Drinking Water Capacity Development & Technical Assistance Program

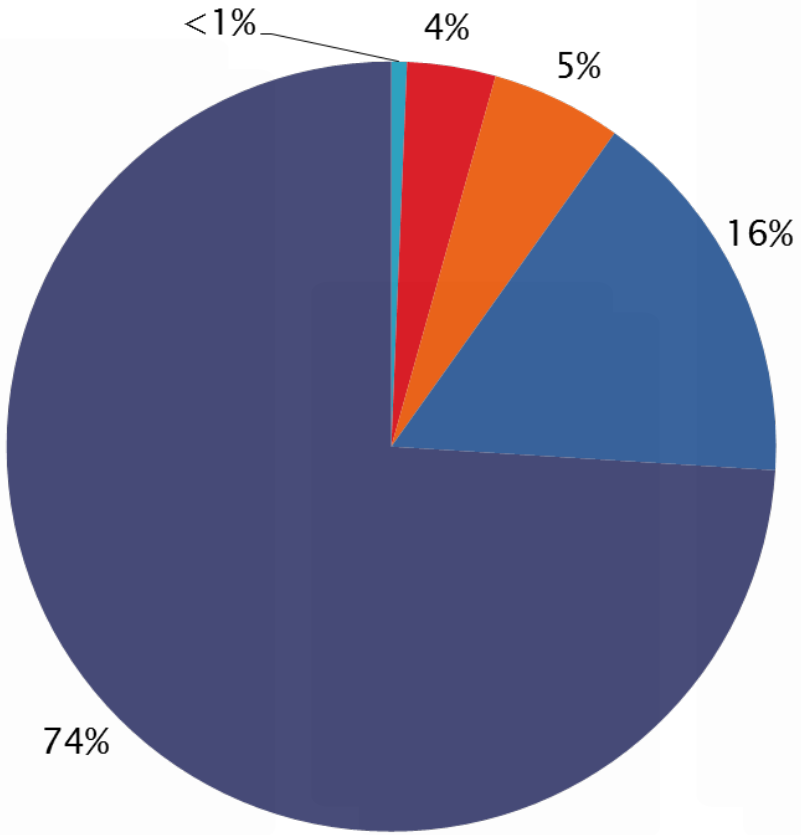
ADEQ Op Cert Workshop

January, 2021

Chelsey Vega

ADEQ
Arizona Department of Environmental Quality

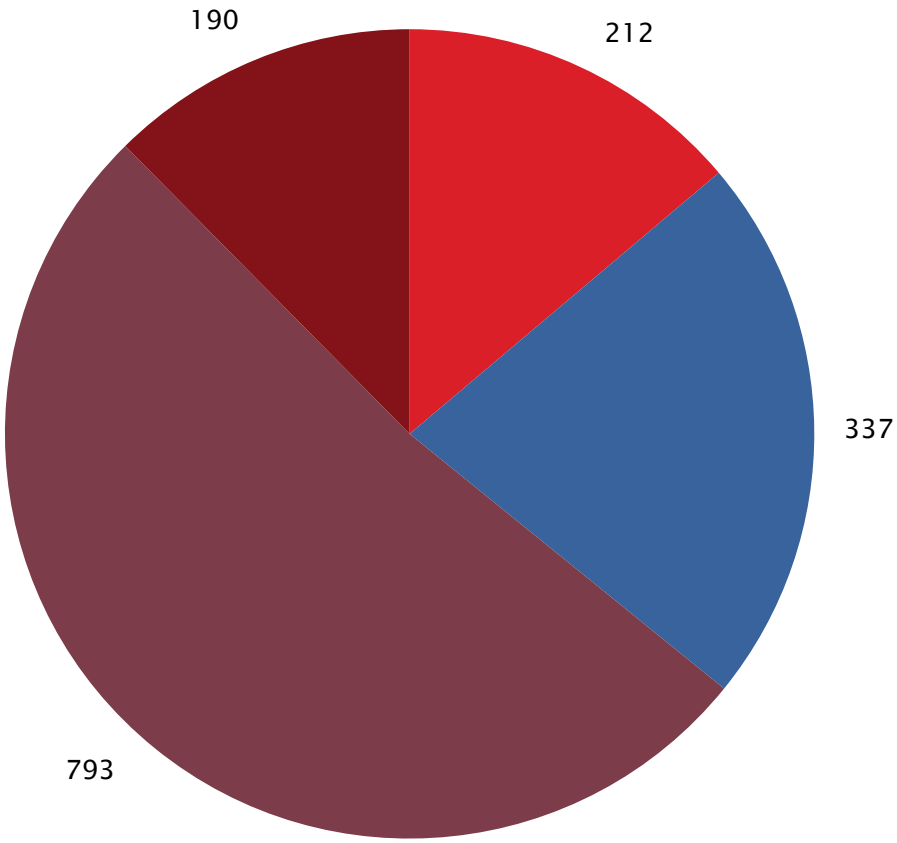
Facts about Public Water Systems



1532 total PWS in Arizona (non-tribal)

Facts about Public Water Systems

Types of Public Water Systems



1532 total public water systems

- Political subdivisions (cities, towns, DWIDs, CFDs, CID) – ADEQ regulated 14%
- Active ACC regulated systems 22%
- Other (non-ACC regulated, non-political subdivision) – regulated by ADEQ 52%
- Fed/state/public school run PWSs – regulated by ADEQ 12%

KOUI
and
Problem Solving
Application

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Arizona Department
of Environmental Quality

ADEQ Mission:

"To protect and enhance public health and the environment."

