

REGIONAL WATER QUALITY NEWSLETTER

DATE: Report for October 2016

**A Tempe, Glendale, Peoria, Chandler, Phoenix, ADEQ, CAP, SRP, Epcor
NSF Central Arizona-Phoenix Long-Term Ecological Research
ASU Regional Water Quality Partnership**

<http://faculty.engineering.asu.edu/pwesterhoff/research/regional-water-quality-issues/>

SUMMARY

1. Taste and Odor compounds were all below the threshold levels of 10 ng/l in the canals and WTPs. Production of Taste and Odor compounds in the canals was not observed. Epilimnion samples from Bartlett and Saguaro both had MIB at 11-11.1 ng/l.
2. UV absorbance values were slightly higher as compared to September but were in a similar range as observed through the summer when DOC concentrations ranged from 2-3 mg/l.
3. The primary source of surface water was the Salt River at the time of sampling. CAP diversions to the Arizona Canal continue while groundwater pumping has decreased.
4. Microbial concentrations were similar to the summer months for coliforms while a decrease was observed in Mycobacterium.

Topics Du Jour

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. The values for coliforms for sampling in October are on consistent with values observed during the summer months while a significant decrease in Mycobacterium was observed in September.

All Values are cfu per 100 ml

<u>Sample</u>	<u>E. coli</u>	<u>Coliform</u>
Blank Average	0	0
AZ Canal at Highway 87 average	11	1136
South Canal below CAP Cross- connect average	48	1176
Cap Canal at Cross-connect average	16	752
AZ Canal at 56th St. average	10	1200
AZ Canal- Central Avenue average	43	922
Pima Average	0	1328
AZ Canal above CAP Cross-connect average	22	984
Waddell Canal average	8	1304
Verde River @ Beeline average	28	1168
AZ Canal below CAP Cross-connect average	33	888
head of the Consolidated Canal average	38	760
Middle of Consolidated Canal average	7	1144
Head of Tempe Canal average	34	968

<u>Mycobacterium (September)</u>	<u>colonies</u>
Blank	0
AZ Canal at Highway 87	1
South Canal below CAP Cross- connect	0
Cap Canal at Cross-connect	0
AZ Canal at 56th St.	2
AZ Canal- Central Avenue	1
AZ Canal at Pima	9
AZ Canal above CAP Cross-connect	15
Waddell Canal	0
Verde River @ Beeline	CONT
AZ Canal below CAP Cross-connect	1

head of the Consolidated Canal	4
Middle of Consolidated Canal	2
Head of Tempe Canal	4

CONT – Contaminated with other bacteria

**Quick Update of Water Supplies for October, 2016
(during day of canal/WTP October 3rd, 2016)**

Source	Trend in supply	Discharge to water supply system	Flow into SRP Canal System	Dissolved organic carbon Concentration (mg/L) **
Salt River	Reservoirs at 47% full	725 cfs	476 cfs into Arizona Canal	2.9 mg/L
Verde River	Reservoirs At 45% full	104 cfs	550 cfs into South Canal	3.0 mg/L
			204 cfs of CAP water into Arizona Canal	
Colorado River	Lake Pleasant is 54.9% full (Lake Powell is 52.5% full)	Lake Pleasant is* releasing 39 cfs	175 cfs Groundwater Pumping into SRP Canals	3.0 mg/L
Groundwater	Pumping ***	175 cfs pumping by SRP		0.5 to 1 mg/L

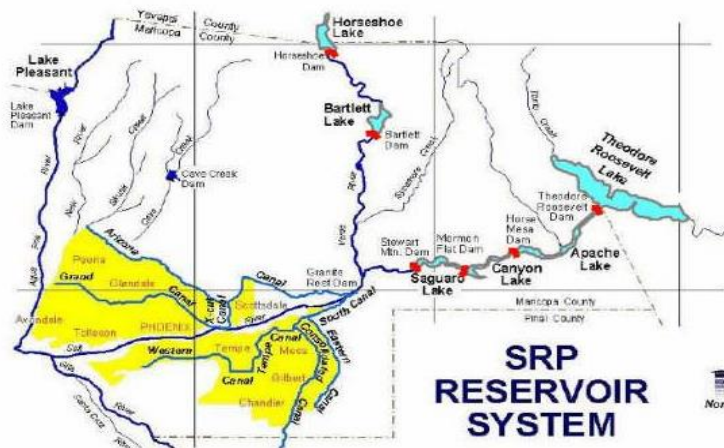
*CAP is releasing 361 cfs from Lake Pleasant which was 14% of the total flow

