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Waste-to-Energy Facility Monitoring Program

2022 Summary Report

May 1, 2023

Submitted By: **Kathryn Anderson, MD, PhD, MSPH**
Commissioner of Health
Onondaga County

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Summary Statement:
In the monitoring conducted to date, no relationship has been established between the operation of the Waste-to-Energy Facility and any significant increased levels of constituents in the environment.

Introduction

The Onondaga County Health Department initiated a Waste-to-Energy Facility monitoring program in 1994, the year prior to the facility being placed into operation. In 2003, the monitoring program for air, soil and ash was reevaluated, and a more effective and efficient program was developed and implemented starting in 2004. As an alternative to offsite air monitoring, direct interaction was established with the Onondaga County Resource Recovery Agency (OCCRA) and the New York State Department of Environmental Conservation (DEC) in providing stack monitoring results and improved assurance on reporting of adverse events and equipment failures. This allows for evaluation of short-term changes in the Waste-to-Energy Facility emissions, an effective alternative to the previous limited scope offsite air monitoring conducted over a nine year period.

Long-term deposition impacts continue to be evaluated by soil and ash monitoring. All soil samples are analyzed for metals twice a year. Several changes related to organics testing have been implemented based on the low levels detected in the monitoring conducted to date, and the fact that there is no evidence of a trend or levels associated with health risks. Starting in 2009, half of the soil sampling sites were analyzed for organics each year; therefore each site is sampled biennially. The monitoring program has the flexibility of testing a site again in the following year should an elevated level of any organic constituent be detected. The four soil ash route sites have been eliminated from the program. Historically, these sites do not show any elevation of metals or organics indicating that ash transport in covered vehicles is not a significant environmental or health concern.

Starting in the fall of 2021, the NYSDEC updated Covanta's permit requirements to include ash sampling every five years instead of the historical annual sampling. The ash sampling that Covanta performed was done under strict NYSDEC protocol that takes significant time, effort and coordinated sampling day and night over a 5-day period in the spring and again in the fall. Traditionally Covanta provided OCHD ten samples in the spring and 10 samples in the fall. Since Covanta will only be doing the extensive sampling every 5 years, they will no longer be able to provide OCHD this level of sampling except for every 5th year. However, Covanta will collect one ash sample in the spring and one in the fall during the years when NYSDEC sampling is not required. This modified sampling protocol was started in the fall of 2021. Based on a review of historical ash sampling data, this change in sampling will not affect the efficacy of OCHD's Waste-to-Energy monitoring program. There were no other changes to the ash and soil monitoring for 2022.

Under present contracts, organic analysis is performed by Axys Analytical Services, LTD, and metal analysis is performed by Life Science Laboratories, Inc. The collection of soil was performed by Onondaga County Health Department, Division of Environmental Health staff, while collection of the ash is the responsibility of Covanta Energy System under New York State Department of Environmental Conservation protocols.

Air Monitoring

During 2022, the department interacted directly with OCCRA and DEC in review of the stack monitoring results and reporting of adverse events and equipment failures by the facility operator, Covanta Energy. The department also reviewed both the monitoring conducted at the stack on a continuous basis and reported quarterly to DEC, as well as the annual stack test that was performed by an independent contractor. At no time did the monitoring indicate constituents above levels of health concern. The annual stack test incorporates an extensive list of analytes that include metals and organics. All of the analytes were well below permit limits.

Soil and Ash Testing for Organics

Soil from six routine sites and one control site, collected in the spring of 2022, were analyzed for dioxins/furans (PCDD/PCDF), polychlorinated biphenyls (PCB's), and polycyclic aromatic hydrocarbons (PAH's). Ash, also collected in the spring of 2022, was analyzed for the same constituents.

Organic sample results are compared to published background data and U.S. Department of Health and Human Services, Agency for Toxic Substances and Disease Registry (ATSDR) Toxicological Profiles, EPA Preliminary Remediation Goals, and NYSDEC Soil Cleanup Objectives. In general, little change in levels of these compounds has been observed from background through the present organic screening period. The levels of organics in the ash were similar to reports for ash identified by other investigators and reported in published literature.

Each form of dioxin/furan is associated with it a toxic equivalency factor that is used to calculate a total toxic equivalency (TEQ) for each sample. **Attachment A** shows the historical dioxin/furan TEQ values for soil sites and ash samples. All levels remain well below the ATSDR and EPA action levels and there is no indication of a trend. For ash, dioxin/furan total TEQ remain consistent. Ash is not homogeneous and an inconsistent result occurs occasionally. The results are similar to those reported by other investigators.

Attachment B shows the historical PCB values for soil sites and ash samples.
All levels remain below the ATSDR and EPA action levels and there is no indication of a trend.

Soil and Ash Testing for Metals

Soil from the fourteen soil sites and ash were analyzed for ten different metals twice during the year (Spring and Fall). The metal results are issued in two different reports, one for soils and one for ash.

In 2011, due to improvements in the contract laboratory's equipment, the detection limits for beryllium, cadmium, and selenium have been lowered. Therefore there are detectable levels of these metals in many of the samples as compared to previous years.

Metal results are compared to background levels, published national averages for urban areas and a statewide rural soil survey. Soil and ash are not homogeneous and can contain materials that can account for an occasional inconsistent result. Hence, a single elevated or depressed value will not be assumed to be indicative of a change at a specific site. Rather, the pattern of values for that specific element must demonstrate a statistically significant difference, which may be indicative of a real environmental change. In general, the metal results for 2022 fall within the expected range of values for urban areas and demonstrate no significant variation from background levels.

Attachment C shows the historical levels for the ten metals at the routine and control soil sites. Due to the volume of data, the mean (average) of all routine sites and all control sites for each year is presented. The complete report includes all of the data for each site. Attachment C-1 provides data on New York State Department of Environmental Conservation Soil Cleanup Objectives, a New York State rural soil survey, and USEPA soil screening levels for metals in residential soil.

Attachment D shows the historical levels of the ten metals in ash.

Summary and Conclusions

In general, the organic and metal results for this monitoring period are within the expected range for urban environments and are below any levels associated with health risk. Any fluctuations in sample results appear to be a reflection of the low levels detected, expected variation as a result of sample collection, preparation, and laboratory procedures, or possible variable levels due to past activities at a site. All levels remain below those associated with health concerns. The results should be viewed in the context of an ongoing program of environmental monitoring performed by the Onondaga County Health Department as a part of its overall Waste-to-Energy Facility Monitoring Program. In the monitoring conducted to date, no relationship has been established between the operation of the Waste-to-Energy Facility and any significant increased levels of constituents in the environment.

The following are the detailed Waste-to-Energy Facility Monitoring Program reports that have been issued on the 2022 soil and ash testing:

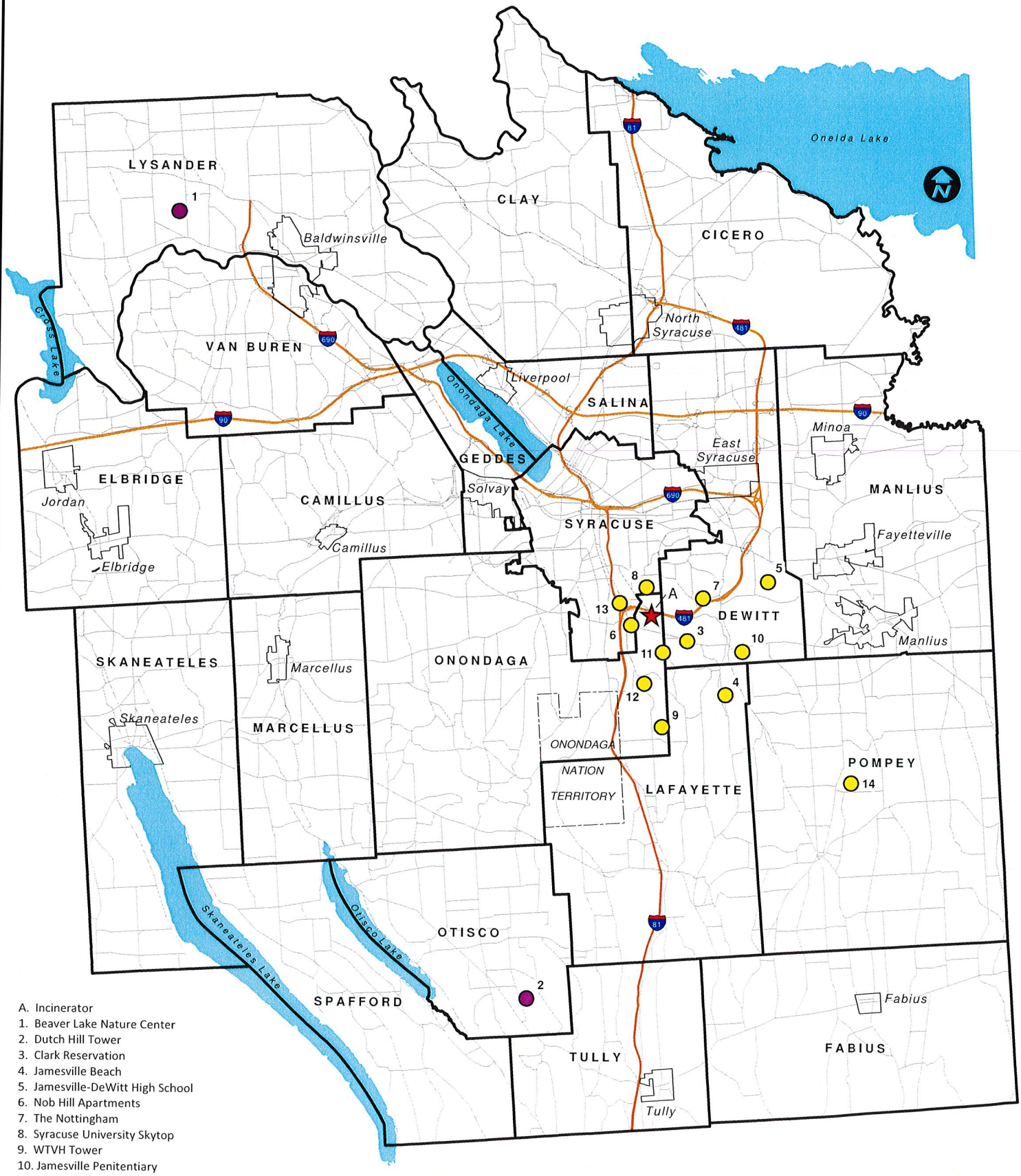
2022 Screening Summary for Organic Constituents
2022 Soil Metals Analysis Summary
2022 Ash Characterization Summary

Copies of these reports are available upon request.

The following abbreviations may be used in this report:

As	Arsenic.
ATSDR	Agency for Toxic Substances and Disease Registry
Be	Beryllium.
Cd	Cadmium.
CES	Certified Environmental Services.
Cr	Chromium.
CV	Coefficient of Variation.
ELS	Environmental Laboratory Services.
Hg	Mercury.
LD	Limit of Detection.
ND	None Detected.
ug/g	micrograms per gram.
Ni	Nickel.
OCCF	Onondaga County Correctional Facility.
OCHD	Onondaga County Health Department.
PAH	Polyaromatic Hydrocarbon
PCB	Polychlorinated Biphenyls
PCDD/PCDF	Polychlorinated Dibenzo-p-Dioxins/Dibenzofurans
Pb	Lead.
pg/g	picograms per gram
PPM	parts per million.
SD	Standard Deviation.
Se	Selenium.
SHFD	Sentinel Heights Fire Department
V	Vanadium.
WTE	Waste to Energy Facility.
Zn	Zinc.
~	approximately.
<	Less than.
>	Greater than.
NA	Not applicable.
NS	Not sampled.

