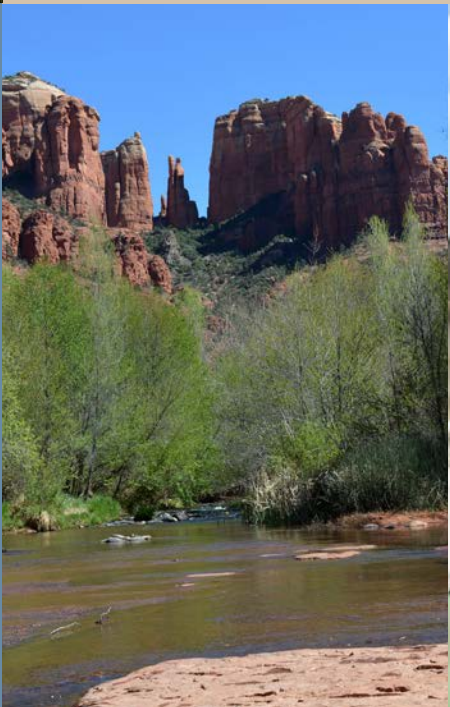


# Arizona's Public Water System Screening for Perfluorooctanoic Acid (PFOA) and Perfluorooctane Sulfonate (PFOS) Final Report

NOVEMBER 2018









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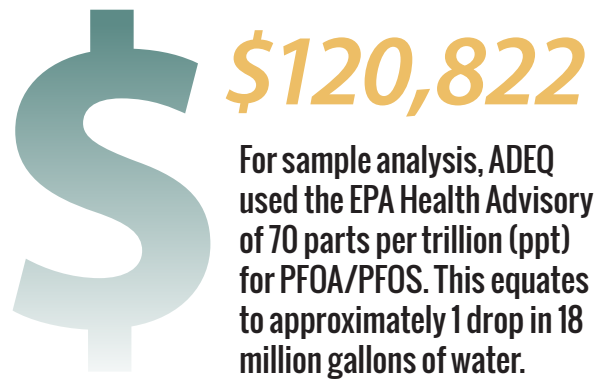
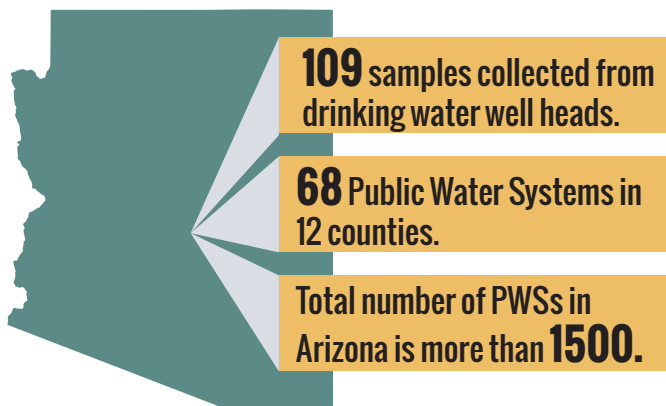
# EXECUTIVE SUMMARY

The Arizona Department of Environmental Quality (ADEQ) prepared this report for the U.S. Environmental Protection Agency (EPA) to fulfill the requirements of a multi-purpose grant. The purpose of the grant was to screen Public Water System (PWS) drinking water wells in Arizona potentially impacted by perfluorooctanoic acid (PFOA) and/or perfluorooctane sulfonate (PFOS) contamination.

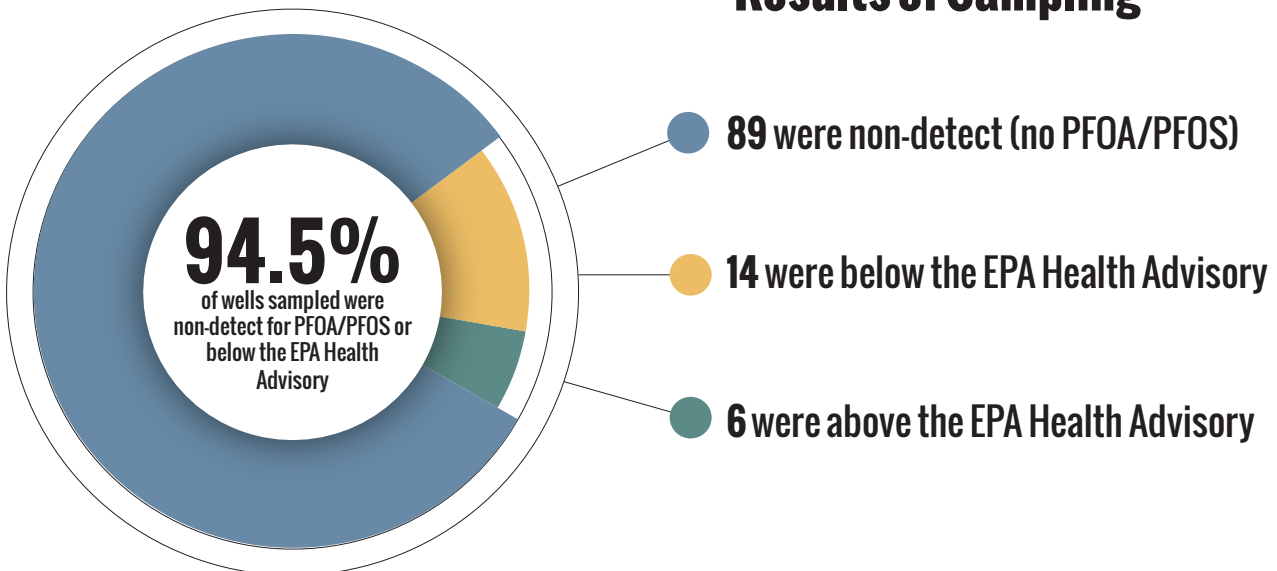
The project focus was on PWSs near facilities that currently or historically may have used PFOA/PFOS. This included industrial, firefighting training facilities, manufacturing, airports and military sites. Research indicated that PFOA/PFOS compounds were not used on large-scale industrial applications in Arizona. There are no known facilities in Arizona that have manufactured these chemicals.

