
Watering the Sun Corridor
Managing Choices in Arizona's Megapolitan Area
ASU Morrison Institute for Public Policy
ARIZONA STATE UNIVERSITY

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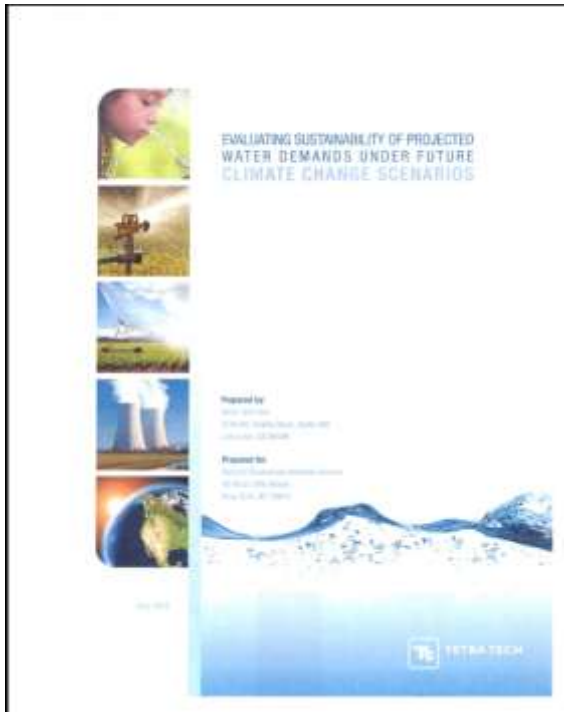
Evaluating Sustainability of Projected Water Demands



'Water Scarcity a Bond Risk, Study Warns'

The New York Times

Water Scarcity a Bond Risk, Study Warns

The municipal bonds that help finance a major portion of the nation's water supply may be riskier than investors realize because their credit ratings do not adequately reflect the growing risks of water shortages and legal battles over water supplies, according to a new study.

As a result, investors may see their bonds drop in value when these risks become apparent, and water and electric utilities may find it more expensive to raise money to cope with supply problems, the study warned.

Looking at significant water bond issuers across the southern part of the country, the report concluded that Wall Street's rating agencies had given similar ratings to utilities with secure sources of water and to those whose water sources were dwindling or were threatened by legal battles with neighboring utilities.

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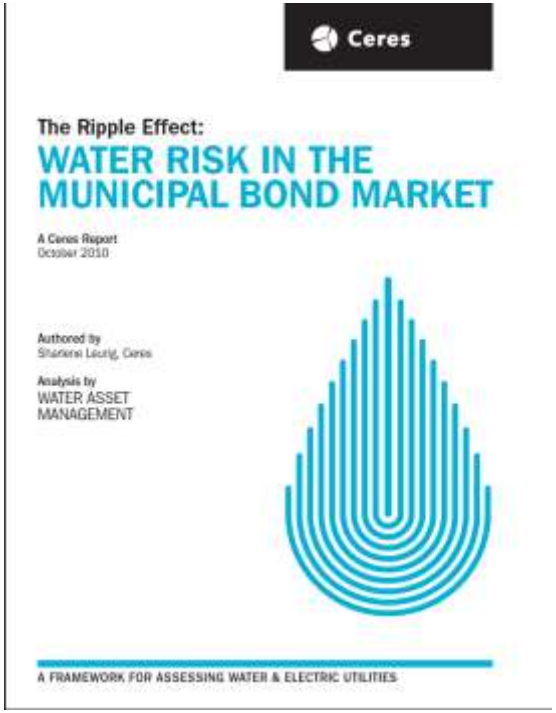
Water Risk in the Municipal Bond Market



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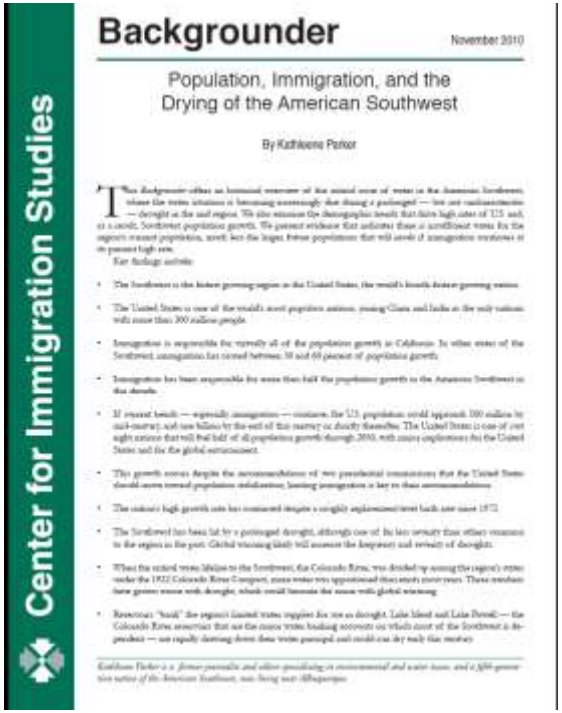
Population, Immigration, and the Drying of the American Southwest



