

REGIONAL WATER QUALITY NEWSLETTER

DATE: Report for February 2018

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

NSF Central Arizona-Phoenix Long-Term Ecological Research

ASU Regional Water Quality Partnership



SUMMARY

1. Golden algae blooms resulting in fish kills appear to be occurring in urban lakes throughout the Phoenix Metropolitan Area. Concern over golden algae is growing for both human health concerns and aquatic life. ADEQ will be meeting with us to discuss monitoring strategies and AZ Game and Fish is considering the fact that golden algae are an Aquatic Invasive Species. Training on the GC-MS which is located in a new laboratory facility in Biodesign has commenced and we should be in queue for Taste and Odor compound analysis in March.
2. The DOC concentrations ranged from 2.3 to 3.4 mg/l in the canals and water treatment plants which was similar to relatively low values observed in January. Reservoir sampling was completed in February and the Salt River Reservoirs all had similar values which ranged from 3.6-4.2 mg/l.
3. Reservoir releases were primarily from Bartlett at the time of sampling with the majority of water entering the South Canal. Bartlett is down to 48% of capacity while Lake Pleasant is up to 85% of capacity.
4. Microbial concentrations for coliforms continued to be within historic norms for winter months with concentrations less than 50% of typical summer months. High levels of E. Coli were observed in the Arizona Canal which was down for maintenance in January. Mycobacterium samples for January continued to have higher levels as observed in November and December.

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 - February 5th-6th

All Values are CFU/100ml

<u>Sample</u>	<u>E. coli</u>	<u>Coliform</u>
Blank Average	0	0
AZ Canal at Highway 87 average	TNTC	CONT
South Canal below CAP Cross- connect average	59	456
Cap Canal at Cross-connect average	N/A	N/A
AZ Canal at 56th St. average	509	296
AZ Canal- Central Avenue average	103	464
Pima Average	TNTC	CONT
AZ Canal above CAP Cross-connect average	140	488
Waddell Canal average	0	640
Verde River @ Beeline average	46	41
AZ Canal below CAP Cross-connect average	95	408
head of the Consolidated Canal average	45	384
Middle of Consolidated Canal average	43	920
Head of Tempe Canal average	41	416

<u>Mycobacterium (January)</u>	<u>colonies</u>
	N/A
AZ Canal at Highway 87	N/A
South Canal below CAP Cross- connect	92
Cap Canal at Cross-connect	N/A
AZ Canal at 56th St.	N/A
AZ Canal- Central Avenue	N/A
AZ Canal at Pima	N/A
AZ Canal above CAP Cross-connect	N/A
Waddell Canal	1
Verde River @ Beeline	82
AZ Canal below CAP Cross-connect	N/A
head of the Consolidated Canal	89
Middle of Consolidated Canal	36
Head of Tempe Canal	71

CONT – Contaminated with other bacteria

**Quick Update of Water Supplies for February 5th, 2018
(during day of canal/WTP sampling – February 5th, 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 64% full	8 cfs	146 cfs into Arizona Canal	2.9 mg/L
Verde River	Reservoirs At 38% full	617 cfs	363 cfs into South Canal 19 cfs of CAP water into Arizona Canal	3.1 mg/L
Colorado River	Lake Pleasant is 84.4% full (Lake Powell is 55.0% full)	Lake Pleasant is* releasing 0 cfs	195 cfs Groundwater Pumping into SRP Canals	2.9 mg/L
Groundwater	Pumping ***	177 cfs pumping by SRP		0.5 to 1 mg/L

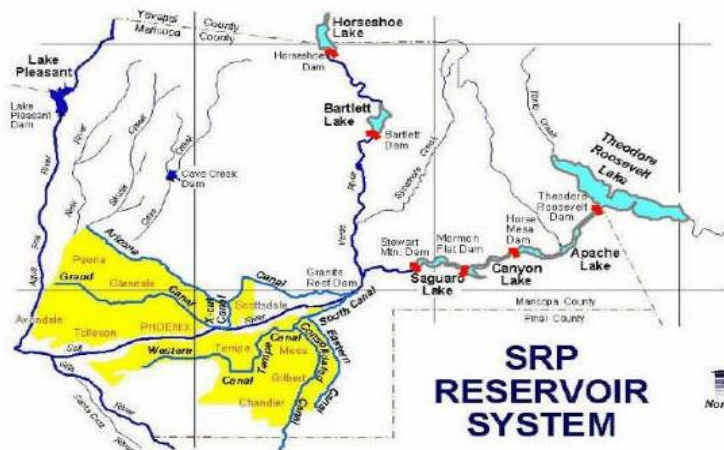
*CAP is not releasing from Lake Pleasant