Data from facility analysis and sampling indicate that PFOA/PFOS are not widespread throughout Arizona and tends to be localized near potential sources.

## Project Scope:



## Results of Sampling



# BACKGROUND

PFOA/PFOS are man-made chemicals that have been manufactured and used in a variety of industries since the 1940s. The compounds can be found in firefighting foams, food packaging, stain and water-repellent fabrics, Teflon™ and chemicals used at paper mills.

A growing awareness nationally about these chemicals and Unregulated Contaminant Monitoring Rule 3 (UCMR3) data sparked ADEQs interest in taking proactive steps to determine if these constituents were present in Arizona drinking water wells. ADEQ was awarded an EPA multi-purpose grant of \$120,822 on August 22, 2016 to sample PWS drinking water wells to determine if they had been impacted with PFOA/PFOS. The purpose of the grant was to further investigate potential risk to PWS drinking water wells that were not previously sampled that could be impacted by PFOA/PFOS contamination.\*

*\*Data for this project came from sampling PWS drinking water well heads; whereas, UCMR3, samples were collected at the entrance to the distribution system.*

# METHODOLOGY

ADEQ developed GIS maps, which showed facilities that currently or historically may have used PFOA/PFOS. ADEQ used Standard Industrial Classification Codes (SIC) and conducted extensive research to identify these facilities. Based on hydrogeologic data, ADEQ then identified PWS drinking water well locations within a two-mile radius of the facility. Non-regulated water systems were not included in this screening as that was outside the scope of this project.

Selection criteria for sampling was determined by:

- Aquifer characteristic evaluations of groundwater velocities and flow direction where adequate information was available.
- Well construction data evaluations to determine regional subsurface lithology.
- Flow direction analysis to identify wells located up gradient, cross gradient and down gradient of flow directions to ensure all wells that may have been impacted were sampled since local groundwater movement often varies from regional flow direction.

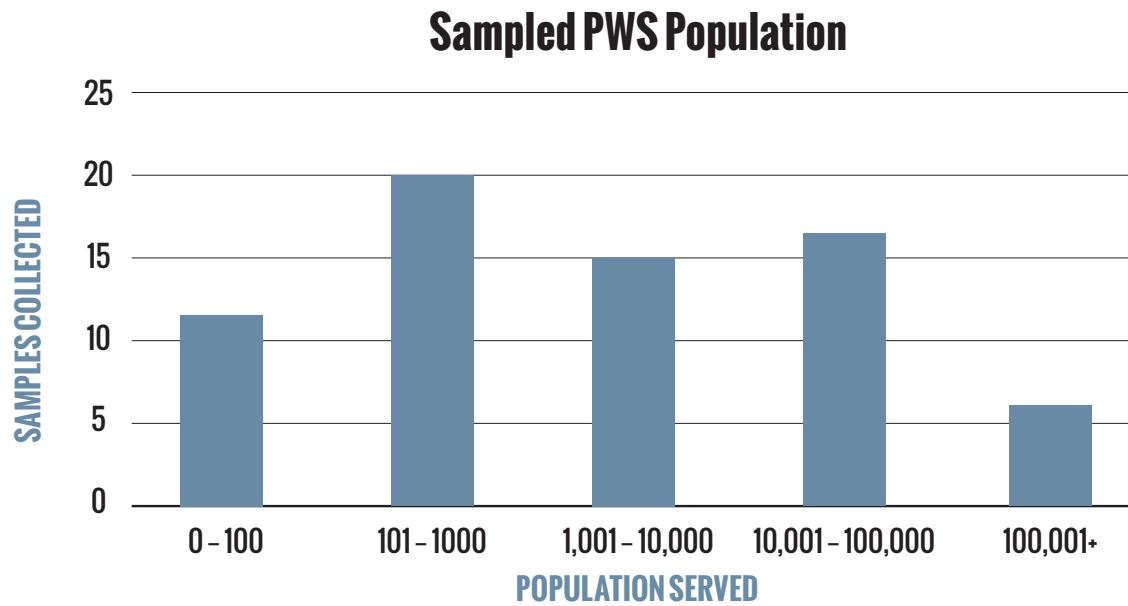
PWSs in this screening varied in number of customers served (Figure 1, pg 6). ADEQ identified 162 PWS drinking water wells for screening (Figure 2, pg 6). ADEQ determined 100 wells at 68 different PWSs met the selection criteria for sampling. ADEQ also received data from some PWSs for 9 additional wells (Figure 2). ADEQ requested sampling data for 8 other wells, but data were not received.

Sampling was conducted by ADEQ's contractor (P.G. Environmental) per the EPA approved sampling plan "ADEQ Quality Assurance and Sampling Plan for Polyfluorinated Compounds at Public Water Systems". Sampling protocols in this plan were strictly followed in order to eliminate false positives. Samples were transported within 24 hours to Eaton Eurofins, Inc. for analysis per EPA Analytical Method 537. Sampling was conducted from January through May 2018. Sampling data can be found in Appendix D.

