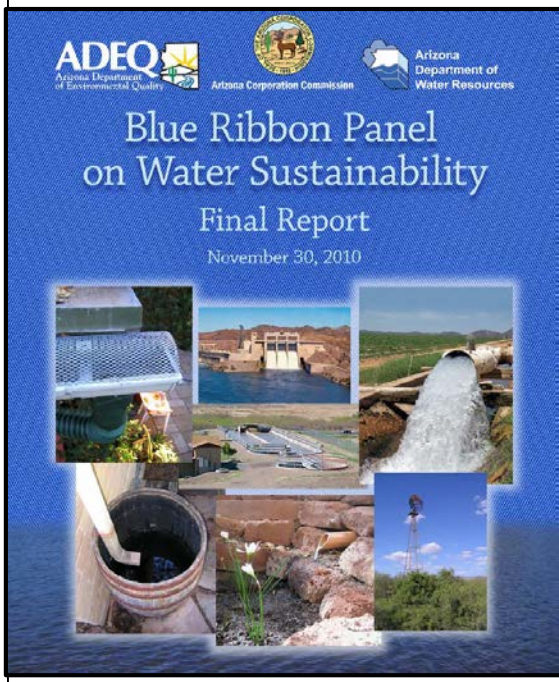
Blue Ribbon Panel on Water Sustainability

December 5, 2016

Background

Purpose: The Blue Ribbon Panel was formed to identify and overcome obstacles to increase water sustainability

- Formed by Gov. Brewer in 2009
- Co-chaired by ADEQ and ADWR Directors, and by ACC Chairman
- Consisted of a 40 member panel representing federal, state, tribal and local governments; as well as NGOs, universities and private utilities
- Created 5 working groups: Funding, Conservation, Infrastructure, Regulations, and Public Perception



Recommendations pertaining to reclaimed/recycled water:

1. Standards

- Matching alternative water supplies to appropriate end uses
- Developing Comprehensive reclaimed water infrastructure standards
- Facilitating Indirect Potable Reuse
- Operator Certification for Reclaimed Water Distribution Systems

2. Regulatory Improvements

- Encourage the use of alternative water supplies
- Update reclaimed water quality standards

3. Incentives

- Develop, expand and promote tax credits/exemptions for use of alternative water supplies

Standards

Matching alternative water supplies to appropriate end uses

Source: PBS and Tucson Water

- Initiate a stakeholder process to review and amend regulations as necessary that will improve, enhance or encourage use, storage and exchange of recycled water supplies.
- Evaluate the potential for incentives that encourage use of lower quality water supplies.
- Encourage public and private water utilities to invest in treatment technology research aimed at improving efficiency, cost reduction and quality improvement.
- Encourage research in water reuse.

Standards

Developing Comprehensive Reclaimed Water Infrastructure Standards

Source: PBS and Tucson Water

- Compile a matrix of state, regional and local specifications and infrastructure standards to identify similarities, inconsistencies, and gaps and develop recommendations on a suite of standards that will provide a common foundation of safety and good engineering practices for reclaimed water distribution systems.

- Establish a reclaimed water infrastructure advisory panel of state, county, local and private experts to facilitate development of the matrix.

Standards

Facilitating Indirect Potable Reuse

Source: PBS and Tucson Water

- Create an IPR multi-agency steering committee to further advance IPR's use by streamlining agency reviews, incorporating new technologies, and directing the IPR advisory panel. The steering committee's first priority should be the development of a statewide unified policy on IPR.
- Create an IPR advisory panel to focus on the effectiveness and implementation of new technologies ad field studies.

Standards

Operator Certification for Reclaimed Water Distribution Systems

Source: PBS and Tucson Water

- Develop a reclaimed water distribution system operator training program and associated certification.

Regulatory Improvements

Encourage the Use of Alternative Water Supplies

Source: City of Flagstaff

- Review the rules that address commingling of remediated and reclaimed waters, modify agency rules and/or policies to clearly address commingling of remediated waters with reclaimed water and review rules to evaluate circumstances whereby a General Permit may be considered for comingling of remediated water and reclaimed water.

- Stormwater BMPs need to encourage green infrastructure development such as rainwater harvesting and reclaimed water use, preservation of riparian corridors and groundwater recharge.

Regulatory Improvements

Encourage the Use of Alternative Water Supplies

Source: City of Flagstaff

- ✓ Add an additional provision to the reclaimed water conveyance rules to refer to backflow requirements.
- ⊘ Amend R18-4-215 to specifically identify reclaimed water as an alternate water supply that would necessitate protection of the potable water service.
- ✓ Consider incorporating cross connection control requirements into rules administered by ADEQ.

Regulatory Improvements

Update Reclaimed Water Quality Standards

Source: City of Flagstaff

ADEQ should consider the following actions:

- Develop a new general permit for commercial and municipal gray water users
- Revise standards for Type 3 gray water systems (R18-9-719)
- Redefine permissive uses of gray water (R18-9-711. A.3)
- Possible revisions to R18-9-101 (definitions) R18-9-704 (signage)

Regulatory Improvements

Update Reclaimed Water Quality Standards

Source: City of Flagstaff

ADEQ should consider the following actions:

- Revise the fecal coliform rule (R18-11-303-307) so E. coli may be used as the indicator organism for pathogen removal similar to the BADCT rule (R18-9-B204) and revise the coliform monitoring frequency requirement for Class A+, A, B+, and B reclaimed water in R18-11-303 to R18-11-306 to match the BADCT frequency in R18-9-B204

Incentives

Develop, Expand and Promote tax credits/exemptions for use of alternative water supplies

Source: AZ Central

- Extend the tax incentive in A.R.S. §43-1090.01 and publicize that it is available for tax credits. (Ended in 2012).
- Expand the tax credit for reclaimed water infrastructure capital investment through legislation.
- Amend A.R.S. §49-204 to allow for local control of gray water systems.
- Consider other policy changes that would provide incentives to encourage converting existing water uses to using alternative water supplies.

Out of the 18 recommendations for reclaimed water made by the BRP:

- 50% have some degree of progress made toward completion
- 39% have not been started at all
- 11% have an unknown status

Questions?

Martin Stiles

Water Resources Specialist

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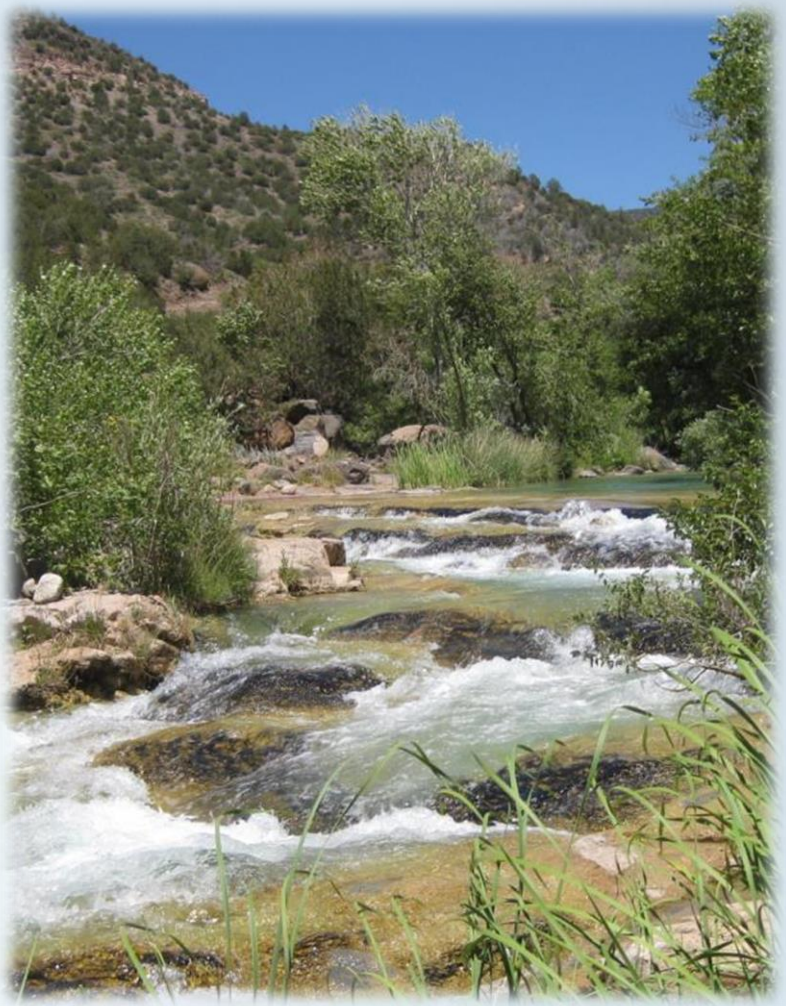
PROTECTING
ARIZONA'S WATER SUPPLIES
for ITS NEXT CENTURY

Reduce, Reuse, Recycle: *Smart Investments with WIFA*



Governor's Water Augmentation Council

Recycled Water Committee

December 5, 2016

Infrastructure makes this all possible






Water Infrastructure Finance Authority

Role

- Manage Arizona's State Revolving Funds

Funding to improve water infrastructure

- Low-interest loans
- Planning and design TA (grants)

Purpose

Save Money

- Protect public health
  - Ensure safe drinking water
  - Proper wastewater treatment
- Improve water quality
  - Lakes and streams clean

*25-year history - invested over **$2 billion** in Arizona's communities*

Traditional Infrastructure Projects

"Expanded Eligibilities"

- Stormwater management including green infrastructure, Low Impact Development and flood control
- Watershed management of wet weather discharge
- Watershed partnerships
- Integrated water resources planning
- Weather/climate-related resilience planning
- Forest restoration
- Riparian improvements
- Stream channel restoration
- Streambank stabilization

New(ish) Incentives for Green Projects

- Lower interest rate loans

- *eligible for* Forgivable principal

  *Up to **20%** of eligible project costs*

- Local match waived for planning projects for technical assistance (grants)

Additional incentives for disadvantaged communities

WIFA

Eligible Borrowers

- Cities, towns, tribal entities and special districts:
  - Own a public water system
  - Own a wastewater facility
  - Manage stormwater (permitted MS4s and unpermitted)
- Private ACC-regulated drinking water systems

County, state and federal entities are NOT eligible

(Pima County Exception)

Drinking Water

Wastewater

Stormwater

Partnership opportunities

ADWR Water News Article published on November 2, 2016

“The ‘purple pipes’ are cute, at least.”

