Regional Water Quality NEWSLETTER

DATE: Report for February 2010
Sampling conducted February 1-2, 2010
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. MIB plus geosmin levels above 10 ng/L in finished water lead to noticeable earthy-musty odors by customers. Currently MIB+geosmin levels are below 10 ng/L.
2. It rained nearly 8 inches during the recent storms, and this has effected turbidity levels and to a lesser extent DOC levels.
3. Dissolved organic carbon (DOC) concentrations in the reservoirs are ~ 3 mg/L (Lake Pleasant) and slightly higher 4.5 to 5 mg/L in the Salt River (Saguaro Lake). Based upon our measurements – the rainfall has had minimal impact (< 0.5 mg/L of DOC) on dissolved organic matter levels in the reservoirs. Based upon the data above and samples from January 2010 (not shown). This may take time for the reservoirs to mix and/or other processes to occur.
4. Water Treatment plants focused on controlling turbidity by 1) ordering more CAP water into the SRP canals to dilute high turbidity, 2) prechlorinating to improve settling and filterability of the solids. During this time concern over THMs were secondary to producing microbially safe water.
5. Where does all the rain infiltrate within the metro area – we have plots, but want your input too.
6. Mussels are in the news – see photo's from the Glendale WTP

Table 1a Summary of WTP Operations February 1, 2010

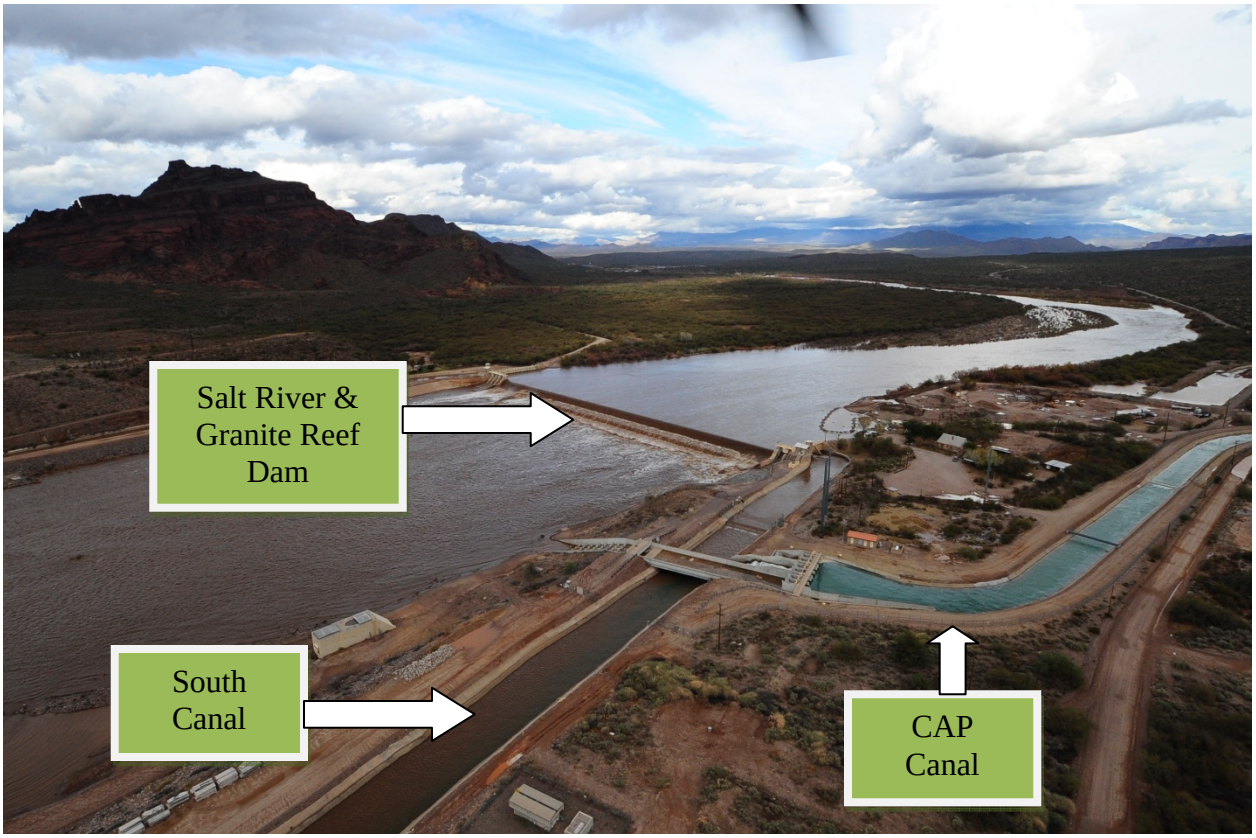
	Verde WTP	Union Hills	24th Street WTP	N.Tempe J.G. Martinez	Deer Valley	Glendale Cholla WTP [3]	Peoria Greenway WTP	Val Vista	South Tempe
	Verde River	CAP Canal	Arizona Canal					South Canal	
PAC Type and Dose		None	Calgon WPH, 10 ppm						None
Copper Sulfate		None	None						None
PreOxidation		None	None						None
Alum Dose Alkalinity pH		9.5 ppm[1] 125 7.5	50 ppm 157/125 7.0			Off-line until late March	Off-line until mid-February		25 ppm 156 7.8
Finished water DOC DOC removal[2]		2.3 mg/L 19%	2.6 mg/L 39%					2.1 mg/L 48%	3.6 mg/L 16%
Average turbidity over last 7 days		< 1 NTU	11-38 NTU						4.1
Notes from operators	Chandler did not experience any high turbidity events Tempe South did not experience turbidity events 24th Stree WTP: Came online 1/22; during turbidity events prechlorinated until 1/27 when treatment stabilized; chlorine demand was 2-3 times higher than before the storms Union Hills – Although Alamo reservoir rose by 4% in 6 hours and releases increased from 45-90 cfs, only impact on flooding was from local desert runoff								

