Ambient Sediment Quality Conditions in Minnesota: Appendices

Advanced data interpretation tools were used to assess sediment quality in a random and reference set of Minnesota lakes. These sediment chemistry data were also compared to other sediment quality data sets collected in Minnesota.

Minnesota Pollution Control Agency

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Cover photo

North Ash Lake, MN by Steve Heiskary (MPCA)

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Appendix A
Additional Field Sampling Information for
Statewide Minnesota Lake Sediment Study (NLAP)

Table A-1. Additional Field Sampling Information

Short ID	Lake	Station ID	DNR Lake ID	Latitude	Longitude	Samples & Field Replicates	Upper Depth (cm)	Lower Depth (cm)
1	Allen	440157CS07	440157	47.465476	-95.7698272	#	0	15
2	Alruss	690005CS07	690005	48.043555	-91.8032839	#	0	15
3	Arthur	690154CS07	690154	47.740458	-92.0418424	#	0	15
4	Aspen	160204CS07	160204	48.04251	-90.4122231	#	0	15
5	August	380691CS07	380691	47.762989	-91.6088765	#	0	15
6	Becoosin	380472CS07	380472	47.94784	-91.3926303	#	0	15
7	Cass	040030CS07	040030	47.396088	-94.56187674	#	0	15
8	Cokato	860263CS07	860263	45.114971	-94.1692172	#	0	10
9	Crow Wing	180155CS07	180155	46.236804	-94.3398654	#	0	15
10	Darling	210080CS07	210080	45.912886	-95.4053601	#	0	15
11	Eagle (North)	070060CS07	070060	44.204342	-93.895636	#	0	15
12	Fairy	560356CS07	560356	46.701466	-95.7477199	01	0	15
12R	Fairy	560356CS07R	560356	46.701466	-95.7477199	02	0	15
13	Fanny	210336CS07	210336	45.993072	-95.6876193	#	0	15
14	Fish	700069CS07	700069	44.649427	-93.4593714	#	0	15
15	Flat	030242CS07	030242	46.972983	-95.655227	01	0	15
15R	Flat	030242CS07R	030242	46.972983	-95.655227	02	0	15
16	Jennie	470015CS07	470015	45.001702	-94.3324583	#	0	15
17	Lamb	690341CS07	690341	48.163849	-92.1054911	#	0	15
18	Long	110480CS07	110480	47.074147	-94.6020025	#	0	15
19	Long	860069CS07	860069	47.597099	-93.4017291	01	0	15
19R	Long	860069CS07R	860069	47.597099	-93.4017291	02	0	15
20	Long (Main Bay)	310266CS07	310266	45.29297	-93.8456201	#	0	15
21	Lookout (Crocker)	180123CS07	180123	46.436544	-93.9535333	#	0	15
22	Lost (Horseshoe)	690611CS07	690611	47.464432	-92.4400361	#	0	15
23	Maine (Round)	560476CS07	560476	46.419217	-95.8388483	#	0	15
24	Mayo	180408CS07	180408	46.569035	-94.3237022	#	0	15
25	Musquash	160104CS07	160104	47.915293	-90.3424825	#	0	15
26	Nest	340154CS07	340154	45.259181	-94.961634	#	0	15
27	Nokomis	270019CS07	270019	44.907361	-93.2424432	01	0	15
27R	Nokomis	270019CS07R	270019	44.907361	-93.2424432	02	0	15

Table A-1. Continued

Short ID	Lake	Station ID	DNR Lake ID	Latitude	Longitude	Samples & Field Replicates	Upper Depth (cm)	Lower Depth (cm)
28	North Ash	410055CS07	410055	44.430074	-96.292438	#	0	15
29	North Mayfield	140029CS07	140029	46.763683	-96.2159881	#	0	15
30	Norway	340251CS07	340251	45.308551	-95.0953582	#	0	15
31	Okamanpeedan	460051CS07	460051	43.519156	-94.5660385	#	0	15
32	Pebble	560829CS07	560829	46.252253	-96.03636	#	0	15
33	Pelican	180308CS07	180308	46.547781	-94.1917035	#	0	15
34	Pickerel	030287CS07	030287	46.870605	-95.7289985	#	0	15
35	Pine Mountain	110411CS07	110411	46.819897	-94.5329554	01	0	15
35R	Pine Mountain	110411CS07R	110411	46.819897	-94.5329554	02	0	15
36	Red Rock	210297CS07	210291	45.85984	-95.71239	#	0	15
37	Richey	160643CS07	160643	47.667396	-90.9898445	#	0	15
38	Snail	620073CS07	620073	45.069694	-93.1236285	#	0	15
39	South	430014CS07	430014	44.942078	-94.0319707	#	0	15
40	South Drywood	760149CS07	760149	45.391974	-96.0937233	#	0	15
41	Spring	330027CS07	330027	45.888292	-93.2756613	#	0	15
42	Spring	690129CS07	690129	47.069496	-92.0011678	#	0	15
43	Straight	030010CS07	030010	46.954808	-95.280324	#	0	15
44	Unnamed	600307CS07	600307	47.578976	-96.2353081	#	0	15
45	Upper Hatch	310770CS07	310770	47.672676	-93.7595588	#	0	15
46	Upper Sakatah	400002CS07	400002	44.223851	-93.5462124	#	0	15
47	Vesper	160414CS07	160414	47.974555	-90.7462879	#	0	15
48	Victoria	210054CS07	210054	45.871605	-95.3440477	#	0	15
49	West Leaf	560114CS07	560114	46.409402	-95.4810045	#	0	15
50	Woodcock (W. Woodcock)	340141CS07	340141	45.238667	-94.9529274	#	0	15
51	Elk*	150010CS07	150010	47.1875	-95.21623	#	0	15
52	Hungry Man*	030029CS07	030029	47.06597	-95.18427	#	0	15
53	Island*	110102CS07	110102	46.92703	-94.0516	#	0	15
54	Spring*	2D3008CS07	110022	47.12272	-93.88065	#	0	15

* Designated reference lake.

Table A-2. Additional Sampling, Lake, and Ecoregion Information for 2007 NLAP Lakes

Short ID	Lake Name	Sample Date (mo/day/yr)	Surface Area (ha)	Surface Area Category	Estimated Lake Volume (m^3)	Watershed Area (ha)	Ecoregion Classes Used by MPCA as of September 2008	National Ecoregion Classes (WSA_ECO9)
1	Allen	8/7/2007	58.0	D	270490	8554.2	North Central Hardwoods	UMW
2	Alruss	7/16/2007	11.8	B	526871	6265.3	Northern Lakes and Forests	UMW
3	Arthur	7/17/2007	30.9	C	381347	7299.7	Northern Lakes and Forests	UMW
4	Aspen	7/30/2007	59.2	D	1677514	8833.5	Northern Lakes and Forests	UMW
5	August	8/3/2007	75.2	D	1378383	3779.0	Northern Lakes and Forests	UMW
6	Becoosin	7/18/2007	30.9	C	785761	21697.6	Northern Lakes and Forests	UMW
7	Cass	8/6/2007	6605.1	E	750783576	14264.0	Northern Lakes and Forests	UMW
8	Cokato	8/20/2007	219.7	E	9884291	12037.4	North Central Hardwoods	UMW
9	Crow Wing	7/30/2007	144.0	E	2736894	4390.8	Northern Lakes and Forests	UMW
10	Darling	7/19/2007	467.8	E	27286108	4537.7	North Central Hardwoods	UMW
11	Eagle (North)	8/8/2007	370	E	864390	3195.4	North Central Hardwoods	TPL
12	Fairy	8/6/2007	54.4	D	434959	3549.1	North Central Hardwoods	UMW
13	Fanny	7/11/2007	15.3	B	55974	4057.0	North Central Hardwoods	UMW
14	Fish	8/6/2007	70.1	D	2010389	2533.3	North Central Hardwoods	UMW
15	Flat	8/7/2007	743.0	E	13620899	2536.6	Northern Lakes and Forests	UMW
16	Jennie	8/21/2007	428.3	E	4283024	6704.4	North Central Hardwoods	UMW
17	Lamb	7/19/2007	27.8	C	481836	1301.1	Northern Lakes and Forests	UMW
18	Long	7/10/2007	105.4	E	8077548	1753.9	Northern Lakes and Forests	UMW
19	Long	6/26/2007	35.4	C	990191	832.0	North Central Hardwoods	UMW
20	Long (Main Bay)	8/15/2007	145.8	E	2915103	1228.2	Northern Lakes and Forests	UMW
21	Lookout (Crocker)	8/13/2007	91.6	D	1405128	1239.1	Northern Lakes and Forests	UMW
22	Lost (Horseshoe)	7/20/2007	32.6	C	565903	2819.0	Northern Lakes and Forests	UMW
23	Maine (Round)	7/25/2007	34.5	C	1151328	1769.3	North Central Hardwoods	UMW
24	Mayo	7/9/2007	252.3	E	3532201	14547.2	Northern Lakes and Forests	UMW
25	Musquash	8/1/2007	53.8	D	1362010	5428.0	Northern Lakes and Forests	UMW
26	Nest	8/22/2007	385.4	E	12588667	9937.9	North Central Hardwoods	UMW
27	Nokomis	6/27/2007	80.7	D	1075621	4483.1	North Central Hardwoods	UMW
28	North Ash	7/10/2007	34.1	C	170269	1528.9	Northern Glaciated Plains	TPL

Table A-2. Continued

Short ID	Lake Name	Sample Date (mo/day/yr)	Surface Area (ha)	Surface Area Category	Estimated Lake Volume (m^3)	Watershed Area (ha)	Ecoregion Classes Used by MPCA as of September 2008	National Ecoregion Classes (WSA_ECO9)
29	North Mayfield	8/9/2007	14.0	B	173099	19094.7	North Central Hardwoods	UMW
30	Norway	8/22/2007	907.0	E	28420781	8428.8	North Central Hardwoods	UMW
31	Okamanpeedan	8/7/2007	888.3	E	2961125	2375.5	Western Corn Belt Plains	TPL
32	Pebble	7/25/2007	68.6	D	3131045	432.2	North Central Hardwoods	UMW
33	Pelican	7/11/2007	3375.9	E	315081314	7390.4	Northern Lakes and Forests	UMW
34	Pickerel	7/31/2007	139.1	E	5747434	1788.7	North Central Hardwoods	UMW
35	Pine Mountain	7/11/2007	631.0	E	49429972	11426.3	Northern Lakes and Forests	UMW
36	Red Rock	7/25/2007	300.2	E	5703705	2332.6	North Central Hardwoods	TPL
37	Richey	8/2/2007	42.1	C	154224	1753.9	Northern Lakes and Forests	UMW
38	Snail	7/18/2007	63.7	D	1508654	5451.5	North Central Hardwoods	UMW
39	South	7/23/2007	70.2	D	257384	6236.6	North Central Hardwoods	UMW
40	South Drywood	7/12/2007	82.0	D	1013472	6097.8	Northern Glaciated Plains	TPL
41	Spring	6/27/2007	7.1	A	130943	3280.8	North Central Hardwoods	UMW
42	Spring	6/28/2007	39.9	C	771145	3924.2	Northern Lakes and Forests	UMW
43	Straight	7/31/2007	209.2	E	12550847	9315.1	Northern Lakes and Forests	UMW
44	Unnamed	8/8/2007	4.3	A	24355	6523.5	Lake Agassiz Plain	UMW
45	Upper Hatch	8/14/2007	6.6	A	136169	8313.1	Northern Lakes and Forests	UMW
46	Upper Sakatah	8/8/2007	495.1	E	4455775	56362.2	North Central Hardwoods	UMW
47	Vesper	7/31/2007	6.3	A	196116	3490.4	Northern Lakes and Forests	UMW
48	Victoria	7/24/2007	168.7	E	7930756	6468.5	North Central Hardwoods	UMW
49	West Leaf	8/1/2007	280.5	E	13745639	5116.0	North Central Hardwoods	UMW
50	Woodcock (W. Woodcock)	7/24/2007	72.7	D	726804	327.0	North Central Hardwoods	UMW
51	Elk	8/9/2007	113.0	E	10546667	1609.4	Northern Lakes and Forests	UMW
52	Hungry Man	8/8/2007	36.1	C	806233	5004.7	Northern Lakes and Forests	UMW
53	Island	8/11/2007	140.0	E	5973333	2947.3	Northern Lakes and Forests	UMW
54	Spring	8/10/2007	32.1	C	1433800	2511.1	Northern Lakes and Forests	UMW

NLAP = National Lake Assessment Project; MPCA = Minnesota Pollution Control Agency; WSA_Eco9 = Wadeable Streams Assessment nine aggregated Omernik level 3 ecoregions; UMW = Upper Midwest; TPL = Temperate Plains.
Surface area categories: A = 4 - 10 ha; B = 10 - 20 ha; C = 20 - 50 ha; D = 50 - 100 ha; E = >100 ha.

Table A-3. Land Use Information for the NLAP Study Lakes

Short ID	Lake Name	Major Land Use	Watershed Land Uses					# of Feedlots
			Developed (%)	Cultivated (%)	Pasture & Open (%)	Forest (%)	Water & Wetland (%)	
1	Allen	cul	3	60	1	20	16	4
2	Alruss	for	1	0	0	70	29	0
3	Arthur	for	2	1	<1	74	23	0
4	Aspen	for	2	0	0	68	30	0
5	August	for	2	0	0	84	14	0
6	Becoosin	wet	<1	<1	<1	48	51	0
7	Cass	wet	3	2	0	39	56	0
8	Cokato	cul	9	70	2	6	13	18
9	Crow Wing	for	12	10	0	53	25	1
10	Darling	wet	9	30	1	23	37	7
11	Eagle (North)	cul	6	59	3	5	27	5
12	Fairy	cul	3	40	<1	28	29	3
13	Fanny	cul	7	72	4	10	7	17
14	Fish	cul	13	33	8	12	32	1
15	Flat	for	1	3	0	54	42	0
16	Jennie	cul	8	54	3	7	29	10
17	Lamb	for	0	0	0	70	30	0
18	Long	for	7	11	0	68	14	0
19	Long	cul	14	43	10	16	17	1
20	Long (Main Bay)	for	3	1	0	75	21	0
21	Lookout (Crocker)	for	1	1	0	57	41	0
22	Lost (Horseshoe)	for	5	2	0	77	16	0
23	Maine (Round)	cul	6	47	0	19	28	1
24	Mayo	for	11	6	1	66	16	1
25	Musquash	for	1	0	0	75	24	0
26	Nest	wet	13	23	8	20	36	14
27	Nokomis	dev	87	3	2	3	5	0
28	North Ash	cul	13	38	23	8	18	5
29	North Mayfield	cul	4	71	7	9	9	21

Table A-3. Continued

Short ID	Lake Name	Major Land Use	Watershed Land Uses					# of Feedlots
			Developed (%)	Cultivated (%)	Pasture & Open (%)	Forest (%)	Water & Wetland (%)	
30	Norway	wet	6	29	6	21	38	24
31	Okamanpeedan	cul	7*	67*	<1*	2*	24*	2*
32	Pebble	cul	9	41	20	7	22	0
33	Pelican	wet	4	1	1	38	56	0
34	Pickerel	for	4	16	0	43	36	1
35	Pine Mountain	for	2	6	1	59	32	0
36	Red Rock	cul	5	53	8	10	24	5
37	Richey	for	3	0	0	65	32	0
38	Snail	dev	61	2	1	18	18	0
39	South	cul	11	53	2	10	24	13
40	South Drywood	cul	4	86	2	2	6	2
41	Spring	cul	13	42	1	19	25	4
42	Spring	for	3	<1	0	80	17	0
43	Straight	for	5	23	0	63	9	0
44	Unnamed	cul	4	73	4	14	5	0
45	Upper Hatch	for	2	1	0	79	18	0
46	Upper Sakatah	wet	11	32	7	17	33	4
47	Vesper	for	0	0	0	60	40	0
48	Victoria	cul	12	52	12	12	12	11
49	West Leaf	cul	4	58	0	14	24	6
50	Woodcock (W. Woodcock)	wet	10	19	2	17	51	6
51	Elk	for	2	1	0	79	18	0
52	Hungry Man	for	4	12	<1	70	14	0
53	Island	for	2	2	0	74	22	0
54	Spring	for	2	<1	0	85	13	0

cul = cultivated; dev = developed; for = forest; wet = water and wetlands.

Table A-4. Summary of Fish Length, Sex, and Age for Trophic Classes of Fish Collected from Five NLA Lakes

Trophic Class & Lake	Sample ID	Length (cm)	Sex	Age (years)
Predator				
August	August-2007-Pike-01	46	f	4
	August-2007-Pike-02	47	m	4
	August-2007-Pike-03	57	m	4
	August-2007-Pike-04	54	f	4
	August-2007-Pike-05	50	m	4
August: Replicate	August-2007-Pike-01R	60	f	4
	August-2007-Pike-02R	54	m	4
	August-2007-Pike-03R	49	f	4
	August-2007-Pike-04R	49	f	4
	August-2007-Pike-05R	46	f	4
Cass	Cass-2007-Pike-01	78	f	6
	Cass-2007-Pike-02	64	m	4
	Cass-2007-Pike-03	72	f	5
	Cass-2007-Pike-04	70	f	5
	Cass-2007-Pike-05	68	f	5
Jennie	Jennie-2007-Pike-01	65	j	5
	Jennie-2007-Pike-02	57	f	4
	Jennie-2007-Pike-03	45	m	4
	Jennie-2007-Pike-04	48	m	4
	Jennie-2007-Pike-05	47	j(f)	4
Mayo	Mayo-2007-Pike-01	59	m	4
	Mayo-2007-Pike-02	54	m	4
	Mayo-2007-Pike-03	64	m	5
	Mayo-2007-Pike-04	48	j	3
	Mayo-2007-Pike-05	57	f	4
Nokomis	Nokomis-2007-Walleye-01	55	m	10
	Nokomis-2007-Walleye-02	43	m	7
	Nokomis-2007-Walleye-03	43	m	7
	Nokomis-2007-Walleye-04	51	m	9
	Nokomis-2007-Walleye-05	61	f	12
Omnivore				
August	August-2007-Yellow Perch-01	22	m	6
	August-2007-Yellow Perch-02	20	f	5
	August-2007-Yellow Perch-03	20	f	5
	August-2007-Yellow Perch-04	17	m	4
	August-2007-Yellow Perch-05	18	f	4
Cass	Cass-2007-Yellow Perch-01	25	f	8
	Cass-2007-Yellow Perch-02	24	f	8
	Cass-2007-Yellow Perch-03	26	f	9
	Cass-2007-Yellow Perch-04	26	f	9
	Cass-2007-Yellow Perch-05	26	f	9

Table A-4. Continued

Trophic Class & Lake	Sample ID	Length (cm)	Sex	Age (years)
Omnivore				
Jennie	Jennie-2007-Bluegill-01	14.5	f	4
	Jennie-2007-Bluegill-02	15	f	4
	Jennie-2007-Bluegill-03	15.5	m	5
	Jennie-2007-Bluegill-04	13.5	m	3
	Jennie-2007-Bluegill-05	15	f	4
Mayo	Mayo-2007-Perch-01	21.5	f	6
	Mayo-2007-Perch-02	19	f	5
	Mayo-2007-Perch-03	19.5	m	5
	Mayo-2007-Perch-04	17	f	4
	Mayo-2007-Perch-05	16	m	4
Nokomis	Nokomis-2007-Bluegill-01	10	m	2
	Nokomis-2007-Bluegill-02	11	f	2
	Nokomis-2007-Bluegill-03	11.5	f	2
	Nokomis-2007-Bluegill-04	11.5	m	2
	Nokomis-2007-Bluegill-05	11.5	f	2
Benthic				
August	August-2007-Sucker-01	51	f	6
	August-2007-Sucker-02	46	m	5
	August-2007-Sucker-03	53	f	7
	August-2007-Sucker-04	39	m	4
	August-2007-Sucker-05	40	m	4
Cass	Cass-2007-Yellow Bullhead-01	30	f	5
	Cass-2007-Yellow Bullhead-02	30	f	5
	Cass-2007-Yellow Bullhead-03	32	m	5
	Cass-2007-Yellow Bullhead-04	32	m	5
	Cass-2007-Yellow Bullhead-05	33	m	5
Jennie	Jennie-2007-Bullhead-01	20	f	3
	Jennie-2007-Bullhead-02	19	f	3
	Jennie-2007-Bullhead-03	20	f	3
	Jennie-2007-Bullhead-04	20	f	3
	Jennie-2007-Bullhead-05	19	f	3

NLA = National Lake Assessment; f = female; j = juvenile; m = male.

Appendix B

MPCA QA/QC Review of Fish Tissue Results for BDEs

DEPARTMENT : POLLUTION CONTROL AGENCY

STATE OF MINNESOTA

Office Memorandum

DATE : February 17, 2009

TO : Judy Crane, Ph.D.
Research Scientist 3
Environmental Analysis & Outcomes Division

FROM : William Scruton, QA Coordinator
Environmental Analysis & Outcomes Division

PHONE : (651)757-2710

SUBJECT : Comments for a Tissue Polybrominated Diphenylether Analysis Report DPWG26427 (Report from AXYS ANALYTICAL SERVICES LTD. Dated September 9, 2008

The above-referenced report was reviewed at the request of Judy Crane (MPCA). Questions or comments can be directed to me at the above number or by email at Bill.Scruton@state.mn.us.

General Comments for WG25941 (Fish Tissue Samples)

1. Analysis procedures followed EPA Method 1614 (a high-resolution gas chromatograph/mass spectrometer technique).

2. There were some discrepancies on the date of collection for some fish. The AXYS Project Manager contacted Judy Crane (MPCA) about the discrepancies and she provided the resolution.

3. 70 whole fish samples were received on August 22, 2007 through October 11, 2007. The samples were assigned to 14 composites in one analytical batch. The composition of the batch is described on a Batch List form supplied in the data package.

Specific Comments for WG25941

1. Initial Calibration/Calibration Verifications: In the Initial Calibration of August 1st, 2008, the %RSDs were all less than 20%. The Calibration Verifications met QC acceptance limits. No data were qualified.

2. Blanks: Three procedural blanks were prepared in the batch. **PBDE levels varied among the blanks. Sample data has to be compared to the procedural blanks.** In the first Blank, IUPAC #28, 47, 66, 85, 99, 100, 153, 203, 206, 207, and 208 were detected and quantified. In the second Blank, IUPAC #28, 47, 99, 100, 153, 154, 203, 206, 207, and 208 were detected and quantified. In the third Blank, IUPAC #17, 28, 47, 49, 85, 99, 100, 153, 154, 296, 207, and 208 were detected and quantified. Since IUPAC #17, 28, 47, 49, 66, 85 99, 100, 138, 140, 153, 154, 155, 183, 203, 206, 207, and 208 seem to be common contaminants for the analysis, any positive result between the individual Report Levels and X10 the maximum concentration in any blank should be considered as estimated.

    A. Due to the concentrations detected in the blanks, the results for IUPAC #85, 140, 155, 183, 203, 206, 207, and 208 in sample MAYO-2007-Perch Composite (1,2,3,4,5) should be considered as estimated.
    B. Due to the concentrations detected in the blanks, the results for IUPAC #85, 99, 138, 140, 153, 154, 155, 183, 203, 206, 207, and 208 in sample MAYO-2007-Pike Composite (1,2,3,4,5) should be considered as estimated.
    C. Due to the concentrations detected in the blanks, the results for IUPAC #85, 99, 138, 140, 153, 154, 155, 183, 203, 206, 207, and 208 in sample Jennie-2007-Pike Composite (1,2,3,4,5) should be considered as estimated.
    D. Due to the concentrations detected in the blanks, the results for IUPAC #85, 138, 140, 154, 155, 183, 203, 206, 207, and 208 in sample Jennie-2007-Bullhead Composite (1,2,3,4,5) should be considered as estimated.
    E. Due to the concentrations detected in the blanks, the results for IUPAC #85, 99, 138, 140, 153, 154, 155, 183, 203, 206, 207, and 208 in sample Jennie-2007-Pike Composite (1,2,3,4,5) should be considered as estimated.
    F. Due to the concentrations detected in the blanks, the results for IUPAC #85, 138, 140, 154, 155, 183, 203, 206, 207, and 208 in sample Jennie-2007-Bluegill Composite (1,2,3,4,5) should be considered as estimated.
    G. Due to the concentrations detected in the blanks, the results for IUPAC #85, 138, 140, 183, 203, 206, 207, and 208 in sample Nokomis-2007-Bluegill Composite (1,2,3,4,5) should be considered as estimated.
    H. Due to the concentrations detected in the blanks, the results for IUPAC #85, 138, 140, 183, 203, 206, 207, and 208 in sample Nokomis-2007-Walleye Composite (1,2,3,4,5) should be considered as estimated.
    I. Due to the concentrations detected in the blanks, the results for IUPAC #85, 99, 138, 140, 153, 155, 183, 203, 206, 207, and 208 in sample August-2007-Pike Composite (1,2,3,4,5) should be considered as estimated.
    J. Due to the concentrations detected in the blanks, the results for IUPAC #85, 99, 138, 140, 153, 155, 183, 203, 206, 207, and 208 in sample August-2007-Yellow Perch Composite (1,2,3,4,5) should be considered as estimated.
    K. Due to the concentrations detected in the blanks, the results for IUPAC #85, 99, 138, 140, 153, 155, 183, 203, 206, 207, and 208 in sample August-2007-Yellow Perch Duplicate Composite (1,2,3,4,5) should be considered as estimated.

L. Due to the concentrations detected in the blanks, the results for IUPAC #85, 99, 138, 140, 183, 203, 206, 207, and 208 in sample August-2007-Sucker Composite (1,2,3,4,5) should be considered as estimated.
M. Due to the concentrations detected in the blanks, the results for IUPAC #85, 138, 140, 155, 183, 203, 206, 207, and 208 in sample Cass-2007-Pike Composite (1,2,3,4,5) should be considered as estimated.
N. Due to the concentrations detected in the blanks, the results for IUPAC #85, 99, 138, 140, 155, 183, 203, 206, 207, and 208 in sample Cass-2007-Yellow Perch Composite (1,2,3,4,5) should be considered as estimated.
O. Due to the concentrations detected in the blanks, the results for IUPAC #138, 140, 155, 183, 203, 206, 207, and 208 in sample Cass-2007-Yellow Bullhead Composite (1,2,3,4,5) should be considered as estimated.
P. Due to the concentrations detected in the blanks, the results for IUPAC #17, 28, 47, 85, 99, 138, 140, 153, 154, 155, 183, 203, 206, 207, and 208 in sample August-2007-Pike Composite (1R,2R,3R,4R,5R) should be considered as estimated.

3. LCS: All target analyte recoveries were acceptable. No data were qualified.

4. MS/MSD: Nokomis-2007-Walleye Composite (1,2,3,4,5) was chosen for QC purposes. All % recoveries (and RPDs) met acceptance criteria except for the RPD for IUPAC #47 (44.2%). However, the background concentration of that analyte exceeded the spike concentrations by over forty times. Since the RPD between the sample and sample duplicate for IUPAC #47 was acceptable, no data were qualified.

5. Labeled Surrogates: All labeled compound recoveries were within QC acceptance limits. No data were qualified.

6. Sample Duplicates: August-2007-Yellow Perch Composite (1,2,3,4,5) was analyzed in duplicate. The RPDs (or concentration difference between duplicates) met QC criteria except for the RPD for IUPAC #183 (41.5%). Since the RPD between the MS and MSD for IUPAC #183 met QC acceptance criteria, only the results for IUPAC #183 in the August-2007-Yellow Perch Composite (1,2,3,4,5) and in the duplicate should be considered as estimated. No other data were qualified.

7. Based on the review of the batch QC results, the sample results for L10290-11, L10290-12, L10291-26 through L10291-30, and L10495-36 through L10495-42 are usable with the exceptions noted above.

Appendix C
Wetland Field Sampling Information

Table C-1. Field Sampling Information for the MPCA Wetlands Project (MPCA Contact: Mark Gernes)

Site Number	Site Name	County	Lake ID	Visit Number	Visit Date	Most Recent Sample?	CenUTMx	CenUTMy
36	Battle Creek	Washington	82-0091-00	779	7/2/2003	x	502229.24	4976811.43
37	Bloom	Becker	03-0110-00	539	7/26/2001	x	307520.23	5191605.23
41	Breen	LeSueur	40-0099-00	778	7/29/2003	x	435208.53	4901302.48
43	Bunker	Todd	77-0101-00	458	8/24/1999	x	357169.55	5075069.47
44	Casey	Ramsey	62-0005-00	459	8/16/1999	x	498924.58	4985472.74
45	Cataract	Ottertail	56-0718-00	460	8/27/1999	x	273367.2	5157564.81
46	Cuba	Becker	03-1255-00	461	8/25/1999	x	264257.22	5203223.41
47	Davis	Becker	03-0651-00	462	8/26/1999	x	263596.83	5199609.41
48	Donley large	Becker	03-0769-00	463	8/25/1999	x	274935.47	5212229.75
49	Elm Creek	Hennepin	27-0066-00	465	8/17/1999	x	468051.76	5002168.17
50	Field	Ottertail	56-1554-00	540	7/27/2001	x	272548.72	5156092.65
51	Glacial	Pope	61-0150-00	832	7/23/2003	x	304058.98	5044366.35
52	Jones	Ramsey	62-0076-00	469	8/19/1999	x	484715.8	4987951.36
53	Grass	Hennepin	27-0681-00	468	8/23/1999	x	476439.17	4971092.37
54	Kasma	Hennepin	27-0380-00	470	8/17/1999	x	440936.95	4989255.22
55	Lake 21	Kandiyohi	34-0222-00	648	7/24/2002	x	339787.74	5021366.86
56	Lake Park	Becker	03-0623-00	472	8/26/1999	x	263949.68	5195412.46
57	Lashier	Todd	77-0106-00	473	8/24/1999	x	354902.78	5087582.7
58	Legion	Hennepin	27-0024-00	1160	7/14/1995	x	479271.3	4970632.15
59	Lost	Hennepin	27-0103-00	475	8/23/1999	x	467270.41	4986441.69
60	Malardi	Wright	86-0112-00	476	8/17/1999	x	429281.14	4992407.14
61	Minnow	Becker	03-1045-00	477	8/26/1999	x	308381.72	5191842.63
62	Mud	Hennepin	27-0099-00	534	7/11/2001	x	463853.98	4989669.76
63	New London	Kandiyohi	34-0143-00	479	8/18/1999	x	346728.07	5019845.24
64	New Prairie	Pope	61-0192-00	831	7/23/2003	x	293350.5	5059088.65
65	Ney	LeSueur	40-0176-00	646	7/2/2002	x	430090.46	4932008.91
66	Overby	Pope	61-0548-00	482	8/19/1999	x	319781.02	5041966.33
67	Prairie	Hennepin	27-0177-00	780	7/7/2003	x	449334.14	5004365.74

Table C-1. Continued

Site Number	Site Name	County	Lake ID	Visit Number	Visit Date	Most Recent Sample?	CenUTMx	CenUTMy
68	Rose Golf	Ramsey	62-0053-00	484	8/16/1999	x	487225.13	4984278.72
69	Round	Ramsey	62-0009-00	485	8/16/1999	x	492115.66	4985651.71
70	Savage	Ramsey	62-0008-00	486	8/16/1999	x	492776.51	4985183.79
71	Seter	Becker	03-0649-00	487	8/26/1999	x	264632.39	5200067.47
72	Sethre	Ottertail	56-1003-00	538	7/25/2001	x	255626.06	5141118.54
73	Sheets Big	Todd	77-0122-01	455	8/24/1999	x	358131.54	5105263.95
74	Sheets Small	Todd	77-0122-03	491	8/24/1999	x	357795	5104640.1
75	Sigler	Sibley	72-0012-00	844	7/30/2003	x	422228.63	4924546.77
76	Skarpness	Pope	61-0007-00	490	8/18/1999	x	324368.57	5039453.66
77	Sucker North	Pope	61-0181-00	492	8/19/1999	x	294623.65	5058962.64
78	Sunset	Dakota	19-0451-00	493	8/20/1999	x	474314.29	4955484.9
79	Trappers	Pope	61-0522-00	494	8/19/1999	x	304000.46	5060786.66
80	Turtle	Hennepin	27-0101-00	650	7/29/2002	x	462502.79	4986949.56
81	Tyrone Bean	Meeker	47-0353-00	496	8/18/1999	x	379140.74	5015367.23
82	Wakefield	Ramsey	62-0011-00	529	7/9/2001	x	497191.37	4982379.23
83	Wood	Hennepin	27-0026-00	786	7/14/2003	x	476792.66	4969275.51
84	Zager	Todd	77-0100-00	499	8/24/1999	x	357818.16	5075063.12
85	CWB-N	Crow Wing	18-0102-00	111	9/16/1999	x	425725.27	5137980.77
116	Donley Small	Becker	03-1256-00	464	8/25/1999	x	274781.02	5212057.02
124	Cemetary	Ramsey	62-0273-00	1137	7/14/1995	x	493771	4982494
125	CrowRef	Hennepin	27-1122-00	1144	8/23/1995	x	449695	5004280
126	DaveFar	Todd	77-0371-00	543	7/18/1995	x	344169	5078309
127	DaveNear	Todd	77-0372-00	544	7/18/1995	x	344653	5078189
128	Frikken	Grant	26-0155-00	1156	8/30/1995	x	272000.262	5109587.215
130	GreyEagle	Todd	77-0373-00	547	7/18/1995	x	357561	5075601
131	Henry	Douglas	21-0425-00	1157	8/31/1995	x	315016.025	5086749.735
132	JohnLake	Pope	61-0546-00	1151	8/29/1995	x	307589	5063061
133	LakeJo	Ramsey	62-0201-00	1138	7/13/1995	x	488502	4986437
135	Maria	Wright	86-0507-00	1145	8/23/1995	x	425781	5018608

Table C-1. Continued

Site Number	Site Name	County	Lake ID	Visit Number	Visit Date	Most Recent Sample?	CenUTMx	CenUTMy
136	MNDOTN	Ramsey	62-0050-00	553	7/12/1995	x	485119.2359	4985681.68
137	MNDOTS	Ramsey	62-0050-00	554	7/12/1995	x	485119.2359	4985681.68
138	Oasis	Ramsey	62-0205-00	555	7/12/1995	x	486504	4985990
139	Orchard	Hennepin	27-0002-00	1146	8/23/1995	x	480718.6409	4963612.034
141	QuistFr	Todd	77-0374-00	1152	8/29/1995	x	337463	5077415
142	QuistNr	Todd	77-0375-00	1153	8/28/1995	x	337849	5077777
143	RenoRef	Pope	61-0547-00	683	7/23/2002	x	308282.66	5062841.42
144	Richard	Ramsey	62-0274-00	1142	7/14/1995	x	493770	4982425
145	RoseHS	Ramsey	62-0210-00	1143	7/14/1995	x	488038.4872	4984699.268
148	Tyrone	Meeker	47-0149-00	1158	8/30/1995	x	379988.2146	5016025.259
149	Winter	Meeker	47-0214-00	1159	8/31/1995	x	387100.8307	5016803.855
187	OakGlenEast	Steele	74-0003-00	608	7/3/2002	x	495000.59	4864125.61
188	OakGlenWest	Steele	74-0004-02	609	7/3/2002	x	494463.81	4863743.67
189	WillowLake	Redwood	64-0044-00	794	7/15/2003	x	324345.75	4909595.84
190	RohliksWMA	Redwood	64-0105-00	792	7/15/2003	x	310675.7	4925924.48
191	LyonsWMA	Lyon	42-0057-00	612	7/15/2002	x	270339.42	4910235.09
192	GreatOasisWMA	Murray	51-0078-02	613	7/16/2002	x	269406.88	4885969.54
193	EastlickMarsh	Murray	51-0026-00	614	7/16/2002	x	285623.2	4886954.98
194	LoneTreeWMA	Lyon	42-0028-00	615	7/16/2002	x	285102.11	4945094.8
195	TylerWMA	Lincoln	41-0004-00	827	7/22/2003	x	248485.29	4907059.82
196	RostWMA	Lincoln	41-0040-02	617	7/17/2002	x	248341.34	4929006.3
197	Prairie Marsh	Lyon	42-0102-00	807	7/17/2003	x	263204.91	4916843.11
198	FurgameWMA	Lyon	42-0108-00	619	7/17/2002	x	258339.73	4923693.25
199	Malta	Bigstone	06-0220-02	620	7/18/2002	x	246101.16	5038456.45
200	BarryWMA	Bigstone	06-0454-00	833	7/23/2003	x	220767.64	5051296.89
201	GoldenWPA	Stevens	75-0175-00	843	7/24/2003	x	258426.68	5037654.96
202	Hoffman	Swift	76-0112-00	838	7/24/2003	x	277872.27	5027827.55
203	Kerk	Swift	76-0280-00	842	7/24/2003	x	314126.59	5025728.21
204	Lee	Stevens	75-0375-00	841	7/24/2003	x	259635.68	5039138.66

Table C-1. Continued

Site Number	Site Name	County	Lake ID	Visit Number	Visit Date	Most Recent Sample?	CenUTMx	CenUTMy
205	FrancoWMA	Chippewa	12-0013-00	788	7/15/2003	x	309707.98	4978867.44
206	Milan	Chippewa	12-0110-00	627	7/22/2002	x	271331.8	4999754.07
207	Hancock	Stevens	75-0007-01	628	7/23/2002	x	282432.98	5042357.7
208	LakeCharlotte	Kandiyohi	34-0075-00	629	7/24/2002	x	351744.1	4984799.5
209	LakeElisabeth	Kandiyohi	34-0022-01	630	7/24/2002	x	357997.88	4992852.19
210	Yohi	Kandiyohi	34-0445-00	631	7/25/2002	x	351226	4999089.35
211	WoodlandWMA	Wright	86-0085-00	632	7/26/2002	x	429218.52	4989183.83
212	HardScrab	Hennepin	27-1128-00	633	7/26/2002	x	446452.04	4973554.07
213	Morraine	Hennepin	27-0994-00	634	7/26/2002	x	462491.51	4966686.1
216	Gleason	Hennepin	27-1135-00	637	7/29/2002	x	460615.85	4981168.62
218	DellRd	Hennepin	27-1127-00	638	7/29/2002	x	460282.13	4966137.33
219	BushLake	Hennepin	27-1019-00	639	7/29/2002	x	469293.94	4964780.28
220	BetShalom	Hennepin	27-1126-00	640	7/30/2002	x	464213.79	4975726.43
221	Westmark	Hennepin	27-1125-00	641	7/30/2002	x	463300.28	4976083.26
222	Kipling	Hennepin	27-1124-00	642	7/31/2002	x	473477.61	4975001.63
223	TheoWirth	Hennepin	27-0648-00	643	7/31/2002	x	473913.12	4981980.6
225	Carex	Freeborn	24-0075-04	784	7/10/2003	x	493080.07	4840786.09
226	Manchester	Freeborn	24-0041-00	785	7/10/2003	x	465133.04	4845191.4
227	Bryclyn	Freeborn	24-0080-03	845	7/10/2003	x	456893.01	4836081.79
229	03linc019	Lincoln	41-0128-00	824	7/22/2003	x	250168.64	4915453.26
231	03linc018	Lincoln	41-0165-00	797	7/15/2003	x	250678.95	4903290.77
232	03linc004	Lincoln	41-0164-00	821	7/22/2003	x	252185.02	4914731.54
233	03lyon082	Lyon	42-0081-00	819	7/21/2003	x	256585.01	4914123.07
234	03linc137	Lincoln	41-0163-00	830	7/22/2003	x	233401.09	4917561.4
235	03linc073	Lincoln	41-0021-99	826	7/22/2003	x	253116.26	4915274.79
236	03lyon070	Lyon	42-0089-00	813	7/17/2003	x	262862.89	4917500.84
237	03murr028	Murray	51-0128-00	798	7/16/2003	x	259256.06	4893561.74
238	03lyon045	Lyon	42-0136-00	815	7/21/2003	x	257416.99	4919461.9
239	03murr066	Murray	51-0124-00	800	7/16/2003	x	256146.64	4895950.08

Table C-1. Continued

Site Number	Site Name	County	Lake ID	Visit Number	Visit Date	Most Recent Sample?	CenUTMx	CenUTMy
240	03lyon080	Lyon	42-0135-00	805	7/16/2003	x	258312.89	4903019.3
241	03lyon099	Lyon	42-0092-00	816	7/21/2003	x	256780.82	4919310.24
242	03murr101	Murray	51-0103-00	806	7/16/2003	x	260258.79	4896688.5
243	03lyon124	Lyon	42-0134-00	818	7/21/2003	x	261448.76	4917918.17
244	03murr132	Murray	51-0088-00	796	7/16/2003	x	259757.37	4895646.2
245	03pipe055	Pipestone	59-0008-00	795	7/16/2003	x	249916.52	4897038.65
246	03lyon146	Lyon	42-0080-00	829	7/22/2003	x	256942.51	4915830.1
247	03redw008	Redwood	64-0139-01	791	7/15/2003	x	294625.03	4924523.64
248	03redw123	Redwood	64-0152-00	793	7/15/2003	x	296110.62	4929532.11
249	03redw094	Redwood	64-0108-02	790	7/15/2003	x	303342.06	4921939.88
251	03redw048	Redwood	64-0151-00	789	7/15/2003	x	325906.4	4930318.31
252	03lyon012	Lyon	42-0133-00	817	7/21/2003	x	260129.61	4911793.71
253	03linc138	Lincoln	41-0162-00	822	7/22/2003	x	252357.49	4911297.38
254	03linc122	Lincoln	41-0161-00	825	7/22/2003	x	252528.81	4909827.06
255	03lyon052	Lyon	42-0132-00	850	7/16/2003	x	256787.4	4907087.8
256	03lyon006	Lyon	42-0131-00	812	7/17/2003	x	263064.92	4917299.8
257	03linc093	Lincoln	41-0160-00	828	7/22/2003	x	237313.29	4906452.24
258	03linc007	Lincoln	41-0159-00	801	7/16/2003	x	241118.59	4902399.8
259	03linc003	Lincoln	41-0158-00	804	7/16/2003	x	235694.98	4913899.75
260	03lyon110	Lyon	42-0130-00	810	7/17/2003	x	284710.35	4924902.65
261	03lyon022	Lyon	42-0129-00	814	7/21/2003	x	265114.23	4914805.71
262	03lyon058	Lyon	42-0128-00	835	7/23/2003	x	265009.48	4917673.08
264	03linc097	Lincoln	41-0005-00	799	7/16/2003	x	247389.31	4907505.41
265	03linc089	Lincoln	41-0112-00	823	7/22/2003	x	244407.57	4911565.02
266	03lyon084	Lyon	42-0127-00	820	7/21/2003	x	265601.79	4912682.11
267	03lyon142	Lyon	42-0126-00	811	7/17/2003	x	284502.08	4924562.39
268	03lyon140	Lyon	43-0125-00	808	7/17/2003	x	262881.34	4916727.69
269	Cedar Lake East	Stearns	73-0226-00	839	7/24/2003	x	363905.2	5062552.28
270	Cedar Lake West	Stearns	73-0255-00	836	7/24/2003	x	352534.7	5068275.4

Table C-1. Continued

Site Number	Site Name	County	Lake ID	Visit Number	Visit Date	Most Recent Sample?	CenUTMx	CenUTMy
271	Monson Lake	Swift	76-0033-00	837	7/24/2003	x	321391.38	5021423.2
272	Hassel Lake	Swift	76-0086-00	840	7/24/2003	x	298730.2	5029533.56
273	Smith Lake	Wright	86-0250-00	782	7/8/2003	x	411062.98	4991925.05
274	Diamond Lake	Hennepin	27-0125-00	781	7/8/2003	x	460324.69	5005464.52
275	French Lake	Hennepin	27-0127-00	783	7/8/2003	x	460118.03	5002818.99
276	03linc125	Lincoln	41-0157-00	847	7/22/2003	x	242787.56	4909415.48

Table C-2. Geographic Representation of the Wetlands Data

County	Number of Sites	General Location
Hennepin	22	Twin Cities Metro
Lyon	20	SW MN
Lincoln	15	SW MN
Ramsey	13	Twin Cities Metro
Pine	11	E. Central MN
Todd	10	Central MN
Becker	8	NW Central MN
Pope	8	Central MN
Murray	6	SW MN
Redwood	6	SW MN
Chisago	5	E. Central MN
Kandiyohi	5	Central MN
Kanabec	4	E. Central MN
Meeker	4	Central MN
Swift	4	W. Central MN
Washington	4	Twin Cities Metro
Wright	4	Twin Cities Metro
Freeborn	3	S. Central MN
Ottertail	3	W. Central MN
Stevens	3	Central MN
Aitkin	2	northern Central MN
Big Stone	2	W. Central MN
Chippewa	2	Central MN
LeSueur	2	S. Central MN
Stearns	2	Central MN
Steele	2	S. Central MN
Carlton	1	almost NE MN
Crow Wing	1	Central MN
Dakota	1	Twin Cities Metro
Douglas	1	Central MN
Grant	1	W. Central MN
Pipestone	1	SW MN
Rice	1	S. Central MN
Sibley	1	S. Central MN
Sum	**178**	

Wetland Sediment Coring Procedures

Sediment Samples

Surface sediments are a useful matrix to examine the concentration of biological and ecologically active compounds. Biological activity has the potential to most adversely be affected by surface sediments (<5 cm deep) since this represents the sediment/water interface and is the point of exposure for many toxic compounds and organisms. The sediment collection method presented here has been used successfully in other wetland assessment work by the MPCA.

Equipment and supplies:

- Core tubes – polycarbonate plastic 40.5 x 4.5 cm
- Rubber stoppers 2.5 in
- Brass extruder (from Wildco)
- Plastic spoons to spoon off sample into collection bag
- 1-liter whirlpac bags or other appropriate sample container
- Cleaning equipment and chemicals

Collect sediment at several stations in the shallow water along the wetland edge in the areas where invertebrate and vegetation samples have been collected.

1. Clean all plastic sampling equipment using appropriate clean techniques for trace metals analysis. Cleaning technique is discussed below. Enter the wetland and remove the orange core tube caps, remember both the inside and outside of the tube has been chemically cleaned.
2. Rinse the core tube and stoppers in site water
3. Try to avoid disturbing the sediment where you will be coring. One way to do this is, once you have arrived at the sample location orient the tube in the water righting it vertical when you reach the chosen location. Push the tube in slightly while reaching and at a distance. Once it is set in place then get into close position to push the core tube as far into the consolidated substrate as is comfortable.

4. Cap the end of the core with a stopper and remove the core. In some sites it works well to stopper the core tube and then push it further into the consolidated sediments. This results in a slight depression at the bottom end of the tube where the extruder easily fits.

   If coring in shallow water (<30 to 40 cm) the end of the core tube may not be fully immersed and the water column above the sediment core should be clean. If coring in deeper water the top end of the core tube is likely to be immersed causing water to fill the core tube from the top. Avoid water gushing into the core tube by one of three practices:

- Push the core tube in to a level where the water is just at the lip of the core tube. Then slightly tip or push the tube until water SLOWLY fills the tube space and minimizing disturbance to the sediment. Resume pushing to obtain a core plug.
- Cap the core tube with a stopper as it is submerged and keep pushing with one hand while the other hand holds the cap in place such that it "burps the tube" releasing air but minimizing the entry of water. Stopper the tube tightly and resume pushing to obtain the core plug.

- Hold the tube horizontal in the water column, so it fills with water, then push the tube vertically down into the sediments retaining a complete water column in the core tube at all times. Stopper and core tube and retrieve the core.

5. Pull the core tube out of the sediment; plug the bottom with a second stopper if the sediment plug starts to slip out.
6. Extrude the core from the bottom up collecting the top 5 cm of soft sediment materials.
7. With a plastic spoon, spoon the soft sediments directly into a large (2-liter) whirlpac bag. We want a volume equal to about 500 ml of sample which equals the whirlpac being about ¼ full.

Hints for troublesome sites:

Some sites the top sediments are clearly mucky others are not so clear. Pick out any obvious chunks of plant material, recently deposited plant materials (the course stuff) and any large rocks. Try also to pick out or avoid collecting root masses or other obvious "fibric" materials in the sample.

With sandy site cores we have tried to take only the fine material at the very top of the core and maybe 1 cm of sandy substrate. Typically, sandy substrates will require several cores to get an adequate final sample. Sites that have a peat substrate are also difficult and may mean discarding the entire core and going in search of locations with more fine sediment accumulations. If none can be found there usually are thin layers of very fine organic materials which you need to allow to settle a couple minutes before extruding. In these kinds of sites again you may need to obtain lots of cores to get an adequate sample.

If all the cores are coming up with very course or recent deposited plant materials (like at Sunset Pond) then a better sample might be able to be obtained from deeper waters. There is a PVC core extender in the vehicle ("the contraption"). This can be and has been used to obtain a deeper

water sample. Insert the core liner into the end of the extender with the set screw screwed out. Make sure the tube is properly seated and then tighten the set screw with a screwdriver. There are at least four problems with this contraption: 1) it is time consuming and cumbersome to use, 2) it is difficult to chemically clean, 3) it tends to dent the core tube where the set screw contacts the core tube, 4) it is difficult to tell how far to push it into the sediments. It has only been used at Sunset and Jones, though at Jones most of the cores were able to be obtained using our normal method of pushing the core down by hand. The Jones sample was collected in the area where the invert sampling was done and not through the mat.

8. Remove excess air from the whirlpacs by squeezing them and bending them down, then roll the whirlpacs down to within a couple inches of the top of the sample and bend the twist ties onto the roll.
9. Label the sample with tape, including: site name/ID, "wetland sediments", date and sampler.
10. Place the sample into a ziplock bag to protect the label and help prevent any water from being taken on by the sample as ice melts and it sits in the bottom of the cooler. Several samples can go into one ziplock bag.
11. Keep the samples on ice until returning to the lab and then place them in our box in the walk-in freezer to freeze the samples.

CLEANING PROCEDURE

Before use, all surfaces of the core tubes, orange end caps and spoons should be chemically cleaned using the following procedure.

1. Wet the equipment surface,
2. Apply a small amount of liquid detergent to the bottle brush and scrub the equipment,
3. Rinse all equipment surfaces (spoon, core tubes, orange end caps) well with tap water.
4. Rinse all equipment surfaces with 10% HCl (mixed at 600 ml DI water and 100 ml 38% concentrated HCl)
5. Rinse all equipment surfaces well with DI water
6. Site rinse equipment, except orange end caps, prior to use.

Clean spoons can be carried inside the core tubes and capping the tubes with orange end caps. We put the cleaned tubes in the large garbage bag in the field vehicle.

Appendix D
Particle Size and TOC

Table D-1. Additional Summary Statistics for Particle Size and TOC (n = 54)

Parameter	Minimum (%)	Maximum (%)	SEM (%)	MAD/0.675 (%)	Skewness	Kurtosis	CV
Clay	0	78.0	2.4	15.4	0.88	0.70	0.74
Sand	1.6	79.2	2.9	25.9	0.24	-0.82	0.60
Silt	4.5	97.4	2.5	15.9	0.56	0.99	0.45
TOC	0.57	30.0	0.96	7.3	0.43	-0.42	0.50

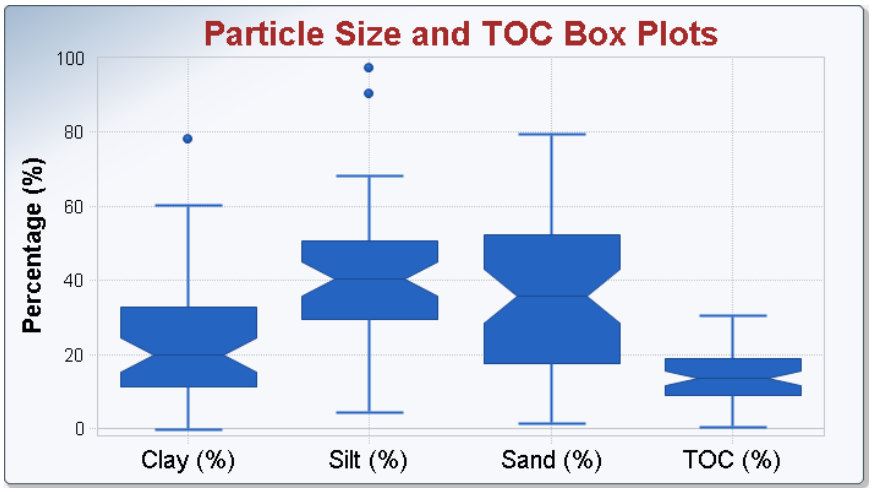
n = number of samples; SEM = standard error of the mean; MAD = median absolute deviation; CV = coefficient of variation; TOC = total organic carbon.

Table D-2. Percentiles of Particle Size and TOC Data. Highlighted Values are Based on Detected Data.

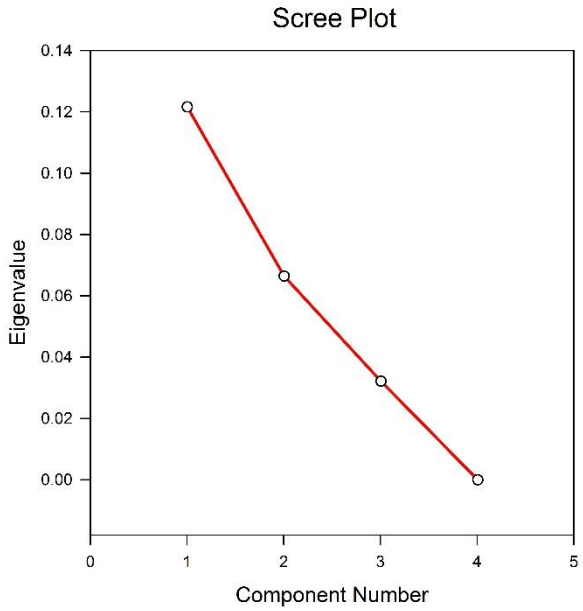
Parameter	25%ile (Q1) (%)	50%ile (Q2) (%)	75%ile (Q3) (%)	95%ile (%)	99%ile (%)
Clay	11.3	19.9	32.6	55.3	68.5
Sand	17.6	35.6	52.0	71.1	78.7
Silt	29.7	40.5	50.4	67.0	93.7
TOC	9.0	13.5	19.0	26.9	29.7

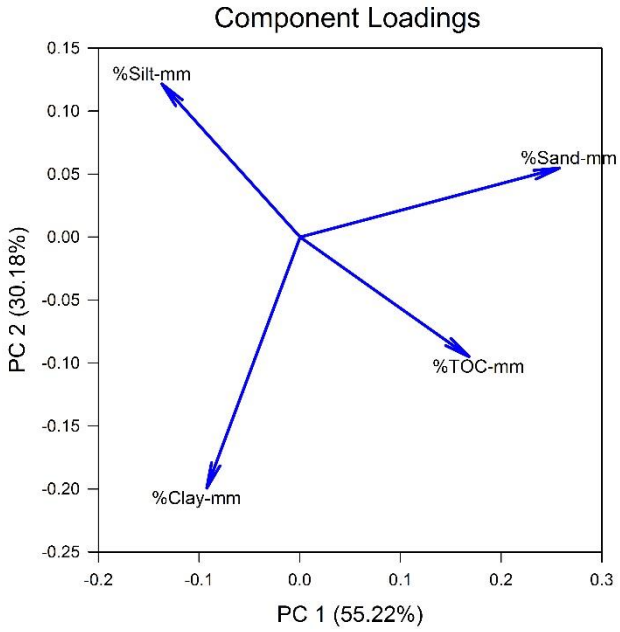
Q = quantile; TOC = total organic carbon.

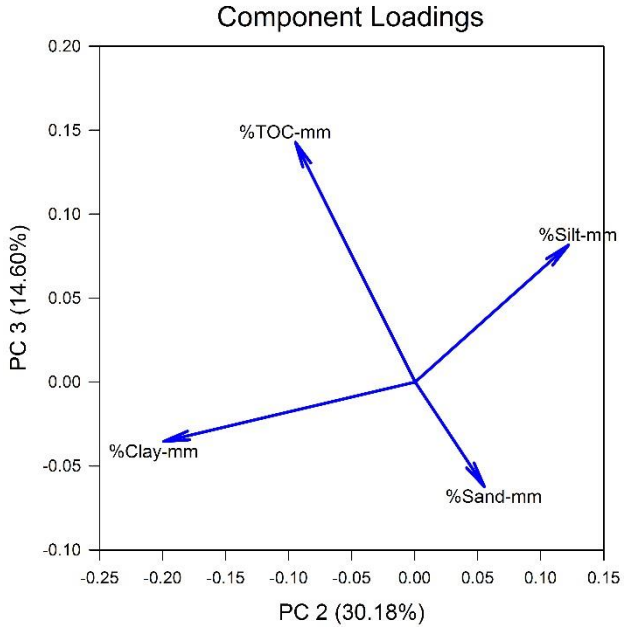
Box Plot of Particle Size and TOC

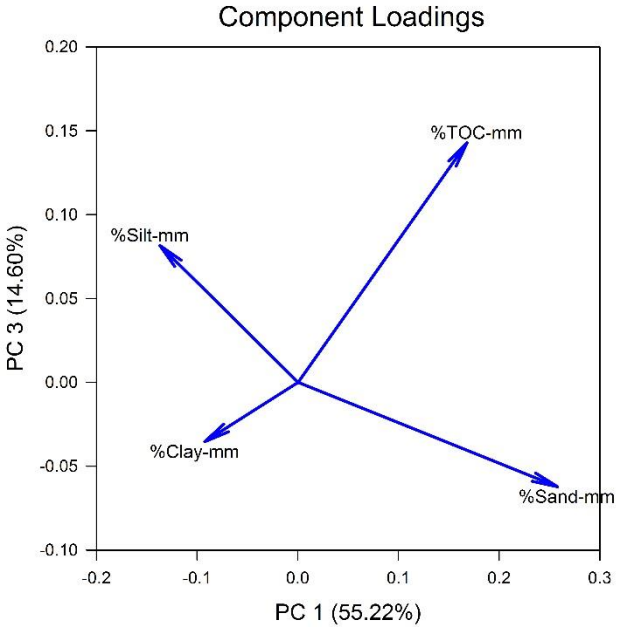


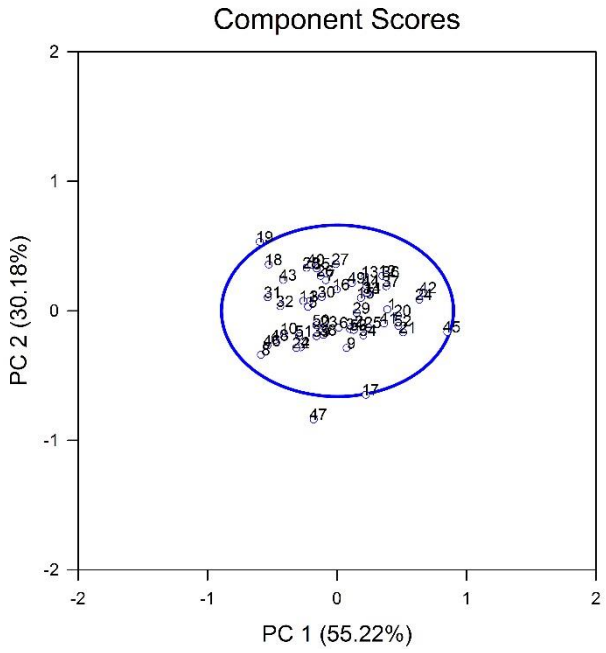
Supporting Information for Principal Components Analysis of Particle Size and TOC

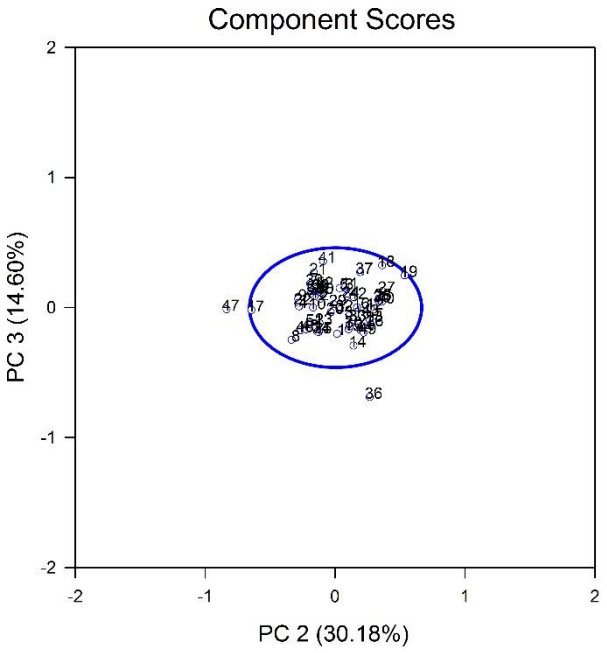


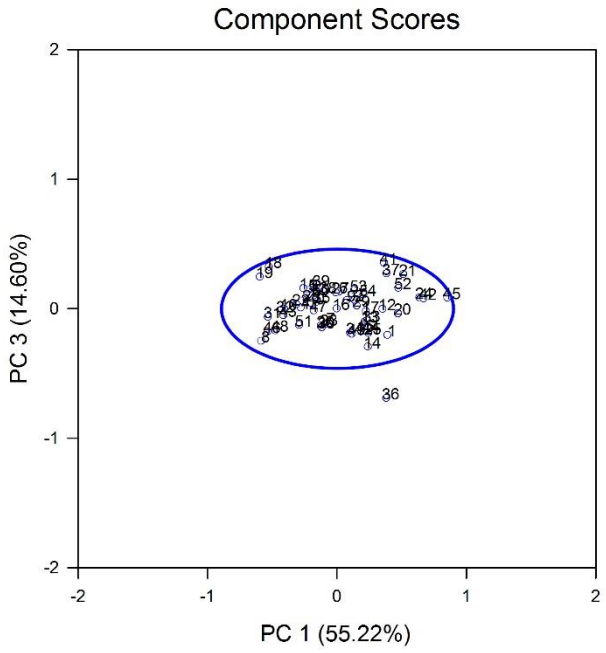












The data point numbers correspond to lake ID numbers (e.g., #36 corresponds to Red Rock Lake).

Eigenvectors of the Covariance Matrix:

	PC 1	PC 2	PC 3
%Clay-mm	-0.266	-0.773	-0.197
%Silt-mm	-0.393	0.471	0.455
%Sand-mm	0.738	0.213	-0.347
%TOC-mm	0.480	-0.368	0.796

Each principal component is a linear combination of the original variables, after each original variable has been centered about its mean. The coefficients of this linear combination are the entries in the corresponding column of the above table. These coefficients provide the interpretation of the principal components in terms of the original variables.

Percentage of Variance Explained by the In-Model Components:

	PC 1	PC 2	PC 3	Unexplained Variance
%Clay-mm	17.332	80.144	2.524	0.0000379
%Silt-mm	46.727	36.724	16.549	0.0000661
%Sand-mm	90.590	4.115	5.295	0.0000254
%TOC-mm	48.833	15.677	35.490	4.320E-012

Component Scores:
The significance level is 0.050. Significant P-values are flagged.

ID	PC 1	PC 2	PC 3	T-square	P
1	0.384	0.0118	-0.202	2.484	0.501
2	0.130	-0.120	0.0696	0.506	0.921
3	-0.217	0.0737	0.151	1.177	0.770
4	-0.284	-0.282	0.00980	1.863	0.620
5	-0.228	0.0310	0.150	1.144	0.777
6	0.0107	-0.131	0.133	0.803	0.856
7	-0.0905	0.237	-0.108	1.273	0.748
8	-0.591	-0.340	-0.248	6.515	0.113
9	0.0708	-0.287	0.0664	1.421	0.714
10	-0.413	-0.174	0.00101	1.856	0.621
11	-0.265	0.0762	0.159	1.452	0.707
12	0.347	0.270	-0.000342	2.087	0.575
13	0.212	0.265	-0.0967	1.714	0.651
14	0.234	0.138	-0.292	3.392	0.363
15	0.181	0.101	-0.167	1.285	0.745
16	-0.00744	0.165	0.00289	0.412	0.940
17	0.219	-0.648	-0.0189	6.725	0.104
18	-0.531	0.358	0.326	7.549	0.0766
19	-0.600	0.532	0.249	9.140	0.0422 <
20	0.466	-0.0374	-0.0352	1.847	0.623
21	0.507	-0.167	0.269	4.776	0.217
22	-0.319	-0.287	0.0370	2.117	0.569
23	-0.103	-0.124	-0.120	0.767	0.864
24	0.632	0.0875	0.0891	3.643	0.331
25	0.236	-0.129	-0.186	1.789	0.635
26	-0.131	0.271	-0.131	1.775	0.638
27	-0.0141	0.362	0.127	2.473	0.503

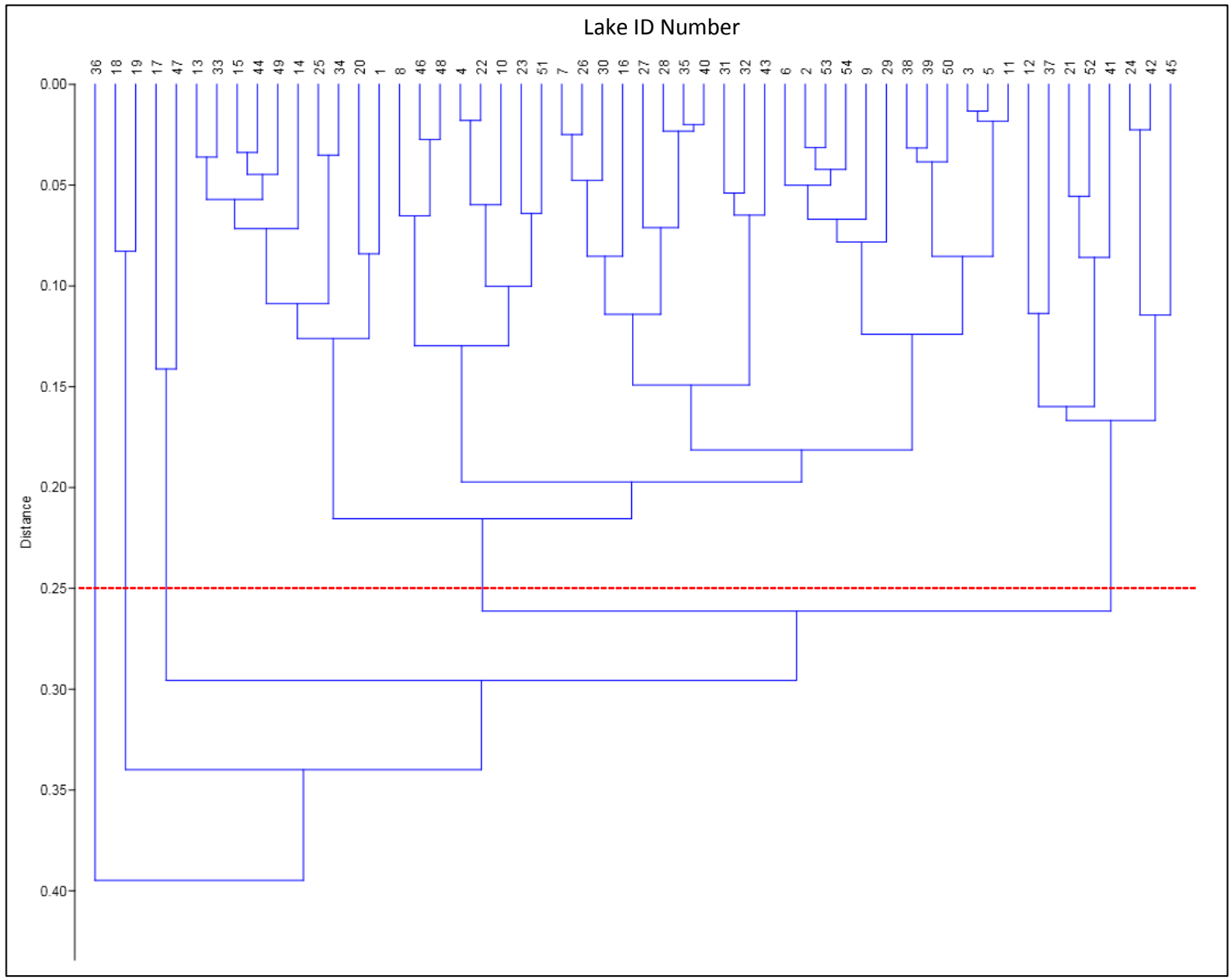
Component Scores (continued):

ID	PC 1	PC 2	PC 3	T-square	P
28	-0.239	0.332	0.0705	2.283	0.537
29	0.149	-0.0156	0.0257	0.206	0.978
30	-0.122	0.108	-0.143	0.931	0.826
31	-0.538	0.105	-0.0621	2.665	0.471
32	-0.442	0.0361	-0.0150	1.633	0.668
33	0.227	0.138	-0.0913	0.966	0.818
34	0.0974	-0.141	-0.185	1.442	0.710
35	-0.160	0.327	0.0558	1.917	0.609
36	0.375	0.262	-0.688	16.918	0.00257 <
37	0.376	0.190	0.274	4.034	0.287
38	-0.109	-0.186	0.132	1.162	0.773
39	-0.162	-0.196	0.185	1.857	0.621
40	-0.202	0.355	0.0448	2.296	0.535
41	0.358	-0.0969	0.357	5.148	0.189
42	0.664	0.140	0.0814	4.124	0.277
43	-0.419	0.239	-0.0501	2.377	0.520
44	0.221	0.193	-0.174	1.899	0.612
45	0.847	-0.163	0.0868	6.528	0.113
46	-0.542	-0.269	-0.176	4.464	0.244
47	-0.185	-0.838	-0.0129	10.859	0.0223 <
48	-0.481	-0.226	-0.167	3.532	0.345
49	0.111	0.216	-0.193	1.958	0.600
50	-0.163	-0.112	0.118	0.841	0.847
51	-0.297	-0.197	-0.125	1.796	0.633
52	0.469	-0.115	0.162	2.823	0.445
53	0.127	-0.147	0.145	1.107	0.786
54	0.200	-0.190	0.110	1.251	0.753

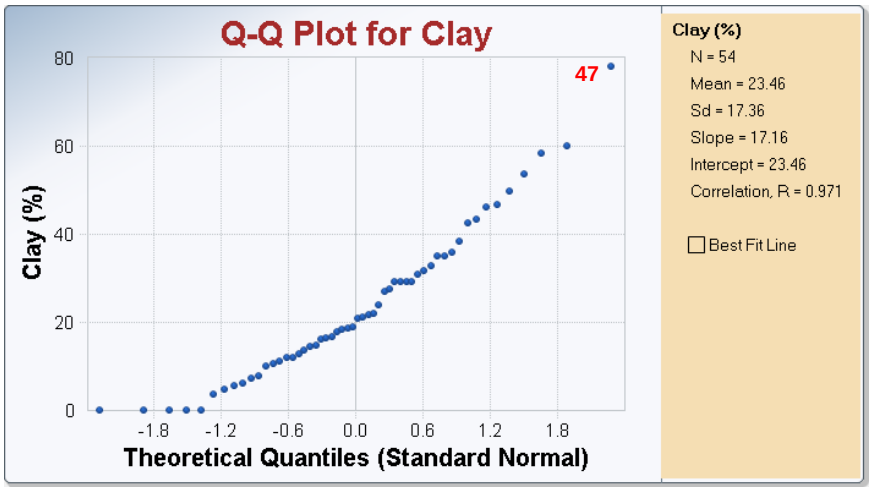
A significant P-value indicates that the corresponding observation is a possible outlier.

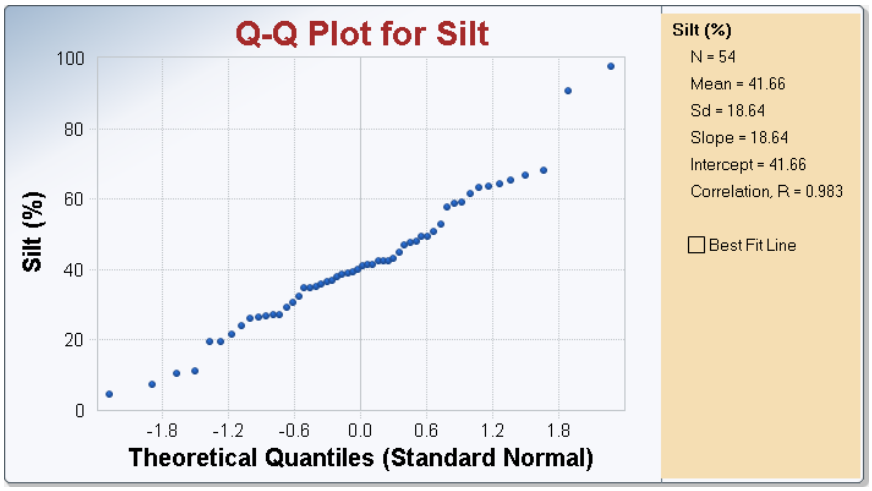
The above PC1, PC2, and PC3 component scores were used in the hierarchical cluster analysis of these data.

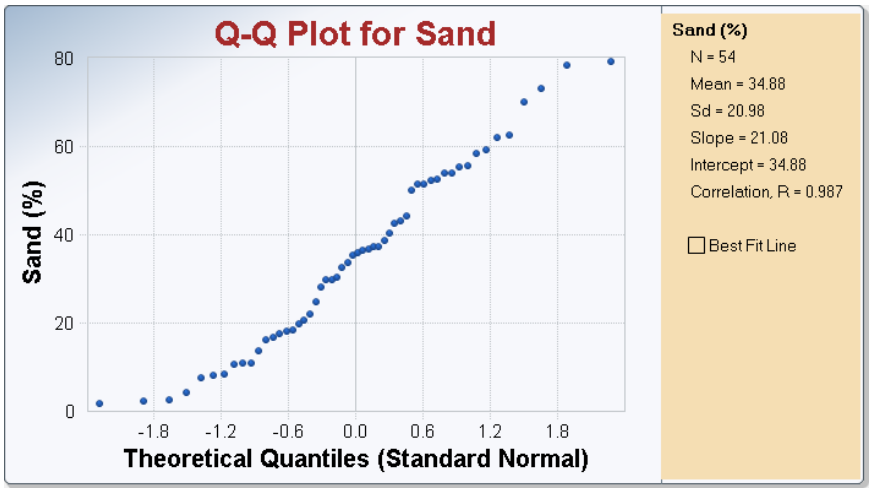
Hierarchical Cluster Analysis (HCA) of the PCA Component Scores for Particle Size and TOC. The HCA was set-up with the paired group (UPGMA) algorithm and the Gower similarity index. Five groups of data were considered at a distance of 0.25.

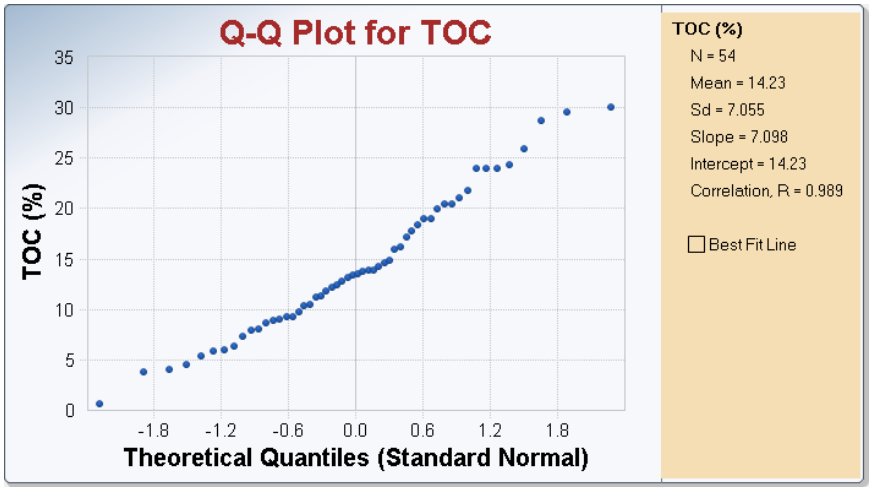


Q-Q Plots for Particle Size and TOC (sample noted in red font is significant at the 5% significance level)








Q-Q Plot for TOC
TOC (%)
35
30
25
20
15
10
5
0
-1.8
-1.2
-0.6
0.0
0.6
1.2
1.8
Theoretical Quantiles (Standard Normal)
TOC (%)
N = 54
Mean = 14.23
Sd = 7.055
Slope = 7.098
Intercept = 14.23
Correlation, R = 0.989
Best Fit Line

Appendix E
Metals and Metalloids

Table E-1. Additional Summary Statistics for Detected Metals and Metalloids (n = 54)

Metal or Metalloid	Minimum (mg/kg dry wt.)	Maximum (mg/kg dry wt.)	SEM (mg/kg dry wt.)	MAD/0.675 (mg/kg dry wt.)	Skewness	Kurtosis	CV
Aluminum	1430	31500	987.2	7798	0.406	-0.518	0.506
Arsenic	1.7	73.2	1.709	3.062	4.238	18.9	1.192
Barium	50.8	390	11.46	89.7	0.172	-0.67	0.396
Chromium	8.57	128	2.69	15.79	2.031	7.956	0.565
Cobalt	1.1	20.7	0.548	2.372	1.88	3.734	0.709
Copper	2.5	200	4.84	6.227	3.382	12.55	1.401
Lead	3.5	161	4.207	17.42	2.705	9.014	0.907
Manganese	90	9290	201.1	584.9	3.97	18.82	1.288
Nickel	3.1	68.7	1.479	6.746	2.902	11.25	0.681
Zinc	9.5	140	3.972	26.69	0.461	0.129	0.475

n = number of samples; SEM = standard error of the mean; MAD = median absolute deviation; CV = coefficient of variation.

Table E-2. Additional Summary Statistics for Censored Metals and Metalloids (n = 54)

Metal or Metalloid	% NDs	Minimum ND (mg/kg dry wt.)	Maximum ND (mg/kg dry wt.)	KM Variance* $(mg/kg\ dry\ wt.)^2$	KM CV*
Antimony	100	<0.3	<0.6	-	-
Beryllium	55.6	<0.2	<0.4	0.041	0.48
Cadmium	11.1	<0.1	<0.1	0.11	0.64
Mercury	59.3	<0.05	<0.05	0.011	1.0
Molybdenum	20.4	<0.5	<1	1.6	0.66
Selenium	1.9	<1	<1	0.39	0.34
Silver	64.8	<0.2	<0.2	0.0053	0.46
Thallium	100	<0.5	<1	-	-
Vanadium	1.9	<2	<2	342.4	0.54

n = number of samples; ND = nondetect value; KM = Kaplan-Meier; CV = coefficient of variation.

* Estimated using the Kaplan-Meier method for nondetects <80%.

Table E-3. Additional Summary Statistics for Censored Forms of Mercury Analyzed in the Upper 1 cm of Sediment Samples Collected from the 2007 NLA Lakes in Minnesota

Forms of Mercury	% NDs	Minimum ND	Maximum ND	KM Variance*	KM CV*
Total Mercury (mg/kg dry wt.)	5.3	0.0045	0.0083	0.011	0.80
Methyl Mercury (µg/kg dry wt.)	10.3	0.060	0.35	0.23	0.76

NLA = National Lake Assessment; ND = nondetect value; KM = Kaplan-Meier; CV = coefficient of variation.

* Estimated using the Kaplan-Meier method for <80% nondetects.

Table E-4. Percentiles of Metal and Metalloid Data. Highlighted Values are Based on Detected Data.

Metal or Metalloid	25%ile (Q1) (mg/kg dry wt.)	50%ile (Q2) (mg/kg dry wt.)	75%ile (Q3) (mg/kg dry wt.)	95%ile (mg/kg dry wt.)	99%ile (mg/kg dry wt.)
Detected Data					
Aluminum	8543.0	13500.0	19150.0	26940.0	29380.0
Arsenic	5.8	7.0	9.8	18.7	70.2
Barium	146.5	203.5	279.8	350.0	386.3
Chromium	22.9	31.0	49.7	57.8	96.8
Cobalt	3.3	4.4	6.6	14.4	18.6
Copper	10.8	14.5	20.3	91.7	170.3
Lead	16.4	26.4	40.1	77.4	160.5
Manganese	485.0	725.5	1303.0	2928.0	7525.0
Nickel	9.9	14.6	18.6	30.5	58.6
Zinc	42.5	62.0	78.3	109.4	133.1
Detected & Censored Data					
Antimony	<0.60	<0.60	<0.60	<0.60	<0.60
Beryllium	<0.40	<0.40	0.51	0.81	0.97
Cadmium	0.29	0.47	0.68	1.1	1.3
Mercury	<0.050	<0.050	0.088	0.30	0.49
Molybdenum	1.1	1.5	2.3	4.6	5.1
Selenium	1.5	1.7	2.1	3.2	3.7
Silver	<0.20	<0.20	<0.20	0.27	0.41
Thallium	<1.0	<1.0	<1.0	<1.0	<1.0
Vanadium	19.0	32.6	46.5	69.0	73.1

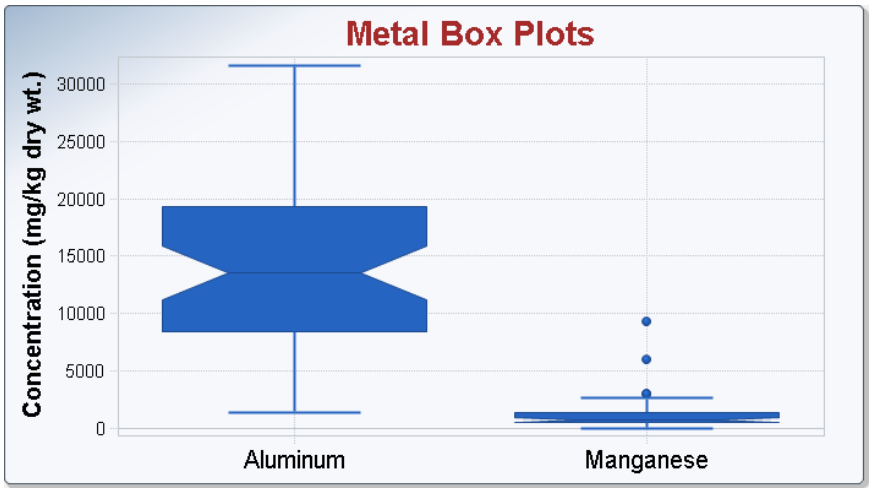
Q = quantile.

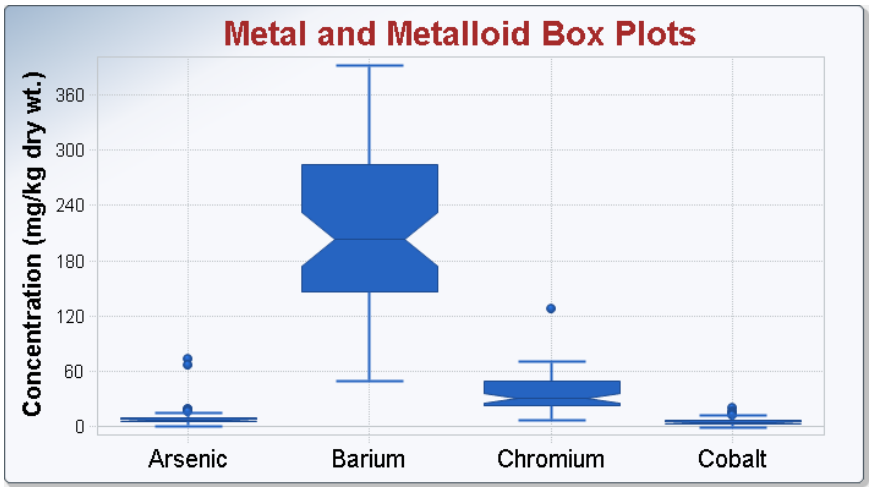
Table E-5. Percentiles of Forms of Mercury Analyzed in the Upper 1 cm of Sediment Samples Collected from the 2007 NLA Lakes in Minnesota. Highlighted Values are Based on Detected Data.

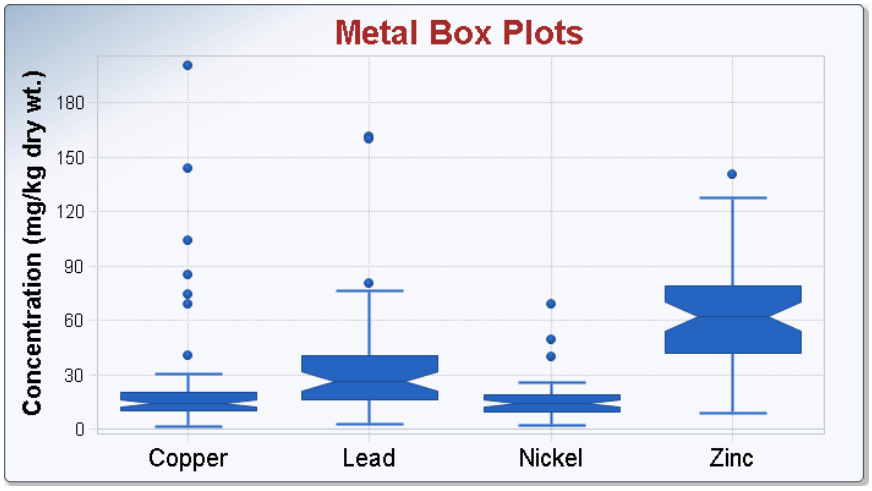
Forms of Mercury	25%ile (Q1)	50%ile (Q2)	75%ile (Q3)	95%ile	99%ile
Total Mercury (mg/kg dry wt.)	0.060	0.085	0.19	0.37	0.41
Methyl Mercury (µg/kg dry wt.)	0.24	0.56	0.91	1.5	2.0

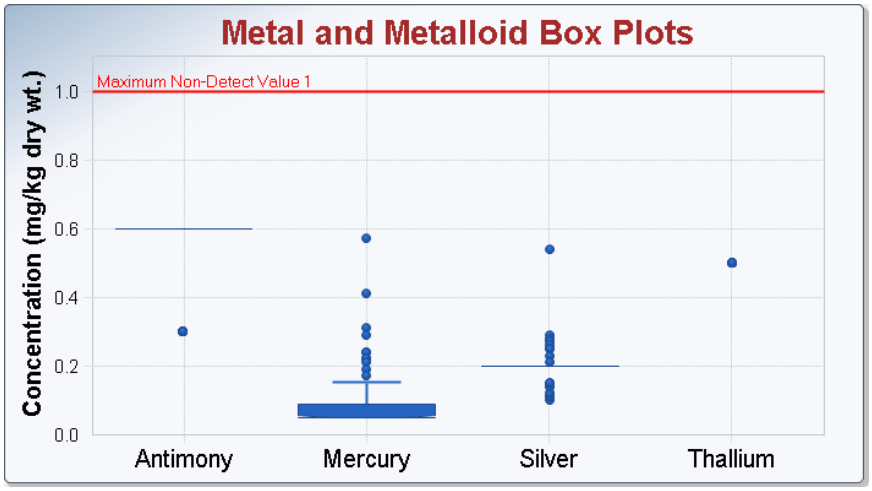
NLA = National Lake Assessment; Q = quantile.

