

REGIONAL WATER QUALITY NEWSLETTER

DATE: Report for December 2017

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. Taste and odor compounds in the canals and water treatment plants were all 3.7 ng/l or less which is less than the threshold detection limit of 10 ng/l. Taste and odor compounds in the reservoirs were also less than 10 mg/l with the highest levels of 7.0 ng/l detected in Saguaro Lake. Overall the taste and odor compounds were similar to November and typical of winter months. Sampling by ADEQ at Lake Pleasant did detect microcystin concentrations above 4 ng/l which could be of concern. We are talking to ADEQ about their sampling and possibly including their data in the newsletter.
2. The concentrations of DOC ranged from 1.7 to 3.0 mg/l in the canals and water treatment plants. Reservoir and river sampling also had low DOC concentrations with concentrations ranging from 2.5-3.1 mg/l.
3. Reservoir releases were primarily from Bartlett at the time of sampling. CAP water and groundwater use remained at approximately 20% of the water supply. Releases were only to the Arizona Canal as the South Canal was down for maintenance. Therefore canal sampling was limited to the Arizona Canal.
4. Microbial concentrations for coliforms continued to decrease as compared to November and most values are now within historic norms. Mycobacterium concentrations for November were relatively high even though the temperature decreased and the trend with Mycobacterium was not consistent with coliform data.

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 - December 5th-6th

<u>Sample</u>	<u>E. coli</u>	<u>Coliform</u>
Blank Average	N/A	N/A
AZ Canal at Highway 87 average	56	1400
South Canal below CAP Cross- connect average	N/A	N/A
Cap Canal at Cross-connect average	105	824
AZ Canal at 56th St. average	28	496
AZ Canal- Central Avenue average	39	568
Pima Average	13	824
AZ Canal above CAP Cross-connect average	73	760
Waddell Canal average	6	1200
Verde River @ Beeline average	57	824
AZ Canal below CAP Cross-connect average	90	480
head of the Consolidated Canal average	36	160
Middle of Consolidated Canal average	9	608
Head of Tempe Canal average	38	240

All Values are CFU/100ml

<u>Mycobacterium (November)</u>	<u>colonies</u>
Blank	0
AZ Canal at Highway 87	136
South Canal below CAP Cross- connect	41
Cap Canal at Cross-connect	46
AZ Canal at 56th St.	0
AZ Canal- Central Avenue	107
AZ Canal at Pima	130
AZ Canal above CAP Cross-connect	2
Waddell Canal	87
Verde River @ Beeline	0
AZ Canal below CAP Cross-connect	CONT
head of the Consolidated Canal	71
Middle of Consolidated Canal	97
Head of Tempe Canal	0

CONT – Contaminated with other bacteria

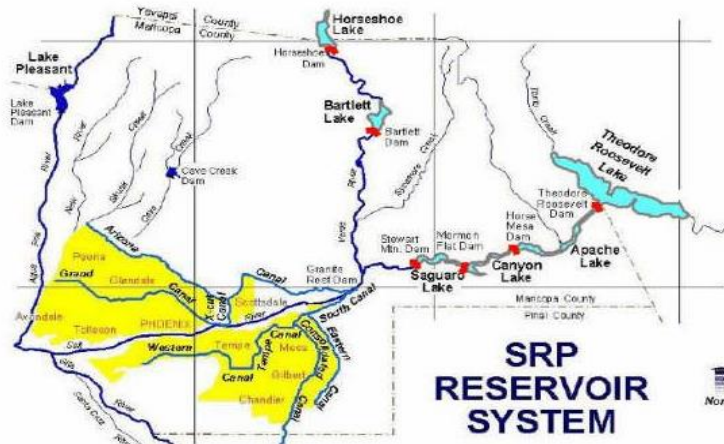
**Quick Update of Water Supplies for December 5th, 2017
(during day of canal/WTP sampling – December 5th, 2017)**

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	440 cfs into Arizona Canal	3.1 mg/L
Verde River	Reservoirs At 42% full	459 cfs	0 cfs into South Canal 109 cfs of CAP water into Arizona Canal	2.8 mg/L
Colorado River	Lake Pleasant is 72.1% full (Lake Powell is 58.4% full)	Lake Pleasant is* releasing 0 cfs	25 cfs Groundwater Pumping into SRP Canals	2.5 mg/L
Groundwater	Pumping ***	109 cfs pumping by SRP		0.5 to 1 mg/L

