Regional Water Quality NEWSLETTER

DATE: Report for December 2018

A Tempe, Glendale, Peoria, Chandler, Phoenix, ADEQ, CAP, SRP

NSF Central Arizona-Phoenix Long-Term Ecological Research

ASU Regional Water Quality Partnership

SUMMARY

1. Taste and odor compounds from all samples were below the threshold odor level of 10 ng/l. The highest levels were observed in Saguaro Lake Hypolimnion (6.1 ng/l of MIB). In the canals, the highest levels were observed in the Arizona Canal at 24th Street with an MIB concentration of 2.6 mg/l.

2. The DOC concentrations were not obtained due to instrument maintenance. The UV absorbance values were similar to November when DOC concentrations ranged from 2-3.5 mg/L.

3. Reservoir releases remained to be primarily Verde River Water. Groundwater was the majority of the water supply in the Arizona Canal which further lowered the organic carbon content in the canals.

4. Microbial concentrations for coliforms were similar to November (360-1176 cfu/100ml). These values continue to be elevated for the winter months possibly due to precipitation. Mycobacterium samples for November ranged from 0 to 8 cfu/100ml which was significantly lower than October.

Microbial Water Quality Data

Over the years the regional water quality center has collected data on numerous different topics but very little data has been collected on basic microbial water quality. Therefore, we have initiated microbial sampling for E. Coli, total coliforms and mycobacterium in the canal system to determine potential impacts on both water quality and sources of possible contamination. Note that Mycobacterium samples require one month to process so they are from the previous month.

Coliform Data - November 26th and 27th
All Values are CFU/100ml

Sample	E. coli	Coliform
Blank Average	**0**	**0**
AZ Canal at Highway 87 average	**6**	**640**
South Canal below CAP Cross- connect average	**offline**	**offline**
Cap Canal at Cross-connect average	**21**	**1096**
AZ Canal at 56th St. average	**20**	**712**
AZ Canal- Central Avenue average	**23**	**496**
Pima Average	**2**	**360**
AZ Canal above CAP Cross-connect average	**22**	**984**
Waddell Canal average	**2**	**1176**
Verde River @ Beeline average	**51**	**800**
AZ Canal below CAP Cross-connect average	**11**	**1152**
head of the Consolidated Canal average	**offline**	**offline**
Middle of Consolidated Canal average	**offline**	**offline**
Head of Tempe Canal average	**offline**	**offline**

Mycobacterium (November)	colonies
Blank	0
AZ Canal at Highway 87	5
South Canal below CAP Cross- connect	Ofline
Cap Canal at Cross-connect	0
AZ Canal at 56th St.	1
AZ Canal- Central Avenue	6
AZ Canal at Pima	4
AZ Canal above CAP Cross-connect	0
Waddell Canal	1
Verde River @ Beeline	8
AZ Canal below CAP Cross-connect	1
head of the Consolidated Canal	offline
Middle of Consolidated Canal	offline
Head of Tempe Canal	offline

CONT – Contaminated with other bacteria

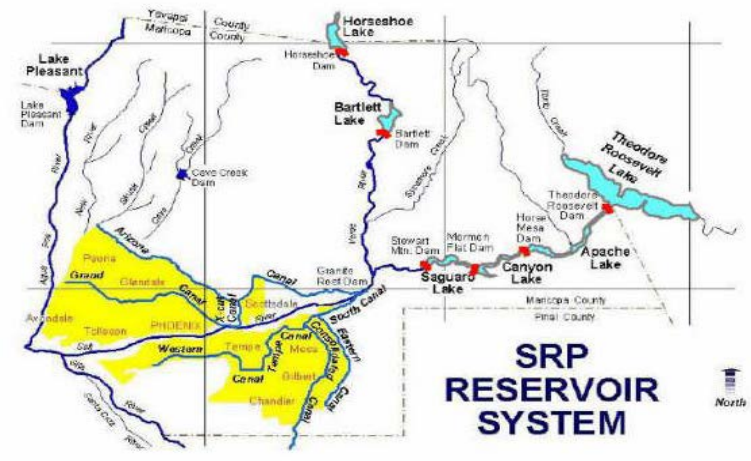
Quick Update of Water Supplies for December 17th, 2018
(during day of canal/WTP sampling – December 17th, 2018)