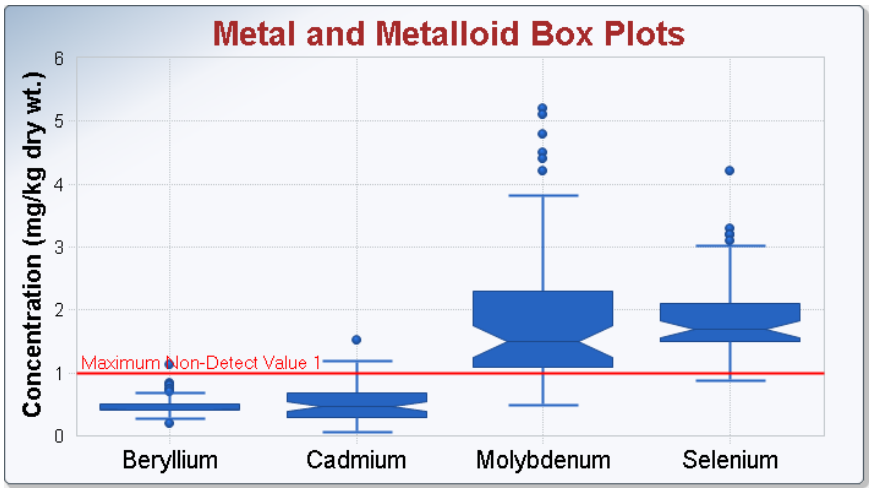
Box Plots for Metals and Metalloids

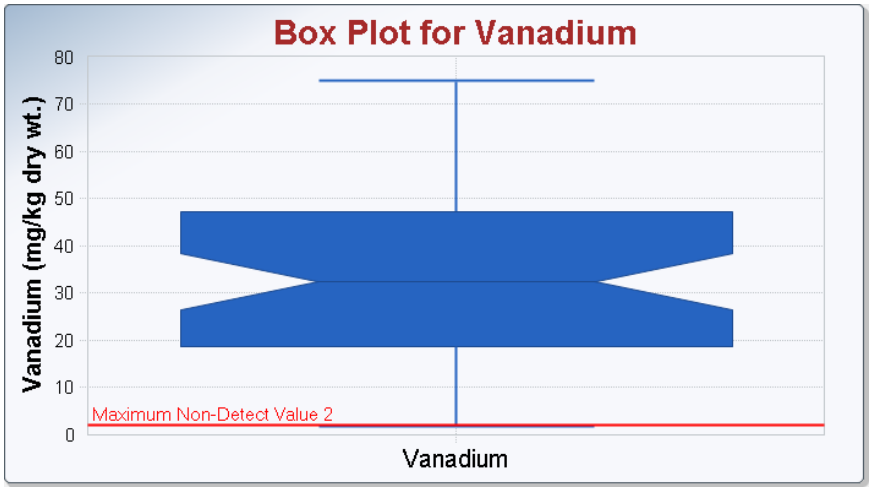




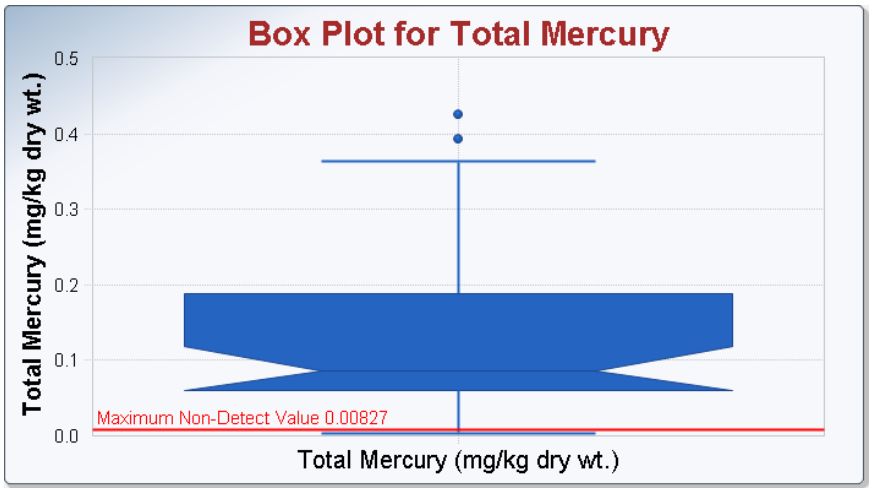



Metal and Metalloid Box Plots
Concentration (mg/kg dry wt.)
Maximum Non-Detect Value 1
1.0
0.8
0.6
0.4
0.2
0.0
Antimony
Mercury
Silver
Thallium


Metal and Metalloid Box Plots
Concentration (mg/kg dry wt.)
6
5
4
3
2
1
0
Maximum Non-Detect Value 1
Beryllium
Cadmium
Molybdenum
Selenium


Box Plot for Vanadium
Vanadium (mg/kg dry wt.)
80
70
60
50
40
30
20
10
0
Maximum Non-Detect Value 2
Vanadium

Box Plots for Forms of Mercury Analyzed in the Upper 1 cm of Sediment Samples



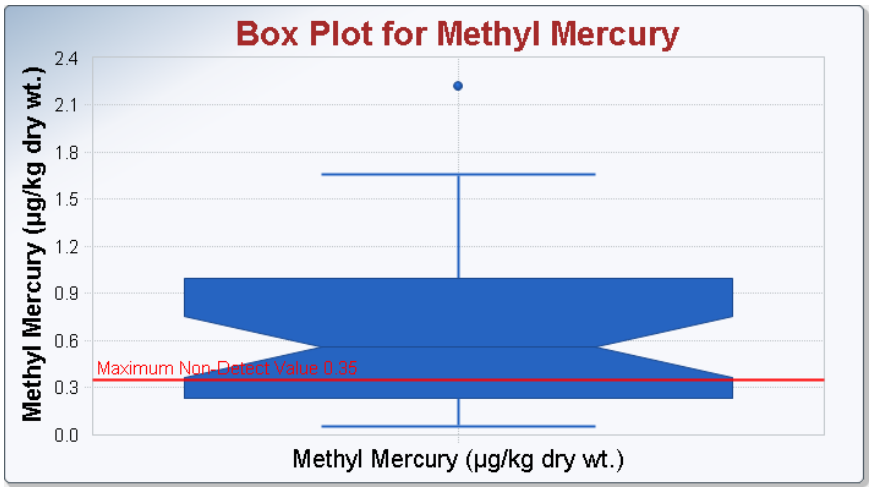


Table E-6. Statistical Comparisons of Untransformed Metals and Metalloids (with ≤1 nondetects) by Land Use Categories

Metal or Metalloid	p-value	
	One-Way ANOVA	Kruskal-Wallis One-Way ANOVA on Ranks
Aluminum	0.879	
Arsenic		0.091
Barium	0.074†	
Chromium		0.031*
Cobalt		0.257
Copper		0.021*
Lead		<0.001*
Manganese		0.504
Nickel		0.755
Selenium		0.797
Vanadium	0.390†	
Zinc	0.002*	

ANOVA = analysis of variance.

† The power of the performed test (0.361 for barium and 0.054 for vanadium) was below the desired power of 0.800. This means that you are less likely to detect a difference when one actually exists.

* statistically significant (p<0.05).

Table E-7. Multiple Pairwise Comparisons of Untransformed Metals by Land Use Categories. Pairs Shaded "Yes" are Significantly Different (p<0.05) from Each Other.

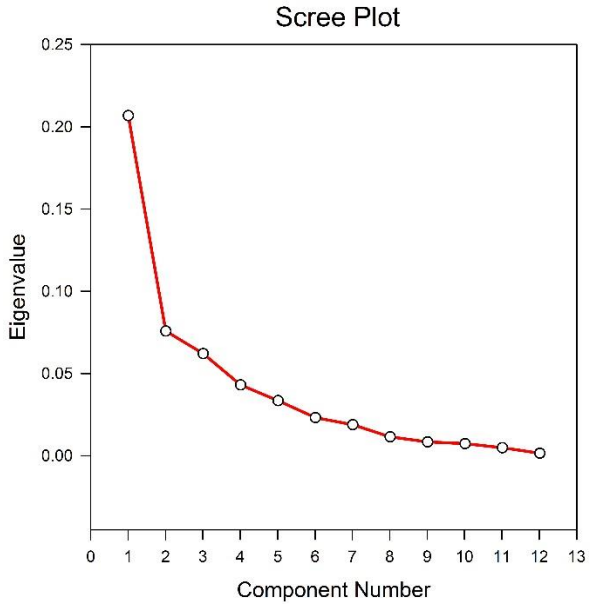
Metal	p<0.05					
	dev vs. cul	dev vs. wet	dev vs. for	for vs. cul	for vs. wet	wet vs. cul
Chromium§	No	DNT	DNT	DNT	DNT	DNT
Copper§	No	DNT	DNT	DNT	DNT	DNT
Lead§	Yes	No	DNT	Yes	DNT	No
Zinc‡	Yes	Yes	No	Yes	No	No

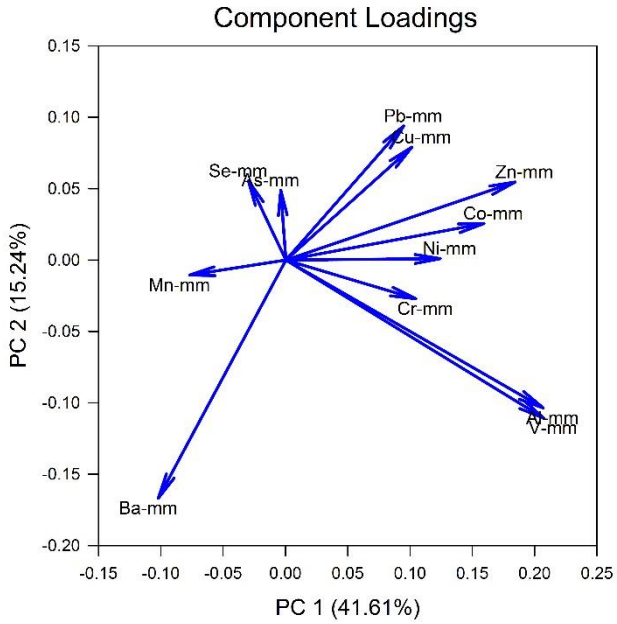
dev = developed; cul = cultivated; for = forested; wet = lake and wetlands; DNT = do not test.

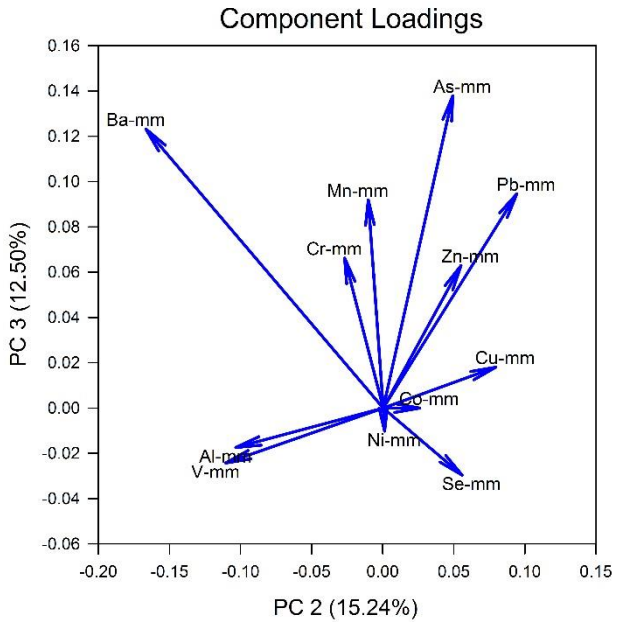
§ Dunn's method was used for these pairwise multiple comparisons.

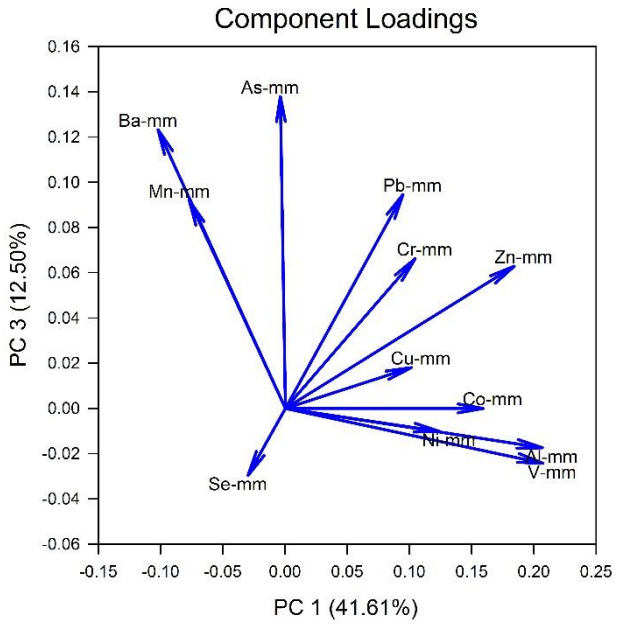
‡ The Holm-Sidak method was used for these pairwise multiple comparisons.

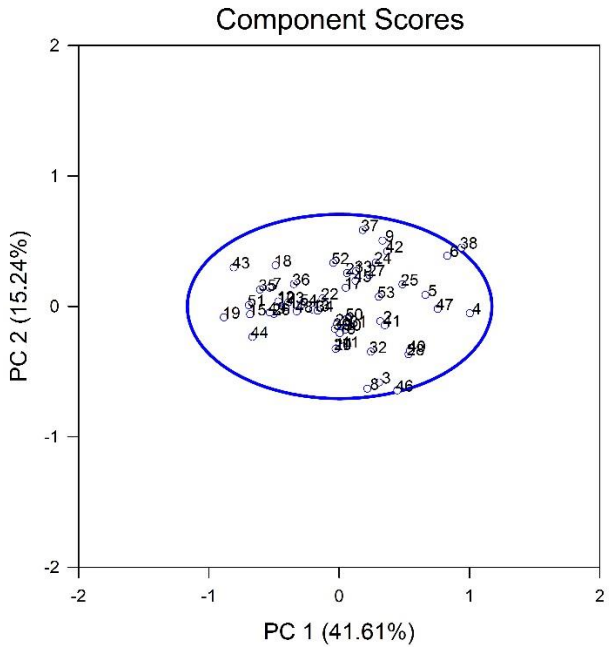
Supporting Information for Principal Components Analysis of 12 Raw Metals

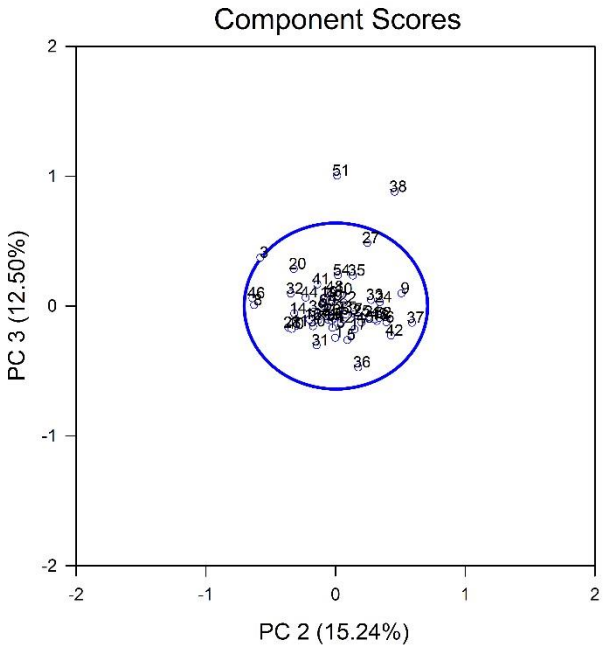


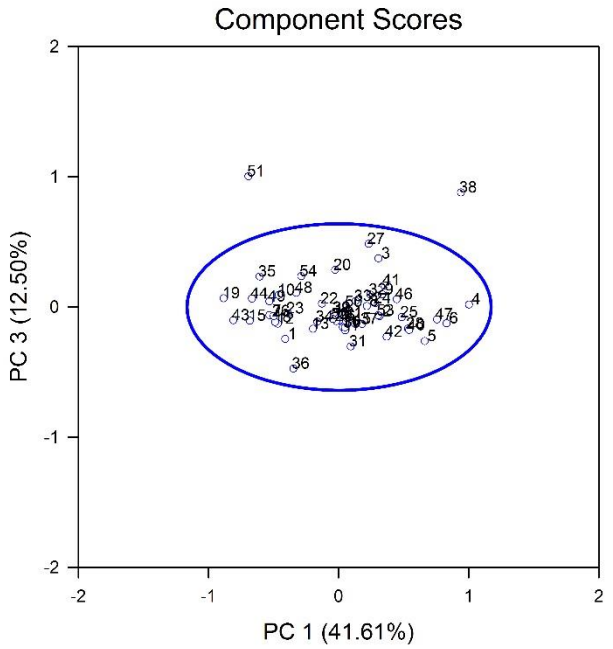












The data point numbers correspond to the lake ID numbers (e.g., #38 corresponds to Snail Lake).

Eigenvectors of the Covariance Matrix:

	PC 1	PC 2	PC 3
Al-mm	0.454	-0.376	-0.0697
As-mm	-0.00889	0.178	0.553
Ba-mm	-0.225	-0.606	0.494
Cr-mm	0.229	-0.0986	0.266
Co-mm	0.349	0.0928	0.0000397
Cu-mm	0.222	0.287	0.0724
Pb-mm	0.208	0.341	0.380
Mn-mm	-0.170	-0.0382	0.369
Ni-mm	0.272	0.00376	-0.0409
Zn-mm	0.404	0.198	0.252
Se-mm	-0.0659	0.201	-0.119
V-mm	0.454	-0.402	-0.0974

Each principal component is a linear combination of the original variables, after each original variable has been centered about its mean. The coefficients of this linear combination are the entries in the corresponding column of the above table. These coefficients provide the interpretation of the principal components in terms of the original variables.

Percentage of Variance Explained by the In-Model Components:

	PC 1	PC 2	PC 3	Unexplained Variance
Al-mm	73.095	18.429	0.519	7.957
As-mm	0.0529	7.747	61.610	30.590
Ba-mm	16.965	45.159	24.662	13.214
Cr-mm	39.654	2.688	16.003	41.655
Co-mm	59.741	1.547	0.000000231	38.712
Cu-mm	31.435	19.267	1.005	48.292
Pb-mm	23.153	22.853	23.228	30.766
Mn-mm	23.038	0.428	32.736	43.798
Ni-mm	55.811	0.00389	0.378	43.806
Zn-mm	67.472	5.959	7.907	18.661
Se-mm	2.460	8.385	2.389	86.765
V-mm	64.725	18.545	0.892	15.838

Component Scores:

The significance level is 0.050. Significant P-values are flagged.

ID	PC 1	PC 2	PC 3	T-square	P
1	-0.415	-0.00634	-0.245	1.799	0.633
2	0.312	-0.114	-0.0698	0.719	0.875
3	0.302	-0.583	0.374	7.178	0.0881
4	0.997	-0.0528	0.0200	4.847	0.212
5	0.657	0.0882	-0.262	3.293	0.376
6	0.825	0.389	-0.125	5.541	0.163
7	-0.536	0.143	-0.0627	1.723	0.649
8	0.213	-0.630	0.00744	5.464	0.168

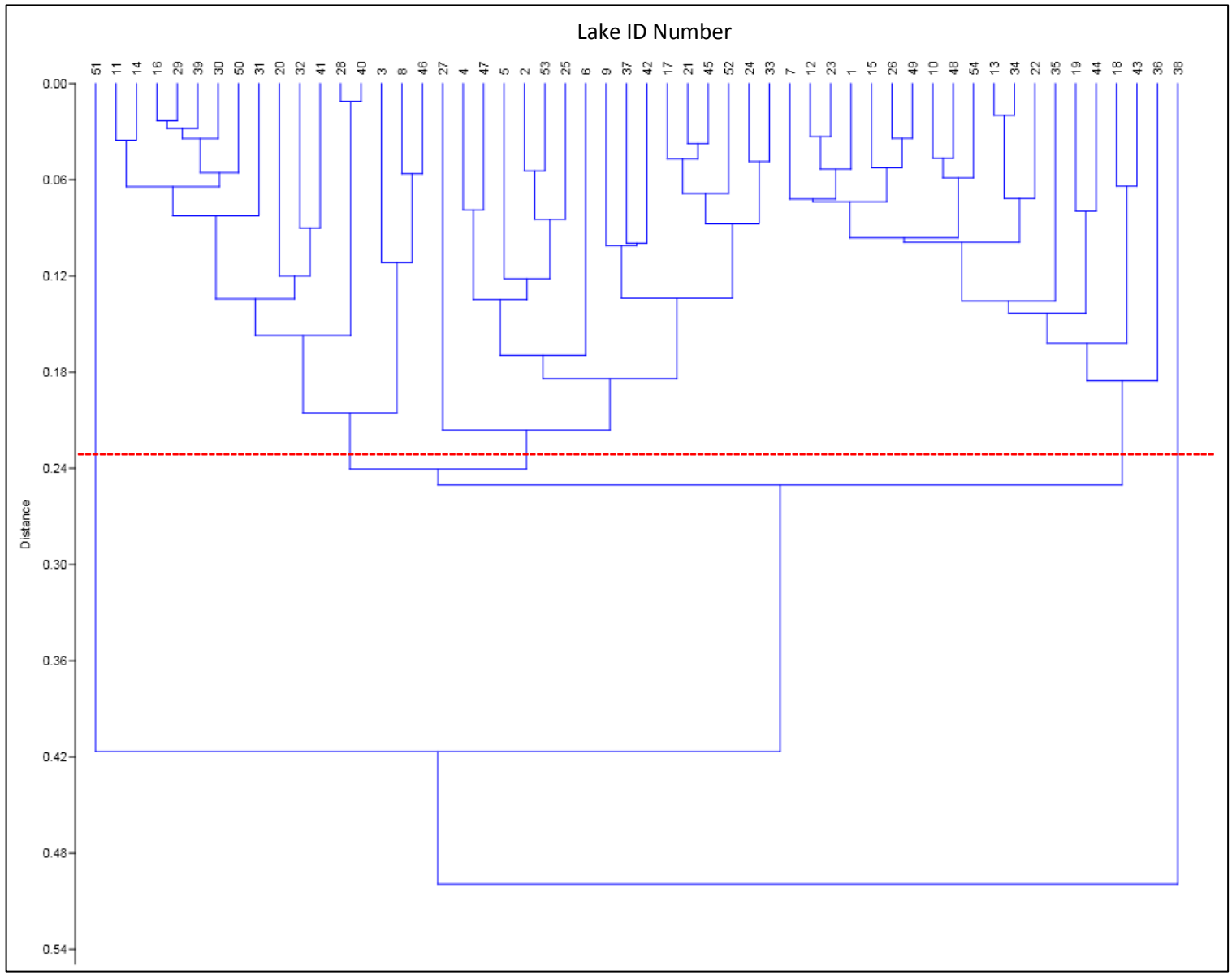
Component Scores (continued):

ID	PC 1	PC 2	PC 3	T-square	P
9	0.329	0.506	0.0977	4.048	0.285
10	-0.464	0.0321	0.0926	1.193	0.766
11	0.0287	-0.309	-0.155	1.646	0.665
12	-0.470	0.0385	-0.128	1.354	0.729
13	-0.201	-0.0276	-0.168	0.659	0.888
14	-0.0268	-0.322	-0.0574	1.424	0.714
15	-0.687	-0.0601	-0.105	2.505	0.498
16	-0.000341	-0.205	-0.103	0.729	0.872
17	0.0470	0.143	-0.179	0.796	0.857
18	-0.491	0.315	-0.116	2.697	0.465
19	-0.887	-0.0838	0.0673	3.971	0.293
20	-0.0314	-0.325	0.286	2.720	0.461
21	0.0573	0.257	-0.0839	0.998	0.811
22	-0.133	0.0613	0.0270	0.146	0.986
23	-0.394	0.0323	-0.0486	0.801	0.856
24	0.277	0.338	0.0304	1.895	0.613
25	0.481	0.170	-0.0783	1.602	0.675
26	-0.504	-0.0575	-0.0696	1.350	0.730
27	0.227	0.242	0.486	4.817	0.214
28	0.528	-0.367	-0.167	3.568	0.340
29	-0.0211	-0.137	-0.108	0.439	0.935
30	0.0445	-0.177	-0.157	0.818	0.852
31	0.0892	-0.150	-0.303	1.812	0.630
32	0.240	-0.348	0.0957	2.022	0.587
33	0.126	0.271	0.0467	1.082	0.791
34	-0.168	-0.0327	-0.112	0.354	0.952
35	-0.611	0.130	0.235	2.917	0.430
36	-0.351	0.171	-0.473	4.579	0.234
37	0.177	0.586	-0.130	4.961	0.203
38	0.936	0.452	0.880	19.398	0.00110 <
39	-0.0373	-0.171	-0.0435	0.423	0.938
40	0.538	-0.341	-0.177	3.436	0.357
41	0.346	-0.144	0.167	1.303	0.741
42	0.365	0.423	-0.228	3.844	0.307
43	-0.812	0.300	-0.102	4.545	0.237
44	-0.670	-0.234	0.0651	2.961	0.424
45	0.122	0.198	-0.128	0.850	0.845
46	0.442	-0.644	0.0604	6.477	0.115
47	0.751	-0.0192	-0.0959	2.881	0.436
48	-0.329	-0.0381	0.109	0.736	0.871
49	-0.536	-0.0470	0.0444	1.450	0.708
50	0.0565	-0.0947	0.00318	0.134	0.988
51	-0.696	0.00970	1.004	18.577	0.00146 <
52	-0.0502	0.334	-0.0927	1.621	0.671
53	0.301	0.0751	-0.0643	0.578	0.906
54	-0.292	0.0160	0.237	1.320	0.737

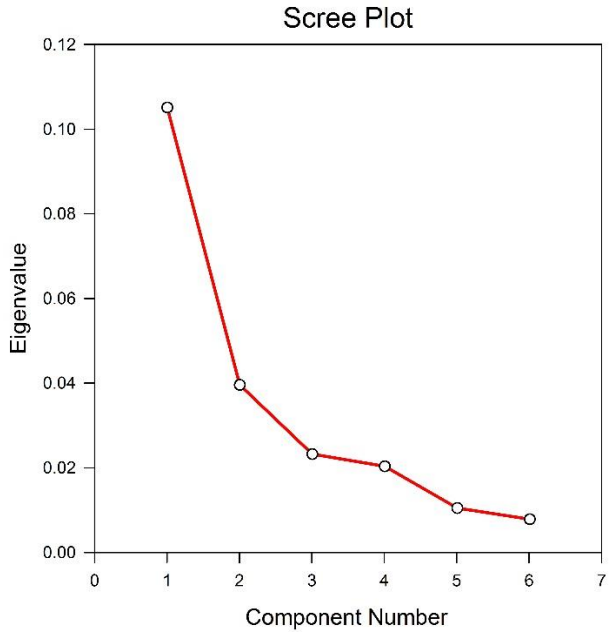
A significant P-value indicates that the corresponding observation is a possible outlier.

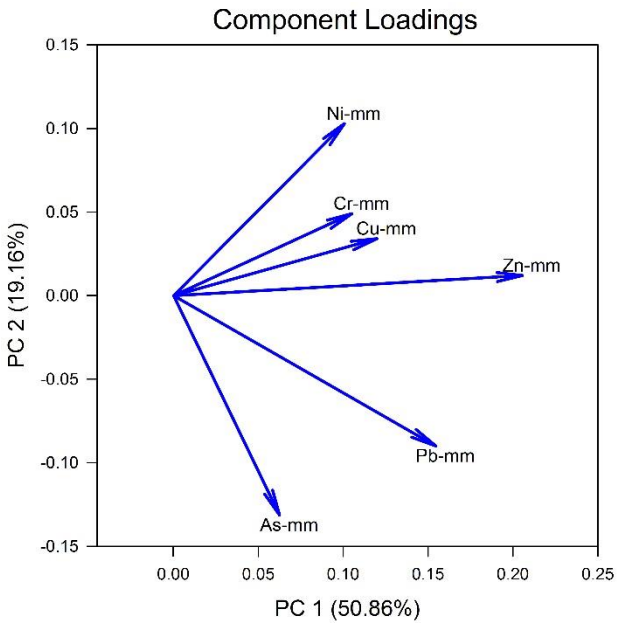
The above PC1, PC2, and PC3 component scores were used in the hierarchical cluster analysis of these data.

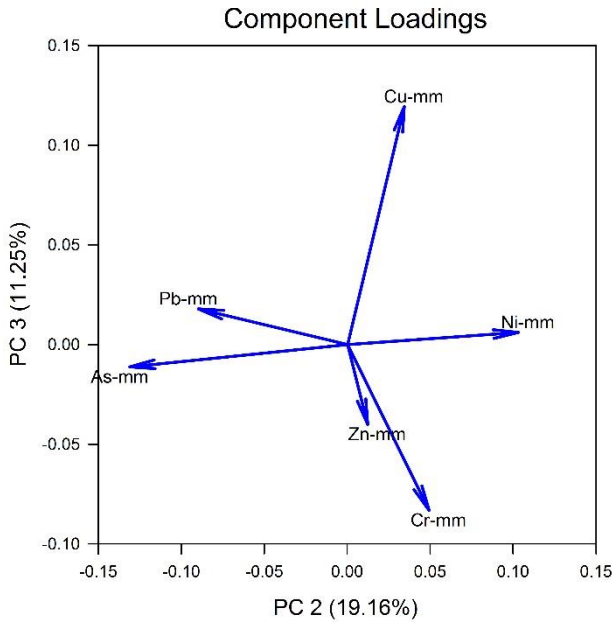
HCA plot of the PCA Component Scores for 12 metals that had been range transformed. The HCA was set-up with the paired group (UPGMA) algorithm and the Gower similarity index. Five groups of data were considered at a distance of ~0.23.

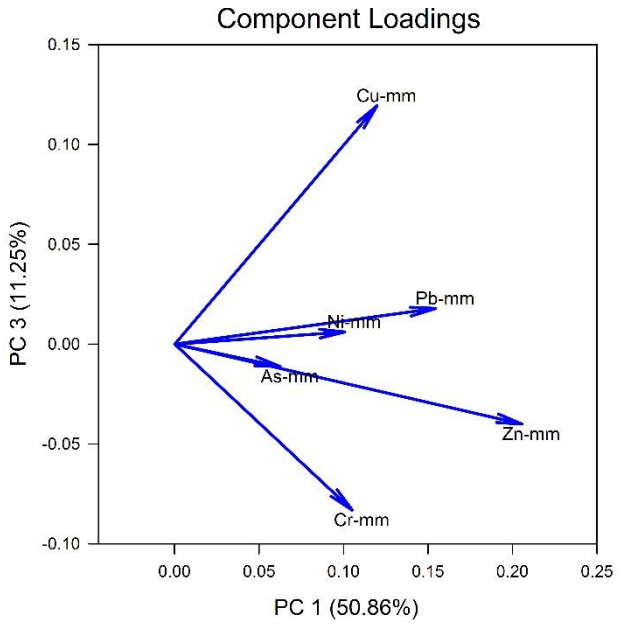


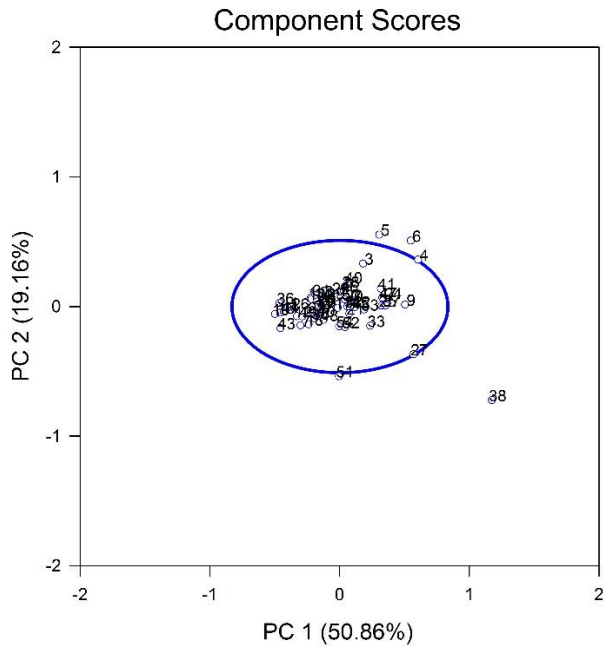
Supporting Information for Principal Components Analysis of Six Raw Metals

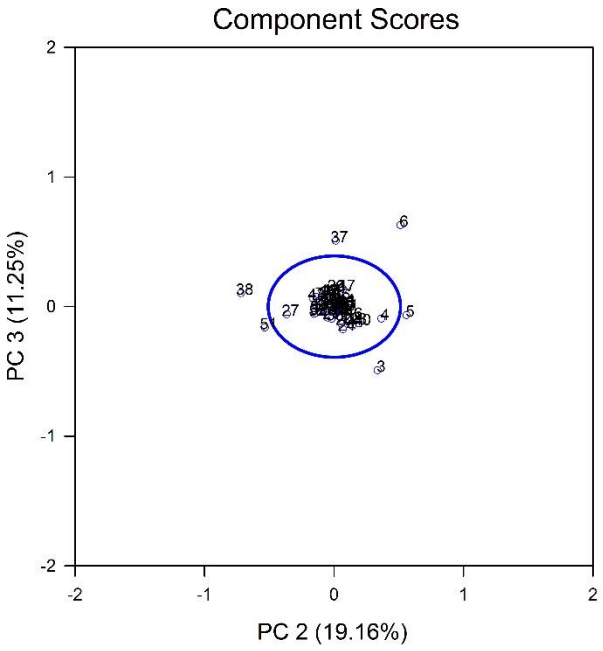


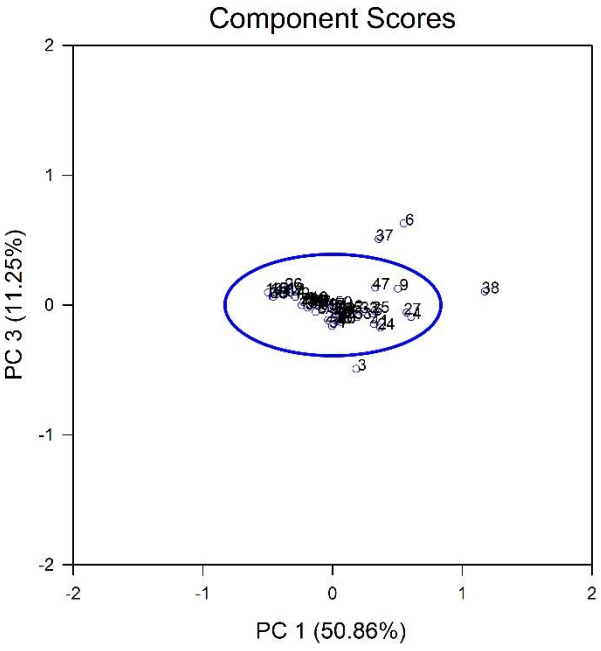












The data point numbers correspond to the lake ID numbers (e.g., #38 corresponds to Snail Lake).

Eigenvectors of the Covariance Matrix:

	PC 1	PC 2	PC 3
As-mm	0.192	-0.659	-0.0736
Cr-mm	0.324	0.246	-0.545
Cu-mm	0.369	0.171	0.783
Pb-mm	0.476	-0.452	0.117
Ni-mm	0.310	0.517	0.0397
Zn-mm	0.633	0.0608	-0.263

Each principal component is a linear combination of the original variables, after each original variable has been centered about its mean. The coefficients of this linear combination are the entries in the corresponding column of the above table. These coefficients provide the interpretation of the principal components in terms of the original variables.

Percentage of Variance Explained by the In-Model Components:

	PC 1	PC 2	PC 3	Unexplained Variance
As-mm	12.556	55.777	0.408	31.260
Cr-mm	40.162	8.774	25.222	25.842
Cu-mm	44.070	3.588	43.941	8.401
Pb-mm	61.725	20.976	0.828	16.471
Ni-mm	36.755	38.575	0.133	24.536
Zn-mm	84.129	0.292	3.203	12.376

Component Scores:

The significance level is 0.050. Significant P-values are flagged.

ID	PC 1	PC 2	PC 3	T-square	P
1	-0.402	-0.00926	0.0871	1.869	0.618
2	0.0840	0.0542	-0.0877	0.473	0.928
3	0.179	0.332	-0.492	13.499	0.00856 <
4	0.603	0.362	-0.0929	7.145	0.0892
5	0.302	0.555	-0.0661	8.830	0.0474 <
6	0.545	0.509	0.629	26.426	0.000114 <
7	-0.305	-0.145	0.0757	1.658	0.662
8	-0.133	0.0809	-0.0540	0.459	0.931
9	0.502	0.0157	0.126	3.087	0.405
10	-0.153	-0.0734	0.0305	0.398	0.943
11	-0.224	0.0730	0.0104	0.616	0.897
12	-0.332	-0.0750	0.0961	1.588	0.678
13	-0.221	0.0597	0.00907	0.559	0.910
14	-0.180	0.0613	0.0234	0.427	0.937
15	-0.460	-0.0479	0.0984	2.491	0.500
16	-0.150	0.0220	-0.00149	0.227	0.974
17	-0.0191	-0.00903	-0.0183	0.0199	0.999
18	-0.242	-0.137	-0.000894	1.033	0.803
19	-0.501	-0.0574	0.0960	2.872	0.437
20	0.0637	0.0496	-0.129	0.817	0.852
21	0.0721	-0.0535	-0.0854	0.435	0.936

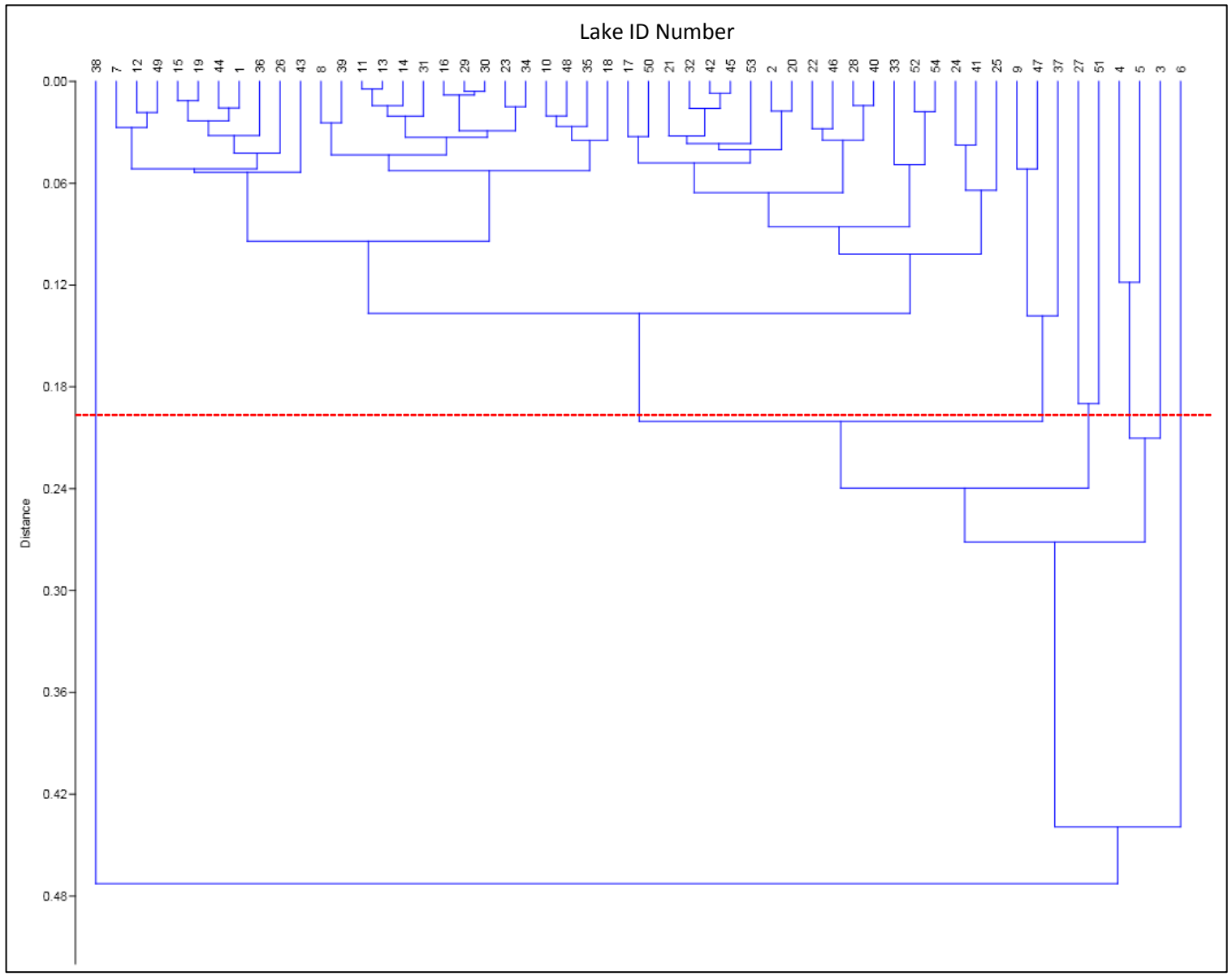
Component Scores (continued):

ID	PC 1	PC 2	PC 3	T-square	P
22	-0.0387	0.105	-0.116	0.877	0.839
23	-0.226	-0.0464	0.0223	0.562	0.909
24	0.365	0.0653	-0.176	2.707	0.464
25	0.321	0.00737	-0.0461	1.075	0.793
26	-0.351	-0.0149	0.134	1.951	0.602
27	0.567	-0.368	-0.0584	6.631	0.108
28	0.0381	0.155	-0.126	1.299	0.742
29	-0.142	0.00578	0.00552	0.194	0.979
30	-0.163	0.0102	0.00710	0.259	0.969
31	-0.189	0.0905	-0.0147	0.557	0.910
32	0.0572	0.00201	-0.0530	0.152	0.986
33	0.233	-0.148	-0.0503	1.183	0.768
34	-0.177	-0.0295	0.0248	0.348	0.953
35	-0.196	-0.0913	-0.0215	0.595	0.902
36	-0.466	0.0284	0.0665	2.281	0.538
37	0.353	0.0103	0.508	12.290	0.0132 <
38	1.171	-0.722	0.104	26.663	0.000106 <
39	-0.0790	0.0645	-0.0225	0.186	0.981
40	0.0601	0.188	-0.130	1.660	0.662
41	0.315	0.139	-0.148	2.369	0.522
42	0.120	0.00118	-0.0372	0.196	0.979
43	-0.459	-0.167	0.0647	2.885	0.435
44	-0.433	-0.0415	0.0835	2.127	0.567
45	0.111	-0.00636	-0.0482	0.219	0.976
46	0.0281	0.122	-0.0818	0.670	0.886
47	0.326	0.0686	0.135	1.911	0.610
48	-0.128	-0.103	0.00461	0.424	0.938
49	-0.291	-0.0761	0.0629	1.124	0.782
50	0.0371	0.0568	-0.00445	0.0954	0.993
51	-0.00817	-0.538	-0.162	8.442	0.0548
52	0.0384	-0.159	-0.0560	0.786	0.859
53	0.186	-0.0225	-0.0937	0.720	0.874
54	-0.00721	-0.153	-0.0318	0.633	0.894

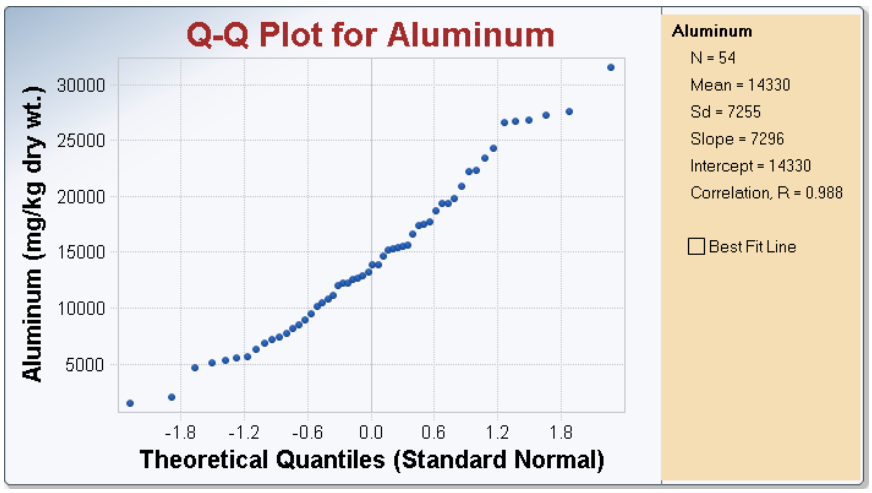
A significant P-value indicates that the corresponding observation is a possible outlier.

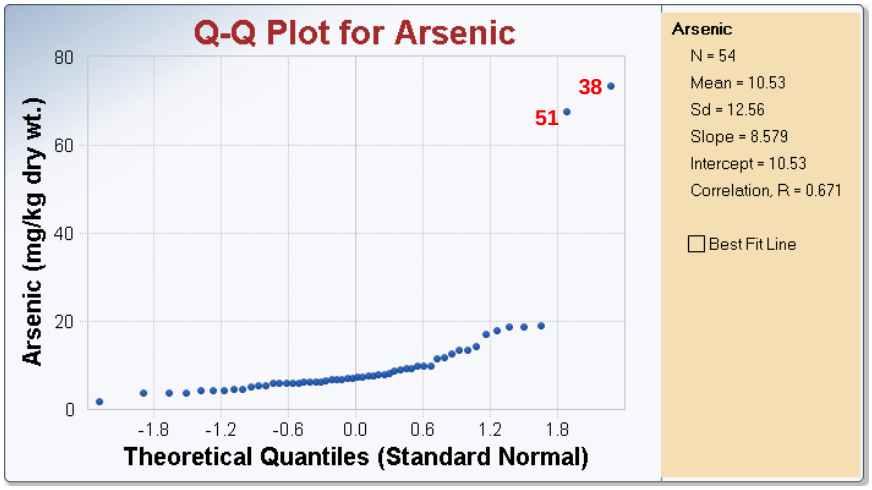
The above PC1, PC2, and PC3 component scores were used in the hierarchical cluster analysis of these data.

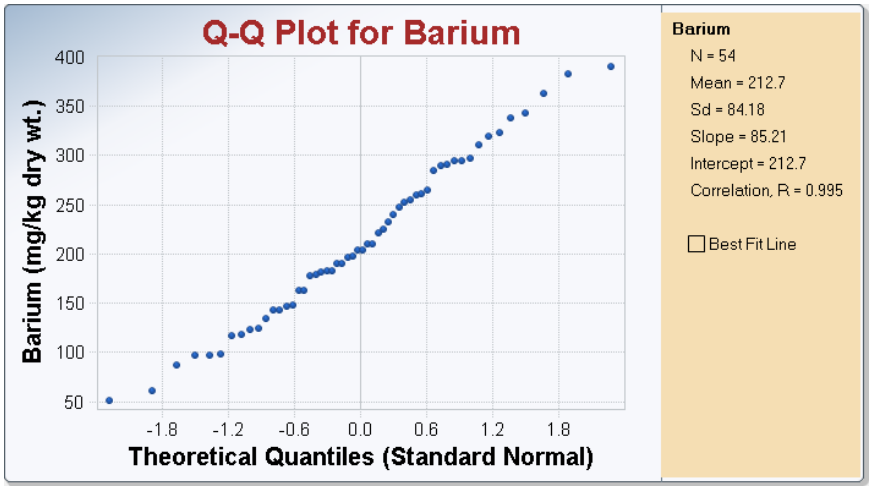
HCA plot of the PCA Component Scores for six metals that had been range transformed. The HCA was set-up with the paired group (UPGMA) algorithm and the Gower similarity index. Seven groups of data were considered at a distance of ~0.19.

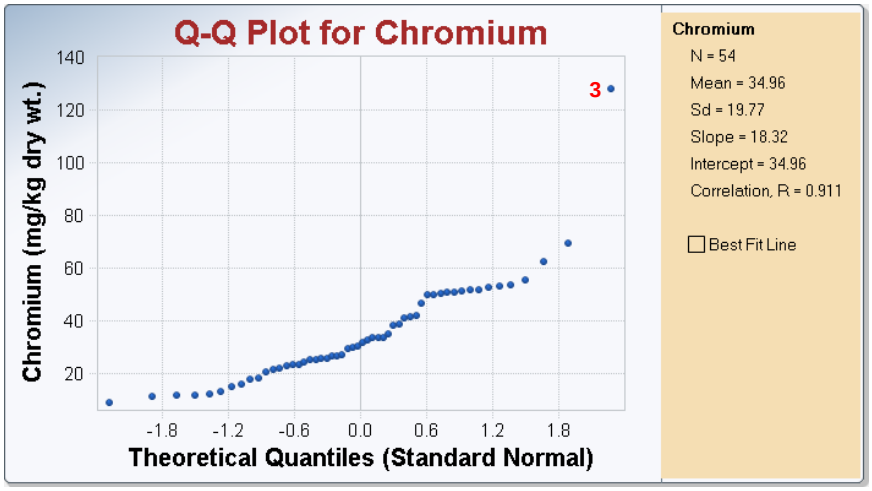


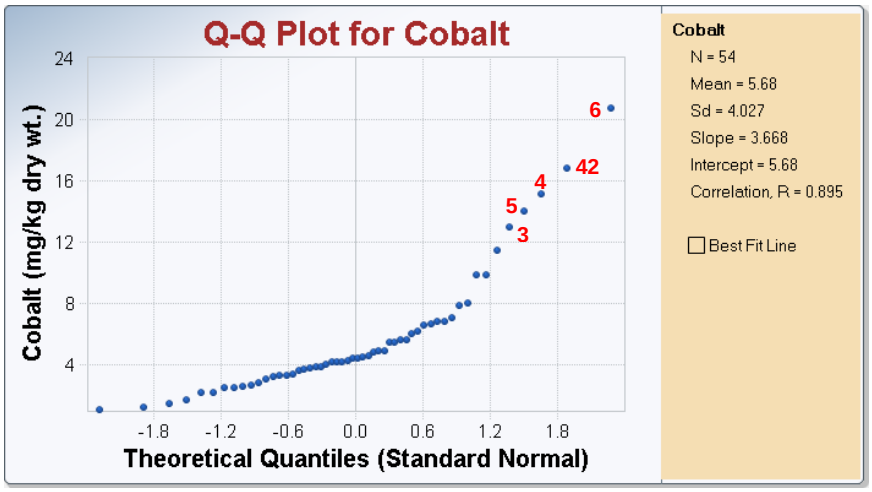
Q-Q Plots for Detected Metals and Metalloids (samples noted in red font are significant at the 5% significance level)

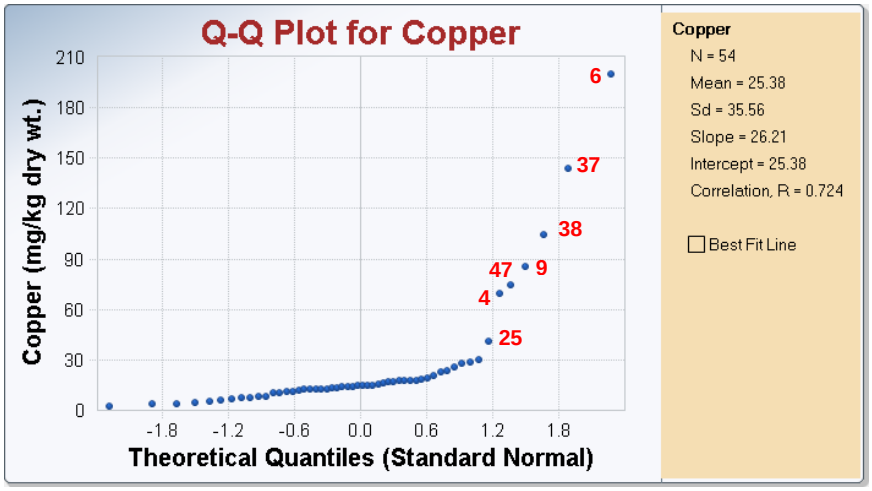


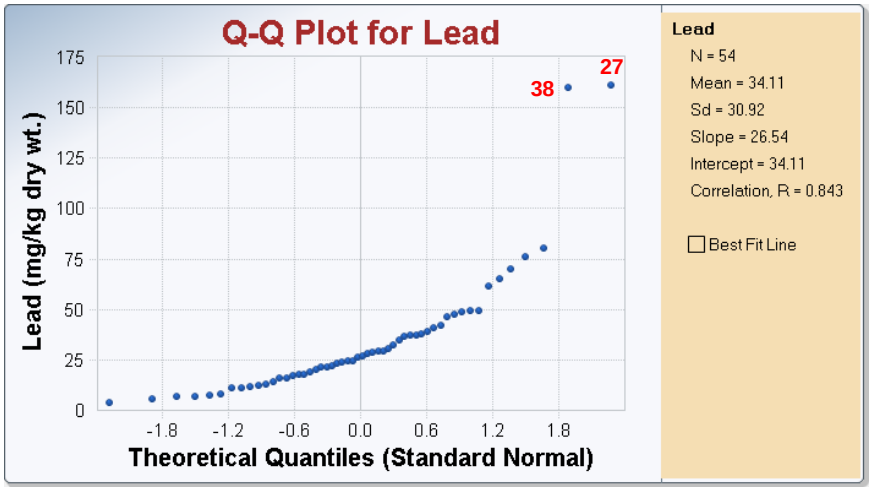


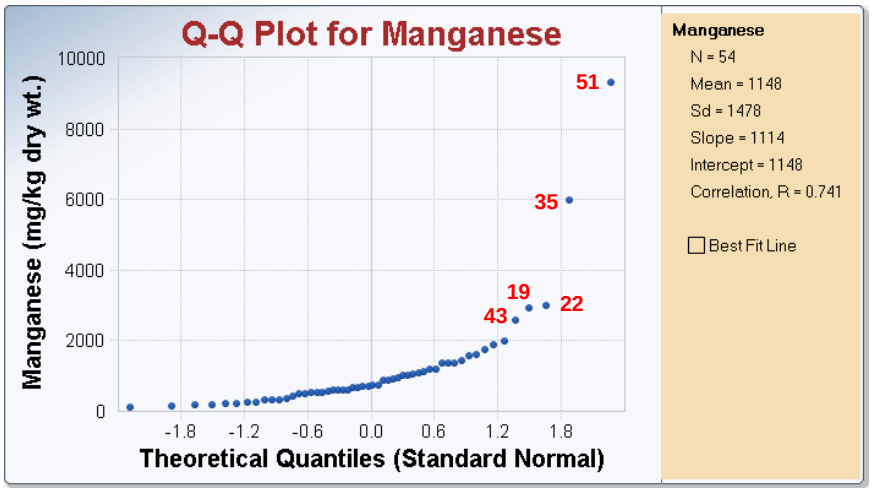


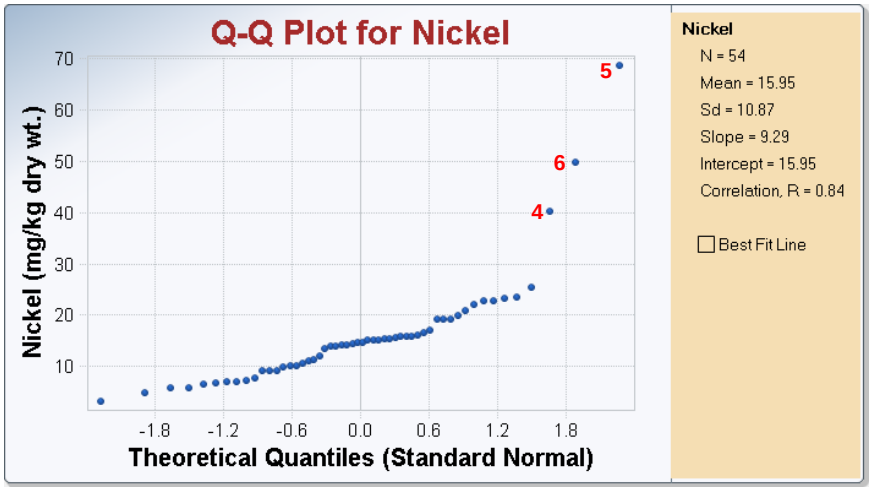

Q-Q Plot for Chromium
Chromium (mg/kg dry wt.)
140
120
100
80
60
40
20
3
-1.8
-1.2
-0.6
0.0
0.6
1.2
1.8
Theoretical Quantiles (Standard Normal)
Chromium
N = 54
Mean = 34.96
Sd = 19.77
Slope = 18.32
Intercept = 34.96
Correlation, R = 0.911
Best Fit Line

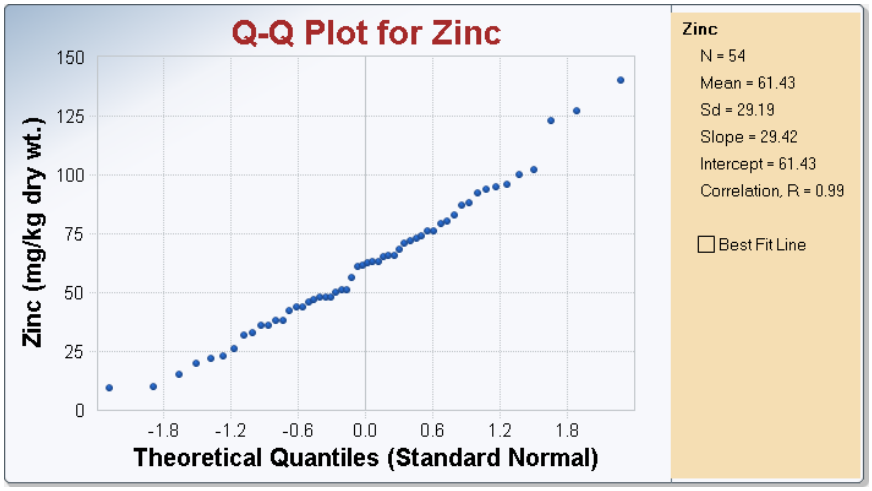

Q-Q Plot for Cobalt
Cobalt (mg/kg dry wt.)
24
20
16
12
8
4
6
42
4
5
3
-1.8
-1.2
-0.6
0.0
0.6
1.2
1.8
Theoretical Quantiles (Standard Normal)
Cobalt
N = 54
Mean = 5.68
Sd = 4.027
Slope = 3.668
Intercept = 5.68
Correlation, R = 0.895
Best Fit Line


Q-Q Plot for Copper
Copper (mg/kg dry wt.)
210
180
150
120
90
60
30
0
6
37
38
47
9
4
25
-1.8
-1.2
-0.6
0.0
0.6
1.2
1.8
Theoretical Quantiles (Standard Normal)
Copper
N = 54
Mean = 25.38
Sd = 35.56
Slope = 26.21
Intercept = 25.38
Correlation, R = 0.724
Best Fit Line

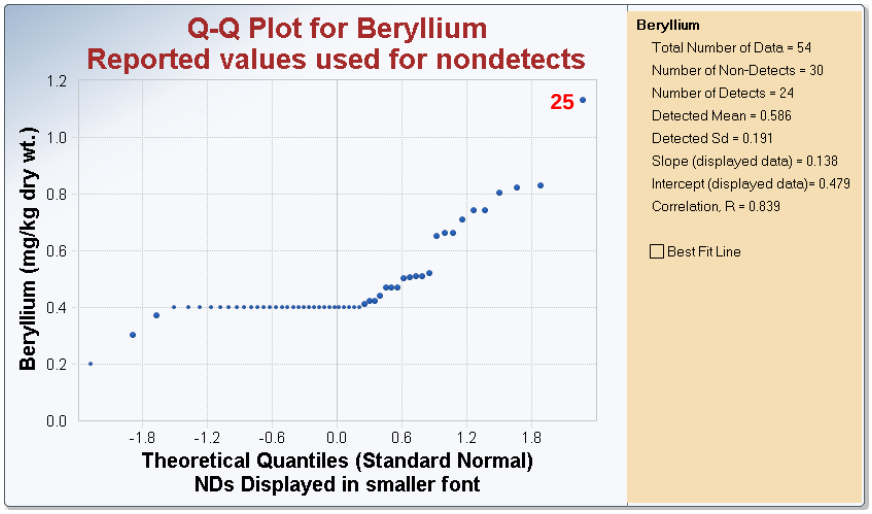

Q-Q Plot for Lead
Lead (mg/kg dry wt.)
175
150
125
100
75
50
25
0
27
38
-1.8
-1.2
-0.6
0.0
0.6
1.2
1.8
Theoretical Quantiles (Standard Normal)
Lead
N = 54
Mean = 34.11
Sd = 30.92
Slope = 26.54
Intercept = 34.11
Correlation, R = 0.843
Best Fit Line

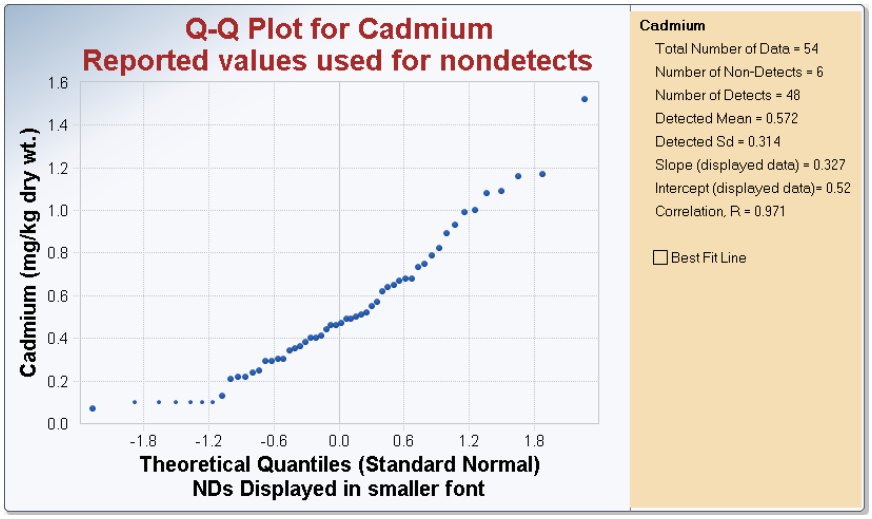

Q-Q Plot for Manganese
Manganese (mg/kg dry wt.)
10000
8000
6000
4000
2000
0
51
35
19
22
43
-1.8
-1.2
-0.6
0.0
0.6
1.2
1.8
Theoretical Quantiles (Standard Normal)
Manganese
N = 54
Mean = 1148
Sd = 1478
Slope = 1114
Intercept = 1148
Correlation, R = 0.741
Best Fit Line

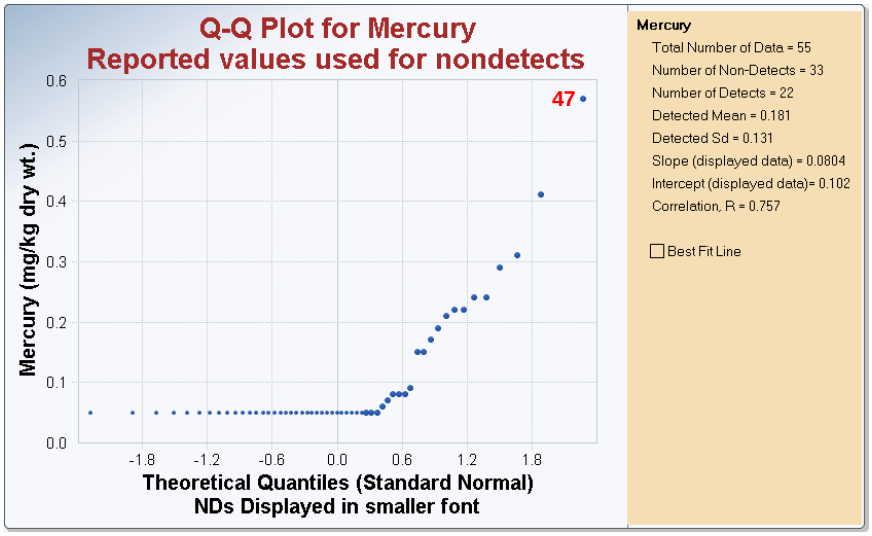

Q-Q Plot for Nickel
Nickel (mg/kg dry wt.)
70
60
50
40
30
20
10
5
6
4
-1.8
-1.2
-0.6
0.0
0.6
1.2
1.8
Theoretical Quantiles (Standard Normal)
Nickel
N = 54
Mean = 15.95
Sd = 10.87
Slope = 9.29
Intercept = 15.95
Correlation, R = 0.84
Best Fit Line

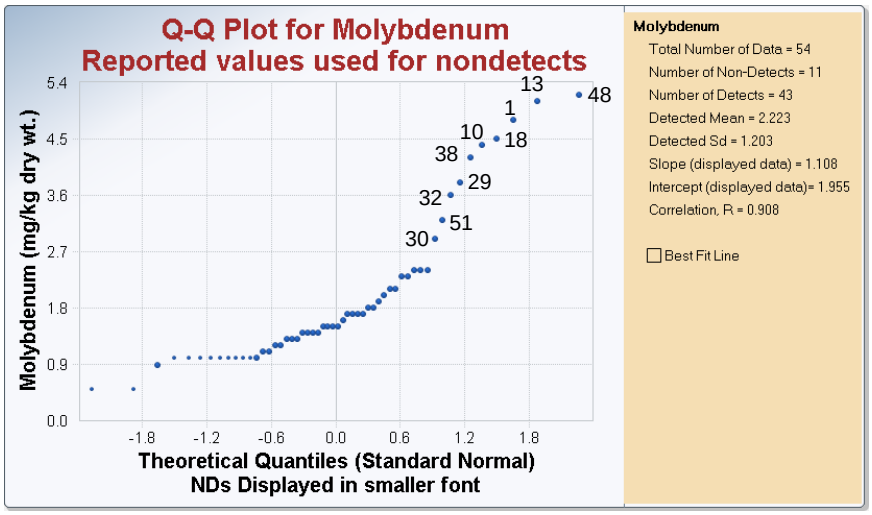


Q-Q Plots for Censored Metals and Metalloids (samples noted in red font are significant at the 5% significance level)

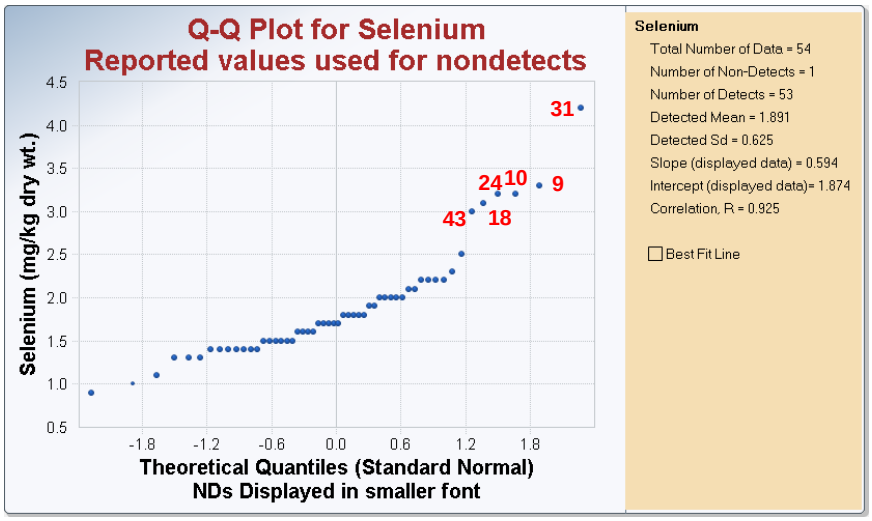


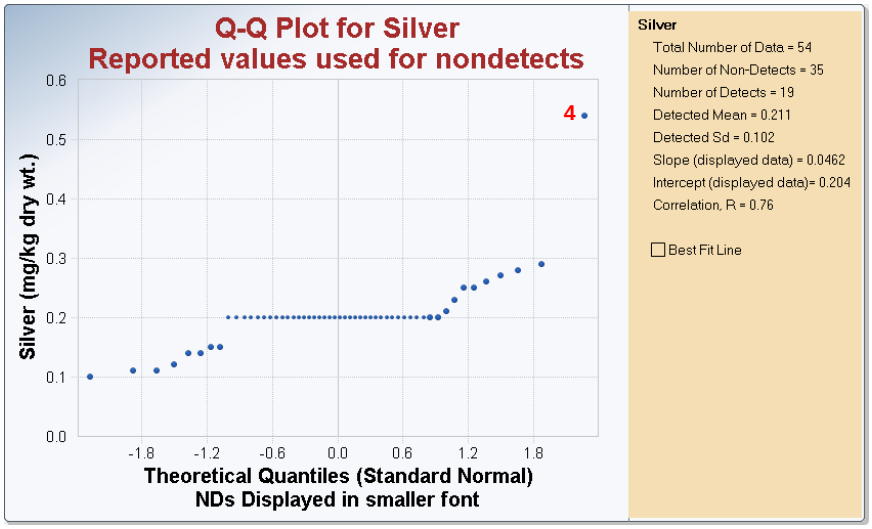


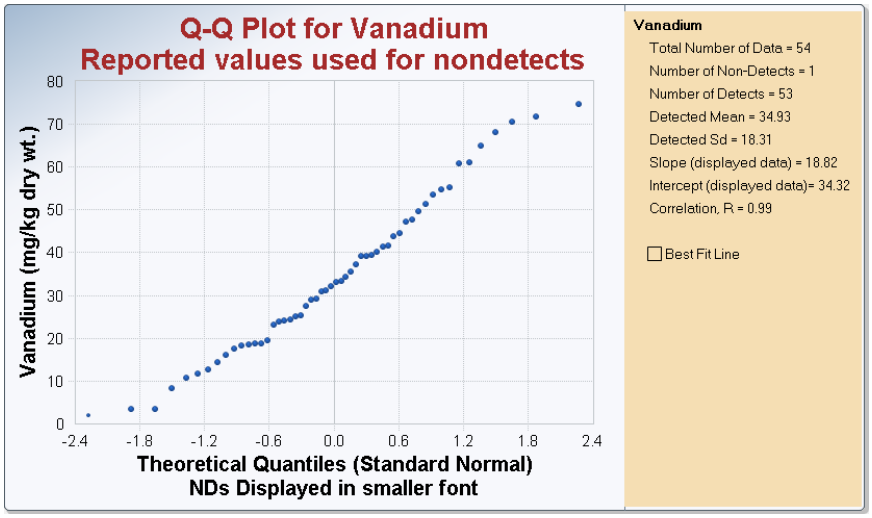




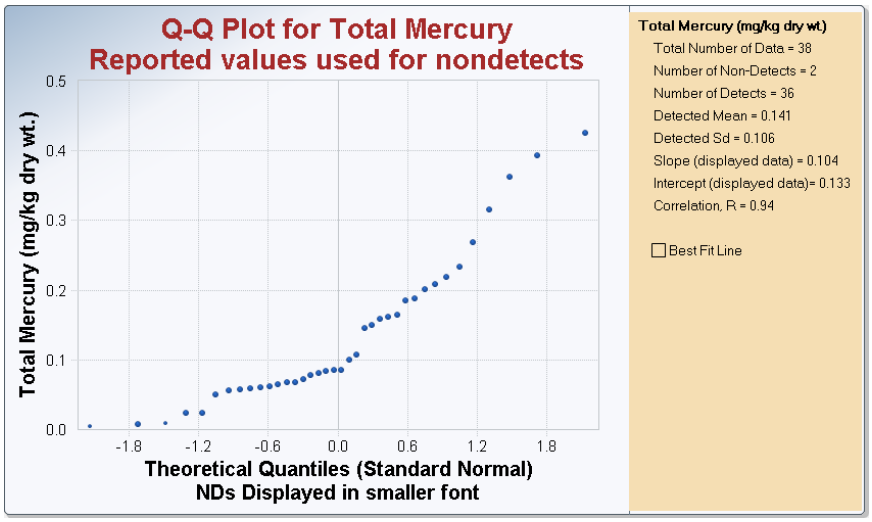
Noted values for molybdenum are not statistical outliers, but appeared to form a separate population of data.

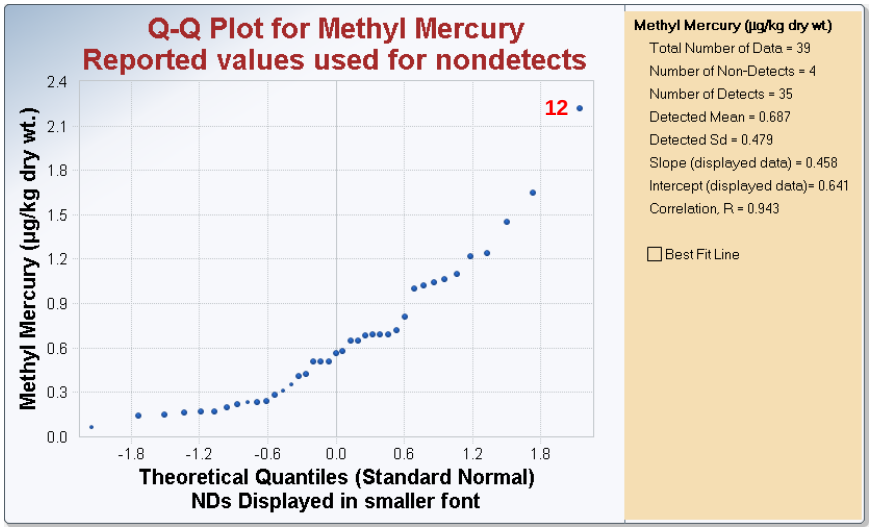



Q-Q Plot for Silver
Reported values used for nondetects
Silver (mg/kg dry wt.)
0.6
0.5
0.4
0.3
0.2
0.1
0.0
4
-1.8
-1.2
-0.6
0.0
0.6
1.2
1.8
Theoretical Quantiles (Standard Normal)
NDs Displayed in smaller font
Silver
Total Number of Data = 54
Number of Non-Detects = 35
Number of Detects = 19
Detected Mean = 0.211
Detected Sd = 0.102
Slope (displayed data) = 0.0462
Intercept (displayed data)= 0.204
Correlation, R = 0.76
Best Fit Line


Q-Q Plot for Vanadium
Reported values used for nondetects
Vanadium (mg/kg dry wt.)
80
70
60
50
40
30
20
10
0
-2.4
-1.8
-1.2
-0.6
0.0
0.6
1.2
1.8
2.4
Theoretical Quantiles (Standard Normal)
NDs Displayed in smaller font
Vanadium
Total Number of Data = 54
Number of Non-Detects = 1
Number of Detects = 53
Detected Mean = 34.93
Detected Sd = 18.31
Slope (displayed data) = 18.82
Intercept (displayed data)= 34.32
Correlation, R = 0.99
Best Fit Line

Q-Q Plots for Censored Forms of Mercury Analyzed in the Upper 1 cm of Sediment Samples (samples noted in red font are significant at the 5% significance level)





Appendix F

PAHs

Table F-1. Total PAH Groups Based on Either Measured Values or Estimated Values (Kaplan-Meier Method)

Site ID	Lake	Station ID	∑PAH$_{13}$ (mg/kg dry wt.)	∑PAH$_{17}$ (mg/kg dry wt.)	∑PAH$_{34}$ (mg/kg dry wt.)
1	Allen[1,2,3]	440157CS07	0.085	0.094	0.204
2	Alruss[3]	690005CS07	0.383	0.445	0.921
3	Arthur[3]	690154CS07	0.194	0.226	1.890
4	Aspen[3]	160204CS07	0.294	0.411	2.119
5	August[3]	380691CS07	0.245	0.298	1.453
6	Becoosin[3]	380472CS07	0.297	0.379	1.558
7	Cass[3]	040030CS07	0.232	0.291	0.669
8	Cokato[3]	860263CS07	0.156	0.222	0.854
9	Crow Wing[3]	180155CS07	0.432	0.582	1.408
10	Darling[3]	210080CS07	0.430	0.567	1.368
11	Eagle (North)[3]	070060CS07	0.247	0.280	1.031
12	Fairy[3]	560356CS07	0.289	0.309	0.623
13	Fanny[3]	210336CS07	0.275	0.303	0.642
14	Fish[3]	700069CS07	0.329	0.455	1.443
15	Flat[3]	030242CS07	0.276	0.298	0.557
16	Jennie[3]	470015CS07	0.454	0.525	1.687
17	Lamb[3]	690341CS07	0.201	0.262	0.973
18	Long[3]	110480CS07	0.550	0.659	1.215
19	Long[3]	860069CS07	0.116	0.137	0.375
20	Long (Main Bay)[3]	310266CS07	0.405	0.485	1.713
21	Lookout (Crocker)[3]	180123CS07	0.531	0.612	1.240
22	Lost (Horseshoe)[3]	690611CS07	0.170	0.214	0.709
23	Maine (Round)[3]	560476CS07	0.316	0.369	1.264
24	Mayo[3]	180408CS07	0.801	0.934	2.625
25	Musquash[3]	160104CS07	0.358	0.491	2.121
26	Nest[3]	340154CS07	0.158	0.192	0.632
27	Nokomis	270019CS07	7.096	8.915	12.431
28	North Ash[3]	410055CS07	0.138	0.161	0.334
29	North Mayfield[3]	140029CS07	0.191	0.212	0.498
30	Norway[3]	340251CS07	0.220	0.267	0.984
31	Okamanpeedan	460051CS07	0.275	0.305	1.444
32	Pebble[3]	560829CS07	1.094	1.581	3.252
33	Pelican[3]	180308CS07	0.559	0.679	1.262
34	Pickerel[3]	030287CS07	0.325	0.383	1.252
35	Pine Mountain[3]	110411CS07	0.207	0.268	0.594
36	Red Rock[1,2,3]	210297CS07	0.011	0.014	0.062
37	Richey[3]	160643CS07	0.364	0.490	1.037

Table F-1. Continued

Site ID	Lake	Station ID	∑PAH$_{13}$ (mg/kg dry wt.)	∑PAH$_{17}$ (mg/kg dry wt.)	∑PAH$_{34}$ (mg/kg dry wt.)
38	Snail[3]	620073CS07	2.492	3.334	4.986
39	South[3]	430014CS07	0.233	0.269	1.078
40	South Drywood[3]	760149CS07	0.364	0.383	0.727
41	Spring[3]	330027CS07	0.462	0.557	1.119
42	Spring[3]	690129CS07	0.469	0.562	1.759
43	Straight[1,2,3]	030010CS07	0.066	0.086	0.190
44	Unnamed[3]	600307CS07	0.075	0.082	0.168
45	Upper Hatch[3]	310770CS07	0.269	0.334	0.806
46	Upper Sakatah[3]	400002CS07	0.334	0.453	2.601
47	Vesper[3]	160414CS07	0.700	0.991	1.960
48	Victoria[3]	210054CS07	0.337	0.471	1.110
49	West Leaf[3]	560114CS07	0.342	0.378	1.149
50	Woodcock (W. Woodcock)[3]	340141CS07	0.252	0.312	0.884
51	Elk[3]	150010CS07	0.169	0.237	0.732
52	Hungry Man[3]	030029CS07	0.237	0.281	0.516
53	Island[3]	110102CS07	0.600	0.737	1.780
54	Spring[3]	2D3008CS07	0.323	0.414	1.127

PAH = polycyclic aromatic hydrocarbon.

[1] ∑PAH$_{13}$ value determined using Kaplan-Meier method.

[2] ∑PAH$_{17}$ value determined using Kaplan-Meier method.

[3] ∑PAH$_{34}$ value determined using Kaplan-Meier method.

Table F-2. Additional Summary Statistics for Detected PAH Compounds and Total PAH Groups (n = 54)

PAHs	Minimum (µg/kg dry wt.)	Maximum (µg/kg dry wt.)	SEM (µg/kg dry wt.)	MAD/0.675 (µg/kg dry wt.)	Skewness	Kurtosis	CV
Acenaphthene	0.50	49.8	1.4	9.4	1.2	1.3	0.65
Acenaphthylene	0.20	208.0	3.8	1.7	7.1	50.9	3.2
Anthracene	0.30	226.0	4.2	4.4	6.8	48.4	2.6
Benzo[a]anthracene	0.40	556.0	10.6	10.4	6.1	40.8	2.5
Benzo[a]pyrene	1.0	669.0	13.1	9.6	5.8	37.1	2.8
Benzo[b]fluoranthene	1.2	1070.0	20.6	19.3	6.1	40.5	2.8
Benzo[g,h,i]perylene	0.50	271.0	5.4	11.3	5.2	31.4	1.8
Benzo[k]fluoranthene	0.60	471.0	9.7	12.3	5.2	29.4	2.2
Benzo[e]pyrene	0.70	577.0	11.1	18.6	5.8	36.8	2.1
C1-Fluorenes	0.70	72.9	2.2	15.3	0.89	0.75	0.61
C1-Fluoranthenes/Pyrenes	0.90	675.0	12.7	16.9	6.2	41.1	2.1
C1-Naphthalenes	0.60	41.2	0.92	4.3	2.5	9.0	0.66
C1-Phenanthrenes/Anthracenes	0.90	369.0	7.1	17.8	5.4	33.1	1.4
C2-Naphthalenes	1.7	211.0	6.8	20.5	2.1	3.9	1.0
C3-Naphthalenes	1.0	52.0	1.2	5.0	2.1	6.8	0.56
Chrysene	0.60	911.0	17.5	21.4	6.0	38.6	2.2
Fluoranthene	1.8	2030.0	38.4	32.0	6.3	42.6	2.6
Fluorene	1.6	149.0	4.1	19.4	2.0	4.2	0.74
Indeno[1,2,3-cd]pyrene	0.50	123.0	2.9	12.2	3.2	12.4	1.1
1-Methylnaphthalene	0.30	21.8	0.48	2.4	2.5	9.1	0.68
2-Methylnaphthalene	0.50	39.4	0.89	4.6	2.5	8.9	0.66
2,6-Dimethylnaphthalene	0.50	328.0	10.8	30.0	2.2	4.6	1.3
1-Methylphenanthrene	0.30	81.6	1.8	4.1	3.9	19.0	1.3
1,6,7-Trimethylnaphthalene	0.10	6.7	0.19	0.74	2.0	4.2	0.89
Naphthalene	0.80	71.0	1.5	9.0	2.4	9.1	0.69
Perylene	5.1	1640.0	49.2	190.6	2.3	5.3	1.3
Phenanthrene	1.7	716.0	14.0	35.1	5.1	30.3	1.5

Table F-2. Continued

PAHs	Minimum (µg/kg dry wt.)	Maximum (µg/kg dry wt.)	SEM (µg/kg dry wt.)	MAD/0.675 (µg/kg dry wt.)	Skewness	Kurtosis	CV
Pyrene	1.2	1390.0	26.3	21.7	6.3	42.0	2.5
$\sum PAH_{13}$	10.8	7096.0	133.4	146.0	6.1	40.8	2.0
$\sum PAH_{17}$	13.6	8915.0	169.3	172.9	6.0	39.2	2.0
$\sum PAH_{34}$	62.1	12431.0	236.6	658.5	5.1	31.1	1.2

n = number of samples; PAHs = polycyclic aromatic hydrocarbons; SEM = standard error of the mean; MAD = median absolute deviation; CV = coefficient of variation.

Table F-3. Additional Summary Statistics for Censored PAHs (n = 54)

PAHs	% NDs	Minimum ND (µg/kg dry wt.)	Maximum ND (µg/kg dry wt.)	KM Variance* (µg/kg dry wt.)^2	KM CV*
Dibenzo[a,h]anthracene	5.6	<0.153	<0.191	158.5	2.8
C1-Chrysenes	3.7	<0.348	<0.436	3784.0	1.1
C1-Dibenzothiophenes	3.7	<0.305	<0.305	51.8	1.0
C2-Chrysenes	22.2	<0.348	<0.79	2653.0	1.0
C2-Dibenzothiophenes	20.4	<0.305	<0.763	165.8	1.8
C2-Fluorenes	3.7	<0.386	<0.483	2049.0	0.80
C2-Phenanthrenes/Anthracenes	3.7	<0.566	<0.657	1197.0	1.1
C3-Chrysenes	46.3	<0.348	<0.79	7673.0	1.7
C3-Dibenzothiophenes	64.8	<0.305	<0.9	289.1	3.4
C3-Fluorenes	37.0	<0.386	<0.876	628.8	1.5
C3-Phenanthrenes/Anthracenes	33.3	<0.29	<0.853	996.8	1.7
C4-Chrysenes	77.8	<0.348	<0.79	443.9	2.1
C4-Naphthalenes	9.3	<0.35	<0.524	133.2	0.57
C4-Phenanthrenes/Anthracenes	77.8	<0.29	<0.853	319.7	2.6
Dibenzothiophene	1.9	<0.153	<0.153	41.8	1.4

n = number of samples; PAHs = polycyclic aromatic hydrocarbons; ND = nondetect value; KM = Kaplan-Meier; CV = coefficient of variation.

* Estimated using the Kaplan-Meier method for <80% nondetects.

Table F-4. Additional Summary Statistics for PAH ESB Toxic Units

Parameter	SEM	MAD/0.675	CV
PAH ESB Toxic Units	0.0026	0.007	1.1

PAH = polycyclic aromatic hydrocarbon; ESB = equilibrium partitioning sediment benchmark; SEM = standard error of the mean; MAD = median absolute deviation; CV = coefficient of variation.

Table F-5. Percentiles of PAH Data. Highlighted Values Include Detected Data.

PAH Compound or Group	25%ile (Q1) (µg/kg dry wt.)	50%ile (Q2) (µg/kg dry wt.)	75%ile (Q3) (µg/kg dry wt.)	95%ile (µg/kg dry wt.)	99%ile (µg/kg dry wt.)
Detected Data					
Acenaphthene	8.8	14.2	21.0	39.6	45.2
Acenaphthylene	2.9	3.6	5.8	12.1	114.8
Anthracene	4.0	7.0	9.8	16.4	132.2
Benzo[a]anthracene	9.4	12.9	24.4	75.9	352.5
Benzo[a]pyrene	7.8	13.6	21.0	90.8	443.8
Benzo[b]fluoranthene	12.1	21.5	37.9	112.0	701.1
Benzo[g,h,i]perylene	6.0	13.4	21.0	69.8	186.7
Benzo[k]fluoranthene	7.7	15.5	27.0	101.6	344.9
Benzo[e]pyrene	11.8	20.0	33.1	95.1	384.1
C1-Fluorenes	13.4	24.5	34.5	56.7	68.8
C1-Fluoranthenes/pyrenes	13.3	21.4	39.6	92.6	430.1
C1-Naphthalenes	6.1	8.9	11.9	18.9	36.2
C1-Phenanthrenes/anthracenes	16.5	24.7	38.8	74.2	256.6
C2-Naphthalenes	18.3	27.5	53.7	163.5	211.0
C3-Naphthalenes	10.7	14.3	17.3	28.1	46.5
Chrysene	18.2	33.5	47.2	121.1	608.4
Fluoranthene	33.6	51.0	81.3	180.4	1313.0
Fluorene	22.2	32.9	48.3	110.4	143.2
Indeno[1,2,3-cd]pyrene	6.3	14.1	24.2	51.5	101.5
1-Methylnaphthalene	3.3	4.3	6.5	10.2	18.5
2-Methylnaphthalene	5.7	8.9	11.8	17.3	35.2
2,6-Dimethylnaphthalene	11.1	29.1	64.6	248.7	323.2
1-Methylphenanthrene	3.1	5.0	11.4	25.8	61.0
1,6,7-Trimethylnaphthalene	0.70	1.1	2.1	4.4	6.1
Naphthalene	8.4	14.6	20.2	34.6	53.1
Perylene	62.5	168.5	339.5	1177.0	1534.0
Phenanthrene	28.3	48.7	73.4	137.7	516.7
Pyrene	24.4	35.7	65.3	157.0	894.4
$\sum PAH_{13}$	210.2	295.9	423.7	903.3	4656.0
$\sum PAH_{17}$	266.9	373.9	516.4	1197.0	5957.0
$\sum PAH_{34}$	679.0	1114.0	1531.0	2845.0	8485.0
Detected & Censored Data					
Dibenzo[a,h]anthracene	1.0	2.2	3.5	10.6	56.1
C1-Chrysenes	23.9	38.9	77.8	147.9	285.4
C1-Dibenzothiophenes	4.1	5.5	8.2	11.2	39.2
C2-Chrysenes	16.4	40.1	73.2	147.8	222.8
C2-Dibenzothiophenes	3.2	5.4	7.7	11.5	63.7
C2-Fluorenes	25.4	40.5	68.1	149.6	187.1

Table F-5. Continued

PAH Compound or Group	25%ile (Q1) (µg/kg dry wt.)	50%ile (Q2) (µg/kg dry wt.)	75%ile (Q3) (µg/kg dry wt.)	95%ile (µg/kg dry wt.)	99%ile (µg/kg dry wt.)
C2-Phenanthrenes/anthracenes	16.3	24.9	32.3	52.7	182.5
C3-Chrysenes	<0.41	18.8	74.0	176.9	383.5
C3-Dibenzothiophenes	<0.36	<0.49	4.5	9.4	77.3
C3-Fluorenes	<0.58	16.3	22.3	41.8	112.7
C3-Phenanthrenes/anthracenes	<0.49	10.7	20.7	73.1	158.1
C4-Chrysenes	<0.35	<0.47	<0.75	47.6	84.5
C4-Naphthalenes	12.9	18.7	27.9	40.5	43.8
C4-Phenanthrenes/anthracenes	<0.34	<0.44	<0.71	36.5	75.7
Dibenzothiophene	2.2	3.3	5.2	8.3	32.5

PAH = polycyclic aromatic hydrocarbon; Q = quantile.

Table F-6. Percentiles of PAH ESB Toxic Units. Highlighted Values Include Detected Data.

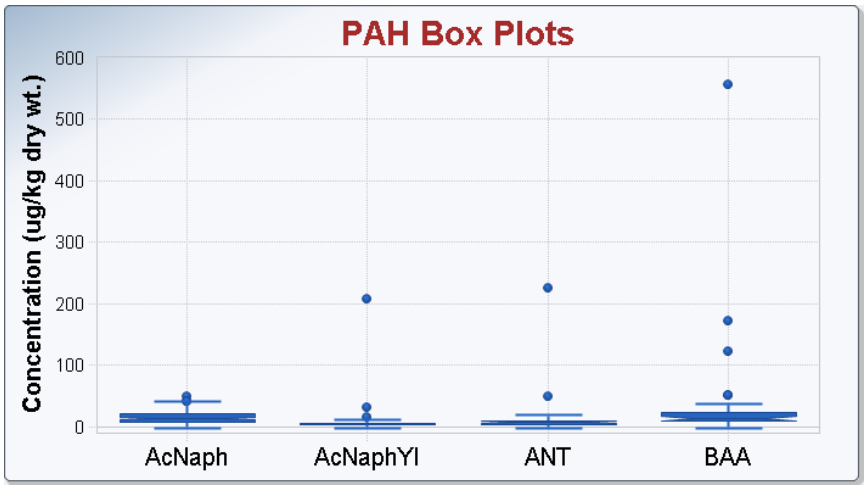
Parameter	25%ile (Q1)	50%ile (Q2)	75%ile (Q3)	95%ile	99%ile
PAH ESB Toxic Units	0.0080	0.013	0.017	0.048	0.089

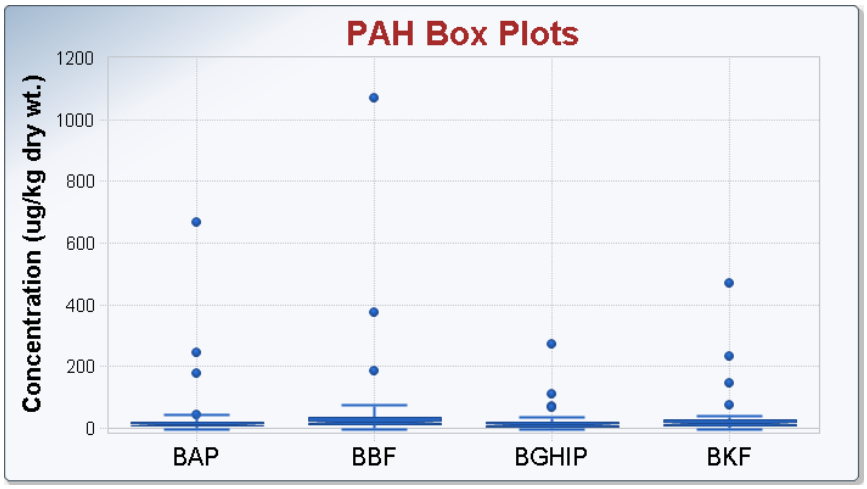
PAH = polycyclic aromatic hydrocarbon; ESB = equilibrium partitioning sediment benchmark; Q = quantile.