Onondaga County Health Department Soil Monitoring Sites



A. Incinerator
1. Beaver Lake Nature Center
2. Dutch Hill Tower
3. Clark Reservation
4. Jamesville Beach
5. Jamesville-DeWitt High School
6. Nob Hill Apartments
7. The Nottingham
8. Syracuse University Skytop
9. WTVH Tower
10. Jamesville Penitentiary
11. Southwood Park
12. Sentinel Hights Fire Department
13. DOT at Jaquith
14. Pratts Falls Park

0 2 4 6 Miles

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January 2015

Attachment
A

Attachment A

Dioxin/Furan TEQ Soil Resuts Through Year 2022 (pg/g dry weight)

Routine Soil Sites

Site	Year																							
	1994	1999	2000	2001	2002	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022
Clark Reservation	1.8	1.2	2.27	1.42	1.23	2.03	1.90	1.76	1.73	1.26	***	1.64	***	1.75	***	1.67	***	1.87	***	1.54	***	1.4	***	1.85
Jamesville Beach	0.6	0.5	1.09	0.82	0.70	0.71	0.97	0.86	0.93	0.77	***	0.52	***	0.488	***	0.493	***	0.531	***	0.541	***	1.26	***	1.09
OCCF	0.79	2.2	1.68	1.47	1.26	1.38	5.54	1.52	1.94	1331.72@	1.72	***	2.13	***	7.67	***	1.22	***	1.04	***	1.64	***	1.9	***
DOT @ Jaquith	2		1.5	1.64	3.41	2.41	3.78	3.38	1.73	39.90@	2.62	***	3.95	***	2.43	***	14.2	***	9.2	***	8.84	***	3.39	***
Dutch Hill *	0.77		1.41	1.16	1.40	1.03	1.26	1.02	1.02	0.64	***	0.73	***	2.44	***	1.25	***	0.68	***	0.767	***	0.692	***	0.747
Erie - Poolsbrook *	1.39		1.5	1.14	1.86	**	**	**	**	**	**	**	**	**	**	**	**	**	**	**	**	**	**	**
Nottingham	0.51		0.78	0.79	0.80	0.70	0.94	0.85	0.84	0.74	0.76	***	0.43	***	0.791	***	0.517	***	0.587	***	0.605	***	0.552	***
SHFD	12		8.02	9.89	9.72	7.02	8.09	6.27	7.20	10.74	***	7.12	***	16	***	19.6	***	4	***	3.59	***	6.58	***	3.61
Sevier Rd	1.8		2.07	2.58	2.56	**	**	**	**	**	**	**	**	**	**	**	**	**	**	**	**	**	**	**
Beaver Lake *			0.51	0.53	0.85	0.70	0.72	0.64	0.69	0.65	0.38	***	0.5	***	0.751	***	0.574	***	0.474	***	0.489	***	0.514	***
Ch. 3 Towers			3.36	3.88	3.35	9.66	7.79	7.69	5.39	2.44	3.72	***	0.45	***	1.02	***	0.541	***	1.29	***	1.16	***	1.13	***
Gen.Crushed Stone			2.77	1.98	2.13	**	**	**	**	**	**	**	**	**	**	**	**	**	**	**	**	**	**	**
Highland Forest			1.18	1.24	0.96	**	**	**	**	**	**	**	**	**	**	**	**	**	**	**	**	**	**	**
JD High School			1.32	1.29	1.12	1.10	1.48	1.16	1.06	1.28	***	1.13	***	0.951	***	1.25	***	0.759	***	0.805	***	0.733	***	0.367
Nob Hill			0.93	0.91	0.90	6.83	1.01	1.00	1.07	1.05	***	0.78	***	0.488	***	0.929	***	0.71	***	0.761	***	0.6	***	0.842
Pratts Falls			0.91	0.98	0.77	0.87	0.98	0.83	0.94	1.17	0.82	***	0.94	***	0.91	***	0.229	***	1.33	***	1.41	***	1.04	***
Southwood			0.6	1.14	1.01	1.08	1.05	0.97	1.09	1.01	0.80	***	0.93	***	0.807	***	0.914	***	0.618	***	0.73	***	0.71	***
Syracuse University			3.11	6.97	9.47	13.89	3.14	3.66	12.96	0.67	***	2.45	***	1.63	***	2.57	***	13.9	***	4.15	***	4.64	***	2.88

* Denotes Control Sites
** Site no longer sampled due to program re-evaluation
*** Site not sampled this year. Sites are sampled every other year.
@ A single elevated value will not be assumed to be indicative of a change at a specific site, rather a pattern of values must demonstrate a statistically significant difference.

Combined Ash

Site	Year																							
	1999-Spring	1999-Fall	2000-Fall	2001-Fall	2002-Fall	2004-Spring	2005-Spring	2006-Spring	2007-Spring	2008-Spring	2009-Spring	2010-Spring	2011-Spring	2012-Spring	2013-Spring	2014-Spring	2015-Spring	2016-Spring	2017-Spring	2018-Spring	2019-Spring	2020-Spring	2021-Spring	2022-Spring
Day 1 and 2	256	153	109	123	177	72	191	246	250	243	168	200	197	116	176	135	249	270	146	220	386	314	309	556
Day 3, 4, and 5	242	205	154	137	220	445	142	148	276	240	126	172	129	127	161	90.4	123	182	167	256	355	329	230	See note (2)

Notes:

(1) For reference purposes, the ATSDR investigation level for Dioxin/Furan TEQ is 50 pg/g and the EPA clean up level is 1,000 pg/g.

(2) Only one ash sample was analyzed this year

Figure 1

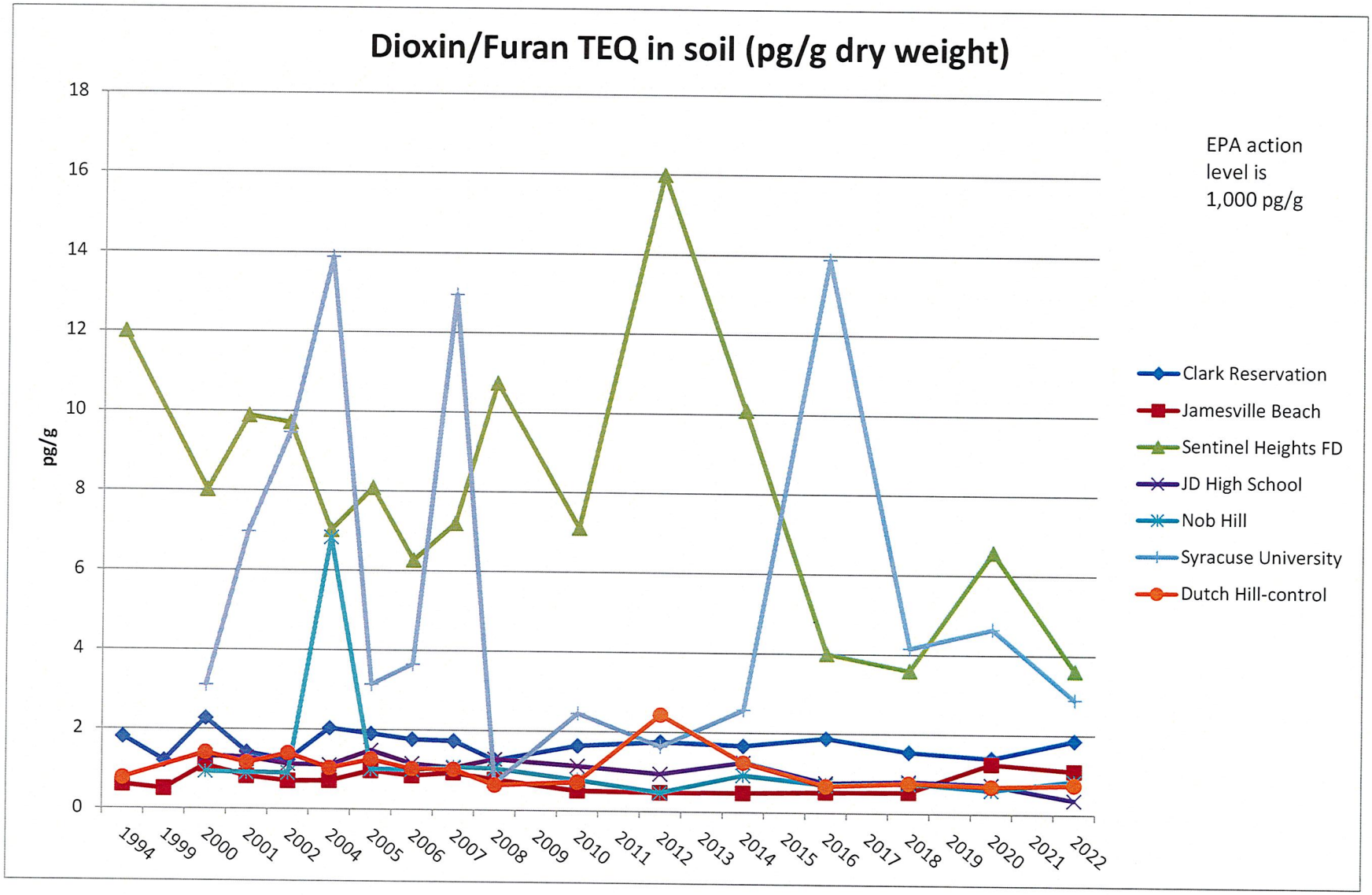
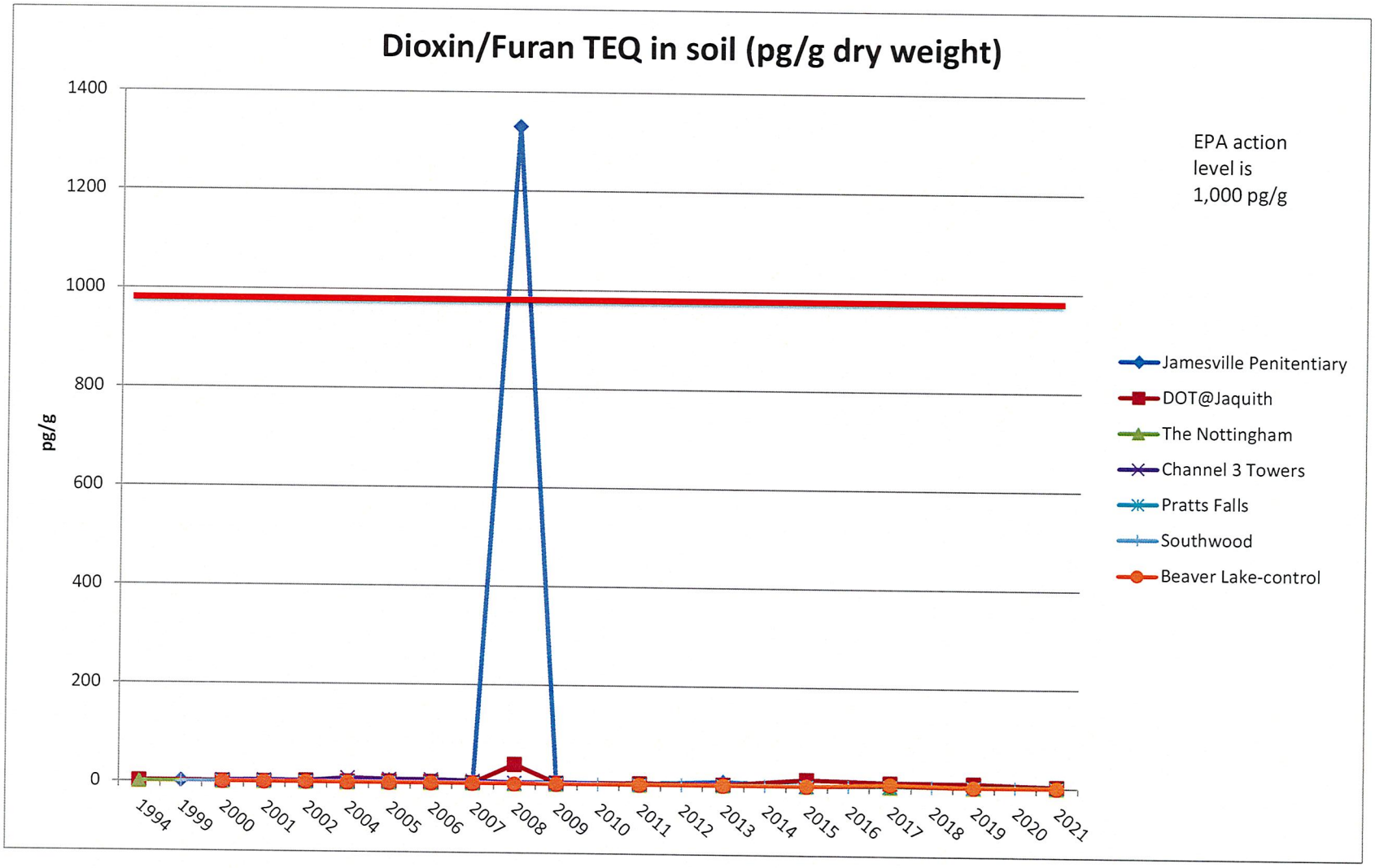
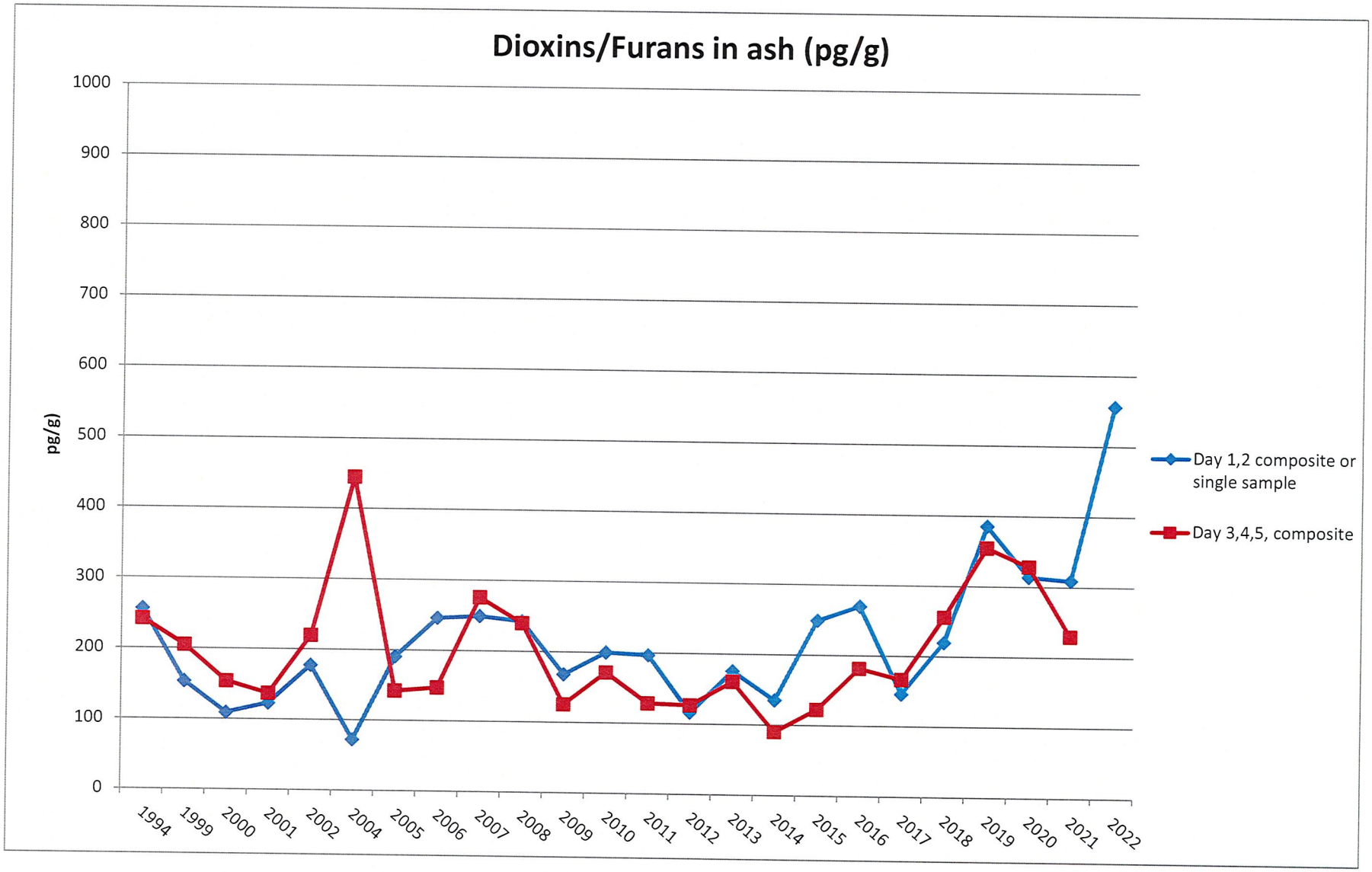

