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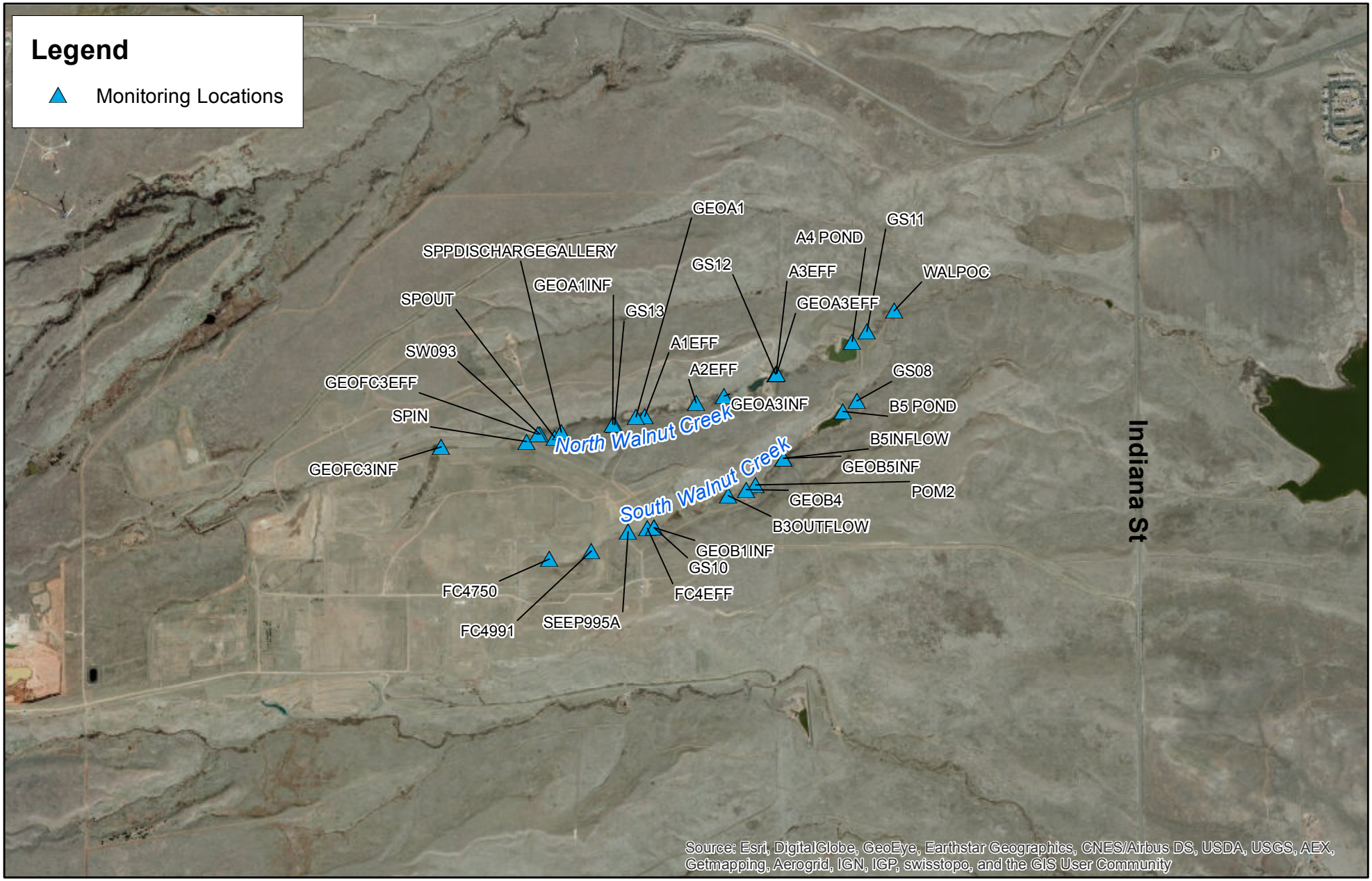


Path: Z:\Project Files\07\071-091\071-091.020\CAD-GIS\GIS\2014_Report\Surface Water Monitoring Locations A.1.mxd

Base Map: ESRI World Imagery, 2012

WRIGHT WATER ENGINEERS, INC.
2490 W 26TH AVE 100A
DENVER, CO. 80211
(303) 480-1700

JEFFERSON COUNTY, COLORADO

SURFACE WATER AND SEDIMENT MONITORING LOCATIONS

ROCKY FLATS SITE

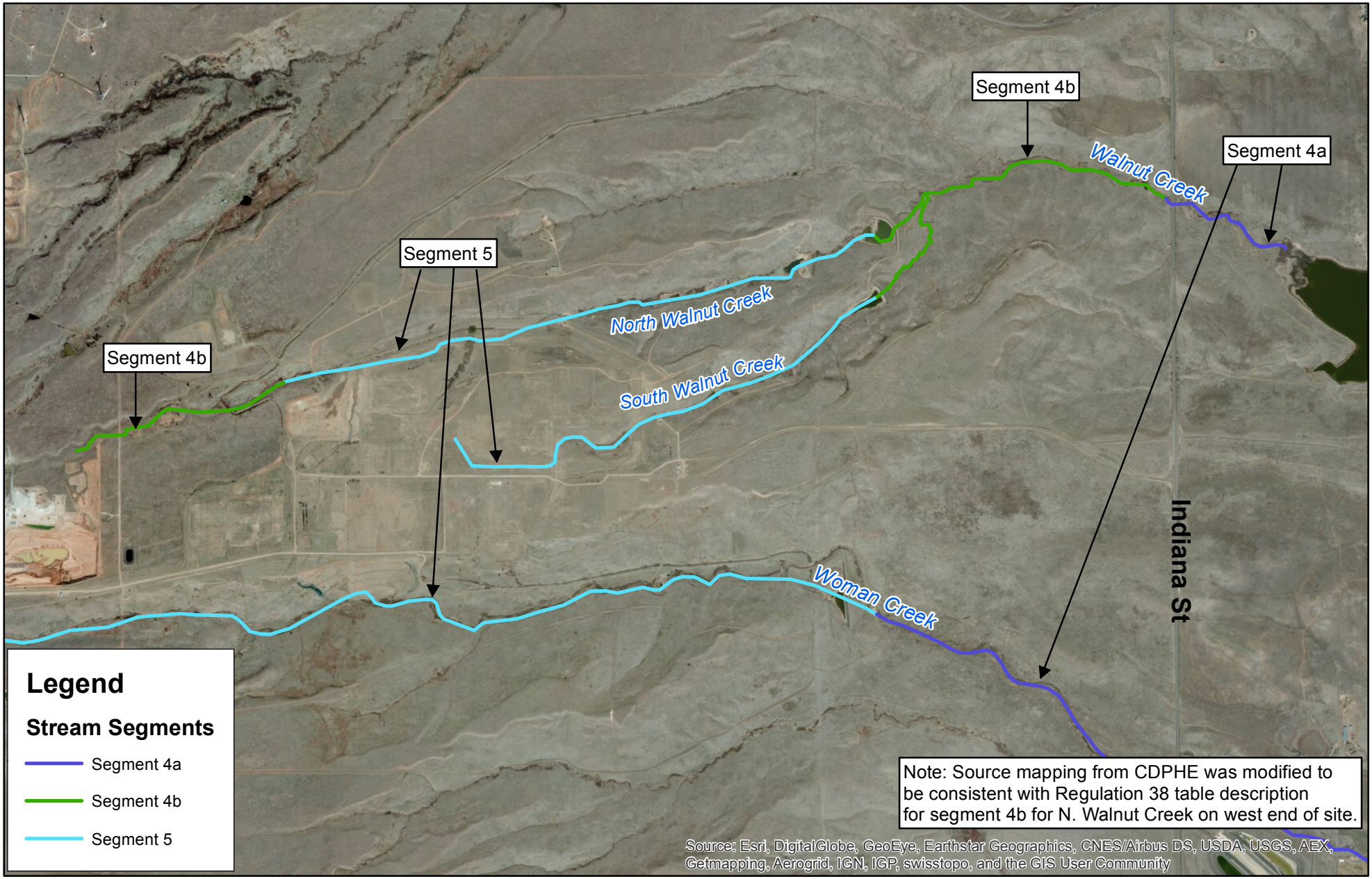
N W E S

1 inch = 2,000 feet

0 500 1,000 2,000 Feet

PROJECT NO. 071-091.020

FIGURE A.1



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Base Map: ESRI World Imagery, 2012

WRIGHT WATER ENGINEERS, INC.
2490 W 26TH AVE 100A
DENVER, CO. 80211
(303) 480-1700

JEFFERSON COUNTY, COLORADO

REGULATION 38-BIG DRY CREEK BASIN STREAM SEGMENTS

ROCKY FLATS SITE

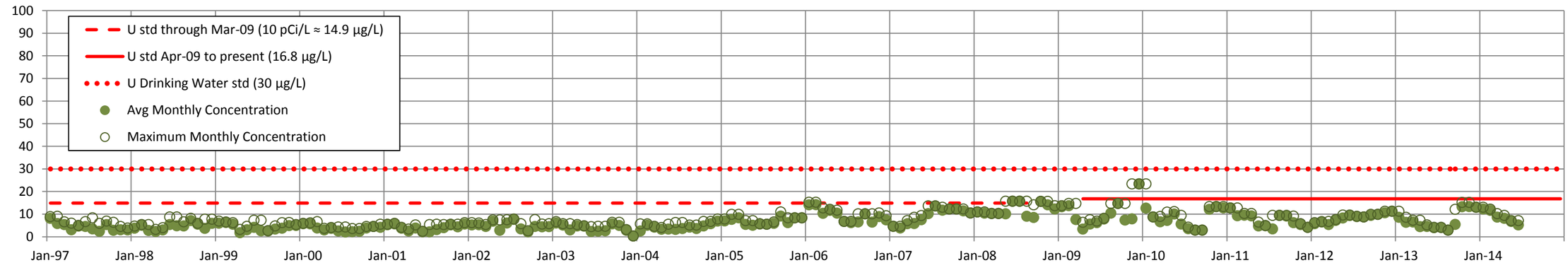
N W E S

0 500 1,000 2,000 Feet

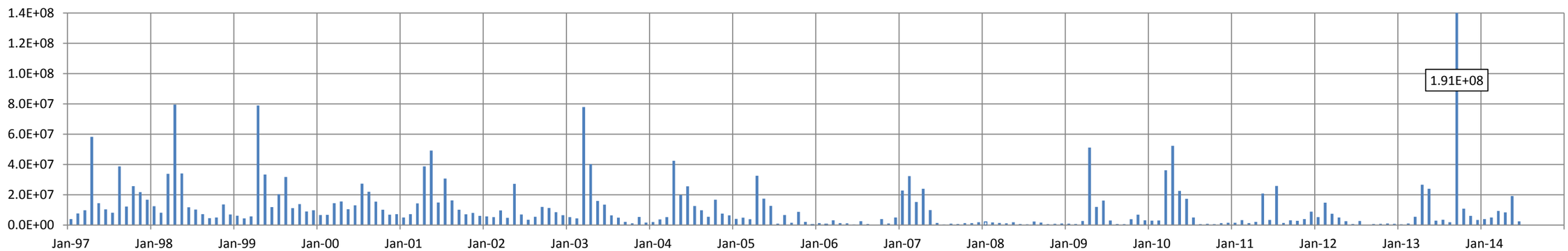
PROJECT NO. 071-091.020

FIGURE A.2

Uranium Concentration (µg/L)



Volume (L)



Total Uranium Load (µg)

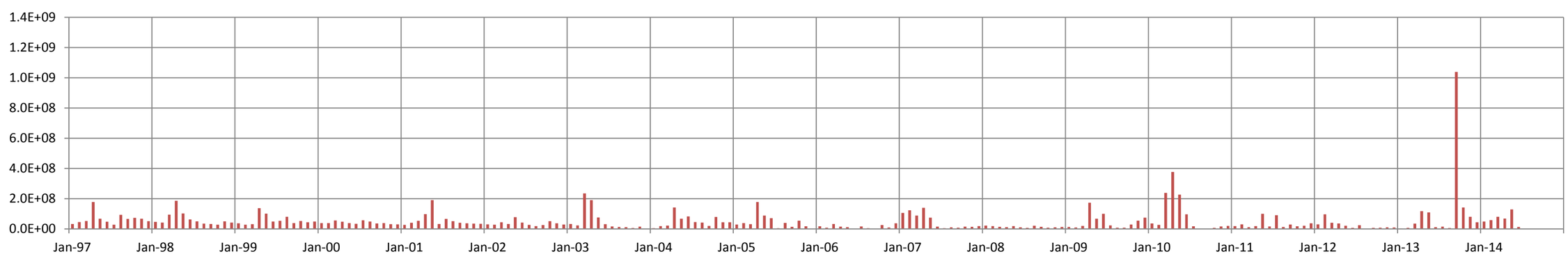


Table B.1

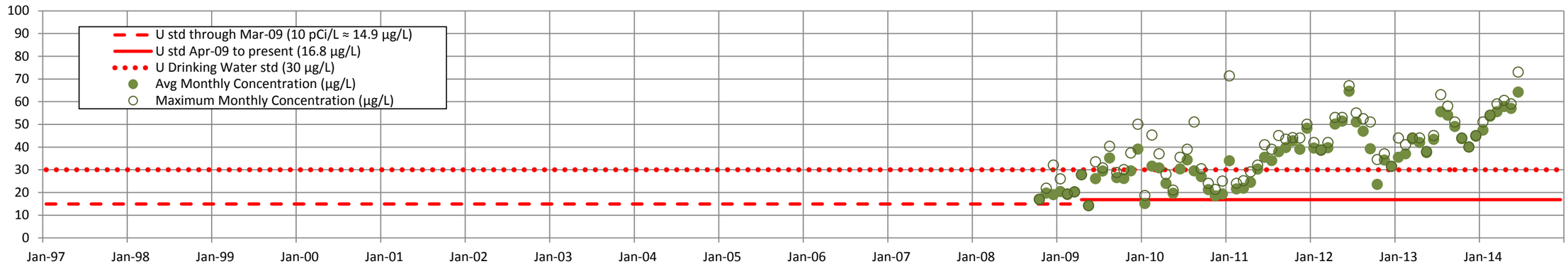
	Uranium Load (µg)								
Date	**SW093**	**SPOUT**	**SW093 + SPOUT**	**+/-**	**GS13**	**+/-**	**GS12**	**+/-**	**GS11**
Jan-09	1.23E+07		1.23E+07	*1.61E+08*	1.73E+08	--	0	--	0
Feb-09	8.27E+06		8.27E+06	*1.44E+08*	1.53E+08	--	0	--	0
Mar-09	1.95E+07		1.95E+07	*1.75E+08*	1.95E+08	--	0	--	0
Apr-09	1.73E+08		1.73E+08	*2.40E+08*	4.13E+08	--		--	0
May-09	6.65E+07		6.65E+07	*7.78E+07*	1.44E+08	--	0	--	1.63E+08
Jun-09	1.00E+08		1.00E+08	*7.86E+07*	1.79E+08	--		--	6.06E+07
Jul-09	2.31E+07		2.31E+07	*4.92E+07*	7.23E+07	--	0	--	0
Aug-09	7.35E+06	5.57E+06	1.29E+07	*1.75E+07*	3.04E+07	--	0	--	0
Sep-09	7.50E+06	4.41E+06	1.19E+07	*-1.19E+07*	3.47E+04	--	0	--	0
Oct-09	2.82E+07	4.18E+06	3.24E+07	*5.05E+07*	8.29E+07	--	0	--	0
Nov-09	5.37E+07	6.24E+06	6.00E+07	*1.01E+08*	1.61E+08	--		--	0
Dec-09	7.36E+07	7.77E+06	8.14E+07	*5.29E+07*	1.34E+08	--	0	--	1.80E+08
2009	**5.73E+08**	**2.82E+07**	**6.01E+08**	***1.14E+09***	**1.74E+09**	**--**	**--**	**--**	**4.04E+08**
Jan-10	3.60E+07	2.74E+06	3.87E+07	*9.47E+07*	1.33E+08	--		--	0
Feb-10	2.64E+07	5.93E+06	3.23E+07	*5.75E+07*	8.98E+07	--		--	0
Mar-10	2.38E+08	6.94E+06	2.45E+08	*1.38E+08*	3.83E+08	--		--	0
Apr-10	3.76E+08	5.06E+06	3.81E+08	*1.14E+08*	4.96E+08	*-9.23E+07*	4.03E+08	*-4.03E+08*	0
May-10	2.26E+08	5.73E+06	2.32E+08	*5.53E+07*	2.87E+08	*2.02E+08*	4.89E+08	*7.11E+08*	1.20E+09
Jun-10	9.63E+07	1.05E+07	1.07E+08	*7.33E+07*	1.80E+08	*1.16E+08*	2.96E+08	*-2.96E+08*	0
Jul-10	1.72E+07	9.01E+06	2.62E+07	*4.55E+07*	7.17E+07	*7.65E+07*	1.48E+08	*-1.48E+08*	0
Aug-10	1.69E+06	6.80E+06	8.49E+06	*-1.32E+06*	7.17E+06	*-3.91E+06*	3.26E+06	*-3.26E+06*	0
Sep-10	2.39E+06	6.09E+06	8.48E+06	*-8.48E+06*	0	*0.00E+00*	0	*0.00E+00*	0
Oct-10	7.05E+06	5.09E+06	1.21E+07	*-1.21E+07*	8.64E+03	*-8.64E+03*	0	*0.00E+00*	0
Nov-10	1.63E+07	3.63E+06	1.99E+07	*3.08E+07*	5.08E+07	*-5.00E+07*	7.29E+05	*-7.29E+05*	0
Dec-10	1.91E+07	3.75E+06	2.28E+07	*5.87E+07*	8.16E+07	*-8.07E+07*	8.74E+05	*-8.74E+05*	0
2010	**1.06E+09**	**7.13E+07**	**1.13E+09**	***6.46E+08***	**1.78E+09**	***-4.38E+08***	**1.34E+09**	***-1.42E+08***	**1.20E+09**
Jan-11	1.80E+07	5.41E+06	2.34E+07	*4.56E+07*	6.90E+07	*-6.90E+07*	0	*0.00E+00*	0
Feb-11	3.02E+07	3.06E+06	3.32E+07	*1.01E+08*	1.34E+08	*-1.34E+08*	0	*0.00E+00*	0
Mar-11	1.12E+07	2.89E+06	1.41E+07	*1.24E+08*	1.38E+08	*-1.38E+08*	0	*1.05E+08*	1.05E+08
Apr-11	1.84E+07	2.76E+06	2.12E+07	*1.57E+08*	1.78E+08	*-9.97E+07*	7.84E+07	*-7.84E+07*	0
May-11	9.92E+07	5.26E+06	1.05E+08	*1.47E+08*	2.51E+08	*2.16E+08*	4.67E+08	*-4.67E+08*	0
Jun-11	1.62E+07	7.10E+06	2.33E+07	*4.80E+07*	7.13E+07	*1.35E+08*	2.07E+08	*-2.07E+08*	0
Jul-11	8.99E+07	6.08E+06	9.60E+07	*9.43E+07*	1.90E+08	*8.82E+07*	2.79E+08	*-2.79E+08*	0
Aug-11	1.23E+07	6.09E+06	1.84E+07	*-1.74E+07*	1.02E+06	*9.58E+07*	9.68E+07	*-9.68E+07*	0
Sep-11	2.81E+07	6.38E+06	3.45E+07	*5.03E+07*	8.48E+07	*-7.59E+07*	8.92E+06	*2.09E+08*	2.18E+08
Oct-11	1.73E+07	5.37E+06	2.27E+07	*4.20E+07*	6.46E+07	*-5.85E+07*	6.15E+06	*-1.35E+06*	4.79E+06
Nov-11	2.07E+07	5.77E+06	2.64E+07	*8.51E+07*	1.12E+08	*-7.17E+07*	3.98E+07	*-1.57E+07*	2.41E+07
Dec-11	3.63E+07	8.53E+06	4.48E+07	*6.74E+07*	1.12E+08	*-1.10E+08*	2.55E+06	*7.60E+07*	7.85E+07
2011	**3.98E+08**	**6.47E+07**	**4.63E+08**	***9.43E+08***	**1.41E+09**	***-2.21E+08***	**1.18E+09**	***-7.53E+08***	**4.31E+08**
Jan-12	2.97E+07	7.44E+06	3.71E+07	*2.17E+07*	5.88E+07	*-5.88E+07*	5.14E+02	*1.15E+08*	1.15E+08
Feb-12	9.58E+07	7.45E+06	1.03E+08	*5.20E+07*	1.55E+08	*-1.55E+08*	0	*1.47E+08*	1.47E+08
Mar-12	3.99E+07	8.69E+06	4.86E+07	*4.09E+07*	8.95E+07	*-7.04E+07*	1.91E+07	*6.85E+07*	8.76E+07
Apr-12	3.53E+07	1.26E+07	4.79E+07	*2.35E+07*	7.14E+07	*1.88E+08*	2.60E+08	*-2.45E+08*	1.52E+07
May-12	2.08E+07	1.00E+07	3.09E+07	*1.17E+07*	4.26E+07	*3.89E+07*	8.15E+07	--	
Jun-12	6.55E+06	1.09E+07	1.74E+07	*-1.61E+07*	1.31E+06	*-8.91E+05*	4.20E+05	*-4.20E+05*	0
Jul-12	2.38E+07	7.26E+06	3.10E+07	*-3.10E+07*	0	*0.00E+00*	0	*0.00E+00*	0
Aug-12	9.65E+05	5.30E+06	6.27E+06	*-6.27E+06*	0	*0.00E+00*	0	*0.00E+00*	0
Sep-12	6.17E+06	3.87E+06	1.00E+07	*-1.00E+07*	0	*0.00E+00*	0	*0.00E+00*	0
Oct-12	7.40E+06	2.38E+06	9.78E+06	*-9.78E+06*	0	*0.00E+00*	0	*0.00E+00*	0
Nov-12	1.04E+07	3.24E+06	1.36E+07	*-1.29E+07*	7.12E+05	*-7.12E+05*	0	*0.00E+00*	0
Dec-12	8.80E+06	3.72E+06	1.25E+07	*1.22E+07*	2.47E+07	*-2.47E+07*	0	*0.00E+00*	0
2012	**2.86E+08**	**8.29E+07**	**3.68E+08**	***7.58E+07***	**4.44E+08**	***-8.34E+07***	**3.61E+08**	***4.36E+06***	**3.65E+08**
Jan-13	3.28E+06	3.41E+06	6.70E+06	*2.73E+07*	3.39E+07	*-3.39E+07*	0	*0.00E+00*	0
Feb-13	6.68E+06	3.22E+06	9.90E+06	*1.48E+07*	2.47E+07	*-2.47E+07*	0	*0.00E+00*	0
Mar-13	3.48E+07	3.46E+06	3.83E+07	*7.75E+07*	1.16E+08	*-4.75E+07*	6.83E+07	*-6.83E+07*	0
Apr-13	1.17E+08	5.39E+06	1.23E+08	*8.56E+06*	1.31E+08	*1.94E+08*	3.25E+08	*-6.11E+07*	2.64E+08
May-13	1.09E+08	7.61E+06	1.16E+08	*7.28E+07*	1.89E+08	*1.39E+08*	3.28E+08	*-8.64E+07*	2.42E+08
Jun-13	1.15E+07	7.82E+06	1.93E+07	*-6.12E+06*	1.32E+07	*1.87E+07*	3.19E+07	*-2.61E+07*	5.77E+06
Jul-13	1.41E+07	7.83E+06	2.20E+07	*-6.61E+06*	1.54E+07	*-1.24E+07*	3.01E+06	*-3.01E+06*	0
Aug-13	5.34E+06	9.04E+06	1.44E+07	*-9.57E+06*	4.81E+06	*-4.81E+06*	4.83E+02	*-4.83E+02*	0
Sep-13	1.04E+09	5.36E+06	1.04E+09	*7.94E+08*	1.84E+09	*4.16E+08*	2.25E+09	*-1.72E+09*	5.28E+08
Oct-13	1.42E+08	1.17E+07	1.54E+08	*8.45E+07*	2.38E+08	*5.88E+07*	2.97E+08	*-1.90E+08*	1.07E+08
Nov-13	7.98E+07	9.57E+06	8.94E+07	*-3.18E+07*	5.76E+07	*1.31E+08*	1.89E+08	*-1.34E+08*	5.49E+07
Dec-13	4.37E+07	8.23E+06	5.19E+07	*1.03E+07*	6.22E+07	*8.10E+07*	1.43E+08	*-1.16E+08*	2.72E+07
2013	**1.61E+09**	**8.26E+07**	**1.69E+09**	***1.04E+09***	**2.72E+09**	***9.15E+08***	**3.64E+09**	***-2.41E+09***	**1.23E+09**
Jan-14	4.78E+07	8.71E+06	5.66E+07	*1.64E+07*	7.30E+07	*1.48E+08*	2.21E+08	*-1.57E+08*	6.34E+07
Feb-14	5.75E+07	1.25E+07	6.99E+07	*5.61E+06*	7.55E+07	*1.75E+08*	2.51E+08	*-1.49E+08*	1.01E+08
Mar-14	8.02E+07	1.36E+07	9.37E+07	*1.43E+07*	1.08E+08	*1.71E+08*	2.79E+08	*-1.00E+08*	1.79E+08
Apr-14				*0.00E+00*		*0.00E+00*		*0.00E+00*	
May-14				*0.00E+00*		*0.00E+00*		*0.00E+00*	
Jun-14				*0.00E+00*		*0.00E+00*		*0.00E+00*	
Jul-14				*0.00E+00*		*0.00E+00*		*0.00E+00*	
Aug-14				*0.00E+00*		*0.00E+00*		*0.00E+00*	
Sep-14				*0.00E+00*		*0.00E+00*		*0.00E+00*	
Oct-14				*0.00E+00*		*0.00E+00*		*0.00E+00*	
Nov-14				*0.00E+00*		*0.00E+00*		*0.00E+00*	
Dec-14				*0.00E+00*		*0.00E+00*		*0.00E+00*	
2014	**1.85E+08**	**3.47E+07**	**2.20E+08**	***3.63E+07***	**2.57E+08**	***4.94E+08***	**7.50E+08**	***-4.07E+08***	**3.43E+08**

Notes:
0 means zero flow was recorded for that month.
NO CONCENTRATION DATA
NO FLOW DATA OR SOME FLOW DATA MISSING

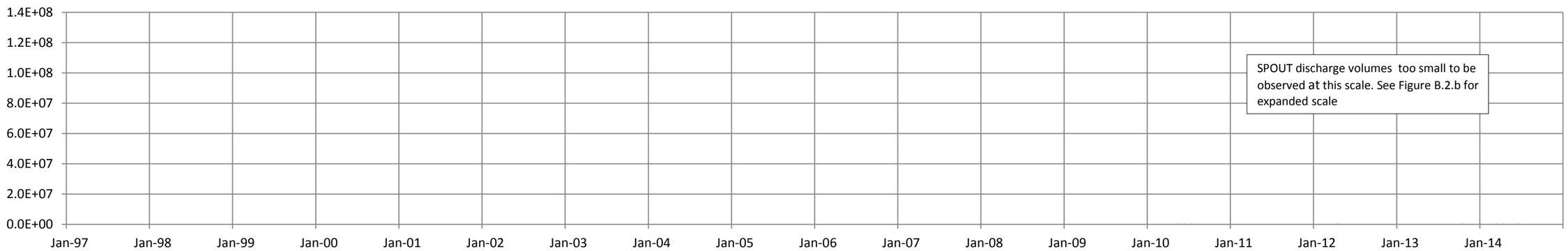
Figure B.2.a
Location: SPOUT

N. Walnut Ck. - 2A
(SPPTS Discharge)

Uranium Concentration (µg/L)



Volume (L)



Total Uranium Load (µg)

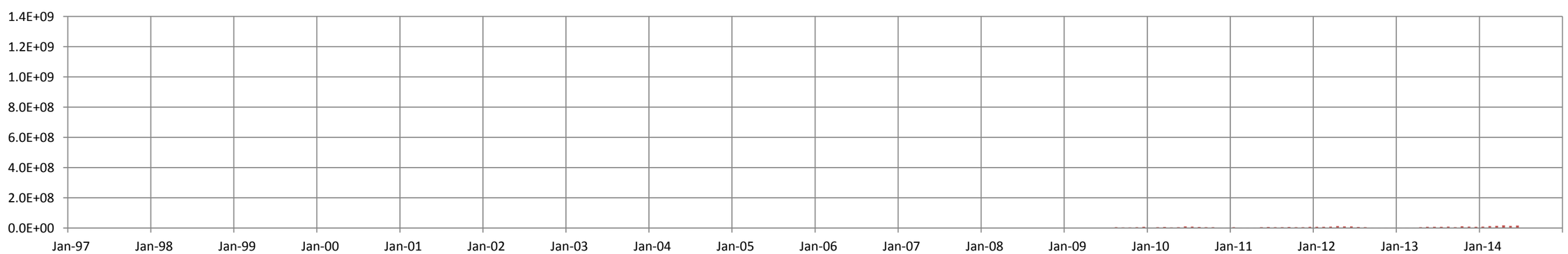
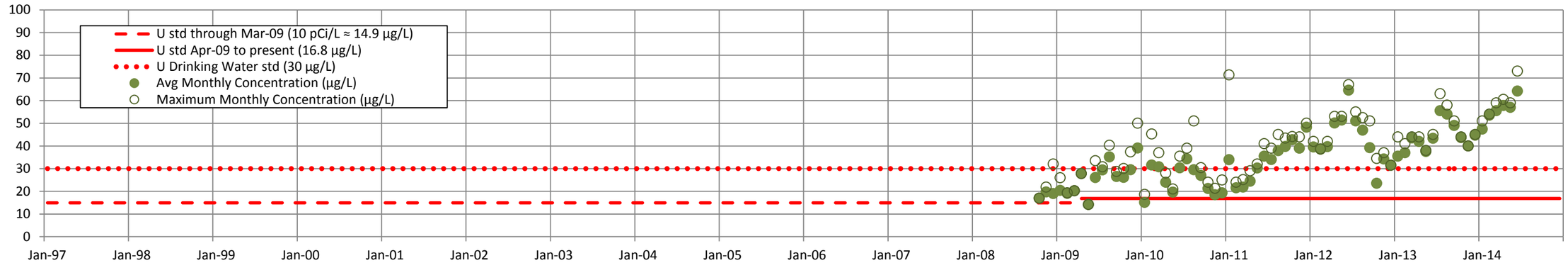


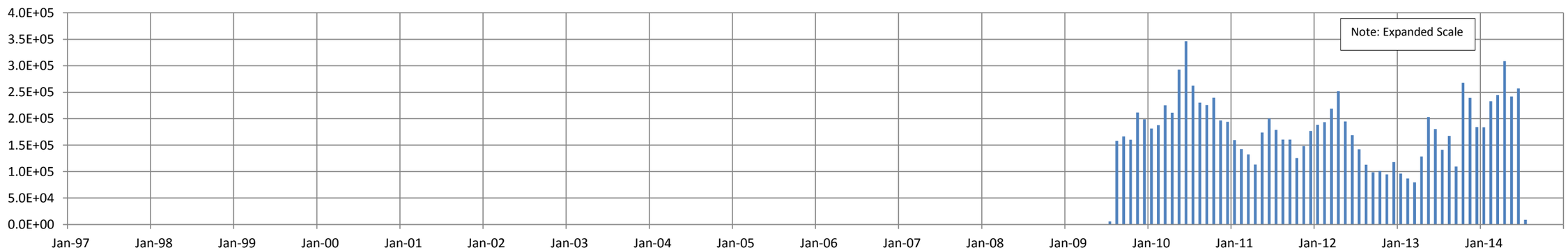
Figure B.2.b
Location: SPOUT

N. Walnut Ck. - 2A
(SPPTS Discharge)

Uranium Concentration (µg/L)



Volume (L)



Total Uranium Load (µg)

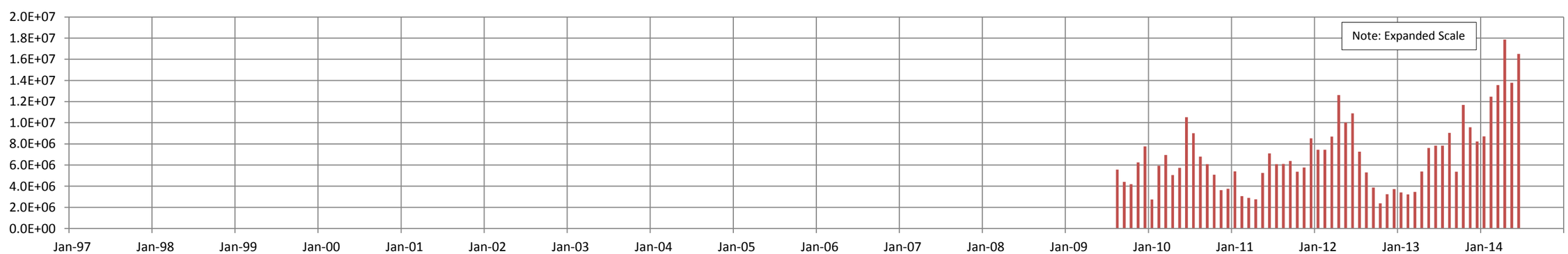
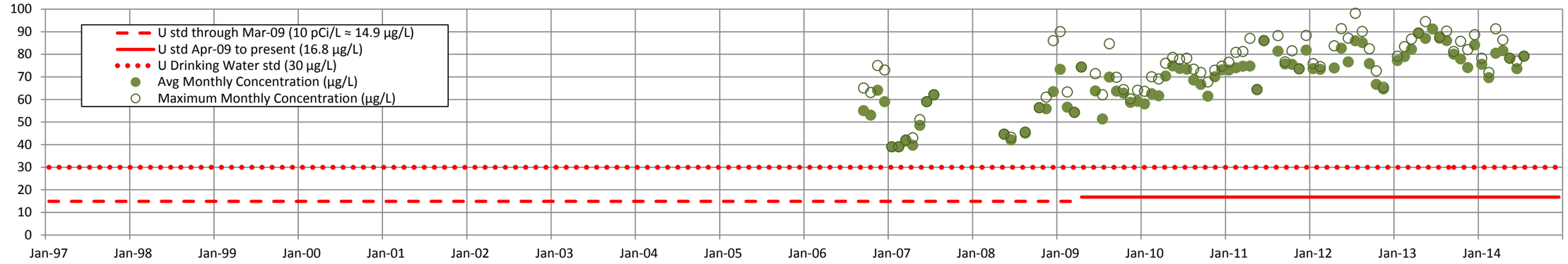


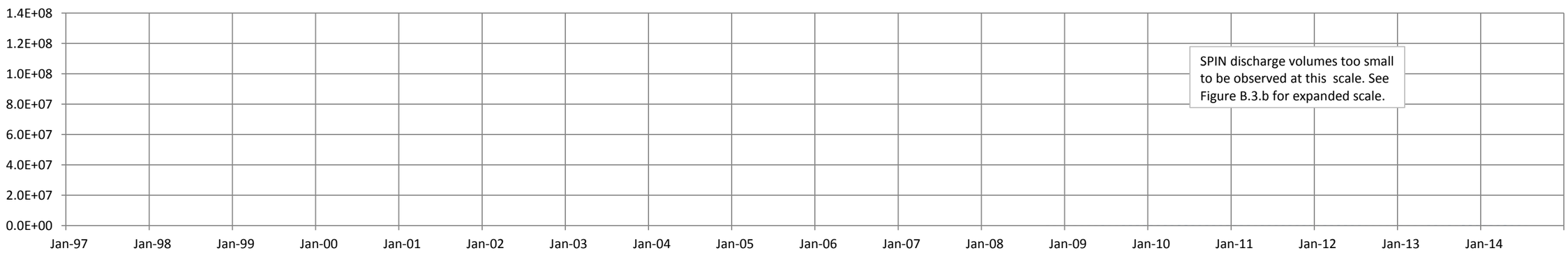
Figure B.3.a
Location: SPIN

N. Walnut Ck. - 2B
(SPPTS Inflow)

Uranium Concentration (µg/L)



Volume (L)



Total Uranium Load (µg)

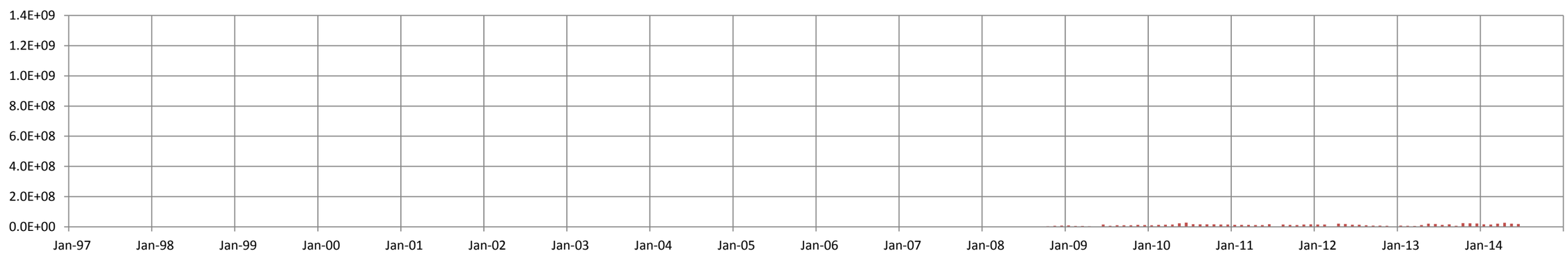
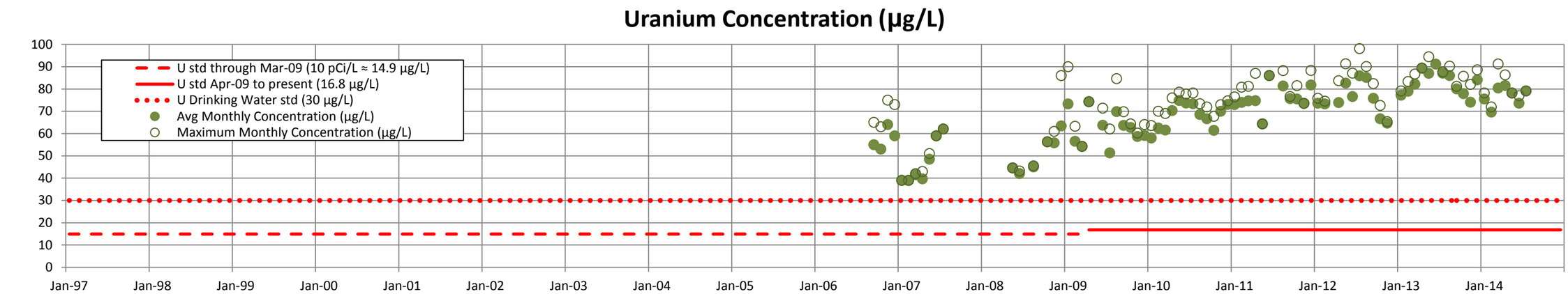
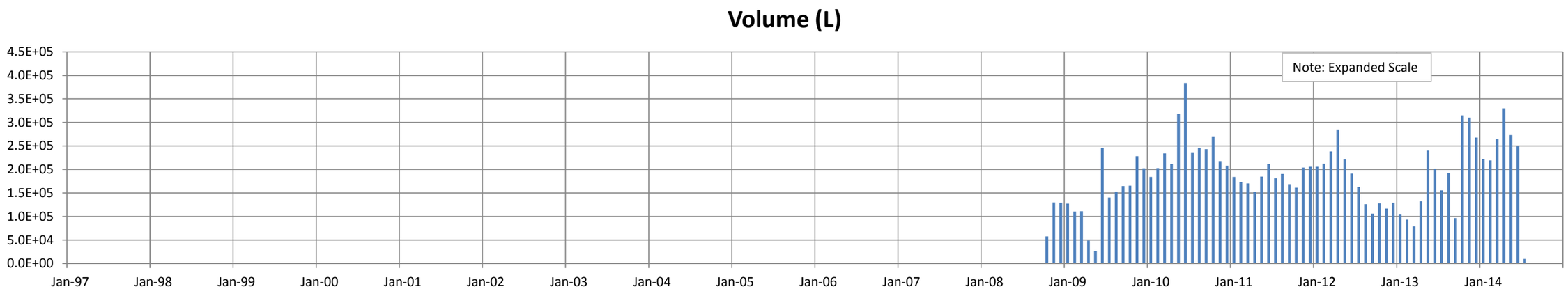


Figure B.3.b
Location: SPIN

N. Walnut Ck. - 2B
(SPPTS Inflow)





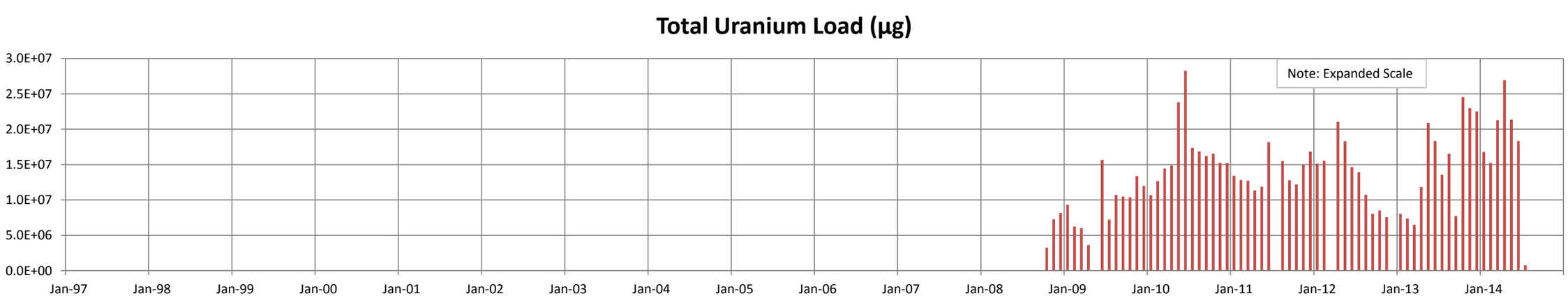
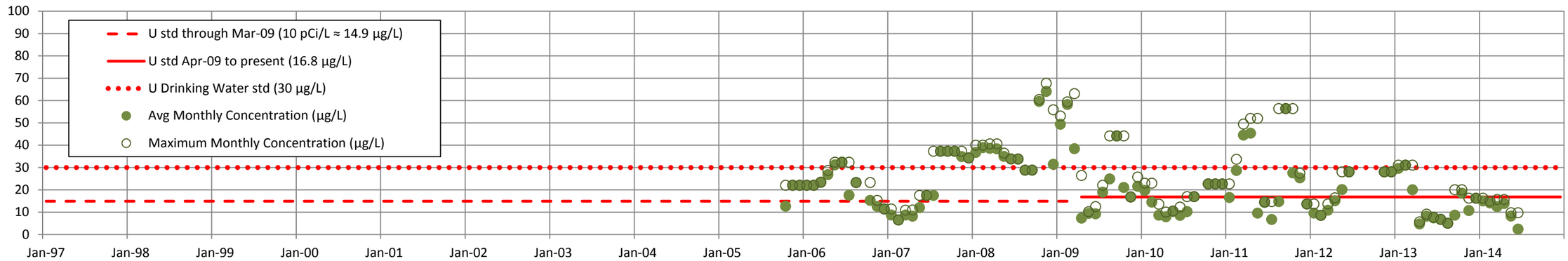


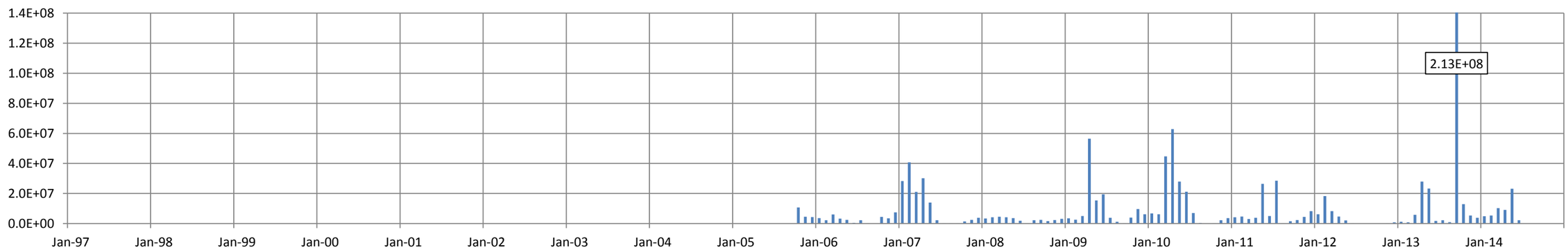
Figure B.4
Location: GS13

N. Walnut Ck. - 3
(Upstream A1)

Uranium Concentration (µg/L)



Volume (L)



Total Uranium Load (µg)

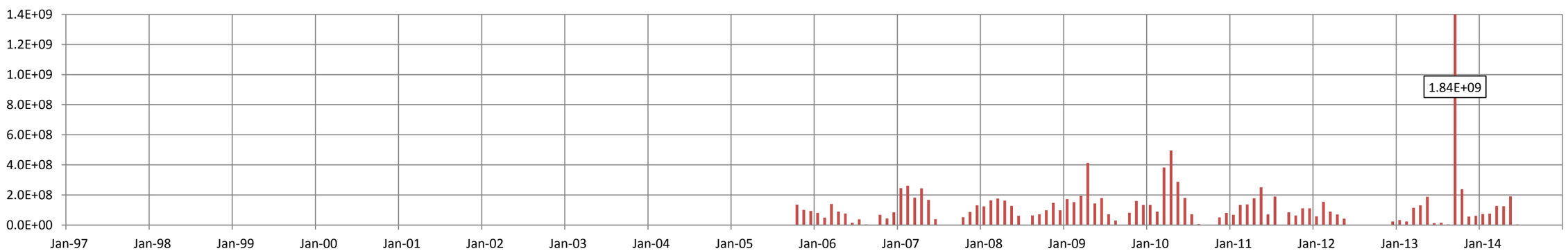


Figure B.5
Location: GS12

N. Walnut Ck. - 4
(A3 Out)

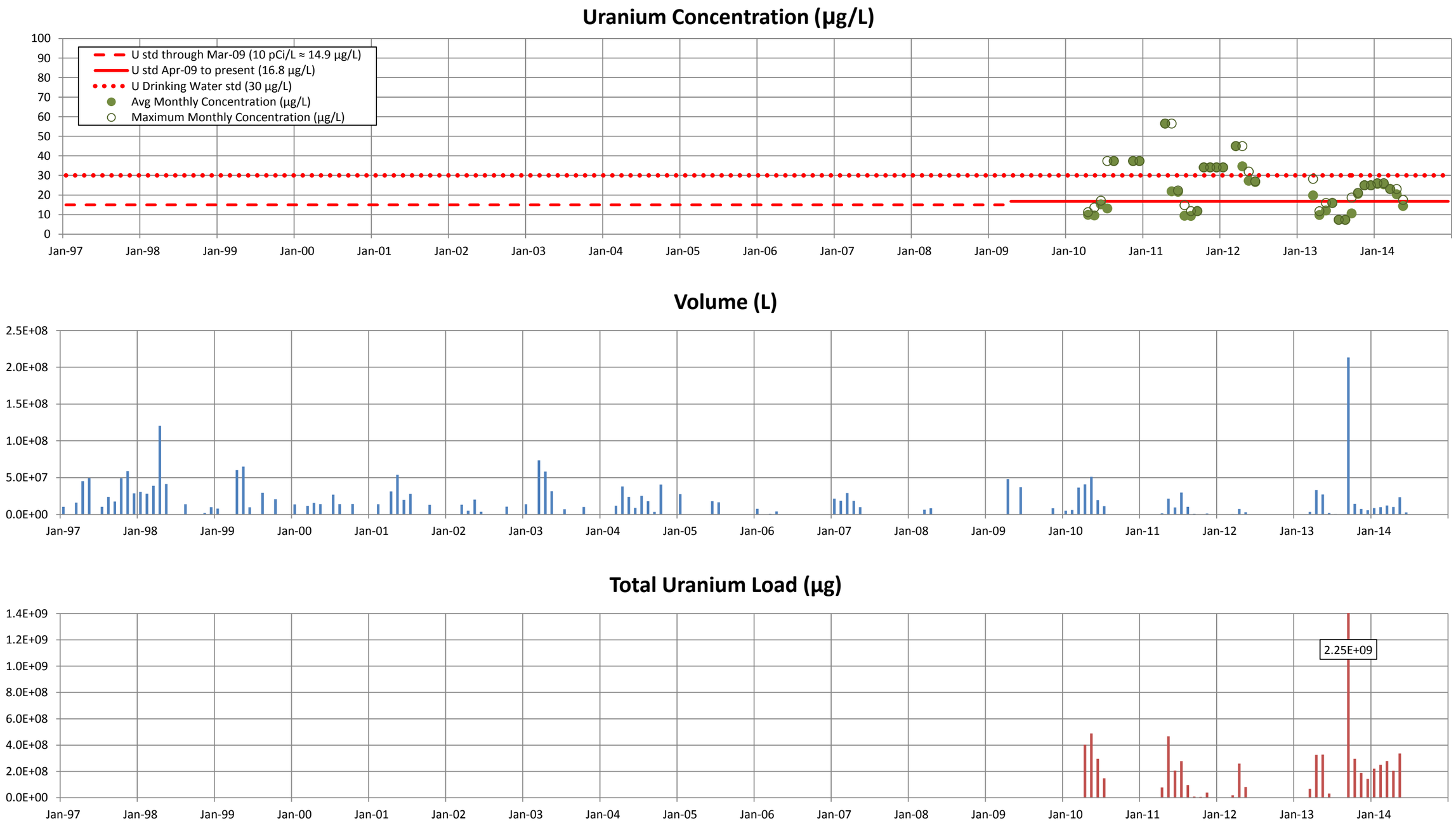
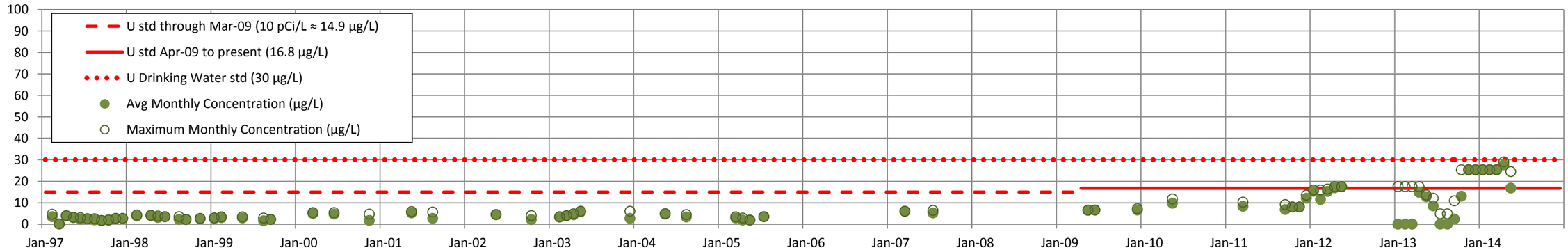


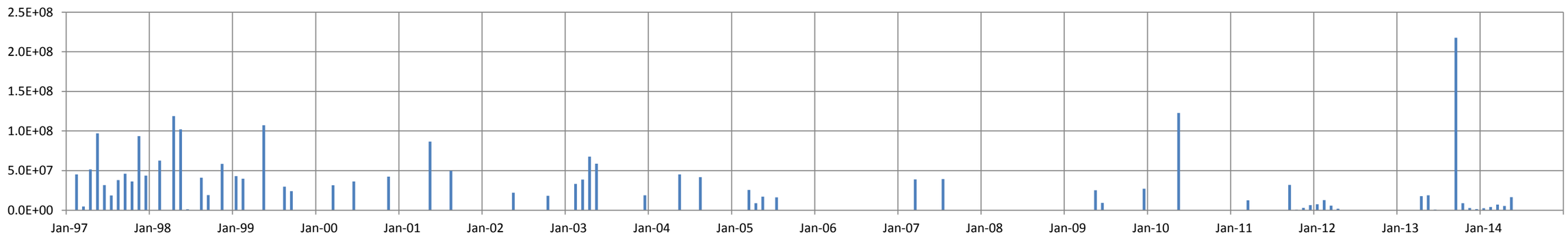
Figure B.6
Location: GS11

N. Walnut Ck. - 5
(A4 Out)

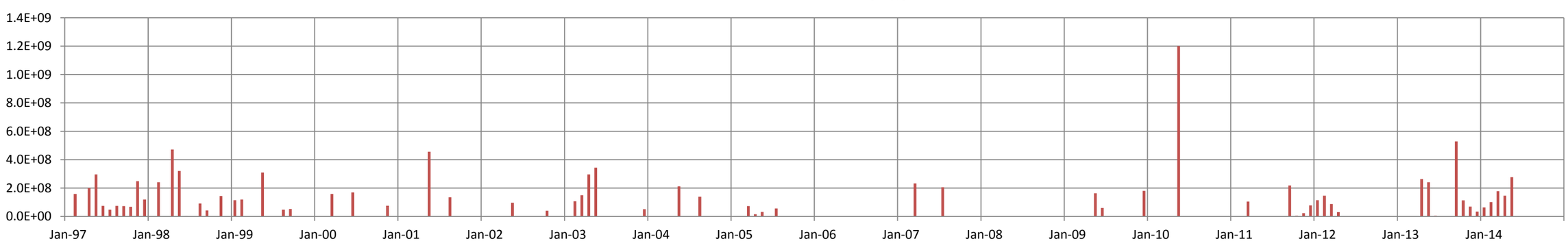
Uranium Concentration (µg/L)



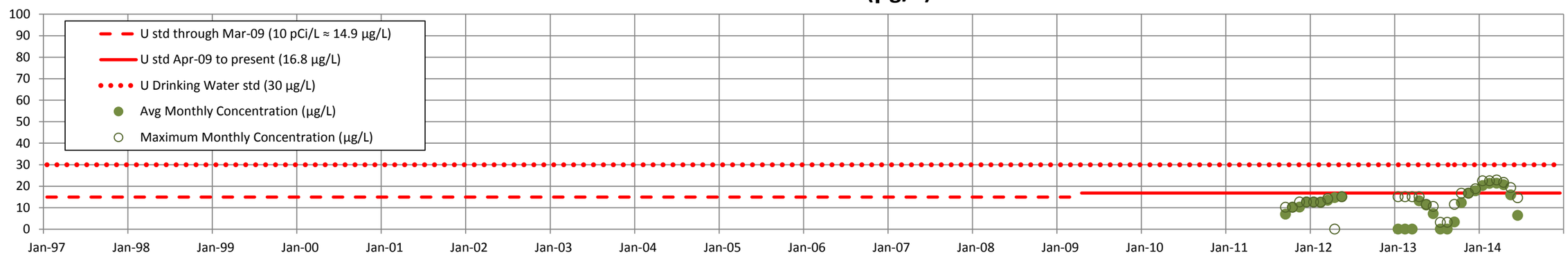
Volume (L)



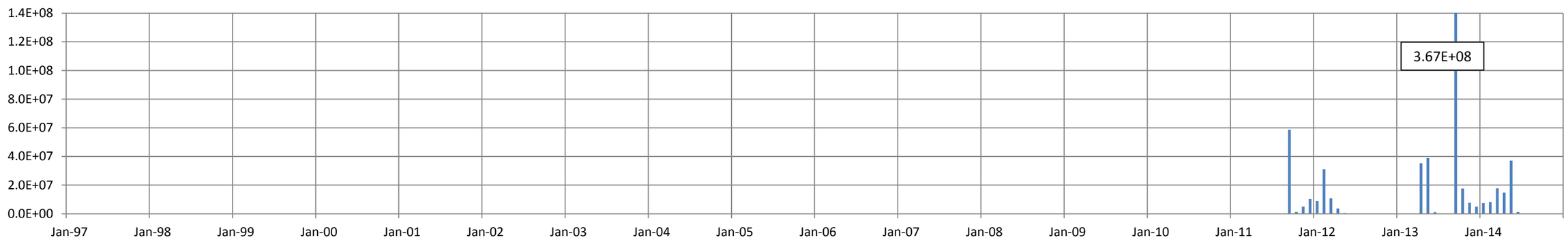
Total Uranium Load (µg)



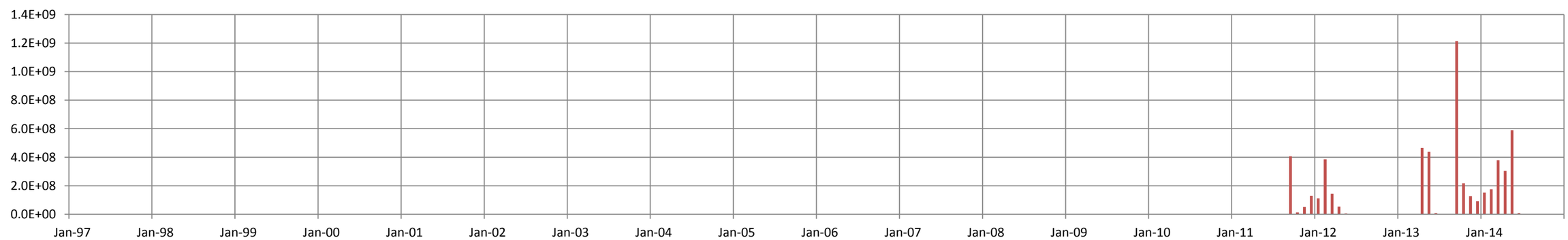
Uranium Concentration (µg/L)



Volume (L)



Total Uranium Load (µg)



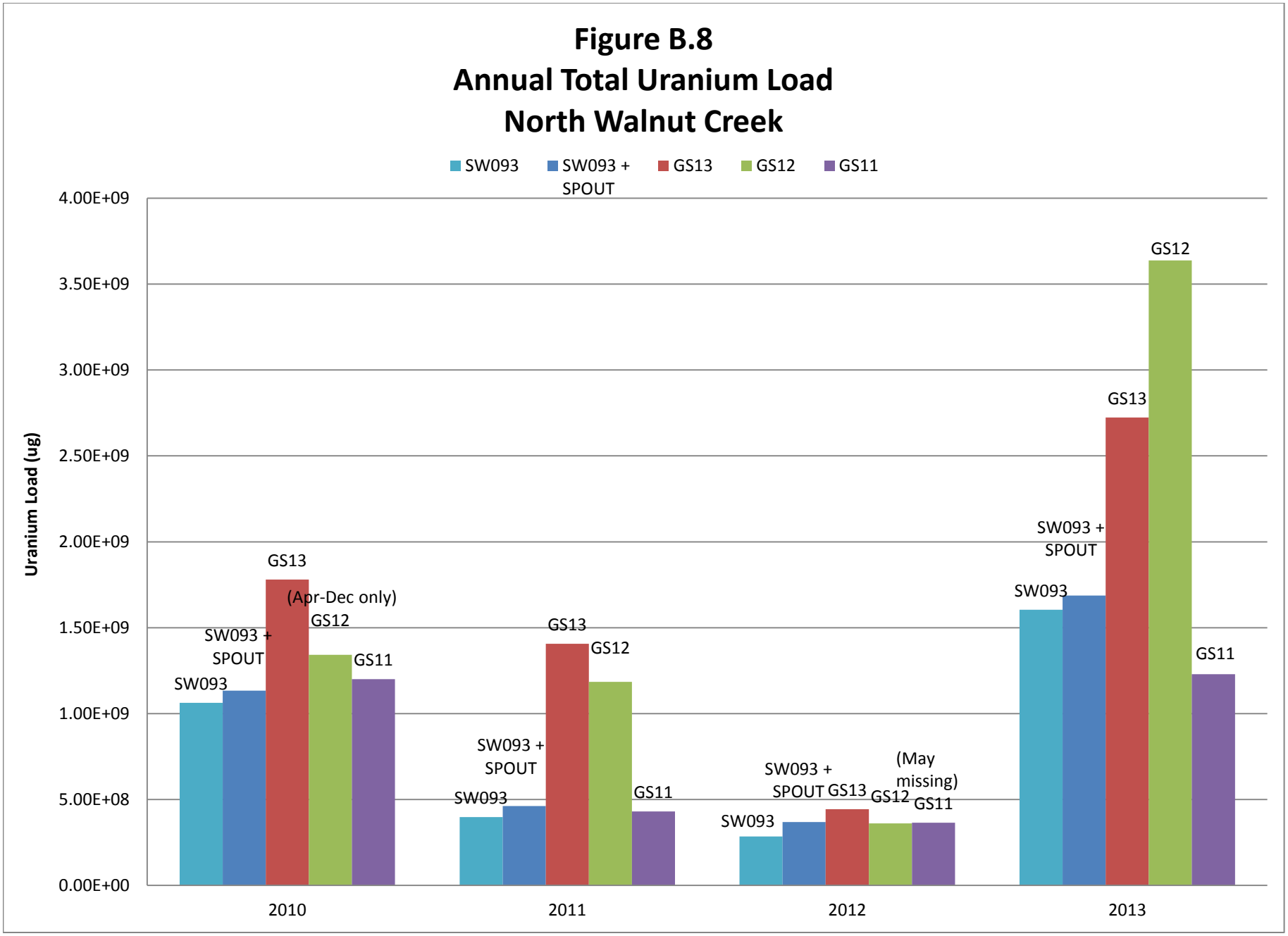
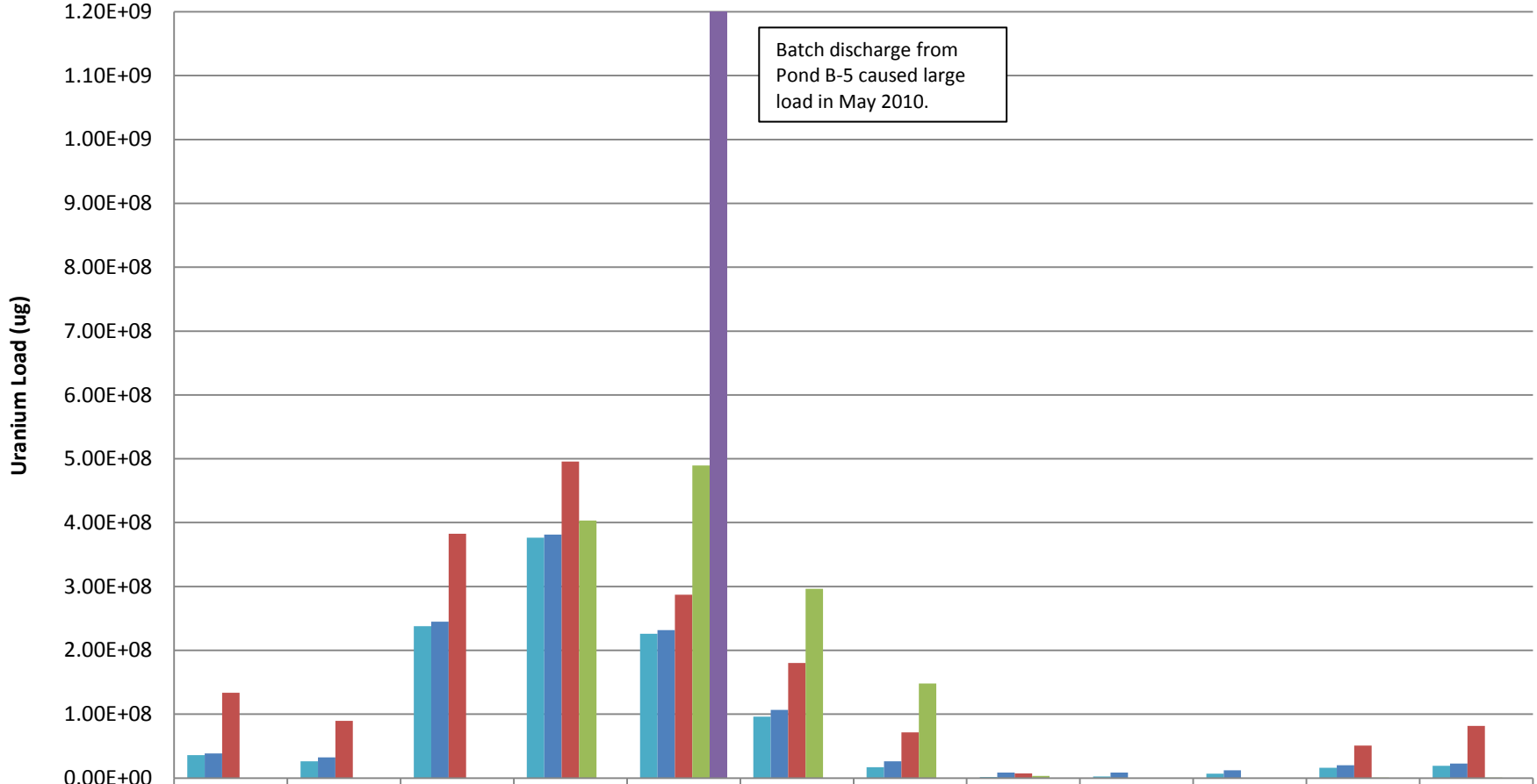


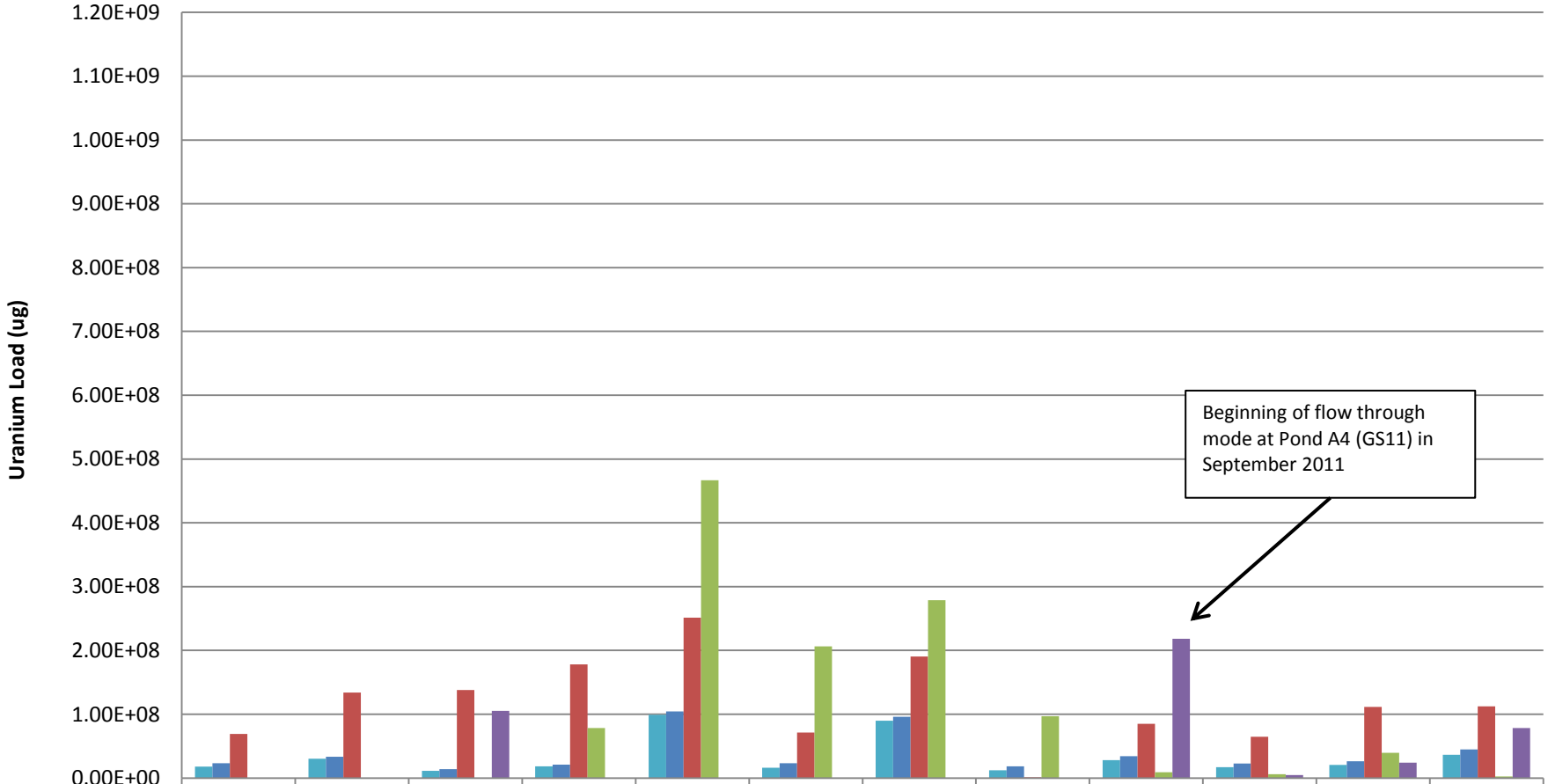
Figure B.8
Annual Total Uranium Load
North Walnut Creek
SW093
SW093 + SPOUT
GS13
GS12
GS11
Uranium Load (ug)
4.00E+09
3.50E+09
3.00E+09
2.50E+09
2.00E+09
1.50E+09
1.00E+09
5.00E+08
0.00E+00
2010
2011
2012
2013
(Apr-Dec only)
(May missing)