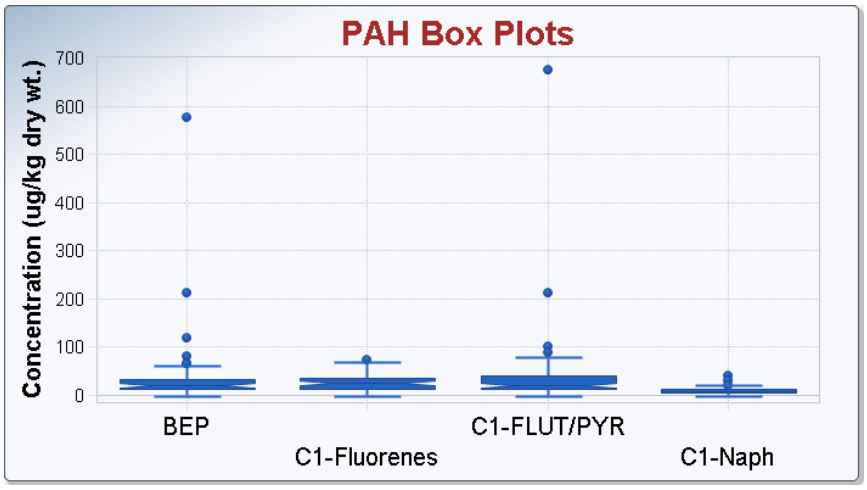
Table F-7. Abbreviations of PAH Compounds Given in Box Plots, Q-Q Plots, and Histogram Plots

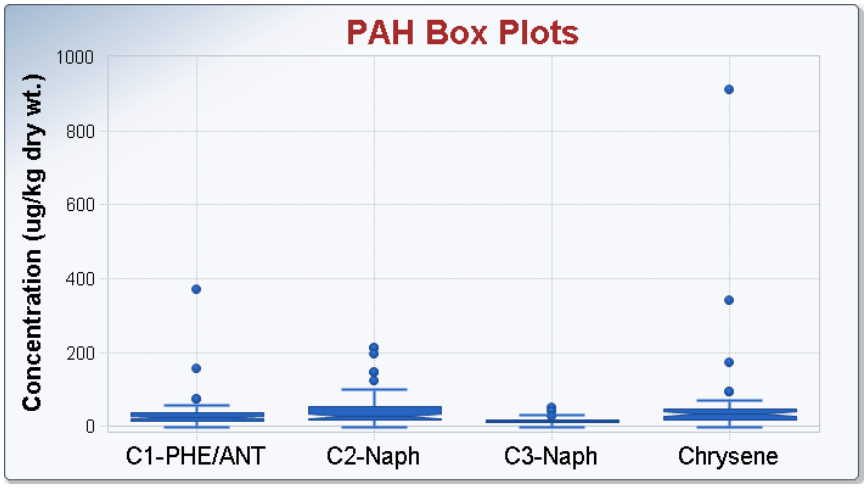
PAH Compound	Abbreviation	PAH Compound	Abbreviation
Naphthalene	Naph	Dibenzothiophene	DBZTP
C1-Naphthalenes	C1-Naph	C1-Dibenzothiophenes	C1-DBZTP
C2-Naphthalenes	C2-Naph	C2-Dibenzothiophenes	C2-DBZTP
C3-Naphthalenes	C3-Naph	C3-Dibenzothiophenes	C3-DBZTP
C4-Naphthalenes	C4-Naph	Fluoranthene	FLUT
1-Methylnaphthalene	1-MeNaph	Pyrene	PYR
2-Methylnaphthalene	2-MeNaph	C1-Fluoranthenes/Pyrenes	C1-FLUT/PYR
2,6-Dimethylnaphthalene	2,6-DMeNaph	Benzo[a]anthracene	BAA
1,6,7-Trimethylnaphthalene	1,6,7-TMeNaph	Chrysene	Chrysene
Acenaphthylene	AcNaphYl	C1-Chrysenes	C1-Chrysenes
Acenaphthene	AcNaph	C2-Chrysenes	C2-Chrysenes
Fluorene	Fluorene	C3-Chrysenes	C3-Chrysenes
C1-Fluorenes	C1-Fluorenes	C4-Chrysenes	C4-Chrysenes
C2-Fluorenes	C2-Fluorenes	Benzo[b]fluoranthene	BBF
C3-Fluorenes	C3-Fluorenes	Benzo[k]fluoranthene	BKF
Anthracene	ANT	Benzo[e]pyrene	BEP
Phenanthrene	PHE	Benzo[a]pyrene	BAP
C1-Phenanthrenes/Anthracenes	C1-PHE/ANT	Perylene	Perylene
C2-Phenanthrenes/Anthracenes	C2-PHE/ANT	Indeno[1,2,3-cd]pyrene	ICDP
C3-Phenanthrenes/Anthracenes	C3-PHE/ANT	Dibenzo[a,h]anthracene	DBahANT
C4-Phenanthrenes/Anthracenes	C4-PHE/ANT	Benzo[g,h,i]perylene	BGHIP
1-Methylphenanthrene	1-MePHE		

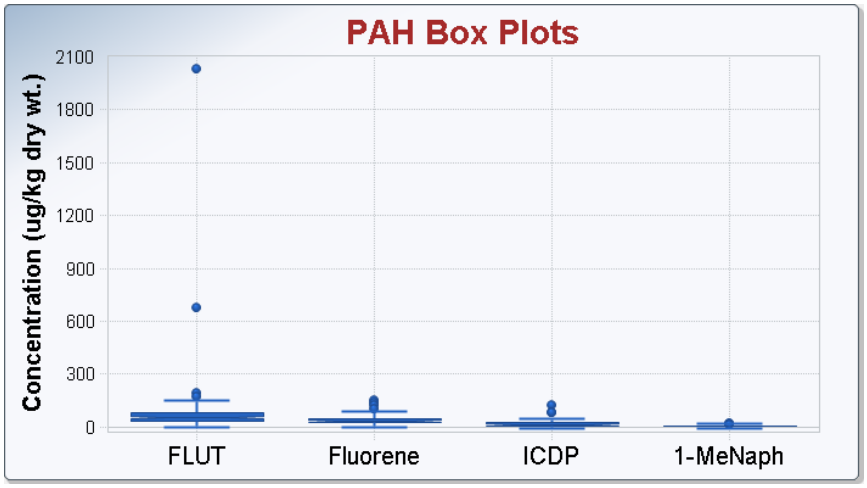
Box Plots of PAH Concentrations

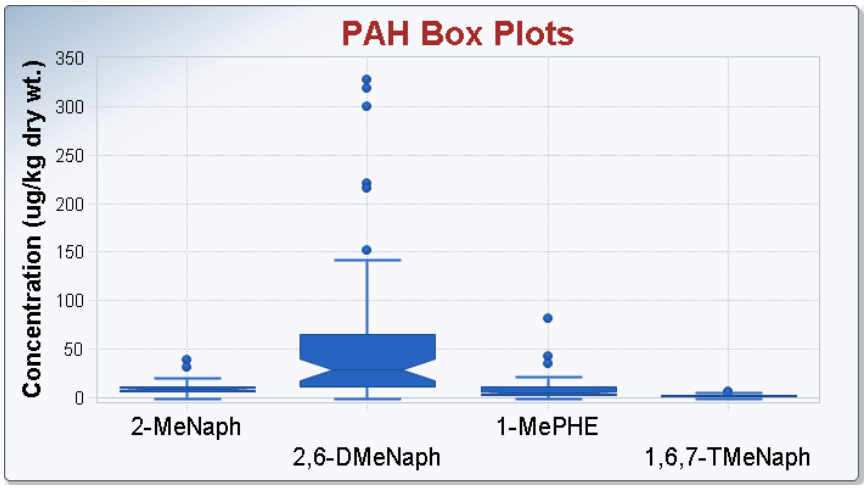


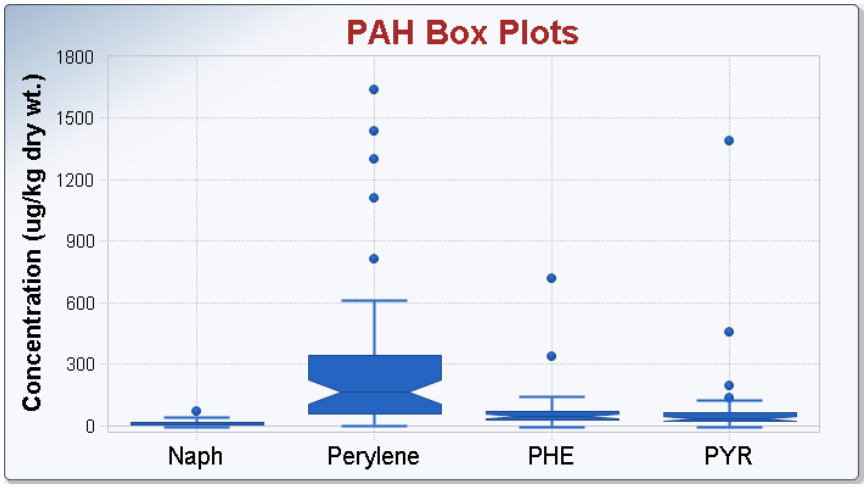


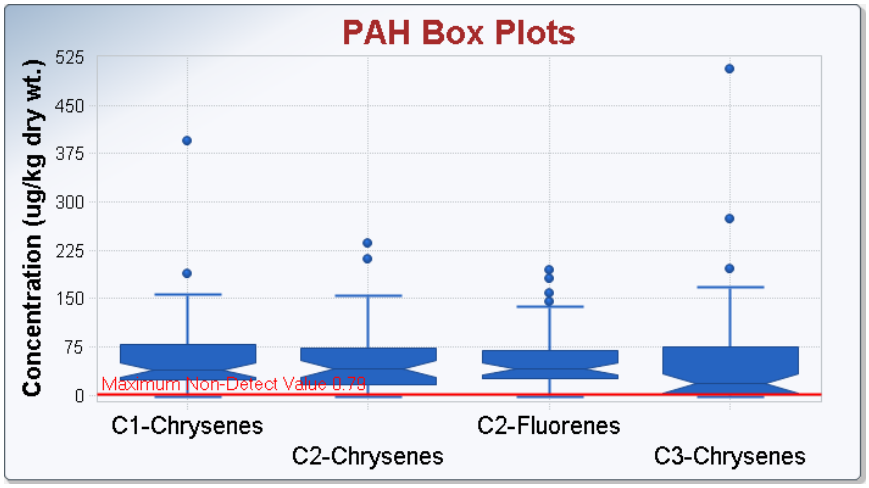


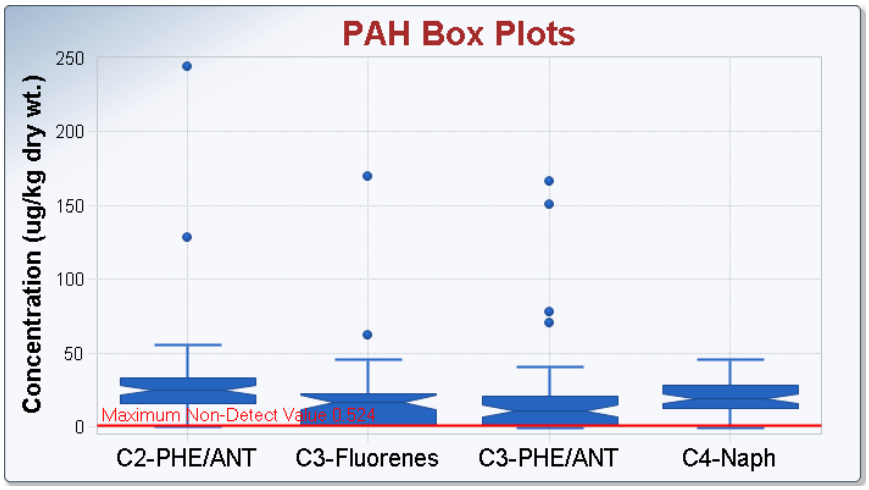

PAH Box Plots
Concentration (ug/kg dry wt.)
1000
800
600
400
200
0
C1-PHE/ANT
C2-Naph
C3-Naph
Chrysene

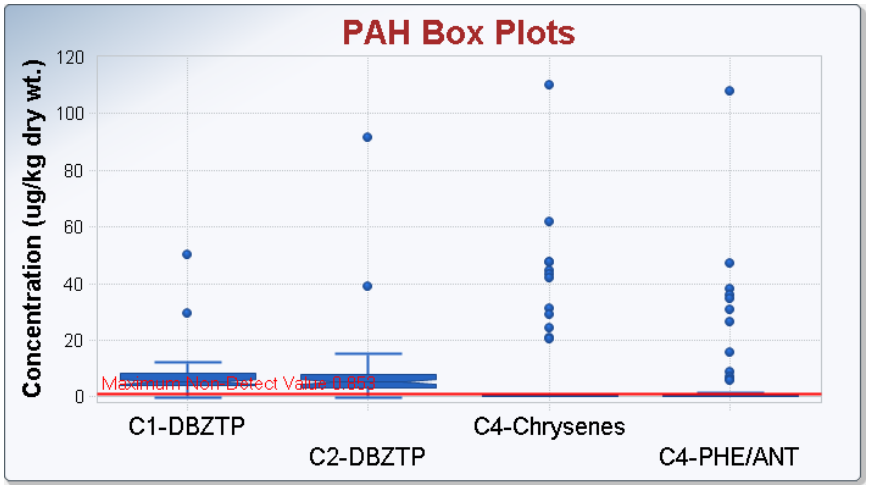

PAH Box Plots
Concentration (ug/kg dry wt.)
2100
1800
1500
1200
900
600
300
0
FLUT
Fluorene
ICDP
1-MeNaph

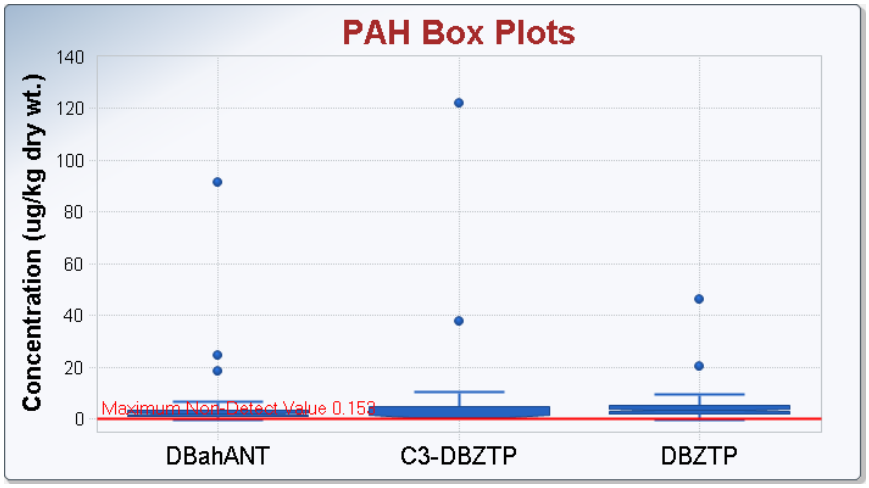

PAH Box Plots
Concentration (ug/kg dry wt.)
350
300
250
200
150
100
50
0
2-MeNaph
2,6-DMeNaph
1-MePHE
1,6,7-TMeNaph


PAH Box Plots
Concentration (ug/kg dry wt.)
1800
1500
1200
900
600
300
0
Naph
Perylene
PHE
PYR


PAH Box Plots
Concentration (ug/kg dry wt.)
525
450
375
300
225
150
75
0
Maximum Non-Detect Value 0.79
C1-Chrysenes
C2-Chrysenes
C2-Fluorenes
C3-Chrysenes


PAH Box Plots
Concentration (ug/kg dry wt.)
250
200
150
100
50
0
Maximum Non-Detect Value 0.524
C2-PHE/ANT
C3-Fluorenes
C3-PHE/ANT
C4-Naph


PAH Box Plots
Concentration (ug/kg dry wt.)
120
100
80
60
40
20
0
Maximum Non-Detect Value 0.653
C1-DBZTP
C2-DBZTP
C4-Chrysenes
C4-PHE/ANT


PAH Box Plots
Concentration (ug/kg dry wt.)
140
120
100
80
60
40
20
0
Maximum Non-Detect Value 0.153
DBahANT
C3-DBZTP
DBZTP

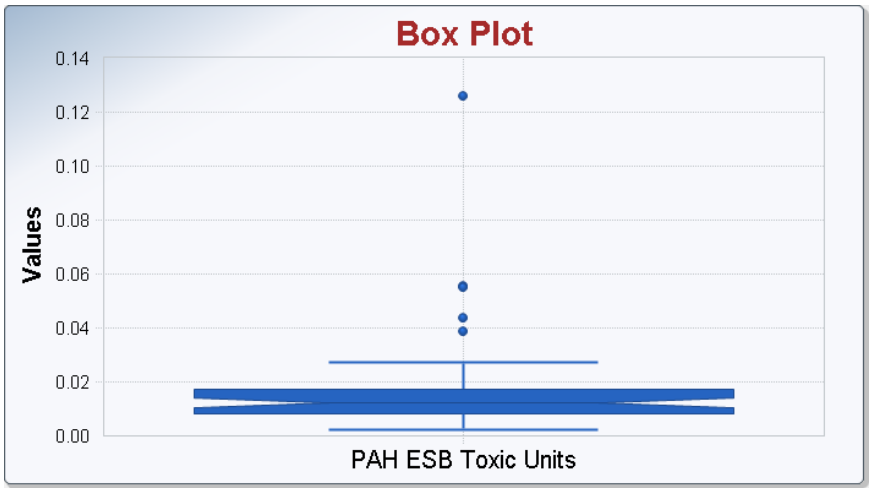

Box Plot
Values
0.14
0.12
0.10
0.08
0.06
0.04
0.02
0.00
PAH ESB Toxic Units

Table F-8. Statistical Comparisons of Untransformed PAHs (with ≤3 nondetects) by Land Use Categories

PAH Compound or Group	p-value	
	One-Way ANOVA	Kruskal-Wallis One Way ANOVA on Ranks
Acenaphthene		0.017*
Acenaphthylene		0.017*
Anthracene		0.075
Benzo[a]anthracene		0.009*
Dibenzo[a,h]anthracene		0.016*
Benzo[a]pyrene		0.020*
Benzo[b]fluoranthene		0.004*
Benzo[g,h,i]perylene		<0.001*
Benzo[k]fluoranthene		0.013*
Benzo[e]pyrene		0.060
C1-Chrysenes		0.026*
C1-Dibenzothiophenes		0.046*
C1-Fluorenes		0.026*
C1-Fluoranthenes/Pyrenes		0.014*
C1-Naphthalenes	<0.001*	
C1-Phenanthrenes/Anthracenes		0.005*
C2-Fluorenes		0.021*
C2-Naphthalenes		0.219
C2-Phenanthrenes/Anthracenes		0.002*
C3-Naphthalenes	<0.001*	
Chrysene		0.026*
Dibenzothiophene		0.023*
Fluoranthene		0.040*
Fluorene		0.259
Indeno[1,2,3-cd]pyrene		0.011*
1-Methylnaphthalene	<0.001*	
2-Methylnaphthalene	<0.001*	
2,6-Dimethylnaphthalene		0.349
1-Methylphenanthrene		0.002*
1,6,7-Trimethylnaphthalene		0.032*
Naphthalene		0.032*
Perylene		0.618
Phenanthrene		0.036*
Pyrene		0.036*
$\sum PAH_{13}$		0.048*
$\sum PAH_{17}$		0.029*
$\sum PAH_{34}$		0.025*

PAH = polycyclic aromatic hydrocarbon; ANOVA = Analysis of Variance.

* Statistically significant ($p<0.05$).

Table F-9. Multiple Pairwise Comparisons by Land Use Categories for PAHs that had Statistically Significant (p<0.05) ANOVA Results (Table F-8). Pairs Shaded "Yes" are Significantly Different (p<0.05) from Each Other.

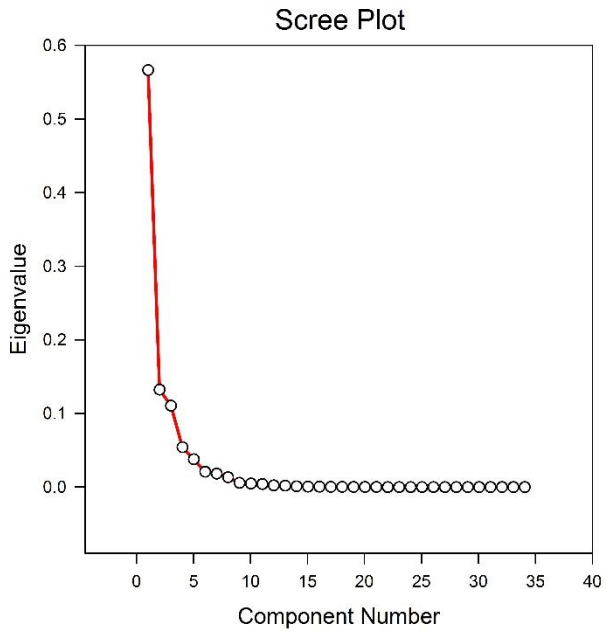
PAH Compound or Group	p<0.05					
	dev vs. cul	dev vs. wet	dev vs. for	for vs. cul	for vs. wet	wet vs. cul
Acenaphthene§	No	DNT	DNT	DNT	DNT	DNT
Acenaphthylene§	Yes	No	DNT	No	DNT	DNT
Benzo[a]anthracene§	Yes	No	DNT	No	DNT	DNT
Dibenzo[a,h]anthracene§	Yes	No	DNT	No	DNT	DNT
Benzo[a]pyrene§	Yes	DNT	No	DNT	DNT	No
Benzo[b]fluoranthene§	Yes	DNT	No	DNT	DNT	No
Benzo[g,h,i]perylene§	Yes	No	DNT	Yes	DNT	No
Benzo[k]fluoranthene§	Yes	DNT	No	DNT	DNT	No
C1-Chrysenes§	Yes	No	DNT	No	DNT	DNT
C1-Dibenzothiophenes§	No	DNT	DNT	DNT	DNT	DNT
C1-Fluorenes§	No	DNT	DNT	DNT	DNT	DNT
C1-Fluoranthenes/Pyrenes§	Yes	No	DNT	No	DNT	DNT
C1-Naphthalenes‡	Yes	Yes	Yes	No	No	No
C1-Phenanthrenes/Anthracenes§	Yes	No	DNT	No	DNT	DNT
C2-Fluorenes§	No	DNT	DNT	DNT	DNT	DNT
C2-Phenanthrenes/Anthracenes§	Yes	No	DNT	Yes	DNT	No
C3-Naphthalenes‡	Yes	Yes	Yes	Yes	No	No
Chrysene§	Yes	DNT	No	DNT	DNT	No
Dibenzothiophene§	Yes	No	DNT	No	DNT	DNT
Fluoranthene§	Yes	No	DNT	No	DNT	DNT
Indeno[1,2,3-cd]pyrene§	No	DNT	DNT	DNT	DNT	DNT
1-Methylnaphthalene‡	Yes	Yes	Yes	No	No	No
2-Methylnaphthalene‡	Yes	Yes	Yes	No	No	No
1-Methylphenanthrene§	Yes	No	DNT	Yes	DNT	No
1,6,7-Trimethylnaphthalene§	Yes	No	DNT	No	DNT	DNT
Naphthalene§	DNT	No	DNT	DNT	DNT	DNT
Phenanthrene§	DNT	No	DNT	DNT	DNT	DNT
Pyrene§	Yes	No	DNT	No	DNT	DNT
$\sum PAH_{13}$§	Yes	No	DNT	No	DNT	DNT
$\sum PAH_{17}$§	Yes	No	DNT	No	DNT	DNT
$\sum PAH_{34}$§	Yes	No	DNT	No	DNT	DNT

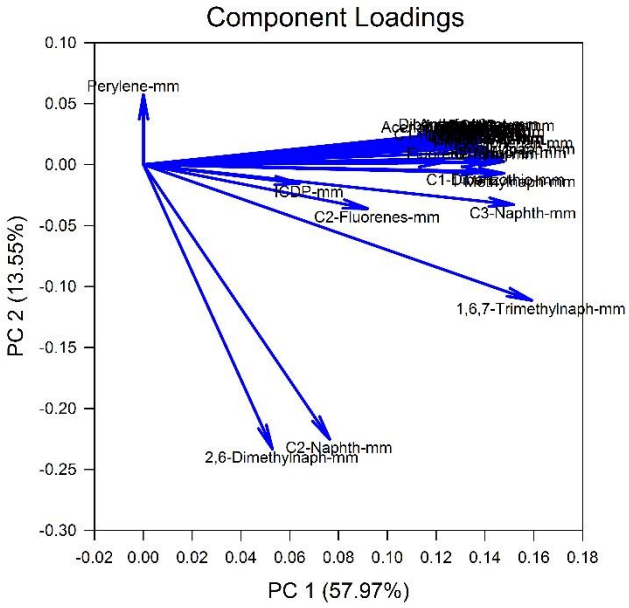
PAH = polycyclic aromatic hydrocarbon; dev = developed; cul = cultivated; for = forested; wet = lake and wetlands; DNT = do not test.

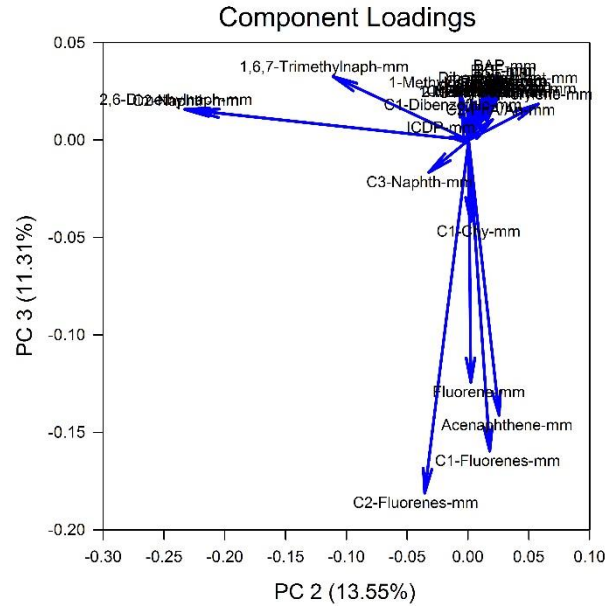
§ Dunn's method was used for these pairwise multiple comparisons.

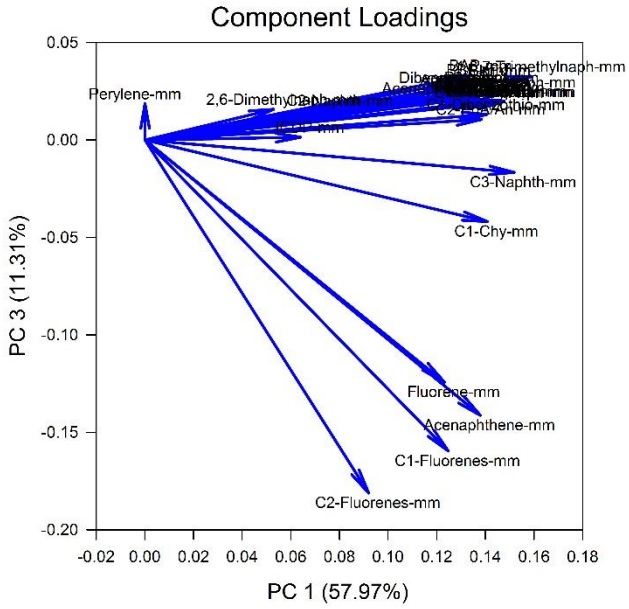
‡ The Holm-Sidak method was used for these pairwise multiple comparisons.

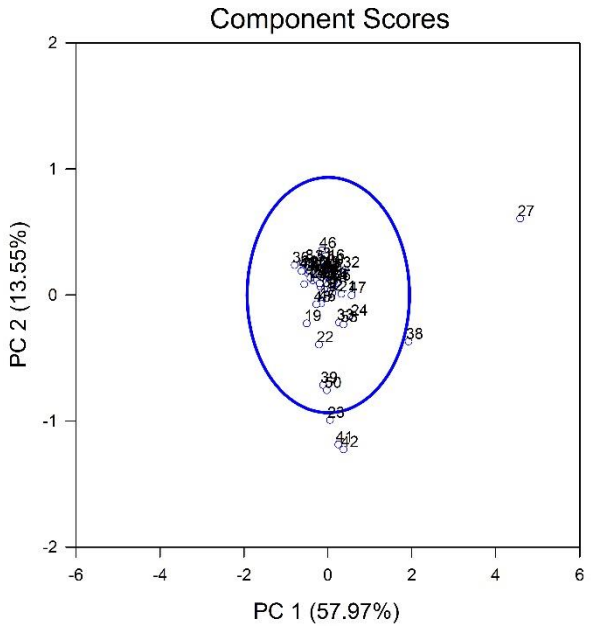
Supporting Information for Principal Components Analysis of 34 PAHs

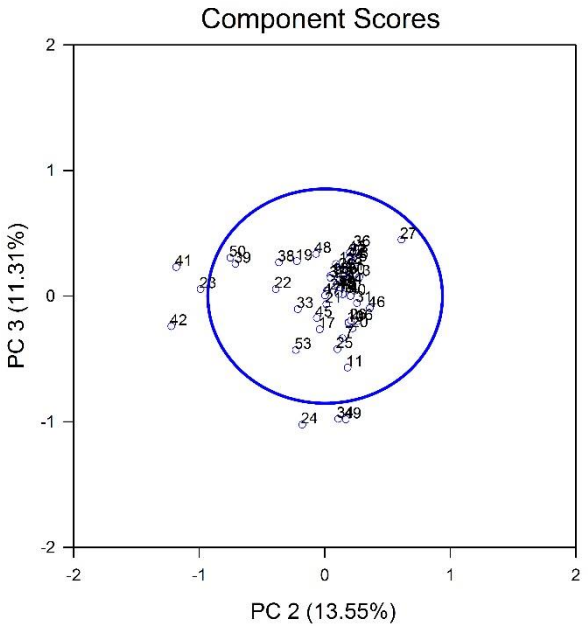


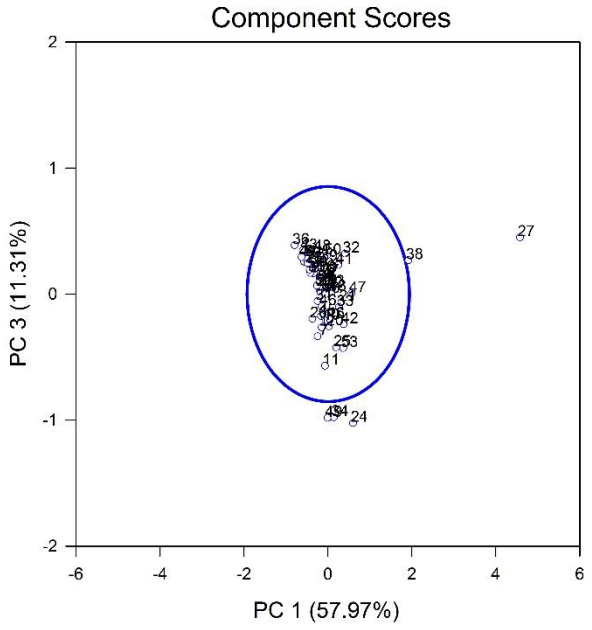












The data point numbers correspond to the lake ID numbers (e.g., #27 corresponds to Lake Nokomis).

Eigenvectors of the Covariance Matrix:

	PC 1	PC 2	PC 3
Acenaphthene-mm	0.183	0.0689	-0.425
Acenaphthylene-mm	0.163	0.0650	0.0646
Anthra-mm	0.166	0.0712	0.0771
BAA-mm	0.176	0.0637	0.0811
Dibenzo[a,h]ant-mm	0.172	0.0712	0.0809
BAP-mm	0.178	0.0643	0.0996
BBF-mm	0.176	0.0643	0.0928
BGHIP-mm	0.183	0.0680	0.0757
BKF-mm	0.189	0.0562	0.0921
BNZEP-mm	0.177	0.0583	0.0671
C1-Chy-mm	0.187	0.00470	-0.126
C1-Dibenzothio-mm	0.186	-0.0150	0.0395
C1-Fluorenes-mm	0.165	0.0478	-0.480
C1-FlA/Py-mm	0.176	0.0450	0.0759
C1-Naphth-mm	0.196	0.00718	0.0603
C1-PhA/An-mm	0.183	0.0379	0.0583
C2-Fluorenes-mm	0.122	-0.0989	-0.545
C2-Naphth-mm	0.101	-0.619	0.0457
C2-PhA/An-mm	0.183	0.0543	0.0318
C3-Naphth-mm	0.201	-0.0900	-0.0499
Chrysene-mm	0.179	0.0583	0.0698
Dibenzothio-mm	0.182	0.0409	0.0659
FlA-mm	0.176	0.0570	0.0756
Fluorene-mm	0.163	0.00517	-0.374
ICDP-mm	0.0847	-0.0422	0.00442
1-Methylnaph-mm	0.196	-0.0194	0.0738
2-Methylnaph-mm	0.196	0.0160	0.0592
2,6-Dimethylnaph-mm	0.0701	-0.641	0.0474
1-Methylphenan-mm	0.190	0.0295	0.0592
1,6,7-Trimethylnaph-mm	0.211	-0.306	0.0981
Naphth-mm	0.179	0.0471	0.0671
Perylene-mm	-0.000104	0.158	0.0559
Phenanth-mm	0.186	0.0391	0.0598
Pyrene-mm	0.176	0.0553	0.0748

Each principal component is a linear combination of the original variables, after each original variable has been centered about its mean. The coefficients of this linear combination are the entries in the corresponding column of the above table. These coefficients provide the interpretation of the principal components in terms of the original variables.

Percentage of Variance Explained by the In-Model Components:

	PC 1	PC 2	PC 3	Unexplained Variance
Acenaphthene-mm	40.781	1.354	42.972	14.892
Acenaphthylene-mm	82.822	3.075	2.538	11.564
Anthra-mm	85.473	3.672	3.597	7.258
BAA-mm	89.031	2.738	3.707	4.524
Dibenzo[a,h]ant-mm	86.064	3.459	3.734	6.744
BAP-mm	86.155	2.629	5.270	5.946
BBF-mm	87.982	2.733	4.759	4.526
BGHIP-mm	89.177	2.892	2.989	4.942
BKF-mm	88.559	1.840	4.121	5.480
BNZEP-mm	87.858	2.232	2.467	7.443
C1-Chy-mm	79.352	0.0118	7.029	13.607
C1-Dibenzothio-mm	92.197	0.139	0.806	6.858
C1-Fluorenes-mm	32.297	0.630	53.098	13.975
C1-FlA/Py-mm	91.523	1.396	3.316	3.764
C1-Naphth-mm	79.106	0.0248	1.463	19.406
C1-PhA/An-mm	95.032	0.956	1.892	2.120
C2-Fluorenes-mm	15.285	2.352	59.548	22.815
C2-Naphth-mm	10.077	88.081	0.401	1.442
C2-PhA/An-mm	92.665	1.895	0.545	4.896
C3-Naphth-mm	82.452	3.856	0.989	12.702
Chrysene-mm	91.474	2.259	2.705	3.562
Dibenzothio-mm	94.431	1.112	2.416	2.042
FlA-mm	90.460	2.223	3.271	4.046
Fluorene-mm	35.533	0.00833	36.364	28.095
ICDP-mm	13.579	0.787	0.00722	85.627
1-Methylnaph-mm	80.374	0.184	2.225	17.217
2-Methylnaph-mm	77.629	0.122	1.387	20.863
2,6-Dimethylnaph-mm	4.731	92.513	0.423	2.333
1-Methylphenan-mm	81.725	0.459	1.551	16.264
1,6,7-Trimethylnaph-mm	58.838	28.913	2.479	9.770
Naphth-mm	69.765	1.123	1.909	27.202
Perylene-mm	0.0000126	6.733	0.705	92.562
Phenanth-mm	94.431	0.972	1.898	2.699
Pyrene-mm	90.789	2.088	3.198	3.925

Component Scores:

The significance level is 0.050. Significant P-values are flagged.

ID	PC 1	PC 2	PC 3	T-square	P
1	-0.574	0.0862	0.256	1.232	0.757
2	0.0921	0.0151	0.0440	0.0342	0.998
3	-0.183	0.271	0.153	0.825	0.850
4	-0.165	0.208	0.0874	0.444	0.934
5	-0.327	0.244	0.268	1.288	0.744
6	-0.0907	0.142	0.144	0.355	0.952
7	-0.255	0.137	-0.336	1.276	0.747
8	-0.598	0.256	0.295	1.913	0.609
9	-0.0364	0.0433	0.162	0.254	0.970
10	-0.0670	0.185	-0.212	0.672	0.885
11	-0.0812	0.179	-0.569	3.181	0.391

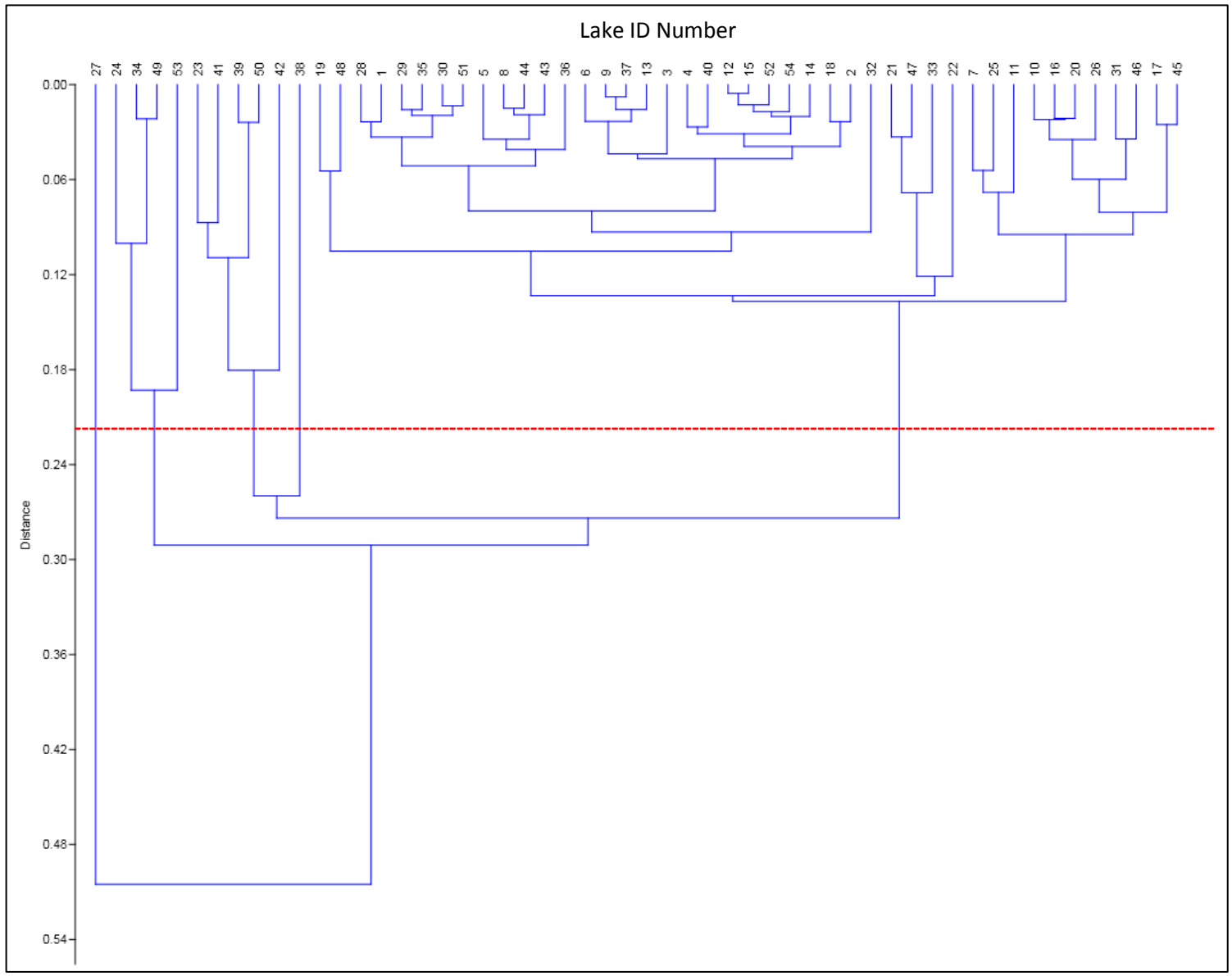
Component Scores (continued):

ID	PC 1	PC 2	PC 3	T-square	P
12	-0.124	0.122	0.0460	0.158	0.985
13	-0.186	0.0647	0.172	0.360	0.951
14	-0.187	0.141	0.0154	0.214	0.976
15	-0.140	0.114	0.0594	0.166	0.984
16	0.0402	0.257	-0.200	0.862	0.842
17	-0.161	-0.0438	-0.264	0.692	0.881
18	0.0820	0.106	0.0164	0.0999	0.992
19	-0.518	-0.225	0.279	1.561	0.684
20	0.0163	0.219	-0.257	0.958	0.820
21	0.311	0.00932	-0.0643	0.209	0.977
22	-0.224	-0.394	0.0567	1.290	0.744
23	0.0392	-0.993	0.0564	7.470	0.0789
24	0.590	-0.182	-1.023	10.339	0.0270 <
25	0.188	0.0975	-0.422	1.748	0.643
26	-0.380	0.205	-0.196	0.919	0.829
27	4.563	0.607	0.450	41.377	0.00000160 <
28	-0.493	0.175	0.246	1.207	0.763
29	-0.371	0.118	0.208	0.738	0.870
30	-0.354	0.195	0.165	0.754	0.867
31	-0.257	0.253	-0.0553	0.628	0.895
32	0.400	0.200	0.321	1.517	0.693
33	0.256	-0.218	-0.104	0.573	0.907
34	0.131	0.103	-0.978	8.759	0.0487 <
35	-0.427	0.136	0.168	0.718	0.875
36	-0.802	0.238	0.388	2.928	0.429
37	-0.0913	0.0444	0.144	0.217	0.976
38	1.910	-0.368	0.269	8.114	0.0620
39	-0.126	-0.715	0.257	4.485	0.242
40	-0.0668	0.202	0.000918	0.317	0.959
41	0.238	-1.186	0.232	11.206	0.0197 <
42	0.364	-1.225	-0.241	12.093	0.0142 <
43	-0.609	0.197	0.346	2.030	0.586
44	-0.637	0.190	0.293	1.768	0.639
45	-0.173	-0.0676	-0.175	0.363	0.950
46	-0.154	0.354	-0.0976	1.077	0.793
47	0.554	-0.00180	0.00616	0.543	0.913
48	-0.290	-0.0740	0.336	1.211	0.762
49	-0.0198	0.164	-0.983	8.938	0.0455 <
50	-0.0371	-0.755	0.306	5.158	0.188
51	-0.443	0.189	0.195	0.962	0.819
52	-0.270	0.120	0.0677	0.279	0.965
53	0.355	-0.234	-0.429	2.299	0.535
54	-0.209	0.0935	0.0932	0.222	0.975

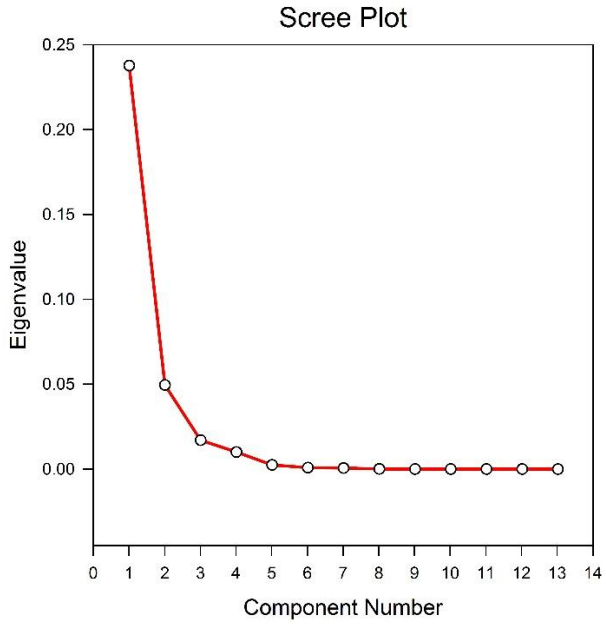
A significant P-value indicates that the corresponding observation is a possible outlier.

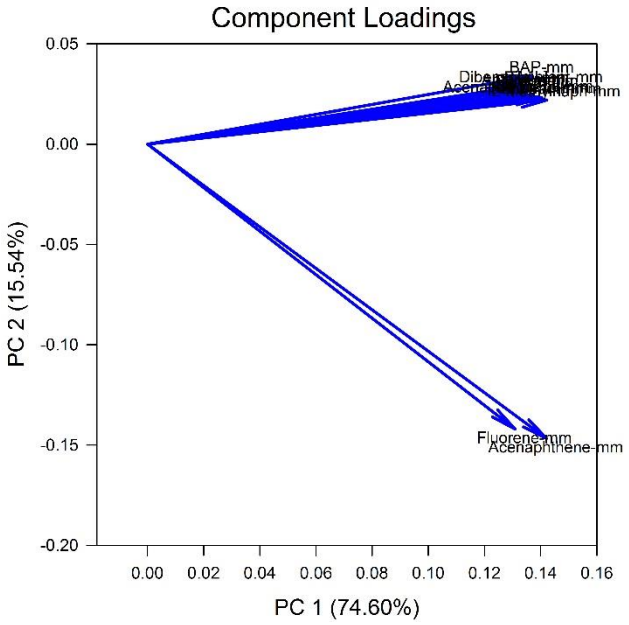
The above PC1, PC2, and PC3 component scores were used in the hierarchical cluster analysis of these data.

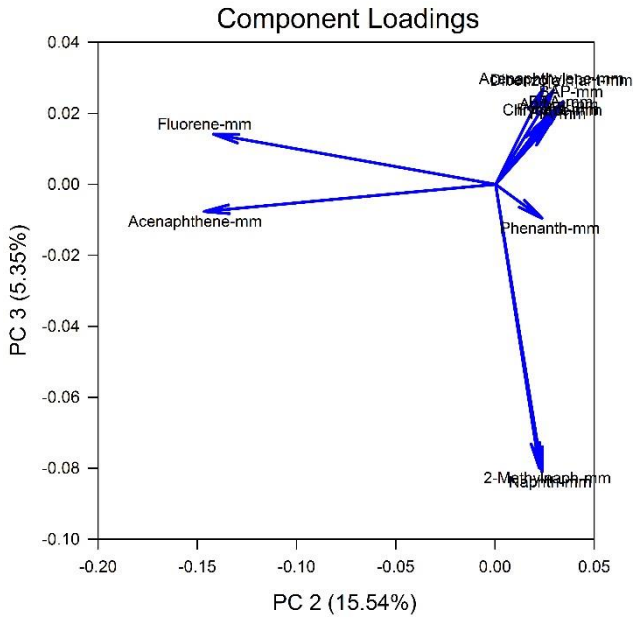
HCA plot of the PCA Component Scores for 34 PAHs that had been range transformed. The HCA was set-up with the paired group (UPGMA) algorithm and the Gower similarity index. Five groups of data were considered at a distance of ~0.22.

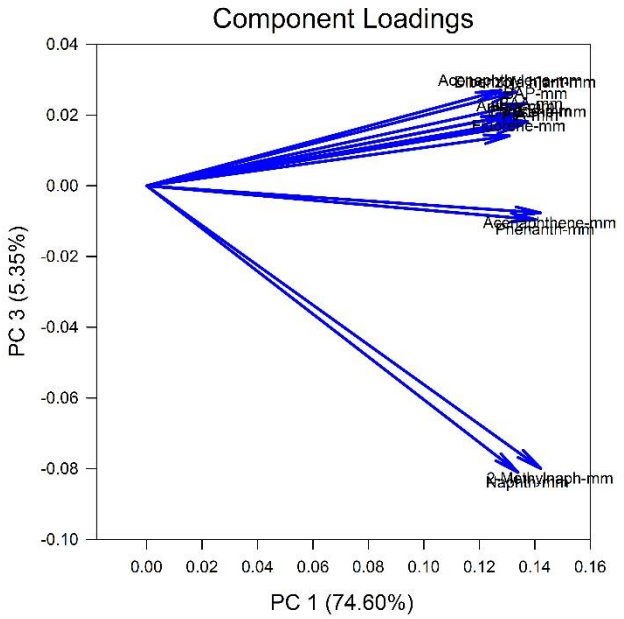


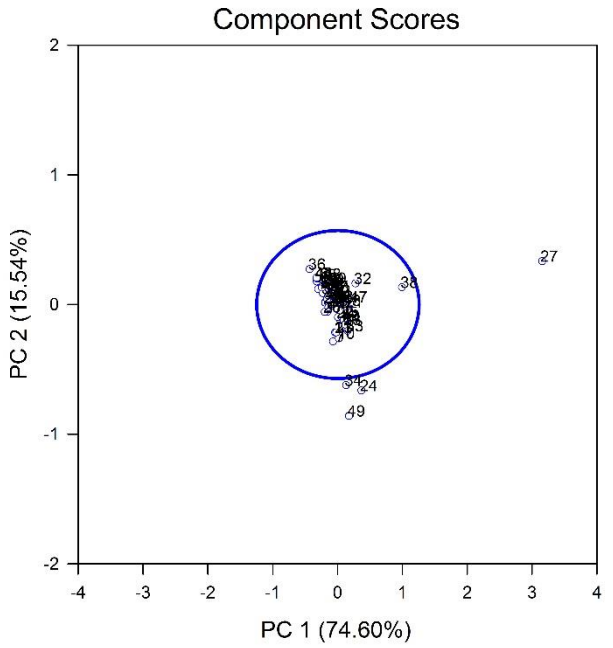
Supporting Information for Principal Components Analysis of 13 PAHs (SQT List)

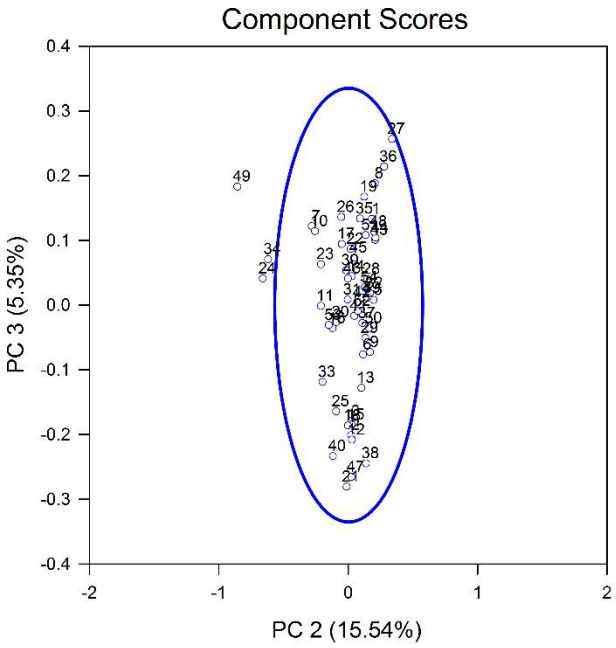


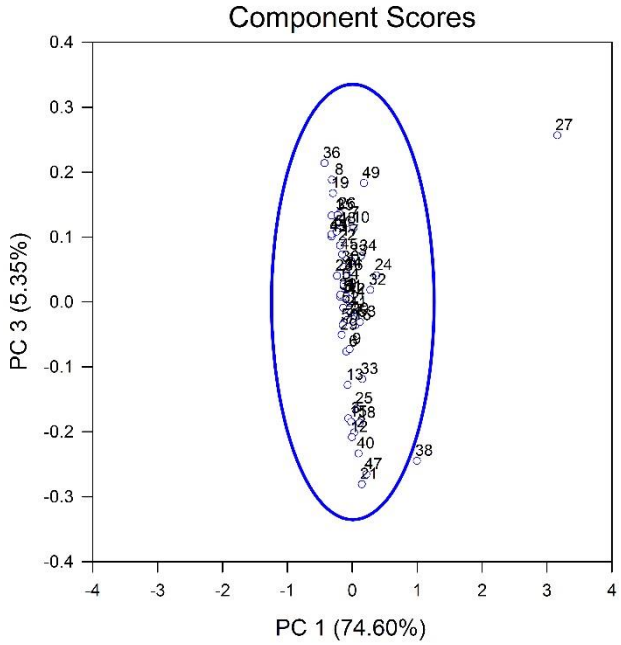












The data point numbers correspond to the lake ID numbers (e.g., #27 corresponds to Lake Nokomis).

Eigenvectors of the Covariance Matrix:

	PC 1	PC 2	PC 3
Acenaphthene-mm	0.291	-0.659	-0.0584
Acenaphthylene-mm	0.262	0.108	0.207
Anthra-mm	0.266	0.125	0.151
BAA-mm	0.277	0.129	0.157
Dibenzo[a,h]ant-mm	0.273	0.131	0.203
BAP-mm	0.280	0.153	0.178
Chrysene-mm	0.281	0.110	0.139
FlA-mm	0.277	0.123	0.131
Fluorene-mm	0.268	-0.638	0.108
2-Methylnaph-mm	0.291	0.0990	-0.612
Naphth-mm	0.274	0.105	-0.621
Phenanth-mm	0.287	0.105	-0.0731
Pyrene-mm	0.277	0.123	0.141

Each principal component is a linear combination of the original variables, after each original variable has been centered about its mean. The coefficients of this linear combination are the entries in the corresponding column of the above table. These coefficients provide the interpretation of the principal components in terms of the original variables.

Percentage of Variance Explained by the In-Model Components:

	PC 1	PC 2	PC 3	Unexplained Variance
Acenaphthene-mm	43.311	46.315	0.125	10.249
Acenaphthylene-mm	89.554	3.200	4.015	3.231
Anthra-mm	91.852	4.246	2.128	1.774
BAA-mm	92.997	4.230	2.132	0.642
Dibenzo[a,h]ant-mm	91.117	4.353	3.624	0.905
BAP-mm	89.777	5.547	2.604	2.073
Chrysene-mm	94.579	3.025	1.655	0.741
FlA-mm	94.186	3.873	1.521	0.420
Fluorene-mm	40.138	47.424	0.471	11.966
2-Methylnaph-mm	72.109	1.739	22.878	3.274
Naphth-mm	68.513	2.090	25.166	4.232
Phenanth-mm	94.163	2.604	0.437	2.795
Pyrene-mm	94.195	3.848	1.741	0.216

Component Scores:

The significance level is 0.050. Significant P-values are flagged.

ID	PC 1	PC 2	PC 3	T-square	P
1	-0.327	0.179	0.133	2.135	0.565
2	0.0203	0.0185	-0.201	2.379	0.520
3	-0.0719	0.0200	-0.179	1.913	0.609
4	-0.143	0.107	0.0116	0.323	0.958
5	-0.198	0.193	0.00802	0.919	0.829
6	-0.102	0.111	-0.0764	0.634	0.894

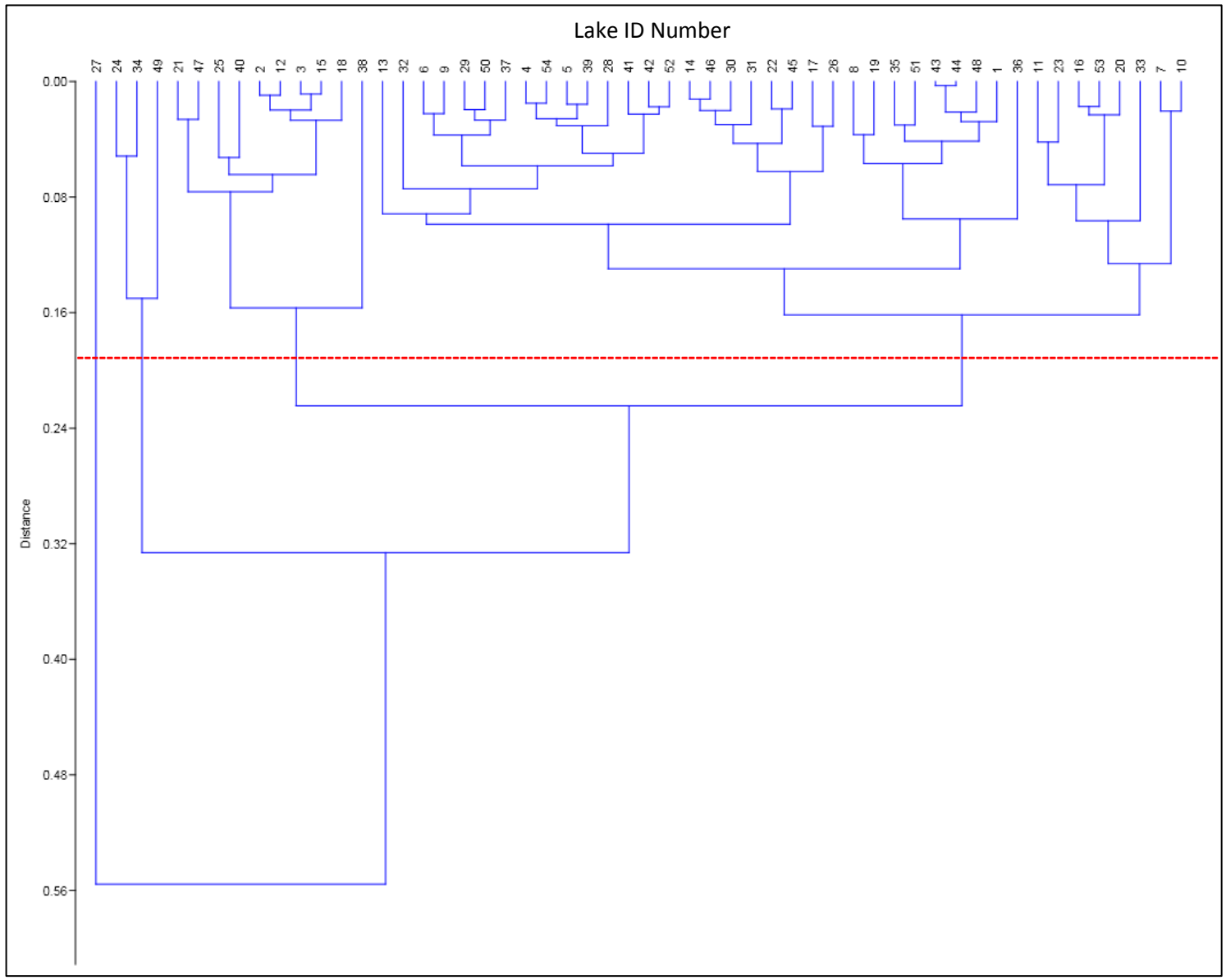
Component Scores (continued):

ID	PC 1	PC 2	PC 3	T-square	P
7	-0.0780	-0.286	0.122	2.555	0.489
8	-0.324	0.202	0.188	3.344	0.369
9	-0.0519	0.166	-0.0728	0.879	0.838
10	0.0140	-0.261	0.114	2.142	0.564
11	-0.0445	-0.216	-0.00130	0.949	0.822
12	-0.0149	0.0255	-0.208	2.553	0.489
13	-0.0804	0.0985	-0.128	1.182	0.768
14	-0.105	0.0252	0.0447	0.176	0.982
15	-0.0272	0.0226	-0.185	2.013	0.589
16	0.0400	-0.126	-0.0358	0.400	0.943
17	-0.159	-0.0538	0.0945	0.689	0.881
18	0.107	-0.00598	-0.186	2.081	0.576
19	-0.308	0.120	0.168	2.339	0.527
20	0.000885	-0.0974	-0.0263	0.232	0.973
21	0.138	-0.0163	-0.281	4.706	0.223
22	-0.199	0.0159	0.0871	0.617	0.897
23	-0.0272	-0.215	0.0633	1.168	0.772
24	0.362	-0.663	0.0412	9.535	0.0364 <
25	0.0603	-0.0969	-0.164	1.787	0.635
26	-0.204	-0.0576	0.136	1.331	0.735
27	3.147	0.335	0.257	47.770	0.000000311 <
28	-0.245	0.143	0.0404	0.759	0.866
29	-0.173	0.127	-0.0507	0.605	0.900
30	-0.148	-0.0214	0.0539	0.272	0.967
31	-0.104	-0.00819	0.00864	0.0514	0.997
32	0.269	0.164	0.0187	0.866	0.841
33	0.146	-0.203	-0.119	1.751	0.643
34	0.125	-0.623	0.0710	8.198	0.0600
35	-0.234	0.0876	0.134	1.436	0.711
36	-0.437	0.274	0.214	5.004	0.200
37	-0.0890	0.106	-0.0278	0.306	0.961
38	0.986	0.134	-0.245	7.964	0.0655
39	-0.189	0.147	0.0115	0.592	0.903
40	0.0875	-0.123	-0.233	3.530	0.345
41	-0.0316	0.0436	-0.0168	0.0591	0.996
42	-0.0532	0.0689	0.00402	0.109	0.991
43	-0.332	0.205	0.101	1.907	0.610
44	-0.330	0.208	0.104	1.967	0.598
45	-0.166	0.0424	0.0734	0.468	0.929
46	-0.0911	-0.00610	0.0412	0.135	0.988
47	0.208	0.0211	-0.266	4.326	0.257
48	-0.199	0.198	0.113	1.709	0.652
49	0.170	-0.860	0.183	17.013	0.00249 <
50	-0.158	0.158	-0.0354	0.684	0.883
51	-0.251	0.132	0.108	1.304	0.741
52	-0.149	0.0706	-0.00910	0.199	0.979
53	0.109	-0.154	-0.0309	0.583	0.905
54	-0.144	0.125	0.0275	0.449	0.933

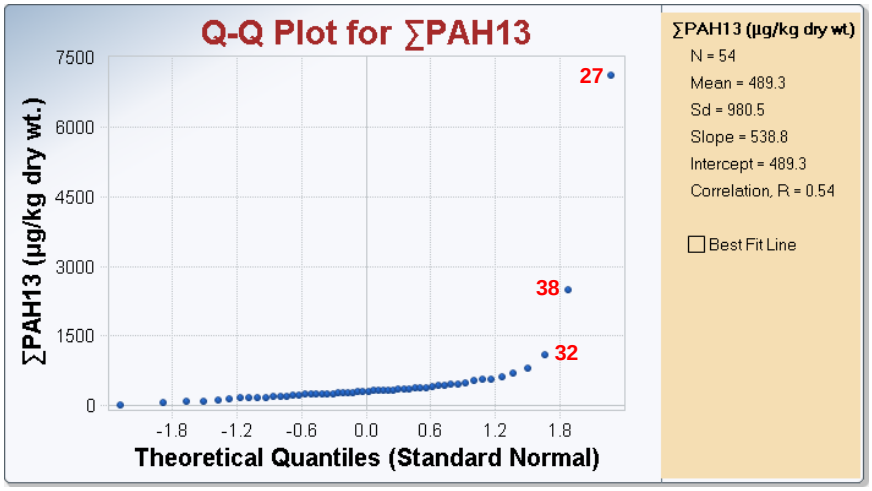
A significant P-value indicates that the corresponding observation is a possible outlier.

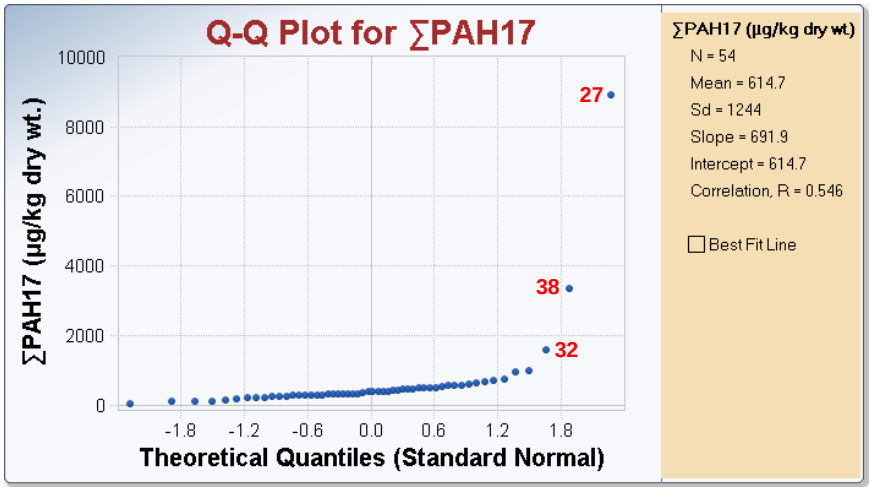
The above PC1, PC2, and PC3 component scores were used in the hierarchical cluster analysis of these data.

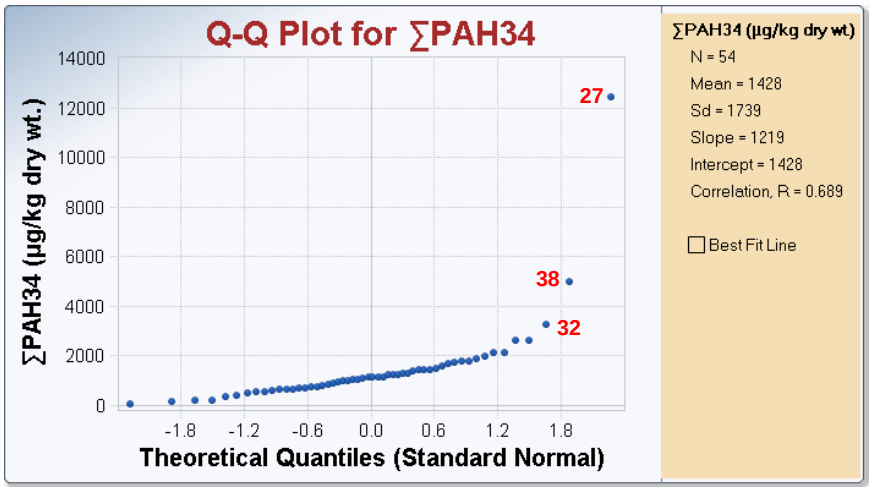
HCA plot of the PCA Component Scores for 13 PAHs (SQT list) that had been range transformed. The HCA was set-up with the paired group (UPGMA) algorithm and the Gower similarity index. Four groups of data were considered at a distance of ~0.18.

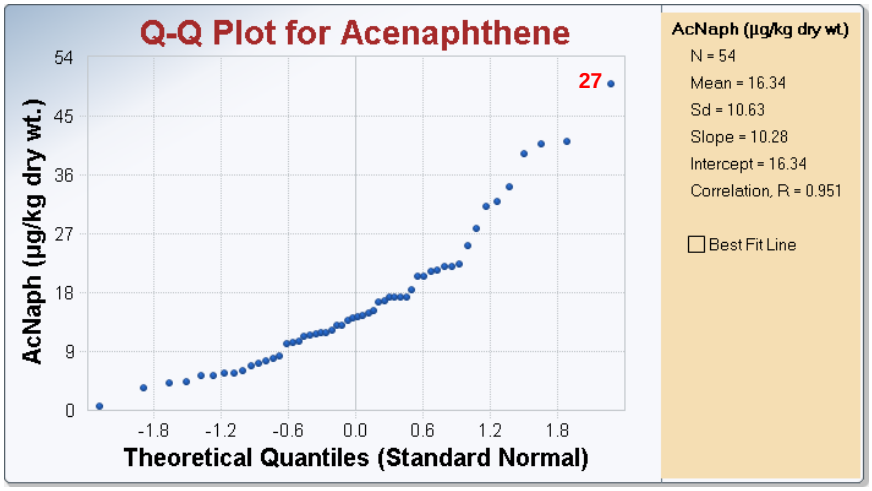


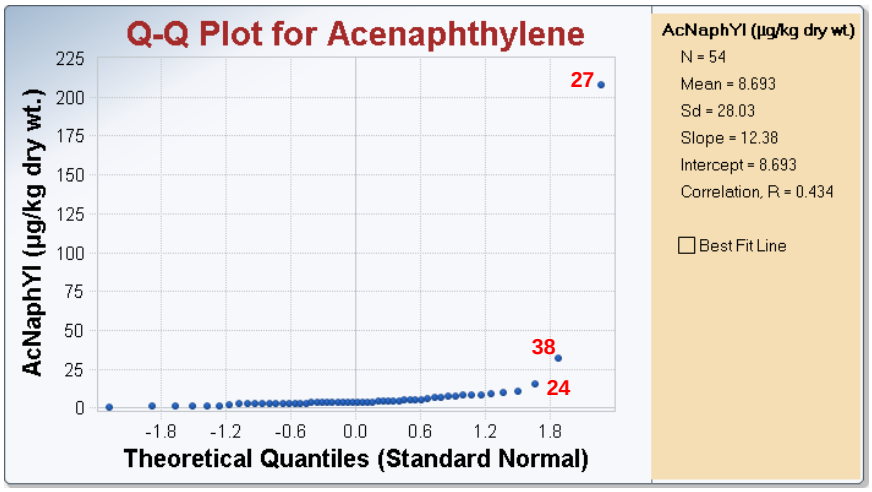
Q-Q Plots for Detected PAHs (samples noted in red font are significant at the 5% significance level)

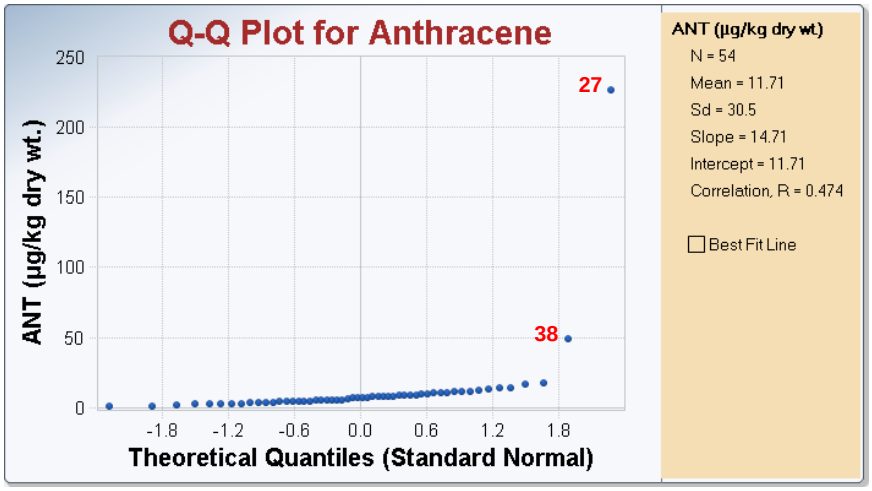


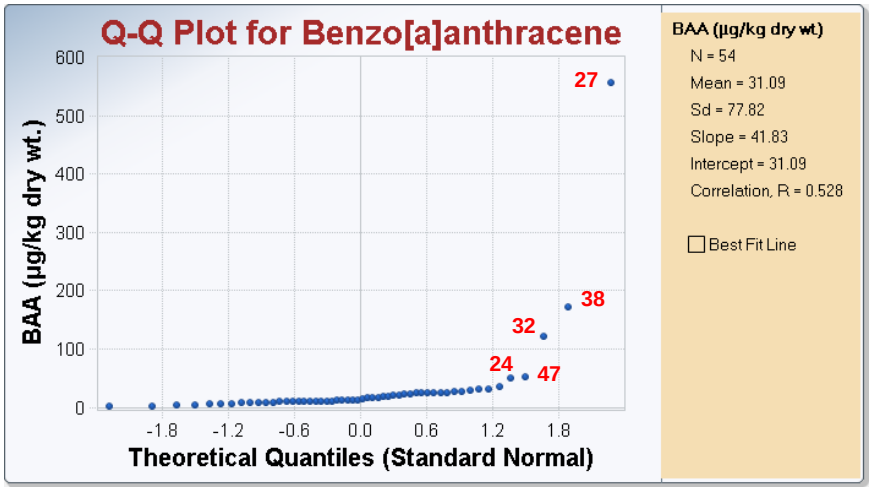


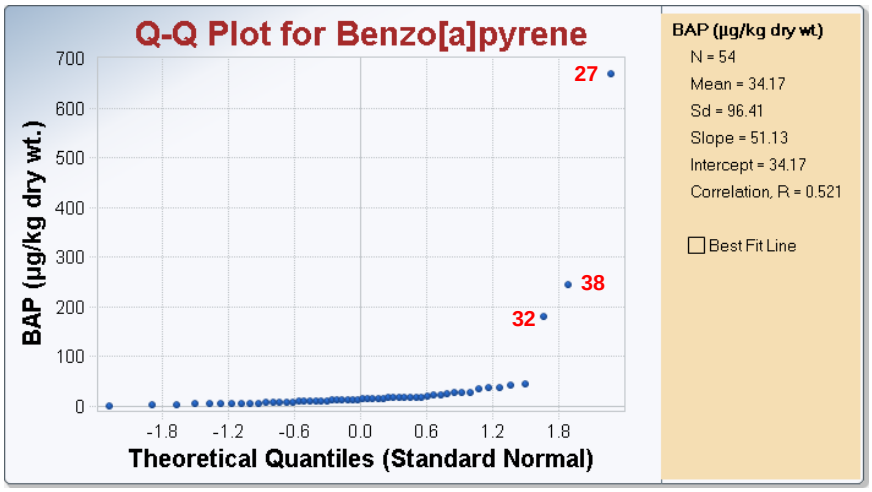


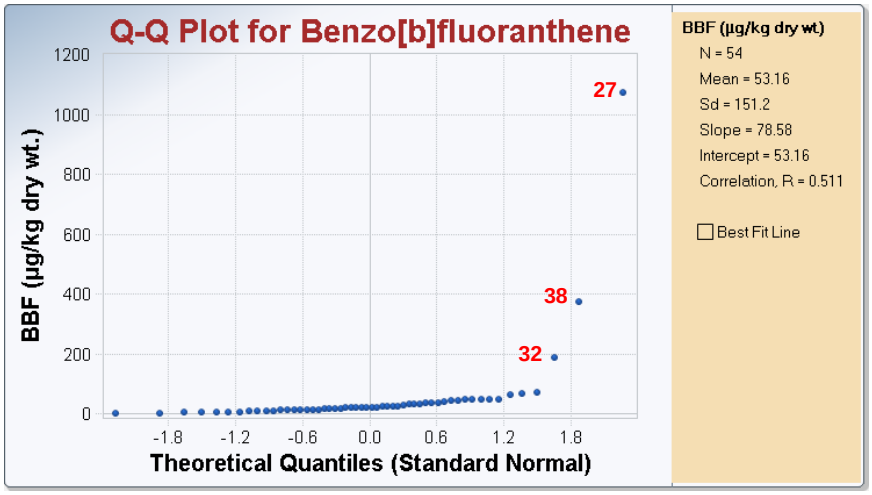

Q-Q Plot for Acenaphthene
AcNaph (µg/kg dry wt.)
Theoretical Quantiles (Standard Normal)
27
AcNaph (µg/kg dry wt)
N = 54
Mean = 16.34
Sd = 10.63
Slope = 10.28
Intercept = 16.34
Correlation, R = 0.951
Best Fit Line

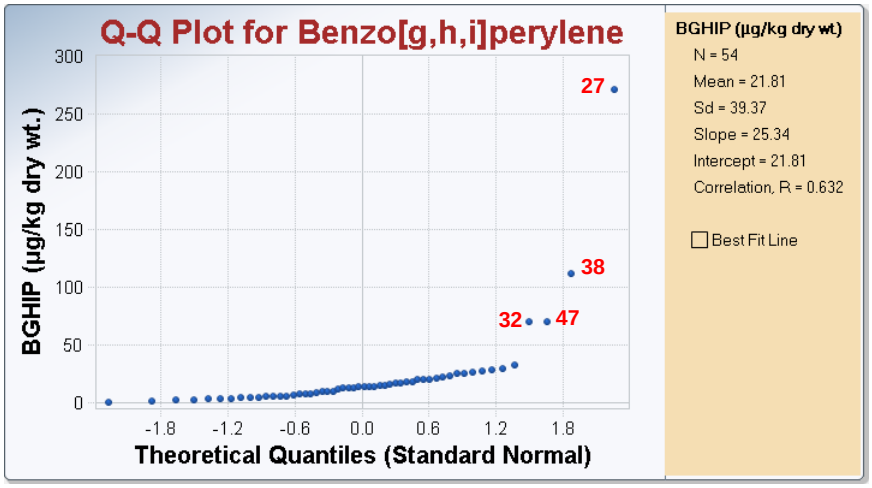

Q-Q Plot for Acenaphthylene
AcNaphYl (µg/kg dry wt.)
Theoretical Quantiles (Standard Normal)
27
38
24
AcNaphYl (µg/kg dry wt)
N = 54
Mean = 8.693
Sd = 28.03
Slope = 12.38
Intercept = 8.693
Correlation, R = 0.434
Best Fit Line

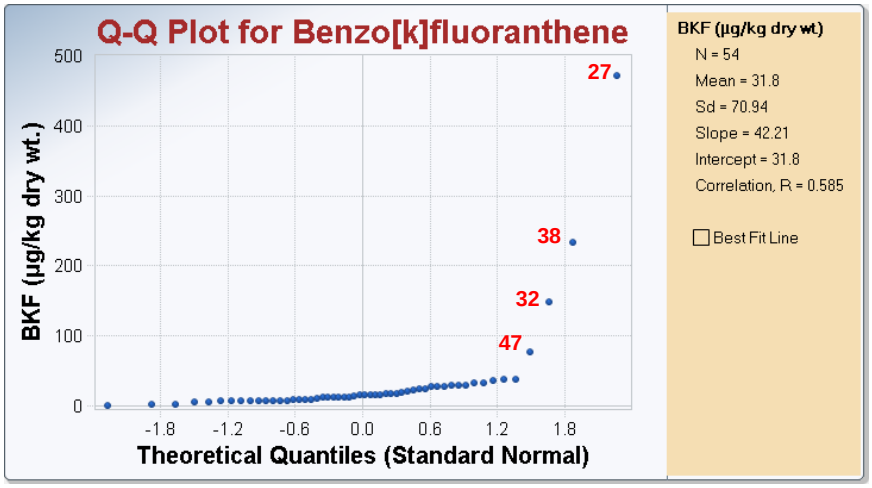

Q-Q Plot for Anthracene
ANT (µg/kg dry wt.)
Theoretical Quantiles (Standard Normal)
27
38
ANT (µg/kg dry wt)
N = 54
Mean = 11.71
Sd = 30.5
Slope = 14.71
Intercept = 11.71
Correlation, R = 0.474
Best Fit Line

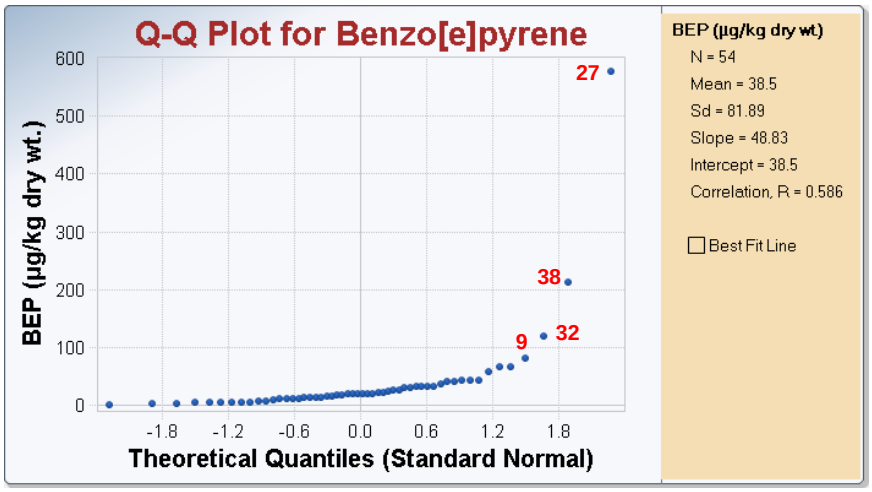

Q-Q Plot for Benzo[a]anthracene
BAA (µg/kg dry wt.)
600
500
400
300
200
100
0
27
38
32
24
47
-1.8
-1.2
-0.6
0.0
0.6
1.2
1.8
Theoretical Quantiles (Standard Normal)
BAA (µg/kg dry wt)
N = 54
Mean = 31.09
Sd = 77.82
Slope = 41.83
Intercept = 31.09
Correlation, R = 0.528
Best Fit Line

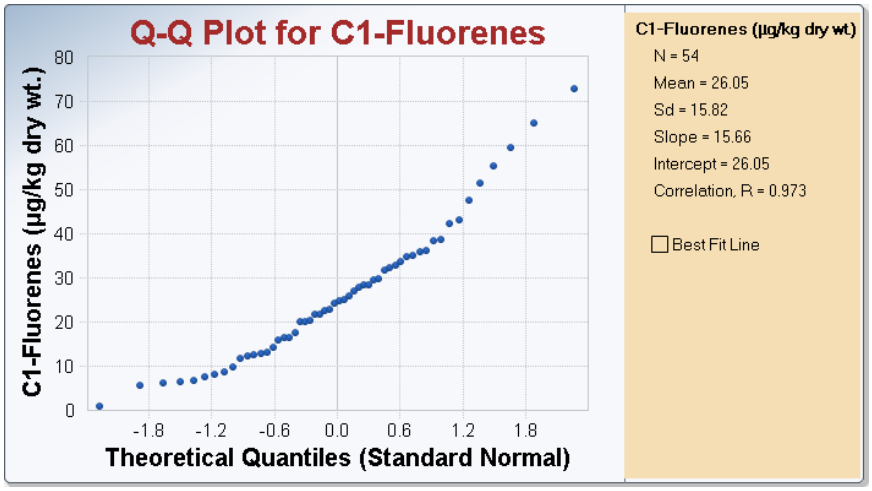

Q-Q Plot for Benzo[a]pyrene
BAP (µg/kg dry wt.)
700
600
500
400
300
200
100
0
27
38
32
-1.8
-1.2
-0.6
0.0
0.6
1.2
1.8
Theoretical Quantiles (Standard Normal)
BAP (µg/kg dry wt)
N = 54
Mean = 34.17
Sd = 96.41
Slope = 51.13
Intercept = 34.17
Correlation, R = 0.521
Best Fit Line

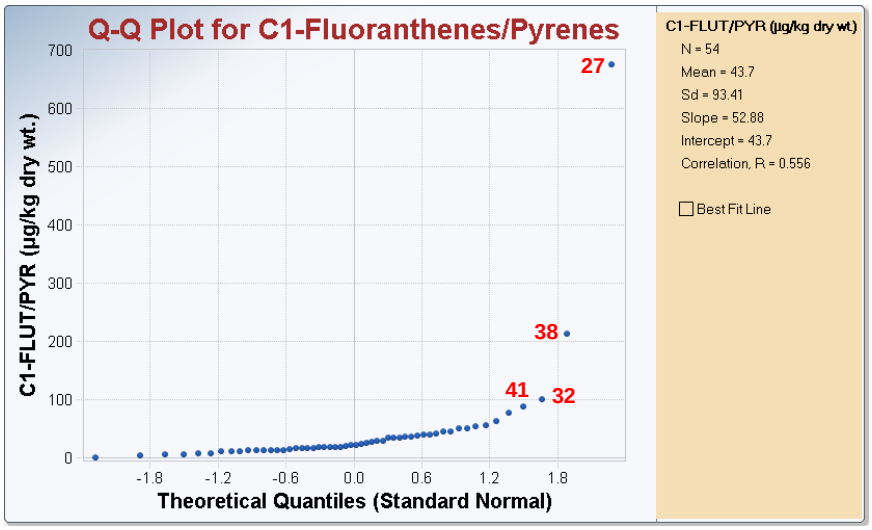

Q-Q Plot for Benzo[b]fluoranthene
BBF (µg/kg dry wt.)
1200
1000
800
600
400
200
0
27
38
32
-1.8
-1.2
-0.6
0.0
0.6
1.2
1.8
Theoretical Quantiles (Standard Normal)
BBF (µg/kg dry wt)
N = 54
Mean = 53.16
Sd = 151.2
Slope = 78.58
Intercept = 53.16
Correlation, R = 0.511
Best Fit Line

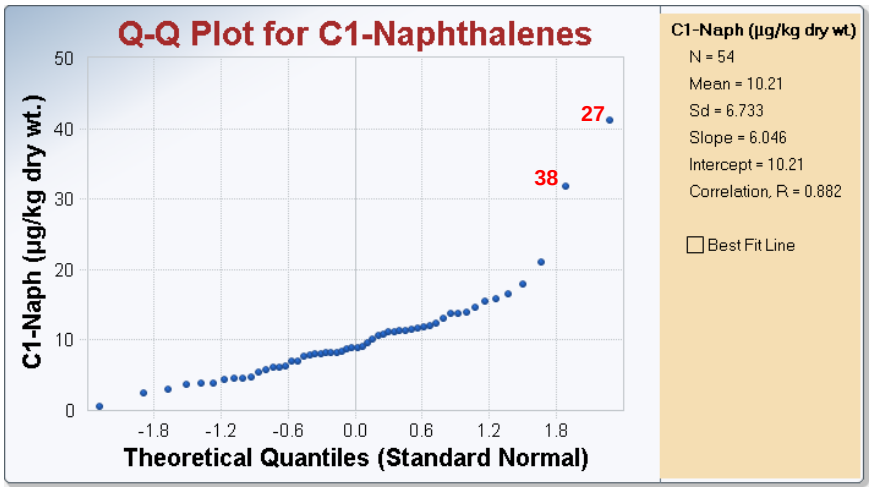

Q-Q Plot for Benzo[g,h,i]perylene
BGHIP (µg/kg dry wt.)
300
250
200
150
100
50
0
27
38
32
47
-1.8
-1.2
-0.6
0.0
0.6
1.2
1.8
Theoretical Quantiles (Standard Normal)
BGHIP (µg/kg dry wt)
N = 54
Mean = 21.81
Sd = 39.37
Slope = 25.34
Intercept = 21.81
Correlation, R = 0.632
Best Fit Line

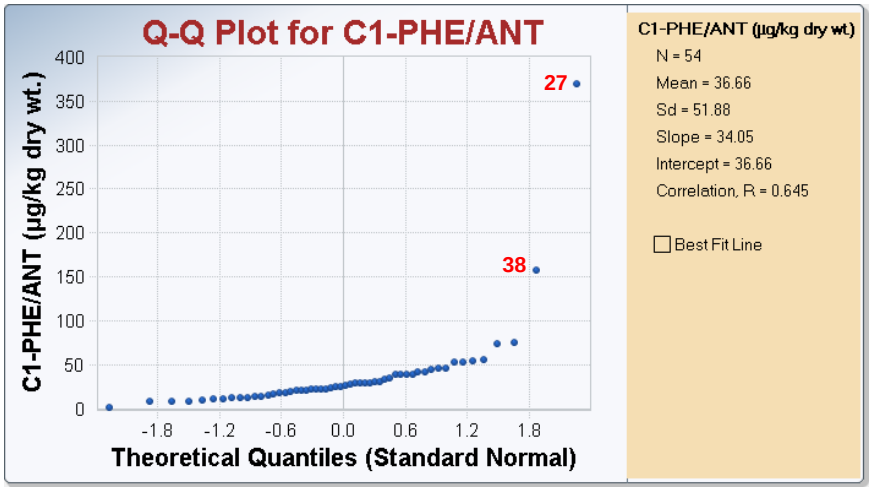

Q-Q Plot for Benzo[k]fluoranthene
BKF (µg/kg dry wt.)
500
400
300
200
100
0
27
38
32
47
-1.8
-1.2
-0.6
0.0
0.6
1.2
1.8
Theoretical Quantiles (Standard Normal)
BKF (µg/kg dry wt)
N = 54
Mean = 31.8
Sd = 70.94
Slope = 42.21
Intercept = 31.8
Correlation, R = 0.585
Best Fit Line

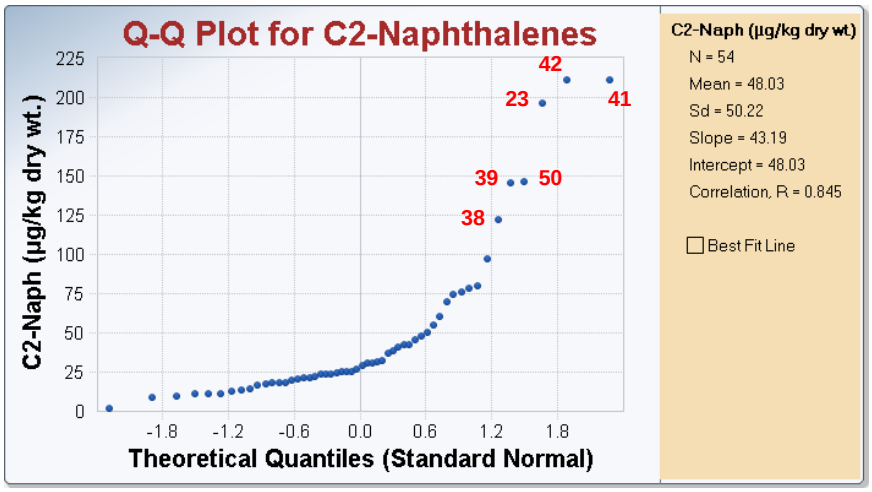

Q-Q Plot for Benzo[e]pyrene
BEP (µg/kg dry wt.)
600
500
400
300
200
100
0
27
38
9
32
-1.8
-1.2
-0.6
0.0
0.6
1.2
1.8
Theoretical Quantiles (Standard Normal)
BEP (µg/kg dry wt)
N = 54
Mean = 38.5
Sd = 81.89
Slope = 48.83
Intercept = 38.5
Correlation, R = 0.586
Best Fit Line

