



# WATERREUSE TEXAS WEBCAST: OPERATOR PERSPECTIVES ON REUSE

FEBRUARY 21, 2024  
11:00 ET | 8:00 PT

WATERREUSE ASSOCIATION WEBCAST SERIES



ENGAGE.  
EDUCATE.  
ADVOCATE.



# A Few Notes Before We Start...

- Today's webcast is scheduled for 60 minutes.
- A PDF of this presentation will be shared afterwards via email
- Please type questions for the presenters into the Q&A box located at the bottom of your screen.
- There is one (1) Professional Development Hour (PDH) available for this webcast. Please email the PDH form to [webcasts@watereuse.org](mailto:webcasts@watereuse.org)



# Upcoming WaterReuse Texas Events

**Save the date!**  
**Abstract**  
**submissions open**  
**in March**



Join us at **Texas Water** for a Reuse  
Happy Hour on Wednesday April 10  
*Co-hosted by the WEAT Reuse Committee*

We are still looking for a sponsor!  
Asking \$250-\$500 to provide drinks  
and appetizers for attendees

- 🌐 WaterReuse Symposium in Denver, CO– Texas Networking  
If you're attending the Symposium, join WRTX for several Texas networking touchpoints on March 12 and 13. For more information, email Noelle George [ngeorge@watereuse.org](mailto:ngeorge@watereuse.org).





**Moderator:**



**Roland Gutierrez**  
San Antonio  
Water Systems  
(SAWS)

# Today's Presenters



**David Garza**  
City of McAllen  
Public Utility



**Migdalia Orozco  
Jackson**  
Fort Worth Water



**Hunter Adams**  
City of Wichita  
Falls



**Angel  
Bustamante, P.E.**  
El Paso Water





David Garza  
Director of Wastewater Systems  
City of McAllen Public Utility



# City of McAllen Overview

- **City of McAllen Golf Course (for over 20 years)**
- **Calpine-Valley generation power plant (for over 20 years)**
- **McAllen North and South WWTP**
- **City of McAllen Baseball/Park system**
- **The only residential subdivision allowed to use reclaimed water is Tres Lagos (this can change in the future)**



# City of McAllen Overview

- **Purple pipe underground-Reclaimed transmission line- ~5miles of 16” and 782 ft of 24”**
- **Reclaimed distribution line- ~6 miles of 12” and ~8.5 miles of 8”**
- **Residential usage started in 2017**
- **Over 778 total accounts**
- **100-150 accounts growth per year**
- **In 2023 monthly average usage at Tres Lagos was 22,252,157 gallons, daily average was 733,897 gallons**





# City of McAllen Overview

- **McAllen is testing for the chlorine residual out in the field**
- **Testing for E. coli**
- **Testing for total dissolved solids (TDS)**





Migdalia Orozco Jackson  
Water Systems Superintendent  
Fort Worth Water



# Fort Worth- Village Creek WRF

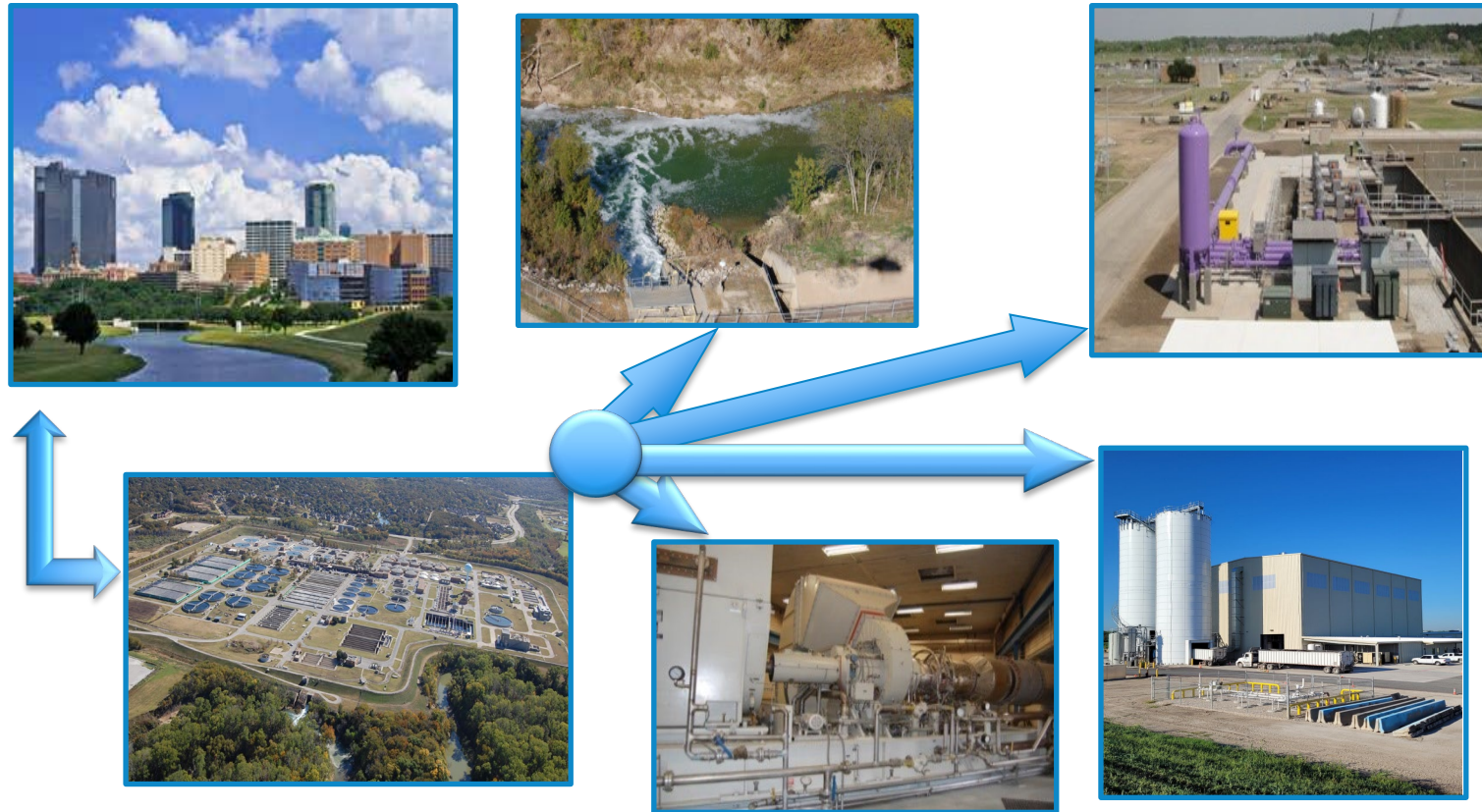


- **1955 Construction Started**
- **TODAY: 166 MGD (Permitted Capacity)**
- **Service Area: Tarrant County - Ft. Worth and 22 Customer Cities**
- **Population Equivalent - One Million**
- **>3400 Miles of Collection Lines**
- **Advanced Treatment**  
**Activated Sludge Process**  
**Anaerobic Digesters**





# From Water To Wastewater To Resource Recovery



# Reclaim System Overview

- **Source of water – Village Creek filtered effluent**
- **Disinfection method - UV System or Contact Basin**
- **Reclaimed Water Pump Station**
- **Chlorine injection after Pump Station**
- **Meter station for each customer**



# UV Disinfection



- **TROJAN, HORIZONTAL**
- **ONE CHANNEL**
- **2 UV BANKS**
- **5 MODULES PER BANK**
- **8 LAMPS PER MODULE**
- **40 LAMPS PER BANK**
- **LAMP OUTPUT 130 UVC WATTS**
- **FLOW CAPACITY 6 MGD**





