Regional Water Quality NEWSLETTER

DATE: Report for February 2008
Sampling conducted February 4 & 5 2008

From the Phoenix, Tempe, Glendale, CAP, SRP – ASU Regional Water Quality Partnership

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

DISTRIBUTION: ACTarvers@FTMCDOWELL.ORG; mary.reker@phoenix.gov; knghiem@csaei.com; Kandis.Knight@asu.edu; gary_moore@tempe.gov; sandra_dewittie@tempe.gov; kspooner@citlink.net; bardizzone@carollo.com; wtrask@mwdh2o.com; jnafsey@mwdh2o.com; JJWilliams@GLENDALEAZ.com; raghunatha.komaragiri@phoenix.gov; mxerxis@scottsdaleaz.gov; mnguyen@ndep.nv.gov; RussellGRhodes@MissouriState.edu; paul.kinshella@phoenix.gov; brian.fayle@phoenix.gov; paul.zelenka@phoenix.gov; patricia.puryear@phoenix.gov; Wontae.Lee@hdrinc.com; kjacobs@ag.arizona.edu; k.kruger@asu.edu; addotson@gmail.com; Hye.Moon@asu.edu; Pedram.Shafieian@asu.edu; Daisuke.Minakata@asu.edu; Billt@gilbert.az.us; paul.mally@phoenix.gov; Braden.Allenby@asu.edu; Rittmann@asu.edu; Jeffrey.Stuck@amwater.com; nina.miller@amwater.com; wayne.janis@asu.edu; jim.holway@asu.edu; gober@asu.edu; rscott@glendaleaz.com; safischer@fs.fed.us; aimee.conroy@phoenix.gov; alan.martindale@cityofmesa.org; alice.brawley-chesworth@phoenix.gov; allison.shepherd@phoenix.gov; AGhosh@PIRNIE.COM; antoniot@ci.gilbert.az.us; anupa.jain@ci.chandler.az.us; arrw716@earthlink.net; awirtz@fs.fed.us; bakerenv@earthlink.net; bardizzone@carollo.com; bhenning@cap-az.com; btalabi@scottsdaleaz.gov; bkmoorhe@srpnet.com; BobCarlson@scwater.com; bonnie.smith@phoenix.gov; Bradley_fuller@tempe.gov; brian.fayle@phoenix.gov; brian.k.watson@phoenix.gov; carl.meyer@phoenix.gov; carlos.padilla@phoenix.gov; cseidel@dswa.net; Charolotte.Jones@cityofmesa.org; chennemann@carollo.com; chris.rounseville@phoenix.gov; Chris_Kincaid/COC@ci.chandler.az.us; christenson.kara@epa.gov; CityofMesaWTP@compuserve.com; cwilson@scottsdaleaz.gov; D'Ann.O'Bannon@phoenix.gov; diwanski@goodyearaz.gov; davev@peoriaaz.com; dempster@asu.edu; dlopez@fs.fed.us; dorothyo@peoriaaz.com; drcrosby@cap-az.com; dwalker@Ag.arizona.edu; dxprigge@srpnet.com; edna.bienz@phoenix.gov; erin.pysell@phoenix.gov; mario_esparza_soto@hotmail.com; francisco.gonzalez@phoenix.gov; frank.blanco@phoenix.gov; gjloomis@fs.fed.us; GMaseeh@PIRNIE.COM; Gregg.Elliott@srpnet.com; goelliot@srpnet.com; grant_osburn@tempe.gov; Greg.Ramon@Phoenix.Gov; gtday@amwater.com; GThelin@carollo.com; guy.carpenter@hdrinc.com; hugiang@asu.edu; Jackie.Strong@ci.chandler.az.us; jdoller@carollo.com; jeffrey.van.hoy@phoenix.gov; jennifer.calles@phoenix.gov; jjwilliams@glendaleaz.com; JohnRK@PeoriaAz.Com; josh_berdeaux@msn.com; kremmel@ci.glendale.az.us; Larry.Duffy@ci.chandler.az.us; laxman.devkota@phoenix.gov; Linda.Bezy-Botma@peoriaaz.gov; Lori.mccallum@ci.chandler.az.us; lroberts@buckeyeaz.gov; luis.manriquez@phoenix.gov; Marisa.Masles@asu.edu; mark.roye@phoenix.gov; matthew.rexing@cityofmesa.org; maureen.hymel@phoenix.gov; mdehaan@dswa.net; Mdew1@mail.ci.tucson.az.us; mhelton@scottsdaleaz.gov; Michael_Bershad@tempe.gov; Milton.Sommerfeld@asu.edu; matt.palenica@phoenix.gov; MURPHYSP@wattsind.com; nancy.milan@ci.chandler.az.us; nicholas.silides@cityofmesa.org; nicoleta.buliga@phoenix.gov; ANUNEZ@SCOTTSDALEAZ.GOV; paul.burchfield@phoenix.gov; paulwestcott@appliedbiochemists.com; pdent@cap-az.com; pfenner@fs.fed.us; Randy.Gottler@phoenix.gov; raymond.schultz@phoenix.gov; robert.hollander@phoenix.gov; robert.goff@ci.chandler.az.us; robert_eck@ci.mesa.az.us; ron.jennings@phoenix.gov; rsgooch@srpnet.com; rscott@glendaleaz.com; rcarpenter@glendaleaz.com; sgrendahl@SCOTTSDALEAZ.GOV; shan.miller@phoenix.gov; sherman_mccutcheon@tempe.gov; SRot@ci.glendale.az.us; srottas@cap-az.com; sacquafredda@dswa.net; steven.schoen@phoenix.gov; susan.potter@phoenix.gov; tara_ford@tempe.gov; terrance.piekarz@phoenix.gov; tgillogly@carollo.com; THockett@GLENDALEAZ.com; thomas.martin@phoenix.gov; thomasdempster@hotmail.com; tjeffer1@ci.tucson.az.us; tkacerek@cap-az.com; tom.doyle@phoenix.gov; Tom_Hartman@tempe.gov; troy.hayes@phoenix.gov; Victoria.Sharp@ci.chandler.az.us; vlee@carollo.com; waerma@bv.com; walid.alsmadi@phoenix.gov; warrens@sgm-inc.com; wendy.chambers@ci.chandler.az.us; wes.cannon@ci.chandler.az.us; wes.taylor@phoenix.gov; wtaylor@mwdh2o.com; William.Hughes@cityofmesa.org; swilson@scottsdaleaz.gov; YoungIl.Kim@asu.edu; yu.chu.hsu@phoenix.gov; LindaW@PeoriaAz.Com; Yongsheng.Chen@asu.edu; keli@asu.edu; jcritt@asu.edu; uiyer@glendaleaz.com; Michael.Helton@amwater.com; Kim.Caggiano@cityofmesa.org; Keith.Greenberg@amwater.com; harry.brown@AMwater.com; mnguyen@ndep.nv.gov; bzachman@dswa.net; hdurbin@dswa.net; Tony.Mardam@ch2m.com; paul.zelenka@phoenix.gov; agrochowski@cap-az.com; bradley_fuller@tempe.gov; JBryck@PIRNIE.COM; Susanne.Neuer@asu.edu; Mohan.Seetharam@asu.edu; Chao-An.Chiu@asu.edu; susan.michael@peoriaaz.gov; tammy.perkins@phoenix.gov; Michael.Kennedy@cityofmesa.org; ZChowdhury@PIRNIE.COM; Shari.Lange@phoenix.gov; nmegonnell@calgoncarbon-us.com; Cynthia.Bain@peoriaaz.gov; Ryan.Rhoades@CH2M.com; jim.kudlinski@srpnet.com; Gambatese.Jason@epamail.epa.gov; charlotte.jones@phoenix.gov