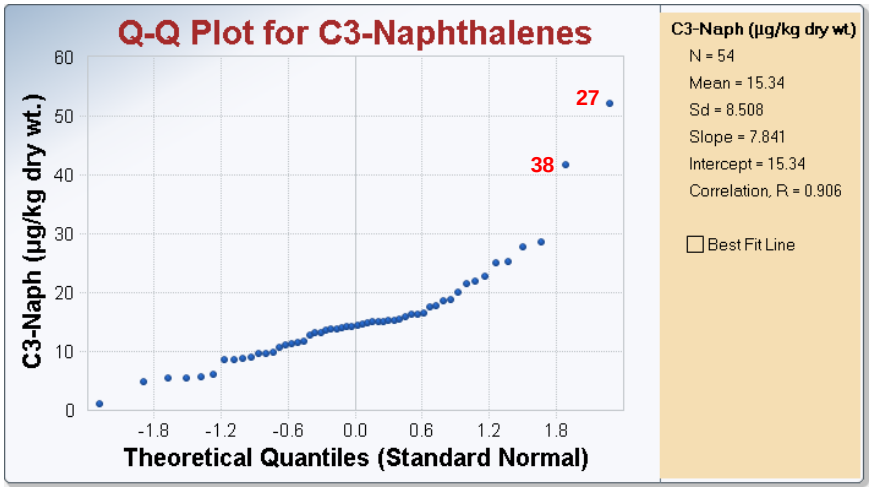

Q-Q Plot for C1-Fluorenes
C1-Fluorenes (µg/kg dry wt.)
Theoretical Quantiles (Standard Normal)
C1-Fluorenes (µg/kg dry wt)
N = 54
Mean = 26.05
Sd = 15.82
Slope = 15.66
Intercept = 26.05
Correlation, R = 0.973
Best Fit Line

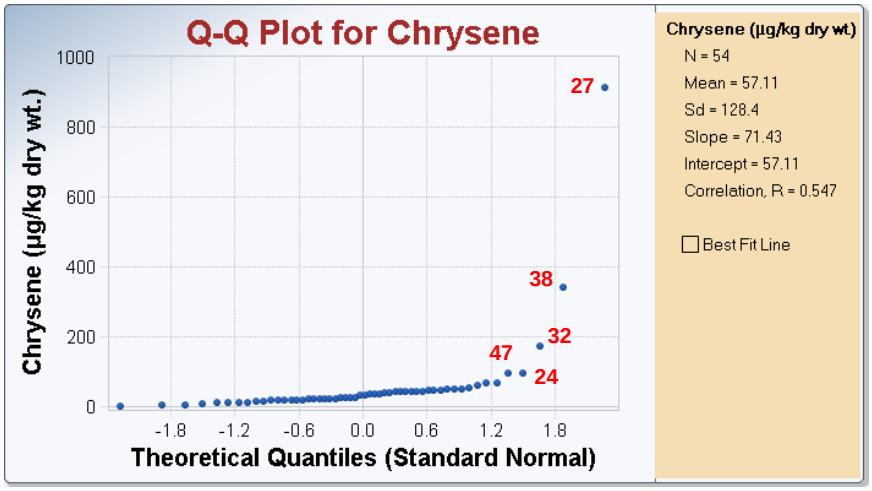

Q-Q Plot for C1-Fluoranthenes/Pyrenes
C1-FLUT/PYR (µg/kg dry wt.)
Theoretical Quantiles (Standard Normal)
27
38
41
32
C1-FLUT/PYR (µg/kg dry wt)
N = 54
Mean = 43.7
Sd = 93.41
Slope = 52.88
Intercept = 43.7
Correlation, R = 0.556
Best Fit Line

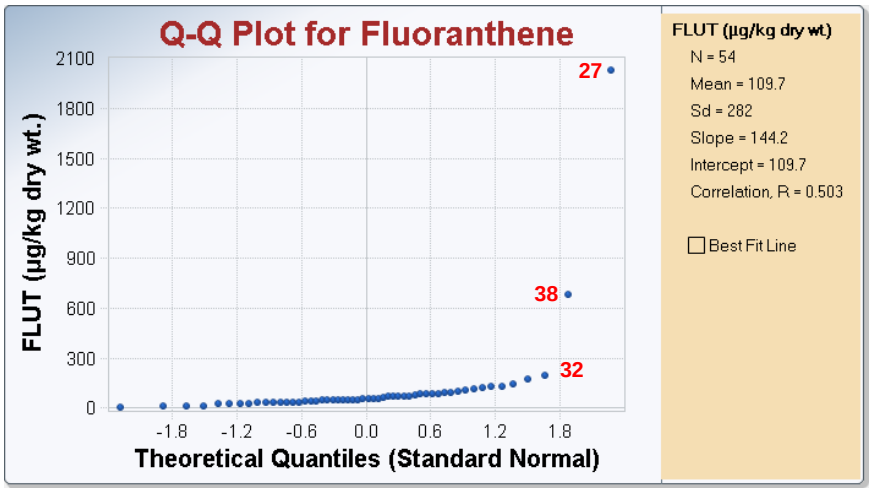

Q-Q Plot for C1-Naphthalenes
C1-Naph (µg/kg dry wt.)
Theoretical Quantiles (Standard Normal)
27
38
C1-Naph (µg/kg dry wt)
N = 54
Mean = 10.21
Sd = 6.733
Slope = 6.046
Intercept = 10.21
Correlation, R = 0.882
Best Fit Line

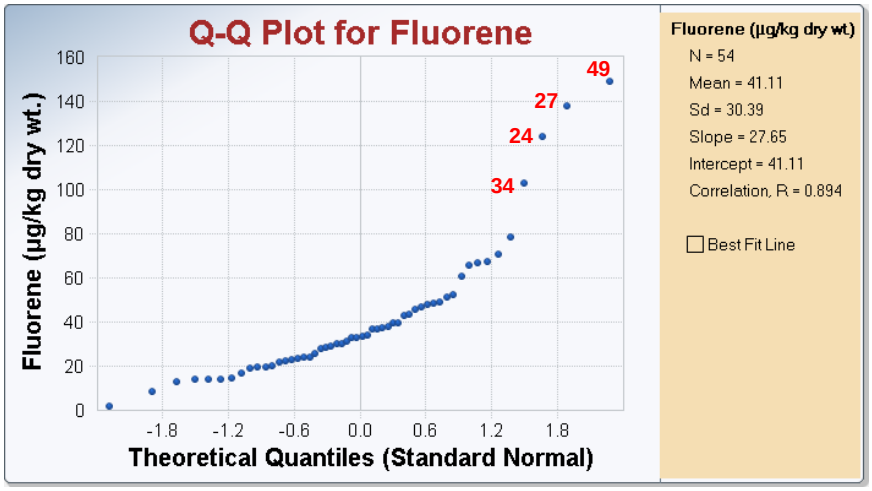

Q-Q Plot for C1-PHE/ANT
C1-PHE/ANT (µg/kg dry wt.)
400
350
300
250
200
150
100
50
0
27
38
-1.8
-1.2
-0.6
0.0
0.6
1.2
1.8
Theoretical Quantiles (Standard Normal)
C1-PHE/ANT (µg/kg dry wt)
N = 54
Mean = 36.66
Sd = 51.88
Slope = 34.05
Intercept = 36.66
Correlation, R = 0.645
Best Fit Line

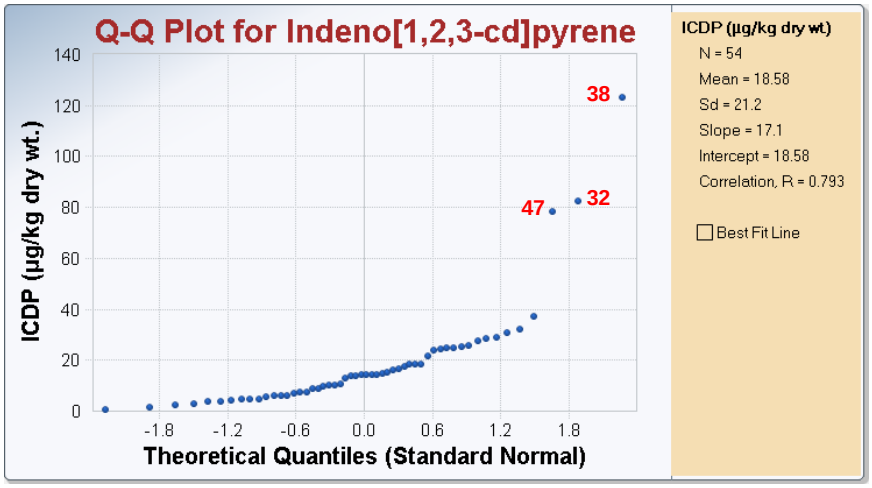

Q-Q Plot for C2-Naphthalenes
C2-Naph (µg/kg dry wt.)
225
200
175
150
125
100
75
50
25
0
42
23
41
39
50
38
-1.8
-1.2
-0.6
0.0
0.6
1.2
1.8
Theoretical Quantiles (Standard Normal)
C2-Naph (µg/kg dry wt)
N = 54
Mean = 48.03
Sd = 50.22
Slope = 43.19
Intercept = 48.03
Correlation, R = 0.845
Best Fit Line

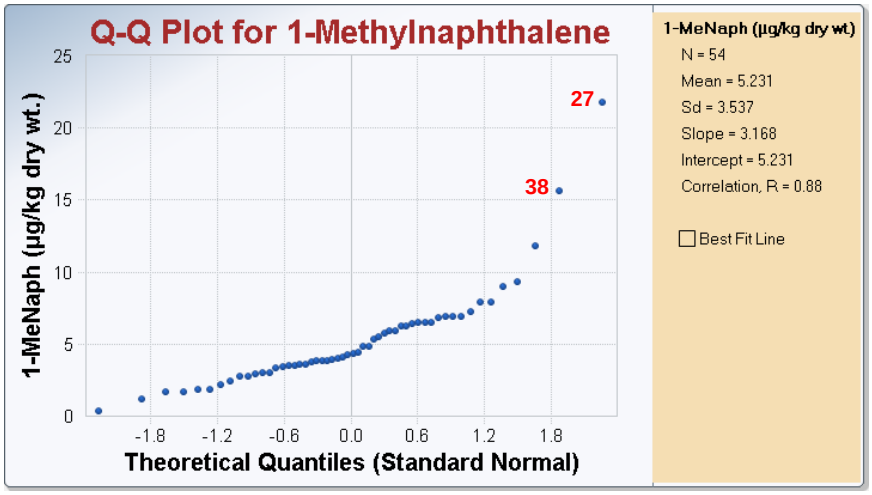

Q-Q Plot for C3-Naphthalenes
C3-Naph (µg/kg dry wt.)
60
50
40
30
20
10
0
27
38
-1.8
-1.2
-0.6
0.0
0.6
1.2
1.8
Theoretical Quantiles (Standard Normal)
C3-Naph (µg/kg dry wt)
N = 54
Mean = 15.34
Sd = 8.508
Slope = 7.841
Intercept = 15.34
Correlation, R = 0.906
Best Fit Line

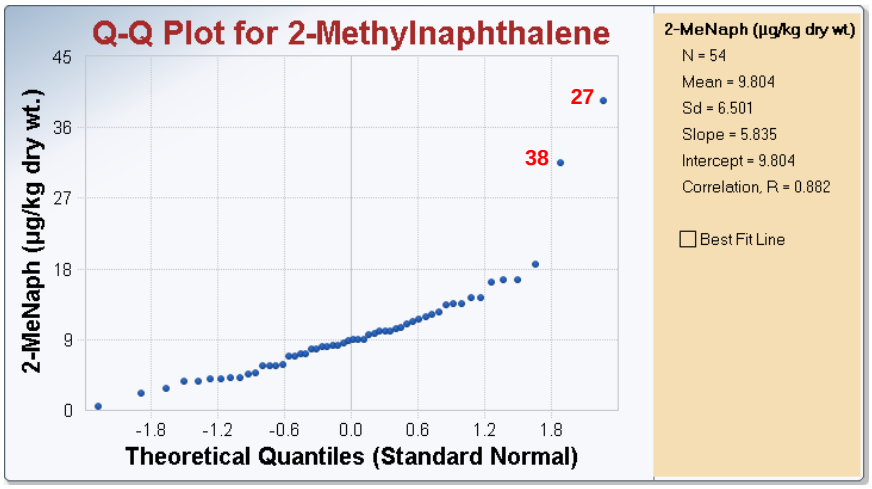

Q-Q Plot for Chrysene
Chrysene (µg/kg dry wt.)
1000
800
600
400
200
0
27
38
32
47
24
-1.8
-1.2
-0.6
0.0
0.6
1.2
1.8
Theoretical Quantiles (Standard Normal)
Chrysene (µg/kg dry wt)
N = 54
Mean = 57.11
Sd = 128.4
Slope = 71.43
Intercept = 57.11
Correlation, R = 0.547
Best Fit Line

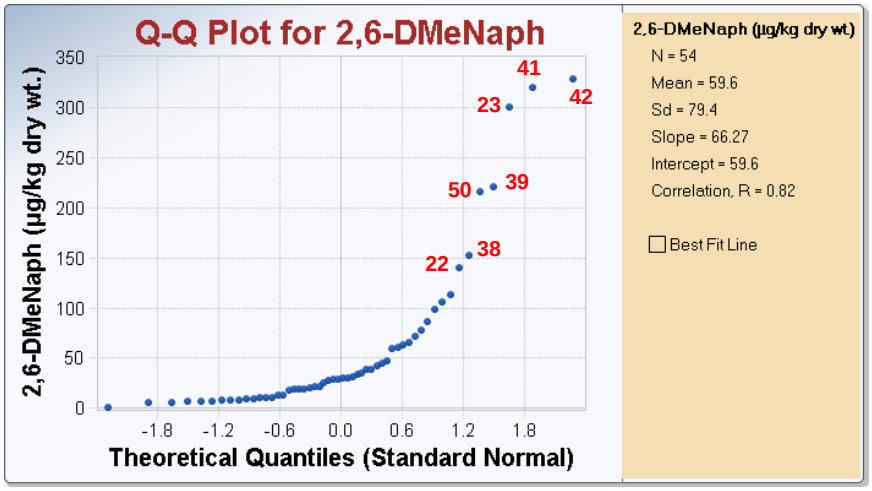

Q-Q Plot for Fluoranthene
FLUT (µg/kg dry wt.)
2100
1800
1500
1200
900
600
300
0
27
38
32
-1.8
-1.2
-0.6
0.0
0.6
1.2
1.8
Theoretical Quantiles (Standard Normal)
FLUT (µg/kg dry wt)
N = 54
Mean = 109.7
Sd = 282
Slope = 144.2
Intercept = 109.7
Correlation, R = 0.503
Best Fit Line

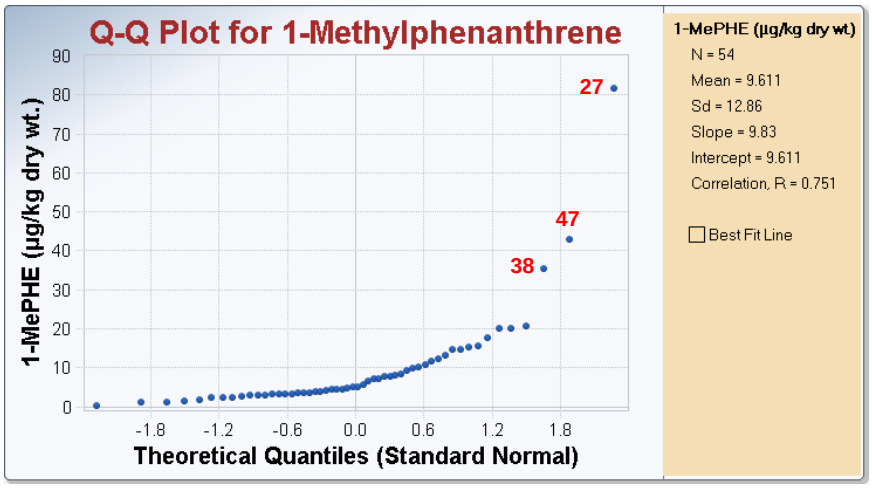

Q-Q Plot for Fluorene
Fluorene (µg/kg dry wt.)
160
140
120
100
80
60
40
20
0
49
27
24
34
-1.8
-1.2
-0.6
0.0
0.6
1.2
1.8
Theoretical Quantiles (Standard Normal)
Fluorene (µg/kg dry wt)
N = 54
Mean = 41.11
Sd = 30.39
Slope = 27.65
Intercept = 41.11
Correlation, R = 0.894
Best Fit Line

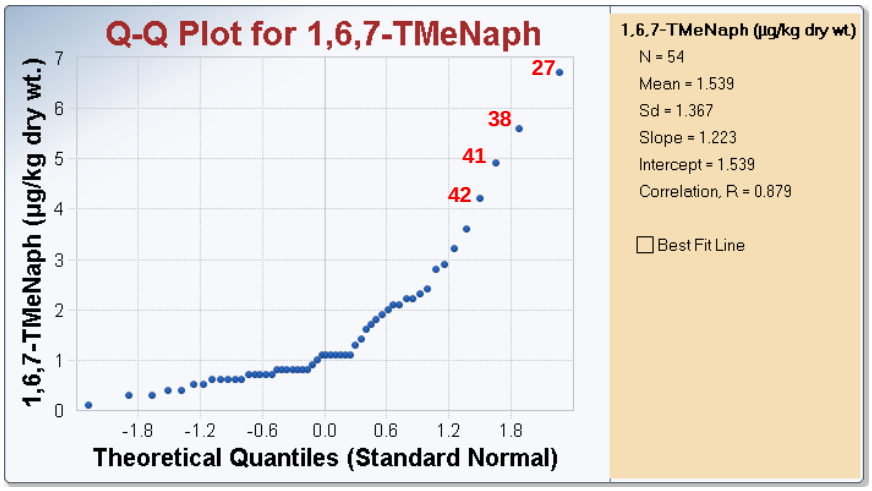

Q-Q Plot for Indeno[1,2,3-cd]pyrene
ICDP (µg/kg dry wt.)
140
120
100
80
60
40
20
0
38
47
32
-1.8
-1.2
-0.6
0.0
0.6
1.2
1.8
Theoretical Quantiles (Standard Normal)
ICDP (µg/kg dry wt)
N = 54
Mean = 18.58
Sd = 21.2
Slope = 17.1
Intercept = 18.58
Correlation, R = 0.793
Best Fit Line

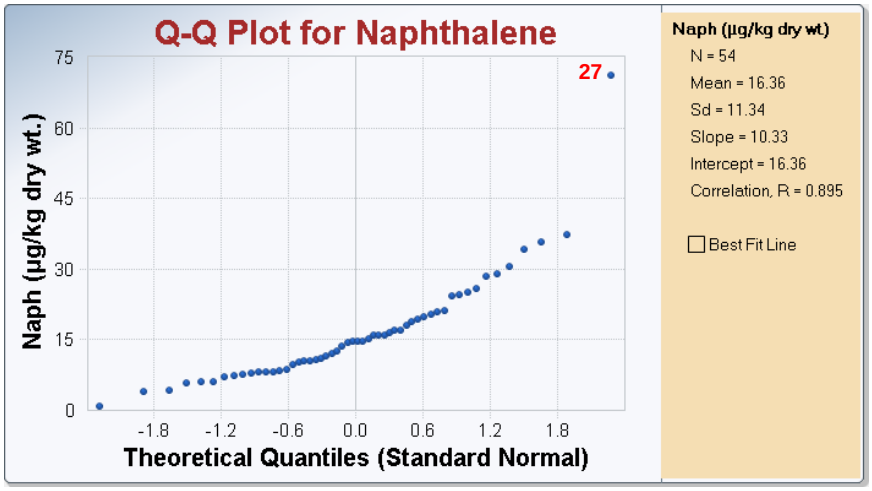

Q-Q Plot for 1-Methylnaphthalene
1-MeNaph (µg/kg dry wt.)
25
20
15
10
5
0
27
38
-1.8
-1.2
-0.6
0.0
0.6
1.2
1.8
Theoretical Quantiles (Standard Normal)
1-MeNaph (µg/kg dry wt)
N = 54
Mean = 5.231
Sd = 3.537
Slope = 3.168
Intercept = 5.231
Correlation, R = 0.88
Best Fit Line

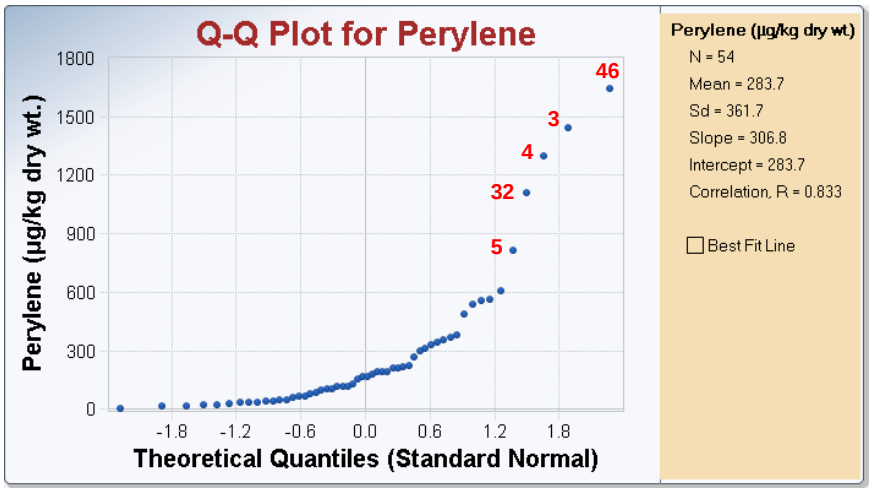

Q-Q Plot for 2-Methylnaphthalene
2-MeNaph (µg/kg dry wt.)
45
36
27
18
9
0
27
38
-1.8
-1.2
-0.6
0.0
0.6
1.2
1.8
Theoretical Quantiles (Standard Normal)
2-MeNaph (µg/kg dry wt)
N = 54
Mean = 9.804
Sd = 6.501
Slope = 5.835
Intercept = 9.804
Correlation, R = 0.882
Best Fit Line

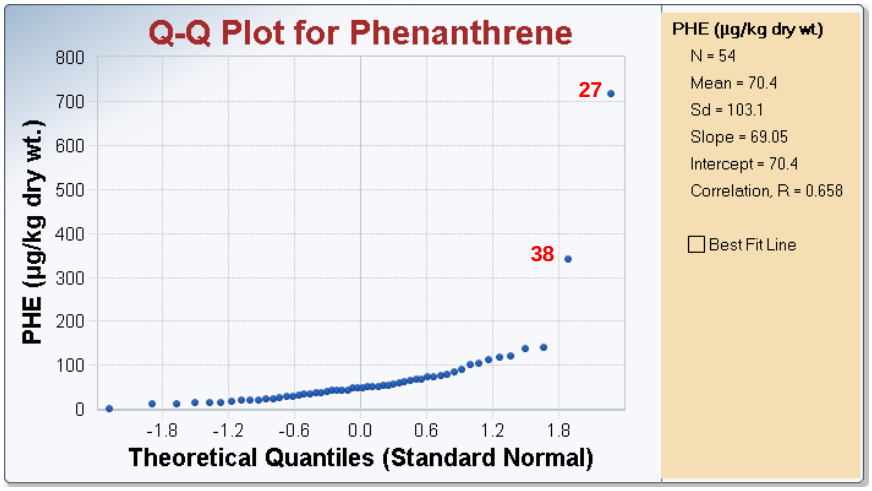

Q-Q Plot for 2,6-DMeNaph
2,6-DMeNaph (µg/kg dry wt.)
Theoretical Quantiles (Standard Normal)
41
42
23
50
39
22
38
2,6-DMeNaph (µg/kg dry wt)
N = 54
Mean = 59.6
Sd = 79.4
Slope = 66.27
Intercept = 59.6
Correlation, R = 0.82
Best Fit Line

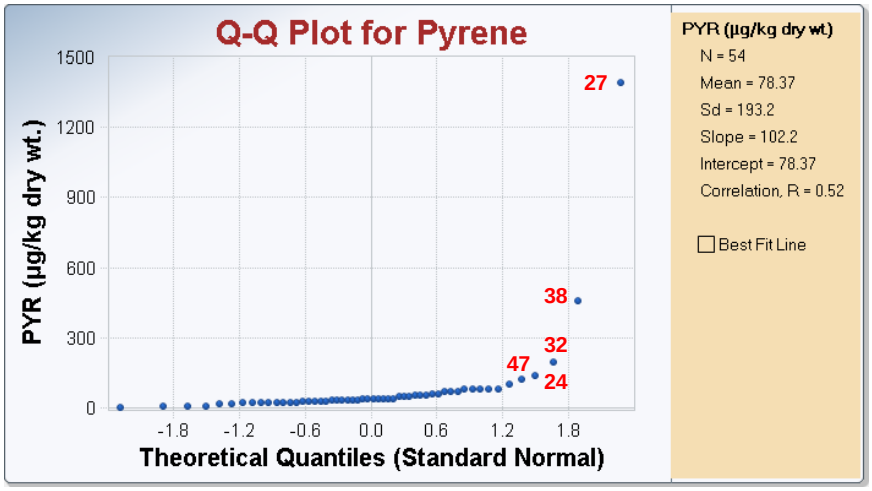

Q-Q Plot for 1-Methylphenanthrene
1-MePHE (µg/kg dry wt.)
Theoretical Quantiles (Standard Normal)
27
47
38
1-MePHE (µg/kg dry wt)
N = 54
Mean = 9.611
Sd = 12.86
Slope = 9.83
Intercept = 9.611
Correlation, R = 0.751
Best Fit Line


Q-Q Plot for 1,6,7-TMeNaph
1,6,7-TMeNaph (µg/kg dry wt.)
Theoretical Quantiles (Standard Normal)
27
38
41
42
1,6,7-TMeNaph (µg/kg dry wt)
N = 54
Mean = 1.539
Sd = 1.367
Slope = 1.223
Intercept = 1.539
Correlation, R = 0.879
Best Fit Line

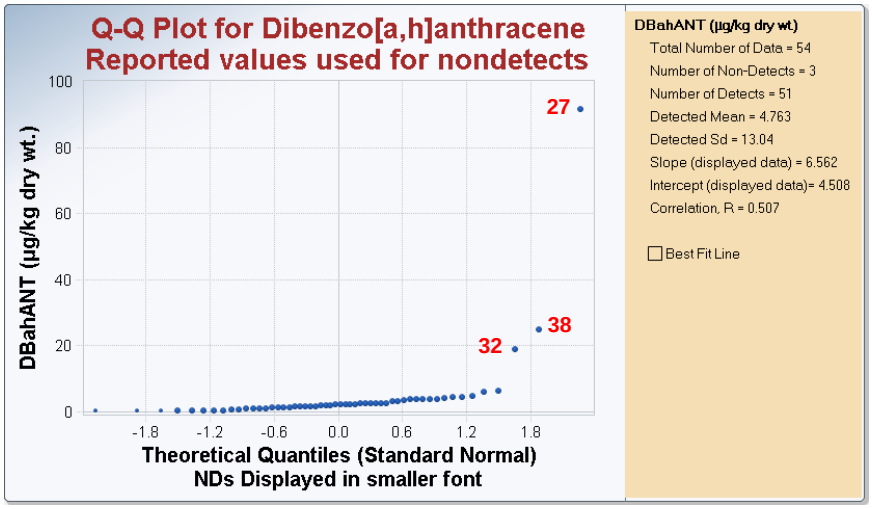

Q-Q Plot for Naphthalene
Naph (µg/kg dry wt.)
75
60
45
30
15
0
27
-1.8
-1.2
-0.6
0.0
0.6
1.2
1.8
Theoretical Quantiles (Standard Normal)
Naph (µg/kg dry wt)
N = 54
Mean = 16.36
Sd = 11.34
Slope = 10.33
Intercept = 16.36
Correlation, R = 0.895
Best Fit Line

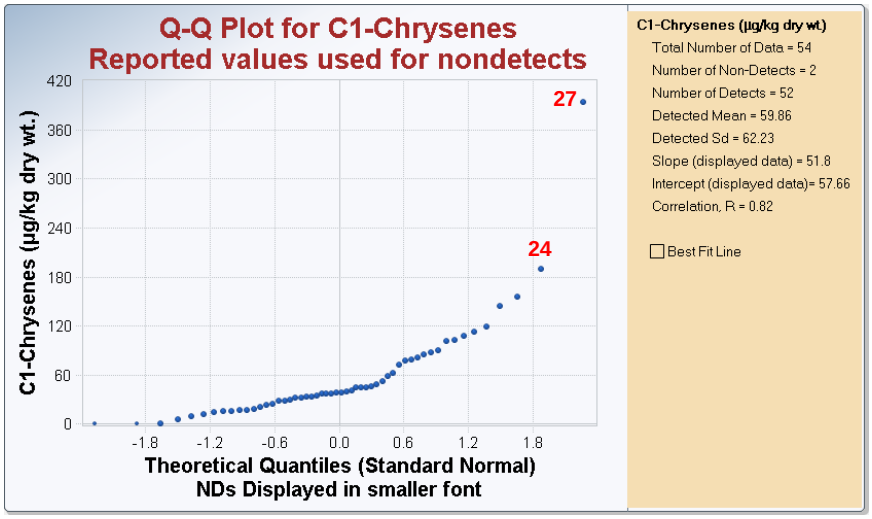

Q-Q Plot for Perylene
Perylene (µg/kg dry wt.)
1800
1500
1200
900
600
300
0
46
3
4
32
5
-1.8
-1.2
-0.6
0.0
0.6
1.2
1.8
Theoretical Quantiles (Standard Normal)
Perylene (µg/kg dry wt)
N = 54
Mean = 283.7
Sd = 361.7
Slope = 306.8
Intercept = 283.7
Correlation, R = 0.833
Best Fit Line

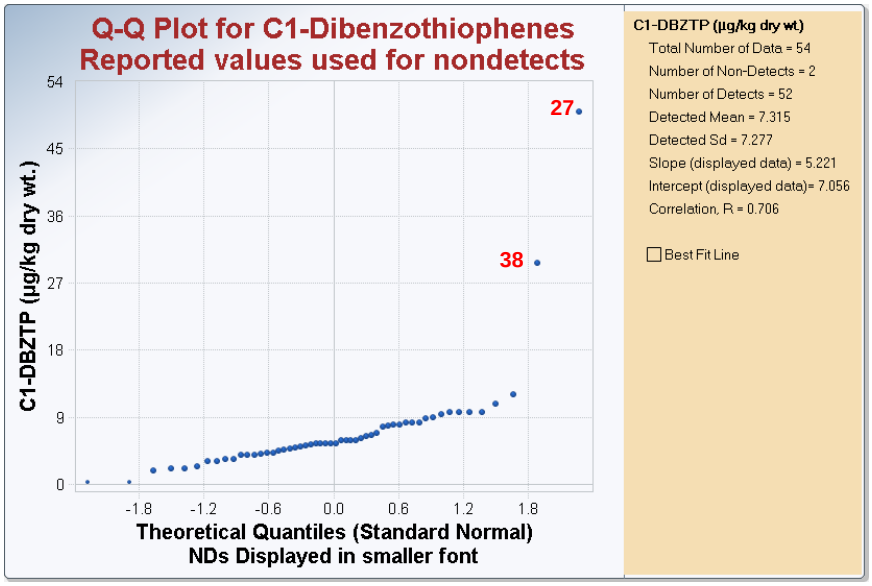

Q-Q Plot for Phenanthrene
PHE (µg/kg dry wt.)
800
700
600
500
400
300
200
100
0
27
38
-1.8
-1.2
-0.6
0.0
0.6
1.2
1.8
Theoretical Quantiles (Standard Normal)
PHE (µg/kg dry wt)
N = 54
Mean = 70.4
Sd = 103.1
Slope = 69.05
Intercept = 70.4
Correlation, R = 0.658
Best Fit Line

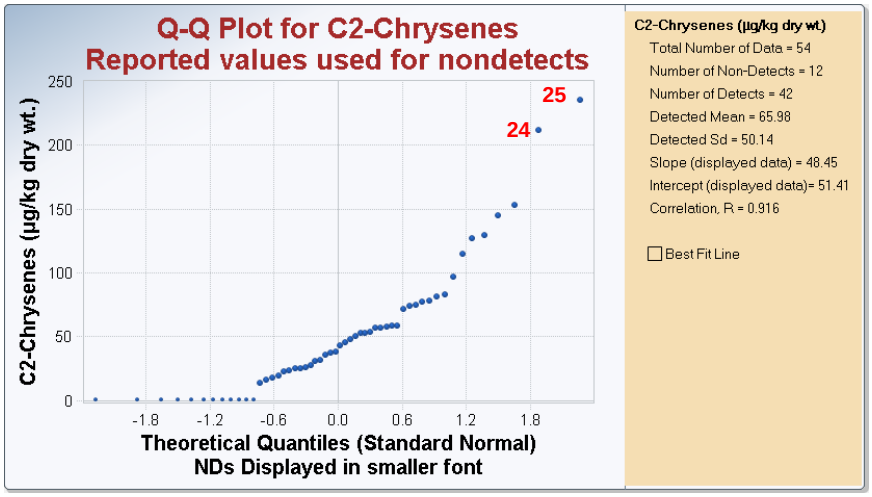


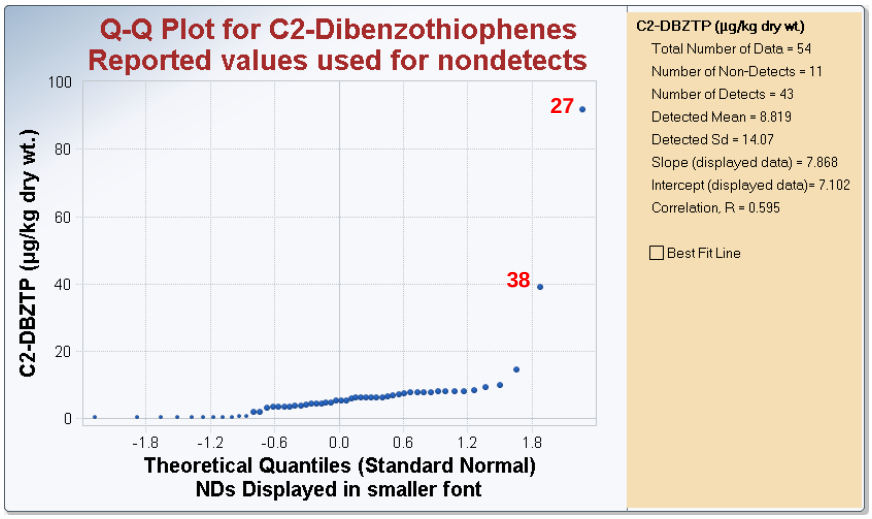
Q-Q Plots for PAHs with Censored Data (samples noted in red font are significant at the 5% significance level)

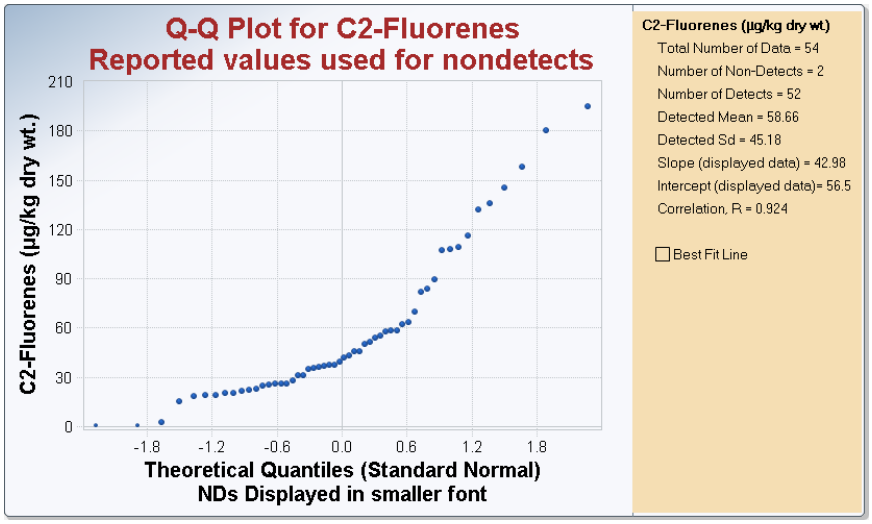


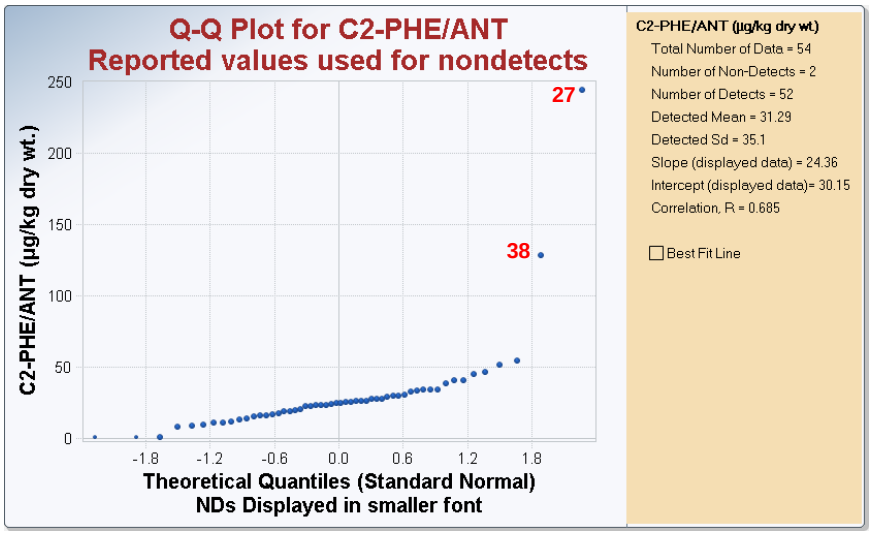


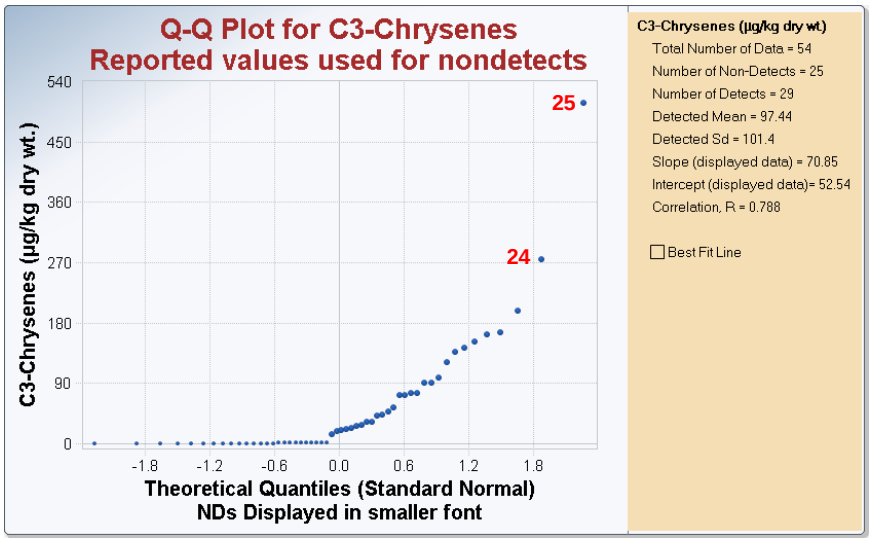

Q-Q Plot for C1-Dibenzothiophenes
Reported values used for nondetects
C1-DBZTP (µg/kg dry wt.)
54
45
36
27
18
9
0
27
38
-1.8
-1.2
-0.6
0.0
0.6
1.2
1.8
Theoretical Quantiles (Standard Normal)
NDs Displayed in smaller font
C1-DBZTP (µg/kg dry wt.)
Total Number of Data = 54
Number of Non-Detects = 2
Number of Detects = 52
Detected Mean = 7.315
Detected Sd = 7.277
Slope (displayed data) = 5.221
Intercept (displayed data)= 7.056
Correlation, R = 0.706
Best Fit Line

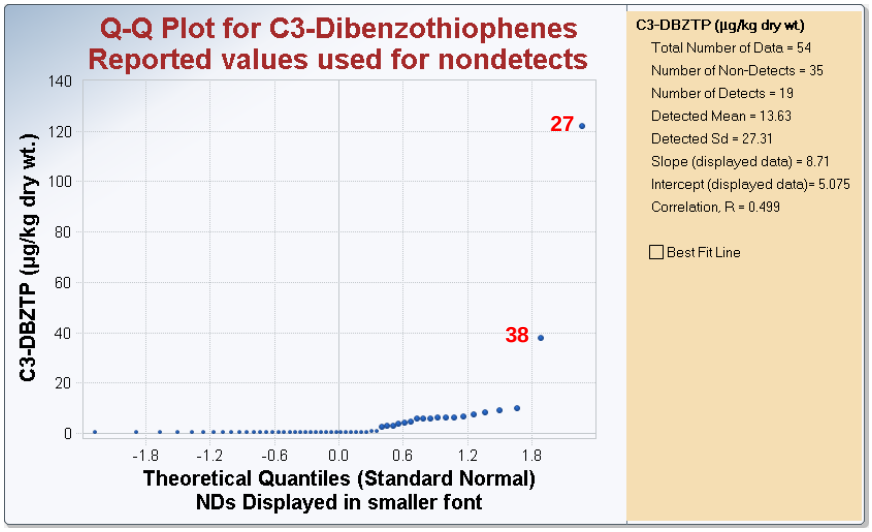

Q-Q Plot for C2-Chrysenes
Reported values used for nondetects
C2-Chrysenes (µg/kg dry wt.)
250
200
150
100
50
0
25
24
-1.8
-1.2
-0.6
0.0
0.6
1.2
1.8
Theoretical Quantiles (Standard Normal)
NDs Displayed in smaller font
C2-Chrysenes (µg/kg dry wt.)
Total Number of Data = 54
Number of Non-Detects = 12
Number of Detects = 42
Detected Mean = 65.98
Detected Sd = 50.14
Slope (displayed data) = 48.45
Intercept (displayed data)= 51.41
Correlation, R = 0.916
Best Fit Line

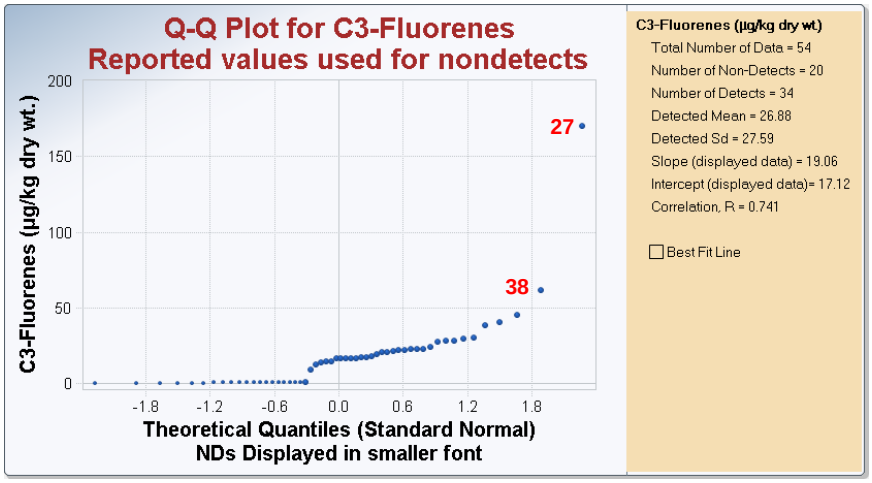

Q-Q Plot for C2-Dibenzothiophenes
Reported values used for nondetects
C2-DBZTP (µg/kg dry wt.)
100
80
60
40
20
0
27
38
-1.8
-1.2
-0.6
0.0
0.6
1.2
1.8
Theoretical Quantiles (Standard Normal)
NDs Displayed in smaller font
C2-DBZTP (µg/kg dry wt.)
Total Number of Data = 54
Number of Non-Detects = 11
Number of Detects = 43
Detected Mean = 8.819
Detected Sd = 14.07
Slope (displayed data) = 7.868
Intercept (displayed data)= 7.102
Correlation, R = 0.595
Best Fit Line

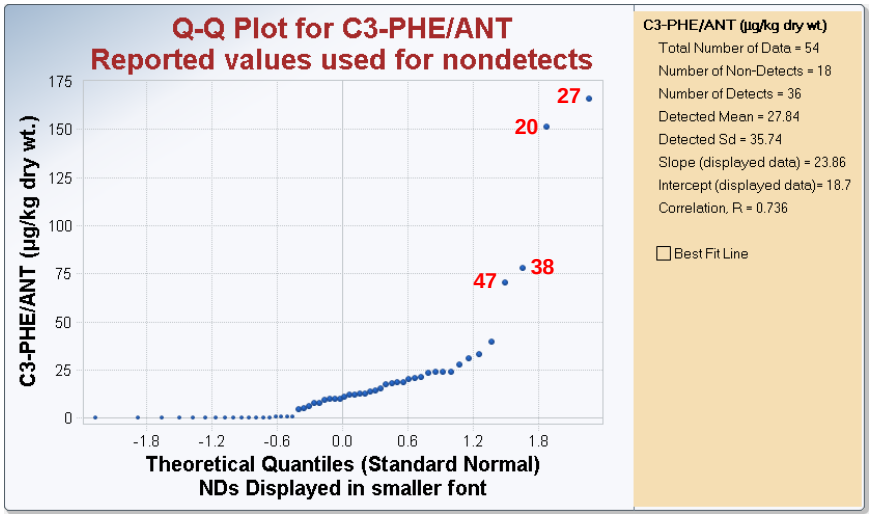

Q-Q Plot for C2-Fluorenes
Reported values used for nondetects
C2-Fluorenes (µg/kg dry wt.)
210
180
150
120
90
60
30
0
-1.8
-1.2
-0.6
0.0
0.6
1.2
1.8
Theoretical Quantiles (Standard Normal)
NDs Displayed in smaller font
C2-Fluorenes (µg/kg dry wt)
Total Number of Data = 54
Number of Non-Detects = 2
Number of Detects = 52
Detected Mean = 58.66
Detected Sd = 45.18
Slope (displayed data) = 42.98
Intercept (displayed data)= 56.5
Correlation, R = 0.924
Best Fit Line

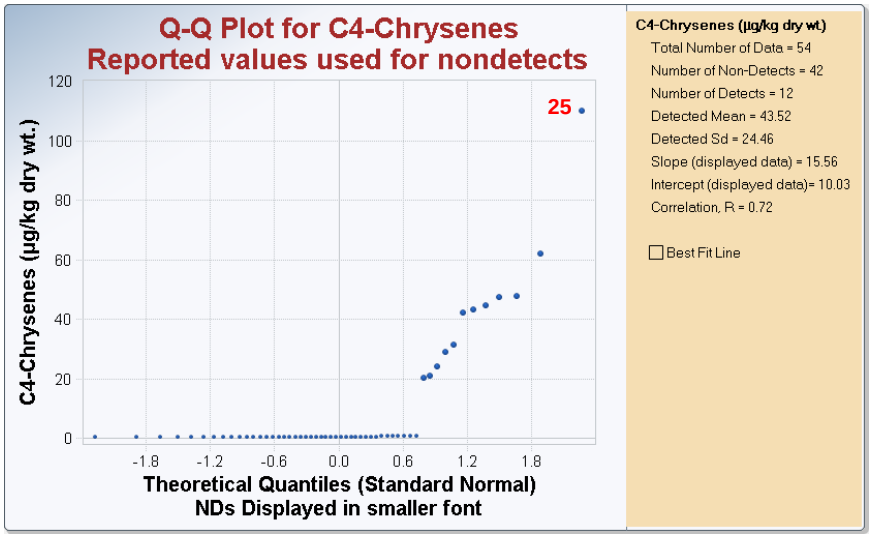

Q-Q Plot for C2-PHE/ANT
Reported values used for nondetects
C2-PHE/ANT (µg/kg dry wt.)
250
200
150
100
50
0
27
38
-1.8
-1.2
-0.6
0.0
0.6
1.2
1.8
Theoretical Quantiles (Standard Normal)
NDs Displayed in smaller font
C2-PHE/ANT (µg/kg dry wt)
Total Number of Data = 54
Number of Non-Detects = 2
Number of Detects = 52
Detected Mean = 31.29
Detected Sd = 35.1
Slope (displayed data) = 24.36
Intercept (displayed data)= 30.15
Correlation, R = 0.685
Best Fit Line

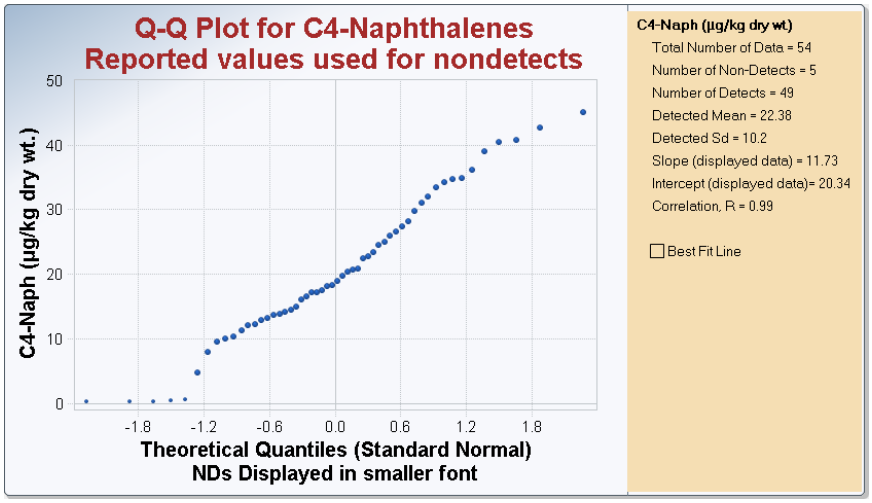

Q-Q Plot for C3-Chrysenes
Reported values used for nondetects
C3-Chrysenes (µg/kg dry wt.)
540
450
360
270
180
90
0
25
24
-1.8
-1.2
-0.6
0.0
0.6
1.2
1.8
Theoretical Quantiles (Standard Normal)
NDs Displayed in smaller font
C3-Chrysenes (µg/kg dry wt)
Total Number of Data = 54
Number of Non-Detects = 25
Number of Detects = 29
Detected Mean = 97.44
Detected Sd = 101.4
Slope (displayed data) = 70.85
Intercept (displayed data)= 52.54
Correlation, R = 0.788
Best Fit Line

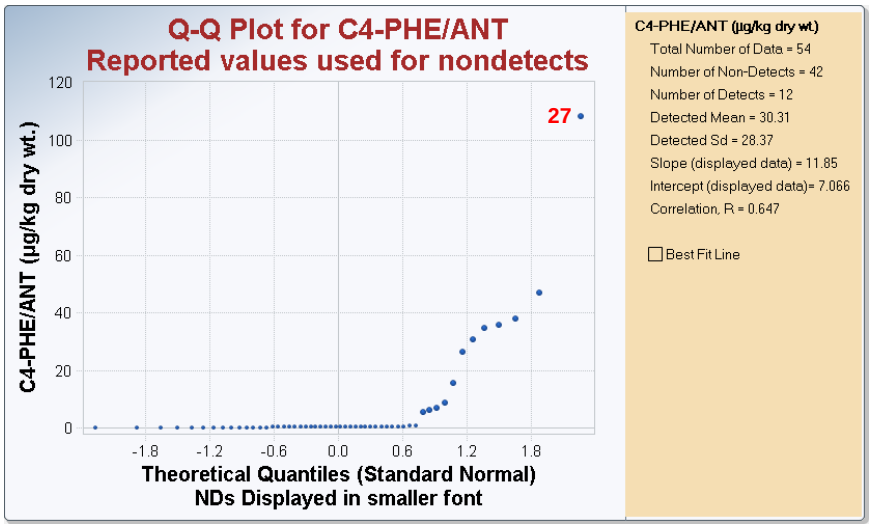

Q-Q Plot for C3-Dibenzothiophenes
Reported values used for nondetects
C3-DBZTP (µg/kg dry wt.)
140
120
100
80
60
40
20
0
27
38
-1.8
-1.2
-0.6
0.0
0.6
1.2
1.8
Theoretical Quantiles (Standard Normal)
NDs Displayed in smaller font
C3-DBZTP (µg/kg dry wt.)
Total Number of Data = 54
Number of Non-Detects = 35
Number of Detects = 19
Detected Mean = 13.63
Detected Sd = 27.31
Slope (displayed data) = 8.71
Intercept (displayed data)= 5.075
Correlation, R = 0.499
Best Fit Line

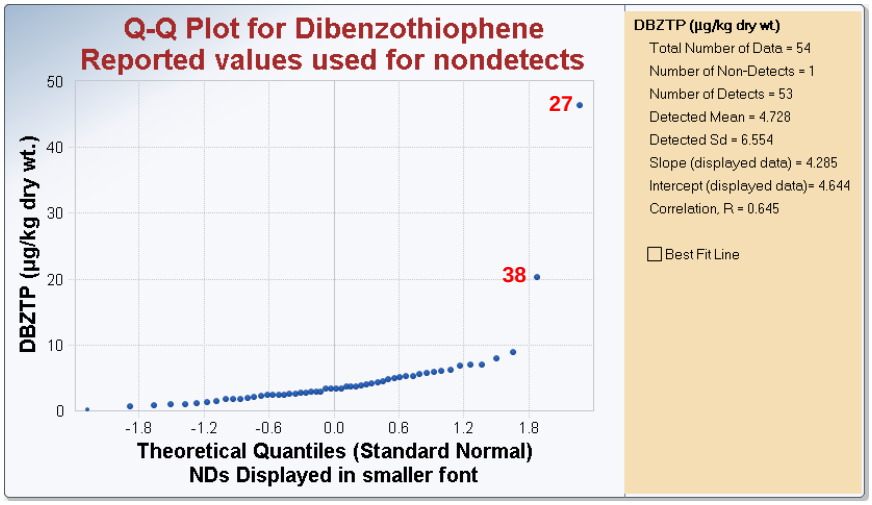

Q-Q Plot for C3-Fluorenes
Reported values used for nondetects
C3-Fluorenes (µg/kg dry wt.)
200
150
100
50
0
27
38
-1.8
-1.2
-0.6
0.0
0.6
1.2
1.8
Theoretical Quantiles (Standard Normal)
NDs Displayed in smaller font
C3-Fluorenes (µg/kg dry wt.)
Total Number of Data = 54
Number of Non-Detects = 20
Number of Detects = 34
Detected Mean = 26.88
Detected Sd = 27.59
Slope (displayed data) = 19.06
Intercept (displayed data)= 17.12
Correlation, R = 0.741
Best Fit Line


Q-Q Plot for C3-PHE/ANT
Reported values used for nondetects
C3-PHE/ANT (µg/kg dry wt.)
175
150
125
100
75
50
25
0
27
20
47
38
-1.8
-1.2
-0.6
0.0
0.6
1.2
1.8
Theoretical Quantiles (Standard Normal)
NDs Displayed in smaller font
C3-PHE/ANT (µg/kg dry wt.)
Total Number of Data = 54
Number of Non-Detects = 18
Number of Detects = 36
Detected Mean = 27.84
Detected Sd = 35.74
Slope (displayed data) = 23.86
Intercept (displayed data)= 18.7
Correlation, R = 0.736
Best Fit Line

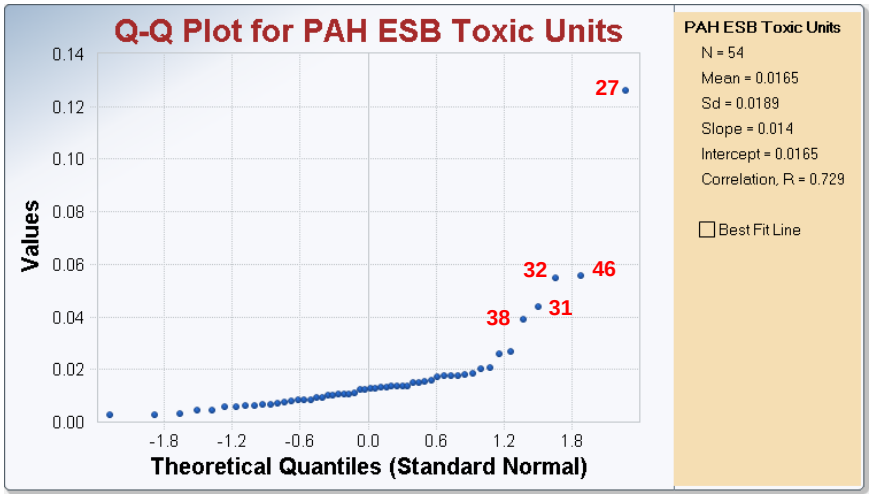

Q-Q Plot for C4-Chrysenes
Reported values used for nondetects
C4-Chrysenes (µg/kg dry wt.)
120
100
80
60
40
20
0
25
-1.8
-1.2
-0.6
0.0
0.6
1.2
1.8
Theoretical Quantiles (Standard Normal)
NDs Displayed in smaller font
C4-Chrysenes (µg/kg dry wt)
Total Number of Data = 54
Number of Non-Detects = 42
Number of Detects = 12
Detected Mean = 43.52
Detected Sd = 24.46
Slope (displayed data) = 15.56
Intercept (displayed data)= 10.03
Correlation, R = 0.72
Best Fit Line


Q-Q Plot for C4-Naphthalenes
Reported values used for nondetects
C4-Naph (µg/kg dry wt.)
50
40
30
20
10
0
-1.8
-1.2
-0.6
0.0
0.6
1.2
1.8
Theoretical Quantiles (Standard Normal)
NDs Displayed in smaller font
C4-Naph (µg/kg dry wt)
Total Number of Data = 54
Number of Non-Detects = 5
Number of Detects = 49
Detected Mean = 22.38
Detected Sd = 10.2
Slope (displayed data) = 11.73
Intercept (displayed data)= 20.34
Correlation, R = 0.99
Best Fit Line


Q-Q Plot for C4-PHE/ANT
Reported values used for nondetects
C4-PHE/ANT (µg/kg dry wt.)
120
100
80
60
40
20
0
27
-1.8
-1.2
-0.6
0.0
0.6
1.2
1.8
Theoretical Quantiles (Standard Normal)
NDs Displayed in smaller font
C4-PHE/ANT (µg/kg dry wt)
Total Number of Data = 54
Number of Non-Detects = 42
Number of Detects = 12
Detected Mean = 30.31
Detected Sd = 28.37
Slope (displayed data) = 11.85
Intercept (displayed data)= 7.066
Correlation, R = 0.647
Best Fit Line

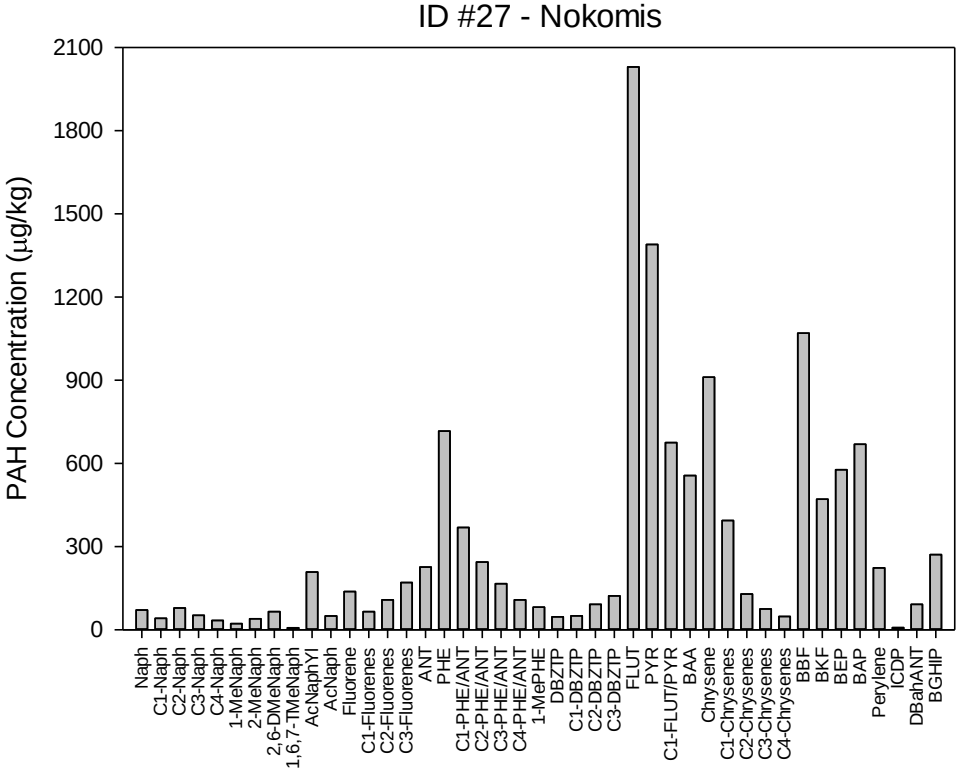


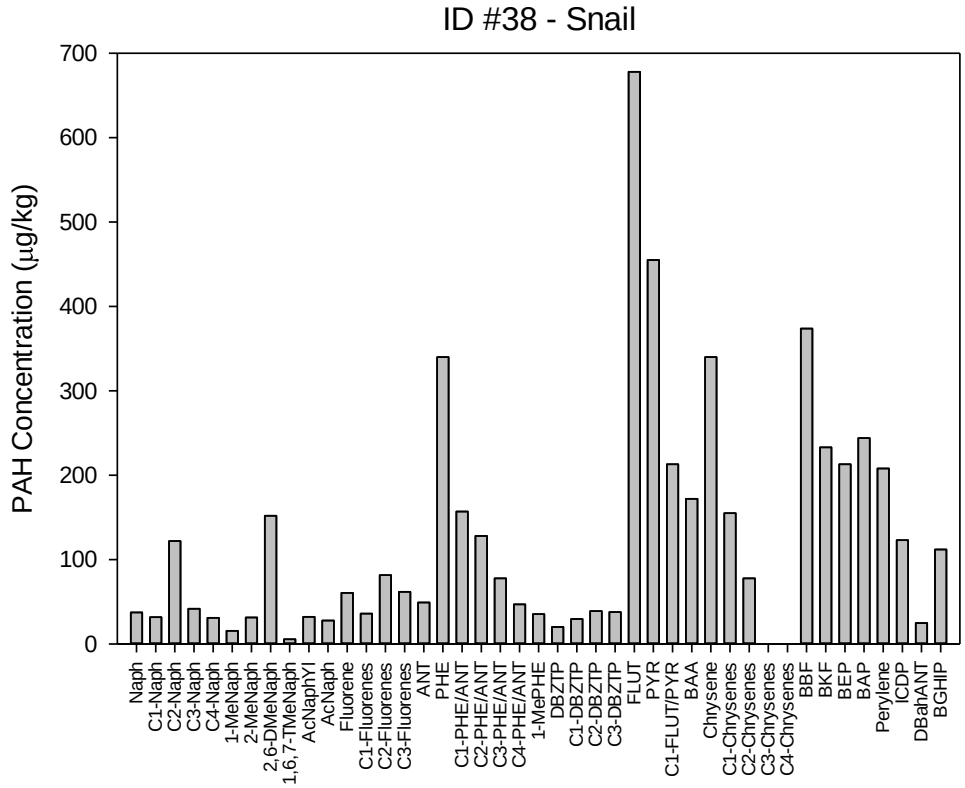
Q-Q Plots for PAH ESB Toxic Units (samples noted in red font are significant at the 5% significance level)

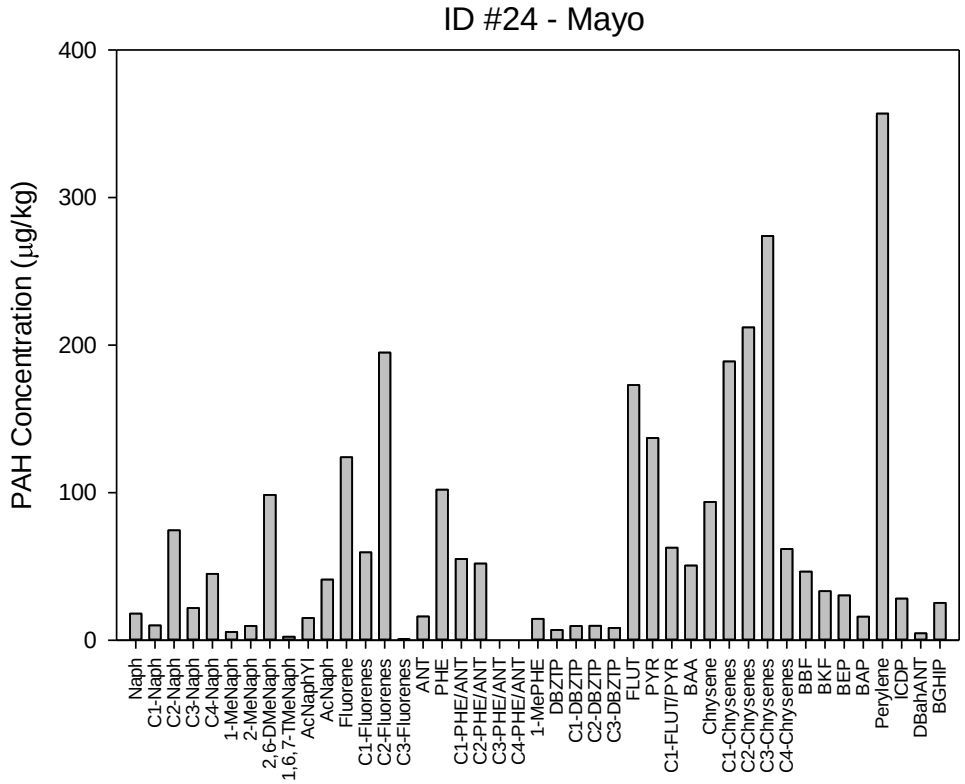


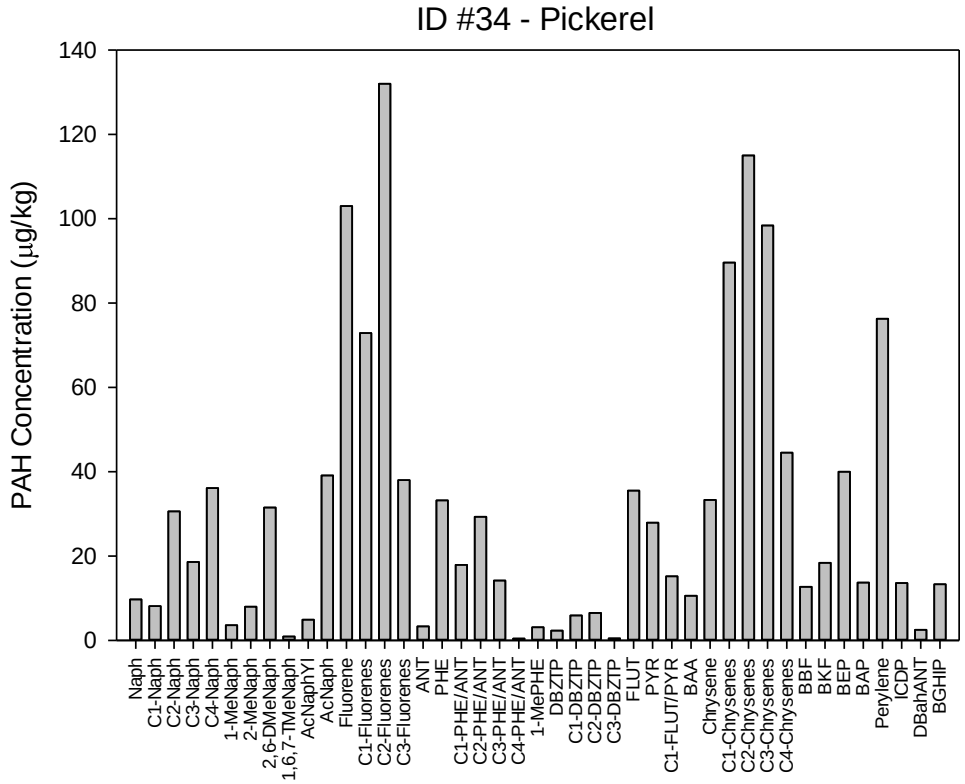
Histogram Plots of PAH Concentrations in Each Study Lake

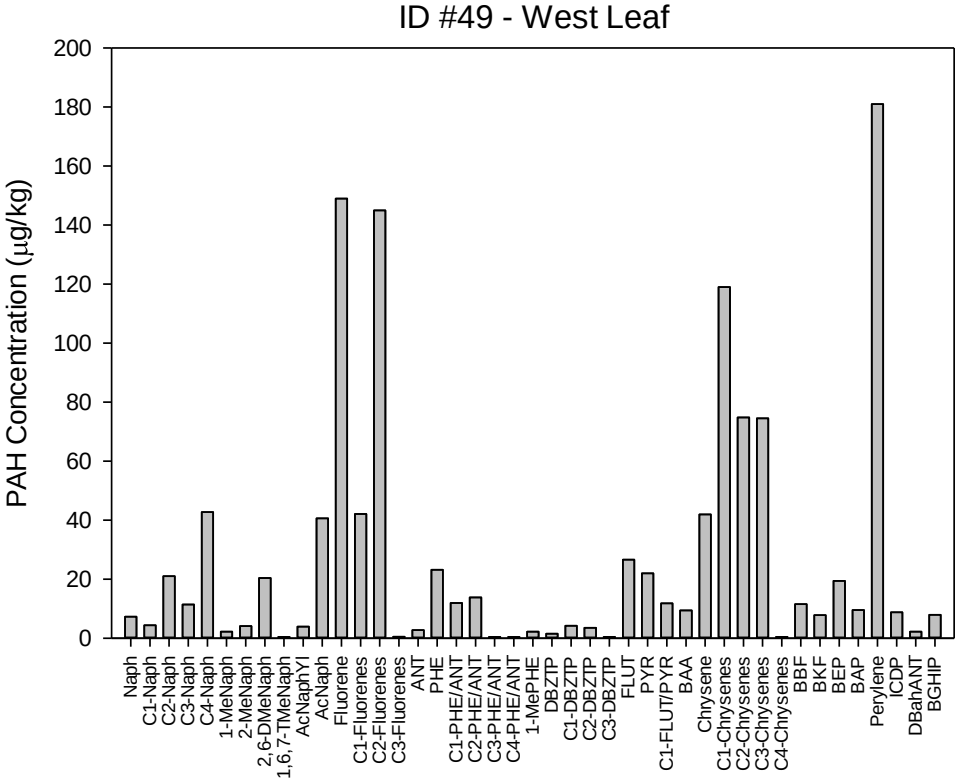
The histogram plots are primarily listed in the order in which they were grouped by their principal component scores in hierarchical cluster analysis for 34 PAHs, except for Snail (#38) which was placed by the other developed lake, Nokomis (#27). All concentration values are in µg/kg dry wt.

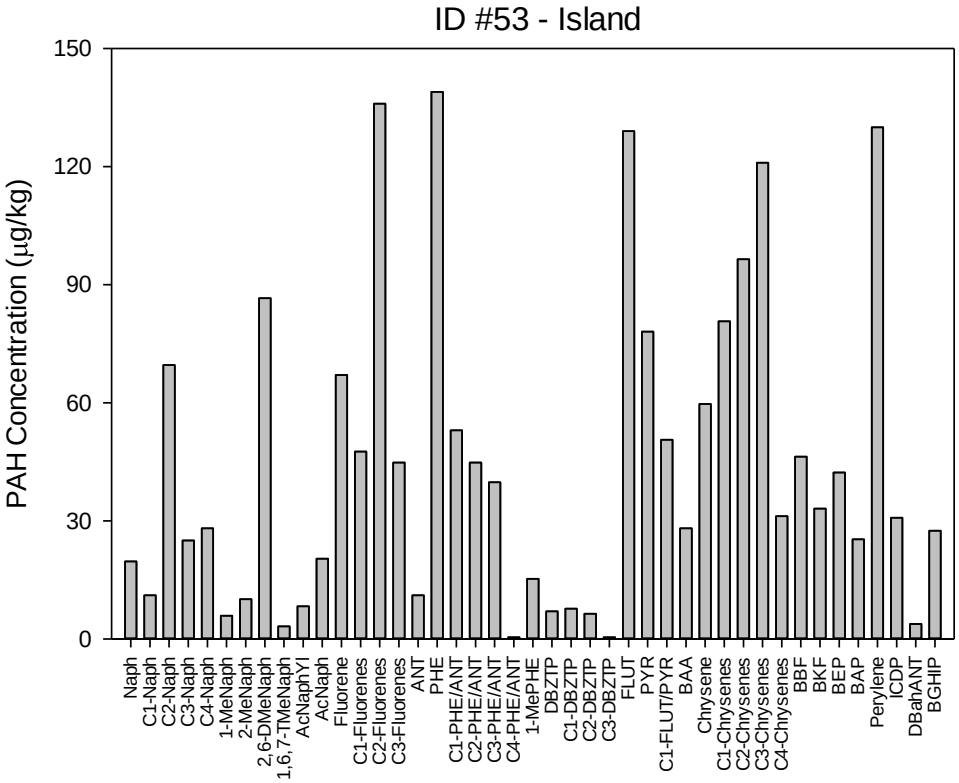

ID #27 - Nokomis
PAH Concentration (µg/kg)
2100
1800
1500
1200
900
600
300
0
Naph
C1-Naph
C2-Naph
C3-Naph
C4-Naph
1-MeNaph
2-MeNaph
2,6-DMeNaph
1,6,7-TMeNaph
AcNaphYl
AcNaph
Fluorene
C1-Fluorenes
C2-Fluorenes
C3-Fluorenes
ANT
PHE
C1-PHE/ANT
C2-PHE/ANT
C3-PHE/ANT
C4-PHE/ANT
1-MePHE
DBZTP
C1-DBZTP
C2-DBZTP
C3-DBZTP
FLUT
PYR
C1-FLUT/PYR
BAA
Chysene
C1-Chrysenes
C2-Chrysenes
C3-Chrysenes
C4-Chrysenes
BBF
BKF
BEP
BAP
Perylene
ICDP
DBahANT
BGHIP

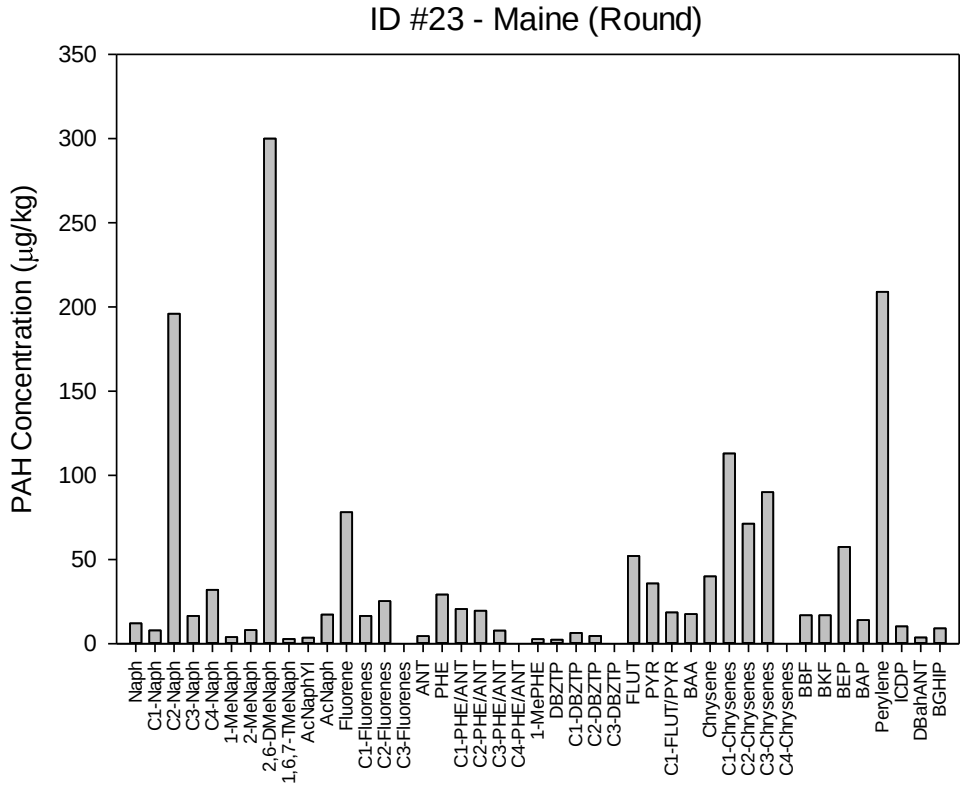

ID #38 - Snail
PAH Concentration (µg/kg)
700
600
500
400
300
200
100
0
Naph
C1-Naph
C2-Naph
C3-Naph
C4-Naph
1-MeNaph
2-MeNaph
2,6-DMeNaph
1,6,7-TMeNaph
AcNaphYl
AcNaph
Fluorene
C1-Fluorenes
C2-Fluorenes
C3-Fluorenes
ANT
PHE
C1-PHE/ANT
C2-PHE/ANT
C3-PHE/ANT
C4-PHE/ANT
1-MePHE
DBZTP
C1-DBZTP
C2-DBZTP
C3-DBZTP
FLUT
PYR
C1-FLUT/PYR
BAA
Chysene
C1-Chrysenes
C2-Chrysenes
C3-Chrysenes
C4-Chrysenes
BBF
BKF
BEP
BAP
Perylene
ICDP
DBahANT
BGHIP

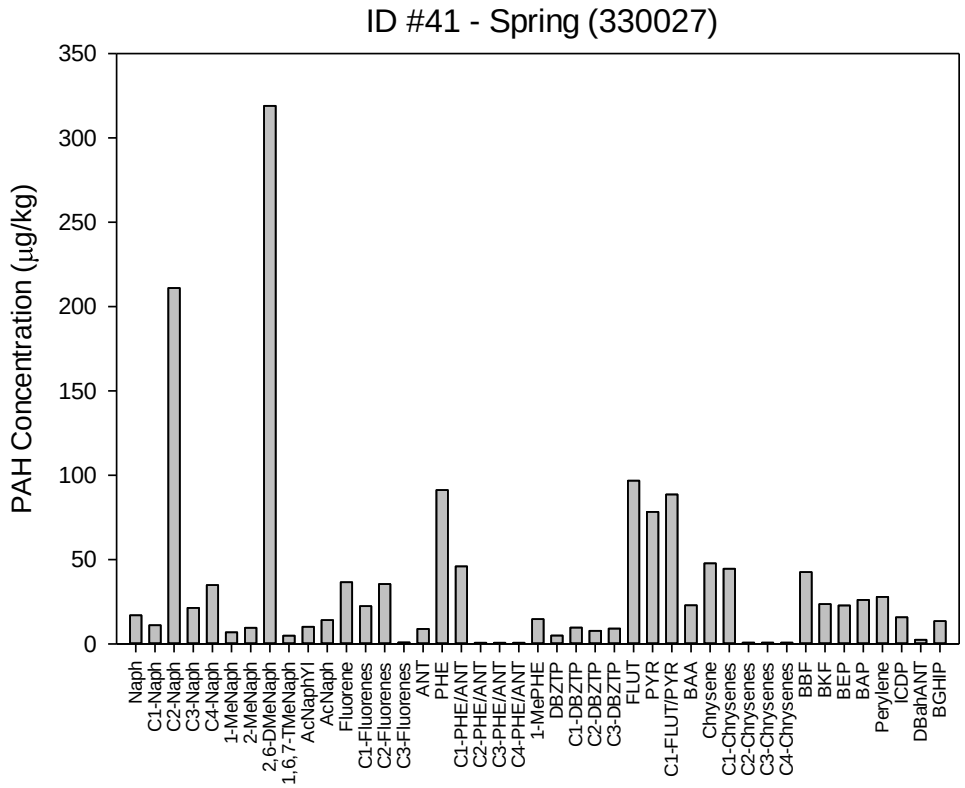

ID #24 - Mayo
PAH Concentration (µg/kg)
400
300
200
100
0
Naph
C1-Naph
C2-Naph
C3-Naph
C4-Naph
1-MeNaph
2-MeNaph
2,6-DMeNaph
1,6,7-TMeNaph
AcNaphYl
AcNaph
Fluorene
C1-Fluorenes
C2-Fluorenes
C3-Fluorenes
ANT
PHE
C1-PHE/ANT
C2-PHE/ANT
C3-PHE/ANT
C4-PHE/ANT
1-MePHE
DBZTP
C1-DBZTP
C2-DBZTP
C3-DBZTP
FLUT
PYR
C1-FLUT/PYR
BAA
Chysene
C1-Chysenes
C2-Chysenes
C3-Chysenes
C4-Chysenes
BBF
BKF
BEP
BAP
Perylene
ICDP
DBahANT
BGHIP

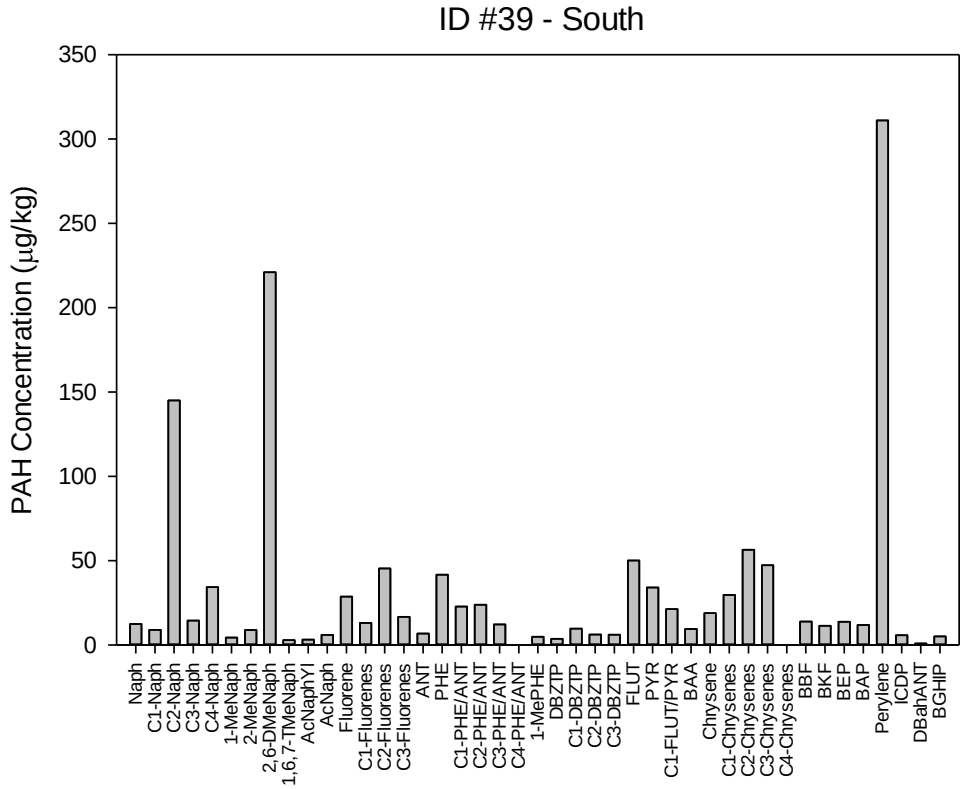

ID #34 - Pickerel
PAH Concentration (µg/kg)
140
120
100
80
60
40
20
0
Naph
C1-Naph
C2-Naph
C3-Naph
C4-Naph
1-MeNaph
2-MeNaph
2,6-DMeNaph
1,6,7-TMeNaph
AcNaphYl
AcNaph
Fluorene
C1-Fluorenes
C2-Fluorenes
C3-Fluorenes
ANT
PHE
C1-PHE/ANT
C2-PHE/ANT
C3-PHE/ANT
C4-PHE/ANT
1-MePHE
DBZTP
C1-DBZTP
C2-DBZTP
C3-DBZTP
FLUT
PYR
C1-FLUT/PYR
BAA
Chysene
C1-Chysenes
C2-Chysenes
C3-Chysenes
C4-Chysenes
BBF
BKF
BEP
BAP
Perylene
ICDP
DBahANT
BGHIP

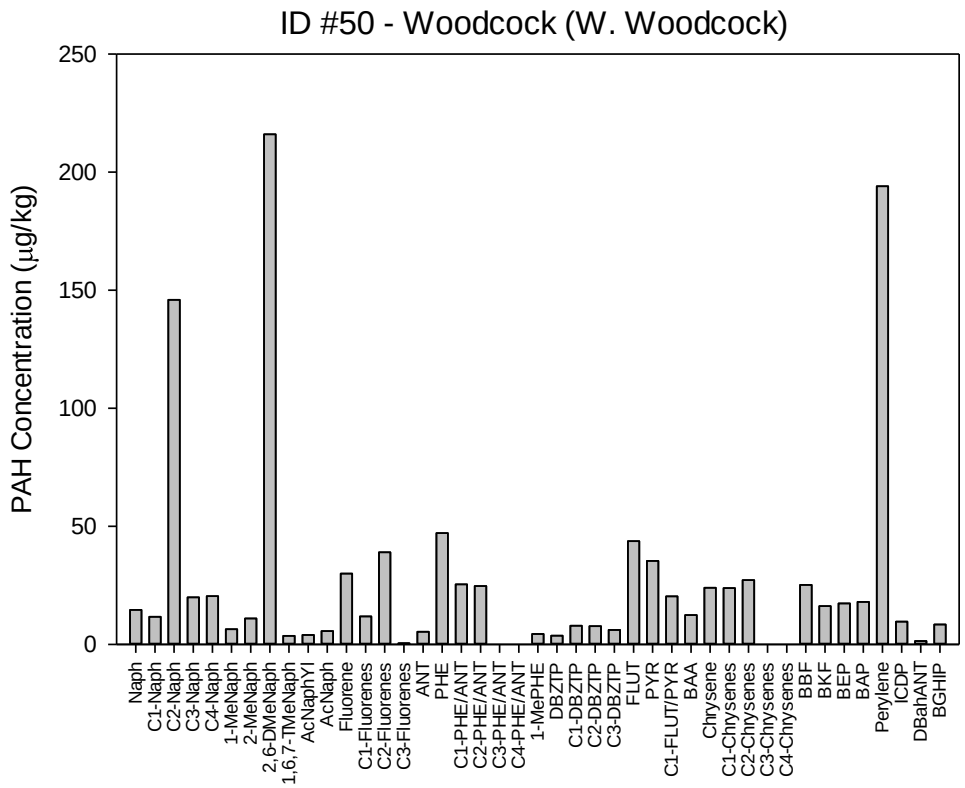

ID #49 - West Leaf
PAH Concentration (µg/kg)
0
20
40
60
80
100
120
140
160
180
200
Naph
C1-Naph
C2-Naph
C3-Naph
C4-Naph
1-MeNaph
2-MeNaph
2,6-DMeNaph
1,6,7-TMeNaph
AcNaphYl
AcNaph
Fluorene
C1-Fluorenes
C2-Fluorenes
C3-Fluorenes
ANT
PHE
C1-PHE/ANT
C2-PHE/ANT
C3-PHE/ANT
C4-PHE/ANT
1-MePHE
DBZTP
C1-DBZTP
C2-DBZTP
C3-DBZTP
FLUT
PYR
C1-FLUT/PYR
BAA
Chysene
C1-Chysenes
C2-Chysenes
C3-Chysenes
C4-Chysenes
BBF
BKF
BEP
BAP
Perylene
ICDP
DBahANT
BGHIP

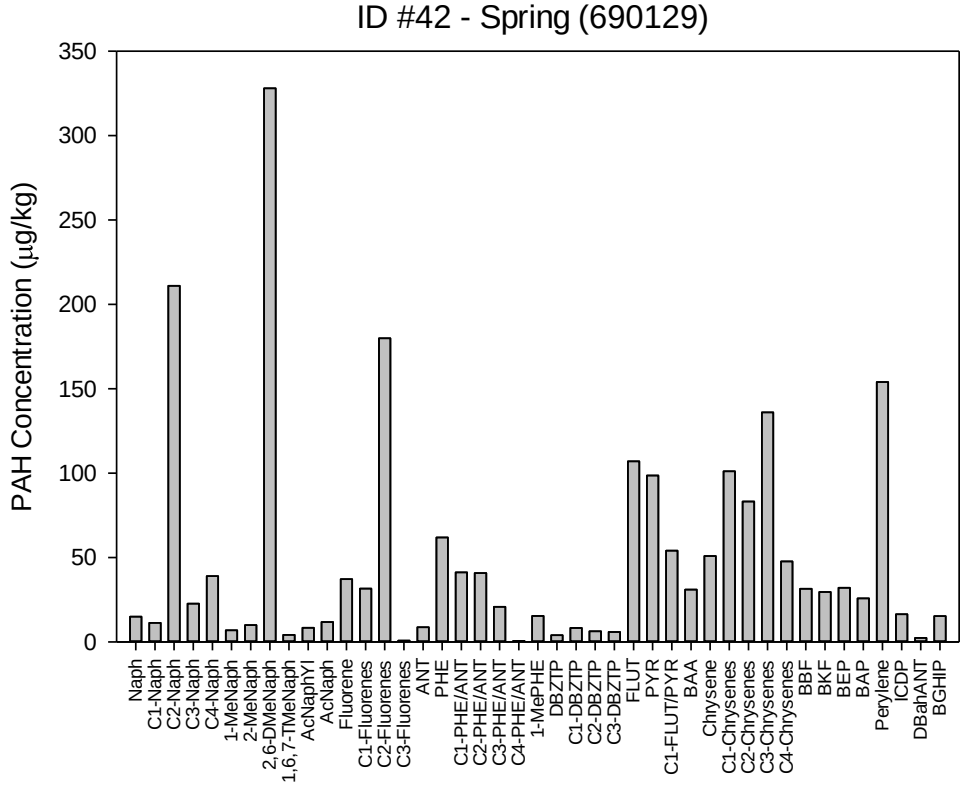

ID #53 - Island
PAH Concentration (µg/kg)
0
30
60
90
120
150
Naph
C1-Naph
C2-Naph
C3-Naph
C4-Naph
1-MeNaph
2-MeNaph
2,6-DMeNaph
1,6,7-TMeNaph
AcNaphYl
AcNaph
Fluorene
C1-Fluorenes
C2-Fluorenes
C3-Fluorenes
ANT
PHE
C1-PHE/ANT
C2-PHE/ANT
C3-PHE/ANT
C4-PHE/ANT
1-MePHE
DBZTP
C1-DBZTP
C2-DBZTP
C3-DBZTP
FLUT
PYR
C1-FLUT/PYR
BAA
Chysene
C1-Chysenes
C2-Chysenes
C3-Chysenes
C4-Chysenes
BBF
BKF
BEP
BAP
Perylene
ICDP
DBahANT
BGHIP