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

Table 1 - SRP/CAP OPERATIONS - Values in cfs, for February 1, 2010

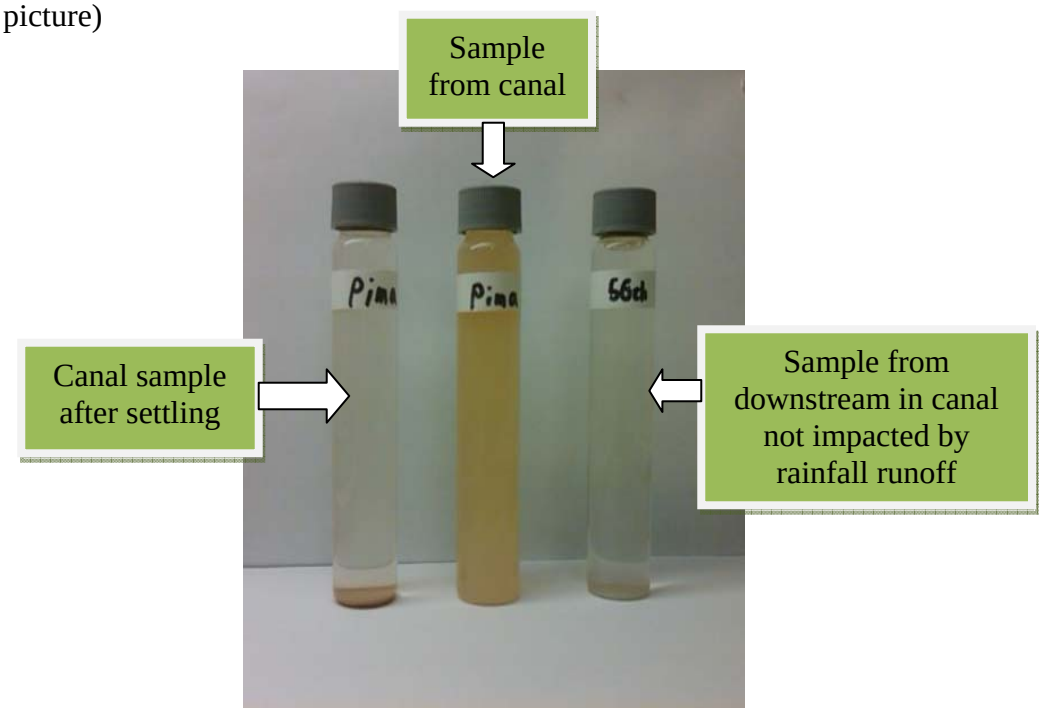
System	SRP Diversions	CAP
Arizona Canal	78	0
South Canal	259	0
Pumping	20	0
Total	357	0