Dioxin/Furan TEQ in soil (pg/g dry weight)
pg/g
18
16
14
12
10
8
6
4
2
0
1994
1999
2000
2001
2002
2004
2005
2006
2007
2008
2009
2010
2011
2012
2013
2014
2015
2016
2017
2018
2019
2020
2021
2022
EPA action level is 1,000 pg/g
Clark Reservation
Jamesville Beach
Sentinel Heights FD
JD High School
Nob Hill
Syracuse University
Dutch Hill-control

Figure 2



*These sites were not sampled this year. Sites are sampled every other year.

Figure 3



In 2022 there was only one ash sample analyzed.

Attachment
B

Attachment B

PCB Results through Year 2022 (pg/g dry weight)

Routine Soil Sites

Site	2000	2001	2002	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022
Clark Reservation	6010	2360	3150	2780	3610	2770	4110	2640	***	2960	***	2980	***	2580	***	7010	***	3440	***	2350	***	3860
Jamesville Beach	1260	644	683	703	1110	781	1220	1610	***	589	***	707	***	754	***	612	***	790	***	1010	***	720
OCCF	3080	5230	2000	2310	6940	3120	6320	2190	2810	***	2650	***	3970	***	2340	***	451	***	294	***	588	***
DOT @ Jaquith	16100	15400	45100	9220	67100	49100	18000	14200	34700	***	31800	***	38400	***	35900	***	16400	***	11500	***	6150	***
Dutch Hill *	**2210**	**1170**	**1400**	**1200**	**1380**	**1140**	**1450**	**1340**	***	**1060**	***	**2350**	***	**933**	***	**665**	***	**941**	***	**776**	***	**1460**
Erie - Poolsbrook *	**2620**	**1400**	**2020**	**	**	**	**	**	**	**	**	**	**	**	**	**	**	**	**	**	**	**
Nottingham	2140	2280	3610	1640	7380	2850	3050	2110	4200	***	2020	***	1290	***	1600	***	3370	***	1020	***	1070	***
SHFD	3080	2970	1760	1900	2730	1610	2510	1730	***	2240	***	1260	***	10800	***	596	***	447	***	939	***	2230
Sevier Rd	1870	1600	2250	**	**	**	**	**	**	**	**	**	**	**	**	**	**	**	**	**	**	**
Beaver Lake *	**1970**	**1210**	**5250**	**2650**	**1420**	**1360**	**1360**	**1370**	**2450**	***	**1110**	***	**1380**	***	**1120**	***	**1340**	***	**1630**	***	**1150**	***
Ch. 3 Towers	3360	2310	2490	1620	1830	1730	2220	1400	1510	***	723	***	1030	***	1110	****	2280	***	2620	***	2250	***
General Crushed Stone	9430	3160	5450	**	**	**	**	**	**	**	**	**	**	**	**	**	**	**	**	**	**	**
Highland Forest	2120	1210	1270	**	**	**	**	**	**	**	**	**	**	**	**	**	**	**	**	**	**	**
JD High School	3580	1780	1732	1810	2640	1780	1720	2720	***	1750	***	1450	***	1640	***	1440	***	1260	***	914	***	429
Nob Hill	3500	2480	2500	3440	2810	2970	2830	2950	***	2510	***	1820	***	2610	***	3310	***	1820	***	1800	***	2120
Pratts Falls	1890	1840	1440	1620	1650	1220	1450	2050	1230	***	1910	***	1100	***	501	***	1810	***	2090	***	1310	***
Southwood	2240	2160	1150	1480	1470	1470	2750	1640	1640	***	1120	***	1240	***	1090	***	1360	***	3860	***	1990	***
Syracuse University	10700	114000	11000	9510	6940	11400	10900	1170	***	78600	***	17400	***	18700	***	37,500	***	37,600	***	92,000	***	17,800

* Denotes Control Sites
** Site no longer sampled due to program re-evaluation
*** Site not sampled this year. Sites are sampled every other year.

Combined Ash

Site	2000-Fall	2001-Fall	2002-Fall	2004-Spring	2005-Spring	2006-Spring	2007-Spring	2008-Spring	2009-Spring	2010-Spring	2011-Spring	2012-Spring	2013-Spring	2014-Spring	2015-Spring	2016-Spring	2017-Spring	2018-Spring	2019-Spring	2020 spring	2021 spring	2022 spring
Day 1 and 2	79000	22000	13600	7850	2470	5770	3080	23000	3100	5930	1260	1800	16200	1660	5610	758	1060	1120	1170	2370	1190	2880
Day 3, 4, and 5	4700	7020	6580	38000	33000	57000	3060	5550	51900	8840	6060	20500	10100	3210	1710	1600	810	594	1120	1020	610	See Note (3)

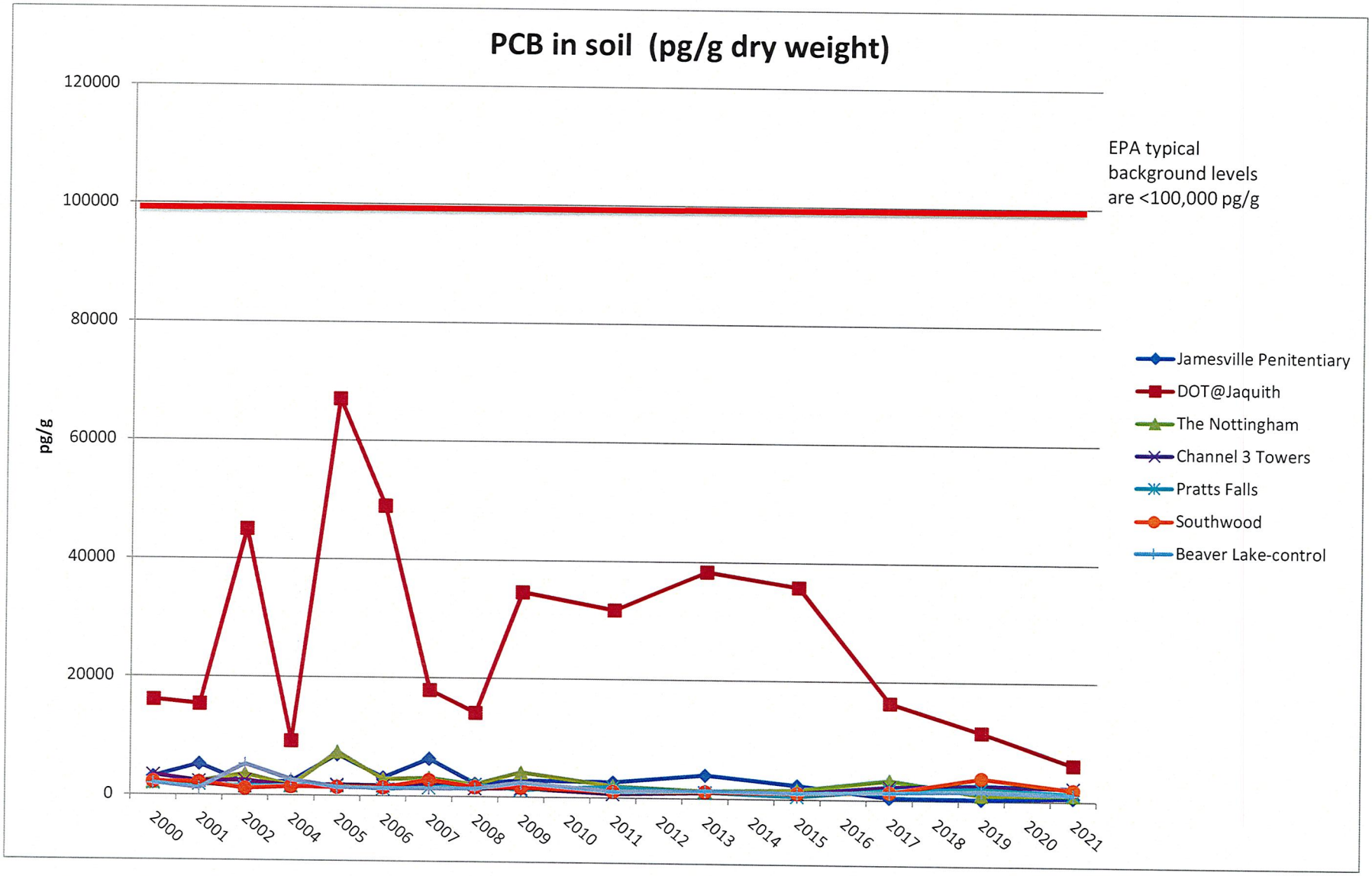
Notes:

(1) PCB results prior to 2000 were all less than detection limits. Starting in 2000 detection limits were lowered so that usable concentrations were available.

(2) For reference purposes, the ATSDR indicates that typical mean PCB concentrations in background soil are less than 100,000 pg/g.

