Legend	
	Assumed value
	Unknown
	no sample

RED TEXT Data Jennifer McIntosh has questions about (e.g. correct units?)

Desert Botanical Gardens data questions, please contact Ron Tiller or Andrew Salywon

Table 1: Sample locations				
sample_name	data_source	source_type	date	latitude
Shinskey	UA/ McIntosh (unpu	well	04/05/14	31.88057
Bunting	UA/ McIntosh (unpu	well	04/05/14	31.76204
Bower	UA/ McIntosh (unpu	well	04/05/14	31.76826
Empire Ranch	UA/ McIntosh (unpu	well	04/05/14	31.78544
Kramp	UA/ McIntosh (unpu	well	04/05/14	31.87628
Harris	UA/ McIntosh (unpu	well	06/27/14	31.87502
Rogers/ Rasch	UA/ McIntosh (unpu	well	06/27/14	31.87921
Tenpenny	UA/ McIntosh (unpu	well	06/27/14	31.88423
Pennington	UA/ McIntosh (unpu	well	06/27/14	31.88496
Clark	UA/ McIntosh (unpu	well	06/27/14	31.882
Suhay	UA/ McIntosh (unpu	well	06/27/14	31.89813
Mennenoh	UA/ McIntosh (unpu	well	06/27/14	31.89969
Buschard 1	UA/ McIntosh (unpu	well	06/28/14	31.88158
Buschard 2	UA/ McIntosh (unpu	well	06/28/14	31.88628
Mack	UA/ McIntosh (unpu	well	06/28/14	31.87978
Hanna	UA/ McIntosh (unpu	well	06/28/14	31.87631
Morris	UA/ McIntosh (unpu	well	06/28/14	31.88181
Lekawa/Runyan	UA/ McIntosh (unpu	well	06/28/14	31.895
Davidson 1 (spring)	Pima Co. RFCD/ PA	spring	06/04/02	32.98490
Davidson 1 (spring)	Pima Co. RFCD/ PA	spring	08/02/02	32.98490
Davidson 1 (spring)	Pima Co. RFCD/ PA	spring	05/08/03	32.98490
Davidson 1 (spring)	Pima Co. RFCD/ PA	spring	09/30/14	32.98490
Davidson 3 (spring)	Pima Co. RFCD/ PA	spring	6/4/2002	32.98490
Davidson 3 (spring)	Pima Co. RFCD/ PA	spring	8/2/2002	32.98490
Davidson 3 (spring)	Pima Co. RFCD/ PA	spring	5/8/2003	32.98490
Davidson 3 (spring)	Pima Co. RFCD/ PA	spring	9/3/2008	32.98490
Davidson 3 (spring)	Pima Co. RFCD/ PA	spring	9/22/2009	32.98490
Davidson 3 (spring)	Pima Co. RFCD/ PA	spring	9/21/2010	32.98490
Davidson 3 (spring)	Pima Co. RFCD/ PA	spring	9/7/2011	32.98490
Davidson 3 (spring)	Pima Co. RFCD/ PA	spring	2/24/2012*	32.98490
Davidson 3 (spring)	Pima Co. RFCD/ PA	spring	9/10/2012	32.98490
Davidson 3 (spring)	Pima Co. RFCD/ PA	spring	11/20/2012	32.98490
Davidson 3 (spring)	Pima Co. RFCD/ PA	spring	9/30/2014	32.98490
JUNGLE WELL	Pima Co. RFCD/ PA	well	05/20/14	31.99592
JUNGLE WELL	Pima Co. RFCD/ PA	well	10/07/14	31.99592
JUNGLE WELL	Pima Co. RFCD/ PA	well	02/18/15	31.99592
JUNGLE WELL	Pima Co. RFCD/ PA	well	06/24/15	31.99592
DAV BAR V WELL	Pima Co. RFCD/ PA	well	05/27/14	31.98435

DAV BAR V WELL	Pima Co. RFCD/ P/	well	09/15/14	31.98435
DAV BAR V WELL	Pima Co. RFCD/ P/	well	02/20/15	31.98435
DAV BAR V WELL	Pima Co. RFCD/ P/	well	02/18/15	32.98435
DAV BAR V WELL	Pima Co. RFCD/ P/	well	06/24/15	32.98435
Del Lago Well	Pima Co. RFCD/ P/	well	06/25/99	32.03399
NSS well	Gu et al. (2008) Gr	well	06/23/99	
NSS well	Gu et al. (2008) Gr	well	04/05/01	
NSS well	Gu et al. (2008) Gr	well	11/14/03	
Patagonia town well	Gu et al. (2008) Gr	well	07/16/99	
Patagonia town well	Gu et al. (2008) Gr	well	03/29/01	
Patagonia town well	Gu et al. (2008) Gr	well	11/06/02	
Patagonia town well	Gu et al. (2008) Gr	well	12/05/03	
Windmill well	Gu et al. (2008) Gr	well	09/24/99	
TNC well	Gu et al. (2008) Gr	well	10/08/98	
TNC well	Gu et al. (2008) Gr	well	03/29/01	
TNC well	Gu et al. (2008) Gr	well	12/05/03	
Old TNC well	Gu et al. (2008) Gr	well	10/06/98	
Old TNC well	Gu et al. (2008) Gr	well	01/14/99	
Flux Canyon flowing we	Gu et al. (2008) Gr	well	09/18/98	
Flux Canyon flowing we	Gu et al. (2008) Gr	well	09/24/99	
WP-10	Desert Botanical Ga	piezometer	07/20/13	31.758
WP-12	Desert Botanical Ga	piezometer	07/20/13	31.780
WP-14	Desert Botanical Ga	piezometer	06/08/14	31.809
WP-14	Desert Botanical Ga	piezometer	08/15/15	31.809
WP-2	Desert Botanical Ga	piezometer	06/08/14	31.826
WP-4	Desert Botanical Ga	piezometer	06/08/14	31.839
WP-7	Desert Botanical Ga	piezometer	07/20/13	31.761
WP-9	Desert Botanical Ga	piezometer	07/20/13	31.788
Cienega Creek headwa	Desert Botanical Ga	spring	05/25/15	31.780
Cinco 5 - spring	Desert Botanical Ga	spring	05/25/15	31.789
Cinco 5 - spring	Desert Botanical Ga	spring	08/16/15	31.789
Coldwater Spring north	Desert Botanical Ga	spring	02/01/14	31.851
Coldwater Spring south	Desert Botanical Ga	spring	02/01/14	31.850
Empire 1 - spring	Desert Botanical Ga	spring	05/25/15	31.802
Empire 1 - spring	Desert Botanical Ga	spring	08/15/15	31.802
Empire 4 - spring	Desert Botanical Ga	spring	05/25/15	31.800
Empire HQ spring	Desert Botanical Ga	spring	07/20/13	31.788
Empire HQ spring	Desert Botanical Ga	spring	10/13/13	31.788
Empire HQ spring	Desert Botanical Ga	spring	02/02/14	31.788
Empire HQ Spring	Desert Botanical Ga	spring	04/19/14	31.788
Empire HQ Spring	Desert Botanical Ga	spring	12/20/14	31.788
Empire HQ Spring	Desert Botanical Ga	spring	03/29/15	31.788
Empire HQ Spring	Desert Botanical Ga	spring	05/25/15	31.788