ADEQ
Arizona Department of Environmental Quality

KOUI

KNOWN

ONGOING

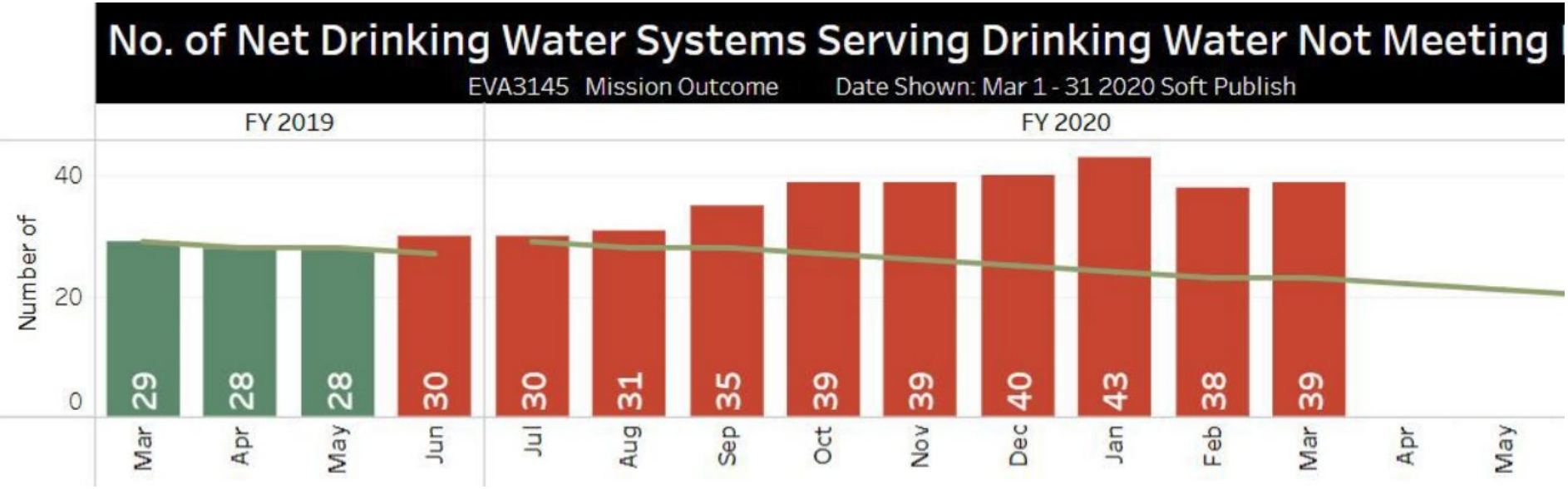
UNAUTHORIZED

IMPACTS

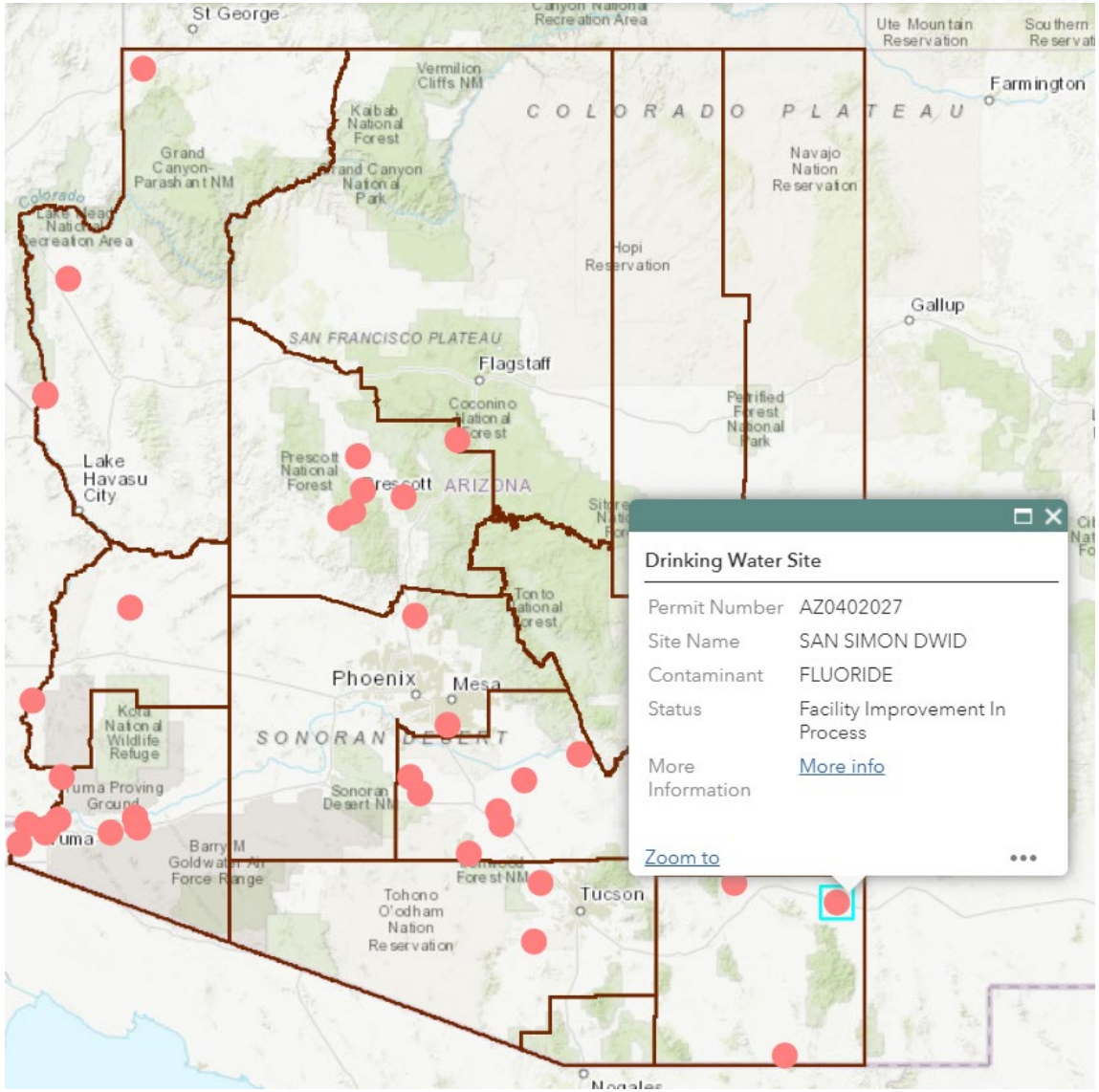
Governor's Scorecard

40 PWS

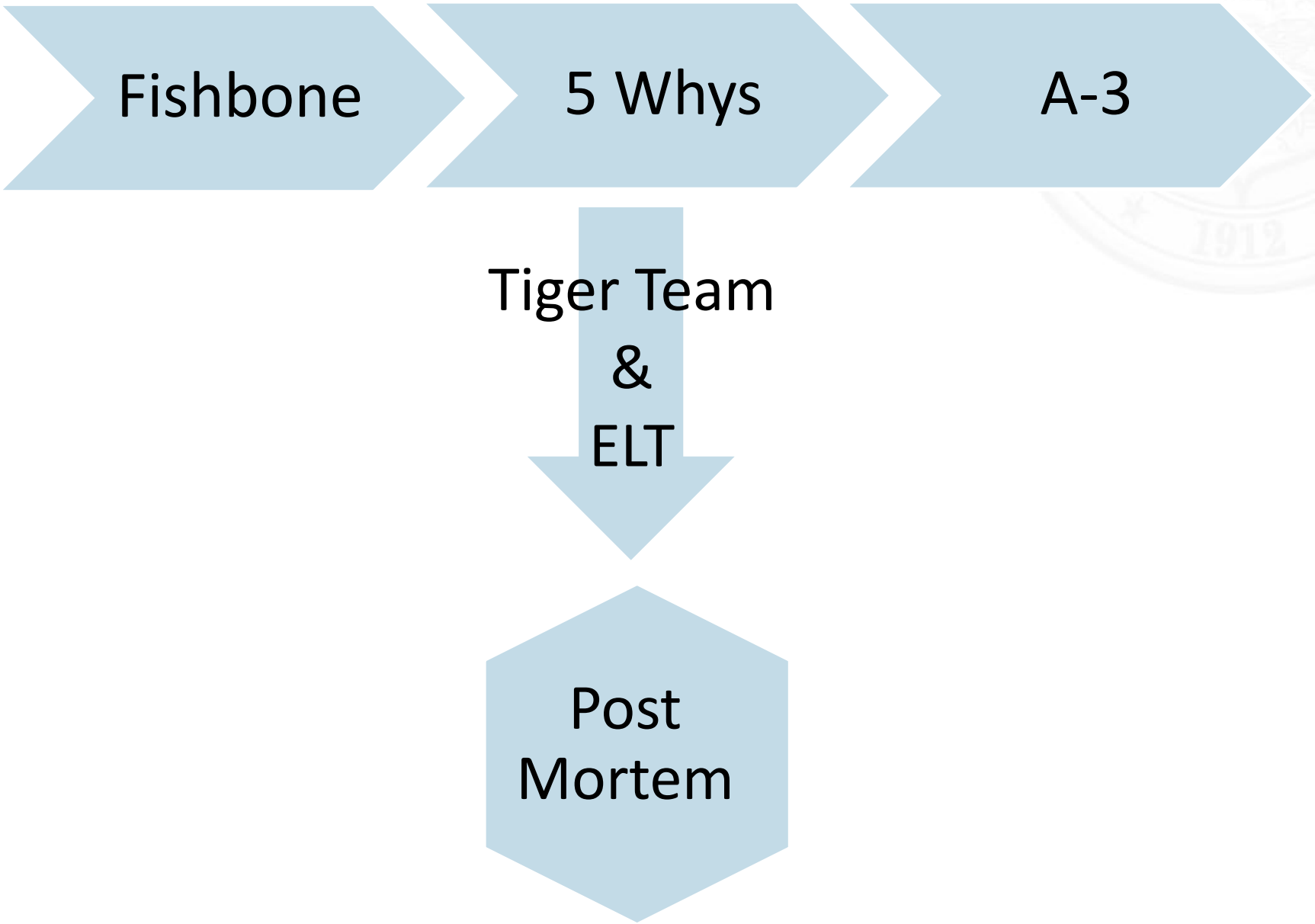
22,755 People



Website - http://azdeq.gov/MyCommunity



Problem Solving Tools



Fishbone

Policies
Statute, Rule, etc.