Figure B.9
Monthly Uranium Load in North Walnut Creek
2010



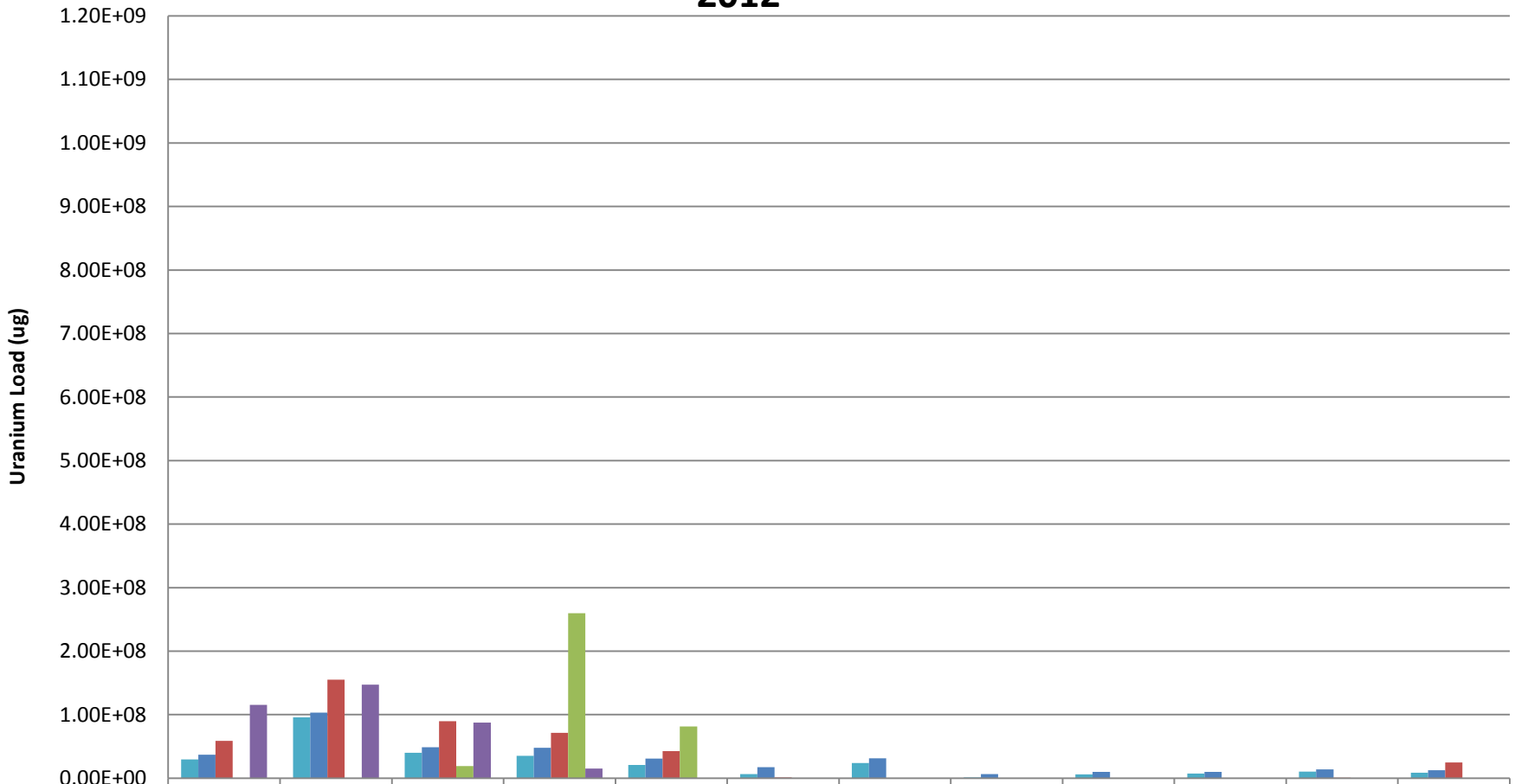
	Jan-10	Feb-10	Mar-10	Apr-10	May-10	Jun-10	Jul-10	Aug-10	Sep-10	Oct-10	Nov-10	Dec-10
SW093	3.60E+07	2.64E+07	2.38E+08	3.76E+08	2.26E+08	9.63E+07	1.72E+07	1.69E+06	2.39E+06	7.05E+06	1.63E+07	1.91E+07
SW093 + SPOUT	3.87E+07	3.23E+07	2.45E+08	3.81E+08	2.32E+08	1.07E+08	2.62E+07	8.49E+06	8.48E+06	1.21E+07	1.99E+07	2.28E+07
GS13	1.33E+08	8.98E+07	3.83E+08	4.96E+08	2.87E+08	1.80E+08	7.17E+07	7.17E+06	0	8.64E+03	5.08E+07	8.16E+07
GS12				4.03E+08	4.89E+08	2.96E+08	1.48E+08	3.26E+06	0	0	7.29E+05	8.74E+05
GS11	0	0	0	0	1.20E+09	0	0	0	0	0	0	0

Figure B.10
Monthly Uranium Load in North Walnut Creek
2011



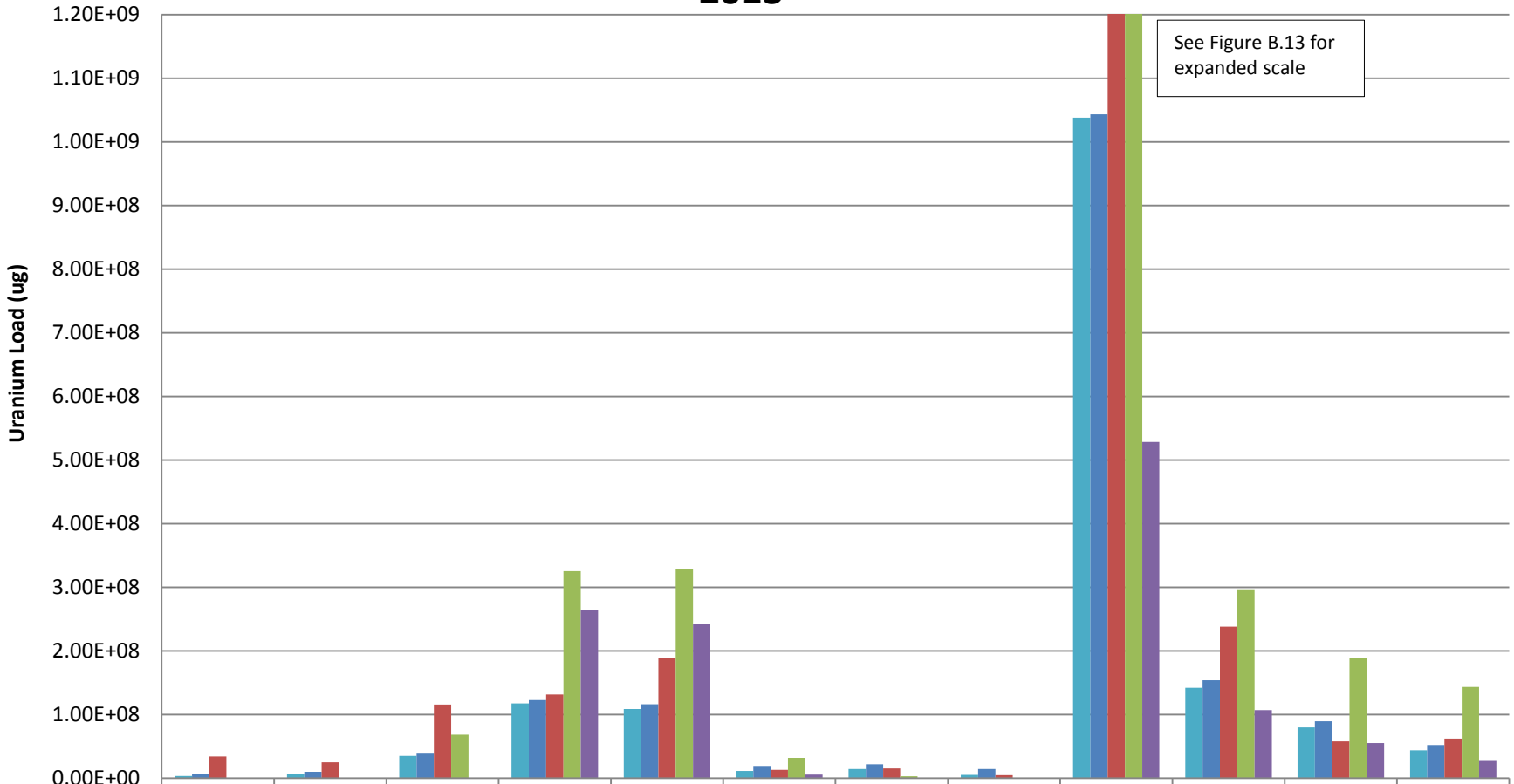
	Jan-11	Feb-11	Mar-11	Apr-11	May-11	Jun-11	Jul-11	Aug-11	Sep-11	Oct-11	Nov-11	Dec-11
SW093	1.80E+07	3.02E+07	1.12E+07	1.84E+07	9.92E+07	1.62E+07	8.99E+07	1.23E+07	2.81E+07	1.73E+07	2.07E+07	3.63E+07
SW093 + SPOUT	2.34E+07	3.32E+07	1.41E+07	2.12E+07	1.05E+08	2.33E+07	9.60E+07	1.84E+07	3.45E+07	2.27E+07	2.64E+07	4.48E+07
GS13	6.90E+07	1.34E+08	1.38E+08	1.78E+08	2.51E+08	7.13E+07	1.90E+08	1.02E+06	8.48E+07	6.46E+07	1.12E+08	1.12E+08
GS12	0	0	0	7.84E+07	4.67E+08	2.07E+08	2.79E+08	9.68E+07	8.92E+06	6.15E+06	3.98E+07	2.55E+06
GS11	0	0	1.05E+08	0	0	0	0	0	2.18E+08	4.79E+06	2.41E+07	7.85E+07

Figure B.11
Monthly Uranium Load in North Walnut Creek
2012



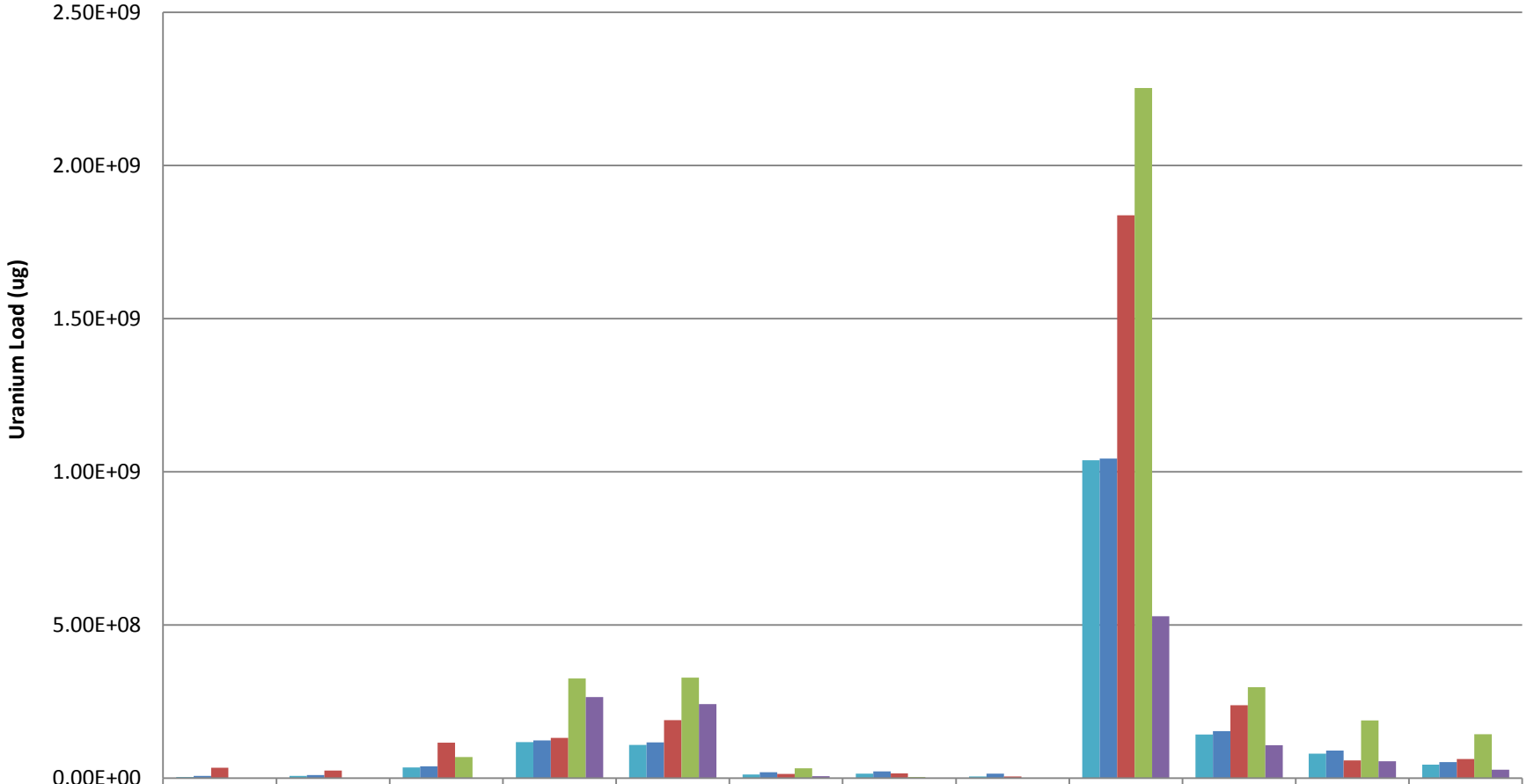
	Jan-12	Feb-12	Mar-12	Apr-12	May-12	Jun-12	Jul-12	Aug-12	Sep-12	Oct-12	Nov-12	Dec-12
SW093	2.97E+07	9.58E+07	3.99E+07	3.53E+07	2.08E+07	6.55E+06	2.38E+07	9.65E+05	6.17E+06	7.40E+06	1.04E+07	8.80E+06
SW093 + SPOUT	3.71E+07	1.03E+08	4.86E+07	4.79E+07	3.09E+07	1.74E+07	3.10E+07	6.27E+06	1.00E+07	9.78E+06	1.36E+07	1.25E+07
GS13	5.88E+07	1.55E+08	8.95E+07	7.14E+07	4.26E+07	1.31E+06	0	0	0	0	7.12E+05	2.47E+07
GS12	5.14E+02	0	1.91E+07	2.60E+08	8.15E+07	4.20E+05	0	0	0	0	0	0
GS11	1.15E+08	1.47E+08	8.76E+07	1.52E+07		0	0	0	0	0	0	0

Figure B.12
Monthly Uranium Load in North Walnut Creek
2013



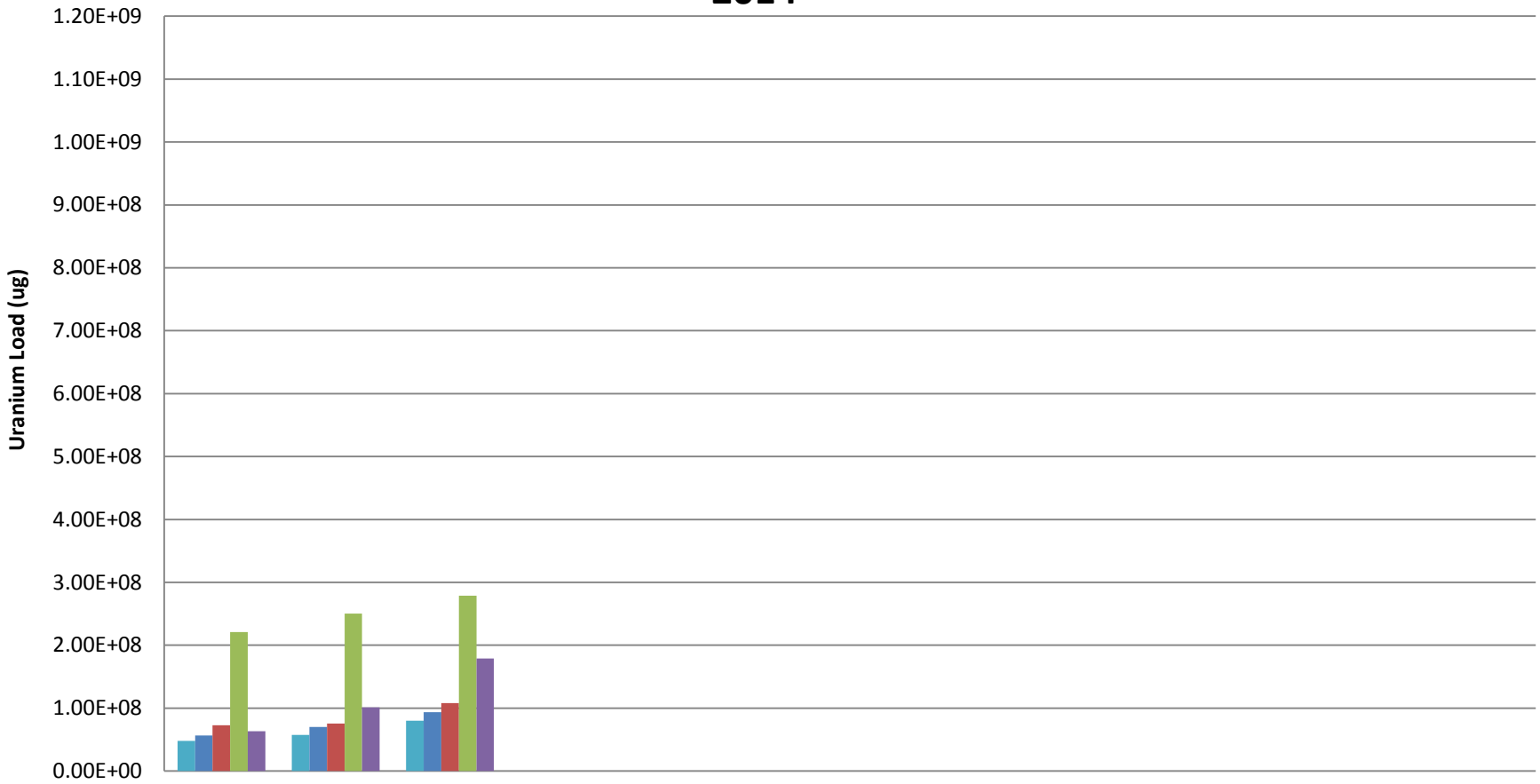
	Jan-13	Feb-13	Mar-13	Apr-13	May-13	Jun-13	Jul-13	Aug-13	Sep-13	Oct-13	Nov-13	Dec-13
SW093	3.28E+06	6.68E+06	3.48E+07	1.17E+08	1.09E+08	1.15E+07	1.41E+07	5.34E+06	1.04E+09	1.42E+08	7.98E+07	4.37E+07
SW093 + SPOUT	6.70E+06	9.90E+06	3.83E+07	1.23E+08	1.16E+08	1.93E+07	2.20E+07	1.44E+07	1.04E+09	1.54E+08	8.94E+07	5.19E+07
GS13	3.39E+07	2.47E+07	1.16E+08	1.31E+08	1.89E+08	1.32E+07	1.54E+07	4.81E+06	1.84E+09	2.38E+08	5.76E+07	6.22E+07
GS12	0	0	6.83E+07	3.25E+08	3.28E+08	3.19E+07	3.01E+06	4.83E+02	2.25E+09	2.97E+08	1.89E+08	1.43E+08
GS11	0	0	0	2.64E+08	2.42E+08	5.77E+06	0	0	5.28E+08	1.07E+08	5.49E+07	2.72E+07

Figure B.13
Monthly Uranium Load in North Walnut Creek
2013



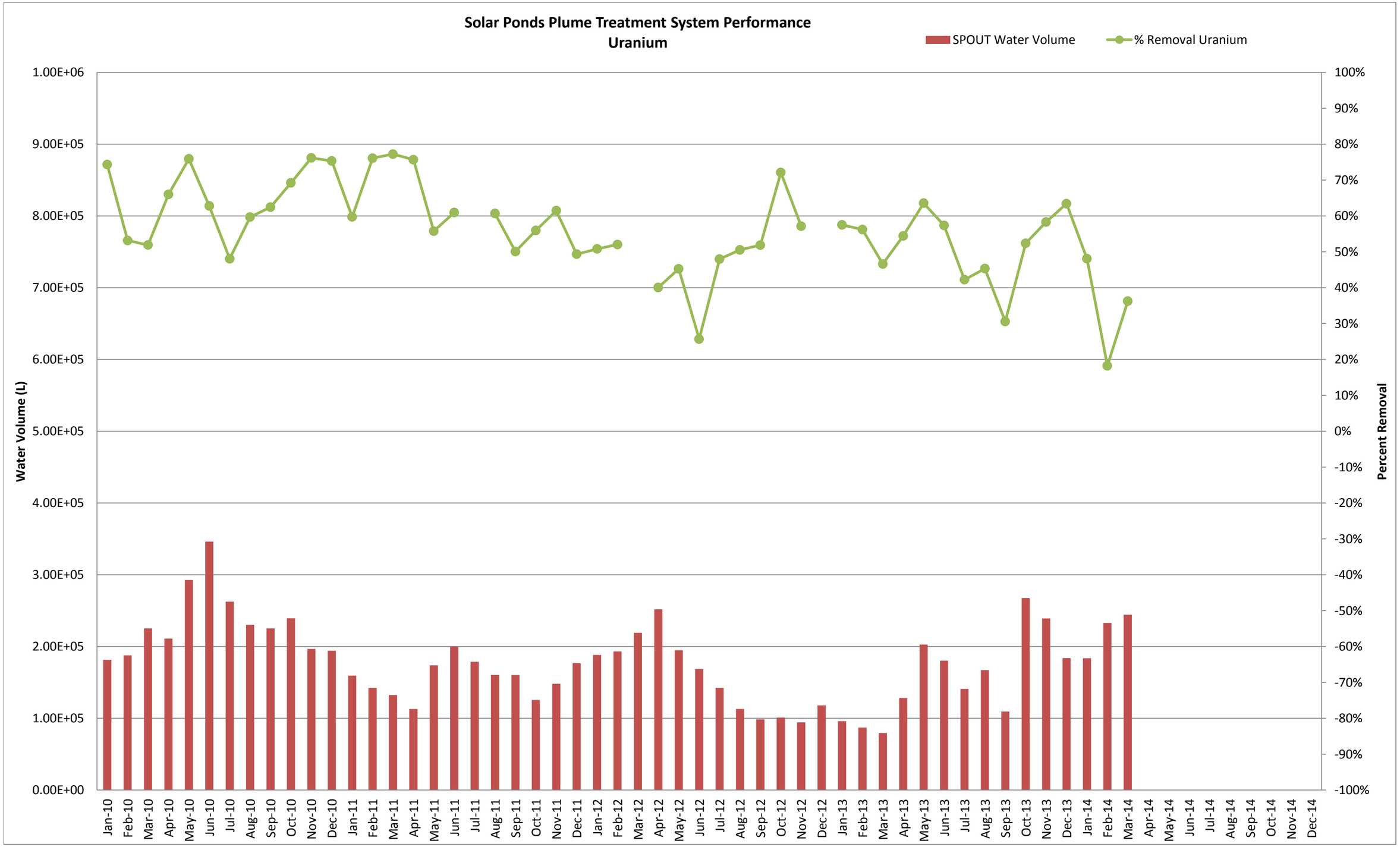
	Jan-13	Feb-13	Mar-13	Apr-13	May-13	Jun-13	Jul-13	Aug-13	Sep-13	Oct-13	Nov-13	Dec-13
SW093	3.28E+06	6.68E+06	3.48E+07	1.17E+08	1.09E+08	1.15E+07	1.41E+07	5.34E+06	1.04E+09	1.42E+08	7.98E+07	4.37E+07
SW093 + SPOUT	6.70E+06	9.90E+06	3.83E+07	1.23E+08	1.16E+08	1.93E+07	2.20E+07	1.44E+07	1.04E+09	1.54E+08	8.94E+07	5.19E+07
GS13	3.39E+07	2.47E+07	1.16E+08	1.31E+08	1.89E+08	1.32E+07	1.54E+07	4.81E+06	1.84E+09	2.38E+08	5.76E+07	6.22E+07
GS12	0	0	6.83E+07	3.25E+08	3.28E+08	3.19E+07	3.01E+06	4.83E+02	2.25E+09	2.97E+08	1.89E+08	1.43E+08
GS11	0	0	0	2.64E+08	2.42E+08	5.77E+06	0	0	5.28E+08	1.07E+08	5.49E+07	2.72E+07

Figure B.14
Monthly Uranium Load in North Walnut Creek
2014



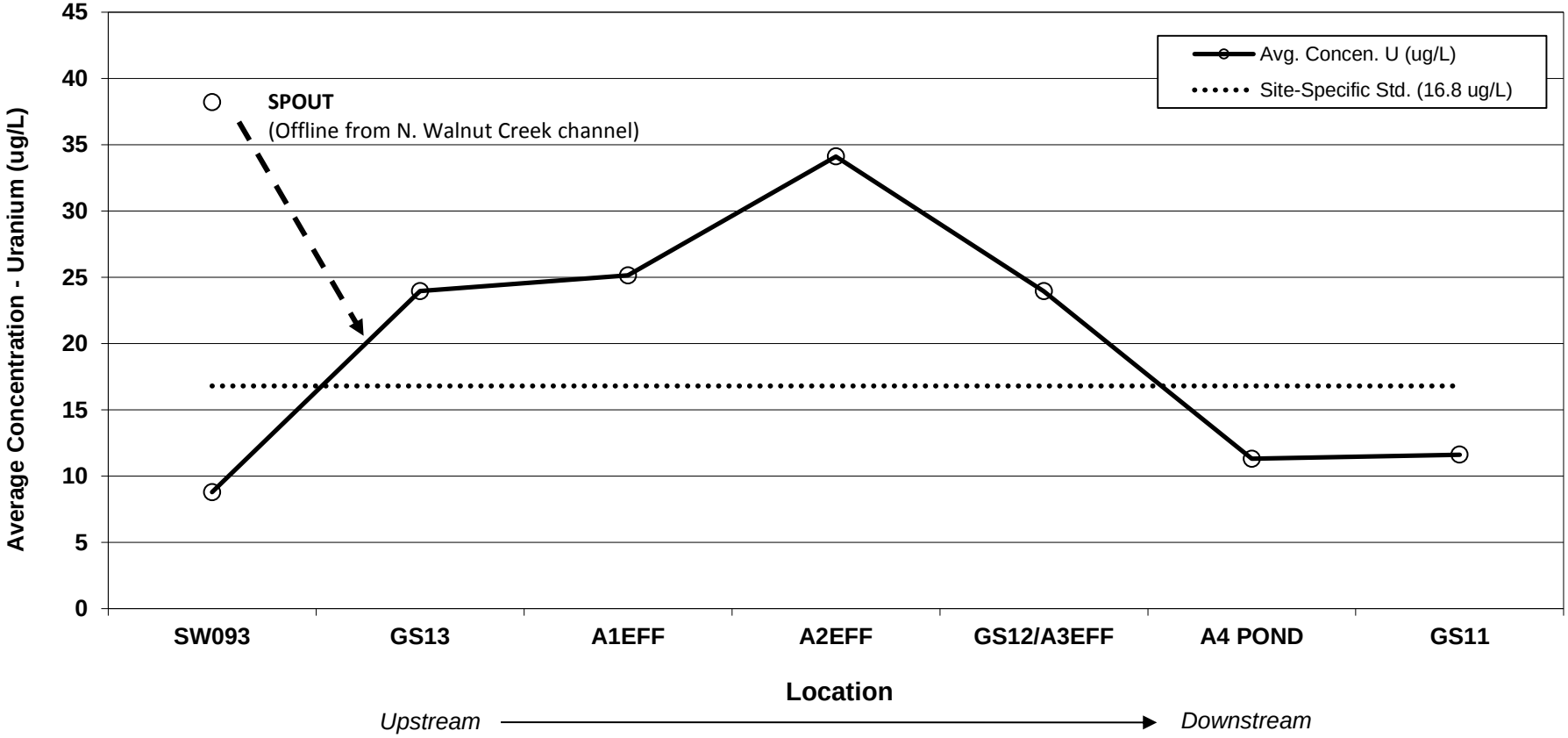
	Jan-14	Feb-14	Mar-14	Apr-14	May-14	Jun-14	Jul-14	Aug-14	Sep-14	Oct-14	Nov-14	Dec-14
SW093	4.78E+07	5.75E+07	8.02E+07									
SW093 + SPOUT	5.66E+07	6.99E+07	9.37E+07									
GS13	7.30E+07	7.55E+07	1.08E+08									
GS12	2.21E+08	2.51E+08	2.79E+08									
GS11	6.34E+07	1.01E+08	1.79E+08									

Figure B.15



Wright Water Engineers, Inc. 6.19/2014

Figure B.16
North Walnut Creek Monitoring Locations
Average Concentrations of Uranium (1/27/10 - 4/30/14)



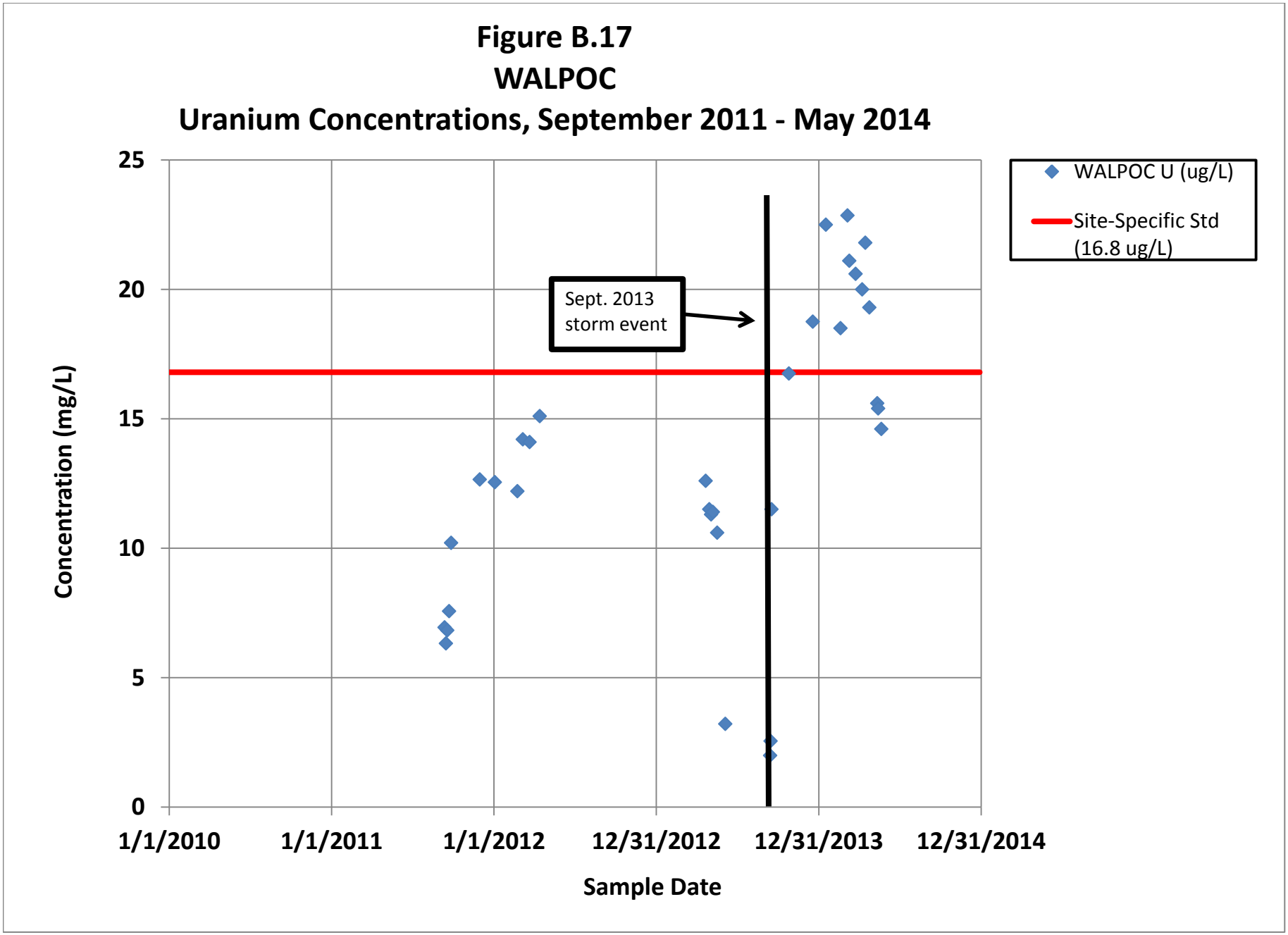
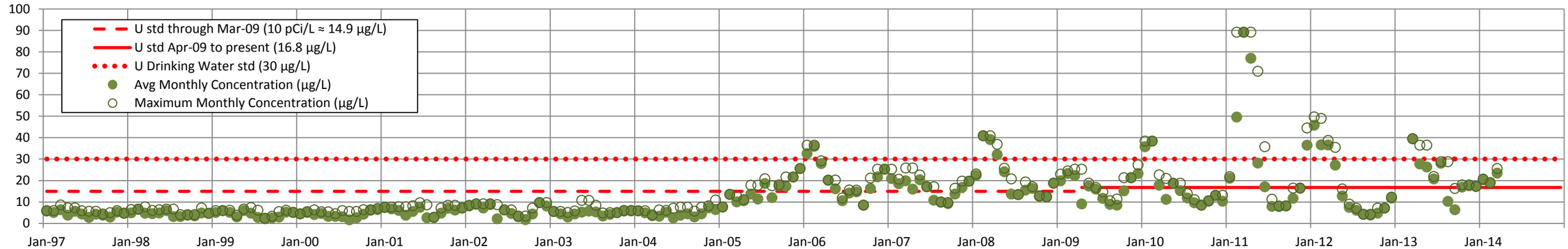


Figure B.17
WALPOC
Uranium Concentrations, September 2011 - May 2014
Concentration (mg/L)
25
20
15
10
5
0
1/1/2010
1/1/2011
1/1/2012
12/31/2012
12/31/2013
12/31/2014
Sample Date
Sept. 2013
storm event
WALPOC U (ug/L)
Site-Specific Std
(16.8 ug/L)

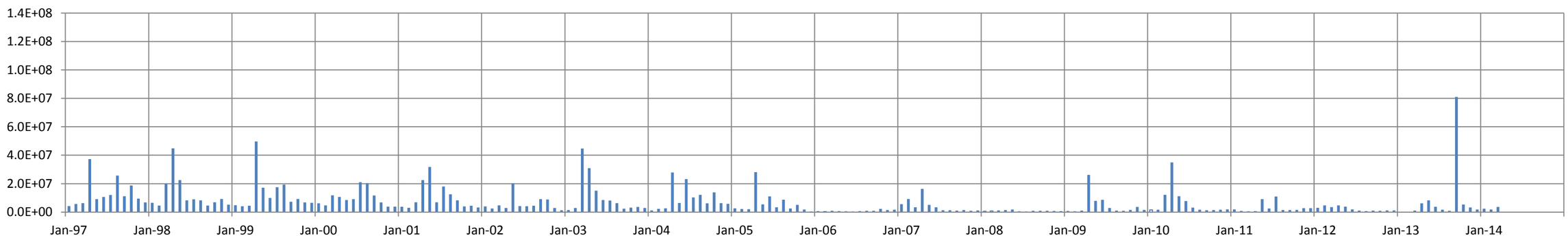
Figure C.1
Location: GS10

S. Walnut Ck. - 1
(IA Perim)

Uranium Concentration (µg/L)



Volume (L)



Total Uranium Load (µg)

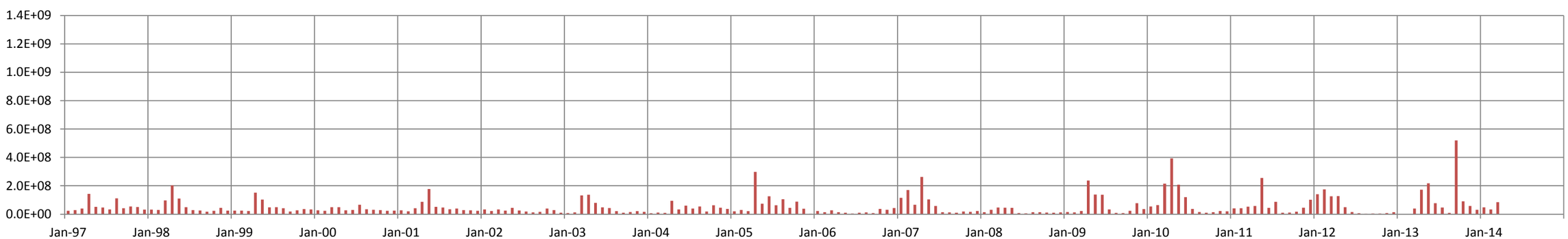
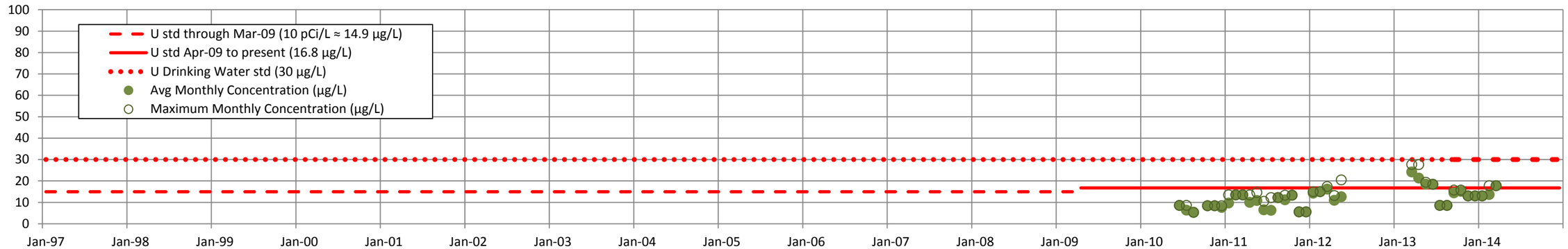


Table C.1

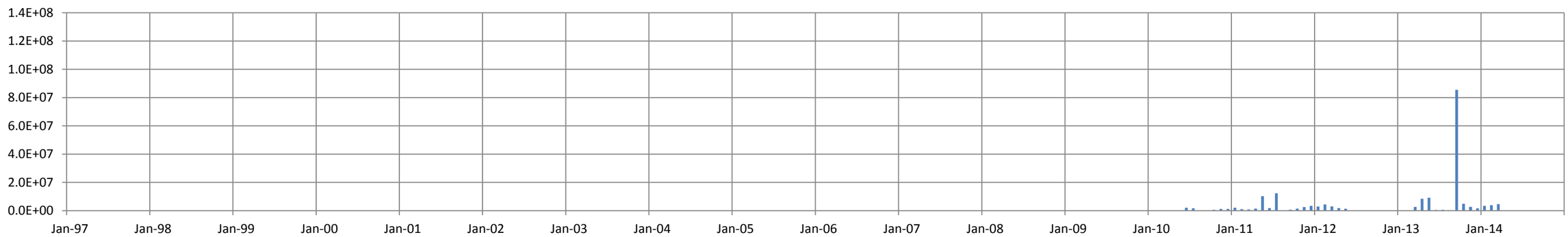
	Uranium Load (µg)				
Date	**GS10**	+/-	**B5INFLOW**	+/-	**GS08**
Jan-09	1.53E+07	--		--	0
Feb-09	1.34E+07	--		--	0
Mar-09	2.28E+07	--		--	0
Apr-09	2.37E+08	--		--	0
May-09	1.38E+08	--		--	2.48E+08
Jun-09	1.37E+08	--		--	7.53E+07
Jul-09	3.36E+07	--		--	0
Aug-09	9.33E+06	--		--	0
Sep-09	8.43E+06	--		--	0
Oct-09	2.35E+07	--		--	0
Nov-09	7.70E+07	--		--	0
Dec-09	3.55E+07	--		--	0
2009	**7.50E+08**	***-7.50E+08***	**0.00E+00**	***3.23E+08***	**3.23E+08**
Jan-10	5.44E+07	--		--	0
Feb-10	6.36E+07	--		--	0
Mar-10	2.15E+08	--		--	0
Apr-10	3.93E+08	--		--	4.22E+08
May-10	2.08E+08	--		--	3.21E+08
Jun-10	1.20E+08	*-1.02E+08*	1.79E+07	*-1.79E+07*	0
Jul-10	3.78E+07	*-2.68E+07*	1.10E+07	*-1.10E+07*	0
Aug-10	1.56E+07	*-1.45E+07*	1.04E+06	*-1.04E+06*	0
Sep-10	1.08E+07	*-1.08E+07*	0	*0.00E+00*	0
Oct-10	1.46E+07	*-9.92E+06*	4.66E+06	*-4.66E+06*	0
Nov-10	2.23E+07	*-1.21E+07*	1.02E+07	*-1.02E+07*	0
Dec-10	2.03E+07	*-1.10E+07*	9.28E+06	*-9.28E+06*	0
2010	**1.18E+09**	***-1.12E+09***	**5.42E+07**	***6.89E+08***	**7.43E+08**
Jan-11	4.09E+07	*-2.04E+07*	2.05E+07	*-2.05E+07*	0
Feb-11	4.22E+07	*-2.68E+07*	1.54E+07	*-1.54E+07*	0
Mar-11	5.33E+07	*-4.16E+07*	1.17E+07	*9.05E+07*	1.02E+08
Apr-11	5.83E+07	*-4.34E+07*	1.50E+07	*-1.50E+07*	0
May-11	2.55E+08	*-1.44E+08*	1.11E+08	*-1.11E+08*	0
Jun-11	4.41E+07	*-3.17E+07*	1.24E+07	*-1.24E+07*	0
Jul-11	8.71E+07	*-9.23E+06*	7.78E+07	*-7.78E+07*	0
Aug-11	1.09E+07	*-8.18E+06*	2.69E+06	*-2.69E+06*	0
Sep-11	1.17E+07	*-3.63E+06*	8.06E+06	*1.30E+08*	1.38E+08
Oct-11	1.82E+07	*1.97E+06*	2.02E+07	*-1.25E+07*	7.68E+06
Nov-11	4.55E+07	*-3.16E+07*	1.39E+07	*9.10E+06*	2.30E+07
Dec-11	1.02E+08	*-8.37E+07*	1.87E+07	*2.57E+07*	4.44E+07
2011	**7.70E+08**	***-4.42E+08***	**3.27E+08**	***-1.18E+07***	**3.15E+08**
Jan-12	1.41E+08	*-9.94E+07*	4.12E+07	*2.45E+06*	4.36E+07
Feb-12	1.75E+08	*-1.08E+08*	6.63E+07	*-2.64E+07*	3.99E+07
Mar-12	1.27E+08	*-7.65E+07*	5.02E+07	*-3.32E+07*	1.70E+07
Apr-12	1.27E+08	*-1.06E+08*	2.04E+07	*-1.61E+06*	1.88E+07
May-12	4.89E+07	*-3.20E+07*	1.69E+07	*-8.87E+06*	8.03E+06
Jun-12	1.48E+07	*-1.48E+07*	0	*0.00E+00*	0
Jul-12	6.76E+06	*-6.76E+06*	0	*0.00E+00*	0
Aug-12	2.71E+06	*-2.71E+06*	0	*0.00E+00*	0
Sep-12	4.04E+06	*-4.04E+06*	0	*0.00E+00*	0
Oct-12	4.76E+06	*-4.76E+06*	0	*0.00E+00*	0
Nov-12	8.58E+06	*-8.58E+06*	0	*0.00E+00*	0
Dec-12	1.47E+07	*-1.47E+07*	0	*0.00E+00*	0
2012	**6.74E+08**	***-4.79E+08***	**1.95E+08**	***-6.76E+07***	**1.27E+08**
Jan-13		--	0	*0.00E+00*	0
Feb-13		--	0	*0.00E+00*	0
Mar-13	3.98E+07	*2.55E+07*	6.53E+07	*-6.53E+07*	0
Apr-13	1.73E+08	*5.23E+06*	1.78E+08	*-1.03E+08*	7.51E+07
May-13	2.17E+08	*-4.83E+07*	1.69E+08	*-7.61E+07*	9.31E+07
Jun-13	7.70E+07	*-6.73E+07*	9.72E+06	*-8.53E+06*	1.19E+06
Jul-13	4.68E+07	*-4.12E+07*	5.58E+06	*-5.58E+06*	0
Aug-13	9.53E+06	*-6.59E+06*	2.94E+06	*-2.94E+06*	0
Sep-13	5.19E+08	*7.15E+08*	1.23E+09	*-7.72E+08*	4.62E+08
Oct-13	9.10E+07	*-1.60E+07*	7.50E+07	*-1.79E+07*	5.71E+07
Nov-13	5.84E+07	*-2.35E+07*	3.49E+07	*2.01E+06*	3.69E+07
Dec-13	3.15E+07	*-9.46E+06*	2.21E+07	*3.26E+06*	2.53E+07
2013	**1.26E+09**	***5.33E+08***	**1.80E+09**	***-1.05E+09***	**7.50E+08**
Jan-14	4.83E+07	*-4.17E+06*	4.42E+07	*-1.75E+07*	2.67E+07
Feb-14	3.35E+07	*2.06E+07*	5.41E+07	*-1.97E+07*	3.45E+07
Mar-14	8.48E+07	*-2.05E+06*	8.27E+07	*-1.92E+07*	6.35E+07
Apr-14		*0.00E+00*		*0.00E+00*	
May-14		*0.00E+00*		*0.00E+00*	
Jun-14		*0.00E+00*		*0.00E+00*	
Jul-14		*0.00E+00*		*0.00E+00*	
Aug-14		*0.00E+00*		*0.00E+00*	
Sep-14		*0.00E+00*		*0.00E+00*	
Oct-14		*0.00E+00*		*0.00E+00*	
Nov-14		*0.00E+00*		*0.00E+00*	
Dec-14		*0.00E+00*		*0.00E+00*	
2014	**1.67E+08**	***1.44E+07***	**1.81E+08**	***-5.64E+07***	**1.25E+08**

Notes:
0 means zero flow was recorded for that month.
NO FLOW DATA OR SOME FLOW DATA MISSING

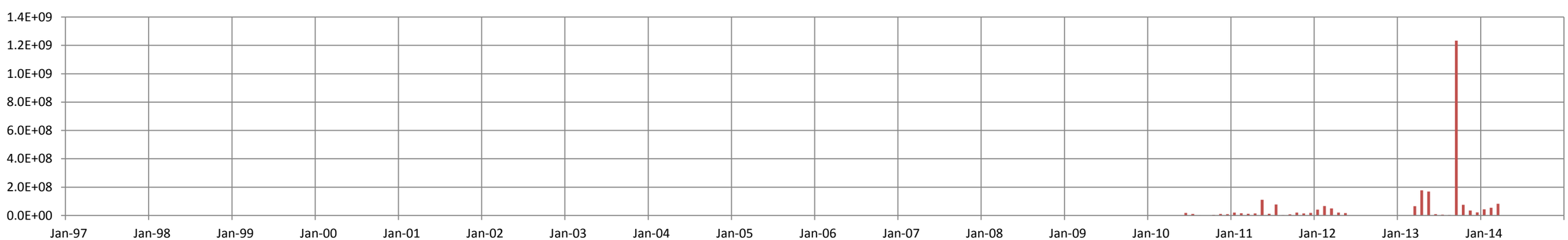
Uranium Concentration (µg/L)



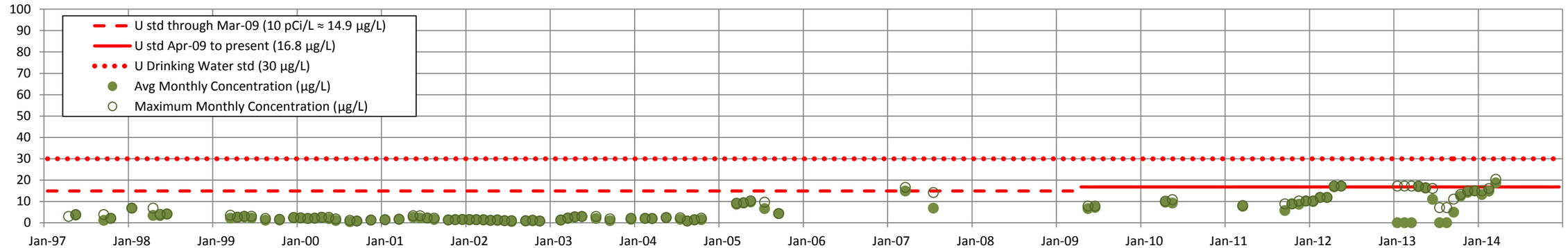
Volume (L)



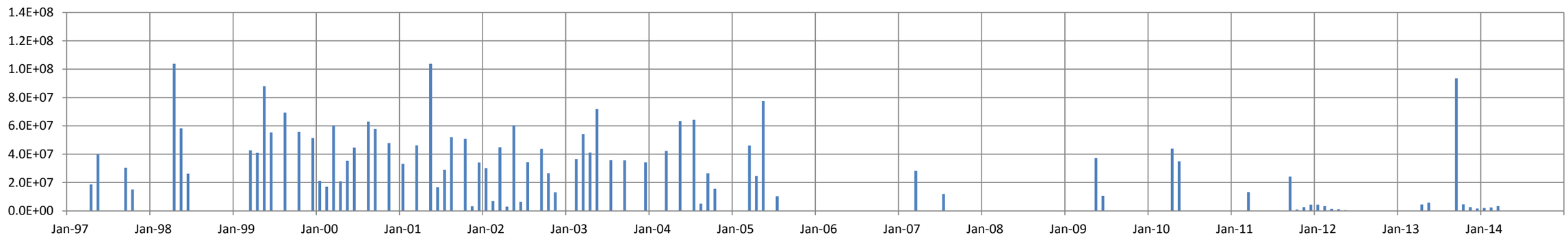
Total Uranium Load (µg)



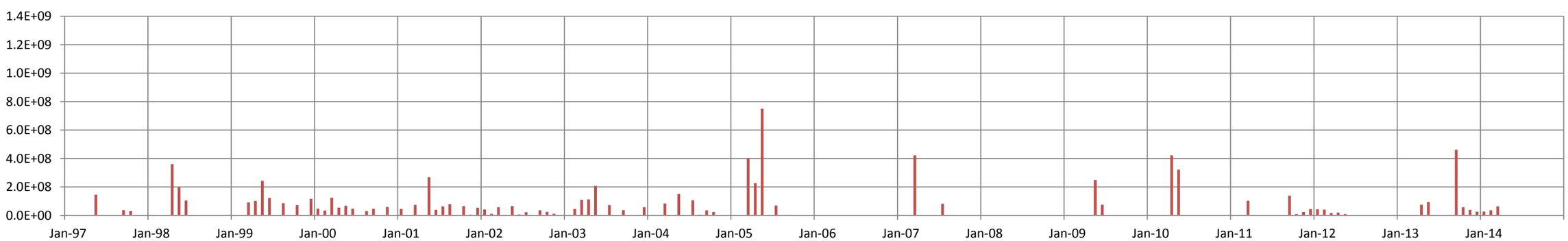
Uranium Concentration (µg/L)



Volume (L)



Total Uranium Load (µg)



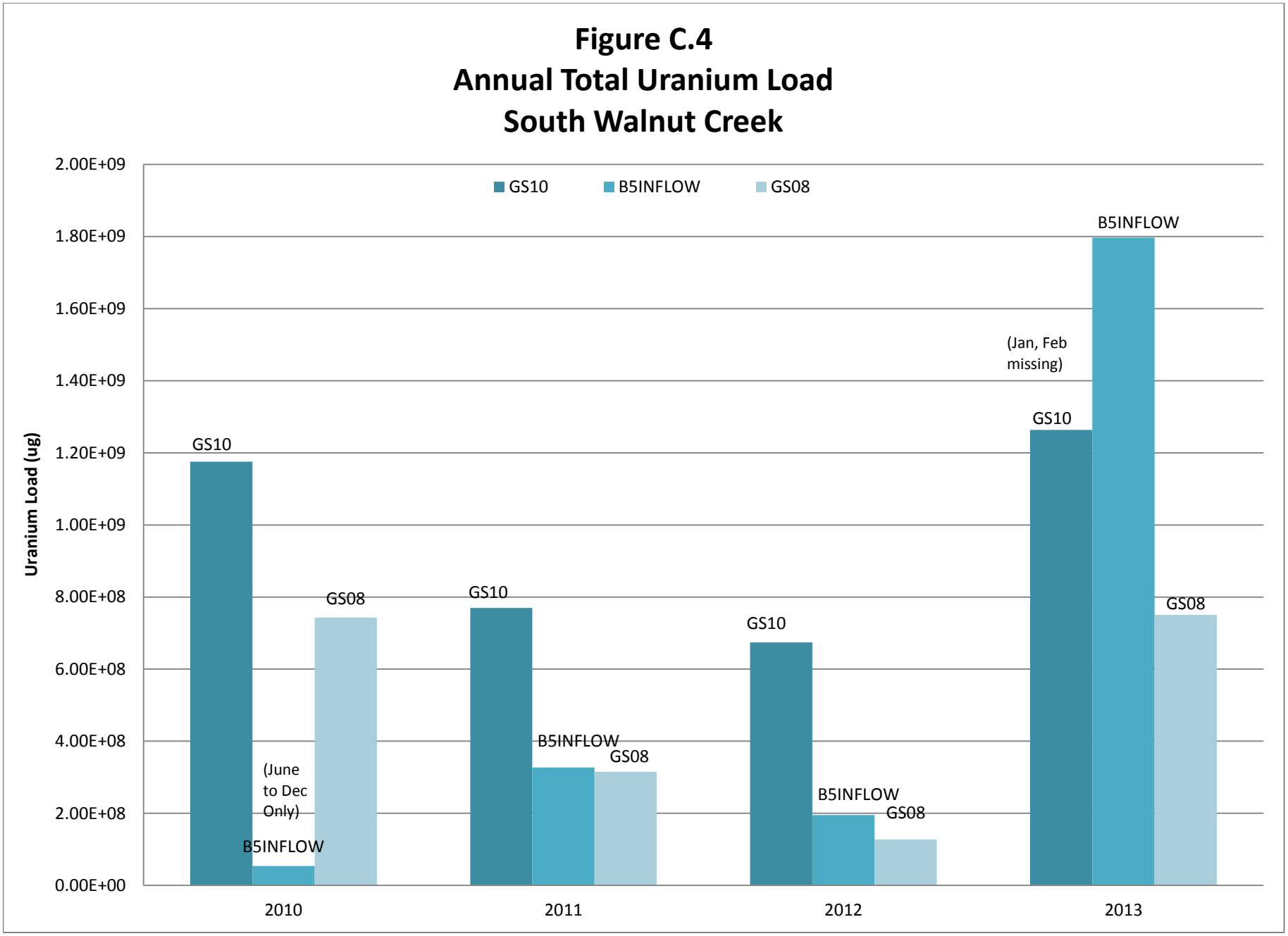
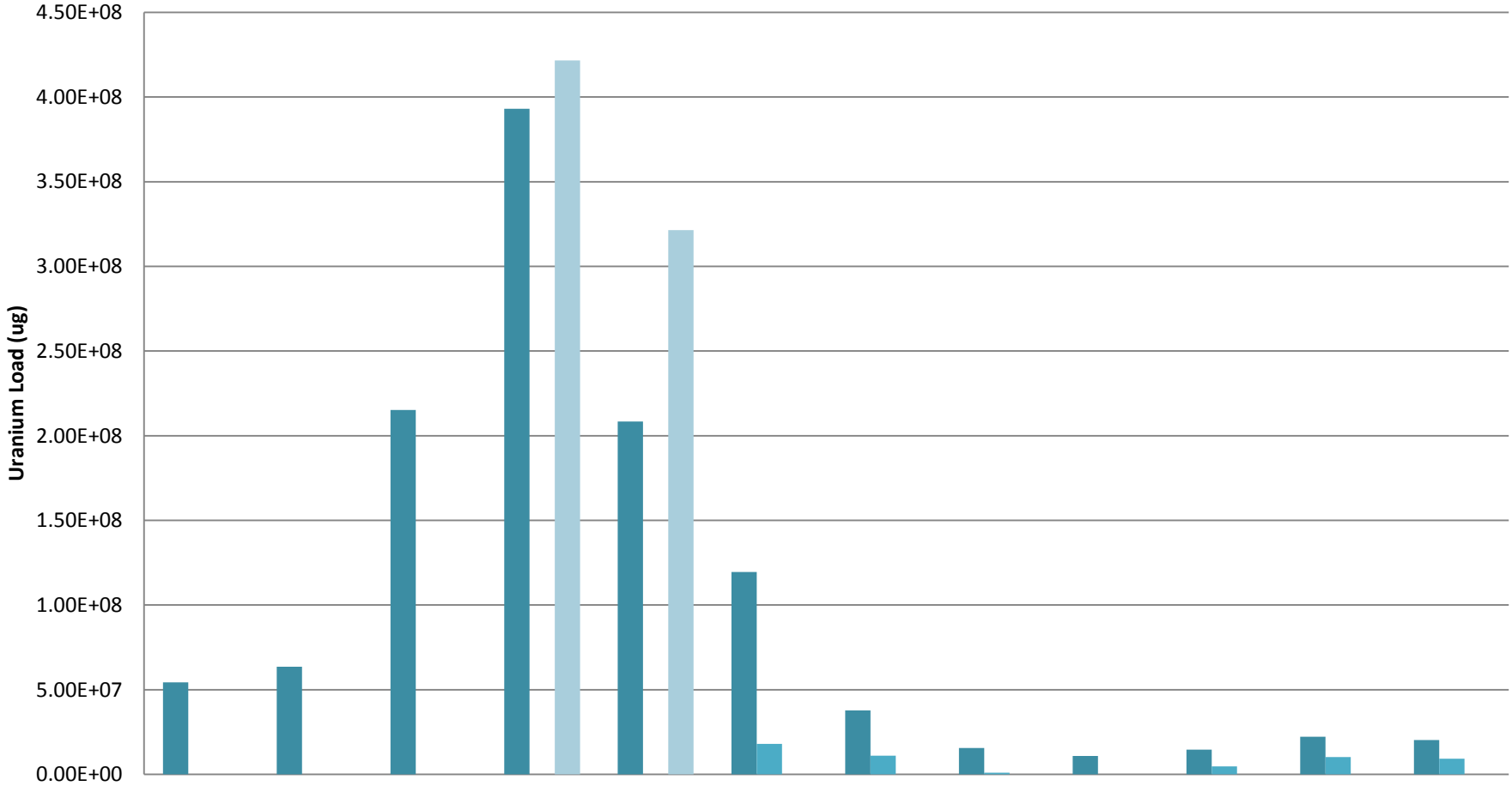


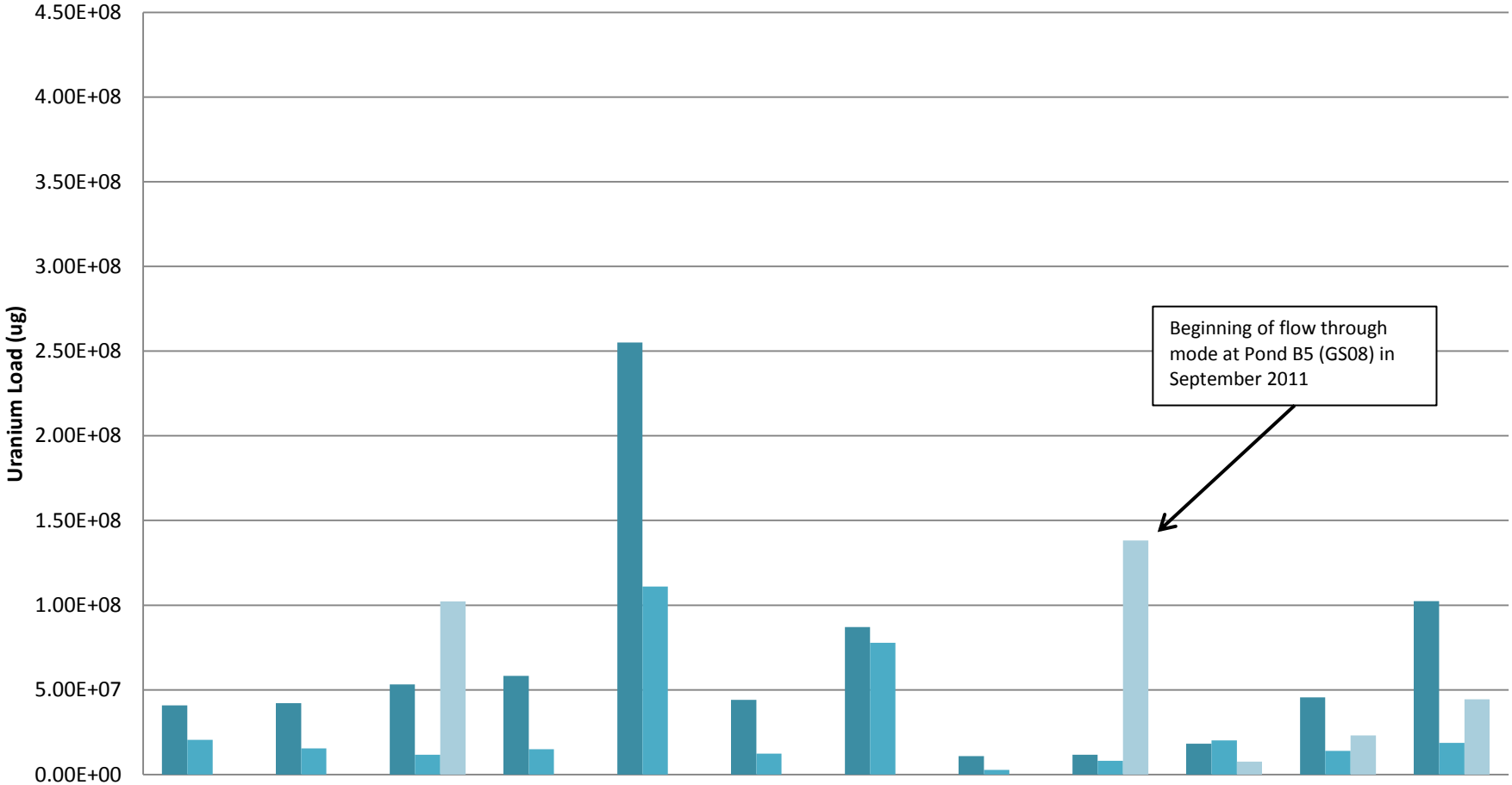
Figure C.4
Annual Total Uranium Load
South Walnut Creek
GS10
B5INFLOW
GS08
Uranium Load (ug)
2.00E+09
1.80E+09
1.60E+09
1.40E+09
1.20E+09
1.00E+09
8.00E+08
6.00E+08
4.00E+08
2.00E+08
0.00E+00
GS10
GS08
(June to Dec Only)
B5INFLOW
GS10
B5INFLOW
GS08
GS10
B5INFLOW
GS08
(Jan, Feb missing)
GS10
B5INFLOW
GS08
2010
2011
2012
2013

Figure C.5
Monthly Uranium Load in South Walnut Creek
2010



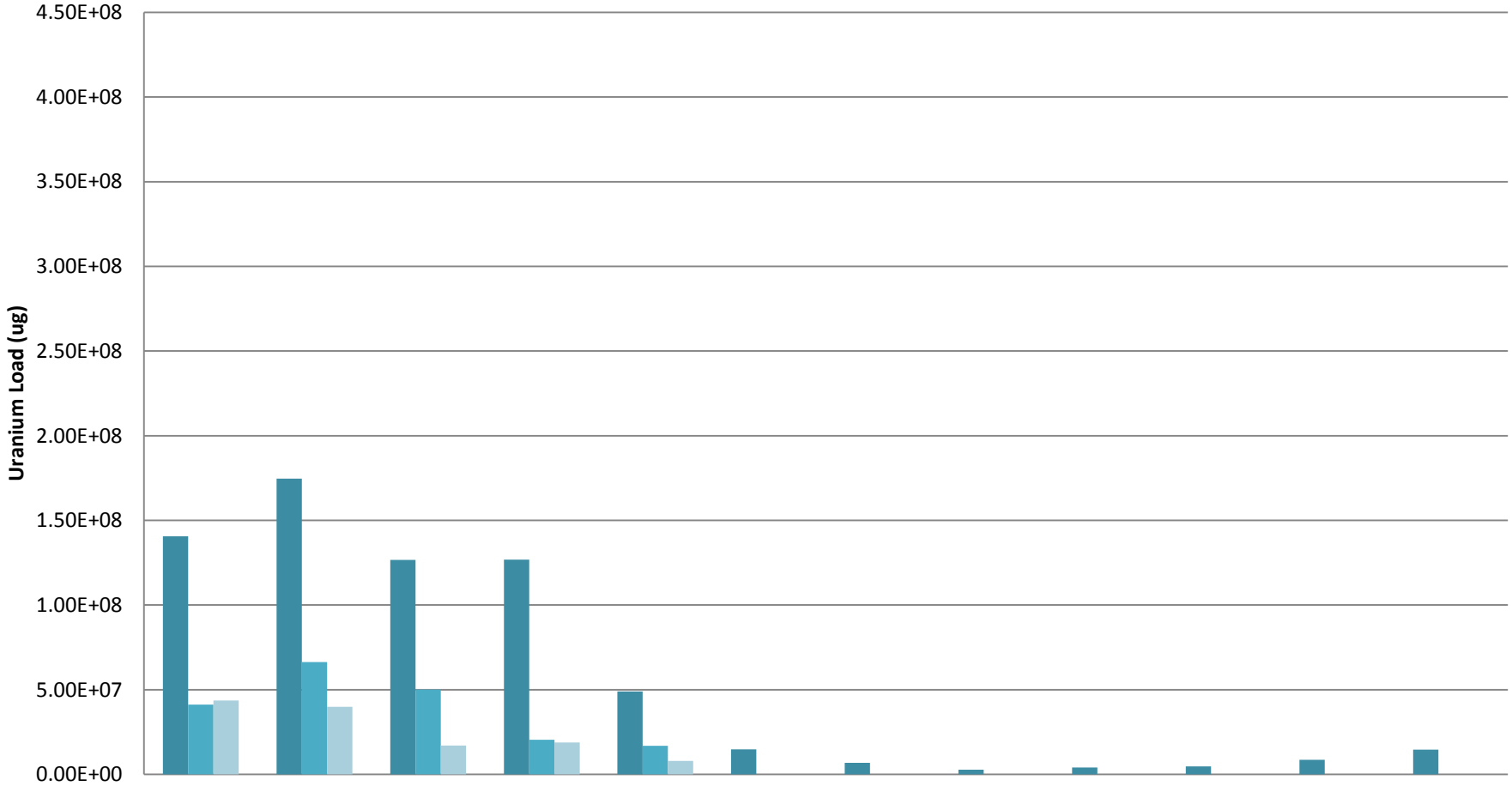
	Jan-10	Feb-10	Mar-10	Apr-10	May-10	Jun-10	Jul-10	Aug-10	Sep-10	Oct-10	Nov-10	Dec-10
GS10	5.44E+07	6.36E+07	2.15E+08	3.93E+08	2.08E+08	1.20E+08	3.78E+07	1.56E+07	1.08E+07	1.46E+07	2.23E+07	2.03E+07
B5INFLOW						1.79E+07	1.10E+07	1.04E+06	0	4.66E+06	1.02E+07	9.28E+06
GS08	0	0	0	4.22E+08	3.21E+08	0	0	0	0	0	0	0