**Concentration of DOC in the terminal reservoir

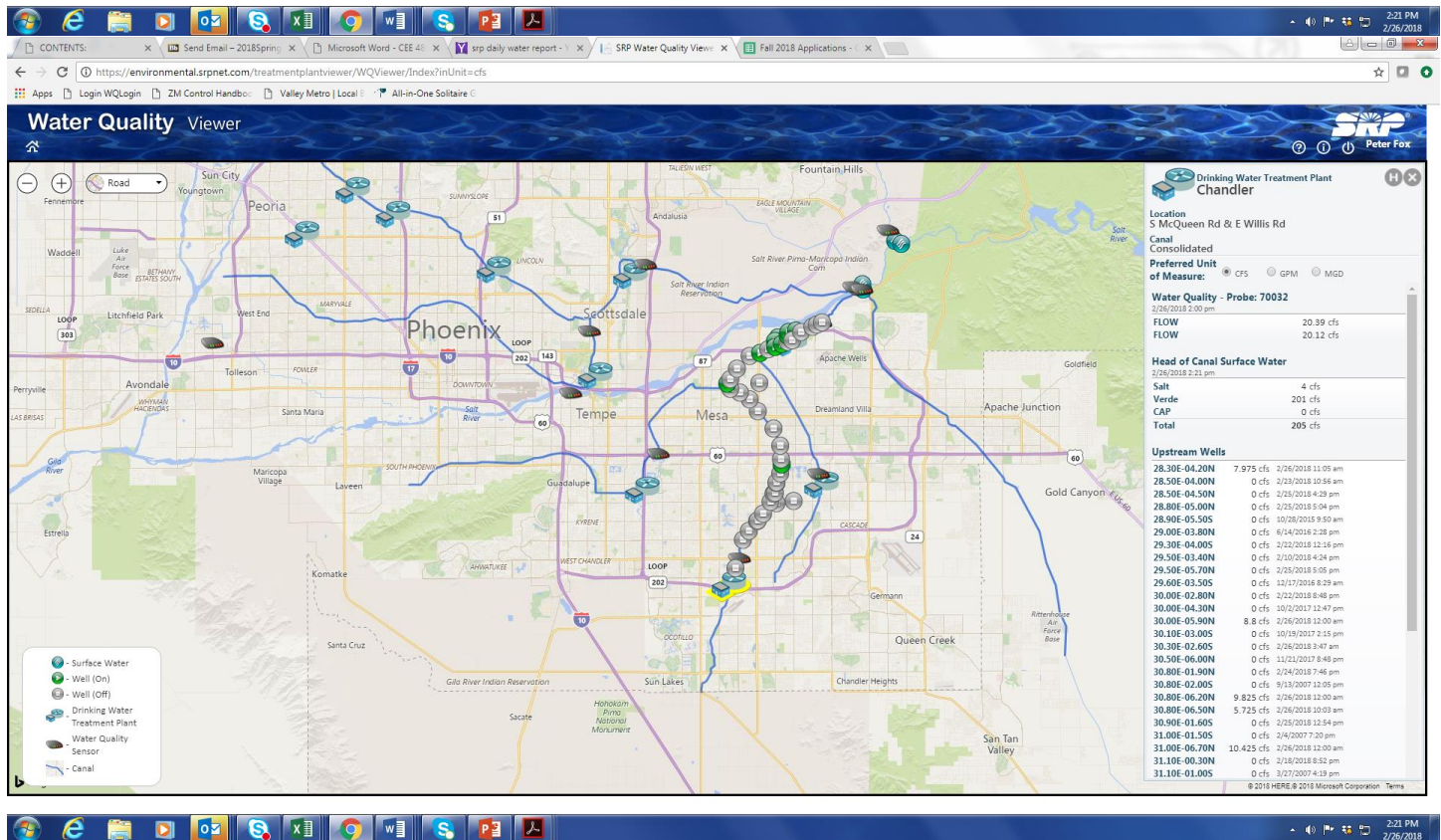