People
Human actions, Skills, etc.

Procedures
How it is done, SW, etc.

Value Stream

Date

Author

Causes

Effect

Measurement
How it is measured,
what is measured, etc.

Environment
Physical, Cultural,
Perceived

Systems
Software, Equipment, etc.

Countermeasures
Consider the Dual Countermeasure Dichotomy

1.

2.

3.

4.

5.

6.

7.

Root Cause

Impact of Countermeasures
-What Flow Board, Tic Sheet, Standard Work, Metric, etc. should be affected by implementing the Countermeasures?

-Make a note on the affected Flow Board, Tic Sheet, Standard Work, Metric, etc. to show connection with this artifact

5 Whys

Author: John Doe "EXAMPLE"		Date: December 25th, 2017
Problem or Cause: The room is dark, there is no light on.		
"WHY"	Answer	Confirmation: (confirm each Why)
Why is the room dark?	The lamp is not turned on.	Go to lamp and check if turned on.
Why is the lamp not turning on?	The lamp is unplugged.	Check if lamp is plugged in, plug in.
Why is the lamp still off after plugging in?	The lamp is not turned on.	Check if lamp turned on.
Why is the lamp still off after turning on?	The bulb is loose.	Tighten bulb.
Why is the lamp still off after tightening bulb?	The bulb is burned out.	Replace bulb, light comes on.
Root Cause: The lamp was turned off, unplugged and had a burned out bulb.		
Countermeasure: Replace the lamps bulb.		
Standardize: Update SW to include testing of lamp when placed in room, train all individuals on SW, lamp replacement and bulb storage location.		

EXAMPLE

A-3

Project A3	Project Name:	San Simon DWID - AZ0402027	Agency:	ADEQ	Division:	WQD	Owner:	Stephanie Diaz - Case Manager	Report Date:	12/13/2019

1. DEFINE (PLAN)

Communicate the context of this project in the overall process or project

Problem Statement (what specifically is being solved):

San Simon DWID has been serving drinking water above the Maximum Contaminant Level for Fluoride since January 2000.

Scope (Specifically what process or bounds exist):

This A3 addresses the Fluoride exceedences at San Simon DWID and does not address any other SDWA or AAC violations.

Goal Statement (format specific "From X to Y by When"):

San Simon DWID will be serving water under the MCL for Fluoride by 5/1/2020.

3. IMPROVEMENT ACTIONS (DO)

Develop and communicate actions/changes to the "critical few" factors that lead to improvement. Base action on data in box 2

No.	Action	Owner	Due Date	% Complete				Date Completed
1	Consent Order Effective	CM	6/7/1995	25	50	75	100	6/7/1995
2	Consent Order Amended	CM	3/25/2013	25	50	75	100	3/25/2013
3	Consent Order Amended	CM	11/28/2016	25	50	75	100	11/28/2016
4	Receive USDA Funding	RP	11/30/2017	25	50	75	100	1/25/2018
5	Conduct zonal sampling	RP	1/15/2018	25	50	75	100	9/6/2018
6	Hydrosleeve sampling and results	RP	12/17-2/1/2018	25	50	75	100	1/31/2019
7	Sample Wells	NCS	3/2/2019	25	50	75	100	3/2/2019
8	Results from Sampling Wells/ Complete PER (25%)	NCS	4/5/2019	25	50	75	100	4/11/2019
9	*USDA approves PER	USDA	3/1/2019	25	50	75	100	
10	Apply for funding for design (50%)	RP/Engineer	3/1/2020	25	50	75	100	
11	Submit ATC	RP/Engineer	9/1/2020	25	50	75	100	
12	Construction begins (75%)	RP/Engineer	11/1/2020	25	50	75	100	
13	Submit AOC (100%)	RP/Engineer		25	50	75	100	
14				25	50	75	100	

TEAM

List project team members and their role

Name	Role
Jennifer Peterson	VSM
Linda Taunt	TAC
Stephanie Diaz	CM
San Simon DWID	RP
USDA	Funding

ISSUES

List immediate obstacles that are blocking progress

*NCS completed draft PER. USDA doing site visit late-November/early December and will provide comments on PER after site visit.

2. MEASURE and ANALYZE (PLAN)

Communicate discovery of possible root cause factors, e.g., fishbone diagram, 5 why's, process flow/value stream map,, SIPOC, etc.

Measure

- Value Stream Map
- Spaghetti Map
- Tic Sheet
- Process Map
- Process Metric

Analyze

- Pareto
- Fishbone
- Multi-vari chart
- Hypothesis testing
- Future State Maps
- Problem Solving A3
- Kaizen Event

4. RESULTS (CHECK)

Display the metric that best indicate progress towards goal statement pre-, during and after project completion, e.g., control charts, Excel charts, capability charts, costs, etc.

Fluoride sampling data is submitted on a quarterly basis and compared to the MCL.

5. SUSTAIN & ADJUST (ACT)

Communicate developed actions, plans, systems that will sustain the achieved improvement, e.g., poka-yoke, standard work, training, equipment, audits, measurements, etc. Recognize and share achievement.

The system will be required to have an operations

- Mistake Proof
- Standard Work
- Training

PROJECT MANAGEMENT

Day and time of regular update meeting:	
Date	
Time	
Regular Updates due to project lead by:	

PROGRESS

List project start and end dates and shade in progress through the PDCA steps

Project Start Date:

Problem, Scope, and Goal

Project A3	Project Name:	San Simon DW

1. DEFINE (PLAN)	*Communicate the context of this project in the overall process or project*

Problem Statement (what specifically is being solved):

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Goal Statement (format specific "From X to Y by When"):

San Simon DWID will be serving water under the MCL for Fluoride by 5/1/2020.

Post Mortem

Water System Details:

- Maricopa County (NE Mesa)
- Transient Non-Community
- Groundwater
- 125 people, 1 service connection
- 1 wells, 1 storage tank

KOUI Details:

- Pollutant: Nitrate MCL Exceedance
- Discovery Date: 06/01/2017
- Impact End Date: 12/18/2018

Actions/Resolution:

Pump to waste testing by ADEQ, nitrate levels dropped <10 after 1 hr.
Owner looked into treatment through Culligan (Centralized Unit), but Maintenance costs were high.
Connected to the City of Mesa as a customer, no longer a PWS

Lessons Learned/Process Improvements:

- Lessons Learned: Verify information on installation/maintenance cost for all options.
- Lessons Learned: Cheaper for the system to connect now w/ more development in the area
- Process Improvement: Connection costs to Mesa around $26,000.

What is Capacity Development?

Arizona's effort to help drinking water systems improve their….