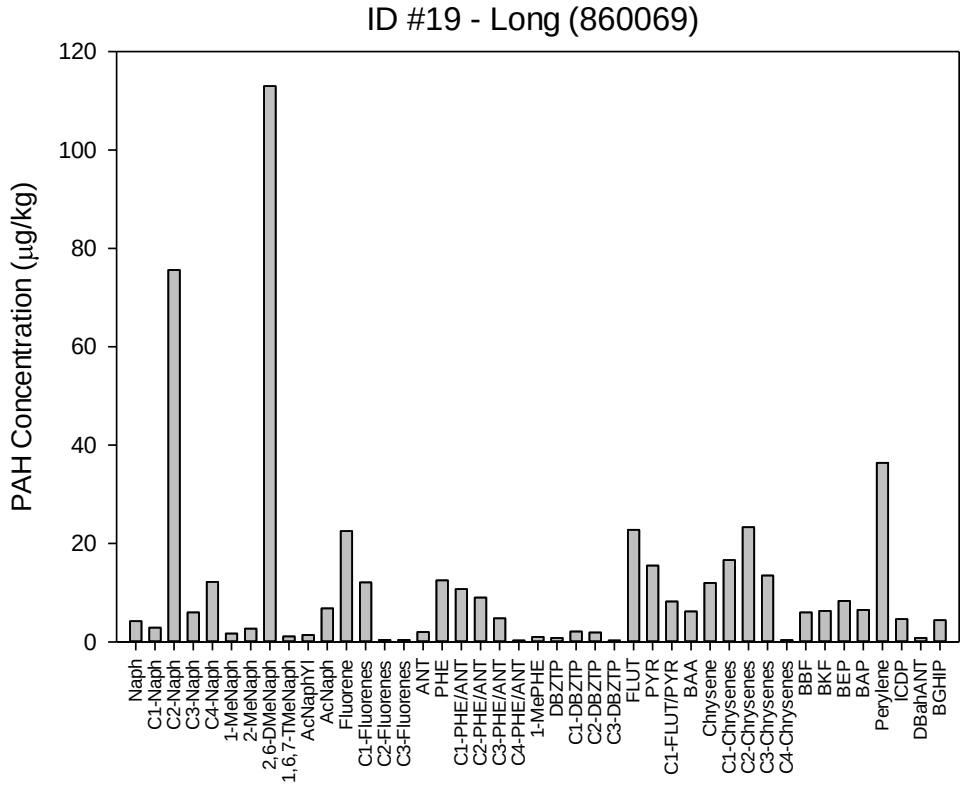

ID #23 - Maine (Round)
PAH Concentration (µg/kg)
0
50
100
150
200
250
300
350
Naph
C1-Naph
C2-Naph
C3-Naph
C4-Naph
1-MeNaph
2-MeNaph
2,6-DMeNaph
1,6,7-TMeNaph
AcNaphYl
AcNaph
Fluorene
C1-Fluorenes
C2-Fluorenes
C3-Fluorenes
ANT
PHE
C1-PHE/ANT
C2-PHE/ANT
C3-PHE/ANT
C4-PHE/ANT
1-MePHE
DBZTP
C1-DBZTP
C2-DBZTP
C3-DBZTP
FLUT
PYR
C1-FLUT/PYR
BAA
Chrysene
C1-Chrysenes
C2-Chrysenes
C3-Chrysenes
C4-Chrysenes
BBF
BKF
BEP
BAP
Perylene
ICDP
DBahANT
BGHIP

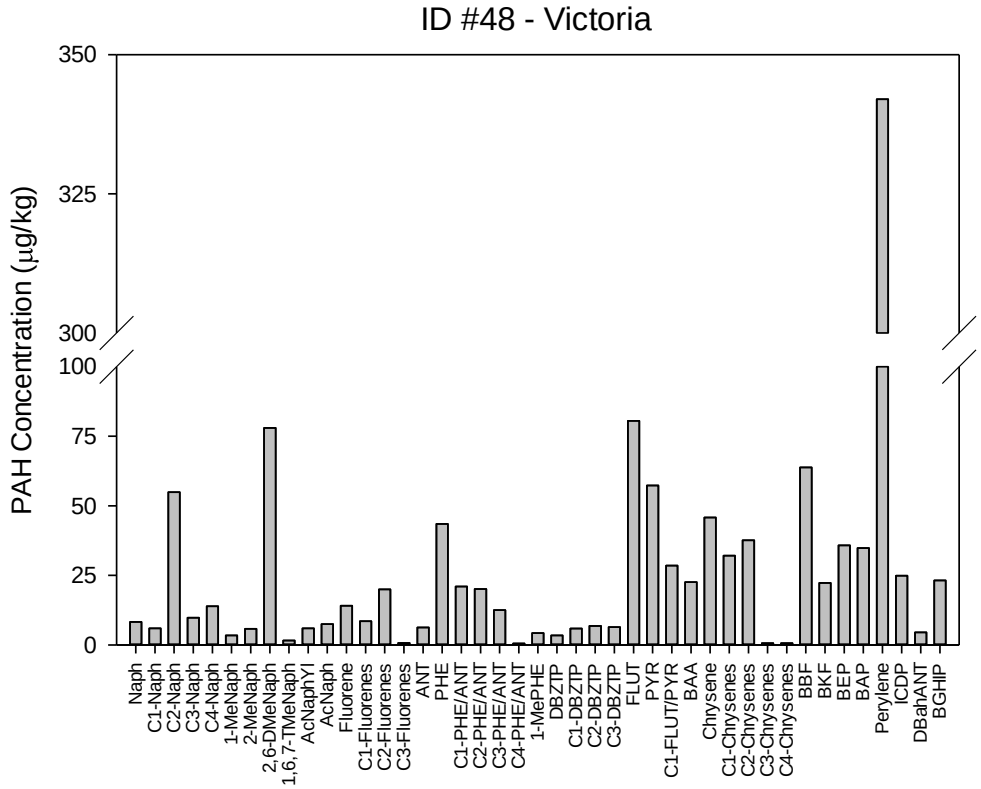

ID #41 - Spring (330027)
PAH Concentration (µg/kg)
0
50
100
150
200
250
300
350
Naph
C1-Naph
C2-Naph
C3-Naph
C4-Naph
1-MeNaph
2-MeNaph
2,6-DMeNaph
1,6,7-TMeNaph
AcNaphYl
AcNaph
Fluorene
C1-Fluorenes
C2-Fluorenes
C3-Fluorenes
ANT
PHE
C1-PHE/ANT
C2-PHE/ANT
C3-PHE/ANT
C4-PHE/ANT
1-MePHE
DBZTP
C1-DBZTP
C2-DBZTP
C3-DBZTP
FLUT
PYR
C1-FLUT/PYR
BAA
Chrysene
C1-Chrysenes
C2-Chrysenes
C3-Chrysenes
C4-Chrysenes
BBF
BKF
BEP
BAP
Perylene
ICDP
DBahANT
BGHIP

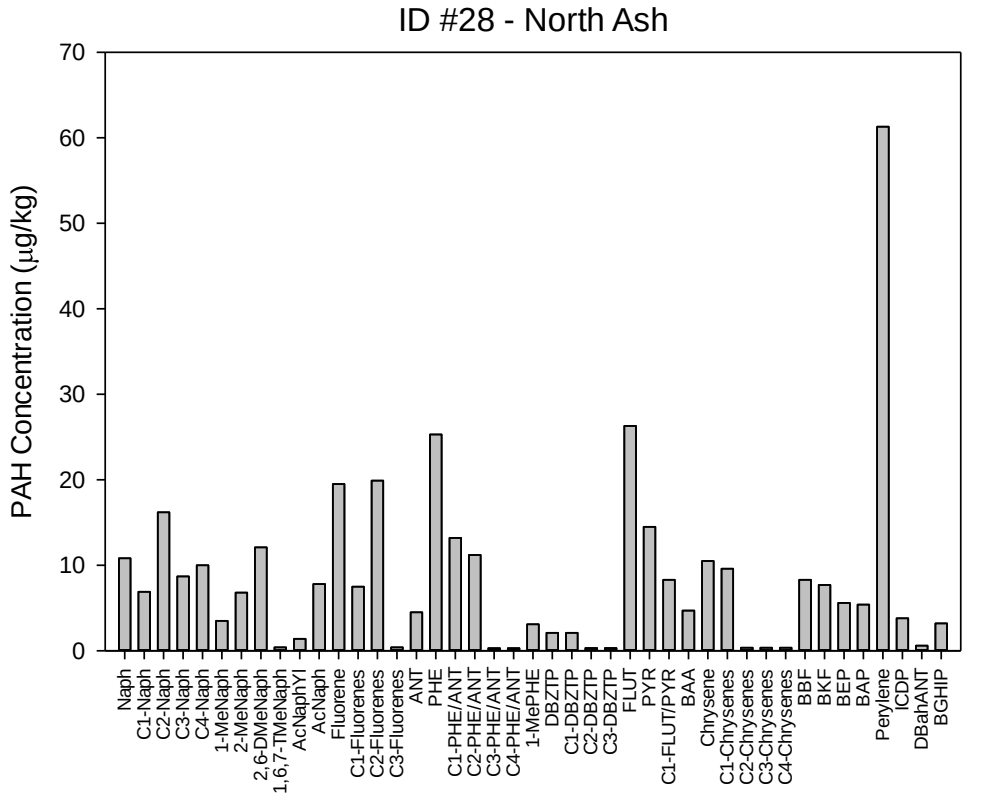

ID #39 - South
PAH Concentration (µg/kg)
350
300
250
200
150
100
50
0
Naph
C1-Naph
C2-Naph
C3-Naph
C4-Naph
1-MeNaph
2-MeNaph
2,6-DMeNaph
1,6,7-TMeNaph
AcNaphYl
AcNaph
Fluorene
C1-Fluorenes
C2-Fluorenes
C3-Fluorenes
ANT
PHE
C1-PHE/ANT
C2-PHE/ANT
C3-PHE/ANT
C4-PHE/ANT
1-MePHE
DBZTP
C1-DBZTP
C2-DBZTP
C3-DBZTP
FLUT
PYR
C1-FLUT/PYR
BAA
Chysene
C1-Chysenes
C2-Chysenes
C3-Chysenes
C4-Chysenes
BBF
BKF
BEP
BAP
Perylene
ICDP
DBahANT
BGHIP

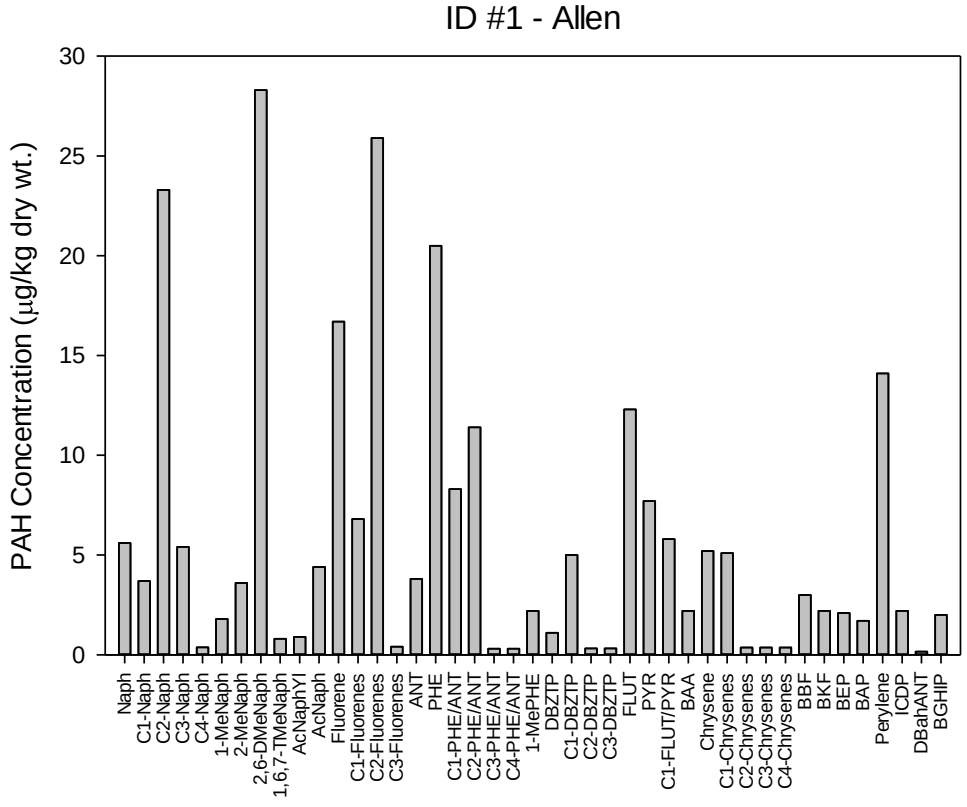

ID #50 - Woodcock (W. Woodcock)
PAH Concentration (µg/kg)
250
200
150
100
50
0
Naph
C1-Naph
C2-Naph
C3-Naph
C4-Naph
1-MeNaph
2-MeNaph
2,6-DMeNaph
1,6,7-TMeNaph
AcNaphYl
AcNaph
Fluorene
C1-Fluorenes
C2-Fluorenes
C3-Fluorenes
ANT
PHE
C1-PHE/ANT
C2-PHE/ANT
C3-PHE/ANT
C4-PHE/ANT
1-MePHE
DBZTP
C1-DBZTP
C2-DBZTP
C3-DBZTP
FLUT
PYR
C1-FLUT/PYR
BAA
Chysene
C1-Chysenes
C2-Chysenes
C3-Chysenes
C4-Chysenes
BBF
BKF
BEP
BAP
Perylene
ICDP
DBahANT
BGHIP

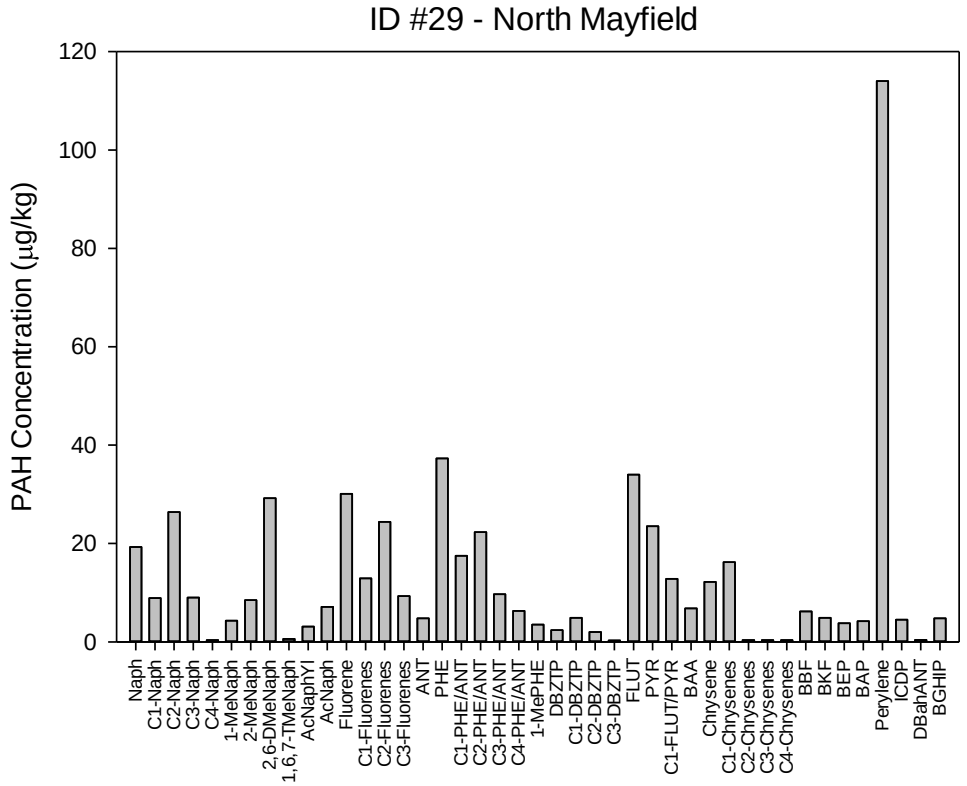

ID #42 - Spring (690129)
PAH Concentration (µg/kg)
0
50
100
150
200
250
300
350
Naph
C1-Naph
C2-Naph
C3-Naph
C4-Naph
1-MeNaph
2-MeNaph
2,6-DMeNaph
1,6,7-TMeNaph
AcNaphYl
AcNaph
Fluorene
C1-Fluorenes
C2-Fluorenes
C3-Fluorenes
ANT
PHE
C1-PHE/ANT
C2-PHE/ANT
C3-PHE/ANT
C4-PHE/ANT
1-MePHE
DBZTP
C1-DBZTP
C2-DBZTP
C3-DBZTP
FLUT
PYR
C1-FLUT/PYR
BAA
Chysene
C1-Chrysenes
C2-Chrysenes
C3-Chrysenes
C4-Chrysenes
BBF
BKF
BEP
BAP
Perylene
ICDP
DBahANT
BGHIP

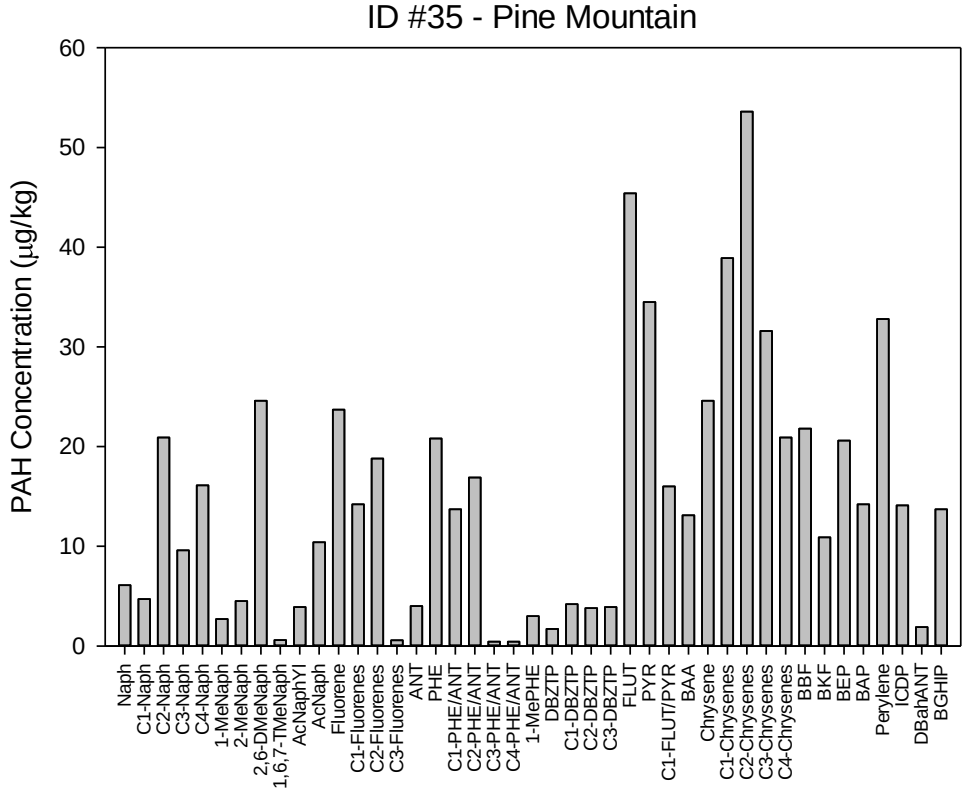

ID #19 - Long (860069)
PAH Concentration (µg/kg)
0
20
40
60
80
100
120
Naph
C1-Naph
C2-Naph
C3-Naph
C4-Naph
1-MeNaph
2-MeNaph
2,6-DMeNaph
1,6,7-TMeNaph
AcNaphYl
AcNaph
Fluorene
C1-Fluorenes
C2-Fluorenes
C3-Fluorenes
ANT
PHE
C1-PHE/ANT
C2-PHE/ANT
C3-PHE/ANT
C4-PHE/ANT
1-MePHE
DBZTP
C1-DBZTP
C2-DBZTP
C3-DBZTP
FLUT
PYR
C1-FLUT/PYR
BAA
Chysene
C1-Chrysenes
C2-Chrysenes
C3-Chrysenes
C4-Chrysenes
BBF
BKF
BEP
BAP
Perylene
ICDP
DBahANT
BGHIP

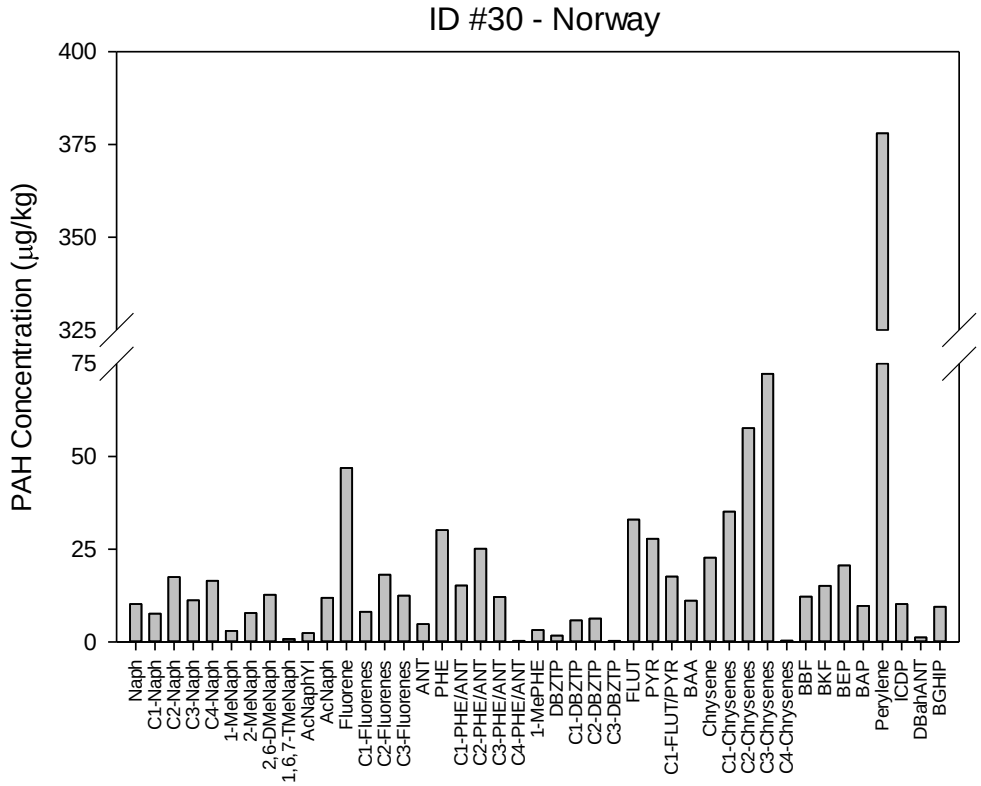

ID #48 - Victoria
PAH Concentration (µg/kg)
350
325
300
100
75
50
25
0
Naph
C1-Naph
C2-Naph
C3-Naph
C4-Naph
1-MeNaph
2-MeNaph
2,6-DMeNaph
1,6,7-TMeNaph
AcNaphYl
AcNaph
Fluorene
C1-Fluorenes
C2-Fluorenes
C3-Fluorenes
ANT
PHE
C1-PHE/ANT
C2-PHE/ANT
C3-PHE/ANT
C4-PHE/ANT
1-MePHE
DBZTP
C1-DBZTP
C2-DBZTP
C3-DBZTP
FLUT
PYR
C1-FLUT/PYR
BAA
Chysene
C1-Chysenes
C2-Chysenes
C3-Chysenes
C4-Chysenes
BBF
BKF
BEP
BAP
Perylene
ICDP
DBahANT
BGHIP

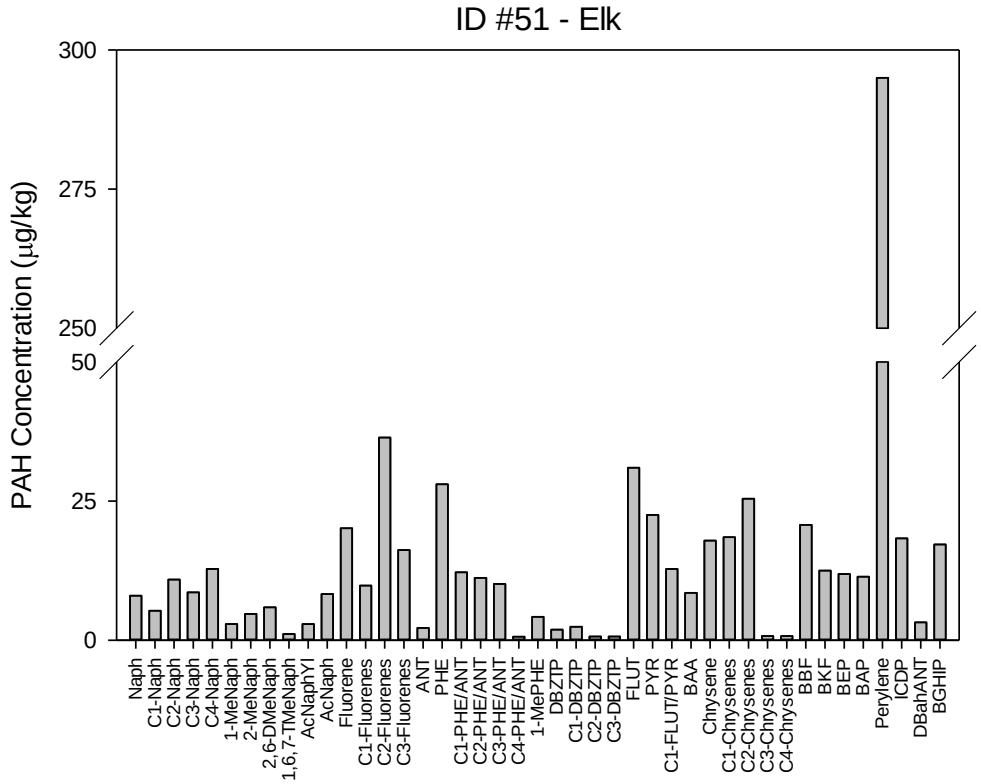

ID #28 - North Ash
PAH Concentration (µg/kg)
70
60
50
40
30
20
10
0
Naph
C1-Naph
C2-Naph
C3-Naph
C4-Naph
1-MeNaph
2-MeNaph
2,6-DMeNaph
1,6,7-TMeNaph
AcNaphYl
AcNaph
Fluorene
C1-Fluorenes
C2-Fluorenes
C3-Fluorenes
ANT
PHE
C1-PHE/ANT
C2-PHE/ANT
C3-PHE/ANT
C4-PHE/ANT
1-MePHE
DBZTP
C1-DBZTP
C2-DBZTP
C3-DBZTP
FLUT
PYR
C1-FLUT/PYR
BAA
Chysene
C1-Chysenes
C2-Chysenes
C3-Chysenes
C4-Chysenes
BBF
BKF
BEP
BAP
Perylene
ICDP
DBahANT
BGHIP

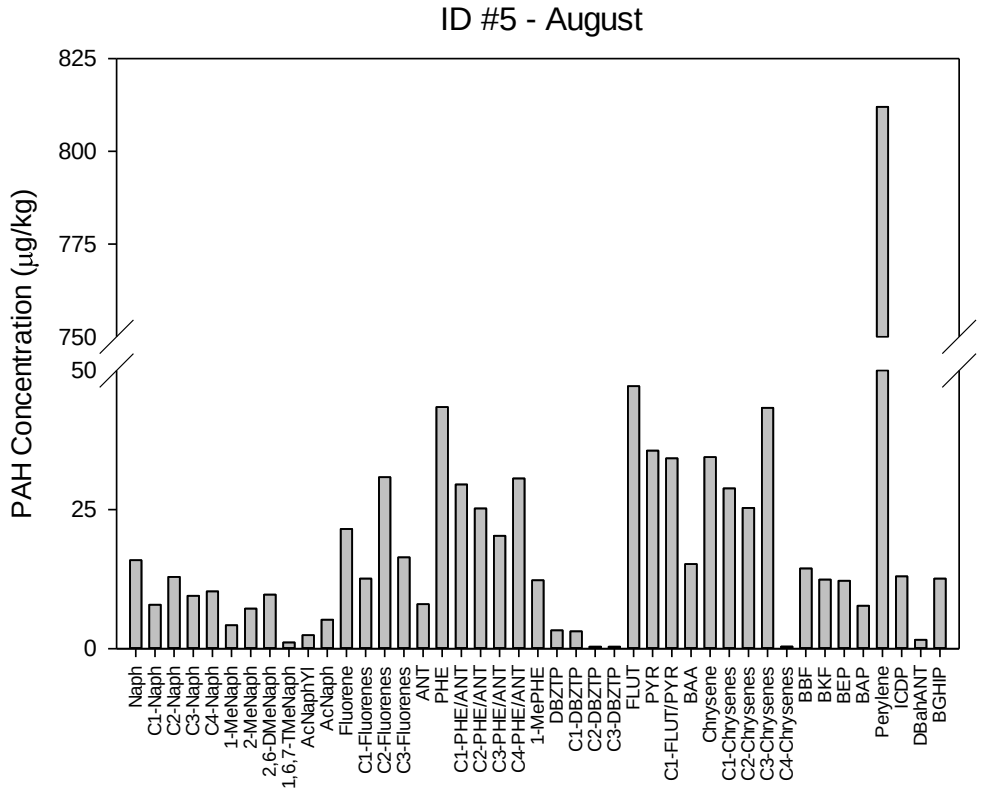

ID #1 - Allen
PAH Concentration (µg/kg dry wt.)
0
5
10
15
20
25
30
Naph
C1-Naph
C2-Naph
C3-Naph
C4-Naph
1-MeNaph
2-MeNaph
2,6-DMeNaph
1,6,7-TMeNaph
AcNaphYl
AcNaph
Fluorene
C1-Fluorenes
C2-Fluorenes
C3-Fluorenes
ANT
PHE
C1-PHE/ANT
C2-PHE/ANT
C3-PHE/ANT
C4-PHE/ANT
1-MePHE
DBZTP
C1-DBZTP
C2-DBZTP
C3-DBZTP
FLUT
PYR
C1-FLUT/PYR
BAA
Chrysene
C1-Chrysenes
C2-Chrysenes
C3-Chrysenes
C4-Chrysenes
BBF
BKF
BEP
BAP
Perylene
ICDP
DBahANT
BGHIP

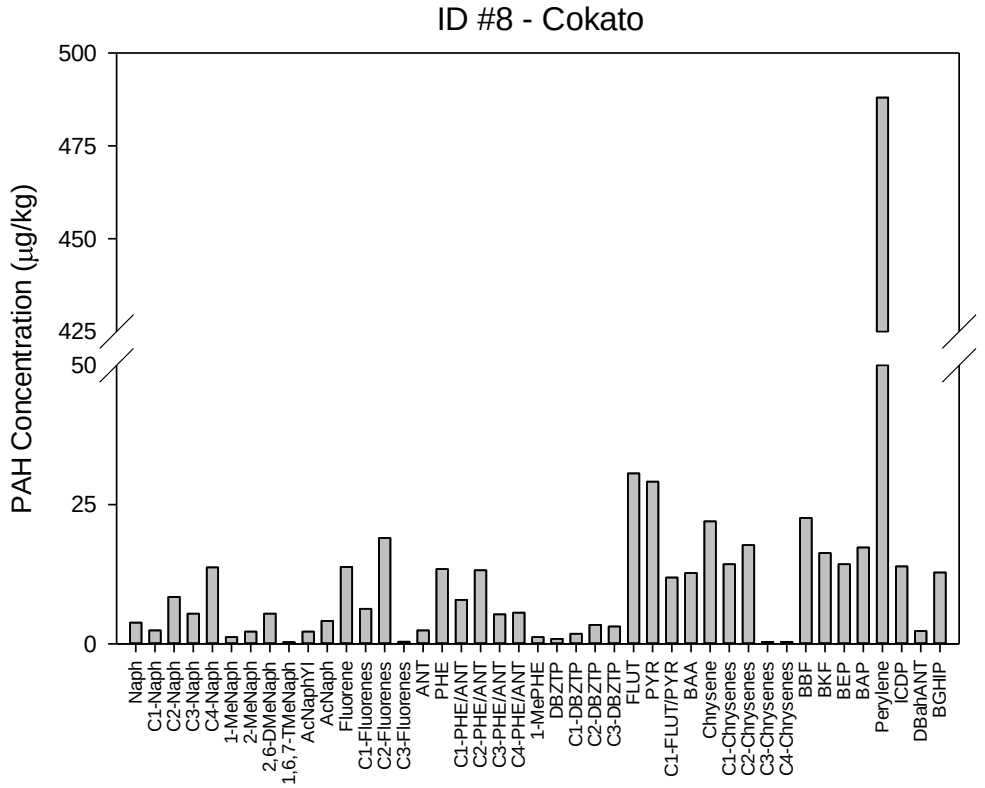

ID #29 - North Mayfield
PAH Concentration (µg/kg)
0
20
40
60
80
100
120
Naph
C1-Naph
C2-Naph
C3-Naph
C4-Naph
1-MeNaph
2-MeNaph
2,6-DMeNaph
1,6,7-TMeNaph
AcNaphYl
AcNaph
Fluorene
C1-Fluorenes
C2-Fluorenes
C3-Fluorenes
ANT
PHE
C1-PHE/ANT
C2-PHE/ANT
C3-PHE/ANT
C4-PHE/ANT
1-MePHE
DBZTP
C1-DBZTP
C2-DBZTP
C3-DBZTP
FLUT
PYR
C1-FLUT/PYR
BAA
Chrysene
C1-Chrysenes
C2-Chrysenes
C3-Chrysenes
C4-Chrysenes
BBF
BKF
BEP
BAP
Perylene
ICDP
DBahANT
BGHIP

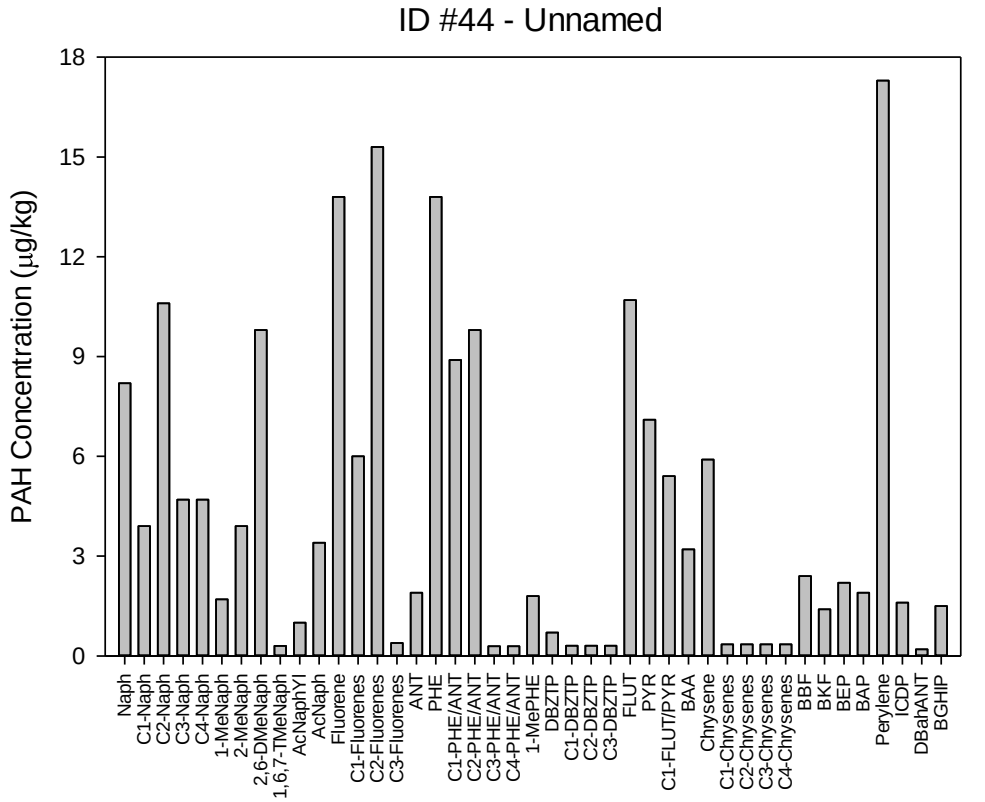

ID #35 - Pine Mountain
PAH Concentration (µg/kg)
0
10
20
30
40
50
60
Naph
C1-Naph
C2-Naph
C3-Naph
C4-Naph
1-MeNaph
2-MeNaph
2,6-DMeNaph
1,6,7-TMeNaph
AcNaphYl
AcNaph
Fluorene
C1-Fluorenes
C2-Fluorenes
C3-Fluorenes
ANT
PHE
C1-PHE/ANT
C2-PHE/ANT
C3-PHE/ANT
C4-PHE/ANT
1-MePHE
DBZTP
C1-DBZTP
C2-DBZTP
C3-DBZTP
FLUT
PYR
C1-FLUT/PYR
BAA
Chysene
C1-Chrysenes
C2-Chrysenes
C3-Chrysenes
C4-Chrysenes
BBF
BKF
BEP
BAP
Perylene
ICDP
DBahANT
BGHIP

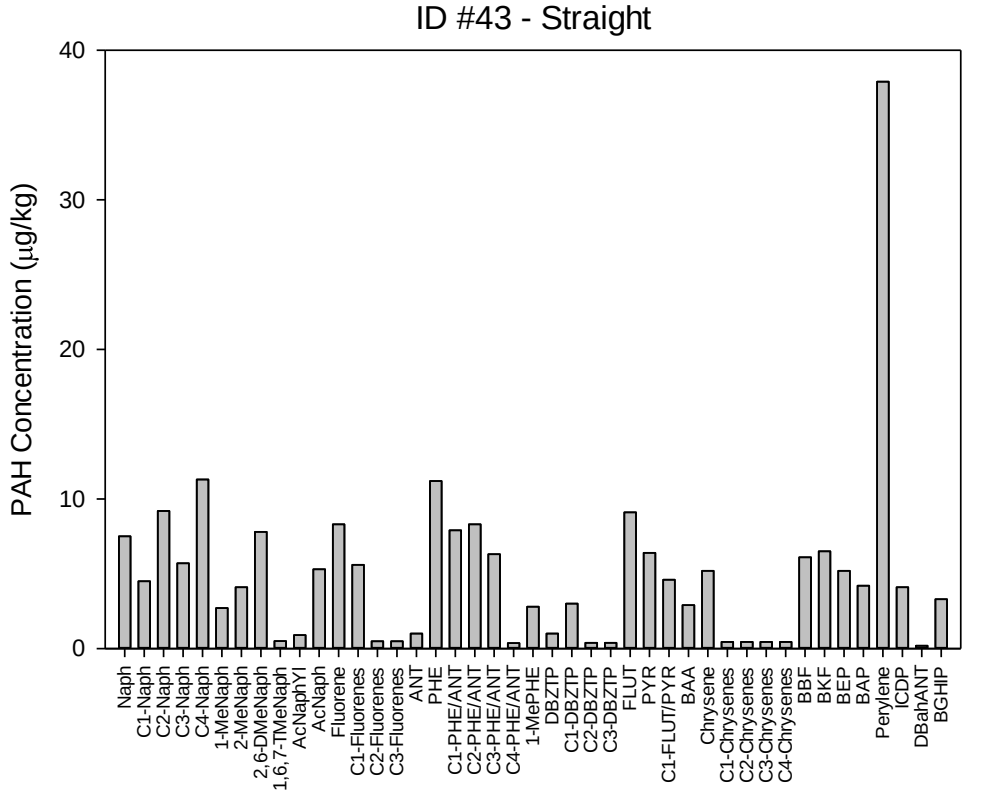

ID #30 - Norway
PAH Concentration (µg/kg)
0
25
50
75
325
350
375
400
Naph
C1-Naph
C2-Naph
C3-Naph
C4-Naph
1-MeNaph
2-MeNaph
2,6-DMeNaph
1,6,7-TMeNaph
AcNaphYl
AcNaph
Fluorene
C1-Fluorenes
C2-Fluorenes
C3-Fluorenes
ANT
PHE
C1-PHE/ANT
C2-PHE/ANT
C3-PHE/ANT
C4-PHE/ANT
1-MePHE
DBZTP
C1-DBZTP
C2-DBZTP
C3-DBZTP
FLUT
PYR
C1-FLUT/PYR
BAA
Chysene
C1-Chrysenes
C2-Chrysenes
C3-Chrysenes
C4-Chrysenes
BBF
BKF
BEP
BAP
Perylene
ICDP
DBahANT
BGHIP

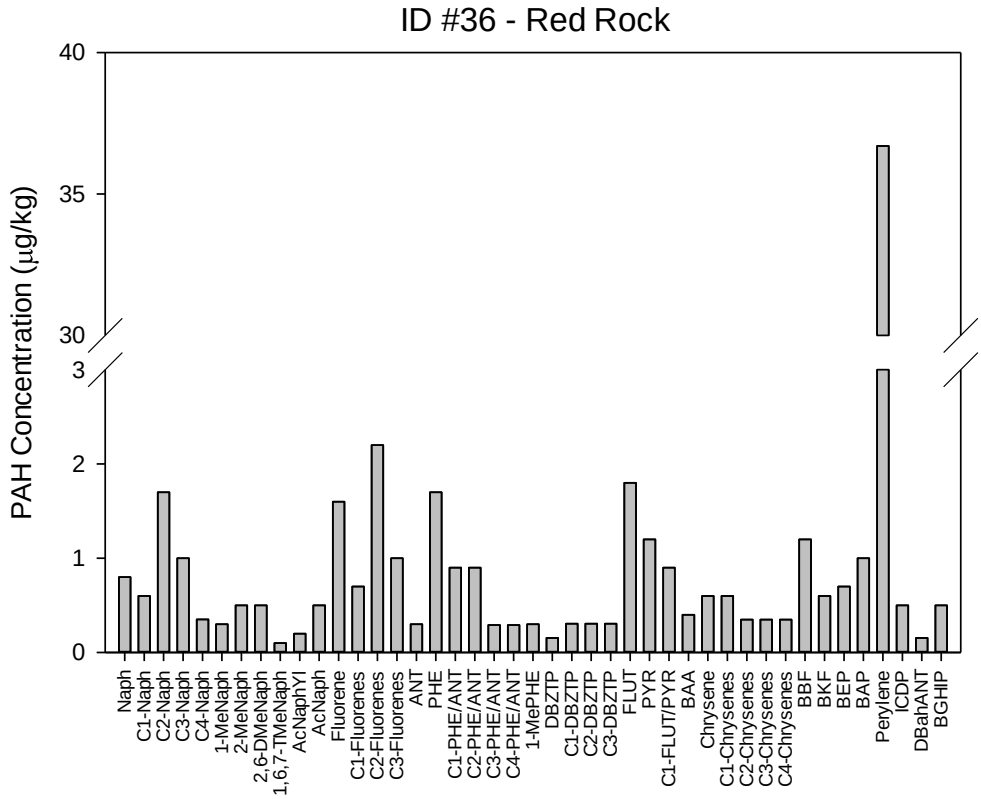

ID #51 - Elk
PAH Concentration (µg/kg)
300
275
250
50
25
0
Naph
C1-Naph
C2-Naph
C3-Naph
C4-Naph
1-MeNaph
2-MeNaph
2,6-DMeNaph
1,6,7-TMeNaph
AcNaphYl
AcNaph
Fluorene
C1-Fluorenes
C2-Fluorenes
C3-Fluorenes
ANT
PHE
C1-PHE/ANT
C2-PHE/ANT
C3-PHE/ANT
C4-PHE/ANT
1-MePHE
DBZTP
C1-DBZTP
C2-DBZTP
C3-DBZTP
FLUT
PYR
C1-FLUT/PYR
BAA
Chysene
C1-Chysenes
C2-Chysenes
C3-Chysenes
C4-Chysenes
BBF
BKF
BEP
BAP
Perylene
ICDP
DBahANT
BGHIP

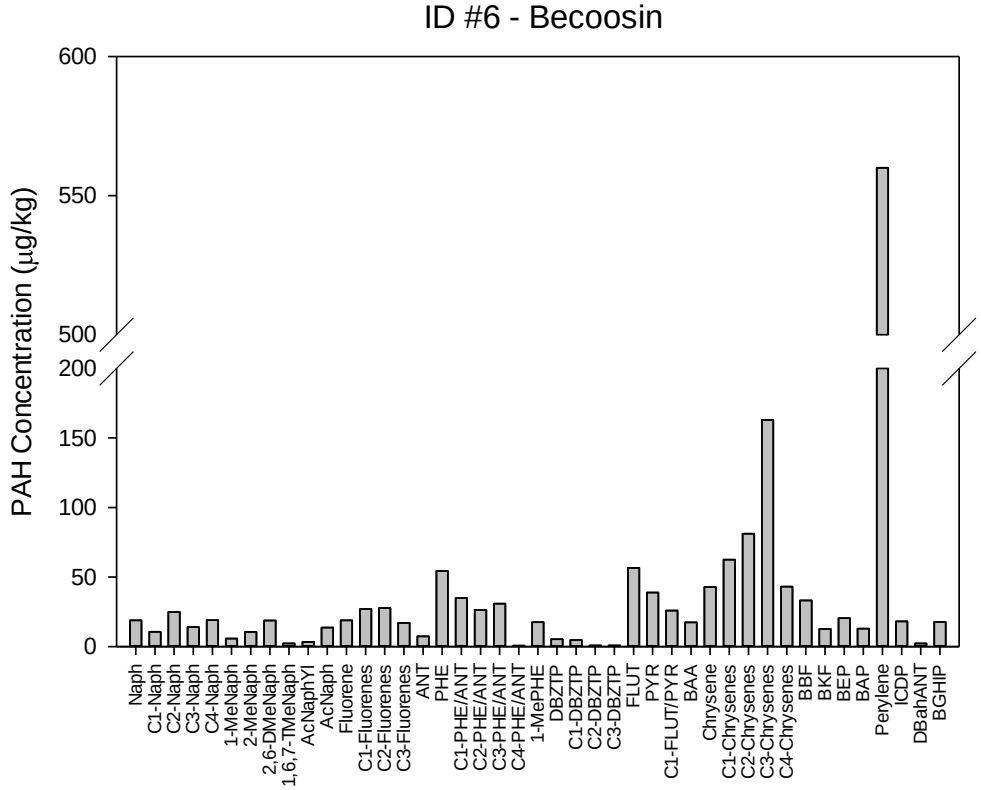

ID #5 - August
PAH Concentration (µg/kg)
825
800
775
750
50
25
0
Naph
C1-Naph
C2-Naph
C3-Naph
C4-Naph
1-MeNaph
2-MeNaph
2,6-DMeNaph
1,6,7-TMeNaph
AcNaphYl
AcNaph
Fluorene
C1-Fluorenes
C2-Fluorenes
C3-Fluorenes
ANT
PHE
C1-PHE/ANT
C2-PHE/ANT
C3-PHE/ANT
C4-PHE/ANT
1-MePHE
DBZTP
C1-DBZTP
C2-DBZTP
C3-DBZTP
FLUT
PYR
C1-FLUT/PYR
BAA
Chysene
C1-Chysenes
C2-Chysenes
C3-Chysenes
C4-Chysenes
BBF
BKF
BEP
BAP
Perylene
ICDP
DBahANT
BGHIP

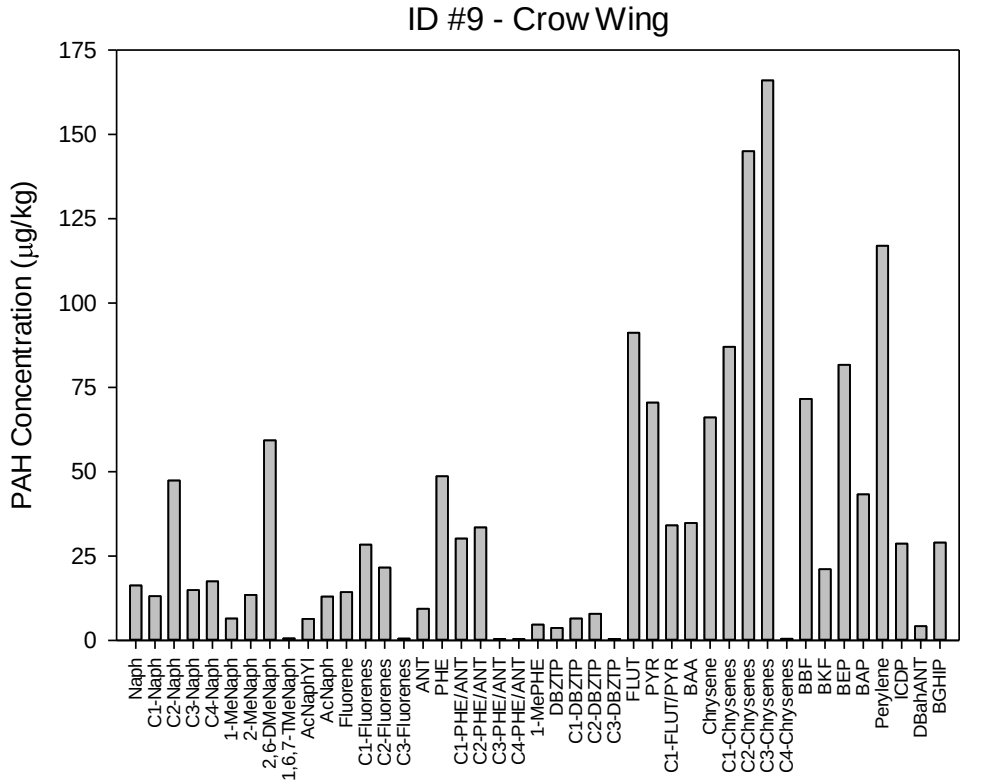

ID #8 - Cokato
PAH Concentration (µg/kg)
500
475
450
425
50
25
0
Naph
C1-Naph
C2-Naph
C3-Naph
C4-Naph
1-MeNaph
2-MeNaph
2,6-DMeNaph
1,6,7-TMeNaph
AcNaphYl
AcNaph
Fluorene
C1-Fluorenes
C2-Fluorenes
C3-Fluorenes
ANT
PHE
C1-PHE/ANT
C2-PHE/ANT
C3-PHE/ANT
C4-PHE/ANT
1-MePHE
DBZTP
C1-DBZTP
C2-DBZTP
C3-DBZTP
FLUT
PYR
C1-FLUT/PYR
BAA
Chysene
C1-Chrysenes
C2-Chrysenes
C3-Chrysenes
C4-Chrysenes
BBF
BKF
BEP
BAP
Perylene
ICDP
DBahANT
BGHIP

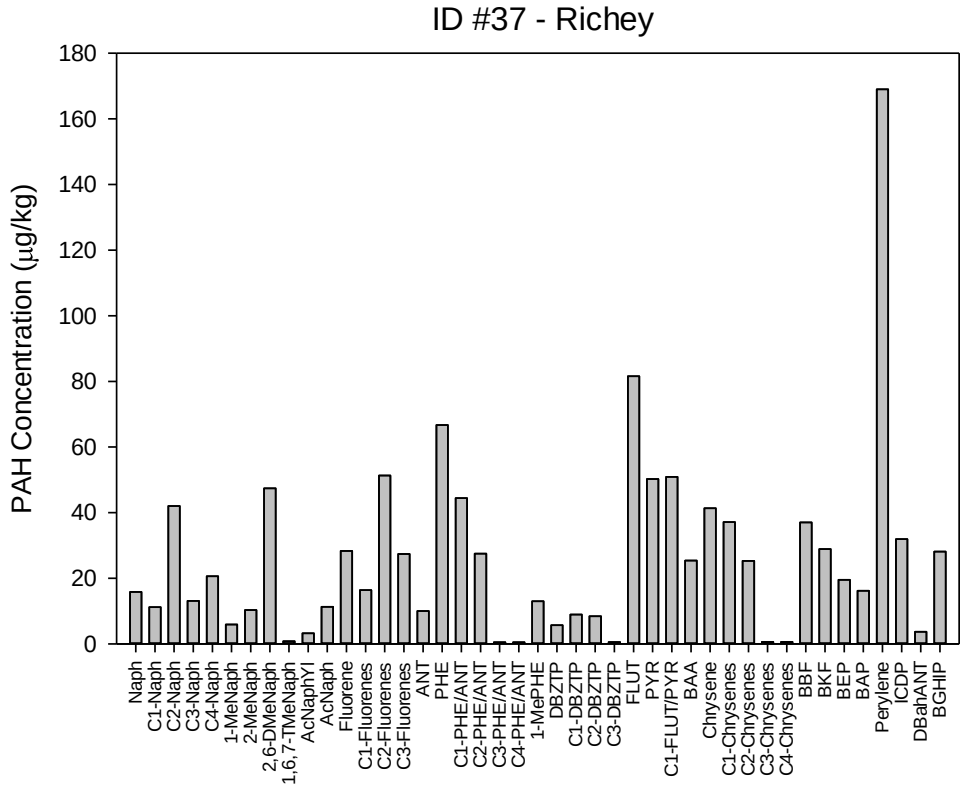

ID #44 - Unnamed
PAH Concentration (µg/kg)
18
15
12
9
6
3
0
Naph
C1-Naph
C2-Naph
C3-Naph
C4-Naph
1-MeNaph
2-MeNaph
2,6-DMeNaph
1,6,7-TMeNaph
AcNaphYl
AcNaph
Fluorene
C1-Fluorenes
C2-Fluorenes
C3-Fluorenes
ANT
PHE
C1-PHE/ANT
C2-PHE/ANT
C3-PHE/ANT
C4-PHE/ANT
1-MePHE
DBZTP
C1-DBZTP
C2-DBZTP
C3-DBZTP
FLUT
PYR
C1-FLUT/PYR
BAA
Chysene
C1-Chrysenes
C2-Chrysenes
C3-Chrysenes
C4-Chrysenes
BBF
BKF
BEP
BAP
Perylene
ICDP
DBahANT
BGHIP

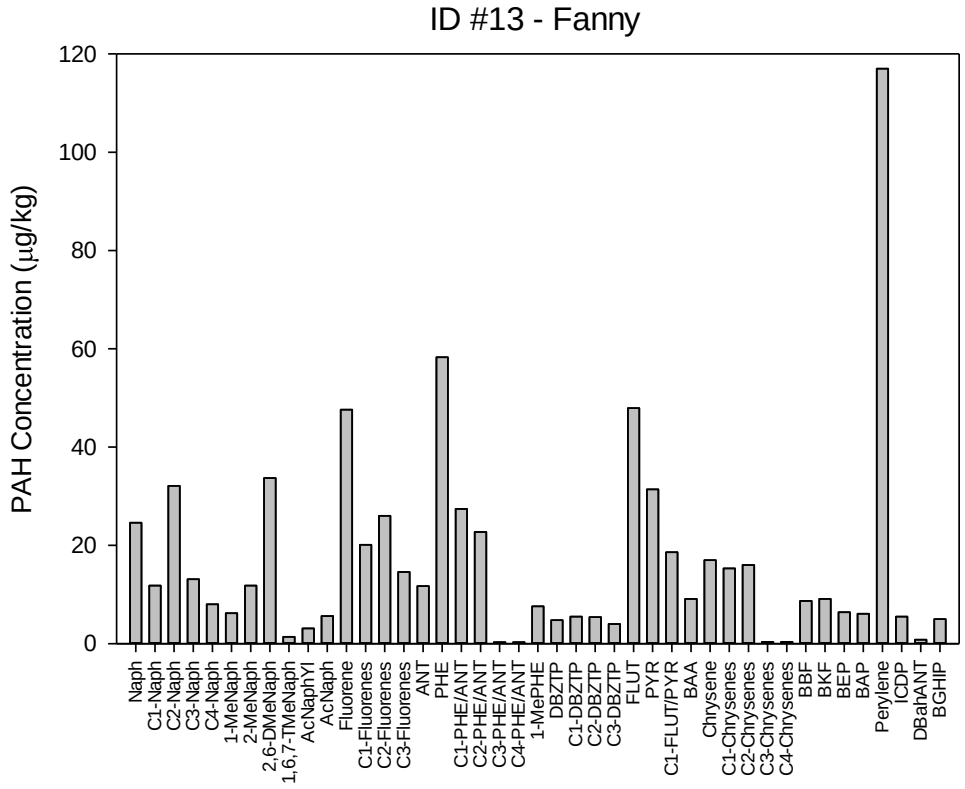

ID #43 - Straight
PAH Concentration (µg/kg)
0
10
20
30
40
Naph
C1-Naph
C2-Naph
C3-Naph
C4-Naph
1-MeNaph
2-MeNaph
2,6-DMeNaph
1,6,7-TMeNaph
AcNaphYl
AcNaph
Fluorene
C1-Fluorenes
C2-Fluorenes
C3-Fluorenes
ANT
PHE
C1-PHE/ANT
C2-PHE/ANT
C3-PHE/ANT
C4-PHE/ANT
1-MePHE
DBZTP
C1-DBZTP
C2-DBZTP
C3-DBZTP
FLUT
PYR
C1-FLUT/PYR
BAA
Chysene
C1-Chrysenes
C2-Chrysenes
C3-Chrysenes
C4-Chrysenes
BBF
BKF
BEP
BAP
Perylene
ICDP
DBahANT
BGHIP

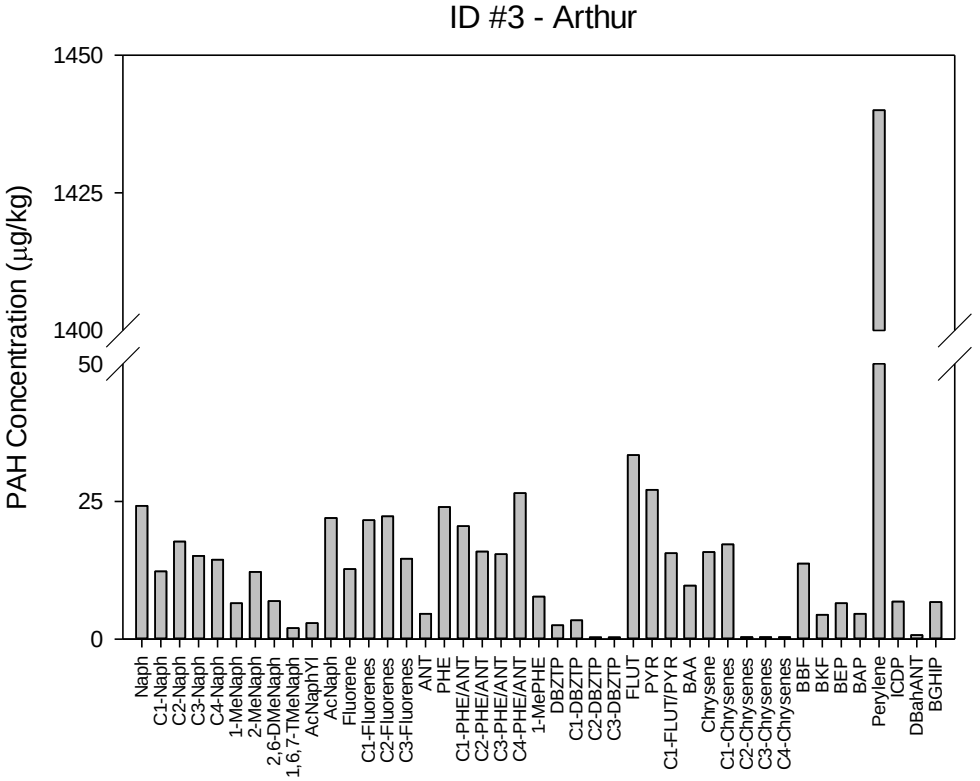

ID #36 - Red Rock
PAH Concentration (µg/kg)
0
1
2
3
30
35
40
Naph
C1-Naph
C2-Naph
C3-Naph
C4-Naph
1-MeNaph
2-MeNaph
2,6-DMeNaph
1,6,7-TMeNaph
AcNaphYl
AcNaph
Fluorene
C1-Fluorenes
C2-Fluorenes
C3-Fluorenes
ANT
PHE
C1-PHE/ANT
C2-PHE/ANT
C3-PHE/ANT
C4-PHE/ANT
1-MePHE
DBZTP
C1-DBZTP
C2-DBZTP
C3-DBZTP
FLUT
PYR
C1-FLUT/PYR
BAA
Chysene
C1-Chrysenes
C2-Chrysenes
C3-Chrysenes
C4-Chrysenes
BBF
BKF
BEP
BAP
Perylene
ICDP
DBahANT
BGHIP

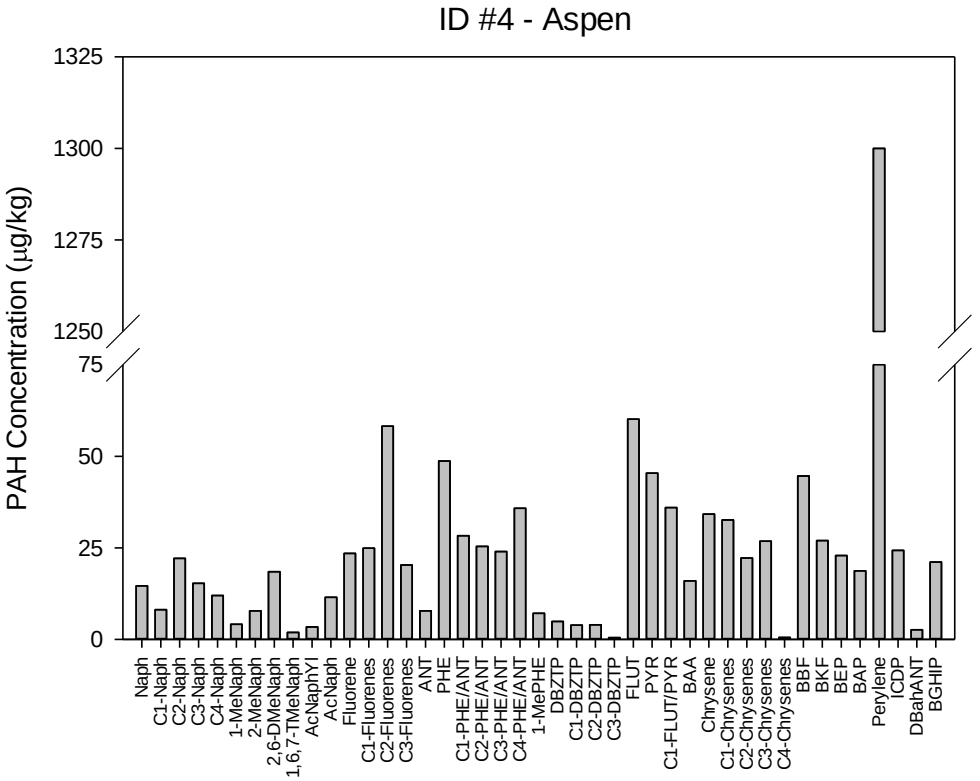

ID #6 - Becoosin
PAH Concentration (µg/kg)
600
550
500
200
150
100
50
0
Naph
C1-Naph
C2-Naph
C3-Naph
C4-Naph
1-MeNaph
2-MeNaph
2,6-DMeNaph
1,6,7-TMeNaph
AcNaphYl
AcNaph
Fluorene
C1-Fluorenes
C2-Fluorenes
C3-Fluorenes
ANT
PHE
C1-PHE/ANT
C2-PHE/ANT
C3-PHE/ANT
C4-PHE/ANT
1-MePHE
DBZTP
C1-DBZTP
C2-DBZTP
C3-DBZTP
FLUT
PYR
C1-FLUT/PYR
BAA
Chrysene
C1-Chrysenes
C2-Chrysenes
C3-Chrysenes
C4-Chrysenes
BBF
BKF
BEP
BAP
Peylene
ICDP
DBahANT
BGHIP

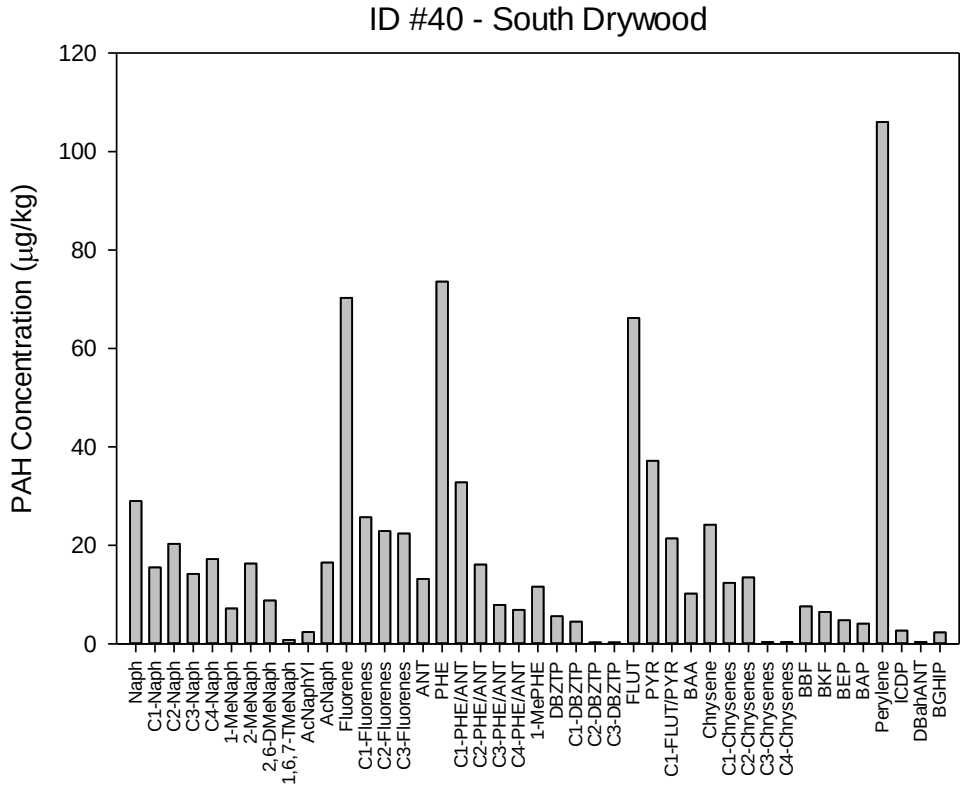

ID #9 - Crow Wing
PAH Concentration (µg/kg)
175
150
125
100
75
50
25
0
Naph
C1-Naph
C2-Naph
C3-Naph
C4-Naph
1-MeNaph
2-MeNaph
2,6-DMeNaph
1,6,7-TMeNaph
AcNaphYl
AcNaph
Fluorene
C1-Fluorenes
C2-Fluorenes
C3-Fluorenes
ANT
PHE
C1-PHE/ANT
C2-PHE/ANT
C3-PHE/ANT
C4-PHE/ANT
1-MePHE
DBZTP
C1-DBZTP
C2-DBZTP
C3-DBZTP
FLUT
PYR
C1-FLUT/PYR
BAA
Chrysene
C1-Chrysenes
C2-Chrysenes
C3-Chrysenes
C4-Chrysenes
BBF
BKF
BEP
BAP
Peylene
ICDP
DBahANT
BGHIP

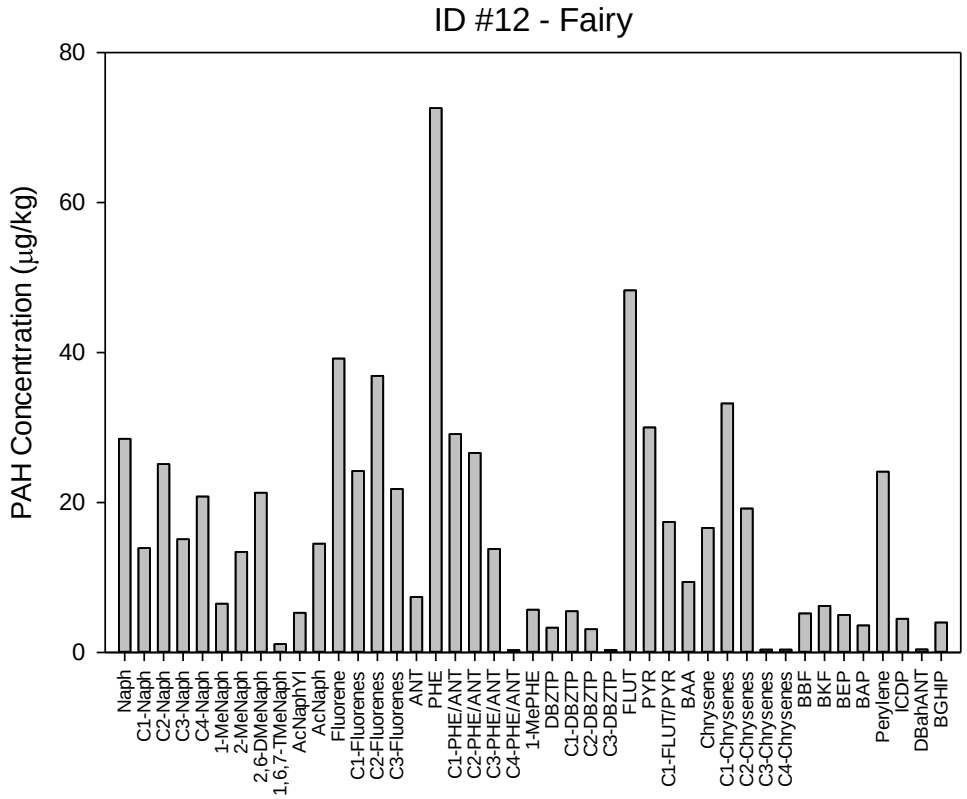

ID #37 - Richey
PAH Concentration (µg/kg)
0
20
40
60
80
100
120
140
160
180
Naph
C1-Naph
C2-Naph
C3-Naph
C4-Naph
1-MeNaph
2-MeNaph
2,6-DMeNaph
1,6,7-TMeNaph
AcNaphYl
AcNaph
Fluorene
C1-Fluorenes
C2-Fluorenes
C3-Fluorenes
ANT
PHE
C1-PHE/ANT
C2-PHE/ANT
C3-PHE/ANT
C4-PHE/ANT
1-MePHE
DBZTP
C1-DBZTP
C2-DBZTP
C3-DBZTP
FLUT
PYR
C1-FLUT/PYR
BAA
Chysene
C1-Chrysenes
C2-Chrysenes
C3-Chrysenes
C4-Chrysenes
BBF
BKF
BEP
BAP
Perylene
ICDP
DBahANT
BGHIP

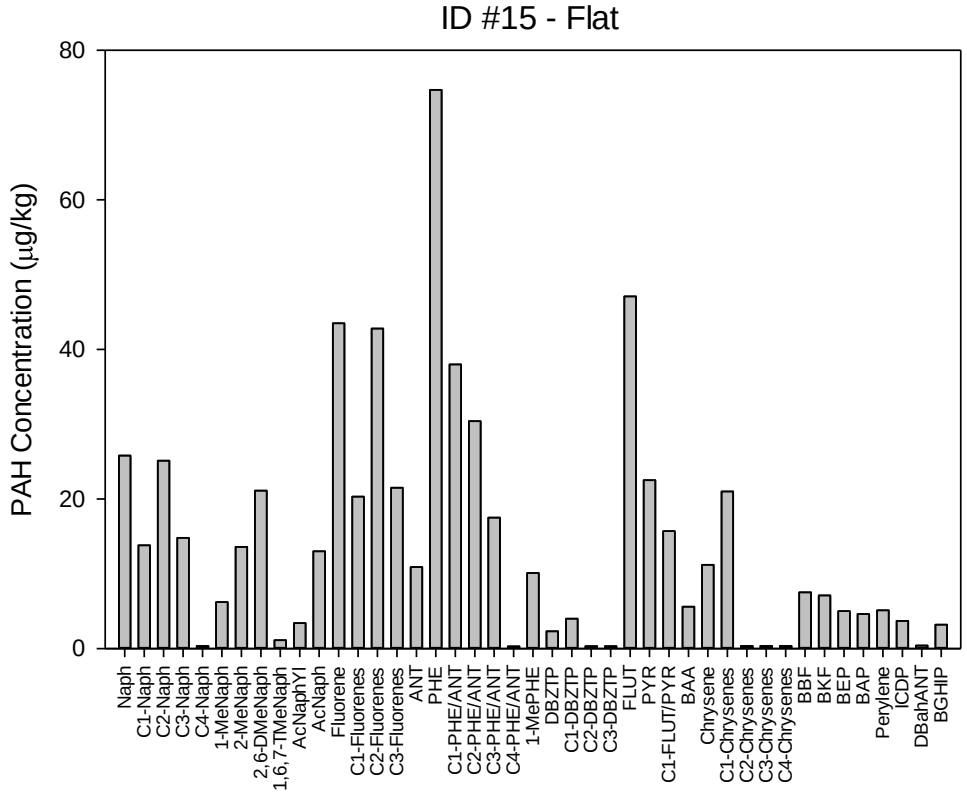

ID #13 - Fanny
PAH Concentration (µg/kg)
0
20
40
60
80
100
120
Naph
C1-Naph
C2-Naph
C3-Naph
C4-Naph
1-MeNaph
2-MeNaph
2,6-DMeNaph
1,6,7-TMeNaph
AcNaphYl
AcNaph
Fluorene
C1-Fluorenes
C2-Fluorenes
C3-Fluorenes
ANT
PHE
C1-PHE/ANT
C2-PHE/ANT
C3-PHE/ANT
C4-PHE/ANT
1-MePHE
DBZTP
C1-DBZTP
C2-DBZTP
C3-DBZTP
FLUT
PYR
C1-FLUT/PYR
BAA
Chysene
C1-Chrysenes
C2-Chrysenes
C3-Chrysenes
C4-Chrysenes
BBF
BKF
BEP
BAP
Perylene
ICDP
DBahANT
BGHIP

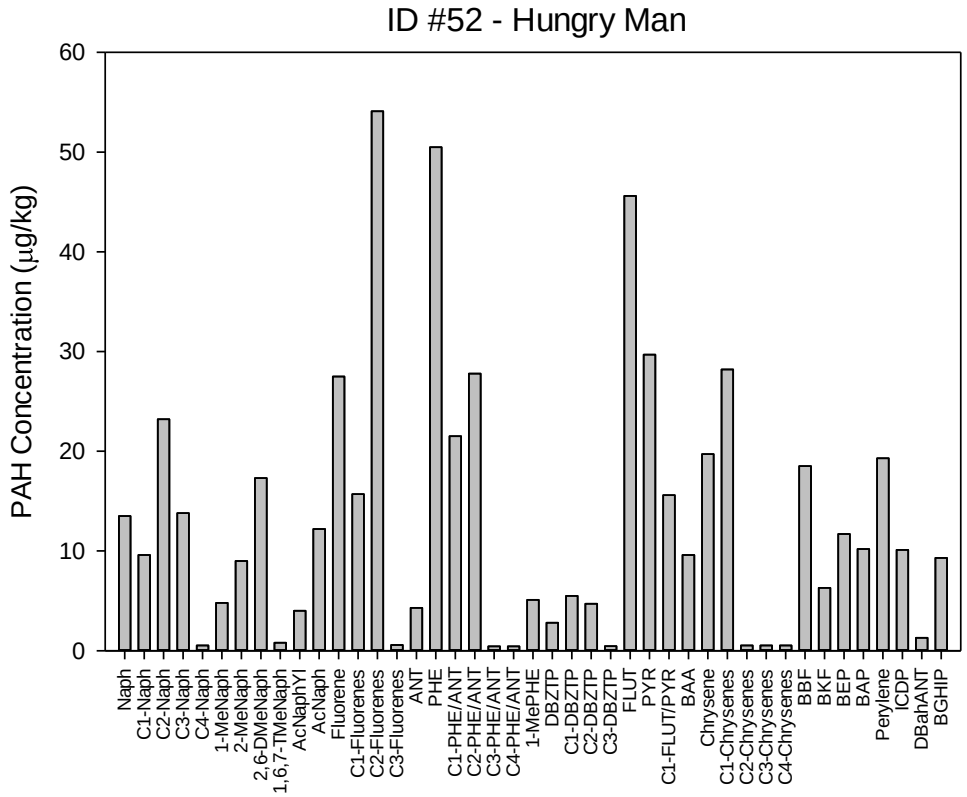

ID #3 - Arthur
PAH Concentration (µg/kg)
1450
1425
1400
50
25
0
Naph
C1-Naph
C2-Naph
C3-Naph
C4-Naph
1-MeNaph
2-MeNaph
2,6-DMeNaph
1,6,7-TMeNaph
AcNaphYl
AcNaph
Fluorene
C1-Fluorenes
C2-Fluorenes
C3-Fluorenes
ANT
PHE
C1-PHE/ANT
C2-PHE/ANT
C3-PHE/ANT
C4-PHE/ANT
1-MePHE
DBZTP
C1-DBZTP
C2-DBZTP
C3-DBZTP
FLUT
PYR
C1-FLUT/PYR
BAA
Chrysene
C1-Chrysenes
C2-Chrysenes
C3-Chrysenes
C4-Chrysenes
BBF
BKF
BEP
BAP
Perylene
ICDP
DBahANT
BGHIP

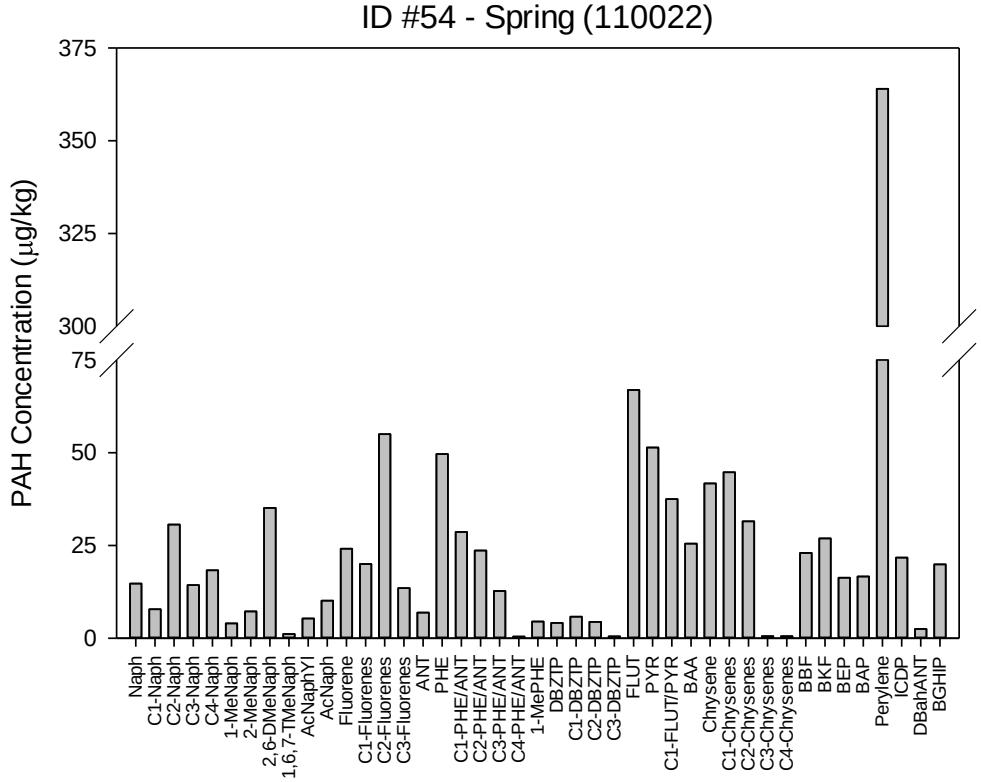

ID #4 - Aspen
PAH Concentration (µg/kg)
1325
1300
1275
1250
75
50
25
0
Naph
C1-Naph
C2-Naph
C3-Naph
C4-Naph
1-MeNaph
2-MeNaph
2,6-DMeNaph
1,6,7-TMeNaph
AcNaphYl
AcNaph
Fluorene
C1-Fluorenes
C2-Fluorenes
C3-Fluorenes
ANT
PHE
C1-PHE/ANT
C2-PHE/ANT
C3-PHE/ANT
C4-PHE/ANT
1-MePHE
DBZTP
C1-DBZTP
C2-DBZTP
C3-DBZTP
FLUT
PYR
C1-FLUT/PYR
BAA
Chrysene
C1-Chrysenes
C2-Chrysenes
C3-Chrysenes
C4-Chrysenes
BBF
BKF
BEP
BAP
Perylene
ICDP
DBahANT
BGHIP

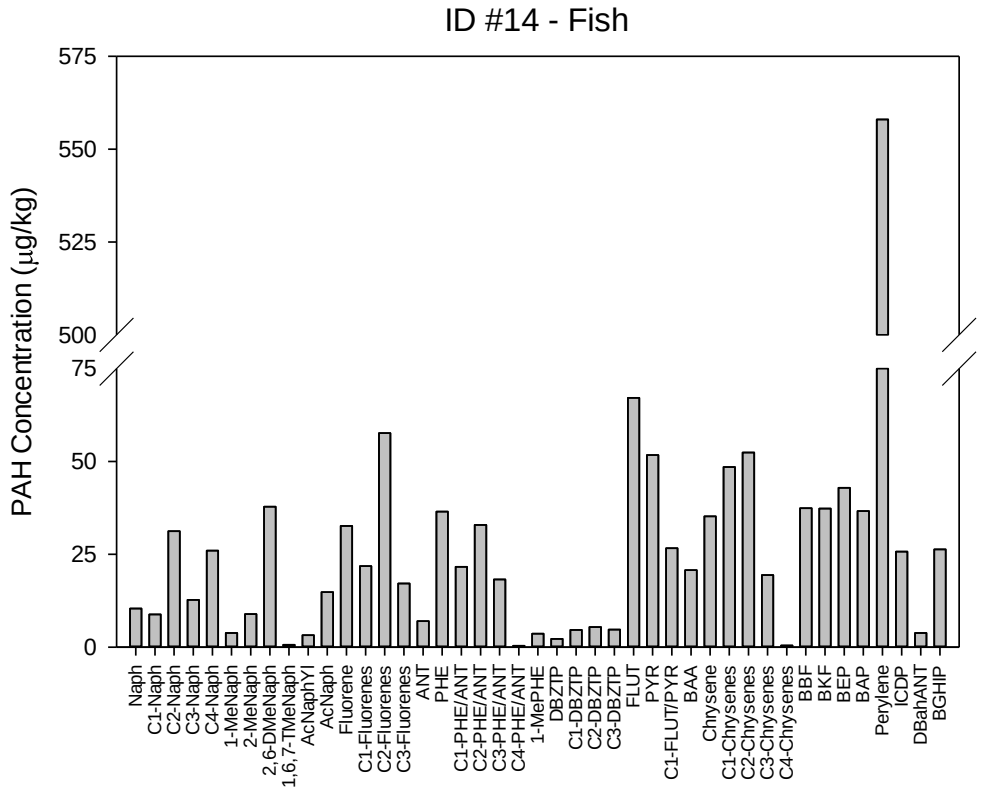

ID #40 - South Drywood
PAH Concentration (µg/kg)
0
20
40
60
80
100
120
Naph
C1-Naph
C2-Naph
C3-Naph
C4-Naph
1-MeNaph
2-MeNaph
2,6-DMeNaph
1,6,7-TMeNaph
AcNaphYl
AcNaph
Fluorene
C1-Fluorenes
C2-Fluorenes
C3-Fluorenes
ANT
PHE
C1-PHE/ANT
C2-PHE/ANT
C3-PHE/ANT
C4-PHE/ANT
1-MePHE
DBZTP
C1-DBZTP
C2-DBZTP
C3-DBZTP
FLUT
PYR
C1-FLUT/PYR
BAA
Chysene
C1-Chrysenes
C2-Chrysenes
C3-Chrysenes
C4-Chrysenes
BBF
BKF
BEP
BAP
Perylene
ICDP
DBahANT
BGHIP

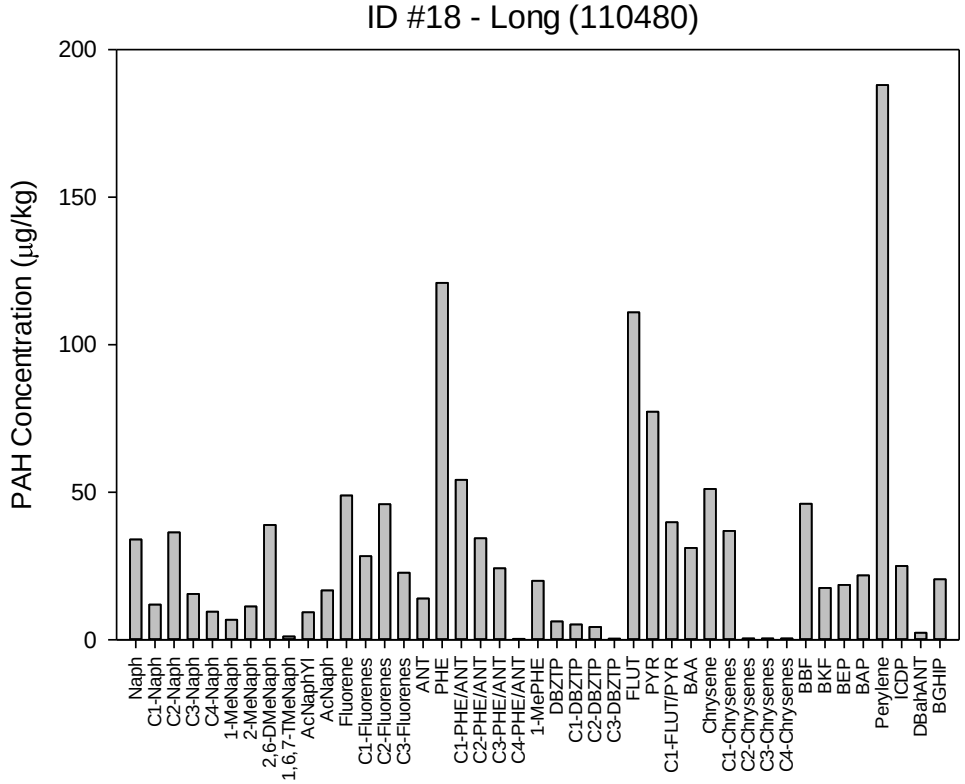

ID #12 - Fairy
PAH Concentration (µg/kg)
0
20
40
60
80
Naph
C1-Naph
C2-Naph
C3-Naph
C4-Naph
1-MeNaph
2-MeNaph
2,6-DMeNaph
1,6,7-TMeNaph
AcNaphYl
AcNaph
Fluorene
C1-Fluorenes
C2-Fluorenes
C3-Fluorenes
ANT
PHE
C1-PHE/ANT
C2-PHE/ANT
C3-PHE/ANT
C4-PHE/ANT
1-MePHE
DBZTP
C1-DBZTP
C2-DBZTP
C3-DBZTP
FLUT
PYR
C1-FLUT/PYR
BAA
Chysene
C1-Chrysenes
C2-Chrysenes
C3-Chrysenes
C4-Chrysenes
BBF
BKF
BEP
BAP
Perylene
ICDP
DBahANT
BGHIP

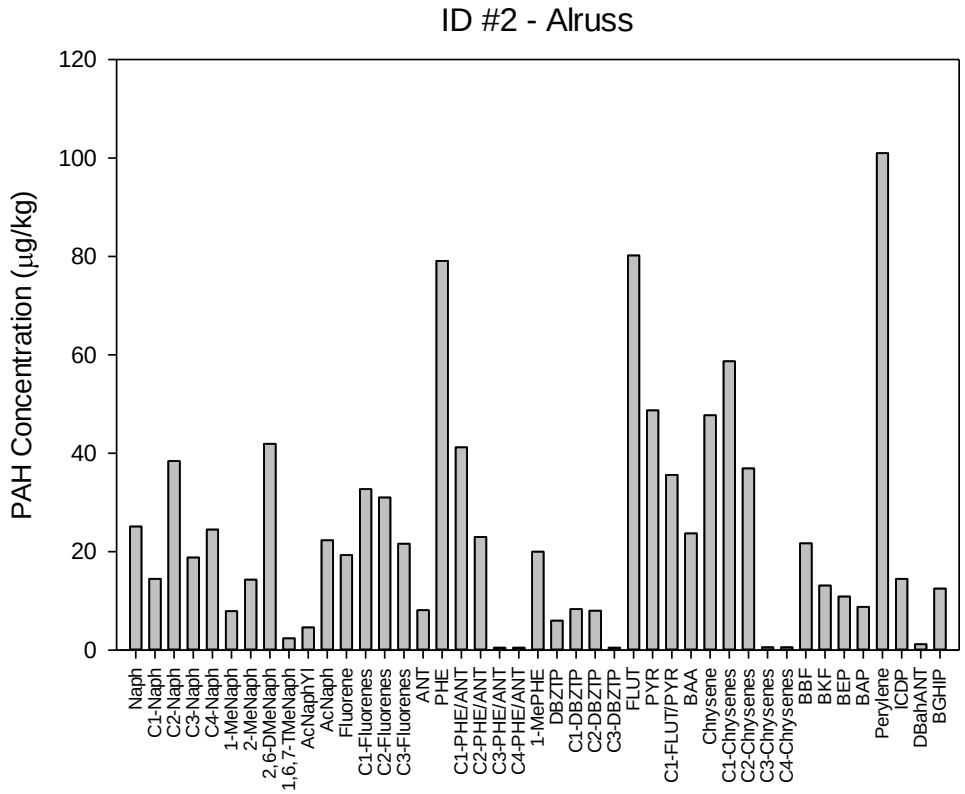

ID #15 - Flat
PAH Concentration (µg/kg)
0
20
40
60
80
Naph
C1-Naph
C2-Naph
C3-Naph
C4-Naph
1-MeNaph
2-MeNaph
2,6-DMeNaph
1,6,7-TMeNaph
AcNaphYl
AcNaph
Fluorene
C1-Fluorenes
C2-Fluorenes
C3-Fluorenes
ANT
PHE
C1-PHE/ANT
C2-PHE/ANT
C3-PHE/ANT
C4-PHE/ANT
1-MePHE
DBZTP
C1-DBZTP
C2-DBZTP
C3-DBZTP
FLUT
PYR
C1-FLUT/PYR
BAA
Chrysene
C1-Chrysenes
C2-Chrysenes
C3-Chrysenes
C4-Chrysenes
BBF
BKF
BEP
BAP
Perylene
ICDP
DBahANT
BGHIP

