

REGIONAL WATER QUALITY NEWSLETTER

DATE: Report for August 2012

A Tempe, Glendale, Peoria, Chandler, CAP, SRP, Arizona American Water– ASU Regional Water Quality Partnership

<http://enpub.fulton.asu.edu/pwest/tasteandodor.htm>

Sampling dates: August 6, 2012

SUMMARY: EVALUATION AND RECOMMENDATIONS

1. MIB levels are starting to increase in Bartlett Reservoir and Saguaro Lake with levels of 70 to 90 ng/L in the epilimnion (upper layers) and 5 to 10 ng/L deeper in the lake where water is released.
2. Geosmin is being produced in the lower AZ canal, up to levels of 20 to 30 ng/L. However, Glendale and Peoria WTPs are effectively reducing the levels to < 10 ng/L.
3. We continue quarterly sampling of the Salt River to monitor effects of the Wallow fire. Our last sampling was May 2012 and our next will be August 2012. We will present the latest data at our workshop in september.

HOLD THE DATE FOR OUR ANNUAL Regional water quality workshop – Friday September 7th (830am-11:30am) at the SRP Pera Club. (Profession Development Hours (PDHs) will be provided for attending)

PRELIMINARY

REGIONAL WATER QUALITY WORKSHOP

Friday September 7, 2012

Time: 8:15 am to 11:30 am
Location: SRP PERA Club
1 E Continental Dr Tempe, AZ 85281
Directions: <https://plus.google.com/107365532664807450679/about?gl=us&hl=en>
Parking: Parking is free.

PDHs (2 hours) will be provided for attending the workshop

Purpose: Provide a forum to review and discuss on-going regional water quality issues.

8:15	Refreshments
8:30	Introductions
8:45	Project overview and Water Quality Trends (Westerhoff)
	Wallow Fire impacts on water quality (Westerhoff)
	Turbidity and DOC impacts on the San Tan WTP in the CAP Canal (Barry)
	Role of liposomes on membrane fouling (Barry)
	Leveraged new projects (Westerhoff)
	- C Removal of trace organics (NDMA precursors) by Activated Carbon (Hannigan)
	- Photocatalytic nitrate reduction on ion exchange brines (Ting)
	- Cr6 and As simultaneous removal (Gifford)
	- Hexavalent chrome occurrence and treatment (Bowen)
	- Pilot tests on-situ GAC regeneration using Ferric Chloride (Westerhoff)
10:45	Future directions & discussion
11:00	Meeting adjournment

Quick Update of Water Supplies for August 2012 (during day of sampling – August 6)

Source	Trend in supply	Discharge to water supply system	Flow into SRP Canal System	Dissolved organic carbon Concentration (mg/L) **
Salt River	Reservoirs at 59% full	1077 cfs	742 cfs into Arizona Canal 469 cfs into South Canal (90% Salt River Water)	4.5 mg/L
Verde River	Reservoirs At 28% full	110 cfs		3.2 mg/L
Colorado River	Lake Pleasant is 73% full (Lake Powell is 59% full)	Lake Pleasant releasing 2166 cfs into CAP canal	0 cfs of CAP water into Arizona Canal ***	3.0 mg/L
Groundwater	Generally increasing due to recharge	481 cfs pumping by SRP	481 cfs Groundwater Pumping into SRP Canals	0.5 to 1 mg/L

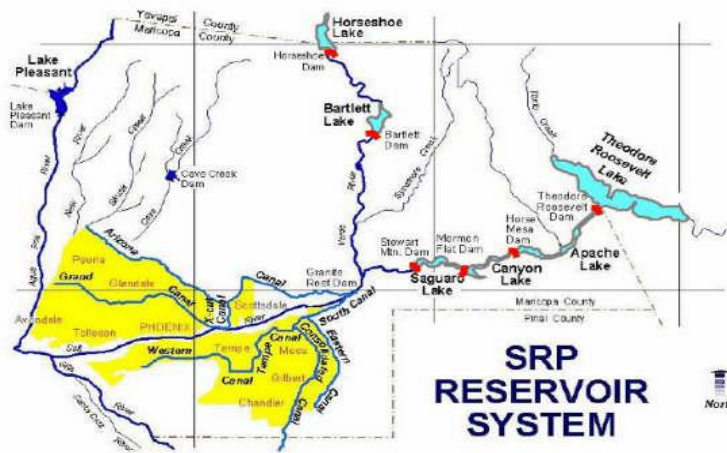
*Concentration of these taste and odor compounds in the upper [lower] levels of the terminal reservoir (Saguaro Lake on the Salt River; Bartlett Lake on the Verde River; Lake Pleasant on the CAP system)