Center for Immigration Studies

Backgrounder November 2010

Population, Immigration, and the Drying of the American Southwest

By Kathleene Parker

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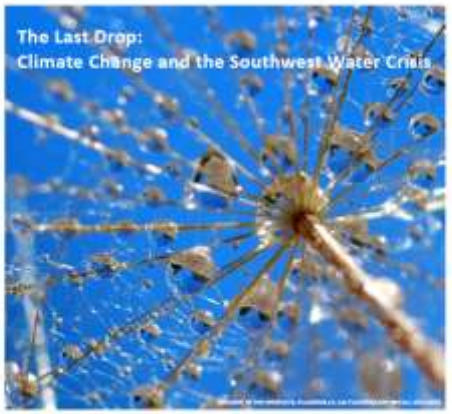
The Last Drop: Climate Change and the Southwest Water Crisis



'Water Use in the Southwest Heads for a Day of Reckoning'

The New York Times

Water Use in Southwest Heads for a Day of Reckoning

LAKE MEAD NATIONAL RECREATION AREA, Nev. — A once-unthinkable day is looming on the Colorado River.

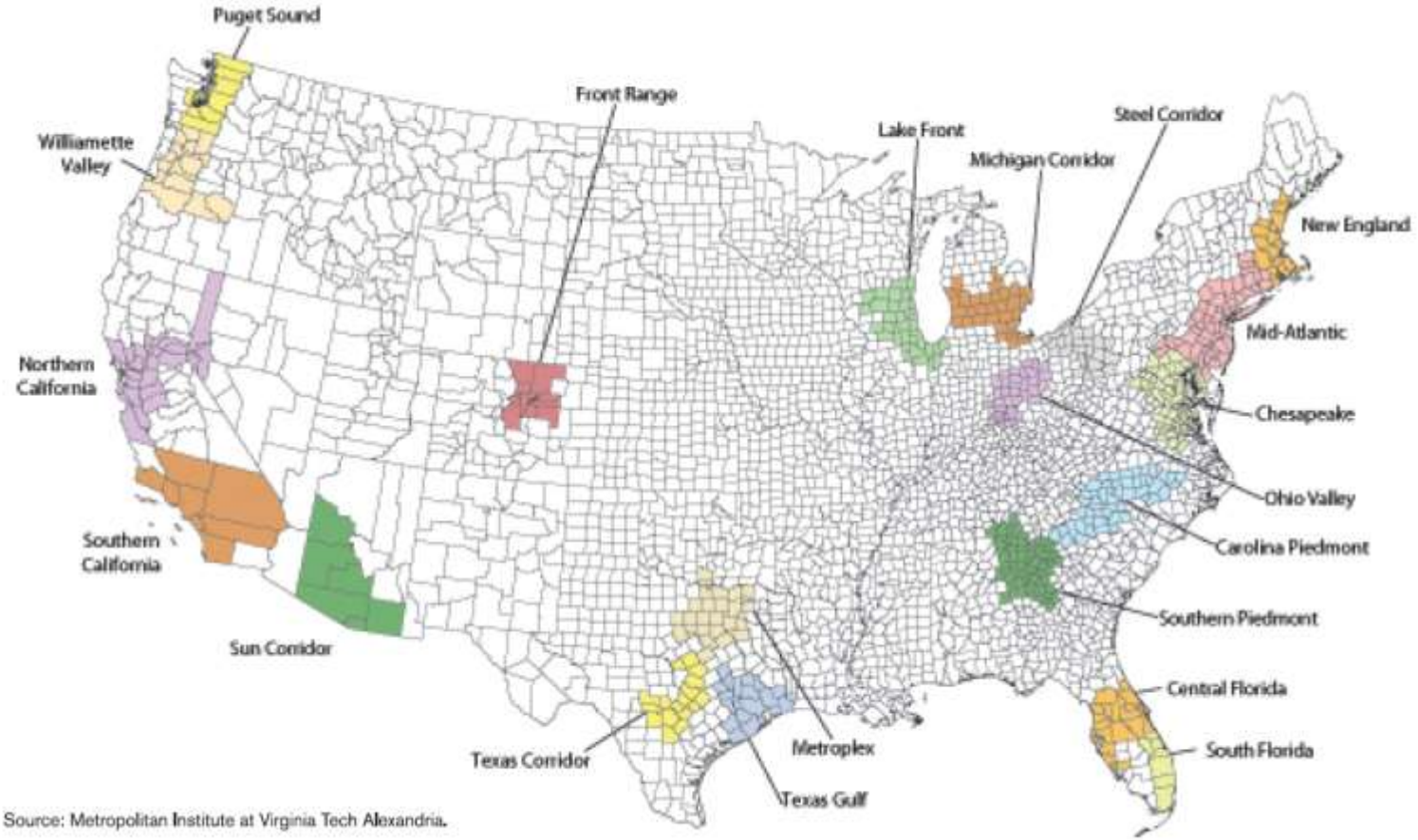
Barring a sudden end to the Southwest's 21-year drought, the distribution of the river's dwindling bounty is likely to be reordered as early as next year because the flow of water cannot keep pace with the region's demands.

For the first time, federal estimates issued in August indicate that Lake Mead, the heart of the lower Colorado basin's water system — irrigating lettuce, onions and wheat in reclaimed corners of the Sonoran Desert, and lawns and golf courses from Las Vegas to Los Angeles — could drop below a crucial demarcation line of 1,075 feet.