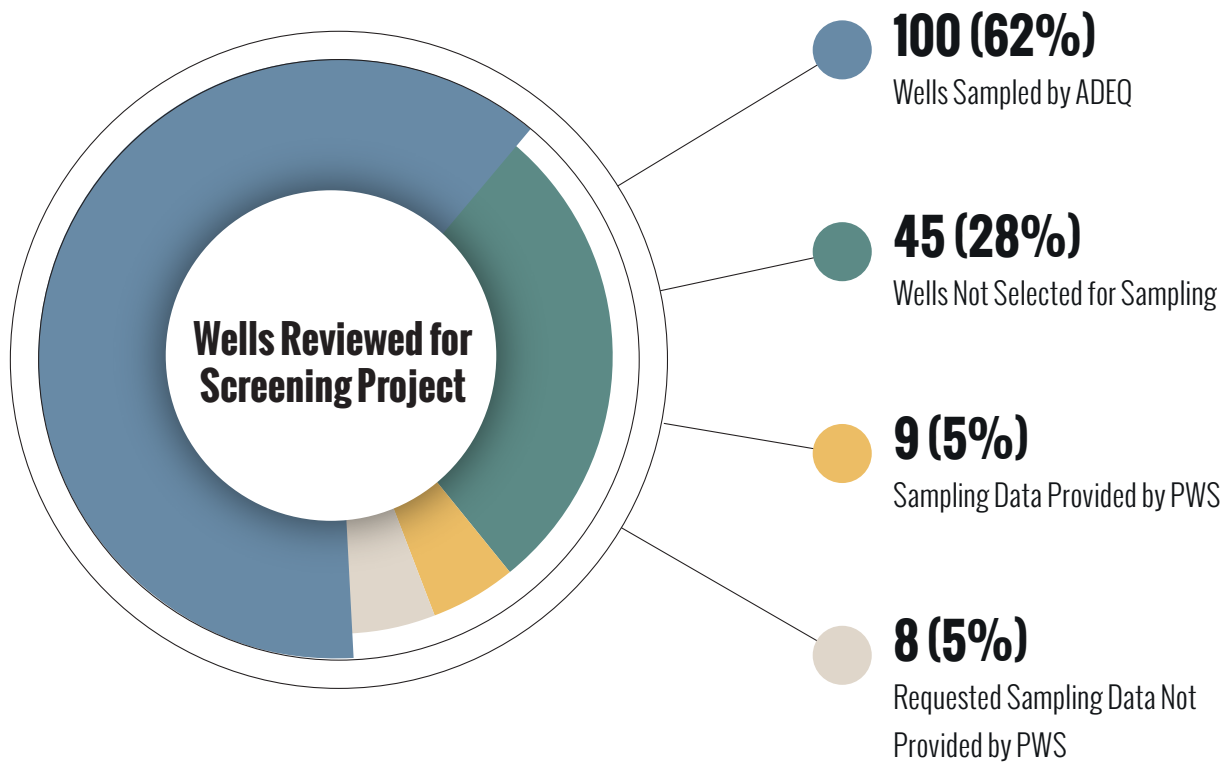
If there was an exceedance of the EPA Health Advisory in the sample gathered at a PWS drinking water well head, ADEQ employed the EPA approved PFOA/PFOS Communications Plan and recommended the following Corrective Action(s) be considered by the PWS:

- **INFORM** | PWS should issue a public notice (Appendix G) to affected customers about the levels of PFOA/PFOS in their drinking water.
- **LIMIT EXPOSURE** | Provide bottled water or an alternative source of drinking water to consumers while taking remedial action(s).
- **TREAT or BLEND** water source(s) to ensure drinking water at the entry point to the distribution system is below the EPA Health Advisory.

**Figure 1:**



**Figure 2:**





# RESULTS AND CONCLUSIONS

PFOA/PFOS contamination in Arizona PWSs is not widespread and tends to be near potential sources. Potential sources included industrial, firefighting training facilities, manufacturing, airports and military sites. Research of potential sources indicates PFOA/PFOS compounds were not used for large scale industrial applications in Arizona and there are no known facilities in Arizona that have manufactured these chemicals.

Out of over 1500 PWSs in Arizona, 68 were identified as having drinking water wells located near potential sources, and 109 wells met the selection criteria for sampling. Data showed 89 wells (81.7%) were non-detect, 14 wells (12.8%) were below the EPA Health Advisory and 6 wells (5.5%) were above the EPA Health Advisory. For those above the EPA Health Advisory, the data ranged from 72 to 166 ppt. Data is available in Appendix D.

ADEQ's first priority is to limit exposure through drinking water. For wells with sample data indicating PFOA/PFOS above the EPA Health Advisory, a communications plan was shared with the PWS. Because PFOA/PFOS is an unregulated compound, PWSs are working voluntarily with ADEQ to address the contamination. Information on the current status of ADEQ's work with impacted PWSs is available in Appendix H.

## POTENTIAL ACTIONS

ADEQ is considering the following activities as part of our continuing effort to address concerns about PFOA/PFOS in Arizona:

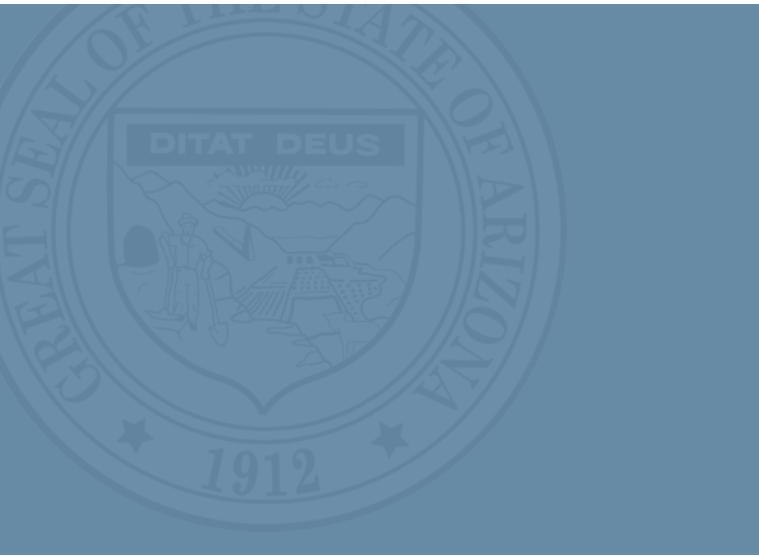
- Develop a strategy to help drinking water systems impacted by PFOA/PFOS contamination.
- Provide a summary of sampling results of PFOA/PFOS contamination to industrial, firefighting training facilities, manufacturing, airports and military sites near wells where these contaminants were detected.
- Participate in the potentially changing regulatory landscape for PFOA/PFOS and other Poly- and Perfluorinated compounds as additional information becomes available.

## WHAT CAN THE EPA DO TO HELP?

- Quickly and efficiently establish a Maximum Contaminate Level (MCL) for PFOA/PFOS.
- Evaluate the need for a MCL for other Poly- and Perfluorinated compounds in drinking water.
- Provide funding to resample wells where results were above the EPA Health Advisory to confirm the results of the initial screening project.
- Provide funding to locate private drinking water wells and monitoring wells in the areas where contaminants were detected. Analyze the hydrogeologic data and sample these wells for PFOA/PFOS when appropriate.
- Keep ADEQ informed on current information regarding Poly- and Perfluorinated compounds, including include health effects, regulation and analytical data collected in Arizona.
- Continue to develop analytical methods for Poly- and Perfluorinated compounds in air, soil and water.