Finley Tank	Desert Botanical Ga	spring	07/09/15	31.606
Finley Tank S	Desert Botanical Ga	spring	07/09/15	31.606
Mattie Canyon headwa	Desert Botanical Ga	spring	10/13/13	31.847
Oak Tree cienega - spr	Desert Botanical Ga	spring	12/20/14	31.809
Oak Tree NW - spring	Desert Botanical Ga	spring	09/07/14	31.809
Oak Tree NW - spring	Desert Botanical Ga	spring	03/29/15	31.809
Oak Tree S - spring	Desert Botanical Ga	spring	03/29/15	31.809
Springwater - spring	Desert Botanical Ga	spring	05/25/15	31.805
Springwater South	Desert Botanical Ga	spring	08/16/15	31.801
608606 Twin Wells - N	Desert Botanical Ga	well	07/21/13	31.798
608609 Tree Well (E-3)	Desert Botanical Ga	well	06/08/14	31.769
608612 Road Well (E-7	Desert Botanical Ga	well	07/21/13	31.802
608614 (E-9)	Desert Botanical Ga	well	07/21/13	31.801
608617 Twin Wells - S	Desert Botanical Ga	well	07/20/13	31.797
608619 GAC-1 artesiar	Desert Botanical Ga	well	06/08/14	31.813
608623 Dike Well	Desert Botanical Ga	well	02/01/14	31.825
608623 Dike Well	Desert Botanical Ga	well	09/07/14	31.825
608623 Dike Well	Desert Botanical Ga	well	12/20/14	31.825
608623 Dike Well	Desert Botanical Ga	well	03/29/15	31.825
608628 Airstrip (GAC-2	Desert Botanical Ga	well	05/25/15	31.791
634295 Upper Hilton W	Desert Botanical Ga	well	07/20/13	31.709
634300 Cottonwood W	Desert Botanical Ga	well	07/20/13	31.761
634310 Mary Kane We	Desert Botanical Ga	well	07/20/13	31.737
Box Well	Desert Botanical Ga	well	07/21/13	31.804
Box Well	Desert Botanical Ga	well	06/08/14	31.804
Box Well	Desert Botanical Ga	well	08/15/15	31.804
McDaniel Well	Desert Botanical Ga	well	06/20/15	31.577
McDaniel Well	Desert Botanical Ga	well	08/15/15	31.577
Post Canyon Well	Desert Botanical Ga	well	06/21/15	31.589

						Table 2: Field Parameters		
longitude	elevation (ft)	well_depth (ft)	depth_to_water (ft)	screened_interval (ft)		Temp (°C)	pH	Conductivity (µs/cm)
-110.65711	4262	400	260	340-400		19.7	7.2	546
-110.70757	4987					21.5	7.3	356
-110.70389	5013					19.9	7.4	365
-110.64319	4606					18.6	7.8	472
-110.65826	4350					18.4	7.3	636
-110.66261	4300	324	275	284-324		23.1	7.0	684
-110.65299	4414	700	520	640-690		29.0	7.5	627
-110.65113	4344	330	285			33.0	7.2	488
-110.65636	4227	220	190			23.7	6.9	598
-110.65453	4313					22.9	7.1	621
-110.66891	4127	500	345	384-484		33.2	8.1	1062
-110.67043	4130					31.6	7.7	1111
-110.66951	4305	500	270			23.8	7.3	1011
-110.66953	4102					24.4	7.4	812
-110.66955	4241	400	150	360-400		24.2	7.1	966
-110.66702	4246	575	290			23.2	7.0	681
-110.65575	4304	460	211	200-280		24.6	7.0	560
-110.66114	4123	706	214			30.1	7.8	1368
-110.64781	3519							
-110.64781	3519							
-110.64781	3519							
-110.64781	3519							
-110.64781	3519					20.4	7.9	727
-110.64781	3519					28.0	7.9	723
-110.64781	3519					17.8	7.4	778
-110.64781	3519					30.6	7.9	610
-110.64781	3519					23.2	8.0	886
-110.64781	3519					23.7	7.3	704
-110.64781	3519					27.0	7.3	975
-110.64781	3519					15.9	7.6	720
-110.64781	3519					23.9	7.6	574
-110.64781	3519					20.4	7.4	693
-110.64781	3519							
-110.57783	3544							
-110.57783	3544							
-110.57783	3544							
-110.57783	3544							
-110.65027	3652					15.9	7.5	903

-110.65027	3652							No Sample
-110.65027	3652					23.3	7.8	710
-110.65027	3652							
-110.65027	3652							
-110.67593	3241							
							7.0	
							7.1	
							7.1	
							6.8	
							7.1	
							7.1	
							7.4	
							7.0	
							7.2	
							7.2	
							7.7	
							4.5	
							4.6	
							7.7	
							6.9	
-110.588								
-110.590								
-110.591								
-110.591								
-110.587								
-110.584								
-110.615								
-110.638								
-110.590								
-110.584								
-110.584								
-110.578								
-110.579								
-110.590								
-110.590								
-110.589								
-110.639								
-110.639								
-110.639								
-110.639								
-110.639								
-110.639								
-110.639								