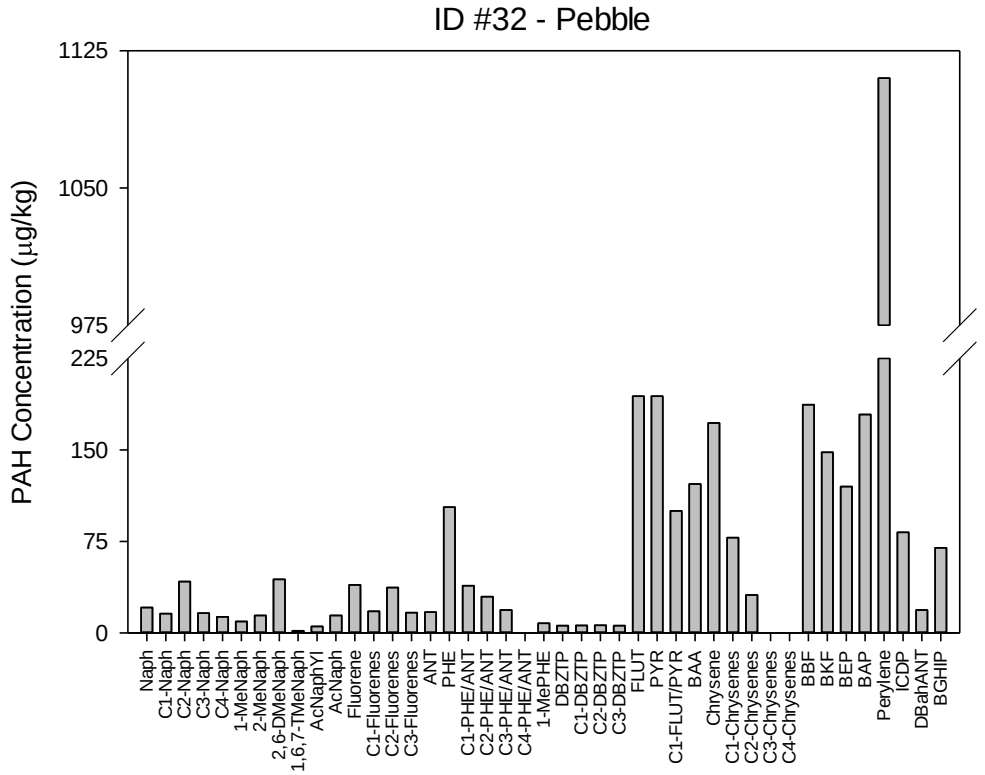

ID #52 - Hungry Man
PAH Concentration (µg/kg)
0
10
20
30
40
50
60
Naph
C1-Naph
C2-Naph
C3-Naph
C4-Naph
1-MeNaph
2-MeNaph
2,6-DMeNaph
1,6,7-TMeNaph
AcNaphYl
AcNaph
Fluorene
C1-Fluorenes
C2-Fluorenes
C3-Fluorenes
ANT
PHE
C1-PHE/ANT
C2-PHE/ANT
C3-PHE/ANT
C4-PHE/ANT
1-MePHE
DBZTP
C1-DBZTP
C2-DBZTP
C3-DBZTP
FLUT
PYR
C1-FLUT/PYR
BAA
Chrysene
C1-Chrysenes
C2-Chrysenes
C3-Chrysenes
C4-Chrysenes
BBF
BKF
BEP
BAP
Perylene
ICDP
DBahANT
BGHIP

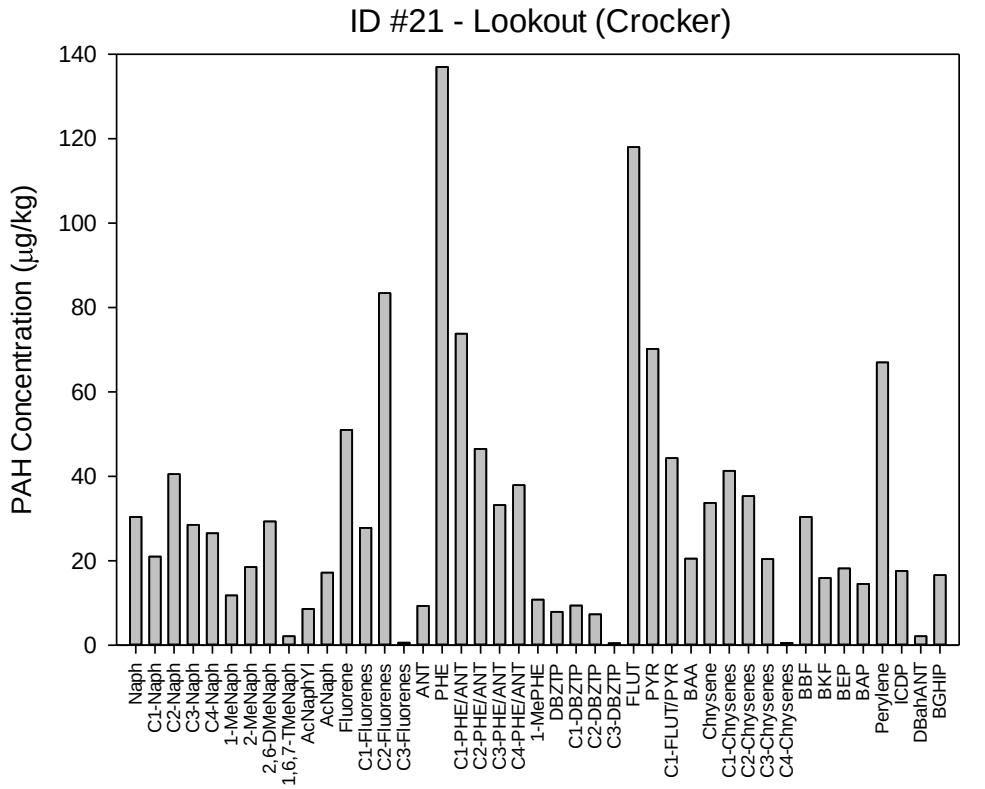

ID #54 - Spring (110022)
PAH Concentration (µg/kg)
375
350
325
300
75
50
25
0
Naph
C1-Naph
C2-Naph
C3-Naph
C4-Naph
1-MeNaph
2-MeNaph
2,6-DMeNaph
1,6,7-TMeNaph
AcNaphYl
AcNaph
Fluorene
C1-Fluorenes
C2-Fluorenes
C3-Fluorenes
ANT
PHE
C1-PHE/ANT
C2-PHE/ANT
C3-PHE/ANT
C4-PHE/ANT
1-MePHE
DBZTP
C1-DBZTP
C2-DBZTP
C3-DBZTP
FLUT
PYR
C1-FLUT/PYR
BAA
Chysene
C1-Chysenes
C2-Chysenes
C3-Chysenes
C4-Chysenes
BBF
BKF
BEP
BAP
Perylene
ICDP
DBahANT
BGHIP

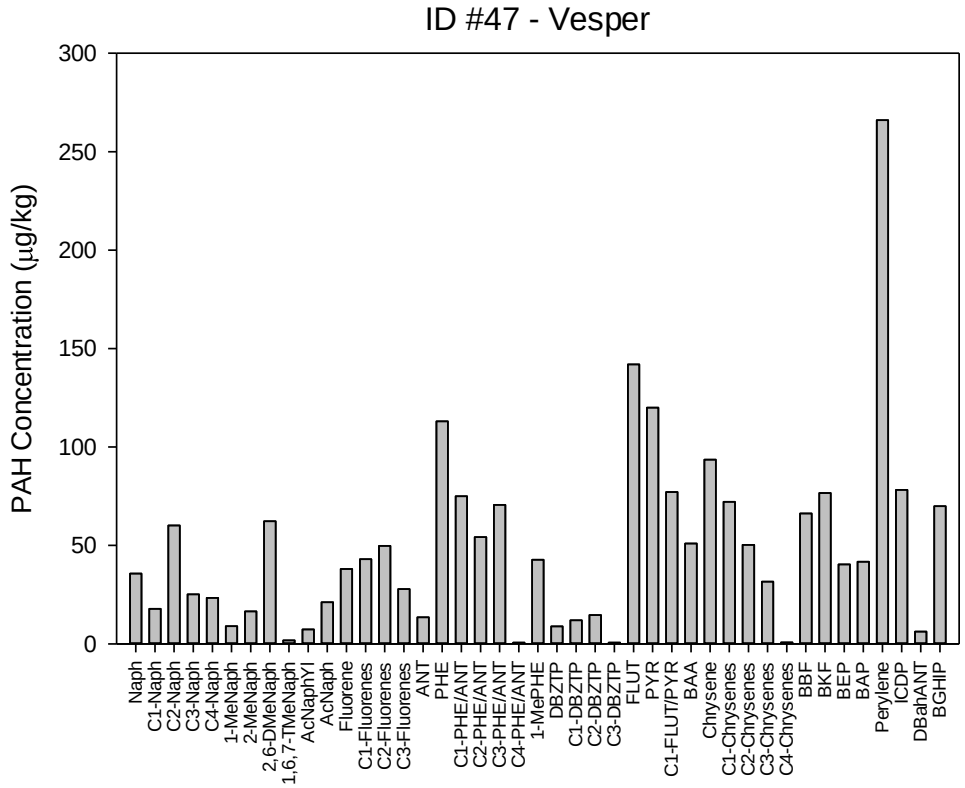

ID #14 - Fish
PAH Concentration (µg/kg)
575
550
525
500
75
50
25
0
Naph
C1-Naph
C2-Naph
C3-Naph
C4-Naph
1-MeNaph
2-MeNaph
2,6-DMeNaph
1,6,7-TMeNaph
AcNaphYl
AcNaph
Fluorene
C1-Fluorenes
C2-Fluorenes
C3-Fluorenes
ANT
PHE
C1-PHE/ANT
C2-PHE/ANT
C3-PHE/ANT
C4-PHE/ANT
1-MePHE
DBZTP
C1-DBZTP
C2-DBZTP
C3-DBZTP
FLUT
PYR
C1-FLUT/PYR
BAA
Chysene
C1-Chysenes
C2-Chysenes
C3-Chysenes
C4-Chysenes
BBF
BKF
BEP
BAP
Perylene
ICDP
DBahANT
BGHIP

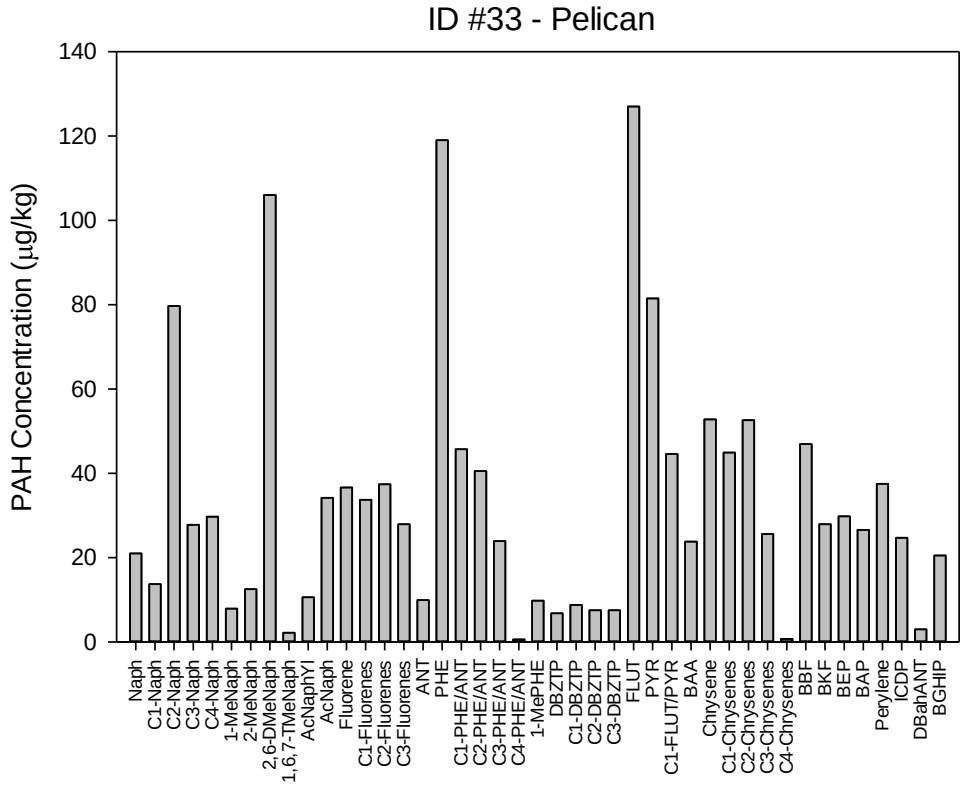

ID #18 - Long (110480)
PAH Concentration (µg/kg)
0
50
100
150
200
Naph
C1-Naph
C2-Naph
C3-Naph
C4-Naph
1-MeNaph
2-MeNaph
2,6-DMeNaph
1,6,7-TMeNaph
AcNaphYl
AcNaph
Fluorene
C1-Fluorenes
C2-Fluorenes
C3-Fluorenes
ANT
PHE
C1-PHE/ANT
C2-PHE/ANT
C3-PHE/ANT
C4-PHE/ANT
1-MePHE
DBZTP
C1-DBZTP
C2-DBZTP
C3-DBZTP
FLUT
PYR
C1-FLUT/PYR
BAA
Chrysene
C1-Chrysenes
C2-Chrysenes
C3-Chrysenes
C4-Chrysenes
BBF
BKF
BEP
BAP
Perylene
ICDP
DBahANT
BGHIP

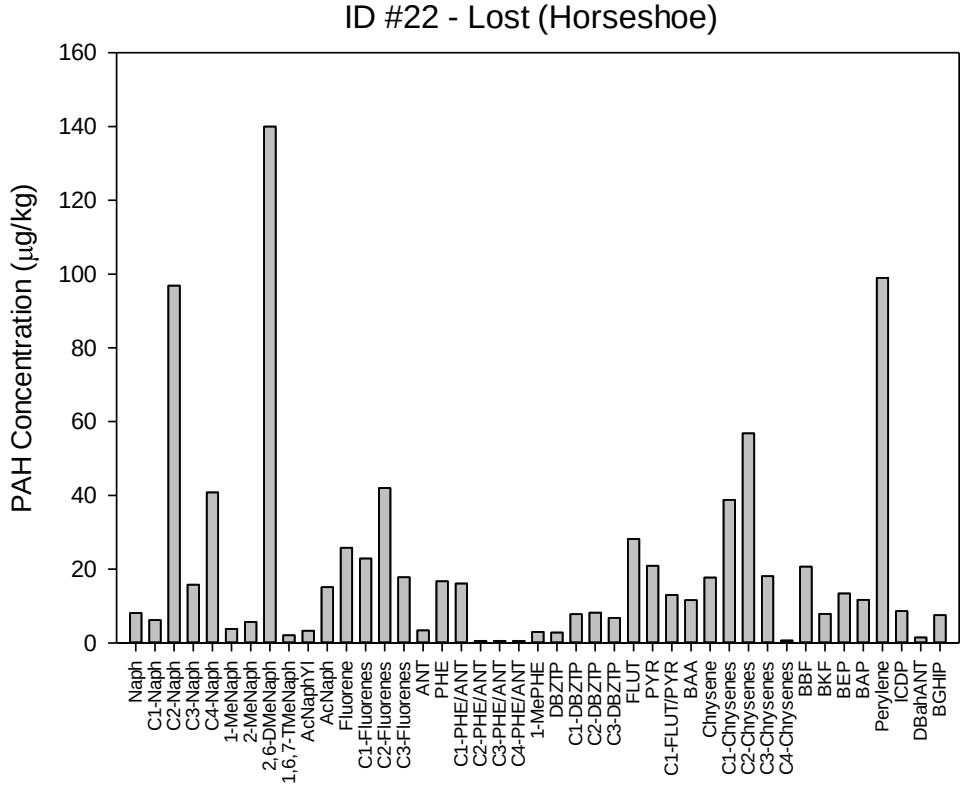

ID #2 - Alruss
PAH Concentration (µg/kg)
0
20
40
60
80
100
120
Naph
C1-Naph
C2-Naph
C3-Naph
C4-Naph
1-MeNaph
2-MeNaph
2,6-DMeNaph
1,6,7-TMeNaph
AcNaphYl
AcNaph
Fluorene
C1-Fluorenes
C2-Fluorenes
C3-Fluorenes
ANT
PHE
C1-PHE/ANT
C2-PHE/ANT
C3-PHE/ANT
C4-PHE/ANT
1-MePHE
DBZTP
C1-DBZTP
C2-DBZTP
C3-DBZTP
FLUT
PYR
C1-FLUT/PYR
BAA
Chrysene
C1-Chrysenes
C2-Chrysenes
C3-Chrysenes
C4-Chrysenes
BBF
BKF
BEP
BAP
Perylene
ICDP
DBahANT
BGHIP

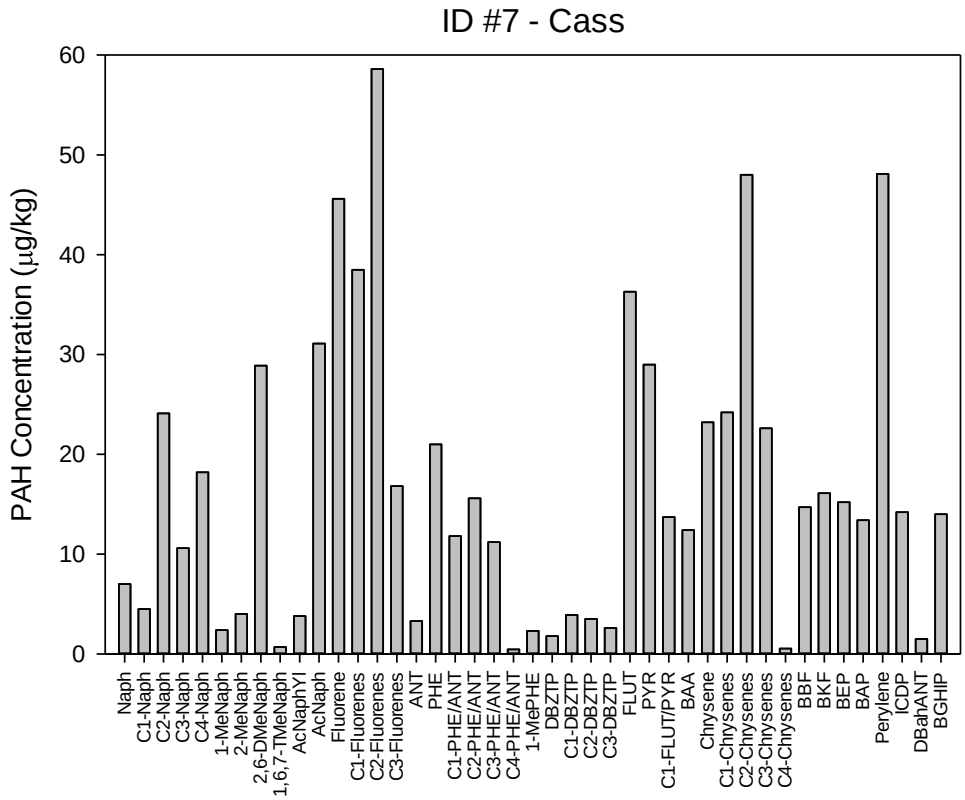

ID #32 - Pebble
PAH Concentration (µg/kg)
1125
1050
975
225
150
75
0
Naph
C1-Naph
C2-Naph
C3-Naph
C4-Naph
1-MeNaph
2-MeNaph
2,6-DMeNaph
1,6,7-TMeNaph
AcNaphYl
AcNaph
Fluorene
C1-Fluorenes
C2-Fluorenes
C3-Fluorenes
ANT
PHE
C1-PHE/ANT
C2-PHE/ANT
C3-PHE/ANT
C4-PHE/ANT
1-MePHE
DBZTP
C1-DBZTP
C2-DBZTP
C3-DBZTP
FLUT
PYR
C1-FLUT/PYR
BAA
Chysene
C1-Chrysenes
C2-Chrysenes
C3-Chrysenes
C4-Chrysenes
BBF
BKF
BEP
BAP
Perylene
ICDP
DBahANT
BGHIP

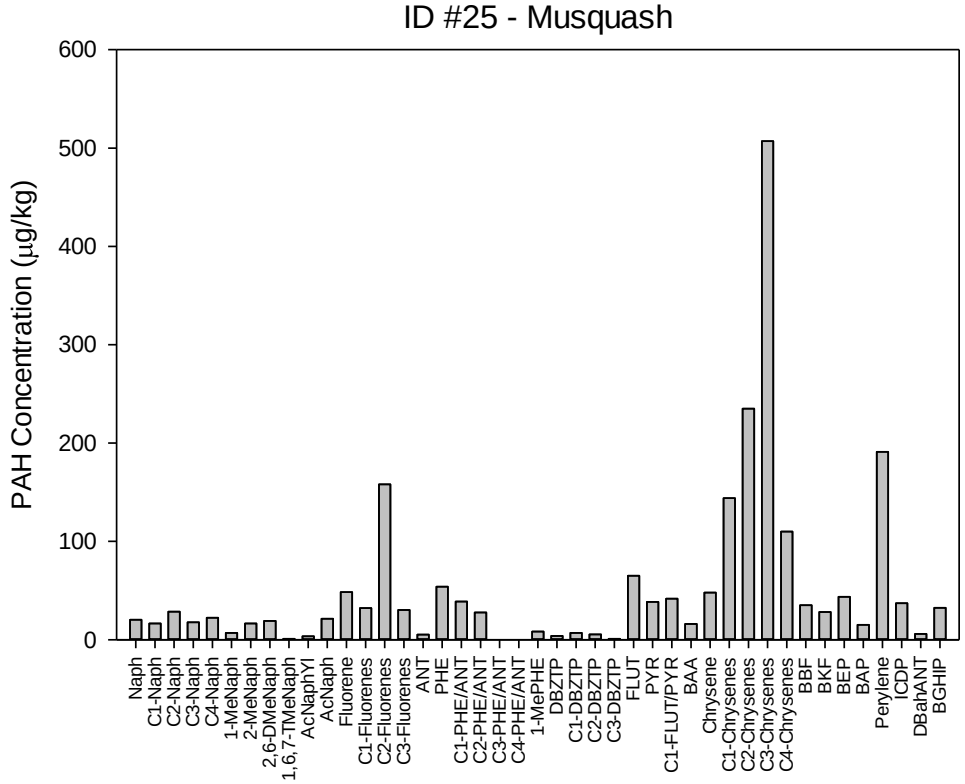

ID #21 - Lookout (Crocker)
PAH Concentration (µg/kg)
140
120
100
80
60
40
20
0
Naph
C1-Naph
C2-Naph
C3-Naph
C4-Naph
1-MeNaph
2-MeNaph
2,6-DMeNaph
1,6,7-TMeNaph
AcNaphYl
AcNaph
Fluorene
C1-Fluorenes
C2-Fluorenes
C3-Fluorenes
ANT
PHE
C1-PHE/ANT
C2-PHE/ANT
C3-PHE/ANT
C4-PHE/ANT
1-MePHE
DBZTP
C1-DBZTP
C2-DBZTP
C3-DBZTP
FLUT
PYR
C1-FLUT/PYR
BAA
Chysene
C1-Chrysenes
C2-Chrysenes
C3-Chrysenes
C4-Chrysenes
BBF
BKF
BEP
BAP
Perylene
ICDP
DBahANT
BGHIP

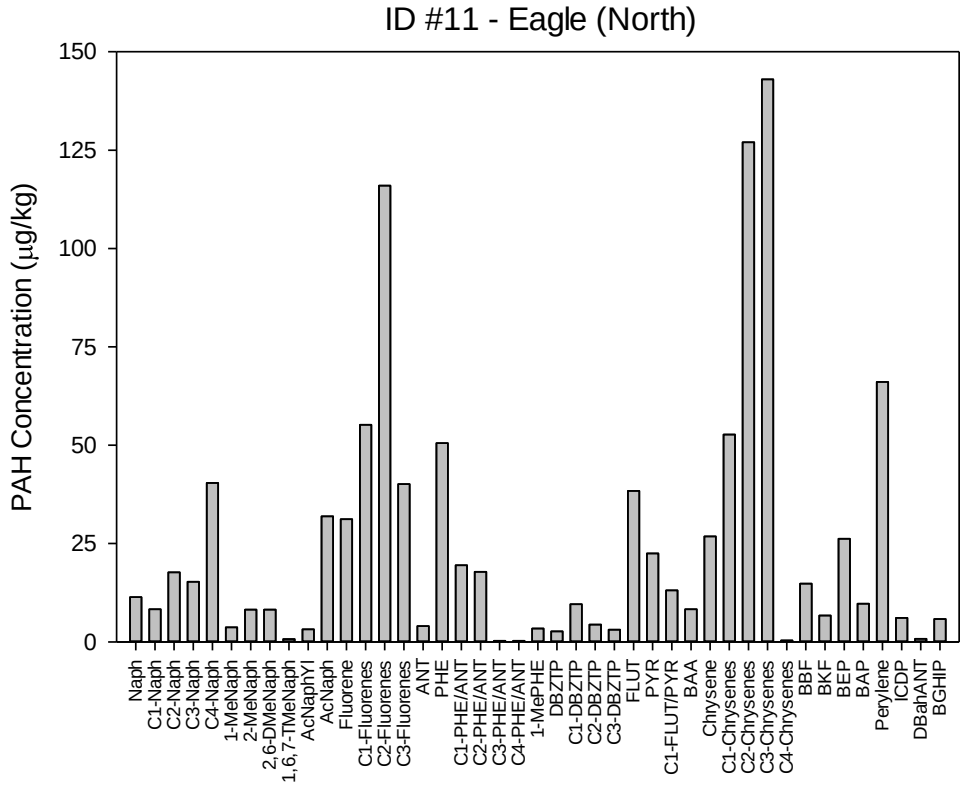

ID #47 - Vesper
PAH Concentration (µg/kg)
300
250
200
150
100
50
0
Naph
C1-Naph
C2-Naph
C3-Naph
C4-Naph
1-MeNaph
2-MeNaph
2,6-DMeNaph
1,6,7-TMeNaph
AcNaphYl
AcNaph
Fluorene
C1-Fluorenes
C2-Fluorenes
C3-Fluorenes
ANT
PHE
C1-PHE/ANT
C2-PHE/ANT
C3-PHE/ANT
C4-PHE/ANT
1-MePHE
DBZTP
C1-DBZTP
C2-DBZTP
C3-DBZTP
FLUT
PYR
C1-FLUT/PYR
BAA
Chysene
C1-Chrysenes
C2-Chrysenes
C3-Chrysenes
C4-Chrysenes
BBF
BKF
BEP
BAP
Perylene
ICDP
DBahANT
BGHIP

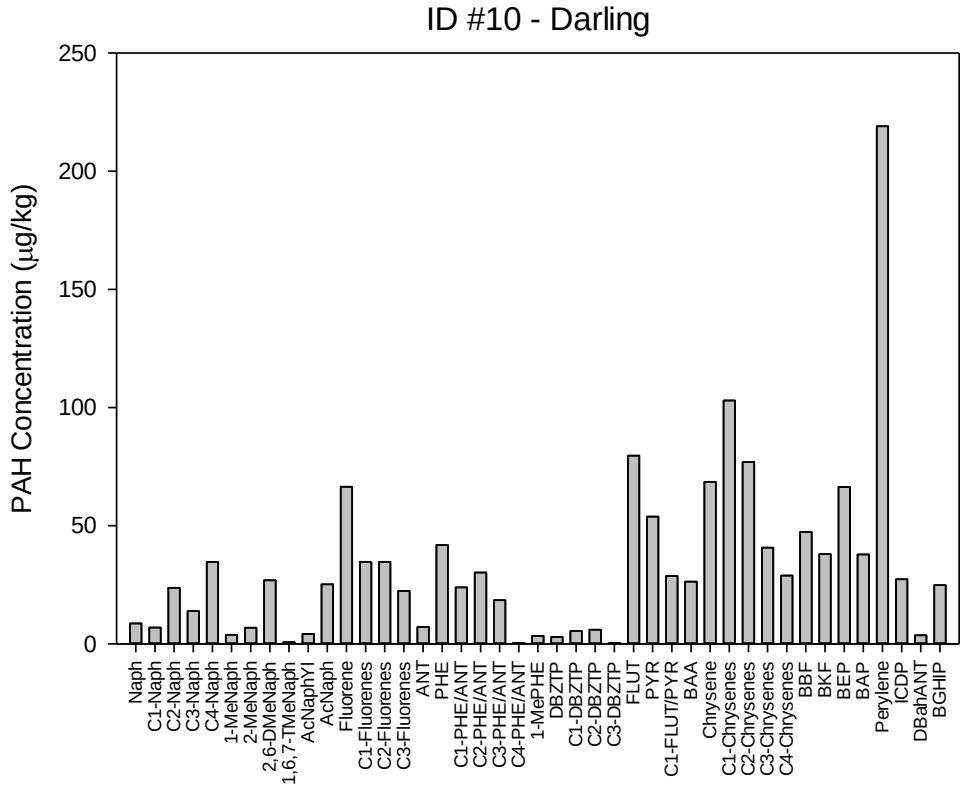

ID #33 - Pelican
PAH Concentration (µg/kg)
140
120
100
80
60
40
20
0
Naph
C1-Naph
C2-Naph
C3-Naph
C4-Naph
1-MeNaph
2-MeNaph
2,6-DMeNaph
1,6,7-TMeNaph
AcNaphYl
AcNaph
Fluorene
C1-Fluorenes
C2-Fluorenes
C3-Fluorenes
ANT
PHE
C1-PHE/ANT
C2-PHE/ANT
C3-PHE/ANT
C4-PHE/ANT
1-MePHE
DBZTP
C1-DBZTP
C2-DBZTP
C3-DBZTP
FLUT
PYR
C1-FLUT/PYR
BAA
Chysene
C1-Chrysenes
C2-Chrysenes
C3-Chrysenes
C4-Chrysenes
BBF
BKF
BEP
BAP
Perylene
ICDP
DBahANT
BGHIP

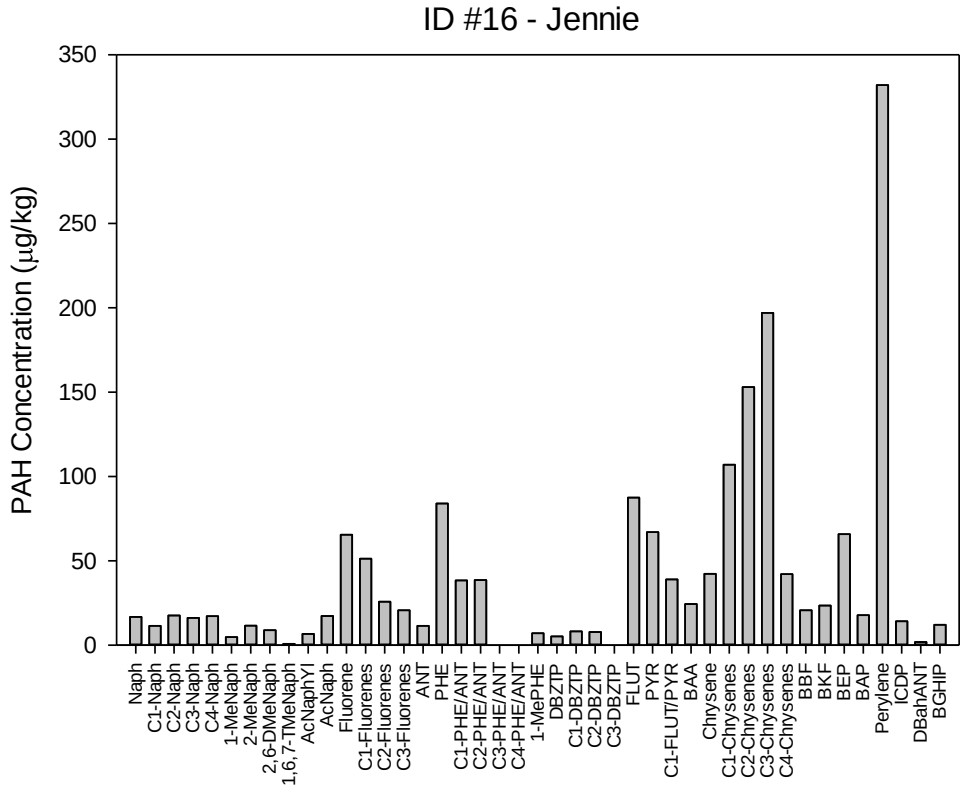

ID #22 - Lost (Horseshoe)
PAH Concentration (µg/kg)
0
20
40
60
80
100
120
140
160
Naph
C1-Naph
C2-Naph
C3-Naph
C4-Naph
1-MeNaph
2-MeNaph
2,6-DMeNaph
1,6,7-TMeNaph
AcNaphYl
AcNaph
Fluorene
C1-Fluorenes
C2-Fluorenes
C3-Fluorenes
ANT
PHE
C1-PHE/ANT
C2-PHE/ANT
C3-PHE/ANT
C4-PHE/ANT
1-MePHE
DBZTP
C1-DBZTP
C2-DBZTP
C3-DBZTP
FLUT
PYR
C1-FLUT/PYR
BAA
Chysene
C1-Chysenes
C2-Chysenes
C3-Chysenes
C4-Chysenes
BBF
BKF
BEP
BAP
Perylene
ICDP
DBahANT
BGHIP

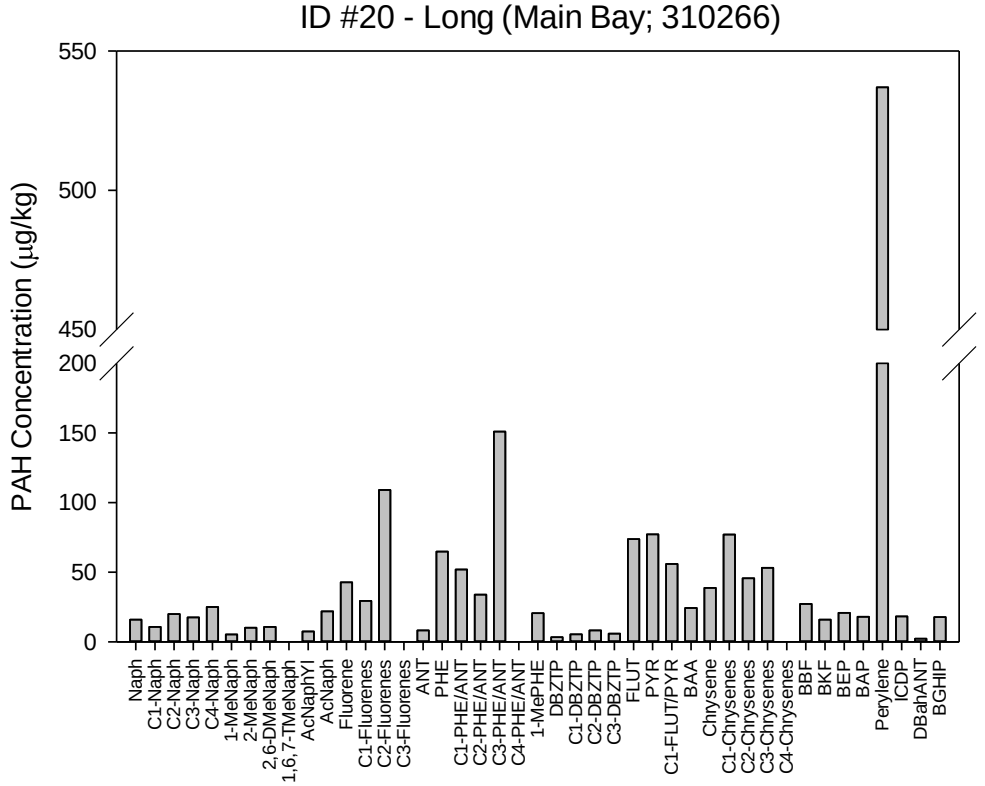

ID #7 - Cass
PAH Concentration (µg/kg)
0
10
20
30
40
50
60
Naph
C1-Naph
C2-Naph
C3-Naph
C4-Naph
1-MeNaph
2-MeNaph
2,6-DMeNaph
1,6,7-TMeNaph
AcNaphYl
AcNaph
Fluorene
C1-Fluorenes
C2-Fluorenes
C3-Fluorenes
ANT
PHE
C1-PHE/ANT
C2-PHE/ANT
C3-PHE/ANT
C4-PHE/ANT
1-MePHE
DBZTP
C1-DBZTP
C2-DBZTP
C3-DBZTP
FLUT
PYR
C1-FLUT/PYR
BAA
Chysene
C1-Chysenes
C2-Chysenes
C3-Chysenes
C4-Chysenes
BBF
BKF
BEP
BAP
Perylene
ICDP
DBahANT
BGHIP

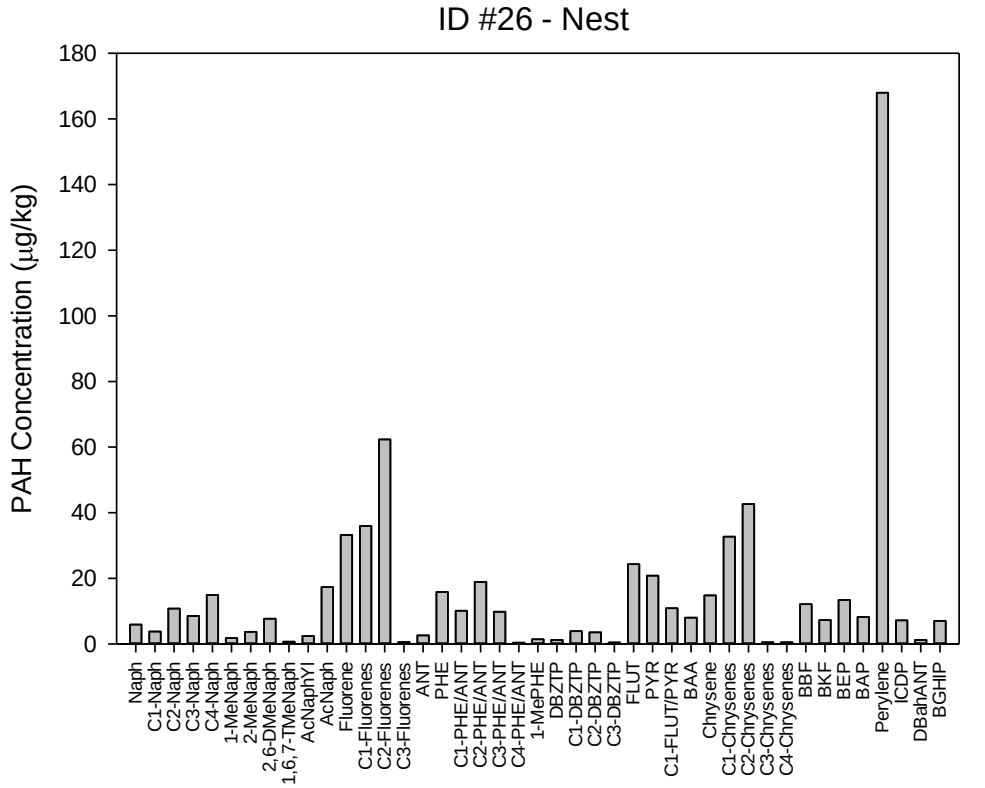

ID #25 - Musquash
PAH Concentration (µg/kg)
600
500
400
300
200
100
0
Naph
C1-Naph
C2-Naph
C3-Naph
C4-Naph
1-MeNaph
2-MeNaph
2,6-DMeNaph
1,6,7-TMeNaph
AcNaphYl
AcNaph
Fluorene
C1-Fluorenes
C2-Fluorenes
C3-Fluorenes
ANT
PHE
C1-PHE/ANT
C2-PHE/ANT
C3-PHE/ANT
C4-PHE/ANT
1-MePHE
DBZTP
C1-DBZTP
C2-DBZTP
C3-DBZTP
FLUT
PYR
C1-FLUT/PYR
BAA
Chrysene
C1-Chrysenes
C2-Chrysenes
C3-Chrysenes
C4-Chrysenes
BBF
BKF
BEP
BAP
Perylene
ICDP
DBahANT
BGHIP

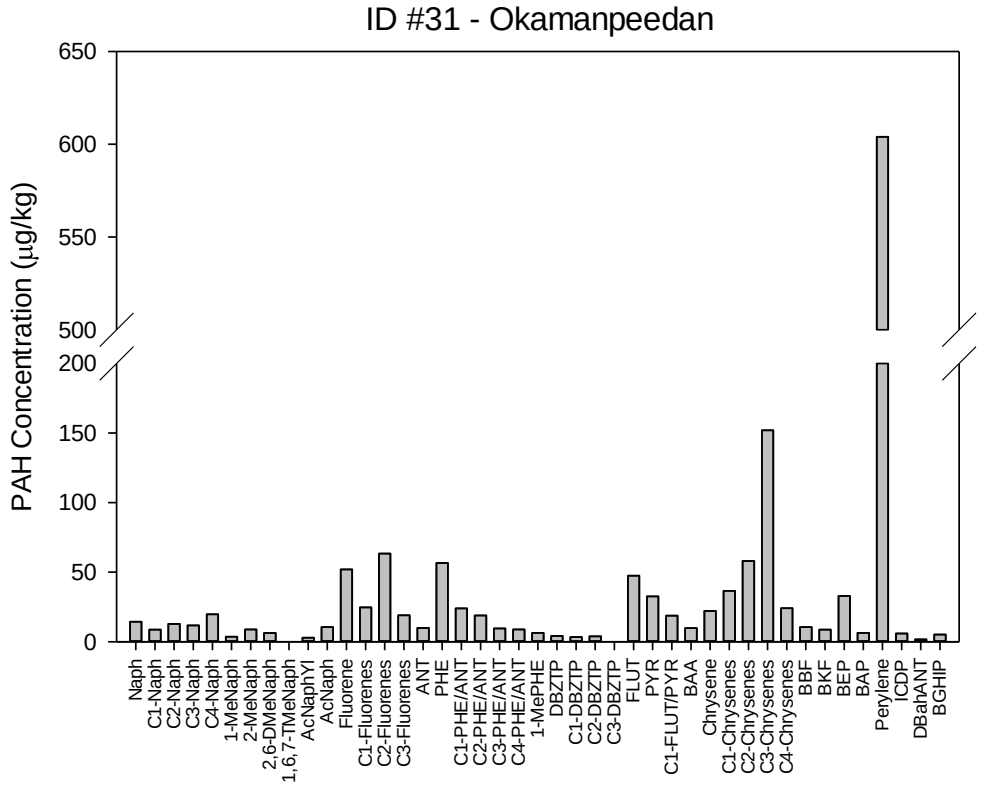

ID #11 - Eagle (North)
PAH Concentration (µg/kg)
150
125
100
75
50
25
0
Naph
C1-Naph
C2-Naph
C3-Naph
C4-Naph
1-MeNaph
2-MeNaph
2,6-DMeNaph
1,6,7-TMeNaph
AcNaphYl
AcNaph
Fluorene
C1-Fluorenes
C2-Fluorenes
C3-Fluorenes
ANT
PHE
C1-PHE/ANT
C2-PHE/ANT
C3-PHE/ANT
C4-PHE/ANT
1-MePHE
DBZTP
C1-DBZTP
C2-DBZTP
C3-DBZTP
FLUT
PYR
C1-FLUT/PYR
BAA
Chrysene
C1-Chrysenes
C2-Chrysenes
C3-Chrysenes
C4-Chrysenes
BBF
BKF
BEP
BAP
Perylene
ICDP
DBahANT
BGHIP

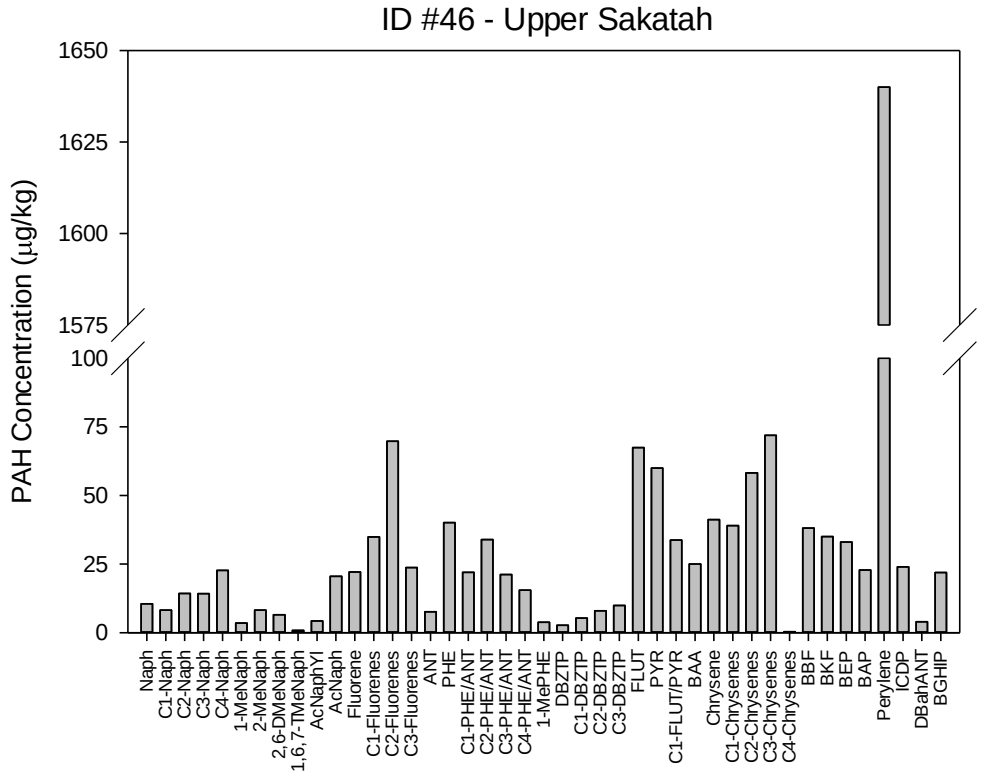

ID #10 - Darling
PAH Concentration (µg/kg)
250
200
150
100
50
0
Naph
C1-Naph
C2-Naph
C3-Naph
C4-Naph
1-MeNaph
2-MeNaph
2,6-DMeNaph
1,6,7-TMeNaph
AcNaphYl
AcNaph
Fluorene
C1-Fluorenes
C2-Fluorenes
C3-Fluorenes
ANT
PHE
C1-PHE/ANT
C2-PHE/ANT
C3-PHE/ANT
C4-PHE/ANT
1-MePHE
DBZTP
C1-DBZTP
C2-DBZTP
C3-DBZTP
FLUT
PYR
C1-FLUT/PYR
BAA
Chysene
C1-Chrysenes
C2-Chrysenes
C3-Chrysenes
C4-Chrysenes
BBF
BKF
BEP
BAP
Perylene
ICDP
DBahANT
BGHIP

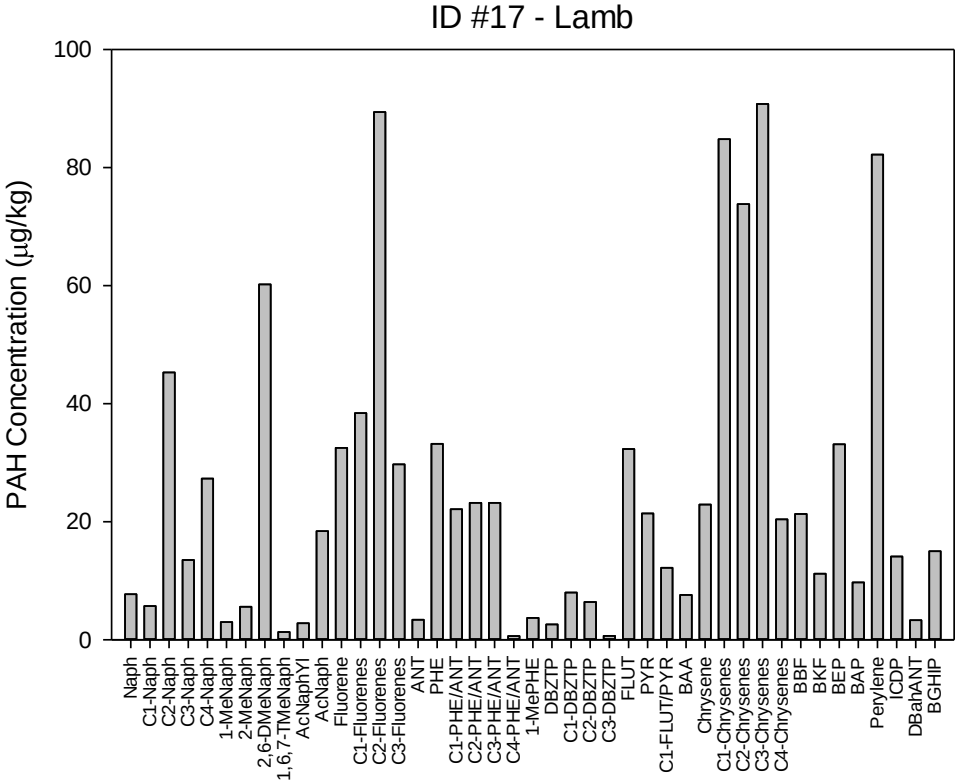

ID #16 - Jennie
PAH Concentration (µg/kg)
350
300
250
200
150
100
50
0
Naph
C1-Naph
C2-Naph
C3-Naph
C4-Naph
1-MeNaph
2-MeNaph
2,6-DMeNaph
1,6,7-TMeNaph
AcNaphYl
AcNaph
Fluorene
C1-Fluorenes
C2-Fluorenes
C3-Fluorenes
ANT
PHE
C1-PHE/ANT
C2-PHE/ANT
C3-PHE/ANT
C4-PHE/ANT
1-MePHE
DBZTP
C1-DBZTP
C2-DBZTP
C3-DBZTP
FLUT
PYR
C1-FLUT/PYR
BAA
Chysene
C1-Chrysenes
C2-Chrysenes
C3-Chrysenes
C4-Chrysenes
BBF
BKF
BEP
BAP
Perylene
ICDP
DBahANT
BGHIP


ID #20 - Long (Main Bay; 310266)
PAH Concentration (µg/kg)
550
500
450
200
150
100
50
0
Naph
C1-Naph
C2-Naph
C3-Naph
C4-Naph
1-MeNaph
2-MeNaph
2,6-DMeNaph
1,6,7-TMeNaph
AcNaphYl
AcNaph
Fluorene
C1-Fluorenes
C2-Fluorenes
C3-Fluorenes
ANT
PHE
C1-PHE/ANT
C2-PHE/ANT
C3-PHE/ANT
C4-PHE/ANT
1-MePHE
DBZTP
C1-DBZTP
C2-DBZTP
C3-DBZTP
FLUT
PYR
C1-FLUT/PYR
BAA
Chysene
C1-Chrysenes
C2-Chrysenes
C3-Chrysenes
C4-Chrysenes
BBF
BKF
BEP
BAP
Perylene
ICDP
DBahANT
BGHIP


ID #26 - Nest
PAH Concentration (µg/kg)
180
160
140
120
100
80
60
40
20
0
Naph
C1-Naph
C2-Naph
C3-Naph
C4-Naph
1-MeNaph
2-MeNaph
2,6-DMeNaph
1,6,7-TMeNaph
AcNaphYl
AcNaph
Fluorene
C1-Fluorenes
C2-Fluorenes
C3-Fluorenes
ANT
PHE
C1-PHE/ANT
C2-PHE/ANT
C3-PHE/ANT
C4-PHE/ANT
1-MePHE
DBZTP
C1-DBZTP
C2-DBZTP
C3-DBZTP
FLUT
PYR
C1-FLUT/PYR
BAA
Chysene
C1-Chrysenes
C2-Chrysenes
C3-Chrysenes
C4-Chrysenes
BBF
BKF
BEP
BAP
Perylene
ICDP
DBahANT
BGHIP


ID #31 - Okamanpeedan
PAH Concentration (µg/kg)
650
600
550
500
200
150
100
50
0
Naph
C1-Naph
C2-Naph
C3-Naph
C4-Naph
1-MeNaph
2-MeNaph
2,6-DMeNaph
1,6,7-TMeNaph
AcNaphYl
AcNaph
Fluorene
C1-Fluorenes
C2-Fluorenes
C3-Fluorenes
ANT
PHE
C1-PHE/ANT
C2-PHE/ANT
C3-PHE/ANT
C4-PHE/ANT
1-MePHE
DBZTP
C1-DBZTP
C2-DBZTP
C3-DBZTP
FLUT
PYR
C1-FLUT/PYR
BAA
Chrysene
C1-Chrysenes
C2-Chrysenes
C3-Chrysenes
C4-Chrysenes
BBF
BKF
BEP
BAP
Perylene
ICDP
DBahANT
BGHIP


ID #46 - Upper Sakatah
PAH Concentration (µg/kg)
1650
1625
1600
1575
100
75
50
25
0
Naph
C1-Naph
C2-Naph
C3-Naph
C4-Naph
1-MeNaph
2-MeNaph
2,6-DMeNaph
1,6,7-TMeNaph
AcNaphYl
AcNaph
Fluorene
C1-Fluorenes
C2-Fluorenes
C3-Fluorenes
ANT
PHE
C1-PHE/ANT
C2-PHE/ANT
C3-PHE/ANT
C4-PHE/ANT
1-MePHE
DBZTP
C1-DBZTP
C2-DBZTP
C3-DBZTP
FLUT
PYR
C1-FLUT/PYR
BAA
Chrysene
C1-Chrysenes
C2-Chrysenes
C3-Chrysenes
C4-Chrysenes
BBF
BKF
BEP
BAP
Perylene
ICDP
DBahANT
BGHIP


ID #17 - Lamb
PAH Concentration (µg/kg)
0
20
40
60
80
100
Naph
C1-Naph
C2-Naph
C3-Naph
C4-Naph
1-MeNaph
2-MeNaph
2,6-DMeNaph
1,6,7-TMeNaph
AcNaphYl
AcNaph
Fluorene
C1-Fluorenes
C2-Fluorenes
C3-Fluorenes
ANT
PHE
C1-PHE/ANT
C2-PHE/ANT
C3-PHE/ANT
C4-PHE/ANT
1-MePHE
DBZTP
C1-DBZTP
C2-DBZTP
C3-DBZTP
FLUT
PYR
C1-FLUT/PYR
BAA
Chrysene
C1-Chrysenes
C2-Chrysenes
C3-Chrysenes
C4-Chrysenes
BBF
BKF
BEP
BAP
Perylene
ICDP
DBahANT
BGHIP

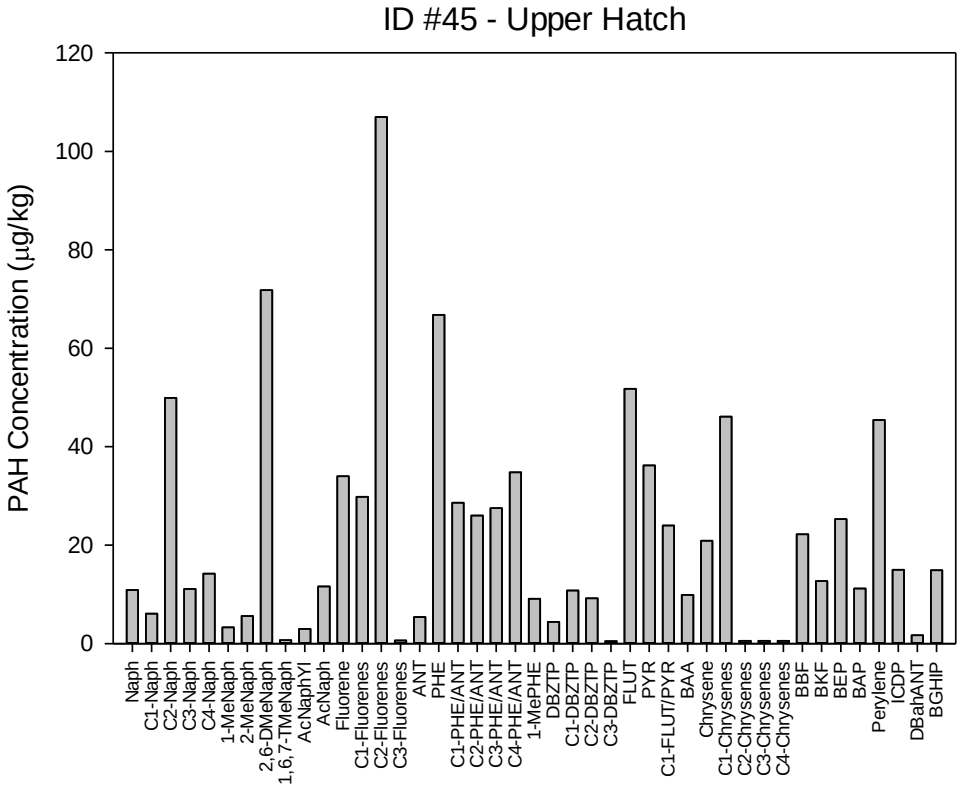

ID #45 - Upper Hatch
PAH Concentration (µg/kg)
0
20
40
60
80
100
120
Naph
C1-Naph
C2-Naph
C3-Naph
C4-Naph
1-MeNaph
2-MeNaph
2,6-DMeNaph
1,6,7-TMeNaph
AcNaphYl
AcNaph
Fluorene
C1-Fluorenes
C2-Fluorenes
C3-Fluorenes
ANT
PHE
C1-PHE/ANT
C2-PHE/ANT
C3-PHE/ANT
C4-PHE/ANT
1-MePHE
DBZTP
C1-DBZTP
C2-DBZTP
C3-DBZTP
FLUT
PYR
C1-FLUT/PYR
BAA
Chrysene
C1-Chrysenes
C2-Chrysenes
C3-Chrysenes
C4-Chrysenes
BBF
BKF
BEP
BAP
Perylene
ICDP
DBahANT
BGHIP

Table F-10. PAH Proportional Values of Sources Used in Final CMB8.2 Model Runs

PAH Compound	PAH Proportional Value (Individual PAH Concentration/$\sum PAH_{CMB}$)											
	ctds6*	Mahctd	Vol09*	diesel	gasoli	tunnel	powerp	reside	coal	pinept	pinewd	oakwod
PHE	0.0800	0.0684	0.0387	0.2440	0.0285	0.1028	0.1428	0.3333	0.1639	0.0462	0.0641	0.0562
ANT	0.0072	0.0046	0.0031	0.0355	0.0071	0.0200	0.0165	0.0702	0.0331	0.0156	0.0070	0.0107
FLUT	0.2039	0.2274	0.1888	0.2598	0.1387	0.1021	0.1605	0.2155	0.1388	0.2710	0.1692	0.0750
PYR	0.1525	0.1753	0.1550	0.1712	0.2409	0.1228	0.1403	0.0855	0.1151	0.2593	0.2170	0.0994
BAA	0.0597	0.0531	0.0541	0.0280	0.0634	0.0633	0.0995	0.0444	0.0869	0.0837	0.0860	0.0394
Chrysene	0.1009	0.1072	0.1099	0.0902	0.0919	0.0995	0.1922	0.0642	0.1213	0.0782	0.1337	0.5306
BBF	0.1205	0.1211	0.1625	0.0439	0.0737	0.0879	0.0732	0.0639	0.0994	0.0542	0.0723	0.0394
BKF	0.0448	0.0432	0.0525	0.0203	0.0586	0.0608	0.0146	0.0303	0.0463	0.0460	0.0696	0.0487
BEP	0.0644	0.0591	0.0745	0.0278	0.0792	0.0646	0.0610	0.0251	0.0625	0.0315	0.0409	0.0244
BAP	0.0701	0.0585	0.0785	0.0266	0.0578	0.0730	0.0348	0.0338	0.0607	0.0488	0.0846	0.0431
ICDP	0.0467	0.0391	0.0420	0.0255	0.0317	0.0944	0.0256	0.0183	0.0325	0.0355	0.0119	0.0088
BGHIP	0.0492	0.0429	0.0405	0.0272	0.1284	0.1086	0.0390	0.0155	0.0394	0.0300	0.0437	0.0244

PAH = polycyclic aromatic hydrocarbon; CMB8.2 = chemical mass balance model version 8.2; PHE = phenanthrene; ANT = anthracene; FLUT = fluoranthene; PYR = pyrene; BAA = benzo[a]anthracene; BBF = benzo[b]fluoranthene; BKF = benzo[k]fluoranthene; BEP = benzo[e]pyrene; BAP = benzo[a]pyrene; ICDP = indeno[1,2,3-cd]pyrene; BGHIP = benzo[g,h,i]perylene.

ctds6* = coal tar-based sealant pavement dust from six cities east of the U.S. Rocky Mountains (Van Metre et al. 2008).

Mahctd = Austin, TX #2 coal tar-based sealant pavement dust (Mahler et al. 2010).

Vol09* = Austin, TX #3 coal tar-based sealant pavement dust (Van Metre et al. 2012b).

diesel = diesel vehicle particulate emissions (Li et al. 2003).

gasoli = gasoline vehicle particulate emissions (Li et al. 2003).

tunnel = traffic tunnel air (Li et al. 2003).

powerp = power plant emissions (Li et al. 2003).

reside = residential heating emissions (Li et al. 2003).

coal = coal emissions average (Li et al. 2003).

pinept = pine wood soot particles #1 (Schauer et al. 2001).

pinewd = pine wood soot particles #2 (Rogge et al. 1998).

oakwod = oak wood combustion (Rogge et al. 1998).

Table F-11. Final CMB8.2 Model Results for Each NLAP Lake, Including Fitting Statistics

Short ID	∑PAH$_{CMB}$ Concentration (mg/kg dry wt.)				RPD	R^2	Chi Square	% Mass
	Mconc	Munc	Cconc	Cunc				
1	0.065	0.013	0.069	0.007	6.8	0.961	0.39	107.0
2	0.369	0.074	0.352	0.044	4.7	0.936	0.63	95.4
3	0.157	0.031	0.157	0.017	0.051	0.975	0.41	99.9
4	0.371	0.074	0.366	0.036	1.2	0.963	0.57	98.8
5	0.256	0.051	0.258	0.028	0.77	0.968	0.42	100.8
6	0.332	0.066	0.326	0.032	1.8	0.974	0.33	98.2
7	0.213	0.043	0.209	0.022	1.8	0.967	0.30	98.2
8	0.207	0.041	0.210	0.021	1.2	0.988	0.15	101.2
9	0.596	0.119	0.568	0.063	4.8	0.967	0.39	95.4
10	0.519	0.104	0.507	0.058	2.3	0.952	0.53	97.8
11	0.220	0.044	0.187	0.022	16.3	0.954	0.46	84.9
12	0.213	0.043	0.188	0.021	12.5	0.923	0.71	88.3
13	0.216	0.043	0.227	0.023	4.9	0.967	0.33	105.0
14	0.424	0.085	0.424	0.046	0.11	0.938	0.62	99.9
15	0.203	0.041	0.179	0.019	12.5	0.961	0.37	88.3
16	0.471	0.094	0.416	0.049	12.4	0.954	0.46	88.3
17	0.225	0.045	0.194	0.021	14.6	0.961	0.49	86.4
18	0.555	0.111	0.546	0.060	1.7	0.977	0.43	98.3
19	0.107	0.021	0.109	0.012	1.3	0.956	0.53	101.4
20	0.405	0.081	0.399	0.038	1.4	0.989	0.18	98.6
21	0.502	0.100	0.460	0.058	8.8	0.967	0.40	91.6
22	0.168	0.034	0.171	0.018	1.4	0.989	0.13	101.4
23	0.304	0.061	0.259	0.027	16.0	0.964	0.45	85.1
24	0.752	0.150	0.767	0.086	2.0	0.986	0.19	102.0
25	0.419	0.084	0.373	0.041	11.4	0.933	0.79	89.2
26	0.142	0.028	0.144	0.015	1.5	0.970	0.29	101.5
27	8.894	1.779	9.081	1.022	2.1	0.961	0.39	102.1
28	0.120	0.024	0.117	0.014	2.8	0.981	0.19	97.3
29	0.147	0.029	0.146	0.021	0.87	0.971	0.25	99.1
30	0.207	0.041	0.208	0.022	0.67	0.913	0.83	100.7
31	0.248	0.050	0.222	0.030	11.2	0.963	0.34	89.4
32	1.588	0.318	1.701	0.200	6.9	0.936	0.55	107.1
33	0.590	0.118	0.591	0.068	0.083	0.969	0.36	100.1
34	0.256	0.051	0.231	0.026	10.0	0.876	1.30	90.5
35	0.238	0.048	0.238	0.025	0.0042	0.980	0.24	100.0
36	0.011	0.002	0.011	0.001	1.6	0.902	0.58	101.7
37	0.437	0.087	0.423	0.045	3.1	0.965	0.41	96.9
38	3.333	0.667	3.345	0.368	0.37	0.967	0.31	100.4
39	0.223	0.045	0.215	0.024	3.5	0.949	0.66	96.5
40	0.253	0.051	0.217	0.028	15.2	0.851	0.93	85.9
41	0.490	0.098	0.477	0.051	2.7	0.977	0.30	97.3

Table F-11. Continued

Short ID	∑PAH$_{CMB}$ Concentration (mg/kg dry wt.)				RPD	R^2	Chi Square	% Mass
	Mconc	Munc	Cconc	Cunc				
42	0.509	0.102	0.487	0.049	4.4	0.967	0.43	95.7
43	0.065	0.013	0.061	0.007	6.4	0.918	0.84	93.8
44	0.054	0.011	0.053	0.007	2.0	0.979	0.20	98.0
45	0.292	0.058	0.260	0.029	11.5	0.965	0.45	89.1
46	0.416	0.083	0.421	0.047	1.1	0.956	0.43	101.1
47	0.906	0.181	0.866	0.098	4.5	0.950	0.42	95.6
48	0.461	0.092	0.461	0.053	0.059	0.984	0.17	99.9
49	0.191	0.038	0.193	0.019	1.3	0.935	1.00	101.3
50	0.263	0.053	0.255	0.027	3.0	0.956	0.41	97.0
51	0.202	0.040	0.193	0.021	4.8	0.957	0.39	95.3
52	0.226	0.045	0.223	0.025	1.1	0.976	0.22	98.9
53	0.650	0.130	0.624	0.066	4.2	0.955	0.61	95.9
54	0.366	0.073	0.355	0.038	3.1	0.963	0.49	97.0

CMB8.2 = chemical mass balance model version 8.2; NLAP = National Lake Assessment Project; PAH = polycyclic aromatic hydrocarbon; Mconc = measured concentration; Munc = uncertainty assigned to measured concentration; Cconc = calculated concentration; Cunc = calculated concentration uncertainty; RPD = relative percent difference; R^2 = coefficient of determination.

Table F-12. Source Apportionment of Modeled $\sum PAH_{CMB}$ Concentrations for Each NLAP Lake

	Source Apportionment of Modeled $\sum PAH_{CMB}$ Concentrations (mg/kg dry wt.)											
Short ID	**ctds6***	**Mahctd**	**Vol09***	**diesel**	**gasoli**	**tunnel**	**powerp**	**reside**	**coal**	**pinept**	**pinewd**	**oakwod**
1				0.041				0.028				
2				0.218					0.134			
3				0.074		0.025	0.038			0.019		
4		0.096		0.064		0.169			0.037			
5				0.123		0.077	0.058					
6				0.095		0.132	0.099					
7						0.135					0.074	
8			0.089			0.092					0.030	
9		0.323			0.036				0.209			
10	0.361								0.104			0.042
11				0.088					0.098			
12				0.137				0.051				
13				0.122				0.105				
14	0.201					0.223						
15				0.060				0.119				
16				0.210					0.206			
17		0.040		0.046		0.108						
18	0.100			0.295		0.069	0.045			0.037		
19		0.056		0.010					0.042			
20				0.125		0.106	0.066			0.102		
21		0.102		0.311		0.047						
22	0.093					0.013			0.065			
23		0.114							0.115			0.030
24				0.165					0.239	0.363		
25		0.083		0.052		0.238						
26	0.091								0.053			
27		4.947							4.134			
28				0.071					0.046			

Table F-12. Continued

Short ID	Source Apportionment of Modeled ∑PAH$_{CMB}$ Concentrations (mg/kg dry wt.)											
	ctds6*	Mahctd	Vol09*	diesel	gasoli	tunnel	powerp	reside	coal	pinept	pinewd	oakwod
29				0.121					0.025			
30		0.068							0.141			
31				0.171					0.051			
32			1.318						0.383			
33		0.306		0.239					0.046			
34		0.126							0.106			
35	0.139			0.028		0.071						
36									0.011			
37				0.137		0.236			0.050			
38		2.203							1.142			
39		0.028		0.102					0.086			
40				0.217								
41		0.212		0.163					0.102			
42		0.084							0.201	0.202		
43	0.037								0.024			
44				0.035					0.017			
45		0.038		0.127		0.095						
46		0.247							0.174			
47						0.664				0.202		
48	0.328					0.062			0.071			
49	0.091			0.027			0.032					0.043
50		0.095							0.160			
51		0.064				0.129						
52	0.111			0.112								
53		0.203		0.261		0.160						
54				0.079					0.099		0.178	
# lakes	10	20	2	33	1	20	6	4	31	6	3	3

PAH = polycyclic aromatic hydrocarbon; CMB = chemical mass balance; NLAP = National Lake Assessment Project.
Source names were identified in Table F-10.

Table F-13. Generalized Source Apportionment of Modeled $\sum PAH_{CMB}$ Concentrations

Short ID	Modeled $\sum PAH_{CMB}$ Concentration (mg/kg dry wt.)			
	CT-Sealant Pavement Dust	Vehicle Emissions	Coal-Related Combustion	Wood Combustion
1	0	0.041	0.028	0
2	0	0.218	0.134	0
3	0	0.100	0.038	0.019
4	0.096	0.234	0.037	0
5	0	0.200	0.058	0
6	0	0.227	0.099	0
7	0	0.135	0	0.074
8	0.089	0.092	0	0.030
9	0.323	0.036	0.209	0
10	0.361	0	0.104	0.042
11	0	0.088	0.098	0
12	0	0.137	0.051	0
13	0	0.122	0.105	0
14	0.201	0.223	0	0
15	0	0.060	0.119	0
16	0	0.210	0.206	0
17	0.040	0.154	0	0
18	0.100	0.364	0.045	0.037
19	0.056	0.010	0.042	0
20	0	0.232	0.066	0.102
21	0.102	0.358	0	0
22	0.093	0.013	0.065	0
23	0.114	0	0.115	0.030
24	0	0.165	0.239	0.363
25	0.083	0.290	0	0
26	0.091	0	0.053	0
27	4.947	0	4.134	0
28	0	0.071	0.046	0
29	0	0.121	0.025	0
30	0.068	0	0.141	0
31	0	0.171	0.051	0
32	1.318	0	0.383	0
33	0.306	0.239	0.046	0
34	0.126	0	0.106	0
35	0.139	0.099	0	0
36	0	0	0.011	0
37	0	0.373	0.050	0
38	2.203	0	1.142	0
39	0.028	0.102	0.086	0
40	0	0.217	0	0

Table F-13. Continued

Short ID	Modeled ∑PAH$_{CMB}$ Concentration (mg/kg dry wt.)			
	CT-Sealant Pavement Dust	Vehicle Emissions	Coal-Related Combustion	Wood Combustion
41	0.212	0.163	0.102	0
42	0.084	0	0.201	0.202
43	0.037	0	0.024	0
44	0	0.035	0.017	0
45	0.038	0.222	0	0
46	0.247	0	0.174	0
47	0	0.664	0	0.202
48	0.328	0.062	0.071	0
49	0.091	0.027	0.032	0.043
50	0.095	0	0.160	0
51	0.064	0.129	0	0
52	0.111	0.112	0	0
53	0.203	0.420	0	0
54	0	0.079	0.099	0.178

PAH = polycyclic aromatic hydrocarbon; CMB = chemical mass balance model; CT-Sealant = coal tar-based sealant.

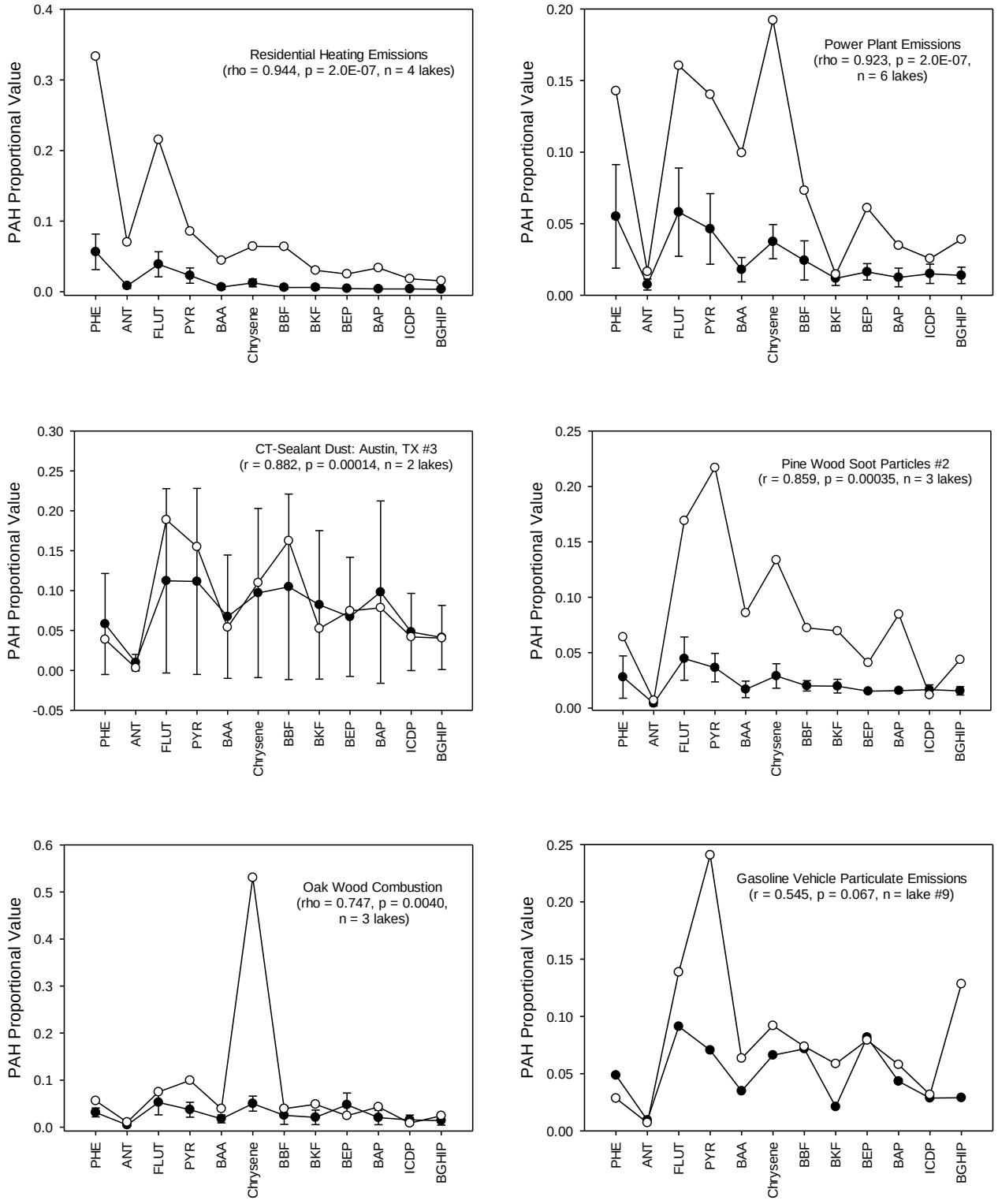


Figure F-1. Comparison of PAH proportional values (i.e., individual PAH concentration normalized to $\sum PAH_{CMB}$ concentration) between sources used in the EPA's CMB8.2 model (open circles) and the mean profile for NLAP lakes (closed circles; uncertainty bars indicate one SD) for which that source was used in the model results. PAHs range from low molecular weight to high molecular weight compounds along the x-axis. Either Pearson's r or Spearman's rho values and associated p values and number of NLAP lakes are given in parentheses; p values <0.05 are significant.

Appendix G
Biphenyl

Table G-1. Other Summary Statistics for Biphenyl

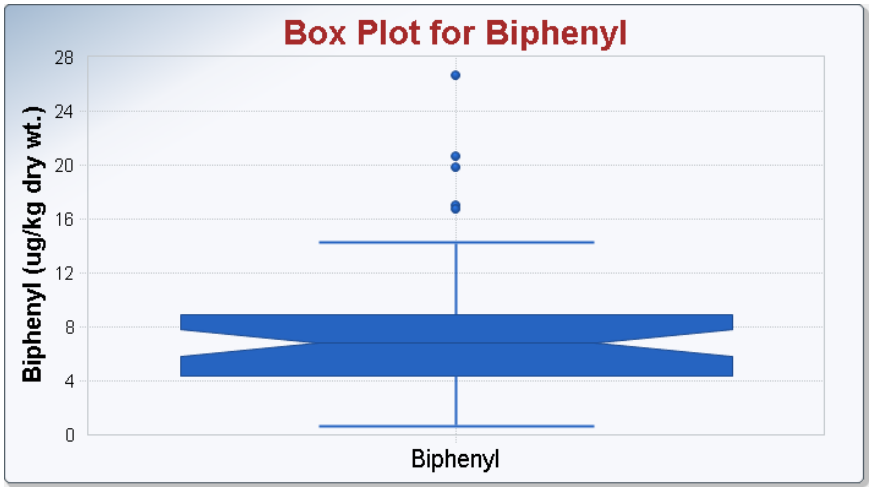
Parameter	Minimum (µg/kg dry wt.)	Maximum (µg/kg dry wt.)	SEM (µg/kg dry wt.)	MAD/0.675 (µg/kg dry wt.)	Skewness	Kurtosis	CV
Biphenyl	0.70	26.6	0.71	3.5	1.5	2.6	0.67

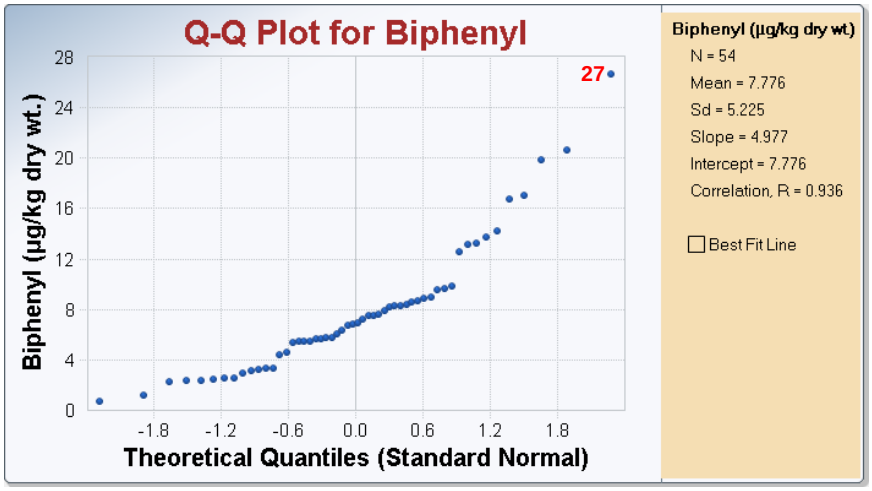
SEM = standard error of the mean; MAD = median absolute deviation; CV = coefficient of variation.

Table G-2. Percentiles for Biphenyl. Highlighted Values Include Detected Data.

Parameter	25%ile (Q1) (µg/kg dry wt.)	50%ile (Q2) (µg/kg dry wt.)	75%ile (Q3) (µg/kg dry wt.)	95%ile (µg/kg dry wt.)	99%ile (µg/kg dry wt.)
Biphenyl	4.5	6.9	8.9	18.0	23.4

Q = quantile.





Sample #27 is significant at the 5% significance level.

Appendix H

PCBs

Table H-1. Summary Statistics for PCB Congener and Total PCB Data with <80% Nondetects

BZ Congener Number* or Total PCB Group	% NDs	KM Mean (µg/kg dry wt.)	KM SD (µg/kg dry wt.)	KM CV
16+32	45.8	0.639	0.673	1.05
18	54.2	0.408	0.464	1.14
20+33+53	75.0	0.302	0.619	2.05
22+51	70.8	0.606	0.961	1.59
28	62.5	0.664	1.57	2.37
29	79.2	0.151	0.215	1.43
37+42+59	58.3	0.349	0.572	1.64
41+64	75.0	0.241	0.445	1.85
43	79.2	0.21	0.354	1.68
44	70.8	0.274	0.499	1.82
46	79.2	0.19	0.274	1.44
47+48+75	66.7	0.791	1.60	2.03
49	62.5	0.545	0.996	1.83
52	50.0	0.776	1.19	1.54
56+60	58.3	0.51	0.735	1.44
61+74	62.5	0.338	0.549	1.62
66	70.8	0.261	0.421	1.61
70	41.7	0.713	0.872	1.22
77†+110	12.5	0.771	1.39	1.80
87+115	37.5	0.304	0.432	1.42
88	45.8	0.252	0.453	1.80
95	75.0	0.183	0.384	2.10
97	66.7	0.65	1.01	1.55
99	70.8	0.226	0.391	1.73
90+101	54.2	0.558	0.976	1.75
105†	50.0	0.141	0.194	1.38
118†	8.3	0.749	0.787	1.05
123†+149	54.2	0.341	0.533	1.56
128	70.8	0.135	0.167	1.24
129	70.8	0.218	0.259	1.19
132+153	8.3	0.701	1.19	1.70
138+160	33.3	0.591	0.842	1.43
146	54.2	0.264	0.3	1.14
156†+171+202	75.0	0.174	0.197	1.13
170+190	62.5	1.20	2.29	1.90
174	79.2	0.229	0.55	2.40
178	62.5	0.175	0.231	1.32
180	12.5	0.4	0.367	0.92
185	79.2	0.0736	0.0632	0.86
187	58.3	0.152	0.245	1.62

Table H-1. Continued

BZ Congener Number* or Total PCB Group	% NDs	KM Mean (µg/kg dry wt.)	KM SD (µg/kg dry wt.)	KM CV
196+203	75.0	0.0979	0.143	1.46
199	62.5	0.222	0.259	1.17
Total PCBs (pesticide scan)	8.3	16.7	19.6	1.17
Estimated Total PCBs (sum congeners; Kaplan-Meier)	50.0	18.8	19.7	1.05

PCB = polychlorinated biphenyl; ND = nondetect value; KM = Kaplan-Meier; SD = standard deviation; CV = coefficient of variation.

* BZ refers to Ballschmiter and Zell's 1980 publication in which they provided this numbering system for PCB congeners.

† PCB congeners with toxicity and structural features similar to 2,3,7,8-TCDD (i.e., dioxin-like).

Table H-2. Additional Summary Statistics for Censored PCB Congeners (n = 24)

BZ Congener Number*	% NDs	Minimum ND (µg/kg dry wt.)	Maximum ND (µg/kg dry wt.)	KM Variance** (µg/kg dry wt.)^2
1	91.7	0.082	<0.169	-
5+8	100.0	<0.082	<0.185	-
7+9	100.0	<0.082	<0.185	-
15	95.8	<0.082	<0.185	-
16+32	45.8	<0.045	<0.102	0.45
18	54.2	<0.045	<0.079	0.22
20+33+53	75.0	<0.045	<0.102	0.38
22+51	70.8	<0.045	<0.102	0.92
24+27	91.7	<0.045	<0.102	-
25	91.7	<0.045	<0.102	-
26	91.7	<0.045	<0.102	-
28	62.5	<0.06	<0.137	2.5
29	79.2	<0.064	<0.145	0.046
31	91.7	<0.045	<0.102	-
37+42+59	58.3	<0.071	<0.127	0.33
40	91.7	<0.071	<0.163	-
41+64	75.0	<0.071	<0.134	0.20
43	79.2	<0.071	<0.163	0.13
44	70.8	<0.048	<0.09	0.25
45	87.5	<0.071	<0.163	-
46	79.2	<0.071	<0.163	0.075
47+48+75	66.7	<0.071	<0.148	2.6
49	62.5	<0.071	<0.127	0.99
52	50.0	<0.071	<0.119	1.4
56+60	58.3	<0.071	<0.127	0.54

Table H-2. Continued

BZ Congener Number*	% NDs	Minimum ND (µg/kg dry wt.)	Maximum ND (µg/kg dry wt.)	KM Variance** (µg/kg dry wt.)^2
61+74	62.5	<0.071	<0.127	0.30
66	70.8	<0.056	<0.126	0.18
70	41.7	<0.071	<0.163	0.76
77†	100.0	<0.071	<0.163	-
77†+110	12.5	<0.05	<0.05	1.9
81†	100.0	<0.071	<0.163	-
82	87.5	<0.044	<0.1	-
83	100.0	<0.044	<0.1	-
84	87.5	<0.044	<0.1	-
85	100.0	<0.044	<0.1	-
86	100.0	<0.044	<0.1	-
87+115	37.5	<0.053	<0.082	0.19
88	45.8	<0.044	<0.091	0.21
92	95.8	<0.044	<0.1	-
95	75.0	<0.044	<0.1	0.15
97	66.7	<0.044	<0.1	1.0
99	70.8	<0.044	<0.1	0.15
90+101	54.2	<0.044	<0.078	0.95
105†	50.0	<0.043	<0.097	0.038
107	91.7	<0.044	<0.1	-
114†+122+131	100.0	<0.044	<0.1	-
118†	8.3	<0.053	<0.06	0.62
123†+149	54.2	<0.096	<0.218	0.29
126†	100.0	<0.044	<0.1	-
128	70.8	<0.065	<0.148	0.028
129	70.8	<0.096	<0.198	0.067
132+153	8.3	<0.037	<0.039	1.4
136	100.0	<0.096	<0.218	-
137+176	83.3	<0.048	<0.108	-
138+160	33.3	<0.096	<0.147	0.71
141+179	87.5	<0.096	<0.218	-
146	54.2	<0.096	<0.218	0.090
151	91.7	<0.096	<0.218	-
156†+171+202	75.0	<0.096	<0.179	0.039
157†+173+200	87.5	<0.04	<0.082	-
158	95.8	<0.096	<0.218	-
166	100.0	<0.096	<0.218	-
167†	87.5	<0.096	<0.218	-
169†	100.0	<0.096	<0.218	-
170+190	62.5	<0.093	<0.211	5.2
172	91.7	<0.048	<0.098	-

Table H-2. Continued

BZ Congener Number*	% NDs	Minimum ND (µg/kg dry wt.)	Maximum ND (µg/kg dry wt.)	KM Variance** (µg/kg dry wt.)^2
174	79.2	<0.048	<0.098	0.30
177	91.7	<0.048	<0.108	-
178	62.5	<0.048	<0.098	0.054
180	12.5	<0.048	<0.084	0.14
183	83.3	<0.048	<0.108	-
185	79.2	<0.048	<0.108	0.0040
187	58.3	<0.05	<0.114	0.060
189†	91.7	<0.048	<0.108	-
191	83.3	<0.048	<0.098	-
194	91.7	<0.04	<0.09	-
195+208	95.8	<0.04	<0.09	-
196+203	75.0	<0.04	<0.09	0.020
199	62.5	<0.081	<0.184	0.067
201	91.7	<0.04	<0.09	-
205	95.8	<0.04	<0.09	-
206	95.8	<0.052	<0.117	-
209	100.0	<0.053	<0.121	-

PCB = polychlorinated biphenyl; ND = nondetect value; KM = Kaplan-Meier.

* BZ refers to Ballschmiter and Zell's 1980 publication in which they provided this numbering system for PCB congeners.

** Estimated using the Kaplan-Meier method for nondetects <80%.

† PCB congeners with toxicity and structural features similar to 2,3,7,8-TCDD (i.e., dioxin-like).

Table H-3. Percentiles of PCB Congener and Total PCB Data. Highlighted Values are Based on Detected Data.