- **SRP is releasing water from both Verde and Salt River Systems**. Salt River release from Saguaro Lake: 398 cfs; Verde River release from Bartlett Lake: 100 cfs.



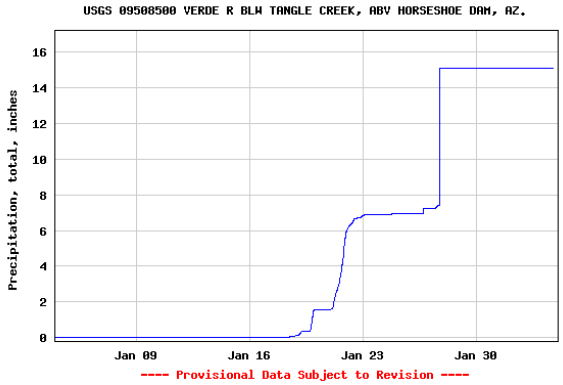
Here is a photo from 1/22/2010 showing CAP water diluting floodwater in the South Canal.

Cities ordered more CAP water into the South Canal to reduce turbidity levels. CAP canal is shown to have a blue color (low turbidity) and water diverted from the Salt River is brown color (high turbidity). Below are water samples from the Arizona Canal (north side of Salt River – outside of picture)

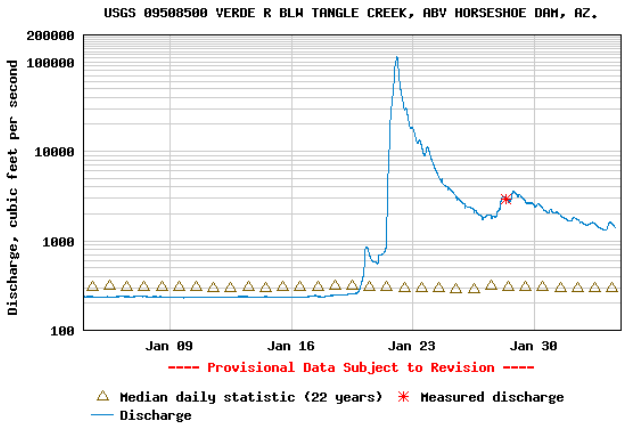


Rains increased flow in the Verde River

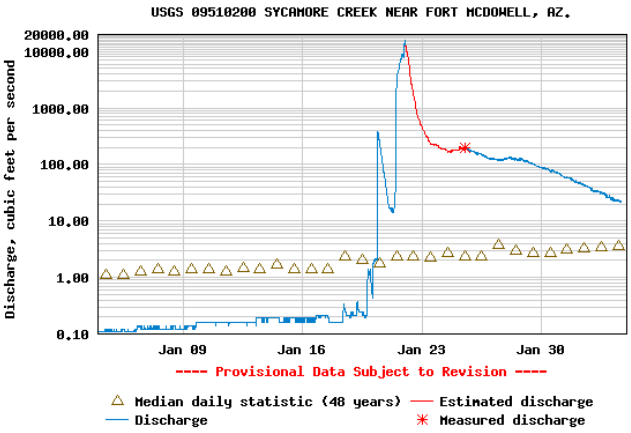
When it rains – it really rains.
The rain gauge near Horseshoe dam recorded nearly 8 inches of precipitation. We believe the additional data is not correct after Jan 25th based upon data from surrounding sites.



This resulted in very high flows (cfs) in the Verde River. The peak flow reached 115,000 cfs.