**Concentration of DOC in the terminal reservoir

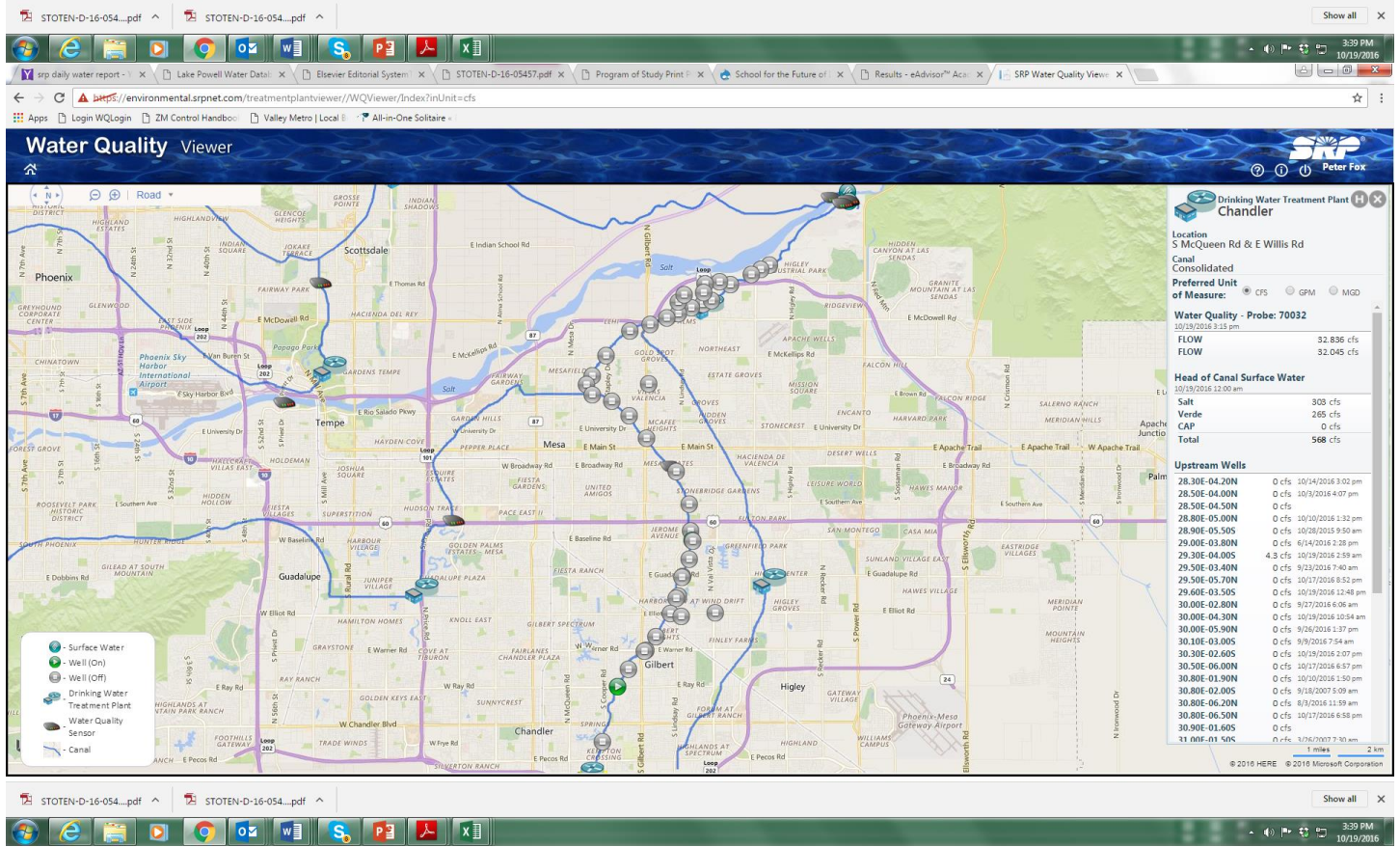
