Chapparal Energy Osage County Oklahoma

Monitoring Well Network Details

Monitoring Well ID	Location	Diameter (in)	Depth (ft)	Screen Interval (ft)
MW-1	NWNWSE, Sec 2, T27N, R5E	4	250	220 - 240
MW-2	NENESE, Sec 11, T27N, R5E	4	250	230 - 250
MW-3	SESENW, Sec 11, T26N, R5E	4	290	240 - 280
MW-4	NWNWSW, Sec 11, T27N, R5E	4	215	175 - 215
MW-5	NWNWSE, Sec 10, T27N, R5E	4	240	200 - 240
MW-6	NWNWNE, Sec 15, T27N, R5E	4	280	240 - 270
MW-7	NWNWNW, Sec 14, T27N, R5E	4	244	204 - 234
MW-8	NWNWNE, Sec 14, T27N, R5E	4	190	150 - 180
MW-9	NENENE, Sec 14, T27N, R5E	4	186	146 - 176
MW-10	SWSWSE, Sec 12, T27N, R5E	4	254	224 - 254
MW-11	NENESE, Sec 14, T27N, R5E	4	180	140 - 170
MW-12	SESENW, Sec 14, T27N, R5E	4	210	180 - 200
MW-13	SWSWNW, Sec 14, T27N, R5E	4	240	200 - 230
MW-14	NWNWNW, Sec 23, T27N, R5E	4	245	205 - 235
MW-15	NENENW, Sec 23, T27N, R5E	4	254	234 - 254
MW-16	NWNWNW, Sec 23, T27N, R5E	4	160	120 - 150
MW-17	SESENE, Sec 23, T27N, R5E	4	148	108 - 138
MW-18	SESENW, Sec 23, T27N, R5E	4	186	146 -176
MW-19	SESENE, Sec 22, T27N, R5E	4	198	158 - 188

Construction

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Baseline Analytical Data

Sample ID	Sample Date	Sample Time	Concentrations, mg/L Chlorides	TDS	Alkalinity
MW-1	10/22/2012	14:48	6010	13000	460
MW-2	10/22/2012	16:15	1420	3430	286
MW-3	10/22/2012	17:08	589	2720	1390
MW-4	10/23/2012	8:20	2220	6910	2360
MW-5	10/23/2012	9:09	1770	5230	860
MW-6	10/23/2012	10:36	387	1230	465
MW-7	10/23/2012	9:54	296	2590	1750
MW-8	10/23/2012	11:33	2090	4980	352
MW-9	10/23/2012	12:31	852	2420	508
MW-10	10/23/2012	13:31	1140	2550	60
MW-10 Dup	10/23/2012	13:31	1080	2590	56
MW-11	10/23/2012	14:55	246	1590	358
MW-12	10/23/2012	15:32	616	2810	1310
MW-13	10/23/2012	16:09	304	2130	1190
MW-14	10/23/2012	17:47	3310	7790	618
MW-15	10/23/2012	16:58	3770	7790	238
MW-16	10/24/2012	7:45	5490	11700	312
MW-17	10/24/2012	9:52	3510	7800	332
MW-18	10/24/2012	9:23	286	2620	2020
MW-19	10/24/2012	8:35	360	3130	2480
MW-19D	10/24/2012	8:35	362	3280	2410
Blank (1)	10/23/2012	8:30	<0.16	<35	4
Blank (2)	10/24/2012	7:49	<0.16	56	2

MW-1 to 19 Reported Nov. 8, 2012

Sample ID	Sample Date	Sample Time	Concentrations, mg/L Chlorides	TDS	Alkalinity
MW-20	8/7/2013	12:55	551	2910	2130
MW-21	8/7/2013	12:05	2510	5310	310
MW-22	8/7/2013	11:00	455	1710	768
MW-23	8/7/2013	14:25	1080	2490	385
MW-24	8/7/2013	13:40	191	1550	1290
MW-25	8/7/2013	17:35	504	2730	1870
MW-26	8/7/2013	16:55	1830	3210	300
MW-27	8/7/2013	16:15	3670	7320	364
MW-28	8/7/2013	15:45	3840	10600	3250
MW-29	8/7/2013	15:10	181	2390	1990
Blank (1)	8/9/2013		<0.16	<50	50

