

Smart Water Management in the Valley of the Sun

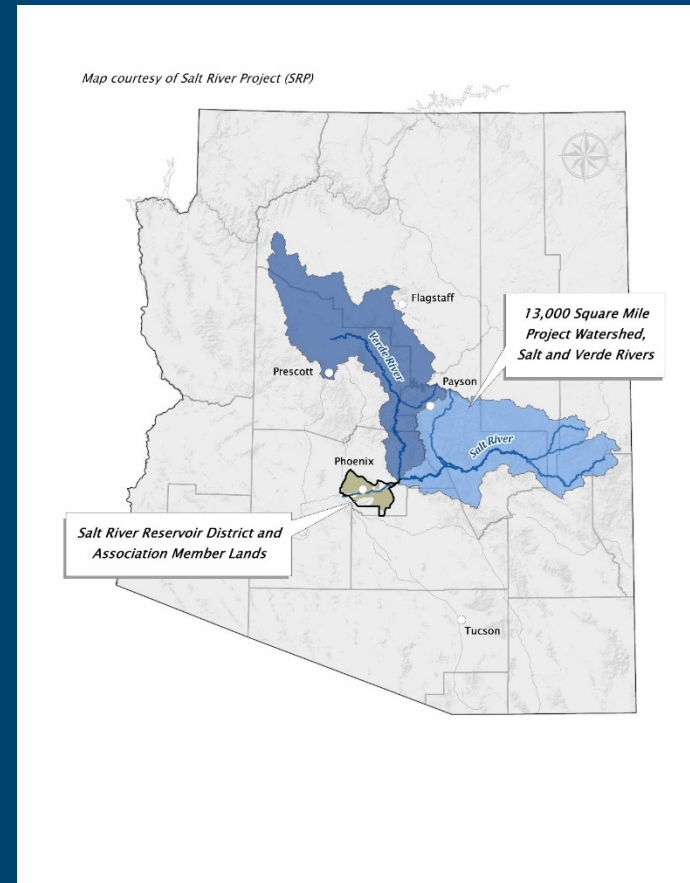
October 17, 2016



PHX WATER SMART

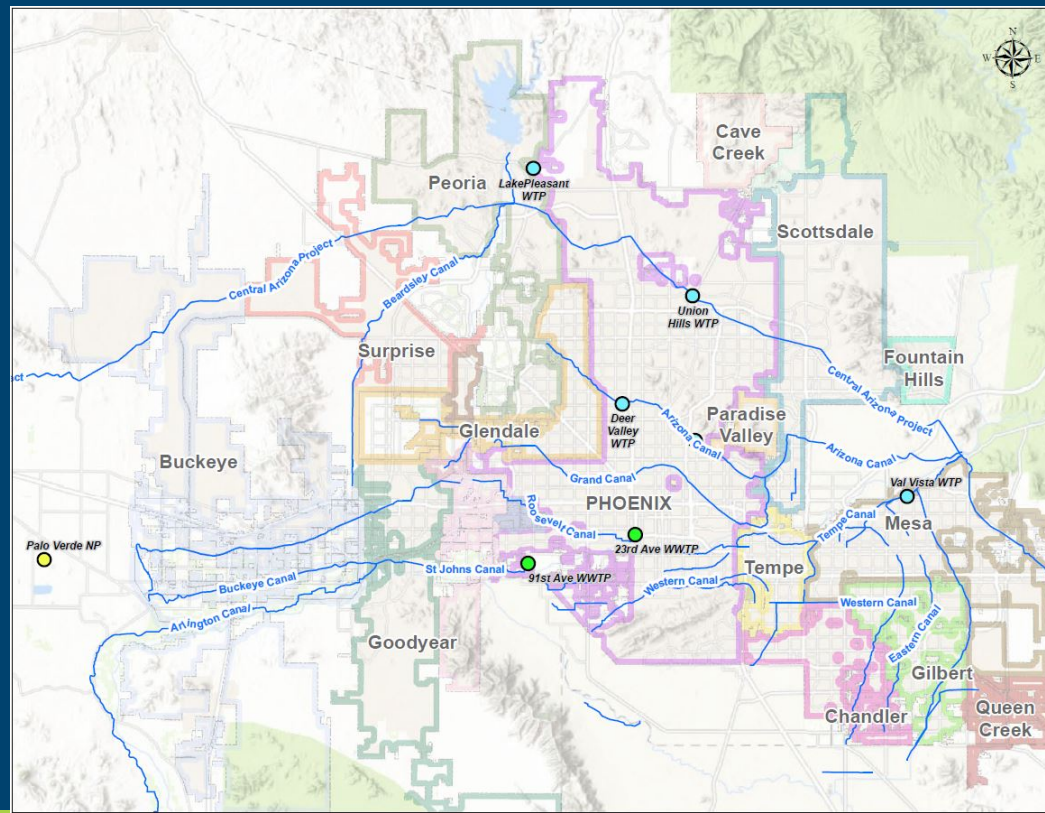
Arizona Geology

- Although in the Sonoran Desert, some of the state's largest rivers flow through the Valley of the Sun.