Finances

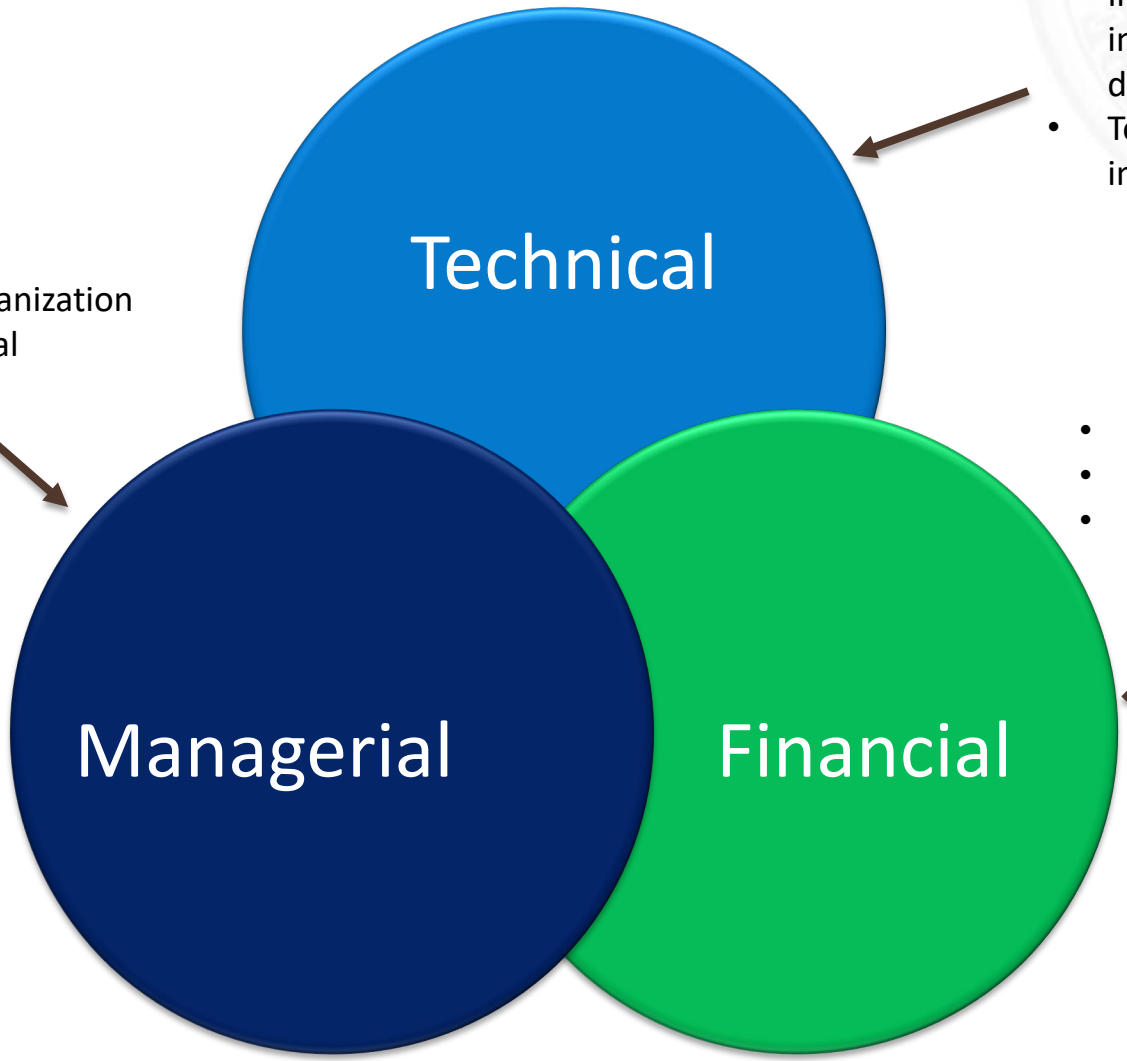
Management

Infrastructure

… so they can provide safe drinking water consistently, reliably, and cost-effectively

Foundation of CapDev for PWS's

TMF



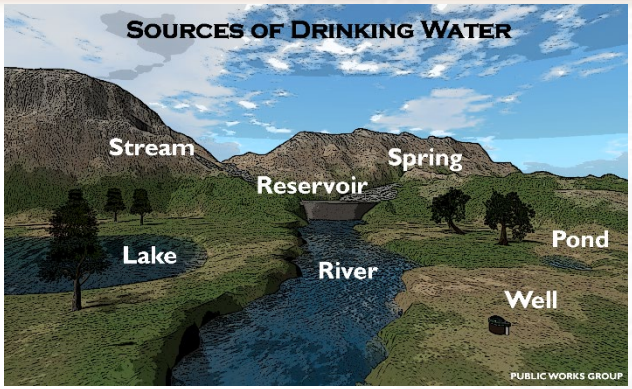
- Source water adequacy
- Infrastructure adequacy including, treatment, distribution, storage
- Technical knowledge and implementation

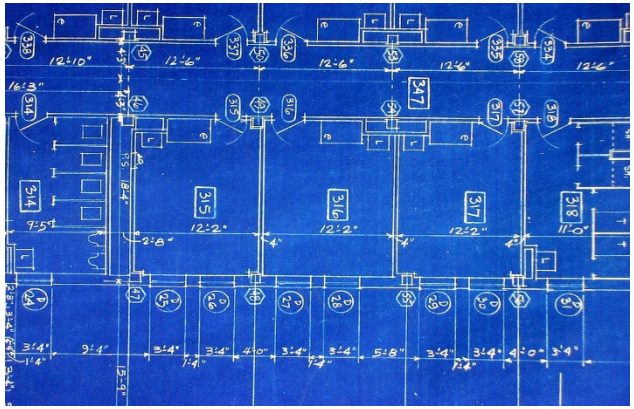
- Ownership accountability
- Staffing and organization
- Effective external linkages

- Revenue sufficiency
- Credit worthiness
- Fiscal management and controls

What is Technical Capacity?

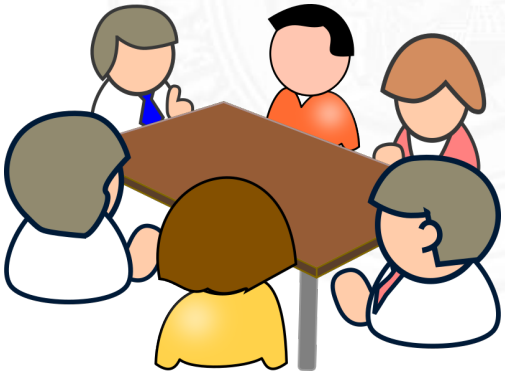
- Sufficient source & supply:
  - an assured water supply or water availability from ADWR OR
  - provide documentation of adequate source capacity
- Water meets drinking water standards
- Infrastructure, treatment & storage meets ADEQ requirements
- Having a certified operator of proper grade & type
- System documentation – O&M manual, as-built plans, distribution map





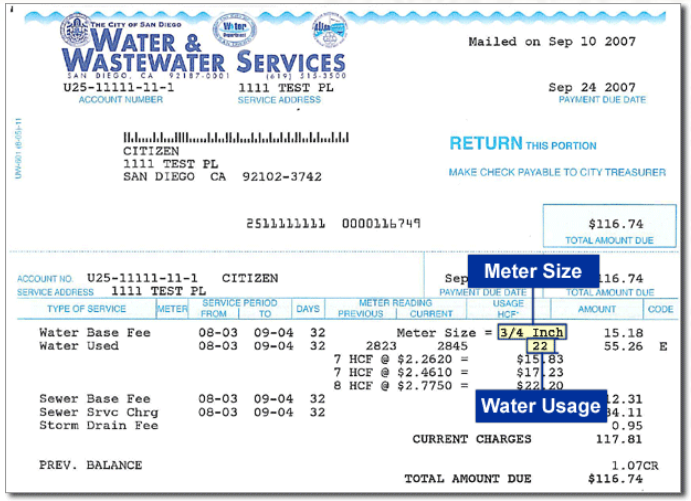
What is Managerial Capacity?

- Formal organizational structure
- Documented bylaws & rules
- Emergency operations plan (EOP)
- Staff job descriptions & organizational chart
- Secure & accessible system records
- Source water protection plan
- Regular communication with customers

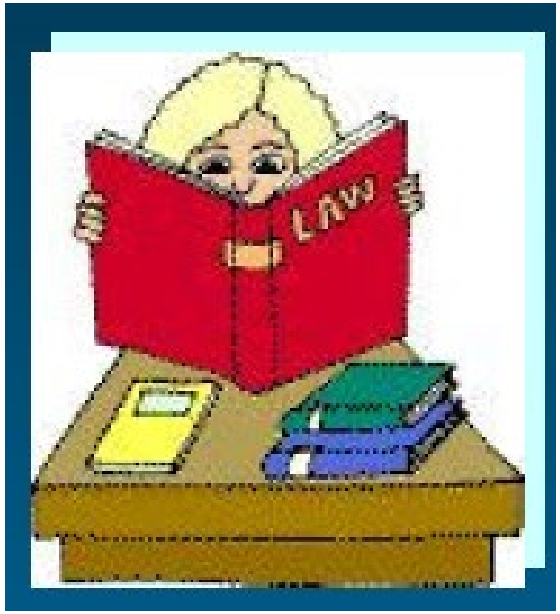


What is Financial Capacity?