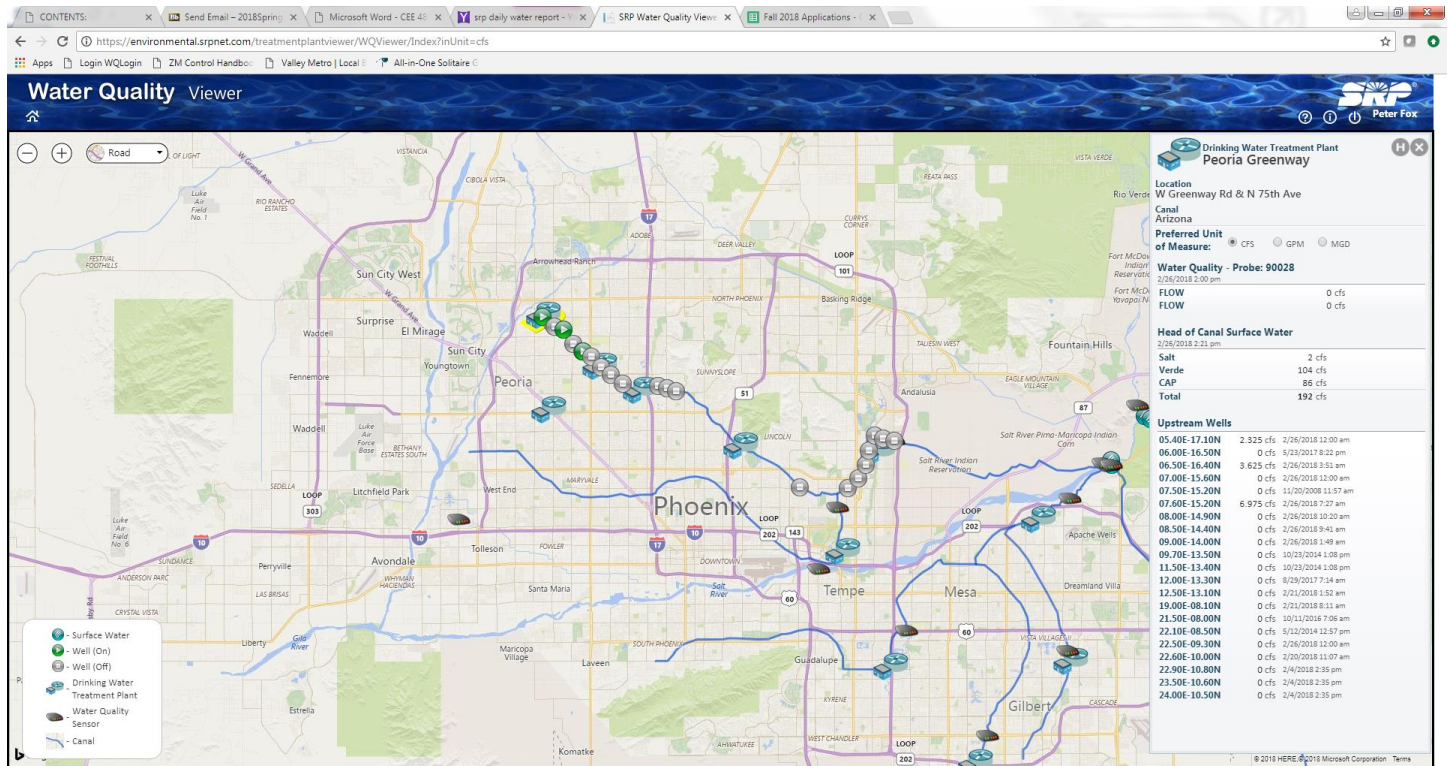
***CAP water is being delivered to the Arizona Canal.