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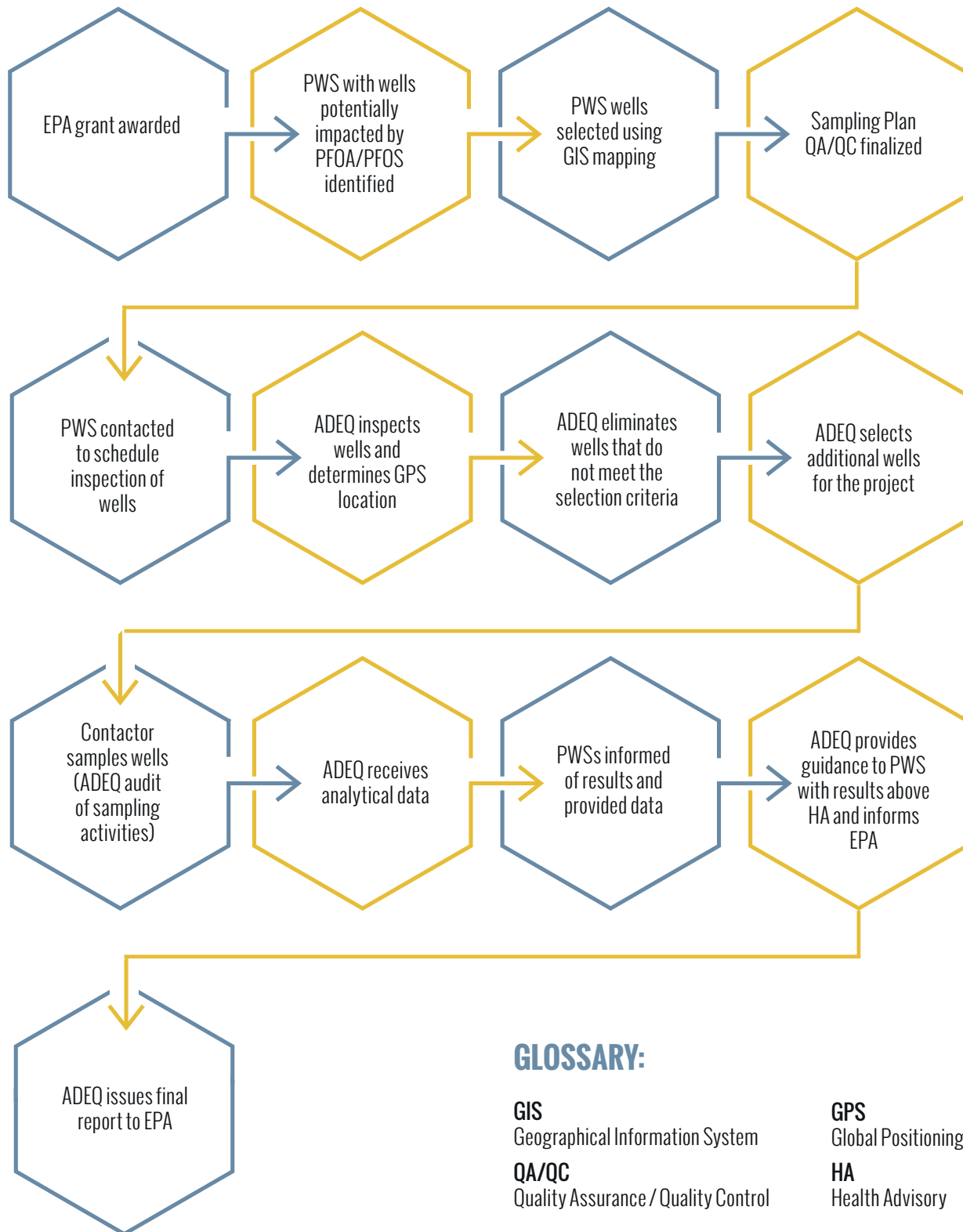