-110.493								
-110.494								
-110.578								
-110.592								
-110.592								
-110.592								
-110.591								
-110.586								
-110.586								
-110.601								
-110.629								
-110.611								
-110.597								
-110.600								
-110.592								
-110.585								
-110.585								
-110.585								
-110.585								
-110.630								
-110.590								
-110.619								
-110.674								
-110.589								
-110.589								
-110.589								
-110.499								
-110.499								
-110.506								

			Table 3: Isotopes					
Alkalinity (mg/L)	TDS (mg/L)		**δ18O ‰**	**δD ‰**	**δ13C ‰**	**δ34S ‰**	**δ18O ‰ Sulfate**	**Tritum TU**
256			-7.7	-54	-2.8	0.5		<1.0 (Apparent .5)
209			-8.7	-62	-4.4	5.2		<.9 (Apparent .4)
217			-8.4	-61	-6.3	5.8		0.8
190			-9.4	-66	-7.0	-0.9		<0.7
305			-8.0	-58	-5.7	4.5		<.9 (Apparent .3)
307			-7.9	-57	-10.2	2.0	7.0	
240			-8.1	-57	-6.6	2.6	2.3	
191			-8.3	-59	-6.2	0.4	3.8	
294			-8.0	-57	-10.2	1.4	6.9	
221			-8.3	-58	-8.6	2.0	4.5	
468			-8.9	-67	-8.3	15.0	8.9	<.8 (Apparent .3)
565			-6.4	-52	-11.5	1.8	6.7	2.2
309			-8.5	-66	-8.5	2.2	9.2	<1.1 (Apparent .5)
395			-8.2	-60	-12.1	-0.0	5.6	1.7
299			-8.3	-64	-8.5	0.6	6.0	
365			-7.7	-58	-10.1	0.9	6.1	1.3
259			-8.1	-58	-7.5	2.2	5.1	
501			-8.3	-62	-4.0	16.1	7.4	
			-7.2	-51				
			-7.2	-51				
			-6.9	-49				
			-8.5	-60				
	415							
	612							
	472							
	663							
	491							
	367							
	450							
			-8.5	-60				
	50		-8.3	-60				
250	50		-8.4	-58				
270			-8.3	-60				
			-8.1	-58		13		1.2
	622		-8.8	-68				

320	No Sample		-8.3	-64				
290	475							
			-8.0	-61				
			-7.7	-61		9.2		0.5
			-8.1	-56				
			-8.8	-59		11.7	10.5	2.3
			-9.1	-63		13.3	12.2	4.6
205			-8.2	-59		13.8	13.7	1.3
			-9.0	-64		10.8	10.8	2.2
			-8.6	-61		-0.4	5.6	2.6
185			-8.2	-59		6.9	9.8	3.5
			-8.2	-58		12.6	12.8	1.3
			-8.3	-61		-6.8	2.6	
225			-8.8	-63				2
			-8.8	-62		10.3	10.7	1.8
			-8.4	-60		11.5	12.8	1.4
			-8.3	-60				<1
			-8.3	-58				
78			-10.5	-73				<1
			-9.2	-72		1.7	3.4	
			-9.6	-55				
			-11.9	-65				
			-7.5	-61				
			-9.3	-66				
			-7.6	-59				
			-7.1	-53				
			-10.1	-60				
			-11.0	-56				
			-7.9	-56				
			-5.0	-43				
			-6.7	-52				
			-11.3	-61				
			-9.2	-55				
			-9.8	-63				
			-1.7	-29				
			-7.7	-54				
			-10.3	-61				
			-9.6	-55				
			-9.4	-55				
			-7.1	-58				
			-8.0	-59				
			-8.4	-59				
			-8.5	-58				

			-6.5	-49				
			-6.4	-49				
			-9.4	-57				
			-8.0	-59				
			1.3	-7				
			9.6	15				
			-8.8	-58				
			-6.5	-46				
			-5.3	-48				
			-11.5	-73				
			-6.8	-58				
			-11.1	-70				
			-12.4	-81				
			-12.3	-75				
			-9.8	-79				
			-11.2	-59				
			-7.1	-56				
			-7.6	-58				
			-9.8	-60				
			-11.0	-76				
			-7.8	-46				
			-10.2	-58				
			-10.1	-60				
			-10.3	-54				
			-6.3	-55				
			-8.6	-59				
			-6.1	-50				
			-6.3	-53				
			-8.8	-73				

		Table 4: Water Chemistry					
C 14 (DIC)	- should	Na^+ (mg/L)	Ca^{2+} (mg/L)	Mg^{2+} (mg/L)	Fe (mg/L)	K^+ (mg/L)	Sr^{2+} (mg/L)
		X	X	X	X	X	X
		X	X	X	X	X	X
		X	X	X	X	X	X
		X	X	X	X	X	X
		X	X	X	X	X	X
		X	X	X	X	X	X
		X	X	X	X	X	X
		X	X	X	X	X	X
		X	X	X	X	X	X
		X	X	X	X	X	X
		X	X	X	X	X	X
		X	X	X	X	X	X
		X	X	X	X	X	X
		X	X	X	X	X	X
		X	X	X	X	X	X
		X	X	X	X	X	X
		X	X	X	X	X	X
		X	X	X	X	X	X
		48	81	21		< 5.0	
		50	87	20		< 5.0	
		44	99	25		< 5.0	
		28	86	14		5.4	
		44	120	26		3.2	
		39	90	17		3.2	
		No Sample	No Sample	No Sample		No Sample	
		33	86	20		2.4	
		25	98	18		2.1	
		25	100	18		2.2	
		20	87	15		2.6	
		39	150	35		3.4	
		40	150	34		3.6	
-10.2		40	160	38		3.7	

		110	59	37	9		
		91	30	31	5.5		
-6.6		93	37	36		7.6	
		11	176				
		12	138				
		14	154				
		13	141				
		18	144				
		18	148				
		27	188				
		16	141				
		15	155				
		43	67				
		58	69				
		144	102				
			116				