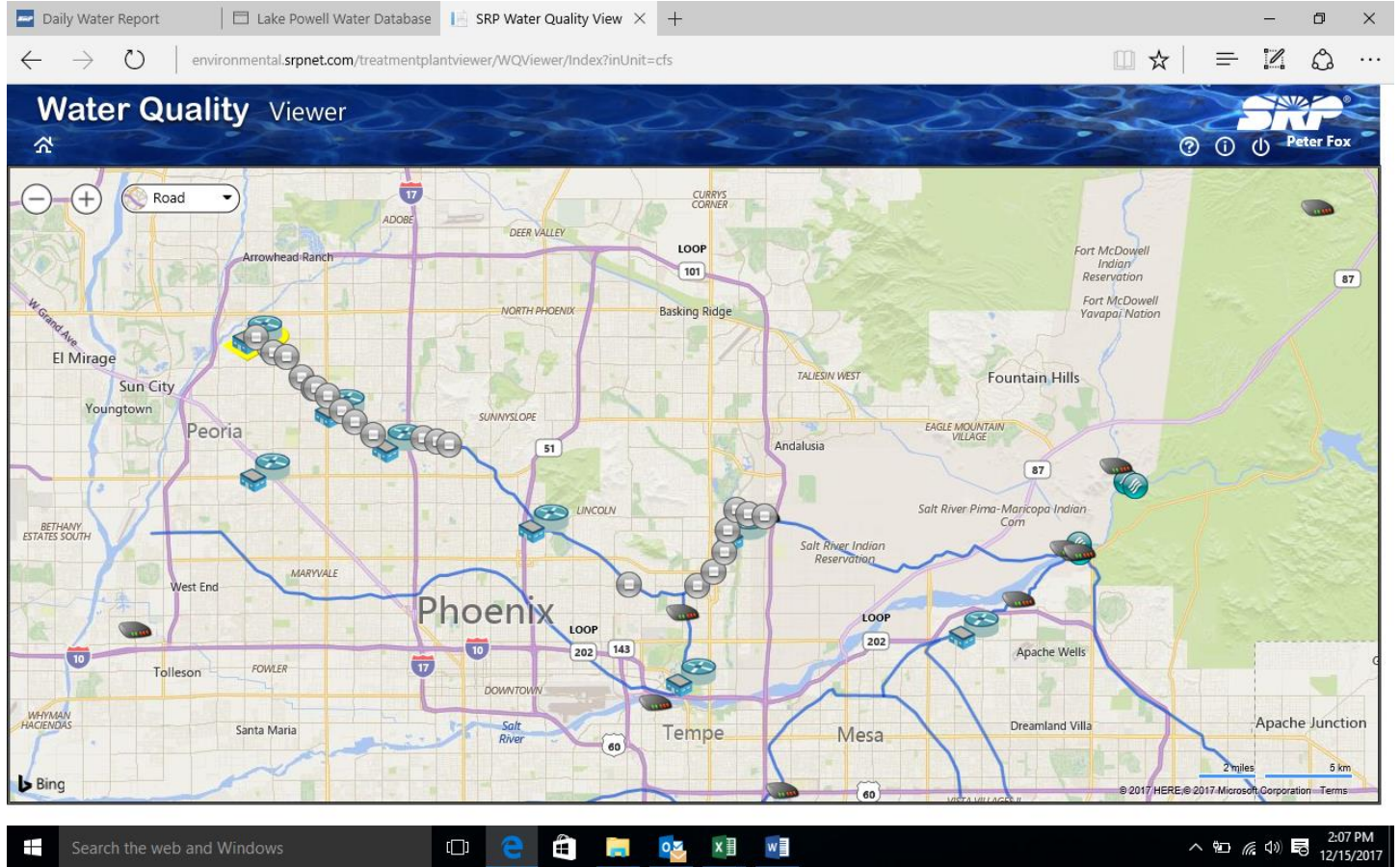
- *CAP is not releasing from Lake Pleasant
- **Concentration of DOC in the terminal reservoir
- ***CAP water is being delivered to the Arizona Canal.