Early WIFA Reuse Projects

2000

Town of Kearny Wastewater Reclamation Facility

Reclaimed water to wetland area, golf course, and Kearny's ball fields

2004

City of Tucson Reclaimed Transmission Main

Reclaimed water to rodeo, park, 10 schools

Types of Reuse Projects

- New water reclamation facilities
- Facility upgrades
- Reclaimed water transmission and distribution

WWTP Expansion and Upgrades
City of Buckeye

SRF Dollars since 2009:

$203M included Reclamation/Reuse

out of

$390M total wastewater loans

Water Reuse and Precipitation Harvesting

- Collection and treatment systems (e.g., wastewater, stormwater, and subsurface drainage water collection and treatment)
- Distribution lines to support water reuse and the use of harvested precipitation
- Transmission lines, injection wells, and green infrastructure infiltration systems for groundwater recharge
- Equipment to reuse reclaimed water
- Direct potable reuse

Town of Cave Creek - Water Ranch

New 0.75 MGD Water Reclamation Facility

- Administration building, four miles of sewage collection system, four miles of effluent return line
- Decommissioning and dismantling of the existing wastewater treatment plant
- A+ effluent
- Effluent conveyed to storage ponds and used for irrigation

Loan Amount
$22.9 million

City of Prescott – Airport WWTP Upgrades

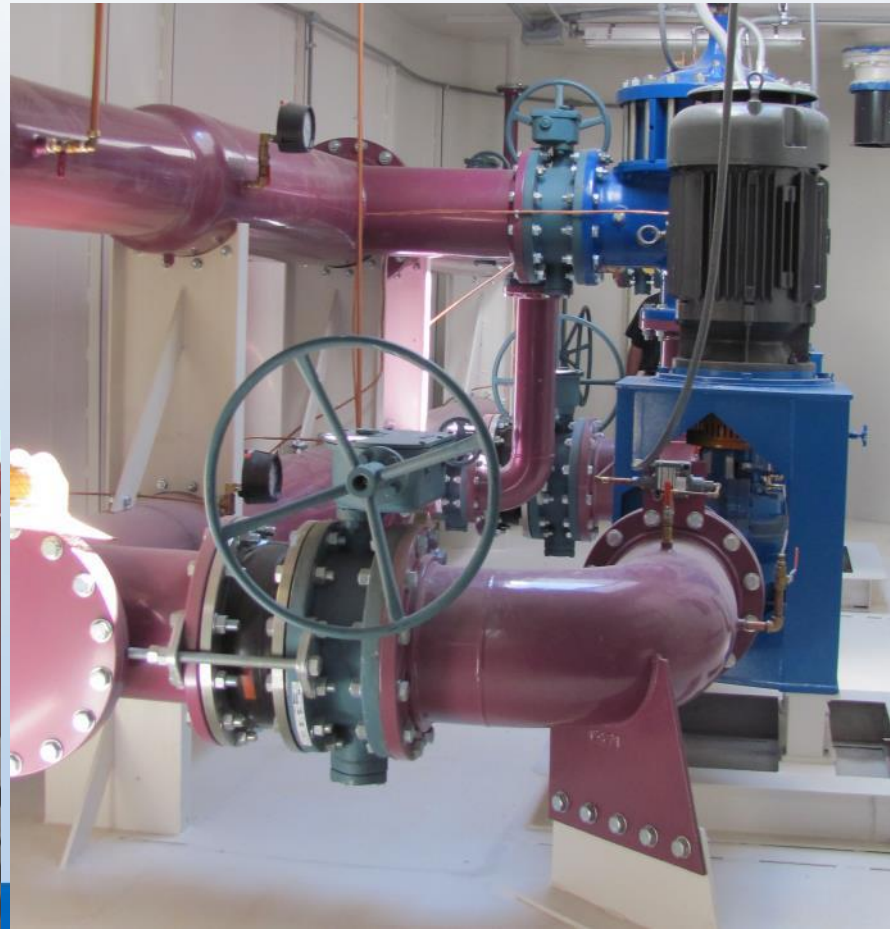
- Expanded from 1.2 to 3.75 mgd capacity
- Upgraded from B+ to A+ effluent
- Aeration system, blower building, tertiary filtration, disinfection, and effluent pump station
- Increased volume of reclaimed water produced by the WWTP
- Irrigating sports fields, golf courses, and commercial landscapes, restoring riparian habitats and recharging groundwater aquifers

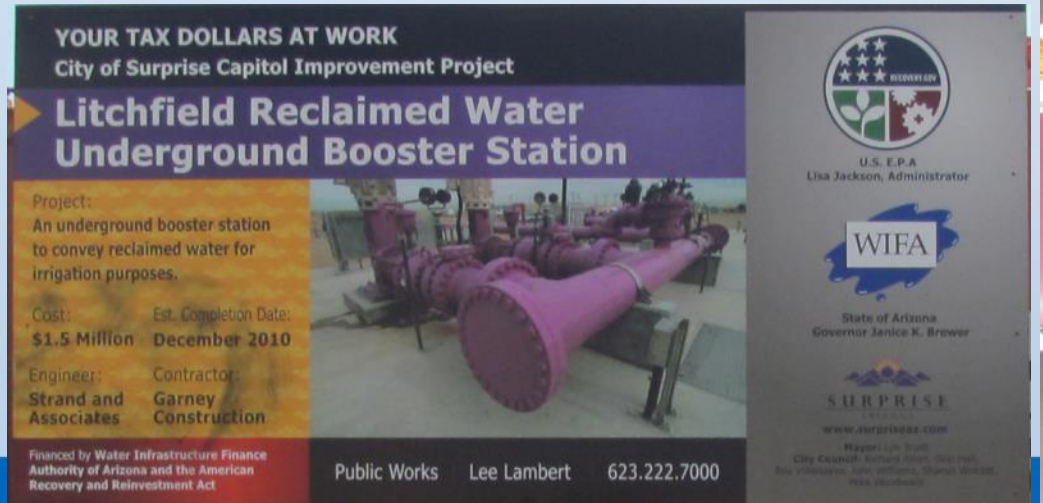
Loan Amount
$45.8 million

City of Surprise – Reclaimed Water Booster Station

- Modified the Reclaimed Booster Station
- Pressurized reclaimed water to the City Stadium, ball fields, green belts and landscaping
- Estimated amount of groundwater that will not be pumped: approximately 2,000 acre feet/year

Loan Amount
$1.5 million





City of Buckeye – Reclaimed Water System Improvements

- Irrigation of Sundance Park - ball fields and dog parks
- School and subdivision landscaping

Improvements:

- 6.25 miles of reclaimed water line with additional turnouts and PRV
- Electrical, instrumentation and operational modifications

Loan Amount
$7.37 million

Reclaimed water not used for irrigation is recharged at local irrigation district Groundwater Savings Facilities

Reuse Via WIFA: Conclusions

FUNDING REUSE PROJECTS THROUGH WIFA

Arizona's largest financing source for water reuse

WIFA

Finance your reuse project with WIFA

The Water Infrastructure Finance Authority of Arizona (WIFA) has provided more than **$2 billion** to protect water quality in Arizona, through the Clean Water and Drinking Water State Revolving Funds.

Traditionally, much of the funding provided by WIFA has been used to build wastewater collection and treatment facilities. WIFA is spearheading an initiative to use more of these funds to conserve Arizona's water supply by **recycling and reusing wastewater**.

As long-term drought continues in Arizona, protecting and increasing water supply reliability is even more important. WIFA offers solutions through low-cost financial assistance for these vital reuse projects. WIFA can help alleviate the financial hurdles facing your community.

Recycle	water
Reuse	reclaimed water
Treat	wastewater
Restore	riparian habitats
Recharge	groundwater aquifers
Conserve	water resources
Increase	supply
Irrigate	sports fields, golf courses, etc.

Who is eligible for WIFA funding? Cities, towns, tribal entities, and special districts. WIFA encourages private industry, nonprofits and other groups to form partnerships with eligible entities.

What types of reuse projects are eligible? Planning, design and construction projects that recycle or reuse wastewater.

What makes WIFA a good funding option? Low-interest loans that allow borrowers to complete a large project and spread project costs over a repayment period of up to 20 years. No application fees or closing costs. Additional incentives, such as a lower interest rate or forgivable principal, may apply.

Project Examples:

- Reuse and recycle
- Recharge wells
- Treatment plant upgrades to produce reclaimed water
- Distribution pipes
- Constructed wetlands for wastewater treatment, polishing and/or effluent disposal

WIFA can fund any amount requested	
2016 Avg. Interest Rate (for public entities): **2.04%**	Standard Loan Term: **20 years**

Partner with a financing agency whose mission aligns with yours - protecting water quality and public health.

Water Infrastructure Finance Authority | 100 N. 15th Avenue, Suite 103 | Phoenix, Arizona 85007
Phone (602) 364-1310 | Toll free (877) 298-0425 | Fax (602) 364-1327 | www.azwifa.gov

- Natural fit for SRF program – standard practice for WWTPs in AZ
- Financial needs of the community are the driver for WIFA funding
- Incentives are also offered

WIFA

Get Stoked - It's No Joke

Benefits of Choosing WIFA:

- Low interest rates (WIFA is rated AAA)
- Financing available year-round
- No application deadlines
- No competition
- No application fees or closing costs
- No min or max loan amount
- Money is recycled in Arizona

WIFA's Most Recent Loans		
Wickenburg	$1M	0.71% (5-yr)
Town of Clarkdale	$7.9M	1.70%
City of Cottonwood	$16M	1.70%
City of Peoria	$14M	2.39%
City of Somerton	$550,000	2.11% (15-yr)
City of Cottonwood	$11.2M	2.20%
Town of Payson	$11M	2.20%
City of Eloy	$4.5M	2.03%

*Average interest rate last year for public entities was **2.04%** (20-year term).*

ooh la la!

Lower interest rate

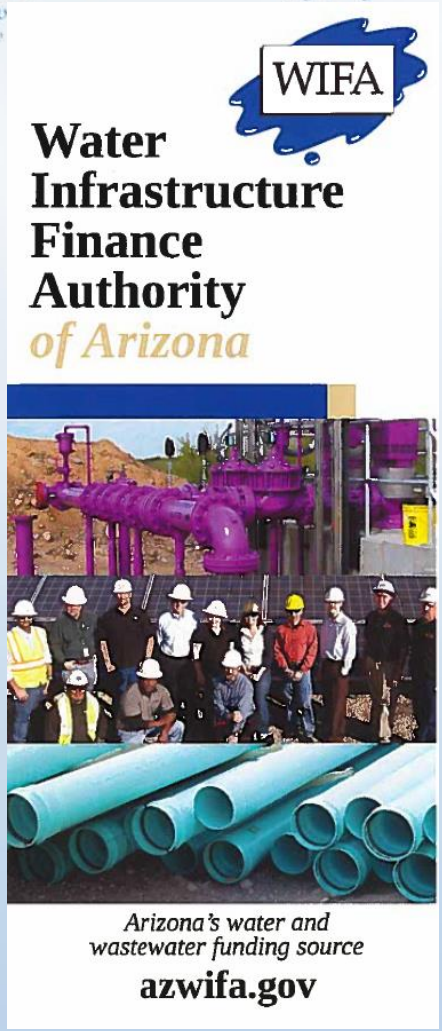
Match waived for TA funding

Forgivable Principal

INCENTIVES

WIFA

Action Items



- Visit WIFA's website
- Follow us on social media
- Join our listserv
- Tell people about WIFA
- Tell people WIFA can fund more projects!
- Tell your people to call our people
- Find out how much $$$ you can save on a project

WIFA

Get Connected

E-mail distribution list: www.azwifa.gov/sign-up

Website: www.azwifa.gov

Social Media: @WIFAfunding

Tucson's Recycled Water Use Past & Future

Presented to:

Governor's Water Augmentation Council
Recycled Water Committee

Presented By:

Jeff Biggs, Tucson Water

December 5, 2016

Agenda

- Reclaimed System History
- Current System
- Recycled Water Master Plan
- New Outlook for Recycled Water

Reclaimed Water System

1984 Filter Plant	1989 Recharge Facility ~3,000 AF/yr	1996 Wetlands and Recharge Expansion ~3,000 AF/yr	2014 Additional Recharge Expansion ~7,000 AF/yr	2016 Total System Delivery Capacity 36 MGD
• 10 MGD Pressure Filter Facility • First Customer – La Paloma Golf Resort	• Four Recharge Basins • Four Recovery Wells	• Four Additional Recharge Basins • Wetlands Backwash Treatment System • Two Additional Recovery Wells	• Three Additional Recharge Basins • Three Additional Recovery Wells	• 10 MGD Filter Capacity • 25 MGD Recovery Wells • 13,000 AF/yr Permitted Recharge Capacity

CITY OF TUCSON FOUNDED 1775

TUCSON WATER

Reclaimed System
(Recharge & Reclaimed Water Plant)

