School of Sustainability
Arizona State University

Sustainable Cities Network
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Collaborative Approach for a Resilient Maricopa County: Sustainability Benchmark Recommendations

SOS 498:
Urban Sustainability Best Practices Application
Fall 2018

Water in a drying climate

- The Fourth National Climate Assessment says the chance of drought within the Southwest will increase significantly over the next decades due to climate change.
- The chances of multidecadal drought are likely to increase.
- Water and heat stress likely to increase.
- The current drought has resulted in a 19% reduction in the Colorado River Basin.

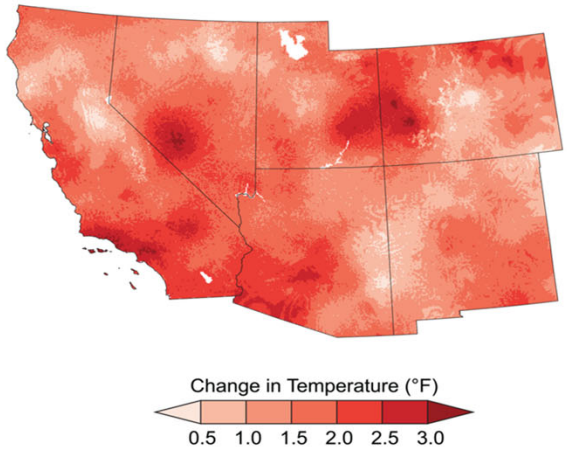
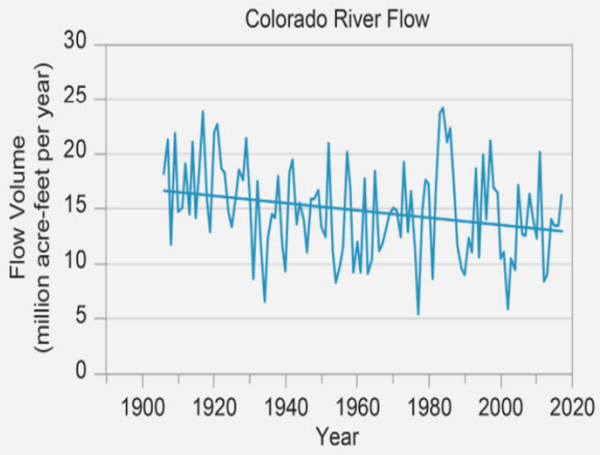
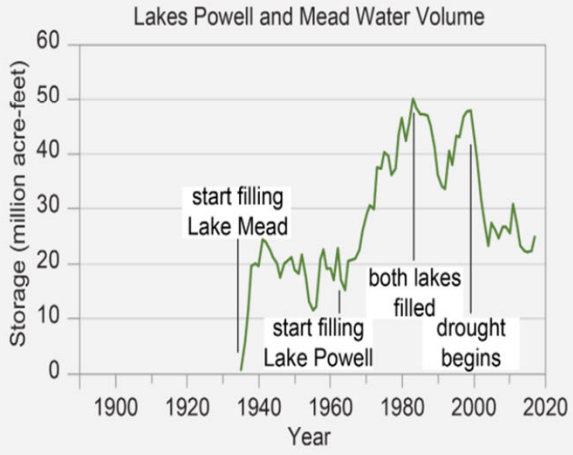


Figure 25.1: Temperatures increased across almost all of the Southwest region from 1901 to 2016, with the greatest increases in southern California and western Colorado.[23] This map shows the difference between 1986–2016 average temperature and 1901–1960 average temperature.[23] Source: adapted from Vose et al. 2017.[23]





This will give rise to conditions that may threaten water security. The future of water in Maricopa County looks bleak unless there is collective action throughout the county and the Southwest to address water usage.

Water: Residential, Commercial, Management

- **Majority of water demand is residential**
  - Water consumption in the Phoenix AMA between 2000 and 2009 averaged to around 212 Gallons per Capita Daily.
- Las Vegas dropped their water consumption from 248 GPCD in 2008 to 127 GPCD by 2017.
  - Great opportunities to reduce water usage: Education campaigns, “Cash-for-Grass,” tiered water bills, water rebates.
- Tribal water demand in Arizona is 57 GPCD.
- 300,000 Acre-feet of water fall as rain on residential land in Maricopa County.
  - Rainwater harvesting could prove to be a great opportunity to reduce the strain on conventional water sources.
  - Strategies to encourage rainwater harvesting includes ordinances encouraging installation like tucson.

Reduce individual water use to 80 Gallons per Capita per Day by 2040.

Short-term Benchmark: 150 GPCD by 2025.
Mid-term Benchmark: 120 GPCD by 2030.
Long-term Benchmark: 100 GPCD by 2035.

Implement Widespread Rainwater Harvesting: Capture and use 10% of rain that falls over residential communities by 2040.

Short-term Benchmark: 3% rainfall capture by 2025.
Mid-term Benchmark: 5% rainfall capture by 2030.
Long-term Benchmark: 8% rainfall capture by 2035.

Water: Residential, Commercial, Management

- Indoor Water Use: LV WET Program
  - Saved 6.5 billion gallons of water
  - 1.9 million dollars in rebates for their efforts
- Outdoor Water Use: LV Cash For Grass, Watersmart
  - Prohibition on turf
  - Rebates
- Golf Courses
  - Regulation: 6.3 acre feet of water per acre annually
    - Surcharge rates
  - Removal of 1,000 acres of turf, 20% of the total area
  - Effluent Water Usage
- Current Cities Strategies
  - Turf conversion; Xeriscape
  - Smart controllers/Watersense

Decrease water use by 60% by 2040

Short-term Benchmark: 15% Decreased water use by 2025.
Mid-term Benchmark: 25% Decreased water use by 2030.
Long-term Benchmark: 45% Decreased water use by by 2035.

Water: Residential, Commercial, Management

- Current: Grey Infrastructure
  - Impervious Surfaces
  - Water is not utilized
- Future: Green Infrastructure
  - Ecosystem: Bioretention/Percolation
  - Economic: Saves money long-term
  - Societal: Community Benefits
- Current State: 82% effluent reuse
  - Peoria, Phoenix
- Legality of effluent wastewater for human consumption
- Constructed Wetlands
  - Three-fold benefit
  - Ex. Tres Rios, Sweetwater

Build a rain garden for every 2000 residents by 2040 (9,000 total)

Short-term Benchmark: a rain garden for every 5000 residents by 2025 (2,250 total).
Mid-term Benchmark: a rain garden for every 4000 residents by 2030 (4,500 total).
Long-term Benchmark: a rain garden for every 3000 residents by 2035 (6,750 total).

50% of water reuse designated for drinking water by 2040

Short-term Benchmark: 13% reuse for drinking water by 2025.
Mid-term Benchmark: 25% reuse for drinking water by 2030.
Long-term Benchmark: 38% reuse for drinking water by 2035.