Si (mg/L)	Al (mg/L)	Trace metals	Cl (mg/L)	SO4 (mg/L)	NO3 (mg/L)	F (mg/L)	Br (mg/L)
X	X	X	9.3	74.2	0.2	2.2	0.2
X	X	X	9.0	7.1	4.2	0.4	ND
X	X	X	7.0	6.9	3.2	0.5	0.1
X	X	X	6.4	79.5	3.4	0.6	0.1
X	X	X	8.8	84.9	6.4	1.7	0.1
X	X	X	8.9	77.8	4.9	0.8	0.1
X	X	X	37.1	91.4	N/A	2.1	0.2
X	X	X	14.5	66.8	5.6	1.2	0.2
X	X	X	8.7	20.6	N/A	0.8	0.2
X	X	X	13.1	88.5	6.6	1.2	0.2
X	X	X	35.9	91.3	0.6	1.8	0.3
X	X	X	36.3	52.5	0.6	1.1	0.3
X	X	X	23.0	168.1	0.3	4.0	0.3
X	X	X	10.8	69.9	0.3	1.3	0.2
X	X	X	20.4	163.1	0.4	3.7	0.3
X	X	X	8.1	24.8	4.2	1.8	0.2
X	X	X	10.5	69.7	7.7	2.4	0.2
X	X	X	76.7	165.1	1.0	6.8	0.4
	< 2.0		17	79			
	< 2.0		15	91			
	< 2.0		15	84			
	< 0.20		6.5	42			
	< 0.20		13	120			
	< 0.20		7.2	59			
	No Sample		No Sample	No Sample			
	< 0.20		6.2	70			
	< 0.20		4.4	46			
	No Sample		4.5	43			
	0.17		2.6	30			
			9.1	360			
			8.2	330			
			8.6	390			

			41	51			
			43	43			
				42			
			6	295			
				300			
			6	307			
			7	216			
			8	228			
			8	252			
				309			
			9	413			
			6	269			
			7	222			
				256			
			10	397			
			27	404			
			7	520			
			10	372			

NO2 (mg/L)	Anions (meq/L)	Cations (meq/L)	Charge Balance				
0.0							
0.4							
0.4							
0.0							
0.0							
0.0							
0.0							
0.0							
0.0							
0.0							
0.0							
0.0							
0.0							
0.0							
0.0							
	11.9	12.1	-1.2				
	11.5	12.1	-2.5				

	9.9	8.3	8.9				
	8.5	8.2	2.0				
	9.5	7.7	10.0				
	12.3	11.4	4.0				

Table 1: Sample locations				
sample_name	data_source	source_type	date	latitude
Canelo Cienega	Desert Botanica	cienega	07/08/15	31.564
Cieneguita E end	Desert Botanica	cienega	04/14/13	31.796
Cieneguita E end	Desert Botanica	cienega	05/25/15	31.796
Cieneguita E exclosure	Desert Botanica	cienega	05/25/15	31.795
Cieneguita E exclosure	Desert Botanica	cienega	08/16/15	31.795
Cieneguita NW Exclosure	Desert Botanica	cienega	02/02/14	31.796
Cieneguita NW exclosure	Desert Botanica	cienega	04/19/14	31.796
Cieneguita NW Exclosure	Desert Botanica	cienega	06/08/14	31.795
Cieneguita NW exclosure	Desert Botanica	cienega	05/25/15	31.796
Cieneguita NW exclosure	Desert Botanica	cienega	08/16/15	31.796
Cieneguita SW Exclosure	Desert Botanica	cienega	04/19/14	31.795
Cieneguita SW Exclosure	Desert Botanica	cienega	06/08/14	31.795
Cieneguita SW Exclosure	Desert Botanica	cienega	05/25/15	31.795
Cieneguita SW exclosure	Desert Botanica	cienega	08/16/15	31.795
Cieneguita wildlife dig out	Desert Botanica	cienega	02/02/14	31.794
Cieneguita wildlife dig out	Desert Botanica	cienega	12/20/14	31.794
Cieneguita wildlife dig out	Desert Botanica	cienega	05/25/15	31.794
Cinco 1 - N pool	Desert Botanica	cienega	06/09/13	31.793
Cinco 1 - N pool	Desert Botanica	cienega	05/25/15	31.793
Cinco 1 - N pool	Desert Botanica	cienega	08/16/15	31.793
Cinco 1 - S pool	Desert Botanica	cienega	08/16/15	31.791
Cinco 2 exclosure	Desert Botanica	cienega	06/09/13	31.790
Cinco 2 exclosure	Desert Botanica	cienega	05/25/15	31.790
Cinco 2 exclosure	Desert Botanica	cienega	08/16/15	31.790
Cinco 5 - cienega	Desert Botanica	cienega	05/25/15	31.789
Empire 1 - cienega	Desert Botanica	cienega	04/14/13	31.802
Empire 1 - cienega	Desert Botanica	cienega	02/01/14	31.802
Empire 1 - cienega	Desert Botanica	cienega	04/19/14	31.802
Empire 1 - cienega	Desert Botanica	cienega	06/08/14	31.802
Empire 1 - cienega	Desert Botanica	cienega	09/07/14	31.802
Empire 1 - cienega	Desert Botanica	cienega	12/20/14	31.802
Empire 1 - cienega	Desert Botanica	cienega	03/29/15	31.802
Empire 1 - cienega	Desert Botanica	cienega	05/25/15	31.802
Empire 1 - cienega	Desert Botanica	cienega	08/15/15	31.802
Empire 2 - cienega	Desert Botanica	cienega	05/25/15	31.801
Empire 3 - cienega	Desert Botanica	cienega	04/14/13	31.800
Empire 4 - cienega	Desert Botanica	cienega	04/14/13	31.801
Empire 4 - cienega	Desert Botanica	cienega	05/25/15	31.800
Empire 4 - cienega	Desert Botanica	cienega	08/15/15	31.800
Empire 5 - cienega	Desert Botanica	cienega	04/14/13	31.802