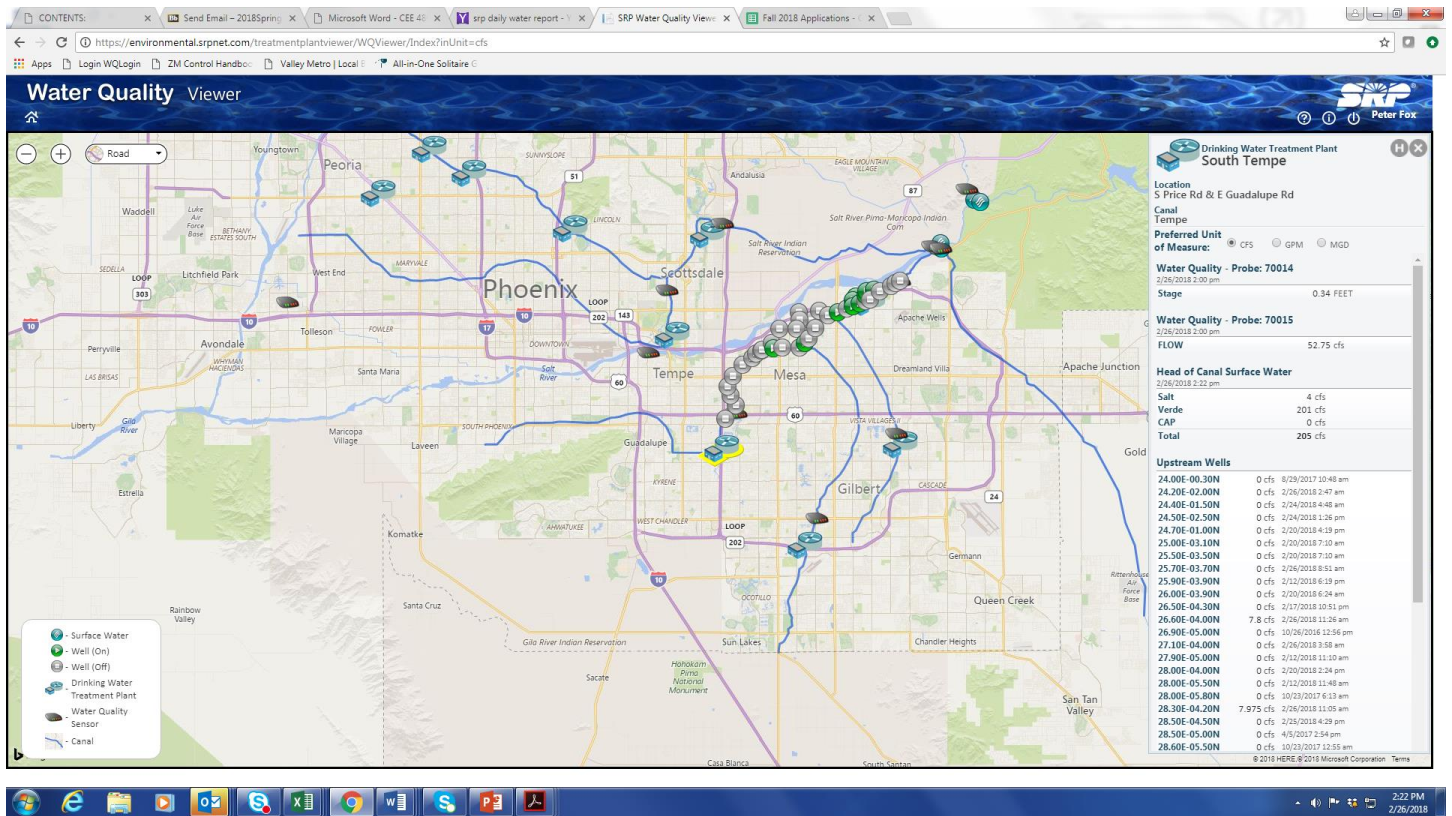
Data from the following websites:

- <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.