Modern Times

- Modern canals are roughly based on ancient canals



Salt River Project

- Water rights are appurtenant to the lands within the project
- Water allocations governed by local board
- Supplies carried by local canals
- Wells feed into the canal system as a redundant supply for drought



Central Arizona Project

- Canal that runs from Lake Havasu, through Phoenix, to Tucson
- Water is junior in the lower Colorado River basin
- Water allocations handled by the most complex governance system possible: “The Law of the River”
- No wells feed into the canal



Groundwater Management

- 1980 Groundwater Management Act
- Set goal of Safe Yield in the Valley of the Sun
- Protection of fossil groundwater supplies
- Aquifers in good shape as a result



Assured Water Supply Rules

- Tied subdivision of land (growth) to availability of an adequate water supply
- Cities must show physical, legal, and financial availability of supplies for 100 years
- Created strong incentives for use of renewable supplies
 - Aquifer recharge
 - Reclaimed water
 - Renewable surface water

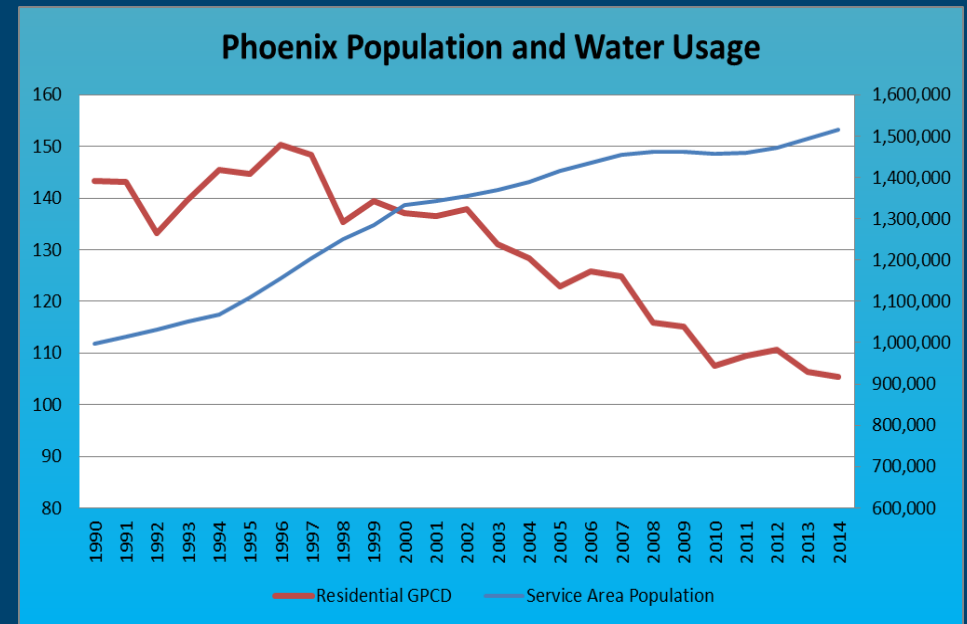
Indian Water Rights Settlements

- Settled disputes over water rights with Indian communities, agricultural districts, and rural communities
- Settlements brought certainty, created benefits for all communities, and developed new relationships



Water Conservation

- State-mandated conservation targets set in the 1980's
- Cities partner in a regional campaign for consistent messaging across the Valley of the Sun