# APPENDICES



# APPENDIX A

## FLOW CHART



### GLOSSARY:

**GIS**  
Geographical Information System

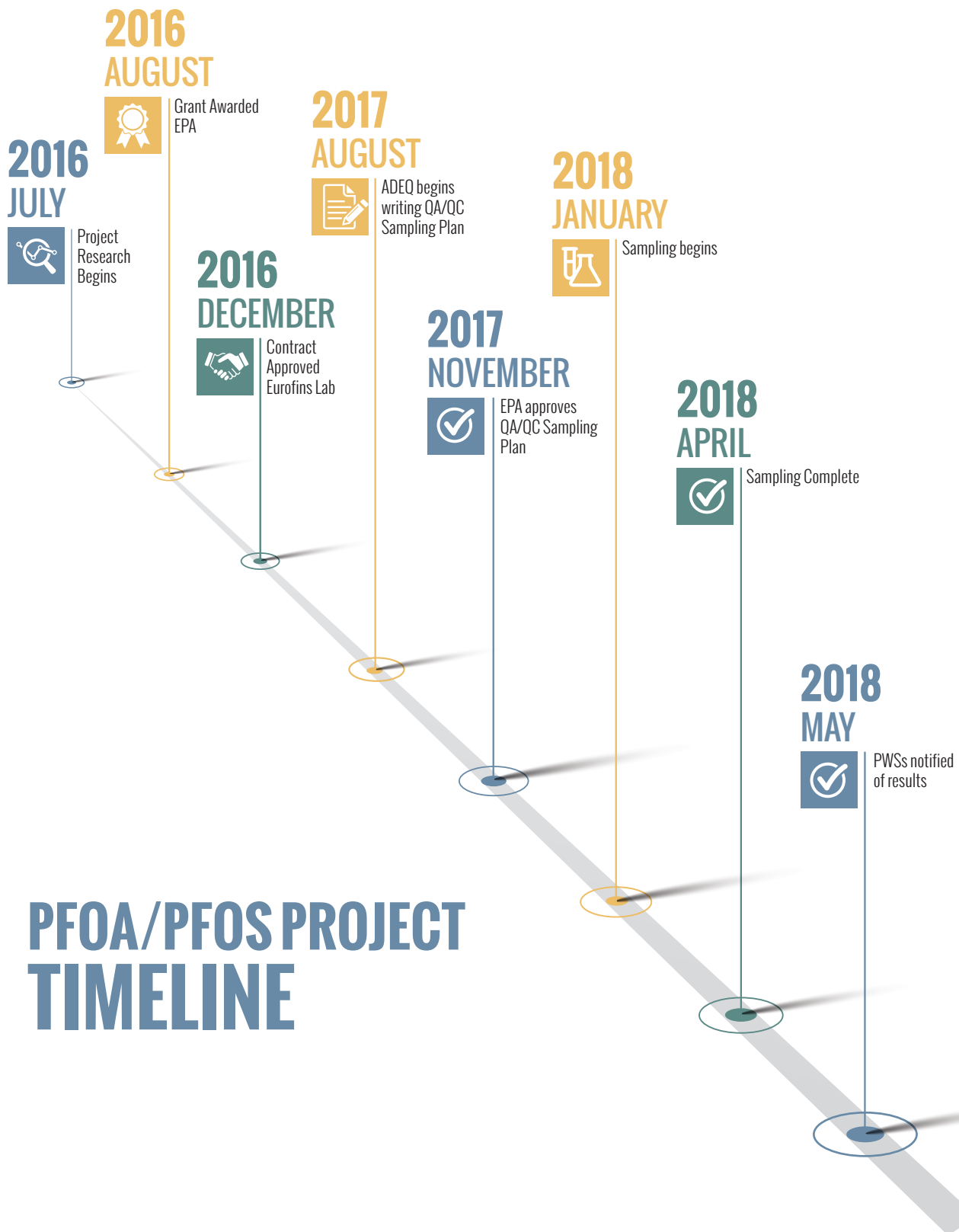
**QA/QC**  
Quality Assurance / Quality Control