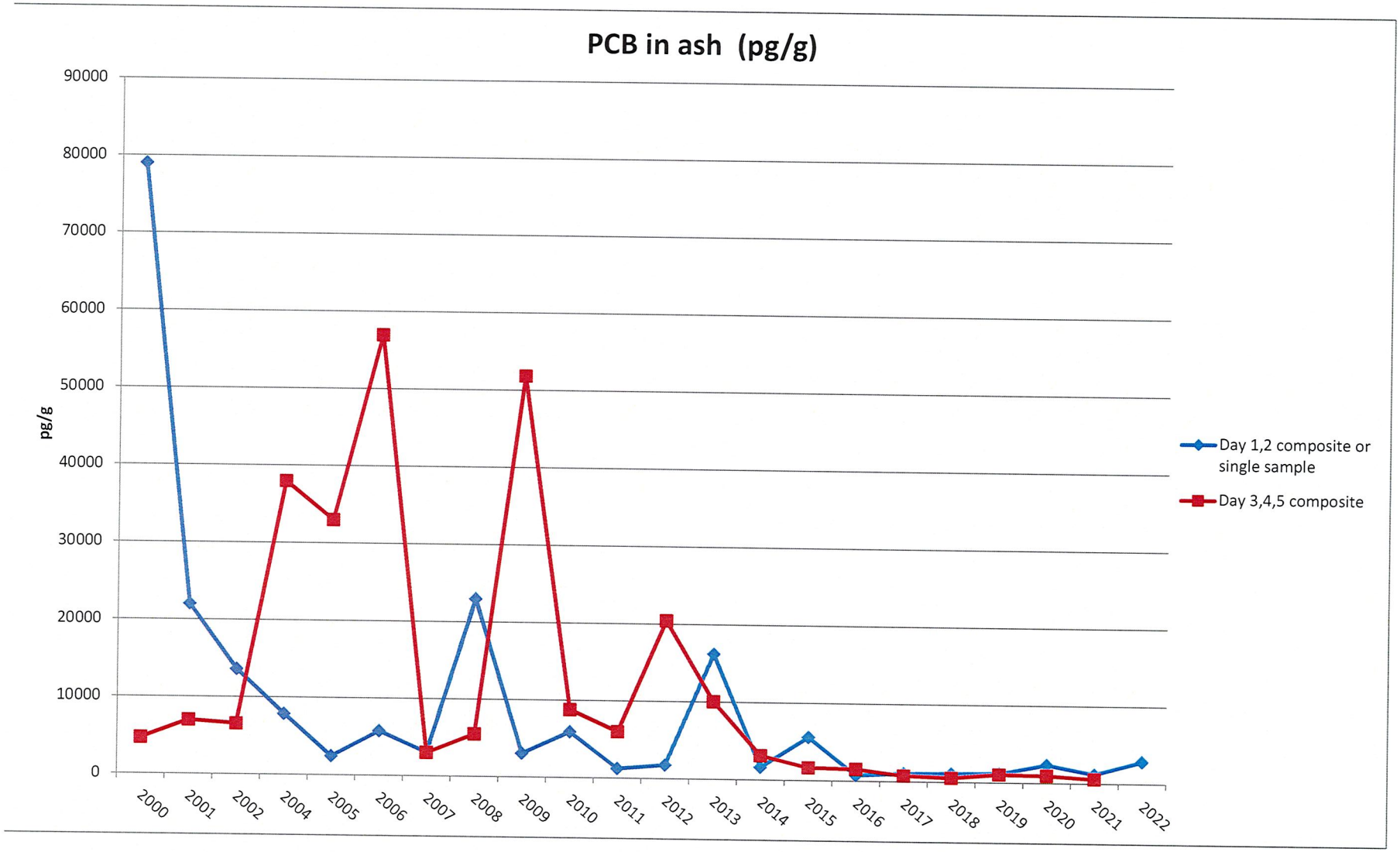
(3) Only one ash sample was analyzed this year.

Figure 5



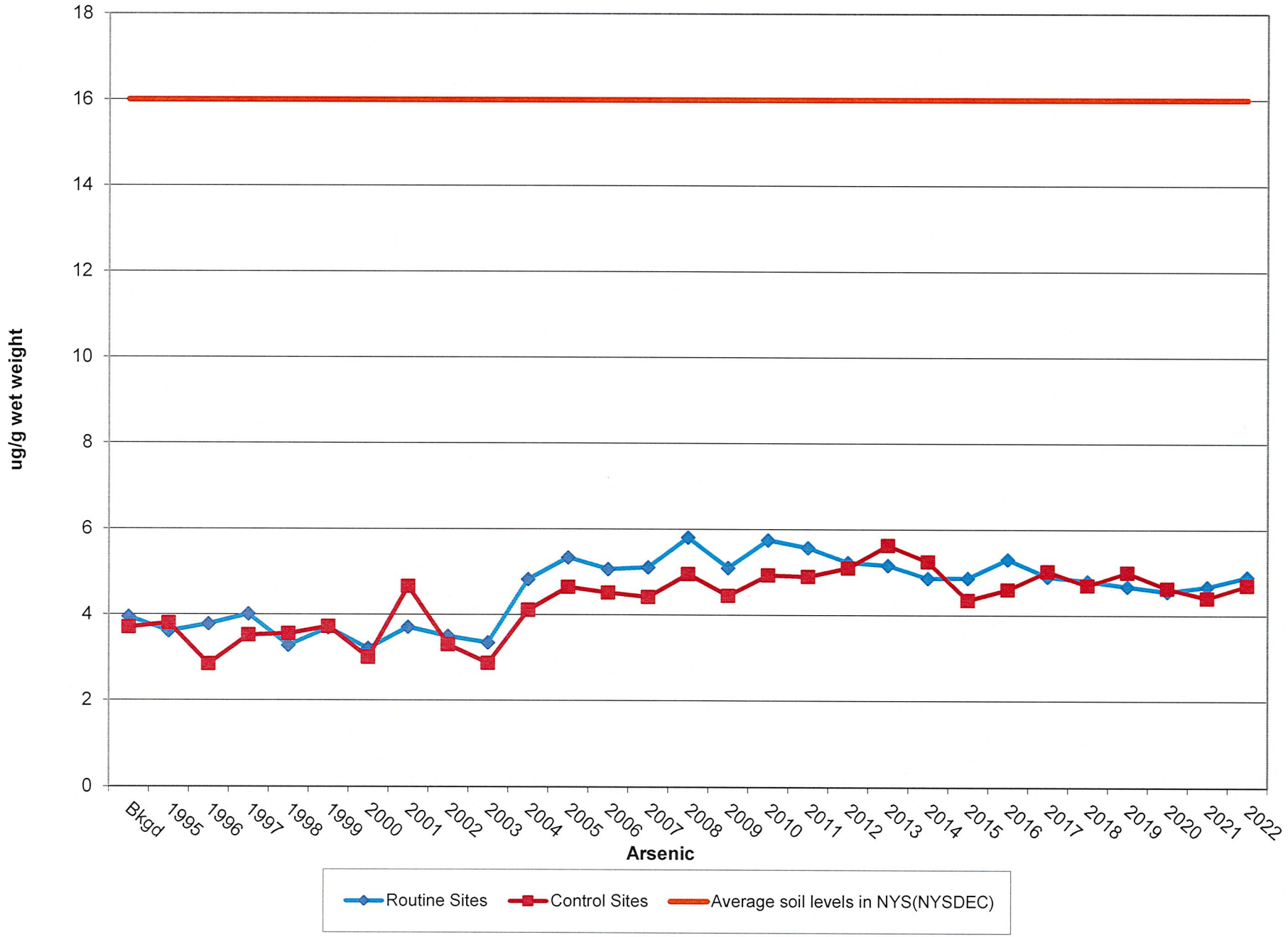
*These sites were not sampled this year. Sites are sampled every other year.

Figure 6

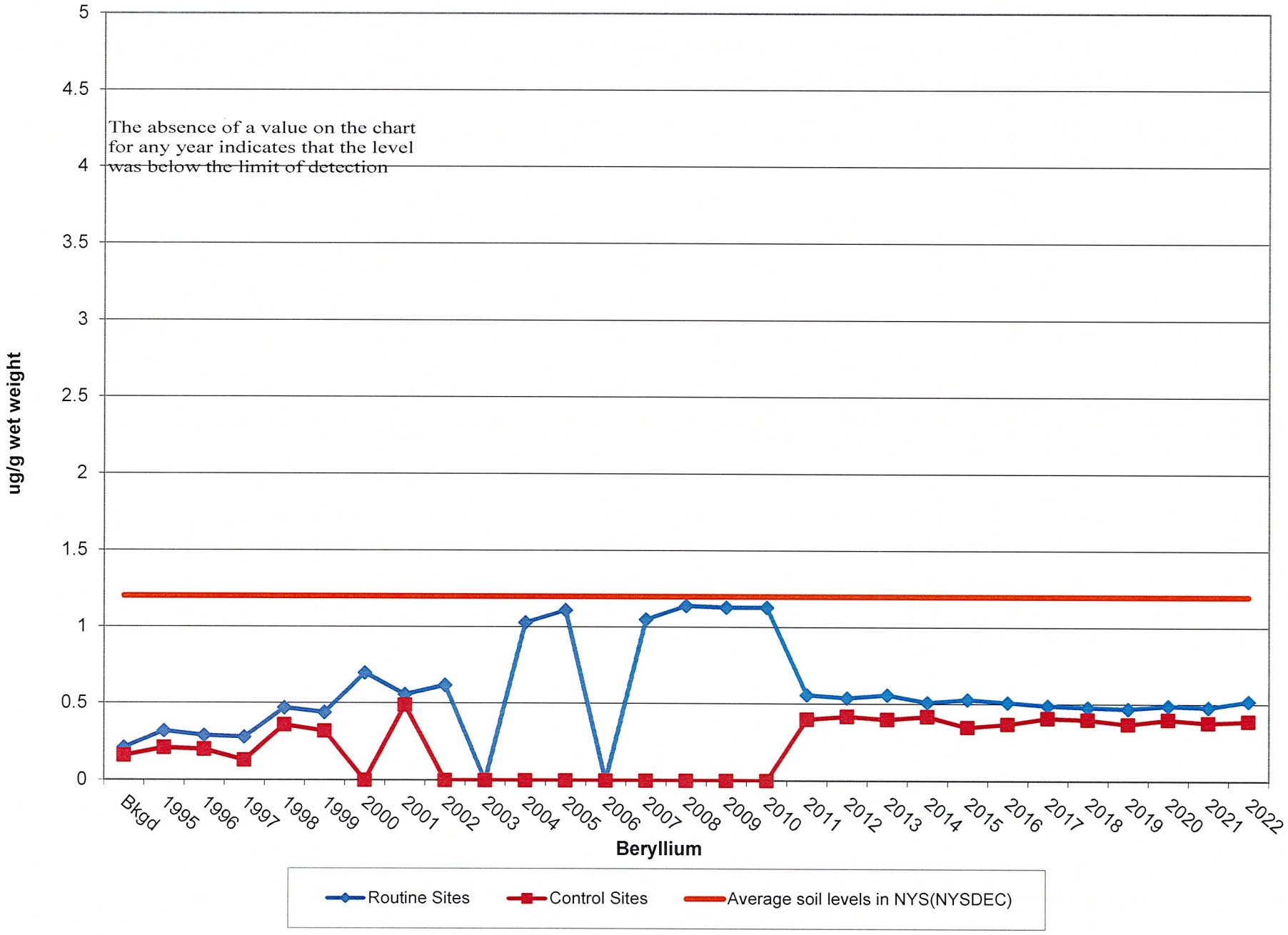

PCB in ash (pg/g)
pg/g
90000
80000
70000
60000
50000
40000
30000
20000
10000
0
2000
2001
2002
2004
2005
2006
2007
2008
2009
2010
2011
2012
2013
2014
2015
2016
2017
2018
2019
2020
2021
2022
Day 1,2 composite or single sample
Day 3,4,5 composite

