Regional Water Quality NEWSLETTER

DATE: Report for May 2007
Samples Collected on May 7-8, 2007
From the Phoenix, Tempe, Peoria, CAP, SRP – ASU Regional Water Quality Partnership

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

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SUMMARY: EVALUATION AND RECOMMENDATIONS

1. MIB concentrations are low, but geosmin concentrations are 5 to 10 ng/L. At these levels earthy-musty tastes and odors will just start to be noticeable. When the sum of MIB + geosmin concentrations exceed 10 to 15 ng/L, they will be quite noticeable in drinking water.
2. High levels of geosmin exist in Saguaro lake and are starting to affect water leaving the reservoir.
3. None of the reservoirs are thermally stratified yet, but should be by mid-June. This will affect a number of water quality parameters over the coming months.
4. DOC concentrations remain high in the Salt River system.
5. SRP funds new project with ASU team on: Monitoring of Trace-Level Pharmaceuticals and Personal Care Products in Salt River Project Waters (Starts July 2007)

Table 1 Summary of WTP Operations

	Union Hills	24th Street WTP	N.Tempe J.G. Martinez	Deer Valley	Greenway WTP	Val Vista	South Tempe	Chandler WTP
Location	**CAP**	**Arizona Canal System**				**South Canal System**		
PAC Type and Dose	None	12 ppm Norit 20b	None	17 ppm	None	15 ppm Norit 20b	None	No
Copper Sulfate	No	No	No	No	No	0.30 ppm	No	
PreOxidation	no	No	No	No	1.4 mg/L ozone	No	No	
Alum Dose Alkalinity pH	12.31 [1] 128/115 7.2	45 148/118 6.9	34 [3] 150 7.5	47 106 6.9	36 146 7.1	60 160/115	13 180 7.65	
Finished water DOC DOC removal[2]	2.6 18%	3.1 31%	3.6 19%	3.3 20%	2.7 35%	2.8 34%	0.9 34%	
WTP plant comments	Plant was shut down 8am to 2pm during sampling					Reports 42% TOC removal and ave TTHM of 30 ppb		
Recommendations			Consider increasing alum and/or adding acid to improve DOC removal					

[1] **Ferric chloride instead of alum**
[2] Calculated based upon influent and filtered water DOC (note that DOC – not TOC – is used in this calculation)
[3] Also adding 4.4 mg/L floc aid

Verde WTP is using 5 mg/L Norit 20B PAC, 55ppm alum (alkalinity is 162 (raw) and 130 (finished)), TOC removal is 48% and TTHM is 27 ppb.

Table 2 - Water Treatment Plants – May 7, 2007

Sample Description	MIB (ng/L)	Geosmin (ng/L)	Cyclocitral (ng/L)
24th Street WTP Inlet	<2.0	4.3	<2.0
24th Street WTP Treated	<2.0	<2.0	<2.0
Deer Valley Inlet	<2.0	<2.0	<2.0
Deer Valley WTP Treated	<2.0	2.4	<2.0
Val Vista Inlet	<2.0	7.3	3.1
Val Vista WTP Treated –East	<2.0	4.0	<2.0
Val Vista WTP Treated -West	<2.0	3.3	<2.0
Union Hills Inlet	<2.0	<2.0	<2.0
Union Hills Treated	<2.0	<2.0	<2.0
Tempe North Inlet	<2.0	5.0	<2.0
Tempe North Plant Treated	<2.0	5.6	<2.0
Tempe South WTP	<2.0	<2.0	<2.0
Tempe South Plant Treated	<2.0	<2.0	<2.0
Tempe South Plant Treated (Lab)			
Chandler WTP Inlet	7.3	<2.0	
Chandler WTP Treated	<2.0	<2.0	
Greenway WTP Inlet	<2.0	4.2	<2.0
Greenway WTP Treated	<2.0	<2.0	<2.0

For the Verde WTP – the MIB & geosmin concentrations collected in the Verde River near the Beeline Highway are probably relevant to what you are seeing. Those concentrations are:

- MIB = <2 ng/L
- Geosmin = 5.1 ng/L

Table 3 - Canal Sampling – May 7, 2007

System	Sample Description	MIB (ng/L)	Geosmin (ng/L)	Cyclocitral (ng/L)
CAP	Waddell Canal	<2.0	<2.0	<2.0
	Union Hills Inlet	<2.0	<2.0	<2.0
	CAP Canal at Cross-connect	<2.0	<2.0	<2.0
AZ Canal	Salt River @ Blue Pt Bridge	<2.0	10.8	<2.0
	Verde River @ Beeline	3.9	<2.0	2.2
	AZ Canal above CAP Cross-connect	<2.0	7.6	<2.0
	AZ Canal below CAP Cross-connect	<2.0	5.2	10.7
	AZ Canal at Highway 87	<2.0	5.1	2.0
	AZ Canal at Pima Rd.	<2.0	<2.0	4.6
	AZ Canal at 56th St.	<2.0	4.2	2.1
	AZ Canal - Inlet to 24th Street WTP	<2.0	4.3	<2.0
	AZ Canal - Central Avenue	<2.0	<2.0	<2.0
	AZ Canal - Inlet to Deer Valley WTP	<2.0	<2.0	<2.0
	AZ Canal - Inlet to Greenway WTP	<2.0	4.2	<2.0
South and Tempe Canals	South Canal below CAP Cross-connect	<2.0	5.0	5.1
	South Canal at Val Vista WTP	<2.0	7.3	3.1
	Head of the Tempe Canal	<2.0	4.2	<2.0
	Tempe Canal - Inlet to Tempe's South Plant	<2.0	<2.0	<2.0
	Chandler WTP – Inlet	7.3	<2.0	<2.0

Table 4 - Reservoir Samples – May 8, 2007

Sample Description	Location	MIB (ng/L)	Geosmin (ng/L)	Cyclocitral (ng/L)
Lake Pleasant (May 1, 2007)	Eplimnion	<2.0	<2.0	<2.0
Lake Pleasant	Hypolimnio	<2.0	<2.0	<2.0
Verde River @ Beeline		3.9	<2.0	2.2
Bartlett Reservoir	Epilimnion	5.6	<2.0	<2.0
Bartlett Reservoir	Epi-near dock	6.4	<2.0	<2.0
Bartlett Reservoir	Hypolimnio	<2.0	<2.0	<2.0
Salt River @ BluePt Bridge		<2.0	10.8	<2.0
Saguaro Lake	Epilimnion	7.5	248.7	2.5
Saguaro Lake	Epi - Duplicate	7.4	228.8	3.1
Saguaro Lake	Epi-near doc	5.5	176.6	2.8
Saguaro Lake	Hypolimnio	5.2	21.4	<2.0
Verde River at Tangle (April 25, 2007)		<2.0	<2.0	<2.0
Havasu (May 1, 2007)		<2.0	<2.0	<2.0

Geosmin concentrations in Saguaro Lake in the upper 10 meters of the water column (Eplimnion) and deeper parts of the water column (hypolimnion) are shown below. Water from the hypolimnion is released downstream to the Salt River, SRP Canals, and then to the water treatment plants. Geosmin levels have increased dramatically over the past month. One reason for this may be that SRP is releasing water from Canyon Lake for repairs on the dam this year. As a result, this water may be moving through Saguaro Lake with minimal mixing.

