Regional Water Quality NEWSLETTER

DATE: Report for February 2009
Sampling conducted January 2-3 2009
A Phoenix, Tempe, Glendale, 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. T&O levels are low now in the winter
2. The big issue now is snow and snowmelt runoff. The Salt River reservoirs are nearly completely full and SRP plans to release water. So we sampled for TOC and turbidity in all the Salt River Reservoirs (data at end of newsletter). There is no "slug" of high TOC expected to move through. The residence time in the Salt River reservoir system is between 2 and 5 years.
3. The snowpack is above average in all Arizona watersheds this year. This will not only bring in water, but also DOC and nutrients. The DOC loading will be a function of the rate of snowmelt. The nutrient loading will fuel algae blooms this summer.
4. Good news – we have wet water. Potentially bad news is it will be high in disinfection by-product precursors this summer.

Table 1 Summary of WTP Operations

	Verde WTP	Union Hills	24th Street WTP	N.Tempe J.G. Martinez	Deer Valley	Glendale Cholla WTP [3]	Peoria Greenway WTP	Val Vista	South Tempe
	Verde River	CAP Canal	Arizona Canal					South Canal	
PAC Type and Dose		None	Calgon WPH10 ppm		Calgon WPH 10 ppm	None			Norit hydrodarco O 10.5 mg/L
Copper Sulfate		None	None		None	None			None
PreOxidation		0.5 ppm	None		None	None because they use GAC filters			None
Alum Dose Alkalinity pH		8 ppm [1] 120 7.6	50 ppm 154/130 7.1		51 ppm 125 7.2	25 ppm 144 6.8			25 ppm 136 7.7
Finished water DOC DOC removal[2]		2.0 16%	2.5 35%		2.7 31%	2.0 47%			3.1 16%
Average turbidity over last 7 days		1-2.7 ntu	8 to 11 ntu		10-16 ntu	7.6 ntu			6.1 NTU
Recommendations				Down from Jan 6 thru Mar 31				Down until April 15th	

[1] Ferric chloride instead of alum; plus 2.25 ppm sulfuric acid
[2] Calculated based upon influent and filtered water DOC (note that DOC – not TOC – is used in this calculation)
[3] Sample from finished water includes a blend of surface and ground water sources

Chandler WTP: No PAC, copper or prechlorination. Alum is added at head of plant (15 ppm), conventional (18 ppm) and for ballasted flocculation (30 ppm). The alkalinity is 145 mg/L (pH 8.3)

Table 1
SRP/CAP OPERATIONS - Values in cfs, for January 2, 2009

System	SRP Diversions	CAP
Arizona Canal	188	0
South Canal	245	0
Pumping	95	0
Total	528	0

- **SRP is releasing water from both Verde and Salt River Systems**. Salt River release from Saguaro Lake: 375 cfs; it is unusual to be releasing Salt River water this time of year. Verde River release from Bartlett Lake: 100 cfs.
- **The Verde River system** is at 52% of full capacity
- **The Salt River reservoirs are at 99% of full capacity**. From Gregg Elliott / SRP: *Reservoirs on the Salt River almost full, and levels are rising due to melting snow. SRP plans to increase the release of water from Saguaro Lake (Stewart Mountain Dam) in the next 7-10 days. The release will be about 1000 cfs. This increase will bring river flows up to a typical summertime flow. The flow should not cause a significant increase in turbidity. Releases will continue for two to three months.*

  While this release is being done to keep Roosevelt Lake levels from going into flood control space, it is not a typical "flood" release that causes high turbidity.

  Any large wet storm that comes in later this year could lead to a significant increase in water releases.