Attachment
C

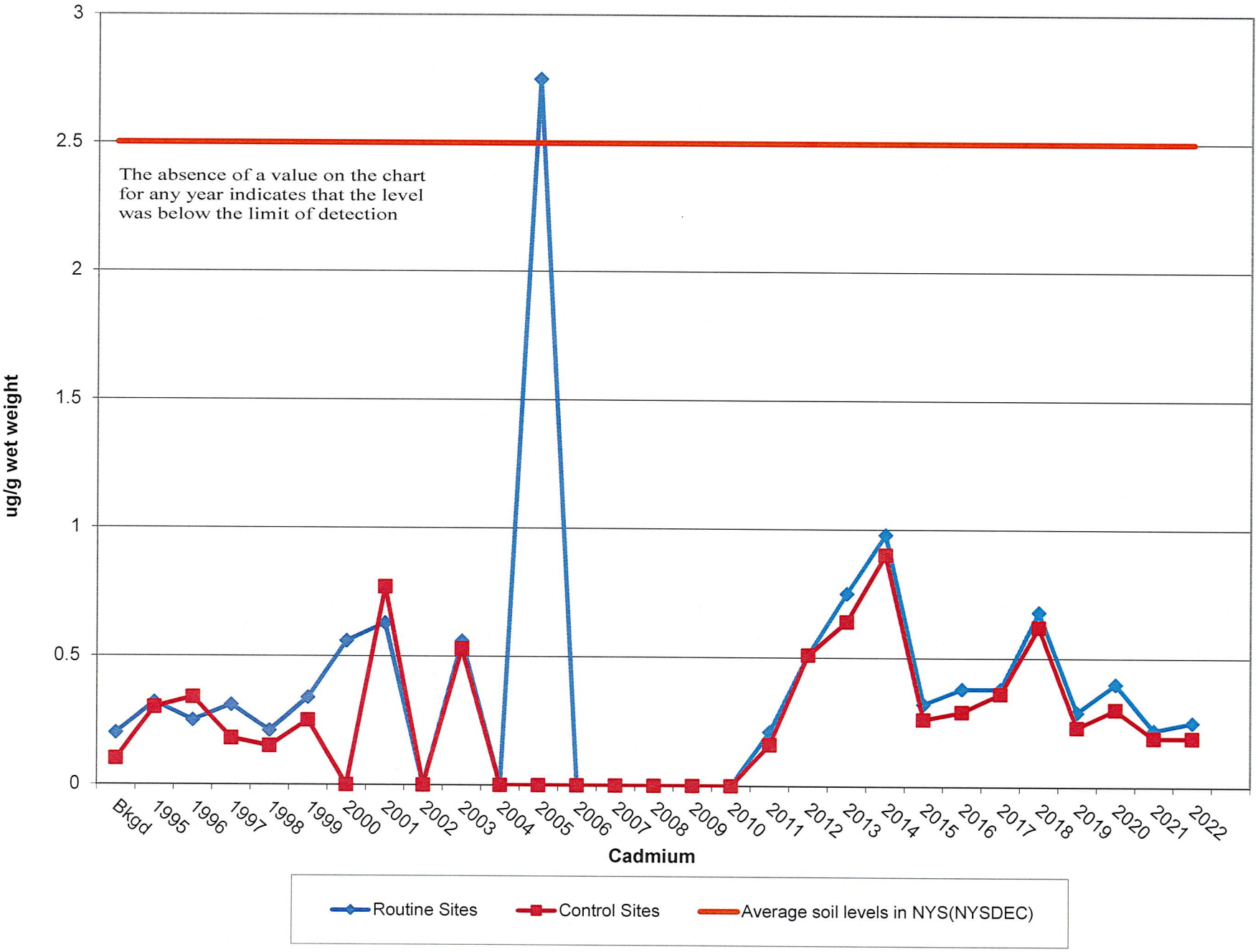
VII.A. Comparison of Annual Mean Values
Routine and Routine Control Sites



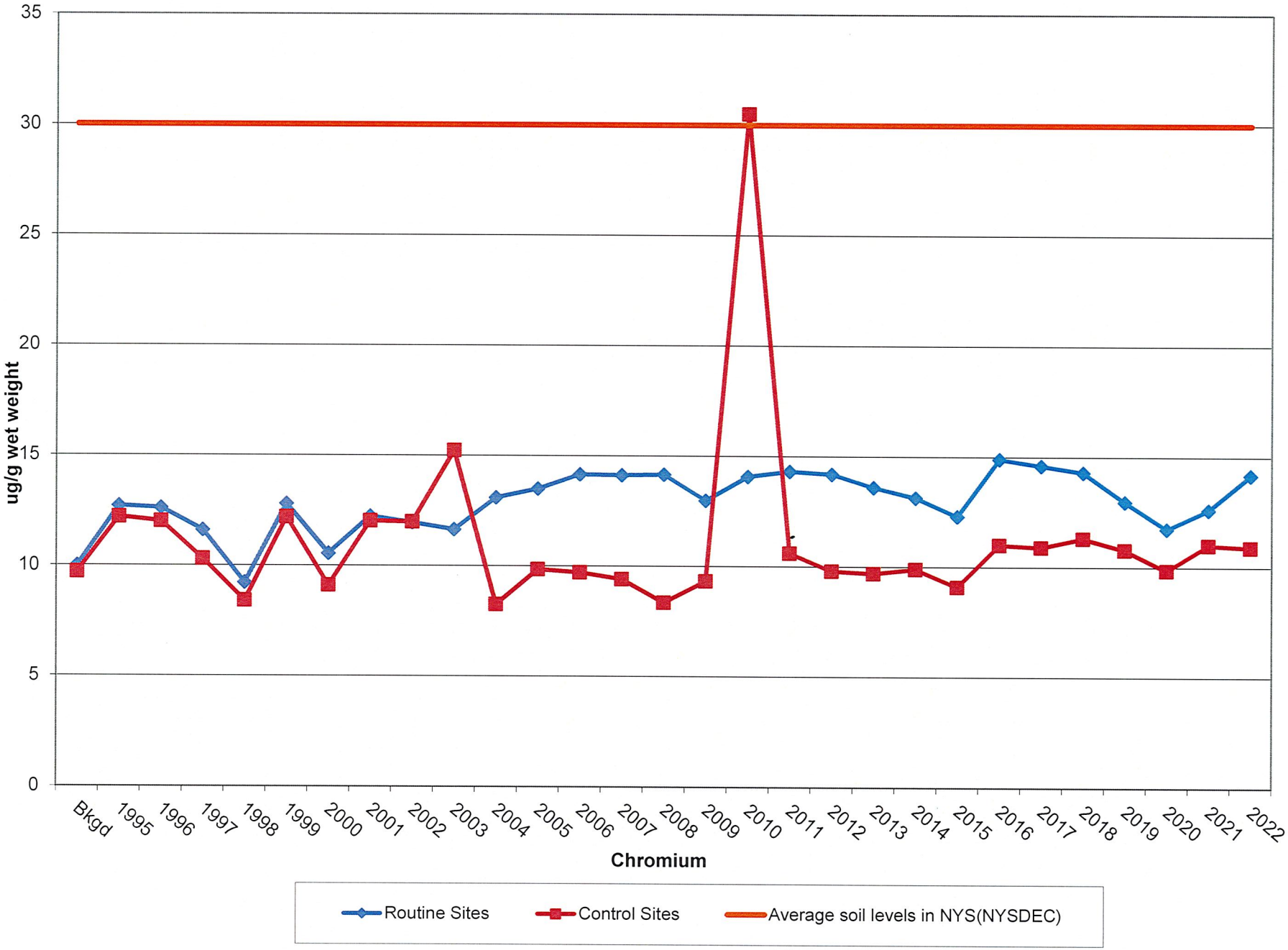
VII.B. Comparison of Annual Mean Values
Routine and Control Sites



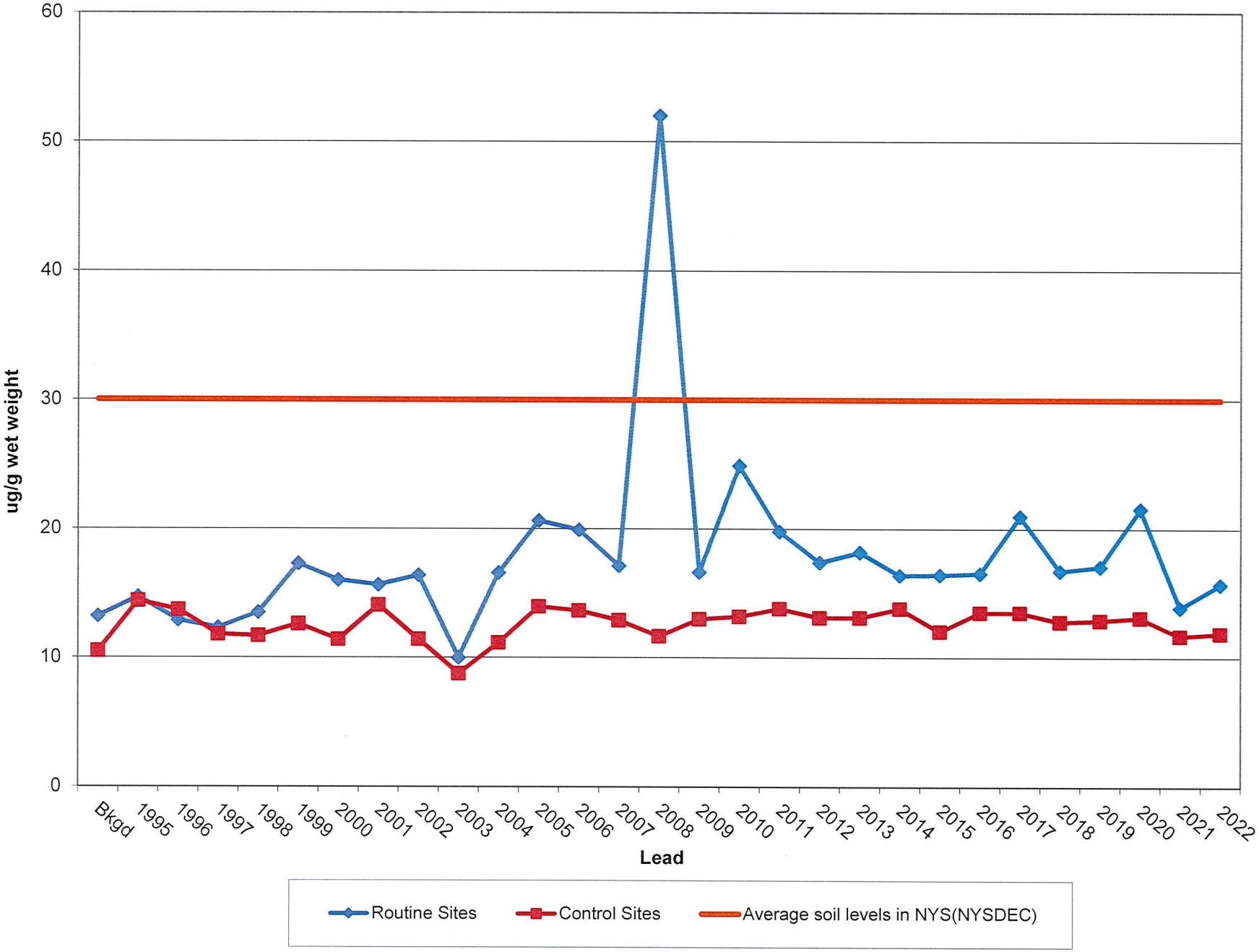
VII.C. Comparison of Annual Mean Values
Routine and Control Sites



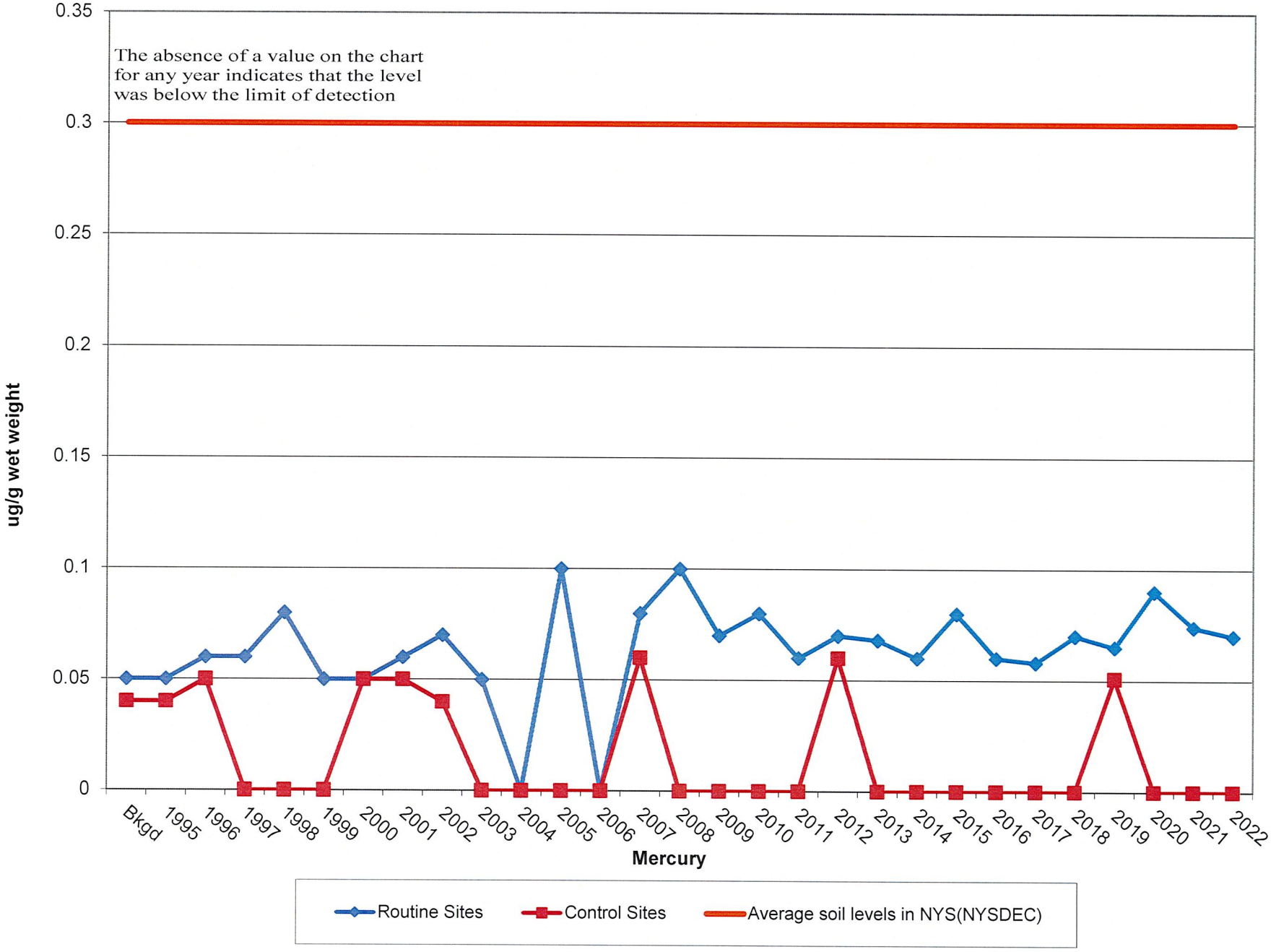
VII.D. Comparison of Annual Mean Values
Routine and Control Sites