If you wish to receive the *Newsletter* and are not on our list, send your email address to Dr. Paul Westerhoff (p.westerhoff@asu.edu) get a free "subscription".

SUMMARY: EVALUATION AND RECOMMENDATIONS

1. MIB & geosmin levels are < 5 ng/L throughout the system.
2. More rain around sampling time this month. An update on SRP and Colorado River Reservoirs are included.
3. DOC is very high in the canal systems and will remain high as long as the Verde River system is being used. DOC in Bartlett Reservoir is ~ 5.5 mg/L with a SUVA of ~ 3.7. As the water begins to warm, this will form considerable levels of DBPs upon chlorination. DOC in Saguaro Lake on the Salt River is comparable to years past. DOC in Lake Pleasant is slowly increasing as more Colorado River and Aqua Fria water enter the lake.

Table 1 Summary of WTP Operations

	Verde WTP	Union Hills	24th Street WTP	N.Tempe J.G. Martinez	Deer Valley	Glendale Cholla WTP [3]	Val Vista	South Tempe	Chandler WTP
Location	**Verde River**	**CAP**	**Arizona Canal System**				**South Canal System**		
PAC Type and Dose	None	None	None	Off-line until April 1st	8 ppm Calgon WPH	None	None	None	Off-line until February 5th
Copper Sulfate	None	None	None		None	None	None	None	
PreOxidation	Yes	None	None		None	0.5 ppm Cl2	ppm Cl2	None	
Alum Dose Alkalinity pH	Data not provided	Data not provided	45 177/155 7.3		50 184/145 8.3/7.3	25 158 6.8	100 168/122 7.2	57 168 7.9	
Finished water DOC DOC removal[2]	NA	3.3 13%	5.3 30%		5.5 24%	3.9 51%	4.5 38%	5.8 15%	
WTP plant comments									
Recommendations									

[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] Sample from finished water includes a blend of surface and ground water sources

Northside dry-up details (Saturday, Jan. 5 through Monday, Feb. 3, 2008)

Portions of the Arizona, Grand and Crosscut canals on the north side of the Salt River will be drained for annual maintenance and construction activities. Many of Salt River Project's northside irrigation customers will not receive water from the canals during the dry-up.

The affected areas include Scottsdale, Paradise Valley, Phoenix, Glendale, Peoria and north Tempe.

During this dry-up, weed-eating white amur fish that are used to control aquatic vegetation in the canals will be relocated to other areas of the canal system. The herding and relocation of the fish will be conducted during the first few days of the dry-up schedule, starting Saturday morning. SRP now utilizes white amurs throughout its 131-mile Valley canal system.

Table 2 - Water Treatment Plants – February 4, 2008

Sample Description	MIB (ng/L)	Geosmin (ng/L)	Cyclocitral (ng/L)
24th Street WTP Inlet	<2.0	<2.0	7.6
24th Street WTP Treated	<2.0	3.3	15.4
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	<2.0	<2.0	<2.0
Val Vista WTP Treated -West			
Union Hills Inlet	2.5	<2.0	2.4
Union Hills Treated	<2.0	<2.0	4.4
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
Tempe South Plant Treated (Lab)			
Chandler WTP Inlet			
Chandler WTP Treated			
Glendale WTP Inlet	<2.0	<2.0	<2.0
Glendale WTP Treated	<2.0	<2.0	<2.0
Glendale WTP Treated (Lab)			

Table 3 - Canal Sampling – February 4, 2007

System	Sample Description	MIB (ng/L)	Geosmin (ng/L)	Cyclocitral (ng/L)
CAP	Waddell Canal	**<2.0**	**<2.0**	**25.1**
	Union Hills Inlet	**2.5**	**<2.0**	**2.4**
	CAP Canal at Cross-connect			
AZ Canal	Salt River @ Blue Pt Bridge	**3.5**	**3.1**	**<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.	**2.4**	**2.0**	**5.9**
	AZ Canal - Inlet to 24th Street WTP	**<2.0**	**<2.0**	**7.6**
	AZ Canal - Central Avenue	**2.9**	**<2.0**	**29.8**
	AZ Canal - Inlet to Deer Valley WTP	**<2.0**	**<2.0**	**<2.0**
	AZ Canal - Inlet to Glendale WTP	**<2.0**	**<2.0**	**<2.0**
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**	**8.6**
	Tempe Canal - Inlet to Tempe's South Plant			
	Chandler WTP – Inlet			

Table 4 - Reservoir Samples – February 5, 2008

Sample Description	Location	MIB (ng/L)	Geosmin (ng/L)	Cyclocitral (ng/L)
Lake Pleasant (Jan08)	Eplimnion	<2.0	<2.0	<2.0
Lake Pleasant	Hypolimnion	<2.0	<2.0	<2.0
Verde River @ Beeline		<2.0	<2.0	<2.0
Bartlett Reservoir	Epilimnion	<2.0	<2.0	<2.0
Bartlett Reservoir	Epi-near dock	<2.0	<2.0	<2.0
Bartlett Reservoir	Hypolimnion	<2.0	<2.0	<2.0
Salt River @ BluePt Bridge		3.5	3.1	<2.0
Saguaro Lake	Epilimnion	<2.0	<2.0	3.8
Saguaro Lake	Epi - Duplicate	<2.0	<2.0	<2.0
Saguaro Lake	Epi-near doc	<2.0	70.7	<2.0
Saguaro Lake	Hypolimnion	<2.0	<2.0	3.0
Verde River at Tangle Creek				
Havasu (Jan08)		<2.0	<2.0	<2.0

The geosmin concentration near the launch-dock in Saguaro Lake is high and was confirmed by strong earthy-must odors in the air. This indicates the presence of T&O producers in the reservoirs.