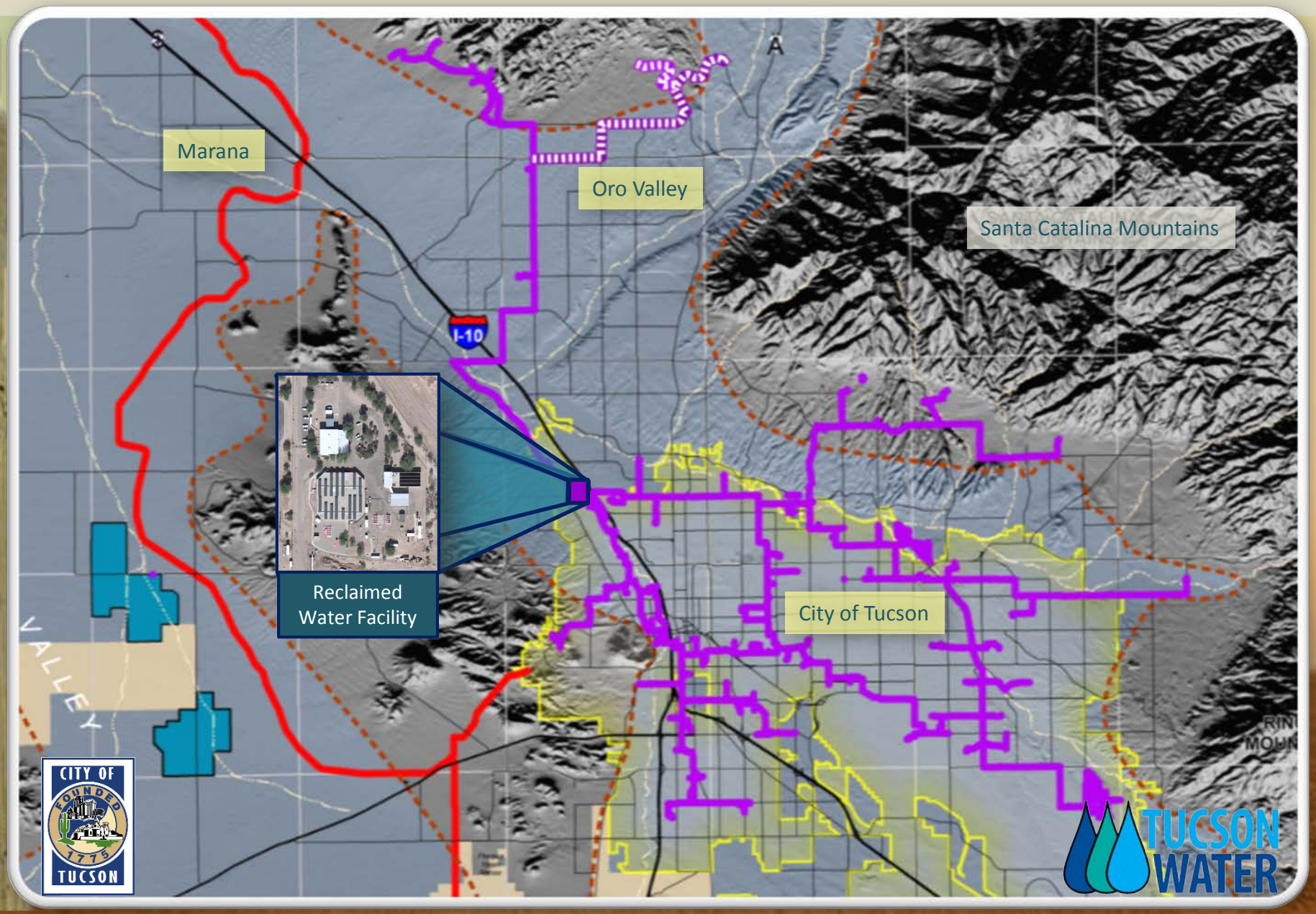
Sweetwater Wetlands

Recharge Basin

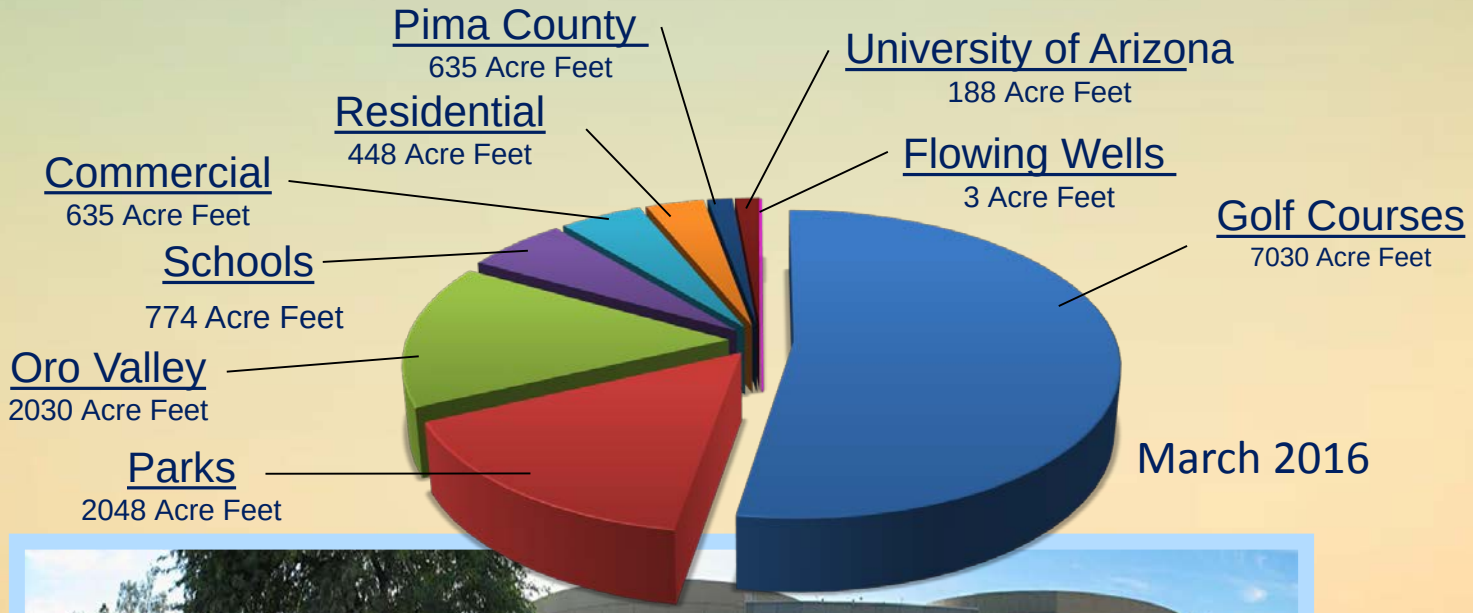
CITY OF TUCSON FOUNDED 1775

TUCSON WATER

Reclaimed System

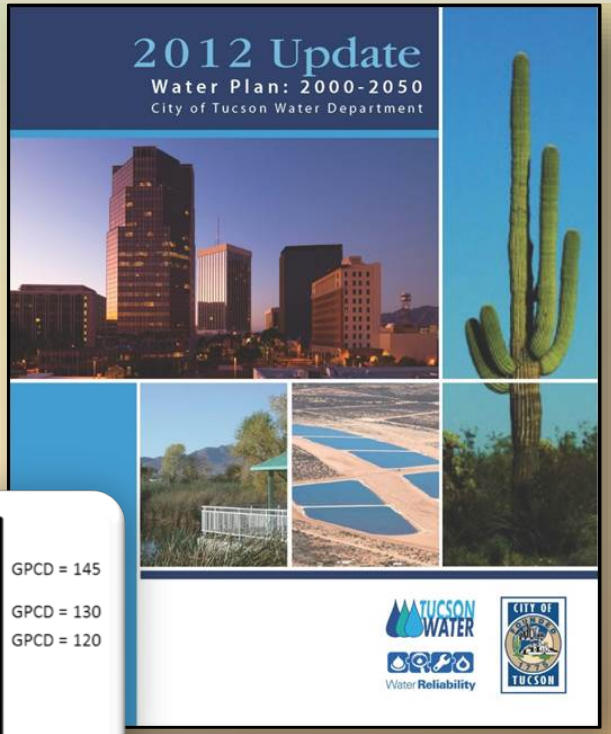


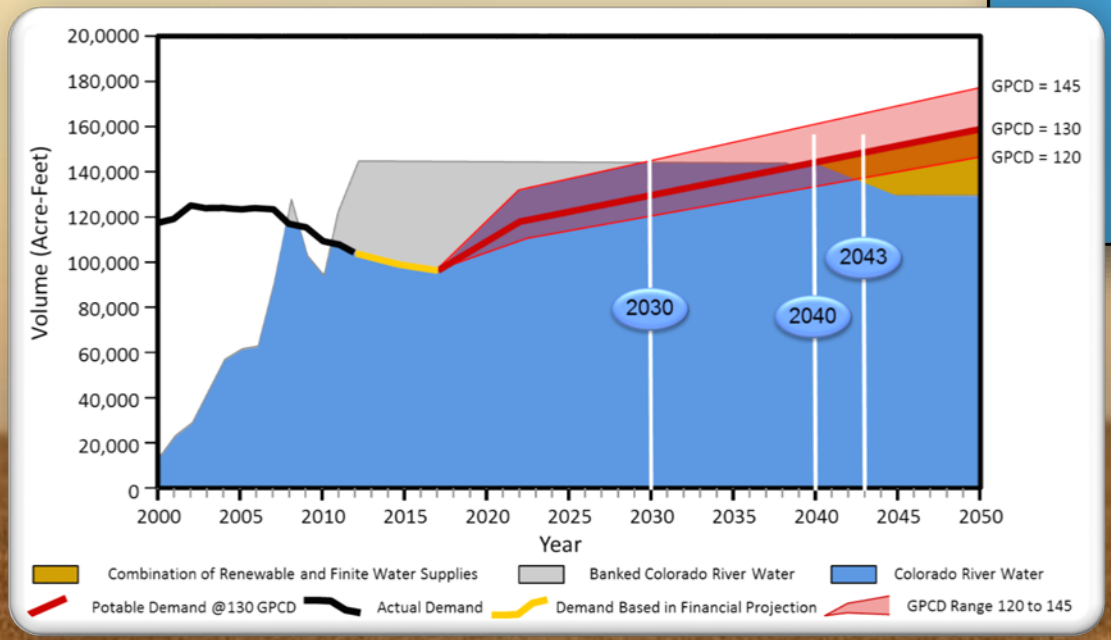
Reclaimed Consumption By User



Long Range Plan

- 2012 Update Potable Demand Projection
- Projected Need for Additional Potable Supplies





CITY OF FOUNDED 1775 TUCSON

TUCSON WATER

Recycled Water Master Plan

- Continue to invest in the Reclaimed Water System to maintain efficient service to existing and potential future customers
- Pursue full utilization of the City's recycled water entitlement through indirect potable reuse (IPR) to diversify renewable supplies

Customer Telephone Surveys

Baseline 2012 – Annual Tracking through 2015

Key Customer Metrics – Terminology and Approach Make a Difference

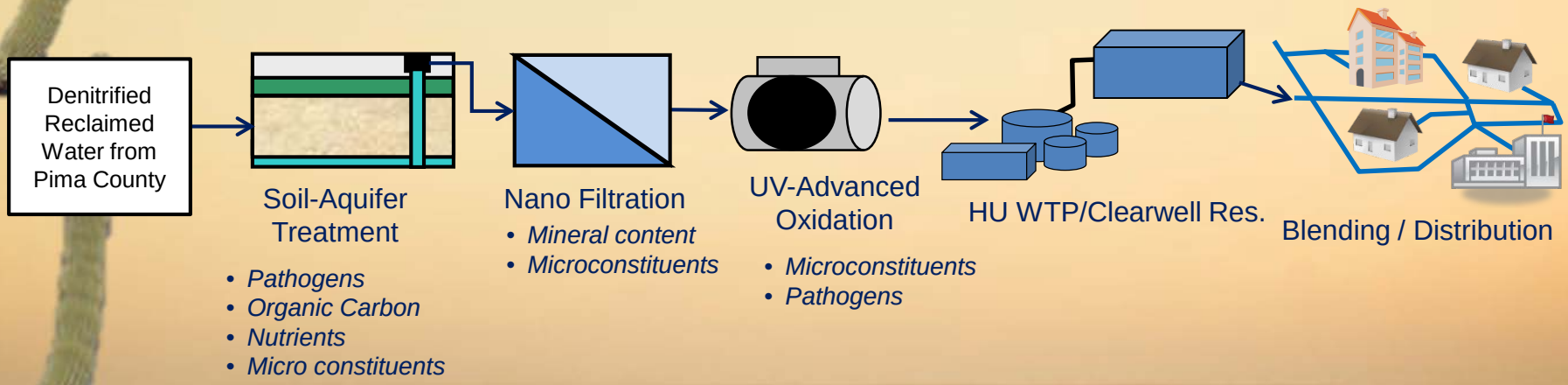
High or very high comfort with purifying wastewater for groundwater replenishment (2012) **45%**