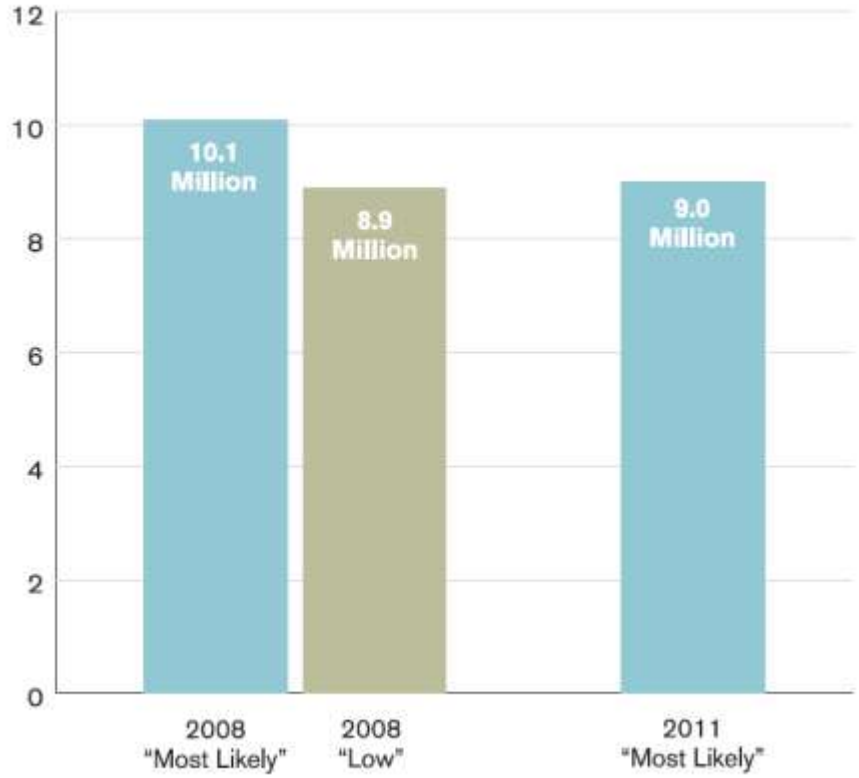
If it does, that will set in motion a temporary distribution plan approved in 2007 by the seven states with claims to the river and by the federal Bureau of Reclamation, and water deliveries to Arizona and Nevada would be reduced.

Megapolitan: Arizona's Sun Corridor

A Megapolitan is Taking Shape



9 MILLION PERSON SUN CORRIDOR BY 2040 REMAINS MOST LIKELY POPULATION PROJECTION



Source: Morrison Institute for Public Policy, ASU.

Sources of Water for the Sun Corridor

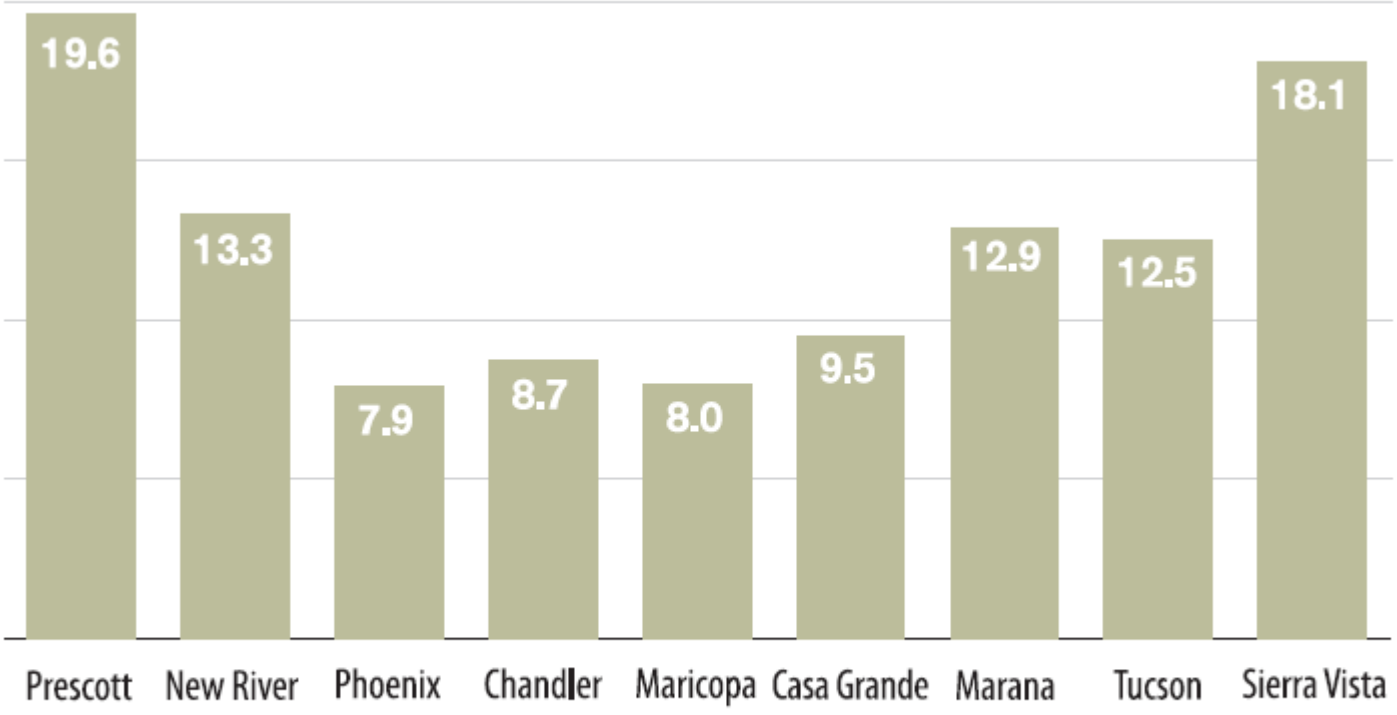
A. Three Concepts: Supply, Stationarity and Variability

B. The Water Sources

C. Climate Change

D. Future Water Supplies

AVERAGE ANNUAL RAINFALL IN INCHES



Source: Federal Research Division, Library of Congress, Country Studies-Arizona Weather.