During sampling in Bartlett Lake: there was considerable debris including logs washed in by recent rains. The water was quite turbid – with a Secchi Disk reading of only 4 feet. In comparison for Saguaro Lake the Secchi Disk reading was 8 ft (much clear water).

Table 5 - SRP/CAP OPERATIONS
Values in cfs, for February 4, 2008

System	SRP Diversions	CAP
Arizona Canal	196	70
South Canal	209	26
Pumping	61	0
Total	466	96

SRP is releasing water from both Verde and Salt River Systems. Salt River release from Saguaro Lake: 130 cfs; Verde River release from Bartlett Lake: 2100 cfs.

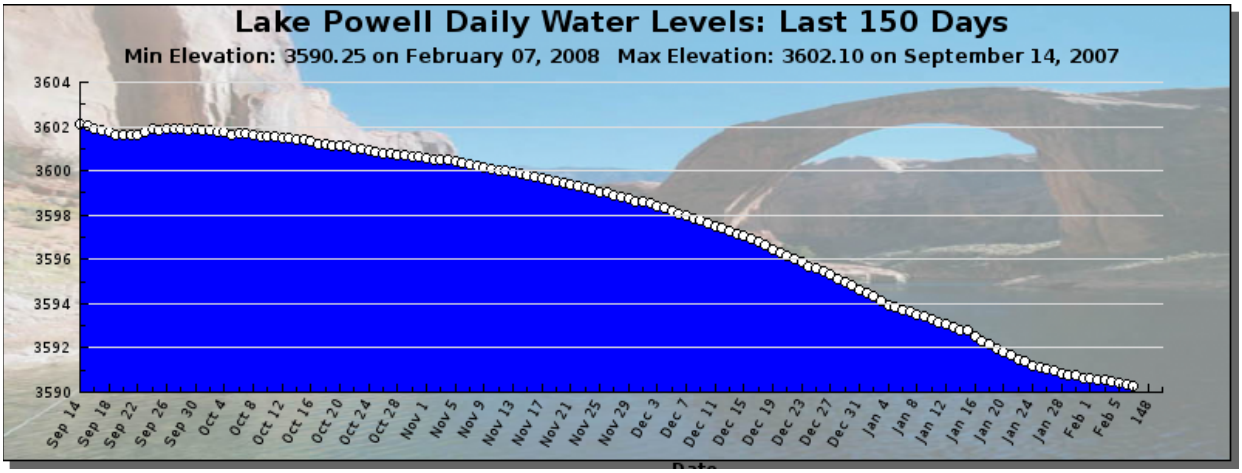
Lake Roosevelt is 81% full and the Verde River system is >97% full as of February 10, 2008.

SRP was releasing water over Granite Reef Dam into the Salt River Channel:

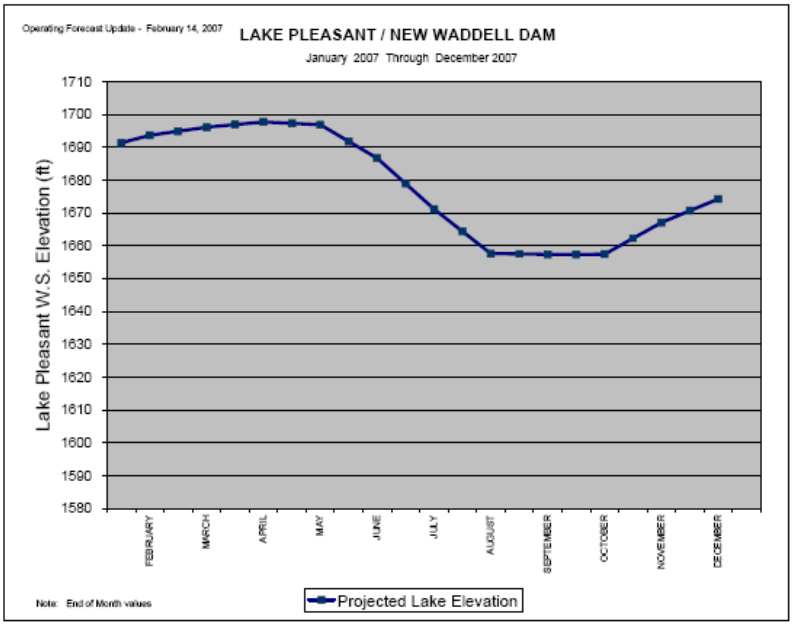
Feb 1	1400 cfs	Feb 6	2325 cfs
Feb 2	1000 cfs	Feb 7	1508 cfs
Feb 3	1750 cfs	Feb 8	600 cfs
Feb 4	2100 cfs	Feb 9	430 cfs
Feb 5	2250 cfs	Feb 10	0 cfs