High or very high comfort with purifying wastewater for drinking water (2013) **33%**

High or very high comfort with purifying reclaimed for drinking water (2015) **47%**

Recommended Advanced Water Treatment Concepts

Alternative	Advanced Water Treatment		
	Pre-Recharge	Natural Treatment & Storage	Post-Recovery
1	MF + NF + UV-AOP	Recharge	Disinfection
2	-	Recharge/SAT	SAT + NF + Disinfection
3	-	Recharge/SAT	SAT + NF + UV-AOP + Disinfection

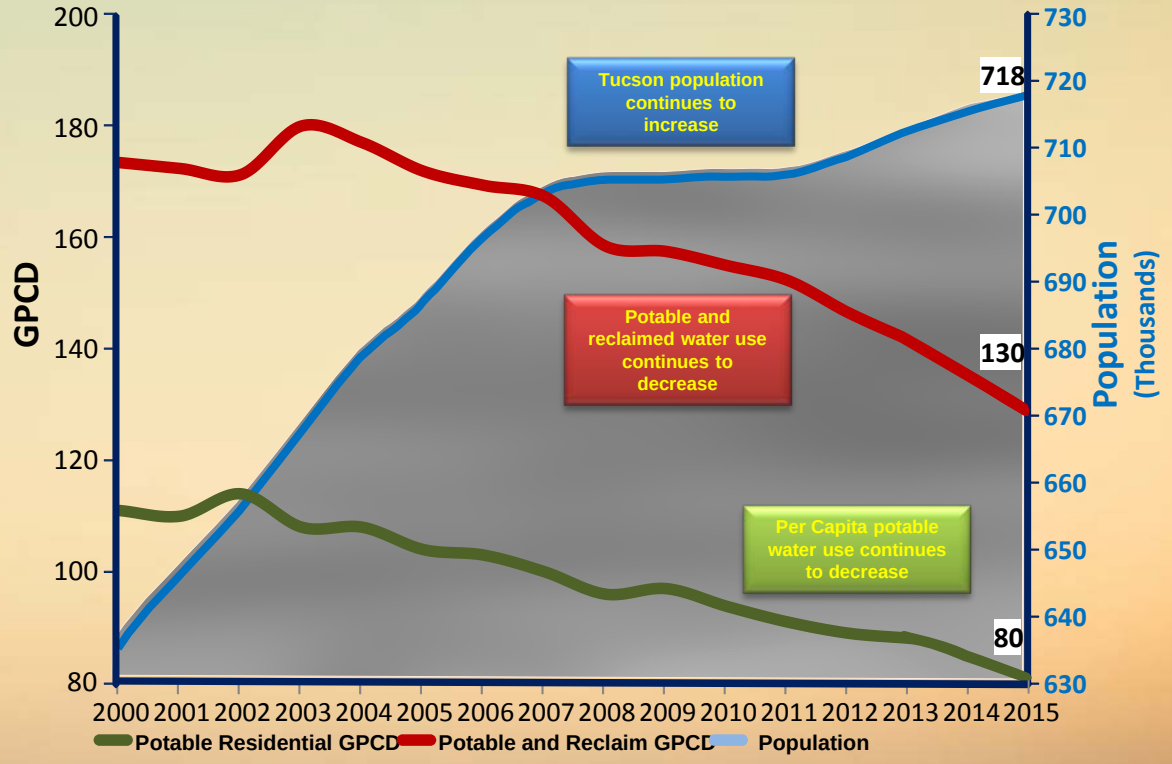


Sweetwater Recharge Facility Reuse Scenario

- Indirect Potable
  - Existing Recharge Infrastructure
  - Recovery Wells
- Brine Disposal
  - Contract with Resource Recovery Company
- Direct Potable
  - Expand Advanced Treatment Plant for Direct Reuse

Recycled Water Future

- Decline in Potable Demand
- Decline in Reclaimed Demand
- Explore other Uses



New Recycled Water Outlook

- Resource Utilization in Downtown Business District
- Riparian Habitat Restoration
- Enhance Economic Development

Agua Dulce

Opportunities

- Jumpstart Westside Development
- Coordinate with Caterpillar HQ
- Support cultural heritage sites
- Water resource management

Components

- In-channel recharge facility
- Habitat restoration in river
- River Walk to enhance economic development

Challenges

- Permitting
- Construction

Tucson's Recycled Water Use Past & Future

Questions

Presented to:

Governor's Water Augmentation Council
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December 5, 2016

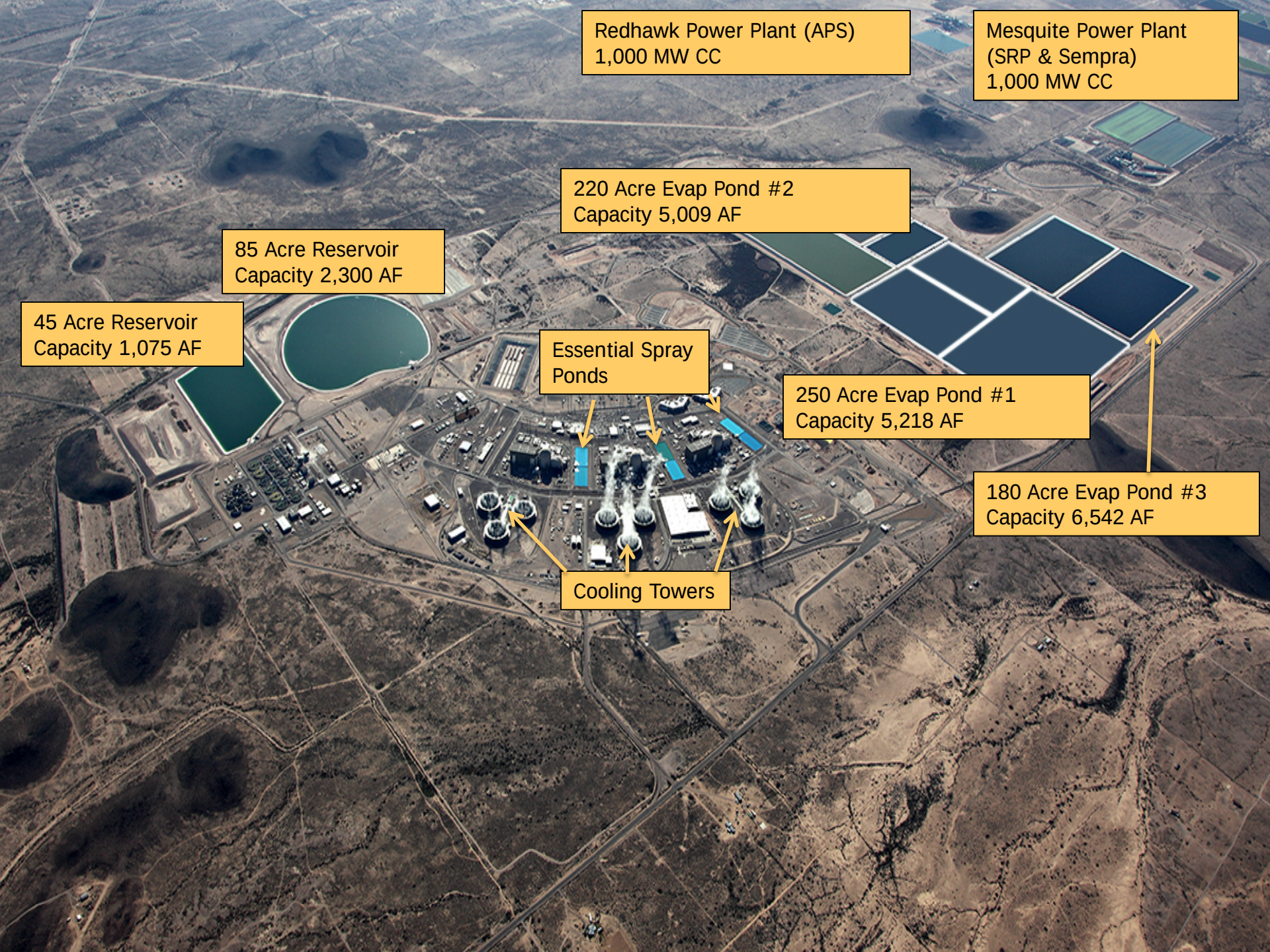
Water and Energy in Arizona

Bob Lotts

Arizona Public Service Company

GWAC Recycled Water Committee

12/5/2016


Redhawk Power Plant (APS)
1,000 MW CC
Mesquite Power Plant
(SRP & Sempra)
1,000 MW CC
220 Acre Evap Pond #2
Capacity 5,009 AF
85 Acre Reservoir
Capacity 2,300 AF
45 Acre Reservoir
Capacity 1,075 AF
Essential Spray
Ponds
250 Acre Evap Pond #1
Capacity 5,218 AF
180 Acre Evap Pond #3
Capacity 6,542 AF
Cooling Towers

Palo Verde…

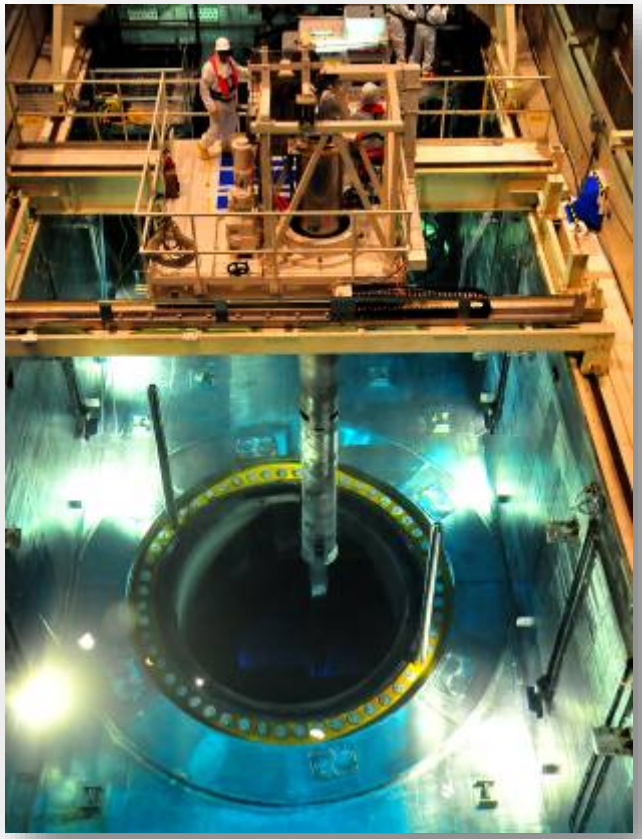
By the Numbers

- Concept presented to APS Board of Directors in 1969
- Arizona Nuclear Resource Study Group completed study in 1971
- Initial construction permit — May 1976
- Began commercial operation
  - Unit 1: January 1986
  - Unit 2: September 1986
  - Unit 3: January 1988