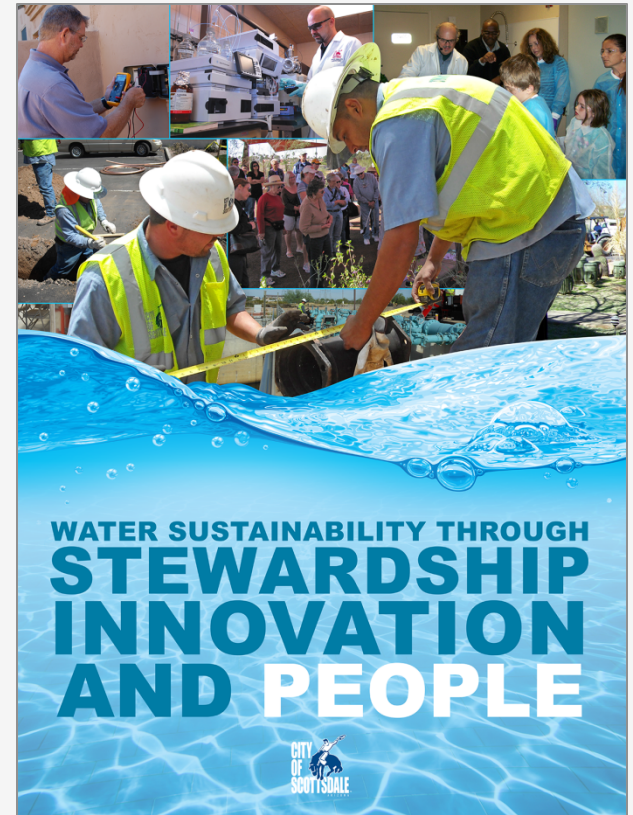
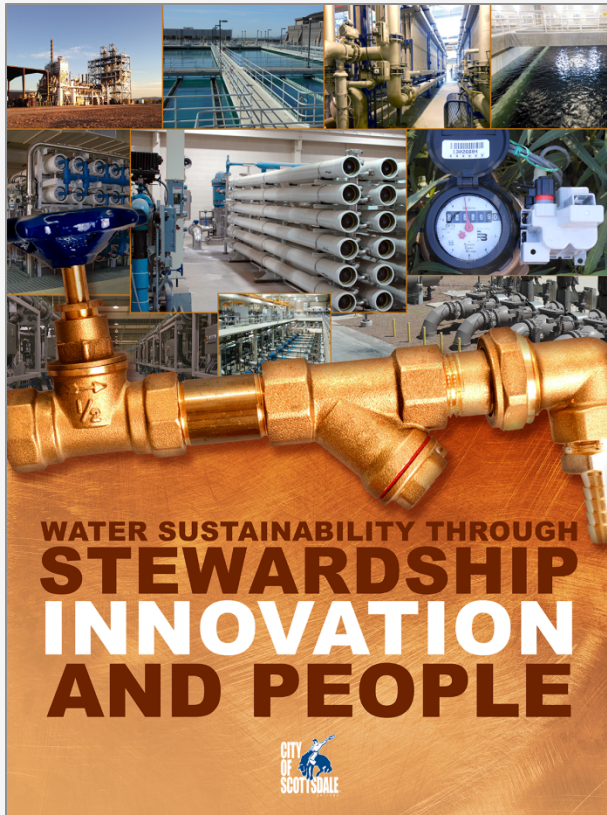
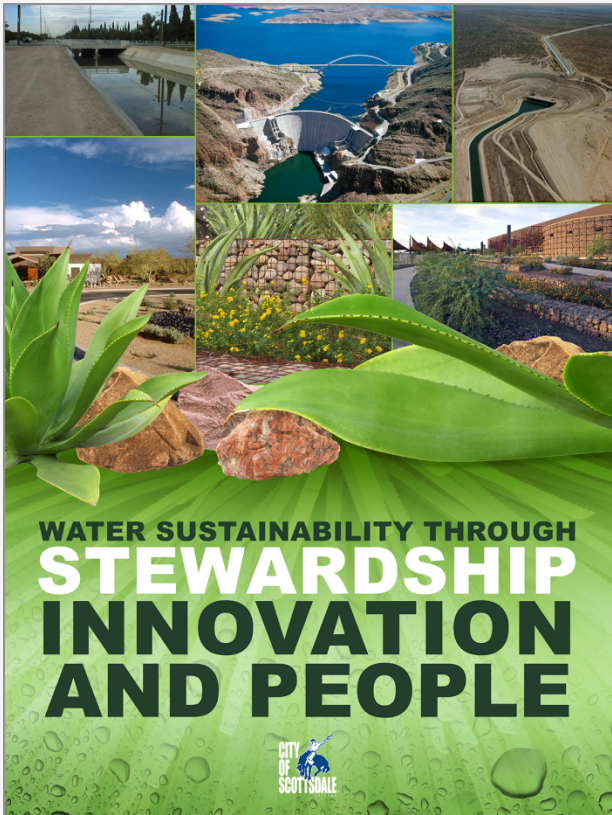
Water Sustainability through Stewardship, Innovation and People