The **Snowpack in Arizona is above average** this year (see table below from: http://www.wcc.nrcs.usda.gov/reports/UpdateReport.html?textReport=Arizona&textRptKey=2&textFormat=SNOTEL+Snowpack+Update+Report&StateList=2&RegionList=Select+a+Region+or+Basin&SpecialList=Select+a+Special+Report&MonthList=January++++++++&DayList=6&YearList=2009&FormatList=N&OutputFormatList=HTML&textMonth=January++++++++&textDay=6&CompYearList=select+a+year)

Arizona SNOTEL Snowpack Update Report

Based on Mountain Data from NRCS SNOTEL Sites

Provisional data, subject to revision

Data based on the first reading of the day (typically 00:00) for Tuesday, January 06, 2009

Basin Site Name	Elev (ft)	Snow Water Equivalent				Percent of	
		Current (in)	Today's Average (in)	Avg Peak (in)	Avg Peak Date	Today's Average	Avg Peak
VERDE RIVER BASIN							
BAKER BUTTE	7300	7.3	2.7	5.9	Feb 24	270	124
FORT VALLEY	7350	4.8	N/A	N/A	N/A	*	*
FRY	7200	8.6	3.2	7.2	Feb 19	269	119
HAPPY JACK	7630	7.0	2.4	6.4	Mar 09	292	109
MORMON MOUNTAIN	7500	8.4	2.9	6.9	Mar 06	290	122
MORMON MTN SUMMIT	8500	10.8	N/A	N/A	N/A	*	*

WHITE HORSE LAKE	7180	7.1	2.5	5.4	Feb 23	284	131
Basin-wide percent of average						**280**	**121**
SAN FRANCISCO PEAKS							
SNOWSLIDE CANYON	9730	15.8	7.4	14.4	Apr 04	214	110
Basin-wide percent of average						**214**	**110**
CENTRAL MOGOLLON RIM							
BAKER BUTTE	7300	7.3	2.7	5.9	Feb 24	270	124
HEBER	7640	9.2	2.9	5.5	Feb 13	317	167
PROMONTORY	7930	14.0	5.4	13.1	Mar 08	259	107
Basin-wide percent of average						**277**	**124**
LITTLE COLORADO - SOUTHERN HEADWATERS							
BALDY	9125	8.4	3.9	8.3	Mar 08	215	101
MAVERICK FORK	9200	11.5	4.7	10.3	Mar 05	245	112
Basin-wide percent of average						**231**	**107**
UPPER SALT RIVER BASIN / WHITE MOUNTAINS							
BALDY	9125	8.4	3.9	8.3	Mar 08	215	101
BEAVER HEAD	7990	3.6	2.1	3.3	Feb 11	171	109
CORONADO TRAIL	8400	3.9	2.2	3.5	Feb 21	177	111
HANNAGAN MEADOWS	9020	6.8	6.1	12.5	Mar 10	111	54
MAVERICK FORK	9200	11.5	4.7	10.3	Mar 05	245	112
NUTRIOSO	8500	1.3	N/A	N/A	N/A	*	*
WILDCAT	7850	4.8	2.1	4.4	Mar 02	229	109
Basin-wide percent of average						**185**	**92**
SAN FRANCISCO RIVER BASIN							
BEAVER HEAD	7990	3.6	2.1	3.3	Feb 11	171	109
CORONADO TRAIL	8400	3.9	2.2	3.5	Feb 21	177	111
HANNAGAN MEADOWS	9020	6.8	6.1	12.5	Mar 10	111	54
FRISCO DIVIDE	8000	3.3	1.6	3.1	Feb 19	206	106
SILVER CREEK DIVIDE	9000	5.8	4.8	10.6	Mar 16	121	55
Basin-wide percent of average						**139**	**71**

UPPER GILA RIVER BASIN							
LOOKOUT MOUNTAIN	8500	1.6	3.0	3.5	Jan 27	53	46
SIGNAL PEAK	8360	3.5	2.9	5.6	Feb 19	121	63
SILVER CREEK DIVIDE	9000	5.8	4.8	10.6	Mar 16	121	55
Basin-wide percent of average						**102**	**55**

-M = Missing data.

* = Analysis may not provide a valid measure of conditions.

N/A = No average available.

The Snow Water Equivalent PERCENT OF AVERAGE represents the current snow water equivalent found at selected SNOTEL sites in or near the basin compared to the average value for those sites on this day. The Snow Water Equivalent PERCENT OF MAXIMUM AVERAGE represents the current snow water equivalent found at selected SNOTEL sites in or near the basin compared to the maximum average value for those sites.