Figure C.6
Monthly Uranium Load in South Walnut Creek
2011



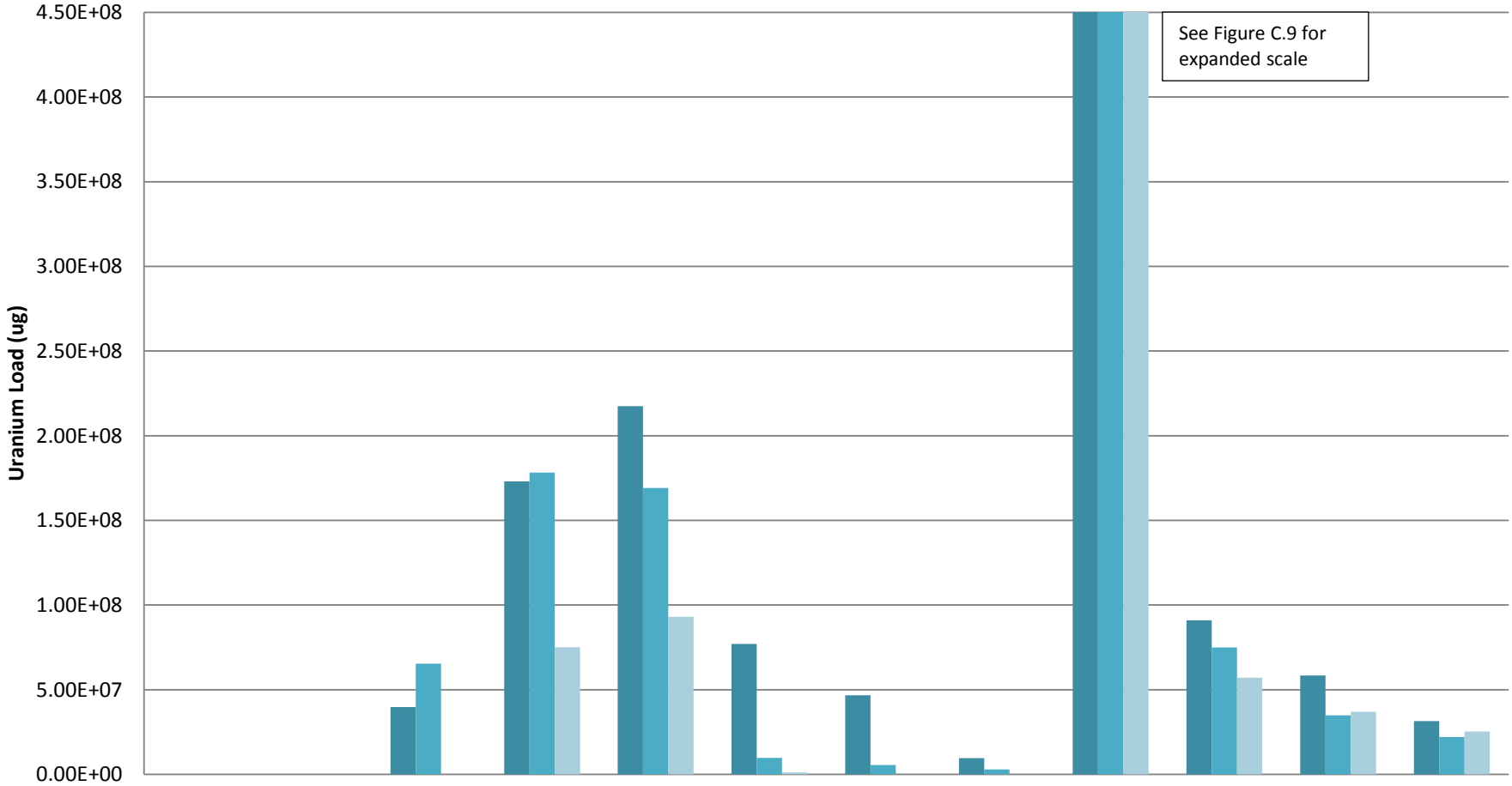
	Jan-11	Feb-11	Mar-11	Apr-11	May-11	Jun-11	Jul-11	Aug-11	Sep-11	Oct-11	Nov-11	Dec-11
GS10	4.09E+07	4.22E+07	5.33E+07	5.83E+07	2.55E+08	4.41E+07	8.71E+07	1.09E+07	1.17E+07	1.82E+07	4.55E+07	1.02E+08
B5INFLOW	2.05E+07	1.54E+07	1.17E+07	1.50E+07	1.11E+08	1.24E+07	7.78E+07	2.69E+06	8.06E+06	2.02E+07	1.39E+07	1.87E+07
GS08	0	0	1.02E+08	0	0	0	0	0	1.38E+08	7.68E+06	2.30E+07	4.44E+07

Figure C.7
Monthly Uranium Load in South Walnut Creek
2012



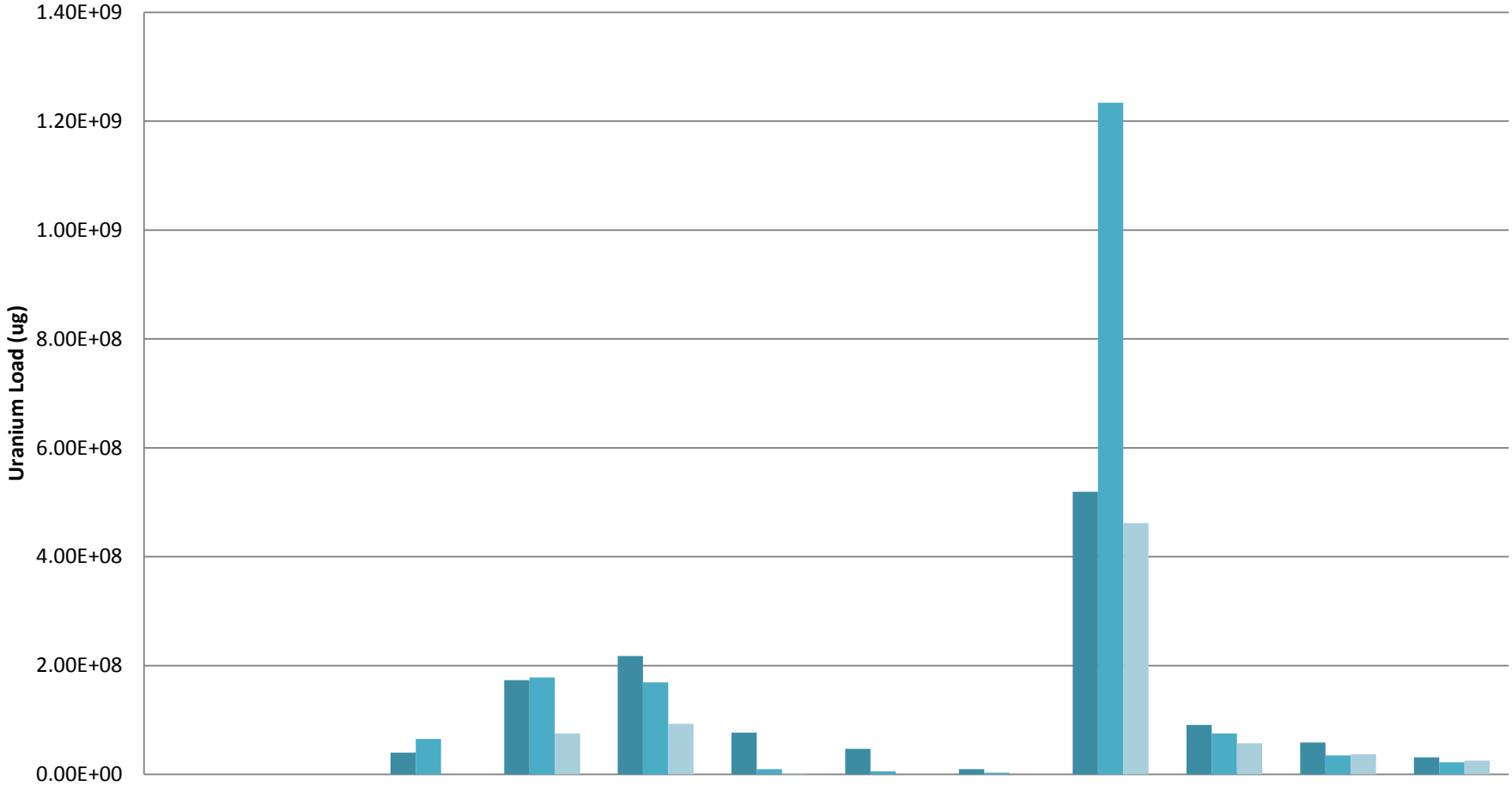
	Jan-12	Feb-12	Mar-12	Apr-12	May-12	Jun-12	Jul-12	Aug-12	Sep-12	Oct-12	Nov-12	Dec-12
GS10	1.41E+08	1.75E+08	1.27E+08	1.27E+08	4.89E+07	1.48E+07	6.76E+06	2.71E+06	4.04E+06	4.76E+06	8.58E+06	1.47E+07
B5INFLOW	4.12E+07	6.63E+07	5.02E+07	2.04E+07	1.69E+07	0	0	0	0	0	0	0
GS08	4.36E+07	3.99E+07	1.70E+07	1.88E+07	8.03E+06	0	0	0	0	0	0	0

Figure C.8
Monthly Uranium Load in South Walnut Creek
2013



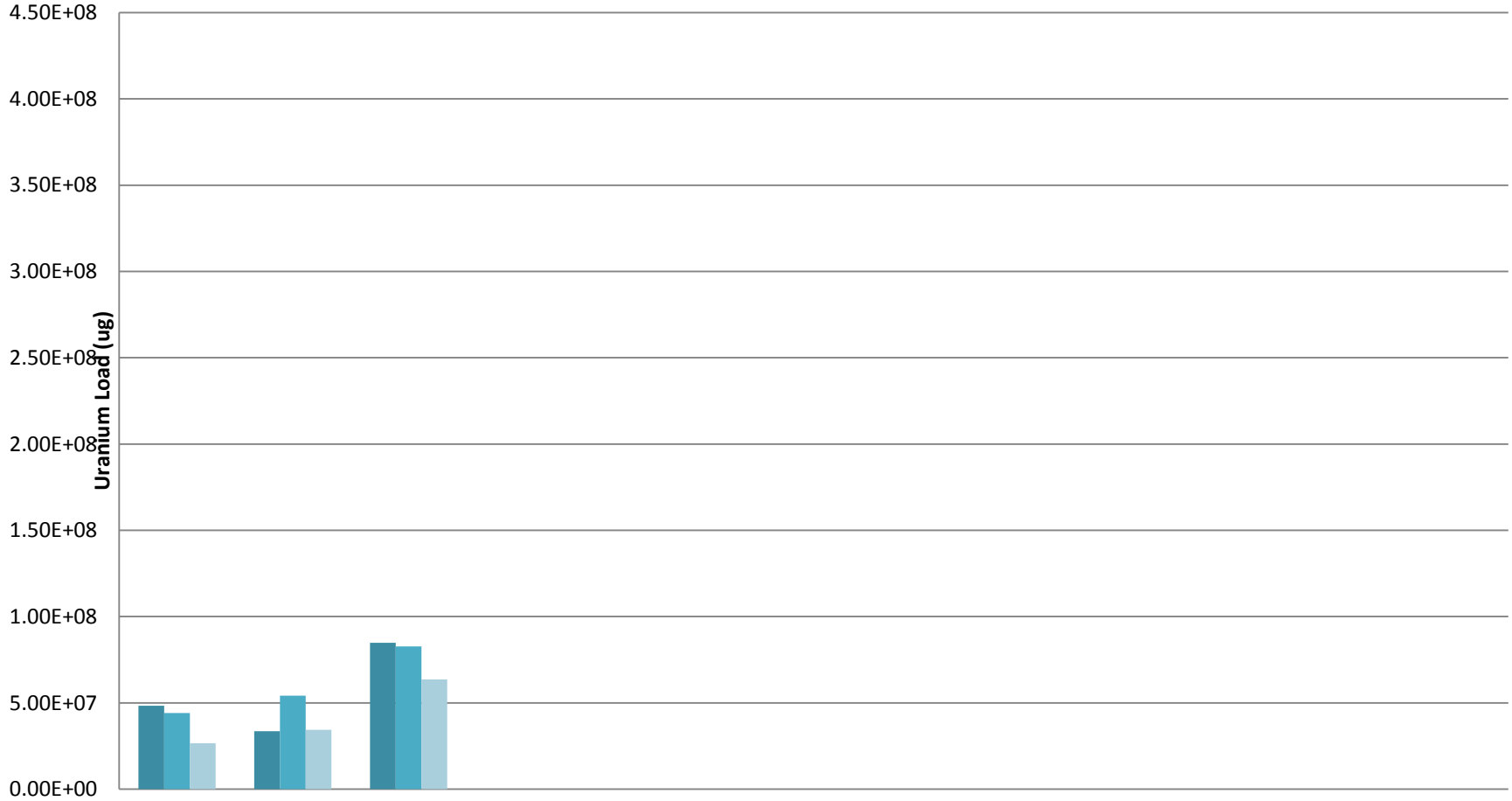
	Jan-13	Feb-13	Mar-13	Apr-13	May-13	Jun-13	Jul-13	Aug-13	Sep-13	Oct-13	Nov-13	Dec-13
GS10			3.98E+07	1.73E+08	2.17E+08	7.70E+07	4.68E+07	9.53E+06	5.19E+08	9.10E+07	5.84E+07	3.15E+07
B5INFLOW	0	0	6.53E+07	1.78E+08	1.69E+08	9.72E+06	5.58E+06	2.94E+06	1.23E+09	7.50E+07	3.49E+07	2.21E+07
GS08	0	0	0	7.51E+07	9.31E+07	1.19E+06	0	0	4.62E+08	5.71E+07	3.69E+07	2.53E+07

Figure C.9
Monthly Uranium Load in South Walnut Creek
2013



	Jan-13	Feb-13	Mar-13	Apr-13	May-13	Jun-13	Jul-13	Aug-13	Sep-13	Oct-13	Nov-13	Dec-13
GS10			3.98E+07	1.73E+08	2.17E+08	7.70E+07	4.68E+07	9.53E+06	5.19E+08	9.10E+07	5.84E+07	3.15E+07
B5INFLOW	0	0	6.53E+07	1.78E+08	1.69E+08	9.72E+06	5.58E+06	2.94E+06	1.23E+09	7.50E+07	3.49E+07	2.21E+07
GS08	0	0	0	7.51E+07	9.31E+07	1.19E+06	0	0	4.62E+08	5.71E+07	3.69E+07	2.53E+07

Figure C.10
Monthly Uranium Load in South Walnut Creek
2014



	Jan-14	Feb-14	Mar-14	Apr-14	May-14	Jun-14	Jul-14	Aug-14	Sep-14	Oct-14	Nov-14	Dec-14
GS10	4.83E+07	3.35E+07	8.48E+07									
B5INFLOW	4.42E+07	5.41E+07	8.27E+07									
GS08	2.67E+07	3.45E+07	6.35E+07									

Figure C.11
South Walnut Creek Monitoring Locations
Average Concentrations of Uranium (1/27/10 - 4/30/14)

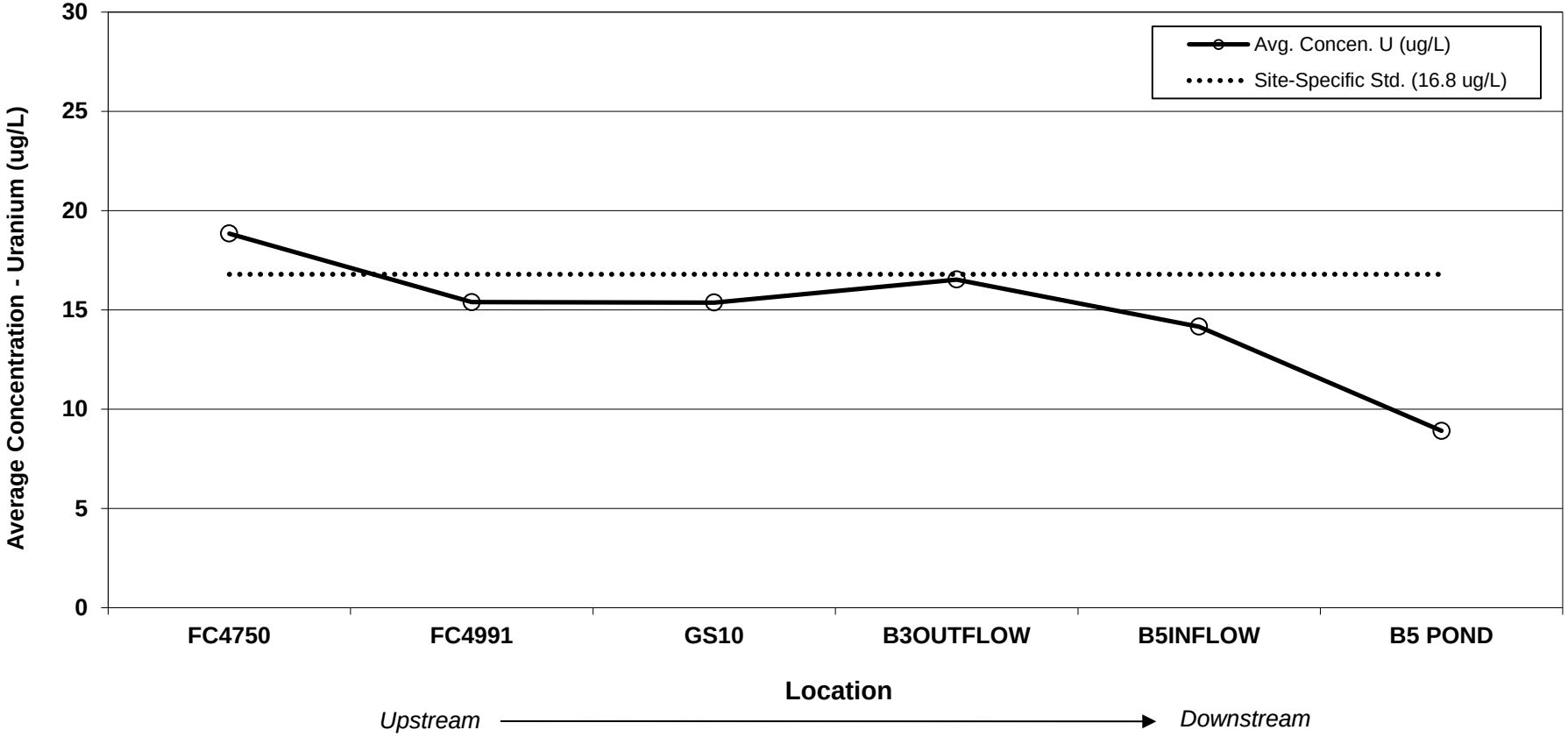
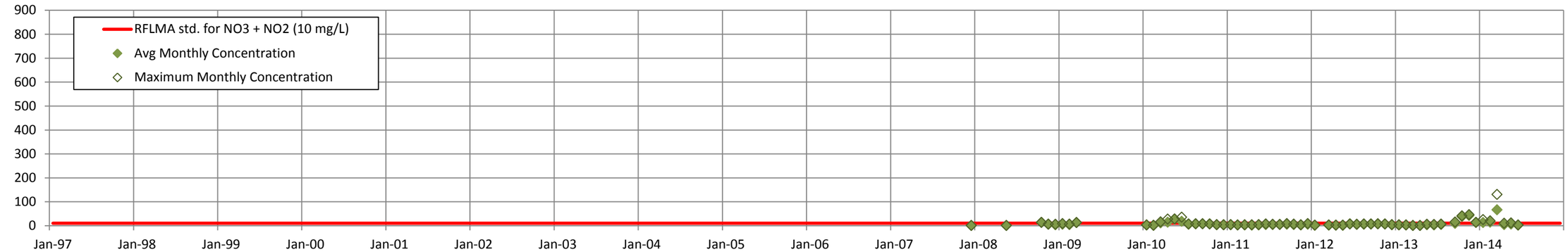


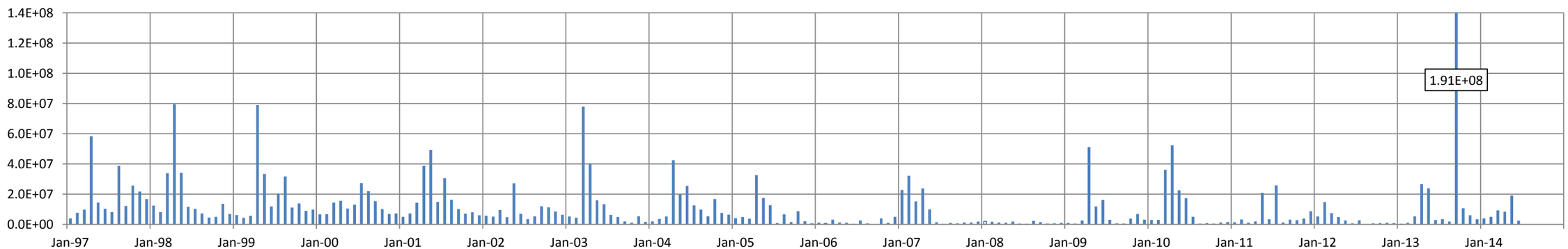
Figure D.1
Location: SW093

N. Walnut Ck - 1
(IA Perim)

Nitrate + Nitrite Concentration (mg/L)



Volume (L)



Nitrate + Nitrite Load (mg)

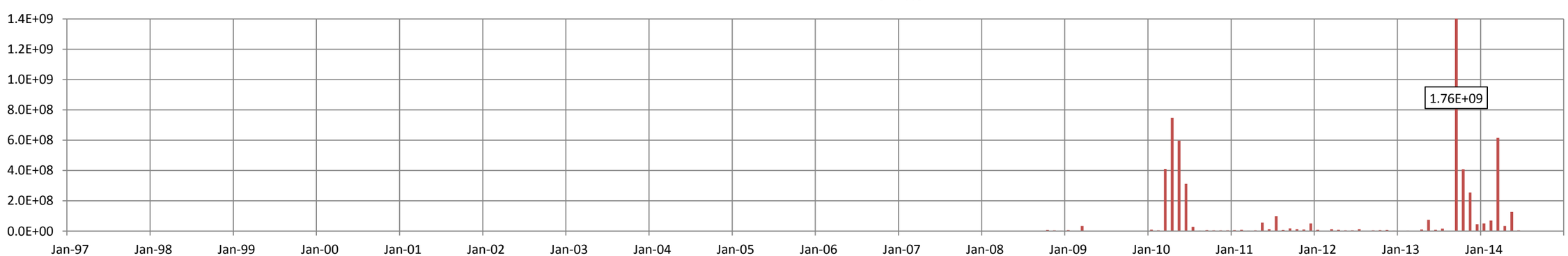


Table D.1

	Nitrate + Nitrite Load (mg)								
Date	**SW093**	**SPOUT**	**SW093 + SPOUT**	+/-	**GS13**	+/-	**GS12**	+/-	**GS11**
Jan-09	5.24E+06	no flow data	5.24E+06	*2.54E+08*	2.59E+08	--	0	--	0
Feb-09	2.68E+06	no flow data	2.68E+06	*4.98E+08*	5.01E+08	--	0	--	0
Mar-09	3.37E+07	no flow data	3.37E+07	*3.82E+08*	4.15E+08	--	0	--	0
Apr-09		no flow data	--	--	1.39E+09	--		--	0
May-09		no flow data	--	--	5.14E+08	--	0	--	3.53E+07
Jun-09		no flow data	--	--	1.77E+08	--		--	2.13E+06
Jul-09		no flow data	--	--	3.44E+07	--	0	--	0
Aug-09		5560294	5.56E+06	*-4.79E+06*	7.75E+05	--	0	--	0
Sep-09		16118700	1.61E+07	--		--	0	--	0
Oct-09		28395381	2.84E+07	*9.94E+07*	1.28E+08	--	0	--	0
Nov-09		35175674	3.52E+07	*1.88E+08*	2.23E+08	--		--	0
Dec-09		11459528	1.15E+07	*1.19E+08*	1.30E+08	--	0	--	2.42E+06
2009	**4.17E+07**	**9.67E+07**	**1.38E+08**	***3.63E+09***	**3.77E+09**	**--**	**--**	**--**	**3.98E+07**
Jan-10	8.56E+06	2.38E+06	1.09E+07	*4.37E+08*	4.48E+08	*-4.28E+08*	2.01E+07	*-2.01E+07*	0
Feb-10	4.22E+06	5.91E+06	1.01E+07	*5.13E+07*	6.14E+07	*-2.35E+07*	3.79E+07	*-3.79E+07*	0
Mar-10	4.11E+08	1.04E+07	4.21E+08	*2.07E+08*	6.28E+08	*-3.04E+08*	3.24E+08	*-3.24E+08*	0
Apr-10	7.48E+08	5.84E+06	7.54E+08	*1.59E+08*	9.13E+08	*-6.32E+08*	2.81E+08	*-2.81E+08*	0
May-10	5.96E+08	2.74E+07	6.24E+08	*1.46E+08*	7.70E+08	*-5.60E+07*	7.14E+08	*-1.23E+08*	5.91E+08
Jun-10	3.12E+08	4.44E+07	3.56E+08	*2.66E+07*	3.83E+08	*-2.32E+08*	1.51E+08	*-1.51E+08*	0
Jul-10	2.75E+07	1.48E+07	4.23E+07	*-1.77E+07*	2.46E+07	*-1.94E+07*	5.19E+06	*-5.19E+06*	0
Aug-10	3.84E+06	8.91E+06	1.28E+07	--	2.12E+05	--	1.40E+04	*-1.40E+04*	0
Sep-10	5.99E+06	1.41E+07	2.01E+07	--	0	--	0	--	0
Oct-10	3.93E+06	4.09E+07	4.49E+07	--	7.17E+03	--	0	--	0
Nov-10	4.41E+06	2.62E+07	3.06E+07	*5.36E+07*	8.43E+07	--	9.75E+03	--	0
Dec-10	4.73E+06	3.09E+07	3.56E+07	*8.53E+07*	1.21E+08	--	1.17E+04	--	0
2010	**2.13E+09**	**2.32E+08**	**2.36E+09**	***1.07E+09***	**3.43E+09**	***-1.90E+09***	**1.53E+09**	***-9.42E+08***	**5.91E+08**

Table D.1

	Nitrate + Nitrite Load (mg)								
Date	**SW093**	**SPOUT**	**SW093 + SPOUT**	+/-	**GS13**	+/-	**GS12**	+/-	**GS11**
Jan-11	5.17E+06	2.83E+07	3.34E+07	*9.39E+07*	1.27E+08	--	0	--	0
Feb-11	7.66E+06	1.59E+07	2.36E+07	*1.12E+08*	1.36E+08	--	0	--	0
Mar-11	3.61E+06	3.33E+07	3.69E+07	*5.14E+07*	8.84E+07	--	0	--	8.09E+05
Apr-11	4.41E+06	1.83E+07	2.27E+07	*9.71E+07*	1.20E+08	*-1.08E+08*	1.17E+07	*-1.17E+07*	0
May-11	5.62E+07	3.22E+07	8.84E+07	*4.27E+08*	5.16E+08	*-3.88E+08*	1.28E+08	*-1.28E+08*	0
Jun-11	1.28E+07	5.23E+07	6.51E+07	*-4.68E+07*	1.83E+07	*6.80E+04*	1.84E+07	*-1.84E+07*	0
Jul-11	9.79E+07	5.90E+07	1.57E+08	*4.01E+07*	1.97E+08	*-1.49E+08*	4.83E+07	*-4.83E+07*	0
Aug-11	6.31E+06	3.19E+07	3.82E+07	*-3.82E+07*	6.59E+02	*2.93E+05*	2.94E+05	*-2.94E+05*	0
Sep-11	1.68E+07	2.43E+07	4.11E+07	*-4.01E+07*	9.79E+05	--	5.55E+06	--	7.09E+05
Oct-11	1.21E+07	2.63E+07	3.84E+07	*-3.82E+07*	2.05E+05	--	2.65E+06	--	5.66E+03
Nov-11	1.07E+07	2.99E+07	4.06E+07	*6.82E+07*	1.09E+08	*-8.31E+07*	2.57E+07	*-2.56E+07*	2.84E+04
Dec-11	5.03E+07	5.61E+07	1.06E+08	*6.69E+07*	1.73E+08	*-1.72E+08*	1.42E+06	*3.92E+06*	5.34E+06
2011	**2.84E+08**	**4.08E+08**	**6.92E+08**	***7.94E+08***	**1.49E+09**	***-1.24E+09***	**2.42E+08**	***-2.35E+08***	**6.89E+06**
Jan-12	8.26E+06	7.74E+07	8.57E+07	*4.07E+07*	1.26E+08	--	1.43E+02	--	5.80E+07
Feb-12		8.04E+07	8.04E+07	--	3.12E+08	--	0	*8.24E+07*	8.24E+07
Mar-12	1.27E+07	7.60E+07	8.87E+07	*2.48E+07*	1.13E+08	--	1.43E+06	--	5.15E+07
Apr-12	8.32E+06	1.04E+08	1.12E+08	*3.00E+07*	1.42E+08	*-9.18E+07*	5.05E+07	*-4.39E+07*	6.63E+06
May-12	4.04E+06	7.99E+07	8.40E+07	*-3.52E+07*	4.88E+07	*-4.49E+07*	3.88E+06	--	1.31E+05
Jun-12	4.70E+06	5.65E+07	6.12E+07	*-6.09E+07*	3.37E+05	--	1.03E+04	--	0
Jul-12	1.29E+07	3.70E+07	4.99E+07	--	0	--	0	*0.00E+00*	0
Aug-12	6.51E+05	2.80E+07	2.86E+07	--	0	--	0	*0.00E+00*	0
Sep-12	4.13E+06	2.88E+07	3.30E+07	--	0	--	0	*0.00E+00*	0
Oct-12	5.15E+06	1.46E+07	1.98E+07	--	0	--	0	*0.00E+00*	0
Nov-12	6.35E+06	1.45E+07	2.08E+07	*-2.07E+07*	1.55E+05	*-1.55E+05*	0	*0.00E+00*	0
Dec-12	2.92E+06	2.85E+07	3.15E+07	*9.20E+07*	1.23E+08	*-1.23E+08*	0	*0.00E+00*	0
2012	**7.02E+07**	**6.26E+08**	**6.96E+08**	***1.71E+08***	**8.67E+08**	***-8.11E+08***	**5.59E+07**	***1.43E+08***	**1.99E+08**

Table D.1

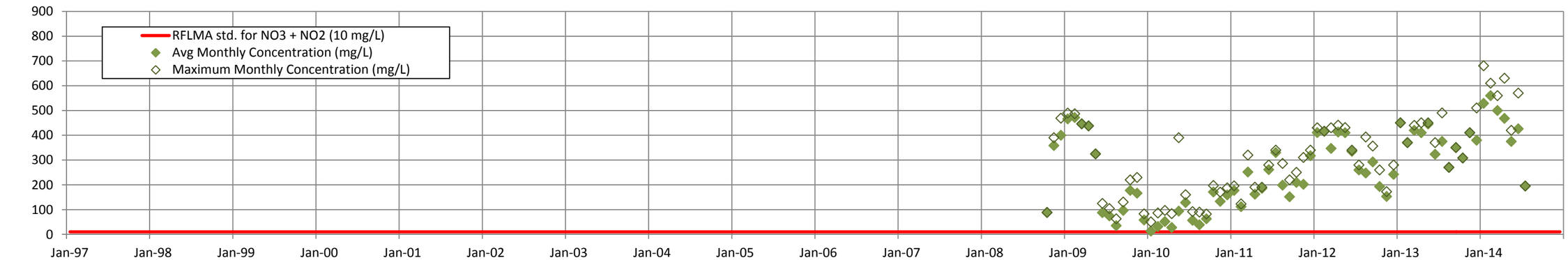
	Nitrate + Nitrite Load (mg)								
Date	**SW093**	**SPOUT**	**SW093 + SPOUT**	+/-	**GS13**	+/-	**GS12**	+/-	**GS11**
Jan-13	1.01E+06	4.33E+07	4.43E+07	*7.06E+07*	1.15E+08	*-1.15E+08*	0	*0.00E+00*	0
Feb-13	2.74E+06	3.22E+07	3.50E+07	*3.11E+07*	6.61E+07	*-6.61E+07*	0	*0.00E+00*	0
Mar-13	1.82E+06	3.34E+07	3.53E+07	*1.44E+08*	1.80E+08	*-9.20E+07*	8.77E+07	*-8.77E+07*	0
Apr-13	1.05E+07	5.26E+07	6.31E+07	*4.11E+08*	4.74E+08	*7.24E+06*	4.81E+08	*-3.96E+08*	8.59E+07
May-13	7.48E+07	9.03E+07	1.65E+08	*1.15E+08*	2.80E+08	*-1.59E+08*	1.21E+08	*1.45E+07*	1.36E+08
Jun-13	7.55E+06	5.84E+07	6.59E+07	*-4.94E+07*	1.65E+07	*3.57E+06*	2.01E+07	*-1.72E+07*	2.81E+06
Jul-13	1.58E+07	5.29E+07	6.87E+07	*-6.44E+07*	4.25E+06	*-4.25E+06*		*0.00E+00*	0
Aug-13		4.52E+07	4.52E+07	*-4.52E+07*		*0.00E+00*		*0.00E+00*	0
Sep-13	1.76E+09	3.83E+07	1.80E+09	*2.89E+07*	1.83E+09	*1.13E+08*	1.94E+09	*-1.65E+09*	2.95E+08
Oct-13	4.08E+08	8.25E+07	4.90E+08	*1.49E+08*	6.40E+08	*-3.65E+08*	2.74E+08	*-2.42E+08*	3.22E+07
Nov-13	2.54E+08	9.81E+07	3.52E+08	*-2.81E+07*	3.24E+08	*-7.16E+07*	2.53E+08	*-2.40E+08*	1.32E+07
Dec-13	4.53E+07	6.99E+07	1.15E+08	*6.14E+07*	1.77E+08	*9.55E+07*	2.72E+08	*-2.66E+08*	6.54E+06
2013	**2.58E+09**	**6.97E+08**	**3.28E+09**	***8.25E+08***	**4.10E+09**	***-6.53E+08***	**3.45E+09**	***-2.88E+09***	**5.71E+08**
Jan-14	4.95E+07	9.72E+07	1.47E+08	*1.14E+08*	2.61E+08	*9.18E+07*	3.52E+08	*-3.32E+08*	2.07E+07
Feb-14	6.92E+07	1.30E+08	2.00E+08	*5.06E+07*	2.50E+08	*1.49E+08*	3.99E+08	*-3.66E+08*	3.31E+07
Mar-14	1.21E+09	1.22E+08	1.33E+09	*-8.26E+08*	5.04E+08	*-8.12E+07*	4.22E+08	*-3.64E+08*	5.84E+07
Apr-14				*0.00E+00*		*0.00E+00*		*0.00E+00*	
May-14				*0.00E+00*		*0.00E+00*		*0.00E+00*	
Jun-14				*0.00E+00*		*0.00E+00*		*0.00E+00*	
Jul-14				*0.00E+00*		*0.00E+00*		*0.00E+00*	
Aug-14				*0.00E+00*		*0.00E+00*		*0.00E+00*	
Sep-14				*0.00E+00*		*0.00E+00*		*0.00E+00*	
Oct-14				*0.00E+00*		*0.00E+00*		*0.00E+00*	
Nov-14				*0.00E+00*		*0.00E+00*		*0.00E+00*	
Dec-14				*0.00E+00*		*0.00E+00*		*0.00E+00*	
2014	**1.33E+09**	**3.50E+08**	**1.68E+09**	***-6.61E+08***	**1.01E+09**	***1.59E+08***	**1.17E+09**	***-1.06E+09***	**1.12E+08**

Notes:
0 means zero flow was recorded for that month.
Nitrate only data used in highlighted months when no nitrate + nitrite data was available (GS13 only).
ESTIMATED VALUE BASED ON INTERPOLATED CONCENTRATION.
NO CONCENTRATION DATA
NO FLOW DATA OR SOME FLOW DATA MISSING

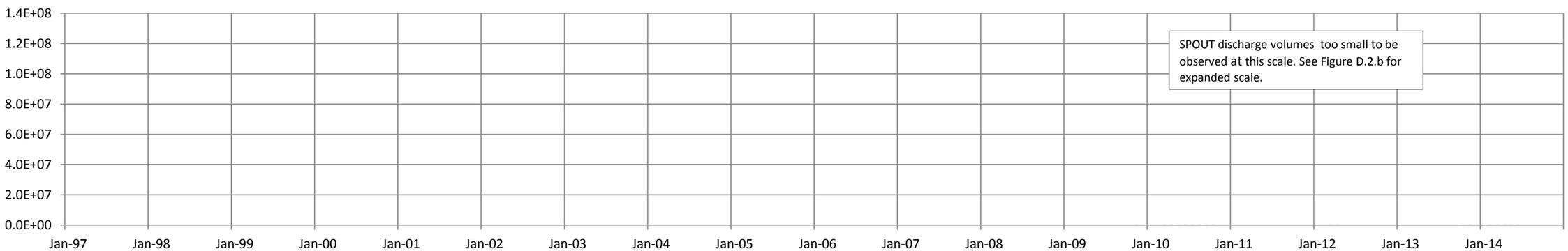
Figure D.2.a
Location: SPOUT

N. Walnut Ck. - 2A
(SPPTS Discharge)

Nitrate + Nitrite Concentration (mg/L)



Volume (L)



Nitrate + Nitrite Load (mg)

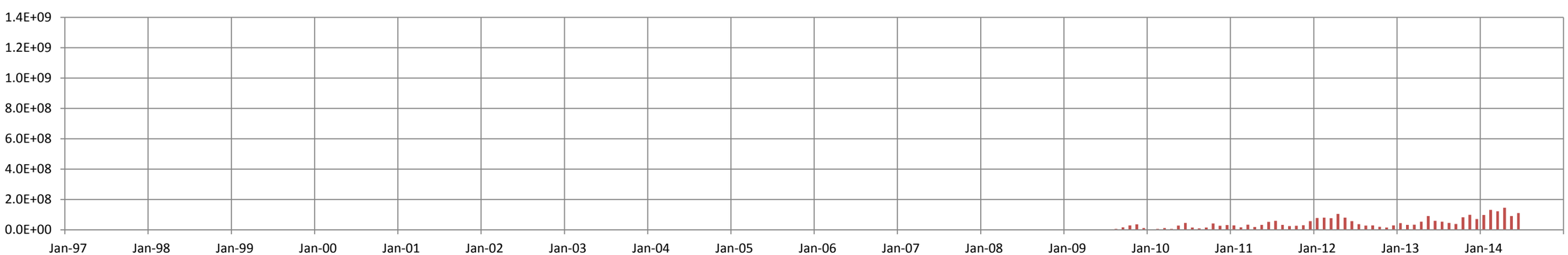
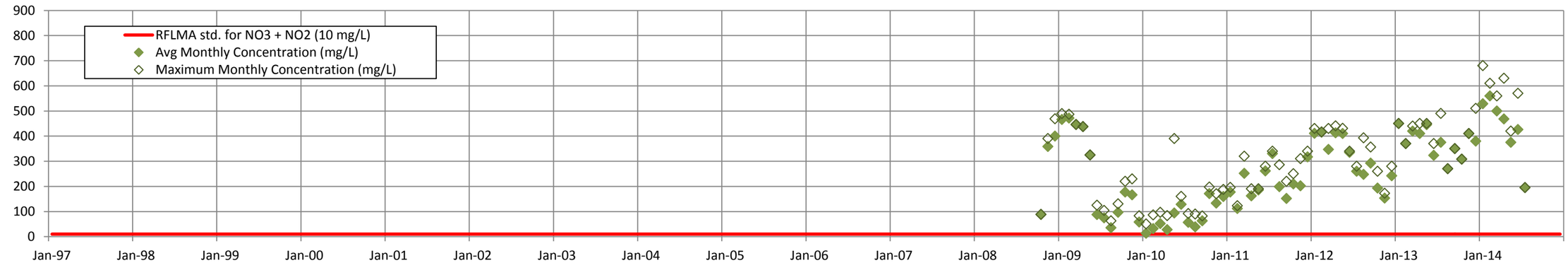


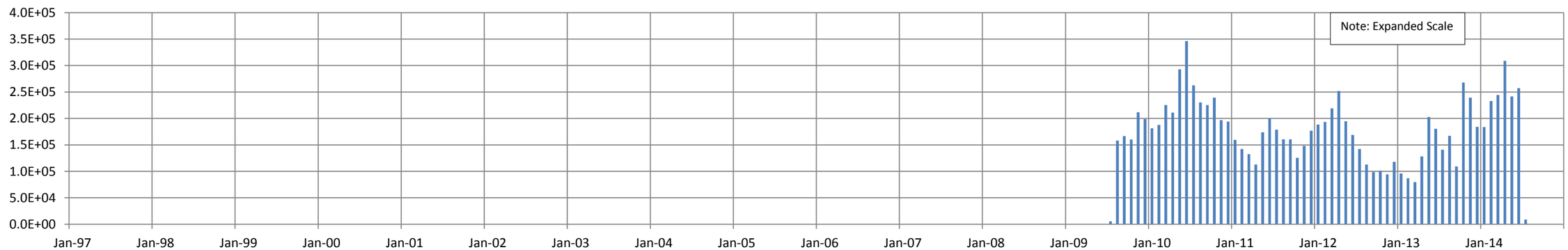
Figure D.2.b
Location: SPOUT

N. Walnut Ck. - 2A
(SPPTS Discharge)

Nitrate + Nitrite Concentration (mg/L)



Volume (L)



Nitrate + Nitrite Load (mg)

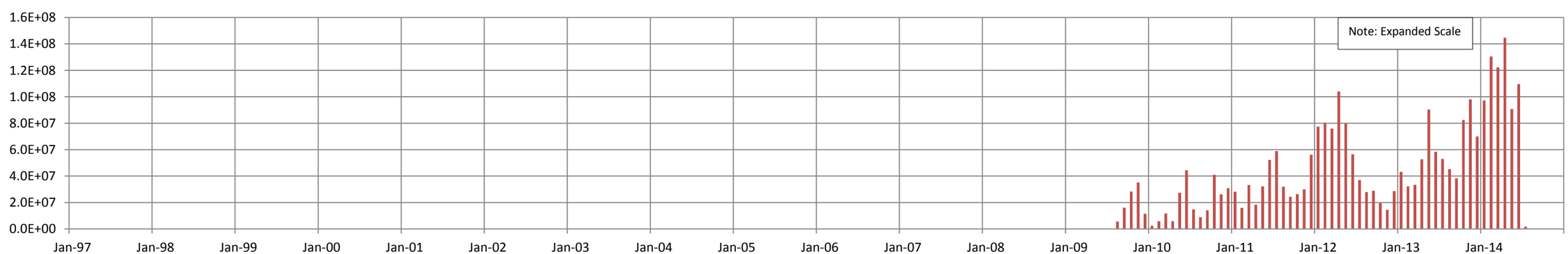
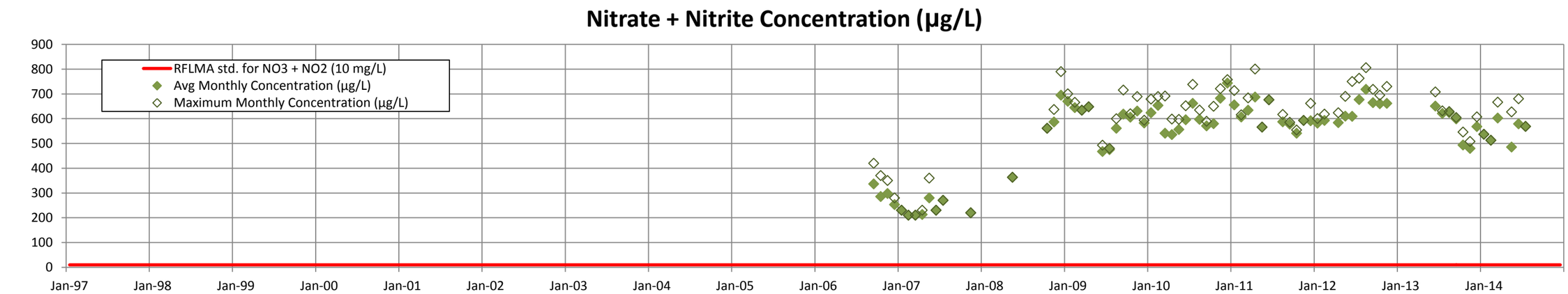
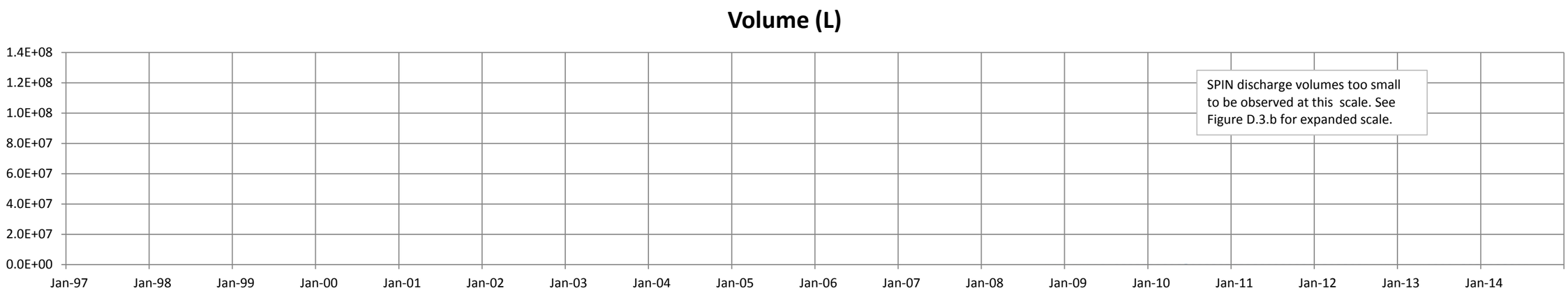


Figure D.3.a
Location: SPIN

N. Walnut Ck. - 2B
(SPPTS Inflow)





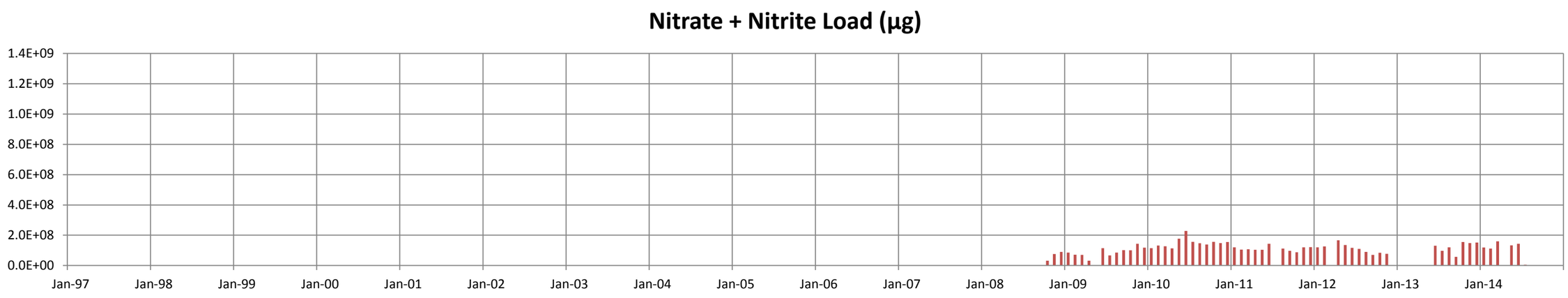
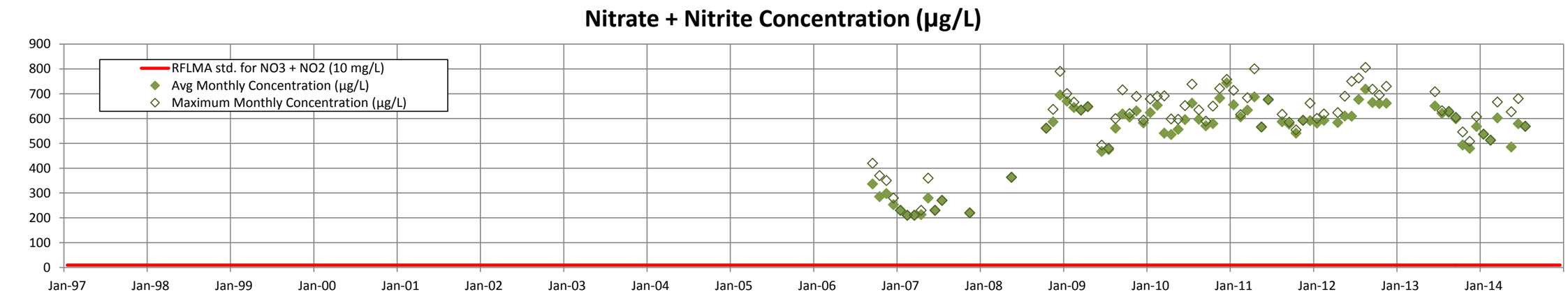
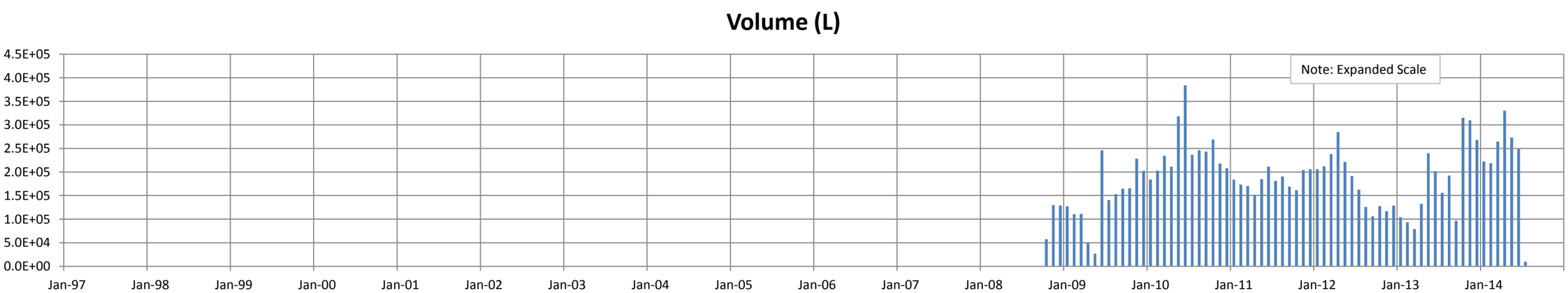


Figure D.3.b
Location: SPIN

N. Walnut Ck. - 2B
(SPPTS Inflow)





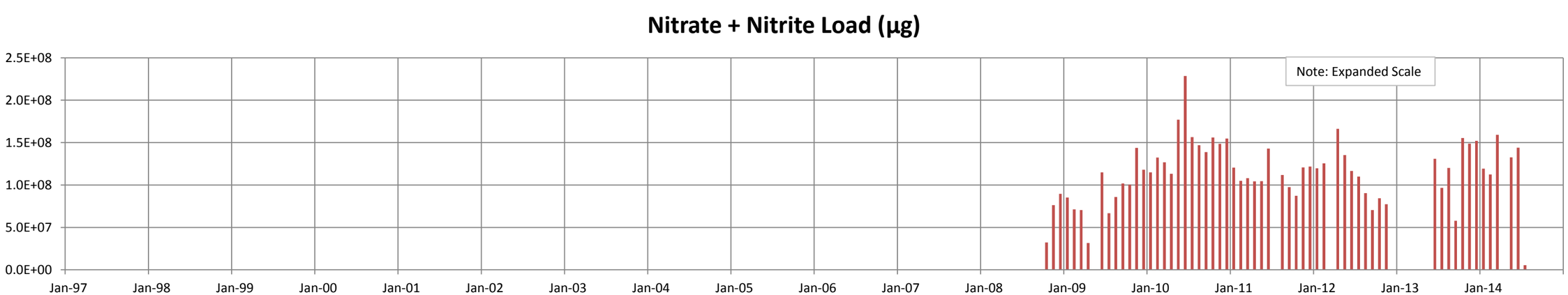
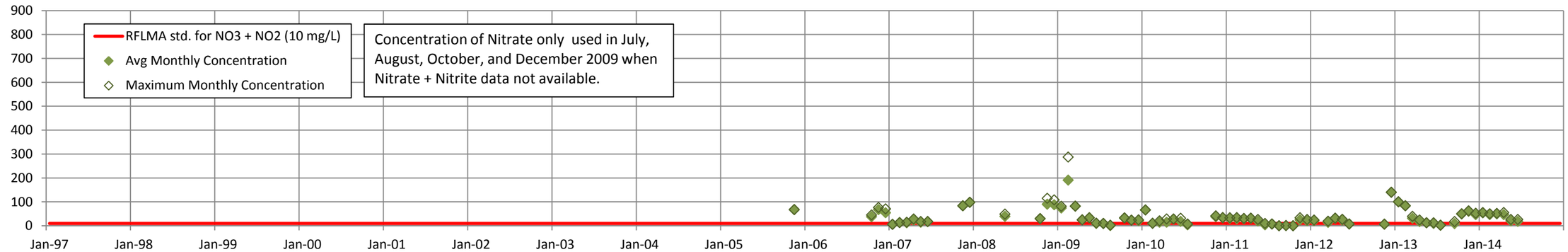


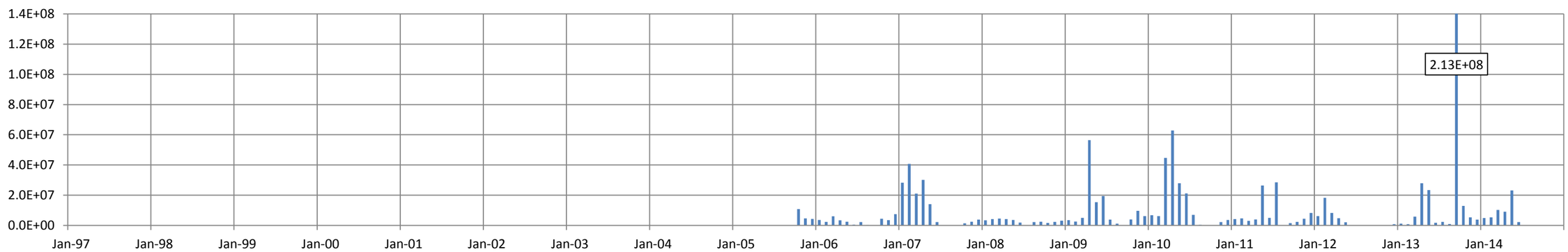
Figure D.4
Location: GS13

N. Walnut Ck. - 3
(Upstream A1)

Nitrate + Nitrite Concentration (mg/L)



Volume (L)



Nitrate + Nitrite Load (mg)

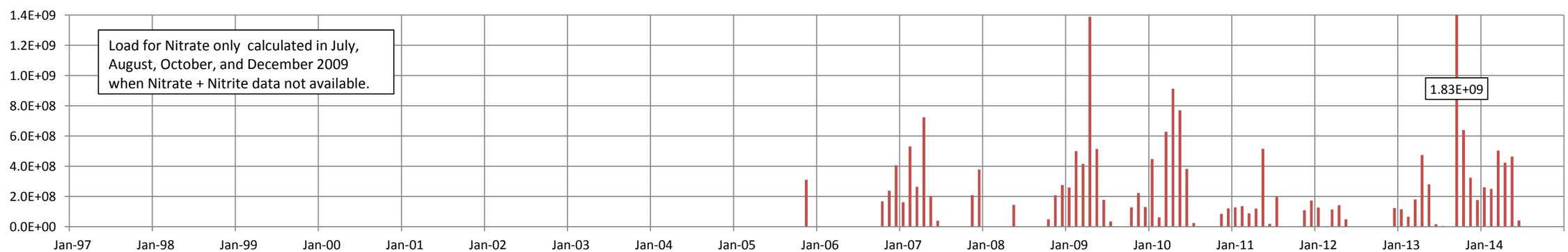
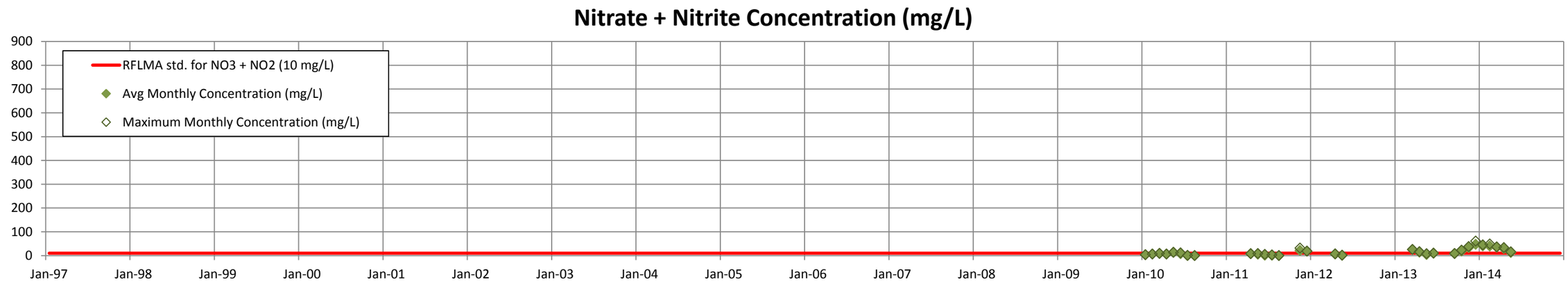
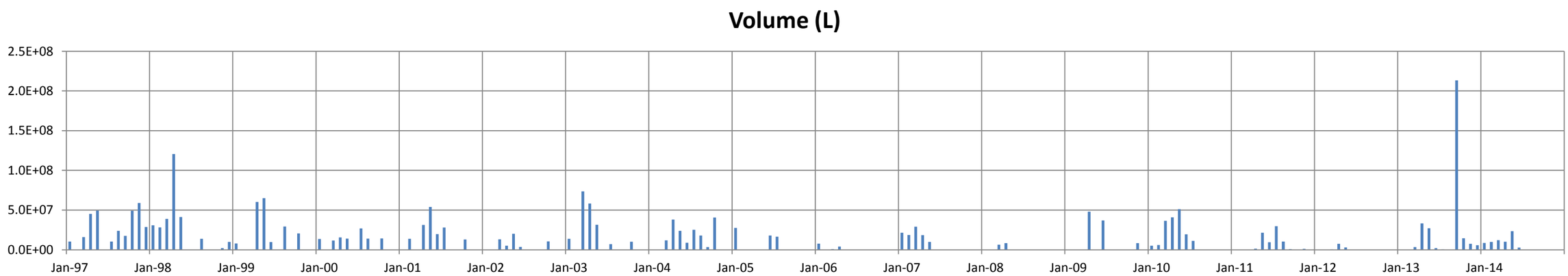
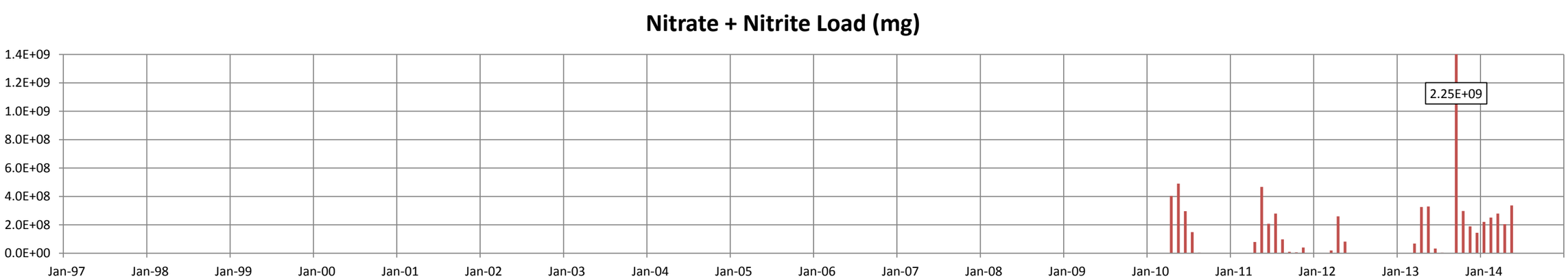


Figure D.5
Location: GS12 / A3EFF

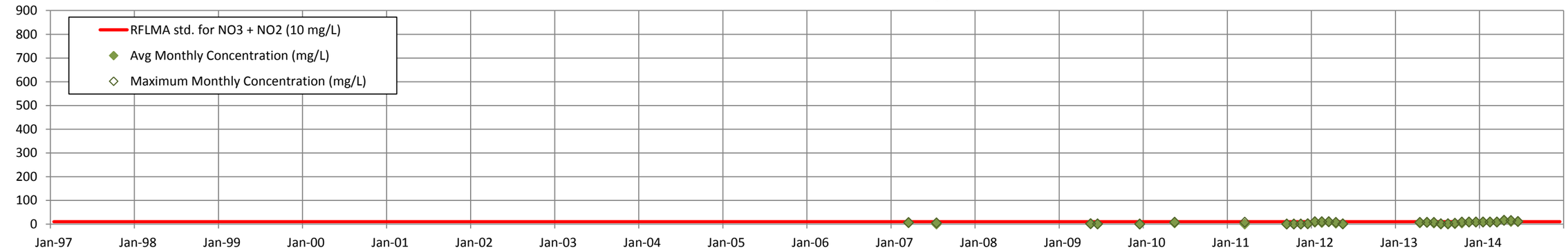
N. Walnut Ck. - 4
(A3 Out)



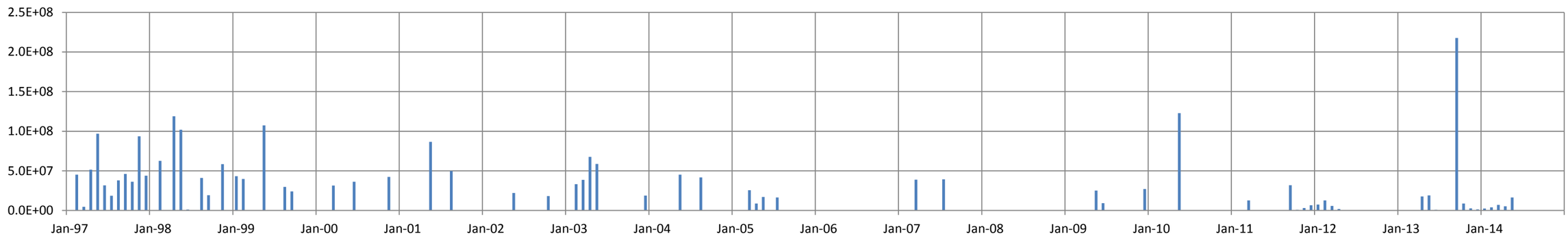




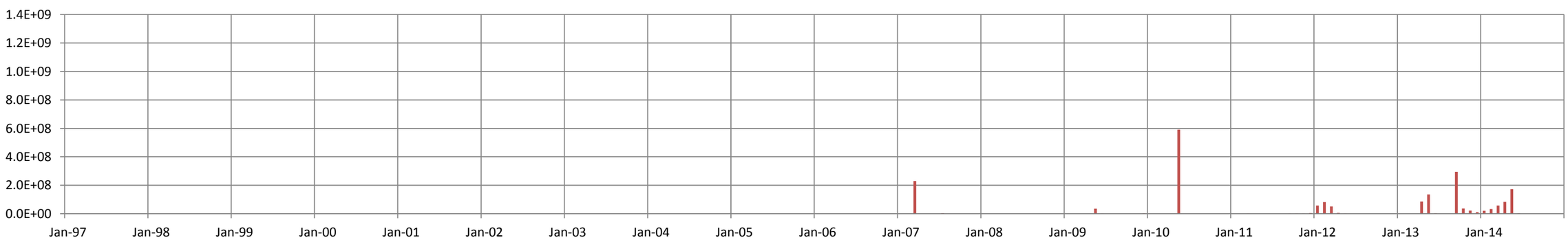
Nitrate + Nitrite Concentration (mg/L)



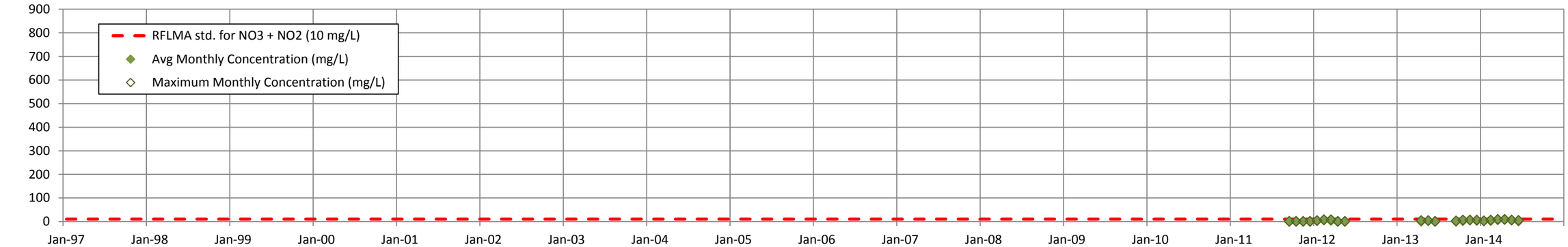
Volume (L)



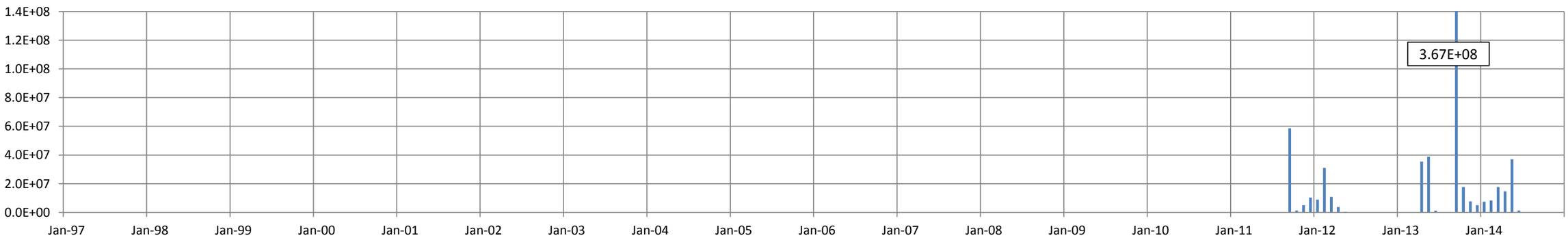
Nitrate + Nitrite Load (mg)