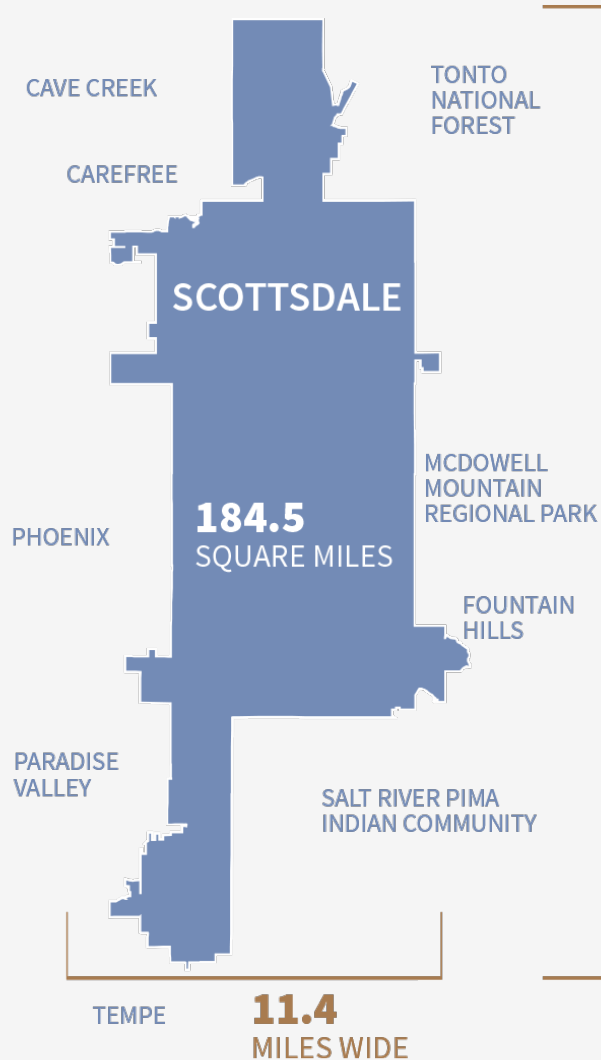


Brian K. Biesemeyer, PE
Scottsdale Water Director, Acting City Manager



Scottsdale Water Vision

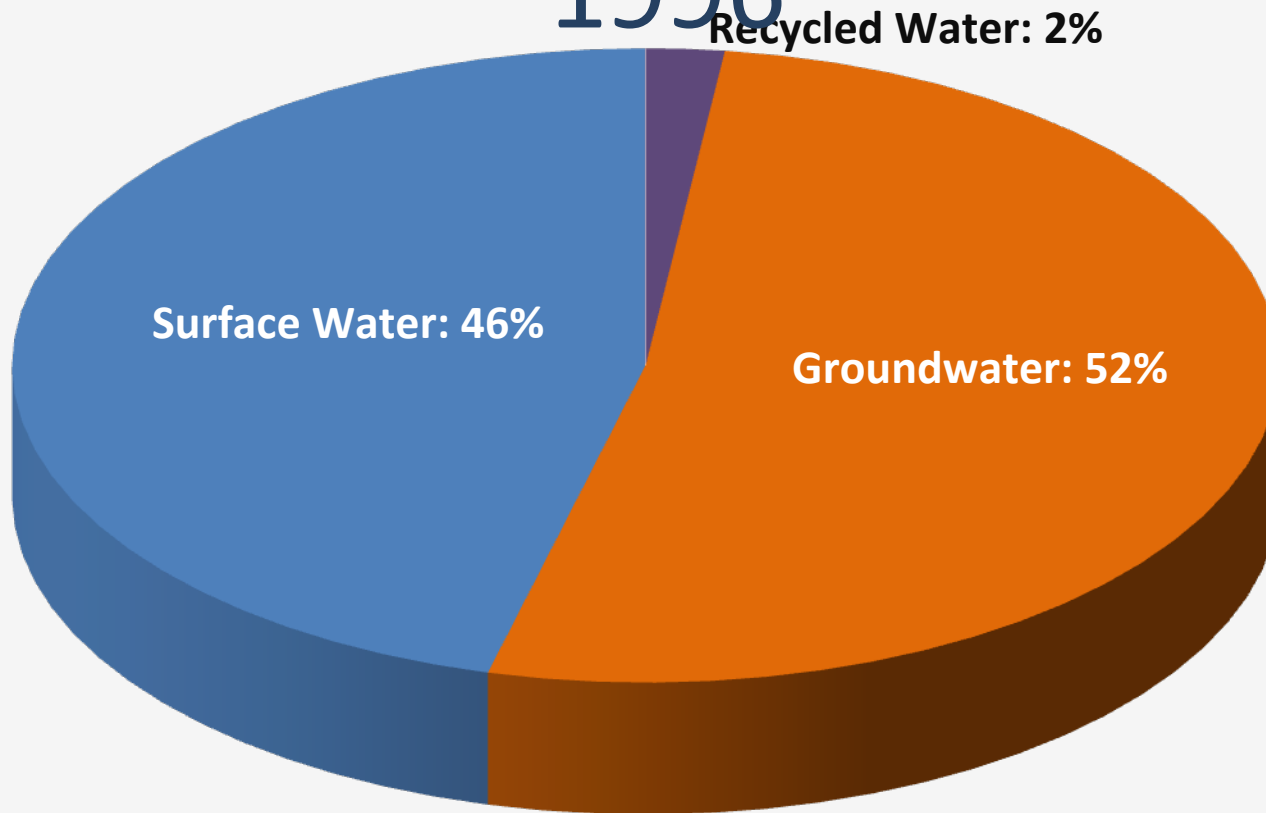




- Population ~ 220,000
- Build Out ~ 285,000
- 184.5 Square miles
- 31 miles long
- Elevation change 3,727 ft
- New growth: North