Empire Cienega nr confl Cienega Cr	Desert Botanica	cienega	07/21/13	31.809
Empire Creek - 0.23 below Cieneguita c	Desert Botanica	cienega	06/08/14	31.799
Empire Creek - 0.27 mi below Cieneguit	Desert Botanica	cienega	04/19/14	31.799
Empire Creek above Cienega Creek cor	Desert Botanica	cienega	09/07/14	31.809
Empire Creek below Rattlesnake-Cieneg	Desert Botanica	cienega	02/02/14	31.798
Empire Creek road crossing	Desert Botanica	cienega	04/14/13	31.803
Empire Creek road crossing	Desert Botanica	cienega	04/19/14	31.803
Empire Creek road crossing	Desert Botanica	cienega	06/08/14	31.803
Empire Creek road crossing	Desert Botanica	cienega	09/07/14	31.803
Empire Creek road crossing	Desert Botanica	cienega	12/20/14	31.803
Empire Creek road crossing	Desert Botanica	cienega	03/29/15	31.803
Empire Creek road crossing	Desert Botanica	cienega	05/25/15	31.803
Empire Creek road crossing	Desert Botanica	cienega	08/15/15	31.803
Oak Tree cienega - S pool	Desert Botanica	cienega	03/29/15	31.809
Oak Tree N - cienega	Desert Botanica	cienega	09/07/14	31.809
Panama Canal E of Ag field cienega	Desert Botanica	cienega	03/29/15	31.825
Rattlesnake above Cieneguita confluenc	Desert Botanica	cienega	04/19/14	31.798
Springwater - cienega	Desert Botanica	cienega	04/19/14	31.806
Springwater - cienega	Desert Botanica	cienega	05/25/15	31.806
Springwater - cienega	Desert Botanica	cienega	08/16/15	31.806
Springwater cienega - W end	Desert Botanica	cienega	04/14/13	31.806
Springwater South central	Desert Botanica	cienega	08/16/15	31.802
Stevenson cienega	Desert Botanica	cienega	02/01/14	31.855
Cienega Creek E of Cieneguita - pool	Desert Botanica	stream	08/16/15	31.795
Cienega Creek & Empire Creek - combi	Desert Botanica	stream	03/29/15	31.809
Cienega Creek above confluence Empir	Desert Botanica	stream	04/19/14	31.809
Cienega Creek above Empire Creek cor	Desert Botanica	stream	03/29/15	31.809
Cienega Creek above Mattie Canyon co	Desert Botanica	stream	10/13/13	31.858
Cienega Creek adj Ag field cienega	Desert Botanica	stream	03/29/15	31.825
Cienega Creek adj Empire 1 - flow	Desert Botanica	stream	04/19/14	31.802
Cienega Creek adj Empire 1 - pool	Desert Botanica	stream	06/08/14	31.802
Cienega Creek adj Empire 1 - pool	Desert Botanica	stream	05/25/15	31.802
Cienega Creek adj Empire 1 - pool	Desert Botanica	stream	08/15/15	31.802
Cienega Creek adj Empire 4	Desert Botanica	stream	05/25/15	31.800
Cienega Creek adj WP-14	Desert Botanica	stream	12/20/14	31.809
Cienega Creek at USGS gage	Desert Botanica	stream	10/13/13	31.866
Cienega Creek E of Box Well	Desert Botanica	stream	12/20/14	31.804
Cienega Creek E of Box Well	Desert Botanica	stream	03/29/15	31.804
Empire Creek nr WP-14	Desert Botanica	stream	03/29/15	31.809
O'Donnell Creek Canelo Hills	Desert Botanica	stream	07/08/15	31.564
O'Donnell Creek Canelo Hills	Desert Botanica	stream	08/15/15	31.564
CC at Narrows	Dr. Eastoe (unp	stream		31.85462
Marsh Stn. Rd.	Dr. Eastoe (unp	stream		32.01983

Marsh Stn. Rd.	Dr. Eastoe (unp	stream		32.01983
Marsh Stn. Rd.	Dr. Eastoe (unp	stream		32.01983
Marsh Stn. Rd.	Dr. Eastoe (unp	stream		32.01983
Flux Canyon	Gu et al. (2008)	stream	05/05/01	
Sonoita Cr	Gu et al. (2008)	stream	09/18/98	
Sonoita Cr	Gu et al. (2008)	stream	09/18/98	
Sonoita Cr	Gu et al. (2008)	stream	09/22/98	
Sonoita Cr	Gu et al. (2008)	stream	09/22/98	
Sonoita Cr	Gu et al. (2008)	stream	01/14/99	
Sonoita Cr	Gu et al. (2008)	stream	01/14/99	
Sonoita Cr	Gu et al. (2008)	stream	01/14/99	
Sonoita Cr	Gu et al. (2008)	stream	01/14/99	
Sonoita Cr	Gu et al. (2008)	stream	01/14/99	
Sonoita Cr	Gu et al. (2008)	stream	01/14/99	
Sonoita Cr	Gu et al. (2008)	stream	07/16/99	
Sonoita Cr	Gu et al. (2008)	stream	07/16/99	
Sonoita Cr	Gu et al. (2008)	stream	07/21/99	
Sonoita Cr	Gu et al. (2008)	stream	07/21/99	
Sonoita Cr	Gu et al. (2008)	stream	02/27/00	
Sonoita Cr	Gu et al. (2008)	stream	02/27/00	
Sonoita Cr	Gu et al. (2008)	stream	02/27/00	
Sonoita Cr	Gu et al. (2008)	stream	02/27/00	
Sonoita Cr	Gu et al. (2008)	stream	02/27/00	
Sonoita Cr	Gu et al. (2008)	stream	04/22/00	
Sonoita Cr	Gu et al. (2008)	stream	04/22/00	
Sonoita Cr	Gu et al. (2008)	stream	04/22/00	
Sonoita Cr	Gu et al. (2008)	stream	05/05/01	
Sonoita Cr	Gu et al. (2008)	stream	05/05/01	
Sonoita Cr	Gu et al. (2008)	stream	05/05/01	
Sonoita Cr	Gu et al. (2008)	stream	11/06/02	
Sonoita Cr	Gu et al. (2008)	stream	11/06/02	
Sonoita Cr	Gu et al. (2008)	stream	11/06/02	
Sonoita Cr	Gu et al. (2008)	stream	03/15/03	
Sonoita Cr	Gu et al. (2008)	stream	03/15/03	
Sonoita Cr	Gu et al. (2008)	stream	11/14/03	
Sonoita Cr	Gu et al. (2008)	stream	11/14/03	
Sonoita Cr	Gu et al. (2008)	stream	11/14/03	
Sonoita Cr	Gu et al. (2008)	stream	11/14/03	
Temporal Gulch	Gu et al. (2008)	stream	07/21/99	
Temporal Gulch	Gu et al. (2008)	stream	05/05/01	
Bedrock outcrop	Pima Co. RFCD	stream		32.01215
Cienega 1	Pima Co. RFCD	stream	09/28/98	32.01850
Cienega 1	Pima Co. RFCD	stream	11/19/98	32.01850