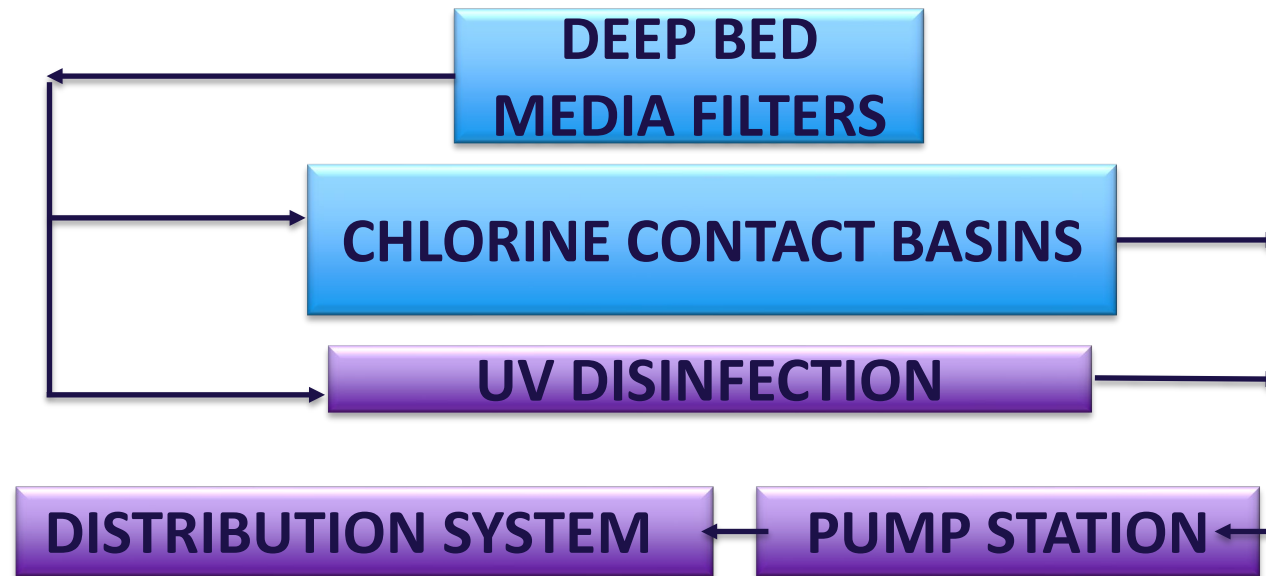
# Reclaimed Water Pump Station



- Three 200 hp pumps
- Total Capacity 12 MGD



# Production Overview



# Fort Worth Reuse Customers



## **Wholesale Customers**

**City of Arlington**

**City of Euless**

**DFW Airport**

## **Retail Customers**

**Waterchase Golf Course**

**Texas 9 (3 Strand Golf  
Academy)**

**TP Barnett**

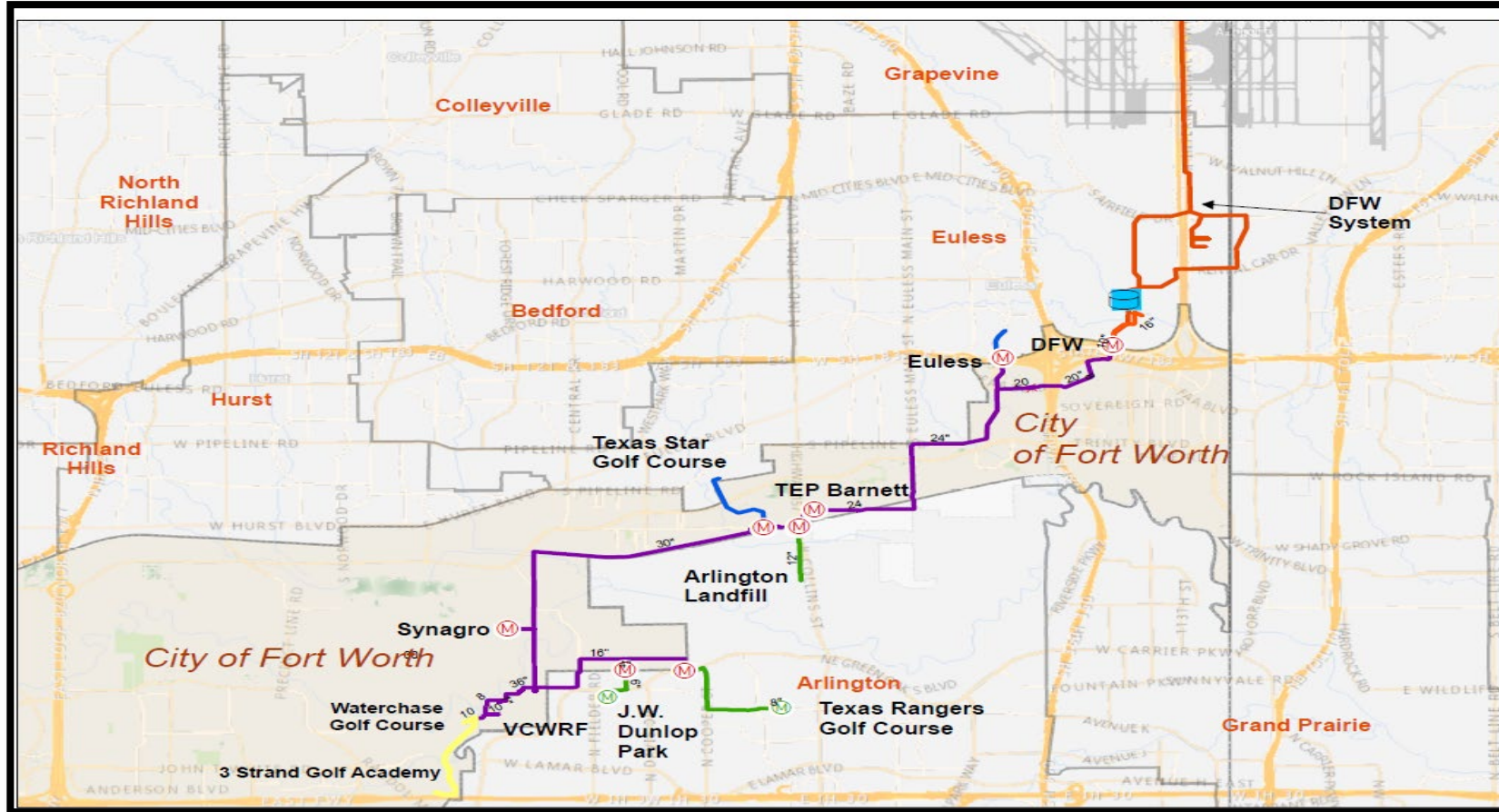
## **Internal Customer**

**Synagro**





# Type I Reclaimed Water Distribution System



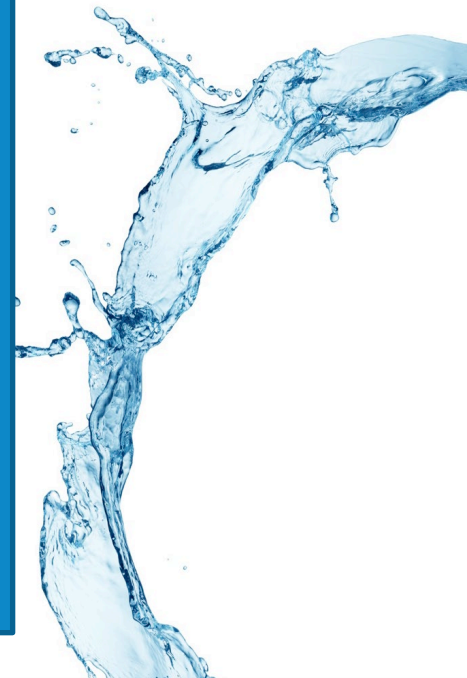
# Reclaim I Permit

## 30 days average Parameters

CBOD5	5.0mg/L
Turbidity	3.0 NTU
Fecal Coliform	20CFU/100mL

## 2023 VCWRF Results

CBOD5	2.1mg/L
Turbidity	0.8 NTU
Fecal Coliform	1.1CFU/100mL






Reclaimed Water  
Supports The  
Environment







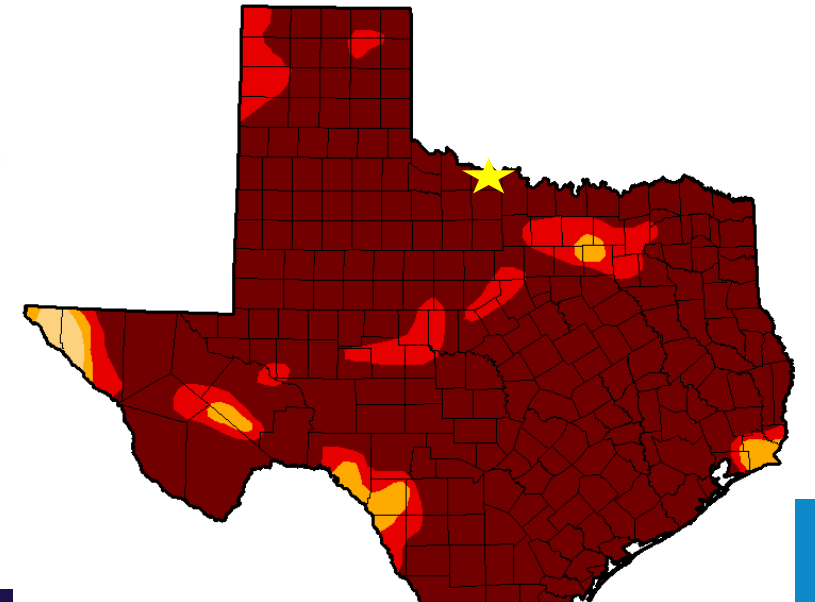
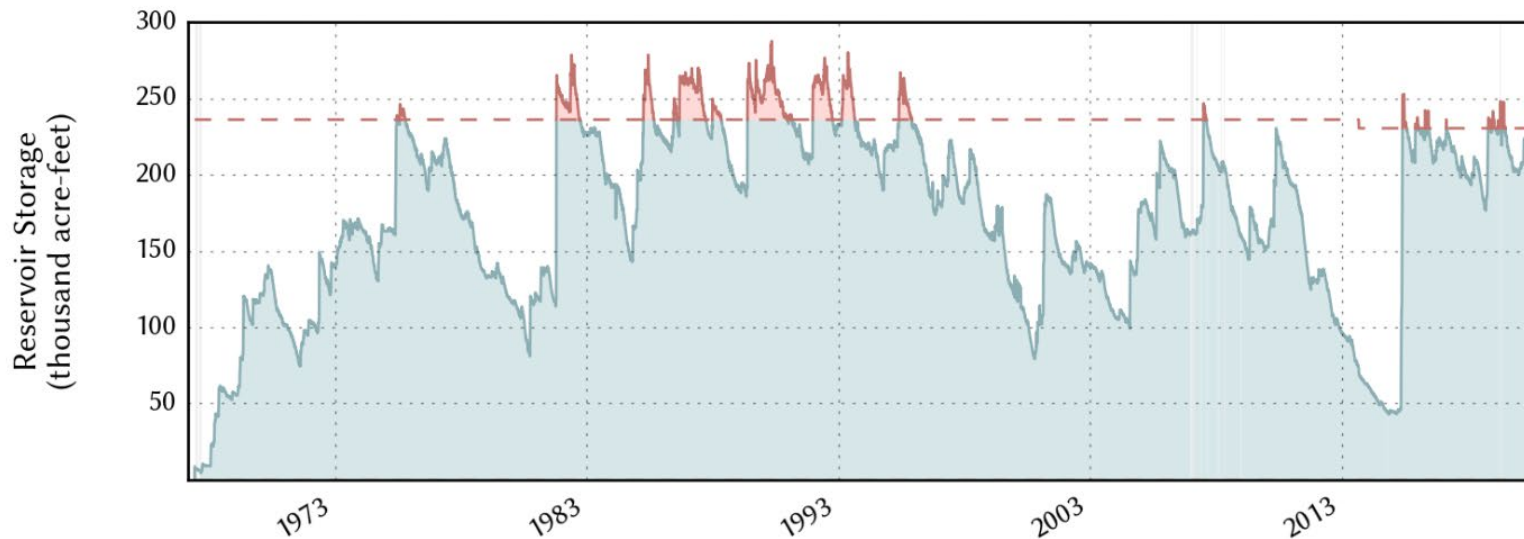
J. Hunter Adams, M.S.  
Environmental Laboratory  
Supervisor  
City of Wichita Falls – Cypress  
Environmental Laboratory





# Why Direct Potable Reuse?

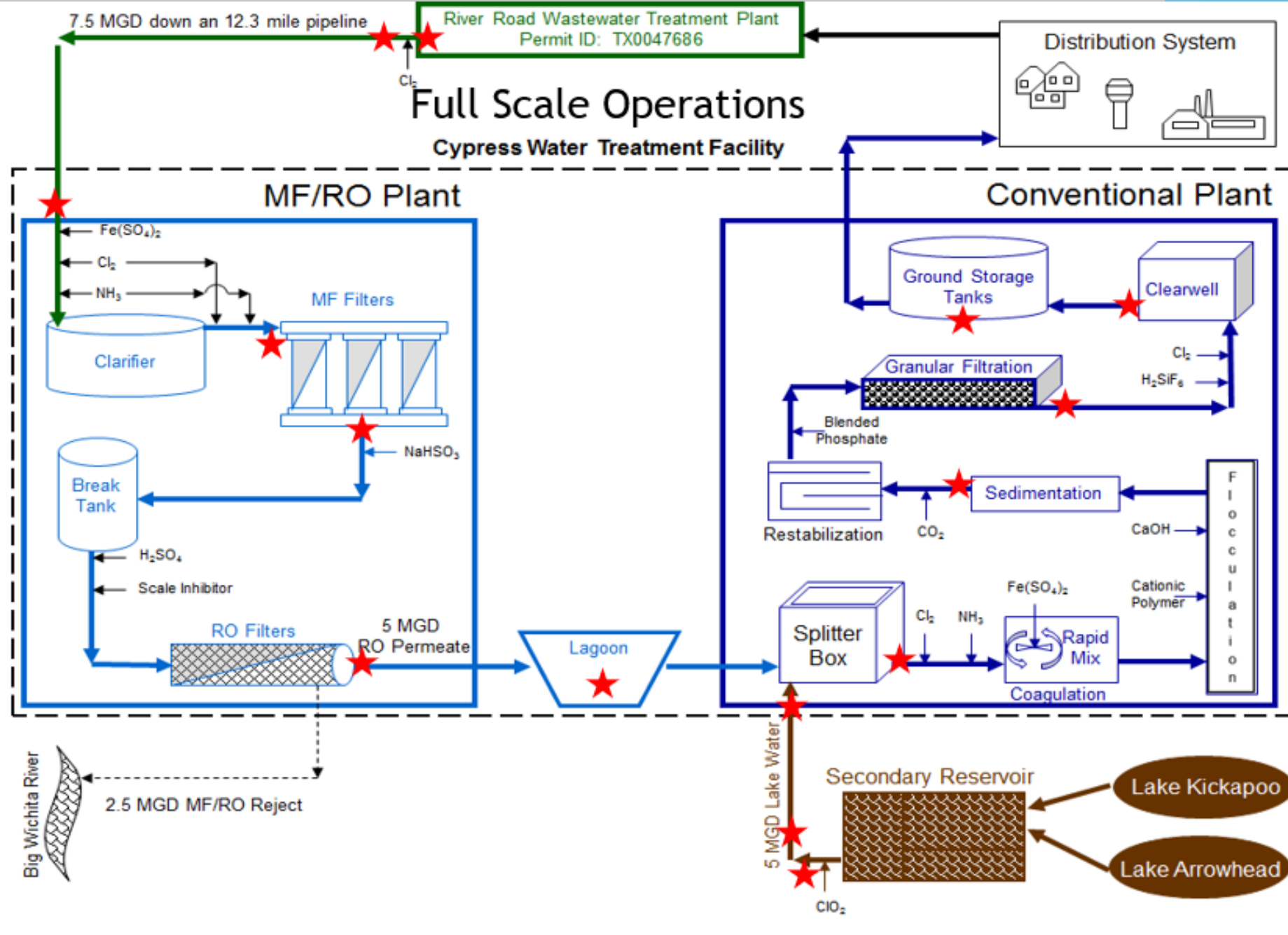
- Extended Drought - Emergency
  - 2011 – May 2015
- Lake Arrowhead – 19.0%
- Lake Kickapoo – 26.4%
- Combined Lake Levels – 21.0%