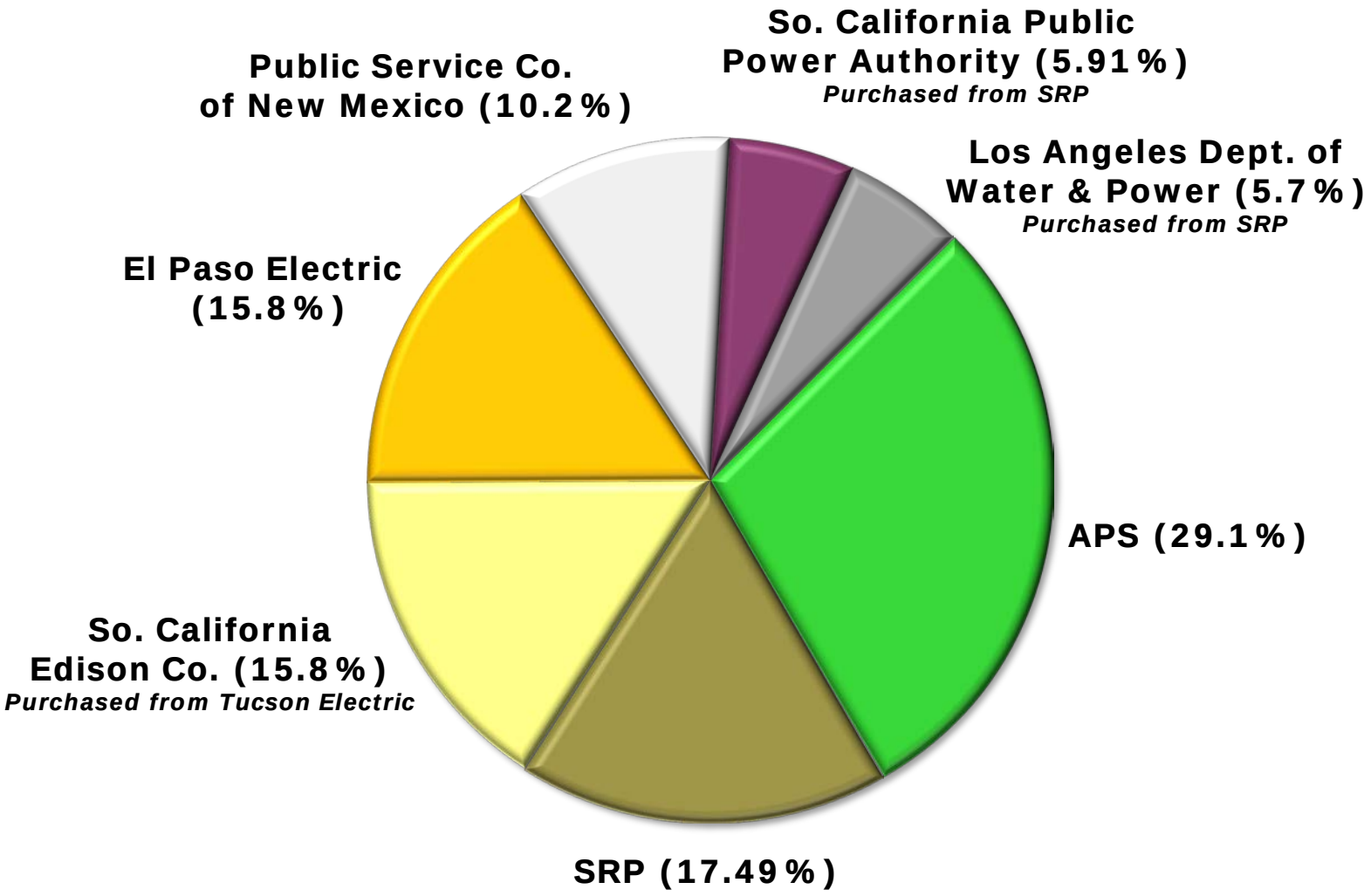
Palo Verde…

By the Numbers

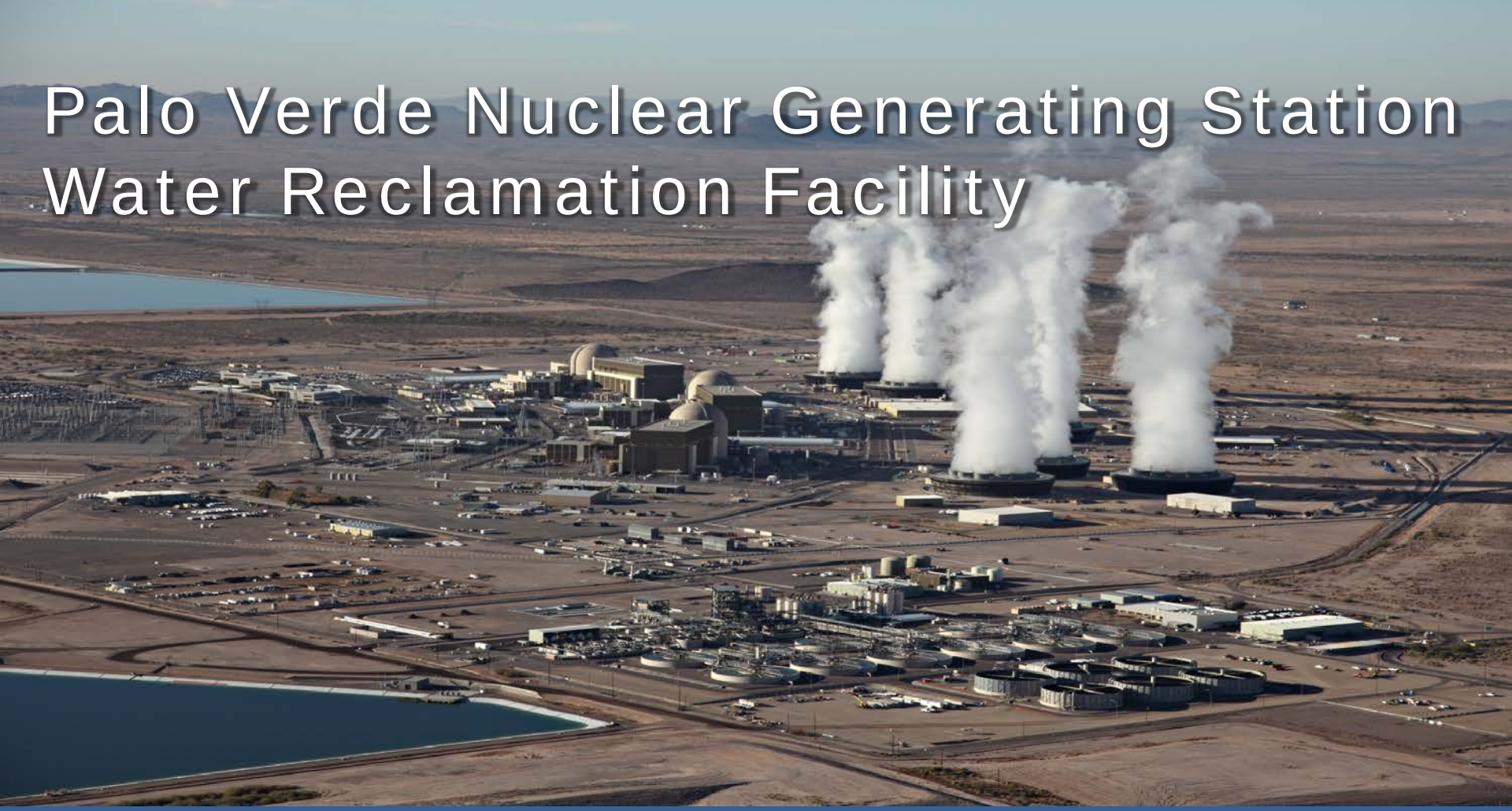
- Largest power generator in the U.S.
- Total output 4,030 net megawatts
  - Meets the electrical needs of approximately 4 million people around the clock



Palo Verde Participants



Palo Verde Nuclear Generating Station Water Reclamation Facility

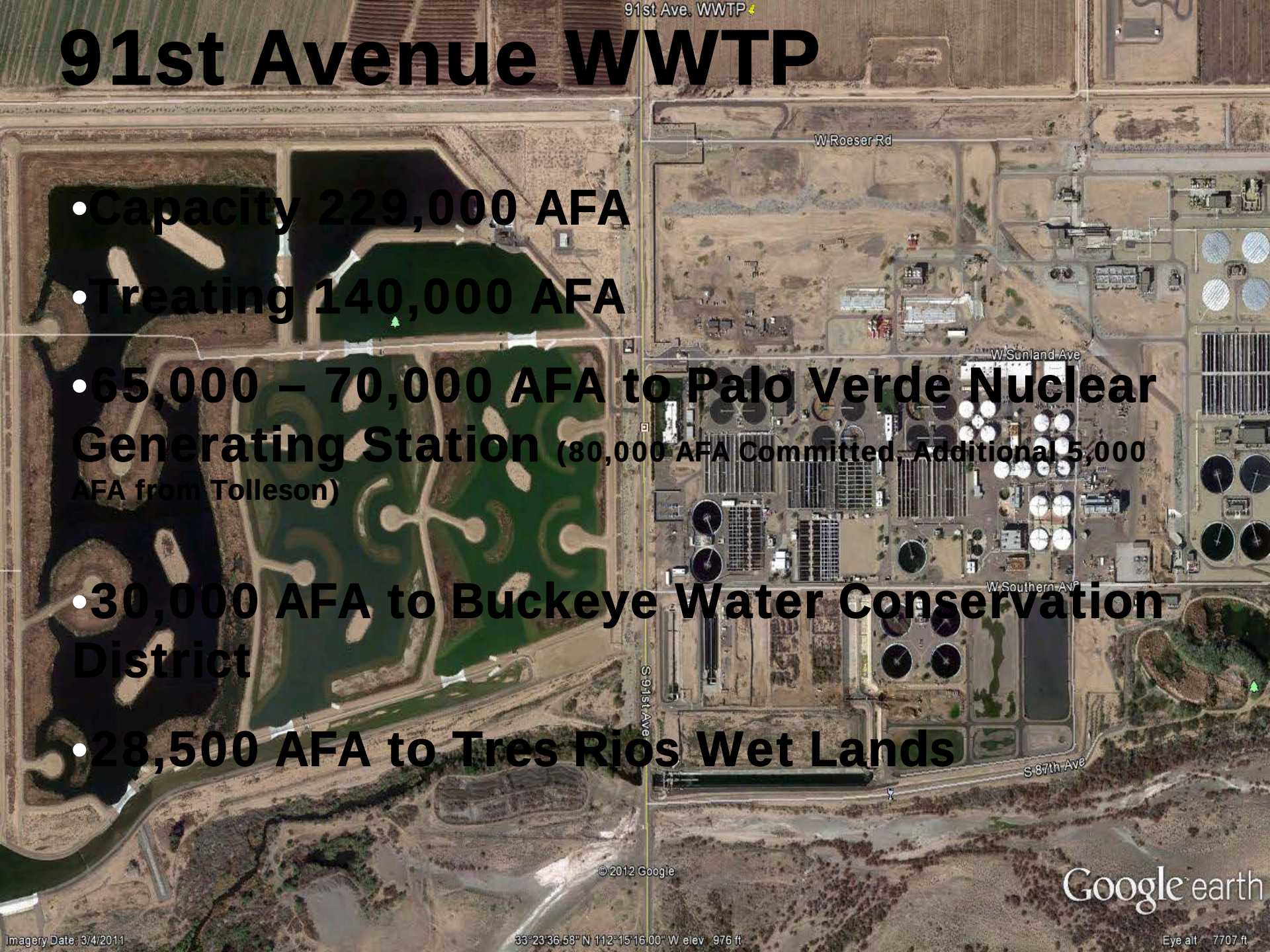


Because of its desert location, Palo Verde is the only nuclear power facility that uses 100% reclaimed water for cooling. Unlike other nuclear plants, Palo Verde maintains “Zero Discharge,” meaning no water is discharged to rivers, streams, or oceans.