More inflow of water into the Verde River occurs from Sycamore Creek, near Fountain Hills



As a result of all the rain the reservoirs are filling up

BEFORE THE RAIN

January 18,2010

Reservoir data Back to top

	Elevation Current/Remaining (feet)		% Full	Storage (in acre feet) Current	Available	24 hr. Change	Evaporation (acre feet)	Rain (inches)
Roosevelt	2,130.67	20.33	76	1,249,168	403,875	362	80	0.00
Horse Mesa	1,904.43	9.57	90	220,422	24,716	-151	11	0.00
Mormon Flat	1,656.79	3.71	94	54,367	3,485	74	4	0.00
Stewart Mtn	1,525.35	3.65	94	65,241	4,524	-284	12	0.00
Total Salt system			**78**	**1,589,198**	**436,600**	**1**	**107**	
Horseshoe	1,986.53	39.47	**26**	27,893	81,324	232	15	0.00
Bartlett	1,745.89	52.11	**38**	68,459	109,727	15	15	0.00
Total Verde system			**34**	**96,352**	**191,051**	**247**	**30**	
Total reservoir system			**73**	**1,685,550**	**627,651**	**248**	**137**	
Total system year ago			**91**					

After the Rain

February 2, 2010

Reservoir data Back to top

	Elevation Current/Remaining (feet)		% Full	Storage (in acre feet) Current	Available	24 hr. Change	Evaporation (acre feet)	Rain (inches)
Roosevelt	2,147.97	3.03	96	1,588,597	64,446	5,661	69	0.00
Horse Mesa	1,908.03	5.97	94	229,555	15,583	77	8	0.00
Mormon Flat	1,658.27	2.23	96	55,748	2,104	542	3	0.00
Stewart Mtn	1,525.32	3.68	93	65,208	4,557	-253	4	0.00
Total Salt system			**96**	**1,939,108**	**86,690**	**6027**	**84**	
Horseshoe	2,021.42	4.58	**89**	97,153	12,064	-1,053	8	0.00
Bartlett	1,785.29	12.71	**81**	144,877	33,309	3,183	8	0.00
Total Verde system			**84**	**242,030**	**45,373**	**2,130**	**16**	
Total reservoir system			**94**	**2,181,138**	**132,063**	**8,157**	**100**	

Taste and Odor Data

Table 2 - Water Treatment Plants – February 1, 2010

Sample Description	MIB (ng/L)	Geosmin (ng/L)	Cyclocitral (ng/L)
24th Street WTP Inlet	<2.0	2.8	<2.0
24th Street WTP Treated	<2.0	<2.0	<2.0
Deer Valley Inlet			
Deer Valley WTP Treated			
Val Vista Inlet	<2.0	2.2	<2.0
Val Vista WTP Treated –East	<2.0	<2.0	<2.0
Val Vista WTP Treated -West			
Union Hills Inlet	<2.0	2.0	<2.0
Union Hills Treated	<2.0	2.4	<2.0
Tempe North Inlet			
Tempe North Plant Treated			
Tempe South WTP	<2.0	<2.0	<2.0
Tempe South Plant Treated	<2.0	2.3	<2.0
Greenway WTP Inlet			
Greenway WTP Treated			
Glendale WTP Inlet	<2.0	2.7	5.1
Glendale WTP Treated			

MIB plus geosmin levels above 10 ng/L in finished water lead to noticeable earthy-musty odors by customers. Currently MIB+geosmin levels are below 10 ng/L.