# The Plan - DPR

- TCEQ expedited permitting
  - Approved exemptions to treatment rules
- FSO began July 9, 2014
- 7.5 MGD effluent from River Rd WWTP
- MFRO Cypress WTP - Blend 1:1
  - 5 MGD RO permeate
  - 5 MGD raw lake water
- Treat blend in a conventional treatment plant
- Develop long-term strategy - IPR







# DPR Results (July 9, 2014-July 21, 2015)

## Microbial Detections

	Wastewater Effluent	Microfilters	RO	POE	Standards Compliance
<b>Virus</b>	0	0	0	0	✓
<b><i>Giardia</i></b>	62.65	0	0	0	✓
<b><i>Cryptosporidium</i></b>	4.35	0	0	0	✓
<b><i>E coli</i></b>	100,000+	0	0	0	✓

## Primary and Secondary Standards

	MCL (mg/L)	FSV Average	FSO Average	FSO Max	Standards Compliance
<b>Nitrate</b>	10.0	0.66	0.85	3.26	✓
<b>TTHM</b>	0.080	0.0142	0.0289	0.0344	✓





# DPR Results (July 9, 2014-July 21, 2015)

## Primary and Secondary Standards

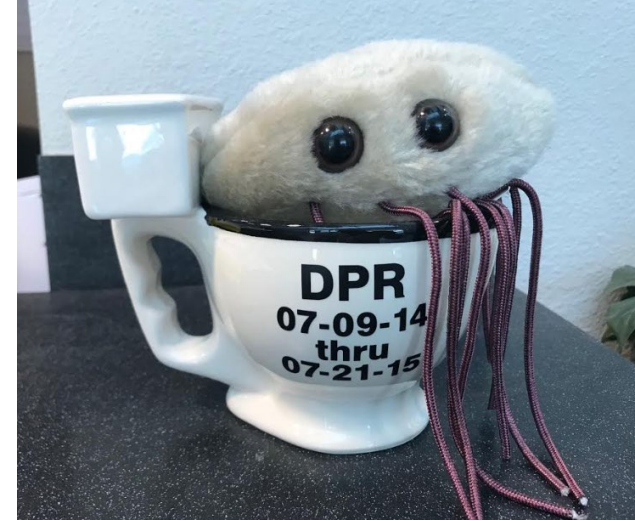
	MCL (mg/L)	FSV Max	FSO Max	Standards Compliance
Aluminum	0.05	0.0260	0.0190	✓
Antimony	0.006	ND	0.0003	✓
Arsenic	0.010	0.0013	0.0008	✓
Barium	2.0	0.0210	0.0459	✓
Chloride	250	120	88	✓
Chlorite	1.0	0.32	0.46	✓
Chromium	0.1	ND	0.0007	✓
Copper	1.3	1.3	0.1470	✓
Cyanide	0.2	ND	0.147	✓
Fluoride	4.0	0.7	0.568	✓
Iron	0.3	0.02	0.134	✓