Cooling Options Evaluated

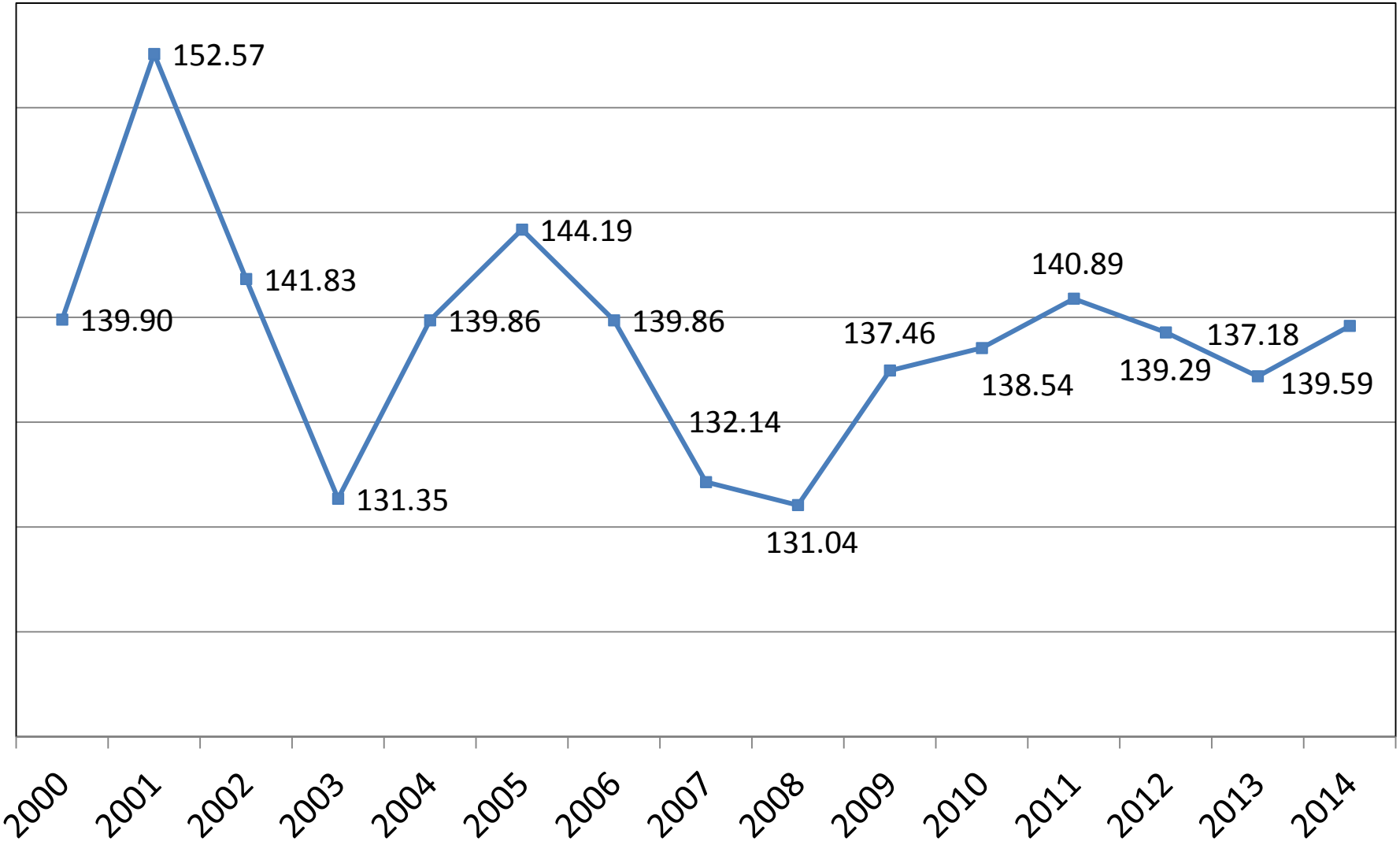
- **Groundwater**
  - Sustainability
  - Subsidence issues
- **Surface Water**
  - Limited accessibility
  - Supply fully appropriated
- **Colorado River Water**
  - Accessibility issues (1973)
- **Dry Cooling**
  - Impact on power generation
- **Effluent**
  - Adequate supply
  - Reliable and sustainable
  - Not being utilized

91st Avenue WWTP

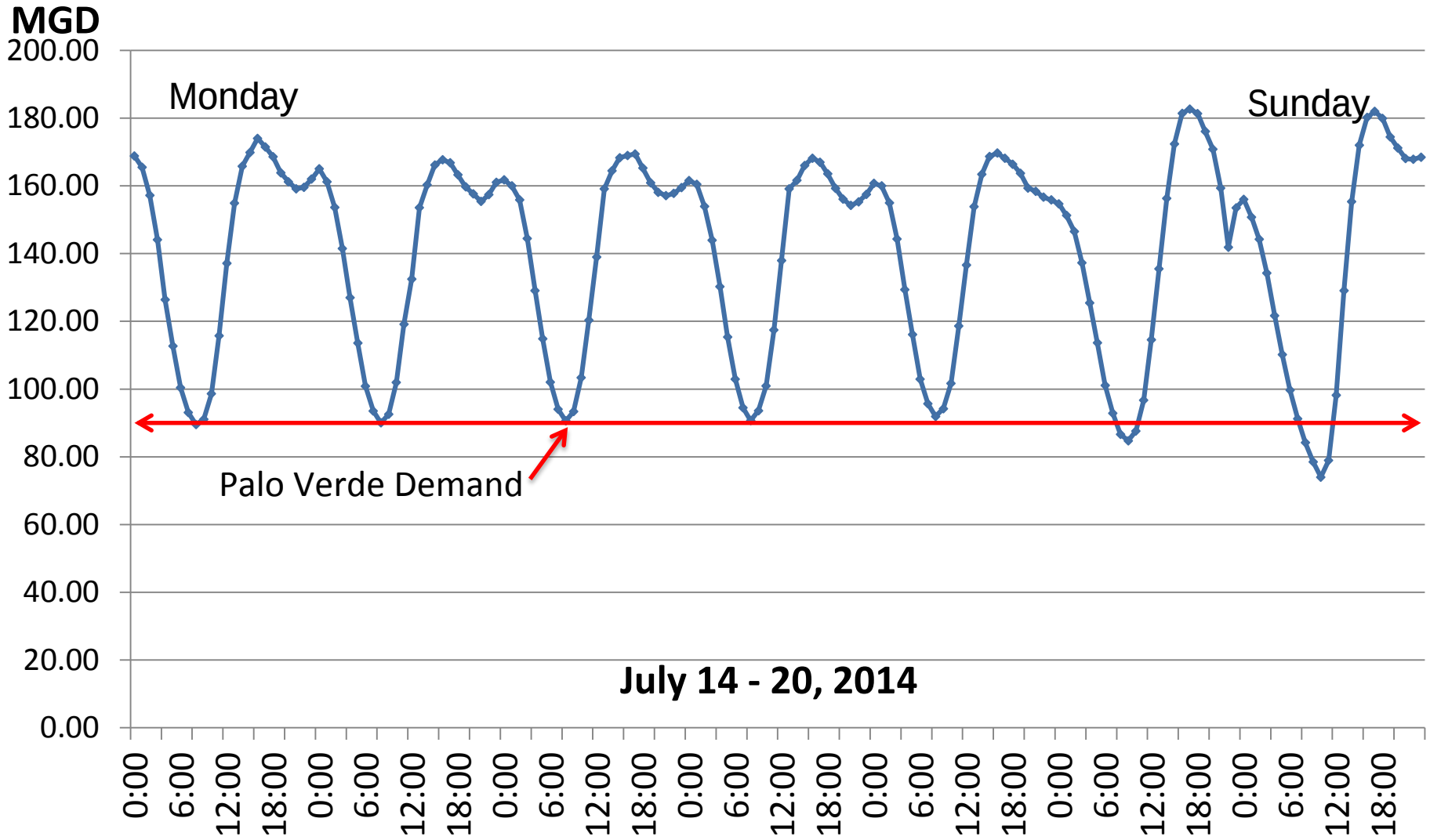


- Capacity 229,000 AFA
- Treating 140,000 AFA
- 65,000 – 70,000 AFA to Palo Verde Nuclear Generating Station (80,000 AFA Committed, Additional 5,000 AFA from Tolleson)
- 30,000 AFA to Buckeye Water Conservation District
- 28,500 AFA to Tres Rios Wet Lands

WWTP Average Daily Flow MGD

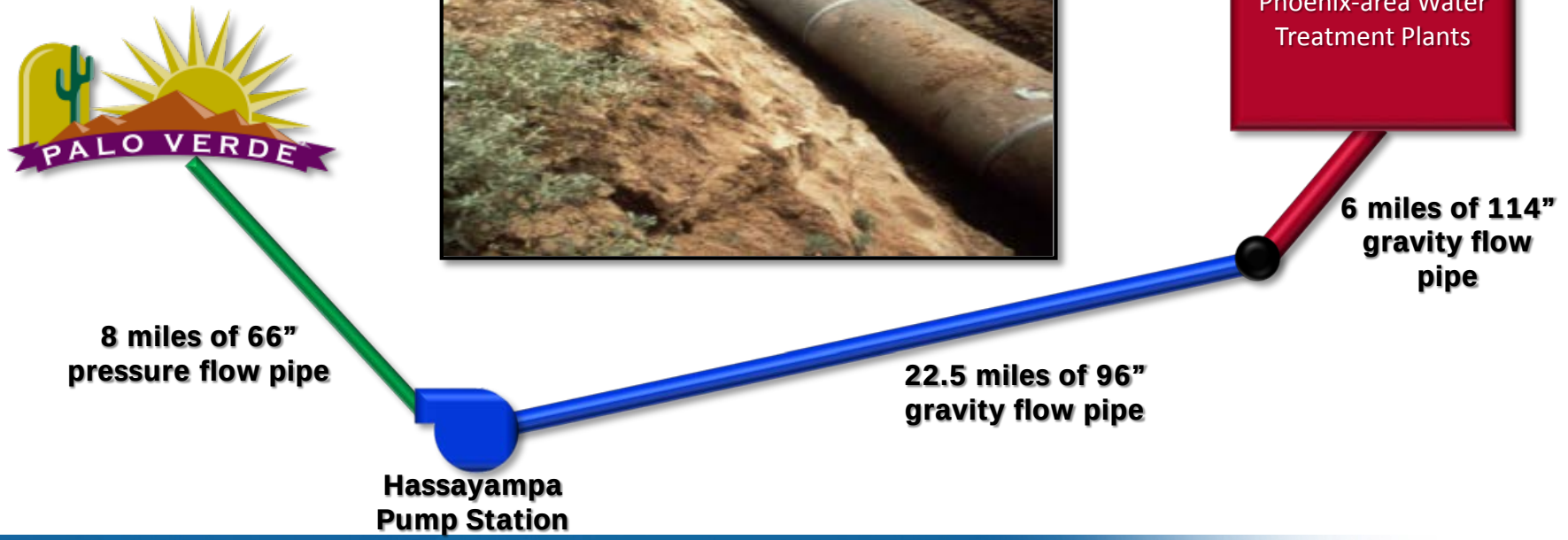


Hourly Flow - MGD



Conveyance System

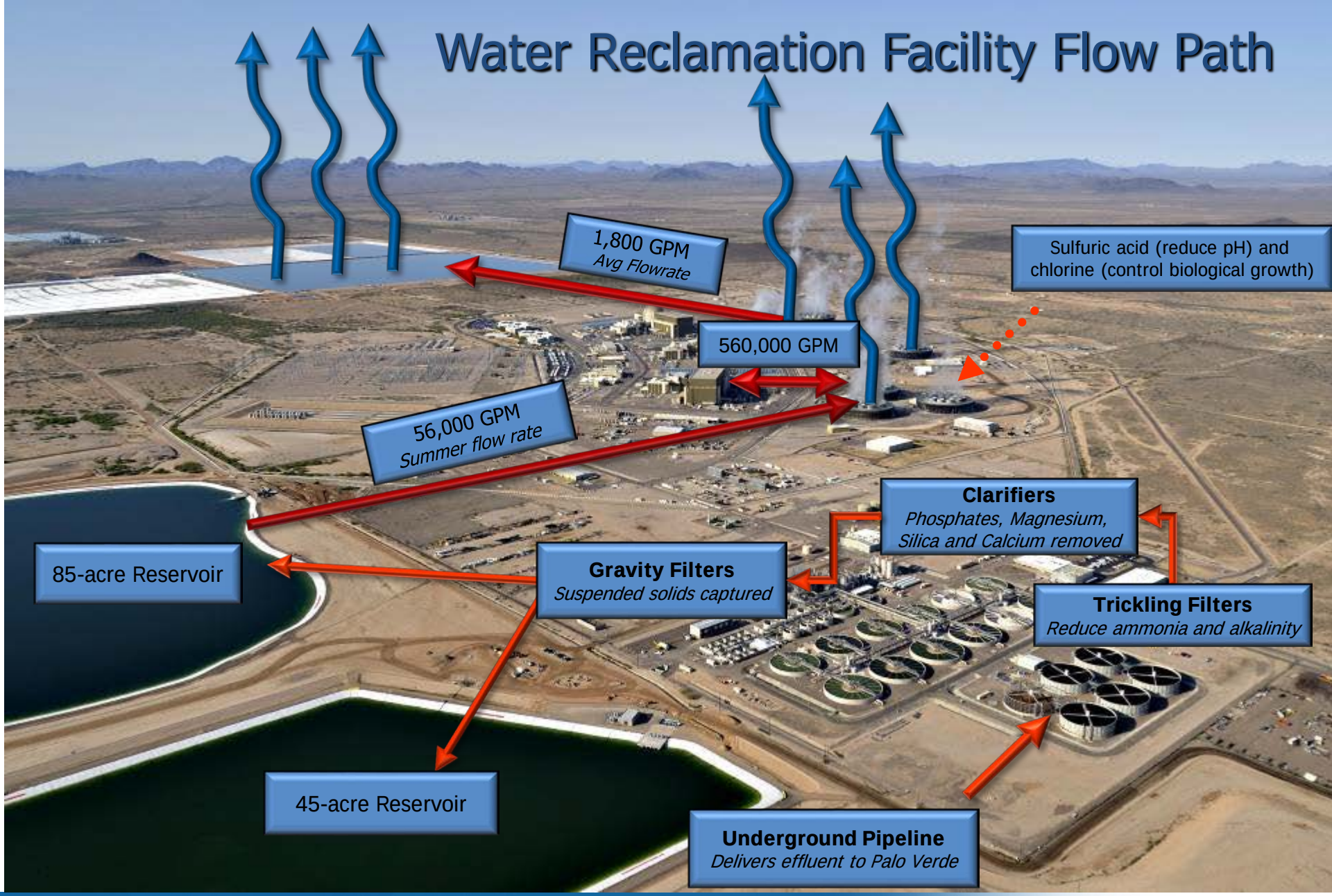
28.5 miles of gravity flow with 100-foot elevation drop,
8 miles pumped flow with 150-foot elevation increase
Total volume ~67 Million Gallons