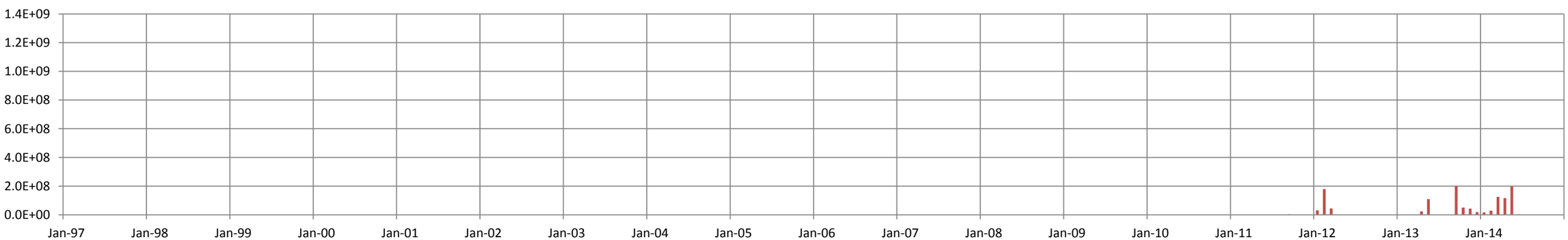
Nitrate + Nitrite Concentration (µg/L)



Volume (L)



Nitrate + Nitrite Load (µg)



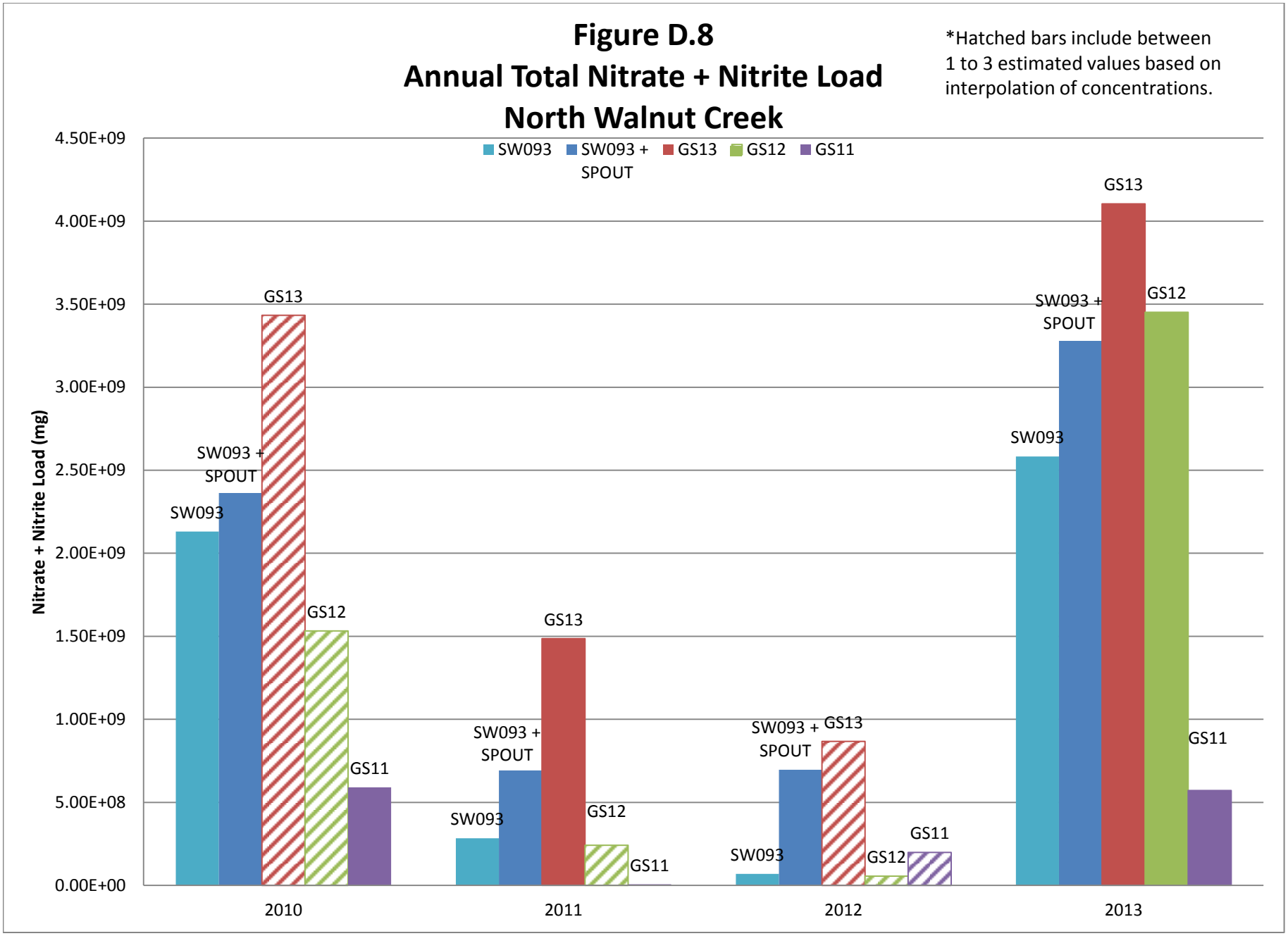
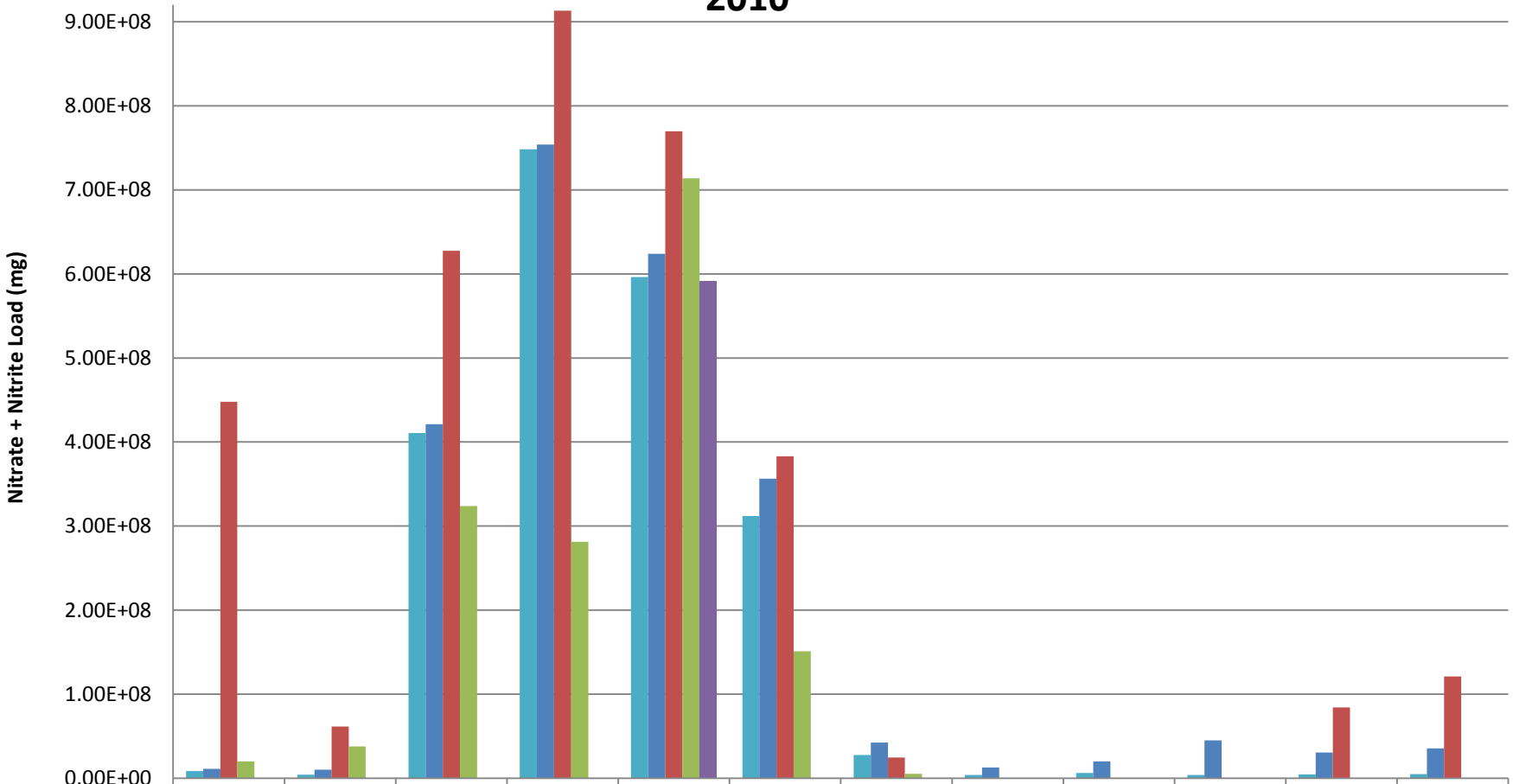


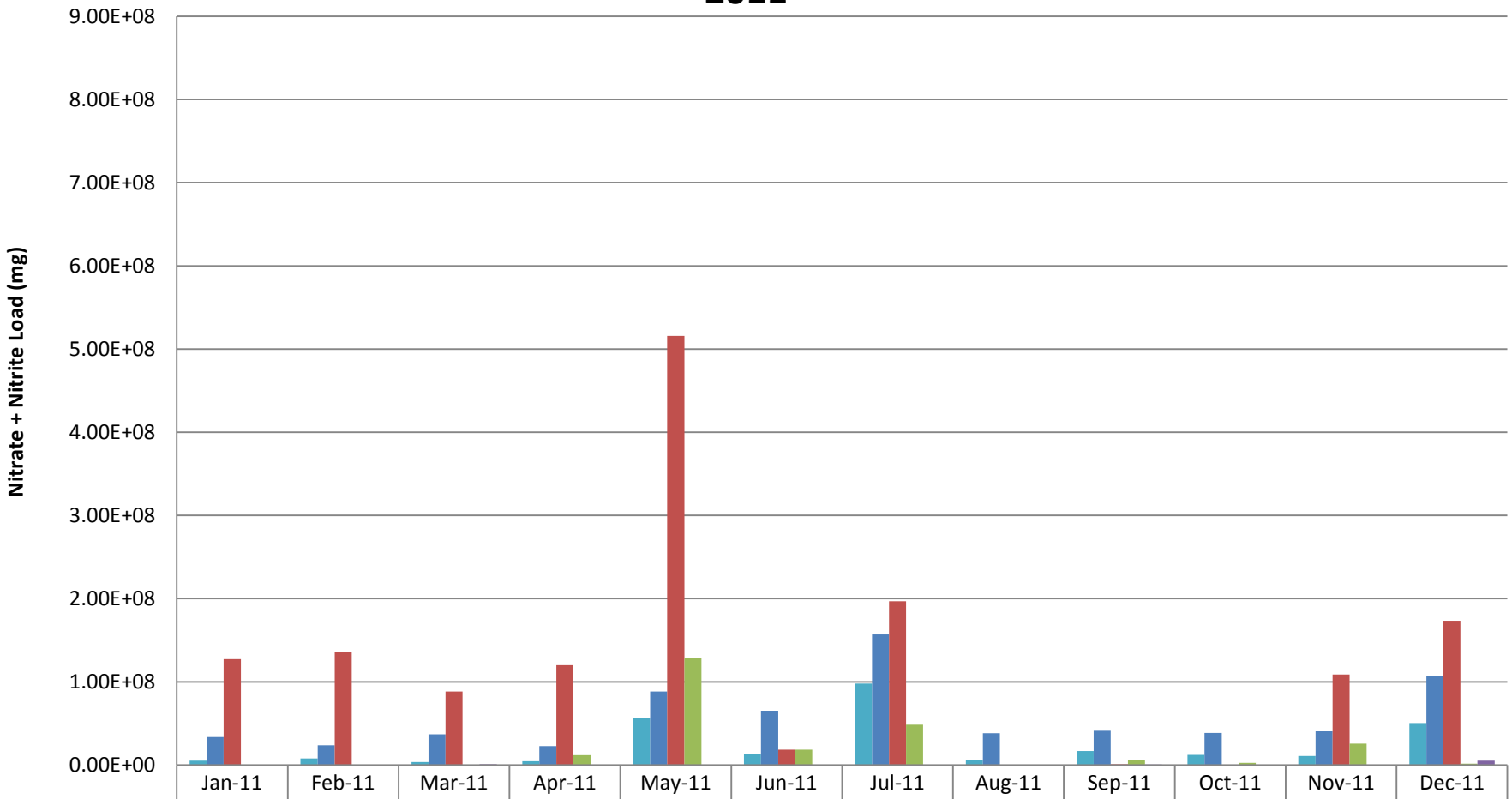
Figure D.8
Annual Total Nitrate + Nitrite Load
North Walnut Creek
*Hatched bars include between 1 to 3 estimated values based on interpolation of concentrations.
SW093
SW093 + SPOUT
GS13
GS12
GS11
Nitrate + Nitrite Load (mg)
4.50E+09
4.00E+09
3.50E+09
3.00E+09
2.50E+09
2.00E+09
1.50E+09
1.00E+09
5.00E+08
0.00E+00
2010
2011
2012
2013

Figure D.9
Monthly Nitrate + Nitrite Load in North Walnut Creek
2010



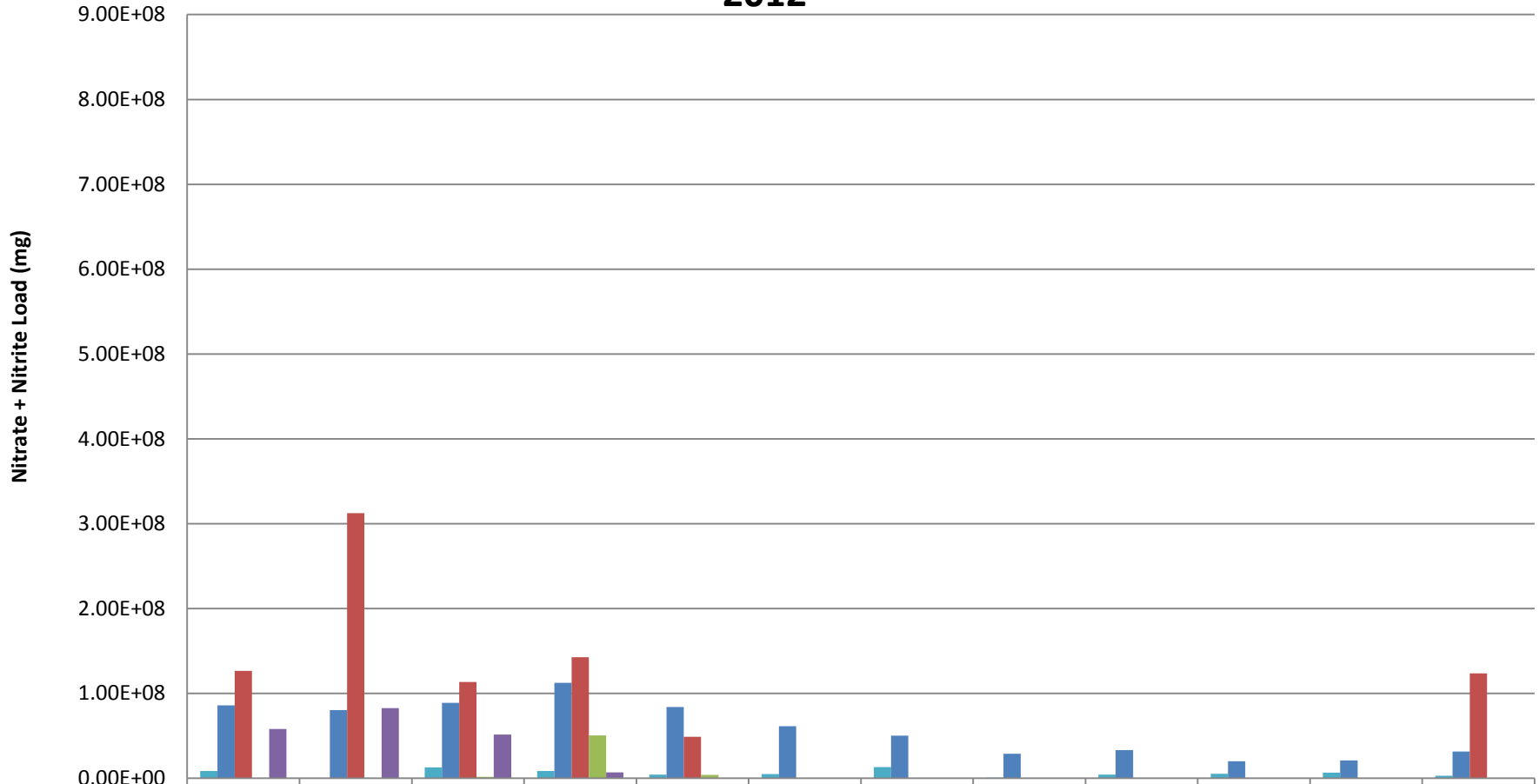
	Jan-10	Feb-10	Mar-10	Apr-10	May-10	Jun-10	Jul-10	Aug-10	Sep-10	Oct-10	Nov-10	Dec-10
SW093	8.56E+06	4.22E+06	4.11E+08	7.48E+08	5.96E+08	3.12E+08	2.75E+07	3.84E+06	5.99E+06	3.93E+06	4.41E+06	4.73E+06
SW093 + SPOUT	1.09E+07	1.01E+07	4.21E+08	7.54E+08	6.24E+08	3.56E+08	4.23E+07	1.28E+07	2.01E+07	4.49E+07	3.06E+07	3.56E+07
GS13	4.48E+08	6.14E+07	6.28E+08	9.13E+08	7.70E+08	3.83E+08	2.46E+07	2.12E+05	0	7.17E+03	8.43E+07	1.21E+08
GS12	2.01E+07	3.79E+07	3.24E+08	2.81E+08	7.14E+08	1.51E+08	5.19E+06	1.40E+04	0	0	9.75E+03	1.17E+04
GS11	0	0	0	0	5.91E+08	0	0	0	0	0	0	0

Figure D.10
Monthly Nitrate + Nitrite Load in North Walnut Creek
2011



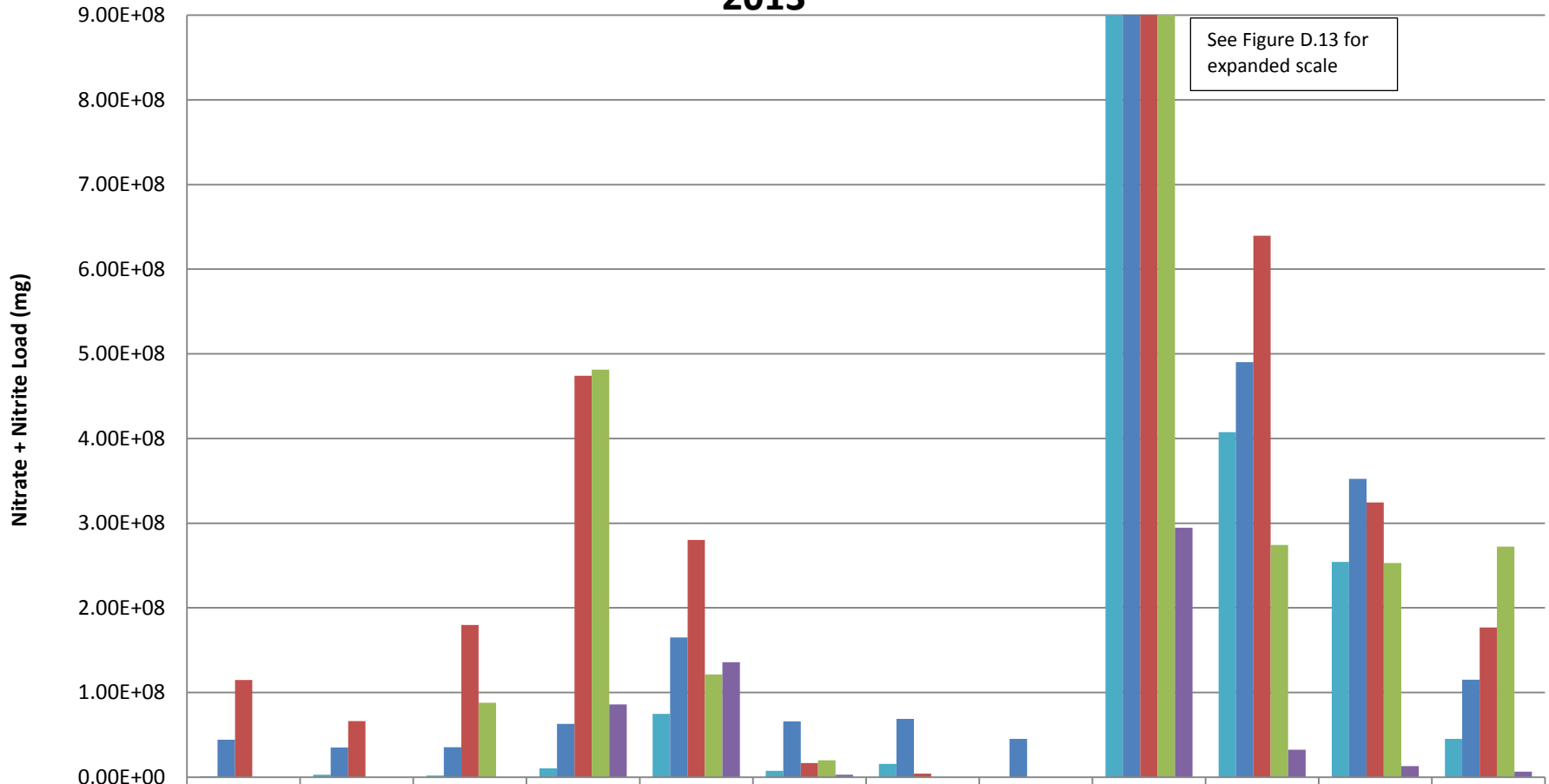
	Jan-11	Feb-11	Mar-11	Apr-11	May-11	Jun-11	Jul-11	Aug-11	Sep-11	Oct-11	Nov-11	Dec-11
SW093	5.17E+06	7.66E+06	3.61E+06	4.41E+06	5.62E+07	1.28E+07	9.79E+07	6.31E+06	1.68E+07	1.21E+07	1.07E+07	5.03E+07
SW093 + SPOUT	3.34E+07	2.36E+07	3.69E+07	2.27E+07	8.84E+07	6.51E+07	1.57E+08	3.82E+07	4.11E+07	3.84E+07	4.06E+07	1.06E+08
GS13	1.27E+08	1.36E+08	8.84E+07	1.20E+08	5.16E+08	1.83E+07	1.97E+08	6.59E+02	9.79E+05	2.05E+05	1.09E+08	1.73E+08
GS12	0	0	0	1.17E+07	1.28E+08	1.84E+07	4.83E+07	2.94E+05	5.55E+06	2.65E+06	2.57E+07	1.42E+06
GS11	0	0	8.09E+05	0	0	0	0	0	7.09E+05	5.66E+03	2.84E+04	5.34E+06

Figure D.11
Monthly Nitrate + Nitrite Load in North Walnut Creek
2012



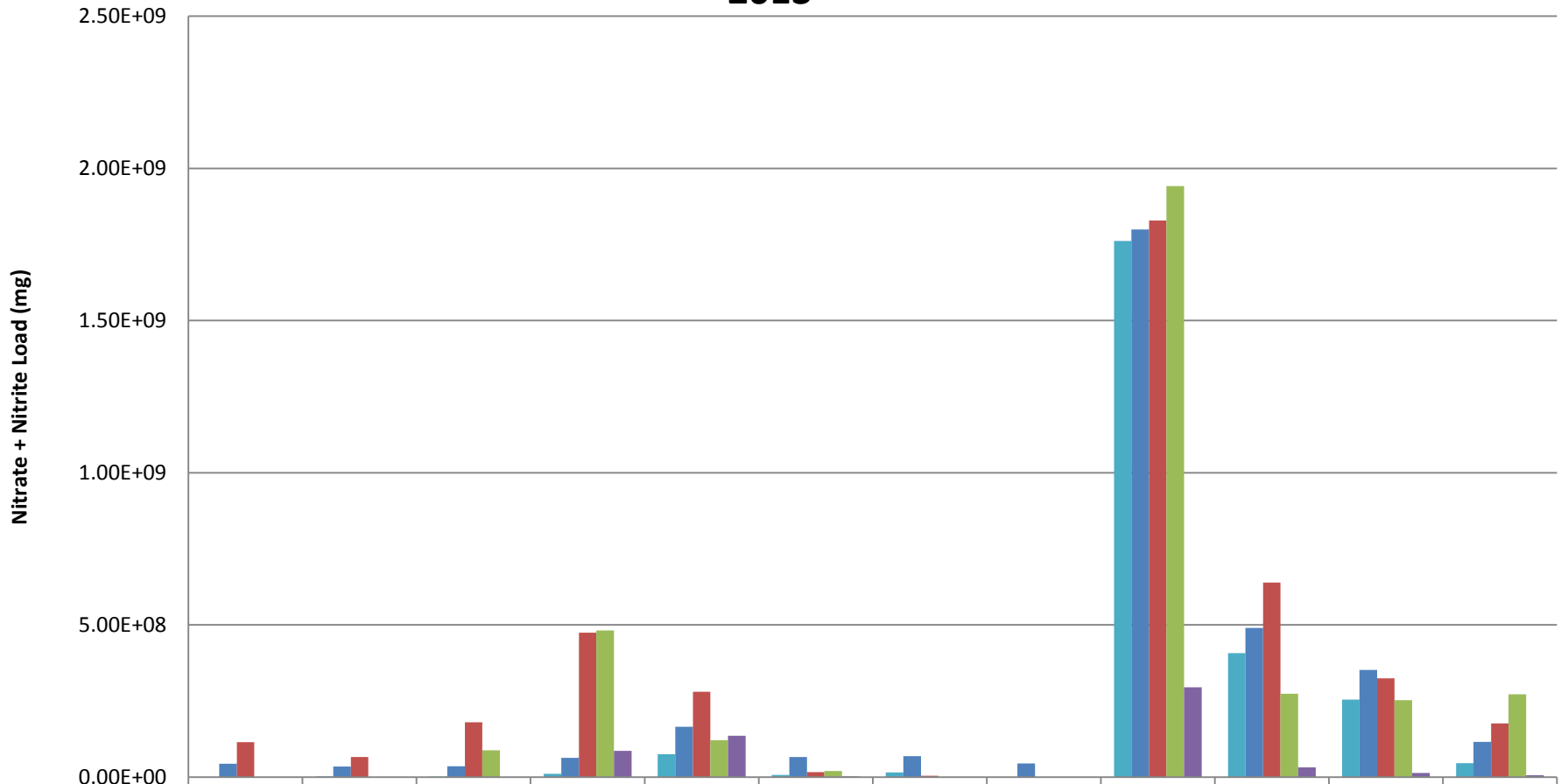
	Jan-12	Feb-12	Mar-12	Apr-12	May-12	Jun-12	Jul-12	Aug-12	Sep-12	Oct-12	Nov-12	Dec-12
SW093	8.26E+06		1.27E+07	8.32E+06	4.04E+06	4.70E+06	1.29E+07	6.51E+05	4.13E+06	5.15E+06	6.35E+06	2.92E+06
SW093 + SPOUT	8.57E+07	8.04E+07	8.87E+07	1.12E+08	8.40E+07	6.12E+07	4.99E+07	2.86E+07	3.30E+07	1.98E+07	2.08E+07	3.15E+07
GS13	1.26E+08	3.12E+08	1.13E+08	1.42E+08	4.88E+07	3.37E+05	0	0	0	0	1.55E+05	1.23E+08
GS12	1.43E+02	0	1.43E+06	5.05E+07	3.88E+06	1.03E+04	0	0	0	0	0	0
GS11	5.80E+07	8.24E+07	5.15E+07	6.63E+06	1.31E+05	0	0	0	0	0	0	0

Figure D.12
Monthly Nitrate + Nitrite Load in North Walnut Creek
2013



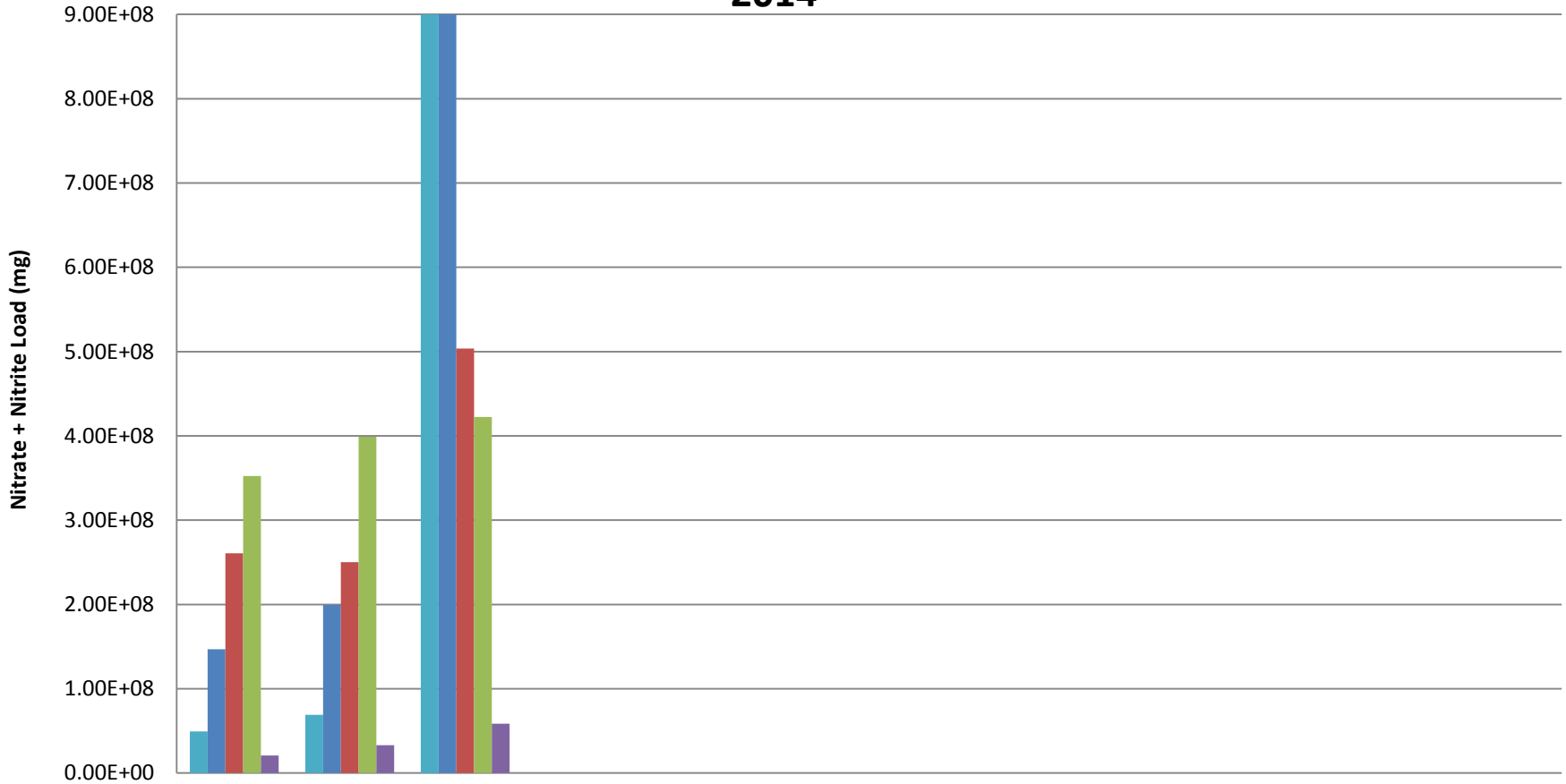
	Jan-13	Feb-13	Mar-13	Apr-13	May-13	Jun-13	Jul-13	Aug-13	Sep-13	Oct-13	Nov-13	Dec-13
SW093	1.01E+06	2.74E+06	1.82E+06	1.05E+07	7.48E+07	7.55E+06	1.58E+07		1.76E+09	4.08E+08	2.54E+08	4.53E+07
SW093 + SPOUT	4.43E+07	3.50E+07	3.53E+07	6.31E+07	1.65E+08	6.59E+07	6.87E+07	4.52E+07	1.80E+09	4.90E+08	3.52E+08	1.15E+08
GS13	1.15E+08	6.61E+07	1.80E+08	4.74E+08	2.80E+08	1.65E+07	4.25E+06		1.83E+09	6.40E+08	3.24E+08	1.77E+08
GS12	0	0	8.77E+07	4.81E+08	1.21E+08	2.01E+07			1.94E+09	2.74E+08	2.53E+08	2.72E+08
GS11	0	0	0	8.59E+07	1.36E+08	2.81E+06	0	0	2.95E+08	3.22E+07	1.32E+07	6.54E+06

Figure D.13
Monthly Nitrate + Nitrite Load in North Walnut Creek
2013



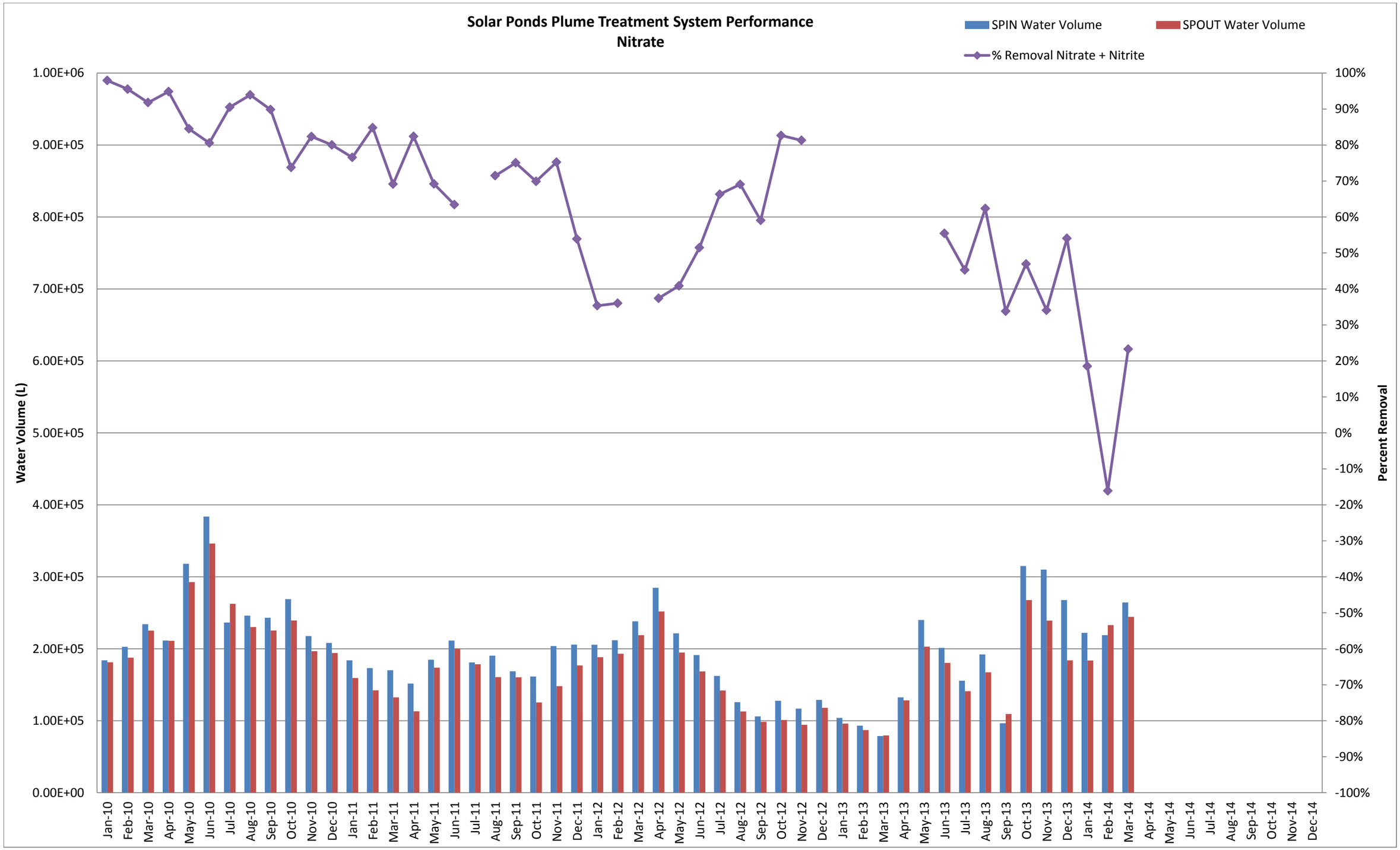
	Jan-13	Feb-13	Mar-13	Apr-13	May-13	Jun-13	Jul-13	Aug-13	Sep-13	Oct-13	Nov-13	Dec-13
SW093	1.01E+06	2.74E+06	1.82E+06	1.05E+07	7.48E+07	7.55E+06	1.58E+07		1.76E+09	4.08E+08	2.54E+08	4.53E+07
SW093 + SPOUT	4.43E+07	3.50E+07	3.53E+07	6.31E+07	1.65E+08	6.59E+07	6.87E+07	4.52E+07	1.80E+09	4.90E+08	3.52E+08	1.15E+08
GS13	1.15E+08	6.61E+07	1.80E+08	4.74E+08	2.80E+08	1.65E+07	4.25E+06		1.83E+09	6.40E+08	3.24E+08	1.77E+08
GS12	0	0	8.77E+07	4.81E+08	1.21E+08	2.01E+07			1.94E+09	2.74E+08	2.53E+08	2.72E+08
GS11	0	0	0	8.59E+07	1.36E+08	2.81E+06	0	0	2.95E+08	3.22E+07	1.32E+07	6.54E+06

Figure D.14
Monthly Nitrate + Nitrite Load in North Walnut Creek
2014



	Jan-14	Feb-14	Mar-14	Apr-14	May-14	Jun-14	Jul-14	Aug-14	Sep-14	Oct-14	Nov-14	Dec-14
SW093	4.95E+07	6.92E+07	1.21E+09									
SW093 + SPOUT	1.47E+08	2.00E+08	1.33E+09									
GS13	2.61E+08	2.50E+08	5.04E+08									
GS12	3.52E+08	3.99E+08	4.22E+08									
GS11	2.07E+07	3.31E+07	5.84E+07									

Figure D.15

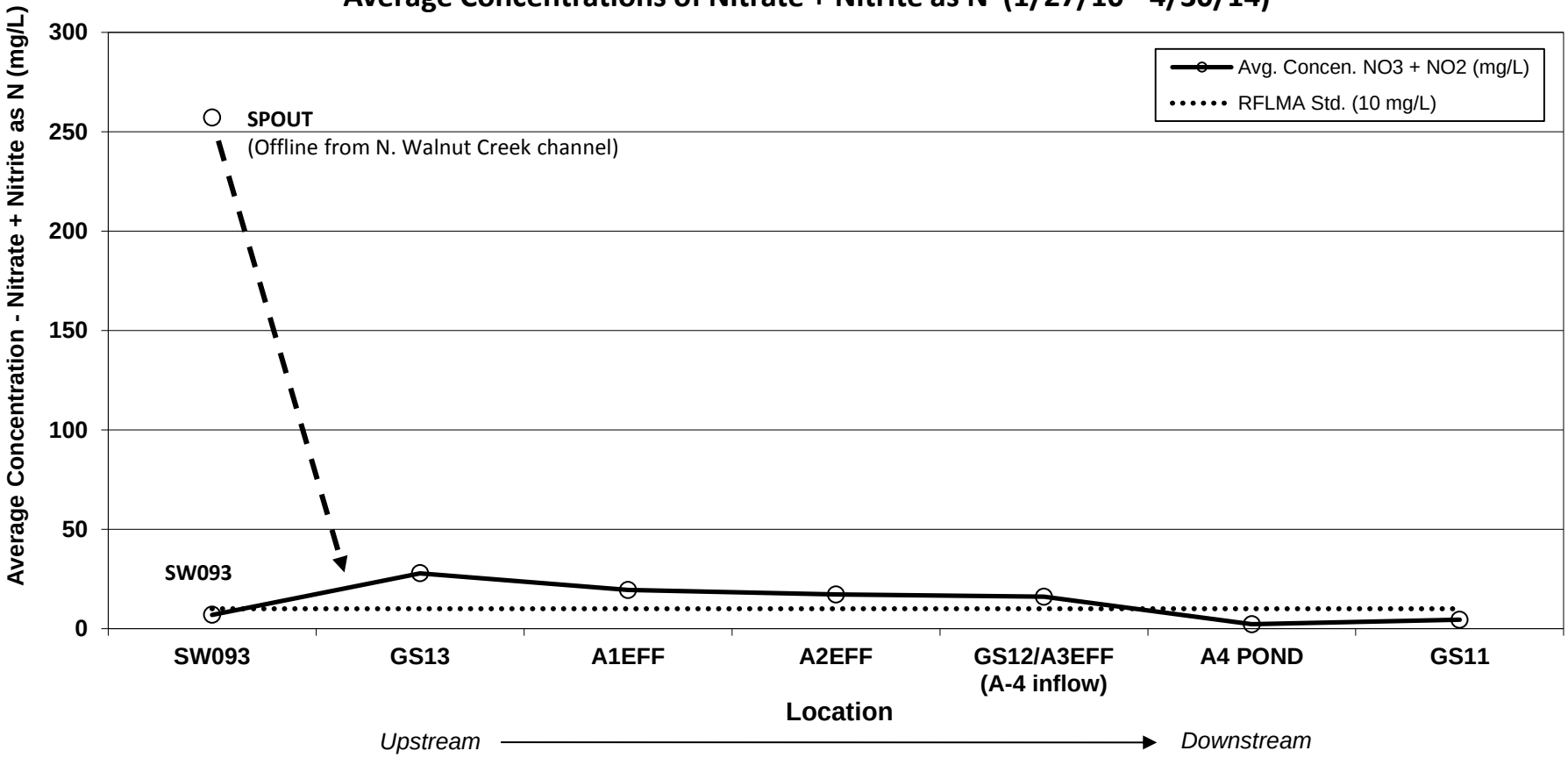


Wright Water Engineers, Inc. 6/19/2014

Figure D.16

North Walnut Creek Monitoring Locations

Average Concentrations of Nitrate + Nitrite as N (1/27/10 - 4/30/14)



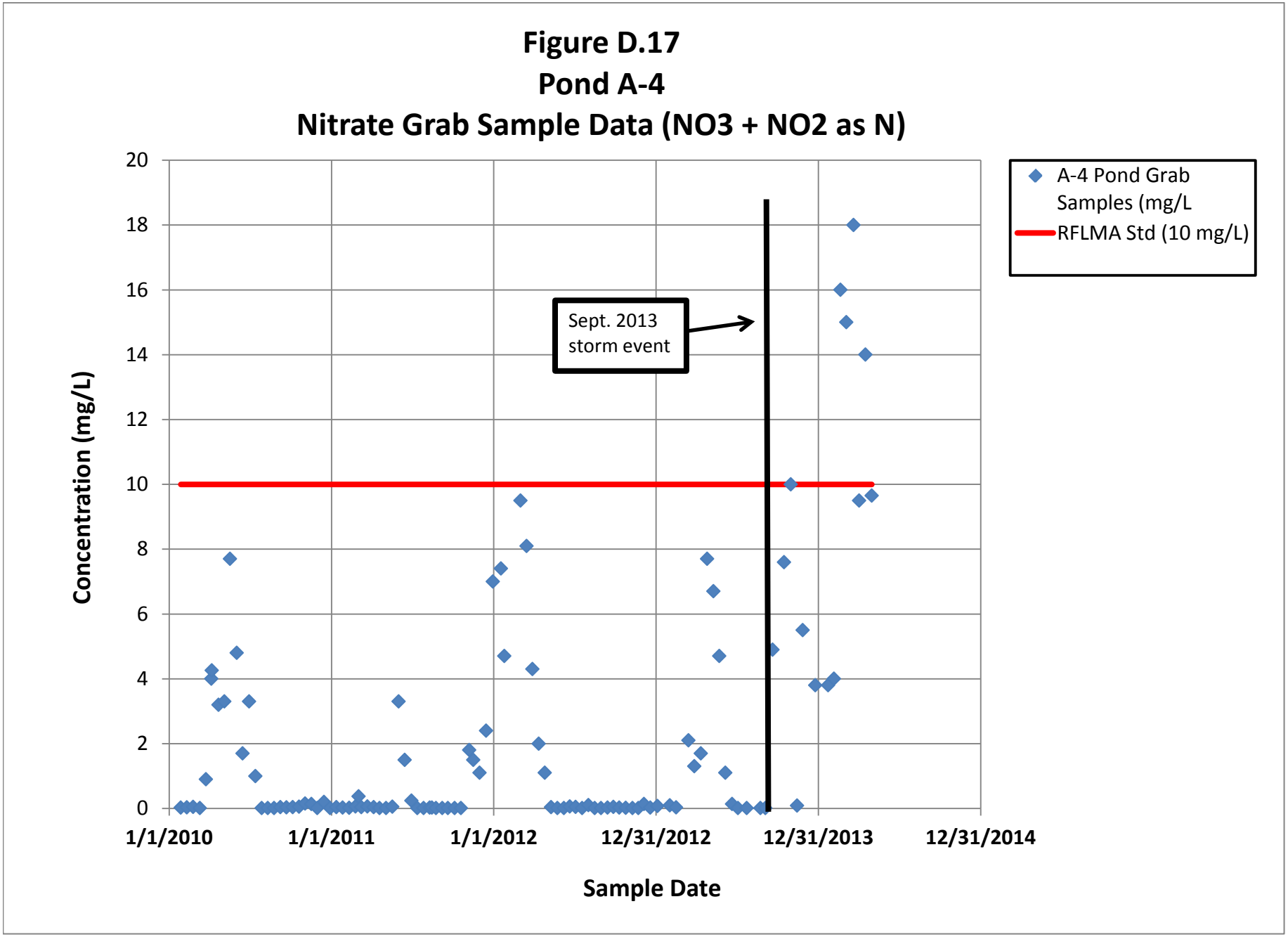


Figure D.17
Pond A-4
Nitrate Grab Sample Data (NO3 + NO2 as N)
Concentration (mg/L)
20
18
16
14
12
10
8
6
4
2
0
1/1/2010
1/1/2011
1/1/2012
12/31/2012
12/31/2013
12/31/2014
Sample Date
Sept. 2013 storm event
A-4 Pond Grab Samples (mg/L
RFLMA Std (10 mg/L)

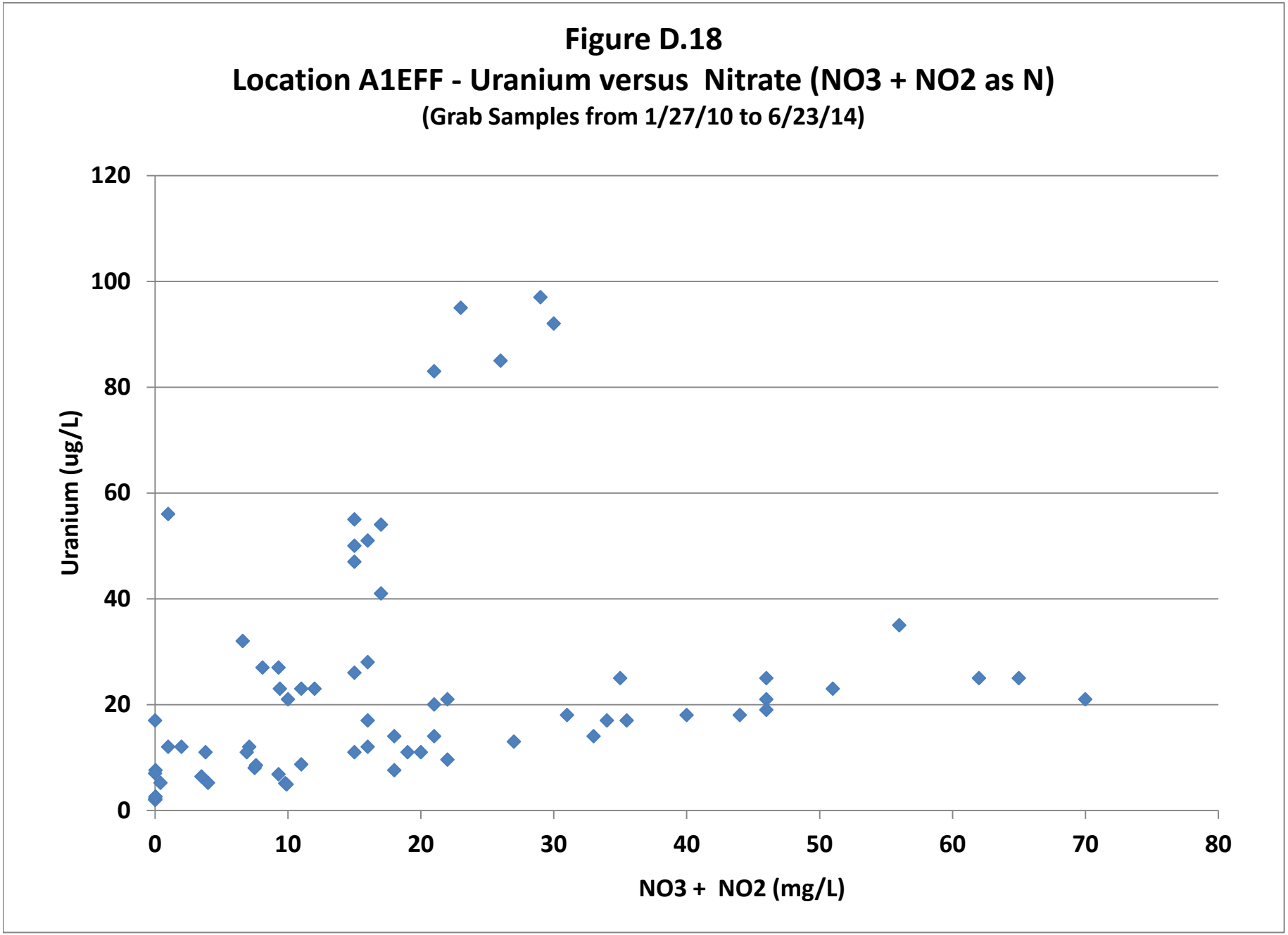
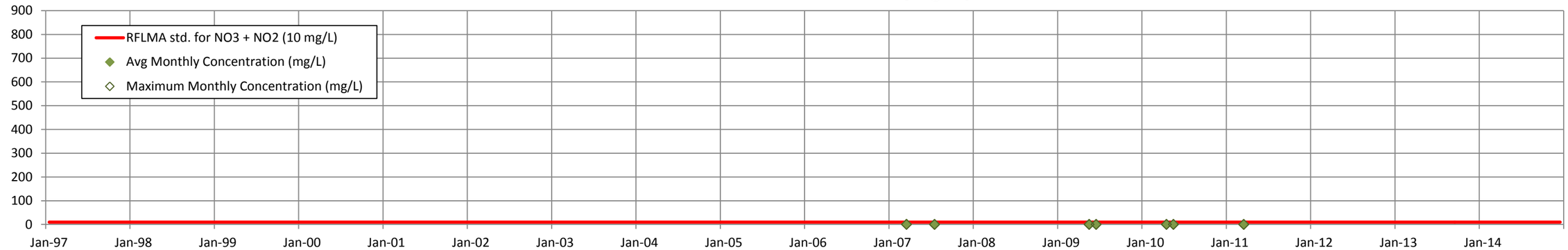


Figure D.18
Location A1EFF - Uranium versus Nitrate (NO3 + NO2 as N)
(Grab Samples from 1/27/10 to 6/23/14)
Uranium (ug/L)
120
100
80
60
40
20
0
0
10
20
30
40
50
60
70
80
NO3 + NO2 (mg/L)

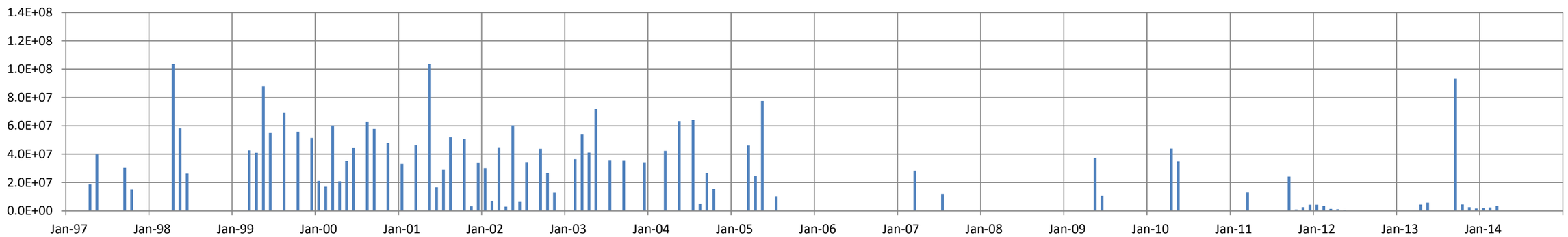
Figure E.1
Location: GS08

S. Walnut Ck. - 3
(B5 Out)

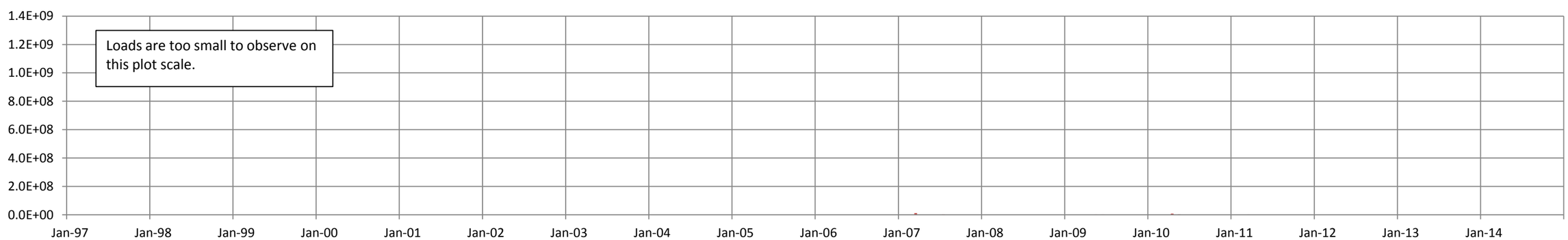
Nitrate + Nitrite Concentration (mg/L)



Volume (L)



Nitrate + Nitrite Load (mg)



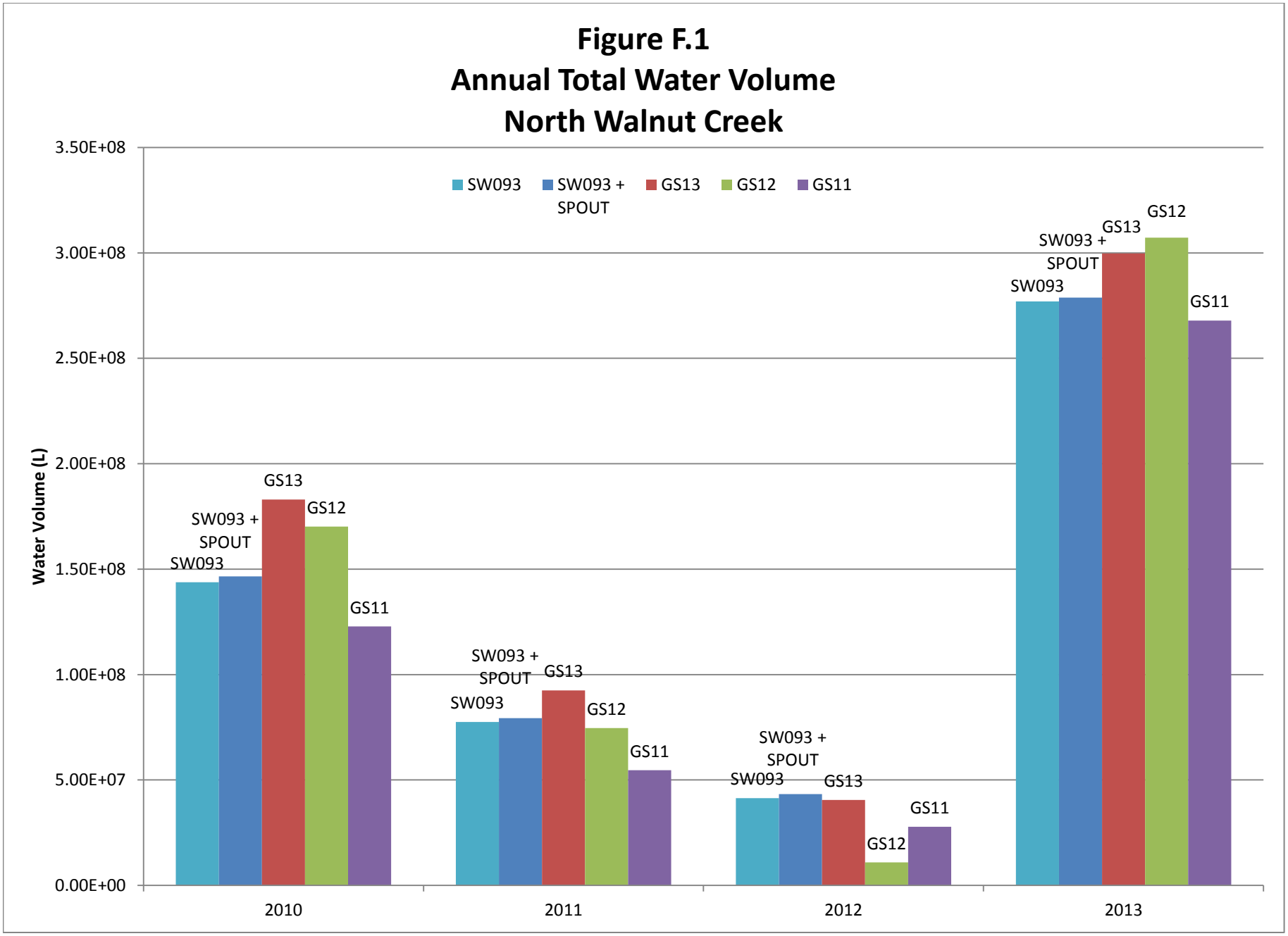


Figure F.1
Annual Total Water Volume
North Walnut Creek
SW093
SW093 + SPOUT
GS13
GS12
GS11
Water Volume (L)
3.50E+08
3.00E+08
2.50E+08
2.00E+08
1.50E+08
1.00E+08
5.00E+07
0.00E+00
2010
2011
2012
2013

Table F.1

	Water Volume (L)								
Date	**SW093**	**SPOUT**	**SW093 + SPOUT**	+/-	**GS13**	+/-	**GS12**	+/-	**GS11**
Jan-09	9.24E+05		9.24E+05	*2.59E+06*	3.51E+06	*-3.51E+06*	0	*0*	0
Feb-09	6.02E+05		6.02E+05	*2.02E+06*	2.62E+06	*-2.62E+06*	0	*0*	0
Mar-09	2.58E+06		2.58E+06	*2.50E+06*	5.07E+06	*-5.07E+06*	0	*0*	0
Apr-09	5.11E+07		5.11E+07	*5.34E+06*	5.65E+07	*-8.52E+06*	4.80E+07	*-4.80E+07*	0
May-09	1.19E+07		1.19E+07	*3.52E+06*	1.54E+07	*-1.54E+07*	0	*2.52E+07*	2.52E+07
Jun-09	1.61E+07		1.61E+07	*3.34E+06*	1.95E+07	*1.75E+07*	3.70E+07	*-2.78E+07*	9.20E+06
Jul-09	2.95E+06		2.95E+06	*8.73E+05*	3.82E+06	*-3.82E+06*	0	*0*	0
Aug-09	7.05E+05	1.58E+05	8.63E+05	*3.61E+05*	1.22E+06	*-1.22E+06*	0	*0*	0
Sep-09	5.10E+05	1.66E+05	6.77E+05	*-6.76E+05*	7.87E+02	*-7.87E+02*	0	*0*	0
Oct-09	3.85E+06	1.60E+05	4.01E+06	*-5.07E+04*	3.96E+06	*-3.96E+06*	0	*0*	0
Nov-09	6.83E+06	2.12E+05	7.04E+06	*2.65E+06*	9.69E+06	*-1.40E+06*	8.29E+06	*-8.29E+06*	0
Dec-09	3.15E+06	1.99E+05	3.34E+06	*2.89E+06*	6.23E+06	*-6.23E+06*	0	*2.71E+07*	2.71E+07
2009	**1.01E+08**	**8.95E+05**	**1.02E+08**	***2.53E+07***	**1.27E+08**	***-3.43E+07***	**9.32E+07**	***-3.16E+07***	**6.16E+07**
Jan-10	2.85E+06	1.81E+05	3.03E+06	*3.75E+06*	6.79E+06	*-1.76E+06*	5.02E+06	*-5.02E+06*	0
Feb-10	3.01E+06	1.88E+05	3.20E+06	*3.00E+06*	6.20E+06	*-1.93E+05*	6.01E+06	*-6.01E+06*	0
Mar-10	3.62E+07	2.25E+05	3.64E+07	*8.27E+06*	4.47E+07	*-8.10E+06*	3.66E+07	*-3.66E+07*	0
Apr-10	5.23E+07	2.11E+05	5.25E+07	*1.03E+07*	6.28E+07	*-2.21E+07*	4.07E+07	*-4.07E+07*	0
May-10	2.25E+07	2.93E+05	2.28E+07	*5.19E+06*	2.80E+07	*2.30E+07*	5.10E+07	*7.18E+07*	1.23E+08
Jun-10	1.73E+07	3.46E+05	1.76E+07	*3.57E+06*	2.12E+07	*-1.77E+06*	1.94E+07	*-1.94E+07*	0
Jul-10	4.91E+06	2.63E+05	5.18E+06	*1.85E+06*	7.03E+06	*4.26E+06*	1.13E+07	*-1.13E+07*	0
Aug-10	5.74E+05	2.30E+05	8.04E+05	*-3.80E+05*	4.24E+05	*-3.37E+05*	8.73E+04	*-8.73E+04*	0
Sep-10	8.10E+05	2.25E+05	1.04E+06	*-1.04E+06*	0	*0*	0	*0*	0
Oct-10	5.83E+05	2.39E+05	8.22E+05	*-8.22E+05*	3.82E+02	*-3.82E+02*	0	*0*	0
Nov-10	1.23E+06	1.97E+05	1.42E+06	*8.24E+05*	2.25E+06	*-2.23E+06*	1.95E+04	*-1.95E+04*	0
Dec-10	1.50E+06	1.94E+05	1.70E+06	*1.91E+06*	3.61E+06	*-3.59E+06*	2.34E+04	*-2.34E+04*	0
2010	**1.44E+08**	**2.79E+06**	**1.47E+08**	***3.64E+07***	**1.83E+08**	***-1.28E+07***	**1.70E+08**	***-4.74E+07***	**1.23E+08**

Table F.1

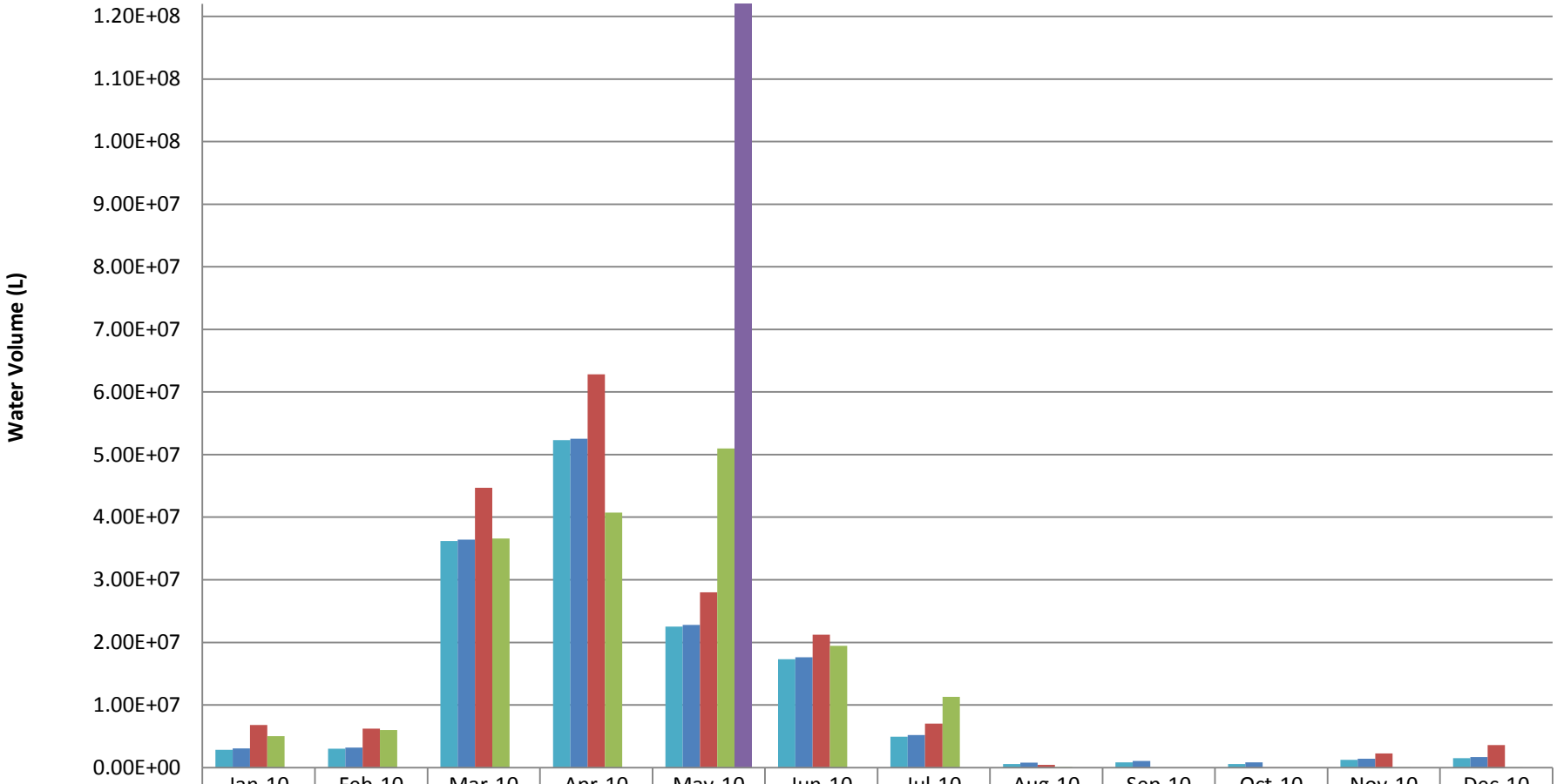
	Water Volume (L)								
Date	**SW093**	**SPOUT**	**SW093 + SPOUT**	+/-	**GS13**	+/-	**GS12**	+/-	**GS11**
Jan-11	1.42E+06	1.60E+05	1.58E+06	*2.60E+06*	4.17E+06	*-4.17E+06*	0	*0*	0
Feb-11	3.26E+06	1.42E+05	3.40E+06	*1.29E+06*	4.69E+06	*-4.69E+06*	0	*0*	0
Mar-11	1.18E+06	1.33E+05	1.32E+06	*1.79E+06*	3.10E+06	*-3.10E+06*	0	*1.26E+07*	1.26E+07
Apr-11	2.00E+06	1.13E+05	2.12E+06	*1.81E+06*	3.93E+06	*-2.54E+06*	1.39E+06	*-1.39E+06*	0
May-11	2.08E+07	1.74E+05	2.10E+07	*5.47E+06*	2.64E+07	*-5.09E+06*	2.14E+07	*-2.14E+07*	0
Jun-11	3.31E+06	2.00E+05	3.51E+06	*1.49E+06*	4.99E+06	*4.56E+06*	9.55E+06	*-9.55E+06*	0
Jul-11	2.58E+07	1.79E+05	2.59E+07	*2.60E+06*	2.85E+07	*1.20E+06*	2.97E+07	*-2.97E+07*	0
Aug-11	1.30E+06	1.61E+05	1.46E+06	*-1.39E+06*	6.93E+04	*1.03E+07*	1.04E+07	*-1.04E+07*	0
Sep-11	3.08E+06	1.60E+05	3.24E+06	*-1.73E+06*	1.51E+06	*-7.50E+05*	7.56E+05	*3.12E+07*	3.19E+07
Oct-11	2.77E+06	1.26E+05	2.90E+06	*-5.51E+05*	2.35E+06	*-2.17E+06*	1.80E+05	*4.16E+05*	5.96E+05
Nov-11	3.85E+06	1.48E+05	4.00E+06	*4.12E+05*	4.41E+06	*-3.24E+06*	1.17E+06	*1.83E+06*	2.99E+06
Dec-11	8.74E+06	1.77E+05	8.92E+06	*-6.70E+05*	8.25E+06	*-8.18E+06*	7.47E+04	*6.41E+06*	6.48E+06
2011	**7.75E+07**	**1.87E+06**	**7.94E+07**	***1.31E+07***	**9.25E+07**	***-1.78E+07***	**7.46E+07**	***-2.00E+07***	**5.46E+07**
Jan-12	5.16E+06	1.88E+05	5.35E+06	*8.13E+05*	6.17E+06	*-6.17E+06*	1.51E+01	*7.52E+06*	7.52E+06
Feb-12	1.48E+07	1.93E+05	1.50E+07	*3.32E+06*	1.83E+07	*-1.83E+07*	0	*1.27E+07*	1.27E+07
Mar-12	7.42E+06	2.19E+05	7.64E+06	*6.62E+05*	8.30E+06	*-7.88E+06*	4.25E+05	*5.31E+06*	5.74E+06
Apr-12	4.90E+06	2.52E+05	5.15E+06	*-4.04E+05*	4.75E+06	*2.74E+06*	7.49E+06	*-5.69E+06*	1.79E+06
May-12	2.52E+06	1.95E+05	2.72E+06	*-5.96E+05*	2.12E+06	*8.65E+05*	2.99E+06	*-2.95E+06*	3.66E+04
Jun-12	7.01E+05	1.69E+05	8.70E+05	*-8.23E+05*	4.68E+04	*-3.11E+04*	1.58E+04	*-1.58E+04*	0
Jul-12	2.67E+06	1.42E+05	2.81E+06	*-2.81E+06*	0	*0.00E+00*	0	*0.00E+00*	0
Aug-12	1.10E+05	1.13E+05	2.23E+05	*-2.23E+05*	0	*0.00E+00*	0	*0.00E+00*	0
Sep-12	6.55E+05	9.86E+04	7.54E+05	*-7.54E+05*	0	*0.00E+00*	0	*0.00E+00*	0
Oct-12	7.49E+05	1.01E+05	8.50E+05	*-8.50E+05*	0	*0.00E+00*	0	*0.00E+00*	0
Nov-12	9.85E+05	9.45E+04	1.08E+06	*-1.05E+06*	2.54E+04	*-2.54E+04*	0	*0.00E+00*	0
Dec-12	7.79E+05	1.18E+05	8.97E+05	*-1.45E+04*	8.82E+05	*-8.82E+05*	0	*0.00E+00*	0
2012	**4.14E+07**	**1.88E+06**	**4.33E+07**	***-2.73E+06***	**4.06E+07**	***-2.97E+07***	**1.09E+07**	***1.69E+07***	**2.78E+07**