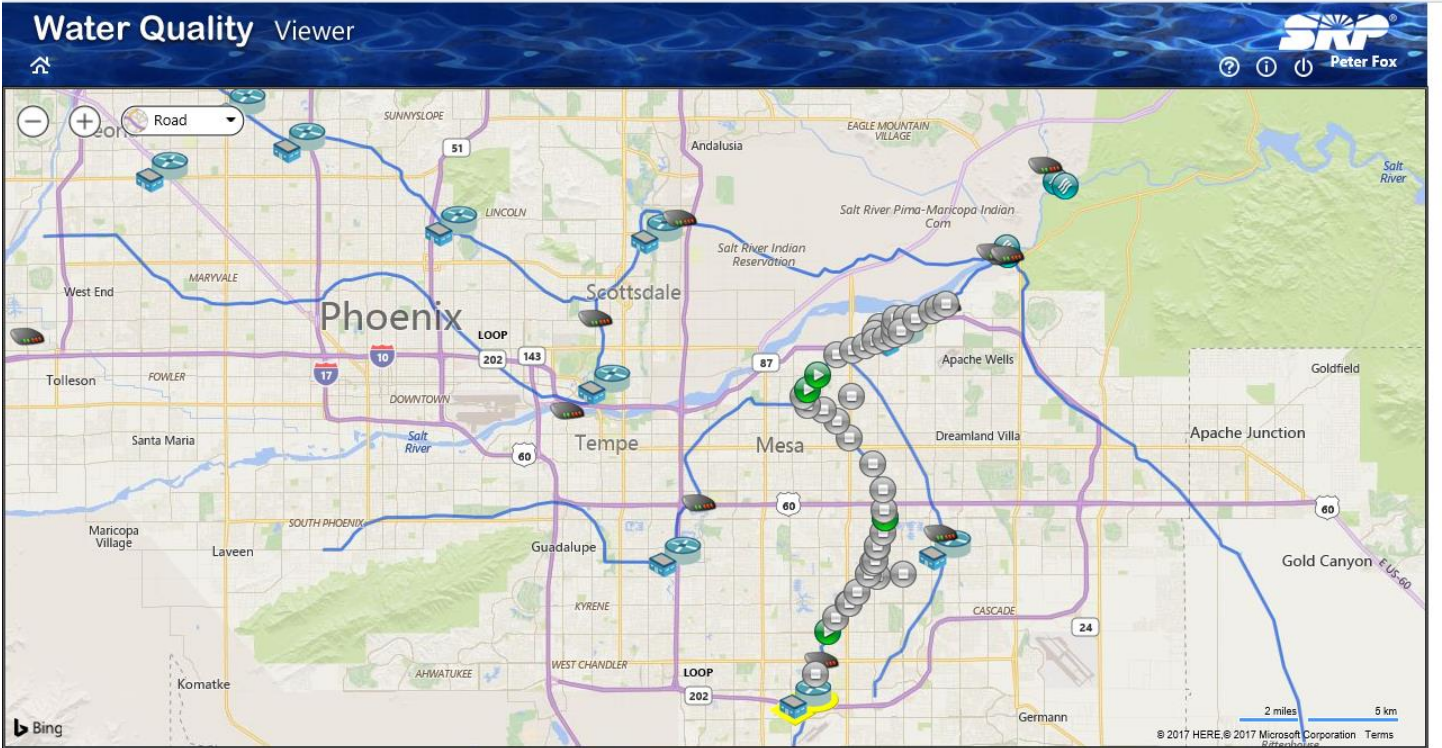
Data from the following websites:

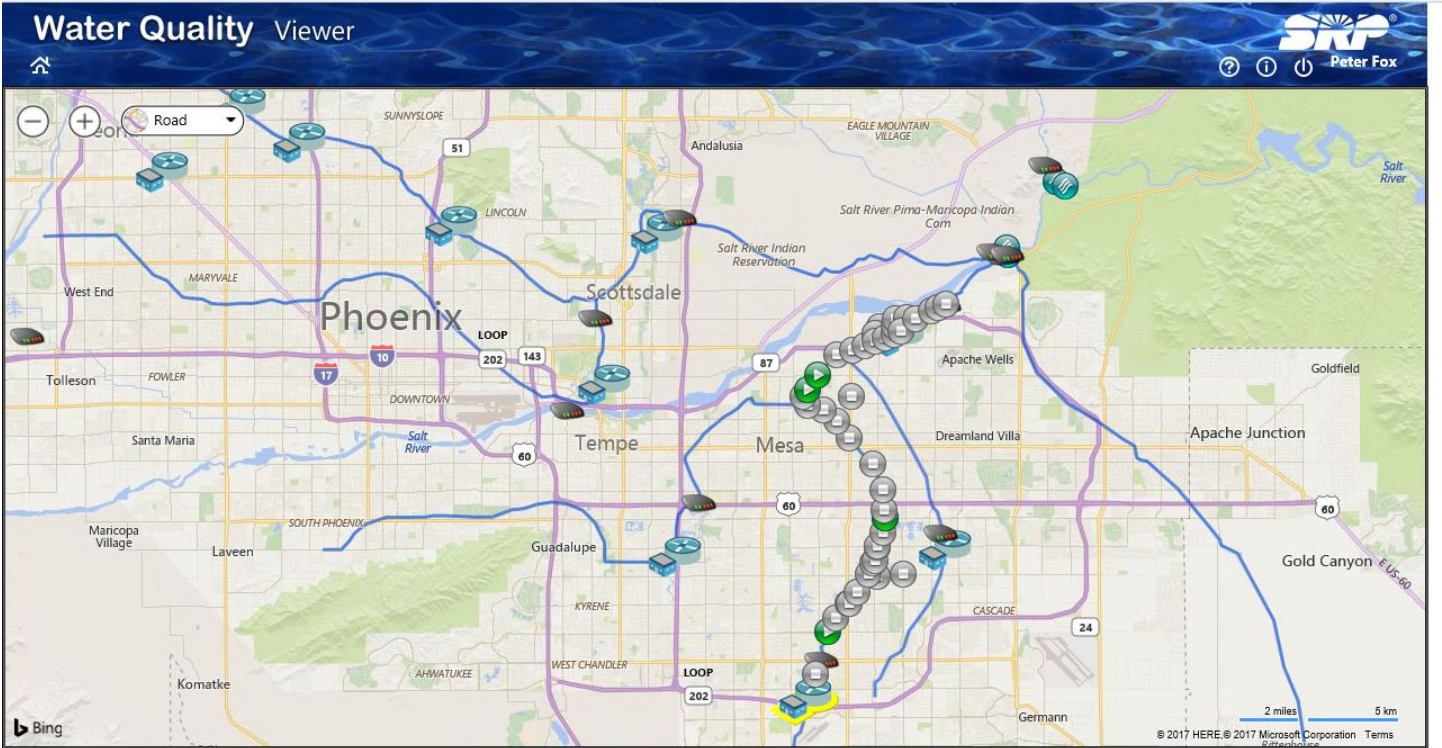
- <http://www.srpwater.com/dwr/>
- <http://www.cap-az.com/departments/water-operations/lake-pleasant>
- <http://lakepowell.water-data.com/>



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)