- Does the water system have?
  - Water system budget
  - Water rates or fee structure that meets expenses
  - Capital reserve fund
  - Asset inventory



SDWA Requirements



- All public water systems must have "system capacity"
  - Adequate capabilities in three areas:
    - Technical (T)
    - Managerial (M)
    - Financial (F)
  - Ability to plan for, achieve, & maintain compliance with applicable drinking water standards and requirements

Goal

To provide safe & healthy drinking water

New Public Water Systems

- All new community and non-community/non-transient water systems must file an Elementary Business Plan (EBP) for review & approval by ADEQ
- EBP must show how they will meet the TMF requirements
- EBP is submitted with Approval to Construction application
- Approval of Construction cannot be issued until/if EBP has been approved

Existing Water Systems

- Continually working to identify systems in need and prioritize them for assistance
- Identify the factors that are causing compliance concerns
- Deploy resources to PWS to:
  - Provide training and certification
  - Provide compliance assistance
  - Encourage partnerships with other PWSs

America's Water Infrastructure Act of 2018

- Risk & Resiliency Assessments
  - Including emergency response plans
- Grant Programs
  - Lead in schools testing
  - Lead material replacement for schools
  - WIIN
- Monitoring for unregulated contaminants
- Asset management

Asset Management: Element within Capacity Development

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Asset Management is…

- Practice of managing infrastructure
  - Costs of owning and operating
- Process to repair, replace or upgrade on time infrastructure
- Centered around 5 core questions….

How Long Will it Last?

Typical Life Expectancies of Water System Equipment

Component	Worksheet	Useful Life
Wells and Springs	Drinking Water Source	25 years
Intake Structures		35 years
Pumping Equipment		10 years
Disinfection Equipment	Treatment System	5 years
Hydropneumatic Tanks	Tanks	10 years
Concrete and Metal Storage Tanks		30 years
Transmission Structures (Pipes)	Distribution System	35 years
Valves	Valves	35 years
Mechanical Valves		15 years
Computer Equipment/Software	Electrical Systems	5 years
Transformers/Switchgears/ Wiring		20 years
Motor Controls/Variable Frequency Drives		10 years
Sensors		7 years
Buildings	Buildings	30 years
Service Lines	Service Lines	30 years
Hydrants	Hydrants	40 years

Note: These expected useful lives are drawn from a variety of sources. The estimates assume that assets have been properly maintained. The adjusted useful life of an asset will be equal to or less than typical useful life.

Capacity Development Strategy for State's

1. What is the current state of my assets?
2. What is my required "sustainable" level of service?
3. Which assets are critical to sustained performance?
4. What are my minimum life-cycle costs?
5. What is my best long-term funding strategy?

S. 3021—86

"(F) a description of how the State will, as appropriate—

"(i) encourage development by public water systems of asset management plans that include best practices for asset management; and

"(ii) assist, including through the provision of technical assistance, public water systems in training operators or other relevant and appropriate persons in implementing such asset management plans.";

(2) in subsection (c)(3), by inserting ", including efforts of the State to encourage development by public water systems of asset management plans and to assist public water systems in training relevant and appropriate persons in implementing such asset management plans" after "public water systems in the State"; and

(3) in subsection (d), by adding at the end the following new paragraph:

"(5) INFORMATION ON ASSET MANAGEMENT PRACTICES.—Not later than 5 years after the date of enactment of this paragraph, and not less often than every 5 years thereafter, the Administrator shall review and, if appropriate, update educational materials, including handbooks, training materials, and technical information, made available by the Administrator to owners, managers, and operators of public water systems, local officials, technical assistance providers (including nonprofit water associations), and State personnel concerning best practices for asset management strategies that may be used by public water systems.".

You're Invited!

- Please Join Us at the next virtual session on Tuesday March 2, 2021 from 9:00 am – 12:00 pm MST; where we will:
  - Discuss reasons for financial challenges identified during our kickoff meeting in November 2020; and
  - Develop countermeasures to address them.

Please register at:
https://register.gotowebinar.com/register/4381869808648642576

SRF Incentives for TMF Capacity

- WIFA cannot loan to systems that do not have adequate TMF capacity *unless* funding will:
  - Help the system achieve and maintain compliance
  - System will make changes in operations to ensure capacity

Common Areas of Noncompliance

- Water quality exceeding MCLs
- Poor system maintenance
- Failure to obtain services of certified operator of correct grade
- Lack of O&M and/or emergency operations plans (EOP)
- Lack of sufficient storage

Common Areas of Noncompliance

- Water treatment failure – MCL violation; disinfection by-products formation
- Use of unapproved water system materials, coatings
- Failure to obtain ATC and/or AOC
- Pipe breaks, leaks in storage tanks; lack of storage – lack of preventative maintenance

Drinking Water Technical Assistance Program

- Under the capacity development program, ADEQ can provide technical assistance to small community and non-community/non-transient PWSs serving < 10,000 persons
- Provided through 3rd party contractors and/or ADEQ staff
- TA can include capital project development or capacity development needs

Technical Assistance Program for Small Water Systems

ADEQ provides free technical, managerial and financial (TMF) assistance to small public water systems using skilled professionals. Help can be provided by experienced ADEQ staff and/or third party contractors.

On-site Technical Assistance

Below is a partial list of the types of technical assistance services that can be provided to small public water systems:

- System evaluation with recommendations for improvement
- Treatment selection & design
- Operations optimization
- Management & financial planning (e.g., budget preparation, rates analysis, board training, asset management)
- Preparing permitting documentation
- Planning for consolidation, acquisition and/or regionalization
- Seeking funding for needed improvements

Is My Water System Eligible?

Community or non-profit, non-transient/non-community public water systems serving 10,000 or fewer persons are eligible for the Technical Assistance Program.

How Does It Work?

Every year, ADEQ develops the **Master Priority List**—a list of public water systems to contact for technical assistance. Based on each system's technical, managerial and financial capabilities, we identify problem areas that need to be addressed | Download Current Master Priority List >

Or, the water system can request technical assistance by contacting ADEQ directly or through its compliance assistance coordinator | Coordinator Contact List >

Once the need is identified, the process is as follows:

1. A scope of work is developed for the water system
2. Service is provided on pre-arranged dates (even on nights or weekends, depending on the system's availability)
3. Deliverables vary from a system evaluation and recommendations for operational improvements to design of a needed treatment system and permitting applications

What Does It Cost?

ADEQ's technical assistance services are free for participants. However, in order to improve the system's operations, some expenditures may result from implementation of program recommendations. We can help you identify potential funding opportunities, depending on improvements needed, water system type and scope of the project.

CONTACT

Technical Assistance Coordinators

602-771-4416
Email >

602-771-4324
Email >

SEE MORE

Drinking Water Capacity Development Program >
Funding Resource Matrix >
Master Priority List >
Master Priority List Legend >

ADDITIONAL RESOURCES

EPA Drinking Water Capacity Page >

http://azdeq/gov/TechnicalAssistanceProgram

Examples of Technical Assistance

- Engineering feasibility study/Preliminary Engineering Report
- Scoping studies to determine types of treatment
- Treatment design
- Environmental reviews
- ATC/AOC applications
- Prepare asset management plans
- Rate cases
- Project cost estimates
- System evaluations
- Pilot studies
- Security inspections & exercises
- Training – board, management, operator

Management Track Training

- Managing Your Public Water System A Workshop for Small Water System Owners & Managers

- A series of trainings developed to help PWS *owners/managers* understand their responsibilities & provide tools for compliance & understanding
  - Basic PWS operations
  - Water audits
  - Budgets & finances
  - Rate setting
  - O&M/Emergency Operations Plans
  - Asset management
  - Security