Cienega 1	Pima Co. RFCD	stream	06/17/99	32.01850
Cienega 1	Pima Co. RFCD	stream	08/24/99	32.01850
Cienega 1	Pima Co. RFCD	stream	11/19/99	32.01850
Cienega 1	Pima Co. RFCD	stream	03/31/00	32.01850
Cienega 1	Pima Co. RFCD	stream	06/04/02	32.01850
Cienega 1	Pima Co. RFCD	stream	08/02/02	32.01850
Cienega 1	Pima Co. RFCD	stream	10/03/02	32.01850
Cienega 1	Pima Co. RFCD	stream	01/03/03	32.01850
Cienega 1	Pima Co. RFCD	stream	05/08/03	32.01850
Cienega 1	Pima Co. RFCD	stream	03/16/10	32.01850
Cienega 1	Pima Co. RFCD	stream	03/08/11	32.01850
Cienega 1	Pima Co. RFCD	stream	09/07/11	32.01850
Cienega 1	Pima Co. RFCD	stream	09/27/12	32.01850
Cienega 1	Pima Co. RFCD	stream	02/26/13	32.01850
Cienega 1	Pima Co. RFCD	stream	09/24/13	32.01850
Cienega 1	Pima Co. RFCD	stream	03/11/14	32.01850
Cienega 1	Pima Co. RFCD	stream	05/20/14	32.01850
Cienega 1	Pima Co. RFCD	stream	09/30/14	32.01850
Cienega 1	Pima Co. RFCD	stream	02/18/15	32.01850
Cienega 1	Pima Co. RFCD	stream	06/15/15	32.01968
Cienega 1	Pima Co. RFCD	stream	04/29/99	32.01850
Cienega 2	Pima Co. RFCD	stream	09/28/98	32.01968
Cienega 2	Pima Co. RFCD	stream	11/19/98	32.01968
Cienega 2	Pima Co. RFCD	stream	04/29/99	32.01968
Cienega 2	Pima Co. RFCD	stream	06/17/99	32.01968
Cienega 2	Pima Co. RFCD	stream	08/24/99	32.01968
Cienega 2	Pima Co. RFCD	stream	11/19/99	32.01968
Cienega 2	Pima Co. RFCD	stream	03/31/00	32.01968
Cienega 2	Pima Co. RFCD	stream	06/04/02	32.01968
Cienega 2	Pima Co. RFCD	stream	08/02/02	32.01968
Cienega 2	Pima Co. RFCD	stream	10/03/02	32.01968
Cienega 2	Pima Co. RFCD	stream	1/3/2003	32.01968
Cienega 2	Pima Co. RFCD	stream	05/08/03	32.01968
Cienega 2	Pima Co. RFCD	stream	3/16/2010	32.01968
Cienega 2	Pima Co. RFCD	stream	9/21/2010	32.01968
Cienega 2	Pima Co. RFCD	stream	3/8/2011	32.01968
Cienega 2	Pima Co. RFCD	stream	9/7/2011	32.01968
Cienega 2	Pima Co. RFCD	stream	2/24/2012	32.01968
Cienega 2	Pima Co. RFCD	stream	9/10/2012	32.01968
Cienega 2	Pima Co. RFCD	stream	11/20/2012	32.01968
Cienega 2	Pima Co. RFCD	stream	2/27/2013	32.01968
Cienega 2	Pima Co. RFCD	stream	4/18/2013	32.01968
Cienega 2	Pima Co. RFCD	stream	9/24/2013	32.01968

Cienega 2	Pima Co. RFCD	stream	3/11/2014	32.01968
Cienega 2	Pima Co. RFCD	stream	05/20/14	32.01968
Cienega 2	Pima Co. RFCD	stream	06/15/15	32.01968
Cienega 3	Pima Co. RFCD	stream		32.01286
Davidson 2	Pima Co. RFCD	stream	06/04/02	32.01599
Davidson 2	Pima Co. RFCD	stream	10/03/02	32.01599
Davidson 2	Pima Co. RFCD	stream	01/03/03	32.01599
Davidson 2	Pima Co. RFCD	stream	02/18/15	32.01599
Cienega Dam	UA/ McIntosh (u	stream	09/26/14	32.03592
Davidson Canyon	UA/ McIntosh (u	stream	09/30/14	31.98531
Davidson/ Cienega Confluence	UA/ McIntosh (u	stream	09/30/14	32.01822
Maddie Canyon	UA/ McIntosh (u	stream	06/12/15	
Maddie/ Cienega Confluence	UA/ McIntosh (u	stream	06/12/15	
Marsh Station	UA/ McIntosh (u	stream	09/26/14	32.01964
Marsh Station	UA/ McIntosh (u	stream	09/30/14	32.01961

			Table 2: Field Parameters					
longitude	elevation (ft)		Temp (°C)	pH	% DO	Conductivity (µs/cm)	Alkalinity (mg/L)	TDS (mg/L)
-110.528								
-110.593								
-110.593								
-110.597								
-110.597								
-110.598								
-110.598								
-110.598								
-110.598								
-110.598								
-110.598								
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-110.589								
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-110.570								
-110.588								
-110.588								
-110.590								
-110.528								
-110.528								
-110.55379	4232							
-110.64613	6604							