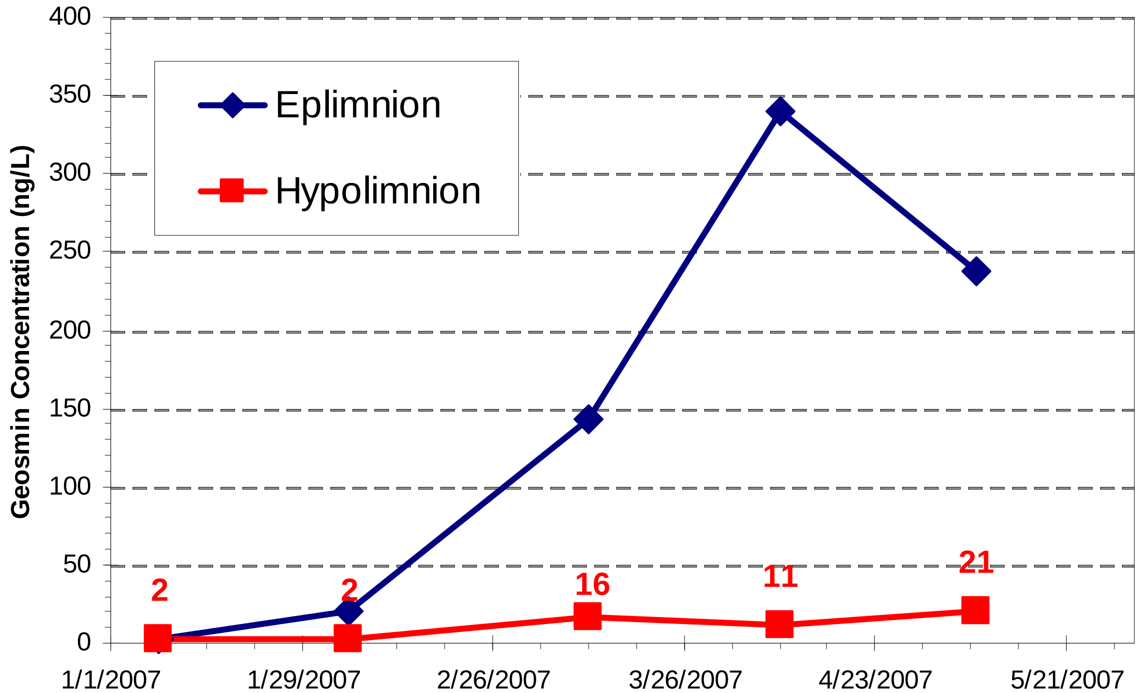

Table 5 - SRP/CAP OPERATIONS
Values in cfs, for May 7, 2007

System	SRP Diversions	CAP
Arizona Canal	619	198
South Canal	411	41
Pumping	583	0
Total	1613	239

SRP is releasing water from both Verde and Salt River Systems. Salt River release from Saguaro Lake: 747 cfs; Verde River release from Bartlett Lake: 135 cfs.

P.O. Box 43020 • Phoenix, AZ 85080-3020
23636 North Seventh Street • Phoenix, AZ 85024
623-869-2333 • www.cap-az.com

DATE: April 24, 2007

TO: Distribution

FROM: TK Tim Kacerek, CAP Water Control Manager

SUBJECT: Summer 2007 Lake Pleasant Operating Plans

CAP's summer 2007 operating strategy will be similar to previous years. In late June, we will begin to transition into the usual summer operation of releasing water from Lake Pleasant. In order to supply customers with the best quality water, CAP's operational strategy will be to make all releases exclusively from the lower gates all summer. This strategy has successfully minimized water quality impacts since 1998. It has been determined that, by not releasing water from Lake Pleasant in late summer, taste and odor issues are effectively avoided, so no lake water will be released after the second week of September. Refilling of Lake Pleasant will begin around November 1. The lake level is projected to drop from elevation 1696 to elevation 1650 by the end of August.

The plan is to continuously pump from the west end of the CAP system, supplementing Lake Pleasant releases with pass-through pumping of Colorado River water. About 1100 cfs of Colorado River water may be blended with Lake Pleasant releases. Pumping operations may change based on energy market conditions. The west end pumping may be reduced and Lake Pleasant water may be increased for short periods of time between June and the end of summer, so the two water sources may be blended in varying amounts. For the benefit of our M&I users, treatment plants will be given as much advance notice as possible of all changes in water sources.

This summer, there will be a three week period in August when there will be no pass-through pumping. CAP will make repairs to the Jackrabbit Siphon during this time. Deliveries will be made from 100% Lake Pleasant water to customers downstream of the lake from July 29 through August 18. Deliveries to customers downstream of Jackrabbit Siphon and upstream of Lake Pleasant will be made from canal storage.

CAP Operations will notify customers of any unscheduled changes as early as possible, so I hope this summer's operation will bring no surprises. If you have any further questions, you may contact me at (623) 869-2563, or Doug Crosby at (623) 869-2426.

drc
Livelink\Enterprise\Departments\Operations & Planning\Water Operations / Control Center\ Water Systems Operations\Seasonal Operating Strategy Letters\2007 Summer Lake Operations