	MCL (mg/L)	FSV Max	FSO Max	Standards Compliance
Manganese	0.05	ND	0.003	✓
Nitrate	10.0	2.08	3.26	✓
Nitrite	1.0	0.02	0.09	✓
Sulfate	250	30	33	✓
TDS	500	462	271	✓
Zinc	5.0	ND	0.025	✓
Gross Alpha/Beta	15.0	10.1	9.2	✓
Uranium	0.03	0.0007	0.0013	✓
Turbidity	0.3	0.267	0.27	✓
TTHM	0.080	0.0167	0.0344	✓
HAA5	0.060	0.0093	0.0152	✓
LSI	+	0.17	0.39	✓



# DPR Success

- 100% compliance with Primary and Secondary Drinking Water Standards
- 100% compliance with microbial log removals
- Viable and reliable supply
- Public acceptance
- Zero customer complaints
- > 2 billion gallons reclaimed in 12 months
- Public health was protected



# The Transition - DPR to IPR

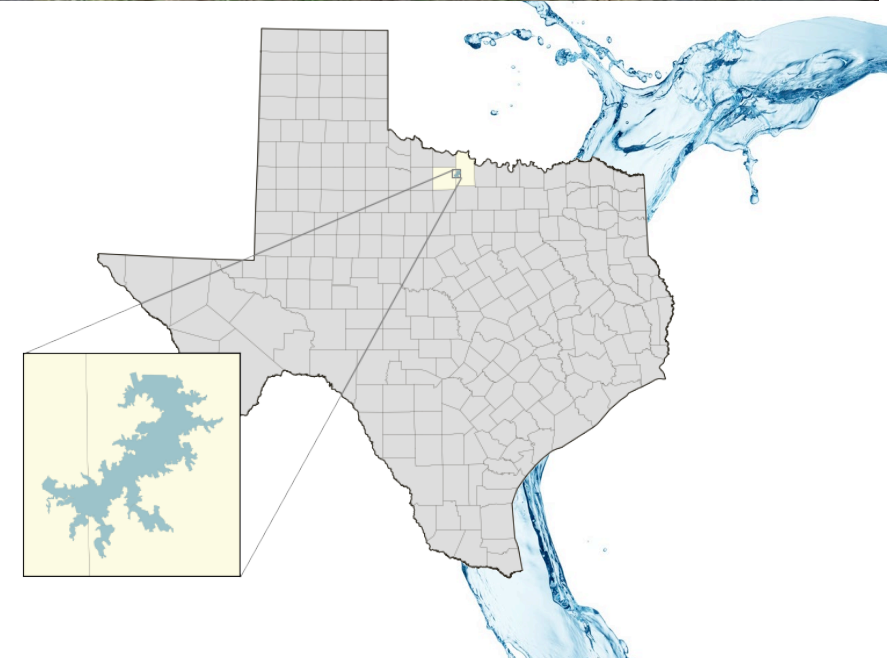
- Entire approval process required
  - Design, modeling, application, permitting, approval
- \$6 million of an 12.3 mile 32" HDPE DPR pipe repurposed for IPR
- 5.5 miles of additional 36" ductile iron pipeline added
- Outfall 3,000 ft into Lake Arrowhead
- Baseline testing for Lake Arrowhead and wastewater effluent





# IPR – Permanent Reuse

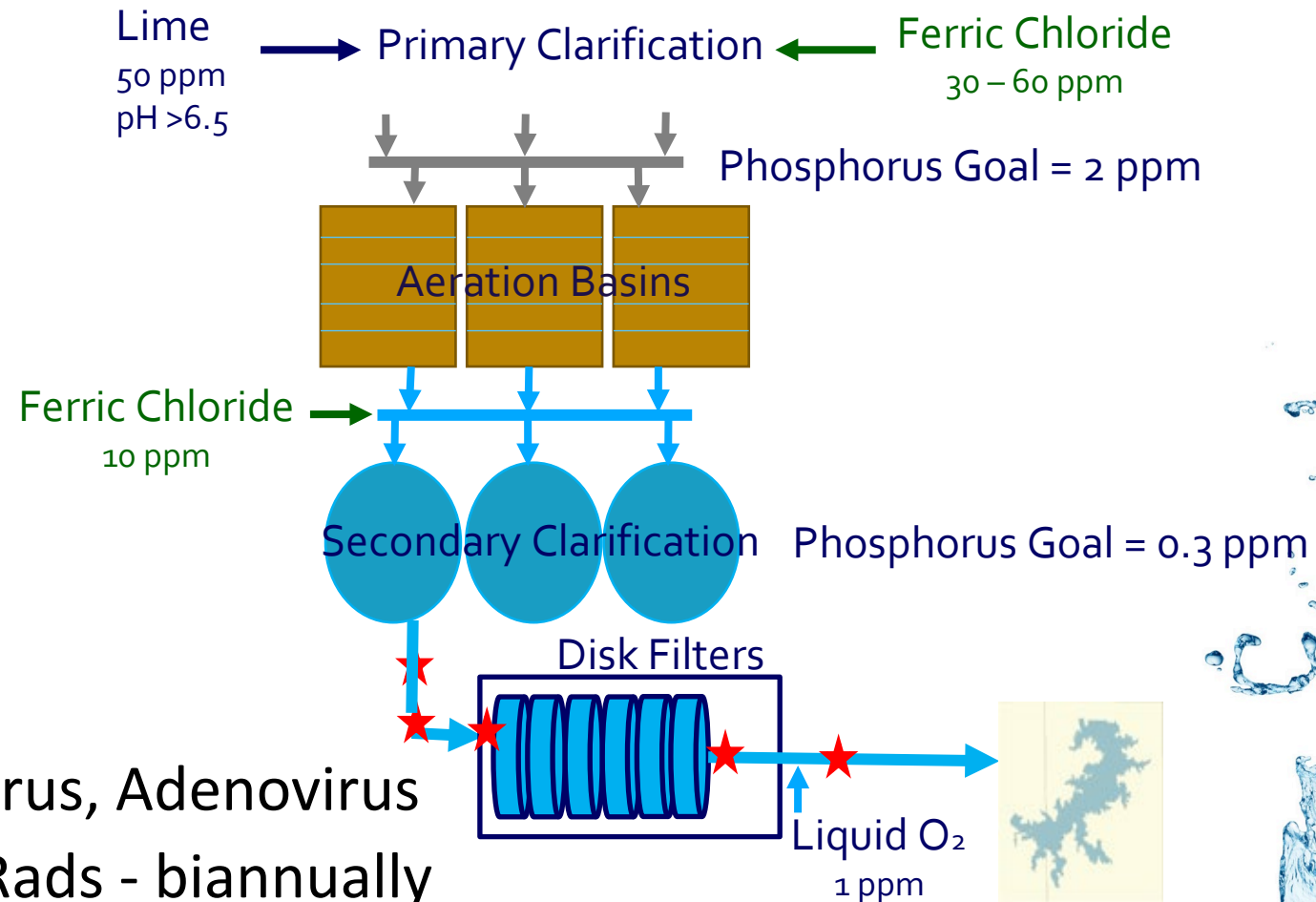
- Plant improvements/additions
  - New SCADA system
  - Lime
    - Phosphorus removal
    - Additional alkalinity
  - Ferric chloride
    - Phosphorus removal
  - Disc filter
    - Phosphorus polishing
    - Protozoan barrier
  - Liquid oxygen
- FSO began January 2018
- ~ 8 MGD RRWWTP effluent returned to watershed
  - Lake Arrowhead instead of Lake Texoma