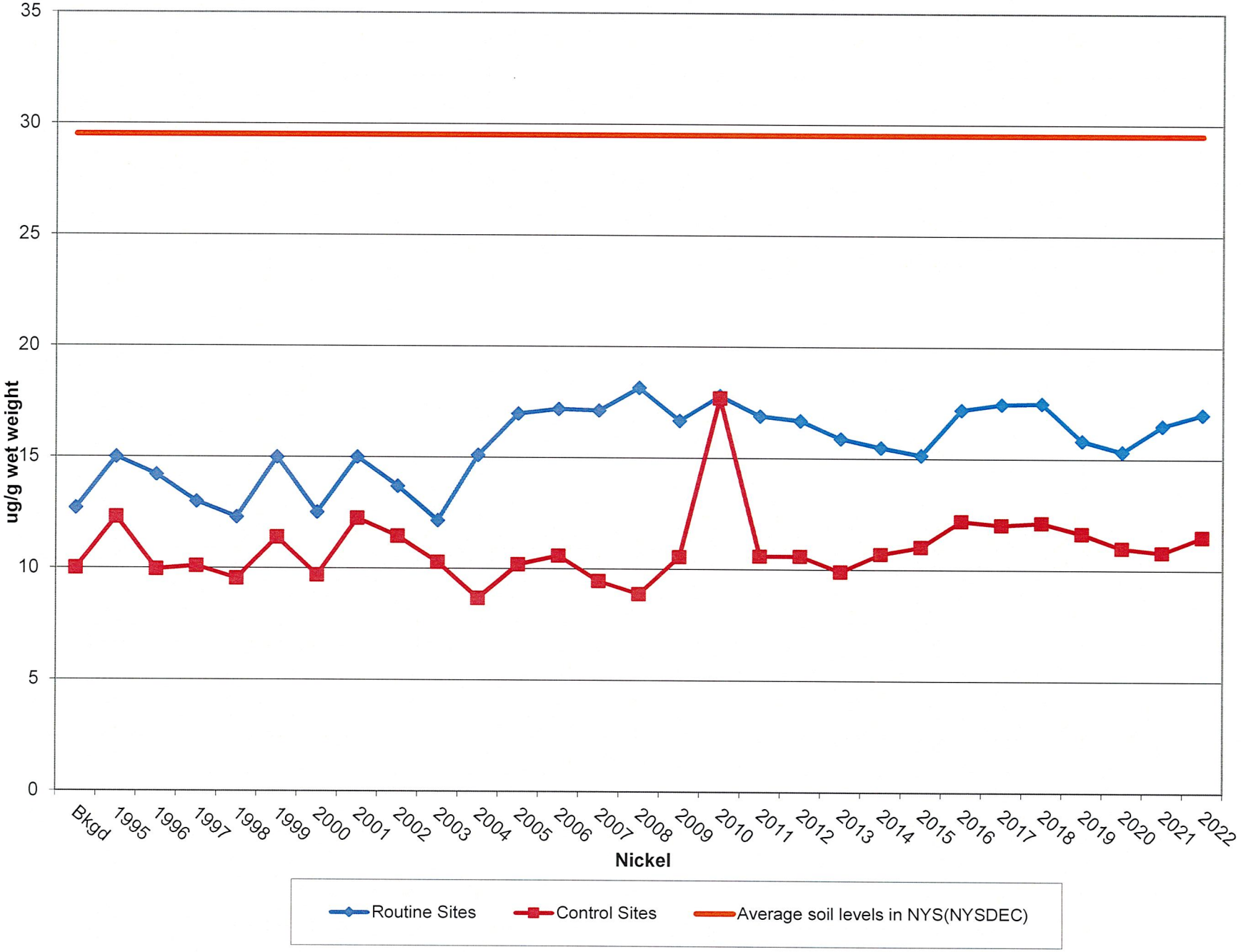
VII.E. Comparison of Annual Mean Values
Routine and Control Sites



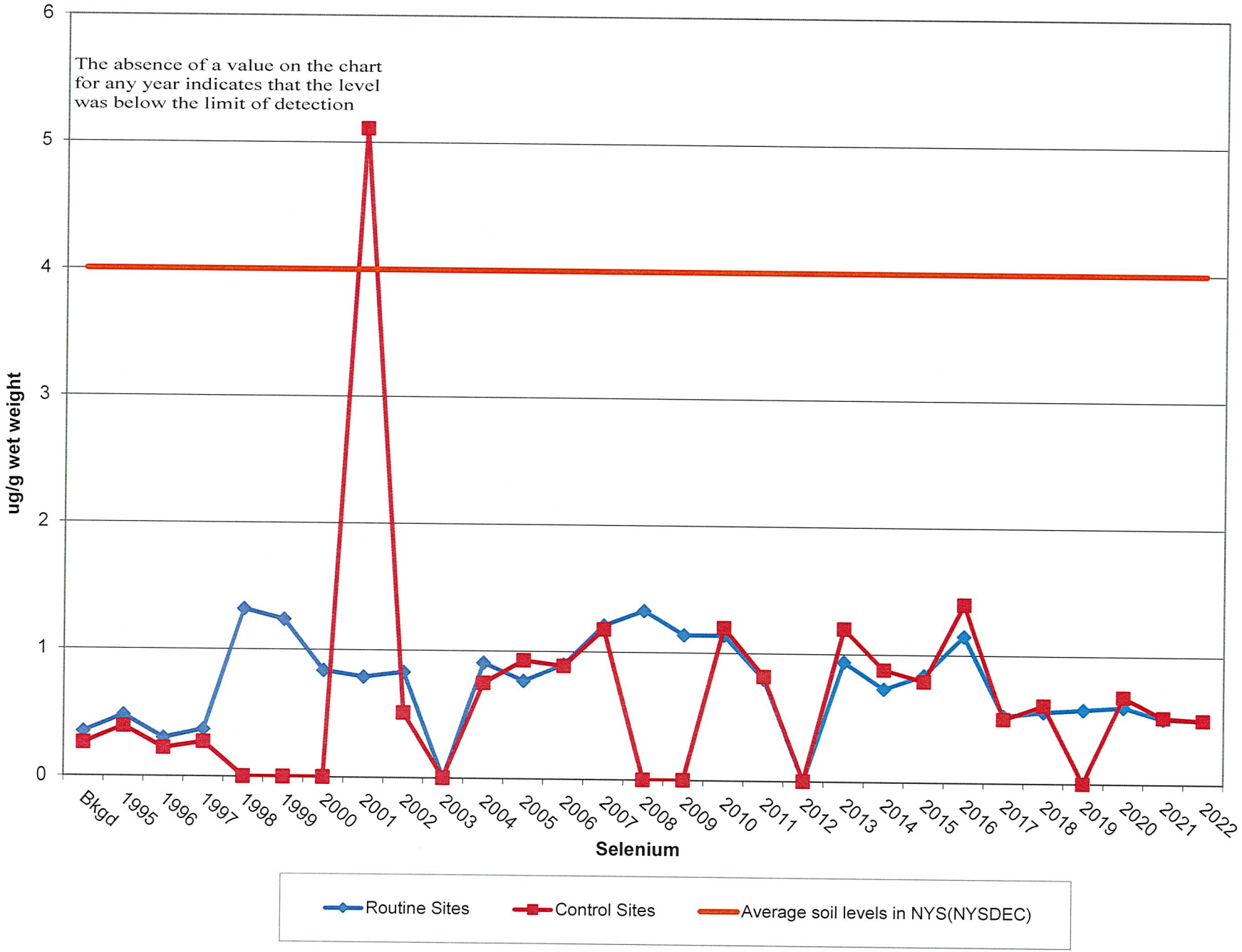
VII.F. Comparison of Annual Mean Values
Routine and Control Sites



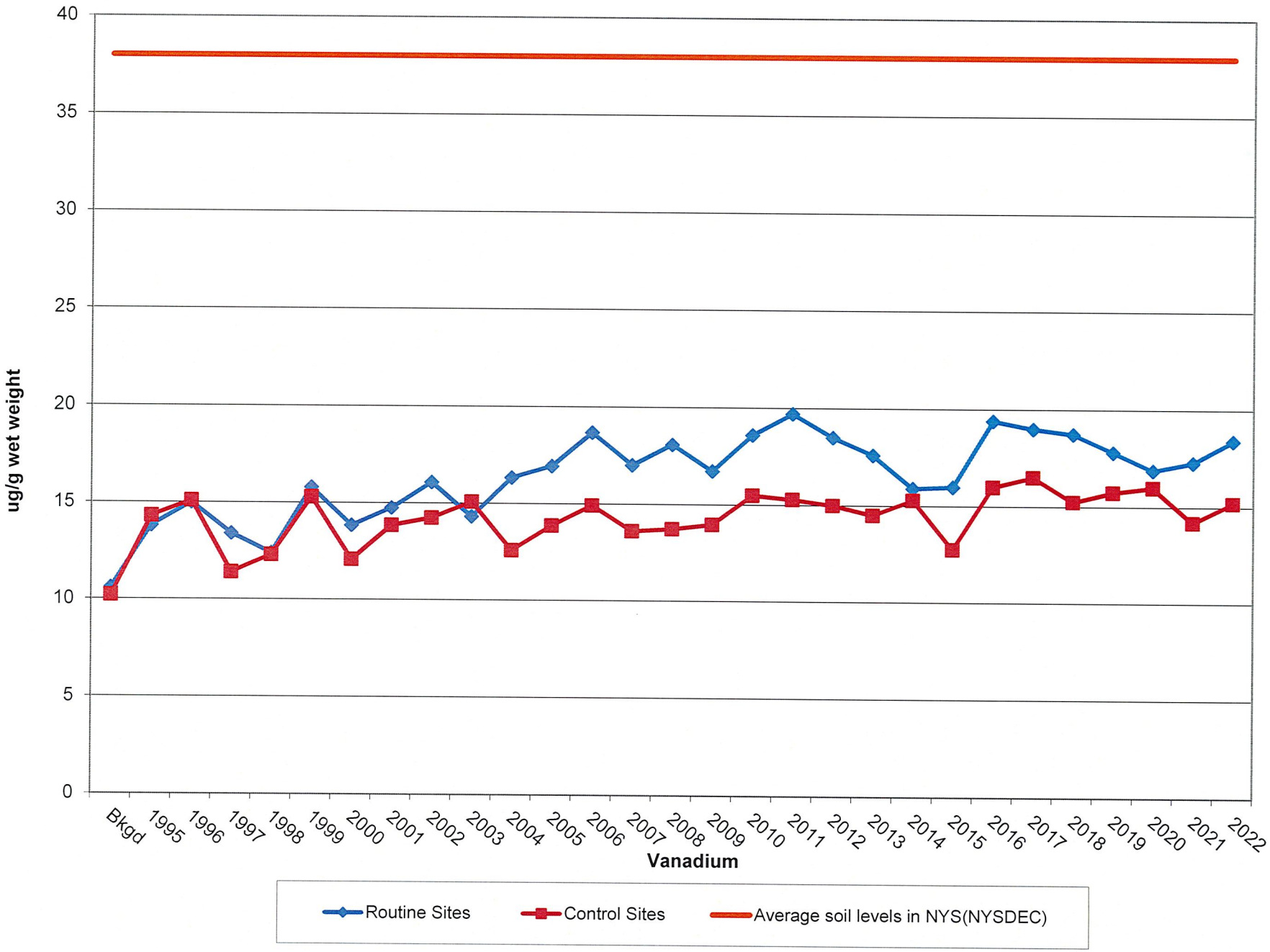
VII.G. Comparison of Annual Mean Values
Routine and Control Sites