Questions were raised about the Bill Williams river which flows into the Colorado River just above the Central Arizona Project (CAP) intake.

The Corps of Engineers (LA District) operate Alamo dam per guidelines in the water control manual.
Current lake elevation is 1123, and the operating manual does define releases to begin at elev 1125.
No experimental releases are planned, but if Mother Nature produces some rainfall/runoff into the reservoir, releases from 1,000 cfs to 5,000 cfs could occur.

Brian

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From : http://www.azgfd.gov/h_f/edits/lake_levels.shtml

Lake Levels
Alamo Reservoir:
More information: U.S. Army Corps of Engineers

Max. Elevation (ft): 1,235	Current Elevation (ft): 1,123
Max. Surface (acres): 13,300	Current Surface (acres): 3,755
Feet Below Max.: -112	Percent Full: 15%

Table 2 - Water Treatment Plants – February 2, 2009

Sample Description	MIB (ng/L)	Geosmin (ng/L)	Cyclocitral (ng/L)
24th Street WTP Inlet	**<2.0**	**<2.0**	**<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**	**<2.0**	**<2.0**
Val Vista Inlet	**<2.0**	**<2.0**	**<2.0**
Val Vista WTP Treated –East			
Val Vista WTP Treated -West			
Union Hills Inlet	**<2.0**	**<2.0**	**<2.0**
Union Hills Treated	**<2.0**	**<2.0**	**<2.0**
Tempe North Inlet			
Tempe North Plant Treated			
Tempe South WTP	**<2.0**	**<2.0**	**<2.0**
Tempe South Plant Treated	**<2.0**	**<2.0**	**<2.0**
Greenway WTP Inlet			
Greenway WTP Treated			
Glendale WTP Inlet	**<2.0**	**<2.0**	**2.7**
Glendale WTP Treated	**<2.0**	**<2.0**	**<2.0**
Glendale WTP Treated (Lab)			

Conclusion: Taste and odor levels are low, because MIB and geosmin are not noticeable in tap water until their concentrations exceed 10 ng/L.

Table 3 - Canal Sampling – February 2, 2009

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			
AZ Canal	Salt River @ Blue Pt Bridge	**<2.0**	**<2.0**	**<2.0**
	Verde River @ Beeline	**<2.0**	**<2.0**	**<2.0**
	AZ Canal above CAP Cross-connect	**<2.0**	**<2.0**	**<2.0**
	AZ Canal below CAP Cross-connect	**<2.0**	**<2.0**	**<2.0**
	AZ Canal at Highway 87	**<2.0**	**<2.0**	**<2.0**
	AZ Canal at Pima Rd.	**<2.0**	**<2.0**	**<2.0**
	AZ Canal at 56th St.	**<2.0**	**<2.0**	**<2.0**
	AZ Canal - Inlet to 24th Street WTP	**<2.0**	**<2.0**	**<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 Glendale WTP	**<2.0**	**<2.0**	**2.7**
South and Tempe Canals	South Canal below CAP Cross-connect	**<2.0**	**<2.0**	**<2.0**
	South Canal at Val Vista WTP	**<2.0**	**<2.0**	**<2.0**
	Head of the Tempe Canal	**<2.0**	**<2.0**	**<2.0**
	Tempe Canal - Inlet to Tempe's South Plant	**<2.0**	**<2.0**	**<2.0**

Table 4 - Reservoir Samples – February 3, 2009

Sample Description	Location	MIB (ng/L)	Geosmin (ng/L)	Cyclocitral (ng/L)
Lake Pleasant (Jan09)	Eplimnion	**2.1**	**<2.0**	**2.3**
Lake Pleasant (Jan09)	Hypolimnio	**2.7**	**<2.0**	**<2.0**
Verde River @ Beeline		**<2.0**	**<2.0**	**<2.0**
Bartlett Reservoir	Epilimnion	**<2.0**	**<2.0**	**3.2**
Bartlett Reservoir	Epi-near dock	**<2.0**	**<2.0**	**<2.0**
Bartlett Reservoir	Hypolimnio	**<2.0**	**<2.0**	**<2.0**
Salt River @ BluePt Bridge		**<2.0**	**<2.0**	**<2.0**
Saguaro Lake	Epilimnion	**<2.0**	**<2.0**	**<2.0**
Saguaro Lake	Epi - Duplicate	**<2.0**	**<2.0**	**<2.0**
Saguaro Lake	Epi-near doc	**<2.0**	**<2.0**	**<2.0**
Saguaro Lake	Hypolimnio	**<2.0**	**<2.0**	**<2.0**
R20 (Dec08)		**<2.0**	**<2.0**	**2.3**