Reservoir Samples - December 5th-6th, 2017

Sample Description	Location	DOC (mg/L)	UV254 (l/cm)	SUVA (L/mg-m)	TDN (mg/L)
Havasu (November)		2.3	0.045	1.9	0.383
Lake Pleasant (November)	Epilimnion	2.7	0.051	1.9	0.368
	Hypolimnion	2.9	0.052	1.8	0.332
Verde River	at Tangle	N/A	N/A	#VALUE!	N/A
Verde River	at Beeline Highway	2.8	0.071	2.5	0.343
Bartlett Reservoir	Epilimnion	N/A	N/A	#VALUE!	N/A
	Hypolimnion	N/A	N/A	#VALUE!	N/A
Saguaro Lake	Epilimnion	N/A	N/A	#VALUE!	N/A
	Epi - Duplicate	N/A	N/A	#VALUE!	N/A
	Hypolimnion	N/A	N/A	#VALUE!	N/A
Salt River	at Blue Point Bridge	3.1	0.060	2.0	0.150
Salt River	above Roosevelt	1.0	0.034	3.3	0.057
Roosevelt Reservoir Point 1	Epilimnion	N/A	N/A	N/A	N/A
	Hypolimnion	N/A	N/A	N/A	N/A
Roosevelt Reservoir Point 2	Epilimnion	N/A	N/A	N/A	N/A
	Hypolimnion	N/A	N/A	N/A	N/A
Apache Reservoir Point 1	Epilimnion	N/A	N/A	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	N/A	N/A	N/A	N/A
	Hypolimnion	N/A	N/A	N/A	N/A
Canyon Reservoir Point 2	Epilimnion	N/A	N/A	N/A	N/A
	Hypolimnion	N/A	N/A	N/A	N/A

Water Treatment Plants- December 5th-6th, 2017

Sample Description	DOC (mg/L)	UV254 (l/cm)	SUVA (L/mg-m)	TDN (mg/L)
Union Hills Inlet	2.5	0.042	1.7	0.378
Union Hills Treated	2.1	0.022	1.0	0.325
Tempe North Inlet	2.9	0.071	2.5	0.251
Tempe North Plant Treated	1.8	0.022	1.2	0.431
Tempe South Inlet	N/A	N/A	#VALUE!	N/A
Tempe South Plant Treated	N/A	N/A	#VALUE!	N/A
Greenway WTP Inlet	3.0	0.072	2.4	0.258
Greenway WTP Treated	2.1	0.023	1.1	0.216
Glendale WTP Inlet	2.9	0.065	2.2	0.235
Glendale WTP Treated	1.7	0.021	1.2	0.203
Anthem WTP Inlet	3.0	0.040	1.3	0.370
Anthem WTP Treated	2.5	0.039	1.6	0.323
24th Street WTP Inlet	2.8	0.067	2.4	0.257
24th Street WTP Treated	2.0	0.029	1.4	0.206
Chandler WTP Inlet	N/A	N/A	#VALUE!	N/A
Chandler WTP Treated	N/A	N/A	#VALUE!	N/A

Rivers and Canals- December 5th-6th, 2017

Sample Description	DOC (mg/L)	UV254 (l/cm)	SUVA (L/mg-m)	TDN (mg/L)
Waddell Canal	2.5	0.043	1.7	0.371
Anthem WTP Inlet	3.0	0.040	1.3	0.370
Union Hills Inlet	2.5	0.042	1.7	0.378
CAP Salt-Gila Pumping Station (November)	2.6	0.043	1.7	0.286
CAP Mesa Turnout (November)	2.6	0.043	1.6	0.310
CAP Canal at Cross-connect	2.7	0.042	1.6	0.327
Salt River @ Blue pt. Bridge	3.1	0.060	2.0	0.150
Verde River @ Beeline	2.8	0.071	2.5	0.343
AZ Canal above CAP Cross-connect	2.7	0.041	1.5	0.339
AZ Canal below CAP Cross-connect	2.7	0.054	2.0	0.337
AZ Canal at Highway 87	2.8	0.063	2.2	0.276
AZ Canal at Pima Rd.	2.8	0.066	2.3	0.222
AZ Canal at 56th St.	2.7	0.065	2.4	0.242
AZ Canal - Central Avenue	2.7	0.065	2.4	0.223
AZ Canal - Inlet to Glendale WTP	3.0	0.065	2.1	0.258
AZ Canal - Inlet to Greenway WTP	2.9	0.072	2.5	0.235
South Canal below CAP Cross-connect	N/A	N/A	#VALUE!	N/A
Head of Tempe Canal	0.5	0.008	1.7	4.437

Tempe Canal - Inlet to Tempe's South Plant	N/A	N/A	#VALUE!	N/A
Head of the Consolidated Canal	0.4	0.009	2.4	4.300
Middle of Consolidated Canal	0.6	0.015	2.5	4.324
Chandler WTP - Inlet	N/A	N/A	#VALUE!	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 noticeable 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)	Eplimnion	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