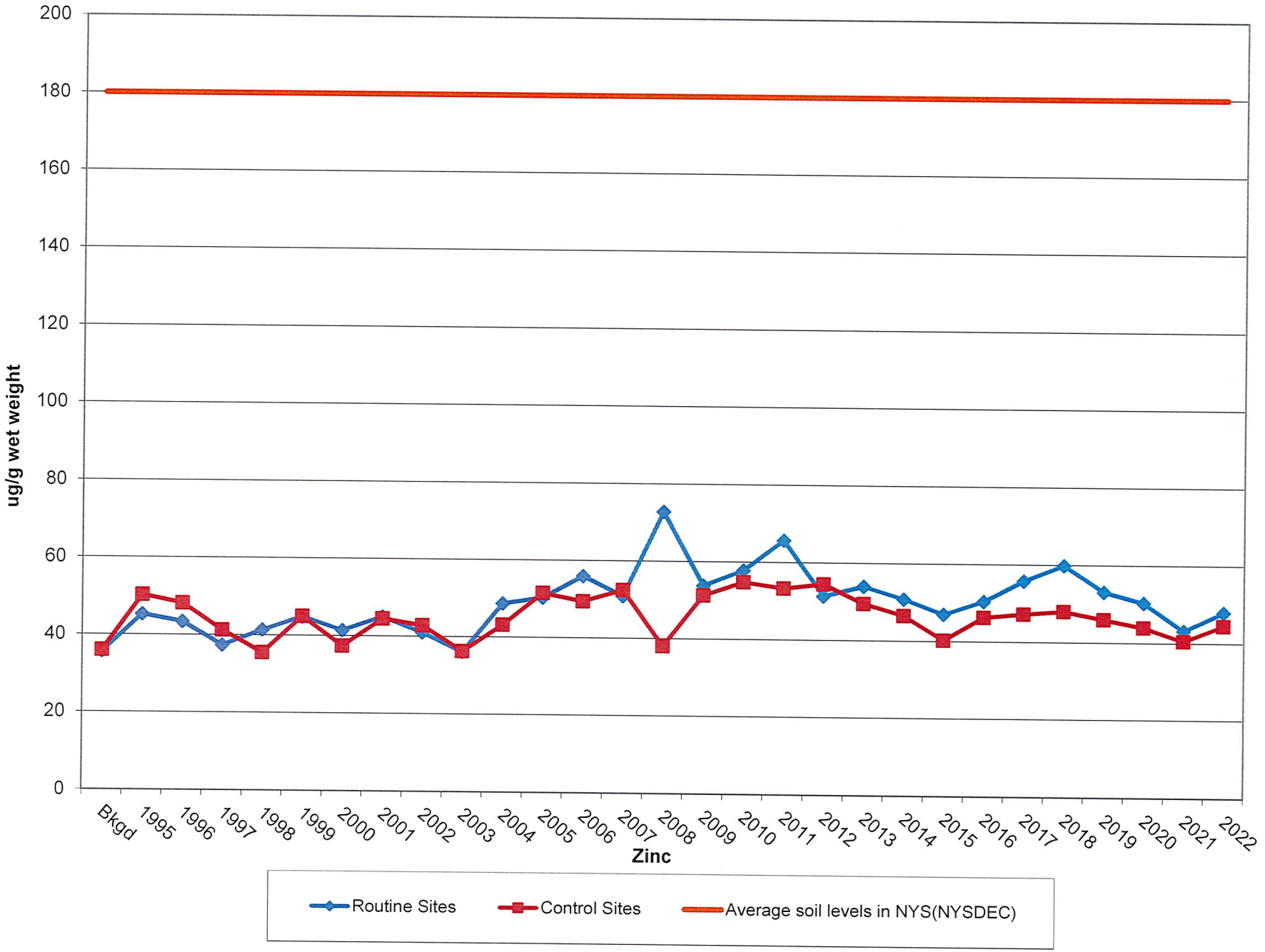
VII.H. Comparison of Annual Mean Values
Routine and Control Sites



VII.I. Comparison of Annual Mean Values
Routine and Control Sites



VII.J. Comparison of Annual Mean Values
Routine and Routine Control Sites



Attachment
C-1

Metal	NYS SCO's for restricted use residential (ppm)	Rural Soil Survey (ppm)	USEPA Soil Screening levels for residential (ppm)
Arsenic	16 (0.21)	16	0.39
Beryllium	14	1.2	160
Cadmium	2.5 (0.86)	2.5	70
Chromium	36	30	280
Lead	400	133	400
Mercury	0.81	0.3	6.7
Nickel	140	29.5	1600
Selenium	36	4	390
Vanadium	NA	38	390
Zinc	2,200	180	23,000

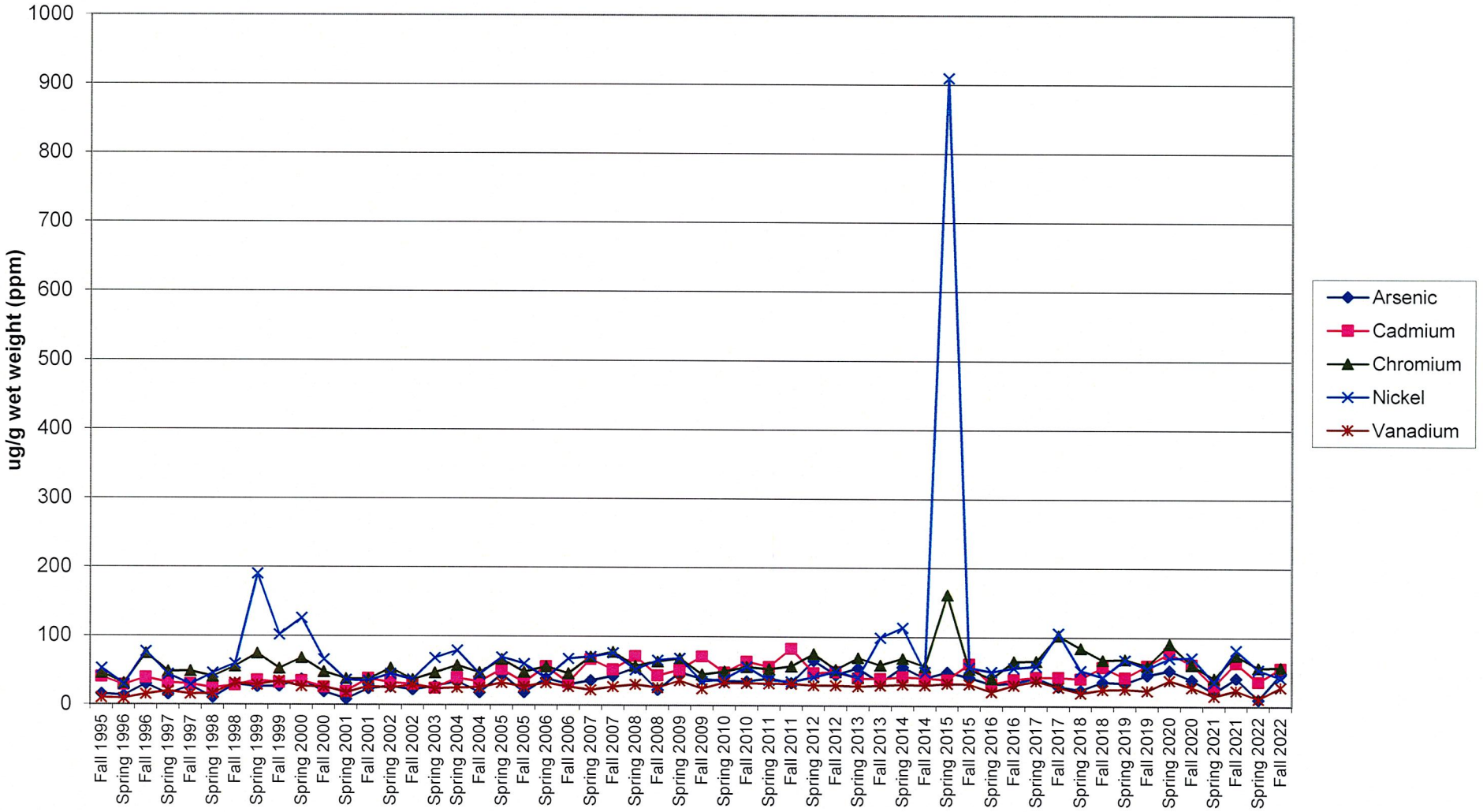
New York State Department of Environmental Conservation Soil Cleanup Objectives. The Health Based SCO's were calculated considering all exposure pathways:ingestion, inhalation, dermal, carcinogenic (1 in a million cancer risk), and non-carcinogenic (using risk reference doses). The final health based SCO is based on the most conservative pathway calculation. In some cases the SCO has been modified to match background if the rural background levels for NYS are above the calculated SCO (the health based SCO is in parenthesis). Restricted use means no livestock or animal product consumption.

NYS Statewide Rural Surface Soil Survey (2005)-determined concentration ranges for 170 commonly assessed analytes in discrete surface soil samples collected at randomly selected rural NYS properties.

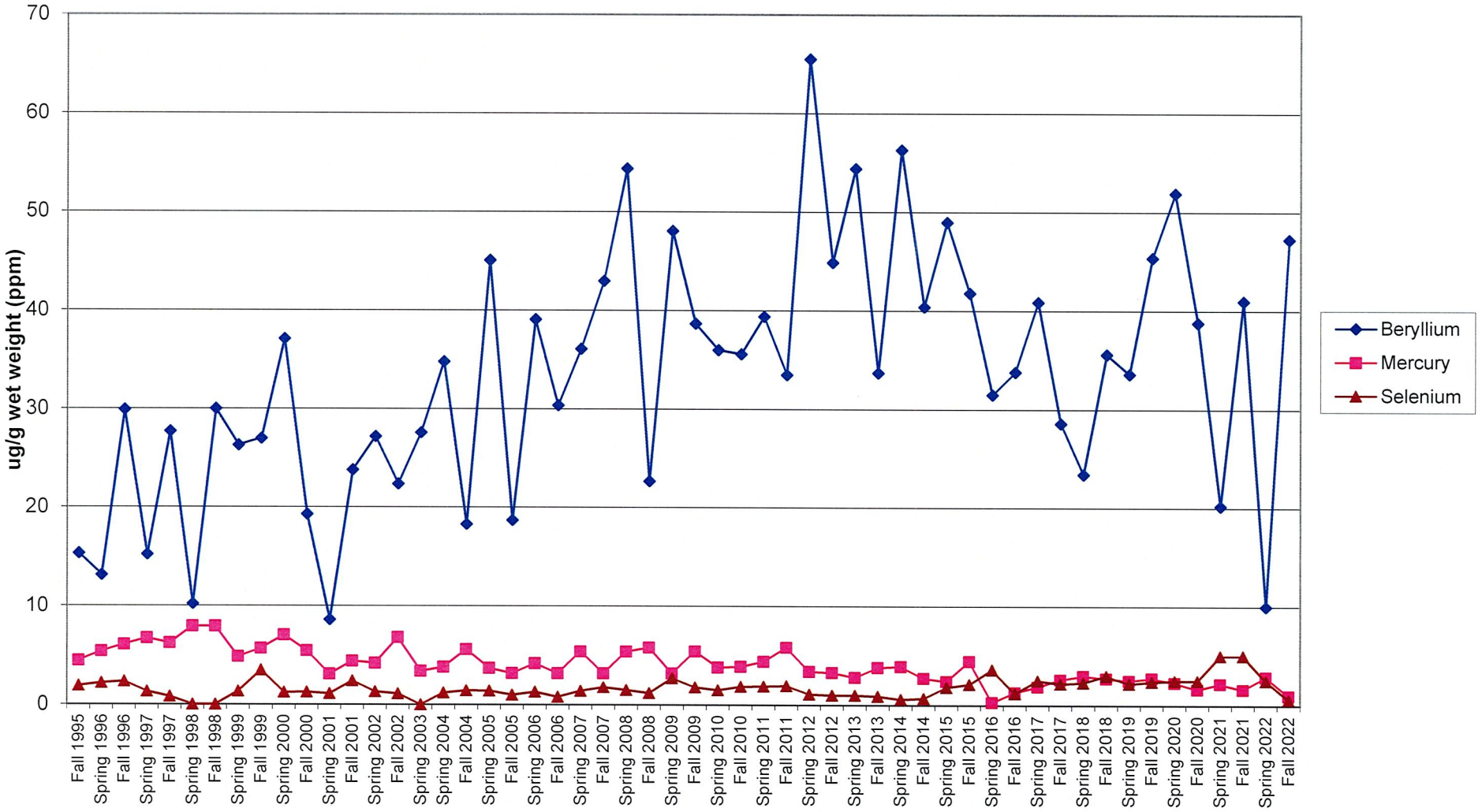
USEPA Soil Screening Levels for residential–Values were calculated based on the ingestion-dermal exposure pathway for residential soils. These screening levels are not action levels or clean up levels, they are a tool for further evaluation.