MW-20 to 29 Reported Aug. 12, 2013

			Concentrations, mg/L
Sampled Well	Chlorides	Analyzed Date	TDS
Sampling Method Employed	(EPA Method 300.0)		(SM 2540C)
MW-1	154	6/27/2013	3170
MW-2	415	6/26/2013	2280
MW-3	1210	6/26/2013	3560
MW-4	1990	6/26/2013	5440
MW-5	1000	6/26/2013	3970

Reported 7/01/2013

Sample ID	Sample Date	Sample Time	Chlorides
MW-1	6/27/2013		154
MW-2	6/26/2013		415
MW-3	6/26/2013		1210
MW-4	6/26/2013		1990
MW-5	6/26/2013		1000
MW-6	6/27/2013		638
MW-7	6/26/2013		349
MW-8	6/26/2013		2090
MW-9	6/26/2013		471
MW-10	6/26/2013		2280
MW-11	6/27/2013		230
MW-12	6/26/2013		571
MW-13	6/26/2013		629
MW-14	6/26/2013		147
MW-15	6/26/2013		4320
MW-16	6/27/2013		798
MW-17	6/26/2013		15800
MW-18	6/26/2013		306
MW-19	6/26/2013		67
MW-20	~8/5/2013		551
MW-21	~8/5/2013		2510
MW-22	~8/5/2013		768
MW-23	~8/5/2013		1080
MW-24	~8/5/2013		191
MW-25	~8/5/2013		504
MW-26	~8/5/2013		1830
MW-27	~8/5/2013		3670
MW-28	~8/5/2013		3840
MW-29	~8/5/2013		181

Sample ID	Sample Date	Sample Time	Chlorides
MW-1	4/7/2014	15:00	3110
MW-2	4/7/2014	15:30	281
MW-3	4/7/2014	16:15	738
MW-4	4/7/2014	17:00	2550
MW-5	4/7/2014	17:45	871
MW-6	4/8/2014	10:30	380
MW-7	4/7/2014	18:15	330
MW-8	4/8/2014	9:45	1820
MW-9	4/8/2014	9:15	449
MW-10	4/7/2014	19:00	3000
MW-11	4/8/2014	12:20	259
MW-12	4/8/2014	11:15	495
MW-13	4/8/2014	11:50	522
MW-14	4/8/2014	15:20	213
MW-15	4/8/2014	14:00	2060
MW-16	4/8/2014	15:00	6320
MW-17	4/8/2014	16:30	9820
MW-18	4/8/2014	15:50	323
MW-19	4/8/2014	16:50	59.8
MW-20	4/8/2014	13:00	1730
MW-21	4/7/2014	19:40	1220
MW-22	4/8/2014	13:30	4480
MW-23	4/7/2014	10:10	2000
MW-24	4/7/2014	9:40	271
MW-25	4/7/2014	14:20	360
MW-26	4/7/2014	13:45	336
MW-27	4/7/2014	12:20	452
MW-28	4/7/2014	11:50	6140
MW-29	4/7/2014	11:00	1790

Analyzed Date	Alkalinity (SM 2320B)	Analyzed Date
6/28/2013	2980	6/26/2013
6/28/2013	1490	6/26/2013
6/28/2013	2000	6/26/2013
6/26/2013	2060	6/26/2013
6/26/2013	2180	6/26/2013

Concentrations, mg/L

TDS	Alkalinity
3170	2980
2280	1490
3560	2000
5440	2060
3970	2180
2080	540
1980	1210
4860	372
1960	925
4900	202
980	320
3380	2210
2730	1320
1900	1730
8840	262
2110	394
29100	232
2270	1610
2490	2350
2910	2130
5310	310
1710	455
2490	385
1550	1290
2730	1870
3210	300
7320	364
10600	3250
2390	1990

Concentrations, mg/L

TDS	Alkalinity
6410	910
2010	1560
2380	1120
5550	1820
3450	2330
1710	860
1650	1160
4100	432
1640	850
5910	224
964	350
2910	2160
2280	1410
1840	1560
4020	236
11700	384
18300	298
1930	1490
1870	2100
4710	1220
2750	430
9870	1870
4340	620
1230	730
2680	1940
3530	3010
2970	2170
12800	2720
4860	2050

	Baseline	Jul-13		
	Concentrations, mg/L			
Sample ID	**Chlorides**		**Delta**	
MW-1	6010	154	-5856	**-97%**
MW-2	1420	415	-1005	**-71%**
MW-3	589	1210	621	**105%**
MW-4	2220	1990	-230	**-10%**
MW-5	1770	1000	-770	**-44%**