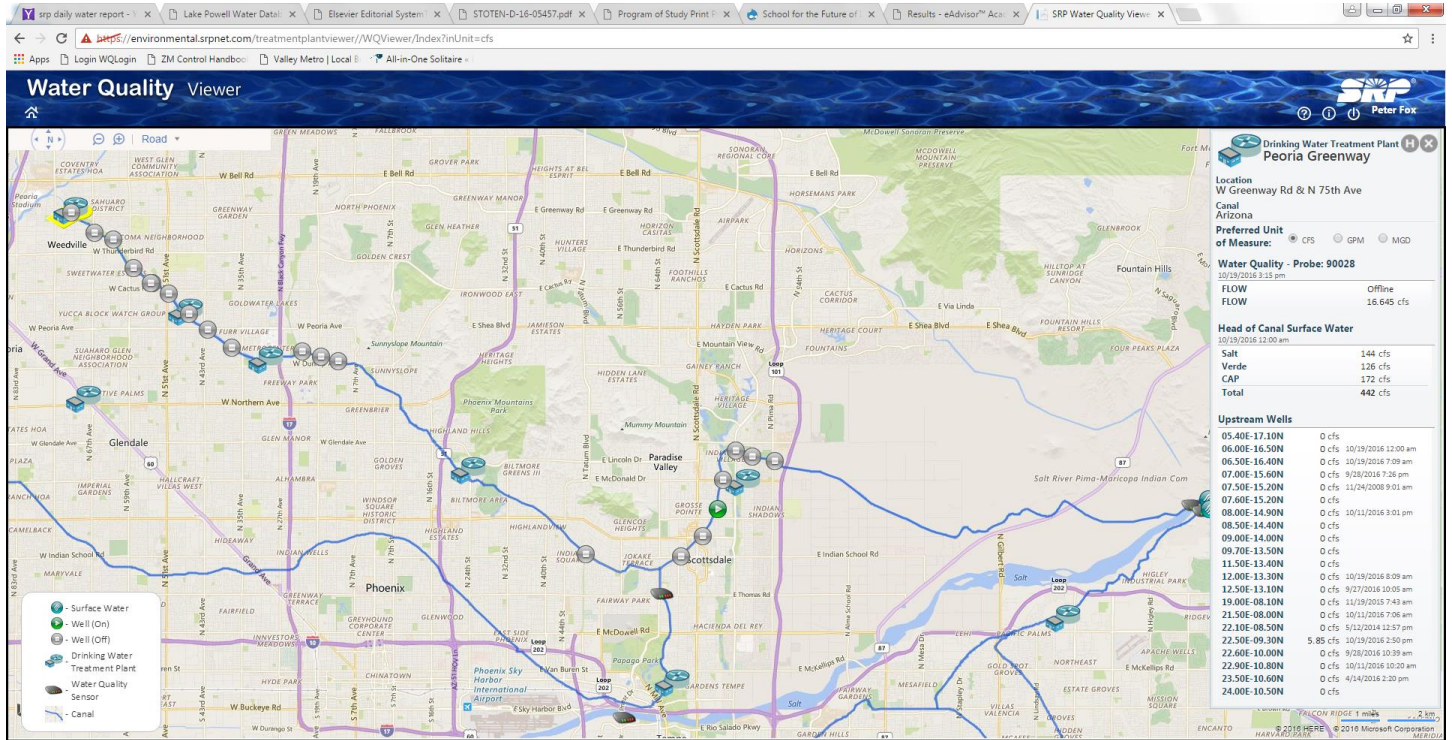
***CAP water is being delivered to the Arizona Canal.