Source	Trend in supply	Discharge to water supply system	Flow into SRP Canal System	Dissolved organic carbon Concentration (mg/L) **
Salt River	Reservoirs at 49% full	8 cfs	391 cfs into **Arizona Canal** 0 cfs into **South Canal** 171 cfs of **CAP water** into Arizona Canal	3.3 mg/L
Verde River	Reservoirs At 31% full	337 cfs		2.3 mg/L
Colorado River	Lake Pleasant is 77.4% full (Lake Powell is 40.4% full)	Lake Pleasant is* releasing 0 cfs	395 cfs **Groundwater Pumping** into SRP Canals	3.2 mg/L
Groundwater	Pumping ***	119 cfs pumping by SRP		0.5 to 1 mg/L

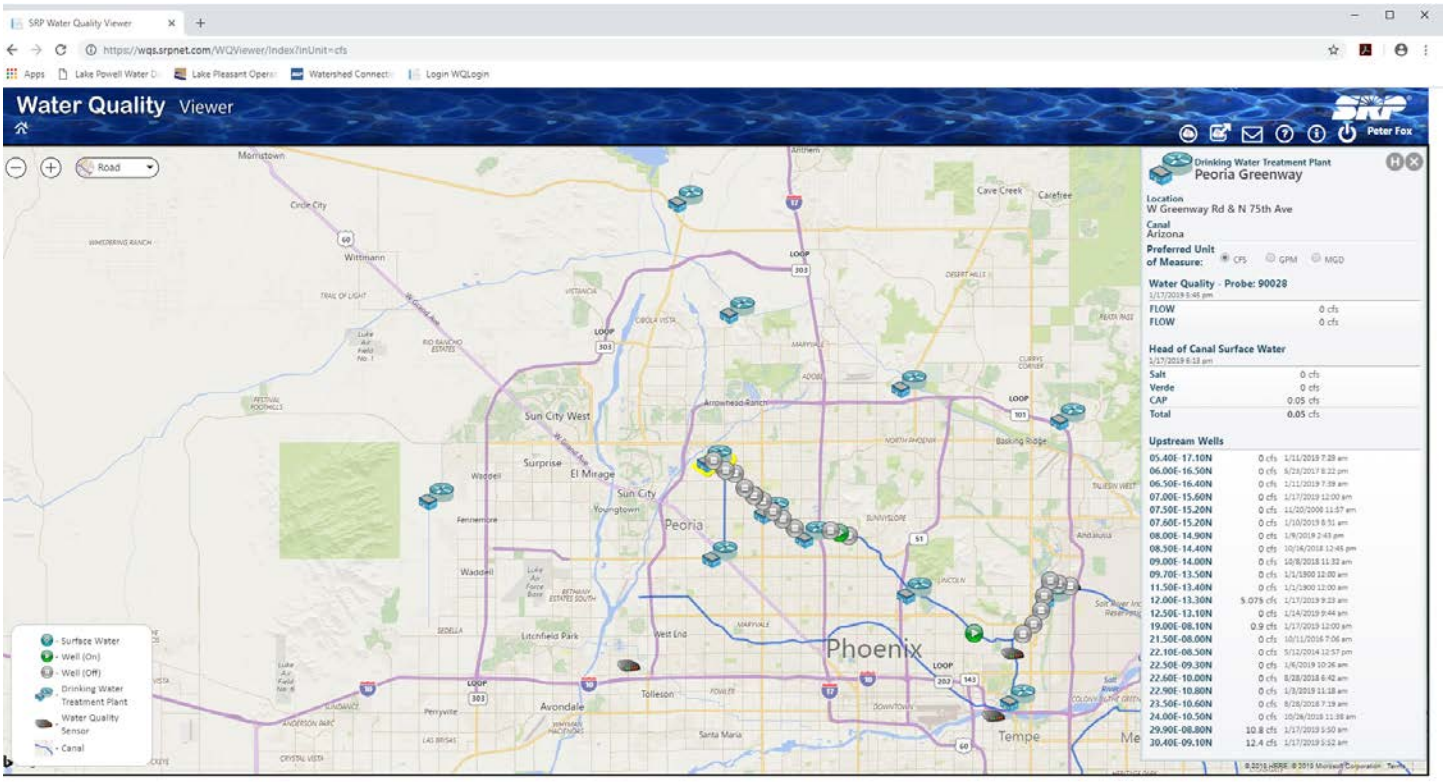
*CAP is not releasing from Lake Pleasant
**Concentration of DOC in the terminal reservoir
***CAP water is being delivered to the Arizona Canal.