Scottsdale's Water Supply Portfolio

1996



Water Campus Concept

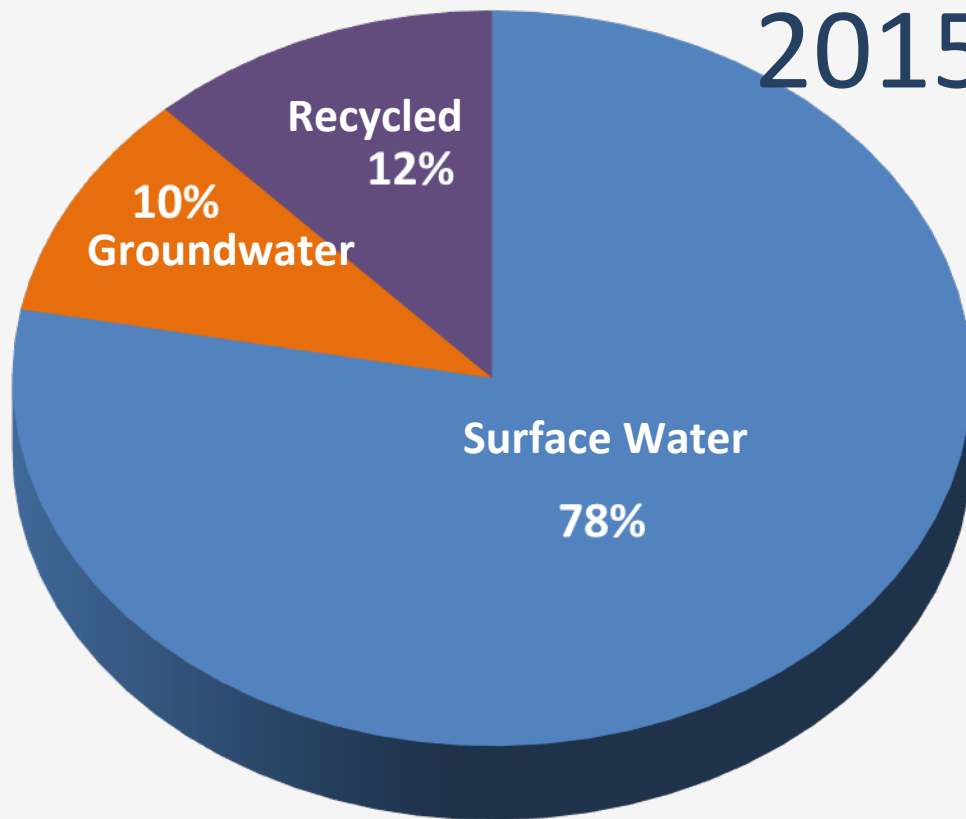
- Potable Water Treatment Plant (70 mgd)
- Water Reclamation Plant (23 mgd)
- Advanced Water Treatment Plant (20 mgd)



- State-of-the-art Water Quality Laboratory
- Injection and ASR wells

Scottsdale's Water Supply Portfolio

2015



- Groundwater: 12,905 AF
- Recycled: 15,328 AF
- Surface Water: 100,110 AF

CAP: 81,110 AF

SRP: 19,000 AF

Total Available Water Supply 2015: 129,072 AF (~36 billion gallons)

Stewardship • Innovation • People

Commitment to Safe Yield

- ***Safe Yield: Accomplished when no more groundwater is being withdrawn than is being annually replaced.***
- GMA mandated that cities achieve safe yield by 2025.
- Scottsdale achieved safe yield in 2006, becoming the first city in Arizona to do so.
- Two reasons for success:
 - Minimized groundwater reliance
 - Aggressive aquifer recharge

Water Conservation

- Awareness programs began 1983
- Robust rebate program began 1992
 - Installation: WaterSense toilets, urinals, showerheads; smart irrigation controllers
 - Removal: turf, pools, spas, water softeners
- Free landscape workshop series twice a year
- HOA and multifamily water budgets
- WaterSense pilot program launched 2016

Since 2005:

- Removed over 1.6 million square feet of turf
- Paid over \$2.3 million to customers in rebates



Leader in Recycled Water Use

- Advanced Water Treatment Facility (20 mgd)
 - Ozonation/Chloramination
 - Ultrafiltration
 - Reverse Osmosis
 - Ultraviolet Disinfection
- Two end uses:
 - RWDS: Golf course irrigation
 - Indirect Potable Reuse



Reclaimed Water Distribution System

- 14 miles of pipe, 5 pump stations, 20 mgd capacity
- Irrigation for 23 golf courses, city-owned sports complex

2015 RWDS Water Delivery:

3.6 billion gallons

2015 AWT Recharge:

1.5 billion gallons



Courtesy: Desert Mountain

Indirect Potable Reuse

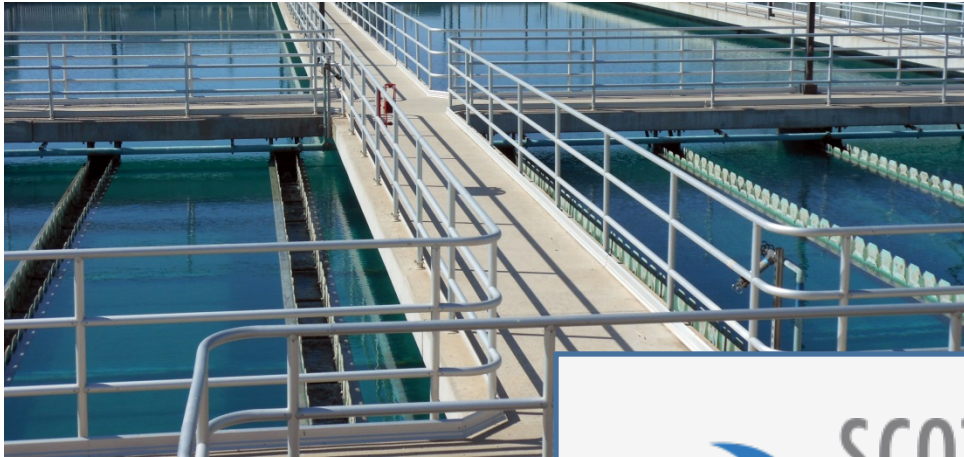
- Recharge of AWT water began in 1998
- Injection through 63 Vadose zone wells
- 400 feet of natural filtration
- Over 1.7 billion gallons of recycled water recharged annually