Table 3 - Canal Sampling – February 1, 2010

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			
	Salt River @ Blue Pt Bridge	<2.0	<2.0	<2.0
	Verde River @ Beeline	<2.0	<2.0	<2.0
AZ	AZ Canal above CAP Cross-connect	<2.0	<2.0	<2.0
Canal	AZ Canal below CAP Cross-connect	<2.0	2.0	<2.0
	AZ Canal at Highway 87	<2.0	2.2	<2.0
	AZ Canal at Pima Rd.	<2.0	2.2	<2.0
	AZ Canal at 56th St.	<2.0	2.4	<2.0
	AZ Canal - Inlet to 24th Street WTP	<2.0	2.8	<2.0
	AZ Canal - Central Avenue	<2.0	4.2	<2.0
	AZ Canal - Inlet to Deer Valley WTP			
	AZ Canal - Inlet to Glendale WTP	<2.0	2.7	5.1
South	South Canal below CAP Cross-connect	<2.0	<2.0	<2.0
and	South Canal at Val Vista WTP	<2.0	<2.0	<2.0
Tempe	Head of the Tempe Canal	<2.0	<2.0	<2.0
Canals	Tempe Canal - Inlet to Tempe's South Plant	<2.0	<2.0	<2.0

Table 4 - Reservoir Samples – February 2, 2010

Sample Description	Location	MIB (ng/L)	Geosmin (ng/L)	Cyclocitral (ng/L)
Lake Pleasant (Jan09)	Eplimnion	4.0	<2.0	<2.0
Lake Pleasant	Hypolimnion	3.8	<2.0	<2.0
Verde River @ Beeline		<2.0	2.0	<2.0
Bartlett Reservoir	Epilimnion	<2.0	2.1	<2.0
Bartlett Reservoir	Epi-near dock	<2.0	2.8	<2.0
Bartlett Reservoir	Hypolimnion	<2.0	3.1	<2.0
Salt River @ BluePt Bridge		<2.0	<2.0	<2.0
Saguaro Lake	Epilimnion	<2.0	5.4	<2.0
Saguaro Lake	Epi - Duplicate	<2.0	2.3	<2.0
Saguaro Lake	Epi-near dock	<2.0	2.9	<2.0
Saguaro Lake	Hypolimnion	<2.0	<2.0	<2.0
Lake Havasu		<2.0	<2.0	<2.0
Verde River at Tangle Creek (12/22/09)		<2.0	<2.0	<2.0

Organic Matter in Water Treatment Plants

Table 2 - Water Treatment Plants – February 01, 2010				
Sample Description	**DOC (mg/L)**	**UV254 (1/cm)**	**SUVA (L/mg-m)**	**TDN**
24th Street WTP Inlet	**4.30**	**0.105**	**2.44**	**1.73**
24th Street WTP Treated	**2.62**	**0.043**	**1.65**	**1.23**
Deer Valley Inlet				
Deer Valley WTP Treated				
Val Vista Inlet	**4.11**	**0.103**	**2.50**	**0.85**
Val Vista WTP Treated –East	**2.14**	**0.031**	**1.44**	**0.77**
Val Vista WTP Treated -West				
Union Hills Inlet	**2.88**	**0.038**	**1.32**	**0.58**
Union Hills Treated	**2.33**	**0.021**	**0.91**	**0.49**
Tempe North Inlet				
Tempe North Plant Treated				
Tempe South WTP	**4.28**	**0.104**	**2.44**	**0.97**
Tempe South Plant Treated	**3.61**	**0.075**	**2.08**	**0.96**
Greenway WTP Inlet				
Greenway WTP Treated				
Glendale WTP Inlet	**4.96**	**0.091**	**1.83**	**0.44**
Glendale WTP Treated				

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)

Sample Description	DOC (mg/L)	UV254 (1/cm)	SUVA (L/mg-m)	TDN
Waddell Canal	2.90	0.039	1.35	0.56
Union Hills Inlet	2.88	0.038	1.32	0.58
CAP Canal at Cross-connect				
Salt River @ Blue Pt Bridge	4.67	0.105	2.24	0.57
Verde River @ Beeline	3.05	0.100	3.26	1.21
AZ Canal above CAP Cross-connect	4.12	0.103	2.49	0.83
AZ Canal below CAP Cross-connect	4.11	0.103	2.52	0.83
AZ Canal at Highway 87	4.38	0.105	2.40	0.81
AZ Canal at Pima Rd.	4.47	0.113	2.52	0.76
AZ Canal at 56th St.	4.04	0.105	2.59	1.53
AZ Canal - Inlet to 24th Street WTP	4.30	0.105	2.44	1.73
AZ Canal - Central Avenue	4.76	0.113	2.38	1.28
AZ Canal - Inlet to Deer Valley WTP				
AZ Canal - Inlet to Glendale WTP	4.96	0.091	1.83	0.44
AZ Canal - Inlet to Greenway WTP				
South Canal below CAP Cross-connect	4.09	0.102	2.50	0.85
South Canal at Val Vista WTP	4.11	0.103	2.50	0.85
Head of the Tempe Canal	4.11	0.102	2.49	0.89
Tempe Canal - Inlet to Tempe's South Plant	4.28	0.104	2.44	0.97
Chandler WTP – Inlet				