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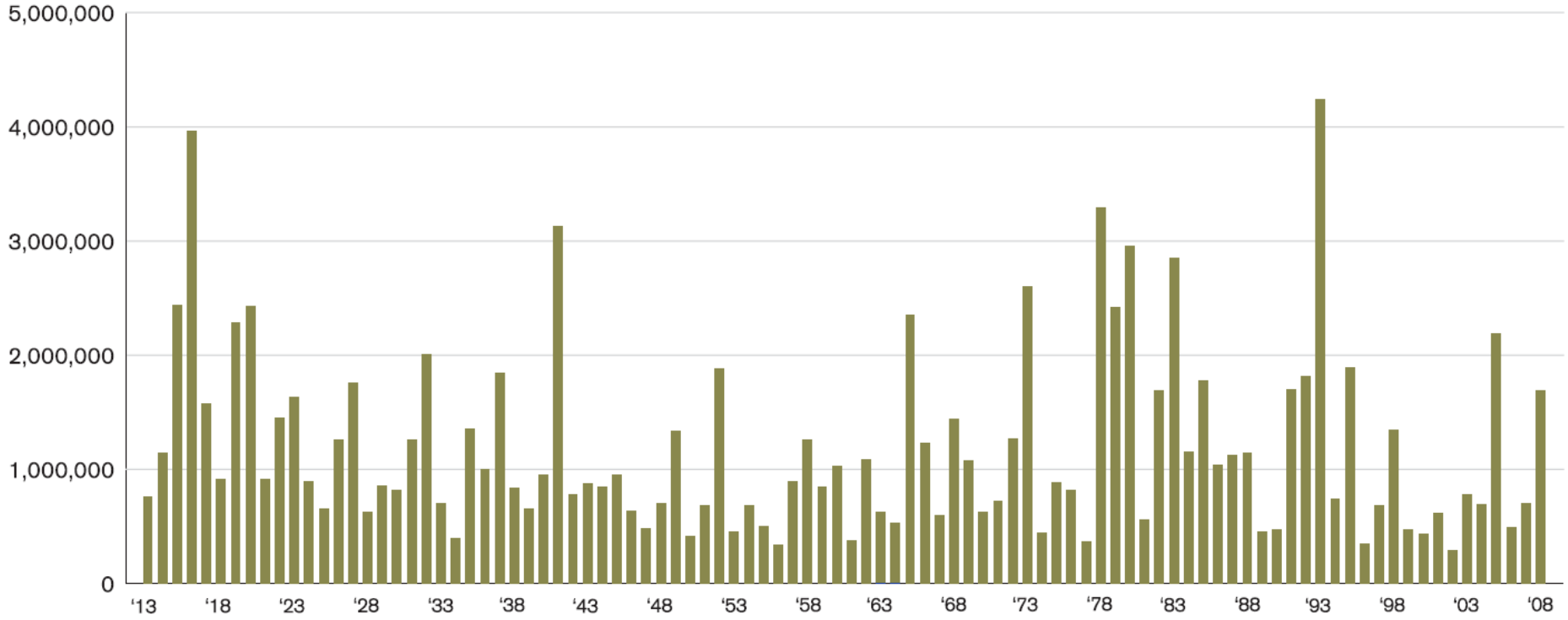
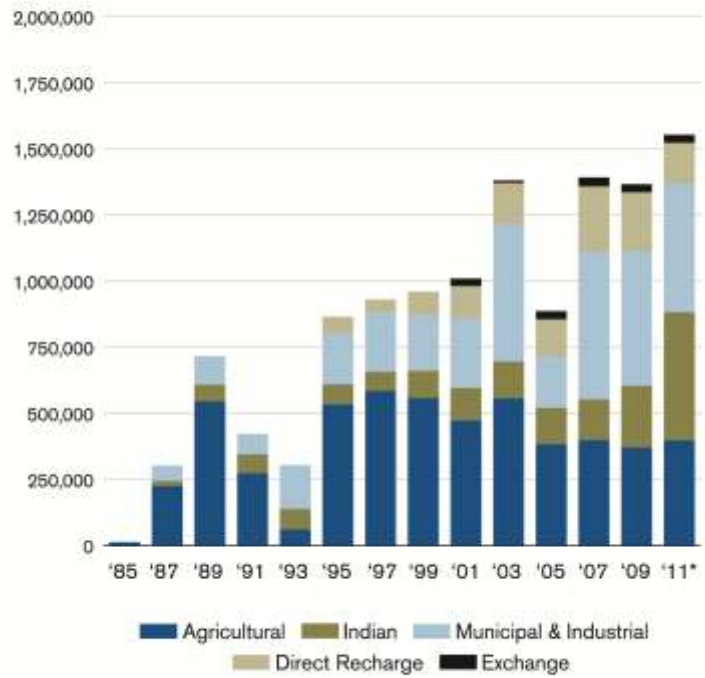
SALT RIVER, TONTO CREEK, AND VERDE RIVER COMBINED ANNUAL INFLOW, IN ACRE FEET 1913-2008



CAP DELIVERIES BY END USER IN VOLUME OF ACRE FEET, 1985-2011



* Forecasted.

