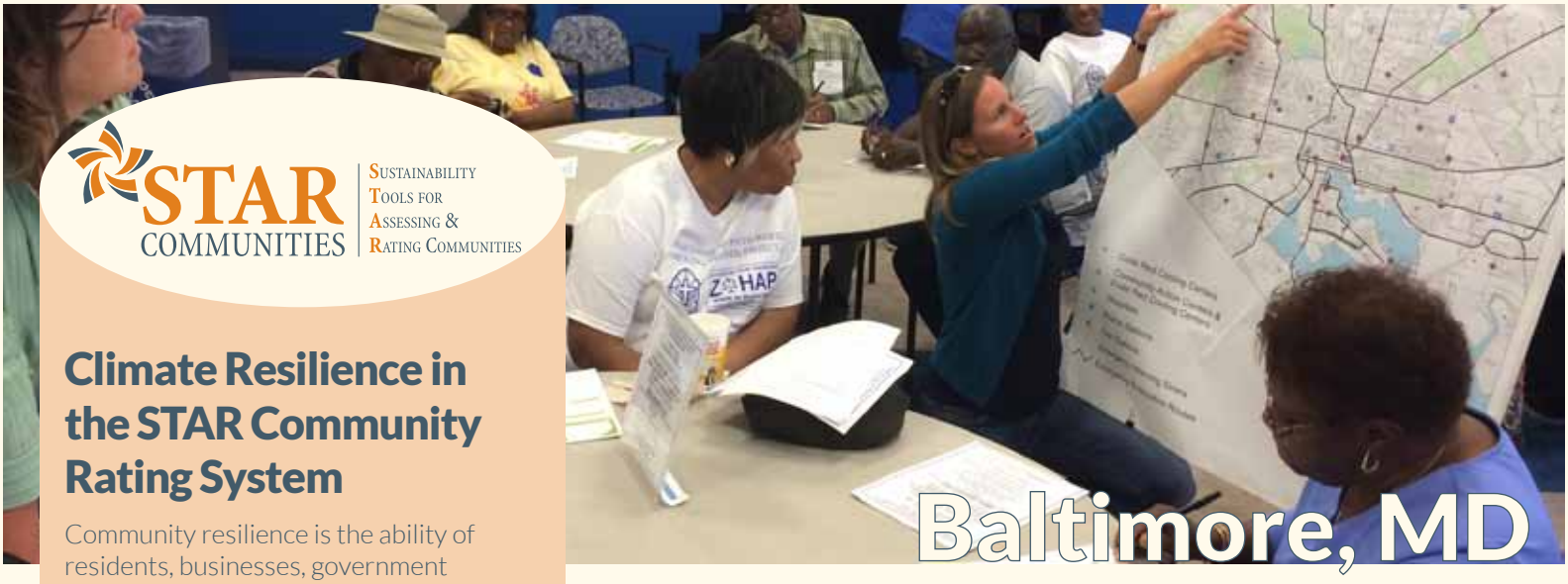


STAR COMMUNITIES | Sustainability Tools for Assessing & Rating Communities

Climate Resilience in the STAR Community Rating System

Community resilience is the ability of residents, businesses, government services, and infrastructure to successfully withstand and adapt to changing conditions impacting the community, especially national or global forces that are outside local control, such as climate change or economic recession.

The concept of resilience is well integrated into the STAR Community Rating System, the nation's first comprehensive framework for measuring and assessing the sustainability of communities at the local scale. This is because, at its core, resilience means that a community has the resources and infrastructure in place to sustain its environment, economy, and people over time, regardless of shifting conditions or unforeseen events.

Climate adaptation is a type of resilience that the STAR rating system focuses on specifically. The following case studies from Baltimore, MD and Tucson, AZ show how two high-scoring STAR communities have taken proactive measures to address climate impacts.

"We may not know precisely when or how hard we will be hit with natural disasters. But our preparation today will help our residents, businesses, and the environment to better endure and bounce back from whatever comes our way."