Table F.1

	Water Volume (L)								
Date	**SW093**	**SPOUT**	**SW093 + SPOUT**	+/-	**GS13**	+/-	**GS12**	+/-	**GS11**
Jan-13	3.82E+05	9.62E+04	4.78E+05	*6.71E+05*	1.15E+06	*-1.15E+06*	0	*0.00E+00*	0
Feb-13	1.05E+06	8.71E+04	1.14E+06	*-3.43E+05*	7.96E+05	*-7.96E+05*	0	*0.00E+00*	0
Mar-13	5.36E+06	7.96E+04	5.44E+06	*3.53E+05*	5.80E+06	*-2.36E+06*	3.44E+06	*-3.44E+06*	0
Apr-13	2.66E+07	1.28E+05	2.68E+07	*1.22E+06*	2.80E+07	*5.23E+06*	3.32E+07	*-1.54E+07*	1.78E+07
May-13	2.39E+07	2.03E+05	2.41E+07	*-7.08E+05*	2.34E+07	*3.77E+06*	2.71E+07	*-8.21E+06*	1.89E+07
Jun-13	2.86E+06	1.81E+05	3.04E+06	*-1.25E+06*	1.79E+06	*2.13E+05*	2.01E+06	*-1.33E+06*	6.76E+05
Jul-13	3.47E+06	1.41E+05	3.61E+06	*-1.32E+06*	2.30E+06	*-1.88E+06*	4.12E+05	*-4.12E+05*	0
Aug-13	1.85E+06	1.67E+05	2.02E+06	*-1.05E+06*	9.74E+05	*-9.74E+05*	6.60E+01	*-6.60E+01*	0
Sep-13	1.91E+08	1.09E+05	1.92E+08	*2.19E+07*	2.13E+08	*-1.05E+05*	2.13E+08	*4.32E+06*	2.18E+08
Oct-13	1.07E+07	2.68E+05	1.10E+07	*1.93E+06*	1.29E+07	*1.52E+06*	1.44E+07	*-5.71E+06*	8.73E+06
Nov-13	5.98E+06	2.39E+05	6.22E+06	*-8.18E+05*	5.41E+06	*2.14E+06*	7.54E+06	*-4.80E+06*	2.75E+06
Dec-13	3.36E+06	1.84E+05	3.54E+06	*2.99E+05*	3.84E+06	*1.89E+06*	5.73E+06	*-4.37E+06*	1.36E+06
2013	**2.77E+08**	**1.88E+06**	**2.79E+08**	***2.09E+07***	**3.00E+08**	***7.49E+06***	**3.07E+08**	***-3.94E+07***	**2.68E+08**
Jan-14	3.90E+06	1.84E+05	4.09E+06	*7.85E+05*	4.87E+06	*3.72E+06*	8.60E+06	*-6.10E+06*	2.50E+06
Feb-14	4.94E+06	2.33E+05	5.17E+06	*2.08E+05*	5.38E+06	*4.47E+06*	9.85E+06	*-5.86E+06*	3.98E+06
Mar-14	9.29E+06	2.44E+05	9.53E+06	*7.48E+05*	1.03E+07	*1.79E+06*	1.21E+07	*-5.03E+06*	7.04E+06
Apr-14				*0.00E+00*		*0.00E+00*		*0.00E+00*	
May-14				*0.00E+00*		*0.00E+00*		*0.00E+00*	
Jun-14				*0.00E+00*		*0.00E+00*		*0.00E+00*	
Jul-14				*0.00E+00*		*0.00E+00*		*0.00E+00*	
Aug-14				*0.00E+00*		*0.00E+00*		*0.00E+00*	
Sep-14				*0.00E+00*		*0.00E+00*		*0.00E+00*	
Oct-14				*0.00E+00*		*0.00E+00*		*0.00E+00*	
Nov-14				*0.00E+00*		*0.00E+00*		*0.00E+00*	
Dec-14				*0.00E+00*		*0.00E+00*		*0.00E+00*	
2014	**1.81E+07**	**6.61E+05**	**1.88E+07**	***1.74E+06***	**2.05E+07**	***9.98E+06***	**3.05E+07**	***-1.70E+07***	**1.35E+07**

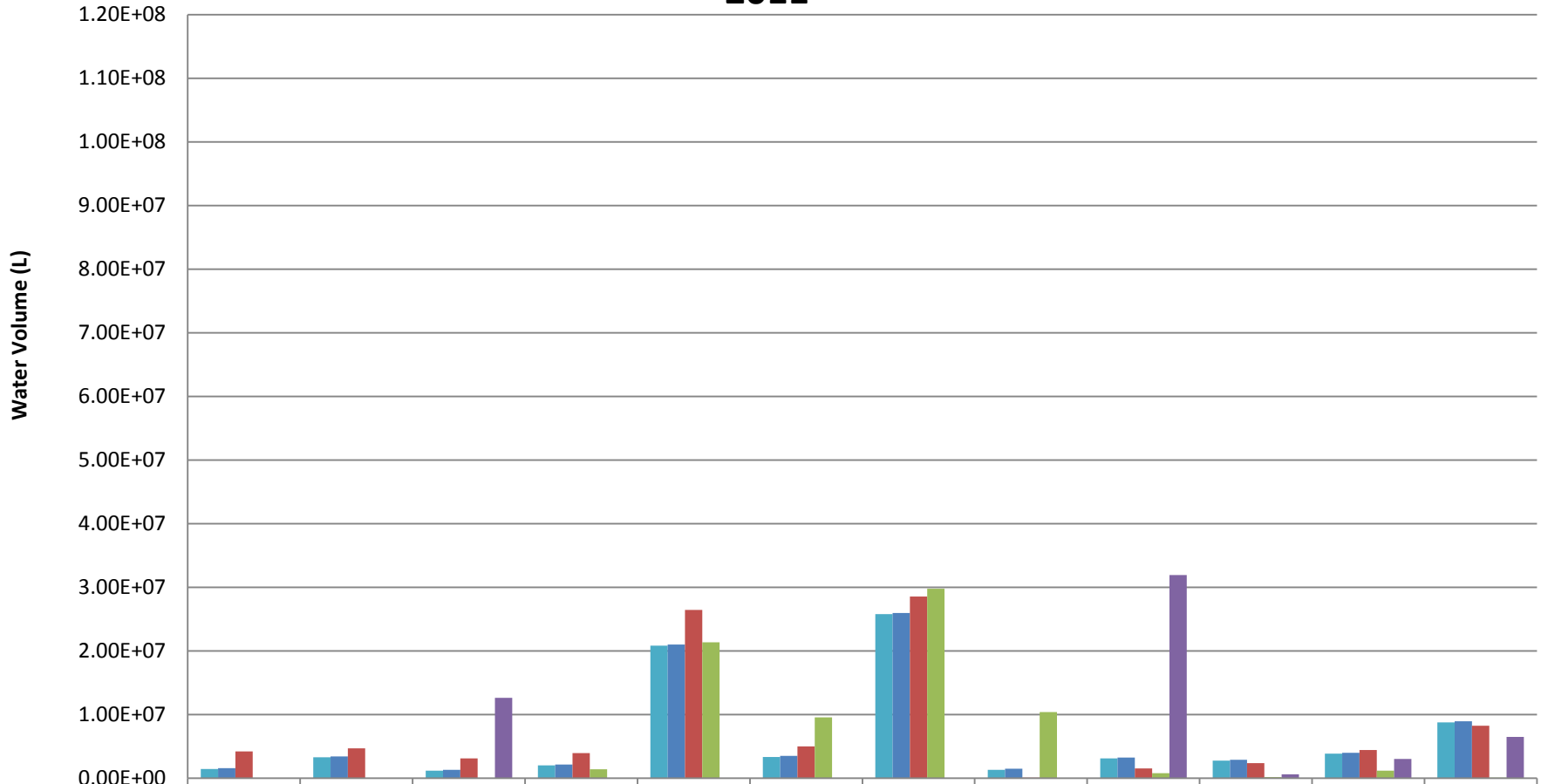
Notes:
0 means zero flow was recorded for that month.
NO FLOW DATA OR SOME FLOW DATA MISSING

Figure F.2
Water Volume in North Walnut Creek
2010



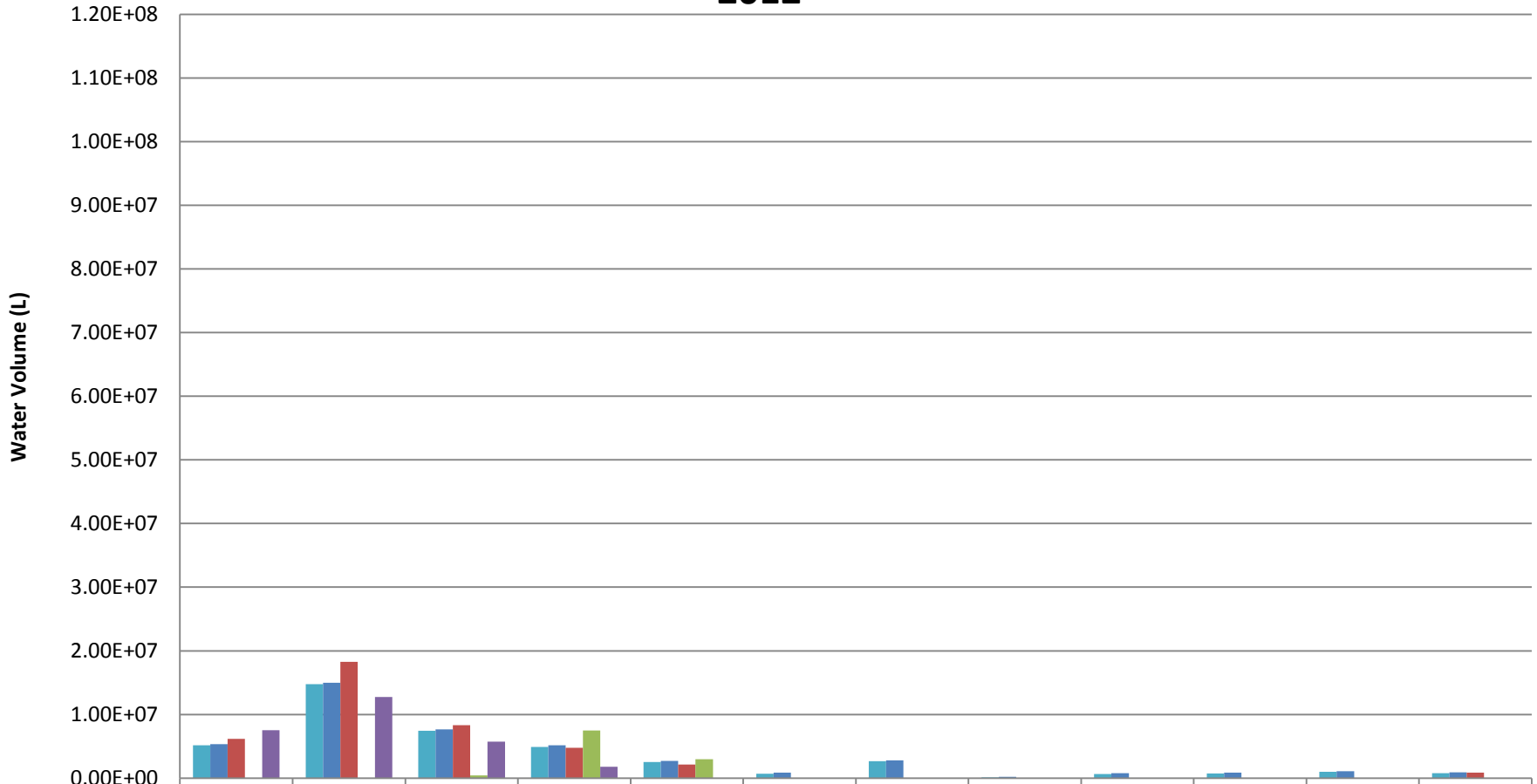
	Jan-10	Feb-10	Mar-10	Apr-10	May-10	Jun-10	Jul-10	Aug-10	Sep-10	Oct-10	Nov-10	Dec-10
SW093	2.85E+06	3.01E+06	3.62E+07	5.23E+07	2.25E+07	1.73E+07	4.91E+06	5.74E+05	8.10E+05	5.83E+05	1.23E+06	1.50E+06
SW093 + SPOUT	3.03E+06	3.20E+06	3.64E+07	5.25E+07	2.28E+07	1.76E+07	5.18E+06	8.04E+05	1.04E+06	8.22E+05	1.42E+06	1.70E+06
GS13	6.79E+06	6.20E+06	4.47E+07	6.28E+07	2.80E+07	2.12E+07	7.03E+06	4.24E+05	0	3.82E+02	2.25E+06	3.61E+06
GS12	5.02E+06	6.01E+06	3.66E+07	4.07E+07	5.10E+07	1.94E+07	1.13E+07	8.73E+04	0	0	1.95E+04	2.34E+04
GS11	0	0	0	0	1.23E+08	0	0	0	0	0	0	0

Figure F.3
Water Volume in North Walnut Creek
2011



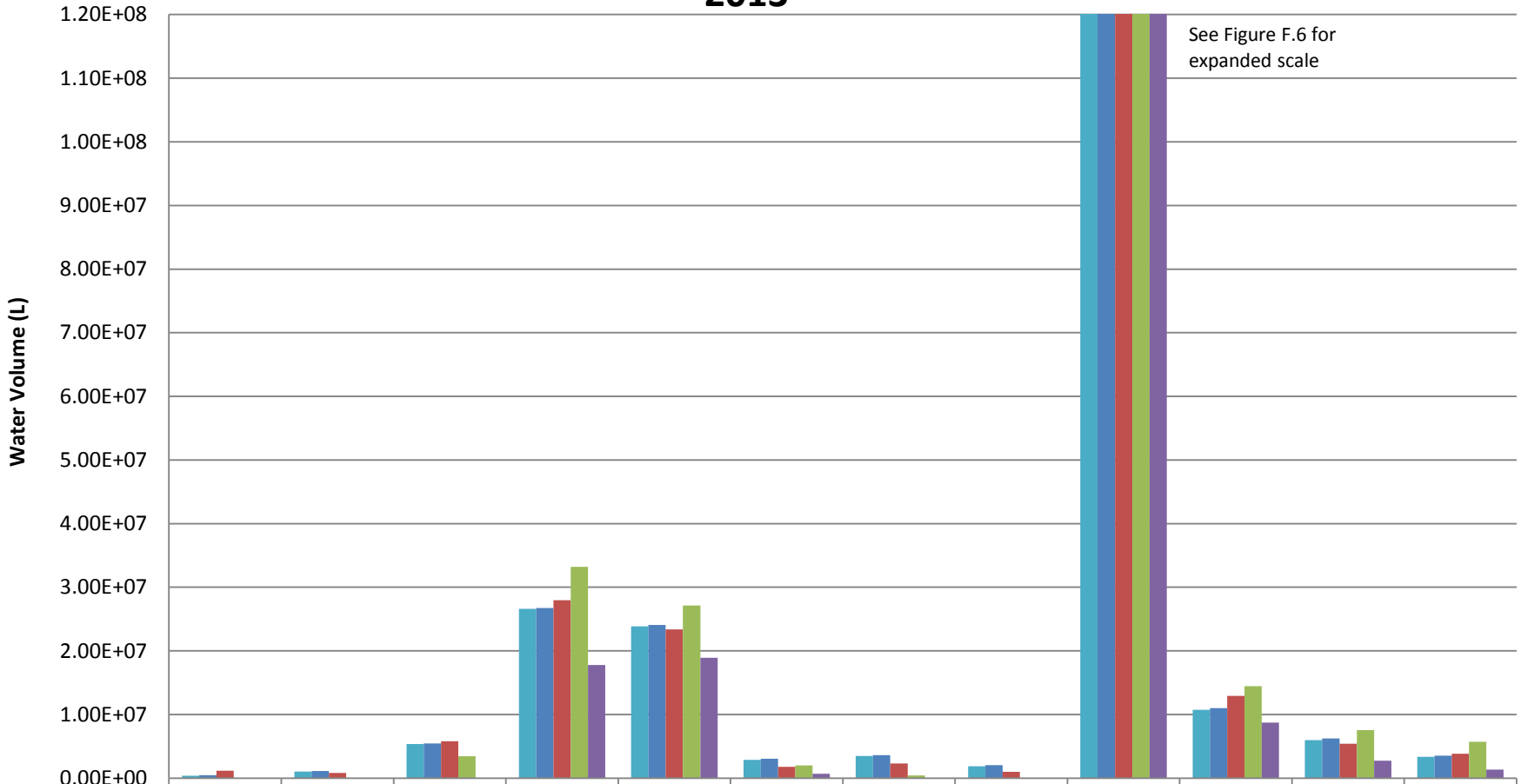
	Jan-11	Feb-11	Mar-11	Apr-11	May-11	Jun-11	Jul-11	Aug-11	Sep-11	Oct-11	Nov-11	Dec-11
SW093	1.42E+06	3.26E+06	1.18E+06	2.00E+06	2.08E+07	3.31E+06	2.58E+07	1.30E+06	3.08E+06	2.77E+06	3.85E+06	8.74E+06
SW093 + SPOUT	1.58E+06	3.40E+06	1.32E+06	2.12E+06	2.10E+07	3.51E+06	2.59E+07	1.46E+06	3.24E+06	2.90E+06	4.00E+06	8.92E+06
GS13	4.17E+06	4.69E+06	3.10E+06	3.93E+06	2.64E+07	4.99E+06	2.85E+07	6.93E+04	1.51E+06	2.35E+06	4.41E+06	8.25E+06
GS12	0	0	0	1.39E+06	2.14E+07	9.55E+06	2.97E+07	1.04E+07	7.56E+05	1.80E+05	1.17E+06	7.47E+04
GS11	0	0	1.26E+07	0	0	0	0	0	3.19E+07	5.96E+05	2.99E+06	6.48E+06

Figure F.4
Water Volume in North Walnut Creek
2012



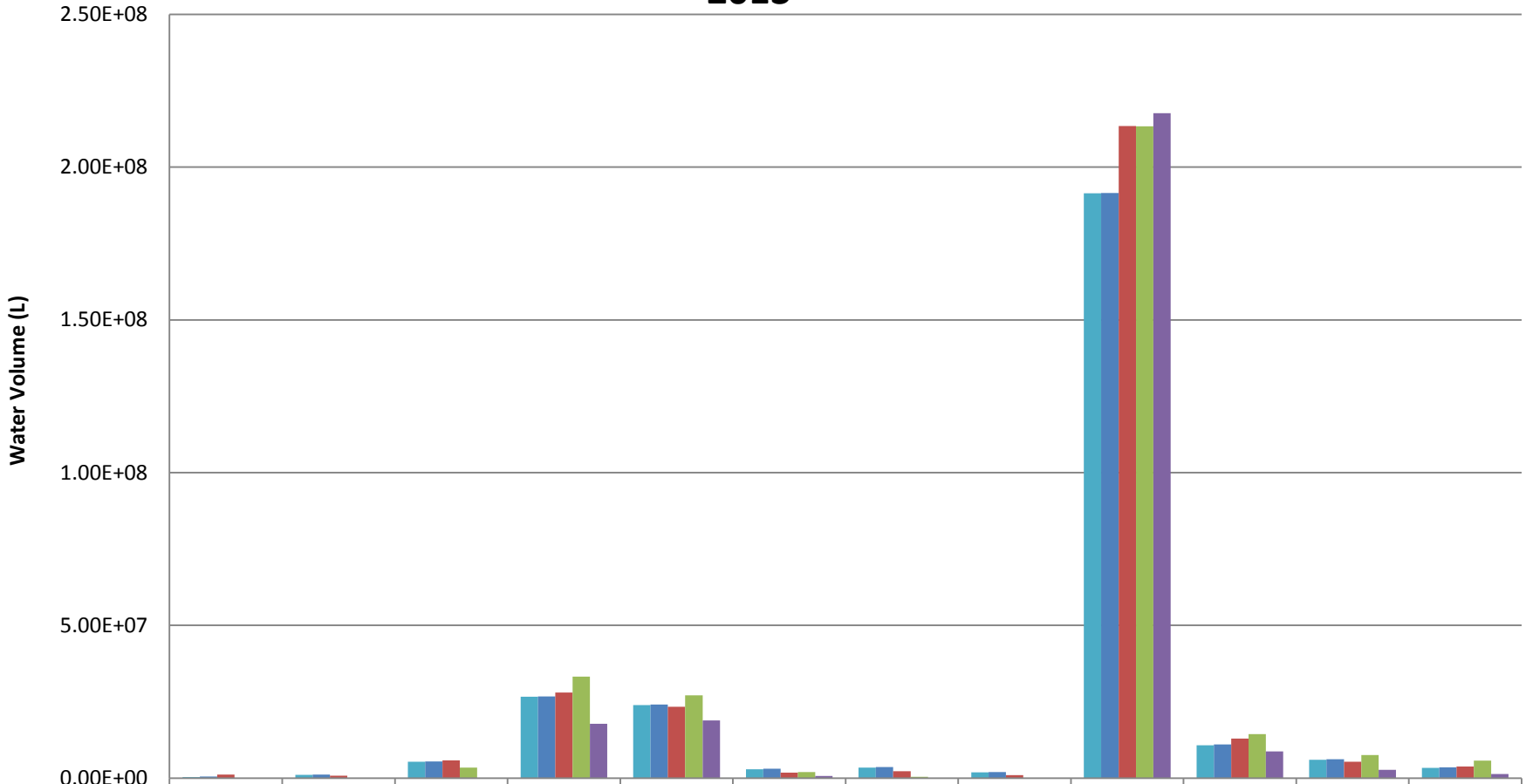
	Jan-12	Feb-12	Mar-12	Apr-12	May-12	Jun-12	Jul-12	Aug-12	Sep-12	Oct-12	Nov-12	Dec-12
SW093	5.16E+06	1.48E+07	7.42E+06	4.90E+06	2.52E+06	7.01E+05	2.67E+06	1.10E+05	6.55E+05	7.49E+05	9.85E+05	7.79E+05
SW093 + SPOUT	5.35E+06	1.50E+07	7.64E+06	5.15E+06	2.72E+06	8.70E+05	2.81E+06	2.23E+05	7.54E+05	8.50E+05	1.08E+06	8.97E+05
GS13	6.17E+06	1.83E+07	8.30E+06	4.75E+06	2.12E+06	4.68E+04	0	0	0	0	2.54E+04	8.82E+05
GS12	1.51E+01	0	4.25E+05	7.49E+06	2.99E+06	1.58E+04	0	0	0	0	0	0
GS11	7.52E+06	1.27E+07	5.74E+06	1.79E+06	3.66E+04	0	0	0	0	0	0	0

Figure F.5
Water Volume in North Walnut Creek
2013



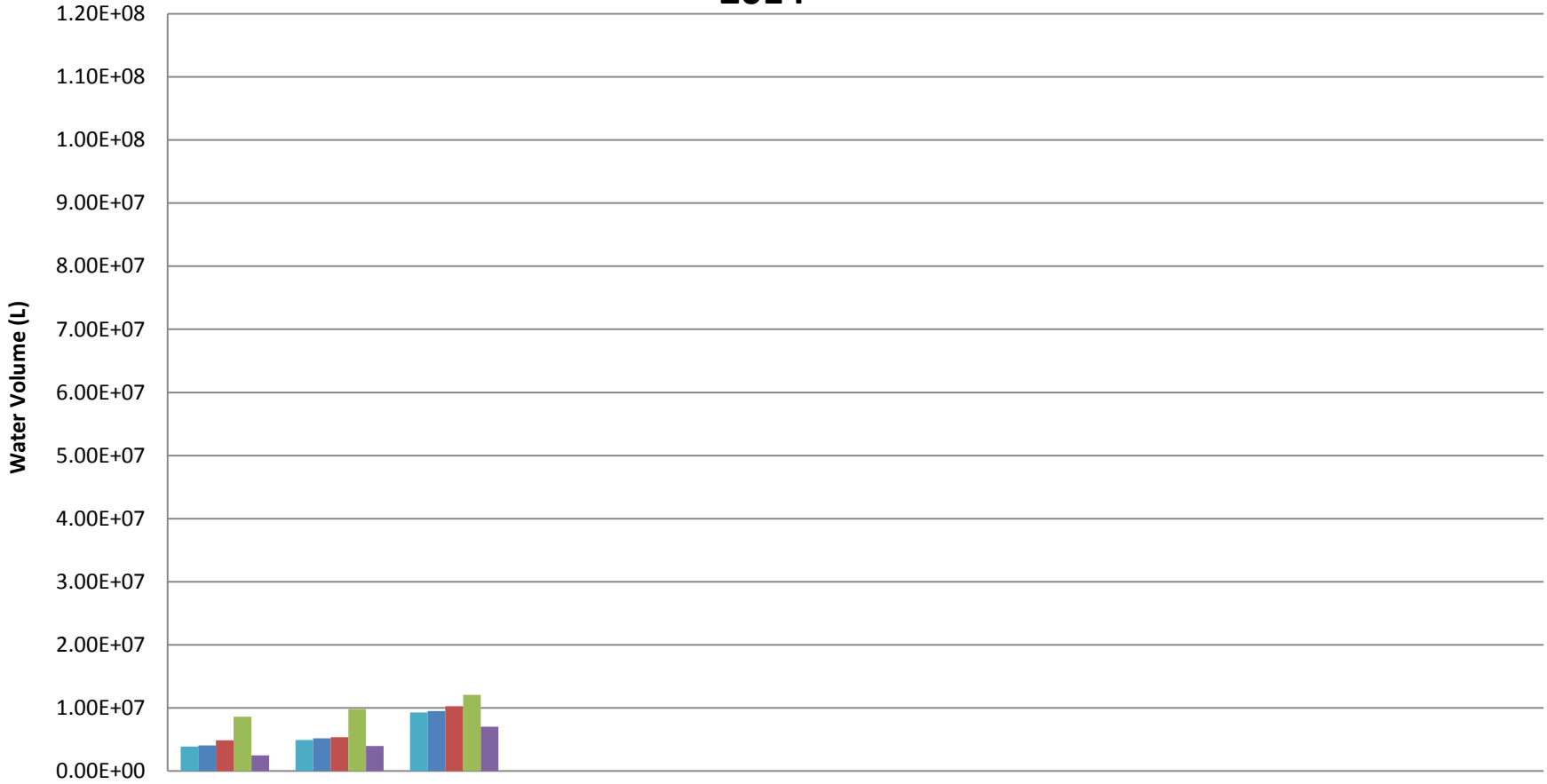
	Jan-13	Feb-13	Mar-13	Apr-13	May-13	Jun-13	Jul-13	Aug-13	Sep-13	Oct-13	Nov-13	Dec-13
SW093	3.82E+05	1.05E+06	5.36E+06	2.66E+07	2.39E+07	2.86E+06	3.47E+06	1.85E+06	1.91E+08	1.07E+07	5.98E+06	3.36E+06
SW093 + SPOUT	4.78E+05	1.14E+06	5.44E+06	2.68E+07	2.41E+07	3.04E+06	3.61E+06	2.02E+06	1.92E+08	1.10E+07	6.22E+06	3.54E+06
GS13	1.15E+06	7.96E+05	5.80E+06	2.80E+07	2.34E+07	1.79E+06	2.30E+06	9.74E+05	2.13E+08	1.29E+07	5.41E+06	3.84E+06
GS12	0	0	3.44E+06	3.32E+07	2.71E+07	2.01E+06	4.12E+05	6.60E+01	2.13E+08	1.44E+07	7.54E+06	5.73E+06
GS11	0	0	0	1.78E+07	1.89E+07	6.76E+05	0	0	2.18E+08	8.73E+06	2.75E+06	1.36E+06

Figure F.6
Water Volume in North Walnut Creek
2013



	Jan-13	Feb-13	Mar-13	Apr-13	May-13	Jun-13	Jul-13	Aug-13	Sep-13	Oct-13	Nov-13	Dec-13
SW093	3.82E+05	1.05E+06	5.36E+06	2.66E+07	2.39E+07	2.86E+06	3.47E+06	1.85E+06	1.91E+08	1.07E+07	5.98E+06	3.36E+06
SW093 + SPOUT	4.78E+05	1.14E+06	5.44E+06	2.68E+07	2.41E+07	3.04E+06	3.61E+06	2.02E+06	1.92E+08	1.10E+07	6.22E+06	3.54E+06
GS13	1.15E+06	7.96E+05	5.80E+06	2.80E+07	2.34E+07	1.79E+06	2.30E+06	9.74E+05	2.13E+08	1.29E+07	5.41E+06	3.84E+06
GS12	0	0	3.44E+06	3.32E+07	2.71E+07	2.01E+06	4.12E+05	6.60E+01	2.13E+08	1.44E+07	7.54E+06	5.73E+06
GS11	0	0	0	1.78E+07	1.89E+07	6.76E+05	0	0	2.18E+08	8.73E+06	2.75E+06	1.36E+06

Figure F.7
Water Volume in North Walnut Creek
2014



	Jan-14	Feb-14	Mar-14	Apr-14	May-14	Jun-14	Jul-14	Aug-14	Sep-14	Oct-14	Nov-14	Dec-14
SW093	3.90E+06	4.94E+06	9.29E+06									
SW093 + SPOUT	4.09E+06	5.17E+06	9.53E+06									
GS13	4.87E+06	5.38E+06	1.03E+07									
GS12	8.60E+06	9.85E+06	1.21E+07									
GS11	2.50E+06	3.98E+06	7.04E+06									

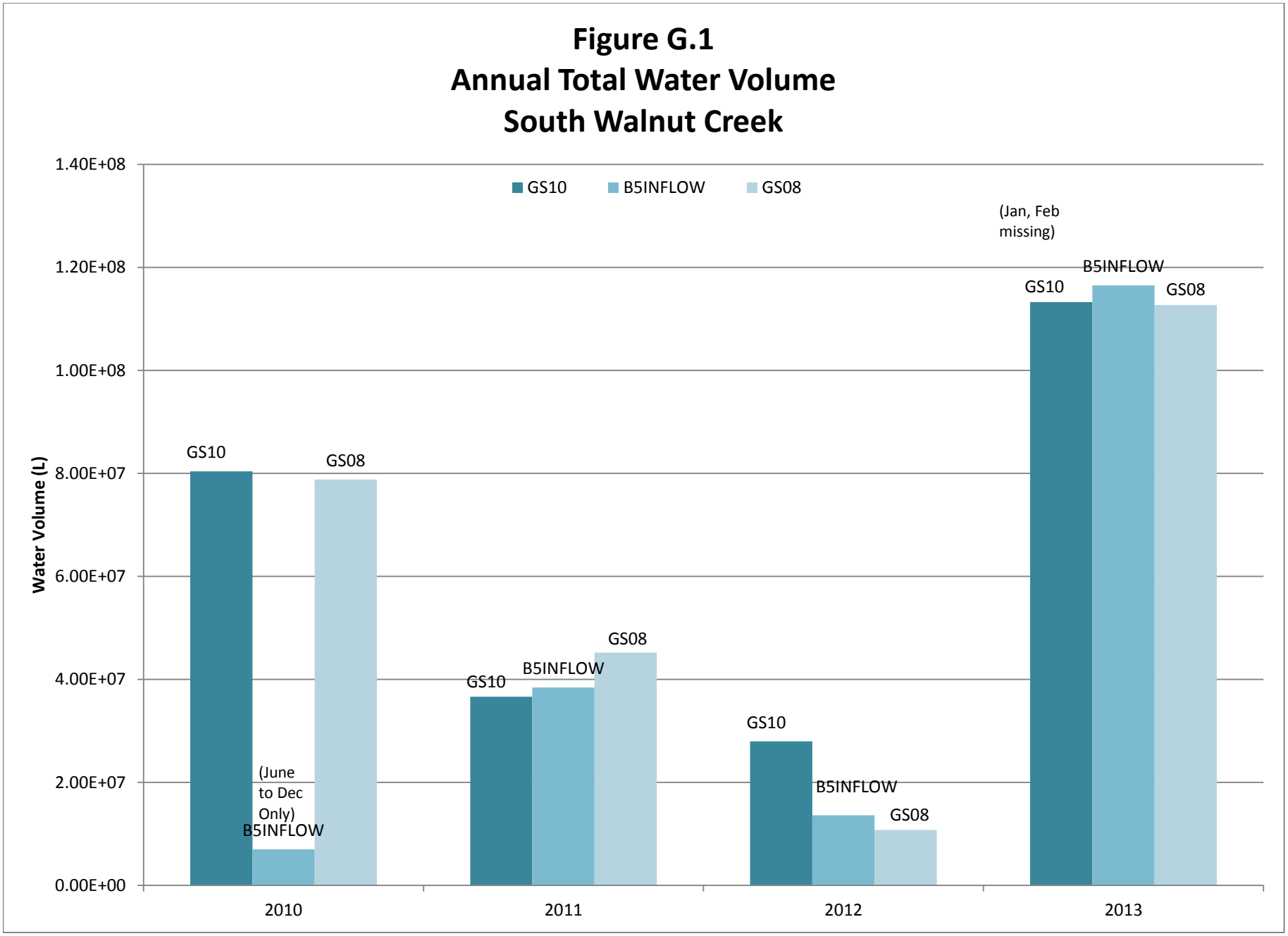


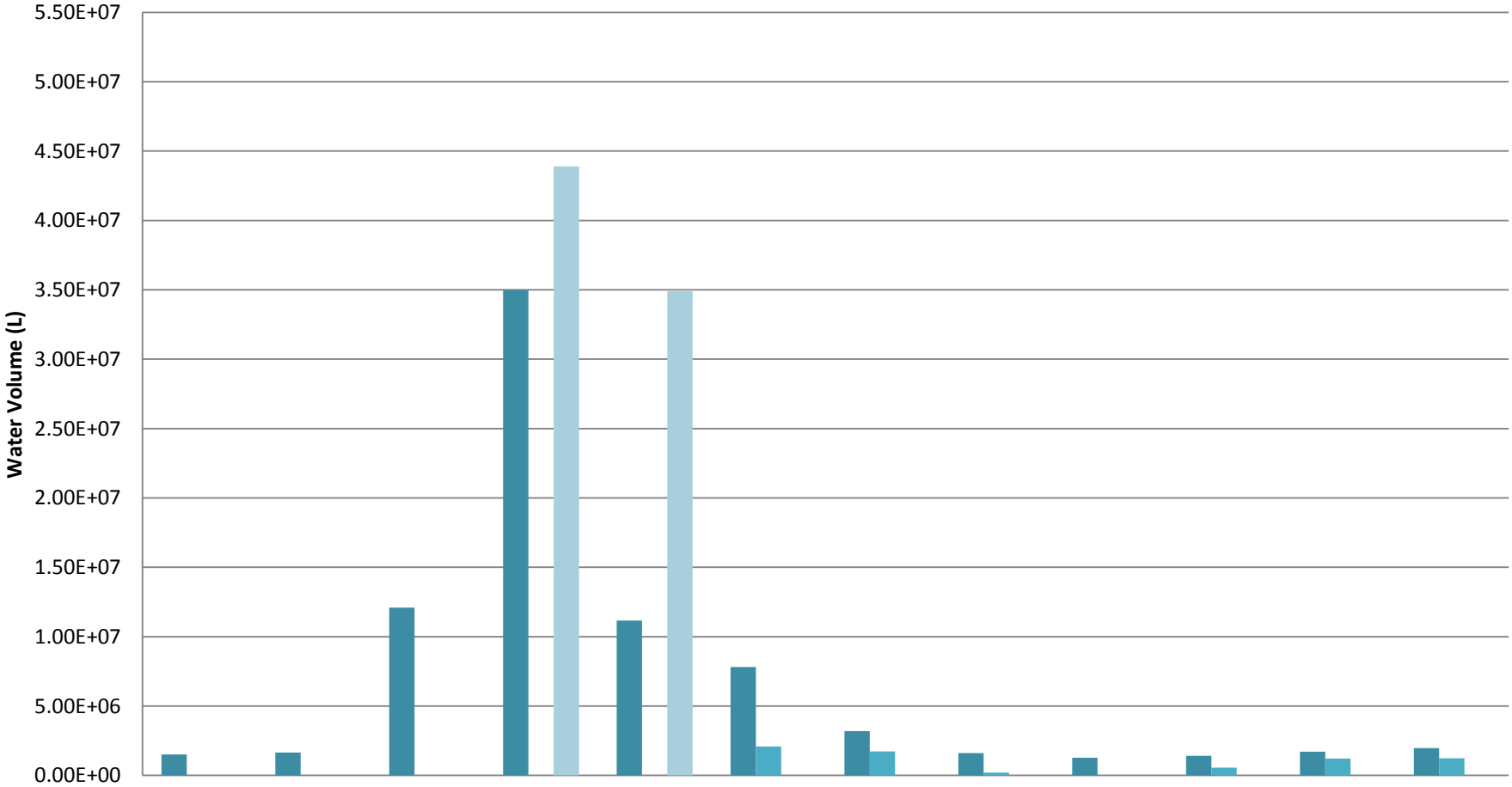
Figure G.1
Annual Total Water Volume
South Walnut Creek
GS10
B5INFLOW
GS08
Water Volume (L)
1.40E+08
1.20E+08
1.00E+08
8.00E+07
6.00E+07
4.00E+07
2.00E+07
0.00E+00
(June to Dec Only)
(Jan, Feb missing)
2010
2011
2012
2013

Table G.1

	Water Volume (L)				
Date	**GS10**	+/-	**B5INFLOW**	+/-	**GS08**
Jan-09	7.70E+05	--		--	0
Feb-09	5.74E+05	--		--	0
Mar-09	1.02E+06	--		--	0
Apr-09	2.62E+07	--		--	0
May-09	7.90E+06	--		--	3.73E+07
Jun-09	8.58E+06	--		--	1.05E+07
Jul-09	2.86E+06	--		--	0
Aug-09	1.05E+06	--		--	0
Sep-09	9.93E+05	--		--	0
Oct-09	1.55E+06	--		--	0
Nov-09	3.62E+06	--		--	0
Dec-09	1.52E+06	--		--	0
2009	**5.66E+07**	***-5.66E+07***	**0.00E+00**	***4.78E+07***	**4.78E+07**
Jan-10	1.52E+06	--		--	0
Feb-10	1.66E+06	--		--	0
Mar-10	1.21E+07	--		--	0
Apr-10	3.50E+07	--		--	4.39E+07
May-10	1.12E+07	--		--	3.49E+07
Jun-10	7.81E+06	*-5.72E+06*	2.09E+06	*-2.09E+06*	0
Jul-10	3.19E+06	*-1.46E+06*	1.73E+06	*-1.73E+06*	0
Aug-10	1.62E+06	*-1.42E+06*	1.95E+05	*-1.95E+05*	0
Sep-10	1.27E+06	*-1.27E+06*	0	*0.00E+00*	0
Oct-10	1.40E+06	*-8.50E+05*	5.54E+05	*-5.54E+05*	0
Nov-10	1.71E+06	*-4.99E+05*	1.21E+06	*-1.21E+06*	0
Dec-10	1.96E+06	*-7.33E+05*	1.22E+06	*-1.22E+06*	0
2010	**8.04E+07**	***-7.34E+07***	**7.01E+06**	***7.18E+07***	**7.88E+07**
Jan-11	1.94E+06	*1.66E+05*	2.11E+06	*-2.11E+06*	0
Feb-11	8.50E+05	*2.90E+05*	1.14E+06	*-1.14E+06*	0
Mar-11	5.97E+05	*2.67E+05*	8.64E+05	*1.23E+07*	1.32E+07
Apr-11	7.57E+05	*7.39E+05*	1.50E+06	*-1.50E+06*	0
May-11	9.07E+06	*1.15E+06*	1.02E+07	*-1.02E+07*	0
Jun-11	2.57E+06	*-6.81E+05*	1.89E+06	*-1.89E+06*	0
Jul-11	1.09E+07	*1.48E+06*	1.24E+07	*-1.24E+07*	0
Aug-11	1.37E+06	*-1.15E+06*	2.21E+05	*-2.21E+05*	0
Sep-11	1.43E+06	*-7.13E+05*	7.19E+05	*2.35E+07*	2.42E+07
Oct-11	1.56E+06	*-4.39E+04*	1.52E+06	*-6.47E+05*	8.71E+05
Nov-11	2.77E+06	*-2.54E+05*	2.51E+06	*1.34E+05*	2.65E+06
Dec-11	2.80E+06	*5.65E+05*	3.37E+06	*9.83E+05*	4.35E+06
2011	**3.66E+07**	***1.81E+06***	**3.84E+07**	***6.79E+06***	**4.52E+07**
Jan-12	3.07E+06	*-1.92E+05*	2.88E+06	*1.51E+06*	4.39E+06
Feb-12	4.77E+06	*-3.50E+05*	4.42E+06	*-1.07E+06*	3.35E+06
Mar-12	3.47E+06	*-3.62E+05*	3.10E+06	*-1.67E+06*	1.43E+06
Apr-12	4.67E+06	*-2.79E+06*	1.87E+06	*-7.49E+05*	1.12E+06
May-12	3.82E+06	*-2.47E+06*	1.34E+06	*-8.76E+05*	4.67E+05
Jun-12	1.96E+06	*-1.96E+06*	0	*0.00E+00*	0
Jul-12	1.10E+06	*-1.10E+06*	0	*0.00E+00*	0
Aug-12	6.45E+05	*-6.45E+05*	0	*0.00E+00*	0
Sep-12	1.02E+06	*-1.02E+06*	0	*0.00E+00*	0
Oct-12	9.86E+05	*-9.86E+05*	0	*0.00E+00*	0
Nov-12	1.20E+06	*-1.20E+06*	0	*0.00E+00*	0
Dec-12	1.25E+06	*-1.25E+06*	0	*0.00E+00*	0
2012	**2.80E+07**	***-1.43E+07***	**1.36E+07**	***-2.86E+06***	**1.08E+07**
Jan-13		--	0	*0.00E+00*	0
Feb-13		--	0	*0.00E+00*	0
Mar-13	1.01E+06	*1.69E+06*	2.70E+06	*-2.70E+06*	0
Apr-13	6.23E+06	*2.13E+06*	8.36E+06	*-3.91E+06*	4.46E+06
May-13	8.27E+06	*8.84E+05*	9.15E+06	*-3.42E+06*	5.73E+06
Jun-13	3.71E+06	*-3.18E+06*	5.28E+05	*-4.19E+05*	1.09E+05
Jul-13	1.67E+06	*-1.02E+06*	6.48E+05	*-6.48E+05*	0
Aug-13	9.30E+05	*-5.88E+05*	3.42E+05	*-3.42E+05*	0
Sep-13	8.09E+07	*4.52E+06*	8.55E+07	*8.09E+06*	9.36E+07
Oct-13	5.36E+06	*-4.19E+05*	4.94E+06	*-3.79E+05*	4.56E+06
Nov-13	3.31E+06	*-6.26E+05*	2.69E+06	*-9.13E+04*	2.60E+06
Dec-13	1.82E+06	*-1.25E+05*	1.70E+06	*-8.98E+03*	1.69E+06
2013	**1.13E+08**	***3.26E+06***	**1.17E+08**	***-3.82E+06***	**1.13E+08**
Jan-14	2.37E+06	--	3.40E+06	*-1.39E+06*	2.01E+06
Feb-14	1.76E+06	--	3.96E+06	*-1.63E+06*	2.33E+06
Mar-14	3.61E+06	*1.03E+06*	4.65E+06	*-1.26E+06*	3.39E+06
Apr-14		*0.00E+00*		*0.00E+00*	
May-14		*0.00E+00*		*0.00E+00*	
Jun-14		*0.00E+00*		*0.00E+00*	
Jul-14		*0.00E+00*		*0.00E+00*	
Aug-14		*0.00E+00*		*0.00E+00*	
Sep-14		*0.00E+00*		*0.00E+00*	
Oct-14		*0.00E+00*		*0.00E+00*	
Nov-14		*0.00E+00*		*0.00E+00*	
Dec-14		*0.00E+00*		*0.00E+00*	
2014	**7.75E+06**	***4.26E+06***	**1.20E+07**	***-4.27E+06***	**7.74E+06**

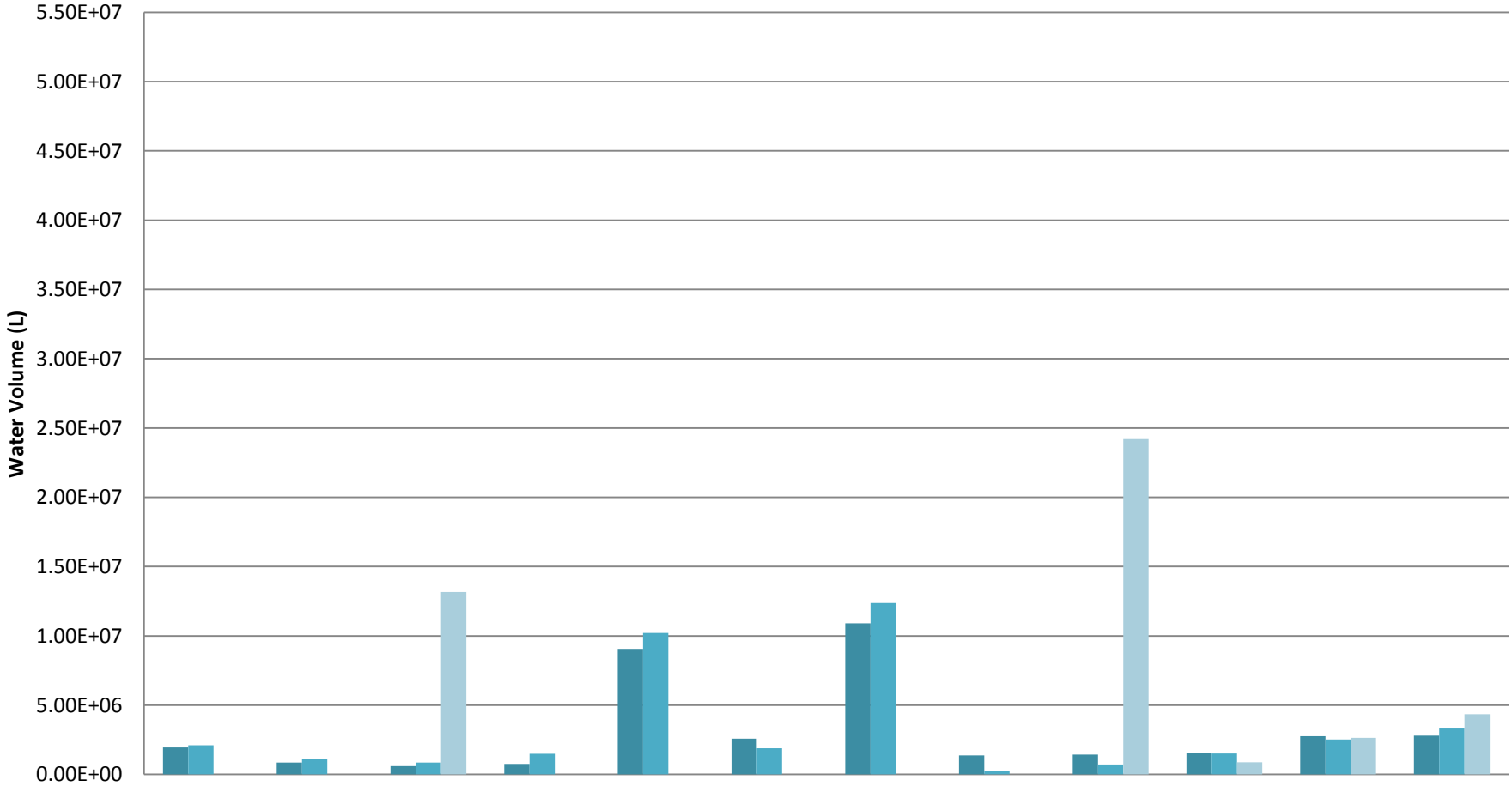
Notes:
0 means zero flow was recorded for that month.
NO FLOW DATA OR SOME FLOW DATA MISSING

Figure G.2
Monthly Water Volume in South Walnut Creek
2010



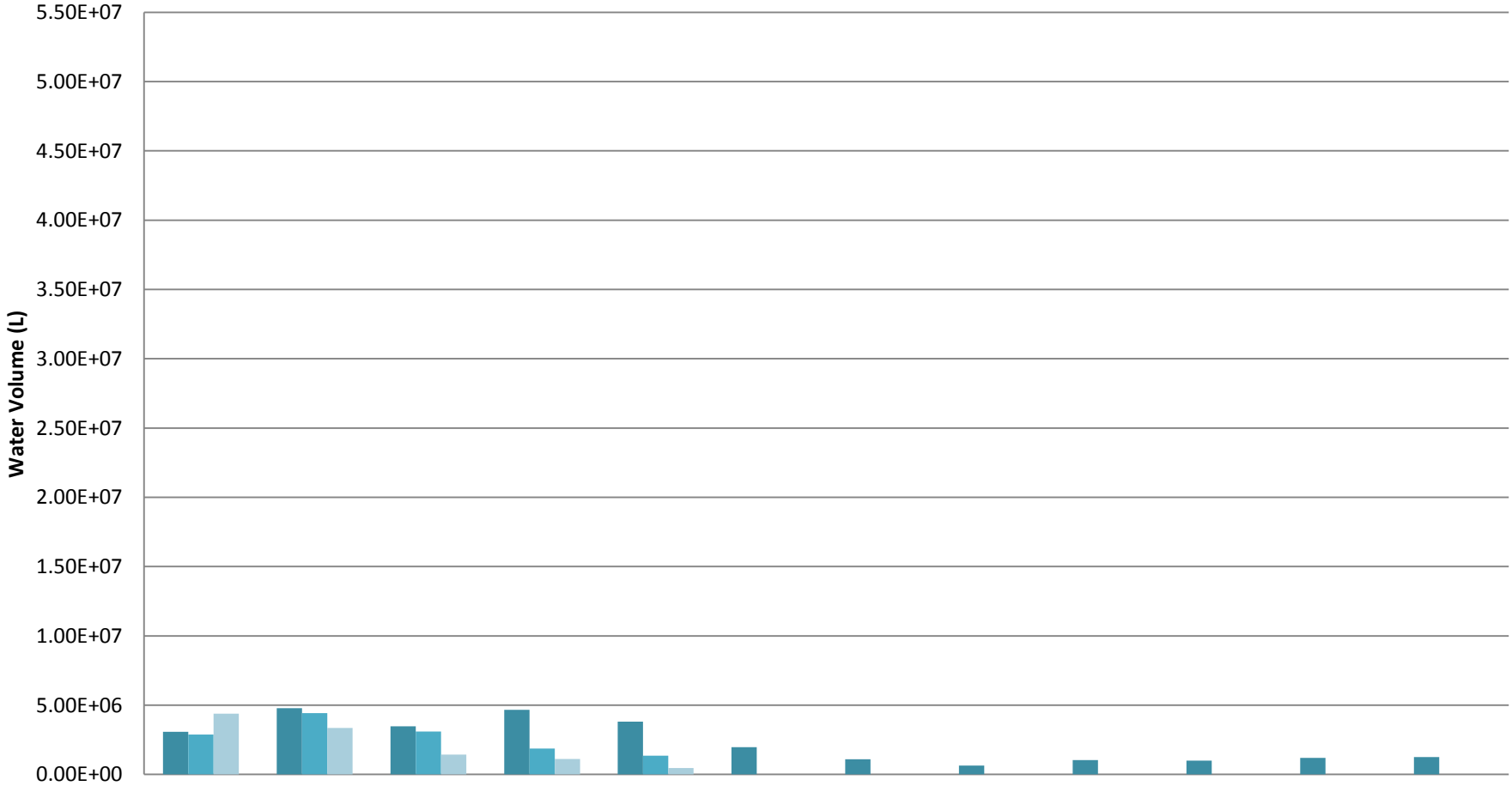
	Jan-10	Feb-10	Mar-10	Apr-10	May-10	Jun-10	Jul-10	Aug-10	Sep-10	Oct-10	Nov-10	Dec-10
GS10	1.52E+06	1.66E+06	1.21E+07	3.50E+07	1.12E+07	7.81E+06	3.19E+06	1.62E+06	1.27E+06	1.40E+06	1.71E+06	1.96E+06
B5INFLOW						2.09E+06	1.73E+06	1.95E+05	0	5.54E+05	1.21E+06	1.22E+06
GS08	0	0	0	4.39E+07	3.49E+07	0	0	0	0	0	0	0

Figure G.3
Monthly Water Volume in South Walnut Creek
2011



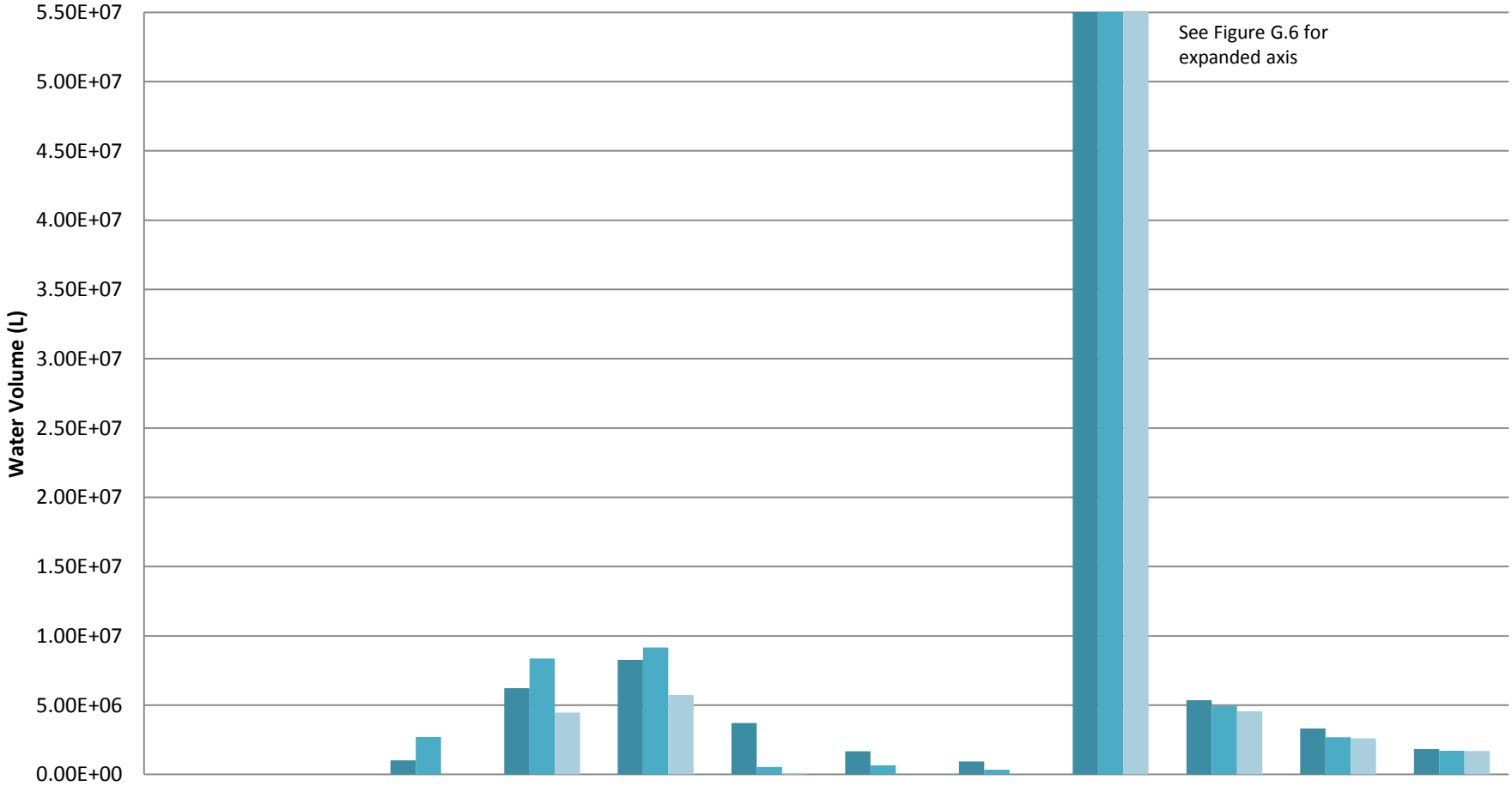
	Jan-11	Feb-11	Mar-11	Apr-11	May-11	Jun-11	Jul-11	Aug-11	Sep-11	Oct-11	Nov-11	Dec-11
GS10	1.94E+06	8.50E+05	5.97E+05	7.57E+05	9.07E+06	2.57E+06	1.09E+07	1.37E+06	1.43E+06	1.56E+06	2.77E+06	2.80E+06
B5INFLOW	2.11E+06	1.14E+06	8.64E+05	1.50E+06	1.02E+07	1.89E+06	1.24E+07	2.21E+05	7.19E+05	1.52E+06	2.51E+06	3.37E+06
GS08	0	0	1.32E+07	0	0	0	0	0	2.42E+07	8.71E+05	2.65E+06	4.35E+06

Figure G.4
Monthly Water Volume in South Walnut Creek
2012



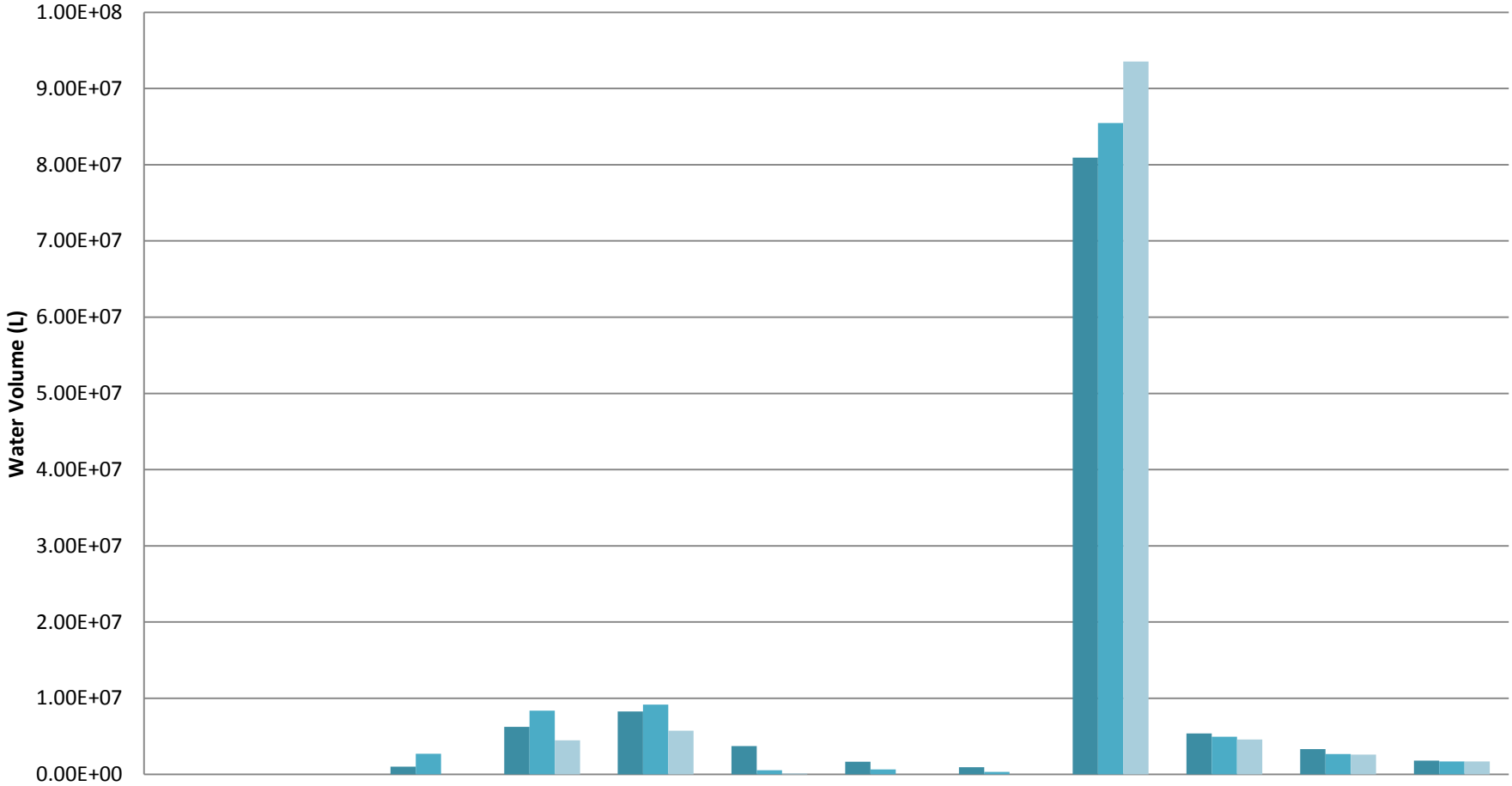
	Jan-12	Feb-12	Mar-12	Apr-12	May-12	Jun-12	Jul-12	Aug-12	Sep-12	Oct-12	Nov-12	Dec-12
GS10	3.07E+06	4.77E+06	3.47E+06	4.67E+06	3.82E+06	1.96E+06	1.10E+06	6.45E+05	1.02E+06	9.86E+05	1.20E+06	1.25E+06
B5INFLOW	2.88E+06	4.42E+06	3.10E+06	1.87E+06	1.34E+06	0	0	0	0	0	0	0
GS08	4.39E+06	3.35E+06	1.43E+06	1.12E+06	4.67E+05	0	0	0	0	0	0	0

Figure G.5
Monthly Water Volume in South Walnut Creek
2013



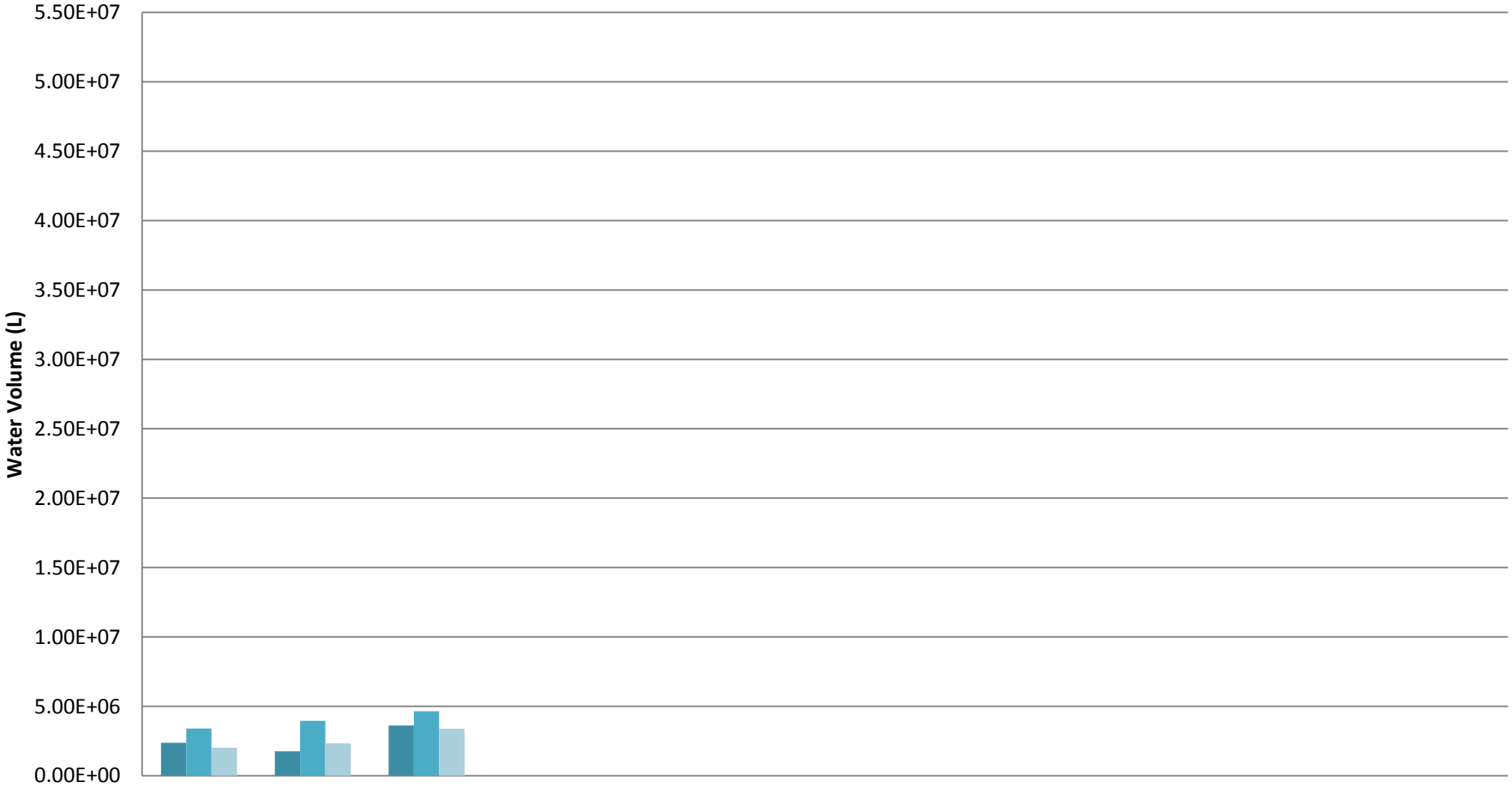
	Jan-13	Feb-13	Mar-13	Apr-13	May-13	Jun-13	Jul-13	Aug-13	Sep-13	Oct-13	Nov-13	Dec-13
GS10			1.01E+06	6.23E+06	8.27E+06	3.71E+06	1.67E+06	9.30E+05	8.09E+07	5.36E+06	3.31E+06	1.82E+06
B5INFLOW	0	0	2.70E+06	8.36E+06	9.15E+06	5.28E+05	6.48E+05	3.42E+05	8.55E+07	4.94E+06	2.69E+06	1.70E+06
GS08	0	0	0	4.46E+06	5.73E+06	1.09E+05	0	0	9.36E+07	4.56E+06	2.60E+06	1.69E+06

Figure G.6
Monthly Water Volume in South Walnut Creek
2013



	Jan-13	Feb-13	Mar-13	Apr-13	May-13	Jun-13	Jul-13	Aug-13	Sep-13	Oct-13	Nov-13	Dec-13
GS10			1.01E+06	6.23E+06	8.27E+06	3.71E+06	1.67E+06	9.30E+05	8.09E+07	5.36E+06	3.31E+06	1.82E+06
B5INFLOW	0	0	2.70E+06	8.36E+06	9.15E+06	5.28E+05	6.48E+05	3.42E+05	8.55E+07	4.94E+06	2.69E+06	1.70E+06
GS08	0	0	0	4.46E+06	5.73E+06	1.09E+05	0	0	9.36E+07	4.56E+06	2.60E+06	1.69E+06

Figure G.7
Monthly Water Volume in South Walnut Creek
2014



	Jan-14	Feb-14	Mar-14	Apr-14	May-14	Jun-14	Jul-14	Aug-14	Sep-14	Oct-14	Nov-14	Dec-14
GS10	2.37E+06	1.76E+06	3.61E+06									
B5INFLOW	3.40E+06	3.96E+06	4.65E+06									
GS08	2.01E+06	2.33E+06	3.39E+06									

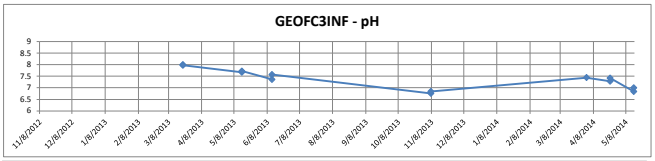
Figure H.1

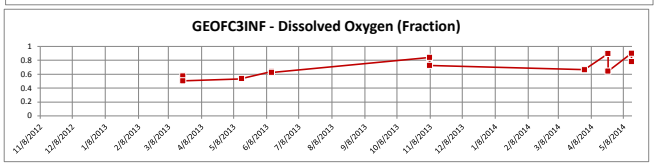
North Walnut Creek - GEOFC3INF - Water Quality and Sediment Data

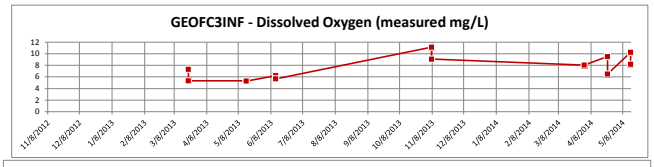
			Water Column											Sediment
Location	DateTime Sampled	RIN-Tik	pH	DO [mg/L unless noted]	DO %	DO Measured mg/L	DO Saturated mg/L	Temp [C]	Fe [ug/L]	SO4 [mg/L]	H2S [mg/L]	NO3	NO2	Uranium [mg/kg]
GEOFC3INF	11/8/12 10:30	12114959-611	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	1.3
GEOFC3INF	3/21/13 4:00		8	7.32	57.41%	7.32	12.75	5.2	#N/A	#N/A	#N/A	4	0	
GEOFC3INF	3/21/13 12:20	13035202-738	7.97	5.34	50.38%	5.34	10.6	12.4	#N/A	220	0.035	6	<2	
GEOFC3INF	5/15/13 4:15		7.67	5.34	53.03%	5.34	10.07	14.9	#N/A	#N/A	#N/A	4	<2	
GEOFC3INF	5/15/13 10:15	13055330- 543	7.72	5.29	53.71%	5.29	9.85	16.2	#N/A	50	0.14	<2	<2	
GEOFC3INF	6/12/13 2:50		7.36	6.23	63.90%	6.23	9.75	16.5	#N/A	#N/A	#N/A	<2	<2	
GEOFC3INF	6/12/13 10:00	13065414-975	7.57	5.67	62.51%	5.67	9.07	19.8	#N/A	40	0.14	3	<2	
GEOFC3INF	11/7/13 4:30		6.76	84.0%	84.0%	11.13	13.25	3.5	#N/A	#N/A	#N/A	low	0	
GEOFC3INF	11/7/13 11:15	13115739-260	6.84	72.6%	72.6%	9.06048	12.48	5.7	68	56	0.007	55	0	
GEOFC3INF	4/1/14 3:45		7.44	8.04	66.34%	8.04	12.12	7.2	#N/A	#N/A	#N/A	low	0	
GEOFC3INF	4/23/14 4:30		7.28	89.7%	89.7%	9.5082	10.6	12.6	#N/A	#N/A	#N/A	5	0	
GEOFC3INF	4/23/14 11:00	14046106-062	7.42	64.4%	64.4%	6.5044	10.1	14.8	260	68	0.007	low	0	
GEOFC3INF	5/15/14 3:45		6.84	10.26	90.00%	10.26	11.4	9.5	#N/A	#N/A	#N/A	#N/A	0	
GEOFC3INF	5/15/14 10:03	sampling team retu	#N/A	#N/A	#N/A	#N/A	#N/A	10.7	#N/A	#N/A	#N/A	10	#N/A	
GEOFC3INF	5/15/14 13:16		7	8.2	77.95%	8.2	10.52	12.9	#N/A	#N/A	#N/A	5	0	

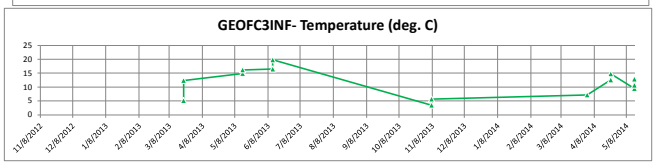
*** Dissolved Oxygen calculations were performed using Table 3.4 of Applications of Environmental Aquatic Chemistry, 3rd Edition by Eugene Weiner*

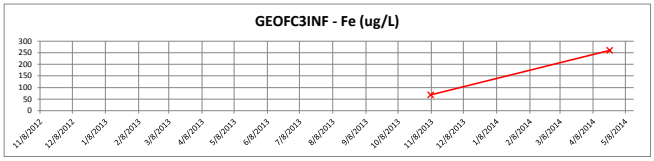
Water Column - GEOFC3INF

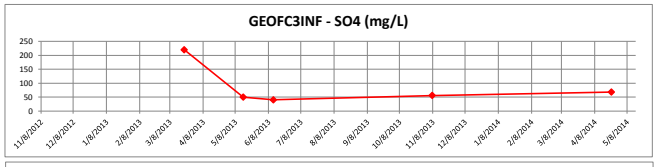


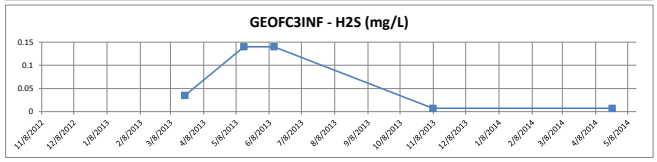


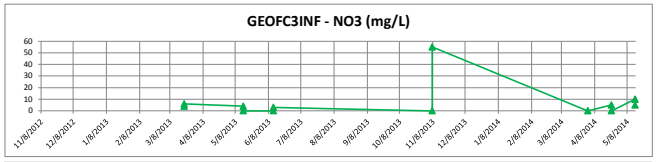












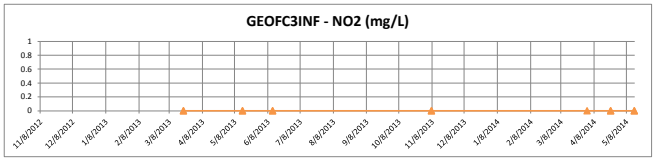


TABLE H.1
NORTH WALNUT CREEK – GEOFC3 INF
GEOCHEMICAL DATA ANALYSIS SUMMARY

SUMMARY COMMENT:
Before 06/12/13:

- Minimal diurnal changes ⇨ Little wetland activity
- Low DO saturation ⇨ reducing conditions

After 06/12/13:

- Higher DO saturation ⇨ oxidizing conditions

Consistent with a new upgradient oxidation source and/or loss of reducing conditions (e.g., increased DO in base flow, high flow-initiated streambed sediment movement, streambed scouring of decaying vegetation, increased NO3 from solar ponds, etc.), potentially with increased U mobility sometime after 07/10/13. Some support for this from SO4 and NO3 data.