-110.64613	6604							
-110.64613	6604							
-110.64613	6604							
				3.5				
				7.8			238	
				7.8			237	
				8.4			205	
				8.5			192	
				6.8				
				6.9			216	
				7.5			210	
				7.1				
				7.8			180	
				7.1				
				7.7				
				7.6				
				7.8				
				7.5				
				7.6				
				7.9				
				7.9				
				7.9				
				7.5				
				7.7				
				7.7				
				7.2				
				7.5				
				7.2				
				6.8			222	
				7.9			236	
				7.9			259	
				7.4				
				7.6				
				7.2				
				7.4				
				7.5				
				7.5				
				7.7				
				6.8				
-110.62240	3366							
-110.64200	3338							
-110.64200	3338							

-110.6420(	3338							
-110.6420(	3338							
-110.6420(	3338							
-110.6420(	3338							
-110.6420(	3338							
-110.6420(	3338							
-110.6420(	3338							
-110.6420(	3338		16.6	7.5		1234		760
-110.6420(	3338							
-110.6420(	3338		17.1	7.3		1380	300	973
-110.6420(	3338		16.6	7.5		1320	300	928
-110.6420(	3338		22.6	7.5		1290	300	899
-110.6420(	3338		20.4	7.7		1302	310	911
-110.6420(	3338		15.9	7.4		1239	300	879
-110.6420(	3338		20.2	7.3		1223	310	863
-110.6420(	3338						320	
-110.6420(	3338							
-110.6420(	3338						310	
-110.6420(	3338						310	
-110.6420(	3338		21.17	7.7		1375		962
-110.6420(	3338							
-110.64517	3311							
-110.64517	3311							
-110.64517	3311							
-110.64517	3311							
-110.64517	3311							
-110.64517	3311							
-110.64517	3311							
-110.64517	3311							
-110.64517	3311							
-110.64517	3311							
-110.64517	3311			7.6				
-110.64517	3311							
-110.64517	3311		16.5	7.7		1341	290	945
-110.64517	3311		22.4	7.4		1217	280	839
-110.64517	3311		16.9	7.7		1253	300	879
-110.64517	3311		23.5	7.4		1153	280	798
-110.64517	3311		16	7.8		1143	310	798
-110.64517	3311		24.2	7.6	58	1110	300	1710
-110.64517	3311		17.9	7.5	69	1010	300	656
-110.64517	3311		15.03	7.6	96	977	310	635
-110.64517	3311		18	7.7	58	1181	310	756
-110.64517	3311		21.1	7.3		1157	310	814

-110.64517	3311						310	
-110.64517	3311							
-110.64517	3311		22.61	8.0		1394	300	949
-110.62142	3370							
-110.64287	3334		23.3©	7.6		794		
-110.64287	3334		19.8©	7.5		793		
-110.64287	3334		17.6©	7.5		791		
-110.64287	3334						310	
-110.67664	3206		22.63	6.3	58	1063		
-110.647	3519		23.9	7.2	38	629		
-110.643	3327		19.5	7.5	67	1246		
			21.2	7.5	88	433		
			18	7.5	64	486		
-110.64561	3318		22.01	6.4	49	1082		
-110.64561	3319		19.7	7.7	66	1144		

	Table 3: Isotopes							
	δ18O ‰	**δD ‰**	**δ13C ‰**	**δ34S ‰**	**δ18O ‰ Sulfate**	**Tritum TU**	**C 14 (DIC) - should**	
	-6.4	-52						
	-1.6	-26						
	-2.4	-34						
	-8.1	-56						
	-5.9	-49						
	-9.8	-52						
	-1.2	-36						
	0.7	-26						
	-2.9	-36						
	-5.5	-46						
	-5.4	-52						
	-8.7	-71						
	-4.0	-41						
	-1.2	-29						
	-9.0	-55						
	-8.0	-59						
	-6.7	-54						
	-1.7	-23						
	-1.5	-28						
	1.2	-19						
	-6.0	-50						
	-8.9	-51						
	-6.9	-51						
	3.0	-5						
	8.6	14						
	-4.7	-40						
	-10.4	-57						
	-6.4	-57						
	-6.1	-54						
	-7.9	-59						
	-8.0	-58						
	-6.7	-55						
	-5.2	-44						
	-5.8	-45						
	8.3	11						
	1.9	-13						
	-6.9	-44						
	-3.2	-39						
	-6.0	-45						
	-5.4	-43						

	-5.8	-41						
	1.0	-27						
	-5.8	-51						
	-8.1	-61						
	-8.2	-55						
	-7.5	-49						
	-6.2	-52						
	-3.5	-45						
	-4.3	-33						
	-8.0	-60						
	-7.0	-54						
	-7.0	-55						
	-5.8	-49						
	-9.2	-60						
	-2.0	-18						
	-6.7	-53						
	-6.2	-52						
	-5.3	-50						
	-6.3	-48						
	-5.8	-50						
	-3.5	-27						
	2.4	-12						
	-8.2	-52						
	-5.1	-42						
	-7.9	-55						
	-4.2	-48						
	-7.5	-55						
	-10.3	-61						
	-7.6	-60						
	-5.9	-55						
	-4.4	-47						
	-7.2	-52						
	-5.4	-36						
	-6.8	-53						
	-7.5	-57						
	-9.9	-59						
	-7.6	-57						
	-7.6	-56						
	-7.8	-56						
	-7.8	-52						
	-7.1	-57						
	-7.7	-56	-9.1			2.9		
						4.0		