Sample ID	**e in Chlorides**	
MW-1	**-97%**	97% decre
MW-2	**-71%**	71% decre
MW-3	**105%**	**105% Incre**
MW-4	**-10%**	10% decre
MW-5	**-44%**	44% decre

Sample ID	**TDS**			
MW-1	13000	3170	-9830	**-76%**
MW-2	3430	2280	-1150	**-34%**
MW-3	2720	3560	840	**31%**
MW-4	6910	5440	-1470	**-21%**
MW-5	5230	3970	-1260	**-24%**

Sample ID	**hange in TDS**	
MW-1	**-76%**	76% decre
MW-2	**-34%**	34% decre
MW-3	**31%**	**31% Increa**
MW-4	**-21%**	21% decre
MW-5	**-24%**	24% decre

Sample ID	**Alkalinity**			
MW-1	460	2980	2520	**548%**
MW-2	286	1490	1204	**421%**
MW-3	1390	2000	610	**44%**
MW-4	2360	2060	-300	**-13%**
MW-5	860	2180	1320	**153%**

Sample ID	**e in Alkalinity**	
MW-1	**548%**	**548% Incre**
MW-2	**421%**	**421% Incre**
MW-3	**44%**	**44% Increa**
MW-4	**-13%**	13% decre
MW-5	**153%**	**153% Incre**

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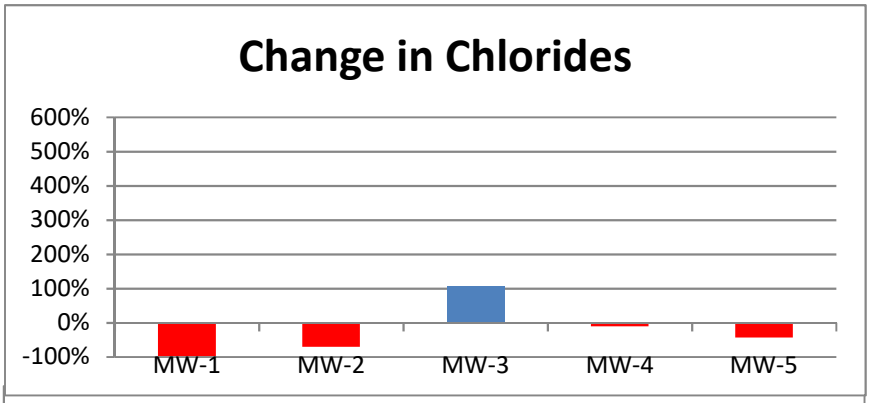

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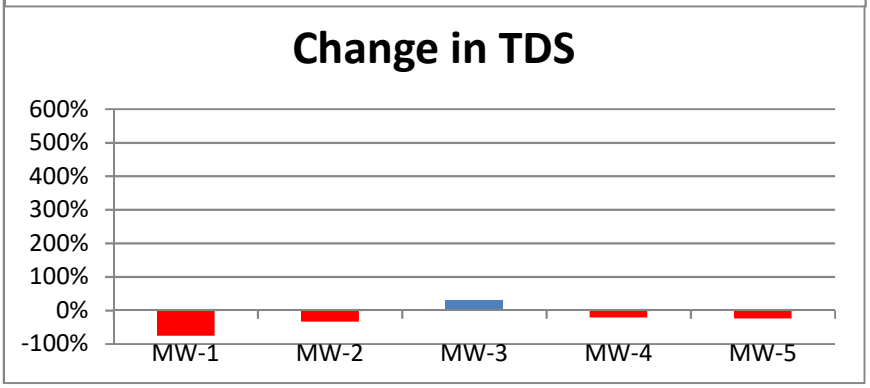

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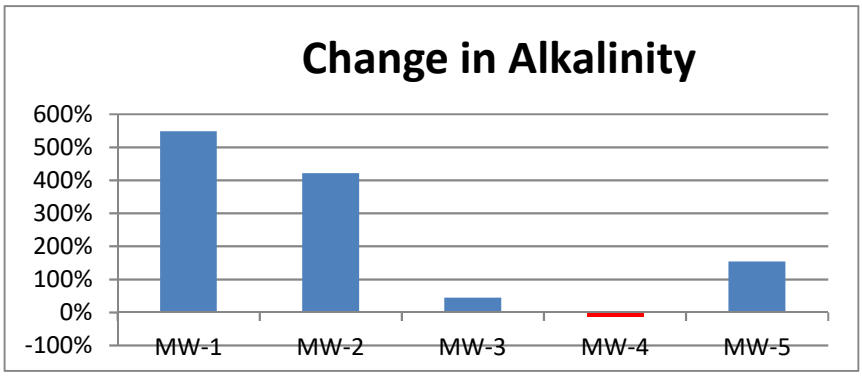