Parameter	Date Interval	Comments	
pH	03/21/12 – 05/15/14	av.: 7.37; max.: 8.00; min.: 6.76; No trend.	
DO (% sat) Values considered high or low depend on Temp.	03/21/13 – 06/12/13	av.: 56.8%; max.: 63.9%; min.:50.4% Early morn & afternoon both low; indicates low DO with no significant wetland activity.	
	06/12/13 – 11/07/13	No data	
	11/07/13 – 05/15/14	av.: 77.9%; max.: 90.0%; min.: 64.4% Early morn & afternoon both high; indicates oxidizing conditions from a new upgradient oxidation source. Increased U mobility.	
SO_4 (mg/L)	03/21/13	220	If 220 value is real, indicates loss of SO_4 sometime after 3/21, possibly by reduction to SO_2 or by complexation with metals, including U, mobilizing them.
	11/07/13 – 04/23/14	50, 40, 56, 68	
NO_3 (mg/L)	03/21/13 – 05/15/14	av.: 11.5; max.: 55; min.: <2.0	Only 1 high value (55) occurring on 11/7/13. Then all low values, unlike other sampling points.

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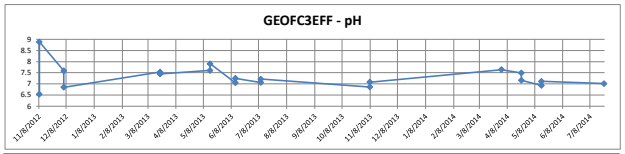
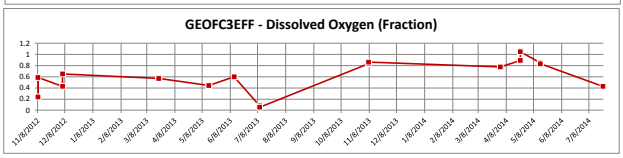
Figure H.2

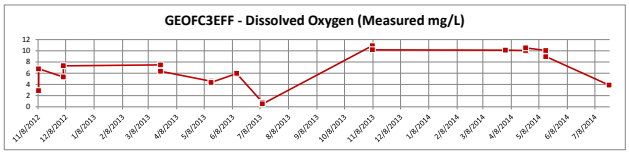
North Walnut Creek - GEOFC3EFF - Water Quality and Sediment Data

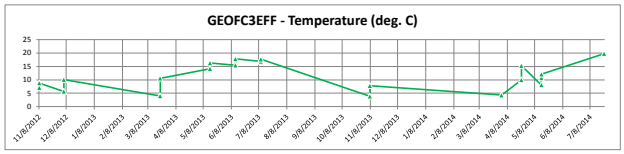
			Water Column											Sediment
Location	DateTime Sampled	RIN-Tik	pH	DO [mg/L unless noted]	DO %	DO Measured mg/L	DO Saturated mg/L	Temp [C]	Fe [ug/L]	SO4 [mg/L]	H2S [mg/L]	NO3	NO2	Uranium [mg/kg]
GEOFC3EFF	11/8/12 5:20		6.53	2.88	23.76%	2.88	12.12	7.1	#N/A	#N/A	#N/A	7	0	
GEOFC3EFF	11/8/12 10:45	12114959-604	8.88	6.78	58.70%	6.78	11.55	8.8	820	160	0.021	<2	0	2.8
GEOFC3EFF	12/5/12 5:40		7.59	5.34	42.86%	5.34	12.46	5.7	#N/A	#N/A	#N/A	4	0	
GEOFC3EFF	12/5/12 11:15	12125014-216	6.85	7.34	65.13%	7.34	11.27	10.1	4850	175	0.007	6	0	
GEOFC3EFF	3/21/13 4:20		7.53	7.49	57.22%	7.49	13.09	4	#N/A	#N/A	#N/A	3	0	
GEOFC3EFF	3/21/13 12:15	13035202-739	7.44	6.34	56.81%	6.34	11.16	10.6	#N/A	150	0.035	5	<2	
GEOFC3EFF	5/15/13 4:25		7.6	4.57	44.50%	4.57	10.27	14.2	#N/A	#N/A	#N/A	13	<2	
GEOFC3EFF	5/15/13 10:25	13055330- 544	7.9	4.34	44.33%	4.34	9.79	16.3	#N/A	56	0.14	<2	<2	
GEOFC3EFF	6/12/13 3:10		7.05	5.97	59.88%	5.97	9.97	15.5	#N/A	#N/A	#N/A	<2	0	
GEOFC3EFF	6/12/13 10:20	13065414-976	7.25	#N/A	#N/A	#N/A	#N/A	17.8	#N/A	69	0.14	<2	<2	
GEOFC3EFF	7/10/13 4:10		7.06	0.77	7.98%	0.77	9.65	16.9	#N/A	#N/A	#N/A	na	na	
GEOFC3EFF	7/10/13 10:30	13075490-837	7.21	0.52	5.49%	0.52	9.48	17.7	#N/A	150	0.007	4	<2	
GEOFC3EFF	11/7/13 4:20		6.86	83.5%	83.5%	10.93015	13.09	3.9	#N/A	#N/A	#N/A	69	0	
GEOFC3EFF	11/7/13 11:40	13115739-261	7.08	86.2%	86.2%	10.19746	11.83	7.8	1500	65	0.007	0	0	
GEOFC3EFF	4/1/14 4:00		7.64	77.6%	77.6%	10.1268	13.05	4.3	#N/A	#N/A	#N/A	low	0	
GEOFC3EFF	4/23/14 4:20		7.49	89.3%	89.3%	10.06411	11.27	10	#N/A	#N/A	#N/A	11	0	
GEOFC3EFF	4/23/14 11:30	14046106-063	7.16	104.9%	104.9%	10.54245	10.05	15.3	290	68	0.007	14	2	
GEOFC3EFF	5/15/14 3:50		6.93	10.06	85.04%	10.06	11.83	8.1	#N/A	#N/A	#N/A	#N/A	0	
GEOFC3EFF	5/15/14 10:30		#N/A	#N/A	#N/A	#N/A	#N/A	10.7	#N/A	#N/A	#N/A	28	#N/A	
GEOFC3EFF	5/15/14 13:35		7.11	8.96	83.27%	8.96	10.76	12.1	#N/A	#N/A	#N/A	30	0	
GEOFC3EFF	7/23/14 10:03		7.01	3.88	42.87%	3.88	9.05	19.8	#N/A	#N/A	#N/A	#N/A	#N/A	

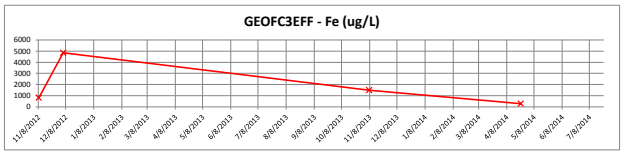
Water Column - GEOFC3EFF

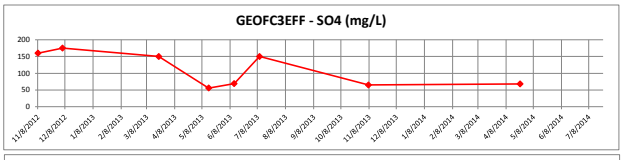


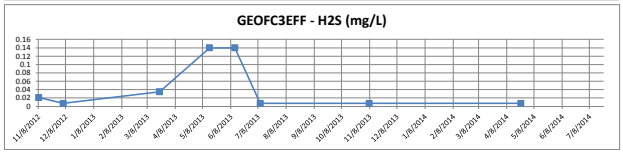


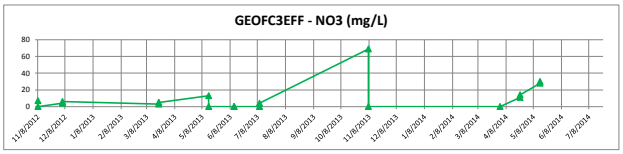












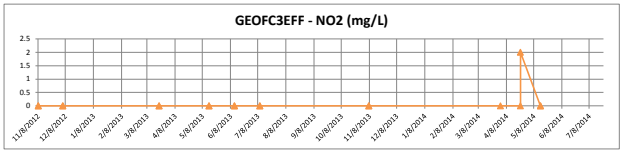


Table H.2
NORTH WALNUT CREEK – GEOFC3 EFF
GEOCHEMICAL DATA ANALYSIS SUMMARY

SUMMARY COMMENT:
Before 06/12/13:

- Minimal diurnal changes ⇨ Little wetland activity
- Low DO saturation ⇨ reducing conditions

After 06/12/13:

- Higher DO saturation ⇨ oxidizing conditions.

Consistent with a new upgradient oxidation source and/or loss of reducing conditions (e.g., increased DO in base flow, high flow-initiated streambed sediment movement, streambed scouring of decaying vegetation, increased NO3 from solar ponds, etc.), potentially with increased U mobility sometime after 07/10/13. Some support for this from SO4 and NO3 data.

Parameter	Date Interval	Comments	
pH	11/08/12 – 05/15/14	av.: 7.32; max.: 8.88; min.: 6.53; No trend.	
DO (% sat) Values considered high or low depend on Temp.	11/08/12 – 07/10/13	av.: 42.4%; max.: 59.9%; min.:5.5% Early morn & afternoon both low; indicates low DO with no significant wetland activity.	
	06/12/13 – 11/07/13	No data	
	11/07/13 – 05/15/14	av.: 87.1%; max.: 104.9%; min.: 77.6% Early morn & afternoon both high; indicates oxidizing conditions from a new upgradient oxidation source. Increased U mobility.	
SO_4 (mg/L)	11/08/12 – 07/10/13	160, 125, 150, 56, 69, 150	May indicate loss of SO_4 sometime after 07/10/13, possibly by reduction to SO_2 or by complexation with metals, including U, mobilizing them.
	11/07/13 – 04/23/14	65, 68	
NO_3 (mg/L)	11/08/12 – 05/15/14	av.: 14.9; max.: 69.0; min.: <2.0	Only 1 high value (55) above 30 occurring on 11/7/13. Then all low values, unlike other sampling points.

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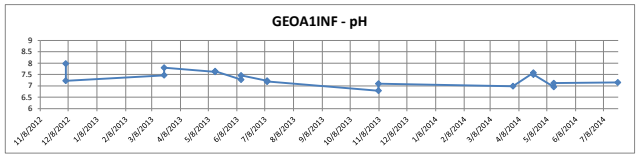
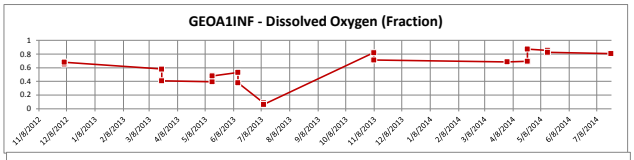
Figure H.3

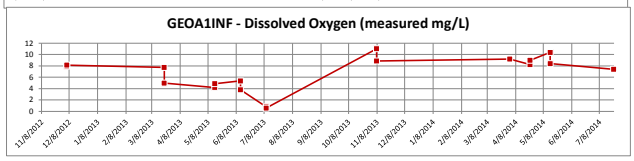
North Walnut Creek - GEOA1INF - Water Quality and Sediment Data

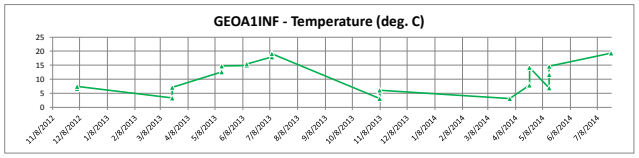
			Water Column											Sediment
Location	DateTime Sampled	RIN-Tik	pH	DO [mg/L unless noted]	DO %	DO Measured mg/L	DO Saturated mg/L	Temp [C]	Fe [ug/L]	SO4 [mg/L]	H2S [mg/L]	NO3	NO2	Uranium [mg/kg]
GEOA1INF	11/8/12 9:50	12114959-614	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	2.35
GEOA1INF	12/5/12 5:50		7.98	7.94	65.51%	7.94	12.12	6.7	#N/A	#N/A	#N/A	High	<2	
GEOA1INF	12/5/12 11:30	12125014-228	7.23	8.15	68.14%	8.15	11.96	7.4	25	300	0.007	High	0	
GEOA1INF	3/21/13 4:35		7.47	7.72	58.05%	7.72	13.3	3.3	#N/A	#N/A	#N/A	49	<2	
GEOA1INF	3/21/13 12:40	13035202-740	7.8	4.96	40.92%	4.96	12.12	7.1	#N/A	180	0.035	High	<2	
GEOA1INF	5/15/13 4:40		7.62	4.21	39.49%	4.21	10.66	12.6	#N/A	#N/A	#N/A	32	<2	
GEOA1INF	5/15/13 10:40	13055330- 545	7.65	4.87	48.03%	4.87	10.14	14.7	#N/A	58	0.007	30	<2	
GEOA1INF	6/12/13 3:15		7.28	5.35	53.13%	5.35	10.07	14.9	#N/A	#N/A	#N/A	34	2	
GEOA1INF	6/12/13 10:40	13065414-977	7.46	3.79	38.05%	3.79	9.96	15.4	#N/A	68	0.14	30	<2	
GEOA1INF	7/10/13 4:20		7.23	0.81	8.57%	0.81	9.45	17.9	#N/A	#N/A	#N/A	15	2	
GEOA1INF	7/10/13 10:45	13075490-838	7.19	0.57	6.16%	0.57	9.26	19.1	#N/A	91	0.007	18	2	
GEOA1INF	11/7/13 3:30		6.79	82.0%	82.00%	11.0208	13.44	3.1	#N/A	#N/A	#N/A	High	0	
GEOA1INF	11/7/13 12:00	13115739-267	7.1	71.3%	71.30%	8.86259	12.43	6.1	22	75	0.007	High	0	
GEOA1INF	4/1/14 4:15		6.99	9.21	68.73%	9.21	13.4	3.1	#N/A	#N/A	#N/A	82	0	
GEOA1INF	4/23/14 3:40		7.58	69.6%	69.60%	8.23368	11.83	7.9	#N/A	#N/A	#N/A	High	0	
GEOA1INF	4/23/14 11:50	14046106-069	7.5	87.4%	87.40%	8.99346	10.29	14.2	44	81	0.007	76	0	
GEOA1INF	5/15/14 3:55		6.96	10.37	85.56%	10.37	12.12	6.9	#N/A	#N/A	#N/A	not workin	0	
GEOA1INF	5/15/14 10:53		#N/A	#N/A	#N/A	#N/A	#N/A	11.6	#N/A	#N/A	#N/A	40	#N/A	
GEOA1INF	5/15/14 13:47		7.12	8.4	82.60%	8.4	10.17	14.6	#N/A	#N/A	#N/A	51	0	
GEOA1INF	7/23/14 10:08		7.15	7.41	80.81%	7.41	9.17	19.3	#N/A	#N/A	#N/A	#N/A	#N/A	

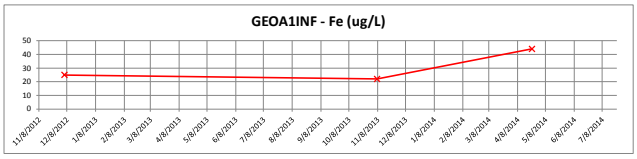
Water Column - GEOA1NF

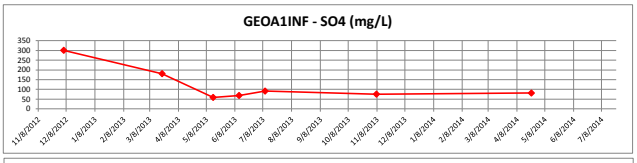


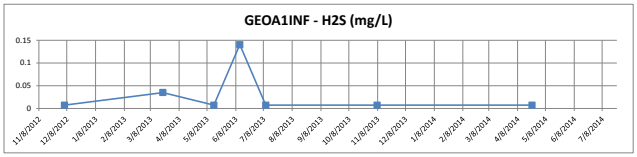


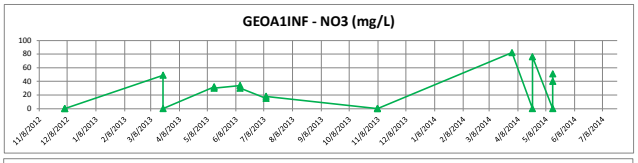












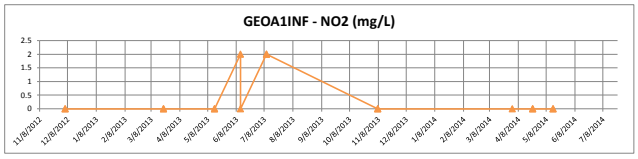


TABLE H.3
NORTH WALNUT CREEK - GEOA1 INF
GEOCHEMICAL DATA ANALYSIS SUMMARY

SUMMARY COMMENT:
Before 07/10/13:

- Minimal diurnal changes ⇨ Little wetland activity
- Low DO saturation ⇨ reducing conditions

After 07/10/13:

- Higher DO saturation ⇨ oxidizing conditions

Consistent with a new upgradient oxidation source and/or loss of reducing conditions (e.g., increased DO in base flow, high flow-initiated streambed sediment movement, streambed scouring of decaying vegetation, increased NO3 from solar ponds, etc.), potentially with increased U mobility sometime after 07/10/13. Some support for this from SO4 and NO3 data.

Parameter	Date Interval	Comments	
pH	12/05/12 – 05/15/14	av.: 7.35; max.: 7.98; min.: 6.79; No trend.	
DO (% sat) Values considered high or low depend on Temp.	12/05/12 – 07/10/13	av.: 43%; max.: 68% min.: 6% Early morn & afternoon both low to fairly low; indicates low Eh & little wetland activity.	
	07/10/13 – 11/07/13	No data	
	11/07/13 – 05/15/14	av.: 78%; max.: 87% min.: 69% Early morn & afternoon both high; indicates an upgradient oxidation source. Increased U mobility.	
SO4 (mg/L)	12/05/12 – 05/15/13	300 – 180	Indicates loss of SO_4 sometime after 5/15, possibly by reduction to SO_2 or by complexation with metals, including U, mobilizing them.
	05/15/13 – 04/23/14	58 – 91	
NO3 (mg/L)	12/05/12 – 05/15/14	32 –82; Inconsistent data, may be a probe problem. Highest concentrations occur after 07/10/13 and could suggest new source became available. Consistent with periods of higher Eh and DO conditions.	

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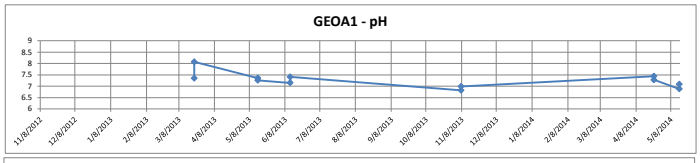
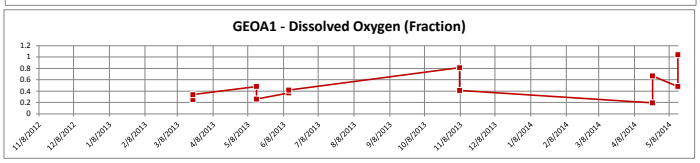
Figure H.4

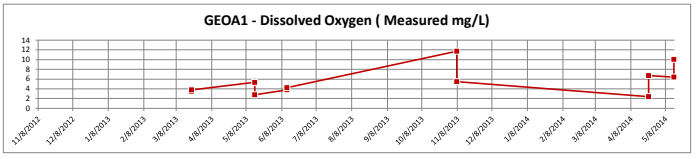
North Walnut Creek - GEOA1 - Water Quality and Sediment Data

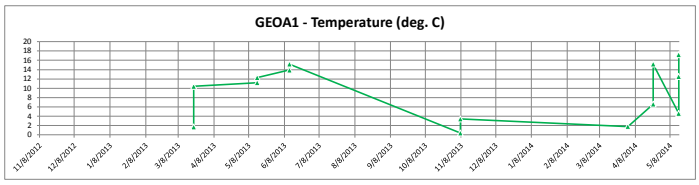
			Water Column											Sediment
Location	DateTime Sampled	RIN-Tik	pH	DO [mg/L unless noted]	DO %	DO Measured mg/L	DO Saturated mg/L	Temp [C]	Fe [ug/L]	SO4 [mg/L]	H2S [mg/L]	NO3	NO2	Uranium [mg/kg]
GEOA1	11/8/12 9:45	12114959-613	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	6.5
GEOA1	3/21/13 4:45		7.35	3.42	25.26%	3.42	13.54	1.7	#N/A	#N/A	#N/A	32	<2	
GEOA1	3/21/13 12:35	13035202-741	8.07	3.78	33.84%	3.78	11.17	10.4	#N/A	240	0.035	32	27	
GEOA1	5/15/13 4:55		7.36	5.32	48.32%	5.32	11.01	11.2	#N/A	#N/A	#N/A	20	<2	
GEOA1	5/15/13 10:55	13055330- 546	7.26	2.77	25.94%	2.77	10.68	12.3	#N/A	60	0.14	17	<2	
GEOA1	6/12/13 3:34		7.15	3.78	36.73%	3.78	10.29	13.9	#N/A	#N/A	#N/A	<2	<2	
GEOA1	6/12/13 10:50	13065414-978	7.41	4.21	41.93%	4.21	10.04	15.2	#N/A	64	0.14	6	<2	
GEOA1	11/7/13 3:20		6.82	81.1%	81.10%	11.71	14.44	0.4	#N/A	#N/A	#N/A	55	0	
GEOA1	11/7/13 12:10	13115739-263	6.99	41.1%	41.10%	5.47	13.3	3.4	5300	74	0.007	70	0	
GEOA1	4/1/14 4:30	pH probe not working after initial samples	#N/A	#N/A	#N/A	#N/A	13.81	1.8	#N/A	#N/A	#N/A	56	0	
GEOA1	4/23/14 3:30		7.44	19.4%	19.40%	2.38	12.24	6.6	#N/A	#N/A	#N/A	79	0	
GEOA1	4/23/14 12:00	14046106-065	7.28	66.7%	66.70%	6.7	10.04	15.2	120	92	0.007	High	0	
GEOA1	5/15/14 4:05		6.88	6.41	48.30%	6.41	13.27	4.6	#N/A	#N/A	#N/A	instrument	0	
GEOA1	5/15/14 11:07		#N/A	#N/A	#N/A	#N/A	#N/A	12.5	#N/A	#N/A	#N/A	28		
GEOA1	5/15/14 14:00		7.09	10.04	104.04%	10.04	9.65	17.2	#N/A	#N/A	#N/A	59	0	

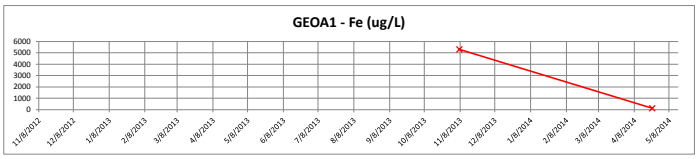
Water Column - GEOA1

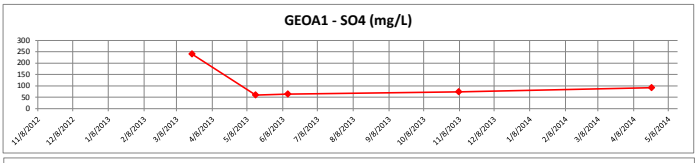


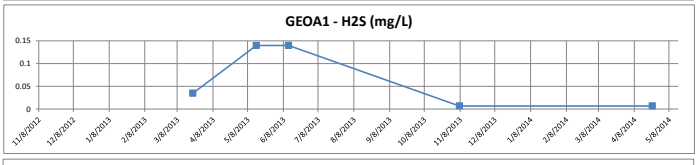


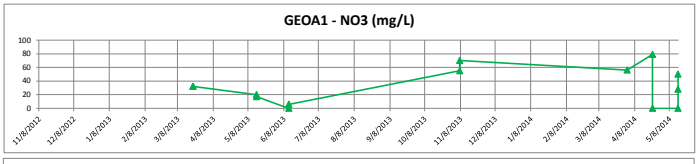












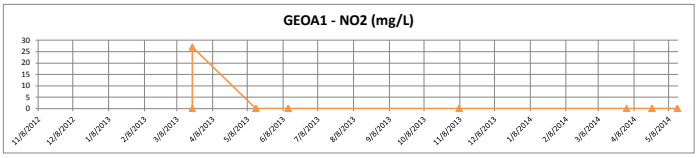


Table H.4
NORTH WALNUT CREEK – GEOA1
GEOCHEMICAL DATA ANALYSIS SUMMARY

SUMMARY COMMENT:
Before 06/12/13:

- Minimal diurnal changes ⇨ Little wetland activity
- Low DO saturation ⇨ reducing conditions

After 06/12/13:

- Higher DO saturation ⇨ oxidizing conditions

Consistent with a new upgradient oxidation source and/or loss of reducing conditions (e.g., increased DO in base flow, high flow-initiated streambed sediment movement, streambed scouring of decaying vegetation, increased NO3 from solar ponds, etc.), potentially with increased U mobility sometime after 07/10/13. Some support for this from SO4 and NO3 data.

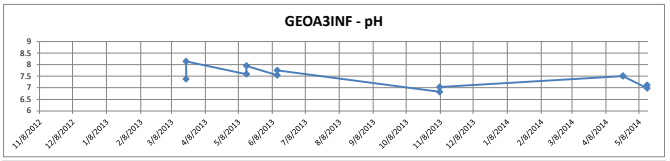
Parameter	Date Interval	Comments	
pH	03/21/12 – 05/15/14	av.: 7.26; max.: 8.07; min.: 6.82; No trend.	
DO (% sat) Values considered high or low depend on Temp.	03/21/13 – 06/12/13	av.: 35.3%; max.: 48.3%; min.:25.3% Early morn & afternoon both low; indicates low Eh & little wetland activity.	
	06/12/13 – 11/07/13	No data	
	11/07/13 – 05/15/14	Early morn low % (41, 19, 48) & afternoon high % (81, 67, 104); indicates active wetland with high daytime DO from photosynthesis and lower nighttime DO from biodegradation.	
SO_4 (mg/L)	03/21/13	240	If 240 value is real, indicates loss of SO_4 sometime after 3/21, possibly by reduction to SO_2 or by complexation with metals, including U, mobilizing them.
	05/15/13 – 04/23/14	60, 64, 92	
NO_3 (mg/L)	03/21/13 – 06/12/13	av.: 18; max.: 32; min.: 6.0	Low nitrate
	06/12/13 – 11/07/13	No data	
	11/07/13 – 05/15/14	av.: 56; max.: 79; min.: 28	Higher nitrate suggests new source became available. Coincides with periods of higher Eh and DO conditions.

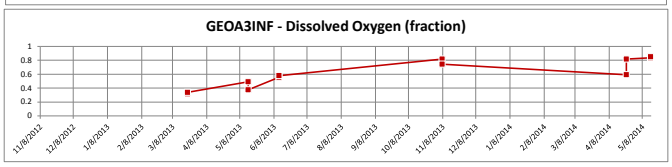
Figure H.5

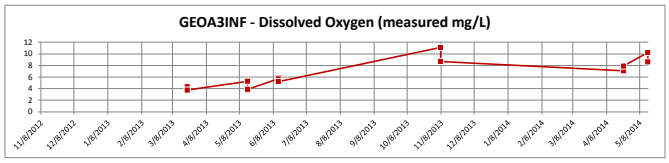
North Walnut Creek - GEOA3INF - Water Quality and Sediment Data

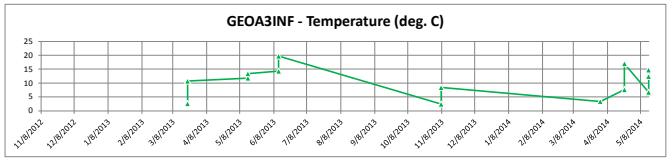
			Water Column											Sediment
Location	DateTime Sampled	RIN-Tik	pH	DO [mg/L unless noted]	DO %	DO Measured mg/L	DO Saturated mg/L	Temp [C]	Fe [ug/L]	SO4 [mg/L]	H2S [mg/L]	NO3	NO2	Uranium [mg/kg]
GEOA3INF	11/8/12 9:35	12114959-609	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	3
GEOA3INF	3/21/13 5:05		7.38	4.33	31.72%	4.33	13.65	2.6	#N/A	#N/A	#N/A	15	<2	
GEOA3INF	3/21/13 12:40	13035202-742	8.14	3.74	33.85%	3.74	11.05	10.7	#N/A	350	0.035	12	<2	
GEOA3INF	5/15/13 5:10		7.59	5.27	48.98%	5.27	10.76	11.8	#N/A	#N/A	#N/A	31	<2	
GEOA3INF	5/15/13 11:05	13055330- 547	7.95	3.87	37.39%	3.87	10.35	13.4	#N/A	70	0.007	31	<2	
GEOA3INF	6/12/13 3:55		7.54	5.67	55.53%	5.67	10.21	14.3	#N/A	#N/A	#N/A	<2	0	
GEOA3INF	6/12/13 11:00	13065414-979	7.75	5.21	57.89%	5.21	9	19.7	#N/A	110	0.14	4	<2	
GEOA3INF	11/7/13 3:45		6.82	81.6%	81.60%	11.0976	13.6	2.4	#N/A	#N/A	#N/A	50	0	
GEOA3INF	11/7/13 12:20	13115739-264	7.03	74.3%	74.30%	8.6931	11.7	8.4	1100	80	0.007	na	0	
GEOA3INF	4/1/14 4:45		#N/A	#N/A	#N/A	#N/A	#N/A	3.4	#N/A	#N/A	#N/A	20	0	
GEOA3INF	4/23/14 3:55		7.51	59.1%	59.10%	7.05654	11.94	7.6	#N/A	#N/A	#N/A	17	0	
GEOA3INF	4/23/14 12:15	14046106-066	7.51	81.7%	81.70%	7.88405	9.65	17	3100	90	0.007	88	1	
GEOA3INF	5/15/14 4:10		6.98	10.21	83.48%	10.21	12.23	6.7	#N/A	#N/A	#N/A	#N/A	0	
GEOA3INF	5/15/14 11:12		#N/A	#N/A	#N/A	#N/A	#N/A	12.4	#N/A	#N/A	#N/A	35	#N/A	
GEOA3INF	5/15/14 14:10		7.12	8.62	84.93%	8.62	10.15	14.7	#N/A	#N/A	#N/A	50	0	

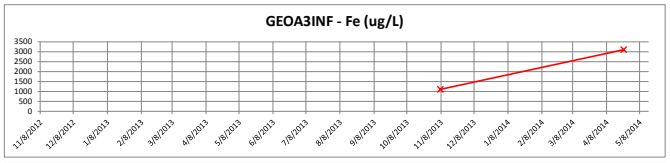
Water Column - GEOA3INF

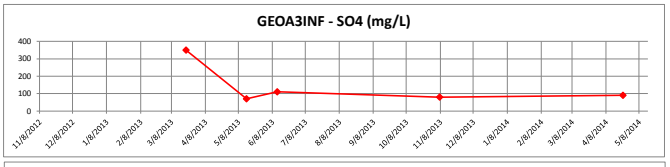


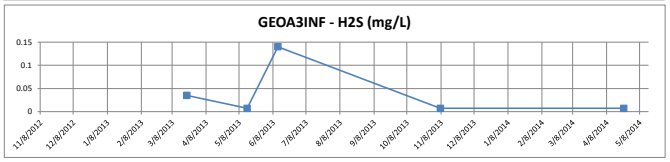


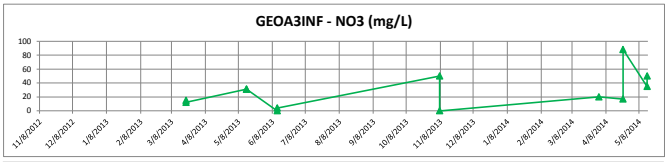












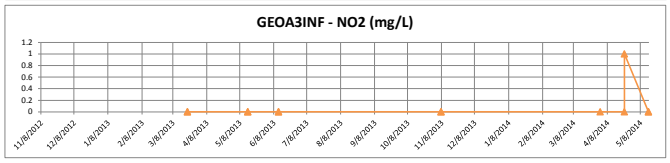


Table H.5
NORTH WALNUT CREEK – GEOA3 INF
GEOCHEMICAL DATA ANALYSIS SUMMARY

Parameter	Date Interval	Comments	
SUMMARY COMMENT: Before 06/12/13: • Minimal diurnal changes ⇨ Little wetland activity • Low DO saturation ⇨ reducing conditions After 06/12/13: • Higher DO saturation ⇨ oxidizing conditions **Consistent with a new upgradient oxidation source and/or loss of reducing conditions (e.g., increased DO in base flow, high flow-initiated streambed sediment movement, streambed scouring of decaying vegetation, increased NO3 from solar ponds, etc.), potentially with increased U mobility sometime after 07/10/13. Some support for this from SO4 and NO3 data.**			
pH	03/21/12 – 05/15/14	av.: 7.44; max.: 8.14; min.: 6.82; No trend.	
DO (% sat) Values considered high or low depend on Temp.	03/21/13 – 06/12/13	av.: 44.2%; max.: 57.9%; min.:31.7% Early morn & afternoon both low; indicates low DO with no significant wetland activity.	
	06/12/13 – 11/07/13	No data	
	11/07/13 – 05/15/14	av.: 77.5%; max.: 84.9%; min.:59.1% Early morn & afternoon both high; indicates oxidizing conditions from a new upgradient oxidation source. Increased U mobility.	
SO_4 (mg/L)	03/21/13	350	If 350 value is real, indicates loss of SO_4 sometime after 3/21, possibly by reduction to SO_2 or by complexation with metals, including U, mobilizing them.
	11/07/13 – 04/23/14	70, 110, 80, 90	
NO_3 (mg/L)	03/21/13 – 05/15/14	av.: 32.1; max.: 88; min.: <2.0	The 3 highest of 12 values (88, 50, 50) all occurred after 11/07/13, showing an apparent increase from start to end. Otherwise no clear trend.

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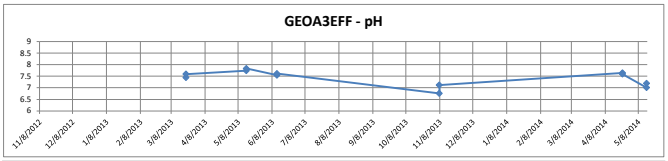
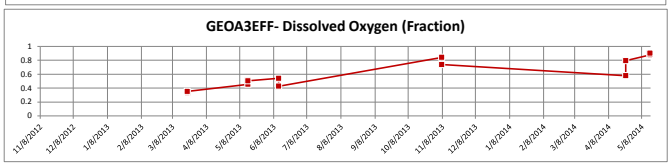
Figure H.6

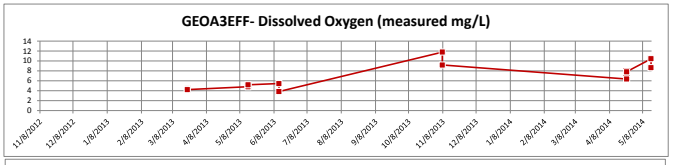
North Walnut Creek - GEOA3EFF - Water Quality and Sediment Data

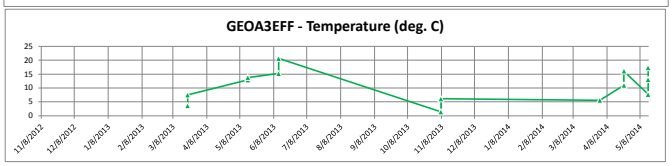
			Water Column											Sediment
Location	DateTime Sampled	RIN-Tik	pH	DO [mg/L unless noted]	DO %	DO Measured mg/L	DO Saturated mg/L	Temp [C]	Fe [ug/L]	SO4 [mg/L]	H2S [mg/L]	NO3	NO2	Uranium [mg/kg]
GEOA3EFF	11/8/12 9:20	12114959-610	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	7
GEOA3EFF	3/21/13 5:15		7.44	4.42	33.36%	4.42	13.25	3.6	#N/A	#N/A	#N/A	11	<2	
GEOA3EFF	3/21/13 12:50	13035202-743	7.59	4.21	35.14%	4.21	11.98	7.5	#N/A	540	0.035	<2	<2	
GEOA3EFF	5/15/13 5:00		7.74	4.79	45.53%	4.79	10.52	12.9	#N/A	#N/A	#N/A	40	<2	
GEOA3EFF	5/15/13 11:15	13055330- 548	7.83	5.19	50.34%	5.19	10.31	13.8	#N/A	85	0.007	27	<2	
GEOA3EFF	6/12/13 3:45		7.54	5.43	53.92%	5.43	10.07	15.2	#N/A	#N/A	#N/A	6	0	
GEOA3EFF	6/12/13 11:20	13065414-980	7.61	3.84	42.76%	3.84	8.98	20.6	#N/A	140	0.14	6	<2	
GEOA3EFF	11/7/13 3:40		6.76	84.2%	84.2%	11.79	14	1.4	#N/A	#N/A	#N/A	#N/A	0	
GEOA3EFF	11/7/13 12:30	13115739-265	7.12	73.8%	73.8%	9.17	12.43	6.1	37	93	0.007	70	0	
GEOA3EFF	4/1/14 5:00		#N/A	#N/A	#N/A	#N/A	#N/A	5.6	#N/A	#N/A	#N/A	57	0	
GEOA3EFF	4/23/14 3:45		7.64	57.8%	57.80%	6.36	11.01	11	#N/A	#N/A	#N/A	61	0	
GEOA3EFF	4/23/14 12:30	14046106-067	7.59	79.3%	79.30%	7.81	9.85	16.1	69	110	0.007	79	0	
GEOA3EFF	5/15/14 4:20		7.01	10.45	87.89%	10.45	11.89	7.7	#N/A	#N/A	#N/A	#N/A	0	
GEOA3EFF	5/15/14 11:18		#N/A	#N/A	#N/A	#N/A	#N/A	13	#N/A	#N/A	#N/A	28	#N/A	
GEOA3EFF	5/15/14 14:20		7.19	8.65	90.10%	8.65	9.6	17.3	#N/A	#N/A	#N/A	10	0	

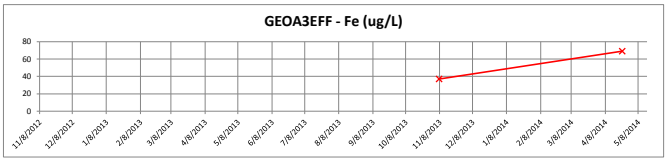
Water Column - GEOA3EFF

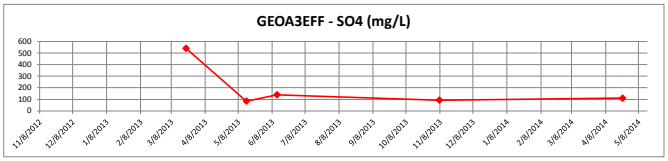


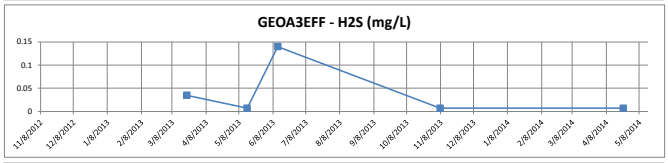


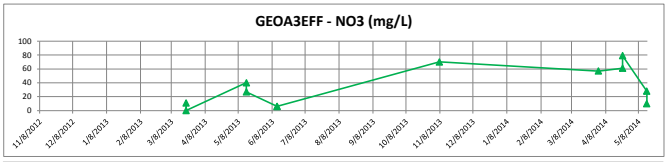












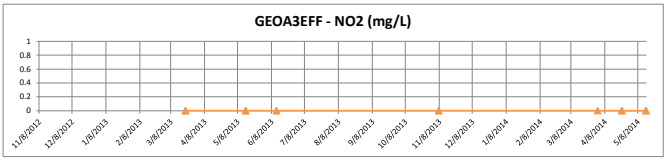


Table H.6
NORTH WALNUT CREEK – GEOA3 EFF
GEOCHEMICAL DATA ANALYSIS SUMMARY

SUMMARY COMMENT:
Before 06/12/13:

- Minimal diurnal changes ⇨ Little wetland activity
- Low DO saturation ⇨ reducing conditions

After 06/12/13:

- Higher DO saturation ⇨ oxidizing conditions

Consistent with a new upgradient oxidation source and/or loss of reducing conditions (e.g., increased DO in base flow, high flow-initiated streambed sediment movement, streambed scouring of decaying vegetation, increased NO3 from solar ponds, etc.), potentially with increased U mobility sometime after 07/10/13. Some support for this from SO4 and NO3 data.

Parameter	Date Interval	Comments	
pH	03/21/12 – 05/15/14	av.: 7.42; max.: 7.83; min.: 6.76; No trend.	
DO (% sat) Values considered high or low depend on Temp.	03/21/13 – 06/12/13	av.: 43.5%; max.: 53.9%; min.:33.4% Early morn & afternoon both low; indicates low DO with no significant wetland activity.	
	06/12/13 – 11/07/13	No data	
	11/07/13 – 05/15/14	av.: 78.9%; max.: 90.1%; min.:57.8% Early morn & afternoon both high; indicates oxidizing conditions from a new upgradient oxidation source. Increased U mobility.	
SO_4 (mg/L)	03/21/13	540	If 540 value is real, indicates loss of SO_4 sometime after 3/21, possibly by reduction to SO_2 or by complexation with metals, including U, mobilizing them.
	11/07/13 – 04/23/14	85, 140, 93, 110	
NO_3 (mg/L)	03/21/13 – 05/15/14	av.: 35.9; max.: 79; min.: <2.0	The 4 highest of 12 values (70, 57, 61, 79) all occurred after 11/07/13, showing an apparent increase from start to end. Otherwise no clear trend.

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Figure I.1

South Walnut Creek - GEOB1INF - Water Quality and Sediment Data

			Water Column											Sediment
Location	DateTime Sampled	RIN-Tik	pH	DO [mg/L unless noted]	DO %	DO Measured mg/L	DO Saturated mg/L	Temp [C]	Fe [ug/L]	SO4 [mg/L]	H2S [mg/L]	NO3	NO2	Uranium [mg/kg]
GEOB1INF	11/8/12 5:45		8.05	3.99	32.52%	3.99	12.27	6.6	#N/A	#N/A	#N/A	<2	0	
GEOB1INF	11/8/12 11:15	12114959-605	6.94	6.14	52.48%	6.14	11.7	8.5	1100	61	0.007	<2	0	14
GEOB1INF	12/5/12 5:15		8.07	7.32	58.89%	7.32	12.43	5.8	#N/A	#N/A	#N/A	<2	2	
GEOB1INF	12/5/12 11:50	12125014-217	6.84	7.88	66.78%	7.88	11.8	8.2	17000	58	0.049	<2	0	
GEOB1INF	3/21/13 5:50		7.59	4.27	31.82%	4.27	13.42	3.2	#N/A	#N/A	#N/A	<10	<2	
GEOB1INF	3/21/13 13:20	13035202-745	7.92	8.52	69.44%	8.52	12.27	6.6	#N/A	100	0.035	<2	0	
GEOB1INF	5/15/13 5:40		7.87	5.84	54.28%	5.84	10.76	12.2	#N/A	#N/A	#N/A	11	<2	
GEOB1INF	5/15/13 12:00	13055330- 550	7.73	4.23	40.67%	4.23	10.4	13.4	#N/A	73	0.007	4	<2	
GEOB1INF	6/12/13 4:25		7.58	4.98	48.87%	4.98	10.19	14.6	#N/A	#N/A	#N/A	0	0	
GEOB1INF	6/12/13 11:45	13065414-982	7.6	5.86	60.10%	5.86	9.75	16.6	#N/A	72	0.14	<4	<2	
GEOB1INF	7/10/13 3:50		7.35	0.83	8.60%	0.83	9.65	17.1	#N/A	#N/A	#N/A	0	0	
GEOB1INF	7/10/13 13:15	13075490-839	7.48	0.52	5.62%	0.52	9.26	18.7	#N/A	62	0.007	<2	<2	
GEOB1INF	11/7/13 4:45		6.86	82.3%	82.30%	11.1105	13.5	2.7	#N/A	#N/A	#N/A	low	0	
GEOB1INF	11/7/13 13:10	13115739-262	7.12	101.4%	101.40%	11.99562	11.83	7.9	390	70	0.007	na	0	
GEOB1INF	4/1/14 5:30		#N/A	#N/A	#N/A	#N/A	#N/A	4.8	#N/A	#N/A	#N/A	low	0	
GEOB1INF	4/23/14 4:00		7.6	64.0%	64.00%	7.392	11.55	9.1	#N/A	#N/A	#N/A	low	0	
GEOB1INF	4/23/14 13:00	14046106-064	7.4	90.7%	90.70%	9.75932	10.76	11.8	27	71	0.007	low	0	
GEOB1INF	5/15/14 5:00		6.94	9.88	79.68%	9.88	12.4	6.3	#N/A	#N/A	#N/A	#N/A	0	
GEOB1INF	5/15/14 11:40		#N/A	#N/A	#N/A	#N/A	#N/A	9.1	#N/A	#N/A	#N/A	10	#N/A	
GEOB1INF	5/15/14 14:45		7.35	8.74	77.90%	8.74	11.22	10.3	#N/A	#N/A	#N/A	0	0	
GEOB1INF	7/23/14 10:47		7.18	10.26 (lots of algae)	119.86%	10.26	8.56	23	#N/A	#N/A	#N/A	#N/A	#N/A	

*** Dissolved Oxygen calculations were performed using Table 3.4 of Applications of Environmental Aquatic Chemistry, 3rd Edition by Eugene Weiner*

Water Column - GEOB1INF

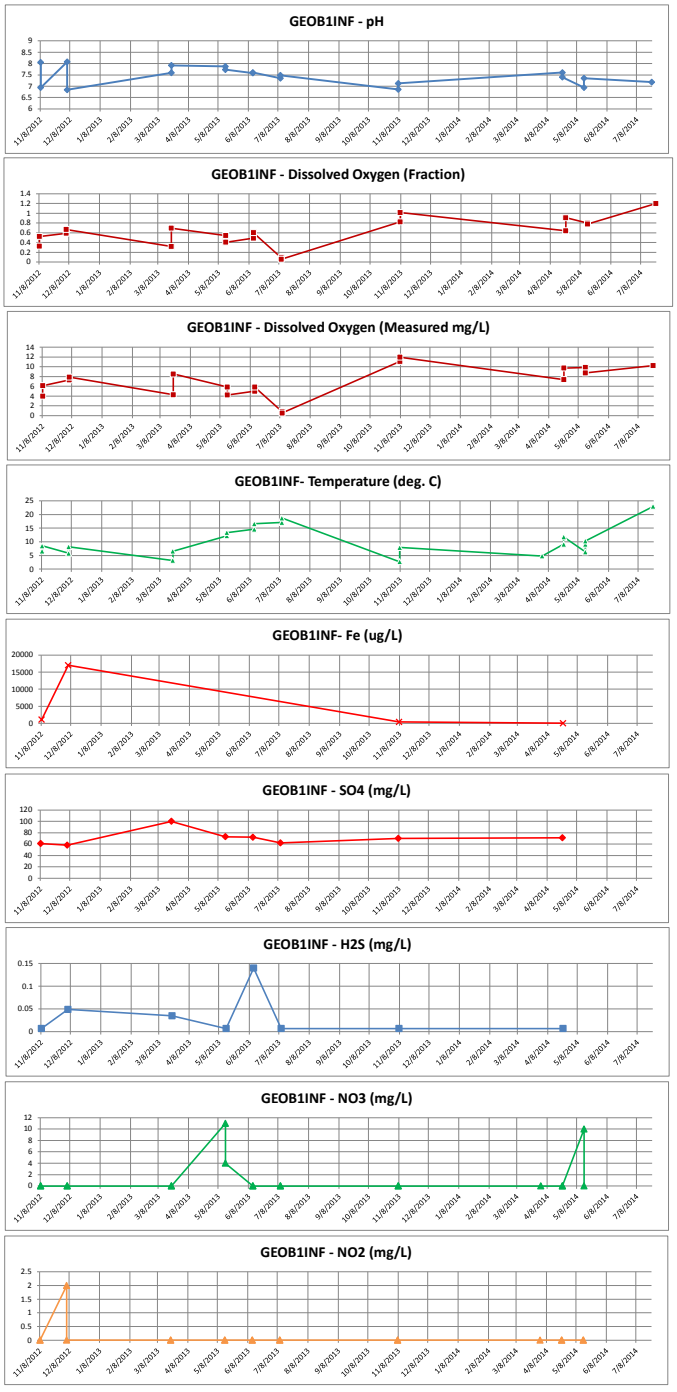

TABLE I.1
SOUTH WALNUT CREEK – GEO B1 INF
GEOCHEMICAL DATA ANALYSIS SUMMARY

SUMMARY COMMENT:
Before 07/10/13:

- Minimal diurnal change ⇨ Little wetland activity.
- Low DO saturation with no diurnal change ⇨ reducing conditions with no photosynthesis effect.

After 07/10/13:

- Higher DO saturation with little diurnal change ⇨ oxidizing conditions in water and sediments with limited photosynthesis effect.

The changes in %DO are consistent with data collected from North Walnut Creek that show a change from anoxic to oxidizing conditions during the same time periods. This could indicate a new upgradient oxidation source and/or loss of reducing conditions (e.g., increased DO in base flow, high flow-initiated streambed sediment movement, streambed scouring of decaying vegetation, etc.), potentially with increased U mobility sometime after 07/10/13. Other data are inconclusive.

Parameter	Date Interval	Comments	
pH	11/08/12 – 05/15/14	av.: 7.46; max.: 8.05; min.: 6.84; No trend.	
DO (% sat) Values considered high or low depend on Temp.	11/08/12 – 07/10/13	av.: 42.4%; max.: 59.9%; min.:5.5% Early morn & afternoon both low; indicates low DO with no significant wetland activity.	
	06/12/13 – 11/07/13	No data	
	11/07/13 – 05/15/14	av.: 87.1%; max.: 104.9%; min.: 77.6% Early morn & afternoon both high; indicates oxidizing conditions from a new upgradient oxidation source. Increased U mobility.	
SO_4 (mg/L)	11/08/12 – 07/10/13	61, 58, 100, 73, 72, 62,	No indication of SO_4 loss after 07/10/13, as in North Walnut Creek.
	11/07/13 – 04/23/14	70, 71	
NO_3 (mg/L)	11/08/12 – 05/15/14	av.: 4.2; max.: 11.0; min.: <2.0 Generally undetectable throughout.	Only 3 detects (11, 4, 10) but some signs that data may be unreliable.

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Figure I.2

South Walnut Creek - GEOB4INF - Water Quality and Sediment Data

			Water Column											Sediment
Location	DateTime Sampled	RIN-Tik	pH	DO [mg/L unless noted]	DO %	DO Measured mg/L	DO Saturated mg/L	Temp [C]	Fe [ug/L]	SO4 [mg/L]	H2S [mg/L]	NO3	NO2	Uranium [mg/kg]
GEOB4	11/8/12 9:30	12114959-608	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	1.4
GEOB4	5/15/13 5:30		7.59	6.27	55.00%	6.27	11.4	9.4	#N/A	#N/A	#N/A	4	<2	
GEOB4	5/15/13 11:45	13055330- 551	7.11	3.27	30.85%	3.27	10.6	12.4	#N/A	45	0.14	4	<2	
GEOB4	5/15/14 4:50		6.97	9.96	80.13%	9.96	12.43	6.1	#N/A	#N/A	#N/A	#N/A	0	
GEOB4	5/15/14 11:34		#N/A	#N/A	#N/A	#N/A	#N/A	13.3	#N/A	#N/A	#N/A	10	#N/A	
GEOB4	5/15/14 14:44		7.28	6.39	64.61%	6.39	9.89	16.2	#N/A	#N/A	#N/A	5	0	

Water Column -GEOB4

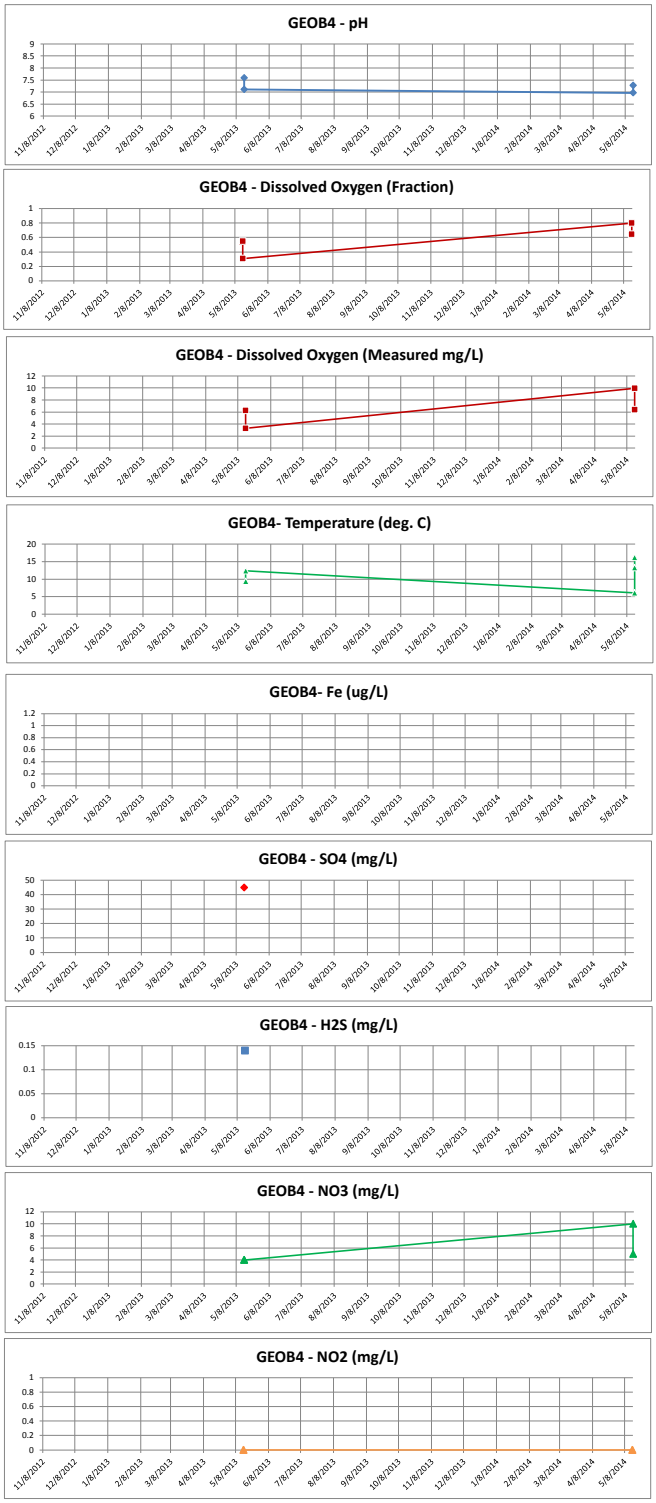


Table I.2
SOUTH WALNUT CREEK – GEO B4 INF
GEOCHEMICAL DATA ANALYSIS SUMMARY

(2 samples collected [morning and afternoon] on each of 2 days: 05/15/13 and 05/15/14)

SUMMARY COMMENT:

With samples collected on only 2 days, 1 year apart, the only useful observations are that the changes in %DO between the two days in sampling are consistent with data collected from North Walnut Creek that show a change from anoxic to oxidizing during the same period.

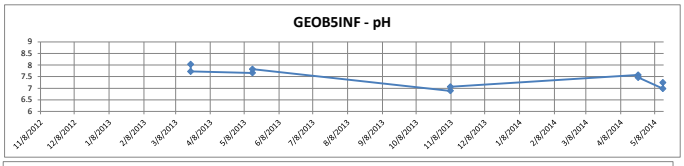
Parameter	Date Interval	Comments	
pH	05/15/13; 05/15/14	05/15/13: 7.59 (morn), 7.11 (aft) // **05/15/14**: 6.97 (morn), 7.28 (aft)	
DO (% sat) Values considered high or low depend on Temp.	05/15/13	55.0 (morn), 30.9 (aft) Just 1 day but low DO% consistent with North Walnut Creek during time period.	
	05/15/13 – 05/15/14	No data	
	05/15/14	80.1 (morn), 64.6 (aft) Just 1 day but high DO% consistent with North Walnut Creek during time period..	
SO_4 (mg/L)	05/15/13	45	Only 1 sample collected. SO4 in same range as at B1
NO_3 (mg/L)	05/15/13	4.0 (morn), 4.0 (aft)	No conclusions.
	05/15/13 – 05/15/14	No data	
	05/15/14	10.0 (morn), 5.01 (aft)	No conclusions.