Table 4 - Reservoir Samples – February 01, 2010

Reservoir sampling will be conducted only monthly.

CAP is sampling Lake Pleasant on slightly different days than the other reservoirs.

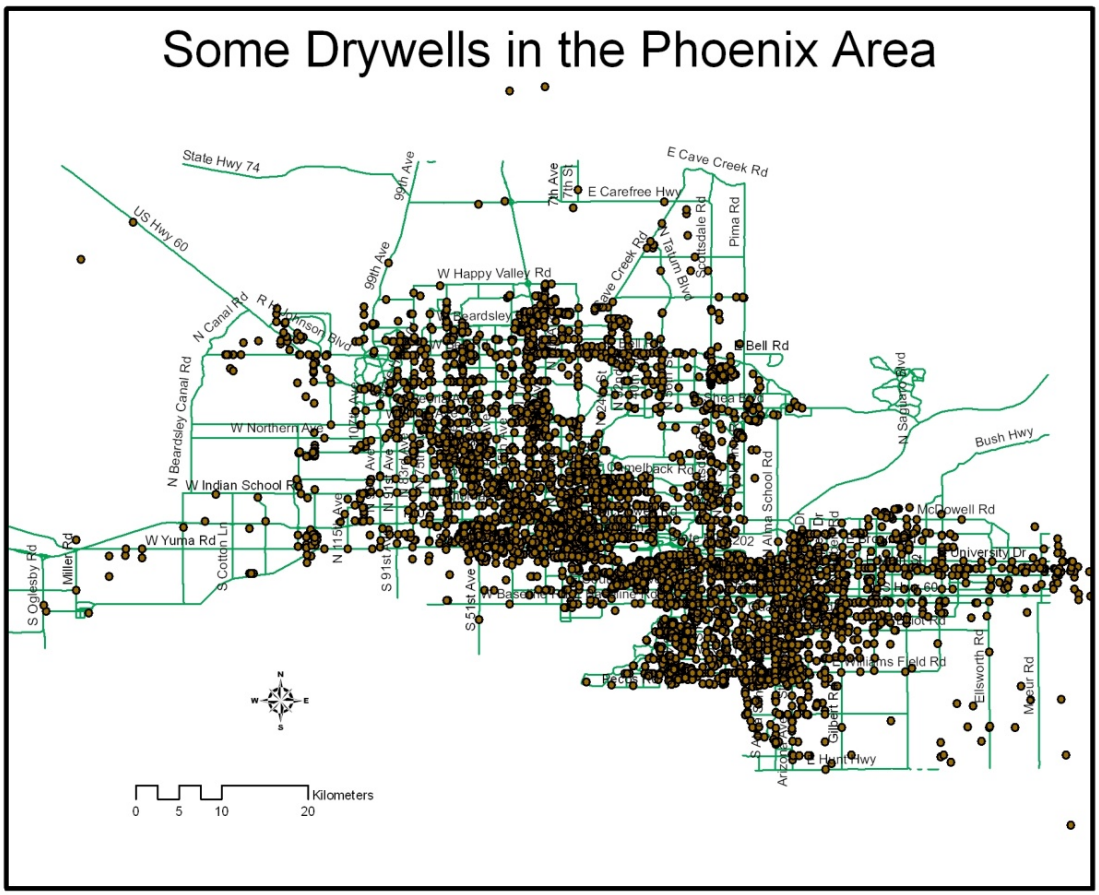
Sample Description	Location	DOC (mg/L)	UV254 (1/cm)	SUVA (L/mg-m)	TDN
Lake Pleasant - January 2010	Eplimnion	3.29	0.041	1.24	0.61
Lake Pleasant - January 2010	Hypolimnion	3.05	0.040	1.31	0.46
Verde River @ Beeline		3.05	0.100	3.26	1.21
Bartlett Reservoir	Epilimnion	4.48	0.146	3.26	1.14
Bartlett Reservoir	Epi-near dock				
Bartlett Reservoir	Hypolimnion	4.57	0.148	3.24	1.02
Salt River @ BluePt Bridge		4.67	0.105	2.24	0.57
Saguaro Lake	Epilimnion	5.09	0.105	2.07	0.53
Saguaro Lake	Epi - Duplicate	5.17	0.106	2.05	0.61
Saguaro Lake	Epi-near doc				
Saguaro Lake	Hypolimnion	5.10	0.108	2.12	0.77
Verde River at Tangle	Dec-09	0.97	0.021	2.13	0.12
Havasu	Dec-09	2.55	0.040	1.58	0.50