Lastly, let's talk about funding

ADEQ Arizona Department of Environmental Quality

Arizona Department of Housing

RCAC www.rcac.org

ADEQ Arizona Department of Environmental Quality

Arizona Department of Emergency and Military Affairs

CoBANK

U.S. Department of Housing and Urban Development

WIFA

North American Development Bank
Banco de Desarrollo de América del Norte

United States Environmental Protection Agency

NRWA

U.S. Department of Homeland Security FEMA

USDA United States Department of Agriculture Rural Development

U.S. Department of the Interior Bureau of Reclamation

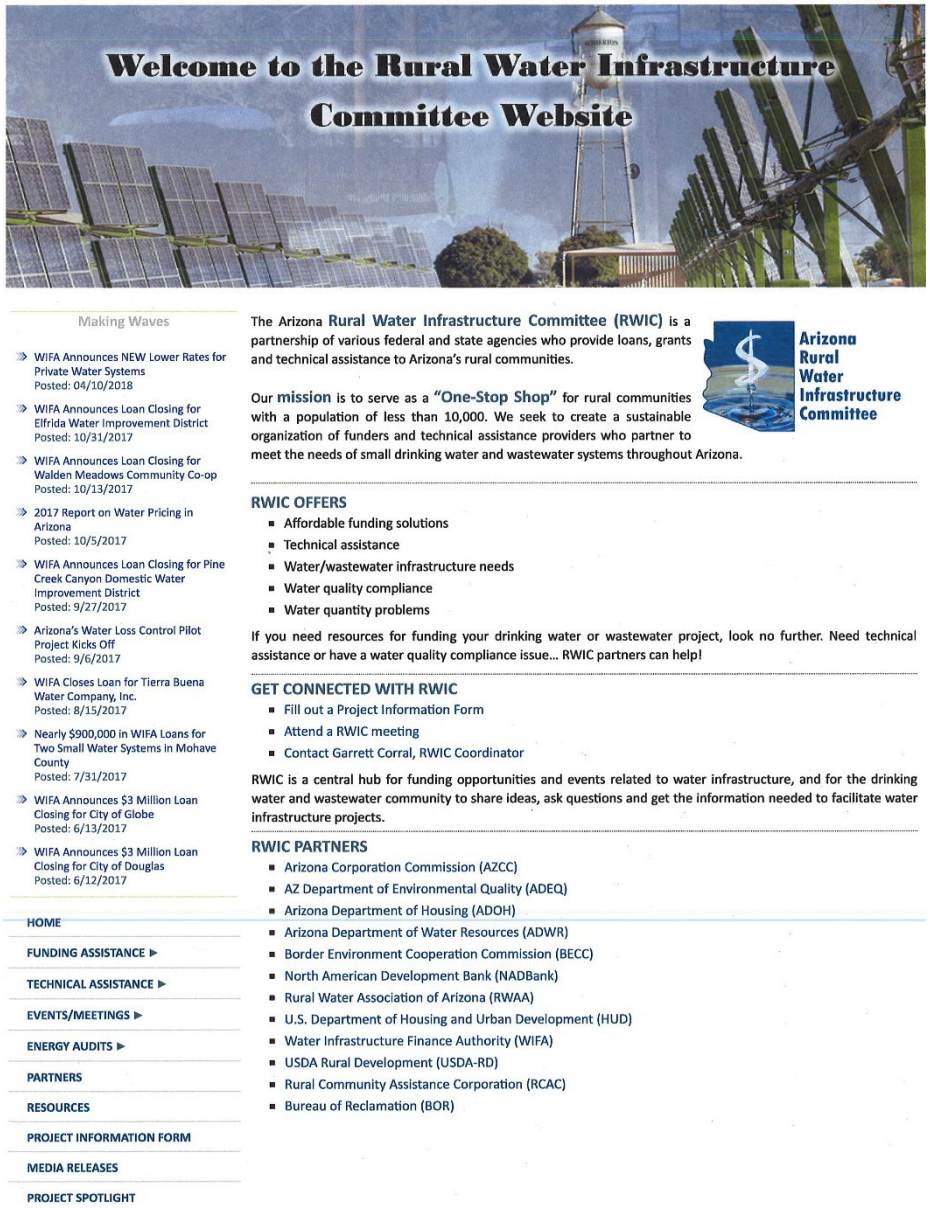
RCAP Rural Community Assistance Partnership

Funding Matrix

Resource Matrix Version 11.0		Programming/Planning	Pre-Development	Development/Construction	Technical Assistance	Operations & Maintenance	Emergency Funding	Drinking Water	Wastewater	Stormwater	Renewable Energy	Publicly-owned (muni, DWID, CID, CFD)	Private, for profit and/or investor-owned, including ACC regulated; & not-for profit	State/Fed/Public Schools	Tribal/Indian Country Water Systems	Unregulated (private or shared wells)			Matrix Version 11.0 created 09/01/19;review on 03/01/20or earlier as needed
Organization	Type of Support	Stage of Service						Resources Available				Eligible Entities					Uses/Purpose	Eligibility Requirements	Agency Website & Contact Person Information
Arizona Department of Housing (ADOH)	Community Development Block Grants (CDBG) - Regional Allocation - Grants		X	X				X	X	X		X[1]	X[2]				Funding that is distributed on a non-competitive basis through the four non-metro Councils of Governments. Funds available vary based on the region's approved rotational method of distribution which also contains a multi-year schedule for how distributions will be made to that all eligible communities receive funding and can plan projects.	[1]All incorporated cities and towns in the 12 rural counties (excluding Casa Grande, Douglas, Flagstaff, Prescott, Sierra Vista & Yuma); all rural counties. [2]Private water companies may be eligible as sub-recipients to the city, town or county and would have to work closely with the public entity on proposed projects.	Arizona Department of Housing
	Community Development Block Grants (CDBG) - State Special Projects - Grants			X				X	X	X		X[1]	X[2]				Competitive opportunity for projects that align with State's Consolidated Plan and are ready to implement immediately meaning that environmental reviews are completed, land control secured, planning, design and permitting complete. 70% of funds must be spent on activities that benefit low & moderate income populations. Application rounds are announced via a Notice of Funding Availability.	[1]All incorporated cities and towns in the 12 rural counties (excluding Casa Grande, Douglas, Flagstaff, Prescott, Sierra Vista & Yuma); all rural counties. [2]Private water companies may be eligible as sub-recipients to the city, town or county and would have to work closely with the public entity on proposed projects.	
	Community Development Block Grants (CDBG) - Colonias - Grants	X	X	X				X	X	X		X[1]					Set-a-side of state's award for colonias to address lack of basic infrastructure (potable water or sanitary sewer) or safe and sanitary housing. This funding is available every two years thru a competitive process.	[1]ADOH certified colonias or applicant to submit Colonia Designation & Certification packet 60 days prior to application deadline	
	Section 108 Loan Program		X	X				X	X	X		X	X[2]	X[1]			A portion of the CDBG funds can be turned into a federally guaranteed loan program and used to provide communities with public project financing for construction, reconstruction or installation of public facilities. Funds can be used for long term recovery or to prevent further damage if it doesn't duplicate funding available from FEMA, SBA and USACE. Section 108 loans can be used for FEMA match for recovery projects.	Metro cities and urban counties; rural cities, towns and counties (non-entitlement communities); and [1]states can apply. Non-entitlement communities require the State to pledge future CDBG funds to secure the loan. [2]Private water companies may be eligible as sub-recipients to the city, town or county and would have to work closely with the public entity on proposed projects.	www.azhousing.gov; Kathy Blodgett at kathy.blodgett@azhousing.gov or 602.771.1021

Link available from the Technical Assistance page:
https://static.azdeq.gov/dw/resource_matrix.pdf

Rural Water Infrastructure Committee



- Partnership of state, federal and private organizations that provide funds and technical assistance to small water & wastewater systems
- Meets quarterly – usually in Phoenix but can go on the road
- Goal is to function as a one-stop shop for rural communities of less than 10,000 population
- Major RWIC partners focus collective resources on those PWS in greatest need – imminent threat to public health & safety
- Funding matrix also available here
- https://rwic.net

- **Workshop Details: February 17 and 18, 2021**
- **Time: 9 am – 12 pm (both days)**
- **Location - Webinar**
- Day 1 of the webinar will cover financial management for small water systems including budgeting.
- Day 2 of the webinar will cover the fundamentals of water rates including water rate increases.
- Professional development hours are available.
- http://azdeq.gov/events/webinar-financial-management-and-rates-ownersoperatorsmanagers-small-water-systems