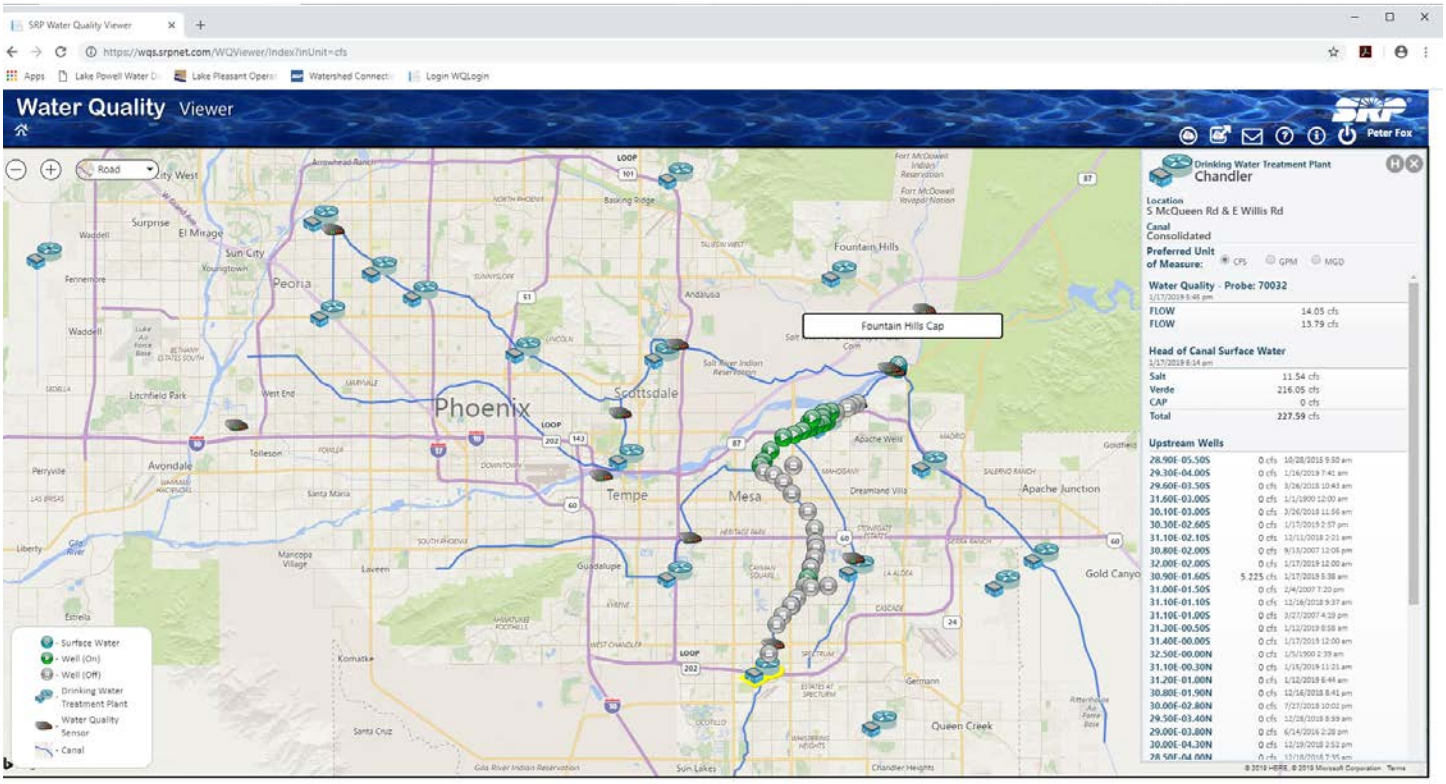
Data from the following websites:

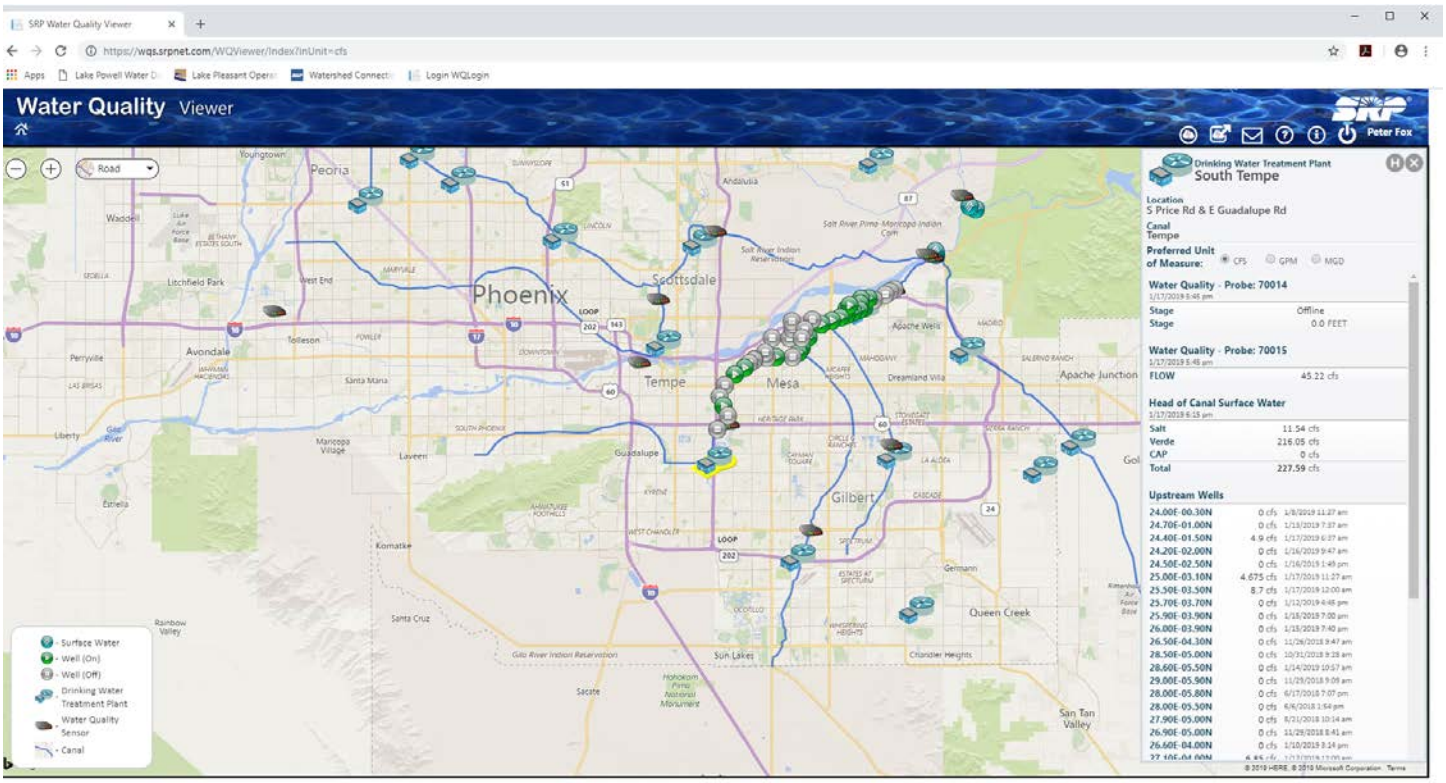
- http://www.srpwater.com/dwr/
- http://www.cap-az.com/departments/water-operations/lake-pleasant
- http://lakepowell.water-data.com/



The following views are from SRP website, and show which wells are operating along the various canals.