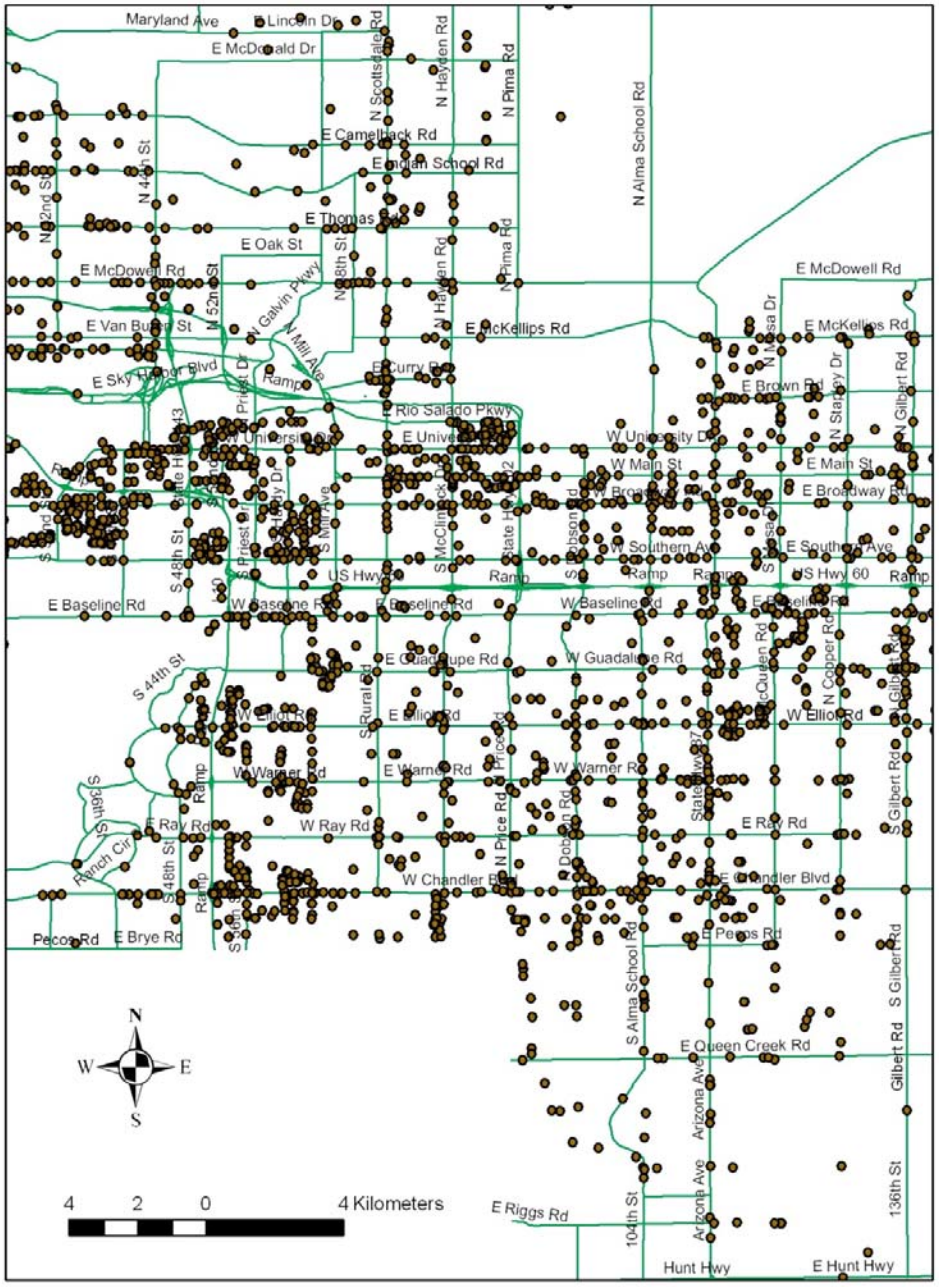
Based upon our measurements – the rainfall has had minimal impact (< 0.5 mg/L of DOC) on dissolved organic matter levels in the reservoirs. Based upon the data above and samples from January 2010 (not shown). This may take time for the reservoirs to mix and/or other processes to occur.