Sun Leisure Estates – TA Success Story

Water system

- 55+ mobile home subdivision in unincorporated Yuma County
- Community water system
- Source: Groundwater
- 143 people, retirees - fixed income
- 57 service connections
- 2 wells, 1 storage tank

Sun Leisure Estates – TA Success Story

Problem:

- Pollutant: combined uranium averaging 41 ug/L and trending upwards
- Discovery Date: 01/09/13
- Consent Order DW-27-14
- On list ~1600 days (4.5 years)
- Impact End Date: 11/02/2018

Actions/Resolution:

- Worked with community to become a county improvement district (no longer ACC regulated)
- ADEQ recommended PWS to receive a grant from the Small Drinking Water System Fund for $95,000 for purchase & installation of the ion-exchange treatment system
- ADEQ TA contractor prepared ATC/AOC applications and supervised installation
- HOA President oversaw day-to-day construction of support needs – preparing site, erecting treatment building with climate controls, power
- Collaboration resulted in completed project on time (6 mo) & $20,000 under budget

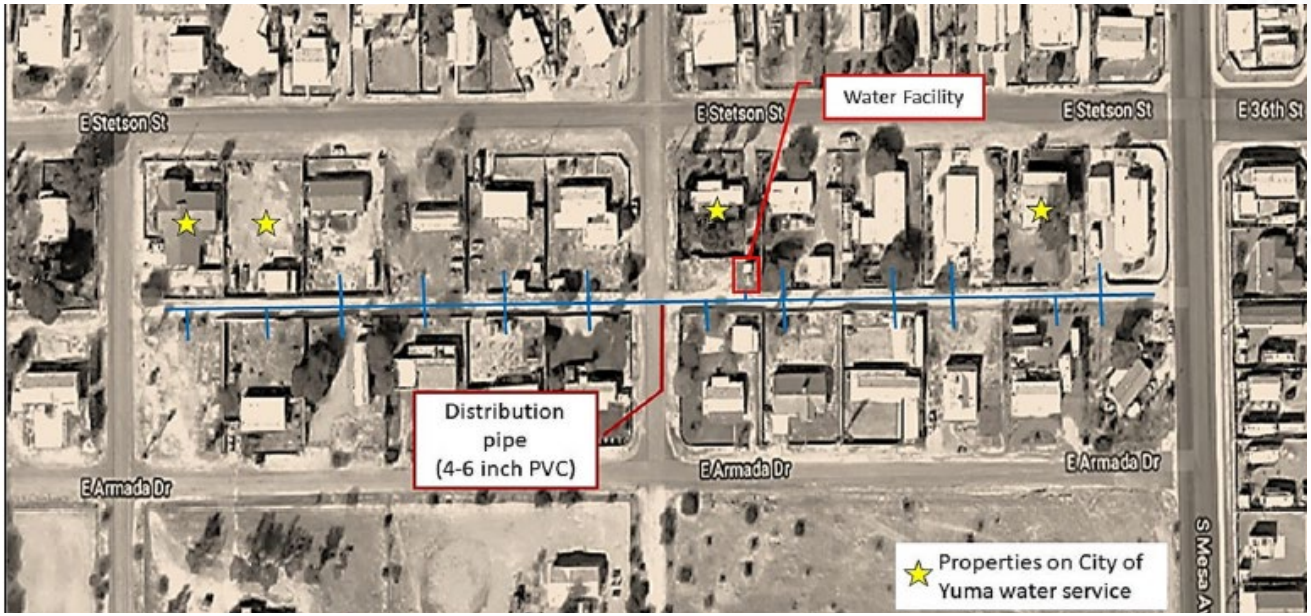
Lessons Learned/Process Improvements:

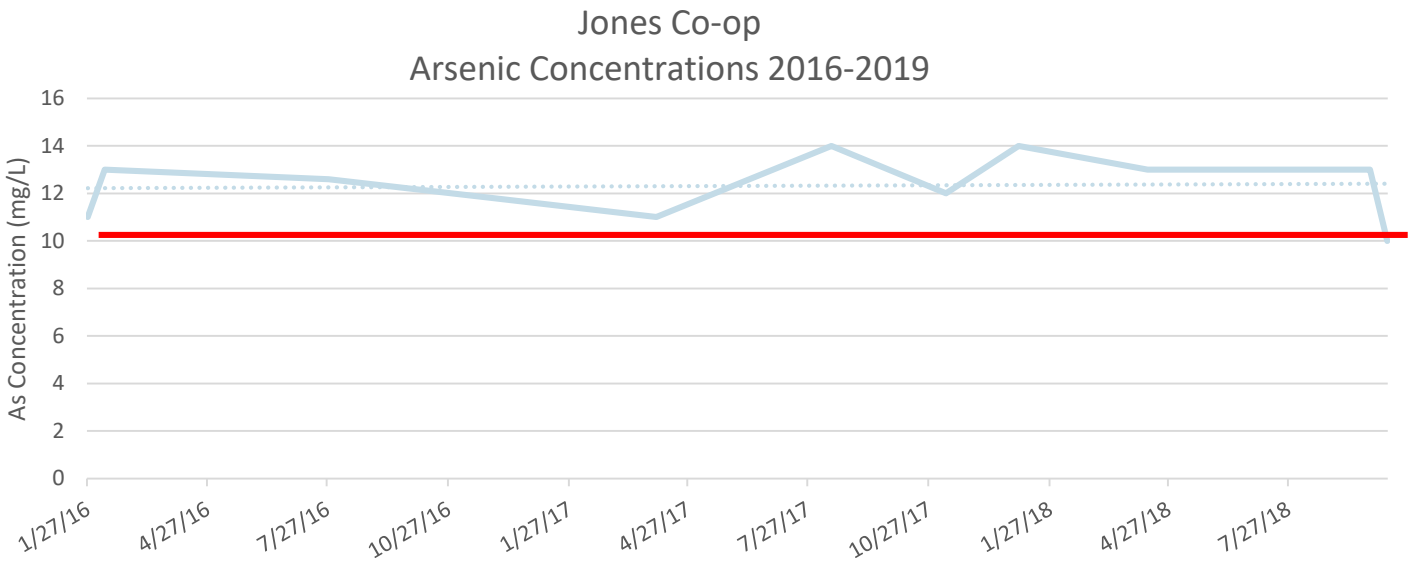
- Work directly with PWS from the beginning
- Giving them affordable options for resolving the problem
- Providing technical support & sources of possible funding

Sun Leisure Estates – TA Success Story

- AdEdge uranium treatment system

Jones Coop – TA Success Story





Jones Coop – TA Success Story

Problem:

- Small water cooperative in unincorporated Yuma County
- 21 homes: 4 on city water; 3 vacant
- One well, 3,500 gallon storage tank, booster pump, hydro-pneumatic tank
- Remaining residents cannot afford city impact fees
- All homes on septic tanks
- Arsenic level ~ 13 ug/L

Plus System

Actions / Resolutions:

- TA provider conducted system evaluation & arsenic treatment options
  - e.g., connect to city, centralized treatment, point-of-use devices
- ADEQ recommended Co-op for $9,500 grant to purchase & install point-of use devices in kitchens
- PWS hired local plumber to install units
- Once units are installed, compliance for arsenic moves from EPDS to individual homes
- 1st set of compliance samples: all <0.005 mg/L (non-detect)