	-9.1	-61						
	-8.1	-57	-9.9			3.3		
	-8.0	-57						
	-8.8	-62		-2.7	-0.1			
	-9.0	-63				2.0		
	-8.8	-64				2.5		
	-8.6	-61				1.6		
	-8.4	-61				2.8		
	-9.0	-62				2.0		
	-9.2	-64						
	-9.1	-64						
	-8.9	-63						
	-8.9	-64						
	-8.8	-62						
	-12.0	-86		6.4	8.8	2.2		
	-9.6	-69		7.3	9	2.0		
	-10.0	-72		6.4				
	-10.2	-72		5.9				
	-8.9	-63		9.4	10			
	-9.1	-63		9.8	11.4			
	-8.9	-63		9.1	10.8			
	-8.9	-63		8.4	9.6			
	-8.8	-62		8	10.4			
	-8.8	-62		9.7				
	-8.9	-63		10.5				
	-8.9	-62		8.3				
	-8.7	-61		7.1	8.4			
	-8.7	-61		7.1	9.2			
	-8.6	-61		5.4	8			
	-8.8	-62		12	12.5	5.2		
	-8.5	-60		7.1	9.7	3.2		
	-8.4	-60		6.7	9	4.3		
				7.4				
				7.1				
	-8.3	-59		8.5	11.3	2.8		
	-8.4	-59		9.2	11.1			
	-8.5	-59		8.4		2.3		
	-8.3	-59		7.1		2.4		
	-11.1	-81		-1.6	2.7			
	-8.8	-61		-1.2	3.9			
	-7.8	-55						
	-7.9	-56						

	-7.6	-55						
	-8.5	-62						
	-7.8	-58						
	-7.8	-57						
	-8.0	-57						
	-7.9	-58						
	-7.7	-55						
	-7.6	-54						
	-7.8	-56						
	-8.0	-58						
	-9.0	-64						
	-8.7	-62						
	-8.4	-61		10.3		1.5	-11.5	
	-7.9	-55						
	-7.9	-56						
	-7.8	-55						
	-7.5	-53						
	-7.8	-54						
	-8.4	-61						
	-7.9	-60						
	-7.9	-57						
	-7.8	-56						
	-7.6	-54						
	-7.5	-53						
	-7.6	-55						

	-8.1	-58						
	-8.3	-61		11.1		1.9	-11	
	-6.8	-48						
	-6.8	-48						
	-6.7	-46						
	-8.5	-60						
	-8.7	-62						
	-9.9	-72						
	-8.4	-60						
	-9.0	-64						
	-8.9	-64						

Table 4: Water Chemistry							
be d13C? Na^{+} (mg/L)	Ca^{2+} (mg/L)	Mg^{2+} (mg/L)	Fe (mg/L)	K^{+} (mg/L)	Sr^{2+} (mg/L)	Si (mg/L)	Al (mg/L)

21	146						
19	145						
24	133						
22	130						
29	194						
17	147						
15	138						
8	97						
16	128						
18	141						
23	174						
17	131						
19	122						
13	132						
16	149						
19	151						
14	80						

72	150	43		6.1			<2.0
76		52	0.075	4.6			< 0.20
63	160	44	< 0.05	4.4			< 0.20
70	160	42	< 0.05	5.6			< 0.20
69	170	46	< 0.10	4.7			< 0.20
64	170	46	< 0.10	4.4			< 0.20
62	160	42	0.14	5.6			< 0.20
66	170	47	< 0.10	4.4			< 0.20
64	150	43	< 0.1	4.3			< 0.1
60	170	46	0.12	4.4			< 0.1
65	200	51		4.7			
69	140	40		5.7			< 2.0
74		50	< 0.05	4.6			< 0.20
69	150	41	< 0.05	4.9			< 0.20
63	150	42	< 0.05	4.2			< 0.20
63	150	37	< 0.05	5.0			< 0.20
55	140	36	< 0.05	3.8			< 0.20
65	170	43		5.1			
54	130	33		4.0			
67	170	44	< 0.10	4.7			< 0.20
66	160	43		4.4			
59	150	38	0.38	5.2			0.38

65	170	45	< 0.10	4.4			< 0.20
66	180	51		5			
45	93	23		< 5.0			< 2.0
43	98	23		< 5.0			< 2.0
49	96	24		< 5.0			< 2.0
34	85	20		3.5			< 0.1

Trace Metals	Cl (mg/L)	SO4 (mg/L)	NO3 (mg/L)	F (mg/L)	Br (mg/L)	NO2 (mg/L)	Anions (meq/L)

		772					
	10	299					10.4
	7	294					10.2
	7	283					9.5
	7	284					9.3
	28	421					
	13	295					10.0
	9	284					9.6
	5	216					
	9	291					9.3
	10	176					
	10	256					
	9	198					
	9	209					
		233					
		206					
		245					
		254					
		265					
		244					
		217					
		262					
		250					
		255					
		284					
	8	196					7.9
	8	236					9.0
	8	255					9.8
		246					
		251					
		274					
		278					
		266					
		270					
	7	117					
		142					

	12	400		0.81			
	11	510	< 0.40	0.57			
	9.8	450	< 0.40	0.62			14.6
	10	460	< 4.2	0.52			14.8
	10	420	0.43	0.69			14.1
	10	430	< 0.40	0.48			14.2
	9.4	390	< 0.40	0.57			13.5
	11	430	< 0.40	0.53			14.5
	9	390	0.8	0.6			13.5
	9.8	430	0.14	0.63			14.3
	13	500		0.86			
	12	360					
	11	480					
	10	400					13.2
	10	400					13.5
	8.8	380					12.8
	9.1	370					13.0
	11	400					13.6
	7.7	270					10.8
	9.6	370					13.1
	10	400					13.7
	9.1	360					12.8

	11	420					14.1
	13	480					15.3
	19	100					
	15	92					
	15	90					
	4.7	57					6.4

Cations (meq/L)	Charge Balance					

8.2	11.9					
8.1	11.7					
7.7	10.3					
7.4	10.9					
8.1	10.9					
7.5	12.1					
7.1	13.3					
7.2	5.3					
8.1	5.1					
8.4	7.8					

14.5	0.4					
14.6	0.5					
15.4	-4.3					
15.2	-3.5					
14.3	-2.9					
15.3	-2.8					
13.9	-1.7					
15.0	-2.3					
14.0	-2.9					
13.8	-1.0					
13.4	-2.5					
12.4	2.4					
15.0	-5.0					
11.7	-4.0					
15.1	-7.4					
14.5	-2.9					
13.3	-1.8					

15.1	-3.4					
16.2	-2.9					
7.5	-7.6					