**GPS**  
Global Positioning System

**HA**  
Health Advisory

# APPENDIX B

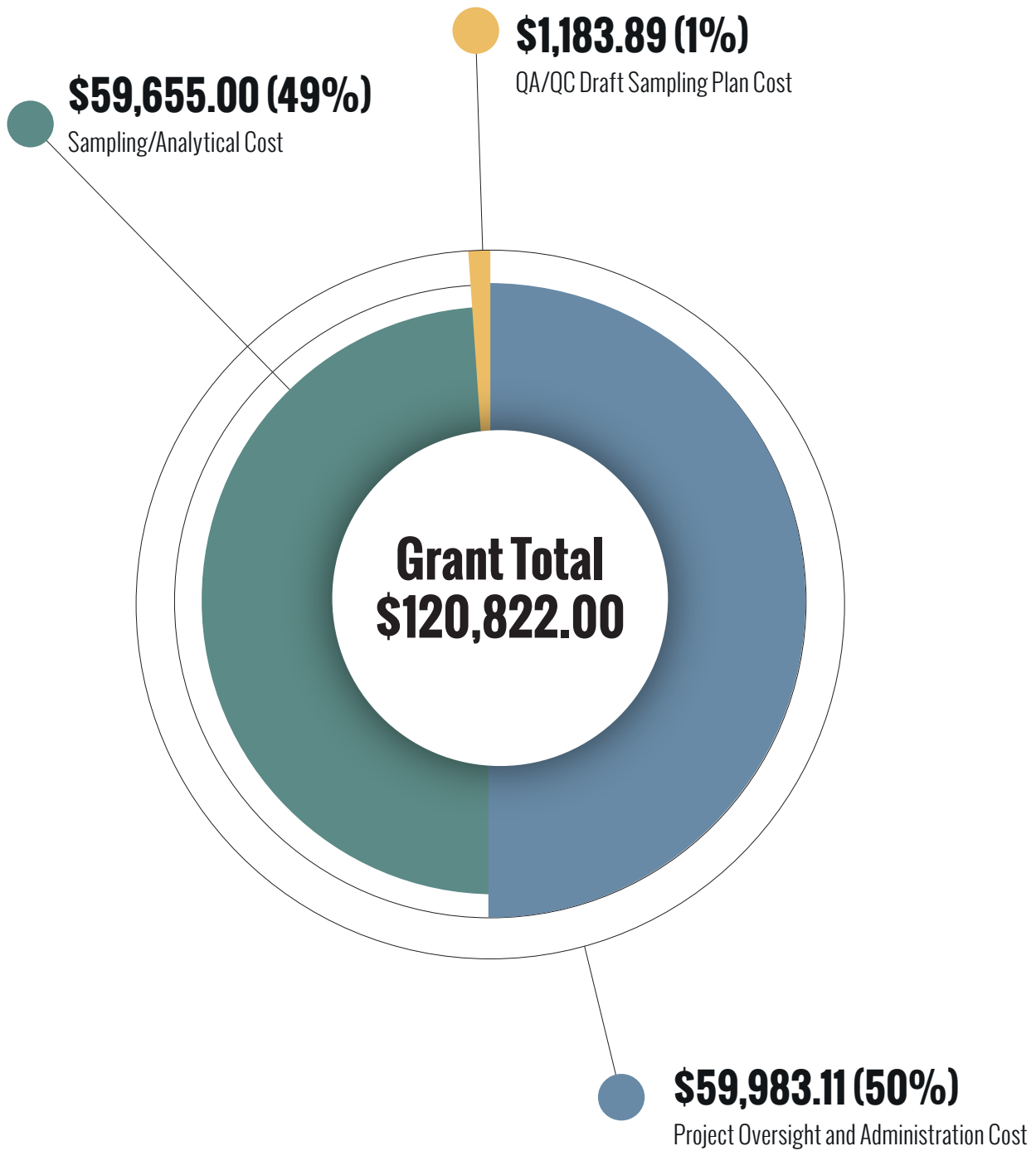
## TIMELINE





# APPENDIX C

## EXPENDITURES AND COSTS



# APPENDIX D

## SCREENING RESULTS

PWS ID #	PWS Name	Well #	PFOS + PFOA ng/L
09026	CITY OF SHOW LOW	55-904169	ND
03312	HYDRO RESOURCES-TUSAYAN	55-523284	ND
14448	SUNSET MHP	55-628972	ND
07195	VWC BUCKEYE DIVISION SUN VALLEY	55-800947	ND
07462	BUCKEYE MUNICIPAL AIRPORT	55-507456	ND
07633	HOPEVILLE	55-800479	ND
10112	CITY OF TUCSON	55-620268	ND
10112	CITY OF TUCSON	55-552118	ND
20549	USAF DAVIS MONTHAN AFB	55-506859	ND
20549	USAF DAVIS MONTHAN AFB	55-621582	ND
20549	USAF DAVIS MONTHAN AFB	55-219602	ND
10112	CITY OF TUCSON	55-533854	104.60
10112	CITY OF TUCSON	55-533855	80.00
20041	EMERY PARK MHP	55-640042	59.00
02082	SIERRA VISTA AIRPORT	55-505189	ND
02078	US ARMY FORT HUACHUCA	55-626108	ND
02102	CORONADO ELEMENTARY	55-087668	ND
02061	BISBEE DOUGLAS INTL AIRPORT	55-516373	ND
02061	BISBEE DOUGLAS INTL AIRPORT	55-606412	ND
10350	MARANA CORRECTIONAL FACILITY	55-586194	3.10
10150	MARANA MUNICIPAL - MARANA	55-632633	11.90
11303	USSOCOM PARACHUTE TRAINING	55-522505	11.90
11034	MARANA AEROSPACE SOLUTIONS	55-617486	12.8
11328	COPPER MOUNTAIN RANCH CFD	55-620626	ND
07911	FAITH FAMILY CHURCH	55-215548	ND
07090	CHANDLER CITY OF	55-605314	ND
07095	MESA CITY OF	55-585924	ND
07098	SCOTTSDALE CITY OF	55-626827	ND
07098	SCOTTSDALE CITY OF	55-572377	ND
07100	TEMPE CITY OF	55-628166	56.00
07100	TEMPE CITY OF	55-628164	29.10
07093	GLENDALE CITY OF	55-217517	17.70

# APPENDIX D CONT.

## SCREENING RESULTS

PWS ID #	PWS Name	Well #	PFOS + PFOA ng/L
07046	LIBERTY WATER LPSCO	55-611729	33.00
07541	X PLICIT SHOW CLUB	55-217656	ND
07046	LIBERTY WATER LPSCO	55-611726	45.00
07484	OLIVE AVENUE HOA	55-599021	ND
07094	GOODYEAR WATER DEPARTMENT	55-218768	ND
07094	GOODYEAR WATER DEPARTMENT	55-218274	ND
07713	TRIPLE G DAIRY	55-582083	ND
07094	GOODYEAR WATER DEPARTMENT	55-501892	ND
07094	GOODYEAR WATER DEPARTMENT	55-609571	ND
14075	SUN LEISURE ESTATES UTILITIES COMPANY	55-610440	ND
14015	SOMERTON CITY OF	55-207524	ND
14015	SOMERTON CITY OF	55-555731	ND
15013	PARKER TOWN OF	55-601139	ND
15013	PARKER TOWN OF	55-601138	ND
03008	FLAGSTAFF CITY OF	55-907084	ND
08032	EPCOR WATER - MOHAVE	55-603477	ND
08062	EPCOR WATER - LAKE MOHAVE HIGHLANDS	55-603417	ND
08068	EPCOR WATER - NORTH MOHAVE VALLEY	55-211751	ND
08068	EPCOR WATER - NORTH MOHAVE VALLEY	55-589061	ND
08098	MOHAVE CNTY PARKS DEPT DAVIS CAMP	55-505168	ND
08098	MOHAVE CNTY PARKS DEPT DAVIS CAMP	55-544186	ND
08038	VALLEY PIONEERS WATER COMPANY INC	55-623084	ND
08038	VALLEY PIONEERS WATER COMPANY INC	55-623082	ND
08020	KINGMAN MUNICIPAL WATER	55-905228	ND
08020	KINGMAN MUNICIPAL WATER	55-612657	ND
08020	KINGMAN MUNICIPAL WATER	55-612664	ND
13045	PRESCOTT CITY OF	55-219158	ND
13045	PRESCOTT CITY OF	55-212087	ND
13246	USFS PNF AIRPORT FIRE CENTER	55-577507	27.40
13261	TRI-CITY PREP HIGH SCHOOL	55-552567	ND
07045	WICKENBURG TOWN OF	55-624479	ND
04032	PAYSON TOWN OF	55-568624	ND



# APPENDIX D CONT.

## SCREENING RESULTS

PWS ID #	PWS Name	Well #	PFOS + PFOA ng/L
04032	PAYSON TOWN OF	55-521982	14.90
04032	PAYSON TOWN OF	55-564016	ND
04032	PAYSON TOWN OF	55-567988	ND
13036	JACKSON ACRES DWID	55-636907	6.80
13408	BEVERLY GARDENS TRAILER PARK	55-528525	4.00
13160	DRY GULCH WATER COMPANY	55-516466	166.00
03003	ARIZONA WATER CO - SEDONA	55-566709	ND
03003	ARIZONA WATER CO - SEDONA	55-616656	ND
13041	OAK CREEK WATER CO 1	55-562092	ND
13041	OAK CREEK WATER CO 1	55-603919	ND
03073	FOREST HIGHLANDS WATER COMPANY	55-562728	ND
07079	VALLEY UTILITIES WATER COMPANY GLENDALE	55-639720	ND
07079	VALLEY UTILITIES WATER COMPANY GLENDALE	55-208819	ND
07033	TOWN OF QUEEN CREEK	55-209407	ND
07021	COUNTRY CLUB ACRES WATER INC	55-505533	ND
07021	COUNTRY CLUB ACRES WATER INC	55-605607	ND
07307	ADJC ADOBE MOUNTAIN SCHOOL	55-614010	ND
07069	GILA BEND TOWN OF	55-573124	ND
07069	GILA BEND TOWN OF	55-222981	ND
07069	GILA BEND TOWN OF	55-504088	ND
08015	EPCOR WATER - LAKE HAVASU	55-594370	ND
08015	EPCOR WATER - LAKE HAVASU	55-221932	ND
04008	CITY OF GLOBE	55-526251	ND
04008	CITY OF GLOBE	55-611121	ND
08081	GOLDEN VALLEY IMPROVEMENT DISTRICT	55-530666	ND
08081	GOLDEN VALLEY IMPROVEMENT DISTRICT	55-530665	ND
07789	DOUBLETREE PAPER MILL	55-909462	ND
03048	ANASAZI WATER COMPANY	55-560179	ND
20092	SIERRA COURT TRAILER PARK	55-603669	ND
12004	NOGALES CITY OF	55-603394	ND
12004	NOGALES CITY OF	55-603393	ND
12004	NOGALES CITY OF	55-625344	ND