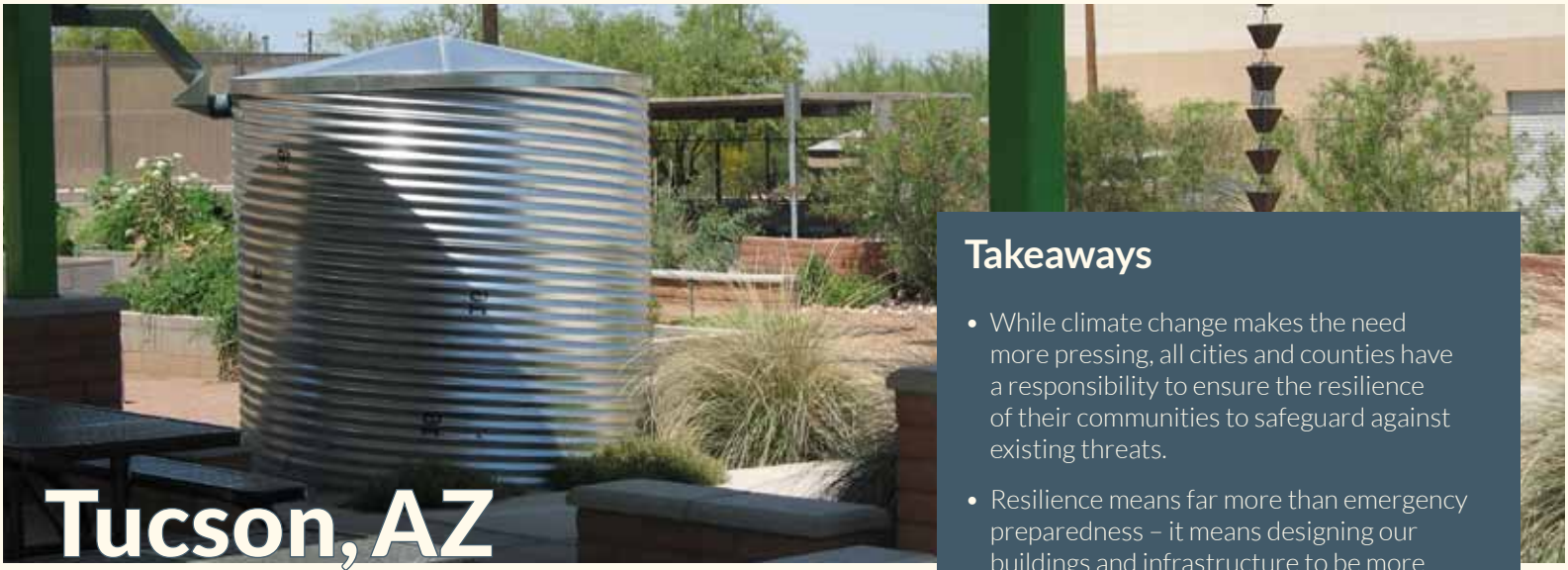
–Kristin Baja, Climate and Resilience Planner for the City of Baltimore

Like many other cities, Baltimore faces a wide range of natural hazards, including flooding, coastal storms, and extreme heat – all of which are expected to intensify with climate change. In 2013, the City developed the Disaster Preparedness Project and Plan (DP3) as a combined hazard mitigation and climate adaptation plan. The DP3 exceeds federal requirements for disaster planning to include modeling that predicts future climate impacts and identify actions the city can take to improve its climate resilience.

Some innovative aspects of the DP3 include a **flood vulnerability assessment** of all structures and critical facilities in the 100- and 500-year floodplains with HAZUS-MH modeling to estimate the flooding, sea level rise, and coastal storm influence of climate change. There is also a **coastal hazards assessment** showing how urban forests, parks, and green spaces can help buffer developed areas from coastal storms. A **high heat vulnerability assessment** identifies urban heat islands and "hot spots" where temperatures are consistently 10-15 degrees hotter than surrounding areas and includes a Health Impact Assessment (HIA) in collaboration with the local health department. The assessment found that some of the city's lowest income neighborhoods have the highest average summer temperatures due to the high percentage of impervious surface.