Supporting our Employees

- Operator Incentive Pay
- Apprenticeship Program
- Extensive training opportunities
- Tuition reimbursement
- Active safety committee





SCOTTSDALE
WATER



Tapping into the Benefits of Reclaimed Water

Brian Draper

City of Mesa

10/17/2016



The Three- Legged Stool



Beneficial Use

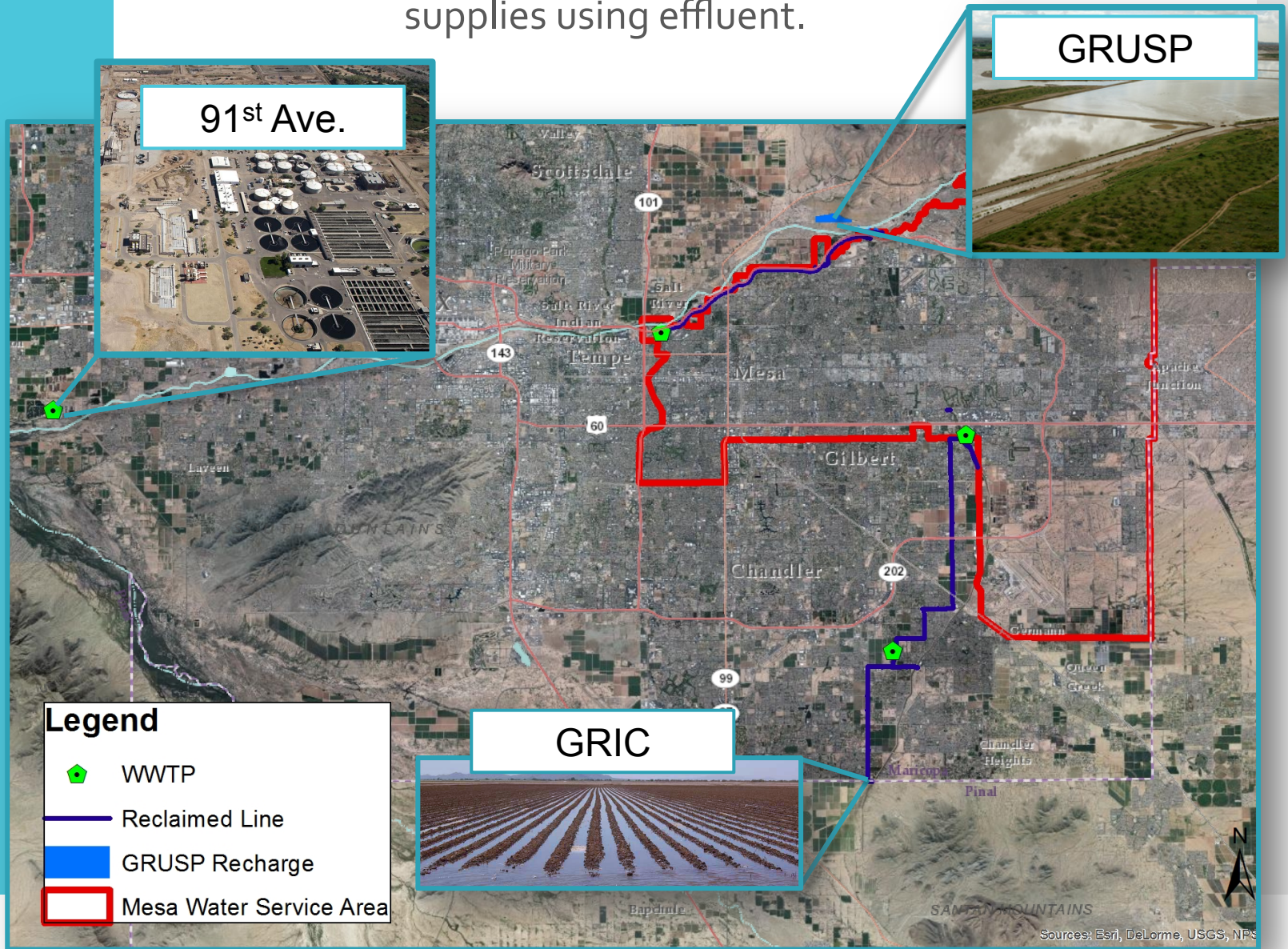
Recharge

Effluent Exchange

91st Ave. /
Palo Verde
Energy

The metaphor of the three-legged stool helps visualize Mesa's management strategy for augmenting the city's water supplies using effluent.