Data from the following websites:

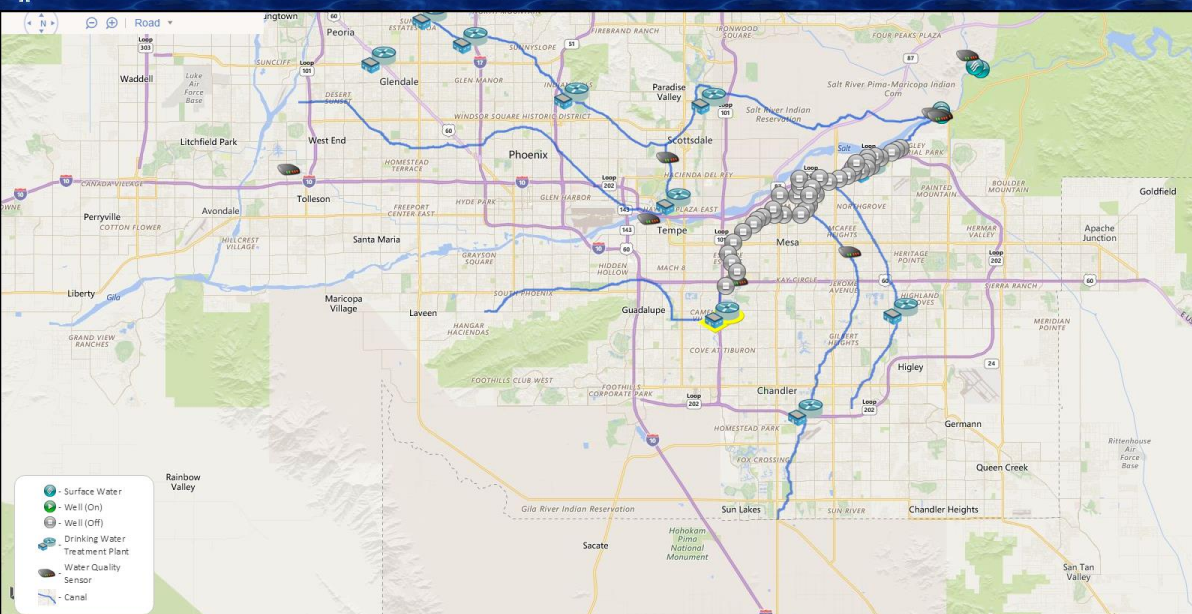
- <http://www.srpwater.com/dwr/>
- <http://www.cap-az.com/departments/water-operations/lake-pleasant>
- <http://lakepowell.water-data.com/>



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



Water Quality Viewer



Drinking Water Treatment Plant
South Tempe

Location
5 Price Rd & E Guadalupe Rd
Canal
Tempe

Preferred Unit of Measure: CFS GPM MGD

Water Quality - Probe: 70014
10/19/2016 3:23 pm
Stage 0.345 FEET

Water Quality - Probe: 70015
10/19/2016 3:25 pm
FLOW 34.09 cfs

Head of Canal Surface Water
10/19/2016 12:00 am
Salt Verde 303 cfs
CAP 0 cfs
Total 568 cfs

Upstream Wells

24.00E-00.30N	0 cfs	10/11/2016 6:54 pm
24.20E-02.00N	0 cfs	10/18/2016 7:21 am
24.40E-01.50N	0 cfs	10/12/2016 7:26 am
24.50E-02.50N	0 cfs	10/11/2016 7:22 pm
24.70E-01.00N	0 cfs	10/16/2016 7:20 am
25.00E-03.10N	0 cfs	10/17/2016 7:25 am
25.50E-03.50N	0 cfs	10/14/2016 8:38 am
25.70E-03.70N	0 cfs	
25.90E-03.90N	0 cfs	10/17/2016 7:28 am
26.00E-04.30N	0 cfs	9/27/2016 6:32 pm
26.60E-04.00N	0 cfs	9/27/2016 10:20 am
26.90E-05.00N	0 cfs	9/29/2016 8:16 am
27.10E-04.00N	0 cfs	10/3/2016 10:17 am
27.90E-05.00N	0 cfs	9/28/2016 8:36 am
28.00E-04.00N	0 cfs	
28.00E-05.50N	0 cfs	9/28/2016 9:02 am
28.00E-05.00N	0 cfs	9/16/2016 10:57 am
28.30E-04.30M	0 cfs	10/14/2016 3:03 pm