Organic Matter Status In the Treatment Plants

Table 5 - Water Treatment Plants – Feburary 02, 2009

Sample Description	DOC (mg/L)	UV254 (1/cm)	SUVA (L/mg-m)	TDN	DOC removal (%)
24th Street WTP Inlet	3.80	0.097	2.54	1.08	
24th Street WTP Treated	2.48	0.042	1.69	0.81	35
Deer Valley Inlet	3.91	0.098	2.51	0.99	
Deer Valley WTP Treated	2.70	0.053	1.95	0.59	31
Val Vista Inlet	3.75	0.096	2.56	0.46	
Val Vista WTP Treated –East					
Val Vista WTP Treated -West					
Union Hills Inlet	2.45	0.042	1.72	0.67	
Union Hills Treated	2.05	0.025	1.19	0.60	16
Tempe North Inlet					
Tempe North Plant Treated					
Tempe South WTP	3.84	0.095	2.48	0.45	
Tempe South Plant Treated	3.10	0.064	2.05	0.37	19
Greenway WTP Inlet					
Greenway WTP Treated					
Glendale WTP Inlet	3.82	0.096	2.51	0.77	
Glendale WTP Treated	2.04	0.034	1.66	1.42	47

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)

Organic Matter Status In the Canals

Table 6

Sample Description	DOC (mg/L)	UV254 (1/cm)	SUVA (L/mg-m)	TDN
Waddell Canal	2.47	0.042	1.70	0.66
Union Hills Inlet	2.45	0.042	1.72	0.67
CAP Canal at Cross-connect				
Salt River @ Blue Pt Bridge	4.53	0.110	2.43	0.46
Verde River @ Beeline	2.25	0.062	2.76	0.51
AZ Canal above CAP Cross-connect	3.70	0.095	2.57	0.46
AZ Canal below CAP Cross-connect	3.77	0.096	2.55	0.47
AZ Canal at Highway 87	3.80	0.095	2.51	0.42
AZ Canal at Pima Rd.	4.09	0.099	2.43	2.61
AZ Canal at 56th St.	4.17	0.097	2.32	1.27
AZ Canal - Inlet to 24th Street WTP	3.80	0.097	2.54	1.08
AZ Canal - Central Avenue	3.80	0.097	2.55	0.80
AZ Canal - Inlet to Deer Valley WTP	3.91	0.098	2.51	0.99
AZ Canal - Inlet to Glendale WTP	3.82	0.096	2.51	0.77
AZ Canal - Inlet to Greenway WTP				
South Canal below CAP Cross-connect	3.70	0.094	2.53	0.46
South Canal at Val Vista WTP	3.75	0.096	2.56	0.46
Head of the Tempe Canal	3.76	0.096	2.55	0.41
Tempe Canal - Inlet to Tempe's South Plant	3.84	0.095	2.48	0.45