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)

Water Treatment Plants- FebruaryFebruary 5th-6th, 2018

Sample Description	DOC (mg/L)	UV254 (l/cm)	SUVA (L/mg-m)	TDN (mg/L)
Union Hills Inlet	2.5	0.048	1.9	N/A
Union Hills Treated	2.1	0.026	1.2	N/A
Tempe North Inlet	N/A	N/A	#VALUE!	N/A
Tempe North Plant Treated	N/A	N/A	#VALUE!	N/A
Tempe South Inlet	3.0	0.072	2.4	N/A
Tempe South Plant Treated	2.3	0.036	1.6	N/A
Greenway WTP Inlet	N/A	N/A	#VALUE!	N/A
Greenway WTP Treated	N/A	N/A	#VALUE!	N/A
Glendale WTP Inlet	N/A	N/A	#VALUE!	N/A
Glendale WTP Treated	N/A	N/A	#VALUE!	N/A
Anthem WTP Inlet	2.9	0.048	1.6	N/A
Anthem WTP Treated	2.8	0.044	1.6	N/A
24th Street WTP Inlet	3.4	0.062	1.8	N/A
24th Street WTP Treated	N/A	N/A	#VALUE!	N/A
Chandler WTP Inlet	2.5	0.066	2.7	N/A
Chandler WTP Treated	2.5	0.038	1.5	N/A

Rivers and Canals- February 5th-6th, 2018

Sample Description	DOC (mg/L)	UV254 (l/cm)	SUVA (L/mg-m)	TDN (mg/L)
Waddell Canal	3.1	0.053	1.7	N/A
Anthem WTP Inlet	2.9	0.048	1.6	N/A
Union Hills Inlet	2.5	0.048	1.9	N/A
CAP Salt-Gila Pumping Station (January)	2.9	0.052	1.8	N/A
CAP Mesa Turnout (January)	2.7	0.051	1.9	N/A
CAP Canal at Cross-connect	N/A	N/A	#VALUE!	N/A
Salt River @ Blue pt. Bridge	2.9	0.063	2.2	N/A
Verde River @ Beeline	3.1	0.073	2.4	N/A
AZ Canal above CAP Cross-connect	3.1	0.072	2.3	N/A
AZ Canal below CAP Cross-connect	3.1	0.081	2.6	N/A

AZ Canal at Highway 87	3.2	0.074	2.3	N/A
AZ Canal at Pima Rd.	3.0	0.078	2.6	N/A
AZ Canal at 56th St.	1.2	0.027	2.3	N/A
AZ Canal - Central Avenue	3.3	0.069	2.1	N/A
AZ Canal - Inlet to Glendale WTP	N/A	N/A	#VALUE!	N/A
AZ Canal - Inlet to Greenway WTP	N/A	N/A	#VALUE!	N/A
South Canal below CAP Cross-connect	2.9	0.077	2.7	N/A
Head of Tempe Canal	2.4	0.060	2.5	N/A
Tempe Canal - Inlet to Tempe's South Plant	3.0	0.072	2.4	N/A
Head of the Consolidated Canal	2.4	0.060	2.5	N/A
Middle of Consolidated Canal	2.9	0.074	2.5	N/A
Chandler WTP - Inlet	2.5	0.066	2.7	N/A