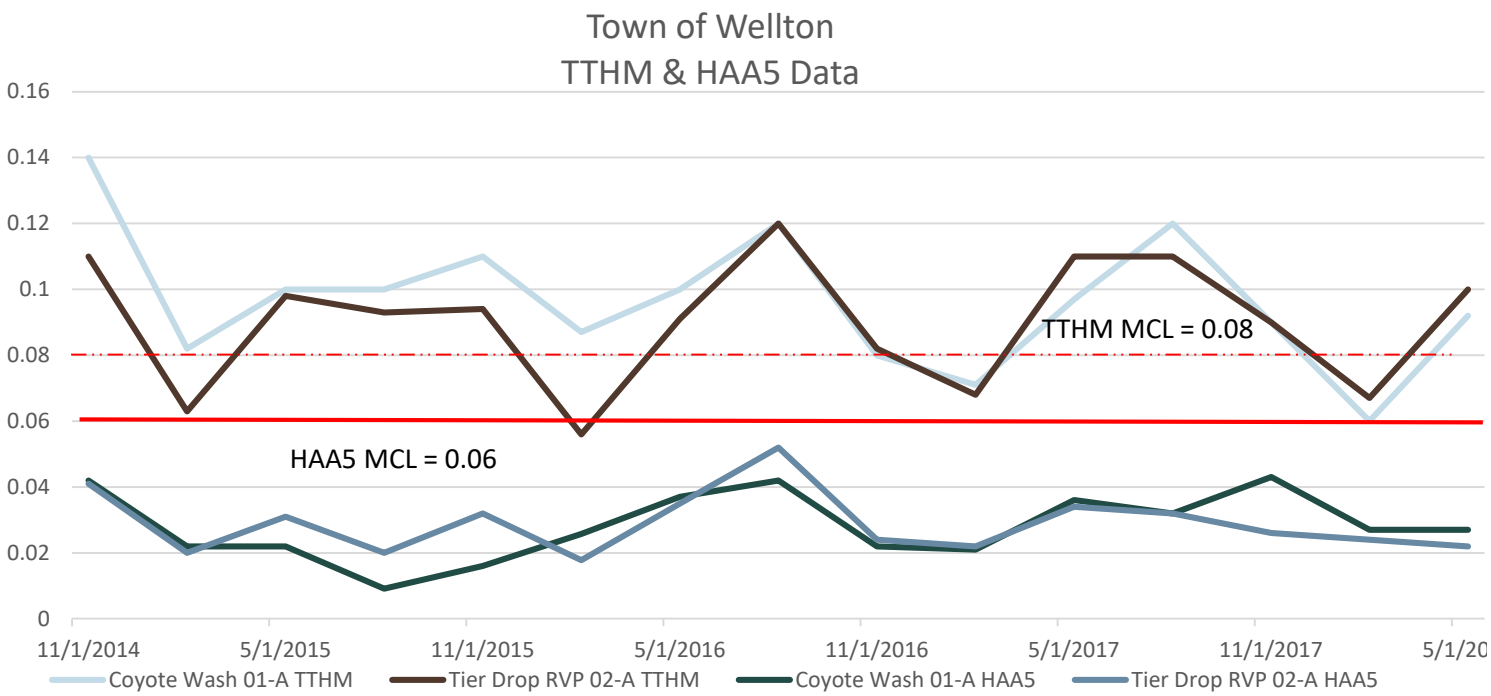
Lessons Learned/Process Improvements:

- Work directly with PWS from the beginning
- Giving them affordable options for resolving the problem
- Providing technical support & sources of possible funding

Town of Wellton – TA Success Story

Problem:

- Town has conventional surface water treatment plant that receives WMIDD water – coagulation, upflow clarifier, three dual filter trains
- Water system demands are seasonally reversed: summer 2,900 persons; winter 3,300 persons
- Distribution system south of I-8 is overbuilt for current demands leading to persistent TTHM exceedances during summer – fall months



Town of Wellton – TA Success Story

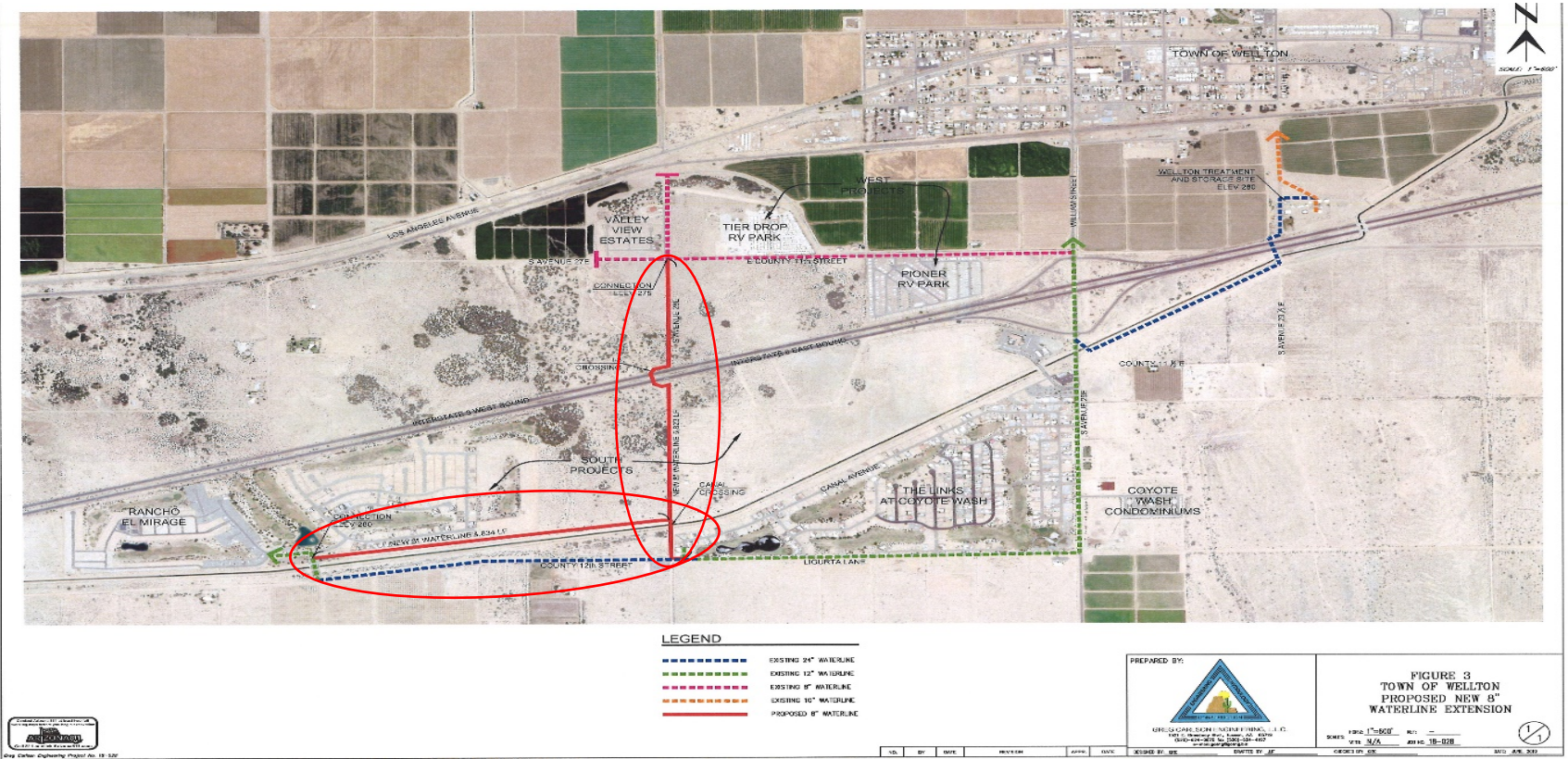
Actions/Resolutions:

- ADEQ TA contractor evaluated treatment alternatives (2015) including:
  - conventional treatment with GAC;
  - enhanced coagulation with either:
    - ferric chloride & chlorine,
    - alum & chlorine dioxide,
    - microfiltration, or
    - reverse osmosis
- The Town felt these were too costly to construct or maintain annually
- The Town had some success with operational changes – line flushing, managing tank levels but still had exceedances at furthest reaches of the system
- Town also explored tank mixers, in-line aeration, autoflush stations
- Town decided to loop the distribution system to reduce water age
- ADEQ TA contractor provided design support for ATC application

Town of Wellton – TA Success Story

Lessons Learned/Process Improvements:

- Listen to the client
- When possible, utilize local talent : local engineering firm was able to provide survey, ADOT permitting & construction management for installation of line
- Town worked in parallel with design process to get necessary funding (WIFA) for construction



Thank You

Questions??