivery is the most urgent. Fortunately, a great deal of work is happening in this area.

The city of Phoenix, for example, is building resilience to extreme heat through diverse approaches, including nature-based solutions. These can help communities that experience risk differently, often because of past disparities in access to green infrastructure that can cool local environments.

Cities should pay attention to the climate vulnerability of their communities and break down silos in land-use and infrastructure planning. We cannot afford to consider one infrastructure system at a time or omit the social and ecological parts of the system. Instead, cities could prioritize solutions that provide multiple benefits across multiple sectors.

Q: How can communities determine whether a climate adaptation strategy is working or creating new risks?

A: Monitoring is key. We need to track how well solutions are working and make adjustments when needed. Monitoring should match the objectives of the strategy.

Cities can develop systemwide resilience strategies and evaluate their responses as an integrated portfolio encompassing greenhouse gas mitigation, climate adaptation and disaster management. Communities also need reliable climate data to plan for the future. What works today may present a risk later as conditions continue to change.

Q: How can researchers meaningfully involve local communities and Indigenous peoples in climate assessments?

A: Local knowledge about climate impacts and adaptation needs to be part of the conversation, whether it comes from communities' lived experiences or the long-standing cultural and relational

knowledge of Indigenous peoples.

Western science is not the only source of authority on how climate change affects society and the ecosystems on which we depend. It is also not the only voice that should be heard when considering what to do.

In our work, we hold workshops to co-create visions for cities' futures, seeking to involve many different sectors and community representatives.

Q: What should happen next, and what role can ASU play?

A: These research priorities should be addressed in the next National Climate Assessment, but climate assessments can also be conducted at local, regional, sectoral and topical levels. Together, these efforts can form a network serving different scientific and decision-making needs.

ASU has a major role to play, given our expertise in water sustainability, urban systems, alternative energy and urban climate, among other areas. Researchers can participate in national assessments as well as local and regional efforts. Getting accessible information to decision-makers throughout Arizona and the Southwest is an essential part of climate assessment.

This story originally appeared on [ASU News](#).

Main image



The cascading risk involving extreme heat and power delivery is an urgent issue for urban Arizona, says ASU Regents Professor Nancy Grimm, who contributed to a recent paper on interconnected climate challenges. Photo by Chris Goulet/Arizona State University

Text image(s)



Nancy Grimm