Water Reclamation Facility

The Palo Verde Water Reclamation Facility (WRF), is a 90 MGD tertiary treatment plant that reclaims treated secondary effluent from local valley cities.

Water Reclamation Facility Flow Path



Water Use

- Average cooling water intensity
  - 760 gallons/MWh
- Average cooling water make-up
  - 73,000 acre feet
- Cooling water cycles
  - 23 – 25
- Cooling tower blowdown
  - 3,000 Acre Feet (>5%)

License Renewal

Palo Verde Economic Impact

- Total estimated annual impact of $1.8 billion in Arizona
  - Largest single commercial taxpayer in Arizona, including nearly $50 million in property taxes annually
  - Local purchases of materials and services
  - Palo Verde employees donate approximately $1 million annually to local charities
  - Approximately 2,500 employees

SOURCE: Applied Economics, Palo Verde Economic Study, May 2010

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City of Flagstaff

Reclaimed Water Program

Presented by

Bradley M. Hill, R.G. - *Utilities Director*

City of Flagstaff, Arizona

Governor's Water Augmentation Council

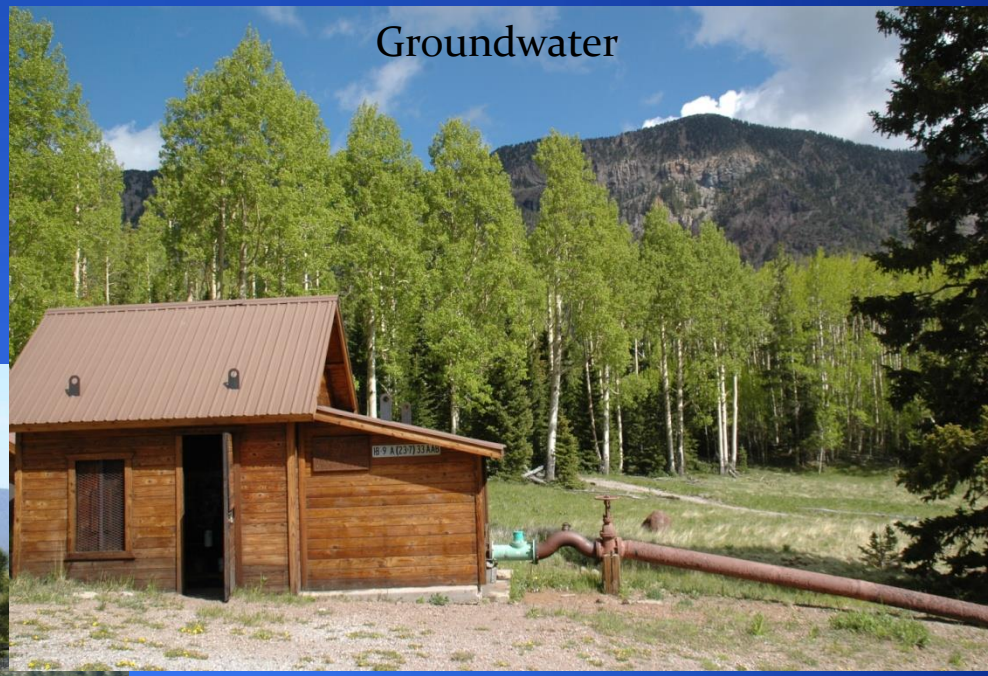
Recycled Water Committee

Phoenix, Arizona

December 5, 2016

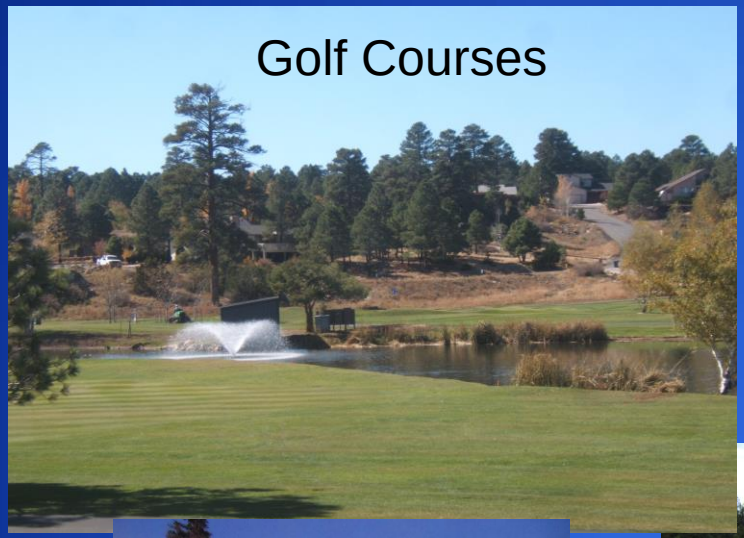
~60% of Flagstaff's total water supplies comes from the national forest

2015 Year
5,719 AF – from USFS lands
2,295 AF – local within City
8,014 AF – total potable


Groundwater


Upper Lake Mary

~20% of Flagstaff's total water deliveries comes from direct delivered Reclaimed Water



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Riparian Habitat

SCA Care of Life

Industry

HISTORY

1973 City started directly delivering reclaimed water to Continental Country Club Golf Course

Wildcat Hill Water Reclamation Plant

1973 – 1985: Rate: $11.60 /AF

6 MGD Trickling Filter Plant. Class B Reclaimed Water Quality.

In 2009, upgraded to a Integrated Fixed Film Activated Sludge (IFAS) System. Class A+ reclaimed water quality (denitrification)

HISTORY

1993 City expanded its direct delivery of reclaimed water with the construction of its 2nd water reclamation plant

Francis Short Pond
reclaimed water

4 MGD Bardenpho Process Class A+ reclaimed water quality (denitrification)

1985: Rate $391/AF ($1.20/1000)
1993: Rate changed to 75% of potable
New Customer Classes:
NAU: $671/AF ($2.06/1000)

City Hospital, Schools:
$915/AF ($2.81/1000)

HISTORY

1995 Rates & Customer Classes Changed

ON PEAK (accept water as available)

OFF PEAK High Volume (on-site storage)

Declining Rate

1st 50 M -	$325/AF	($1.00/1000)
2nd 50M -	$260/AF	($0.80/1000)
3rd 50M -	$195/AF	($0.60/1000)
4th 50M -	$130/AF	($0.40/1000)
>200M -	$65/AF	($0.20/1000)

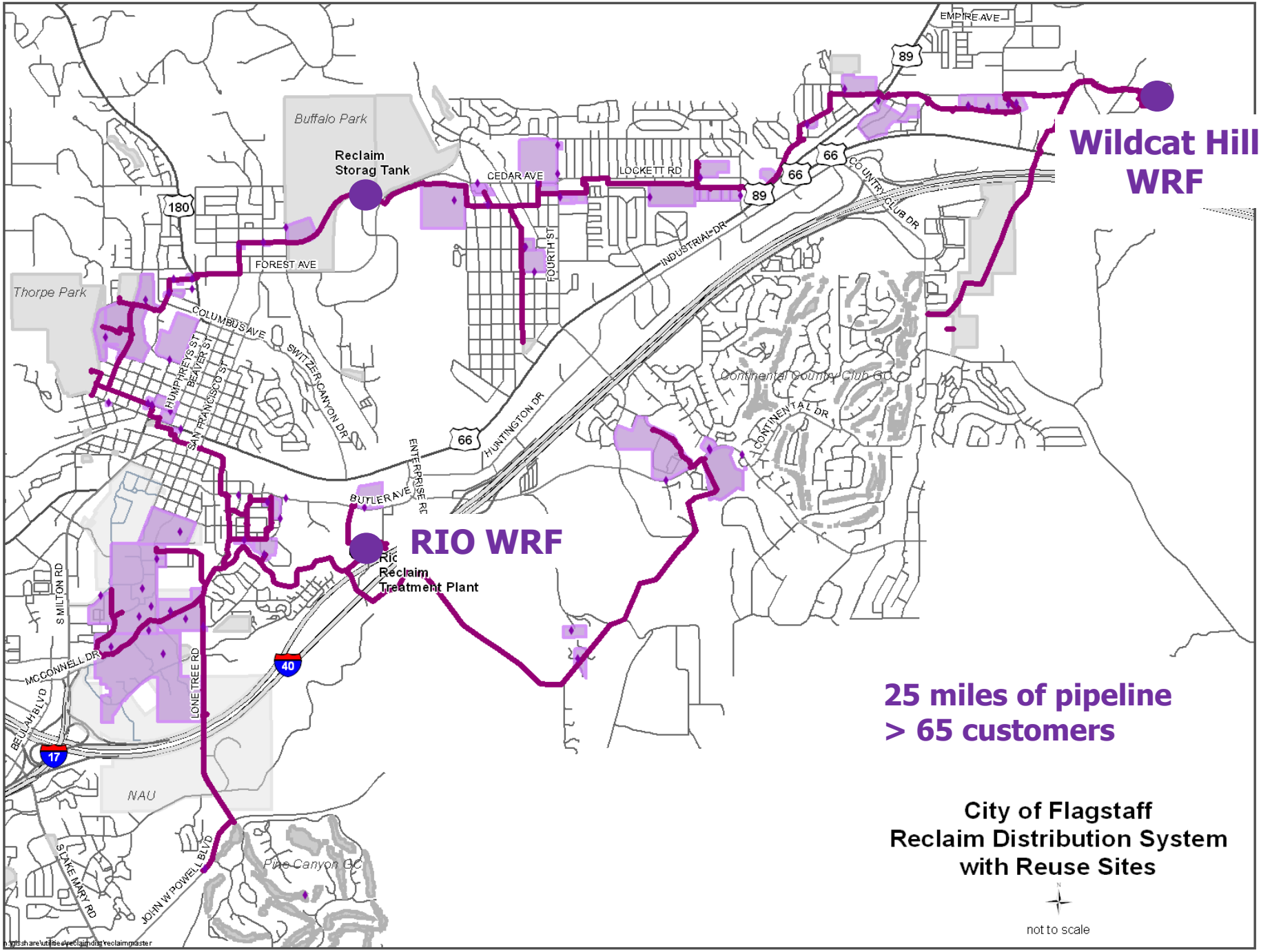
CONTINENTAL
GOLF CLUB • FLAGSTAFF

HISTORY

2002 City Council signed an Agreement with the Arizona Snowbowl to directly deliver *552 AF/ski season (or up to 2.25 MGD)* of reclaimed water for snowmaking between November through February