Source: Central Arizona Project.

Summary of Existing Sun Corridor Supplies

Salt/Verde	800,000 Average Af/Yr
Other Surface Water	250,000 Average Af/Yr
Natural Groundwater Recharge	260,000 Average Af/Yr
Colorado River	1,500,000 Af/Yr
TOTAL	**2,810,000 Average Af/Yr**

What about Climate Change?

- NOAA estimate: 10-20% reduction in rainfall
- BOR projection for Colorado River: 9% decline by mid century

15% reduction here: cuts 2.8 MAF annual “supply” inputs to 2.4 MAF

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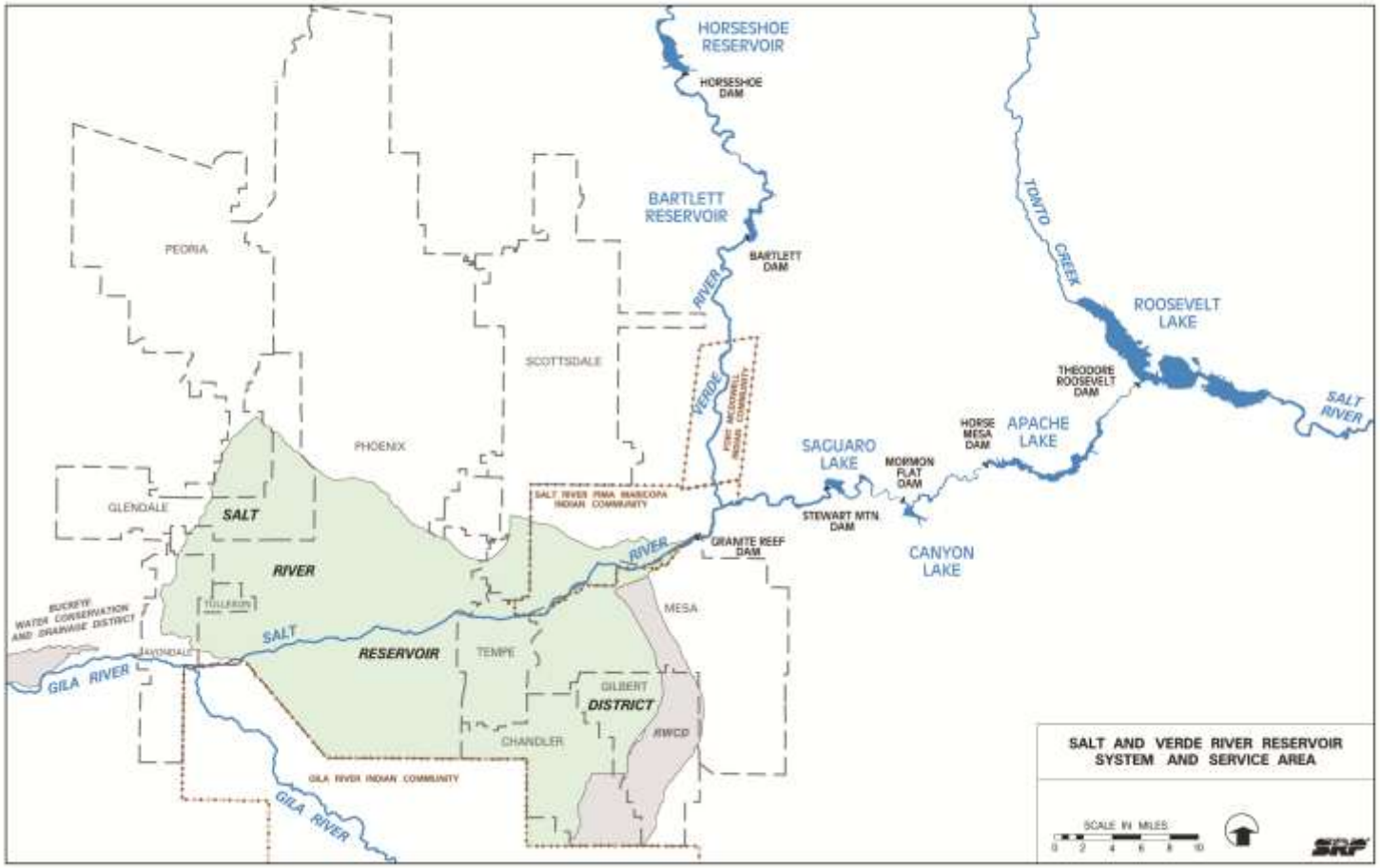
Managing a Desert Water Supply: From Variable to Reliable

A. Salt River Project
B. Central Arizona Project
C. Managing Groundwater
D. Reclaimed Water
E. Conclusions on Supply and Reliability

SRP RESERVOIR SYSTEM, SALT RIVER RESERVOIR DISTRICT, AND CITY BOUNDARIES



Source: Salt River Project.