Sample ID	Sample Date	Sample Time	Concentrations, mg/L Chlorides	TDS	Alkalinity
MW-1	10/28/2013	15:00	2630	6370	1220
MW-2	10/28/2013	15:40	325	2160	1590
MW-3	10/28/2013	16:15	732	2920	1720
MW-4	10/28/2013	17:00	2240	5600	1920
MW-5	10/28/2013	17:30	862	3750	2390
MW-6	10/29/2013	16:00	347	1650	880
MW-7	10/28/2013	18:15	323	1680	1120
MW-8	10/29/2013	9:45	3160	6390	404
MW-9	10/29/2013	9:00	482	1870	880
MW-10	10/29/2013	8:15	413	1550	404
MW-11	10/29/2013	12:15	242	958	300
MW-12	10/29/2013	11:30	549	3220	2140
MW-13	10/29/2013	11:00	596	2740	1400
MW-14	10/29/2013	14:00	123	1940	1800
MW-15	10/29/2013	13:30	2560	4760	248
MW-16	10/29/2013	13:00	7320	13500	386
MW-17	10/29/2013	16:30	10700	18900	312
MW-18	10/29/2013	17:00	327	2420	1570
MW-19	10/29/2013	17:30	62.1	2280	2230
MW-20	10/28/2013	13:00	872	2890	1370
MW-21	10/28/2013	14:15	1170	2480	430
MW-22	10/28/2013	13:30	4420	10000	3040
MW-23	10/28/2013	11:45	1420	3270	535
MW-24	10/28/2013	12:15	226	1440	1090
MW-25	10/28/2013	8:00	420	2660	2100
MW-26	10/28/2013	9:10	246	3130	2990
MW-27	10/28/2013	9:45	625	3240	2010
MW-28	10/28/2013	10:15	6500	11900	2720
MW-29	10/28/2013	11:00	1420	4330	2230