**Concentration of DOC in the terminal reservoir

*** On paper cities are receiving CAP water in the SRP canals, but as a method of “paying back” from the last drought for excess CAP deliveries – SRP is delivering wet water only from the Salt and Verde Rivers

Data from the following websites:

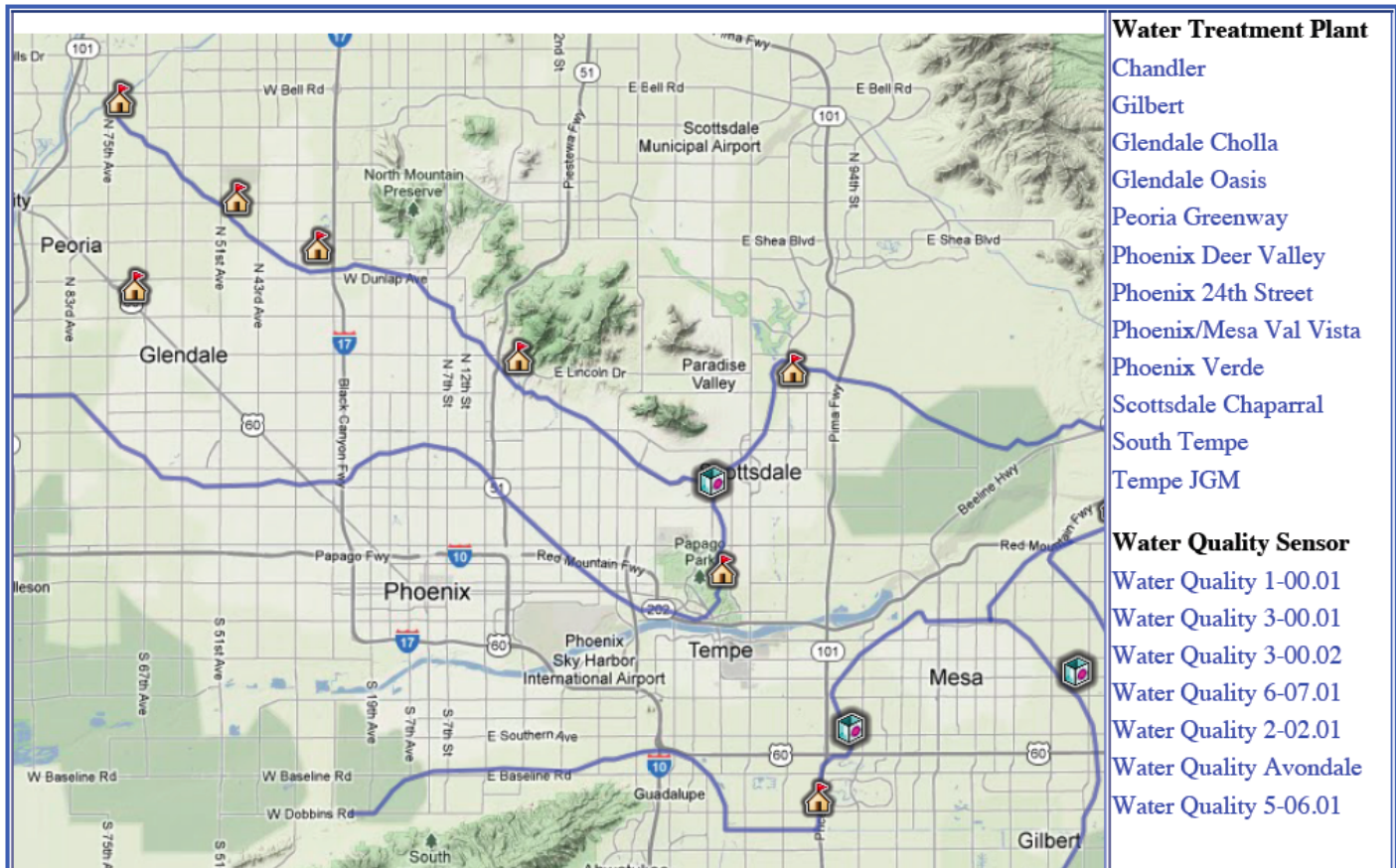
- <http://www.srpwater.com/dwr/>
- <http://www.cap-az.com/Operations/LakePleasantOps.aspx>
- <http://lakepowell.water-data.com/>