BZ Congener Number*	25%ile (Q1) (µg/kg dry wt.)	50%ile (Q2) (µg/kg dry wt.)	75%ile (Q3) (µg/kg dry wt.)	95%ile (µg/kg dry wt.)	99%ile (µg/kg dry wt.)
1	<0.082	<0.1	<0.13	<0.17	<0.90
5+8	<0.082	<0.098	<0.13	<0.17	<0.18
7+9	<0.082	<0.098	<0.13	<0.17	<0.18
15	<0.082	<0.10	<0.13	<0.18	<0.56
16+32	<0.054	0.62	0.99	1.8	2.4
18	<0.054	<0.076	0.80	1.3	1.4
20+33+53	<0.049	<0.069	<0.12	1.4	2.4
22+51	<0.046	<0.068	0.80	2.6	2.8
24+27	<0.045	<0.056	<0.075	<0.28	0.35
25	<0.045	<0.056	<0.070	<1.1	2.1
26	<0.045	<0.060	<0.075	<0.12	<0.71
28	<0.067	<0.11	0.62	1.5	6.4

Table H-3. Continued

BZ Congener Number*	25%ile (Q1) (µg/kg dry wt.)	50%ile (Q2) (µg/kg dry wt.)	75%ile (Q3) (µg/kg dry wt.)	95%ile (µg/kg dry wt.)	99%ile (µg/kg dry wt.)
29	<0.071	<0.097	<0.14	0.48	0.89
31	<0.045	<0.058	<0.075	<1.6	2.6
37+42+59	<0.086	<0.12	0.32	1.6	2.3
40	<0.072	<0.090	<0.11	<0.16	<0.88
41+64	<0.074	<0.10	<0.15	0.77	1.9
43	<0.076	<0.11	<0.15	0.74	1.4
44	<0.053	<0.072	<0.12	1.4	1.83
45	<0.072	<0.094	<0.11	<0.16	<0.23
46	<0.076	<0.11	<0.14	0.91	0.95
47+48+75	<0.084	<0.11	0.73	3.7	6.4
49	<0.080	<0.11	0.39	2.1	3.9
52	<0.086	<0.16	0.93	3.6	4.2
56+60	<0.086	<0.12	0.59	2.0	2.7
61+74	<0.080	<0.11	0.44	1.3	2.2
66	<0.058	<0.084	0.16	1.2	1.4
70	<0.10	0.24	1.0	2.6	2.8
77†	<0.072	<0.086	<0.11	<0.15	<0.16
77†+110	0.20	0.42	0.54	3.0	5.9
81†	<0.072	<0.086	<0.11	<0.15	<0.16
82	<0.045	<0.063	<0.079	1.2	1.8
83	<0.044	<0.052	<0.068	<0.090	<0.098
84	<0.045	<0.058	<0.074	<0.10	0.30
85	<0.044	<0.052	<0.068	<0.090	<0.098
86	<0.044	<0.052	<0.068	<0.090	<0.098
87+115	<0.066	0.13	0.32	1.5	1.6
88	<0.049	0.11	0.22	1.2	1.9
90+101	<0.053	<0.076	0.53	3.0	3.6
92	<0.044	<0.052	<0.069	<0.099	<0.39
95	<0.049	<0.066	<0.093	0.83	1.6
97	<0.046	<0.067	1.4	2.9	3.3
99	<0.046	<0.067	<0.14	1.0	1.5
105†	<0.057	<0.081	0.12	0.54	0.79
107	<0.044	<0.054	<0.069	<0.099	<0.35
114†+122+131	<0.044	<0.052	<0.068	<0.090	<0.098
118†	0.26	0.43	1.2	2.2	3.2
123†+149	<0.11	<0.17	0.28	1.5	2.2
126†	<0.044	<0.052	<0.068	<0.090	<0.098
128	<0.073	<0.099	<0.12	0.49	0.71
129	<0.11	<0.14	<0.20	0.77	1.0
132+153	0.15	0.29	0.52	3.7	4.7
136	<0.096	<0.12	<0.15	<0.20	<0.21

Table H-3. Continued

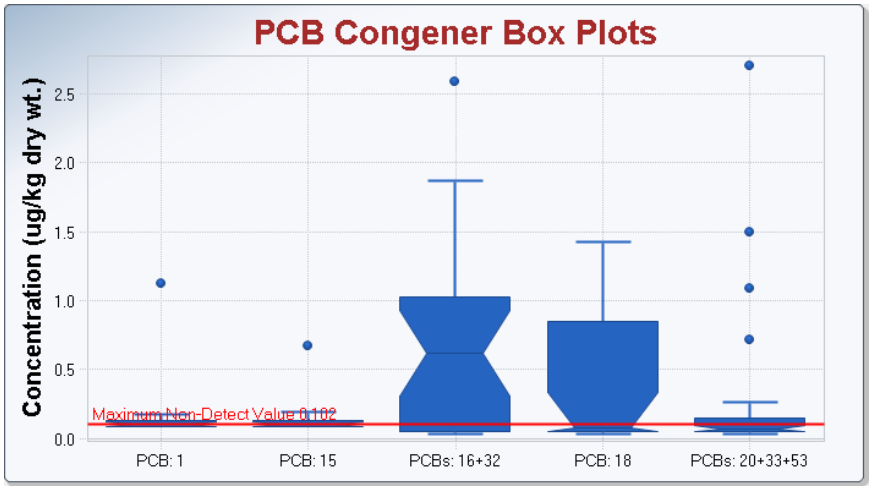
BZ Congener Number*	25%ile (Q1) (µg/kg dry wt.)	50%ile (Q2) (µg/kg dry wt.)	75%ile (Q3) (µg/kg dry wt.)	95%ile (µg/kg dry wt.)	99%ile (µg/kg dry wt.)
137+176	<0.050	<0.070	<0.085	0.31	0.58
138+160	<0.11	0.32	0.47	2.9	3.2
141+179	<0.096	<0.14	<0.17	0.39	0.43
146	<0.1	<0.15	0.25	0.88	1.2
151	<0.096	<0.12	<0.16	<0.58	0.89
156†+171+202	<0.098	<0.14	<0.18	0.45	0.89
157†+173+200	<0.040	<0.051	<0.067	0.21	0.43
158	<0.096	<0.12	<0.15	<0.22	<0.40
166	<0.096	<0.12	<0.15	<0.20	<0.21
167†	<0.096	<0.12	<0.16	0.32	0.40
169†	<0.096	<0.12	<0.15	<0.20	<0.21
170+190	<0.10	<0.15	0.97	4.4	9.0
172	<0.048	<0.057	<0.073	<0.19	0.28
174	<0.049	<0.066	<0.091	1.1	2.3
177	<0.048	<0.061	<0.080	<0.33	0.39
178	<0.050	<0.076	0.18	0.71	0.88
180	0.16	0.28	0.52	1.0	1.5
183	<0.049	<0.071	<0.091	0.38	0.49
185	<0.048	<0.060	<0.091	0.20	0.30
187	<0.060	<0.082	0.13	0.65	1.0
189†	<0.048	<0.058	<0.075	<0.11	<0.19
191	<0.048	<0.061	<0.080	0.39	0.84
194	<0.040	<0.050	<0.063	<0.089	<0.12
195+208	<0.040	<0.050	<0.063	<0.089	<0.27
196+203	<0.046	<0.060	<0.084	0.41	0.60
199	<0.095	<0.12	0.28	0.90	0.99
201	<0.041	<0.052	<0.067	<0.12	0.13
205	<0.040	<0.048	<0.063	<0.089	<0.45
206	<0.052	<0.062	<0.079	<0.12	<0.30
209	<0.053	<0.064	<0.082	<0.11	<0.12
Total PCBs (pesticide scan)	3.3	9.4	23.1	65.1	76.0
Estimated Total PCBs (sum congeners; Kaplan-Meier)	<8.9	<14.7	25.6	67.4	77.7

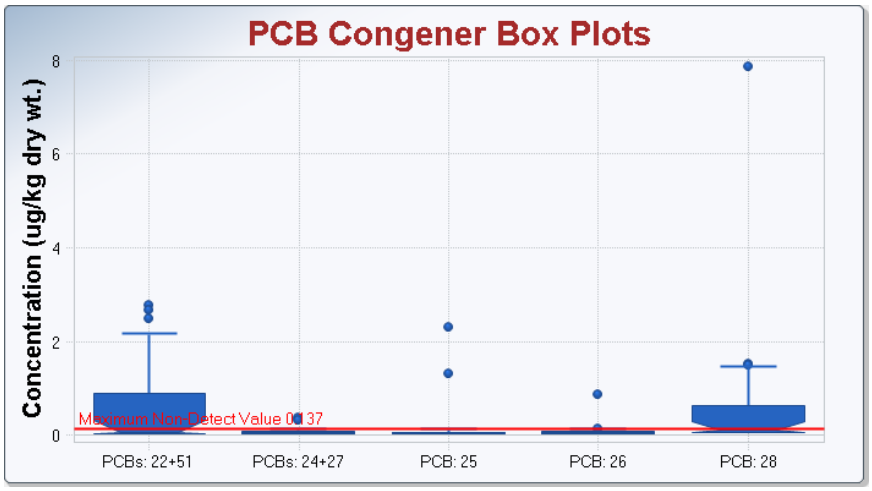
PCB = polychlorinated biphenyl.

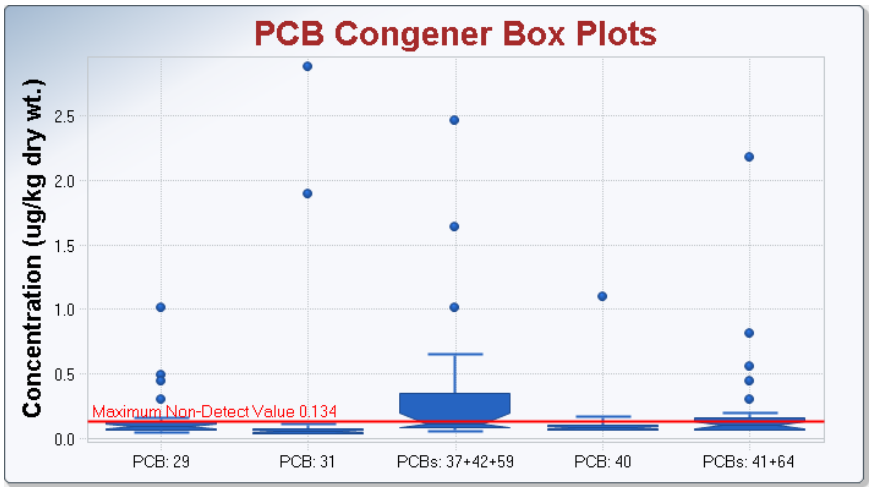
* BZ refers to Ballschmiter and Zell's 1980 publication in which they provided this numbering system for PCB congeners.

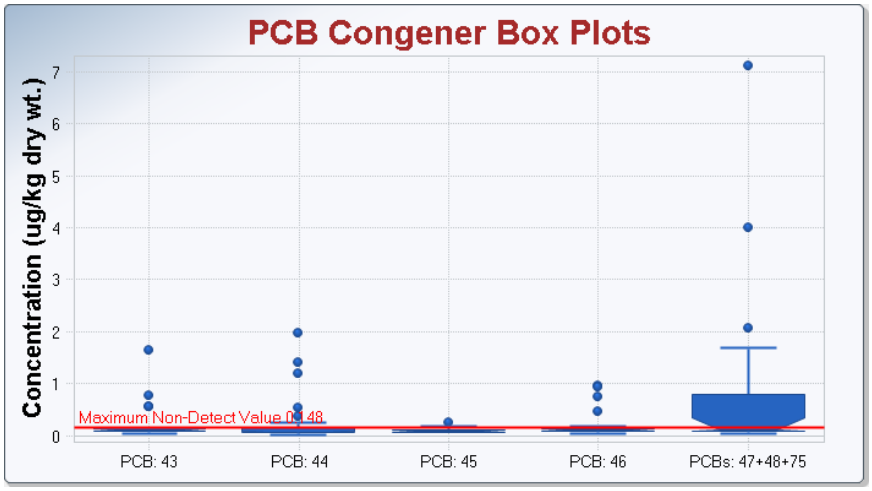
† PCB congeners with toxicity and structural features similar to 2,3,7,8-TCDD (i.e., dioxin-like).

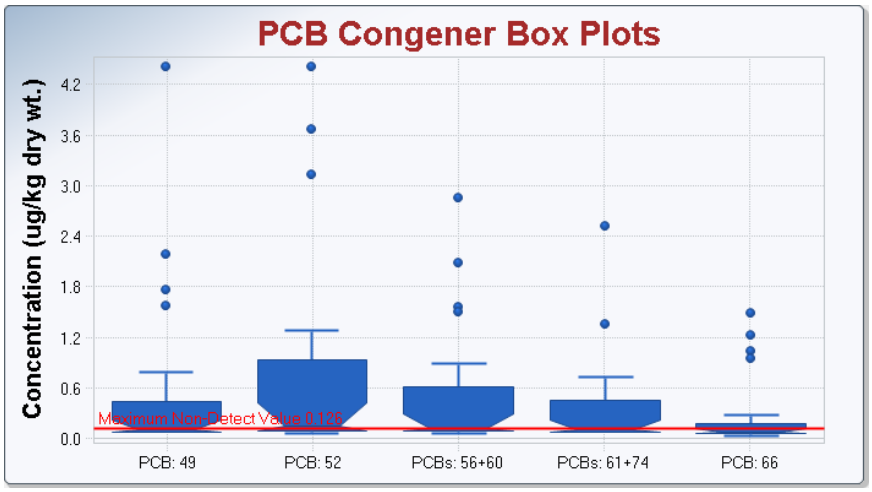
Box Plots for PCB Congeners

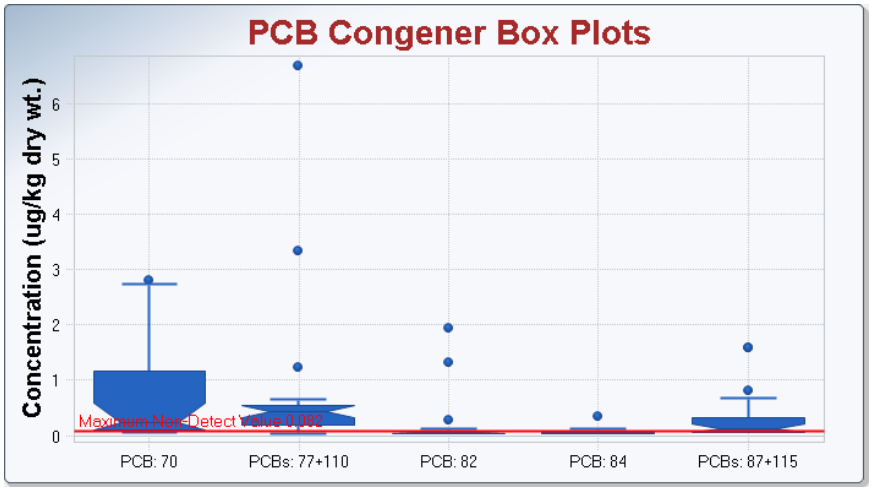


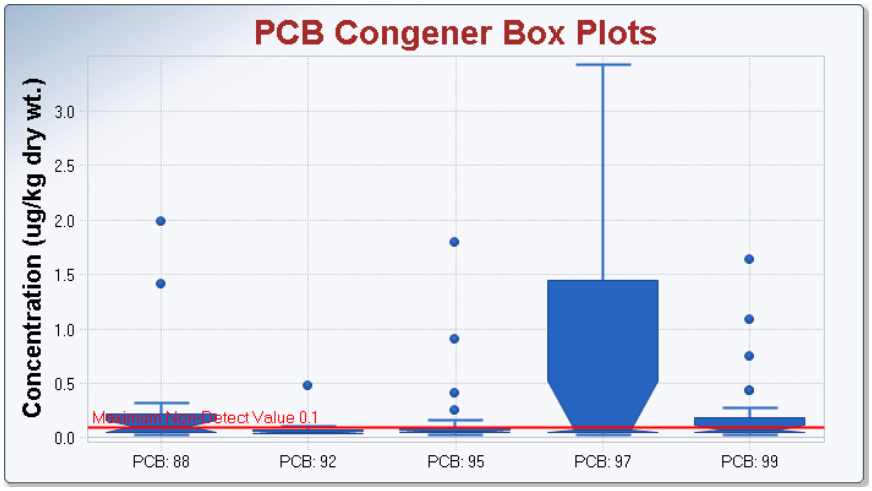


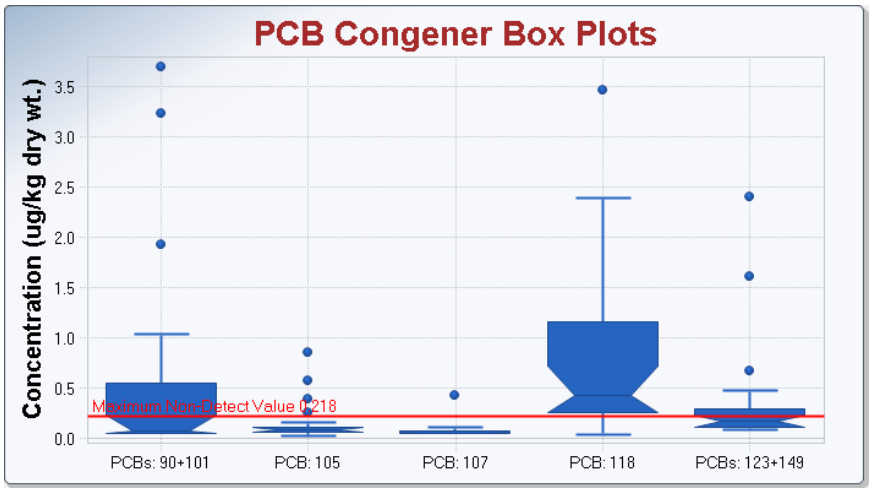


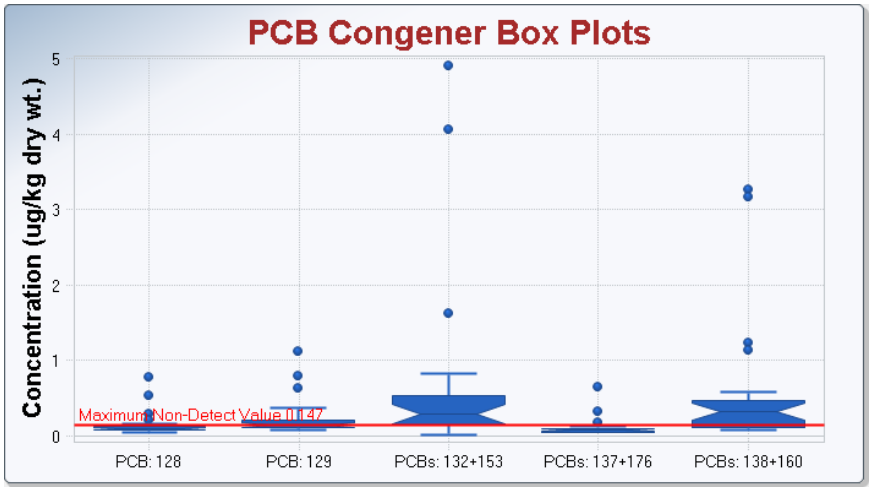

PCB Congener Box Plots
Concentration (ug/kg dry wt.)
0
1
2
3
4
5
6
7
Maximum Non-Detect Value 0.48
PCB: 43
PCB: 44
PCB: 45
PCB: 46
PCBs: 47+48+75

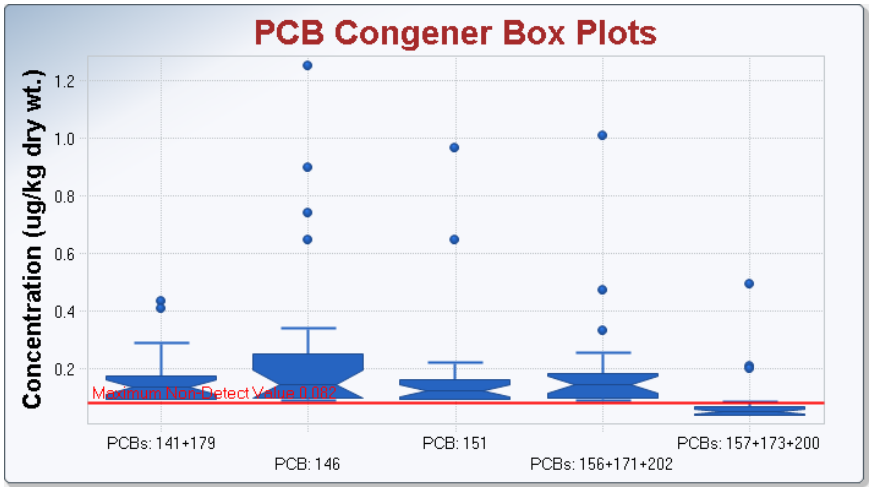

PCB Congener Box Plots
Concentration (ug/kg dry wt.)
0.0
0.6
1.2
1.8
2.4
3.0
3.6
4.2
Maximum Non-Detect Value 0.125
PCB: 49
PCB: 52
PCBs: 56+60
PCBs: 61+74
PCB: 66

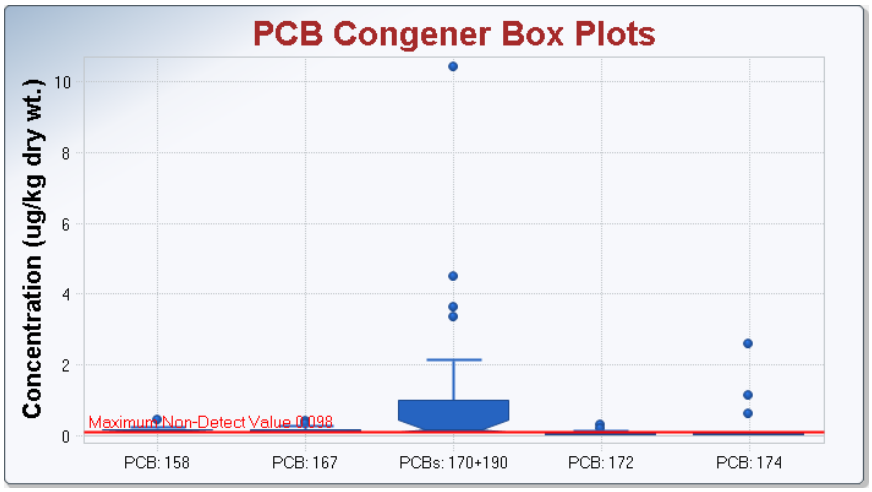

PCB Congener Box Plots
Concentration (ug/kg dry wt.)
0
1
2
3
4
5
6
Maximum Non-Detect Value 0.091
PCB: 70
PCBs: 77+110
PCB: 82
PCB: 84
PCBs: 87+115

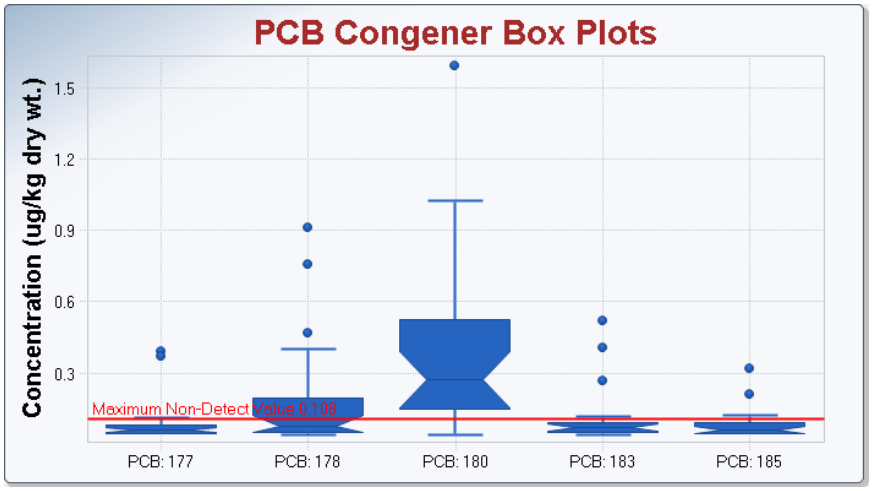

PCB Congener Box Plots
Concentration (ug/kg dry wt.)
3.0
2.5
2.0
1.5
1.0
0.5
0.0
Maximum Non-Detect Value 0.1
PCB: 88
PCB: 92
PCB: 95
PCB: 97
PCB: 99

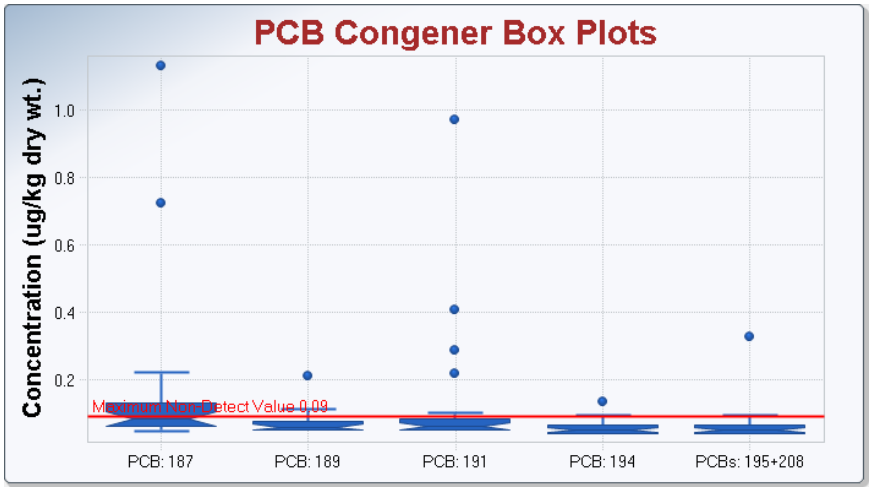

PCB Congener Box Plots
Concentration (ug/kg dry wt.)
3.5
3.0
2.5
2.0
1.5
1.0
0.5
0.0
Maximum Non-Detect Value 0.218
PCBs: 90+101
PCB: 105
PCB: 107
PCB: 118
PCBs: 123+149

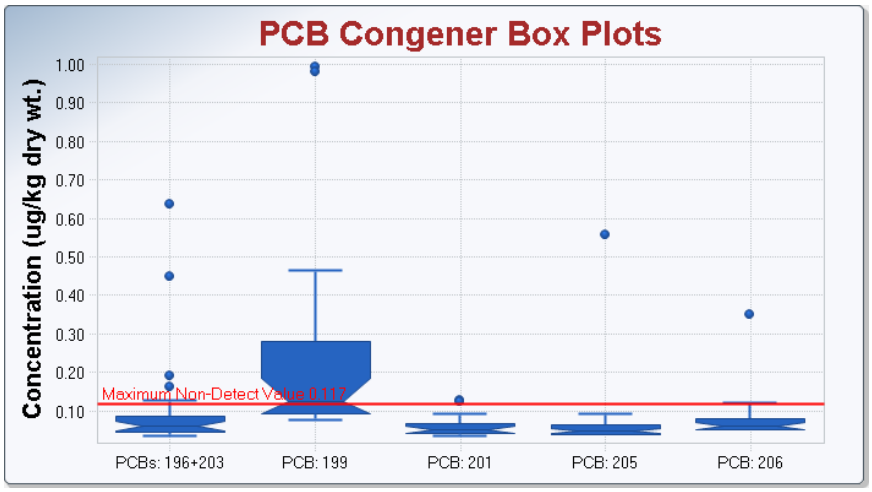

PCB Congener Box Plots
Concentration (ug/kg dry wt.)
5
4
3
2
1
0
Maximum Non-Detect Value 0.147
PCB: 128
PCB: 129
PCBs: 132+153
PCBs: 137+176
PCBs: 138+160


PCB Congener Box Plots
Concentration (ug/kg dry wt.)
1.2
1.0
0.8
0.6
0.4
0.2
Maximum Non-Detect Value 0.082
PCBs: 141+179
PCB: 146
PCB: 151
PCBs: 156+171+202
PCBs: 157+173+200

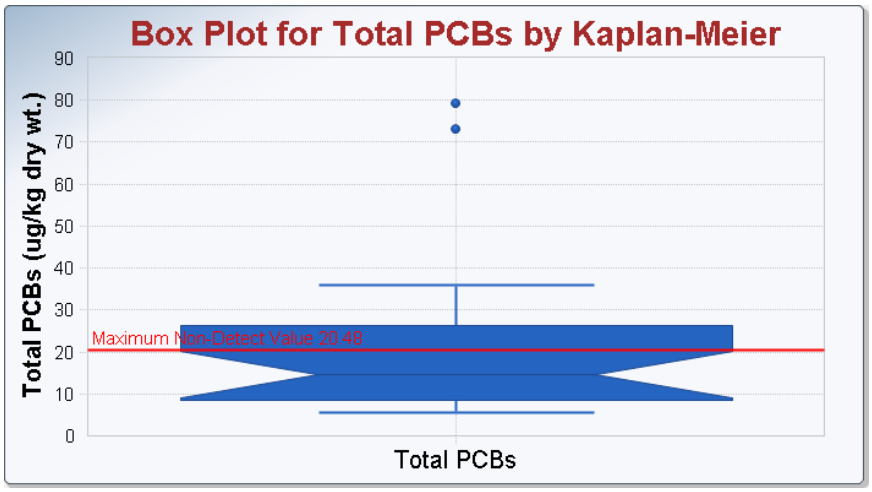

PCB Congener Box Plots
Concentration (ug/kg dry wt.)
10
8
6
4
2
0
Maximum Non-Detect Value 0.098
PCB: 158
PCB: 167
PCBs: 170+190
PCB: 172
PCB: 174

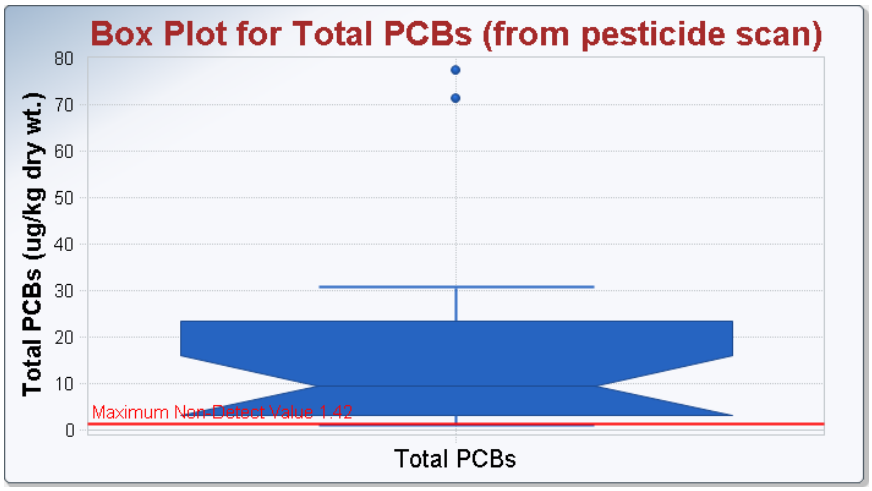

PCB Congener Box Plots
Concentration (ug/kg dry wt.)
1.5
1.2
0.9
0.6
0.3
Maximum Non-Detect Value 0.106
PCB: 177
PCB: 178
PCB: 180
PCB: 183
PCB: 185


PCB Congener Box Plots
Concentration (ug/kg dry wt.)
1.0
0.8
0.6
0.4
0.2
Maximum Non-Detect Value 0.09
PCB: 187
PCB: 189
PCB: 191
PCB: 194
PCBs: 195+208

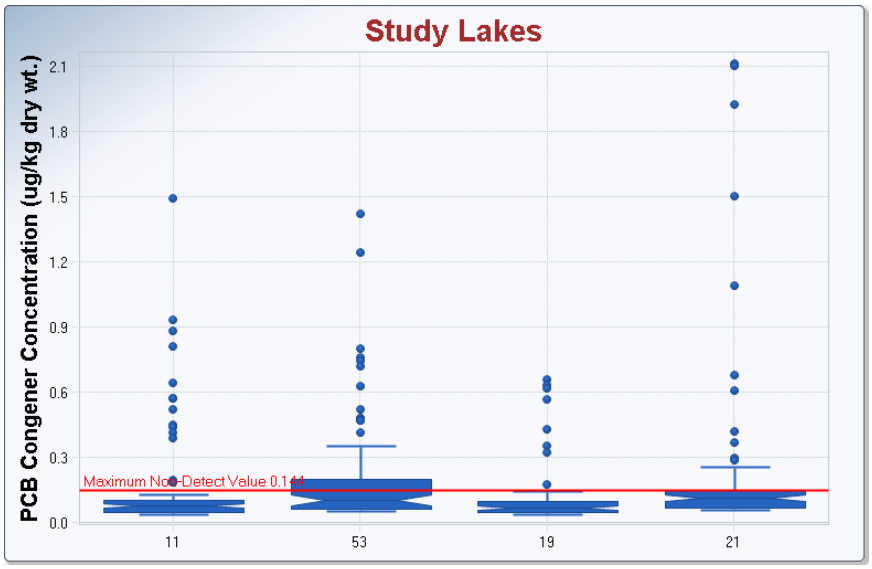

PCB Congener Box Plots
Concentration (ug/kg dry wt.)
1.00
0.90
0.80
0.70
0.60
0.50
0.40
0.30
0.20
0.10
Maximum Non-Detect Value 0.117
PCBs: 196+203
PCB: 199
PCB: 201
PCB: 205
PCB: 206

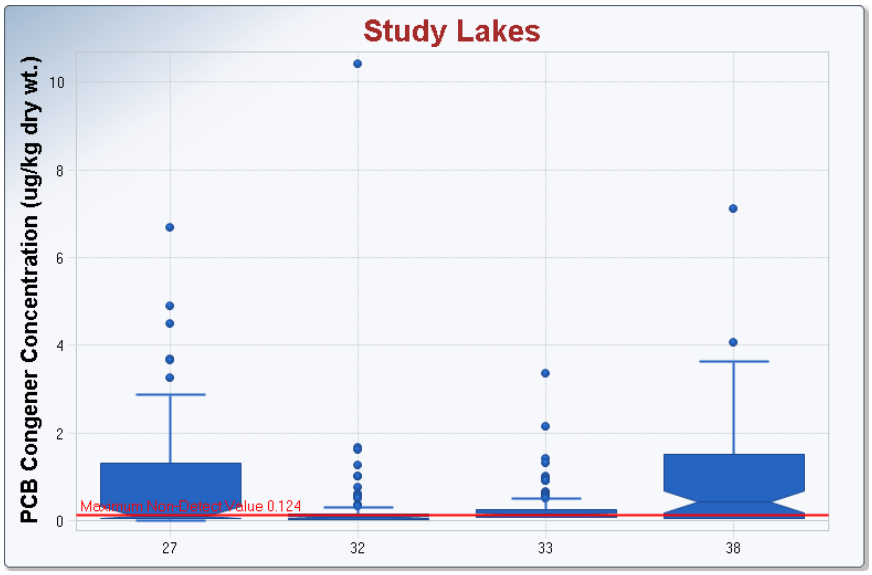
Box Plots for Total PCBs

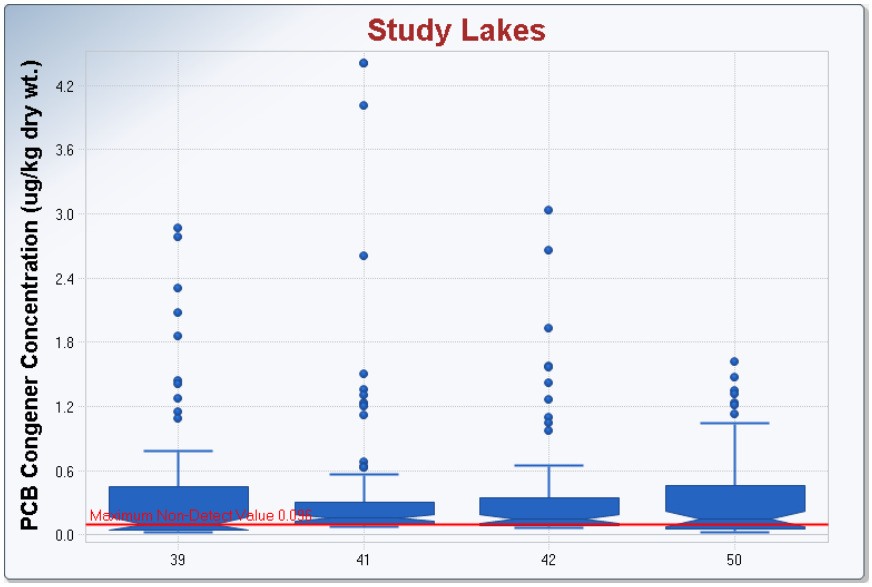




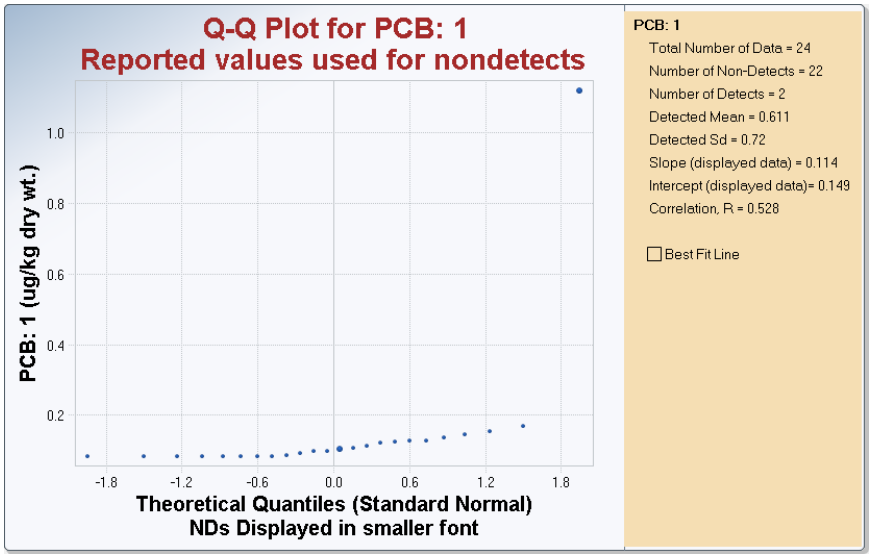
Box Plots of Study Lakes with <80% Nondetects of PCB Congeners

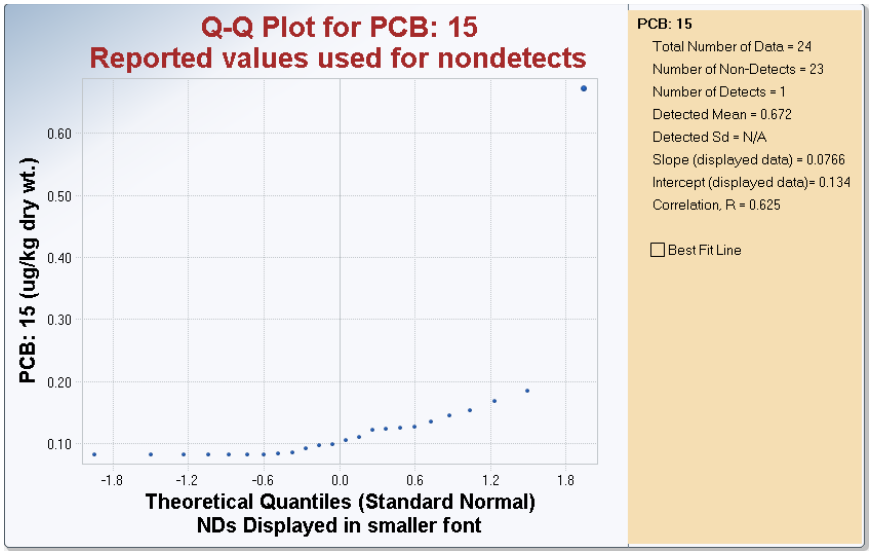


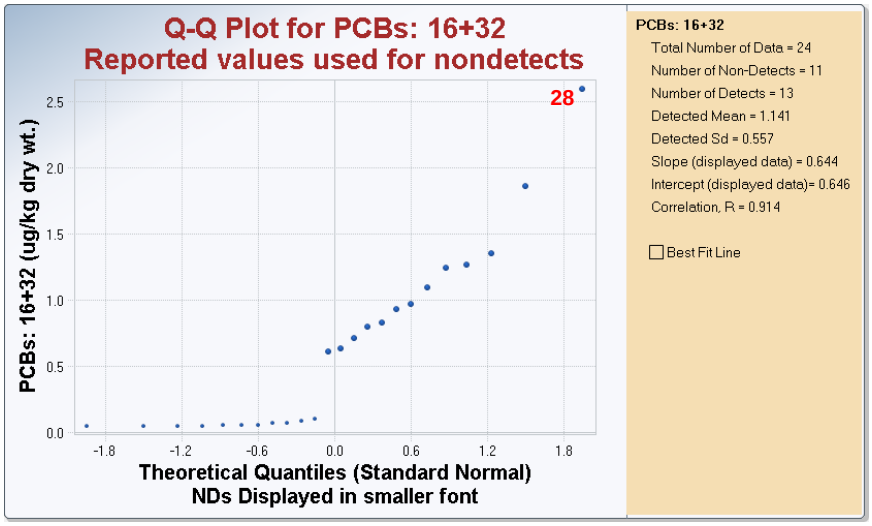


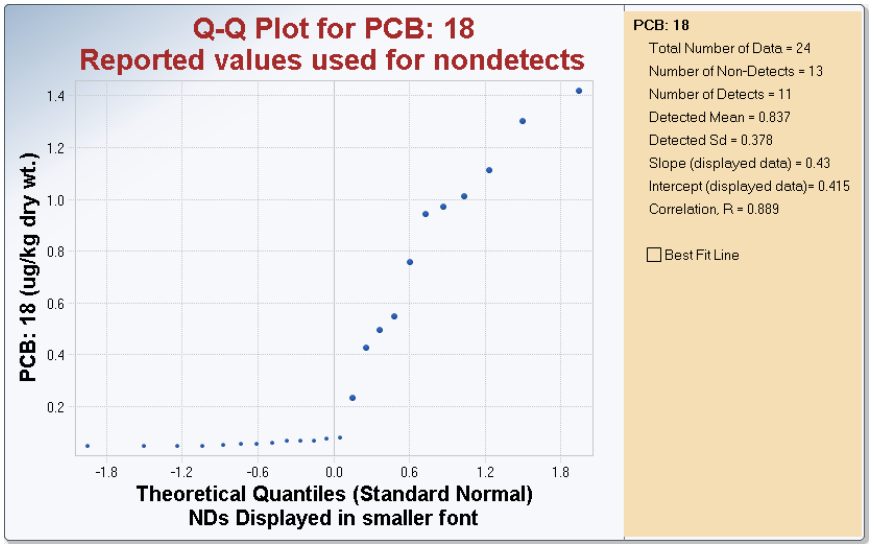

Study Lakes
PCB Congener Concentration (ug/kg dry wt.)
4.2
3.6
3.0
2.4
1.8
1.2
0.6
0.0
Maximum Non-Detect Value 0.08
39
41
42
50

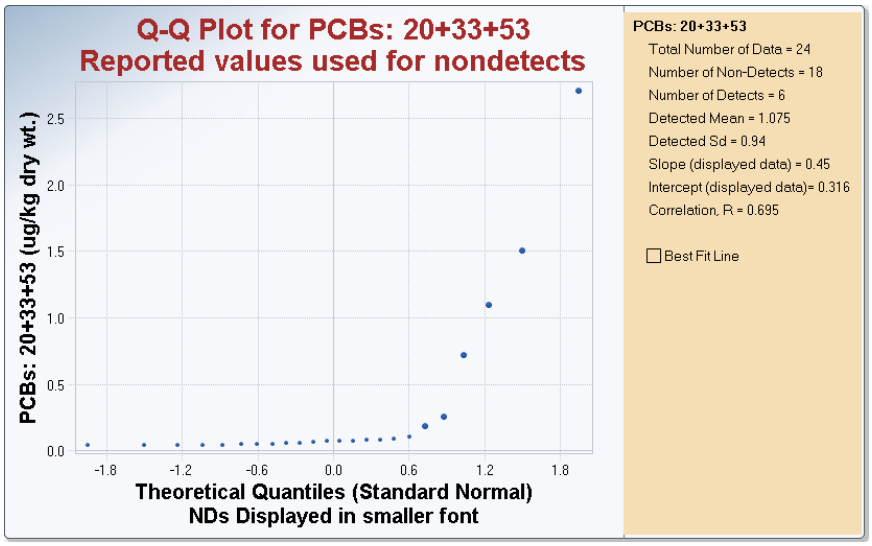
Q-Q Plots for Censored PCB Congeners with <80% Nondetects (samples noted in red font are significant at the 5% significance level and those noted in black font were excluded based on professional judgment)

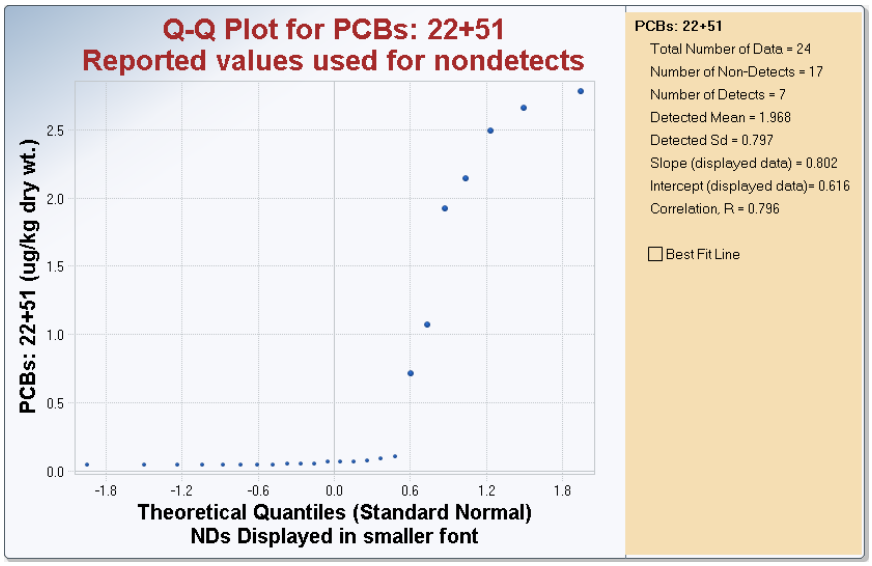


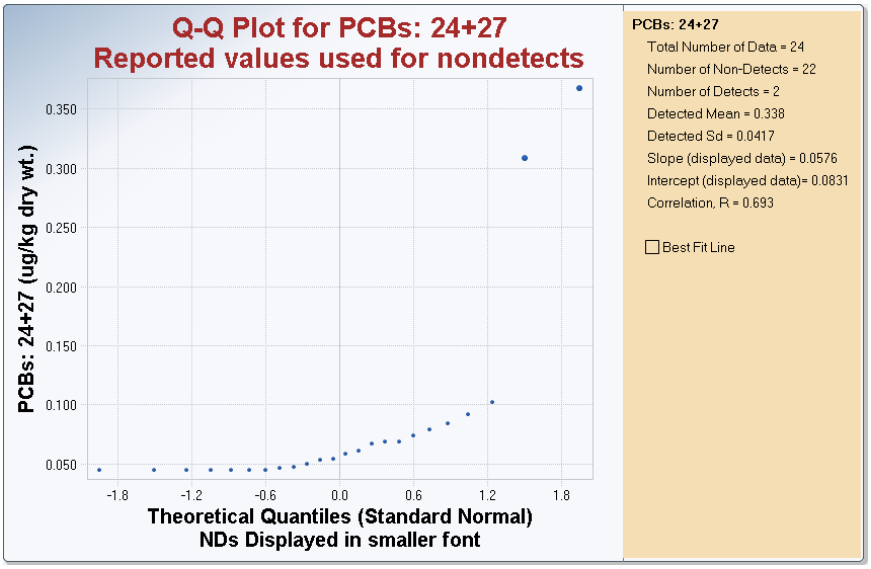


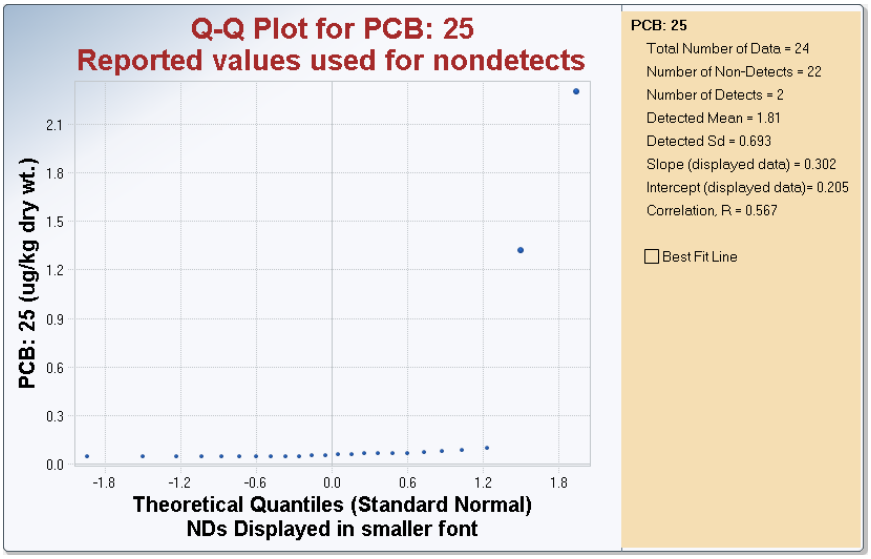


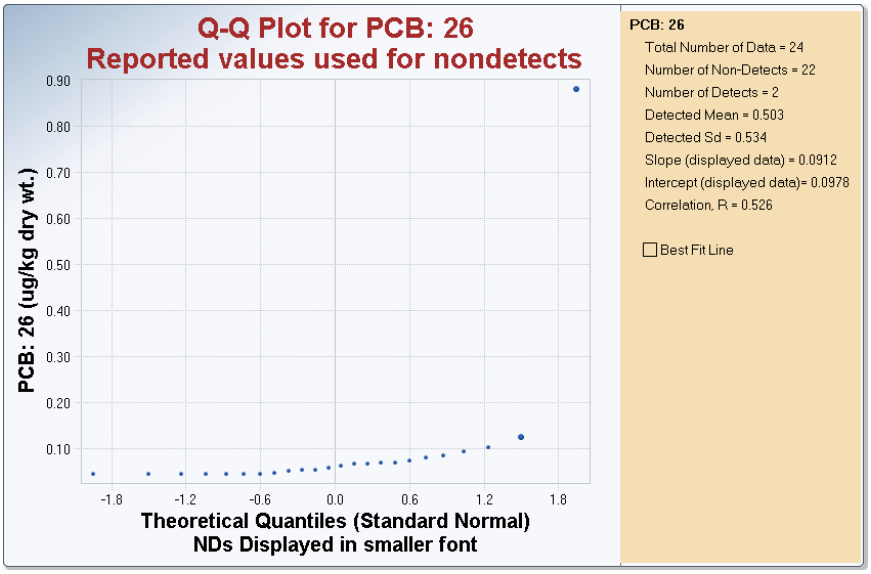

Q-Q Plot for PCB: 18
Reported values used for nondetects
PCB: 18 (ug/kg dry wt.)
Theoretical Quantiles (Standard Normal)
NDs Displayed in smaller font
PCB: 18
Total Number of Data = 24
Number of Non-Detects = 13
Number of Detects = 11
Detected Mean = 0.837
Detected Sd = 0.378
Slope (displayed data) = 0.43
Intercept (displayed data)= 0.415
Correlation, R = 0.889
Best Fit Line

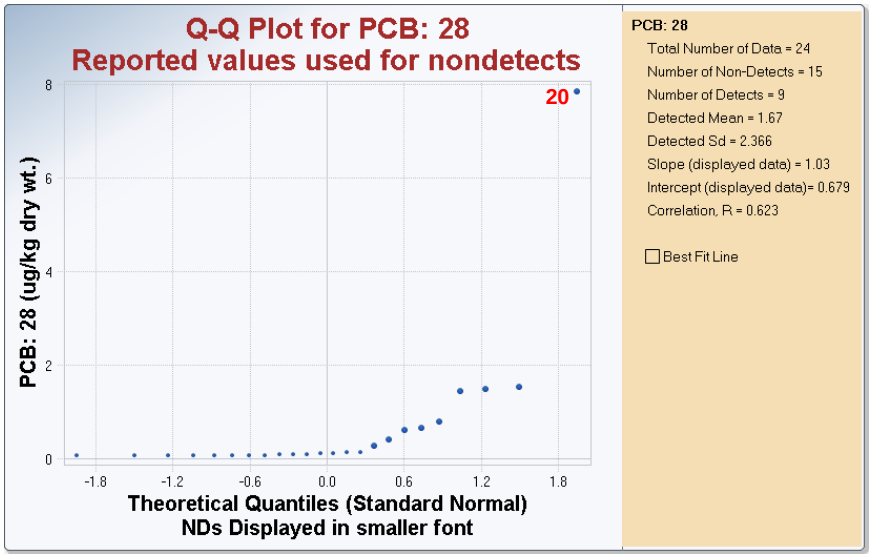

Q-Q Plot for PCBs: 20+33+53
Reported values used for nondetects
PCBs: 20+33+53 (ug/kg dry wt.)
Theoretical Quantiles (Standard Normal)
NDs Displayed in smaller font
PCBs: 20+33+53
Total Number of Data = 24
Number of Non-Detects = 18
Number of Detects = 6
Detected Mean = 1.075
Detected Sd = 0.94
Slope (displayed data) = 0.45
Intercept (displayed data)= 0.316
Correlation, R = 0.695
Best Fit Line

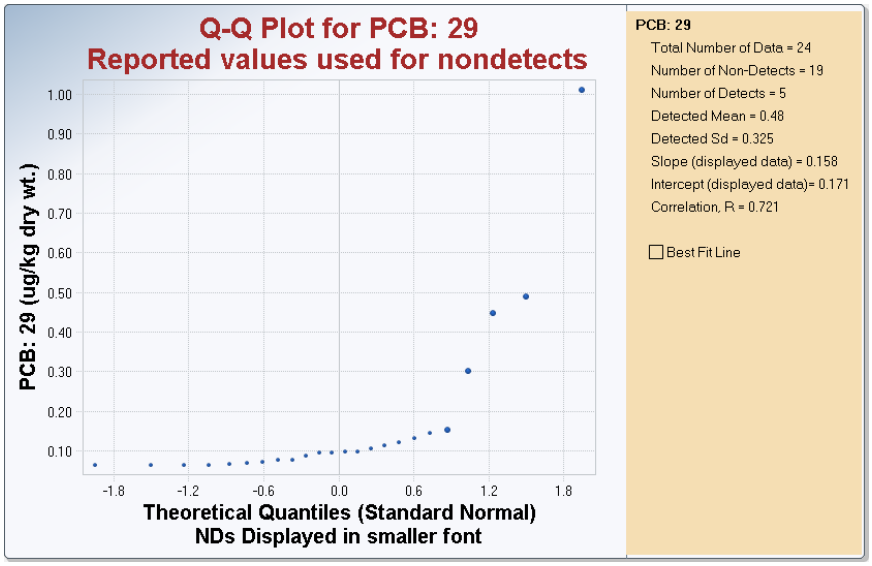

Q-Q Plot for PCBs: 22+51
Reported values used for nondetects
PCBs: 22+51 (ug/kg dry wt.)
Theoretical Quantiles (Standard Normal)
NDs Displayed in smaller font
PCBs: 22+51
Total Number of Data = 24
Number of Non-Detects = 17
Number of Detects = 7
Detected Mean = 1.968
Detected Sd = 0.797
Slope (displayed data) = 0.802
Intercept (displayed data)= 0.616
Correlation, R = 0.796
Best Fit Line

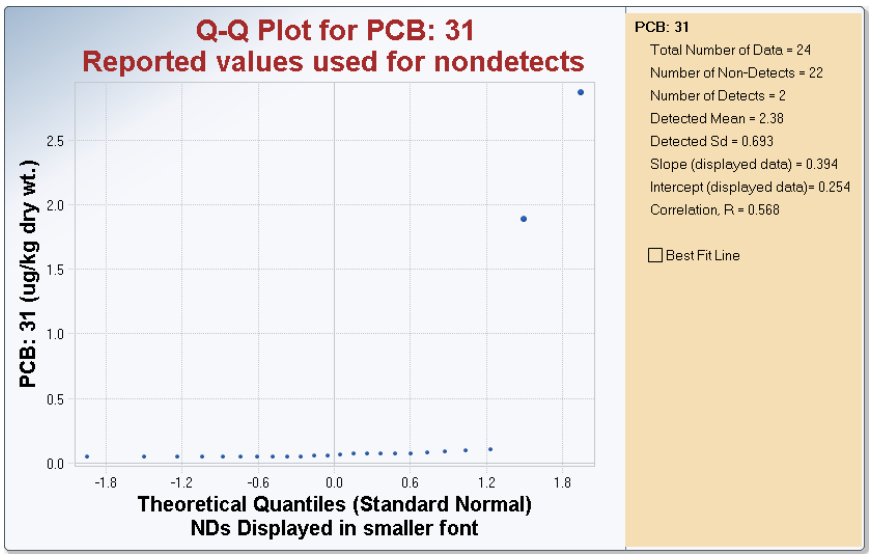

Q-Q Plot for PCBs: 24+27
Reported values used for nondetects
PCBs: 24+27 (ug/kg dry wt.)
0.350
0.300
0.250
0.200
0.150
0.100
0.050
-1.8
-1.2
-0.6
0.0
0.6
1.2
1.8
Theoretical Quantiles (Standard Normal)
NDs Displayed in smaller font
PCBs: 24+27
Total Number of Data = 24
Number of Non-Detects = 22
Number of Detects = 2
Detected Mean = 0.338
Detected Sd = 0.0417
Slope (displayed data) = 0.0576
Intercept (displayed data)= 0.0831
Correlation, R = 0.693
Best Fit Line

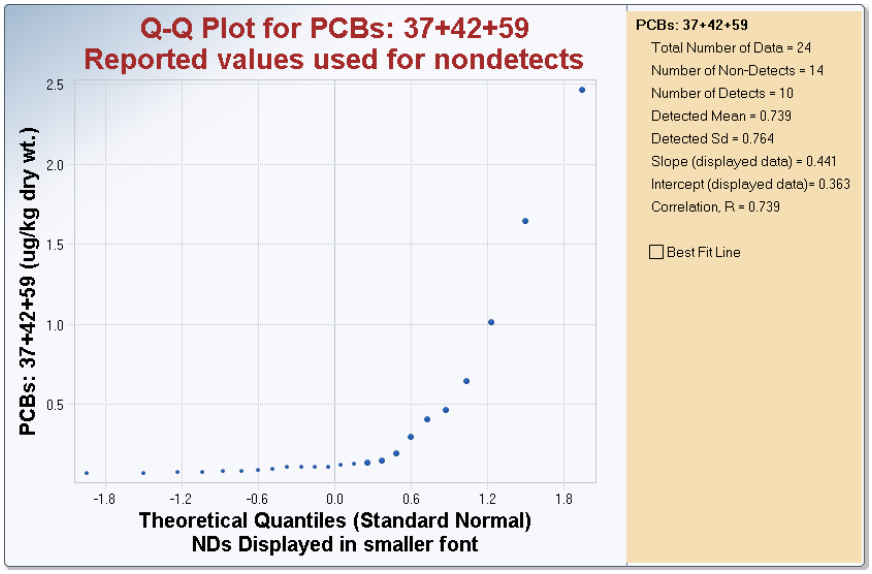

Q-Q Plot for PCB: 25
Reported values used for nondetects
PCB: 25 (ug/kg dry wt.)
2.1
1.8
1.5
1.2
0.9
0.6
0.3
0.0
-1.8
-1.2
-0.6
0.0
0.6
1.2
1.8
Theoretical Quantiles (Standard Normal)
NDs Displayed in smaller font
PCB: 25
Total Number of Data = 24
Number of Non-Detects = 22
Number of Detects = 2
Detected Mean = 1.81
Detected Sd = 0.693
Slope (displayed data) = 0.302
Intercept (displayed data)= 0.205
Correlation, R = 0.567
Best Fit Line

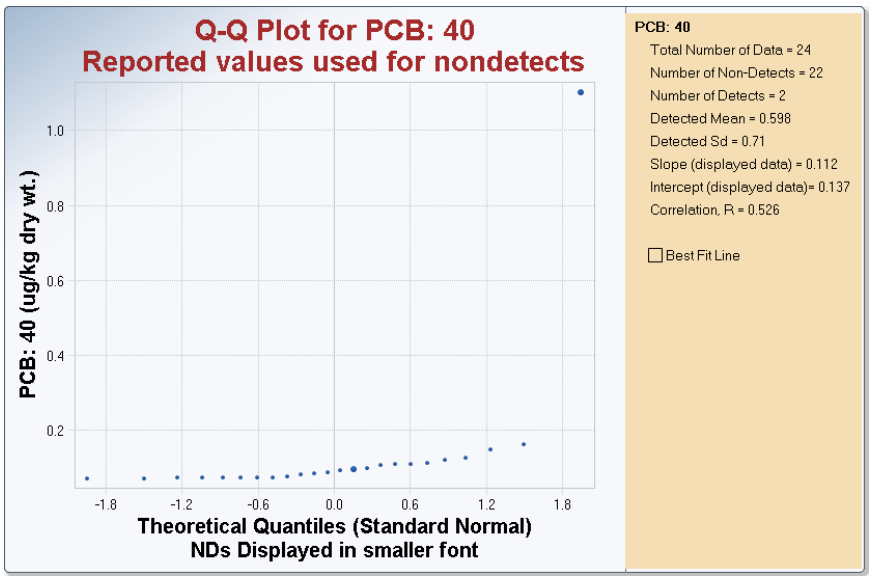

Q-Q Plot for PCB: 26
Reported values used for nondetects
PCB: 26 (ug/kg dry wt.)
0.90
0.80
0.70
0.60
0.50
0.40
0.30
0.20
0.10
-1.8
-1.2
-0.6
0.0
0.6
1.2
1.8
Theoretical Quantiles (Standard Normal)
NDs Displayed in smaller font
PCB: 26
Total Number of Data = 24
Number of Non-Detects = 22
Number of Detects = 2
Detected Mean = 0.503
Detected Sd = 0.534
Slope (displayed data) = 0.0912
Intercept (displayed data)= 0.0978
Correlation, R = 0.526
Best Fit Line

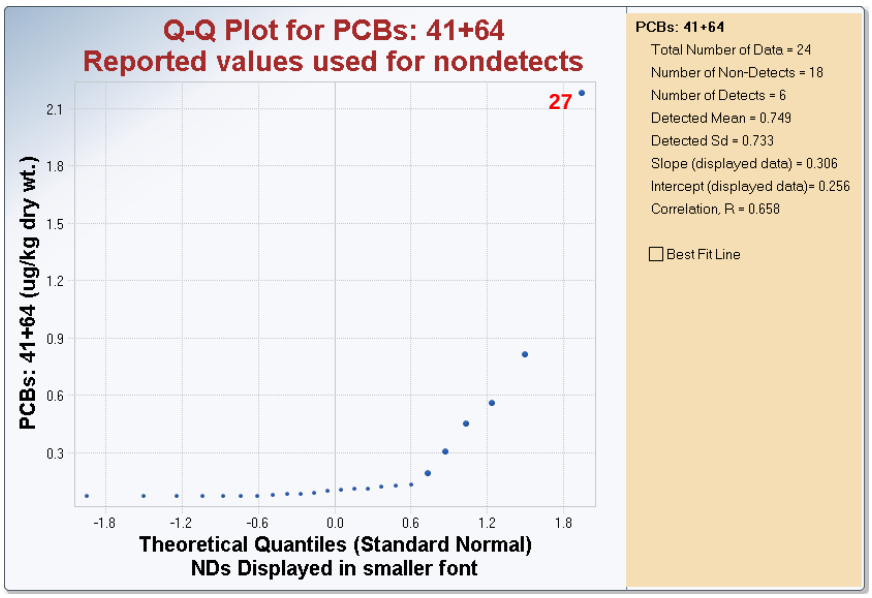

Q-Q Plot for PCB: 28
Reported values used for nondetects
20
PCB: 28 (ug/kg dry wt.)
Theoretical Quantiles (Standard Normal)
NDs Displayed in smaller font
PCB: 28
Total Number of Data = 24
Number of Non-Detects = 15
Number of Detects = 9
Detected Mean = 1.67
Detected Sd = 2.366
Slope (displayed data) = 1.03
Intercept (displayed data)= 0.679
Correlation, R = 0.623
Best Fit Line

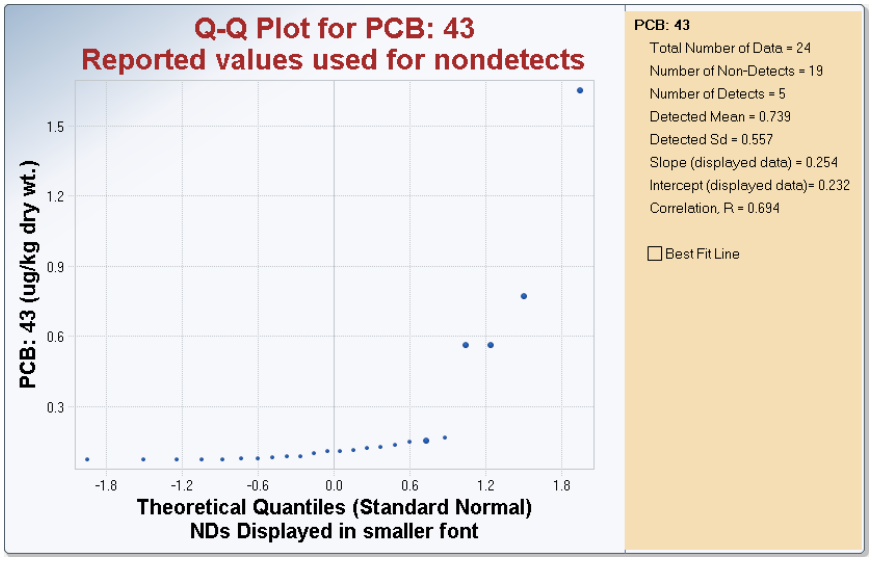

Q-Q Plot for PCB: 29
Reported values used for nondetects
PCB: 29 (ug/kg dry wt.)
Theoretical Quantiles (Standard Normal)
NDs Displayed in smaller font
PCB: 29
Total Number of Data = 24
Number of Non-Detects = 19
Number of Detects = 5
Detected Mean = 0.48
Detected Sd = 0.325
Slope (displayed data) = 0.158
Intercept (displayed data)= 0.171
Correlation, R = 0.721
Best Fit Line

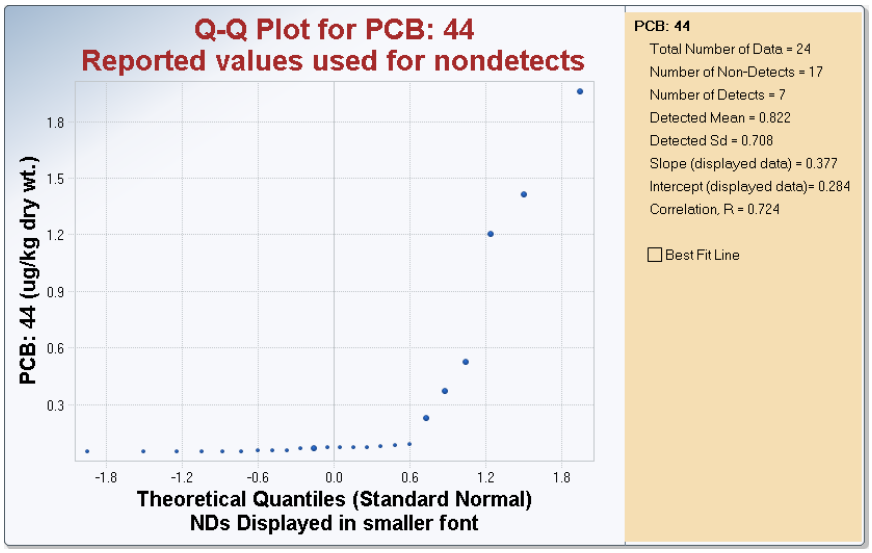

Q-Q Plot for PCB: 31
Reported values used for nondetects
PCB: 31 (ug/kg dry wt.)
Theoretical Quantiles (Standard Normal)
NDs Displayed in smaller font
PCB: 31
Total Number of Data = 24
Number of Non-Detects = 22
Number of Detects = 2
Detected Mean = 2.38
Detected Sd = 0.693
Slope (displayed data) = 0.394
Intercept (displayed data)= 0.254
Correlation, R = 0.568
Best Fit Line

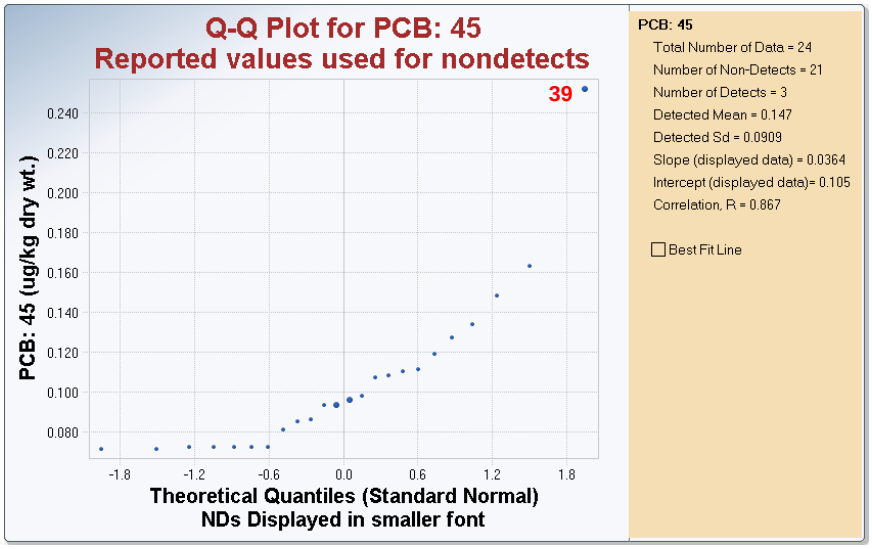

Q-Q Plot for PCBs: 37+42+59
Reported values used for nondetects
PCBs: 37+42+59 (ug/kg dry wt.)
2.5
2.0
1.5
1.0
0.5
-1.8
-1.2
-0.6
0.0
0.6
1.2
1.8
Theoretical Quantiles (Standard Normal)
NDs Displayed in smaller font
PCBs: 37+42+59
Total Number of Data = 24
Number of Non-Detects = 14
Number of Detects = 10
Detected Mean = 0.739
Detected Sd = 0.764
Slope (displayed data) = 0.441
Intercept (displayed data)= 0.363
Correlation, R = 0.739
Best Fit Line

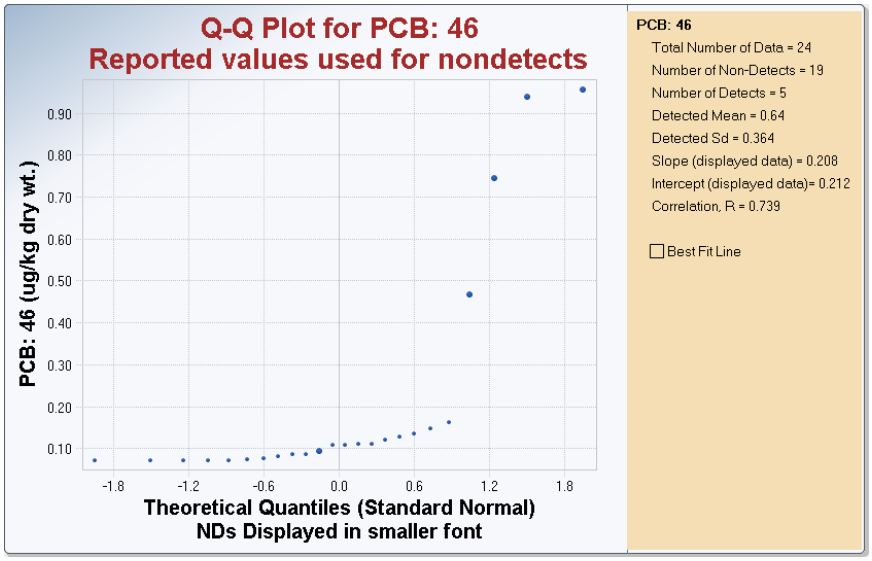

Q-Q Plot for PCB: 40
Reported values used for nondetects
PCB: 40 (ug/kg dry wt.)
1.0
0.8
0.6
0.4
0.2
-1.8
-1.2
-0.6
0.0
0.6
1.2
1.8
Theoretical Quantiles (Standard Normal)
NDs Displayed in smaller font
PCB: 40
Total Number of Data = 24
Number of Non-Detects = 22
Number of Detects = 2
Detected Mean = 0.598
Detected Sd = 0.71
Slope (displayed data) = 0.112
Intercept (displayed data)= 0.137
Correlation, R = 0.526
Best Fit Line

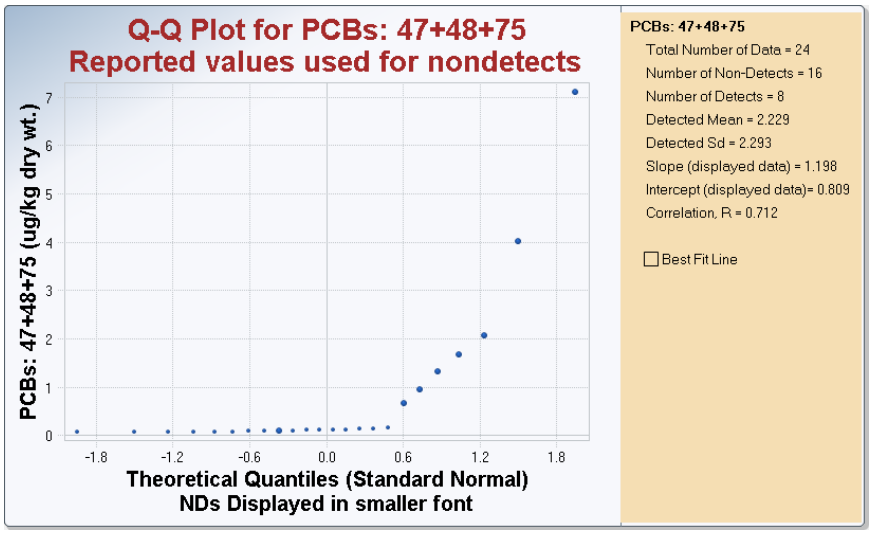

Q-Q Plot for PCBs: 41+64
Reported values used for nondetects
27
PCBs: 41+64 (ug/kg dry wt.)
2.1
1.8
1.5
1.2
0.9
0.6
0.3
-1.8
-1.2
-0.6
0.0
0.6
1.2
1.8
Theoretical Quantiles (Standard Normal)
NDs Displayed in smaller font
PCBs: 41+64
Total Number of Data = 24
Number of Non-Detects = 18
Number of Detects = 6
Detected Mean = 0.749
Detected Sd = 0.733
Slope (displayed data) = 0.306
Intercept (displayed data)= 0.256
Correlation, R = 0.658
Best Fit Line

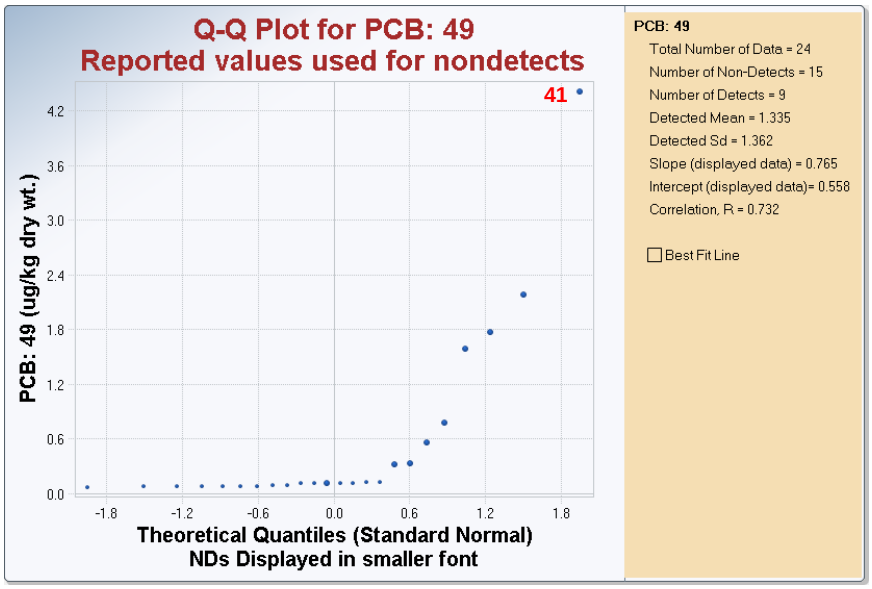

Q-Q Plot for PCB: 43
Reported values used for nondetects
PCB: 43 (ug/kg dry wt.)
1.5
1.2
0.9
0.6
0.3
-1.8
-1.2
-0.6
0.0
0.6
1.2
1.8
Theoretical Quantiles (Standard Normal)
NDs Displayed in smaller font
PCB: 43
Total Number of Data = 24
Number of Non-Detects = 19
Number of Detects = 5
Detected Mean = 0.739
Detected Sd = 0.557
Slope (displayed data) = 0.254
Intercept (displayed data)= 0.232
Correlation, R = 0.694
Best Fit Line

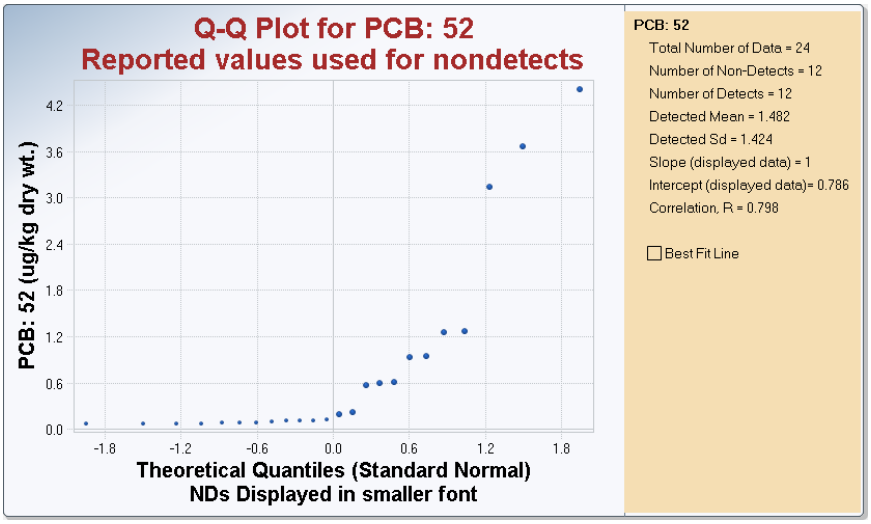

Q-Q Plot for PCB: 44
Reported values used for nondetects
PCB: 44 (ug/kg dry wt.)
1.8
1.5
1.2
0.9
0.6
0.3
-1.8
-1.2
-0.6
0.0
0.6
1.2
1.8
Theoretical Quantiles (Standard Normal)
NDs Displayed in smaller font
PCB: 44
Total Number of Data = 24
Number of Non-Detects = 17
Number of Detects = 7
Detected Mean = 0.822
Detected Sd = 0.708
Slope (displayed data) = 0.377
Intercept (displayed data)= 0.284
Correlation, R = 0.724
Best Fit Line

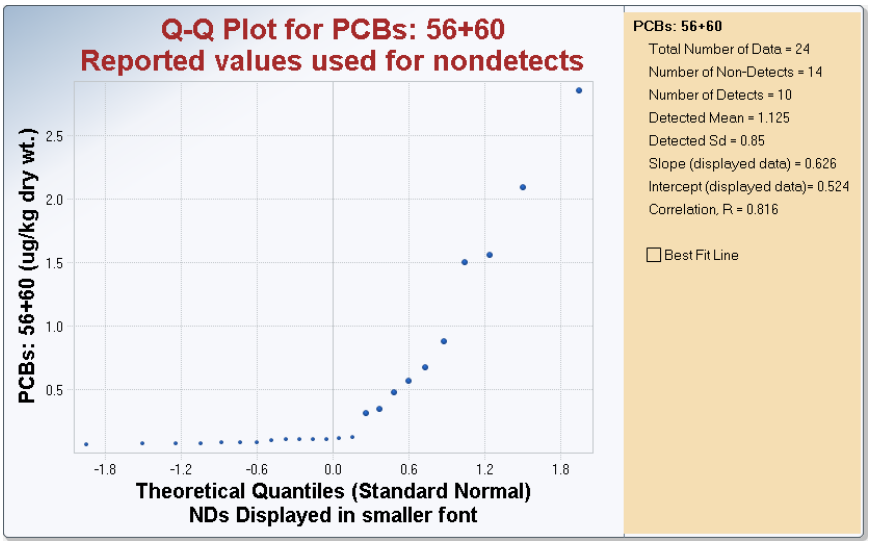

Q-Q Plot for PCB: 45
Reported values used for nondetects
39
PCB: 45 (ug/kg dry wt.)
0.240
0.220
0.200
0.180
0.160
0.140
0.120
0.100
0.080
-1.8
-1.2
-0.6
0.0
0.6
1.2
1.8
Theoretical Quantiles (Standard Normal)
NDs Displayed in smaller font
PCB: 45
Total Number of Data = 24
Number of Non-Detects = 21
Number of Detects = 3
Detected Mean = 0.147
Detected Sd = 0.0909
Slope (displayed data) = 0.0364
Intercept (displayed data)= 0.105
Correlation, R = 0.867
Best Fit Line

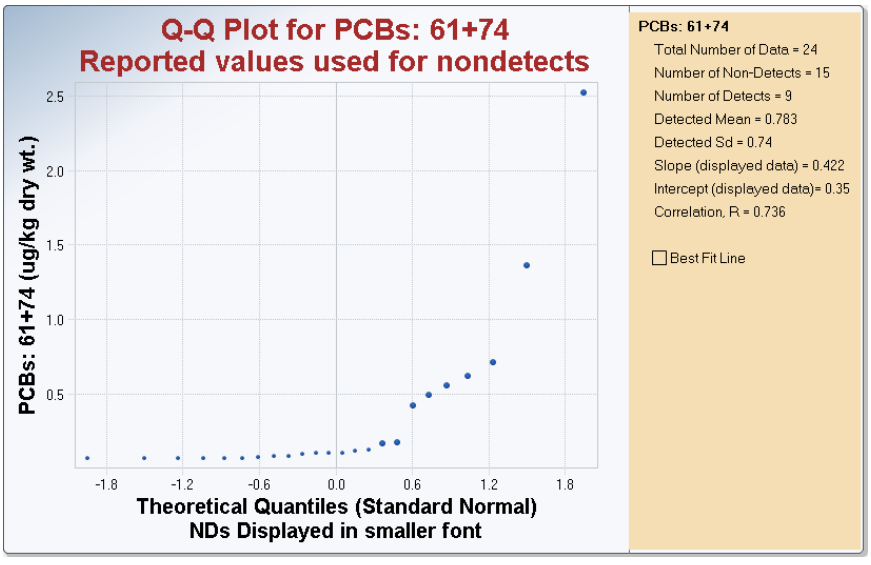

Q-Q Plot for PCB: 46
Reported values used for nondetects
PCB: 46 (ug/kg dry wt.)
0.90
0.80
0.70
0.60
0.50
0.40
0.30
0.20
0.10
-1.8
-1.2
-0.6
0.0
0.6
1.2
1.8
Theoretical Quantiles (Standard Normal)
NDs Displayed in smaller font
PCB: 46
Total Number of Data = 24
Number of Non-Detects = 19
Number of Detects = 5
Detected Mean = 0.64
Detected Sd = 0.364
Slope (displayed data) = 0.208
Intercept (displayed data)= 0.212
Correlation, R = 0.739
Best Fit Line

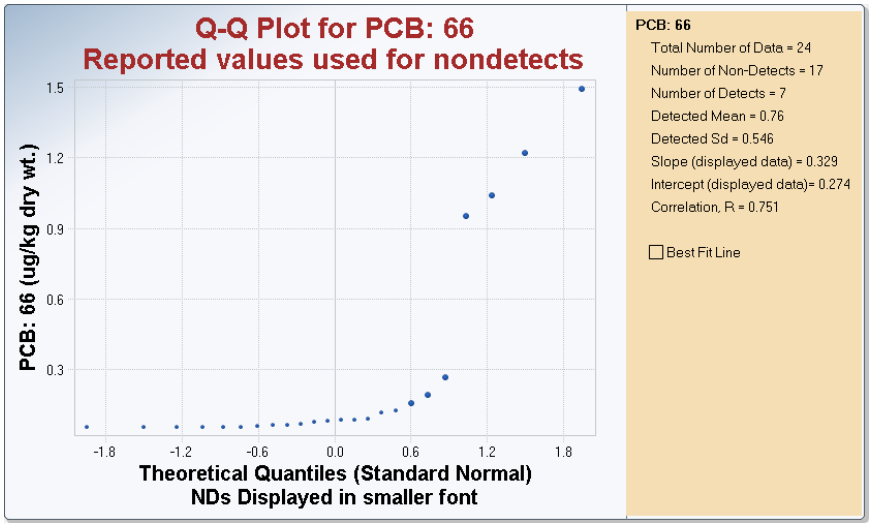

Q-Q Plot for PCBs: 47+48+75
Reported values used for nondetects
PCBs: 47+48+75 (ug/kg dry wt.)
7
6
5
4
3
2
1
0
-1.8
-1.2
-0.6
0.0
0.6
1.2
1.8
Theoretical Quantiles (Standard Normal)
NDs Displayed in smaller font
PCBs: 47+48+75
Total Number of Data = 24
Number of Non-Detects = 16
Number of Detects = 8
Detected Mean = 2.229
Detected Sd = 2.293
Slope (displayed data) = 1.198
Intercept (displayed data)= 0.809
Correlation, R = 0.712
Best Fit Line

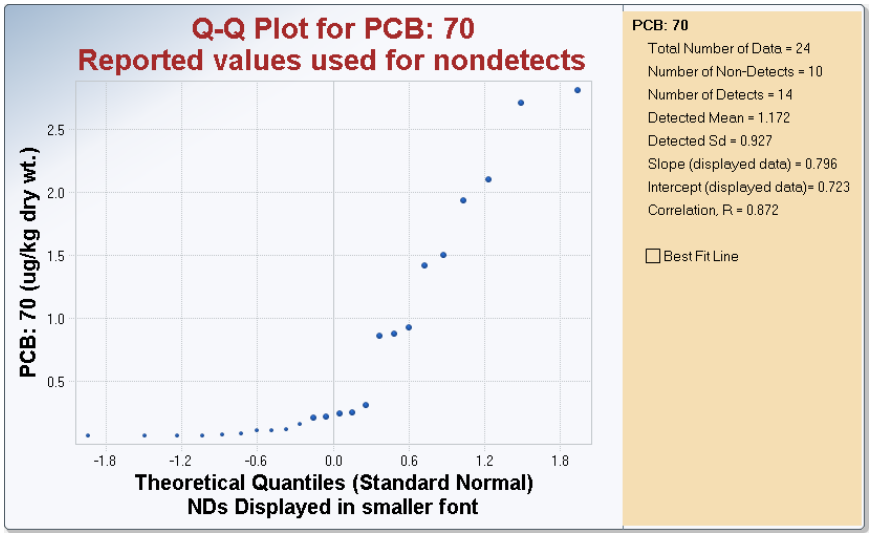

Q-Q Plot for PCB: 49
Reported values used for nondetects
41
PCB: 49 (ug/kg dry wt.)
4.2
3.6
3.0
2.4
1.8
1.2
0.6
0.0
-1.8
-1.2
-0.6
0.0
0.6
1.2
1.8
Theoretical Quantiles (Standard Normal)
NDs Displayed in smaller font
PCB: 49
Total Number of Data = 24
Number of Non-Detects = 15
Number of Detects = 9
Detected Mean = 1.335
Detected Sd = 1.362
Slope (displayed data) = 0.765
Intercept (displayed data)= 0.558
Correlation, R = 0.732
Best Fit Line

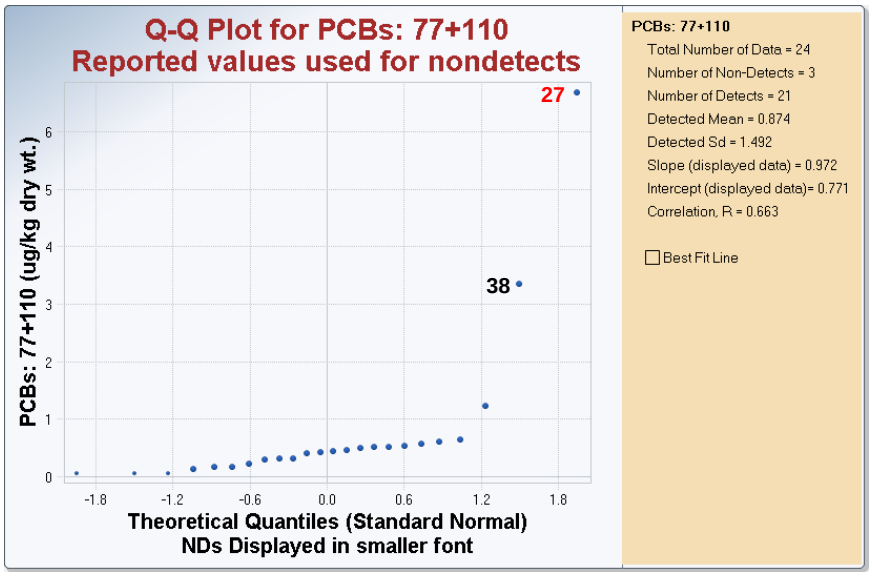

Q-Q Plot for PCB: 52
Reported values used for nondetects
PCB: 52 (ug/kg dry wt.)
4.2
3.6
3.0
2.4
1.8
1.2
0.6
0.0
-1.8
-1.2
-0.6
0.0
0.6
1.2
1.8
Theoretical Quantiles (Standard Normal)
NDs Displayed in smaller font
PCB: 52
Total Number of Data = 24
Number of Non-Detects = 12
Number of Detects = 12
Detected Mean = 1.482
Detected Sd = 1.424
Slope (displayed data) = 1
Intercept (displayed data)= 0.786
Correlation, R = 0.798
Best Fit Line