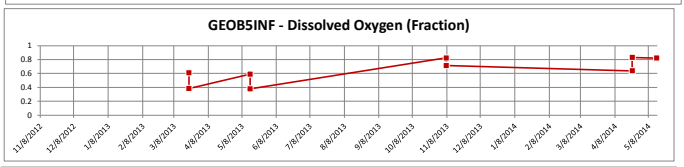
Figure I.3

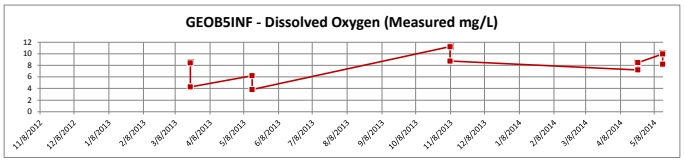
South Walnut Creek - GEOB5INF - Water Quality and Sediment Data

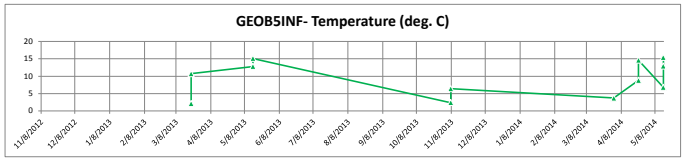
			Water Column											Sediment
Location	DateTime Sampled	RIN-Tik	pH	DO [mg/L unless noted]	DO %	DO Measured mg/L	DO Saturated mg/L	Temp [C]	Fe [ug/L]	SO4 [mg/L]	H2S [mg/L]	NO3	NO2	Uranium [mg/kg]
GEOB5INF	11/8/12 10:00	12114959-606	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	2.5
GEOB5INF	3/21/13 5:30		8.03	8.42	60.97%	8.42	13.81	2.1	#N/A	#N/A	#N/A	<10	<2	
GEOB5INF	3/21/13 13:00	13035202-744	7.72	4.27	38.54%	4.27	11.08	10.7	#N/A	210	0.007	<2	<2	
GEOB5INF	5/15/13 5:15		7.66	6.2	58.94%	6.2	10.52	12.8	#N/A	#N/A	#N/A	0	<2	
GEOB5INF	5/15/13 11:30	13055330- 549	7.82	3.82	37.93%	3.82	10.07	15.1	#N/A	83	0.007	<2	<2	
GEOB5INF	11/7/13 4:10		6.89	82.3%	82.30%	11.20926	13.62	2.4	#N/A	#N/A	#N/A	12	0	
GEOB5INF	11/7/13 12:40	13115739-266	7.06	71.3%	71.30%	8.72712	12.24	6.4	630	66	0.007	na	0	
GEOB5INF	4/1/14 5:15		#N/A	#N/A	#N/A	#N/A	#N/A	3.7	#N/A	#N/A	#N/A	9	0	
GEOB5INF	4/23/14 4:10		7.57	63.8%	63.80%	7.2094	11.3	8.8	#N/A	#N/A	#N/A	low	0	
GEOB5INF	4/23/14 12:40	14046106-068	7.46	83.1%	83.10%	8.46789	10.19	14.6	1900	71	0.007	low	0	
GEOB5INF	5/15/14 4:35		6.98	9.96	81.91%	9.96	12.16	6.8	#N/A	#N/A	#N/A		#N/A	0
GEOB5INF	5/15/14 11:27		#N/A	#N/A	#N/A	#N/A	#N/A	12.9	#N/A	#N/A	#N/A	10	#N/A	
GEOB5INF	5/15/14 14:32		7.24	8.2	82.25%	8.2	9.97	15.4	#N/A	#N/A	#N/A	0	0	

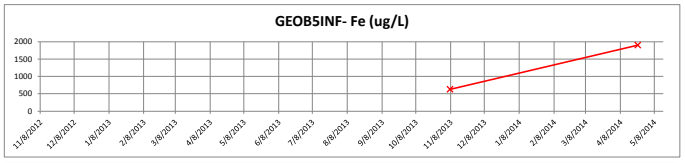
Water Column - GEOB5INF

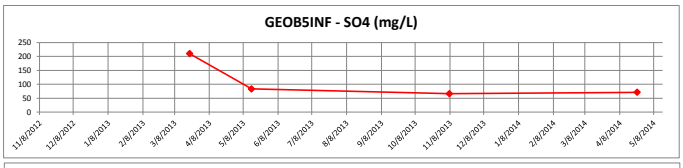


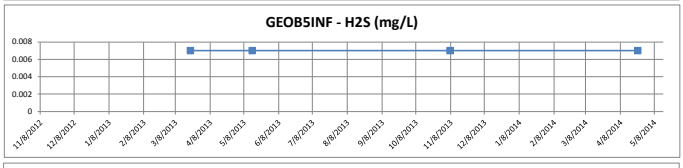


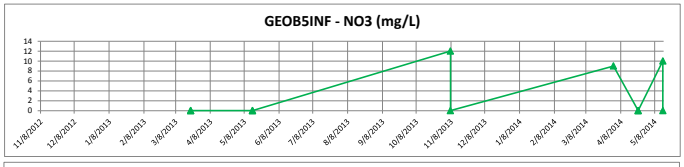












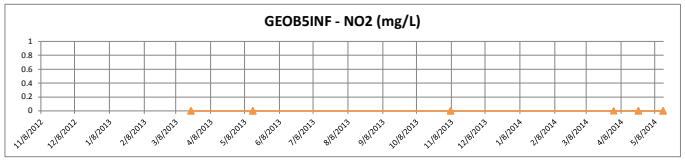


Table I.3
SOUTH WALNUT CREEK – GEO B5 INF
GEOCHEMICAL DATA ANALYSIS SUMMARY

SUMMARY COMMENT:
Before 07/10/13:

- Minimal diurnal changes ⇨ Little wetland activity
- Low DO saturation with no diurnal change ⇨ reducing conditions with no photosynthesis effect.

After 07/10/13:

- Higher DO saturation with little diurnal change ⇨ oxidizing conditions in water and sediments with limited photosynthesis effect.

The changes in %DO are consistent with data collected from North Walnut Creek that show a change from anoxic to oxidizing conditions during the same time periods. This could indicate a new upgradient oxidation source and/or loss of reducing conditions (e.g., increased DO in base flow, high flow-initiated streambed sediment movement, streambed scouring of decaying vegetation, etc.), potentially with increased U mobility sometime after 07/10/13. Other data are inconclusive.

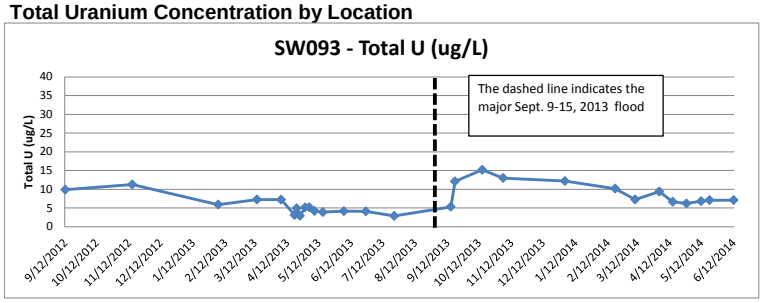
Parameter	Date Interval	Comments	
pH	11/08/12 – 05/15/14	av.: 7.44; max.: 8.03; min.: 6.89; No trend.	
DO (% sat) Values considered high or low depend on Temp.	11/08/12 – 05/15/13	av.: 49.1%; max.: 61.0%; min.:37.9% Early morn & afternoon both low; indicates low DO with no significant wetland activity.	
	05/15/13 – 11/07/13	No data	
	11/07/13 – 05/15/14	av.: 77.5%; max.: 83.1%; min.: 63.8% Early morn & afternoon both high; indicates oxidizing conditions from a new upgradient oxidation source. Increased U mobility.	
SO_4 (mg/L)	03/21/13 and 05/15/13	210 and 83	No reliable indication of SO_4 loss after 07/10/13, as in North Walnut Creek.
	11/07/13 and 04/23/14	66 and 71	
NO_3 (mg/L)	11/08/12 – 05/15/14	av.: 6.2; max.: 12.0; min.: <2.0	Only 3 detects (12, 9, 10) but some signs that data may be unreliable.

Z:\Project Files\07\071-091\071-091.020\Engineering\Reports\2015\Water Quality Report\September 2015\Appendices\Appendix I - Geochem - SWC\Appendix I\Table I.3_S WALNUT CR B5 INF.docx

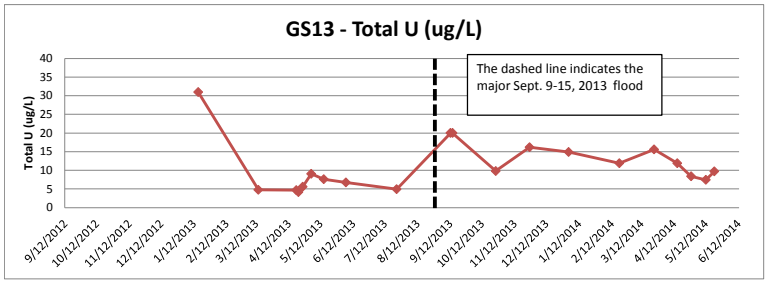
Figure J.1

Total Uranium Concentration by Location

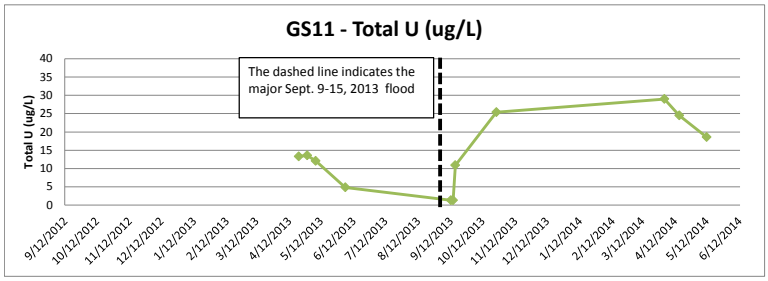
North Walnut Creek



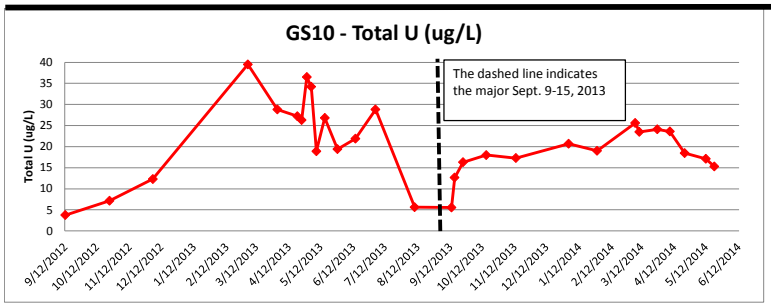
Upstream



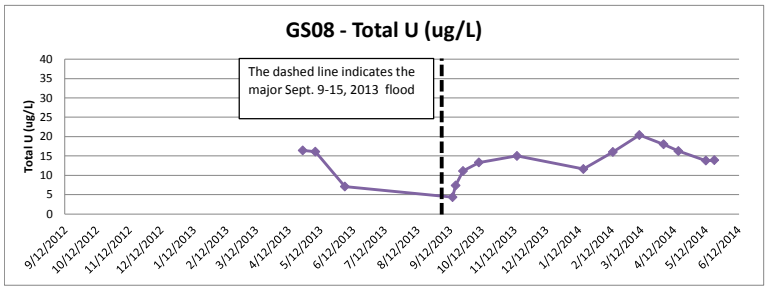
Downstream



South Walnut Creek



Upstream



Downstream

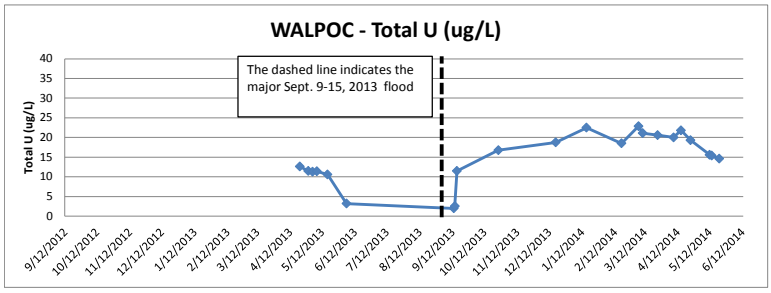
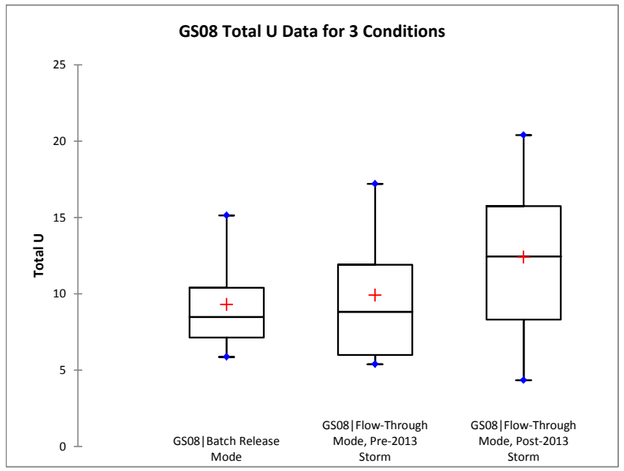
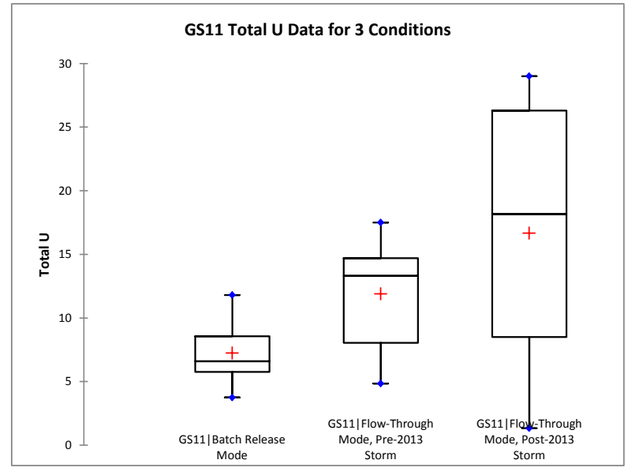
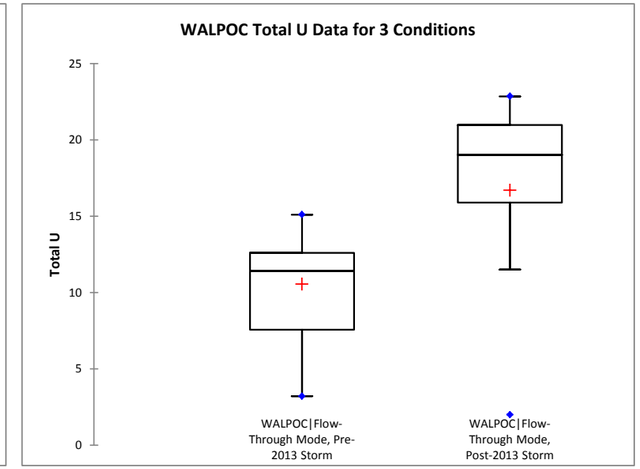
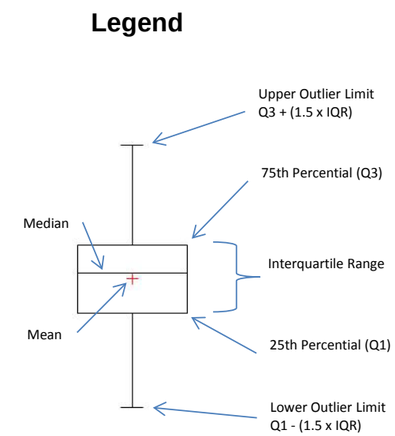


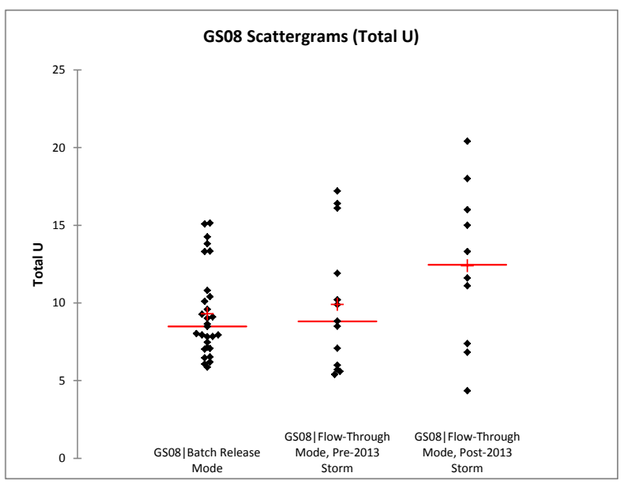
Figure J.2

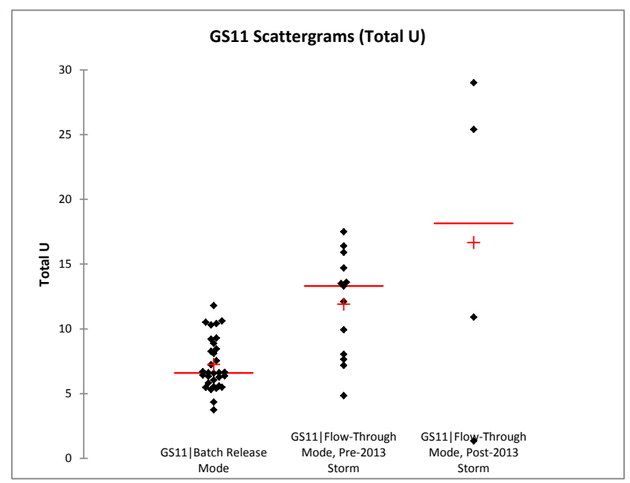

GS08 Total U Data for 3 Conditions
Total U
25
20
15
10
5
0
GS08|Batch Release Mode
GS08|Flow-Through Mode, Pre-2013 Storm
GS08|Flow-Through Mode, Post-2013 Storm

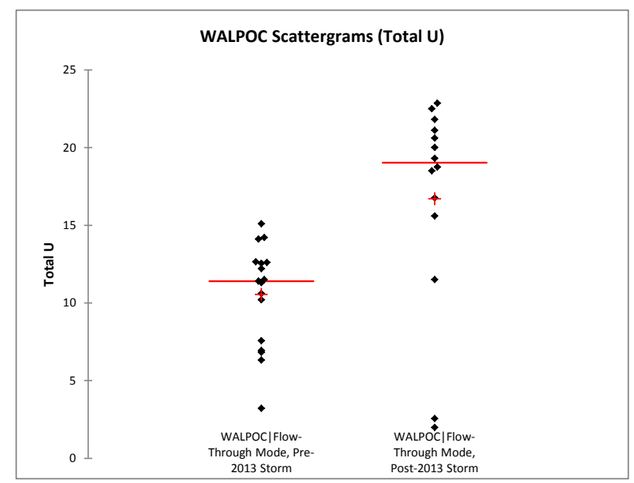

GS11 Total U Data for 3 Conditions
Total U
30
25
20
15
10
5
0
GS11|Batch Release Mode
GS11|Flow-Through Mode, Pre-2013 Storm
GS11|Flow-Through Mode, Post-2013 Storm

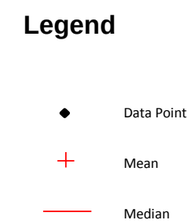

WALPOC Total U Data for 3 Conditions
Total U
25
20
15
10
5
0
WALPOC|Flow-Through Mode, Pre-2013 Storm
WALPOC|Flow-Through Mode, Post-2013 Storm


Legend
Upper Outlier Limit
Q3 + (1.5 x IQR)
75th Percential (Q3)
Median
Interquartile Range
Mean
25th Percential (Q1)
Lower Outlier Limit
Q1 - (1.5 x IQR)


GS08 Scattergrams (Total U)
Total U
25
20
15
10
5
0
GS08|Batch Release Mode
GS08|Flow-Through Mode, Pre-2013 Storm
GS08|Flow-Through Mode, Post-2013 Storm


GS11 Scattergrams (Total U)
Total U
30
25
20
15
10
5
0
GS11|Batch Release Mode
GS11|Flow-Through Mode, Pre-2013 Storm
GS11|Flow-Through Mode, Post-2013 Storm


WALPOC Scattergrams (Total U)
Total U
25
20
15
10
5
0
WALPOC|Flow-Through Mode, Pre-2013 Storm
WALPOC|Flow-Through Mode, Post-2013 Storm


Legend
Data Point
Mean
Median

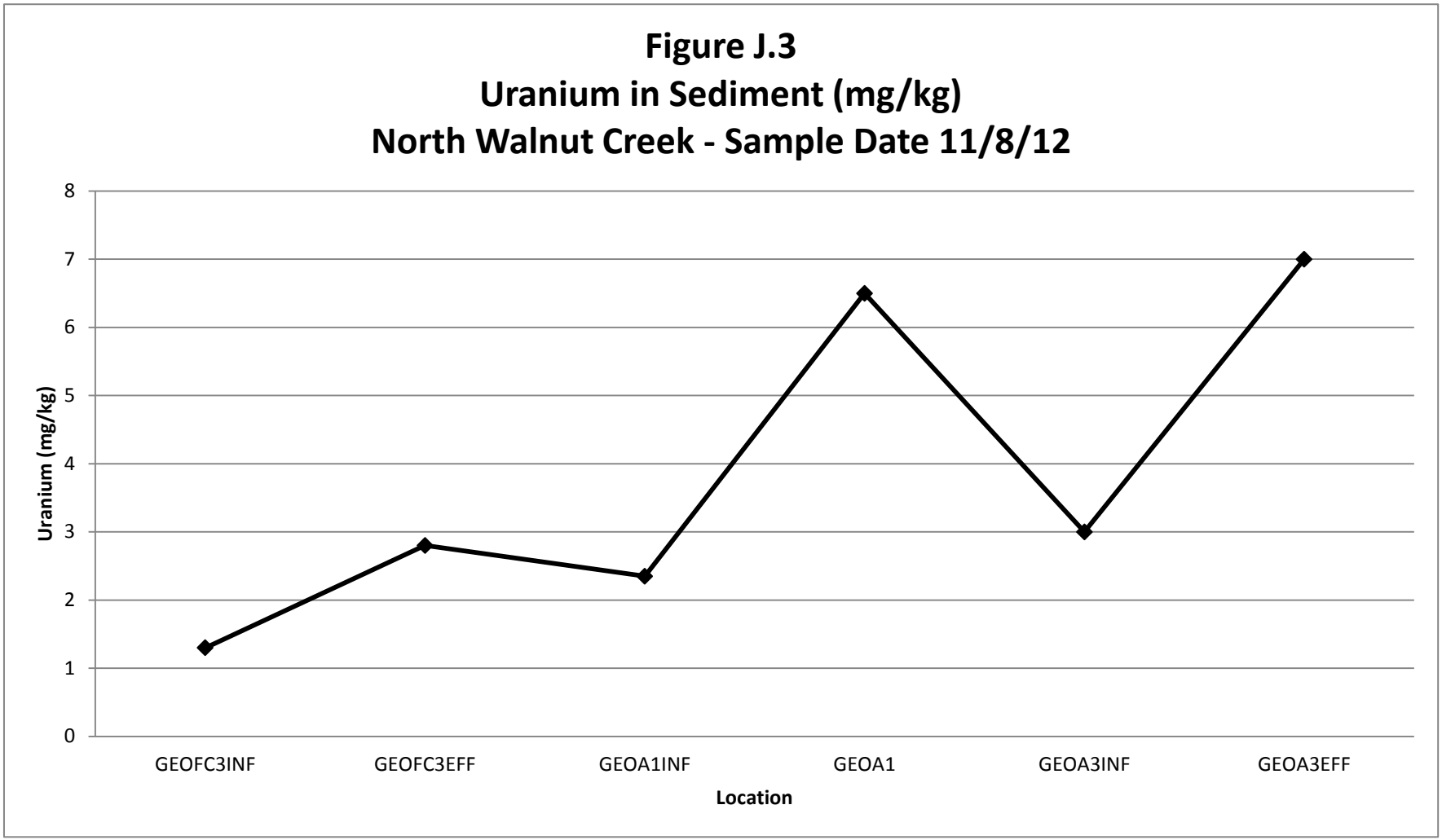


Figure J.3
Uranium in Sediment (mg/kg)
North Walnut Creek - Sample Date 11/8/12
Uranium (mg/kg)
0
1
2
3
4
5
6
7
8
GEOFC3INF
GEOFC3EFF
GEOA1INF
GEOA1
GEOA3INF
GEOA3EFF
Location

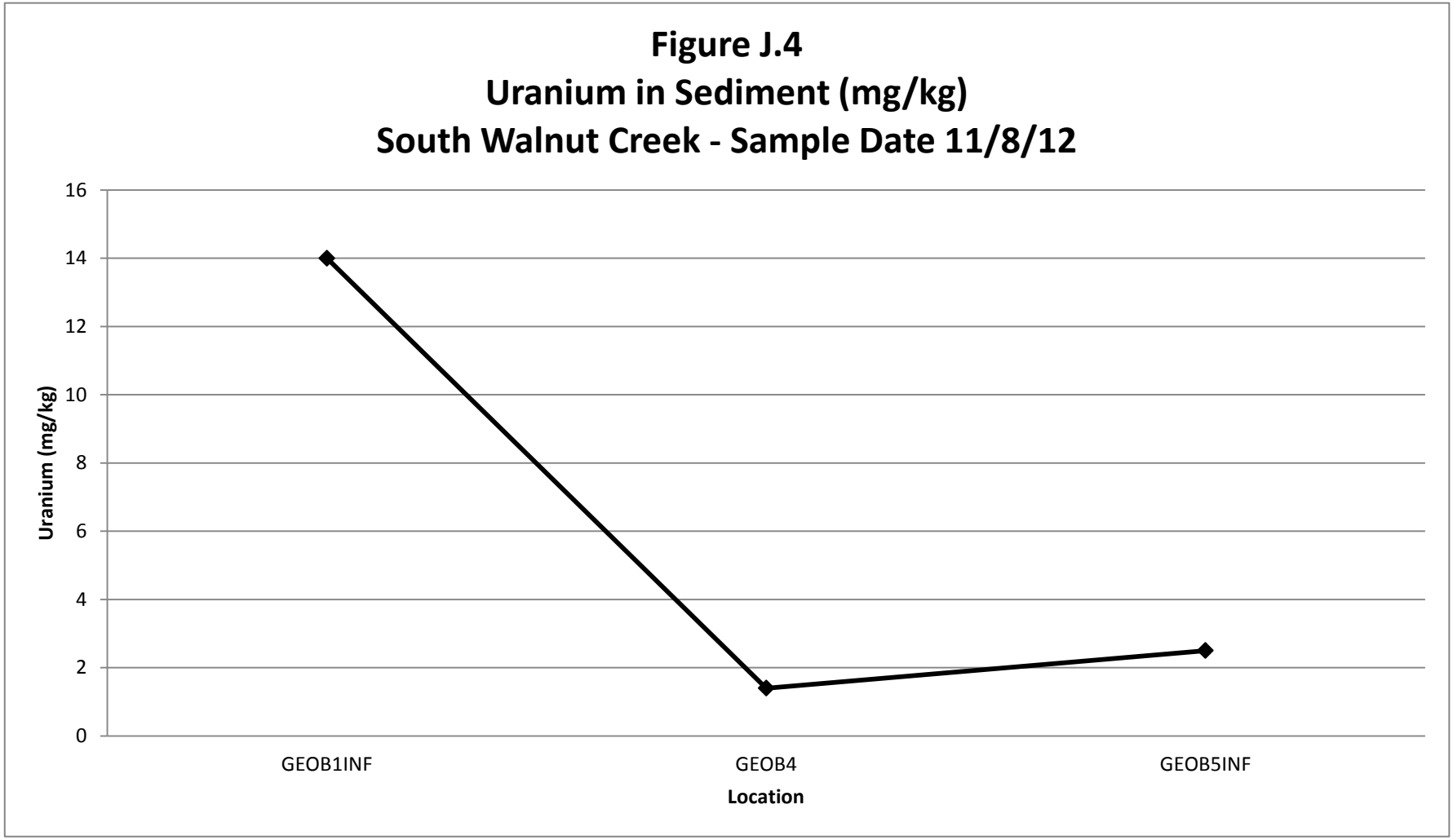


Figure J.4
Uranium in Sediment (mg/kg)
South Walnut Creek - Sample Date 11/8/12
16
14
12
10
8
6
4
2
0
Uranium (mg/kg)
GEOB1INF
GEOB4
GEOB5INF
Location

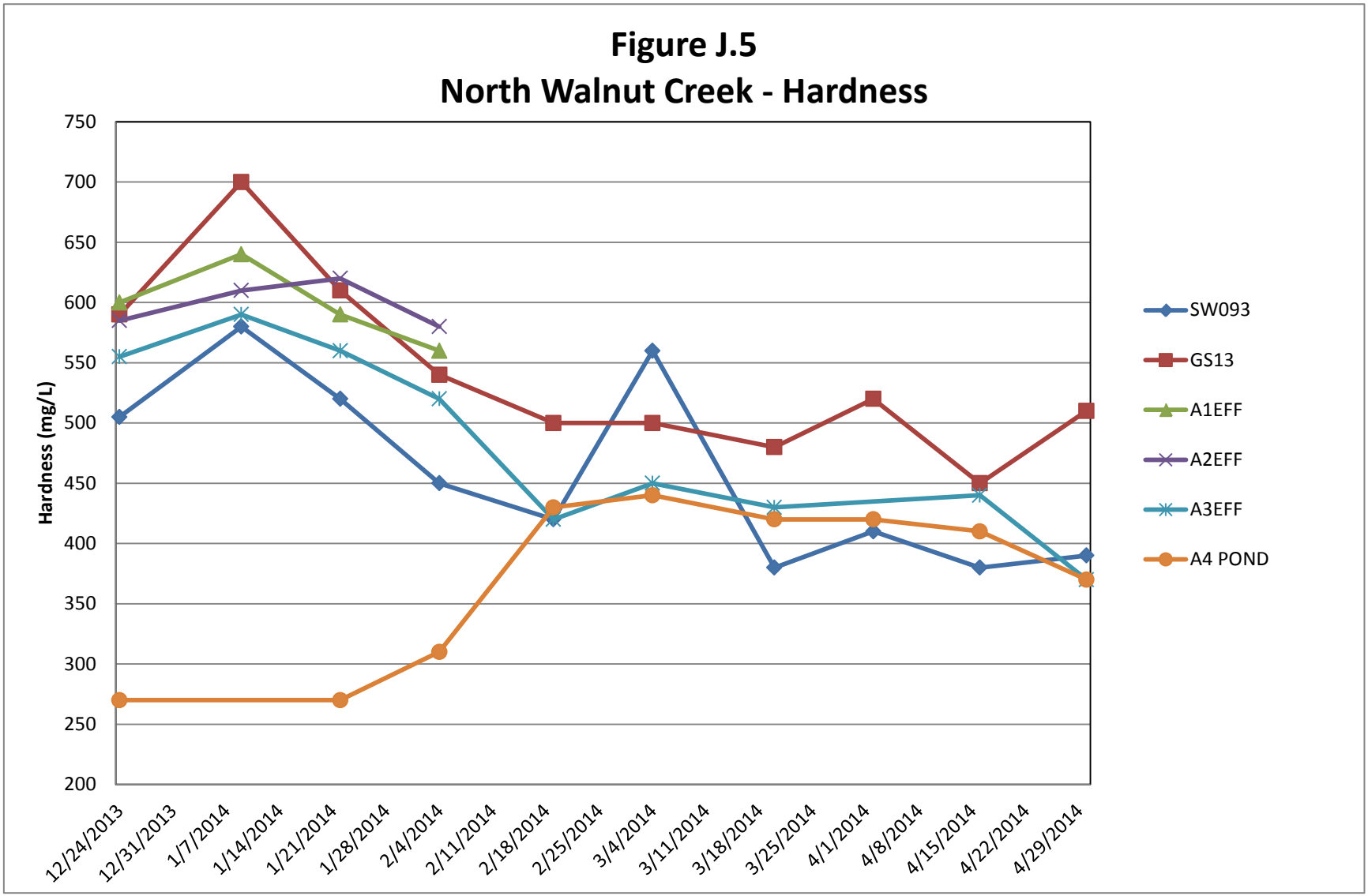


Figure J.5
North Walnut Creek - Hardness
Hardness (mg/L)
750
700
650
600
550
500
450
400
350
300
250
200
12/24/2013
12/31/2013
1/7/2014
1/14/2014
1/21/2014
1/28/2014
2/4/2014
2/11/2014
2/18/2014
2/25/2014
3/4/2014
3/11/2014
3/18/2014
3/25/2014
4/1/2014
4/8/2014
4/15/2014
4/22/2014
4/29/2014
SW093
GS13
A1EFF
A2EFF
A3EFF
A4 POND

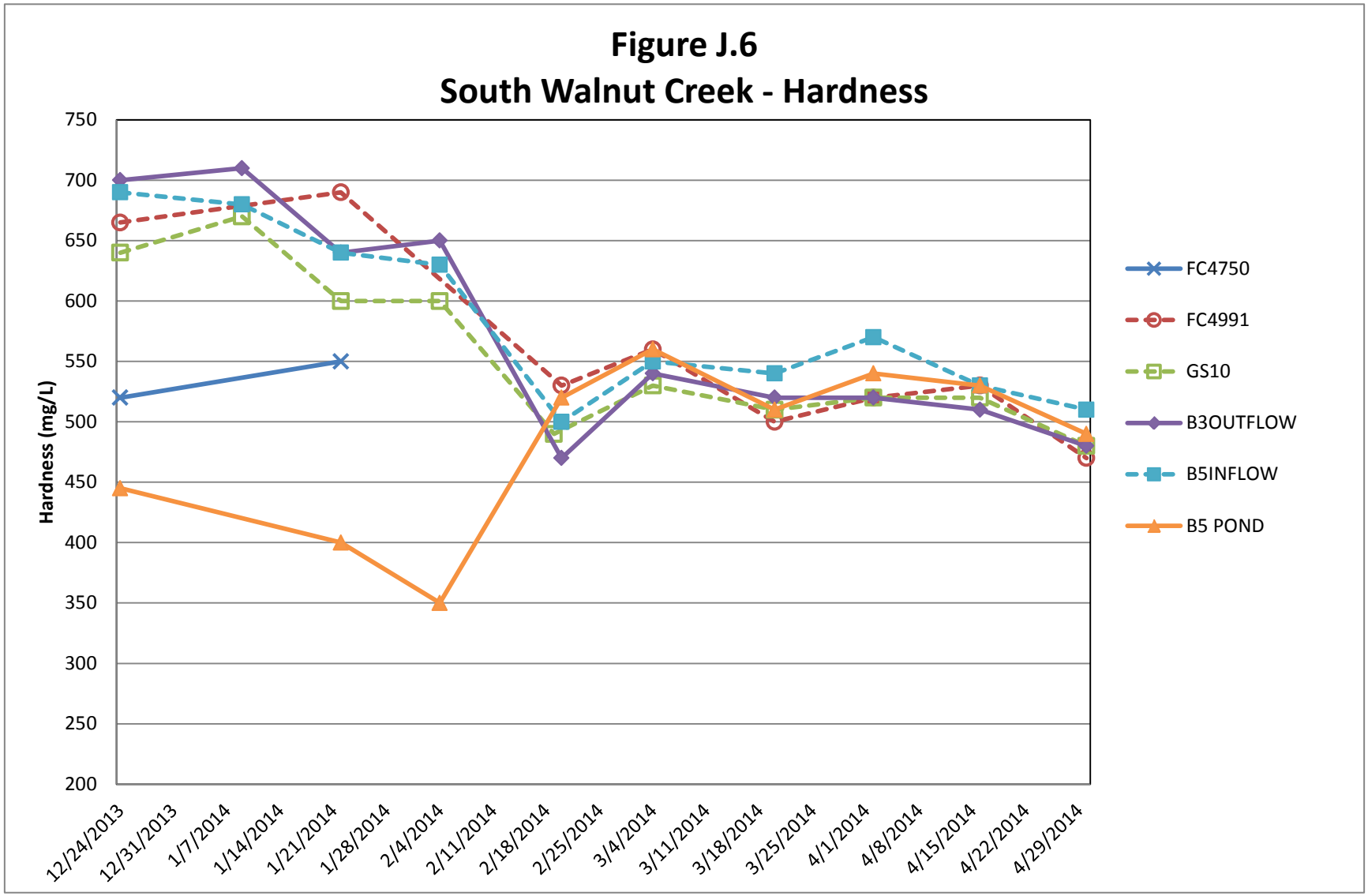


Figure J.6
South Walnut Creek - Hardness
Hardness (mg/L)
750
700
650
600
550
500
450
400
350
300
250
200
12/24/2013
12/31/2013
1/7/2014
1/14/2014
1/21/2014
1/28/2014
2/4/2014
2/11/2014
2/18/2014
2/25/2014
3/4/2014
3/11/2014
3/18/2014
3/25/2014
4/1/2014
4/8/2014
4/15/2014
4/22/2014
4/29/2014
FC4750
FC4991
GS10
B3OUTFLOW
B5INFLOW
B5 POND

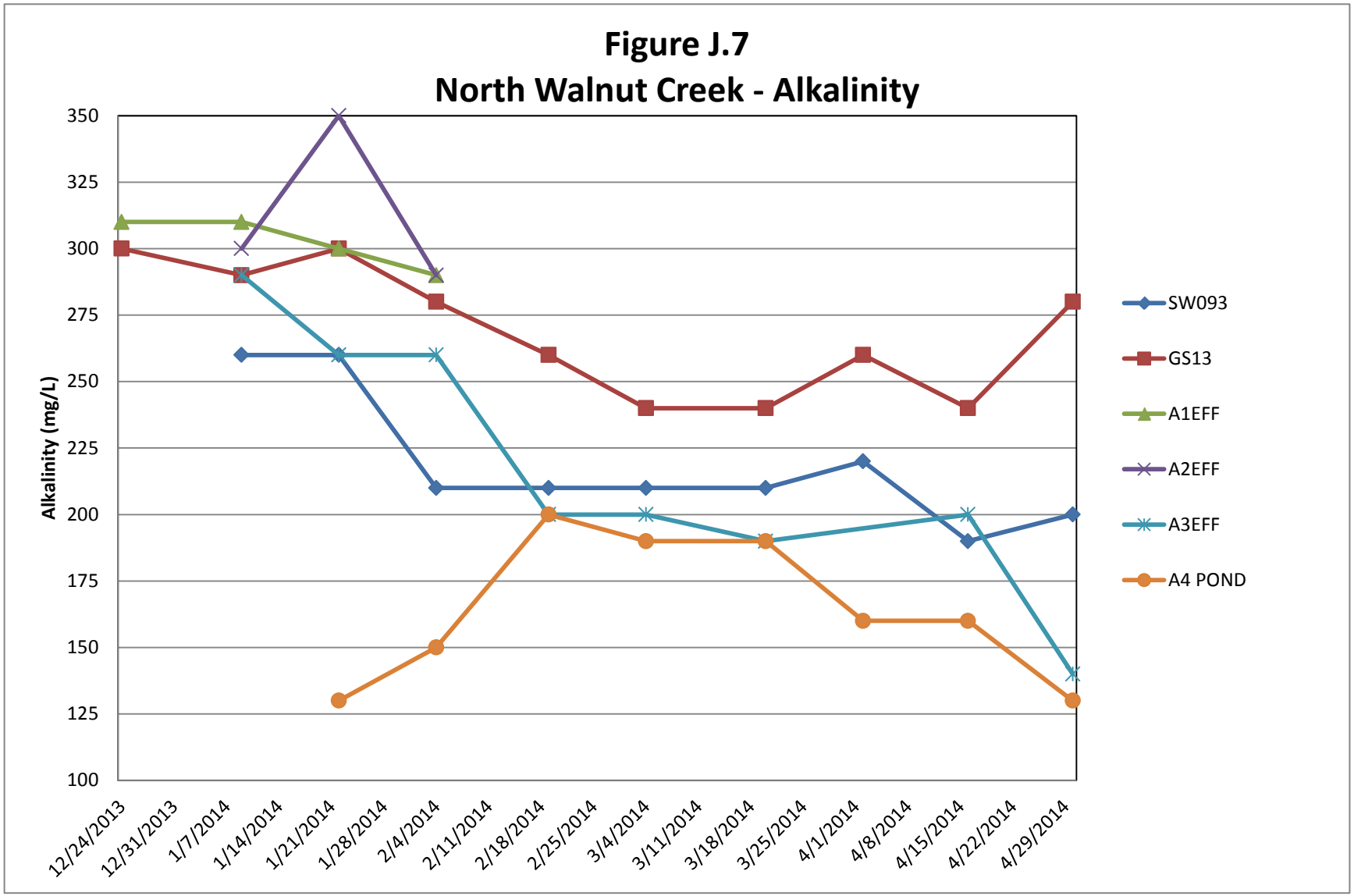


Figure J.7
North Walnut Creek - Alkalinity
Alkalinity (mg/L)
350
325
300
275
250
225
200
175
150
125
100
12/24/2013
12/31/2013
1/7/2014
1/14/2014
1/21/2014
1/28/2014
2/4/2014
2/11/2014
2/18/2014
2/25/2014
3/4/2014
3/11/2014
3/18/2014
3/25/2014
4/1/2014
4/8/2014
4/15/2014
4/22/2014
4/29/2014
SW093
GS13
A1EFF
A2EFF
A3EFF
A4 POND

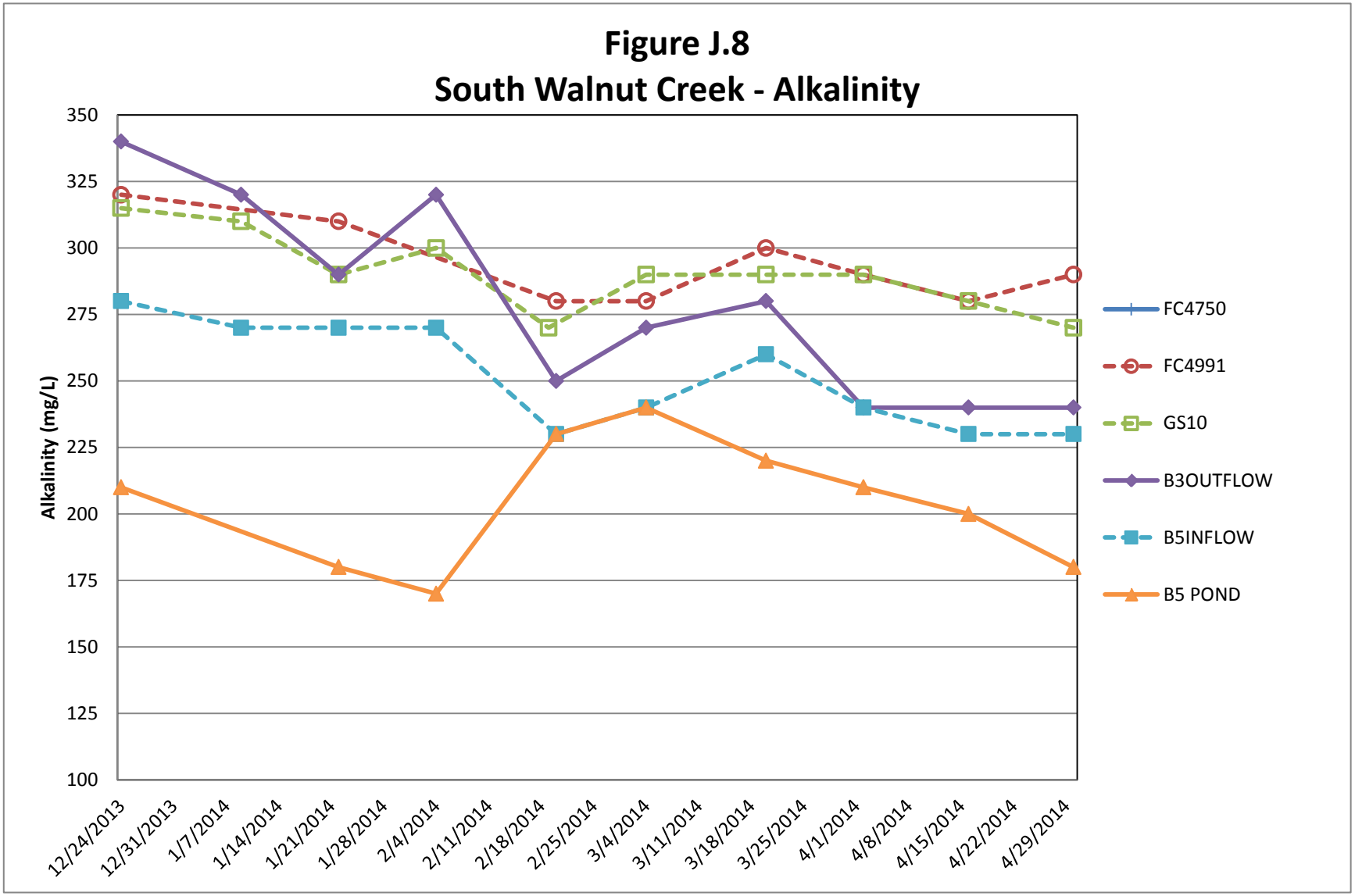
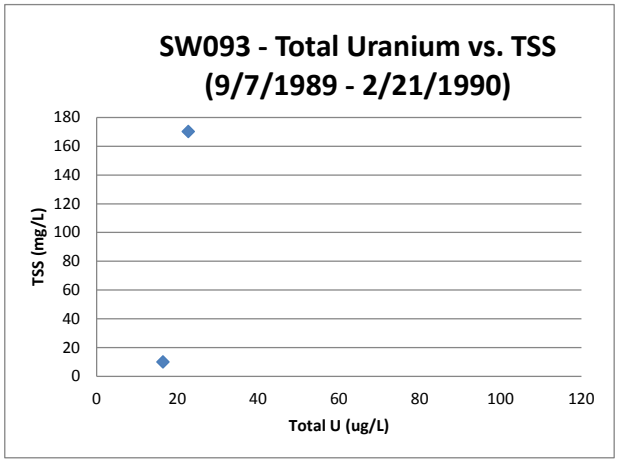
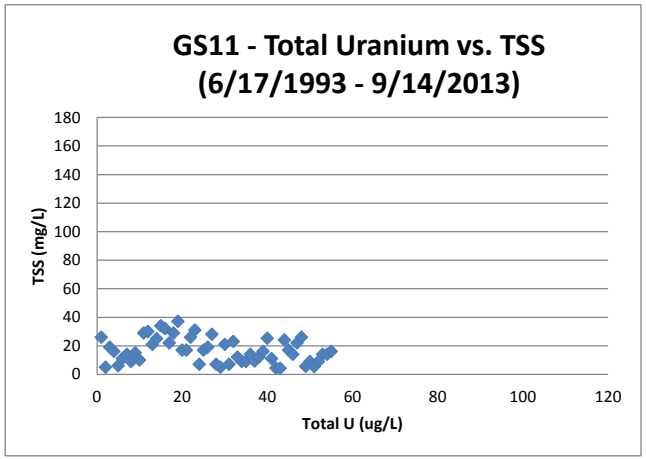


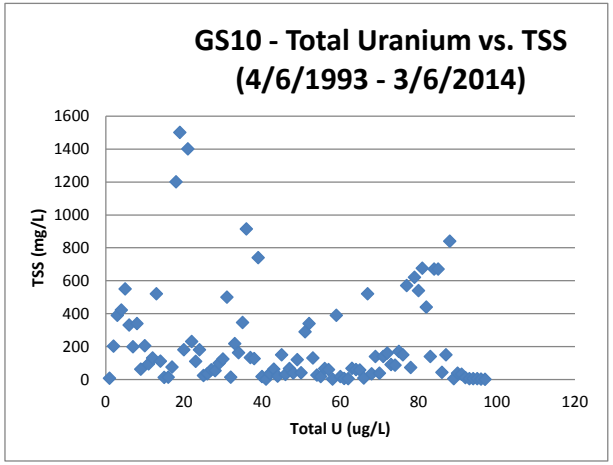
Figure J.8
South Walnut Creek - Alkalinity
Alkalinity (mg/L)
350
325
300
275
250
225
200
175
150
125
100
12/24/2013
12/31/2013
1/7/2014
1/14/2014
1/21/2014
1/28/2014
2/4/2014
2/11/2014
2/18/2014
2/25/2014
3/4/2014
3/11/2014
3/18/2014
3/25/2014
4/1/2014
4/8/2014
4/15/2014
4/22/2014
4/29/2014
FC4750
FC4991
GS10
B3OUTFLOW
B5INFLOW
B5 POND

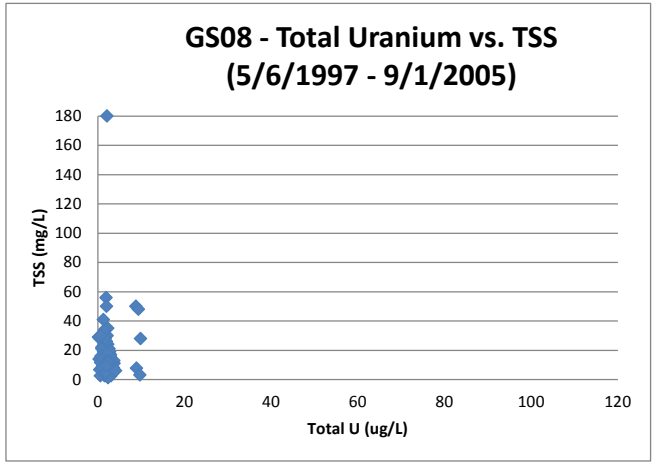
Figure J.9





Upstream → Downstream





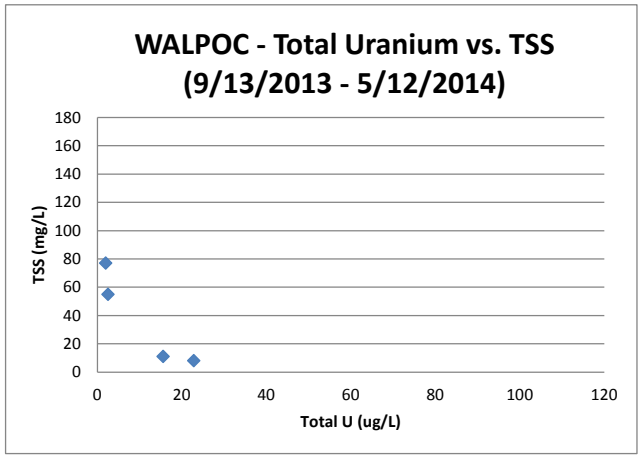
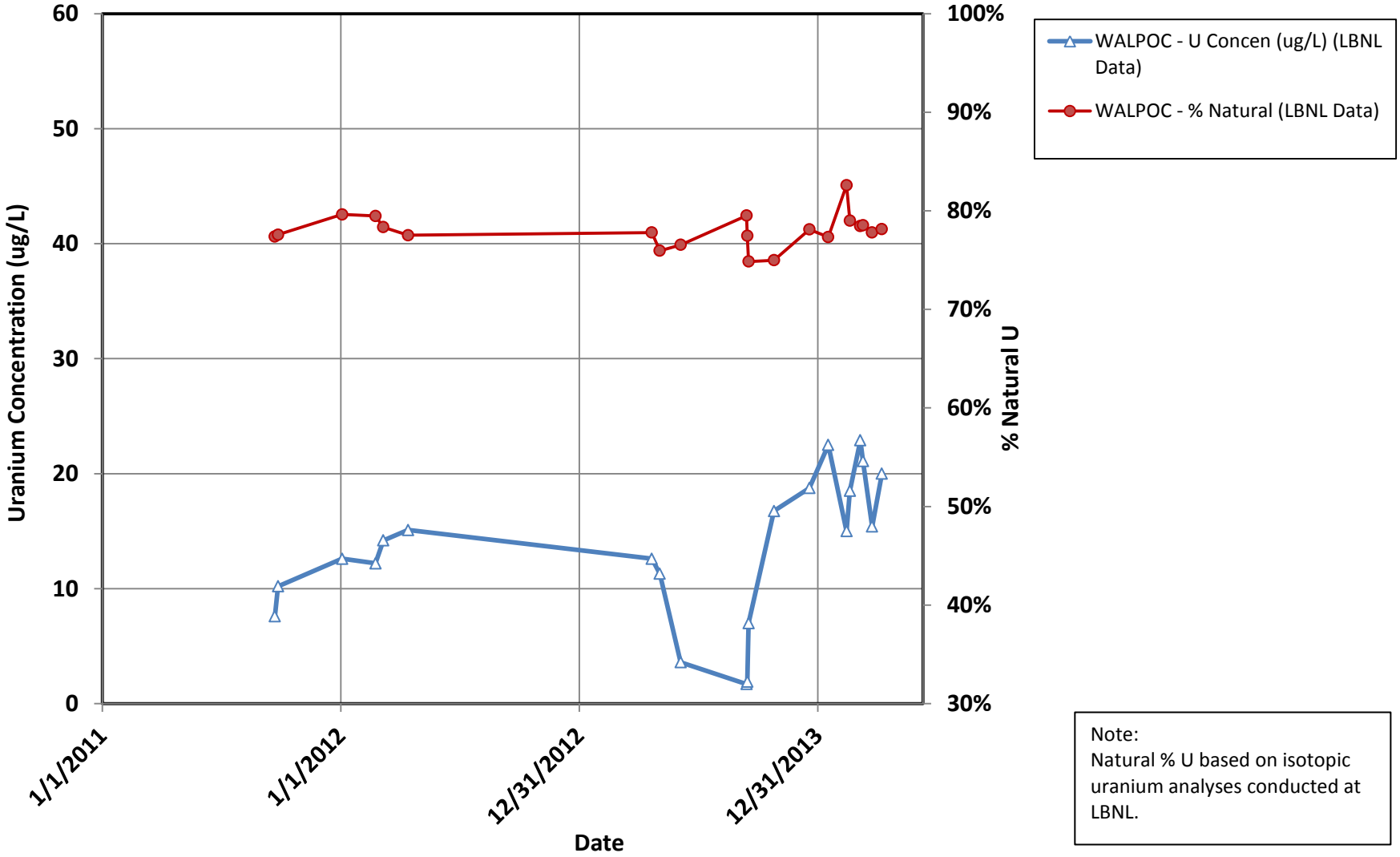


Figure K.1
Uranium Concentration and Natural Percentage
WALPOC



Note:
Natural % U based on isotopic uranium analyses conducted at LBNL.

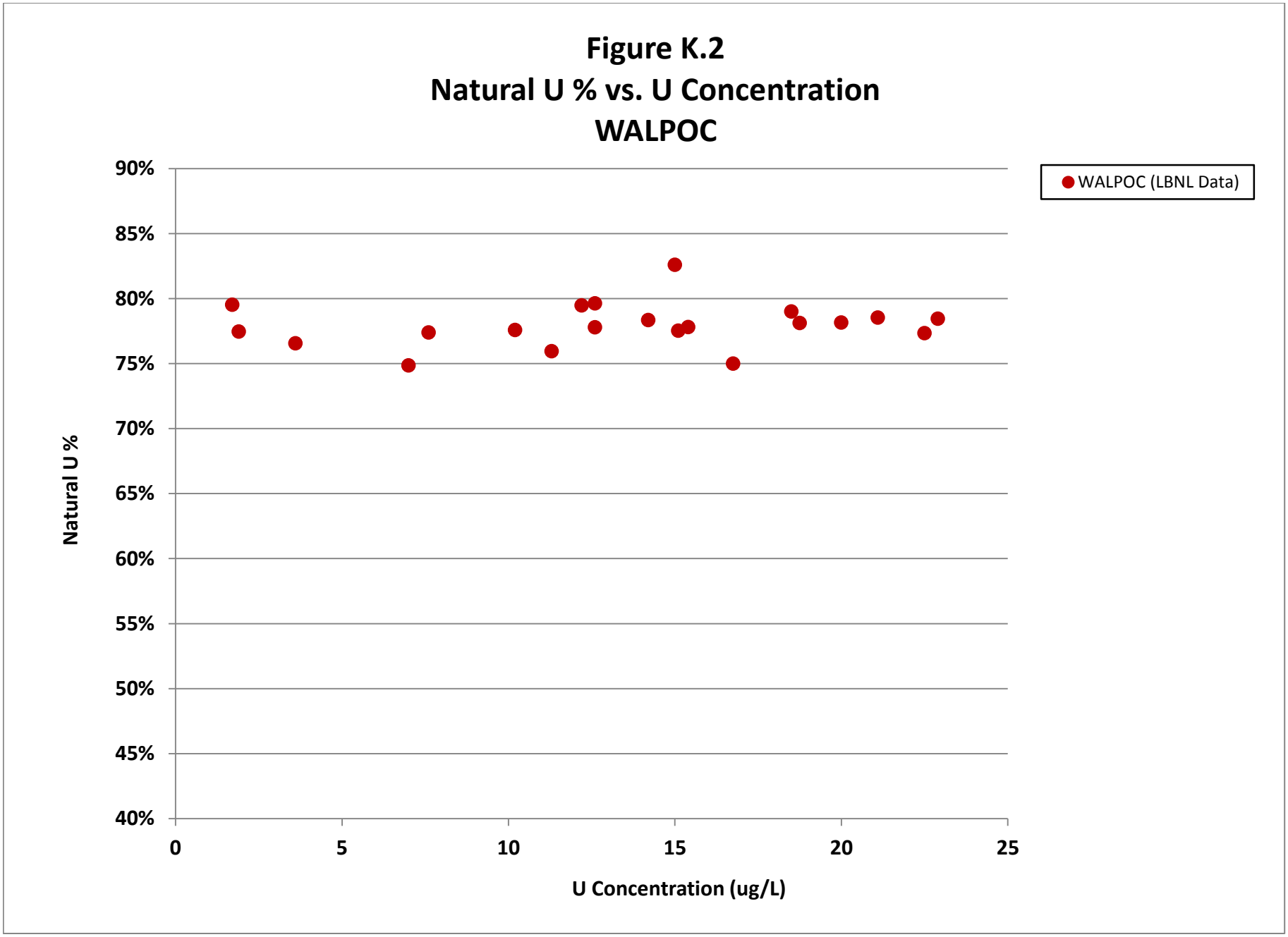
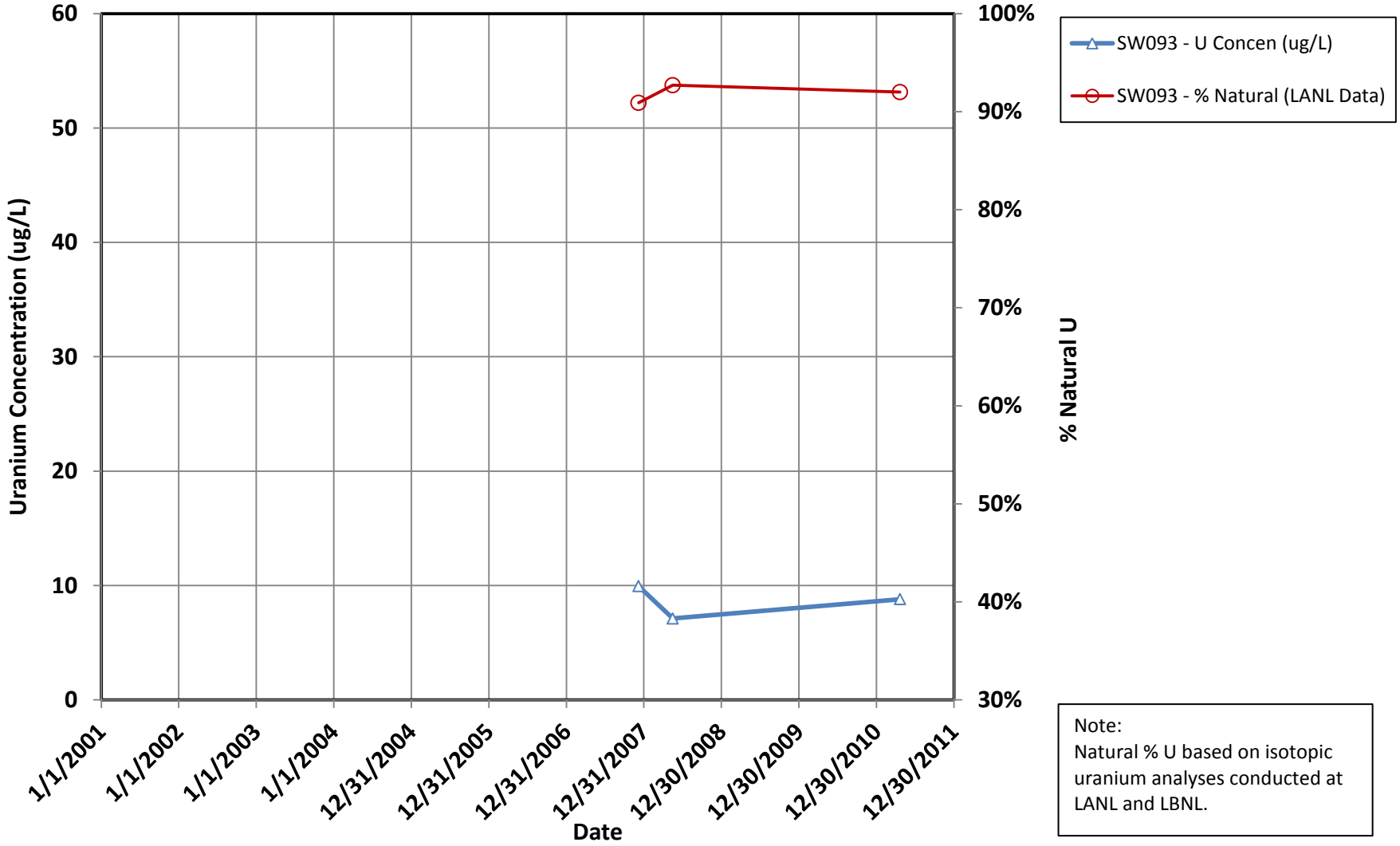


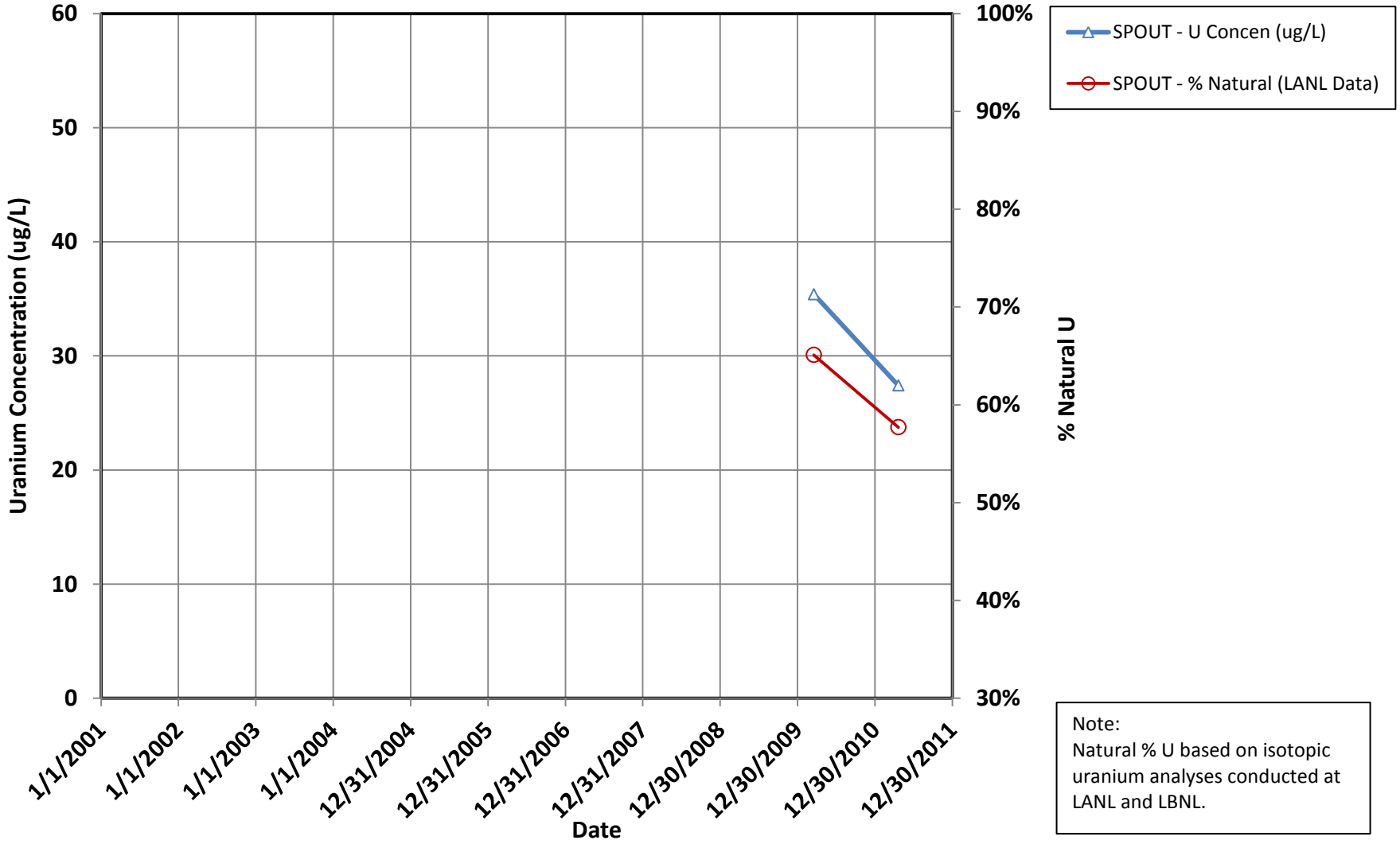
Figure K.2
Natural U % vs. U Concentration
WALPOC
WALPOC (LBNL Data)
Natural U %
90%
85%
80%
75%
70%
65%
60%
55%
50%
45%
40%
0
5
10
15
20
25
U Concentration (ug/L)

Figure K.3
Uranium Concentration and Natural Percentage
SW093 (N. Walnut Creek)



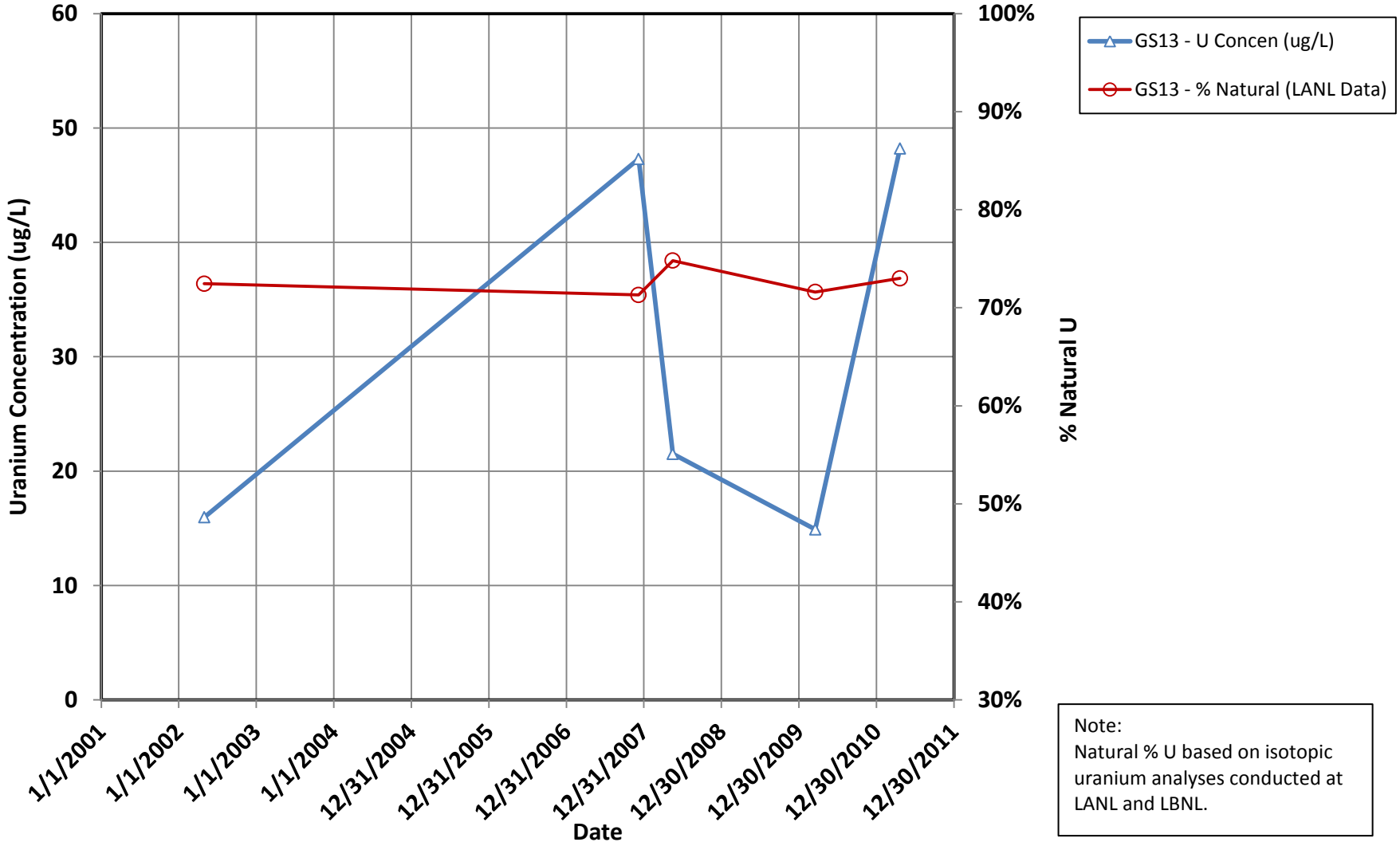
Note:
Natural % U based on isotopic uranium analyses conducted at LANL and LBNL.