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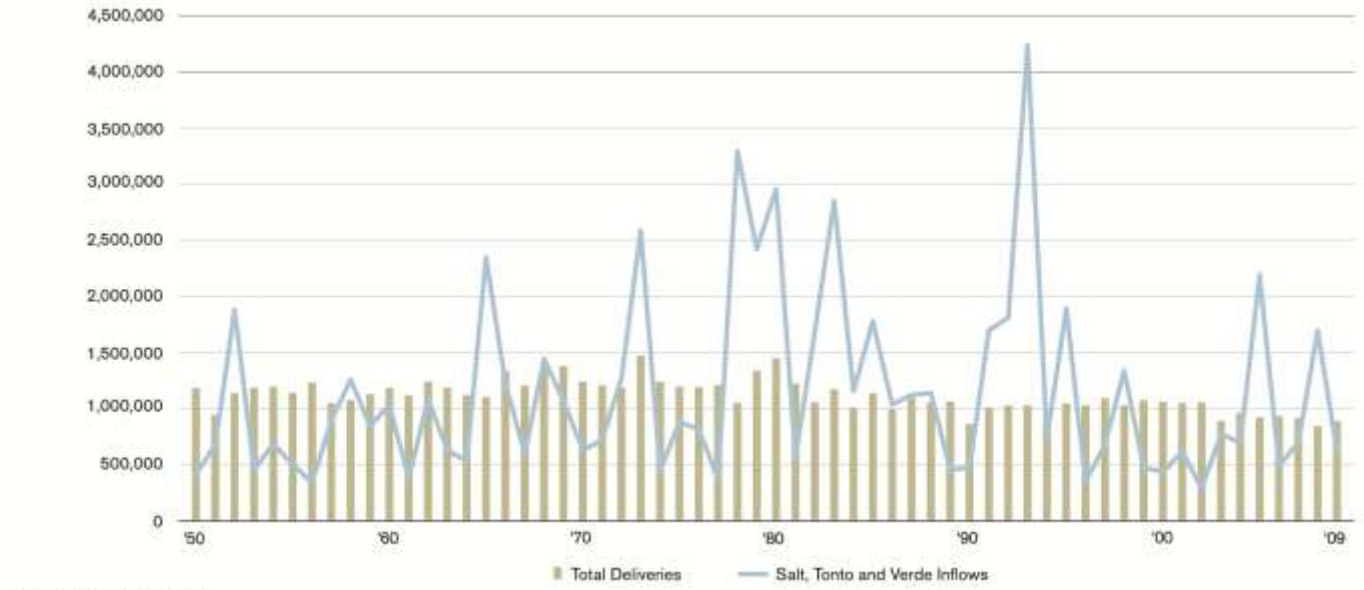
SRP DELIVERIES FROM COMPLETION OF HORSESHOE DAM THROUGH THE PRESENT



Source: Salt River Project.

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COLORADO AND SALT, TONTO AND VERDE FLOWS, IN MILLION ACRE FEET

Demand: Where Does the Water Go?

A. Urban Water Use
B. Agriculture
C. Price and Conservation
D. The Natural Environment

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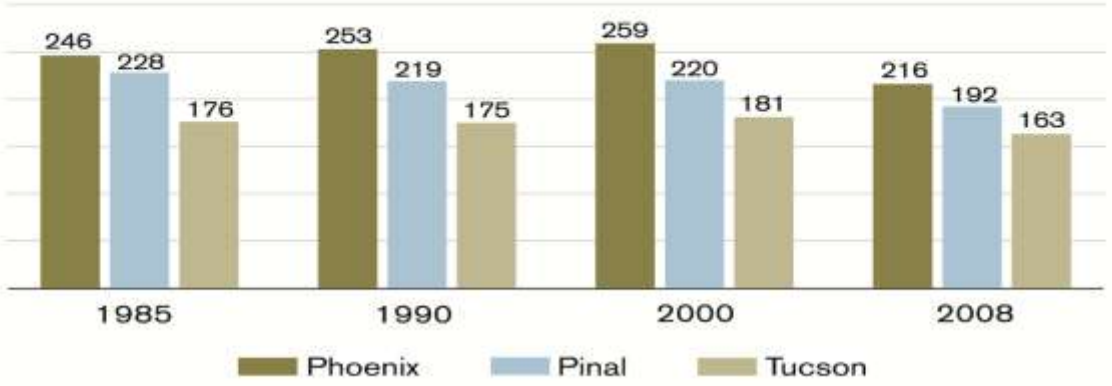
GALLONS PER CAPITA PER DAY RATES FOR CENTRAL ARIZONA AMAS



Source: ADWR.