So – with the Salt & Verde Rivers filling – what is happening on the Colorado System?

Lake Powell water levels continue to decline (see plot). Lake Mead levels have raised by a few feet over the same period. Snowpack in the Colorado River Basin is running slightly above the long term average (100% to 150% of normal levels).



As of Feb 11th the water level elevation in Lake Pleasant/CAP system is 1686 ft and the CAP is pumping water into the lake. This water level elevation is very close to the planned level for 2008.



Water from the Aqua Fria River is also flowing into Lake Pleasant (see hydrograph below). Nice storms over the past month have resulted in significant streamflows in the Aqua Fria river. **A big question will be to what extent this influx of nutrients will stimulate algae growth this summer?** DOC levels in Lake Pleasant are slightly higher in February 2008 than in January 2008, but it is difficult to assess if this is because of filling with Colorado River water which has a DOC concentration (3.8 mg/L) that is higher than the Lake Pleasant water (~ 2.7 mg/L) or from high flows in the Aqua Fria River.

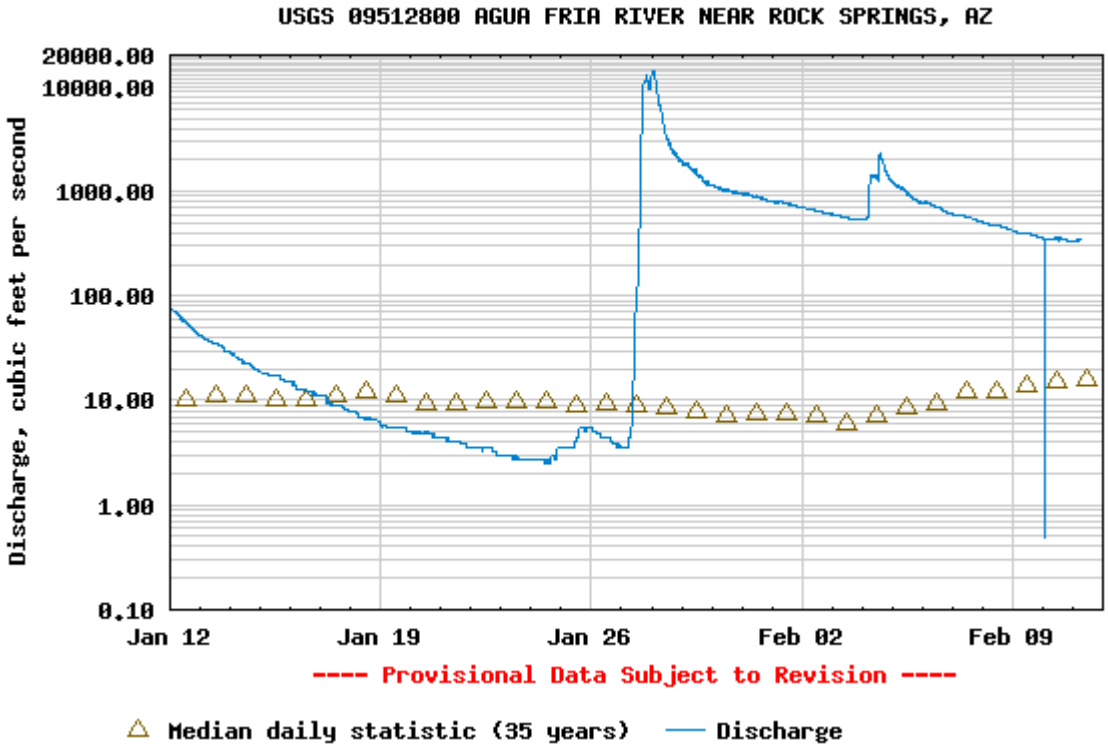


Table 6 - Water Treatment Plants – February 04, 2008

Sample Description	DOC (mg/L)	UV254 (1/cm)	SUVA (L/mg-m)	TDN
24th Street WTP Inlet	7.54	0.187	2.5	2.245
24th Street WTP Treated	5.27	0.084	1.6	1.868
Deer Valley Inlet	7.30	0.172	2.4	2.114
Deer Valley WTP Treated	5.55	0.090	1.6	1.752
Val Vista Inlet	7.33	0.195	2.66	1.776
Val Vista WTP Treated –East	4.53	0.066	1.46	1.684
Val Vista WTP Treated -West				
Union Hills Inlet	3.82	0.039	1.02	0.747
Union Hills Treated	3.32	0.023	0.69	0.706
Tempe North Inlet				
Tempe North Plant Treated				
Tempe South WTP	6.85	0.158	2.31	1.744
Tempe South Plant Treated	5.81	0.092	1.58	1.848
Chandler WTP Inlet				
Chandler WTP Treated				
Glendale WTP Inlet	7.80	0.190	2.4	1.852
Glendale WTP Treated	3.86	0.041	1.1	3.072

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 – February 4, 2007

System	Sample Description	DOC (mg/L)	UV254 (1/cm)	SUVA (L/mg-m)	TDN