Table 6 - Water Treatment Plants – May 7, 2007

Sample Description	DOC (mg/L)	UV254 (1/cm)	SUVA	TDN (mg/L)
24th Street WTP Inlet	4.46	0.077	1.7	0.555
24th Street WTP Treated	3.08	0.038	1.2	0.4596
Deer Valley Inlet	4.08	0.077	1.9	0.712
Deer Valley WTP Treated	3.28	0.039	1.2	0.784
Val Vista Inlet	4.15	0.0785	1.89	0.394
Val Vista WTP Treated –East	2.83	0.0336	1.19	0.357
Val Vista WTP Treated -West	2.70	0.0347	1.29	0.345
Union Hills Inlet	3.22	0.042	1.30	0.706
Union Hills Treated	2.64	0.022	0.82	0.632
Tempe North Inlet	4.42	0.076	1.73	0.505
Tempe North Plant Treated	3.56	0.046	1.28	0.502
Tempe South WTP	1.37	0.0109	0.80	3.178
Tempe South Plant Treated	0.91	0.0073	0.81	3.028
Chandler WTP Inlet				
Chandler WTP Treated				
Greenway WTP Inlet	4.09	0.068	1.7	2.153
Greenway WTP Treated	2.68	0.017	0.6	1.350

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)

Table 7 - Canal Sampling – May 7, 2007

System	Sample Description	DOC (mg/L)	UV254 (1/cm)	SUVA	TDN (mg/L)
CAP	Waddell Canal	3.72	0.0473	1.27	0.563
	Union Hills Inlet	3.22	0.0417	1.30	0.706
	CAP Canal at Cross-connect	3.18	0.0403	1.27	0.671
AZ Canal	Salt River @ Blue Pt Bridge	4.91	0.0962	1.96	0.431
	Verde River @ Beeline	1.93	0.0469	2.43	0.348
	AZ Canal above CAP Cross-connect	4.80	0.0917	1.91	0.370
	AZ Canal below CAP Cross-connect	4.00	0.0675	1.69	0.513
	AZ Canal at Highway 87	4.17	0.0682	1.64	0.445
	AZ Canal at Pima Rd.	4.73	0.0738	1.56	0.449
	AZ Canal at 56th St.	4.36	0.0723	1.66	0.521
	AZ Canal - Inlet to 24th Street WTP	4.46	0.0768	1.72	0.555
	AZ Canal - Central Avenue	4.06	0.0726	1.79	0.416
	AZ Canal - Inlet to Deer Valley WTP	4.08	0.0769	1.89	0.712
	AZ Canal - Inlet to Greenway WTP	4.09	0.0679	1.66	2.153
South and Tempe Canals	South Canal below CAP Cross-connect	4.82	0.0925	1.92	0.414
	South Canal at Val Vista WTP	4.15	0.0785	1.89	0.394
	Head of the Tempe Canal	2.50	0.0431	1.72	1.615
	Tempe Canal - Inlet to Tempe's South Plant	1.37	0.0109	0.80	3.178
	Chandler WTP – Inlet				

Table 8 - Reservoir Samples – May 7, 2007

Sample Description	Location	DOC (mg/L)	UV254 (1/cm)	SUVA	TDN (mg/L)
Lake Pleasant	Eplimnion	3.85	0.0400	1.04	0.349
Lake Pleasant	Hypolimnion	3.63	0.0399	1.10	0.518
Verde River @ Beeline		1.93	0.0469	2.43	0.348
Bartlett Reservoir	Epilimnion	2.48	0.0332	1.34	0.346
Bartlett Reservoir	Epi-near dock				
Bartlett Reservoir	Hypolimnion	3.21	0.0433	1.35	0.618
Salt River @ BluePt Bridge		4.91	0.0962	1.96	0.431
Saguaro Lake	Epilimnion	5.80	0.0922	1.59	0.422
Saguaro Lake	Epi - Duplicate	5.86	0.0934	1.59	0.443
Saguaro Lake	Epi-near doc				
Saguaro Lake	Hypolimnion	6.78	0.0972	1.43	0.965
Verde River at Tangle		1.93	0.0243	1.26	0.348
Havasu		2.88	0.0329	1.14	0.737

New Feature Section: For Salt Sakes

This section will periodically give updates on salinity related issues in the valley. If you have something to add, please send it along. This month – because a lot of salt is imported from the Colorado River, here is a nice summary on the Colorado River from the National Academies.

THE NATIONAL ACADEMIES IN FOCUS

Winter/Spring 2007 Vol. 7 No. 1

Troubled Waters

New Findings and Regional Trends Are Complicating Colorado River Water Management

For most of the last century, the only information on the Colorado River's streamflow came from a series of gauges that measure flows at various points along the river. Over the years, these gauges provided the data upon which many contentious water-allocation negotiations were based. In fact, measurements from the U.S. Geological Survey's gauging station at Lees Ferry, Arizona, were cited in the 1922 Colorado River Compact, which to this day governs the allocation of water between states in the upper and lower basin.

