



# Water Vulnerability on the Urban Periphery: The Case of Metropolitan Phoenix, Arizona

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## Overview

Vulnerability analysis examines the differential ability of individuals and groups to anticipate, avoid, cope with, and recover from the effects of acute or chronic hazards. For this study, the vulnerability of community water systems to drought and water scarcity is evaluated in relation to consumption patterns, urban growth, and resource access. At a variety of scales, vulnerability is mediated by institutional arrangements that affect resource access as well as linked to persistent social inequalities and uneven geographic development produced by capitalist accumulation strategies.

Within the regional context of metropolitan Phoenix, Arizona, our research focuses on the urban fringe communities of Buckeye and Cave Creek. While Buckeye faces rapid urbanization including privately planned development of former agricultural lands, Cave Creek has recently confronted major water shortages and conflicts over water provider services. Drawing from vulnerability and political ecology perspectives, our place based research includes analysis of policy documents, media coverage and interviews.

## Buckeye

- Once a small agricultural town, Buckeye is rapidly transitioning into a large residential suburb of Phoenix, with its population of about 8,500 in 2000 projected to expand to over 380,000 by 2030.
- For an area covering 600 square miles, the town is undergoing a comprehensive planning process that aims to create an integrated municipal water distribution and wastewater reclamation system.
- The town is currently enrolled in state mandated groundwater recharge programs and is pursuing a certificate of 100 years assured water from the Arizona Department of Water Resources (ADWR).

"Decisions will need to be made as to which services have a higher overall priority than others as they compete for the limited new revenue available."  
- Town of Buckeye Recommended Budget, Fiscal Year 2006-2007

Town looking toward future growth by annexing 108 square miles - Associate Press 7/20/06



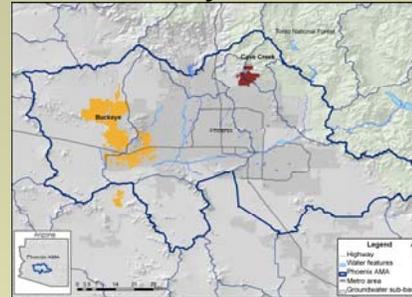
"We are in a drought but development is still rampant"  
- Community Development Director, Town of Buckeye

Water is top concern at Buckeye town hall - Arizona Republic 1/21/06

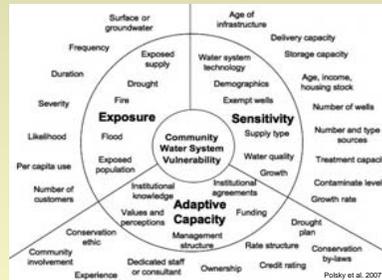
"We have a large supply of water available to Buckeye, but it is not suitable for human consumption without treatment."  
- Superintendent, Roosevelt Irrigation District

Residents question fairness of different water charges - Arizona Republic 10/14/05

## Study Area

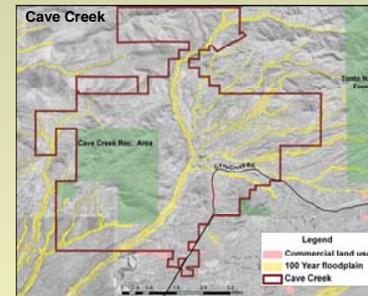


## Vulnerability Scoping Diagram



## Cave Creek

- Bordered by the Tonto National Forest, Cave Creek values low-density desert living, preservation of open spaces, and associated recreational amenities. Cave Creek is known for its 'old West' atmosphere and eclectic independent lifestyle.
- The town of Cave Creek recently condemned the privately owned Cave Creek Water company forcing rival, Global Water, to sell the company for 19 million dollars. Desert Hills Water Co. was also bought out by the town of Cave Creek after severe water outages in the summer of 2006 affected residential customers in nearby unincorporated areas.
- After taking municipal control of the water company, Cave Creek residents suffered several water outages. Outages caused by electrical surges, pump failures and ruptured lines were exasperated by a severe lack of storage.



"We know that demand for water at this point is very close to our capacity to supply water...it's not a lack of water, it's a lack of both storage and treatment capacity."  
- Councilman, Town of Cave Creek



"The town wants to bring the future under control by controlling water and as we know here in Arizona, water is the future."  
- Councilman, Town of Cave Creek



"This is a town in which we live in the desert and we want to live in the desert and we don't want our little mini-oasis for each home. So all of it has to do with public perceptions and public values of the desert environment."  
- Councilman, Town of Cave Creek

"We are very cognizant of the fact that water is a limited resource, the Colorado river is not inexhaustible, and we're quickly finding that out"  
- Mayor, Town of Cave Creek

## Vulnerability Factors

Sample Factor	Buckeye	Cave Creek
Source of water	100% groundwater	100% CAP water for potable uses (1,600 AF allocation)
Water providers	Town of Buckeye (municipal provider) & 5 small private providers	Town of Cave Creek (municipal provider)
Infrastructure	- Spatially fragmented water extraction, treatment and delivery systems	- Dilapidated delivery system that lacks sufficient storage and treatment capacity
Groundwater Quality	- Arsenic, total dissolved solids, Nitrates, and Fluorides	- High arsenic levels
Exempt wells (#)*	1,187	545
Wildfire	N/A	- Bordering Tonto National Forest - Severe fires have caused property damage and increased flooding - Protection thru subscription to private fire service co.
Demographics:		
Ethnicity (% Anglo)	57%	91%
Median income	\$35,383	\$59,937
Median house value	\$86,400	\$270,500

\* Unregulated wells with a pumping capacity of less than 35 gallons per minute

## Conclusions and Next Steps

Rapid growth exposes communities in the Phoenix region to rapid changes that can outpace comprehensive planning efforts and decrease institutional capacity necessary to prepare and cope with water scarcity. These factors threaten resilience and result in different levels of vulnerability among and within communities. A key difficulty facing municipalities on the urban fringe is coordinated planning and preparedness in the face of private, and sometimes multiple, water providers. For the case study communities, proximity to preserved desert areas versus agricultural land also create unique challenges such as wildfires exacerbated by drought and wells that are exempt from regulatory oversight, respectively. Particular geographic contexts may, in turn, influence perceptions of risks and the willingness and ability of communities to prepare and respond to acute or chronic scarcity.

Interviews with water resource professionals and other key informants are being evaluated for risk perceptions and institutional capacity to cope with water scarcity. Further data collection and mapping will also reveal regional-wide vulnerabilities in terms of differential access to secure water sources and infrastructural buffers as well as preparedness to respond and cope with water scarcity and other risks.

Acknowledgment

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