# APPENDIX D CONT.

## SCREENING RESULTS

PWS ID #	PWS Name	Well #	PFOS + PFOA ng/L
12004	NOGALES CITY OF	55-603392	ND
12004	NOGALES CITY OF	55-574906	ND
12004	NOGALES CITY OF	55-574907	ND
02010	BELLA VISTA CITY WATER SYSTEM	55-610125	ND
10357	METROPOLITAIN DWID	55-208091	ND
03015	MOUNTAIN DELL WATER INC	55-802025	ND
03015	MOUNTAIN DELL WATER INC	55-802024	ND
13063	PRESCOTT VALLEY WD LOWER SYSTEM	55-612332	ND
13063	PRESCOTT VALLEY WD LOWER SYSTEM	55-613021	ND
13063	PRESCOTT VALLEY WD LOWER SYSTEM	55-550395	ND
20011	CALPORTLAND RILLITO CEMENT PLANT	55-610526	72
20011	CALPORTLAND RILLITO CEMENT PLANT	55-610527	76
20447	TUCSON READY MIX ORANGE GROVE	55-625466	86

# APPENDIX E

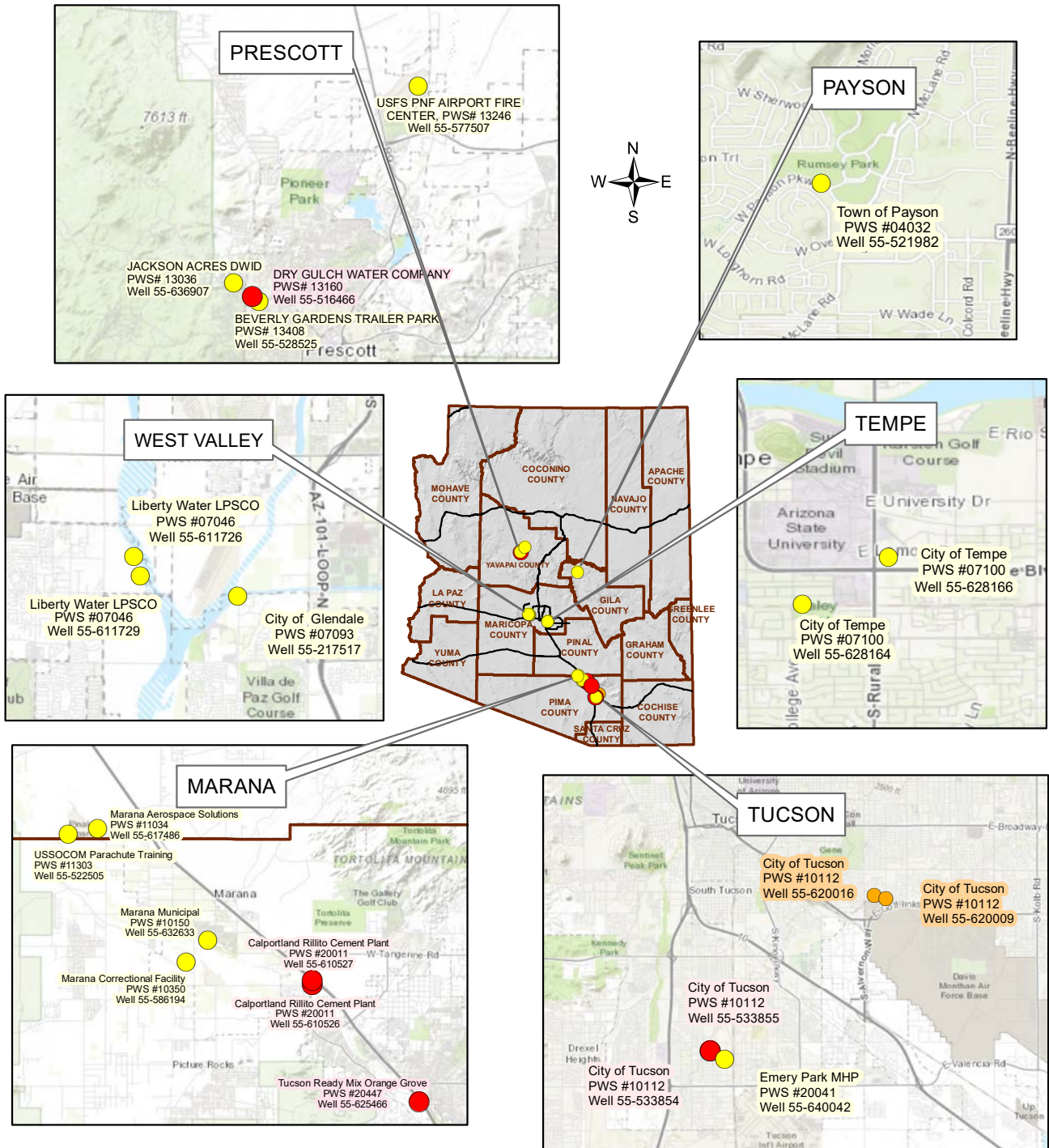
## COUNTY RESULTS

County	# of Samples	ND	Detects Below HA	Above HA
APACHE	0	0	0	0
COCHISE	6	6	0	0
COCONINO	8	8	0	0
GILA	6	5	1	0
GRAHAM	0	0	0	0
GREENLEE	0	0	0	0
MARICOPA	31	26	5	0
MOHAVE	15	15	0	0
NAVAJO	1	1	0	0
PIMA	15	7	3	5
PINAL	3	1	2	0
SANTA CRUZ	6	6	0	0
YAVAPAI	12	8	3	1
YUMA	4	4	0	0
LA PAZ	2	2	0	0



# APPENDIX F

## MAPS



- Above Health Advisory
- Sampled, Below Health Advisory
- Outside Project Scope, Above HA

This map is for general reference only and may not be all inclusive. ADEQ program's data collection efforts are ongoing. More detailed information and specific locations can be obtained by contacting the Arizona Department of Environmental Quality.