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Show all x

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)

October 2016 Data

Reservoir Samples - October 3rd-4th, 2016					
Sample Description	Location	DOC (mg/L)	UV254 (l/cm)	SUVA (L/mg-m)	TDN (mg/L)
Havasu (March)			0.052	#DIV/0!	
Lake Pleasant (March)	Epilimnion		0.046	#DIV/0!	
	Hypolimnion		0.044	#DIV/0!	
Verde River	at Tangle		N/A	#VALUE!	
Verde River	at Beeline Highway		0.069	#DIV/0!	
Bartlett Reservoir	Epilimnion		0.065	#DIV/0!	
	Hypolimnion		N/A	#VALUE!	
Saguaro Lake	Epilimnion		0.059	#DIV/0!	
	Epi - Duplicate		N/A	#VALUE!	
	Hypolimnion		N/A	#VALUE!	
Salt River	at Blue Point Bridge		0.059	#DIV/0!	
Salt River	above Roosevelt		N/A	#VALUE!	
Roosevelt Reservoir Point 1	Epilimnion		N/A	N/A	N/A
	Hypolimnion		N/A	N/A	N/A
Roosevelt Reservoir Point 2	Epilimnion		N/A	N/A	N/A
	Hypolimnion		N/A	N/A	N/A
Apache Reservoir Point 1	Epilimnion		N/A	N/A	N/A
	Hypolimnion		N/A	N/A	N/A
Apache Reservoir Point 2	Epilimnion		N/A	N/A	N/A
	Hypolimnion		N/A	N/A	N/A
Canyon Reservoir Point 1	Epilimnion		N/A	N/A	N/A

	Hypolimnion		N/A	N/A	N/A
Canyon Reservoir Point 2	Epilimnion		N/A	N/A	N/A
	Hypolimnion		N/A	N/A	N/A

Organic Matter in Canal & Water Treatment Plants

Water Treatment Plants- October 3rd-4th, 2016

Sample Description	DOC (mg/L)	UV254 (l/cm)	SUVA (L/mg-m)	TDN (mg/L)
Union Hills Inlet		0.045	#DIV/0!	
Union Hills Treated		0.029	#DIV/0!	
Tempe North Inlet		0.061	#DIV/0!	
Tempe North Plant Treated		0.028	#DIV/0!	
Tempe South Inlet		0.050	#DIV/0!	
Tempe South Plant Treated		0.030	#DIV/0!	
Greenway WTP Inlet		N/A	#VALUE!	
Greenway WTP Treated		N/A	#VALUE!	
Glendale WTP Inlet		0.066	#DIV/0!	
Glendale WTP Treated		0.019	#DIV/0!	
Anthem WTP Inlet		0.048	#DIV/0!	
Anthem WTP Treated		0.046	#DIV/0!	
24th Street WTP Inlet		0.056	#DIV/0!	
24th Street WTP Treated		0.028	#DIV/0!	
Chandler WTP Inlet		0.045	#DIV/0!	
Chandler WTP Treated		0.036	#DIV/0!	

Rivers and Canals- October 3rd-4th, 2016

Sample Description	DOC (mg/L)	UV254 (l/cm)	SUVA (L/mg-m)	TDN (mg/L)
Waddell Canal		0.047	#DIV/0!	
Anthem WTP Inlet		0.048	#DIV/0!	
Union Hills Inlet		0.045	#DIV/0!	
CAP Salt-Gila Pumping Station (June)		0.052	#DIV/0!	
CAP Mesa Turnout (June)		0.051	#DIV/0!	
CAP Canal at Cross-connect		0.049	#DIV/0!	
Salt River @ Blue pt. Bridge		0.059	#DIV/0!	
Verde River @ Beeline		0.069	#DIV/0!	
AZ Canal above CAP Cross-connect		0.049	#DIV/0!	