MW-20 to 29 Reported Nov 08, 2013

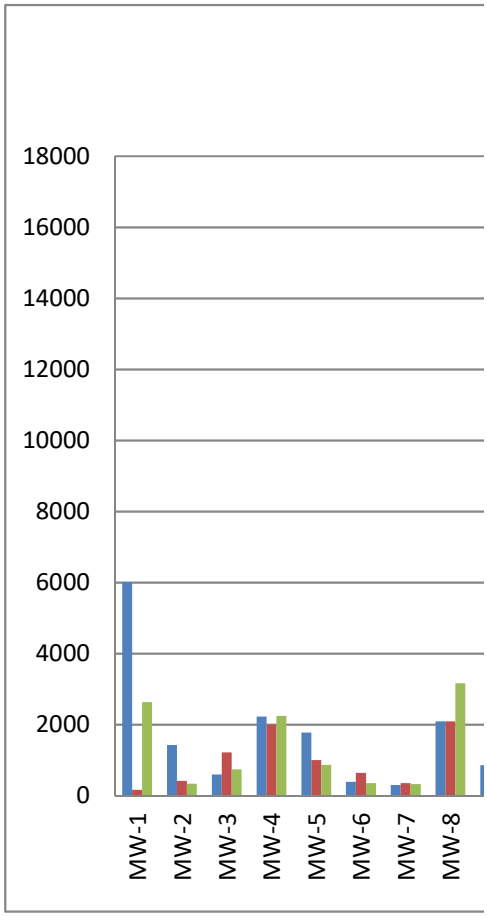
MW-25,26,27,28 Reported

Sample ID	Sample Date	Sample Time	Concentrations, mg/L Chlorides	TDS	Alkalinity

Chlorides

ions, mg/L

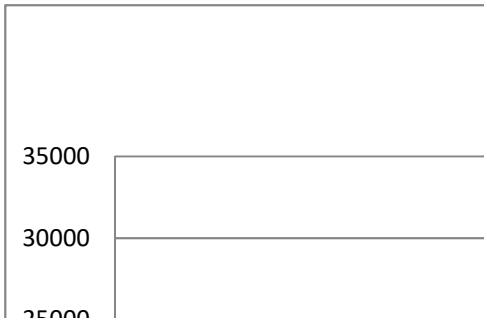
Sample ID	Baseline	Jul-13	13-Oct
MW-1	6010	154	2630
MW-2	1420	415	325
MW-3	589	1210	732
MW-4	2220	1990	2240
MW-5	1770	1000	862
MW-6	387	638	347
MW-7	296	349	323
MW-8	2090	2090	3160
MW-9	852	471	482
MW-10	1140	2280	413
MW-11	246	230	242
MW-12	616	571	549
MW-13	304	629	596
MW-14	3310	147	123
MW-15	3770	4320	2560
MW-16	5490	798	7320
MW-17	3510	15800	10700
MW-18	286	306	327
MW-19	360	67	62.1
MW-20	551	551	872
MW-21	2510	2510	1170
MW-22	768	768	4420
MW-23	1080	1080	1420
MW-24	191	191	226
MW-25	504	504	420
MW-26	1830	1830	246
MW-27	3670	3670	625
MW-28	3840	3840	6500
MW-29	181	181	1420



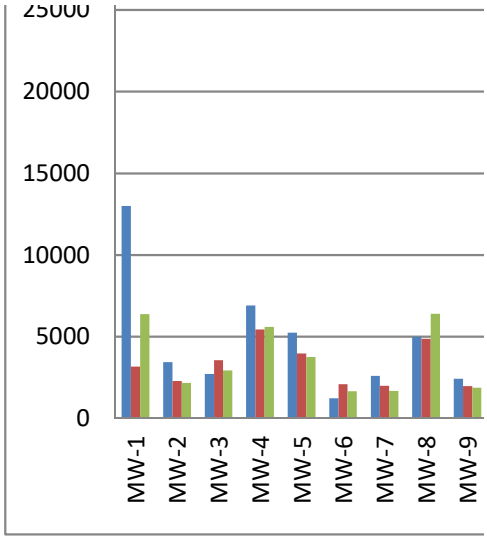
TDS

ions, mg/L

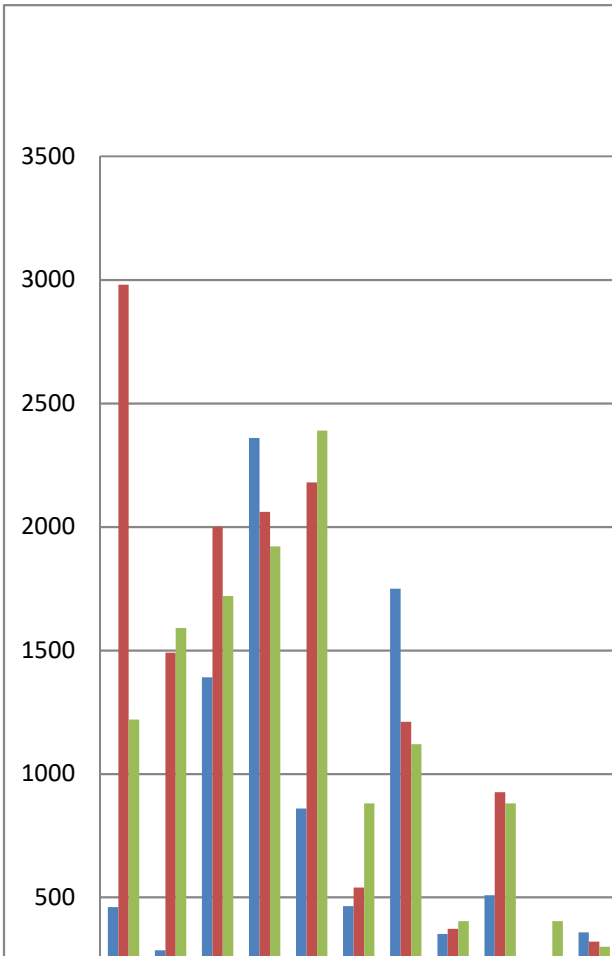
Sample ID	Baseline	Jul-13	13-Oct
MW-1	13000	3170	6370
MW-2	3430	2280	2160
MW-3	2720	3560	2920
MW-4	6910	5440	5600
MW-5	5230	3970	3750
MW-6	1230	2080	1650
MW-7	2590	1980	1680
MW-8	4980	4860	6390
MW-9	2420	1960	1870
MW-10	2550	4900	1550
MW-11	1590	980	958