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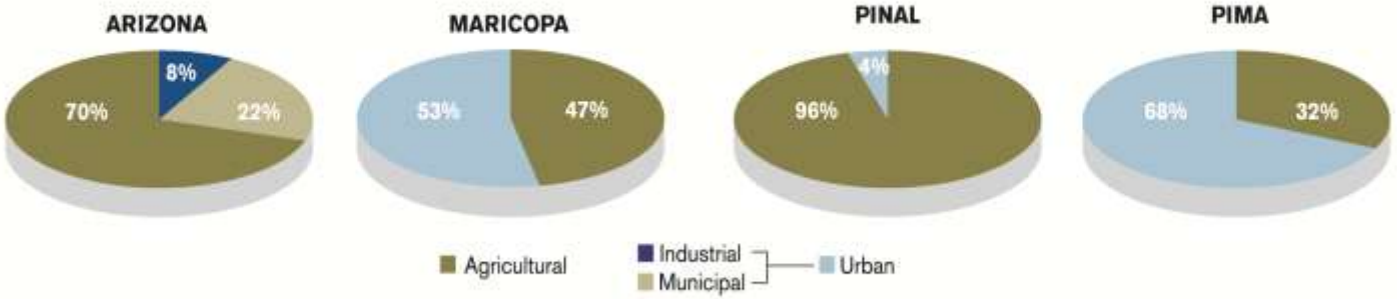
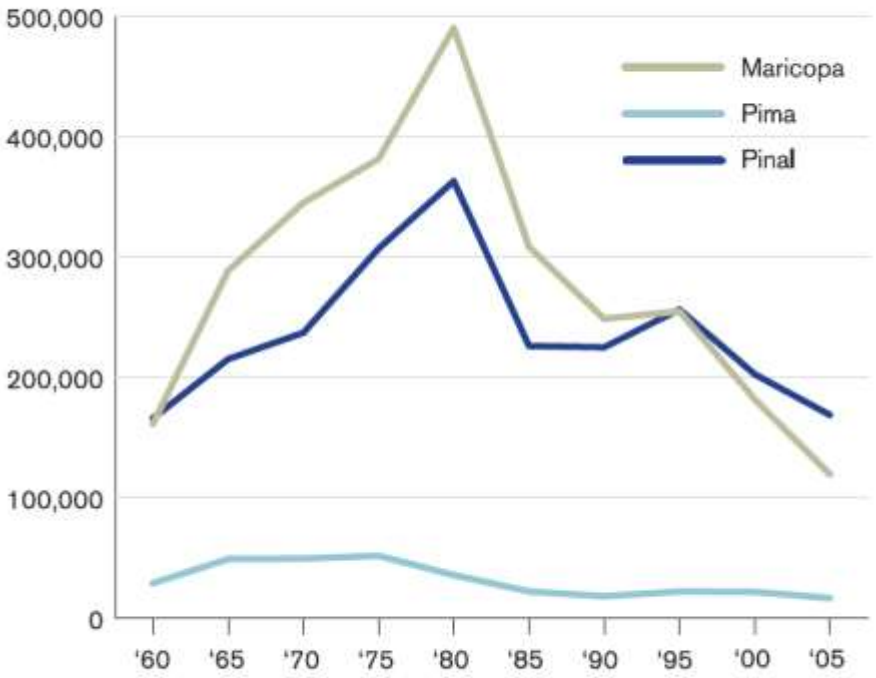
WATER USE PROFILES FOR ARIZONA AND THREE COUNTIES



Source: *Arizona Water Atlas*, Vol. 8 (2010). Arizona Department of Water Resources.

TOTAL NUMBER OF ACRES PLANTED FOR ALL AGRICULTURAL PURPOSES BY COUNTY



Source: Morrison Institute for Public Policy, ASU; data from the U.S. Department of Agriculture, National Agriculture Statistics Service, 2007.

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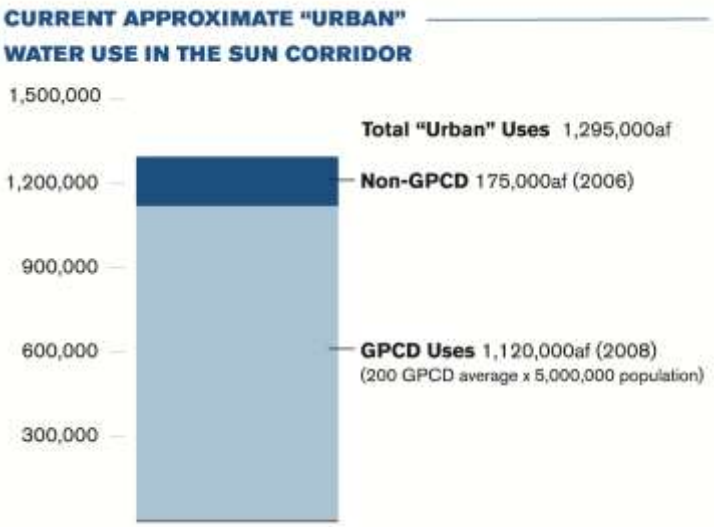

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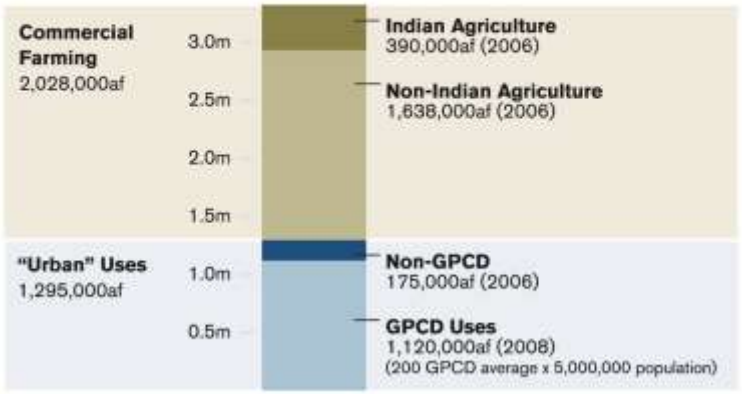
CURRENT APPROXIMATE TOTAL WATER USE IN THE SUN CORRIDOR