The Three-legged Stool Model





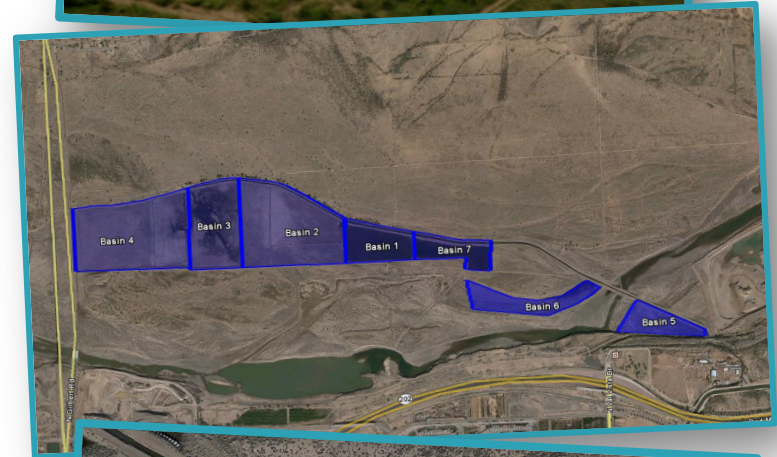
Palo Verde Nuclear Facility

- ~70% of the treated effluent from the co-owned 91st Avenue WWTP is delivered to Palo Verde Nuclear Generating Station for cooling water.
- The cooling towers recycle 20 billion gallons of effluent a year.
- Palo Verde is estimated to have an economic impact of \$1.8 billion and serves 4 million people annually.

Granite Reef Underground Storage Project (GRUSP)

- Effluent is locally recharged to generate Long-Term Storage Credits (LTSC).
- Mesa owns 24.9% of GRUSP capacity.
- On *average* Mesa annually recharges ~6,000 acre-feet (af).
- Mesa has over 500,000 af stored in the aquifer for recovery.

LTSC are an important component to shortage and long term resilient planning.



Gila River Indian Community Exchange

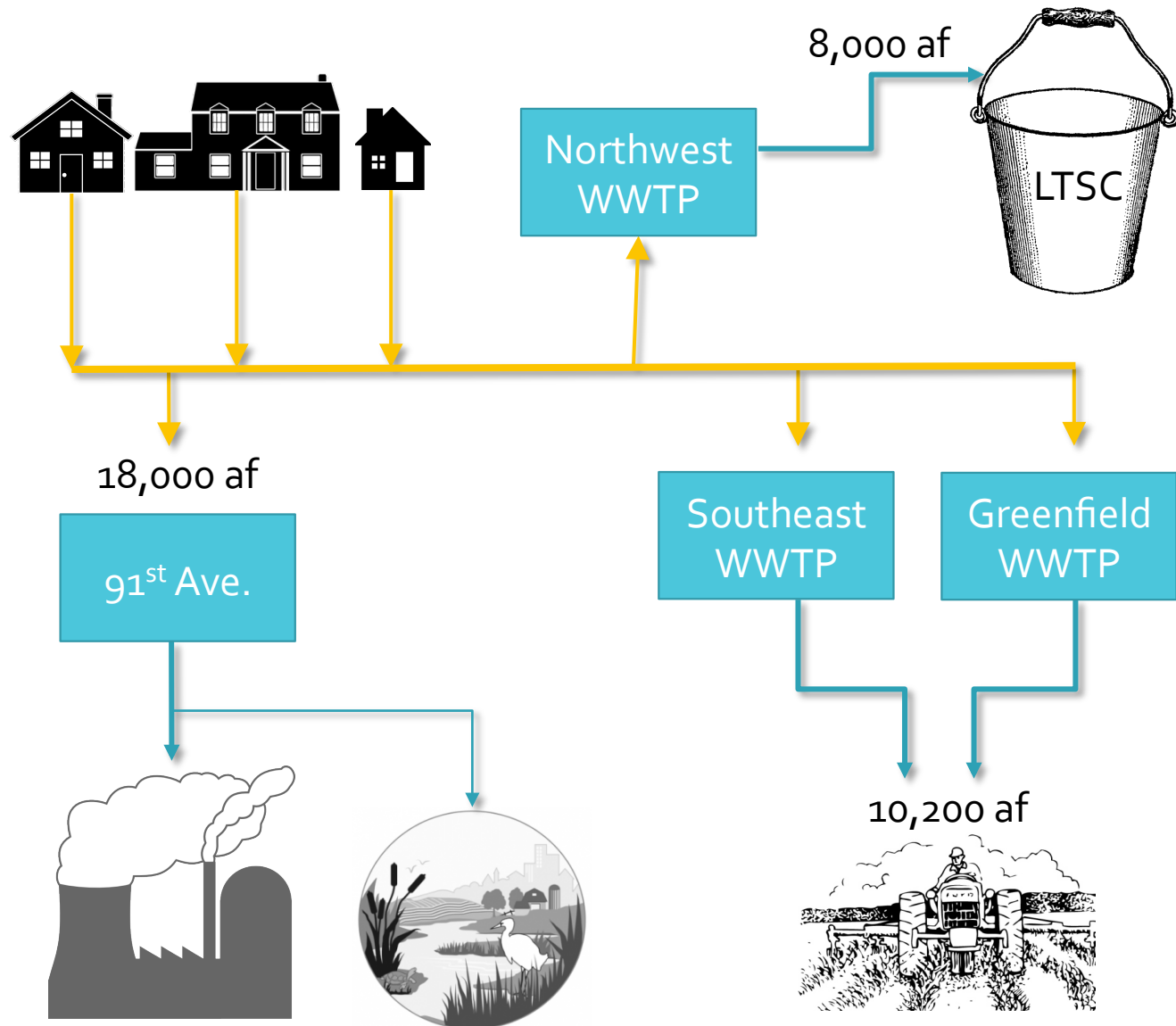
- Through an Exchange Agreement, Mesa delivers effluent to the Gila River Indian Community (GRIC) and receives CAP water.
- The City agreed to deliver up to 29,400 acre-feet per year (af/yr) of effluent in exchange for 80% (23,520 af/yr) of the GRIC's CAP water by 2031.
 - 5/4 Exchange