Where does all the water go?

Rainfall in the city occurs, and much of the runoff goes into infiltration basins and drywells. A group at ASU is collecting ifnormation on stormwater runoff and has generated the map below locating all the drywells in the metro area. Much of the water infiltrates into these wells. This does not include separate infiltration basins.

There are about 35,000 drywells in Maricopa county. Does anyone know how much stormwater infiltrates into these drywells? We want your help – do you know who to contact?




Maryland Ave
E Lincoln Dr
E McDonald Dr
N Scottsdale Rd
N Hayden Rd
N Pima Rd
N Alma School Rd
E Camelback Rd
E Indian School Rd
N 44th St
N 32nd St
E Thomas Rd
E Oak St
E McDowell Rd
N 52nd St
N Galvin Pkwy
N 48th St
N Hayden Rd
N Pima Rd
E McDowell Rd
E Van Buren St
N Mill Ave
E McKellips Rd
N Mesa Dr
E McKellips Rd
E Sky Harbor Blvd
N Priest Dr
Ramp
E Curry Rd
E Brown Rd
N Stapley Dr
N Gilbert Rd
E Rio Salado Pkwy
E University Dr
W University Dr
W Main St
E Main St
E Broadway Rd
S Priest Dr
S Mill Ave
S McClintock Dr
S Hobson Rd
W Southern Ave
E Southern Ave
S Mesa Dr
US Hwy 60
Ramp
S 48th St
US Hwy 60
E Baseline Rd
W Baseline Rd
E Baseline Rd
W Baseline Rd
E Baseline Rd
E Guadalupe Rd
W Guadalupe Rd
S 44th St
S Rural Rd
E McQueen Rd
N Copper Rd
S Gilbert Rd
W Elliot Rd
E Elliot Rd
W Elliot Rd
W Warner Rd
E Warner Rd
N Price Rd
W Warner Rd
S 36th St
Ramp
E Ray Rd
W Ray Rd
E Ray Rd
Ranch Cir
S 48th St
Ramp
W Chandler Blvd
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E Chandler Blvd
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S Alma School Rd
S Gilbert Rd
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E Riggs Rd
104th St
Arizona Ave
136th St
Hunt Hwy
E Hunt Hwy

Mussels in the News

News from Lake Pleasant…

The Glendale CAP plant is finding mussels everywhere in the plant that is not chlorinated. The pH meter above is one example.

Glendale installed a test block in our raw water structure as recommended by the BLM and CAP about two years ago. We found them starting to attach the block about 14 months ago. They have continued to get worse with time. Two years ago when we cleaned the raw water structure and pipes we had about two 5 gallon buckets of shells…this year there was two loader buckets full. We can chlorinate in front of the climber screen and we chlorinate once every 4 to 6 weeks for six days. This procedure has controlled/killed them in the rest of the plant.