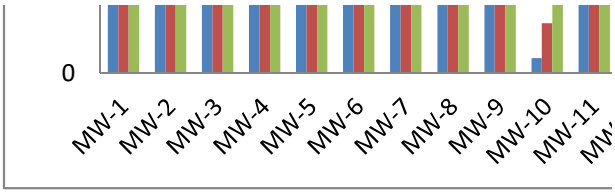
MW-12	2810	3380	3220
MW-13	2130	2730	2740
MW-14	7790	1900	1940
MW-15	7790	8840	4760
MW-16	11700	2110	13500
MW-17	7800	29100	18900
MW-18	2620	2270	2420
MW-19	3130	2490	2280
MW-20		2910	2890
MW-21		5310	2480
MW-22		1710	10000
MW-23		2490	3270
MW-24		1550	1440
MW-25		2730	2660
MW-26		3210	3130
MW-27		7320	3240
MW-28		10600	11900
MW-29		2390	4330

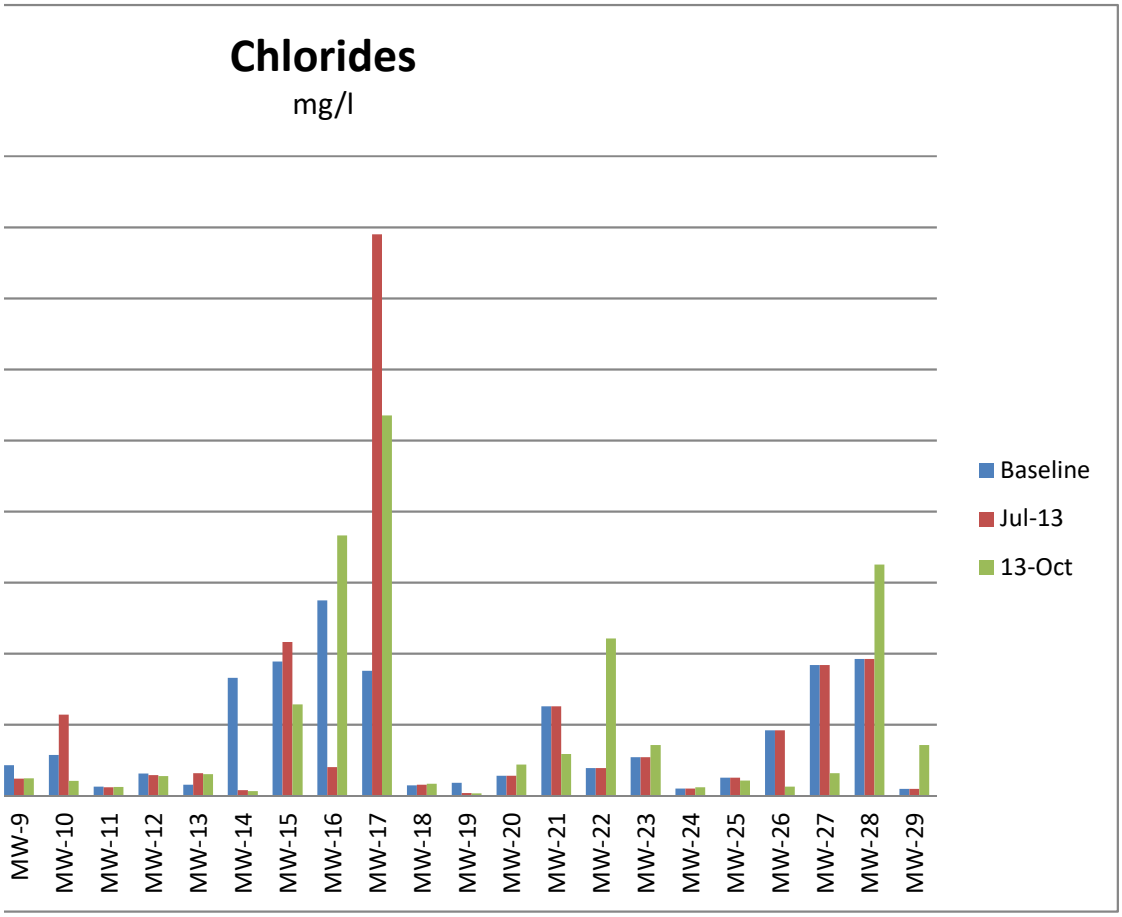


	Alkalinity		
ions, mg/L			
Sample ID	**Baseline**	**Jul-13**	**13-Oct**
MW-1	460	2980	1220
MW-2	286	1490	1590
MW-3	1390	2000	1720
MW-4	2360	2060	1920
MW-5	860	2180	2390
MW-6	465	540	880
MW-7	1750	1210	1120
MW-8	352	372	404
MW-9	508	925	880
MW-10	60	202	404
MW-11	358	320	300
MW-12	1310	2210	2140
MW-13	1190	1320	1400
MW-14	618	1730	1800
MW-15	238	262	248
MW-16	312	394	386
MW-17	332	232	312
MW-18	2020	1610	1570
MW-19	2480	2350	2230
MW-20		2130	1370
MW-21		310	430
MW-22		455	3040
MW-23		385	535
MW-24		1290	1090
MW-25		1870	2100