Are you tracking water and water quality on-line:

Ask you supervisor or Gregg Elliott/SRP for access to this password protected site. There is access to real-time water quality data, well pumping, etc. Most of the operating pumps are on the South and Consolidated canals.

Water Quality and Canal Mix Viewer



<http://www.srpwater.com/wtpviewer/Default.aspx>

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Dissolved Organic Carbon In Reservoirs and Treatment Plants

DOC = Dissolved organic carbon

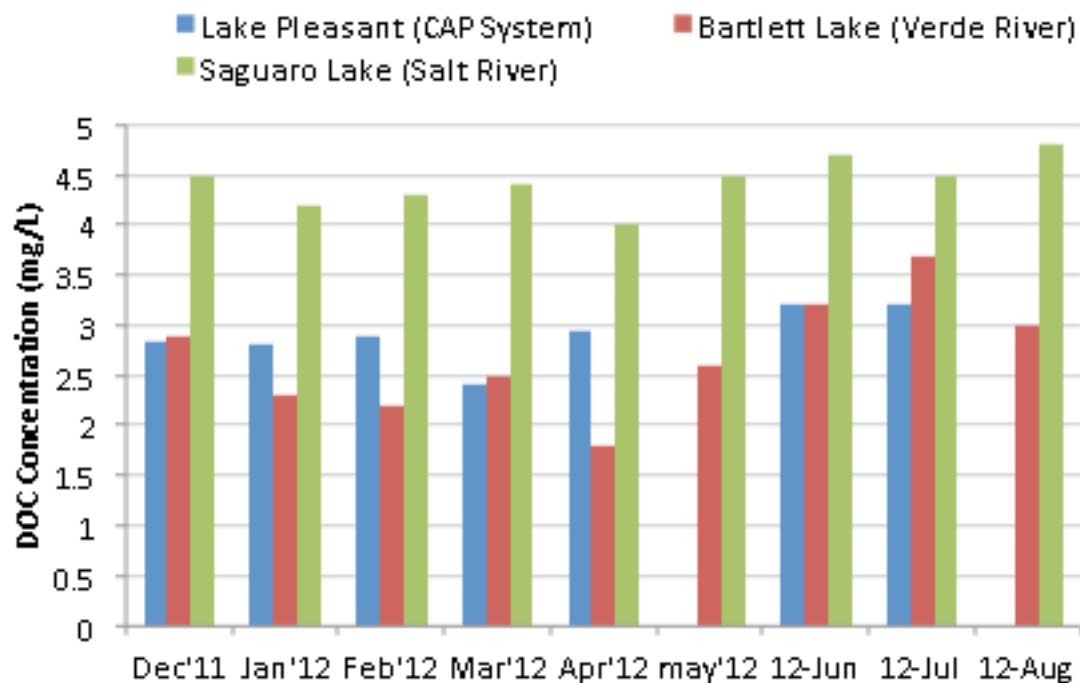
UV254 = ultraviolet absorbance at 254 nm (an indicator of aromatic carbon content)

SUVA = UV254/DOC

TDN = Total dissolved nitrogen (mgN/L)

Reservoir Samples – July 2012

DOC levels in Bartlett Lake have been slowly increasing as the result of algae production and release of algae soluble microbial products. Right now with little outflow from Bartlett Lake is behaving as a giant bathtub reactor.