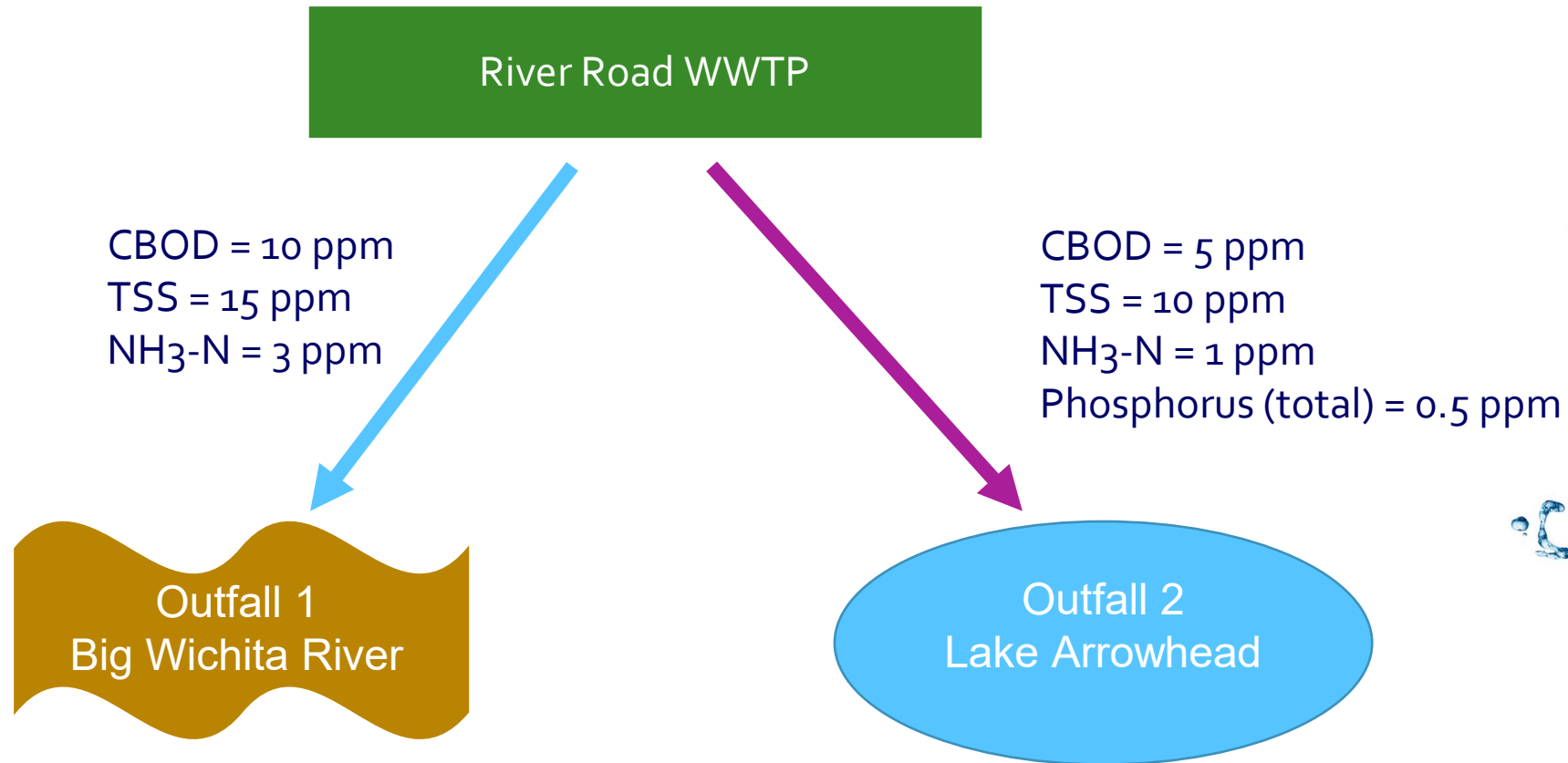


# Wastewater Effluent Monitoring

- Wet chemistry
- Anions/Cations
- Metals
- TTHMs
- HAA<sub>5</sub>
- *E. coli*
- *Crypto/Giardia*
- Coliphage
- Enterovirus, Norovirus, Adenovirus
- SOC<sub>s</sub>, VOC<sub>s</sub>, IOC<sub>s</sub>, Rads - biannually