Document Path: S:\gidevj\4\Data or Work Requests\2018\WQ\Grants\PFAS\_Report\_082218\_PORTRAIT.mxd

# APPENDIX G

## DRAFT PUBLIC NOTICE

Notice in response to EPA Drinking Water Health Advisories for PFOS and PFOA

On May 19, 2016, the Environmental Protection Agency (EPA) issued a health advisory regarding levels of Perfluorooctanoic Acid (PFOA) and Perfluorooctane Sulfonate (PFOS) in drinking water. The health advisory limit is combined concentrations of PFOA and PFOS of 0.070 ug/L (parts per billion).

Recently, the Arizona Department of Environmental Quality (ADEQ) sampled **PWS Name** wells and found these chemicals in concentrations above the health advisory limits. We understand this information may cause you to be concerned. **PWS Name** is conducting regular sampling and analysis of our water sources to ensure that customers continue to receive drinking water that is in compliance with applicable health and environmental regulations.

**PWS Name** is notifying its customers that the health advisory levels are calculated to make the public aware of potential adverse effects on the most sensitive populations; fetuses during pregnancy, breastfed infants, and people with immunity issues. Though no harm is imminent, sensitive populations may seek an alternative water source with PFOA and PFOS levels below 70 ppt. Parents with formula-fed infants should consider using formula that does not require adding water or using an alternative source for infant consumption.

**PWS Name** is working with state and federal officials to find a long-term solution regarding PFOA and PFOS. In addition, we are taking the following corrective actions **PWS should list planned corrective actions here.**

To the extent that you would like more information regarding PFOA, PFOS, their health effects or the basis for the EPA's actions, the EPA's health advisory can be found on their website.

<https://www.epa.gov/ground-water-and-drinking-water/drinking-water-health-advisories-pfoa-and-pfos>

# APPENDIX H

## CURRENT STATUS OF ADEQ'S WORK WITH IMPACTED PWSs

PWS #	PWS Name	Data Source	Current Status
AZ0420447	Tucson Ready Mix	ADEQ	Bottled water provided; ADEQ regional investigation ongoing
AZ0420011	Calportland Rillito Cement	ADEQ	Bottled water provided; ADEQ regional investigation ongoing
AZ0413160	Dry Gulch Water Company	ADEQ	Notice posted; treatment being considered
AZ408001	Oatman Water Company	UCMR3	Meeting the Health Advisory; ADEQ met with PWS; new plans have been submitted
AZ0407046	Liberty Water LPSCO	UCMR3	Granular Activated Carbon (GAC) filters installed at impacted wells
AZ0407100	City of Tempe	UCMR3	Wells are offline; ADEQ resampled at the well head
AZ0410112	City of Tucson	UCMR3, City of Tucson	Wells are offline; ADEQ met with City to discuss treatment implementation; ADEQ regional investigation ongoing
AZ04 (all Marana PWS)	Town of Marana	UCMR3, Town of Marana	ADEQ is working to support Town efforts to install treatment; ADEQ regional investigation ongoing



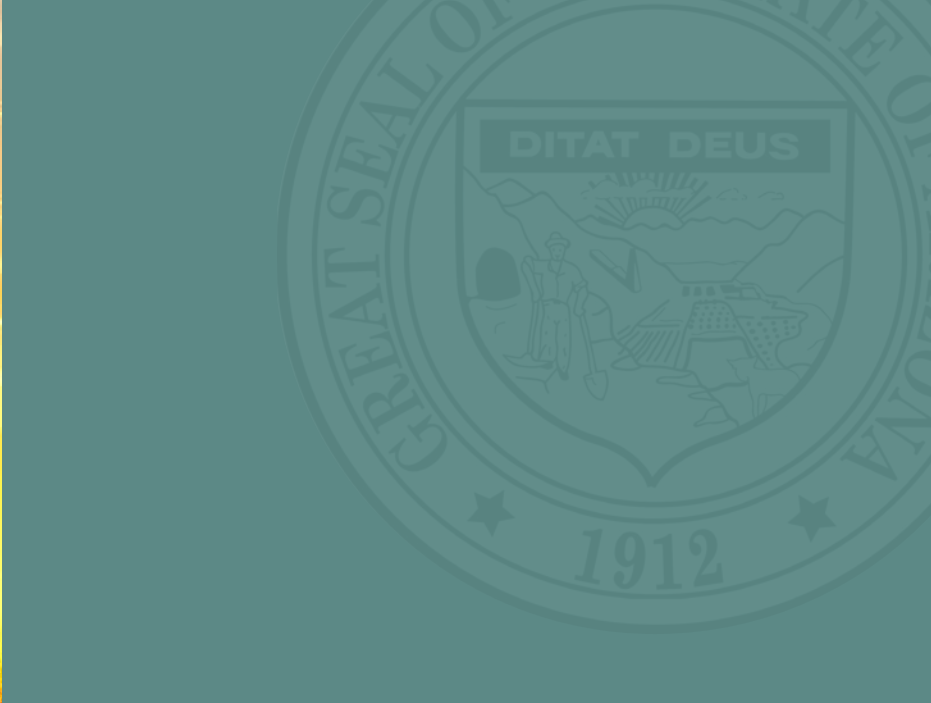
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