Reservoir Samples - February 5th-6th, 2018

Sample Description	Location	DOC (mg/L)	UV254 (l/cm)	SUVA (L/mg-m)	TDN (mg/L)
Havasu (January)		2.54	0.051	2.0	N/A
Lake Pleasant (January)	Epilimnion	3.22	0.058	1.8	N/A
	Hypolimnion	3.22	0.060	1.9	N/A
Verde River	at Tangle	0.91	0.034	3.7	N/A
Verde River	at Beeline Highway	3.10	0.073	2.4	N/A
Bartlett Reservoir	Epilimnion	3.37	0.084	2.5	N/A
	Hypolimnion	3.95	0.089	2.3	N/A
Saguaro Lake	Epilimnion	3.9	0.083	2.1	N/A
	Epi - Duplicate	3.8	0.084	2.2	N/A
	Hypolimnion	3.9	0.086	2.2	N/A
Salt River	at Blue Point Bridge	2.9	0.063	2.2	N/A
Salt River	above Roosevelt	N/A	N/A	#VALUE!	N/A
Roosevelt Reservoir Point 1	Epilimnion	3.90	0.104	N/A	N/A
	Hypolimnion	3.75	0.103	N/A	N/A
Roosevelt Reservoir Point 2	Epilimnion	4.24	0.104	N/A	N/A
	Hypolimnion	4.18	0.104	N/A	N/A
Apache Reservoir Point 1	Epilimnion	3.53	0.085	N/A	N/A
	Hypolimnion	N/A	N/A	N/A	N/A
Apache Reservoir Point 2	Epilimnion	N/A	N/A	N/A	N/A
	Hypolimnion	N/A	N/A	N/A	N/A
Canyon Reservoir Point 1	Epilimnion	4.04	0.087	N/A	N/A
	Hypolimnion	3.77	0.085	N/A	N/A
Canyon Reservoir Point 2	Epilimnion	3.89	0.087	N/A	N/A
	Hypolimnion	3.64	0.088	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 5, 2017

Sample Description	MIB (ng/L)	Geosmin (ng/L)
Union Hills Inlet	<2.0	<2.0
Union Hills Treated	<2.0	2.4
Tempe North Inlet	3.7	2.5
Tempe North Plant Treated	2.6	<2.0
Tempe South WTP	ns	ns
Tempe South Plant Treated	ns	ns
Anthem Inlet	<2.0	2.4
Anthem Treated	<2.0	2.2
Chandler Inlet	ns	ns
Chandler Treated	ns	ns
Greenway WTP Inlet	2.9	2.3
Greenway WTP Treated	<2.0	<2.0
Glendale WTP Inlet	3.2	<2.0
Glendale WTP Treated	3.0	<2.0
24th St. WTP Inlet	3.9	2.4
24th St. WTP Outlet	2.9	<2.0

Table 2 - Canal Sampling – December 5, 2017

System	Sample Description	MIB (ng/L)	Geosmin (ng/L)
CAP	Waddell Canal	<2.0	4.7

	Union Hills Inlet	<2.0	<2.0
	CAP Canal at Cross-connect	<2.0	3.2
AZ Canal	Salt River @ Blue Pt Bridge	2.8	<2.0
	Verde River @ Beeline	3.3	2.2
	AZ Canal above CAP Cross-connect	<2.0	2.6
	AZ Canal below CAP Cross-connect	2.3	2.4
	AZ Canal at Highway 87	3.1	2.3
	AZ Canal at Pima Rd.	3.4	2.5
	AZ Canal at 56th St.	3.5	2.3
	AZ Canal - Central Avenue	3.4	2.5
	AZ Canal - Inlet to Glendale WTP	3.2	<2.0
	Head of the Consolidated Canal	2.2	<2.0
	Middle of the Consolidated Canal	<2.0	<2.0
South Tempe Canals	South Canal below CAP Cross-connect	ns	ns
	Head of the Tempe Canal	<2.0	<2.0
	Tempe Canal - Inlet to Tempe's South Plant	ns	ns
	Salt-Gila (November)	7.0	<2.0
	Mesa Turnout (November)	<2.0	2.3

Table 3 - Reservoir Samples – December 5, 2017

Sample Description	Location	MIB (ng/L)	Geosmin (ng/L)
Lake Pleasant (November)	Epilimnion	2.9	2.0
Lake Pleasant (November)	Hypolimnion	5.0	2.1
Verde River @ Beeline		3.3	2.2
Bartlett Reservoir	Epilimnion	ns	ns
Bartlett Reservoir	Epi-near dock	5.8	<2.0
Bartlett Reservoir	Hypolimnion	ns	ns
Salt River @ BluePt Bridge		2.8	<2.0
Saguaro Lake	Epilimnion	ns	ns
Saguaro Lake	Epi - Duplicate	ns	ns
Saguaro Lake	Epi-near dock	7.0	<2.0
Saguaro Lake	Hypolimnion	ns	ns
Lake Havasu (November)		<2.0	<2.0

Verde River at Tangle Creek (November)		<2.0	<2.0
Roosevelt at Salt River Inlet		ns	ns