MW-26	300	2990
MW-27	364	2010
MW-28	3250	2720
MW-29	1990	2230




Chlorides
mg/l
Baseline
Jul-13
13-Oct
MW-9
MW-10
MW-11
MW-12
MW-13
MW-14
MW-15
MW-16
MW-17
MW-18
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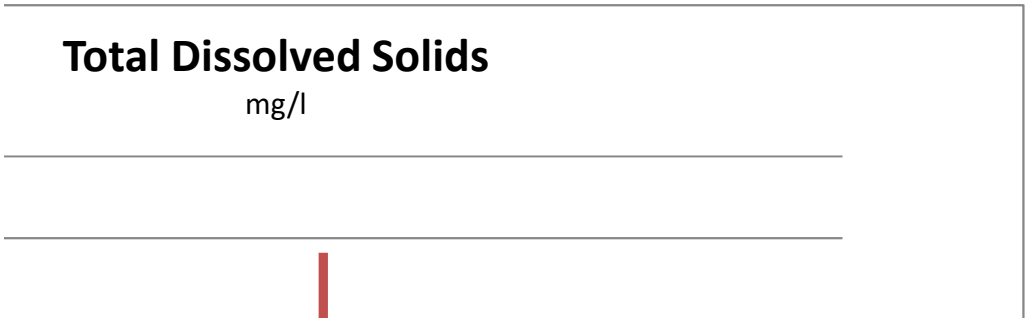
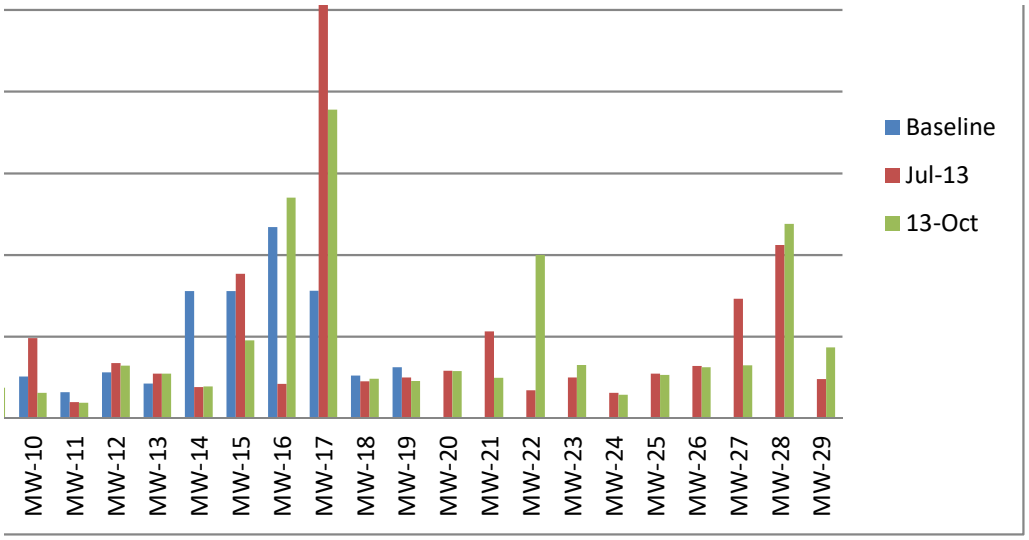