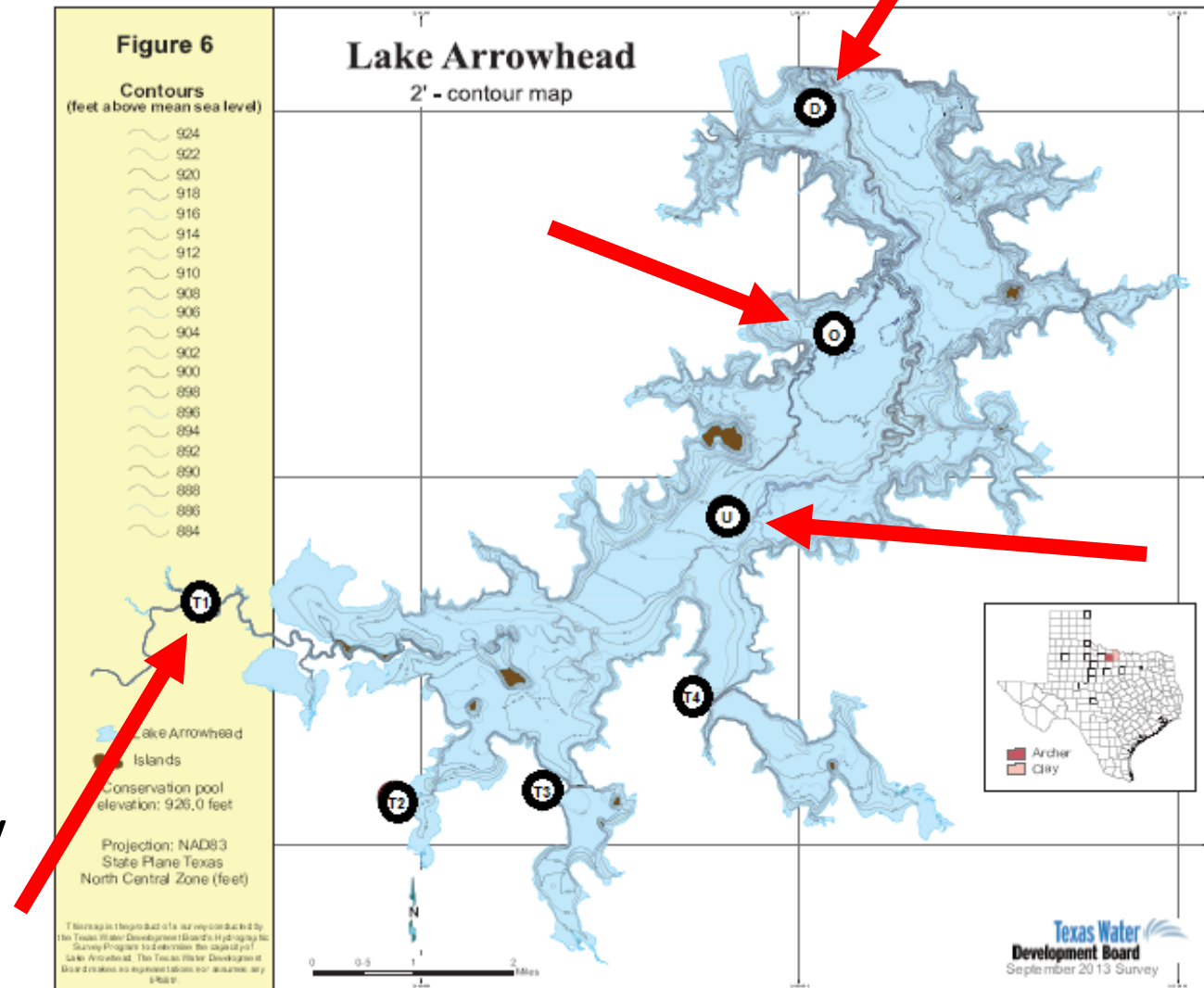


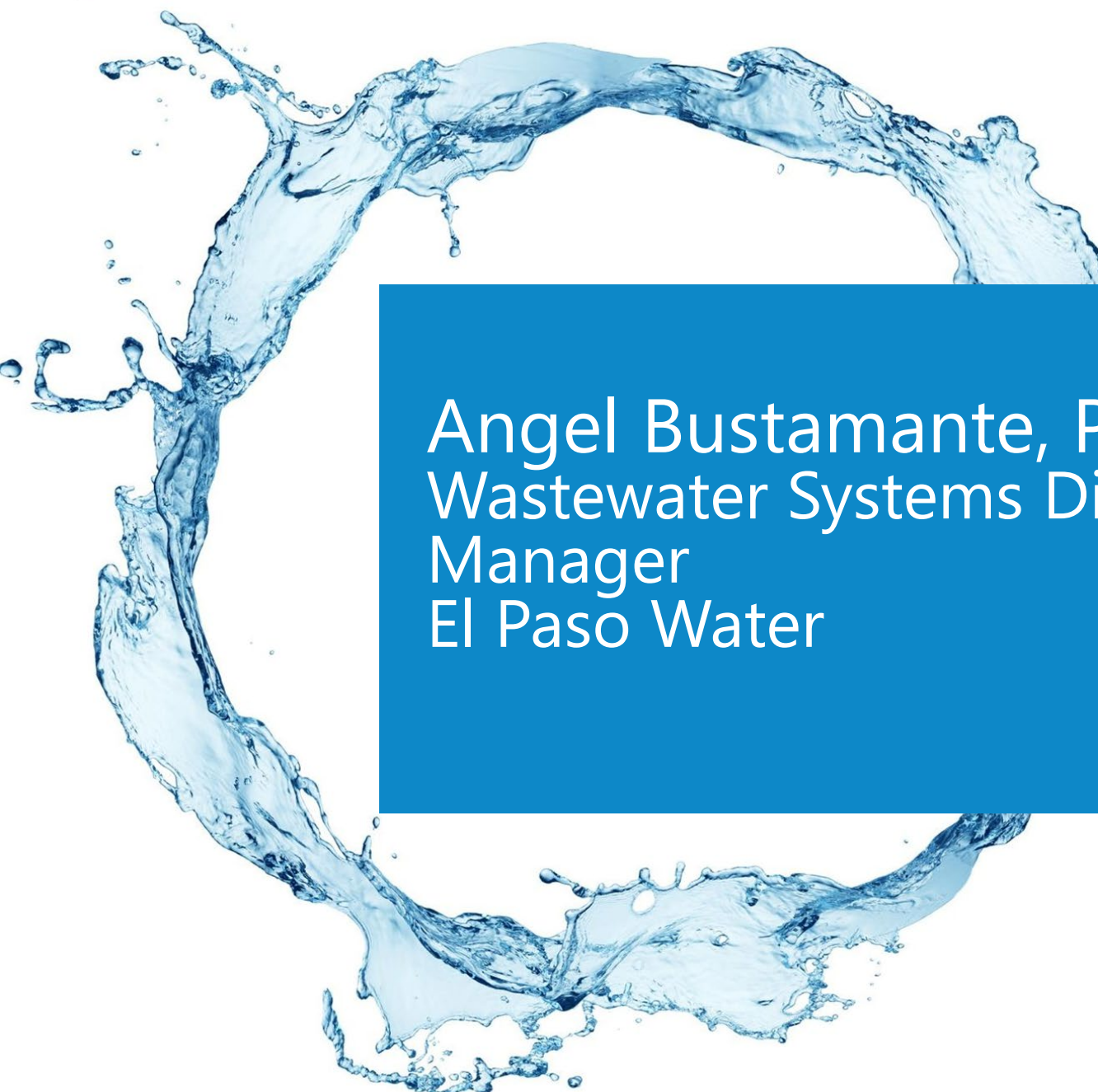
# Environmental Buffer – Lake Arrowhead



# Reservoir Monitoring – Lake Arrowhead

- Wet chemistry
- Anions/Cations
- Metals
- TTHMs
- HAA<sub>5</sub>
- *E. coli*
- *Crypto/Giardia*
- Enterovirus, Norovirus, Adenovirus
- Coliphage
- SOC, VOCs, IOC, Rads - biannually
- Benthic sediment - annually





Angel Bustamante, P.E.  
Wastewater Systems Division  
Manager  
El Paso Water



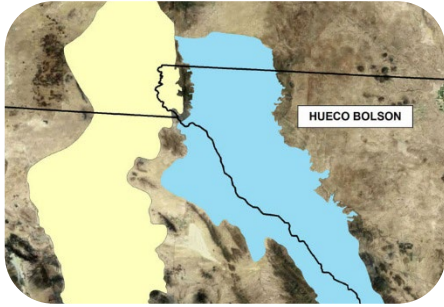


# El Paso and Water Information

- Estimated population in El Paso County is over 860,000
- Approximately 232,000 water service connections
- Average rainfall is 9 to 11 inches per year
- River water allotment is weather dependent
- Wastewater system includes 2400 miles of pipeline and 70 lift stations
- 3 CAS plants
- 1 IPR plant



# El Paso Water Already has a Diverse Supply Portfolio



Groundwater



Surface Water



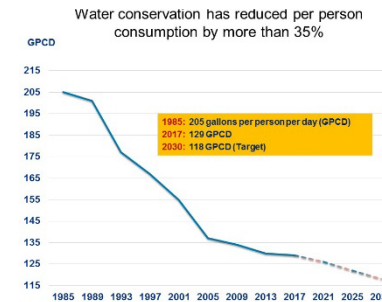
Desalination



Non-Potable  
Reuse



Indirect Potable  
Reuse



Conservation





# The DPR Operator



# What are the challenges?

- Wastewater system – don't spill
- Wastewater plant – meet permit
- Water system – transporting water to customer
- Water distribution – meeting primary standards and uninterrupted service





# What do the operators care about?

- Wastewater – meeting discharge permit
- Drinking water – Primary Drinking Water Standards – MCL or treatment technique