Water Supply	1,800,000af	2,000,000af	2,200,000af
Per Capita Use	Approximate Population		
200 GPCD (.22 af/yr)	8,182,000	9,100,000	10,000,000
150 GPCD (.17 af/yr)	10,588,000	11,765,000	12,941,000

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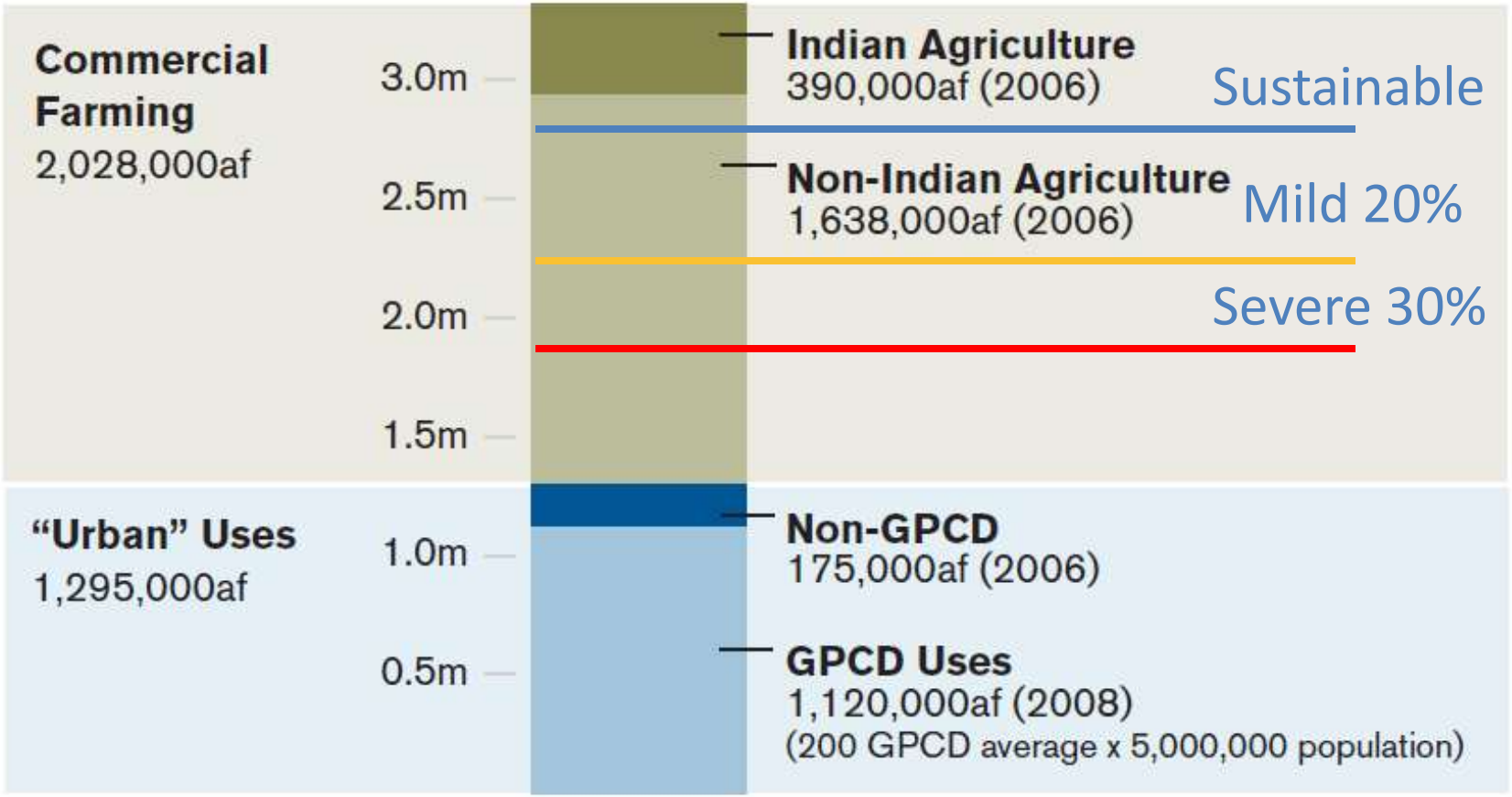

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200 GPCD (.22 af/yr)	8,182,000	9,100,000	10,000,000
150 GPCD (.17 af/yr)	10,588,000	11,765,000	12,941,000

500,000 af for Agriculture (1/4 today's Water Use)

Water Supply	1,300,000 af	1,500,000 af	1,700,000 af
Per Capita Use	Approximate Population		
200 GPCD (.22 af/yr)	5,700,000	6,600,000	7,600,000
150 GPCD (.17 af/yr)	7,600,000	8,900,000	10,100,000

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The Dilemma of the Sun Corridor: How Should We Choose to Live?

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Managing Choices in Arizona's Sun Corridor

- Where Should We Grow?
- Density
- Landscaping
- The Lifestyle of Affluence
- Agriculture
- Aesthetics & Urban Environment
- The Natural Environment