Figure K.4
Uranium Concentration and Natural Percentage
SPOUT (N. Walnut Creek)



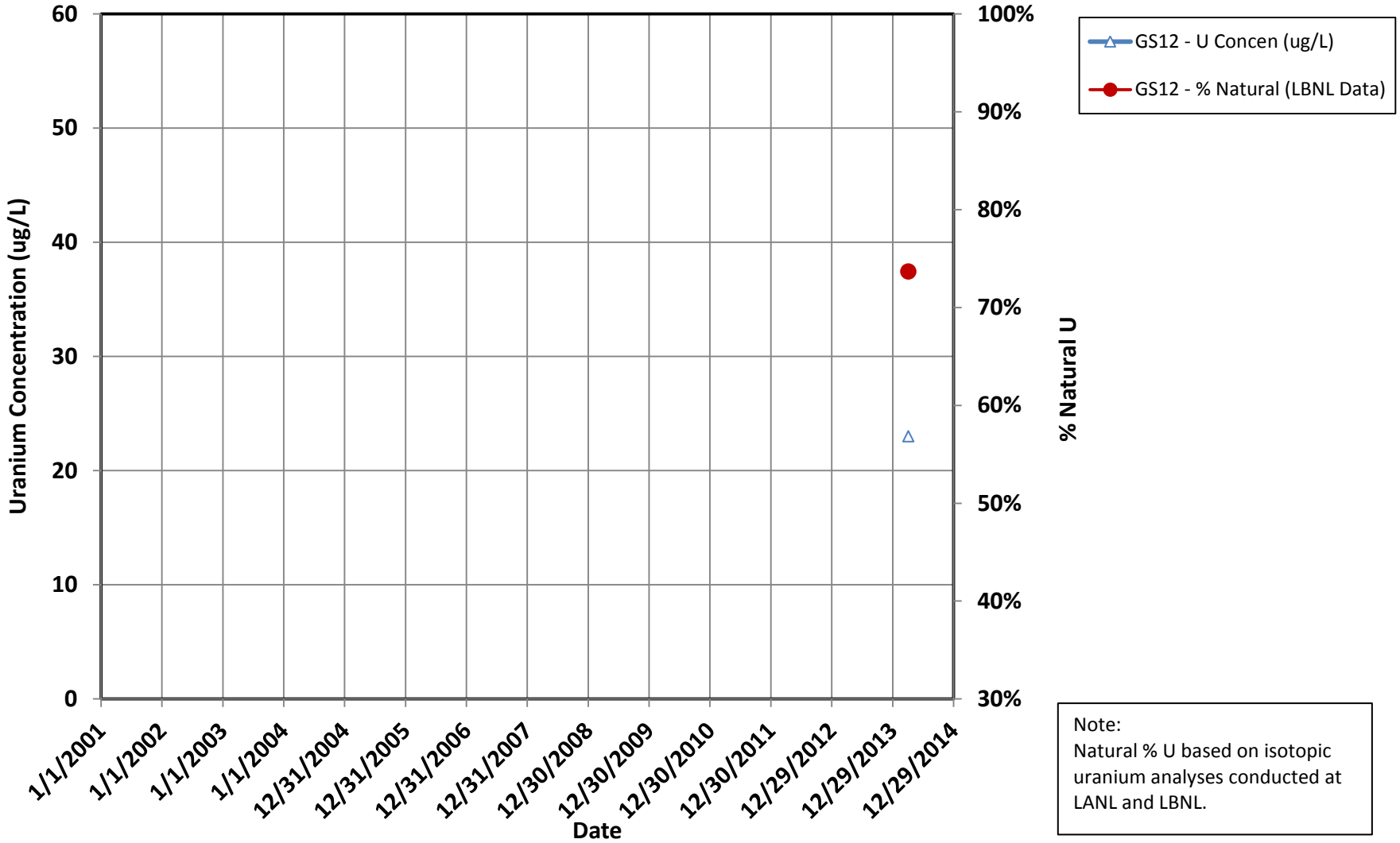
Note:
Natural % U based on isotopic uranium analyses conducted at LANL and LBNL.

Figure K.5
Uranium Concentration and Natural Percentage
GS13 (N. Walnut Creek)



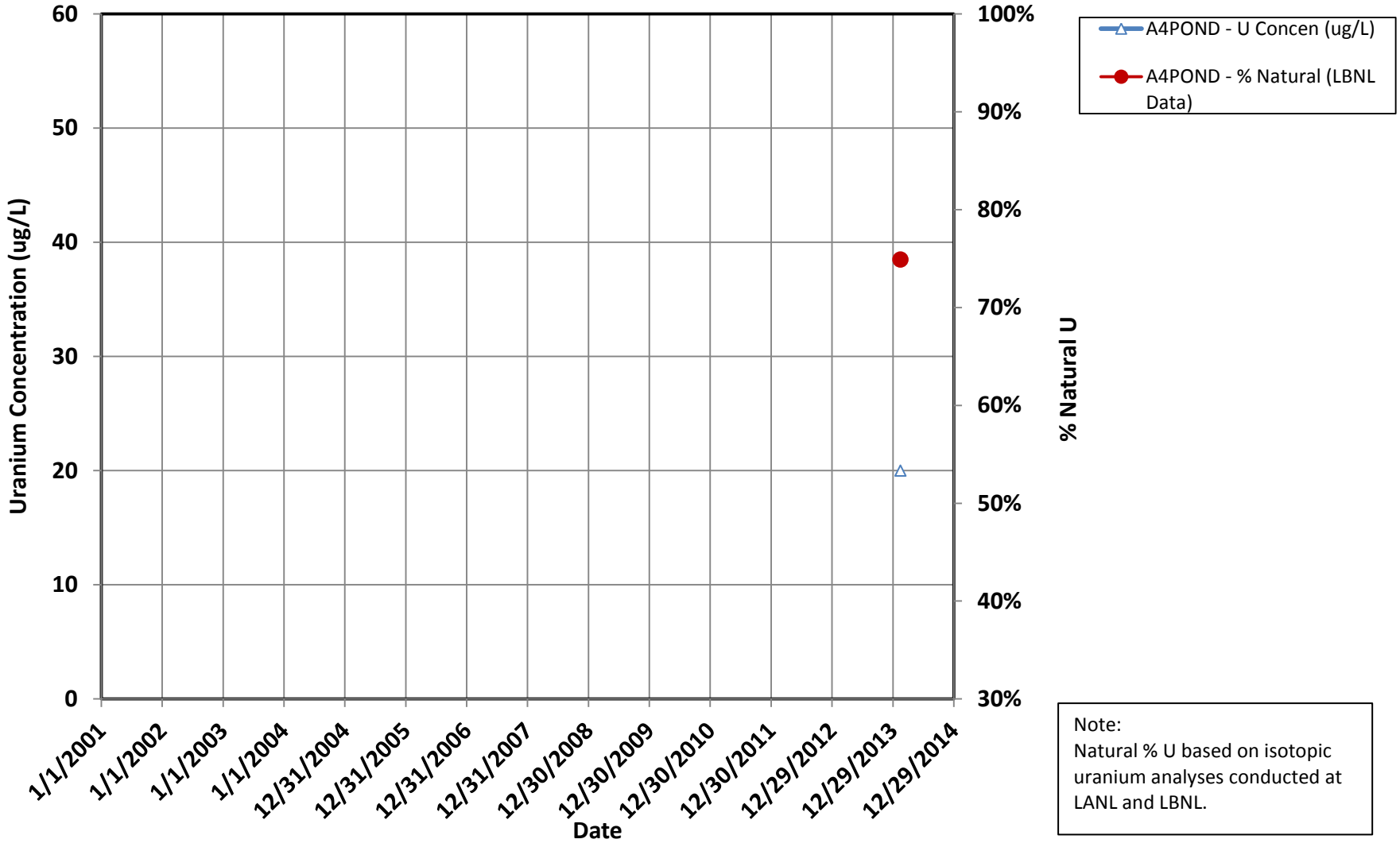
Note:
Natural % U based on isotopic uranium analyses conducted at LANL and LBNL.

Figure K.6
Uranium Concentration and Natural Percentage
GS12 (N. Walnut Creek)



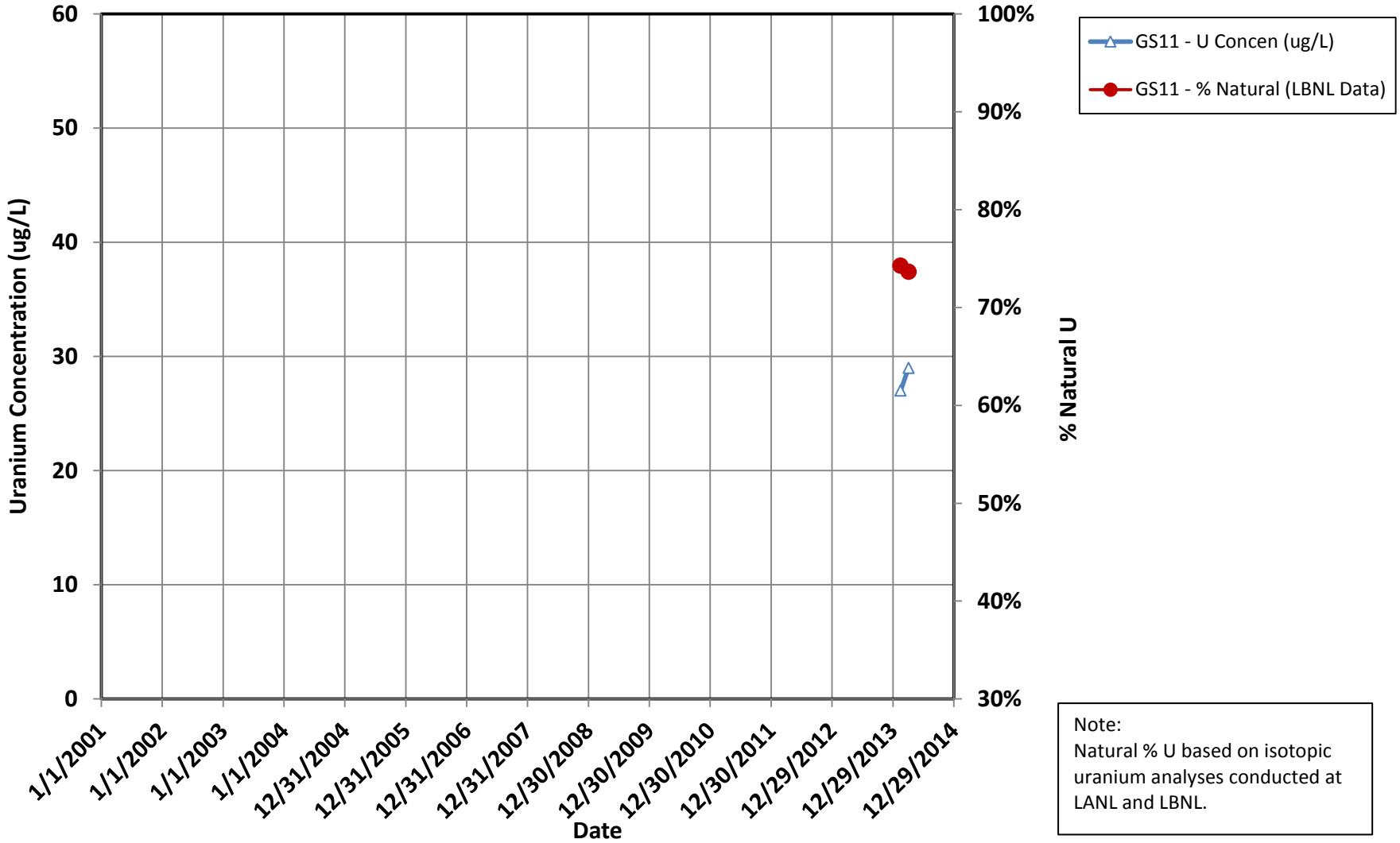
Note:
Natural % U based on isotopic uranium analyses conducted at LANL and LBNL.

Figure K.7
Uranium Concentration and Natural Percentage
A4 POND (N. Walnut Creek)



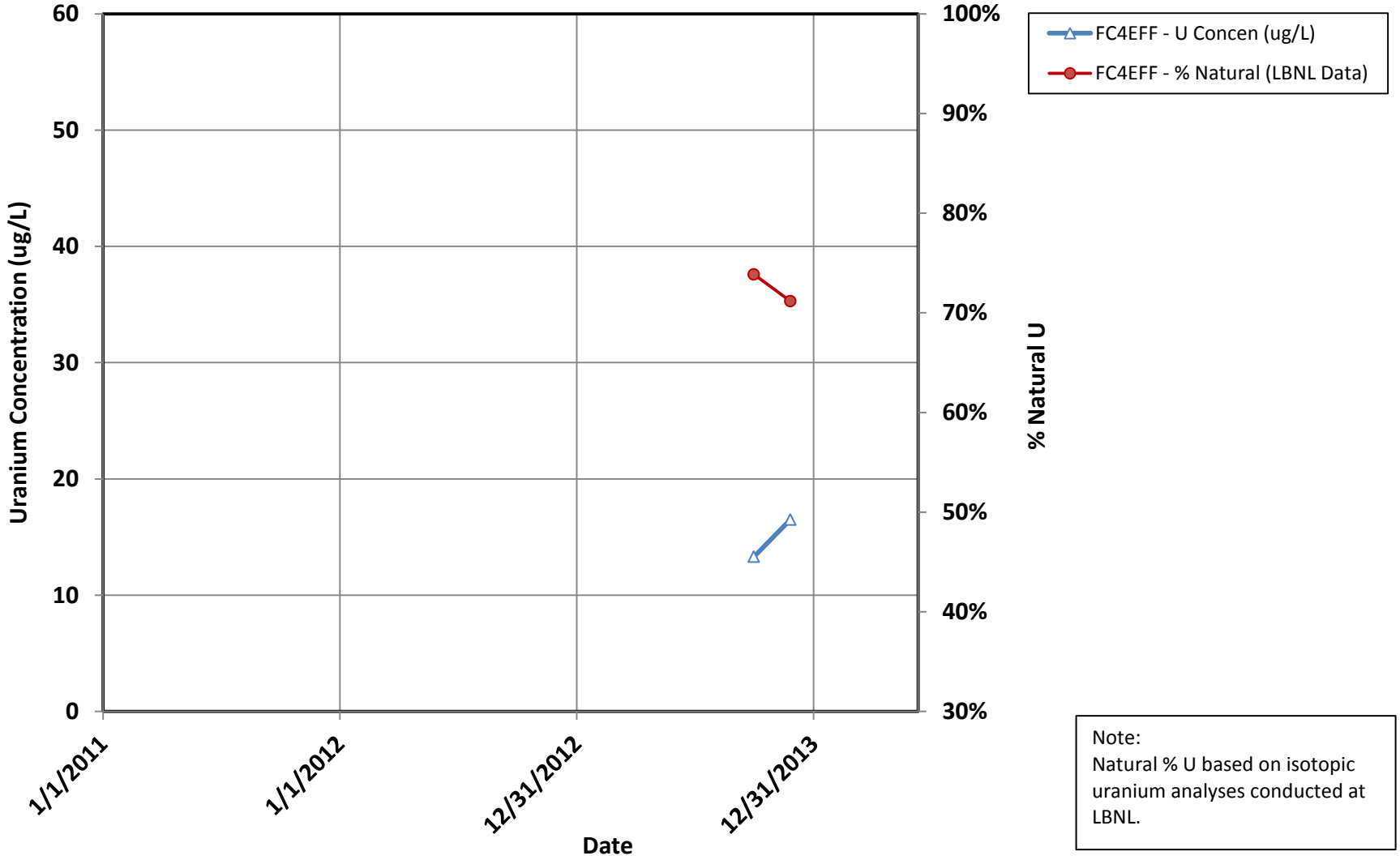
Note:
Natural % U based on isotopic uranium analyses conducted at LANL and LBNL.

Figure K.8
Uranium Concentration and Natural Percentage
GS11 (N. Walnut Creek)



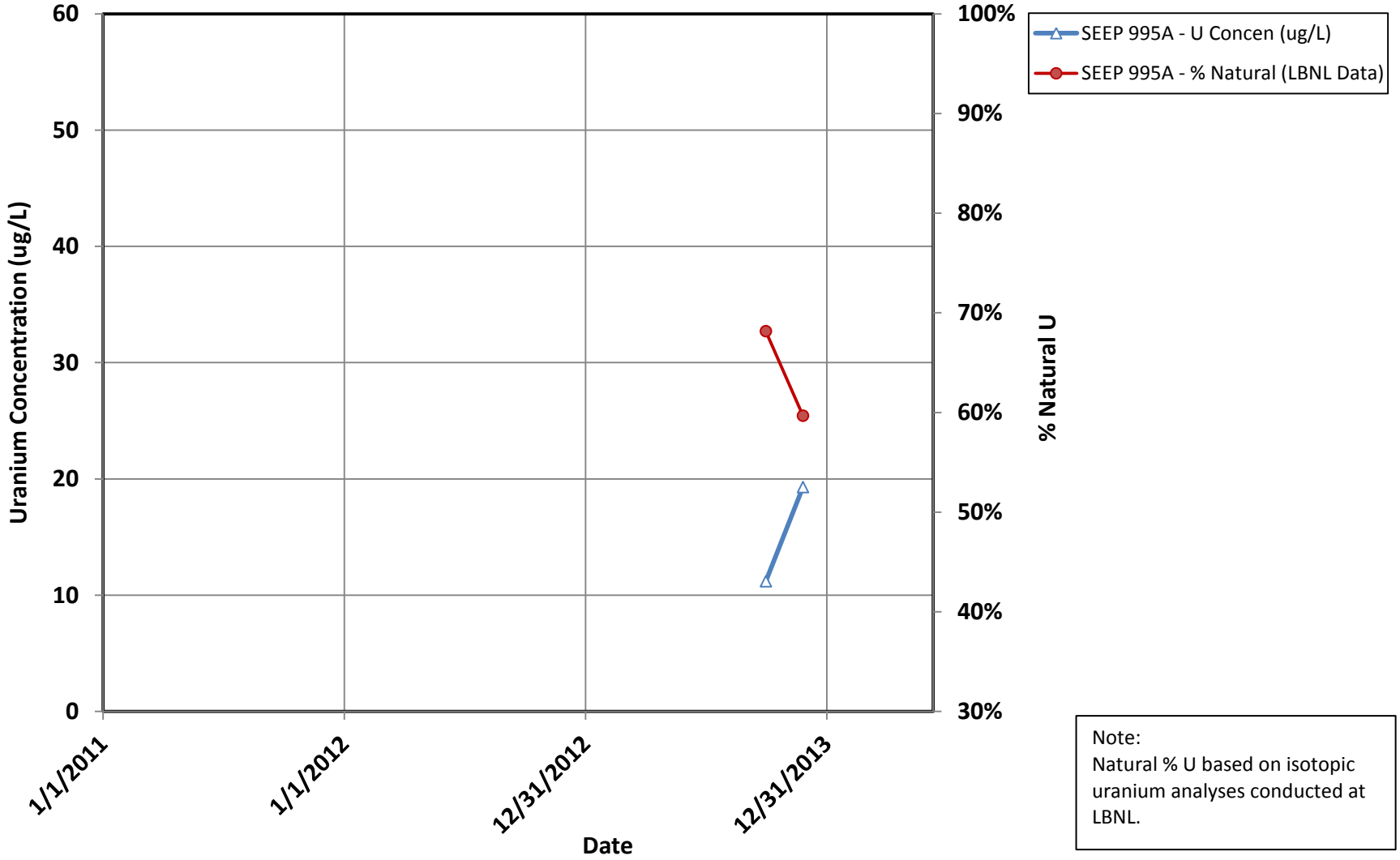
Note:
Natural % U based on isotopic uranium analyses conducted at LANL and LBNL.

Figure K.9
Uranium Concentration and Natural Percentage
FC4EFF (S. Walnut Creek)



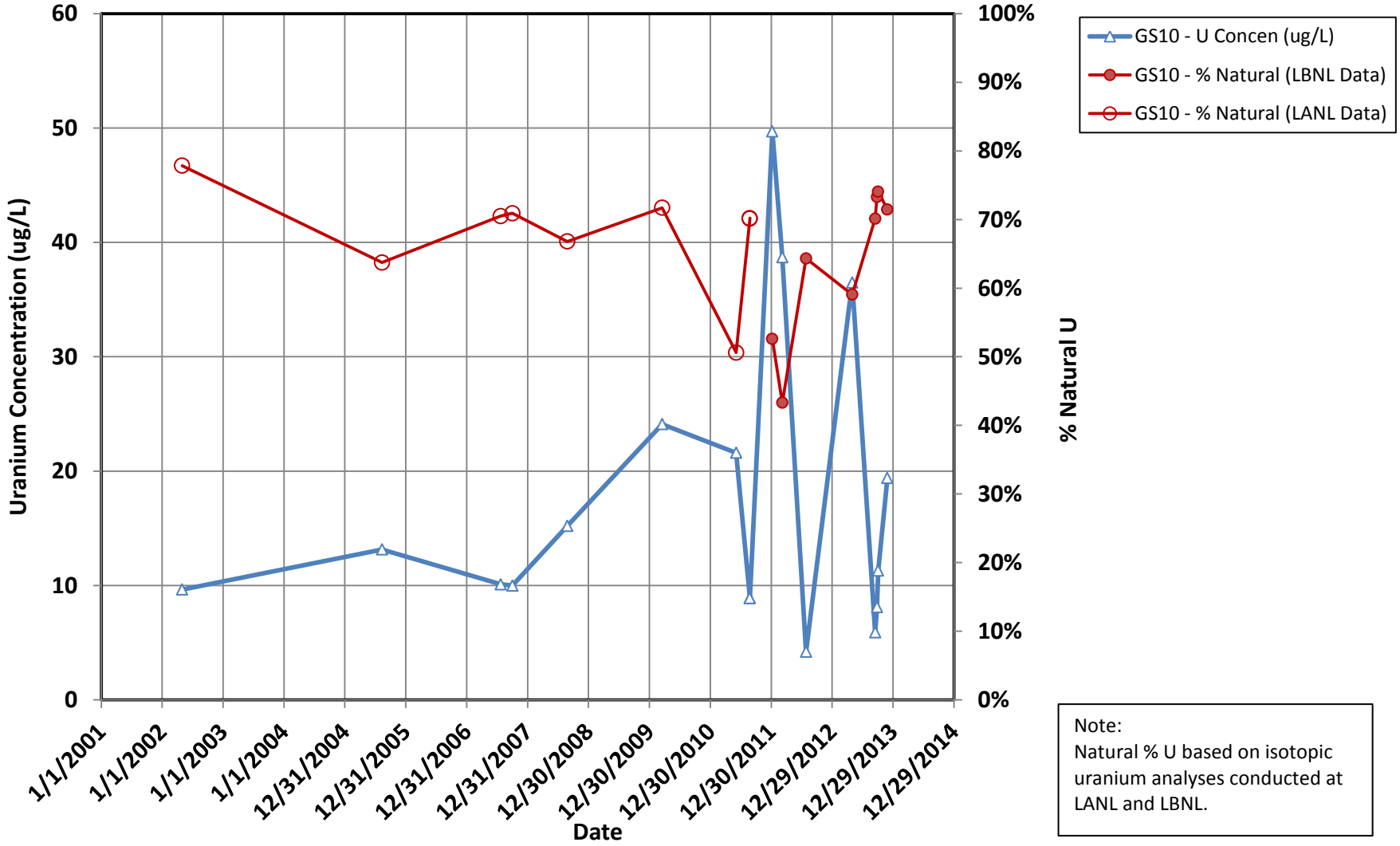
Note:
Natural % U based on isotopic uranium analyses conducted at LBNL.

Figure K.10
Uranium Concentration and Natural Percentage
SEEP995A (S. Walnut Creek)



Note:
Natural % U based on isotopic uranium analyses conducted at LBNL.

Figure K.11
Uranium Concentration and Natural Percentage
GS10 (S. Walnut Creek)



Note:
Natural % U based on isotopic uranium analyses conducted at LANL and LBNL.

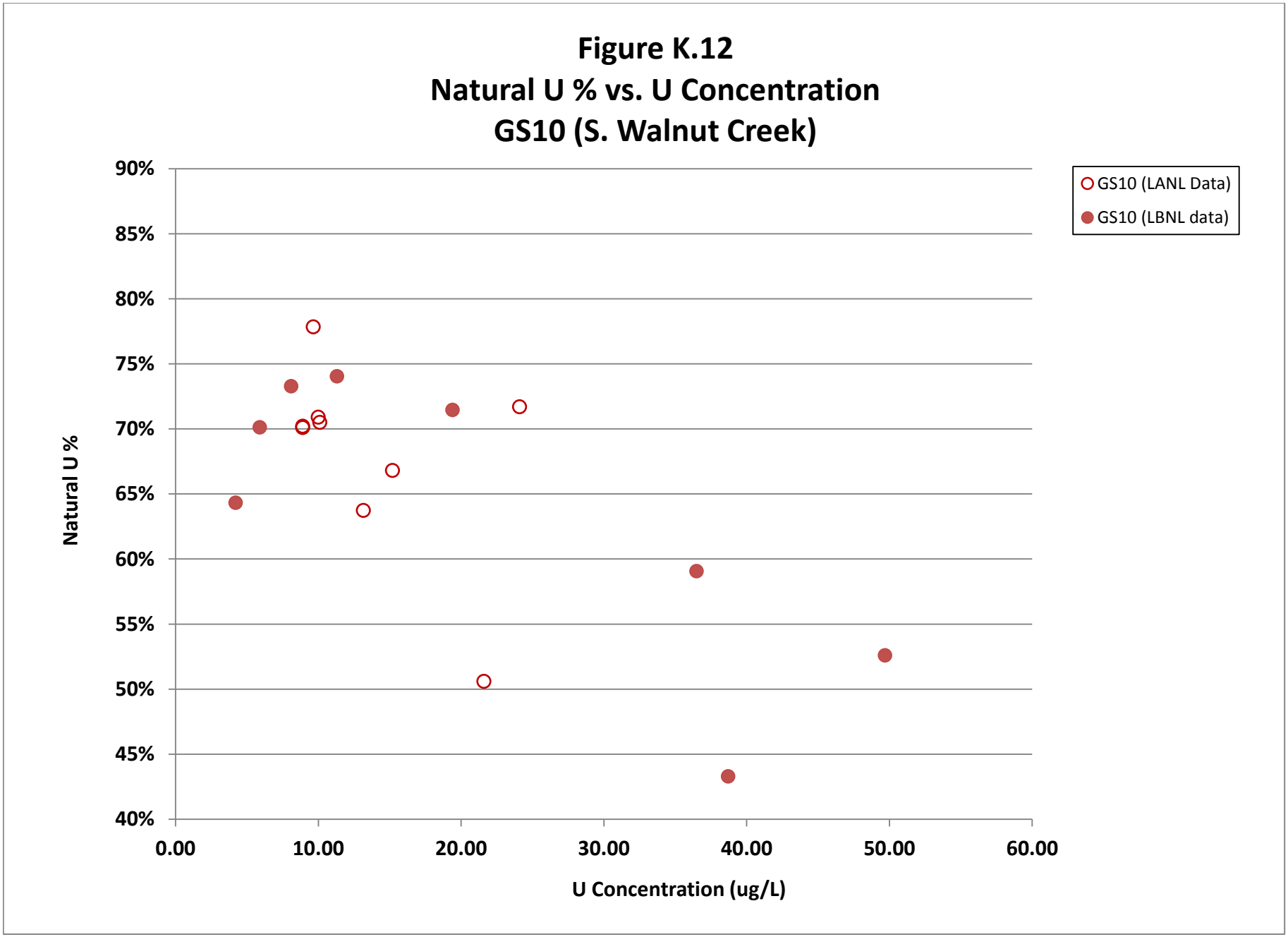
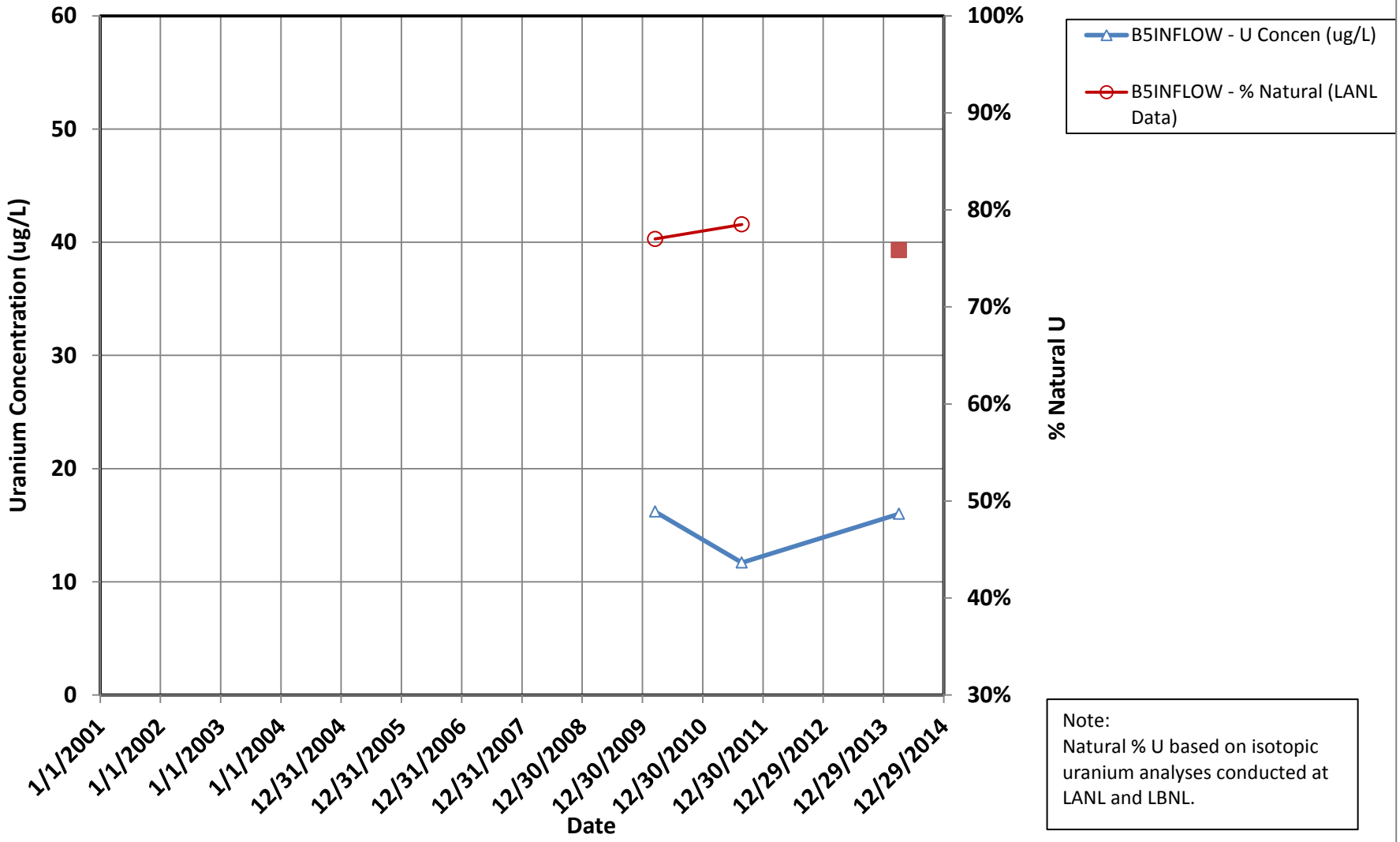


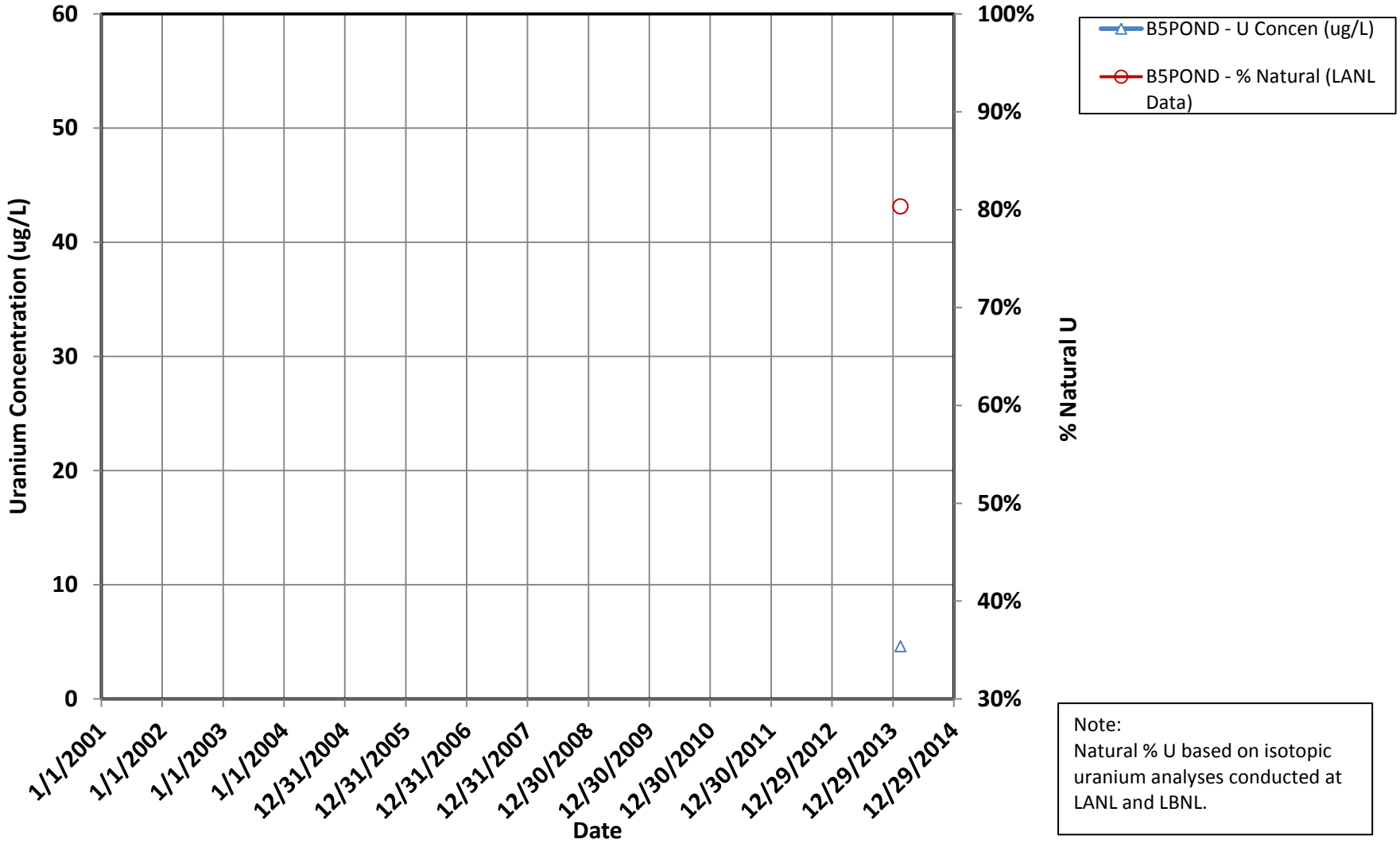
Figure K.12
Natural U % vs. U Concentration
GS10 (S. Walnut Creek)
90%
85%
80%
75%
70%
65%
60%
55%
50%
45%
40%
Natural U %
0.00
10.00
20.00
30.00
40.00
50.00
60.00
U Concentration (ug/L)
GS10 (LANL Data)
GS10 (LBNL data)

Figure K.13
Uranium Concentration and Natural Percentage
B5INFLOW (S. Walnut Creek)



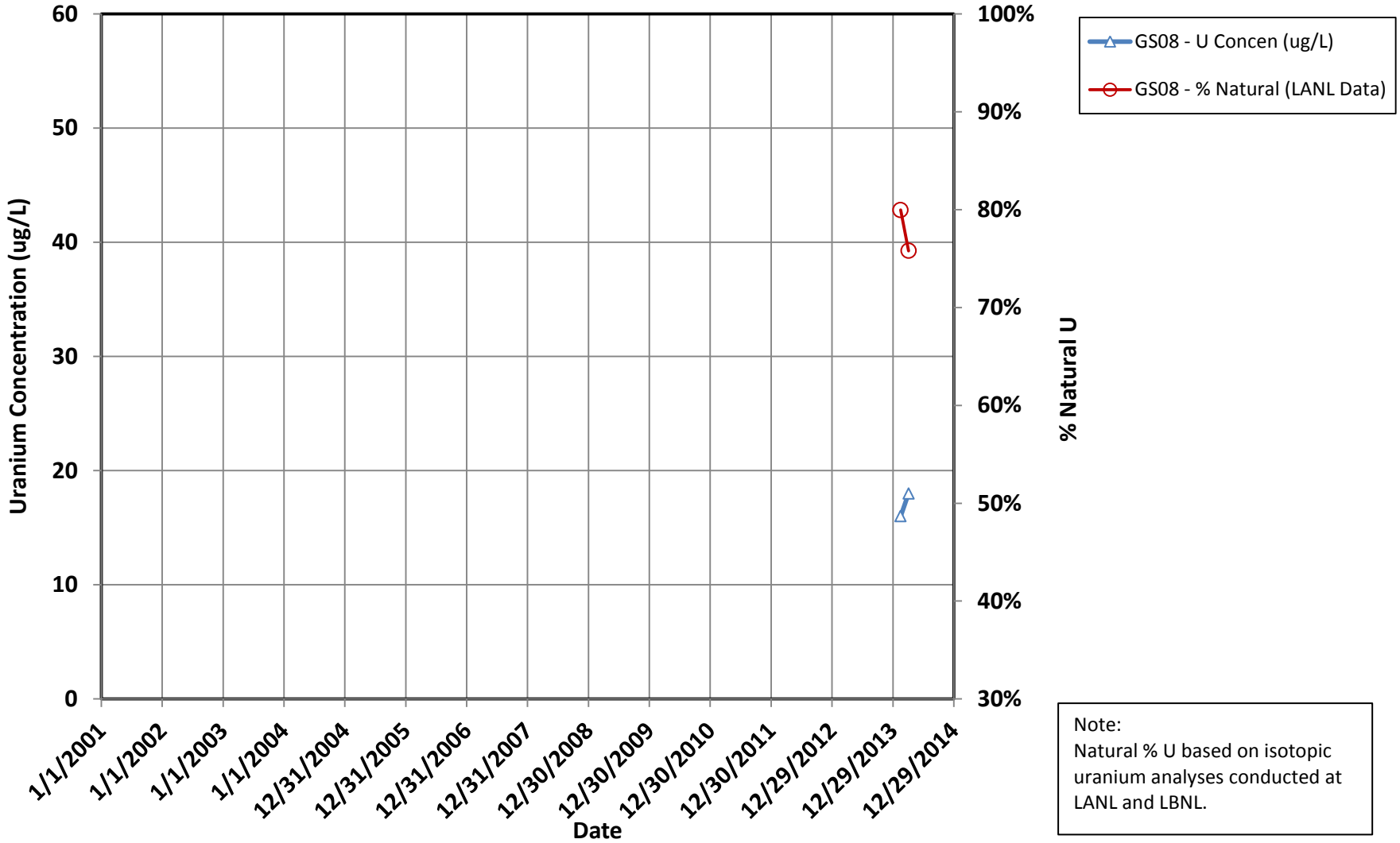
Note:
Natural % U based on isotopic uranium analyses conducted at LANL and LBNL.

Figure K.14
Uranium Concentration and Natural Percentage
B5POND (S. Walnut Creek)



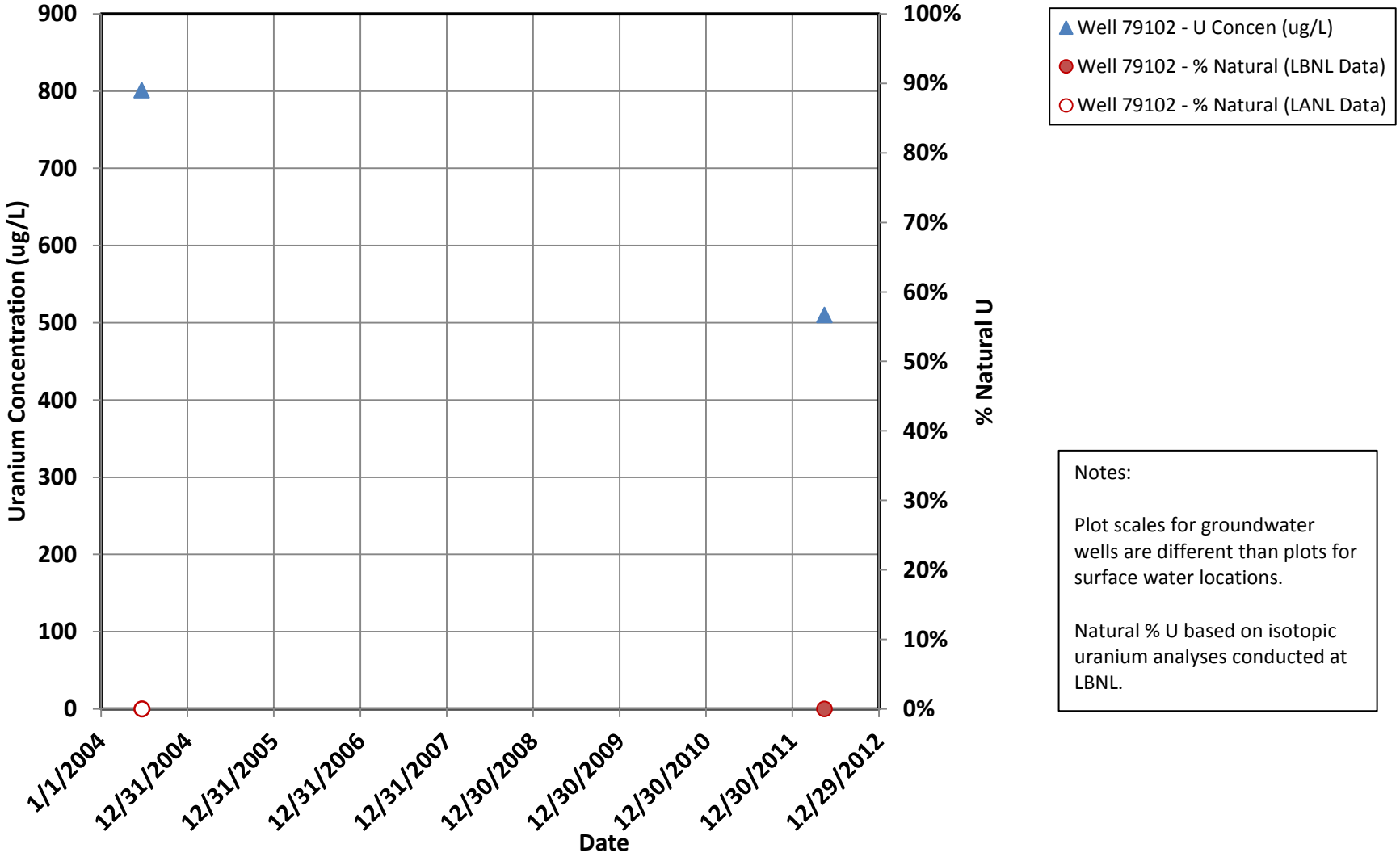
Note:
Natural % U based on isotopic uranium analyses conducted at LANL and LBNL.

Figure K.15
Uranium Concentration and Natural Percentage
GS08 (S. Walnut Creek)



Note:
Natural % U based on isotopic uranium analyses conducted at LANL and LBNL.

Figure K.16
Uranium Concentration and Natural Percentage
Groundwater Well: 79102

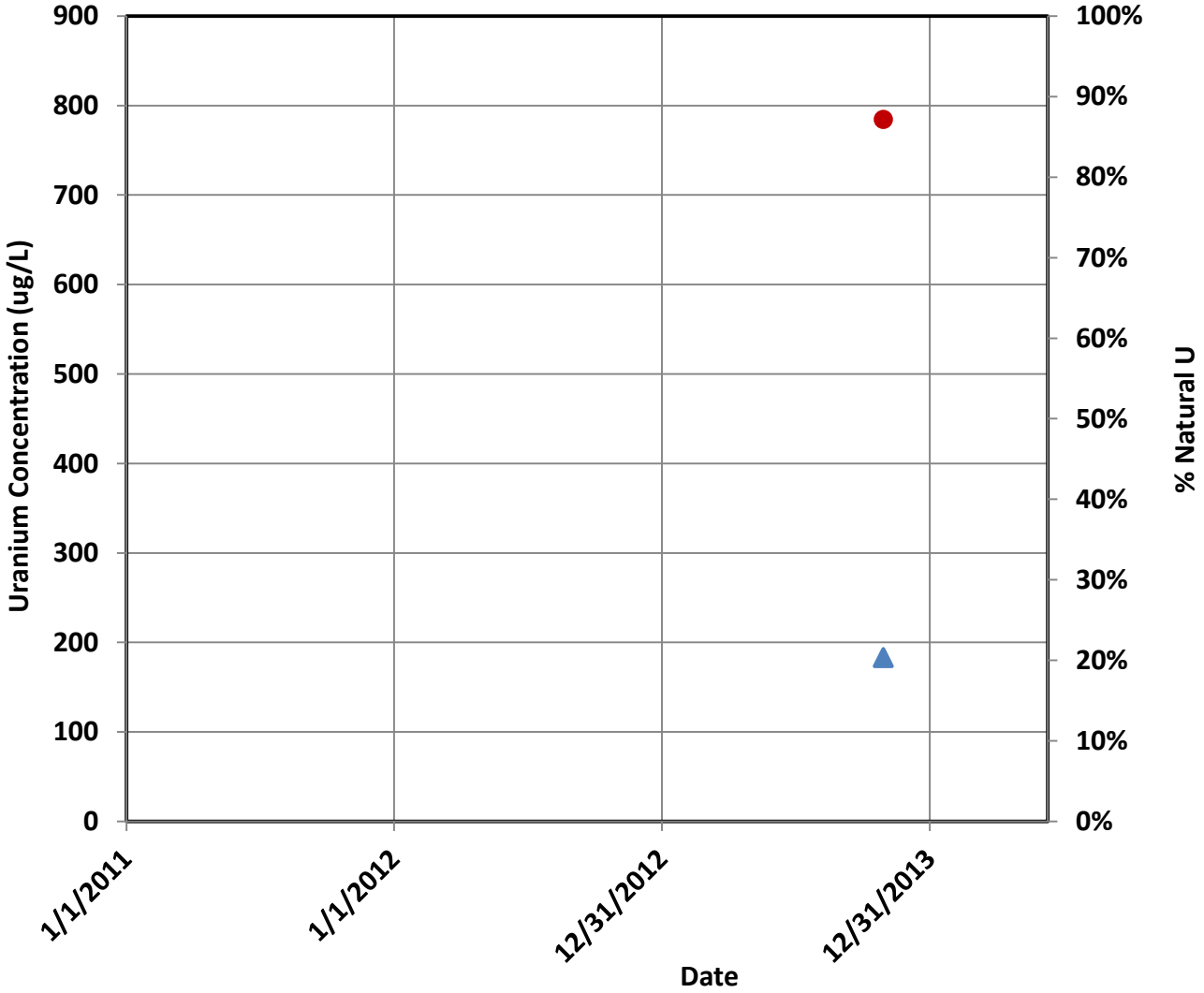


Notes:

Plot scales for groundwater wells are different than plots for surface water locations.

Natural % U based on isotopic uranium analyses conducted at LBNL.

Figure K.17
Uranium Concentration and Natural Percentage
Groundwater Well: 79302



Well 79302 - U Concen (ug/L)

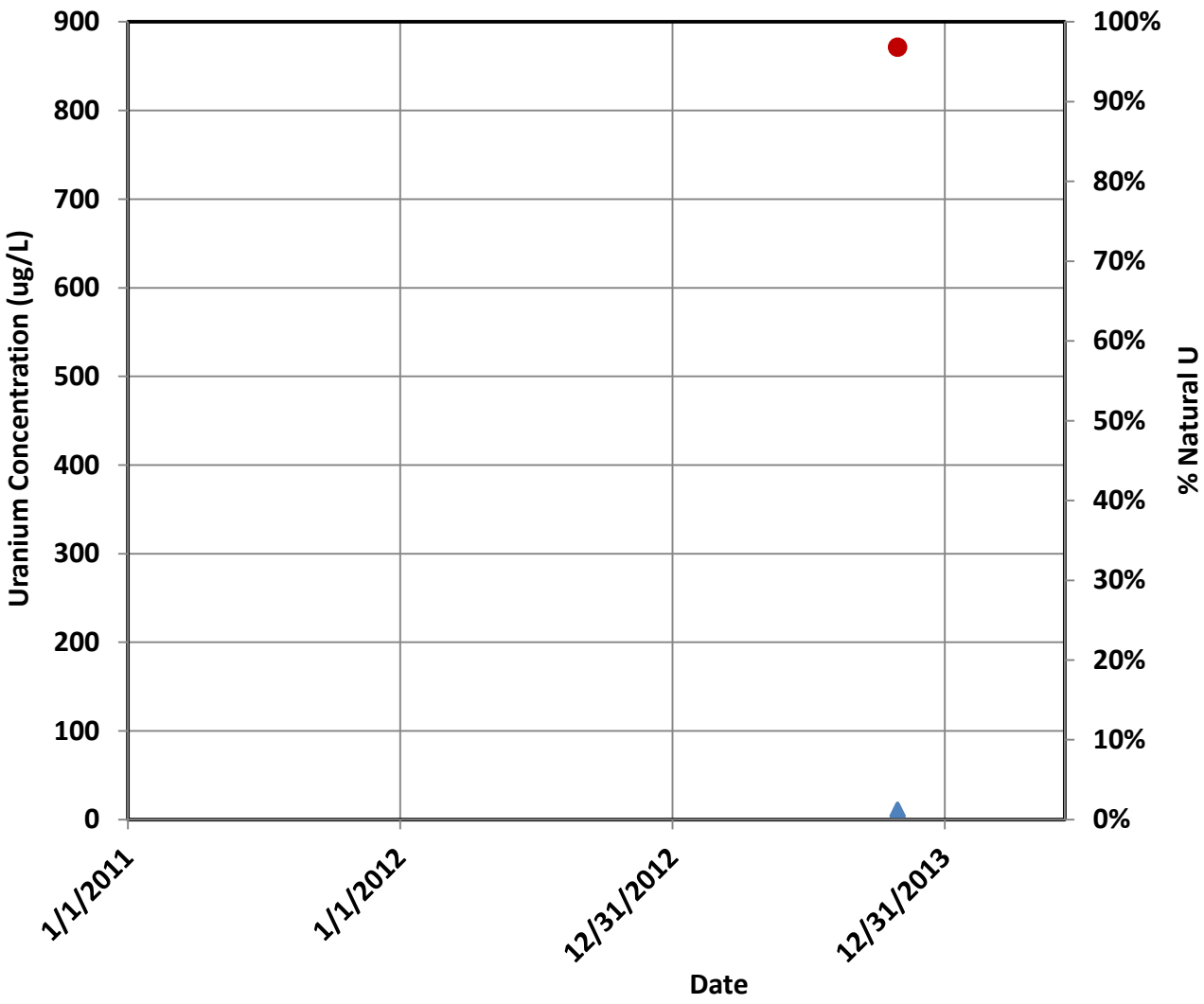
Well 79302 - % Natural (LBNL Data)

Notes:

Plot scales for groundwater wells are different than plots for surface water locations.

Natural % U based on isotopic uranium analyses conducted at LBNL.

Figure K.18
Uranium Concentration and Natural Percentage
Groundwater Well: 79502

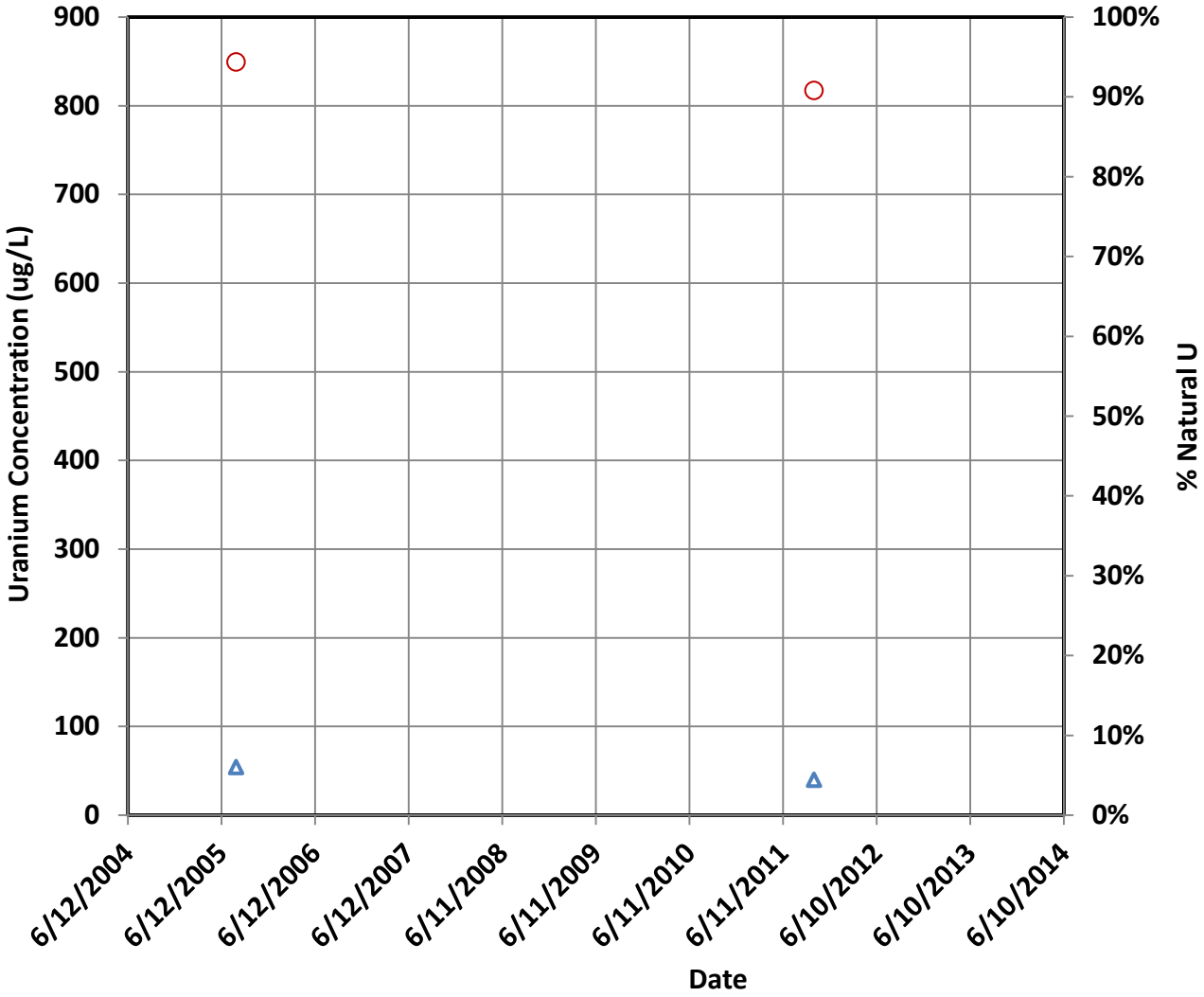


Notes:

Plot scales for groundwater wells are different than plots for surface water locations.

Natural % U based on isotopic uranium analyses conducted at LBNL.

Figure K.19
Uranium Concentration and Natural Percentage
Groundwater Well: 91305

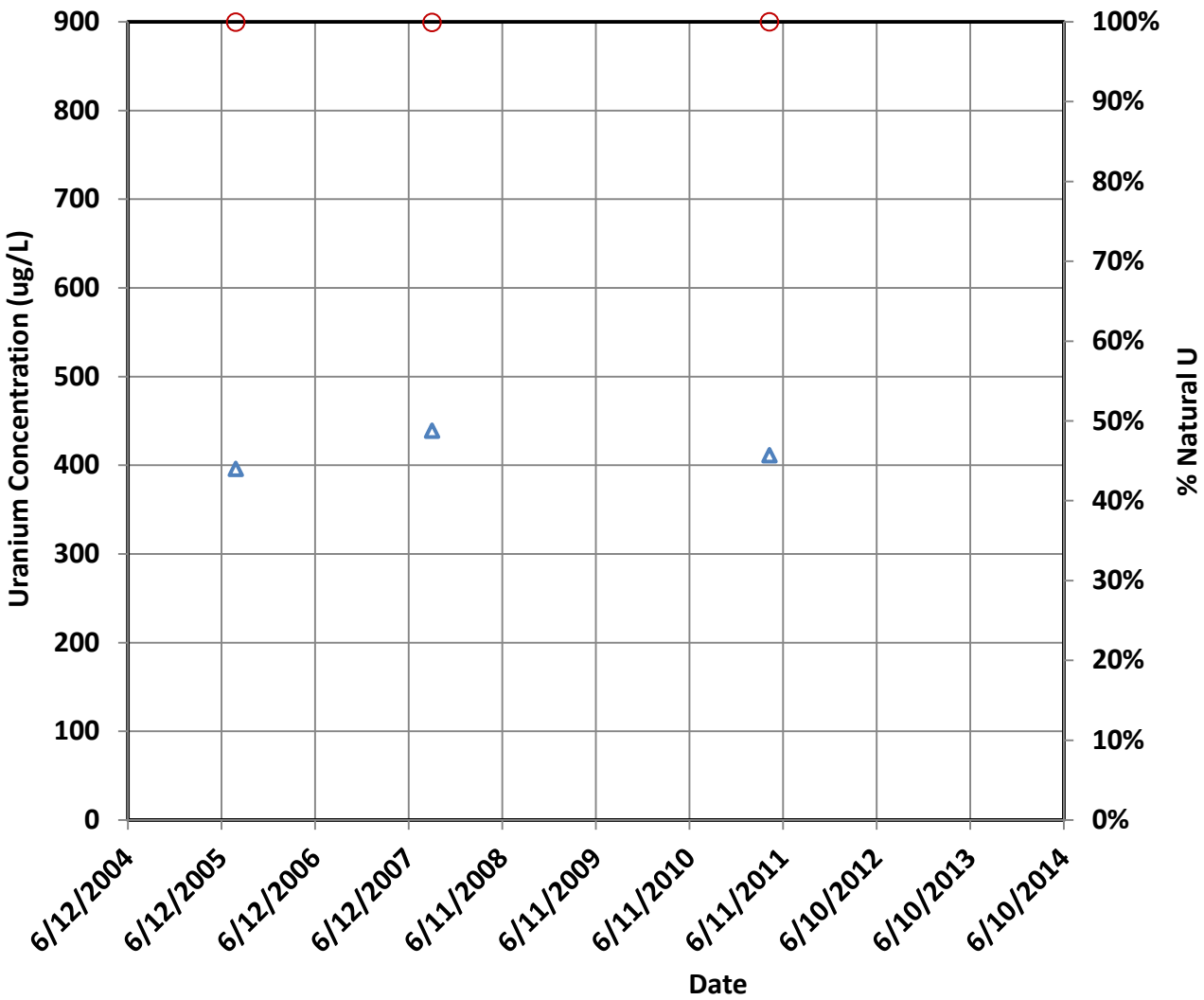


Notes:

Plot scales for groundwater wells are different than plots for surface water locations.

Natural % U based on isotopic uranium analyses conducted at LBNL.

Figure K.20
Uranium Concentration and Natural Percentage
Groundwater Well: 99405



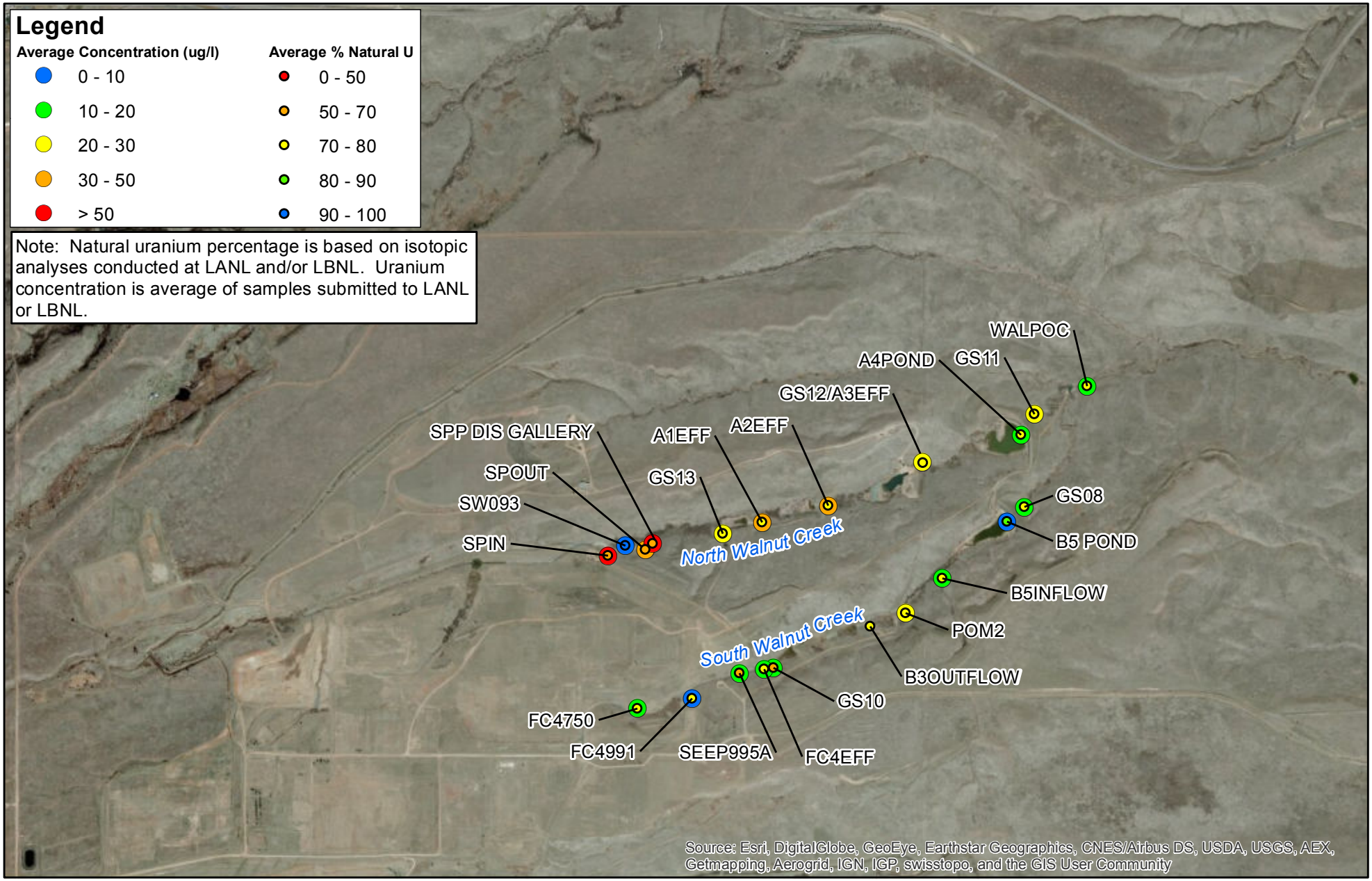
Well 99405 - U Concen (ug/L)

Well 99405 - LANL % Natural

Notes:

Plot scales for groundwater wells are different than plots for surface water locations.

Natural % U based on isotopic uranium analyses conducted at LBNL.



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Base Map: ESRI World Imagery, 1999

WRIGHT WATER ENGINEERS, INC.
2490 W 26TH AVE 100A
DENVER, CO. 80211
(303) 480-1700

JEFFERSON COUNTY, COLORADO

SURFACE WATER NATURAL URANIUM COMPOSITION

ROCKY FLATS SITE

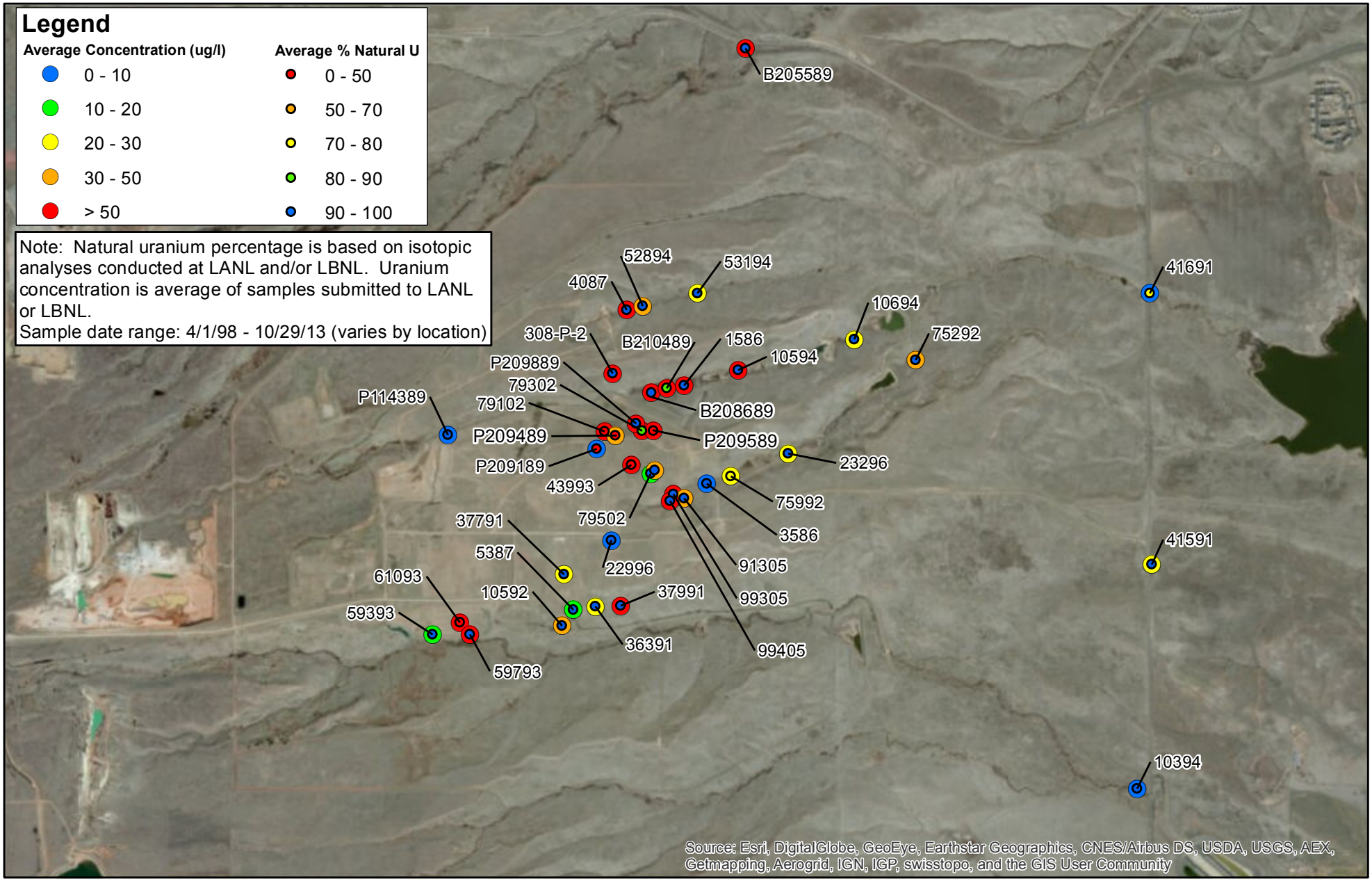
N W E S

1 inch = 2,000 feet

0 500 1,000 2,000 Feet

PROJECT NO. 071-091.020

FIGURE K.21



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Base Map: ESRI World Imagery, 1999

WRIGHT WATER ENGINEERS, INC.
2490 W 26TH AVE 100A
DENVER, CO. 80211
(303) 480-1700

JEFFERSON COUNTY, COLORADO

GROUNDWATER NATURAL URANIUM COMPOSITION AT SELECT WELLS

ROCKY FLATS SITE

N W E S

1 inch = 3,000 feet

0 1,500 3,000 Feet

PROJECT NO. 071-091.020

FIGURE K.22