Created 3 types of Reclaimed Water Agreements:

Reclaimed (existing system)
Reimbursement (City pays)
Conversion (existing potable use is converted to reclaimed water)


Wildcat Hill WRF
RIO WRF
Reclaim Storag Tank
Reclaim Treatment Plant
25 miles of pipeline
> 65 customers
City of Flagstaff
Reclaim Distribution System
with Reuse Sites
not to scale
Buffalo Park
Thorpe Park
NAU
Pine Canyon GC
Continental Country Club GC
EMPIRE AVE
CEDAR AVE
LOCKETT RD
FOREST AVE
COLUMBUS AVE
SWITZER CANYON DR
HUMPHREYS ST
BEAVER ST
SAN FRANCISCO ST
FOURTH ST
INDUSTRIAL DR
COUNTRY CLUB DR
HUNTINGTON DR
CONTINENTAL DR
BUTLER AVE
ENTERPRISE RD
S MILTON RD
MCCONNELL DR
LONE TREE RD
BEULAH BLVD
S LAKE MARY RD
JOHN W POWELL BLVD
180
89
66
40
17

~20% of Flagstaff's total water deliveries comes from direct delivered Reclaimed Water

2015 Year

Golf Courses	945 AF	49%
Manufacturing/Commercial	406 AF	21%
Snowbowl	237 AF	12%
Northern Arizona University	162 AF	8%
Construction	49 AF	3%
Residential	2 AF	<1%
	1,921 AF	

Riparian habitat / incidental recharge 4,084 AF

SCA Care of Life

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ISSUES of TODAY

Use of Reclaimed Water for Snowmaking

Compounds of Emerging Concern

Indirect & Direct Potable Reuse

Rates – the value of Reclaimed Water

ISSUES of TODAY

Use of Reclaimed Water for Snowmaking

2009 9th Circuit Court of Appeals affirmed that snowmaking did not interfere with religious freedoms of area tribes

Tribes appealed to the Supreme Court where they declined to hear the appeal

SUPREME COURT
OF THE UNITED STATES

ARIZONA SNOWBOWL

ISSUES of TODAY

2011 Hopi Tribe files a complaint for seeking *$40 million* against City for the sale of reclaimed water to the Arizona Snowbowl for snowmaking

Lawsuit Claiming

1. Illegal Contract
2. Water Rights Infringement
3. Public Nuisance

ISSUES of TODAY

2014 Hopi Claim on Public Nuisance resumes in Superior Court

Lawsuit Claiming

1. Illegal Contract
2. Water Rights Infringement
3. Public Nuisance

2016 Arizona Superior Court dismisses Public Nuisance claim relying on the Exxon Valdez case that the Hopi do not have standing that reclaimed water use for snowmaking is a public nuisance. Appeal is likely

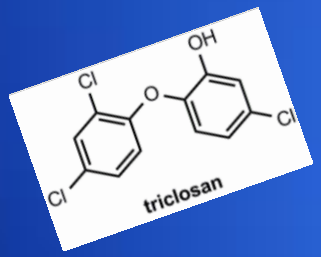
ISSUES of TODAY

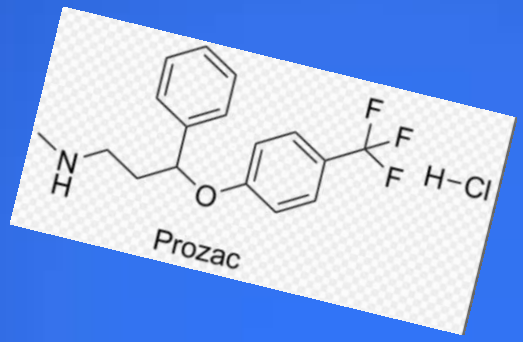
Compounds of Emerging Concern

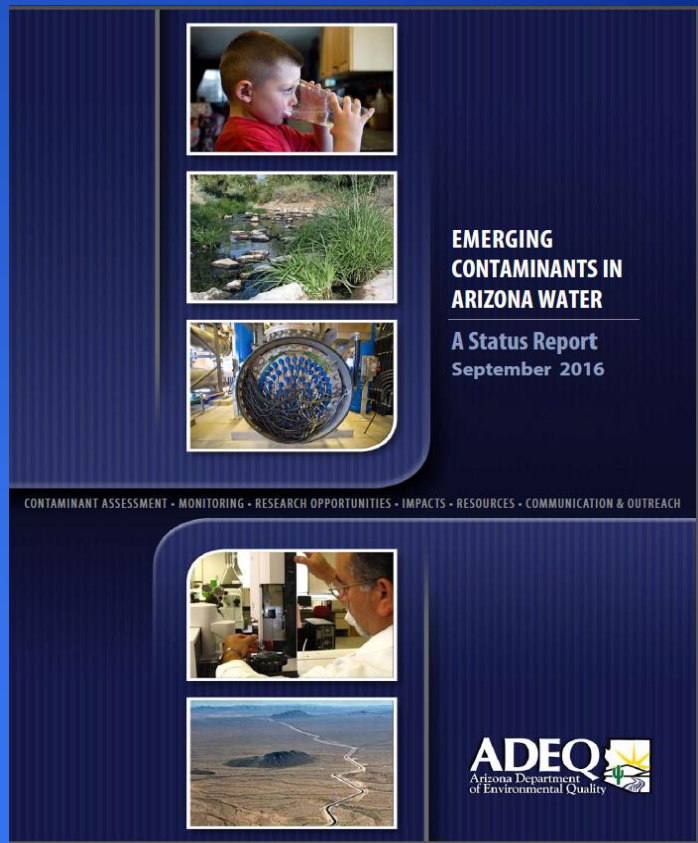
2002 City has been engaged in water quality sampling

2013 ADEQ Advisory Panel on Emerging Contaminants

2013 City Managers Advisory Panel

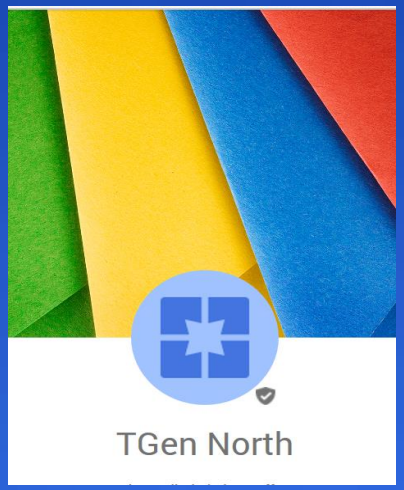






Flagstaff City Manager's Advisory Panel

THE UNIVERSITY OF ARIZONA



VirginiaTech

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Flagstaff Medical Center
Northern Arizona Healthcare

USGS
science for a changing world

Heart Of The Verde Valley

PUBLIC HEALTH SERVICES DISTRICT
COCONINO COUNTY

National Science Foundation Project

Relative Abundance and Diversity of Antibiotic Resistance Genes and Pathogens in Reclaimed Versus Potable Water Distribution Systems

A. Pruden (Virginia Tech), M. Edwards (Virginia Tech), J. McLain (Univ Arizona), D. Engelthaler (TGen)

Award $330,000

August 1 2014-July 31, 2017

TGen North

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VirginiaTech

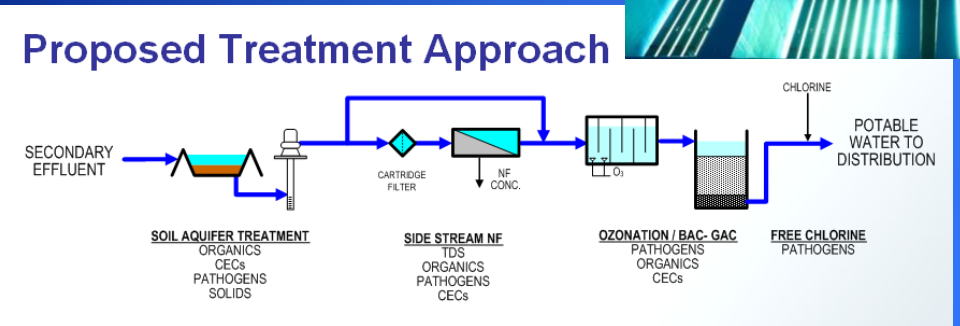
ISSUES of TODAY

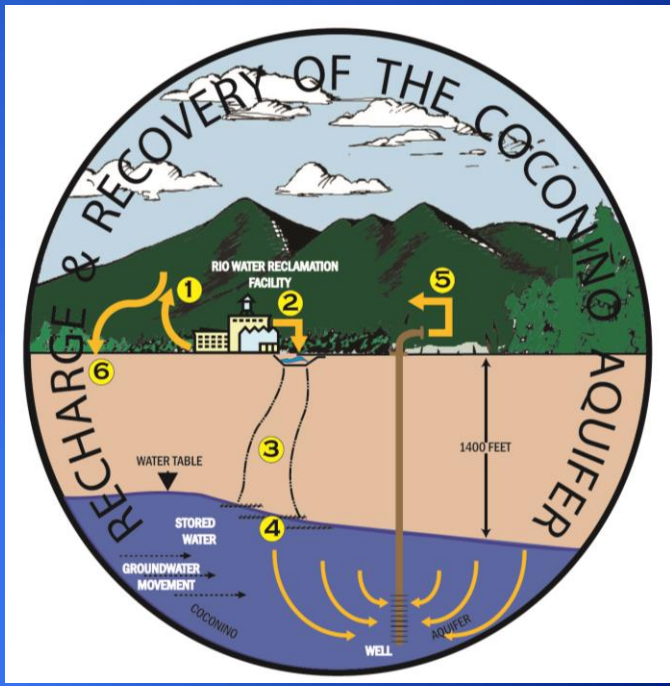
Indirect & Direct Potable Reuse

2016 WateReuse Arizona & ADEQ Rule Making

Advanced Treatment considerations

Evaluating Local Options



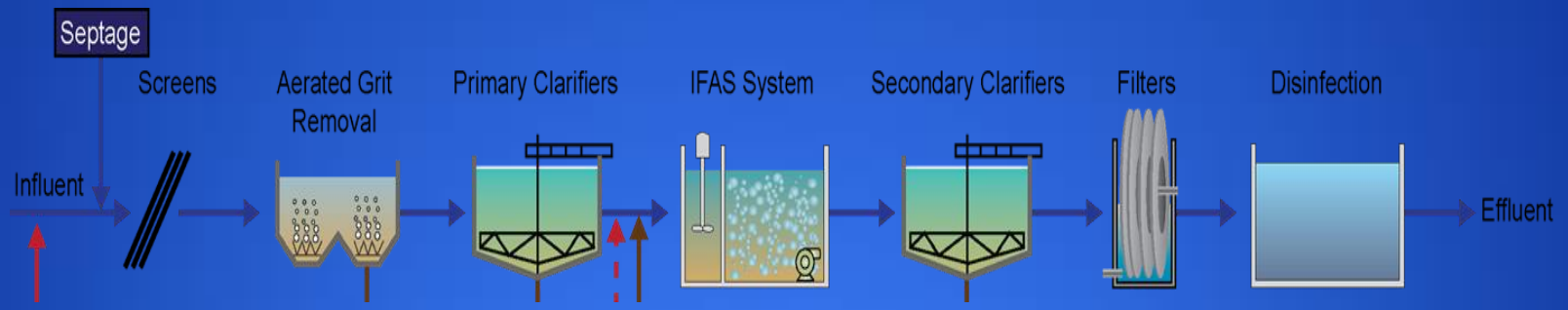


ISSUES of TODAY

Rates – the value of Reclaimed Water

2016/17

Where within treatment process do you divide Wastewater v. Reclaimed expenses?



Wastewater Customers
Reclaimed Customers

2016 Rates: $348/ AF
$1,156/ AF

Reclaimed Pumps

17 Cl Chlorine 35.4527

Distribution System

Storage Tank

Distribution System

Summary

Reclaimed water is important to Flagstaff

20% of total water deliveries and recharge groundwater system

City has been proactive in understanding Compounds of Emerging Concerns within our community

City is evaluating Indirect & Direct Potable Reuse options

City Council evaluating what to charge customers for reclaimed water


McMillan Bank & Hotel- 1900