CAP	Waddell Canal	3.74	0.040	1.1	0.784
	Union Hills Inlet	3.82	0.039	1.02	0.747
	CAP Canal at Cross-connect				
AZ Canal	Salt River @ Blue Pt Bridge	6.30	0.089	1.41	0.625
	Verde River @ Beeline	8.07	0.227	2.81	2.135
	AZ Canal above CAP Cross-connect	7.61	0.214	2.81	2.159
	AZ Canal below CAP Cross-connect	7.44	0.222	2.98	2.026
	AZ Canal at Highway 87	7.37	0.207	2.81	1.715
	AZ Canal at Pima Rd.	7.59	0.194	2.56	1.762
	AZ Canal at 56th St.	7.37	0.181	2.46	1.839
	AZ Canal - Inlet to 24th Street WTP	7.54	0.187	2.48	2.245
	AZ Canal - Central Avenue	7.31	0.170	2.33	1.851
	AZ Canal - Inlet to Deer Valley WTP	7.30	0.172	2.36	2.114
	AZ Canal - Inlet to Glendale WTP	7.80	0.190	2.44	1.852
South and Tempe Canals	South Canal below CAP Cross-connect	7.19	0.211	2.93	1.783
	South Canal at Val Vista WTP	7.33	0.195	2.66	1.776
	Head of the Tempe Canal	7.08	0.187	2.64	1.741
	Tempe Canal - Inlet to Tempe's South Plant	6.85	0.158	2.31	1.744
	Chandler WTP – Inlet				

DOC values are VERY high in the SRP canal system this month.

Table 8 - Reservoir Samples – February 04, 2008

Sample Description	Location	DOC (mg/L)	UV254 (1/cm)	SUVA (L/mg-m)	TDN
Lake Pleasant	Eplimnion	2.99	0.055	1.84	0.416
Lake Pleasant	Hypolimnion	3.23	0.063	1.95	0.360
Verde River @ Beeline		8.07	0.227	2.81	2.135
Bartlett Reservoir	Epilimnion	5.36	0.211	3.94	0.982
Bartlett Reservoir	Epi-near dock				
Bartlett Reservoir	Hypolimnion	5.79	0.211	3.64	1.011
Salt River @ BluePt Bridge		6.30	0.089	1.41	0.625
Saguaro Lake	Epilimnion	5.43	0.120	2.21	0.825
Saguaro Lake	Epi - Duplicate	5.16	0.120	2.33	0.767
Saguaro Lake	Epi-near doc				
Saguaro Lake	Hypolimnion	5.68	0.120	2.11	0.346
Verde River at Tangle					
Havasu					

DOC values in the Bartlett Lake System are considerably higher now than in previous years:

Year	Feb 2008	Feb 2007	Feb 2006
DOC (mg/L)	5.4	2.1	3.1
SUVA $((mg/L)^{-1}m^{-1})$	3.9	2.7	2.7

DOC values in the Saguaro Lake System are similar now than in previous years:

Year	Feb 2008	Feb 2007	Feb 2006
DOC (mg/L)	5.4	5.0	4.9
SUVA $((mg/L)^{-1}m^{-1})$	2.2	2.1	2.4