Now in the implementation phase, Baltimore is taking action to strengthen the city's resilience. As the lead department, the Office of Sustainability seeks to ensure that environmental, economic, and equity factors are considered during implementation. High priority actions that have been completed or are underway include:

- New **floodplain regulations** that go beyond FEMA's standards, including regulation of development in the 500-year floodplain citywide, creation of a Flood Resilience Area, adoption of higher standards for critical facilities, and increasing freeboard requirements from one to two feet.
- The Growing Green Initiative, which transforms vacant lots for a variety of uses including stormwater management, stream restoration, and coastal buffering while simultaneously reducing blight and improving community cohesion.
- Installation of over 200 **Urban Heat Island sensors** in "hot spot" neighborhoods where more than 30 **community tree plantings** have taken place. These sensors measure the temperature difference from community-wide resiliency efforts including tree plantings, cool roof installations, impervious surface removal, and behavior change campaigns. The City is also expanding public services to alert and educate residents about air quality, asthma, and high heat preparedness.
- Integration of resiliency considerations into the City's **Capital Improvements Process** (CIP). The CIP also has energy efficiency and green building requirements, which reduces operating costs and carbon emissions.
- **Citizen and business education** about emergency preparedness and the impacts of climate change, such as the 2014 Make a Plan. Build a Kit. Help Each Other. event and the Turtles Helpers program for youth. The City has also worked with residents to develop over 1,250 emergency plans and kits in areas most vulnerable to current and future hazards.
- Development of a **Tree Database** that considers predicted impacts from climate change and identifies which tree species are best to plant in specific areas of the city.



Tucson, AZ

"Tucson residents value living comfortably and responsibly in the desert. The strategies for dealing with climate change are part of who we are as a community."

–Leslie Ethen, Sustainability Manager for the City of Tucson

Tucson's main climate change challenge is the flip side of Baltimore's – not enough water. Tucson is a desert community with a limited water supply. As of 2012, more than 70% of potable water came from the Colorado River through the Central Arizona Project (CAP) canal. Unfortunately, the Colorado River is under increasing stress. The 1920s compact allocating Colorado River water to neighboring states was based on a period of high river flow, and expectations are that streamflow from the Colorado will decline as climate change worsens.

In response, Tucson has become highly aggressive and innovative about securing its water future. Tucson's Water Plan: 2000-2050 provides projections about current and future needs, available water supplies, and lays out options and recommendations.

Thanks to the City's efforts since 2000, Tucson is currently banking six months of its available supply every year. Many of the more extreme measures, such as recharge and recovery of treated effluent, have been pushed out significantly past original projections. Even so, the City is moving forward with the recycled effluent plans now to add to its water reserves.

Takeaways

- While climate change makes the need more pressing, all cities and counties have a responsibility to ensure the resilience of their communities to safeguard against existing threats.
- Resilience means far more than emergency preparedness – it means designing our buildings and infrastructure to be more compatible with the natural environment and anticipating that extreme events may well exceed historical records.
- Now is the time to invest in the infrastructure projects that will improve resilience in the future. Waiting until climate change impacts become more apparent to take action will waste precious time and could threaten lives and property.
- Targeted outreach, education, and investments may be needed for sensitive and vulnerable populations to ensure safety and disaster preparedness, recognizing these persons may be concentrated in areas that are most at risk.
- Cities and counties that are getting started or diving into resilience planning can utilize the STAR Community Rating System, which provides technical guidance, resources, and additional case studies of communities that are leading the way in climate adaptation.

Some of Tucson's water conservation and efficiency measures include:

- **Rainwater harvesting**, which requires all new commercial developments to capture enough stormwater onsite to support at least 50% of irrigation needs. The City also offers incentives for residents to install rainwater or graywater harvesting systems; larger cisterns and more complex systems receive larger rebates.
- A wide range of **voluntary programs** for residents and businesses, such as high efficiency toilet/urinal rebates, free water audits, and the Conserve to Enhance (C2E) program, which encourages residents and businesses to conserve water and donate the savings to enhance urban rivers and washes. C2E also issues grants for local habitat enhancement or restoration projects.
- The **Green Streets** policy requires new or improved roadways to incorporate green infrastructure and use rainwater harvesting to water these plants. In addition to reducing wasted water, this policy also minimizes the urban heat island effect and makes walking more pleasant (and safer, given the extreme desert heat) for residents.
- A state-mandated citywide Drought Preparedness Response Plan that calls for annual monitoring of drought indicators that triggers escalating or rescinding of various stages of local and regional drought response.
- $66.5 million investment over the past three years in **Sweetwater Wetlands**, in which reclaimed, treated water filters through recharge basins to replenish the local aquifer.

While Tucson still faces some uncertainty about the extent of climate change impacts to its water supplies, especially with a growing population, the efforts the City has taken now will increase its future resilience.

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Photos courtesy of the City of Baltimore and the City of Tucson