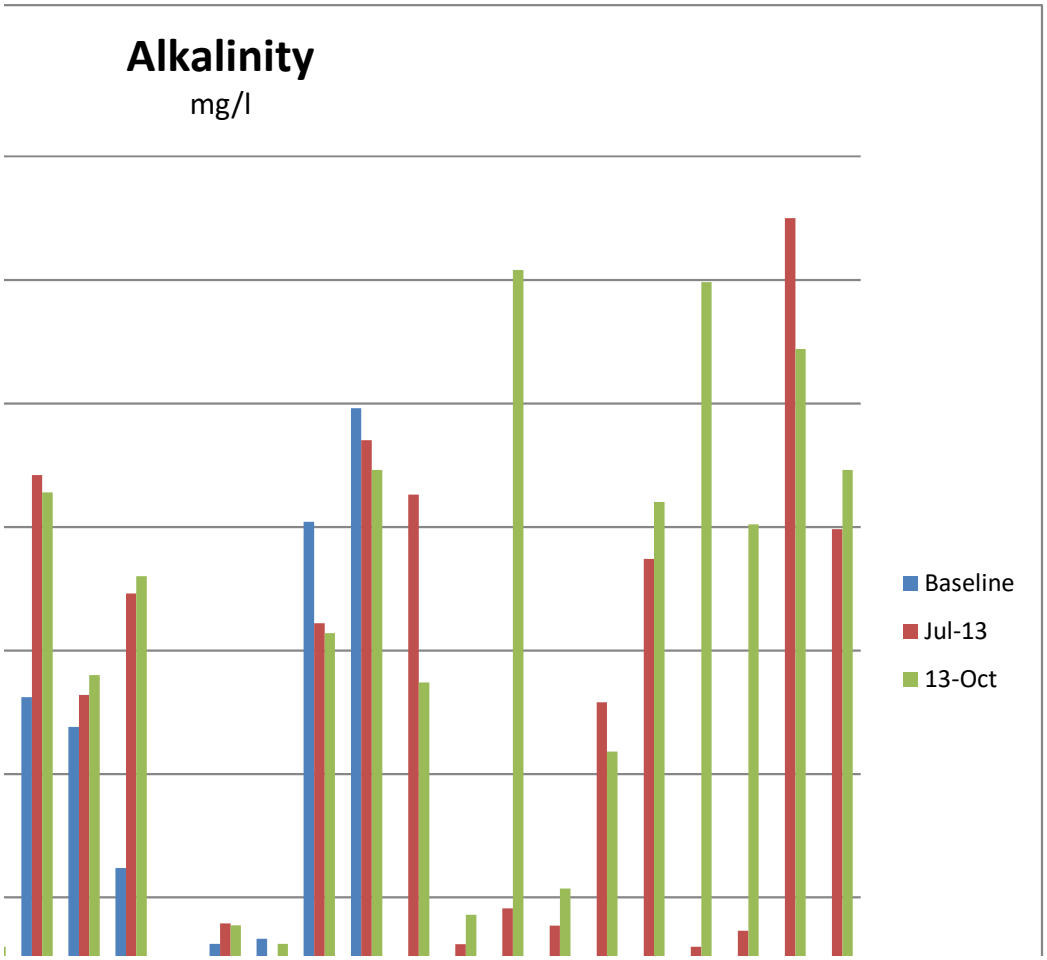
MW-27
MW-28
MW-29

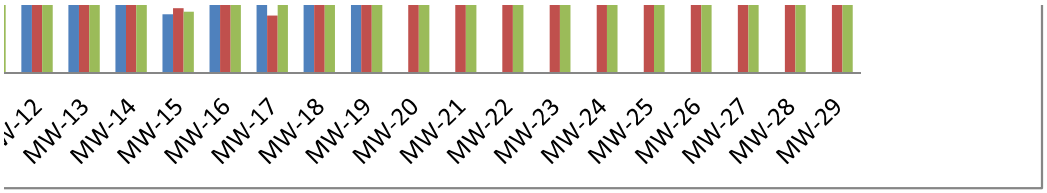

Total Dissolved Solids
mg/l



2910
5310
1710
2490
1550
2730
3210
7320
10600
2390



2130
310
768
385
1290
1870
300



364
3250
1990

551
2510
455
1080
191
504
1830
3670
3840
181