AZ Canal below CAP Cross-connect		0.054	#DIV/0!
AZ Canal at Highway 87		0.058	#DIV/0!
AZ Canal at Pima Rd.		0.061	#DIV/0!
AZ Canal at 56th St.		0.059	#DIV/0!
AZ Canal - Central Avenue		0.057	#DIV/0!
AZ Canal - Inlet to Glendale WTP		0.066	#DIV/0!
AZ Canal - Inlet to Greenway WTP		N/A	#VALUE!
South Canal below CAP Cross-connect		0.063	#DIV/0!
Head of Tempe Canal		0.060	#DIV/0!
Tempe Canal - Inlet to Tempe's South Plant		0.050	#DIV/0!
Head of the Consolidated Canal		0.061	#DIV/0!
Middle of Consolidated Canal		0.058	#DIV/0!
Chandler WTP - Inlet		0.045	#DIV/0!

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 – October 3, 2016

Sample Description	MIB (ng/L)	Geosmin (ng/L)
Union Hills Inlet	3.6	<2.0
Union Hills Treated	4.8	2.3
Tempe North Inlet	9.5	3.9
Tempe North Plant Treated	8.1	2.2
Tempe South WTP	4.0	3.6
Tempe South Plant Treated	4.0	<2.0
Anthem Inlet	4.2	2.5
Anthem Treated	4.1	2.3
Chandler Inlet	5.4	3.8
Chandler Treated	6.5	3.2
Greenway WTP Inlet	ns	ns
Greenway WTP Treated	ns	ns
Glendale WTP Inlet	4.3	2.1
Glendale WTP Treated	2.1	<2.0
24th St. WTP Inlet	7.6	3.8
24th St. WTP Outlet	7.0	<2.0

Table 2 - Canal Sampling – October 3, 2016

System	Sample Description	MIB (ng/L)	Geosmin (ng/L)
CAP	Waddell Canal	5.0	2.3
	Union Hills Inlet	3.6	<2.0
	CAP Canal at Cross-connect	4.3	2.1
AZ Canal	Salt River @ Blue Pt Bridge	8.3	2.8
	Verde River @ Beeline	8.5	6.6
	AZ Canal above CAP Cross-connect	3.8	<2.0
	AZ Canal below CAP Cross-connect	5.7	2.4
	AZ Canal at Highway 87	8.2	4.7
	AZ Canal at Pima Rd.	6.6	4.2
	AZ Canal at 56th St.	7.2	3.5
	AZ Canal - Central Avenue	6.7	4.0
	AZ Canal - Inlet to Glendale WTP	4.3	2.1
	Head of the Consolidated Canal	9.0	3.3
	Middle of the Consolidated Canal	9.2	2.9
South Tempe Canals	South Canal below CAP Cross-connect	<2.0	<2.0
	Head of the Tempe Canal	8.3	3.6
	Tempe Canal - Inlet to Tempe's South Plant	4.0	3.6
	Salt-Gila (Sept)	14.5	<2.0
	Mesa Turnout (Sept)	13.5	<2.0

Table 3 - Reservoir Samples – October 4, 2016

Sample Description	Location	MIB (ng/L)	Geosmin (ng/L)
Lake Pleasant (Sept)	Epilimnion	5.5	<2.0
Lake Pleasant (Sept)	Hypolimnion	16.6	<2.0
Verde River @ Beeline		8.5	6.6
Bartlett Reservoir	Epilimnion	ns	ns
Bartlett Reservoir	Epi-near dock	11.1	2.5
Bartlett Reservoir	Hypolimnion	ns	ns
Salt River @ BluePt Bridge		8.3	2.8
Saguaro Lake	Epilimnion	ns	ns
Saguaro Lake	Epi - Duplicate	ns	ns
Saguaro Lake	Epi-near dock	11.0	3.5
Saguaro Lake	Hypolimnion	ns	ns
Lake Havasu (Sept)		5.1	3.0
Verde River at Tangle Creek		ns	ns
Roosevelt at Salt River Inlet		ns	ns