SRP Water Quality Viewer
https://wqs.srpnet.com/WQViewer/Index?inUnit=cfs
Water Quality Viewer
Peter Fox
Road
Phoenix
Scottsdale
Tempe
Mesa
Gilbert
Chandler
Queen Creek
Apache Junction
Avondale
Peoria
Surface Water
Well (On)
Well (Off)
Drinking Water Treatment Plant
Water Quality Sensor
Canal
Drinking Water Treatment Plant
South Tempe
Location
S Price Rd & E Guadalupe Rd
Canal
Tempe
Preferred Unit of Measure:
CFS
GPM
MGD
Water Quality - Probe: 70014
Stage
Offline
Stage
0.0 FEET
Water Quality - Probe: 70015
FLOW
45.22 cfs
Head of Canal Surface Water
Salt
11.54 cfs
Verde
216.05 cfs
CAP
0 cfs
Total
227.59 cfs
Upstream Wells
24.00E-00.30N 0 cfs
24.70E-01.00N 0 cfs
24.40E-01.50N 4.9 cfs
24.20E-02.00N 0 cfs
24.50E-02.50N 0 cfs
25.00E-03.10N 4.675 cfs
25.50E-03.50N 8.7 cfs
25.70E-03.70N 0 cfs
25.90E-03.90N 0 cfs
26.00E-03.90N 0 cfs
26.50E-04.30N 0 cfs
28.50E-05.00N 0 cfs
28.60E-05.50N 0 cfs
29.00E-05.90N 0 cfs
28.00E-05.80N 0 cfs
28.00E-05.30N 0 cfs
27.90E-05.00N 0 cfs
26.90E-05.00N 0 cfs
26.60E-04.00N 0 cfs

Dissolved Organic Carbon in Reservoirs and Treatment Plants

DOC = Dissolved organic carbon
UV254 = ultraviolet absorbance at 254 nm (an indicator of aromatic carbon content)
SUVA = UV254/DOC
TDN = Total dissolved nitrogen (mostly nitrate from groundwater)

Reservoir Samples - December 17th, 2018

Sample Description	Location	DOC (mg/L)	UV254 (l/cm)	SUVA (L/mg-m)	TDN (mg/L
Havasu (November)			0.045	#DIV/0!	
Lake Pleasant (November)	Epilimnion		0.051	#DIV/0!	
	Hypolimnion		0.052	#DIV/0!	
Verde River	at Tangle		N/A	#VALUE!	
Verde River	at Beeline Highway		0.071	#DIV/0!	
Bartlett Reservoir	Epilmnion		N/A	#VALUE!	
	Hypolimnion		N/A	#VALUE!	
Saguaro Lake	Epilimnion		N/A	#VALUE!	
	Epi - Duplicate		N/A	#VALUE!	
	Hypolimnion		N/A	#VALUE!	
Salt River	at Blue Point Bridge		0.060	#DIV/0!	
Salt River	above Roosevelt		0.034	#DIV/0!	
Roosevelt Reservoir Point 1	Epilmnion	N/A	N/A	N/A	N/A
	Hypolimnion	N/A	N/A	N/A	N/A
Roosevelt Reservoir Point 2	Epilmnion	N/A	N/A	N/A	N/A
	Hypolimnion	N/A	N/A	N/A	N/A
Apache Reservoir Point 1	Epilmnion	N/A	N/A	N/A	N/A
	Hypolimnion	N/A	N/A	N/A	N/A
Apache Reservoir Point 2	Epilmnion	N/A	N/A	N/A	N/A
	Hypolimnion	N/A	N/A	N/A	N/A
Canyon Reservoir Point 1	Epilmnion	N/A	N/A	N/A	N/A
	Hypolimnion	N/A	N/A	N/A	N/A
Canyon Reservoir Point 2	Epilmnion	N/A	N/A	N/A	N/A
	Hypolimnion	N/A	N/A	N/A	N/A

Taste and Odor

MIB, Geosmin and Cyclocitral are compounds naturally produced by algae in our reservoirs and canals, usually when the water is warmer and algae are growing/decaying more rapidly. They are non toxic, but detectable to consumers of water because of their earthy-musty-moldy odor. The human nose can detect these in drinking water because the compounds are semi-volatile. Since compounds are more volatile from warmer water, these tend to be more noticable in the summer and fall. The human nose can detect roughly 10 ng/L of these compounds. Our team collects samples from the water sources and raw/treated WTP samples.