Sample Description	Location	DOC (mg/L)	UV254 (1/cm)	SUVA (L/mg-m)	TDN
Lake Pleasant	Epilimnion Hypolimnion	Not Available			
Verde River	@ Beeline Hwy	2.5	0.04	1.6	0.3
Bartlett Reservoir	Epilimnion	3.6	0.05	1.3	0.5
	Hypolimnion	2.4	0.05	2.0	0.4
Salt River	@ Blue Point Bridge	3.4	0.07	2.0	0.3
Saguaro Lake	Epilimnion	5.1	0.07	1.4	0.4
	Epi - Duplicate	5.6	0.07	1.2	0.5
	Hypolimnion	4.3	0.07	1.5	0.5
Verde River	@ Tangle	2.3	0.15	6.2	0.3
Havas		Not Available			
Salt River above Roosevelt	above Roosevelt	Not Available			

Organic Matter in Canal
August 2012

Sample Description	DOC (mg/L)	UV254 (1/cm)	SUVA (L/mg-m)	TDN
Waddell Canal	2.5	0.05	1.9	0.4
Anthem WTP Inlet	2.5	0.05	1.9	0.4
Union Hills Inlet	2.3	0.04	1.6	0.4
CAP Canal at Cross-connect	not available			
Salt River @ Blue Pt Bridge	3.4	0.07	2.0	0.3
Verde River @ Beeline	2.5	0.04	1.6	0.3
AZ Canal above CAP Cross-connect	3.4	0.07	1.9	0.3
AZ Canal below CAP Cross-connect	3.1	0.07	2.1	0.3
AZ Canal at Highway 87	3.1	0.07	2.1	0.3
AZ Canal at Pima Rd.	3.6	0.07	1.8	0.3
AZ Canal at 56th St.	2.8	0.06	2.3	0.3
AZ Canal - Central Avenue	3.1	0.06	2.1	1.8
AZ Canal - Inlet to Glendale WTP	3.2	0.06	1.9	0.7
AZ Canal - Inlet to GreenwayWTP	3.2	0.06	1.8	0.7
South Canal below CAP Cross-connect	3.1	0.07	2.1	0.3
Head of the Tempe Canal	2.6	0.05	2.1	0.6
Tempe Canal - Inlet to Tempe's South Plant	1.1	0.02	1.5	2.7
Head of the Consolidated Canal	3.0	0.05	1.6	0.6
Middle of the Consolidated Canal	2.9	0.04	1.4	1.5
Chandler WTP – Inlet	2.1	0.04	1.9	0.3

Organics at the Water Treatment Plants

Table 2 - Water Treatment Plants – August 6, 2012

Sample Description	DOC (mg/L)	UV254 (1/cm)	SUVA (L/mg-m)	TDN
Union Hills Inlet	2.3	0.04	1.6	0.4
Union Hills Treated	2.2	0.03	1.1	0.3
Tempe North Inlet	3.1	0.06	2.1	0.3
Tempe North Plant Treated	2.6	0.03	1.3	0.3
Tempe South Inlet	1.1	0.02	1.5	2.7
Tempe South Plant Treated	0.7	0.01	1.5	2.2
Greenway WTP Inlet	3.2	0.06	1.8	0.7
Greenway WTP Treated	2.3	0.02	1.0	1.5
Glendale WTP Inlet	3.2	0.06	1.9	0.7
Glendale WTP Treated	2.9	0.04	1.3	0.6
Anthem WTP Inlet	2.5	0.05	1.9	0.4
Anthem WTP Treated	2.0	0.04	2.2	0.3
Chandler WTP Inlet	2.1	0.04	1.9	0.3
Chandler WTP Treated	1.9	0.03	1.4	1.6

DOC removal (%)
5
18
40
29
9
19
10

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. We usually present all the data when concentrations start to exceed 5 ng/L. Here we summarize the occurrence during the cooler months:

OBSERVATIONS FOR July 2012

- MIB levels in Saguaro lake have increased over the past month from ~6 ng/L in June to ~30 ng/L in July and now very high in Bartlett and Saguaro Lakes (**70 to 90 ng/L**). This is typical as sunlight and warm water produce algae that release MIB and Geosmin in the upper layers of the lake. Deeper in the lake, where water is withdrawn into the Salt River and SRP canals, MIB levels remain below 10 ng/L. This will gradually increase over the summer. The same is happening in Bartlett Lake.
- There is no production of MIB in the Canals, but **Geosmin is being produced at elevated levels in the lower Arizona Canal – below 56th street with Glendale having levels above 15 ng/L – which is noticeable. Fortunately their treatment is able to reduce the levels to < 2 ng/L.** Peoria also has high levels of geosmin from the Arizona Canal, which is also being controlled to less than 10 ng/L.

Sample Description	Location	MIB (ng/L)	Geosmin (ng/L)	Cyclocitral (ng/L)
Lake Pleasant	Epilimnion			
Lake Pleasant	Hypolimnion			
Verde River @ Beeline		28.8	5.7	<2.0
Bartlett Reservoir	Epilimnion	94.6	2.3	<2.0
Bartlett Reservoir	Epi-near dock	81.0	2.3	<2.0
Bartlett Reservoir	Hypolimnion	4.0	1.6	<2.0
Salt River @ BluePt Bridge		12.1	9.1	<2.0
Saguaro Lake	Epilimnion	75.3	3.6	<2.0
Saguaro Lake	Epi - Duplicate	77.2	3.3	<2.0
Saguaro Lake	Epi-near dock	73.2	2.7	<2.0
Saguaro Lake	Hypolimnion	10.9	2.3	<2.0
Lake Havasu				
Verde River at Tangle Creek (July)		<2.0	<2.0	<2.0
Roosevelt at Salt River Inlet				

System	Sample Description	MIB (ng/L)	Geosmin (ng/L)	Cyclocitral (ng/L)
CAP	Waddell Canal	2.1	<2.0	<2.0
	Union Hills Inlet	4.3	<2.0	<2.0
	CAP Canal at Cross-connect			
AZ Canal	Salt River @ Blue Pt Bridge	12.1	9.1	<2.0
	Verde River @ Beeline	28.8	5.7	<2.0
	AZ Canal above CAP Cross-connect	16.2	7.6	<2.0
	AZ Canal below CAP Cross-connect	17.7	7.2	<2.0
	AZ Canal at Highway 87	17.2	7.7	<2.0
	AZ Canal at Pima Rd.	13.8	6.6	<2.0
	AZ Canal at 56th St.	17.3	10.3	<2.0
	AZ Canal - Central Avenue	21.6	32.6	<2.0
	AZ Canal - Inlet to Glendale WTP	9.4	10.4	<2.0
	Head of the Consolidated Canal	11.1	5.7	<2.0
	Middle of the Consolidated Canal	7.7	17.0	<2.0
South Tempe Canals	South Canal below CAP Cross-connect	16.4	6.9	<2.0
	Head of the Tempe Canal	12.2	9.1	<2.0
	Tempe Canal - Inlet to Tempe's South Plant	5.6	1.9	<2.0

Sample Description	MIB (ng/L)	Geosmin (ng/L)	Cyclocitral (ng/L)
Union Hills Inlet	4.3	<2.0	<2.0
Union Hills Treated	<2.0	<2.0	<2.0
Tempe North Inlet	14.5	16.4	<2.0
Tempe North Plant Treated	7.8	2.3	<2.0
Tempe South WTP	5.6	<2.0	<2.0
Tempe South Plant Treated	2.2	<2.0	<2.0
Anthem Inlet	<2.0	<2.0	<2.0
Anthem Treated	<2.0	<2.0	<2.0
Chandler Inlet	2.3	4.6	<2.0
Chandler Treated	3.3	6.5	<2.0
Greenway WTP Inlet	3.9	6.0	<2.0
Greenway WTP Treated	<2.0	<2.0	<2.0
Glendale WTP Inlet	9.4	10.4	<2.0
Glendale WTP Treated	<2.0	<2.0	<2.0