# Source Water Characterization

## Raw Surface Water

Turbidity pH TOC Salinity



## Primary Clarified Effluent

TSS BOD NH4





# Treatment Differences

**WW:** Biological – no control on Q

**DW:** Chemical





Final Effluent - plant washout,  
plant upset E Coli

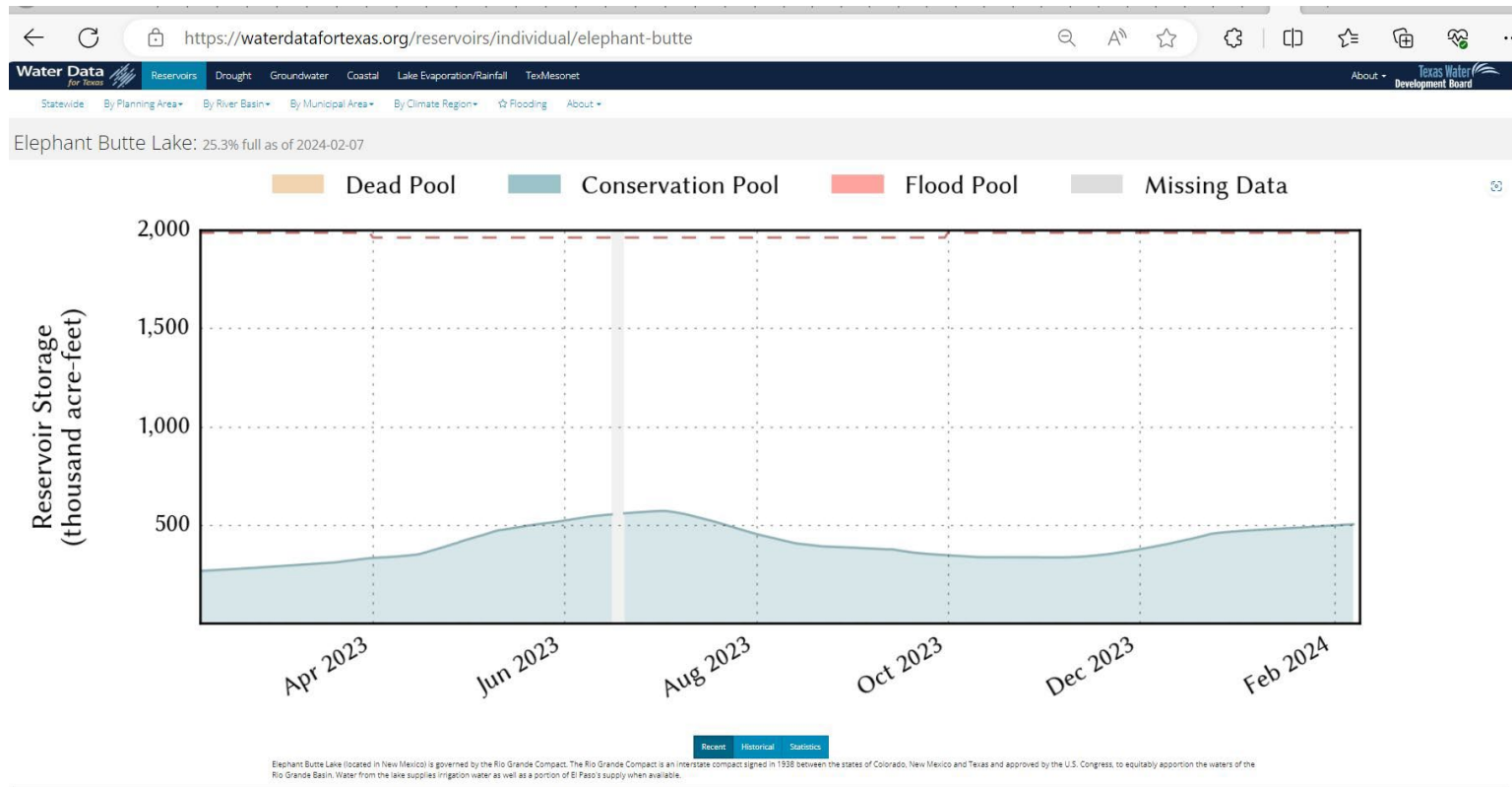


Finished Water – no  
pathogens, pleasant



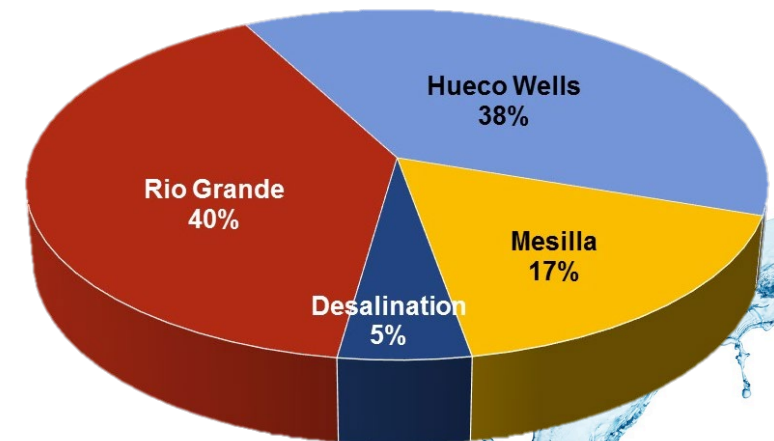


# EPWater's surface water supply is variable



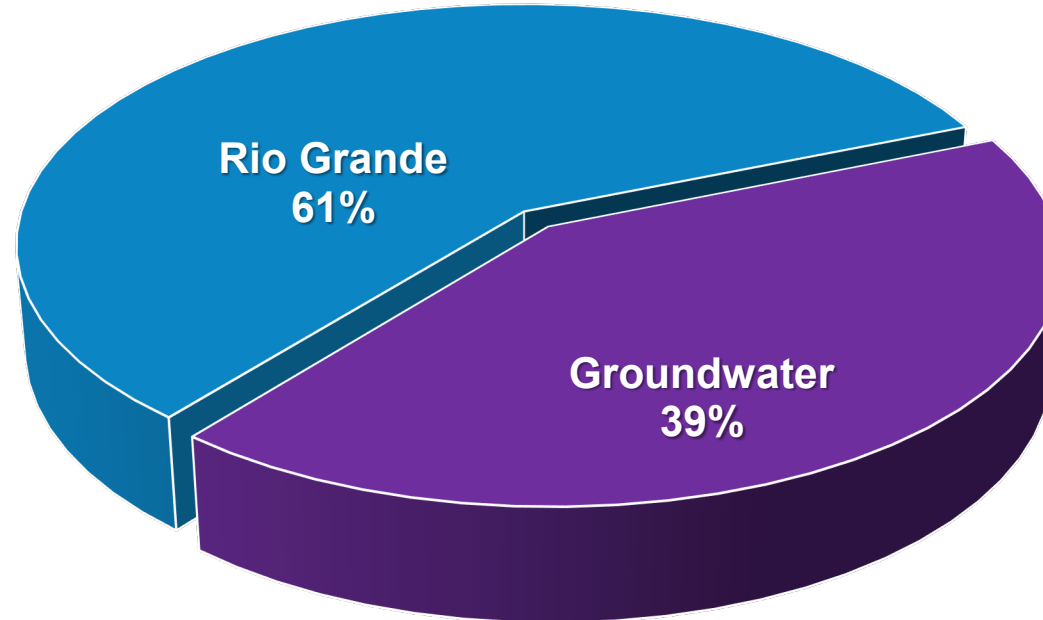
25.3% full as of 02/07/24

## Sources in an Average Non-Drought Year

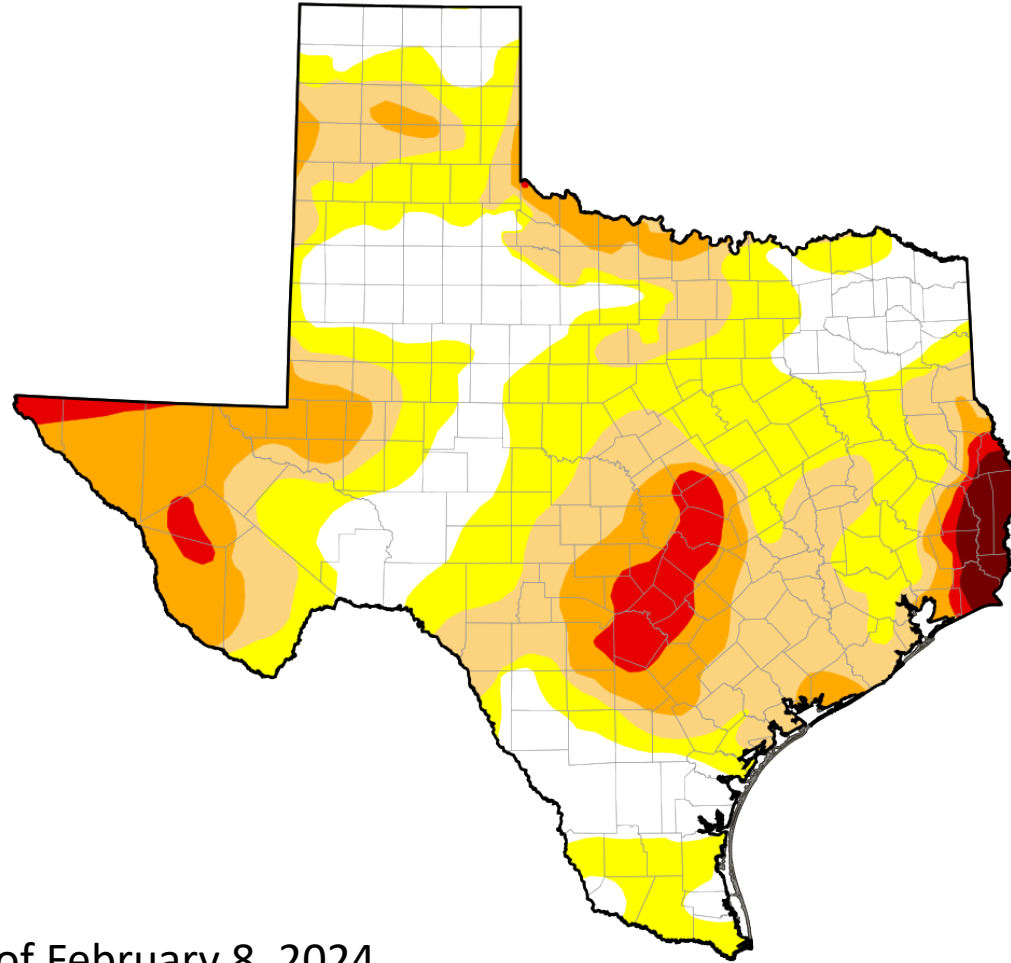


# How much is surface water?

**2023 Summer Months  
(June, July, August)**



# How about Texas?



Source: TWDB – drought map as of February 8, 2024