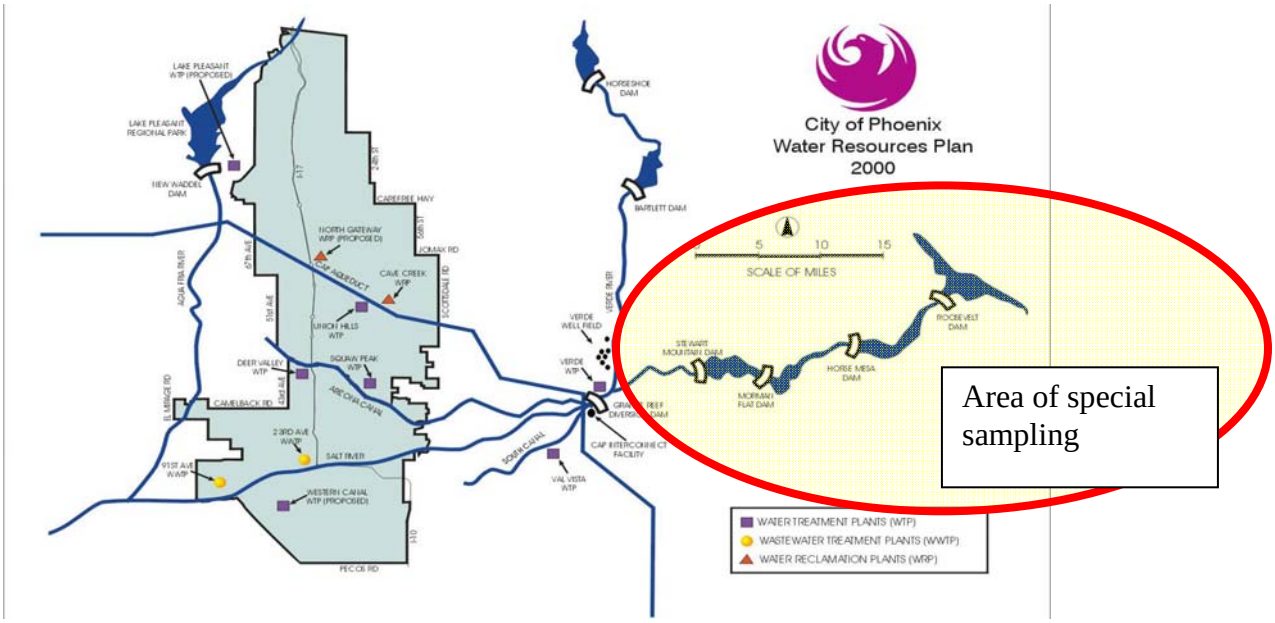
Organic Matter Status In the Watershed

Table 7 - Reservoir Samples – Feburary 02, 2009

Reservoir sampling will be conducted only monthly. CAP is sampling Lake Pleasant on slightly different days than the other reservoirs.

Sample Description	Location	DOC (mg/L)	UV254 (1/cm)	SUVA (L/mg-m)	TDN
Lake Pleasant (January 2009)	Eplimnion	3.21	0.047	1.45	0.46
Lake Pleasant	Hypolimnio	3.19	0.048	1.49	0.50
Verde River @ Beeline		2.25	0.062	2.76	0.51
Bartlett Reservoir	Epilimnion	3.19	0.093	2.91	0.37
Bartlett Reservoir	Epi-near dock				
Bartlett Reservoir	Hypolimnio	3.28	0.093	2.84	0.52
Salt River @ BluePt Bridge		4.53	0.110	2.43	0.46
Saguaro Lake	Epilimnion	4.81	0.113	2.34	0.75
Saguaro Lake	Epi - Duplicate	4.54	0.112	2.46	0.67
Saguaro Lake	Epi-near doc				
Saguaro Lake	Hypolimnio	4.65	0.110	2.37	0.68
Verde River at Tangle					
Havasu					

Special Sampling

In response to some concerns about releasing water from the Salt River because of upstream runoff we measured organic levels in all the Salt River reservoirs last week. The results are shown below. The results suggest there will NOT be a pulse of TOC or turbidity moving through the Salt River during high release. Releases on the Verde River may be different because there is less storage.

	pH	Temp (C)	Cond. (mS)	Turbidity (NTU)	DOC (mg/l)	TDN (mg/l)	UV254
Canyon Lake	8.34	13.3	0.966	7	4.87	0.61	0.134
Apache Lake	7.98	13.4	1.093	5	4.46	0.57	0.119
Roosevelt Lake A	8.01	13.2	1.052	4	4.20	0.32	0.109
Roosevelt Lake B	8.39	13.0	1.015	4	4.20	0.26	0.111