Attachment
D

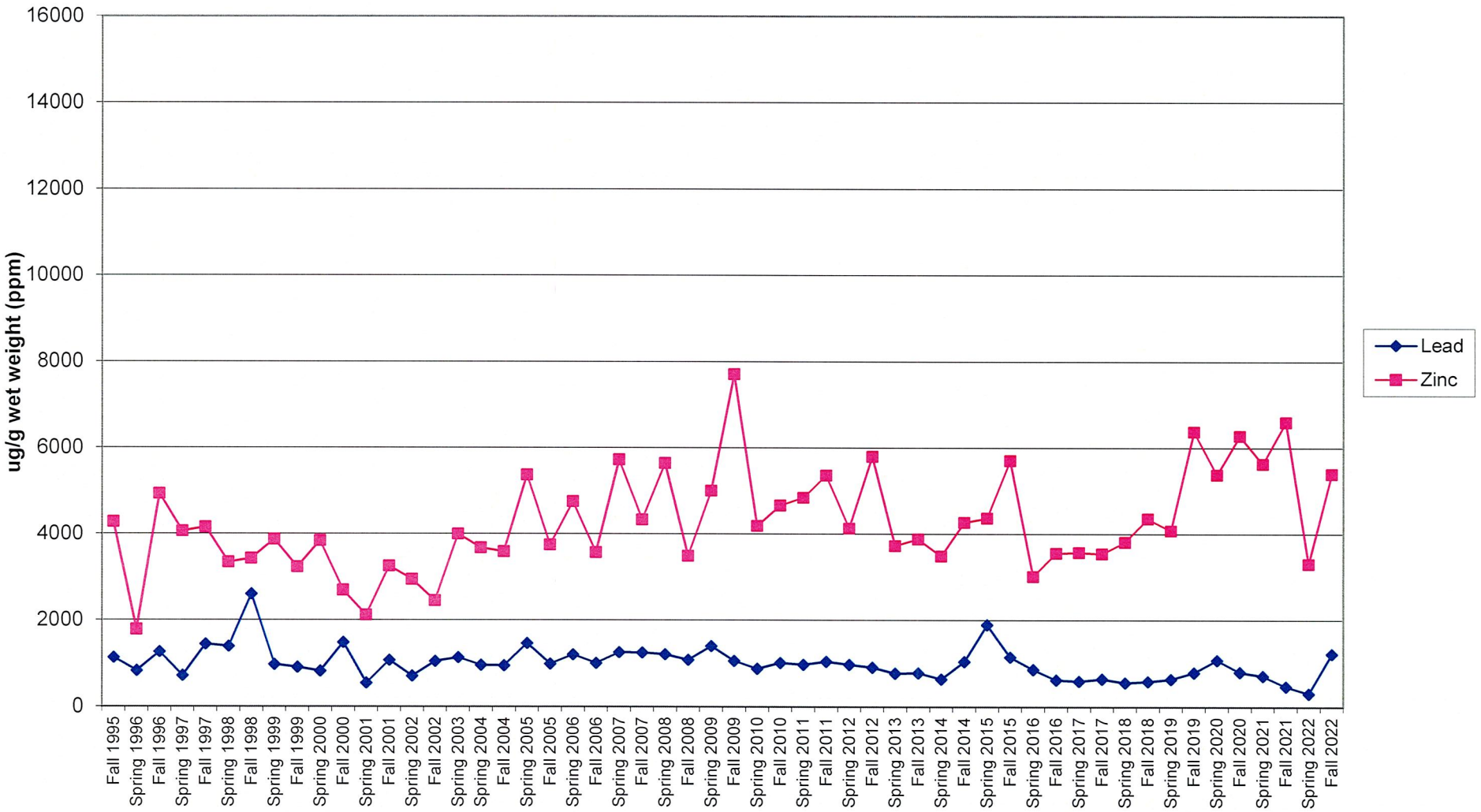
VI.A. Mean Values Ash Data
Wet Weight



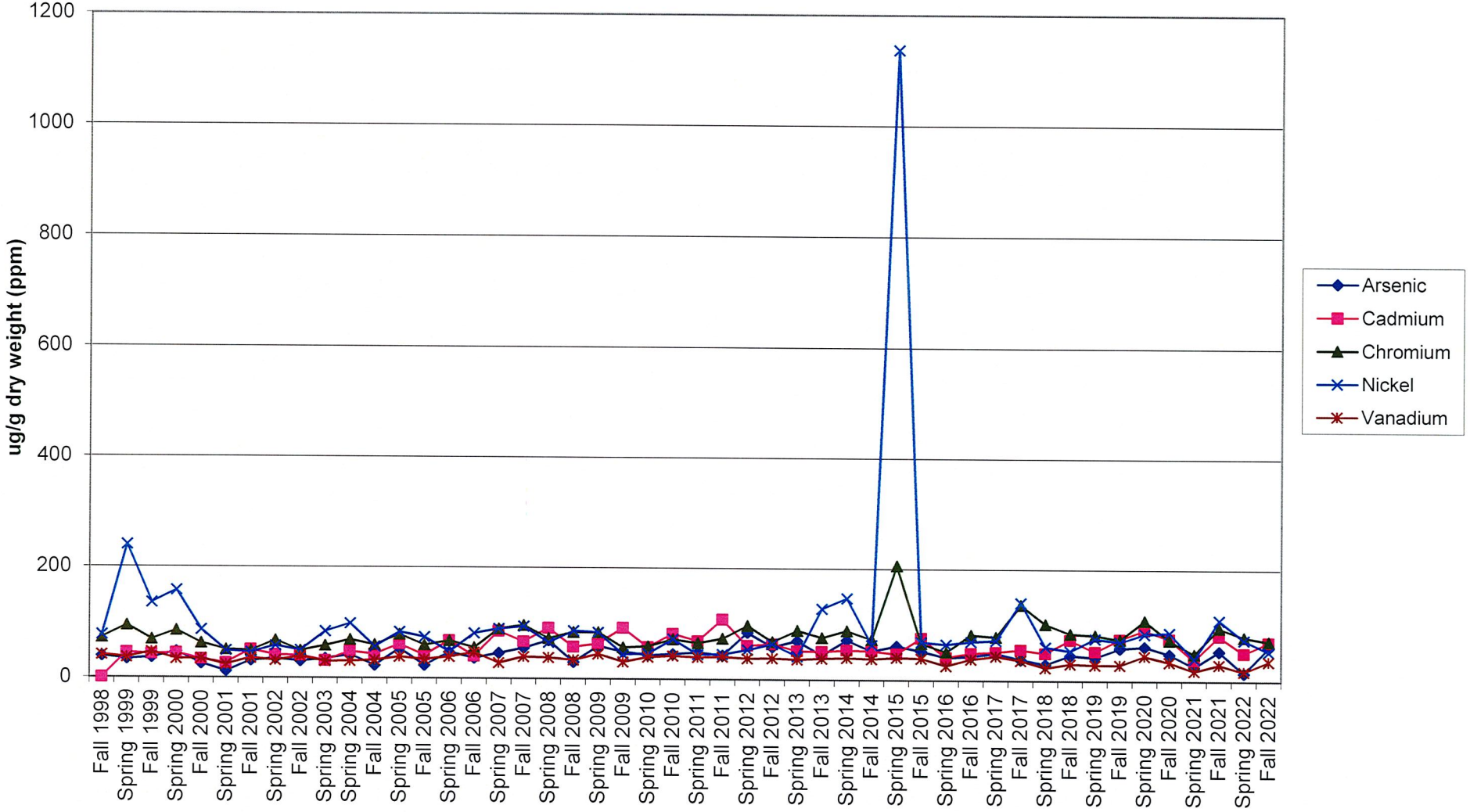
VI.B. Mean Values Ash Data
Wet Weight



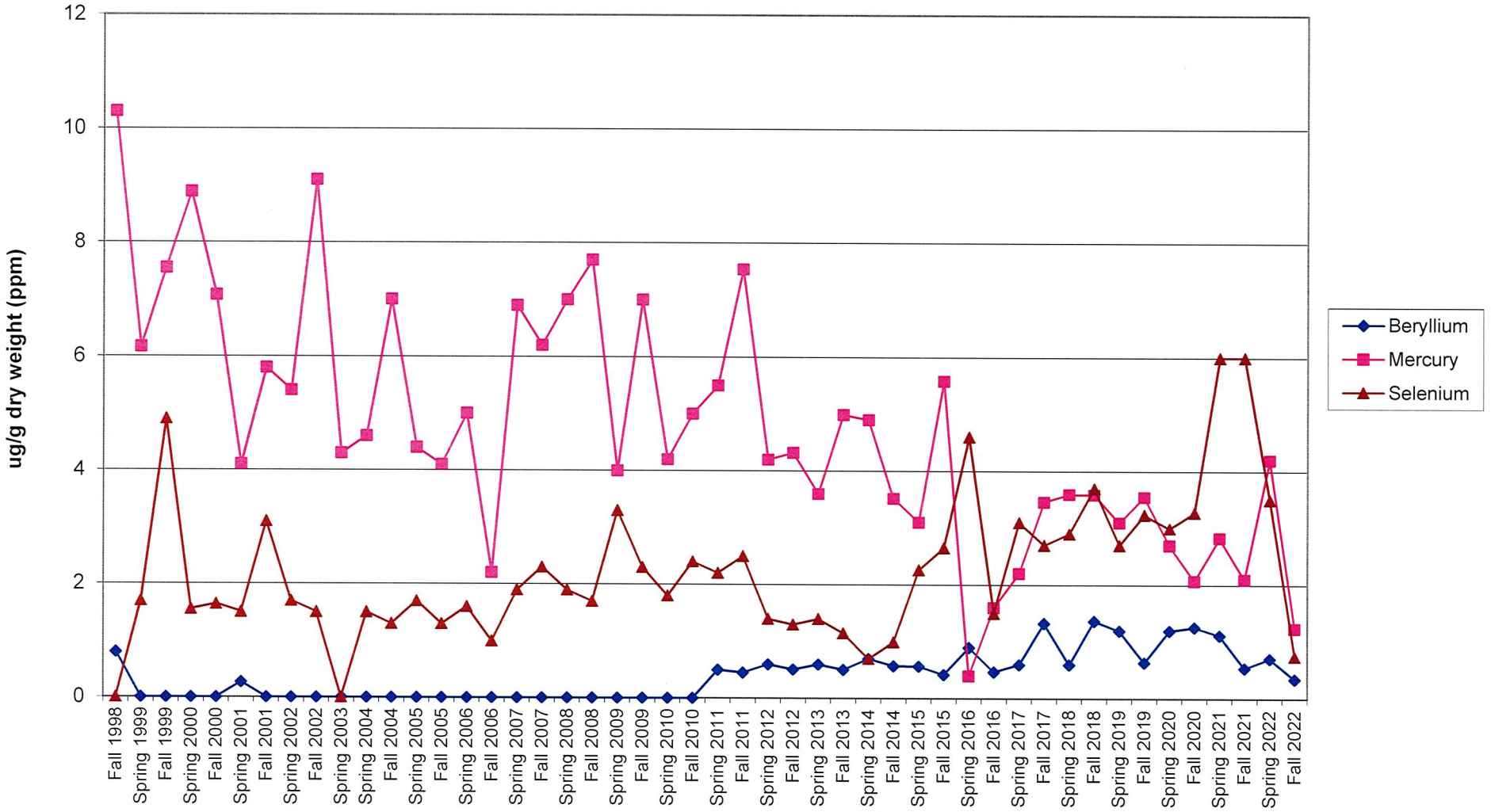
VI.C. Mean Values Ash Data
Wet Weight



VII.A. Mean Values Ash Data
Dry Weight



VII.B. Mean Values Ash Data
Dry Weight



VII.C. Mean Values Ash Data
Dry Weight