# Nonpotable Reuse since 1963

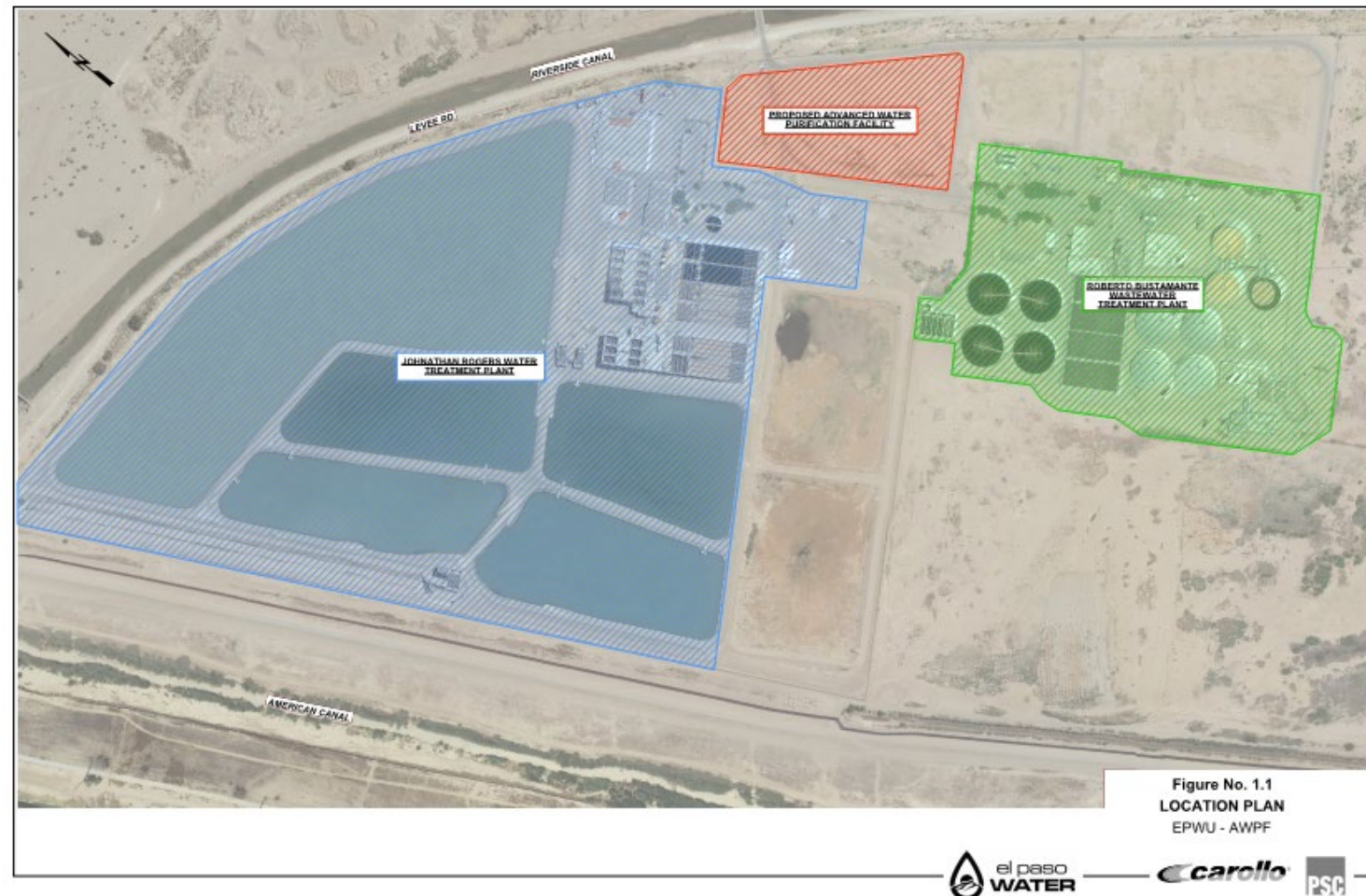




# Indirect Potable Plant – Fred Hervey Water Reclamation Plant

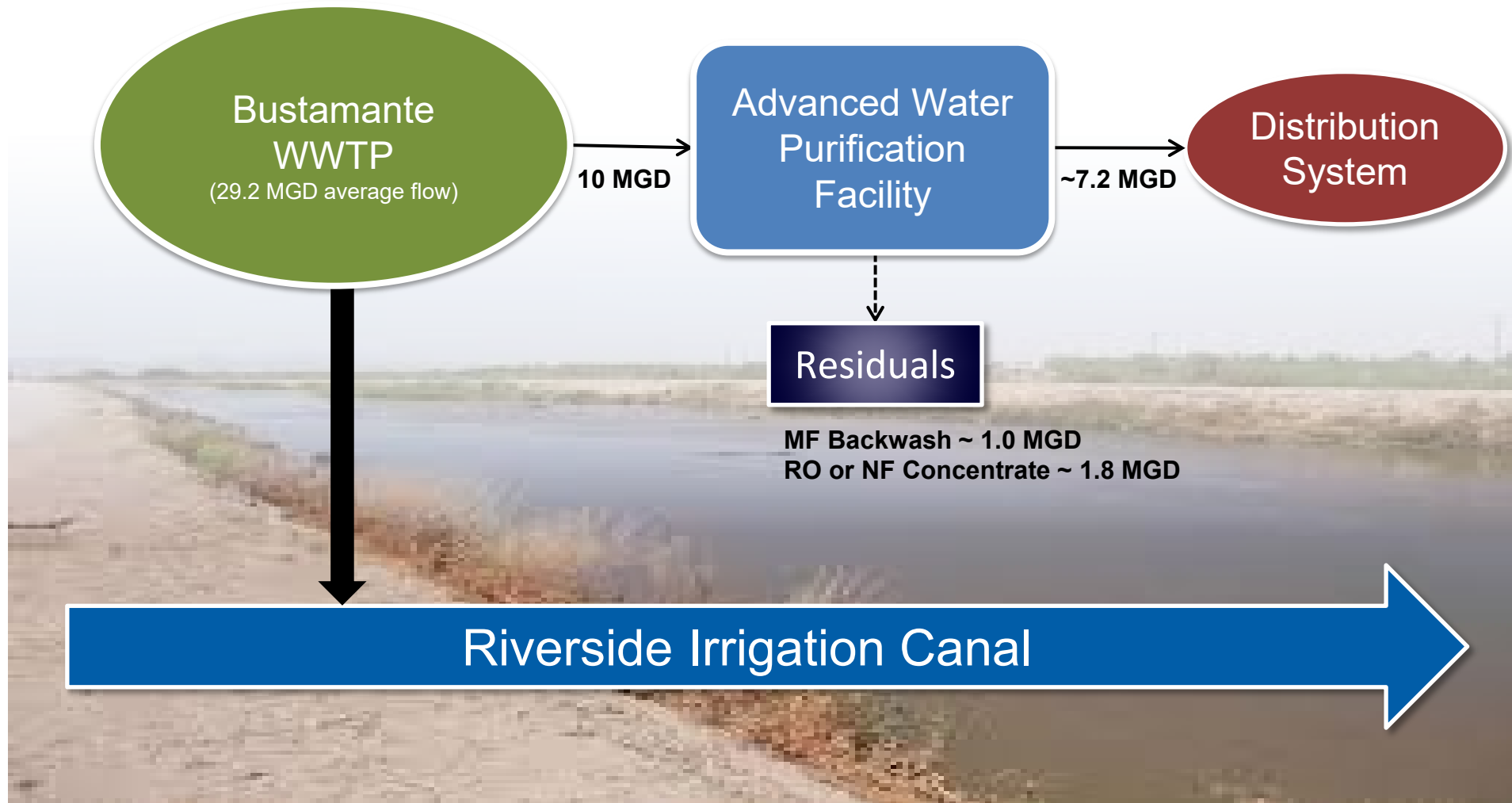


# Potable reuse concepts using Bustamante Water Resource Recovery Plant and Jonathan Rogers Water Plant

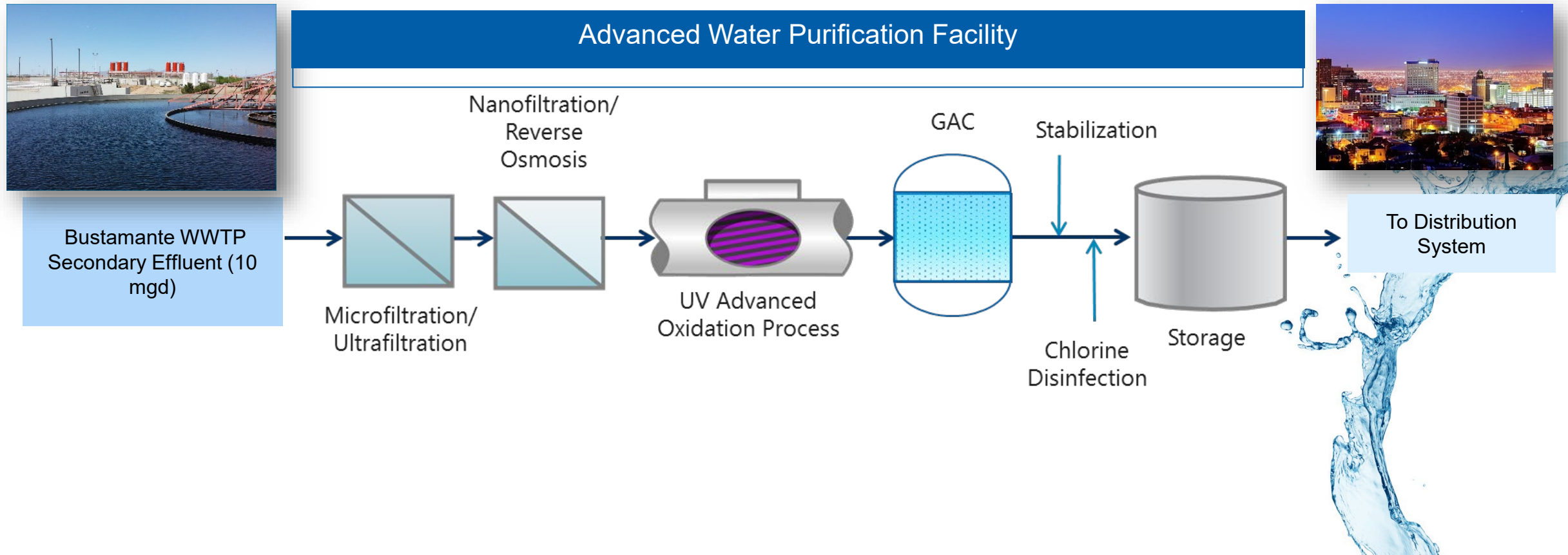




# Concept: Advanced Water Purification Facility



# Advanced Water Purification Facility (AWPF) Process Schematic





# Augmentation with Blend



- Used to provide stabilization of advanced water stream
- Need to check Pb and Cu
- No red water
- 50/50 orthophosphate blend





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# Audience Q & A

Email for PDHs: [Webcasts@watereuse.org](mailto:Webcasts@watereuse.org)  
Email for staff support: [Mmerk@watereuse.org](mailto:Mmerk@watereuse.org)