The exchange allows Mesa to convert what is essentially a non-drinking water supply into a potable supply.

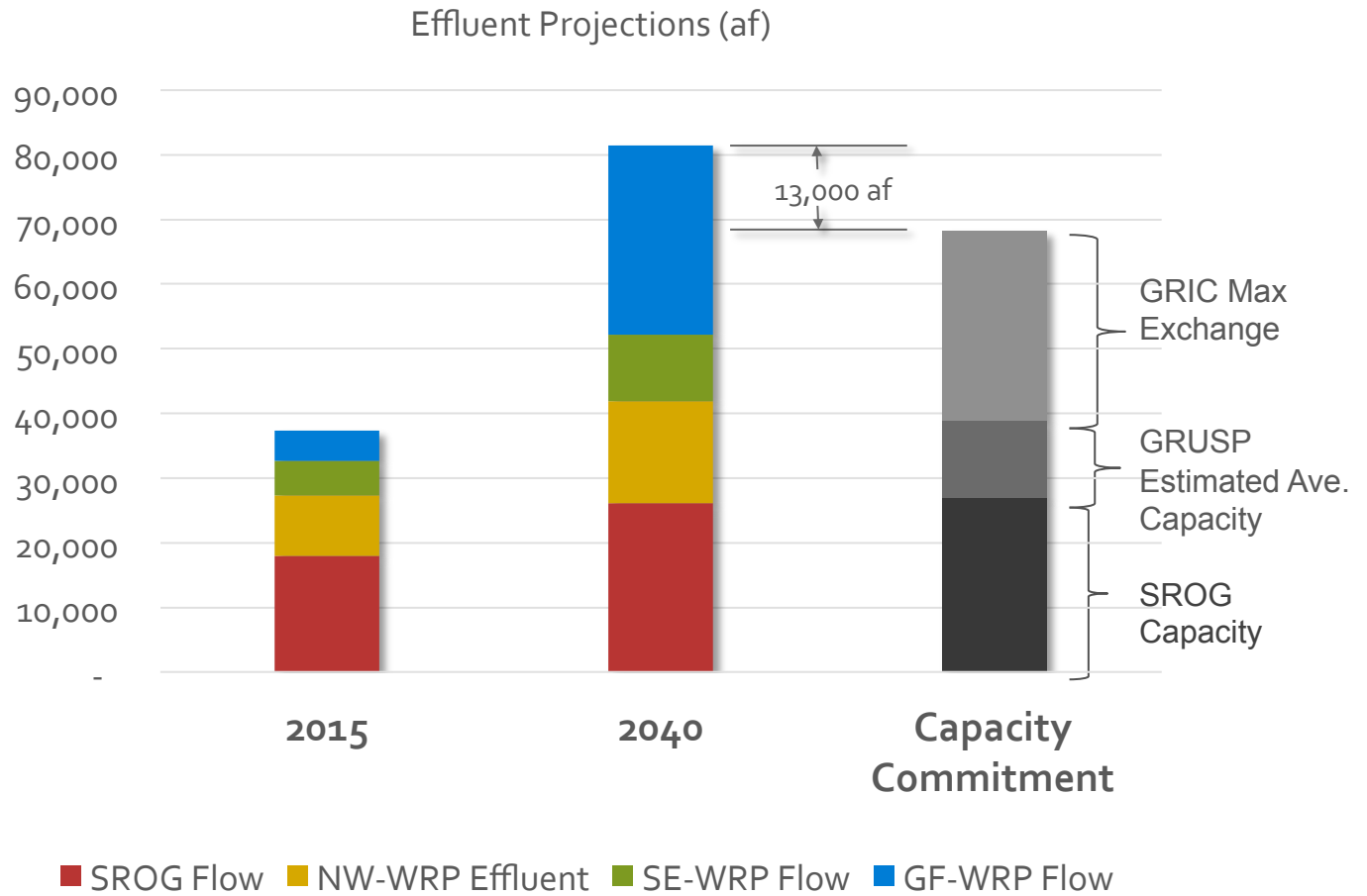


2015 Effluent Delivered for Beneficial Use = 36,200 af

What does this look like?



Looking Forward



Questions?