More recently, scientists have started looking further back in history to get a better idea of the river's average flow. They were able to do so by studying coniferous trees with long life spans across the region. Because moisture availability is reflected in the annual growth rings of trees that grow at low elevations, scientists can use this information to reconstruct past climatic conditions and, in turn, estimate river flows.

What they have learned is that the Colorado River's average flow over the past four to five centuries has fluctuated more than previously assumed, exhibiting periods when average flows were higher and lower than the average measured by gauges during the last century, according to a new report from the National Research Council. In particular, the tree-ring data show that there were several periods when flows were considerably lower than those measured at Lees Ferry since 1921, and that the period just prior to the signing of the compact was exceptionally wet. Equally important, the tree rings indicate that extended droughts, like the one experienced in recent years, are a recurrent feature of the Colorado River basin.

The new data are prompting much discussion among water managers in many arid parts of the western United States where the Colorado River is the main source of surface water. River management decisions rely heavily on forecasts that assume the instrumental record of past water conditions will generally be replicated in the future. But the tree-ring data call these assumptions into question, the report says.

Further complicating the forecasts is a warming trend in the West that shows no signs of dissipating. The recent drought is not unprecedented, as the tree-ring data show, and could be chalked up to natural climate variability. Droughts in the future, however, are likely to be more severe because of rising temperatures. A preponderance of evidence suggests that warmer temperatures will reduce Colorado River streamflow and water supplies, the report says. Even if precipitation levels remain the same, streamflow could drop because warmer temperatures mean more rain will fall than snow, reducing the snowpack that gradually feeds the river. More water will be lost to evaporation as well.

Higher temperatures will also increase the demand for water from a rapidly growing population across the western United States. Although some of the added stress placed on water supplies by this burgeoning population has been abated through technology and conservation, demand is rising sharply. Water consumption doubled from 1985 to 2000 in Clark County, Nevada, where Las Vegas is located, for example.

Technology and conservation will not provide a panacea for coping with water shortages in the long run, the report warns. It also notes that the practice of transferring agricultural water rights to municipalities -- often a preferred method for meeting urban water demand in the basin -- may have undesirable effects on "third parties," such as downstream farmers or ecosystems. The agricultural water supply is also not unlimited. Cooperation among basin states, informed in part by a comprehensive basinwide study of water practices, will be essential in managing future droughts, as will better communication between scientists and water managers.

-- *Bill Kearney*

***Colorado River Basin Water Management: Evaluating and Adjusting to Hydroclimatic Variability*.** Committee on the Scientific Bases of Colorado River Basin Water Management, Water Science and Technology Board, Division on Earth and Life Studies (2007, approx. 218 pp.; ISBN 0-309-10524-2; available from the National Academies Press, tel. 1-800-624-6242; $44.75 plus $4.50 shipping for single copies).

The committee was chaired by **Ernest T. Smerdon,** emeritus dean of the College of Engineering and Mines, University of Arizona, Tucson. The study was funded by the National Academies, U.S. Bureau of Reclamation, California Department of Water Resources, Metropolitan Water District of Southern California, and the Southern Nevada Water Authority.

<u>SRP Funds New Project with Research Team:</u>

Monitoring of Trace-Level Pharmaceuticals and Personal Care Products in Salt River Project Waters

Paul Westerhoff, Pierre Herckes, and Arizona Department of Health Services

The purpose of this project will be to provide SRP with baseline data for EDC/PPCPs in the SRP watershed, including canals and recharge systems. This data will provide information on the occurrence of these compounds, but also their natural attenuation in the environment. The sampling will be integrated into the Regional Water Quality Monitoring project lead by Prof. Westerhoff and supported by the Cities of Phoenix, Tempe, Peoria, and Chandler plus Central Arizona Project. SRP currently provides in-kind support, allowing ASU staff to sample from SRP boats in Saguaro Lake and Bartlett Lake. The proposed work involves the following tasks:

- Task 1 – Watershed Sampling
- Task 2 – Canal Sampling
- Task 3 – Recharge and Groundwater Sampling
- Task 4 – Recommendations for Monitoring for Organics of Wastewater Origin

This project will begin July 1, 2007 and continue for one year.