Table 1 - Water Treatment Plants – December 17, 2018

Sample Description	MIB (ng/L)	Geosmin (ng/L)
Union Hills Inlet	**<2.0**	**<2.0**
Union Hills Treated	**<2.0**	**<2.0**
Tempe North Inlet	**2.1**	**<2.0**
Tempe North Plant Treated	**ns**	**ns**
Tempe South WTP	**ns**	**ns**
Tempe South Plant Treated	**ns**	**ns**
Anthem Inlet	**ns**	**ns**
Anthem Treated	**ns**	**ns**
Chandler Inlet	**ns**	**ns**
Chandler Treated	**ns**	**ns**
Greenway WTP Inlet	**ns**	**ns**
Greenway WTP Treated	**ns**	**ns**
Glendale WTP Inlet	**2.2**	**<2.0**
Glendale WTP Treated	**<2.0**	**<2.0**
24th St. WTP Inlet	**3.7**	**<2.0**
24th St. WTP Outlet	**<2.0**	**<2.0**

Table 2 - Canal Sampling – December 16, 2018

System	Sample Description	MIB (ng/L)	Geosmin (ng/L)
CAP	Waddell Canal	**<2.0**	**<2.0**
	Union Hills Inlet	**<2.0**	**<2.0**
	CAP Canal at Cross-connect	**<2.0**	**<2.0**
AZ Canal	Salt River @ Blue Pt Bridge	**<2.0**	**<2.0**
	Verde River @ Beeline	**2.8**	**<2.0**
	AZ Canal above CAP Cross-connect	**<2.0**	**<2.0**
	AZ Canal below CAP Cross-connect	**<2.0**	**<2.0**
	AZ Canal at Highway 87	**<2.0**	**<2.0**
	AZ Canal at Pima Rd.	**<2.0**	**<2.0**
	AZ Canal at 56th St.	**2.0**	**<2.0**
	AZ Canal - Central Avenue	**2.6**	**<2.0**
	AZ Canal - Inlet to Glendale WTP	**2.2**	**<2.0**
	Head of the Consolidated Canal	**ns**	**ns**
	Middle of the Consolidated Canal	**ns**	**ns**
South Tempe Canals	South Canal below CAP Cross-connect	**ns**	**ns**
	Head of the Tempe Canal	**ns**	**ns**
	Tempe Canal - Inlet to Tempe's South Plant	**ns**	**ns**
	Salt-Gila (Nov)	**<2.0**	**<2.0**
	Mesa Turnout (Nov)	**<2.0**	**<2.0**

Table 3 - Reservoir Samples – December 17, 2018

Sample Description	Location	MIB (ng/L)	Geosmin (ng/L)
Lake Pleasant	Eplimnion	**<2.0**	**<2.0**
Lake Pleasant	Hypolimnion	**2.8**	**<2.0**
Verde River @ Beeline		**2.8**	**<2.0**
Bartlett Reservoir	Epilimnion	**3.9**	**<2.0**
Bartlett Reservoir	Epi-near dock	**3.1**	**<2.0**
Bartlett Reservoir	Hypolimnion	**2.7**	**<2.0**
Salt River @ BluePt Bridge		**<2.0**	**<2.0**
Saguaro Lake	Epilimnion	**3.0**	**<2.0**
Saguaro Lake	Epi - Duplicate	**4.1**	**<2.0**
Saguaro Lake	Epi-near dock	**4.3**	**<2.0**
Saguaro Lake	Hypolimnion	**6.1**	**<2.0**
Lake Havasu (Nov)		**<2.0**	**<2.0**
Verde River at Tangle Creek		**ns**	**ns**
Roosevelt at Salt River Inlet		**ns**	**ns**