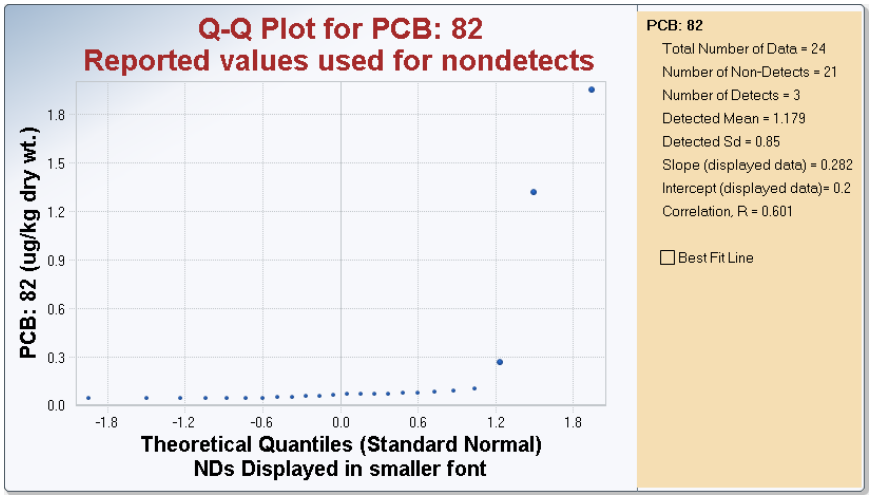

Q-Q Plot for PCBs: 56+60
Reported values used for nondetects
PCBs: 56+60 (ug/kg dry wt.)
2.5
2.0
1.5
1.0
0.5
-1.8
-1.2
-0.6
0.0
0.6
1.2
1.8
Theoretical Quantiles (Standard Normal)
NDs Displayed in smaller font
PCBs: 56+60
Total Number of Data = 24
Number of Non-Detects = 14
Number of Detects = 10
Detected Mean = 1.125
Detected Sd = 0.85
Slope (displayed data) = 0.626
Intercept (displayed data)= 0.524
Correlation, R = 0.816
Best Fit Line

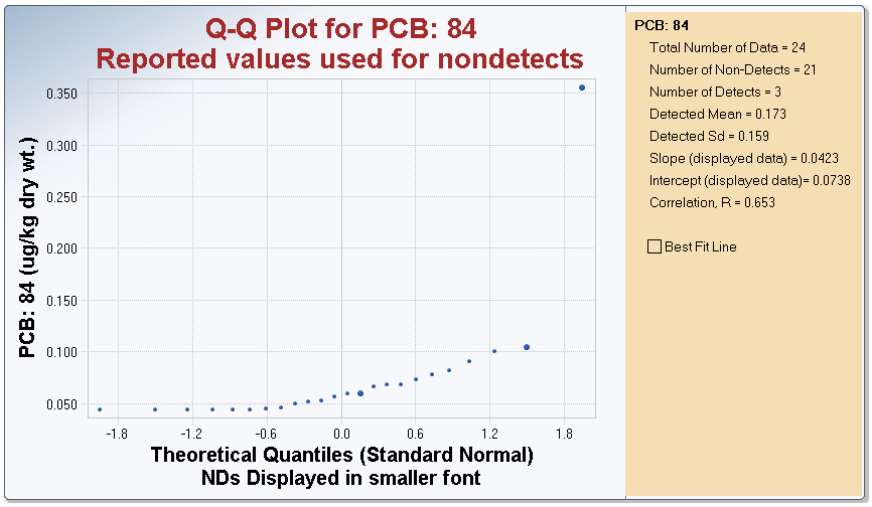

Q-Q Plot for PCBs: 61+74
Reported values used for nondetects
PCBs: 61+74 (ug/kg dry wt.)
2.5
2.0
1.5
1.0
0.5
-1.8
-1.2
-0.6
0.0
0.6
1.2
1.8
Theoretical Quantiles (Standard Normal)
NDs Displayed in smaller font
PCBs: 61+74
Total Number of Data = 24
Number of Non-Detects = 15
Number of Detects = 9
Detected Mean = 0.783
Detected Sd = 0.74
Slope (displayed data) = 0.422
Intercept (displayed data)= 0.35
Correlation, R = 0.736
Best Fit Line

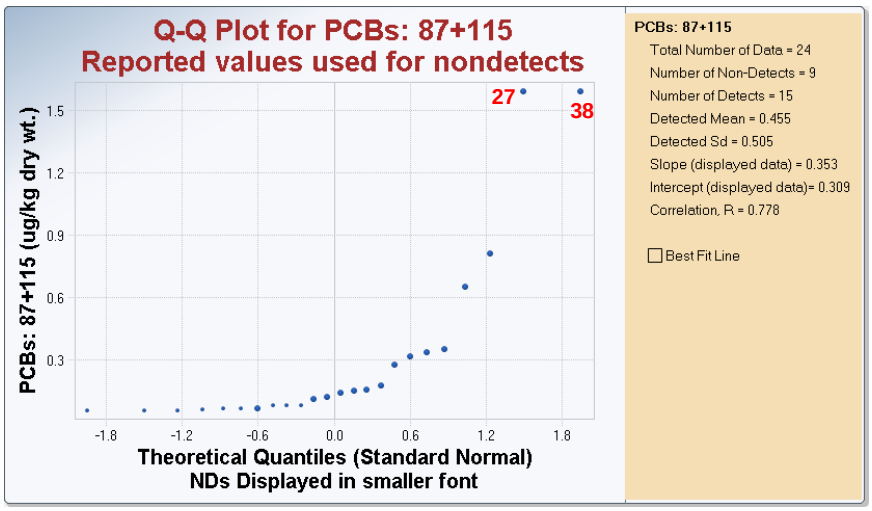

Q-Q Plot for PCB: 66
Reported values used for nondetects
PCB: 66 (ug/kg dry wt.)
1.5
1.2
0.9
0.6
0.3
-1.8
-1.2
-0.6
0.0
0.6
1.2
1.8
Theoretical Quantiles (Standard Normal)
NDs Displayed in smaller font
PCB: 66
Total Number of Data = 24
Number of Non-Detects = 17
Number of Detects = 7
Detected Mean = 0.76
Detected Sd = 0.546
Slope (displayed data) = 0.329
Intercept (displayed data)= 0.274
Correlation, R = 0.751
Best Fit Line

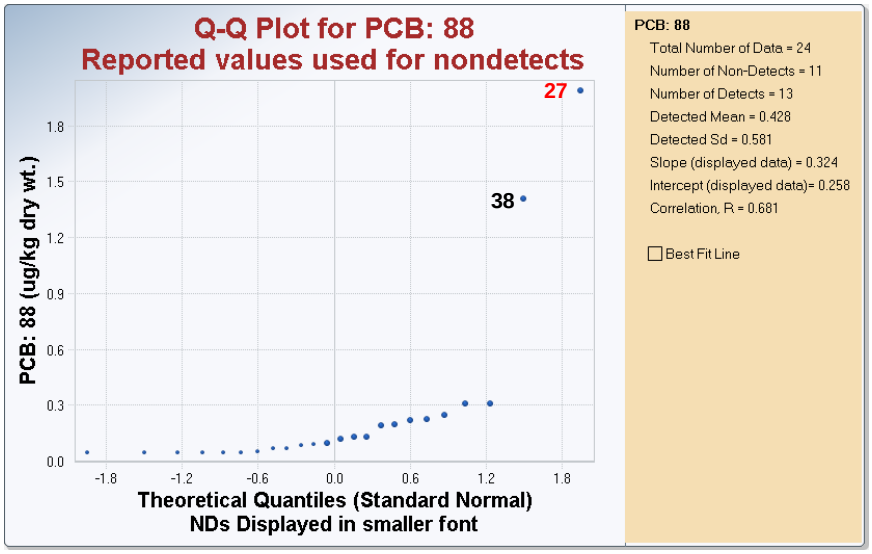

Q-Q Plot for PCB: 70
Reported values used for nondetects
PCB: 70 (ug/kg dry wt.)
2.5
2.0
1.5
1.0
0.5
-1.8
-1.2
-0.6
0.0
0.6
1.2
1.8
Theoretical Quantiles (Standard Normal)
NDs Displayed in smaller font
PCB: 70
Total Number of Data = 24
Number of Non-Detects = 10
Number of Detects = 14
Detected Mean = 1.172
Detected Sd = 0.927
Slope (displayed data) = 0.796
Intercept (displayed data)= 0.723
Correlation, R = 0.872
Best Fit Line

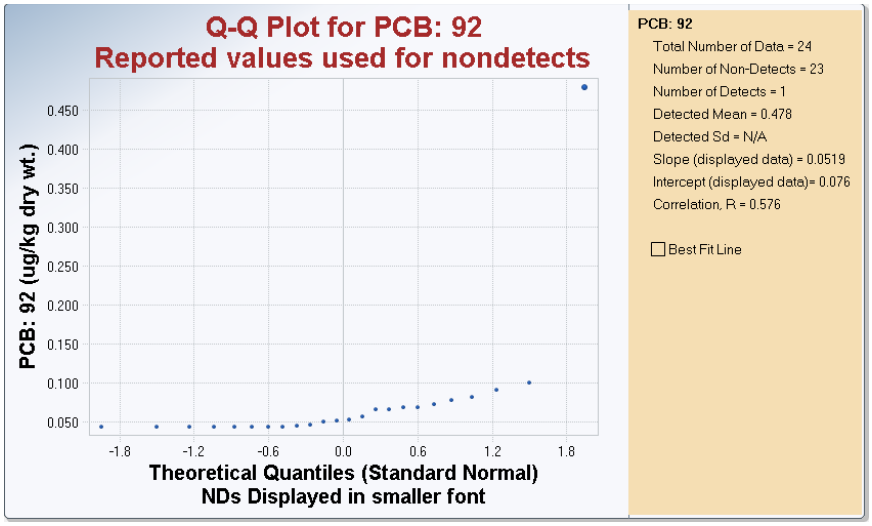

Q-Q Plot for PCBs: 77+110
Reported values used for nondetects
PCBs: 77+110 (ug/kg dry wt.)
27
38
6
5
4
3
2
1
0
-1.8
-1.2
-0.6
0.0
0.6
1.2
1.8
Theoretical Quantiles (Standard Normal)
NDs Displayed in smaller font
PCBs: 77+110
Total Number of Data = 24
Number of Non-Detects = 3
Number of Detects = 21
Detected Mean = 0.874
Detected Sd = 1.492
Slope (displayed data) = 0.972
Intercept (displayed data)= 0.771
Correlation, R = 0.663
Best Fit Line

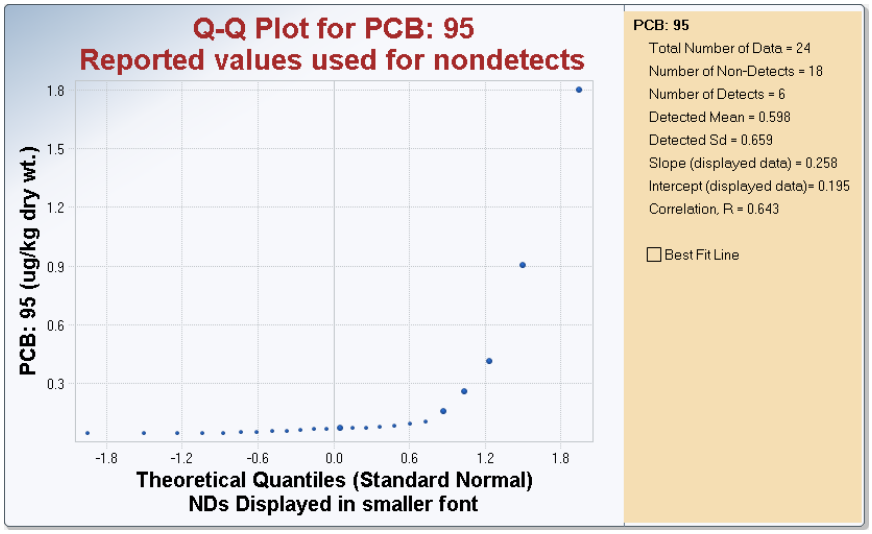

Q-Q Plot for PCB: 82
Reported values used for nondetects
PCB: 82 (ug/kg dry wt.)
1.8
1.5
1.2
0.9
0.6
0.3
0.0
-1.8
-1.2
-0.6
0.0
0.6
1.2
1.8
Theoretical Quantiles (Standard Normal)
NDs Displayed in smaller font
PCB: 82
Total Number of Data = 24
Number of Non-Detects = 21
Number of Detects = 3
Detected Mean = 1.179
Detected Sd = 0.85
Slope (displayed data) = 0.282
Intercept (displayed data)= 0.2
Correlation, R = 0.601
Best Fit Line

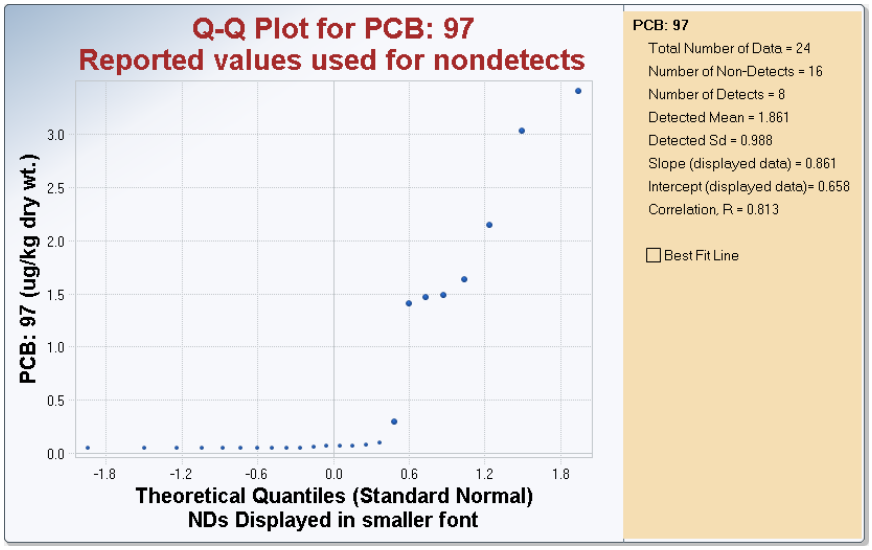

Q-Q Plot for PCB: 84
Reported values used for nondetects
PCB: 84 (ug/kg dry wt.)
0.350
0.300
0.250
0.200
0.150
0.100
0.050
-1.8
-1.2
-0.6
0.0
0.6
1.2
1.8
Theoretical Quantiles (Standard Normal)
NDs Displayed in smaller font
PCB: 84
Total Number of Data = 24
Number of Non-Detects = 21
Number of Detects = 3
Detected Mean = 0.173
Detected Sd = 0.159
Slope (displayed data) = 0.0423
Intercept (displayed data)= 0.0738
Correlation, R = 0.653
Best Fit Line

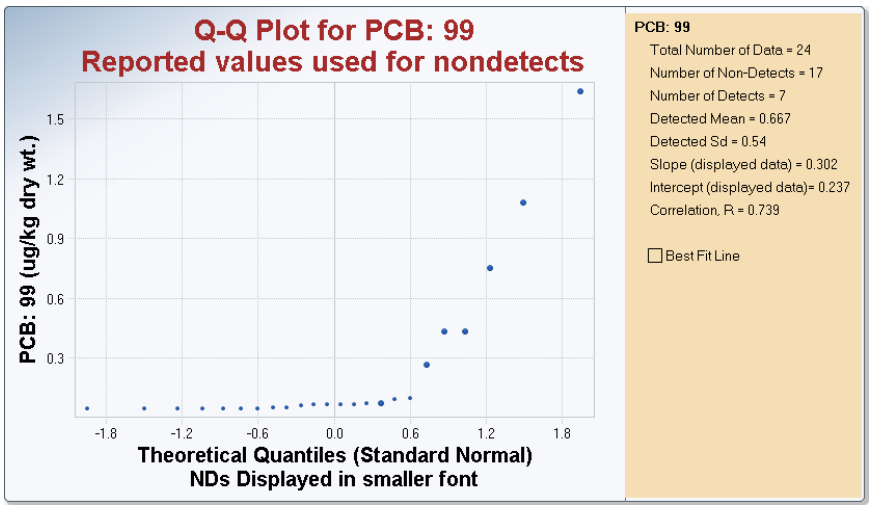

Q-Q Plot for PCBs: 87+115
Reported values used for nondetects
PCBs: 87+115 (ug/kg dry wt.)
27
38
1.5
1.2
0.9
0.6
0.3
-1.8
-1.2
-0.6
0.0
0.6
1.2
1.8
Theoretical Quantiles (Standard Normal)
NDs Displayed in smaller font
PCBs: 87+115
Total Number of Data = 24
Number of Non-Detects = 9
Number of Detects = 15
Detected Mean = 0.455
Detected Sd = 0.505
Slope (displayed data) = 0.353
Intercept (displayed data)= 0.309
Correlation, R = 0.778
Best Fit Line

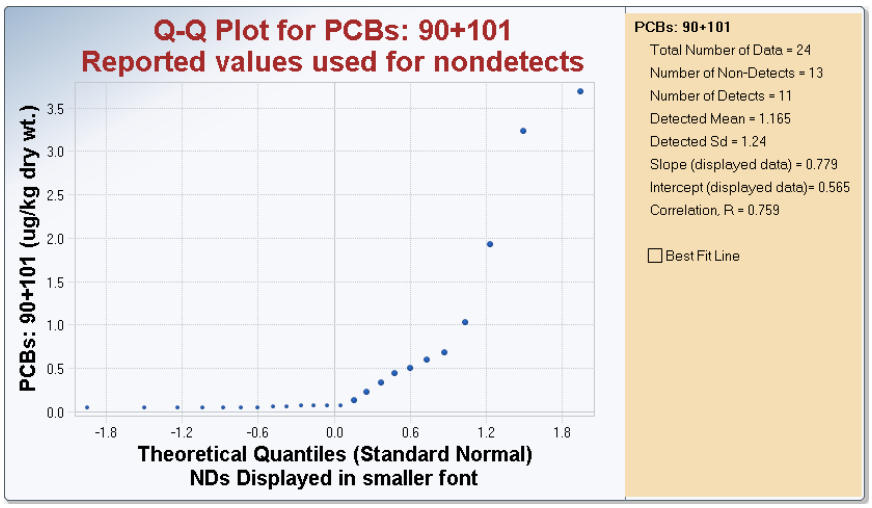

Q-Q Plot for PCB: 88
Reported values used for nondetects
27
38
PCB: 88 (ug/kg dry wt.)
Theoretical Quantiles (Standard Normal)
NDs Displayed in smaller font
PCB: 88
Total Number of Data = 24
Number of Non-Detects = 11
Number of Detects = 13
Detected Mean = 0.428
Detected Sd = 0.581
Slope (displayed data) = 0.324
Intercept (displayed data)= 0.258
Correlation, R = 0.681
Best Fit Line

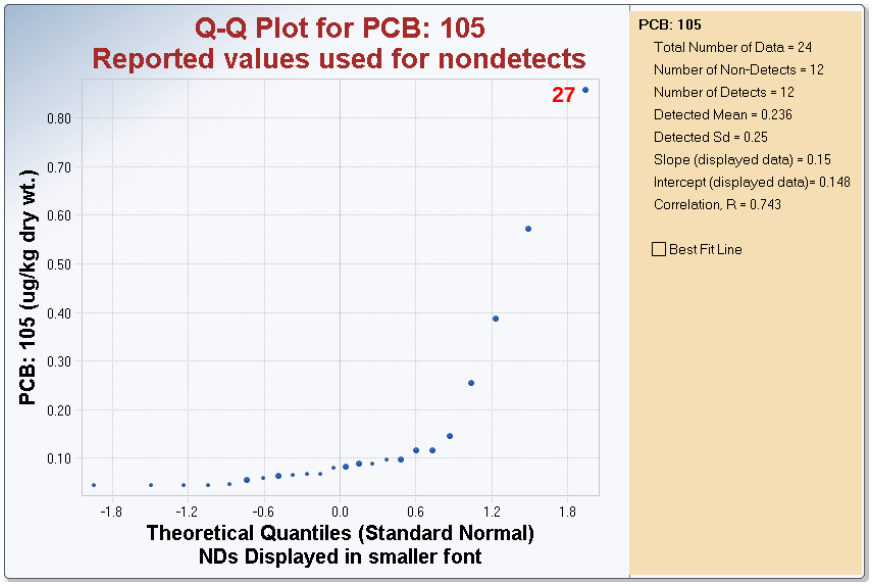

Q-Q Plot for PCB: 92
Reported values used for nondetects
PCB: 92 (ug/kg dry wt.)
Theoretical Quantiles (Standard Normal)
NDs Displayed in smaller font
PCB: 92
Total Number of Data = 24
Number of Non-Detects = 23
Number of Detects = 1
Detected Mean = 0.478
Detected Sd = N/A
Slope (displayed data) = 0.0519
Intercept (displayed data)= 0.076
Correlation, R = 0.576
Best Fit Line

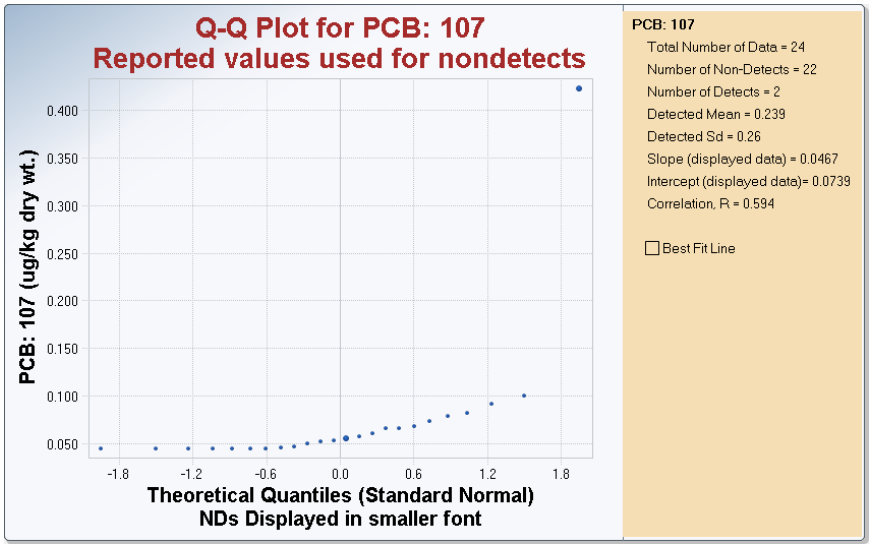

Q-Q Plot for PCB: 95
Reported values used for nondetects
PCB: 95 (ug/kg dry wt.)
Theoretical Quantiles (Standard Normal)
NDs Displayed in smaller font
PCB: 95
Total Number of Data = 24
Number of Non-Detects = 18
Number of Detects = 6
Detected Mean = 0.598
Detected Sd = 0.659
Slope (displayed data) = 0.258
Intercept (displayed data)= 0.195
Correlation, R = 0.643
Best Fit Line

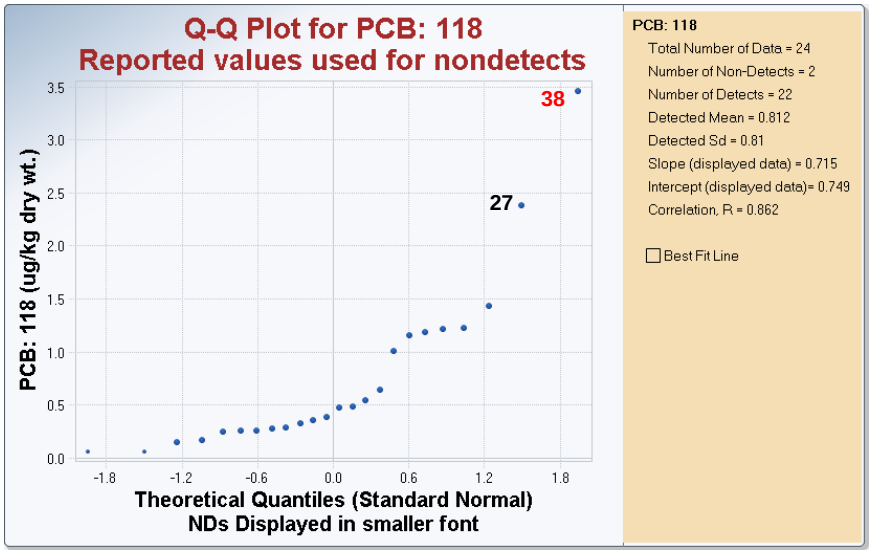

Q-Q Plot for PCB: 97
Reported values used for nondetects
PCB: 97 (ug/kg dry wt.)
Theoretical Quantiles (Standard Normal)
NDs Displayed in smaller font
PCB: 97
Total Number of Data = 24
Number of Non-Detects = 16
Number of Detects = 8
Detected Mean = 1.861
Detected Sd = 0.988
Slope (displayed data) = 0.861
Intercept (displayed data)= 0.658
Correlation, R = 0.813
Best Fit Line

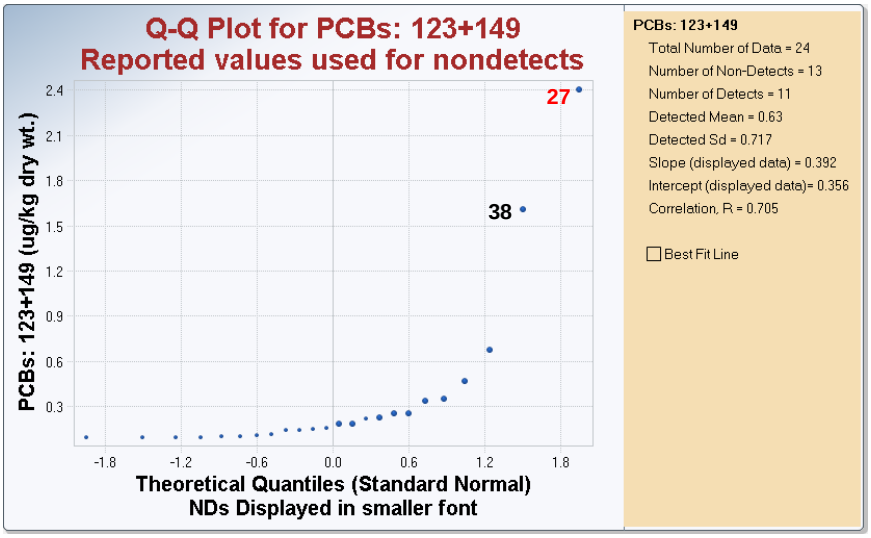

Q-Q Plot for PCB: 99
Reported values used for nondetects
PCB: 99 (ug/kg dry wt.)
Theoretical Quantiles (Standard Normal)
NDs Displayed in smaller font
PCB: 99
Total Number of Data = 24
Number of Non-Detects = 17
Number of Detects = 7
Detected Mean = 0.667
Detected Sd = 0.54
Slope (displayed data) = 0.302
Intercept (displayed data)= 0.237
Correlation, R = 0.739
Best Fit Line

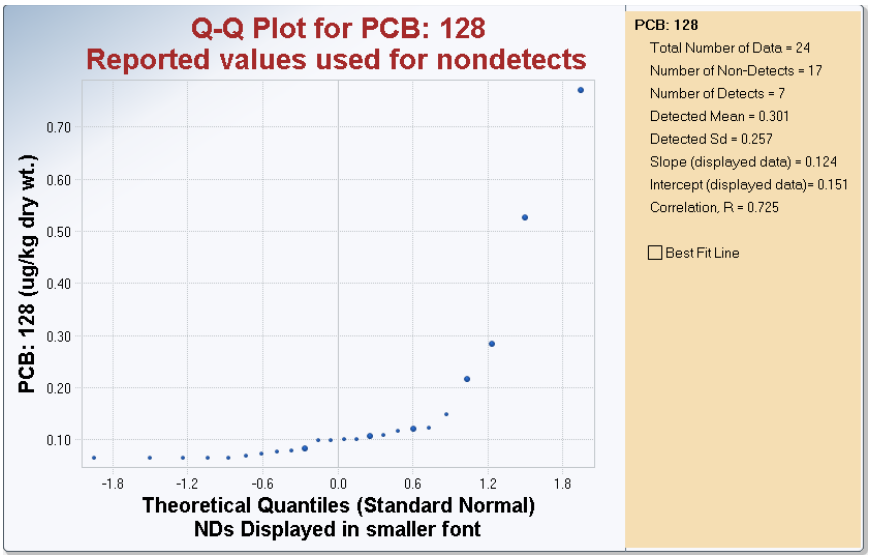

Q-Q Plot for PCBs: 90+101
Reported values used for nondetects
PCBs: 90+101 (ug/kg dry wt.)
Theoretical Quantiles (Standard Normal)
NDs Displayed in smaller font
PCBs: 90+101
Total Number of Data = 24
Number of Non-Detects = 13
Number of Detects = 11
Detected Mean = 1.165
Detected Sd = 1.24
Slope (displayed data) = 0.779
Intercept (displayed data)= 0.565
Correlation, R = 0.759
Best Fit Line

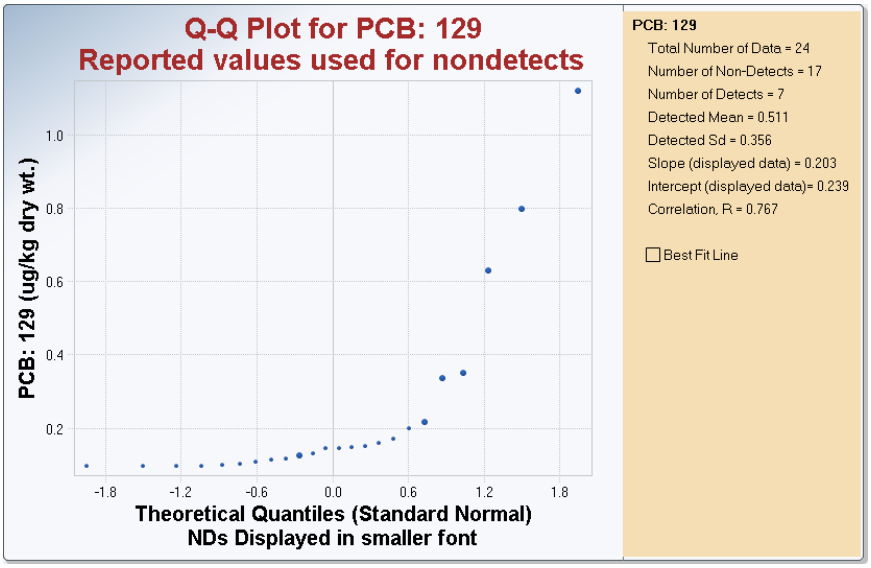

Q-Q Plot for PCB: 105
Reported values used for nondetects
27
PCB: 105 (ug/kg dry wt.)
0.80
0.70
0.60
0.50
0.40
0.30
0.20
0.10
-1.8
-1.2
-0.6
0.0
0.6
1.2
1.8
Theoretical Quantiles (Standard Normal)
NDs Displayed in smaller font
PCB: 105
Total Number of Data = 24
Number of Non-Detects = 12
Number of Detects = 12
Detected Mean = 0.236
Detected Sd = 0.25
Slope (displayed data) = 0.15
Intercept (displayed data)= 0.148
Correlation, R = 0.743
Best Fit Line

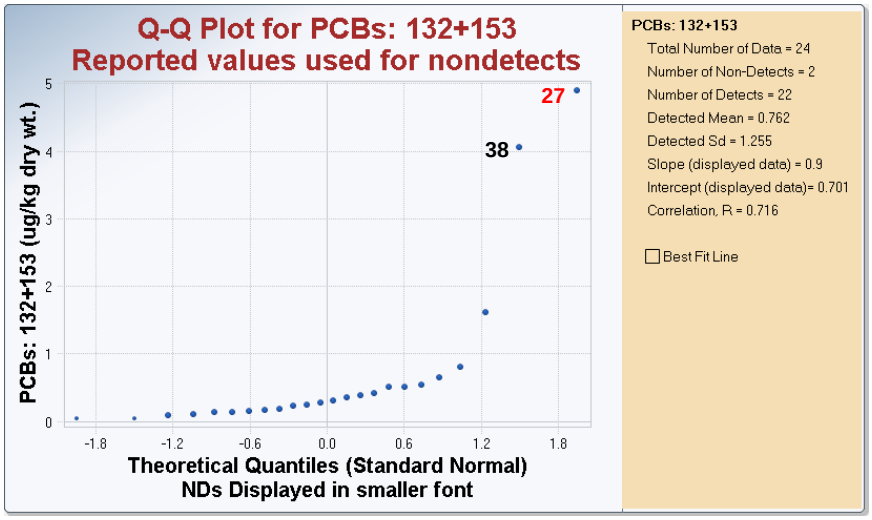

Q-Q Plot for PCB: 107
Reported values used for nondetects
PCB: 107 (ug/kg dry wt.)
0.400
0.350
0.300
0.250
0.200
0.150
0.100
0.050
-1.8
-1.2
-0.6
0.0
0.6
1.2
1.8
Theoretical Quantiles (Standard Normal)
NDs Displayed in smaller font
PCB: 107
Total Number of Data = 24
Number of Non-Detects = 22
Number of Detects = 2
Detected Mean = 0.239
Detected Sd = 0.26
Slope (displayed data) = 0.0467
Intercept (displayed data)= 0.0739
Correlation, R = 0.594
Best Fit Line

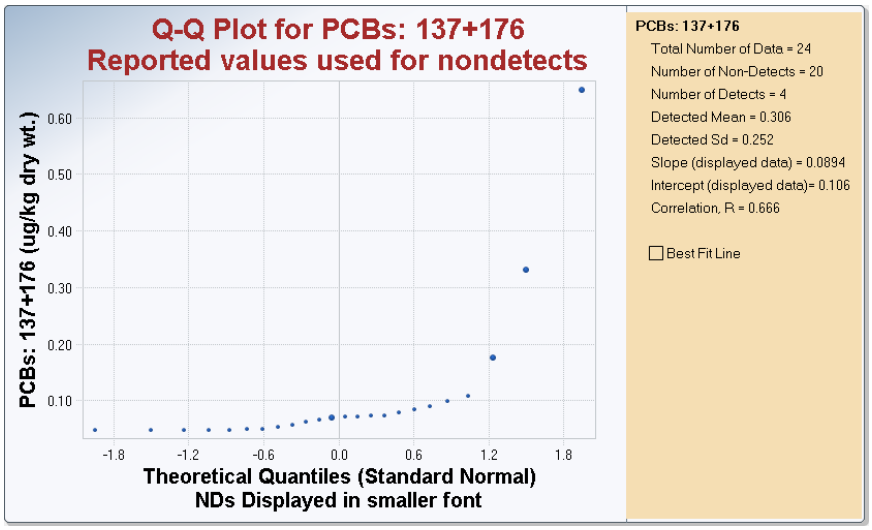

Q-Q Plot for PCB: 118
Reported values used for nondetects
38
27
PCB: 118 (ug/kg dry wt.)
3.5
3.0
2.5
2.0
1.5
1.0
0.5
0.0
-1.8
-1.2
-0.6
0.0
0.6
1.2
1.8
Theoretical Quantiles (Standard Normal)
NDs Displayed in smaller font
PCB: 118
Total Number of Data = 24
Number of Non-Detects = 2
Number of Detects = 22
Detected Mean = 0.812
Detected Sd = 0.81
Slope (displayed data) = 0.715
Intercept (displayed data)= 0.749
Correlation, R = 0.862
Best Fit Line

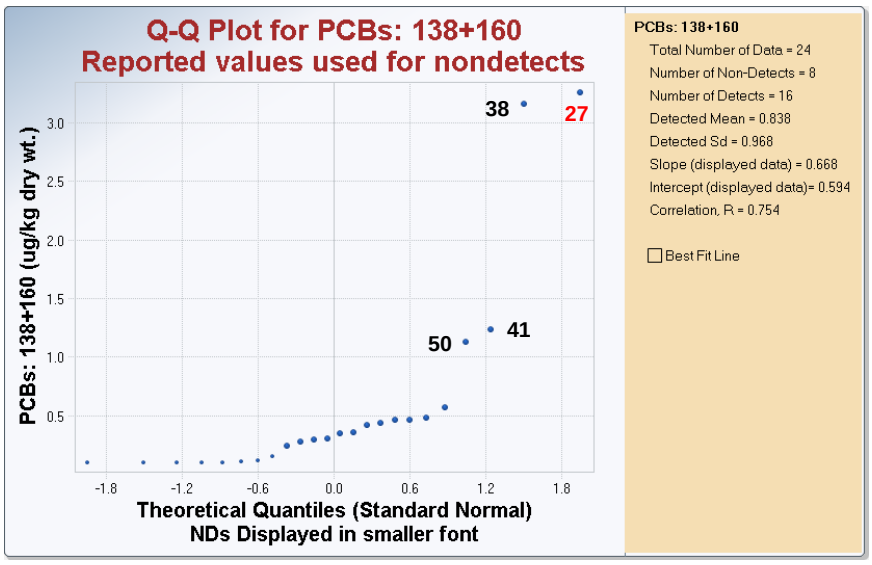

Q-Q Plot for PCBs: 123+149
Reported values used for nondetects
PCBs: 123+149 (ug/kg dry wt.)
27
38
Theoretical Quantiles (Standard Normal)
NDs Displayed in smaller font
PCBs: 123+149
Total Number of Data = 24
Number of Non-Detects = 13
Number of Detects = 11
Detected Mean = 0.63
Detected Sd = 0.717
Slope (displayed data) = 0.392
Intercept (displayed data)= 0.356
Correlation, R = 0.705
Best Fit Line

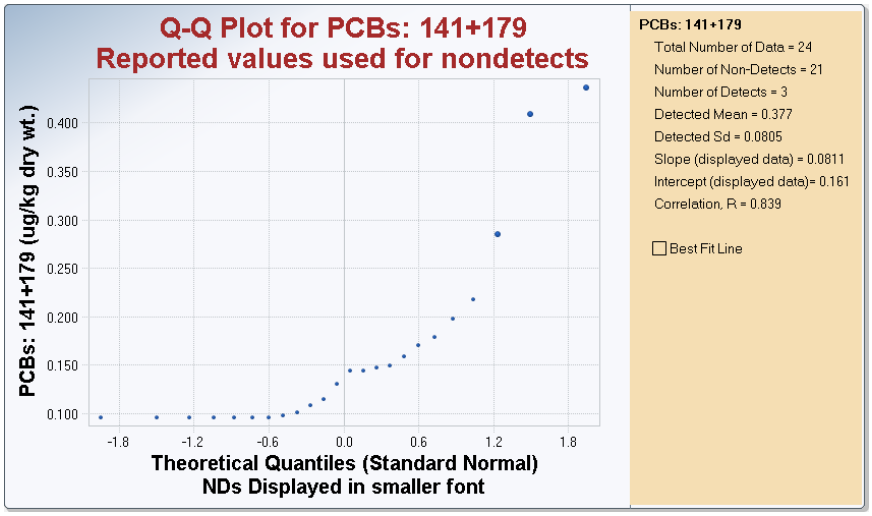

Q-Q Plot for PCB: 128
Reported values used for nondetects
PCB: 128 (ug/kg dry wt.)
Theoretical Quantiles (Standard Normal)
NDs Displayed in smaller font
PCB: 128
Total Number of Data = 24
Number of Non-Detects = 17
Number of Detects = 7
Detected Mean = 0.301
Detected Sd = 0.257
Slope (displayed data) = 0.124
Intercept (displayed data)= 0.151
Correlation, R = 0.725
Best Fit Line

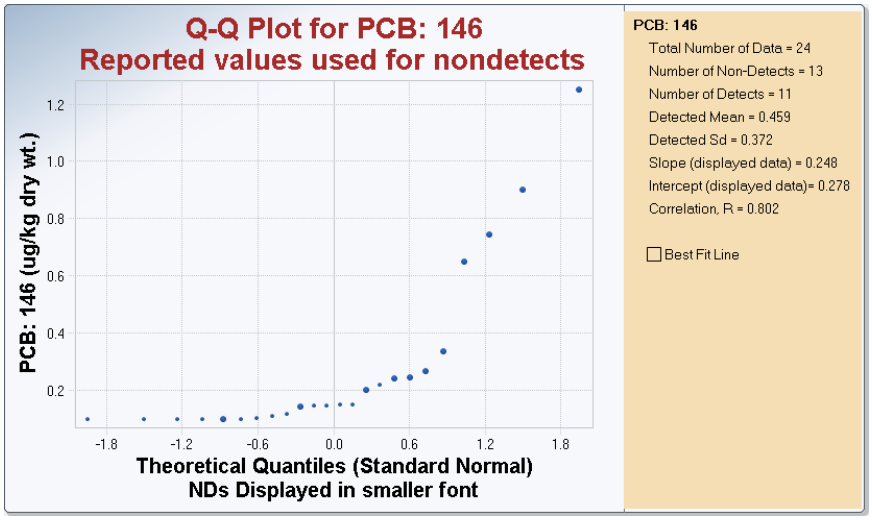

Q-Q Plot for PCB: 129
Reported values used for nondetects
PCB: 129 (ug/kg dry wt.)
Theoretical Quantiles (Standard Normal)
NDs Displayed in smaller font
PCB: 129
Total Number of Data = 24
Number of Non-Detects = 17
Number of Detects = 7
Detected Mean = 0.511
Detected Sd = 0.356
Slope (displayed data) = 0.203
Intercept (displayed data)= 0.239
Correlation, R = 0.767
Best Fit Line

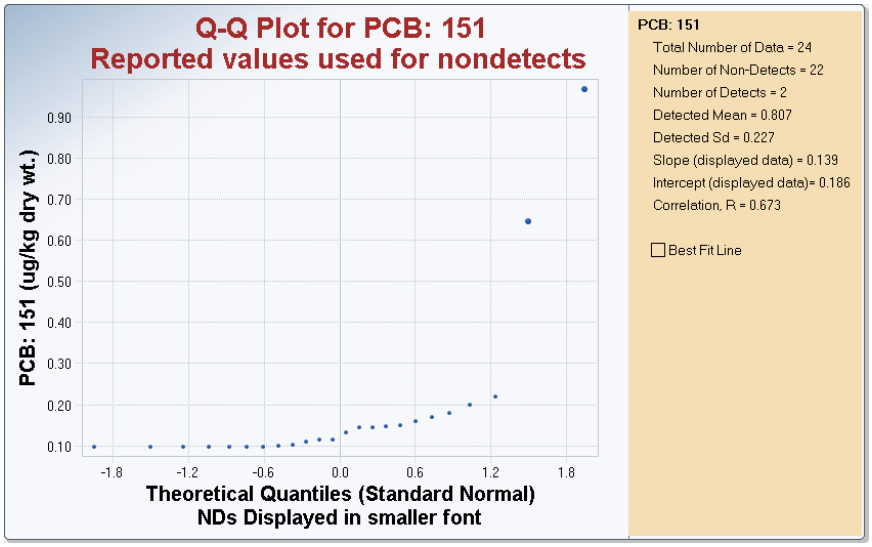

Q-Q Plot for PCBs: 132+153
Reported values used for nondetects
PCBs: 132+153 (ug/kg dry wt.)
27
38
Theoretical Quantiles (Standard Normal)
NDs Displayed in smaller font
PCBs: 132+153
Total Number of Data = 24
Number of Non-Detects = 2
Number of Detects = 22
Detected Mean = 0.762
Detected Sd = 1.255
Slope (displayed data) = 0.9
Intercept (displayed data)= 0.701
Correlation, R = 0.716
Best Fit Line

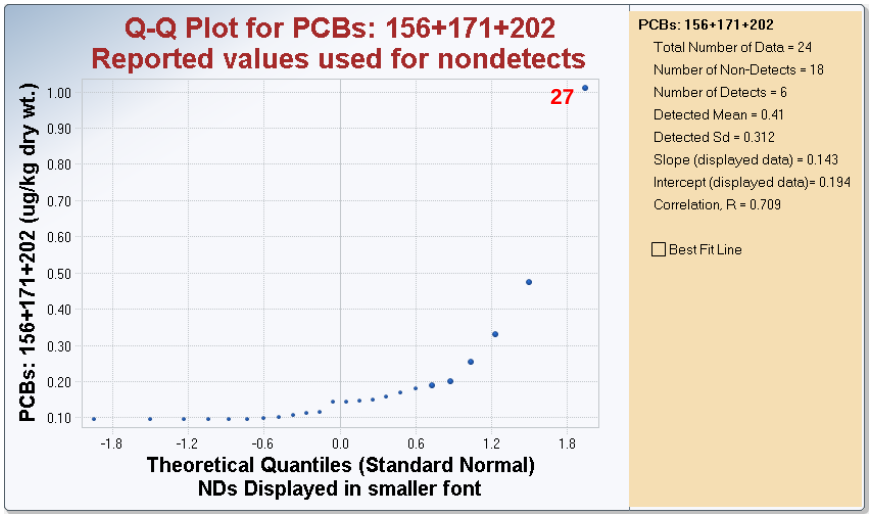

Q-Q Plot for PCBs: 137+176
Reported values used for nondetects
PCBs: 137+176 (ug/kg dry wt.)
Theoretical Quantiles (Standard Normal)
NDs Displayed in smaller font
PCBs: 137+176
Total Number of Data = 24
Number of Non-Detects = 20
Number of Detects = 4
Detected Mean = 0.306
Detected Sd = 0.252
Slope (displayed data) = 0.0894
Intercept (displayed data)= 0.106
Correlation, R = 0.666
Best Fit Line

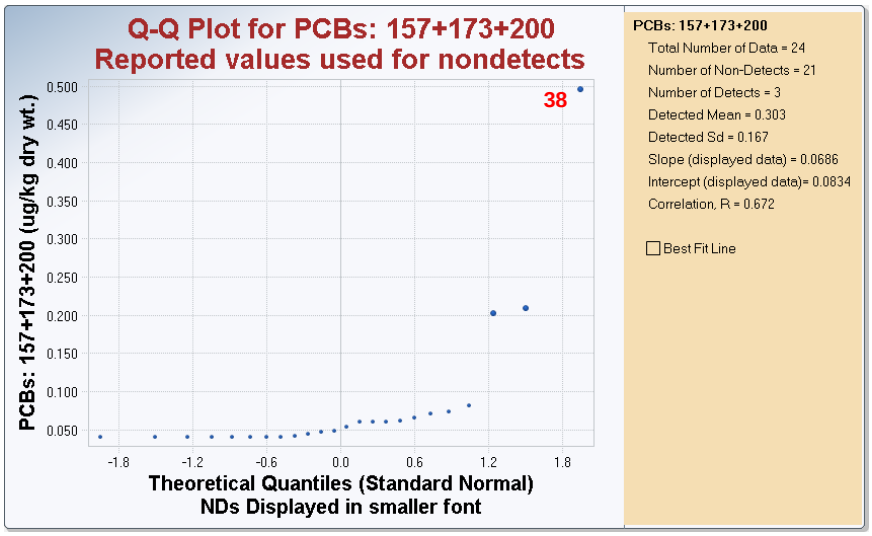

Q-Q Plot for PCBs: 138+160
Reported values used for nondetects
PCBs: 138+160 (ug/kg dry wt.)
38
27
50
41
Theoretical Quantiles (Standard Normal)
NDs Displayed in smaller font
PCBs: 138+160
Total Number of Data = 24
Number of Non-Detects = 8
Number of Detects = 16
Detected Mean = 0.838
Detected Sd = 0.968
Slope (displayed data) = 0.668
Intercept (displayed data)= 0.594
Correlation, R = 0.754
Best Fit Line

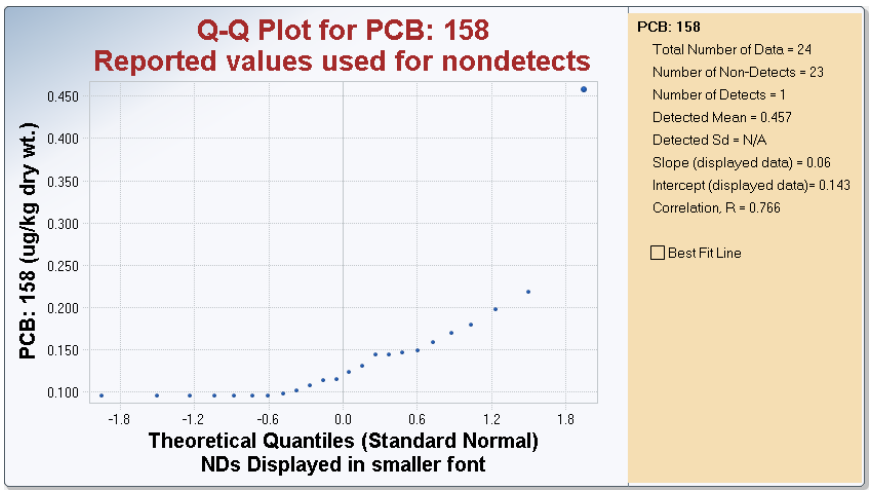

Q-Q Plot for PCBs: 141+179
Reported values used for nondetects
PCBs: 141+179 (ug/kg dry wt.)
0.400
0.350
0.300
0.250
0.200
0.150
0.100
-1.8
-1.2
-0.6
0.0
0.6
1.2
1.8
Theoretical Quantiles (Standard Normal)
NDs Displayed in smaller font
PCBs: 141+179
Total Number of Data = 24
Number of Non-Detects = 21
Number of Detects = 3
Detected Mean = 0.377
Detected Sd = 0.0805
Slope (displayed data) = 0.0811
Intercept (displayed data)= 0.161
Correlation, R = 0.839
Best Fit Line

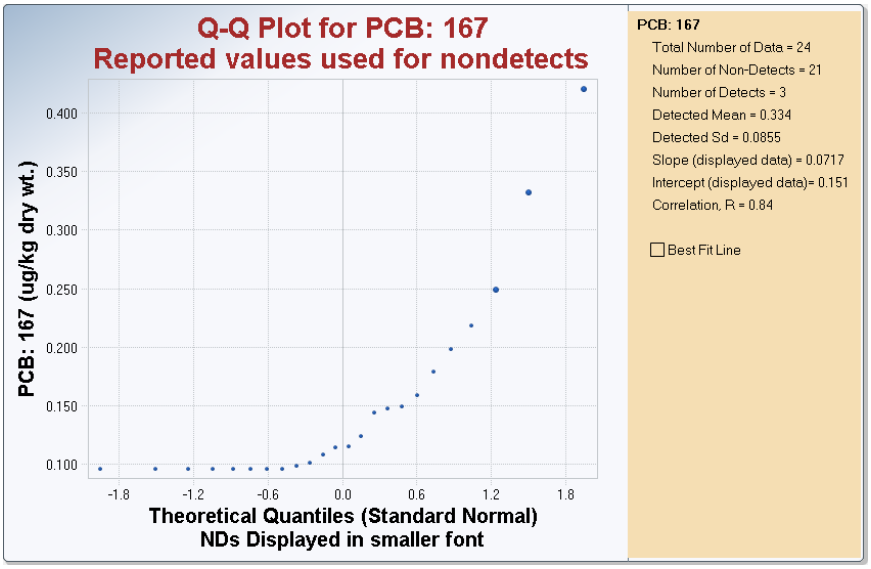

Q-Q Plot for PCB: 146
Reported values used for nondetects
PCB: 146 (ug/kg dry wt.)
1.2
1.0
0.8
0.6
0.4
0.2
-1.8
-1.2
-0.6
0.0
0.6
1.2
1.8
Theoretical Quantiles (Standard Normal)
NDs Displayed in smaller font
PCB: 146
Total Number of Data = 24
Number of Non-Detects = 13
Number of Detects = 11
Detected Mean = 0.459
Detected Sd = 0.372
Slope (displayed data) = 0.248
Intercept (displayed data)= 0.278
Correlation, R = 0.802
Best Fit Line

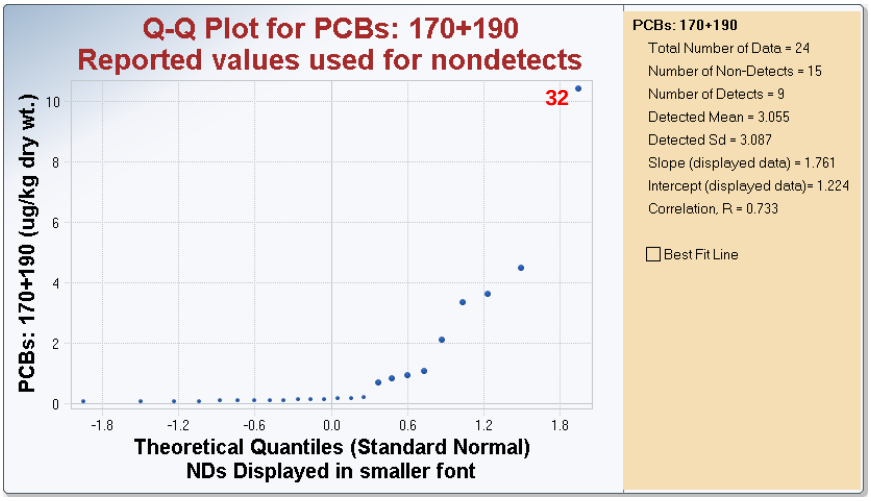

Q-Q Plot for PCB: 151
Reported values used for nondetects
PCB: 151 (ug/kg dry wt.)
0.90
0.80
0.70
0.60
0.50
0.40
0.30
0.20
0.10
-1.8
-1.2
-0.6
0.0
0.6
1.2
1.8
Theoretical Quantiles (Standard Normal)
NDs Displayed in smaller font
PCB: 151
Total Number of Data = 24
Number of Non-Detects = 22
Number of Detects = 2
Detected Mean = 0.807
Detected Sd = 0.227
Slope (displayed data) = 0.139
Intercept (displayed data)= 0.186
Correlation, R = 0.673
Best Fit Line

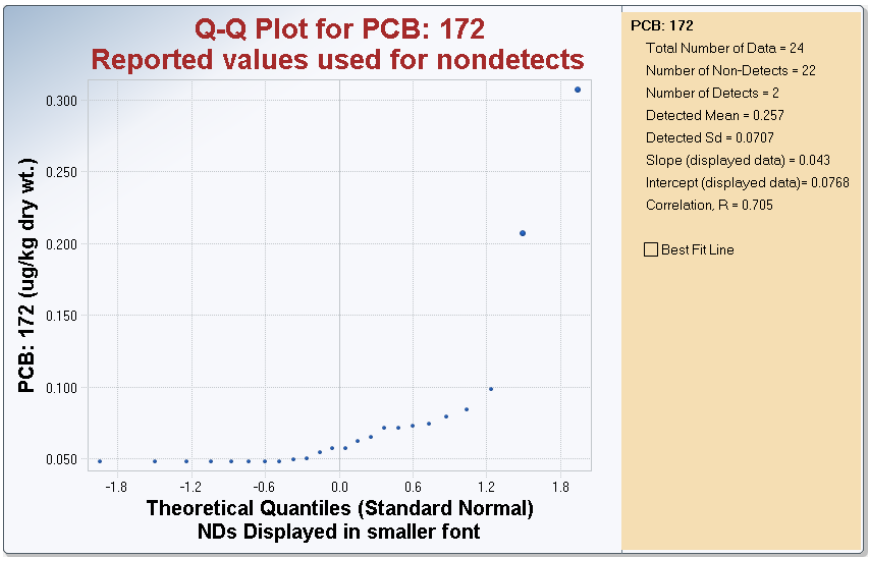

Q-Q Plot for PCBs: 156+171+202
Reported values used for nondetects
27
PCBs: 156+171+202 (ug/kg dry wt.)
1.00
0.90
0.80
0.70
0.60
0.50
0.40
0.30
0.20
0.10
-1.8
-1.2
-0.6
0.0
0.6
1.2
1.8
Theoretical Quantiles (Standard Normal)
NDs Displayed in smaller font
PCBs: 156+171+202
Total Number of Data = 24
Number of Non-Detects = 18
Number of Detects = 6
Detected Mean = 0.41
Detected Sd = 0.312
Slope (displayed data) = 0.143
Intercept (displayed data)= 0.194
Correlation, R = 0.709
Best Fit Line

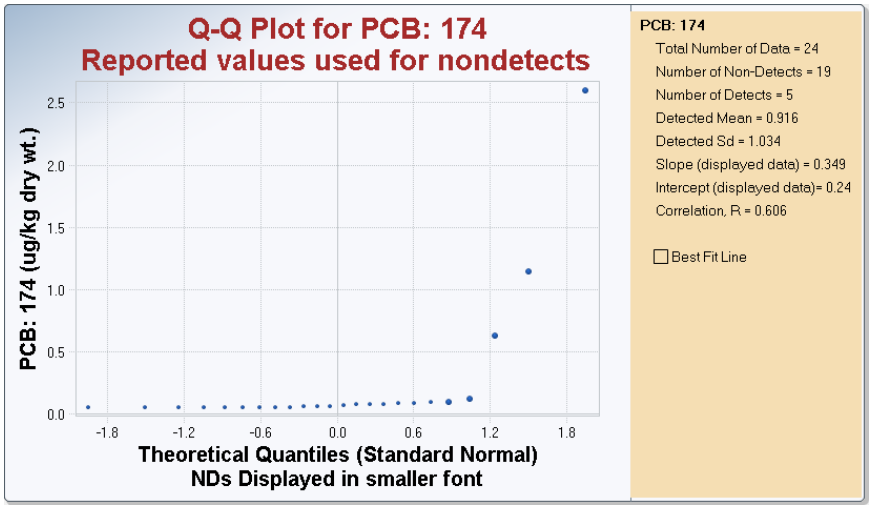

Q-Q Plot for PCBs: 157+173+200
Reported values used for nondetects
38
PCBs: 157+173+200 (ug/kg dry wt.)
0.500
0.450
0.400
0.350
0.300
0.250
0.200
0.150
0.100
0.050
-1.8
-1.2
-0.6
0.0
0.6
1.2
1.8
Theoretical Quantiles (Standard Normal)
NDs Displayed in smaller font
PCBs: 157+173+200
Total Number of Data = 24
Number of Non-Detects = 21
Number of Detects = 3
Detected Mean = 0.303
Detected Sd = 0.167
Slope (displayed data) = 0.0686
Intercept (displayed data)= 0.0834
Correlation, R = 0.672
Best Fit Line

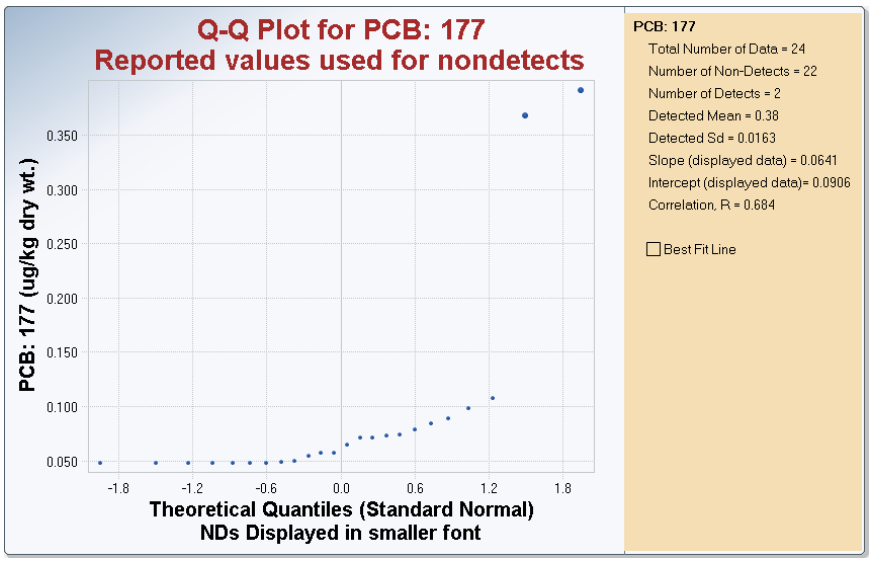

Q-Q Plot for PCB: 158
Reported values used for nondetects
PCB: 158 (ug/kg dry wt.)
0.450
0.400
0.350
0.300
0.250
0.200
0.150
0.100
-1.8
-1.2
-0.6
0.0
0.6
1.2
1.8
Theoretical Quantiles (Standard Normal)
NDs Displayed in smaller font
PCB: 158
Total Number of Data = 24
Number of Non-Detects = 23
Number of Detects = 1
Detected Mean = 0.457
Detected Sd = N/A
Slope (displayed data) = 0.06
Intercept (displayed data)= 0.143
Correlation, R = 0.766
Best Fit Line

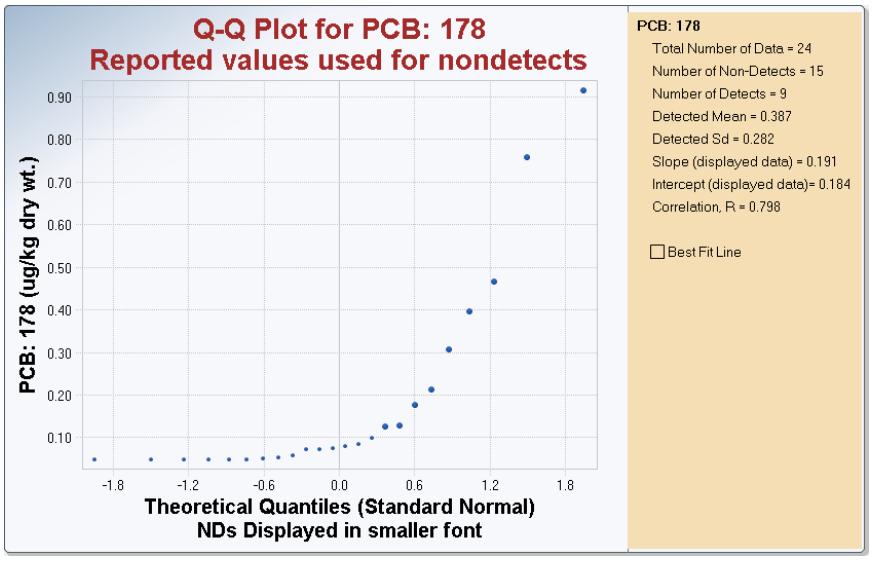

Q-Q Plot for PCB: 167
Reported values used for nondetects
PCB: 167 (ug/kg dry wt.)
0.400
0.350
0.300
0.250
0.200
0.150
0.100
-1.8
-1.2
-0.6
0.0
0.6
1.2
1.8
Theoretical Quantiles (Standard Normal)
NDs Displayed in smaller font
PCB: 167
Total Number of Data = 24
Number of Non-Detects = 21
Number of Detects = 3
Detected Mean = 0.334
Detected Sd = 0.0855
Slope (displayed data) = 0.0717
Intercept (displayed data)= 0.151
Correlation, R = 0.84
Best Fit Line

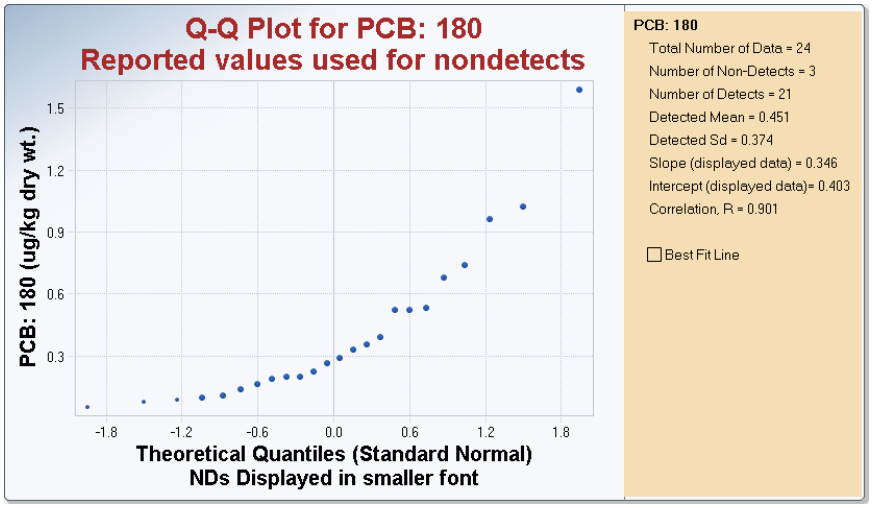

Q-Q Plot for PCBs: 170+190
Reported values used for nondetects
32
PCBs: 170+190 (ug/kg dry wt.)
10
8
6
4
2
0
-1.8
-1.2
-0.6
0.0
0.6
1.2
1.8
Theoretical Quantiles (Standard Normal)
NDs Displayed in smaller font
PCBs: 170+190
Total Number of Data = 24
Number of Non-Detects = 15
Number of Detects = 9
Detected Mean = 3.055
Detected Sd = 3.087
Slope (displayed data) = 1.761
Intercept (displayed data)= 1.224
Correlation, R = 0.733
Best Fit Line

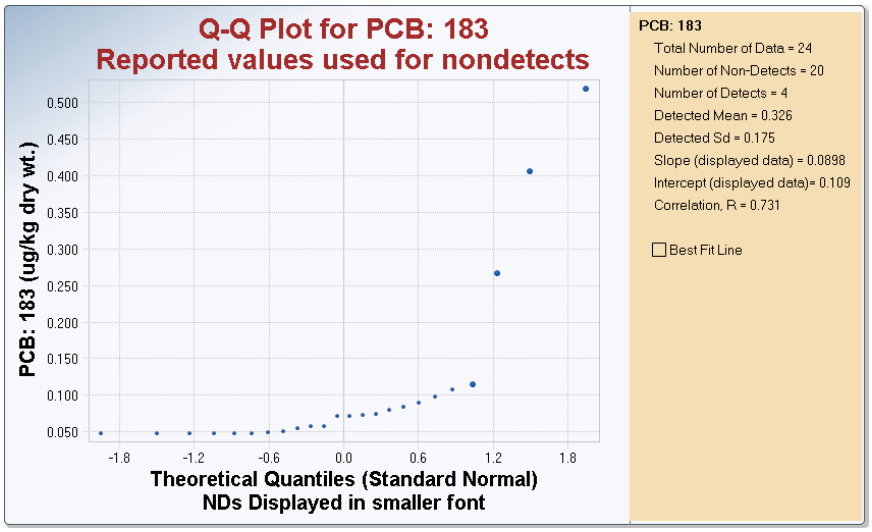

Q-Q Plot for PCB: 172
Reported values used for nondetects
PCB: 172 (ug/kg dry wt.)
0.300
0.250
0.200
0.150
0.100
0.050
-1.8
-1.2
-0.6
0.0
0.6
1.2
1.8
Theoretical Quantiles (Standard Normal)
NDs Displayed in smaller font
PCB: 172
Total Number of Data = 24
Number of Non-Detects = 22
Number of Detects = 2
Detected Mean = 0.257
Detected Sd = 0.0707
Slope (displayed data) = 0.043
Intercept (displayed data)= 0.0768
Correlation, R = 0.705
Best Fit Line

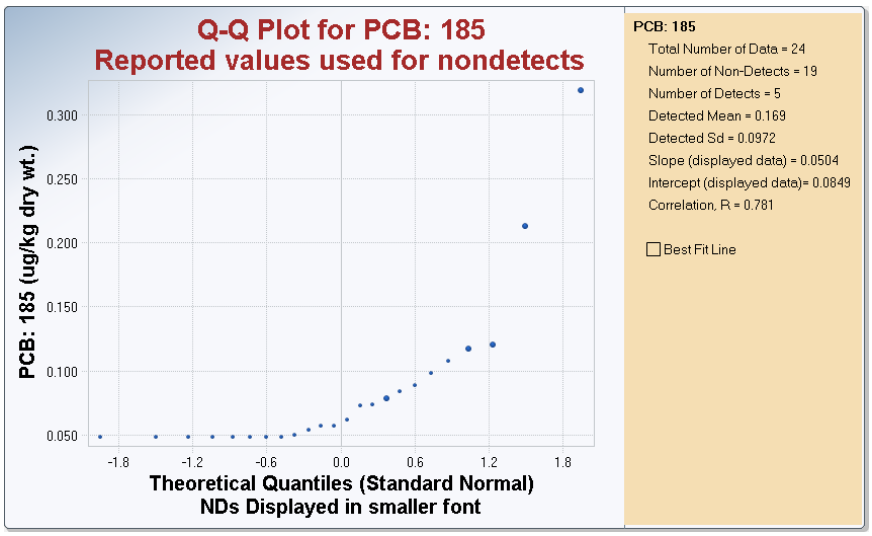

Q-Q Plot for PCB: 174
Reported values used for nondetects
PCB: 174 (ug/kg dry wt.)
2.5
2.0
1.5
1.0
0.5
0.0
-1.8
-1.2
-0.6
0.0
0.6
1.2
1.8
Theoretical Quantiles (Standard Normal)
NDs Displayed in smaller font
PCB: 174
Total Number of Data = 24
Number of Non-Detects = 19
Number of Detects = 5
Detected Mean = 0.916
Detected Sd = 1.034
Slope (displayed data) = 0.349
Intercept (displayed data)= 0.24
Correlation, R = 0.606
Best Fit Line

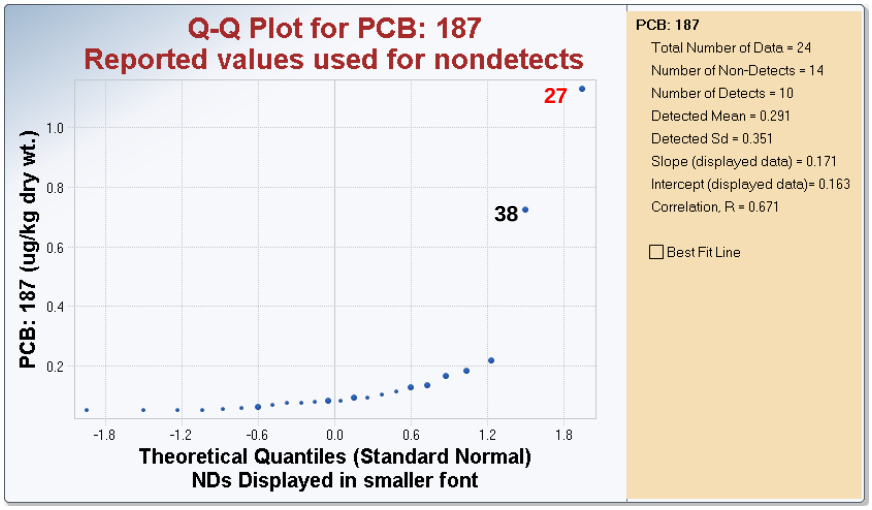

Q-Q Plot for PCB: 177
Reported values used for nondetects
PCB: 177 (ug/kg dry wt.)
0.350
0.300
0.250
0.200
0.150
0.100
0.050
-1.8
-1.2
-0.6
0.0
0.6
1.2
1.8
Theoretical Quantiles (Standard Normal)
NDs Displayed in smaller font
PCB: 177
Total Number of Data = 24
Number of Non-Detects = 22
Number of Detects = 2
Detected Mean = 0.38
Detected Sd = 0.0163
Slope (displayed data) = 0.0641
Intercept (displayed data)= 0.0906
Correlation, R = 0.684
Best Fit Line

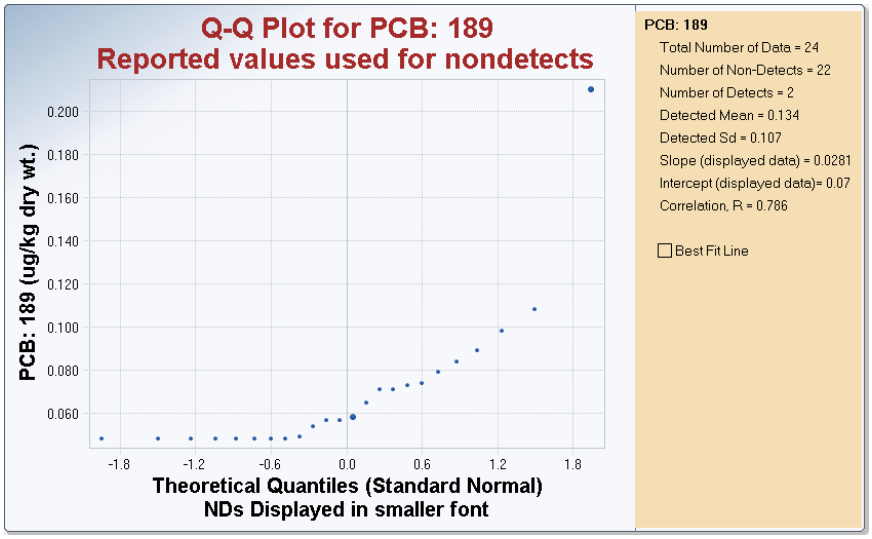

Q-Q Plot for PCB: 178
Reported values used for nondetects
PCB: 178 (ug/kg dry wt.)
0.90
0.80
0.70
0.60
0.50
0.40
0.30
0.20
0.10
-1.8
-1.2
-0.6
0.0
0.6
1.2
1.8
Theoretical Quantiles (Standard Normal)
NDs Displayed in smaller font
PCB: 178
Total Number of Data = 24
Number of Non-Detects = 15
Number of Detects = 9
Detected Mean = 0.387
Detected Sd = 0.282
Slope (displayed data) = 0.191
Intercept (displayed data)= 0.184
Correlation, R = 0.798
Best Fit Line

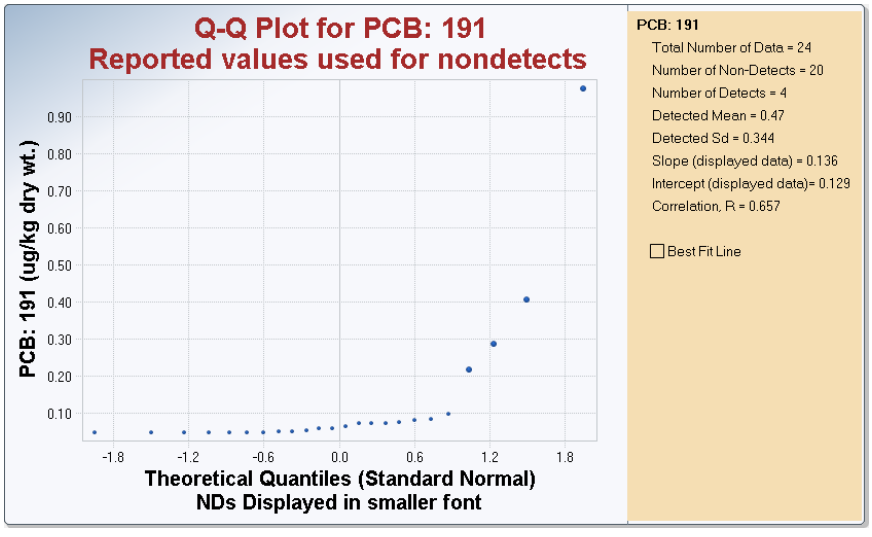

Q-Q Plot for PCB: 180
Reported values used for nondetects
PCB: 180 (ug/kg dry wt.)
1.5
1.2
0.9
0.6
0.3
-1.8
-1.2
-0.6
0.0
0.6
1.2
1.8
Theoretical Quantiles (Standard Normal)
NDs Displayed in smaller font
PCB: 180
Total Number of Data = 24
Number of Non-Detects = 3
Number of Detects = 21
Detected Mean = 0.451
Detected Sd = 0.374
Slope (displayed data) = 0.346
Intercept (displayed data)= 0.403
Correlation, R = 0.901
Best Fit Line

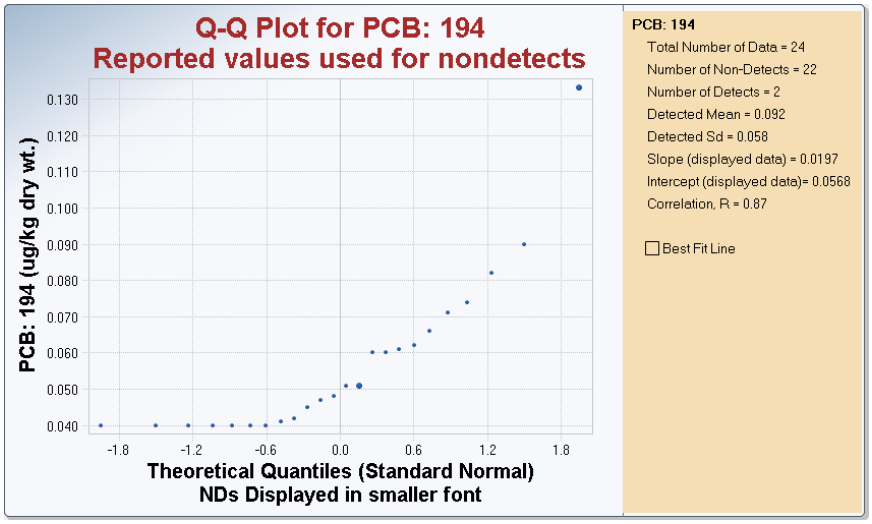

Q-Q Plot for PCB: 183
Reported values used for nondetects
PCB: 183 (ug/kg dry wt.)
0.500
0.450
0.400
0.350
0.300
0.250
0.200
0.150
0.100
0.050
-1.8
-1.2
-0.6
0.0
0.6
1.2
1.8
Theoretical Quantiles (Standard Normal)
NDs Displayed in smaller font
PCB: 183
Total Number of Data = 24
Number of Non-Detects = 20
Number of Detects = 4
Detected Mean = 0.326
Detected Sd = 0.175
Slope (displayed data) = 0.0898
Intercept (displayed data)= 0.109
Correlation, R = 0.731
Best Fit Line

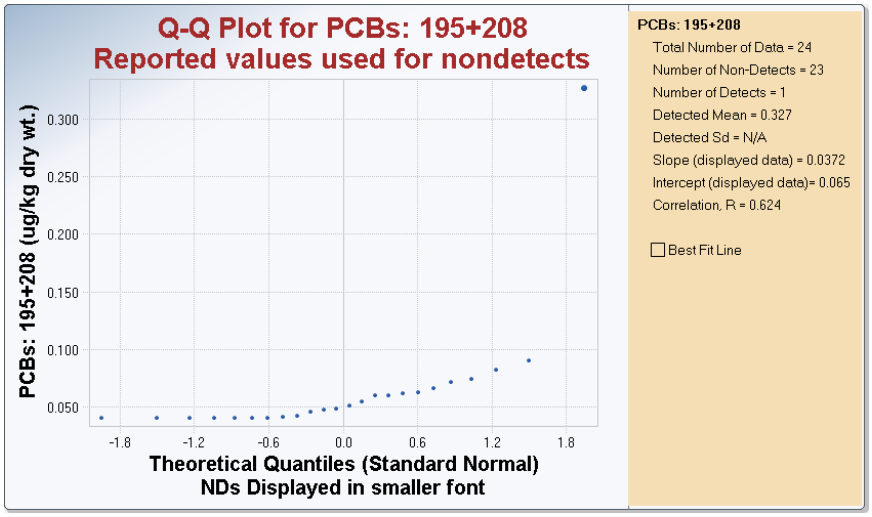

Q-Q Plot for PCB: 185
Reported values used for nondetects
PCB: 185 (ug/kg dry wt.)
0.300
0.250
0.200
0.150
0.100
0.050
-1.8
-1.2
-0.6
0.0
0.6
1.2
1.8
Theoretical Quantiles (Standard Normal)
NDs Displayed in smaller font
PCB: 185
Total Number of Data = 24
Number of Non-Detects = 19
Number of Detects = 5
Detected Mean = 0.169
Detected Sd = 0.0972
Slope (displayed data) = 0.0504
Intercept (displayed data)= 0.0849
Correlation, R = 0.781
Best Fit Line

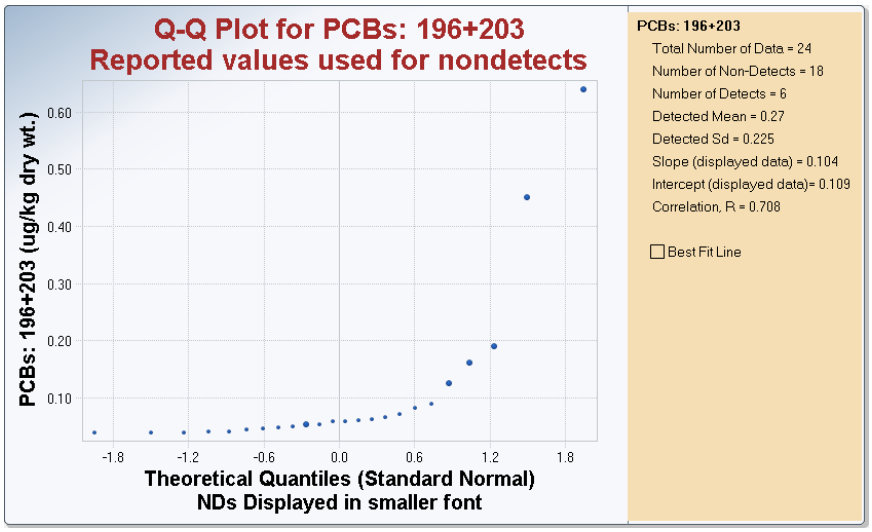

Q-Q Plot for PCB: 187
Reported values used for nondetects
27
38
PCB: 187 (ug/kg dry wt.)
1.0
0.8
0.6
0.4
0.2
-1.8
-1.2
-0.6
0.0
0.6
1.2
1.8
Theoretical Quantiles (Standard Normal)
NDs Displayed in smaller font
PCB: 187
Total Number of Data = 24
Number of Non-Detects = 14
Number of Detects = 10
Detected Mean = 0.291
Detected Sd = 0.351
Slope (displayed data) = 0.171
Intercept (displayed data)= 0.163
Correlation, R = 0.671
Best Fit Line

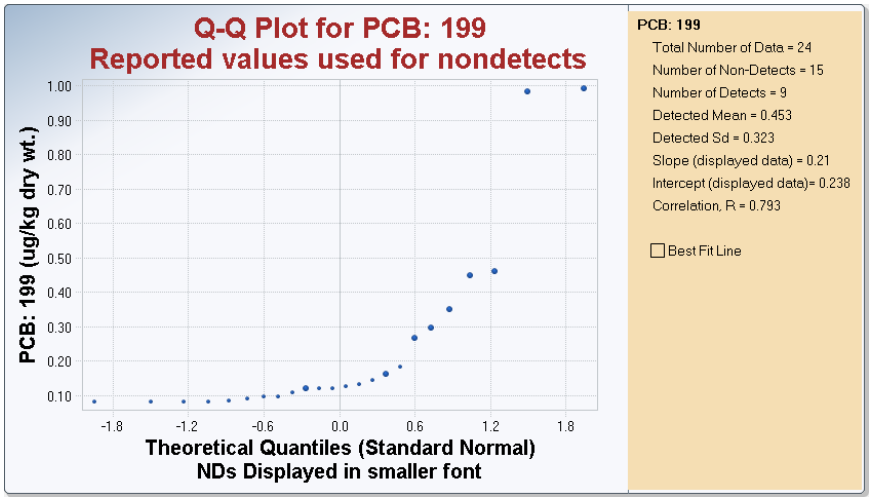

Q-Q Plot for PCB: 189
Reported values used for nondetects
PCB: 189 (ug/kg dry wt.)
0.200
0.180
0.160
0.140
0.120
0.100
0.080
0.060
-1.8
-1.2
-0.6
0.0
0.6
1.2
1.8
Theoretical Quantiles (Standard Normal)
NDs Displayed in smaller font
PCB: 189
Total Number of Data = 24
Number of Non-Detects = 22
Number of Detects = 2
Detected Mean = 0.134
Detected Sd = 0.107
Slope (displayed data) = 0.0281
Intercept (displayed data)= 0.07
Correlation, R = 0.786
Best Fit Line

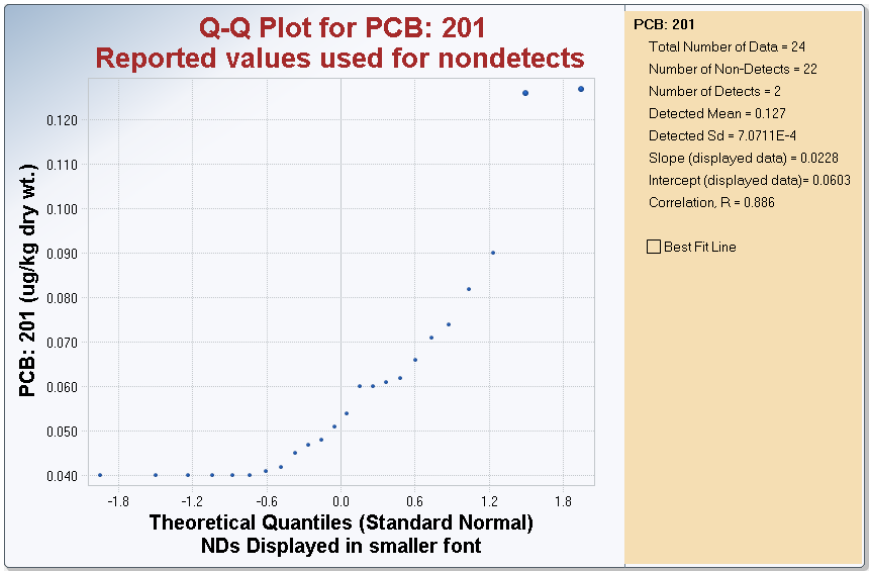

Q-Q Plot for PCB: 191
Reported values used for nondetects
PCB: 191 (ug/kg dry wt.)
0.90
0.80
0.70
0.60
0.50
0.40
0.30
0.20
0.10
-1.8
-1.2
-0.6
0.0
0.6
1.2
1.8
Theoretical Quantiles (Standard Normal)
NDs Displayed in smaller font
PCB: 191
Total Number of Data = 24
Number of Non-Detects = 20
Number of Detects = 4
Detected Mean = 0.47
Detected Sd = 0.344
Slope (displayed data) = 0.136
Intercept (displayed data)= 0.129
Correlation, R = 0.657
Best Fit Line

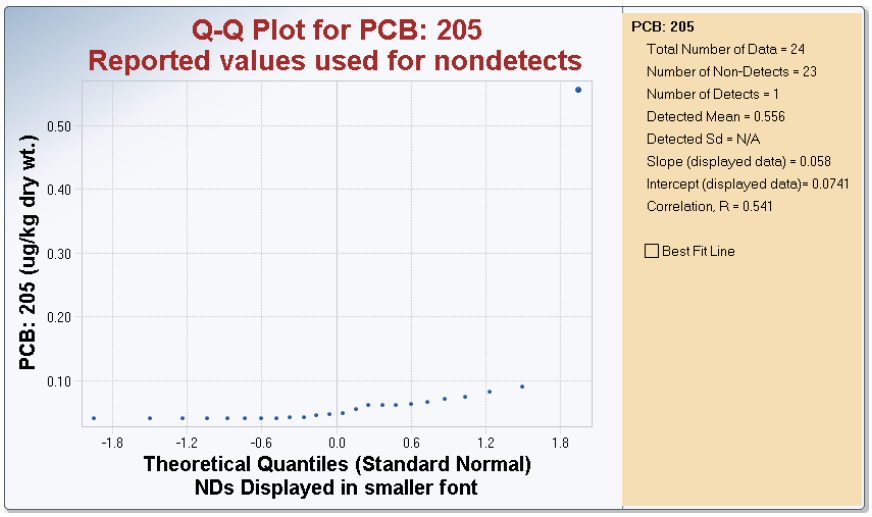

Q-Q Plot for PCB: 194
Reported values used for nondetects
PCB: 194 (ug/kg dry wt.)
0.130
0.120
0.110
0.100
0.090
0.080
0.070
0.060
0.050
0.040
-1.8
-1.2
-0.6
0.0
0.6
1.2
1.8
Theoretical Quantiles (Standard Normal)
NDs Displayed in smaller font
PCB: 194
Total Number of Data = 24
Number of Non-Detects = 22
Number of Detects = 2
Detected Mean = 0.092
Detected Sd = 0.058
Slope (displayed data) = 0.0197
Intercept (displayed data)= 0.0568
Correlation, R = 0.87
Best Fit Line

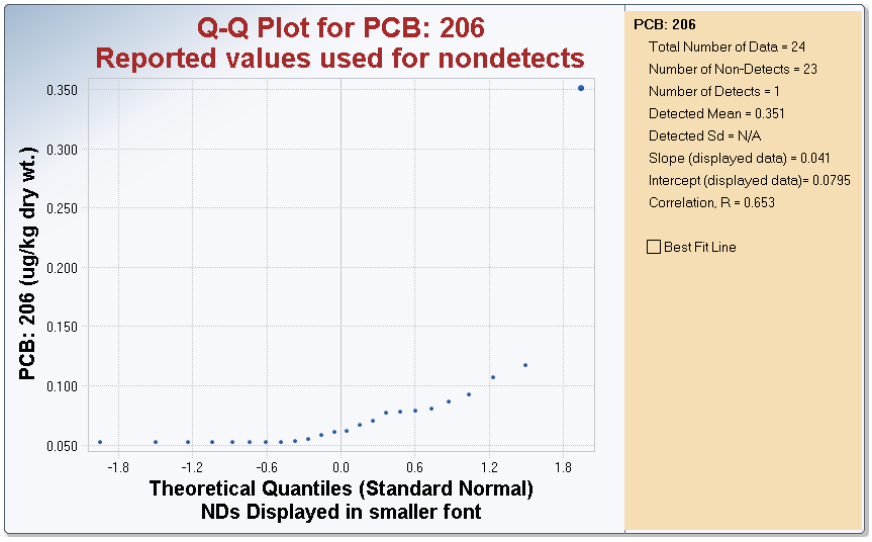

Q-Q Plot for PCBs: 195+208
Reported values used for nondetects
PCBs: 195+208 (ug/kg dry wt.)
0.300
0.250
0.200
0.150
0.100
0.050
-1.8
-1.2
-0.6
0.0
0.6
1.2
1.8
Theoretical Quantiles (Standard Normal)
NDs Displayed in smaller font
PCBs: 195+208
Total Number of Data = 24
Number of Non-Detects = 23
Number of Detects = 1
Detected Mean = 0.327
Detected Sd = N/A
Slope (displayed data) = 0.0372
Intercept (displayed data)= 0.065
Correlation, R = 0.624
Best Fit Line

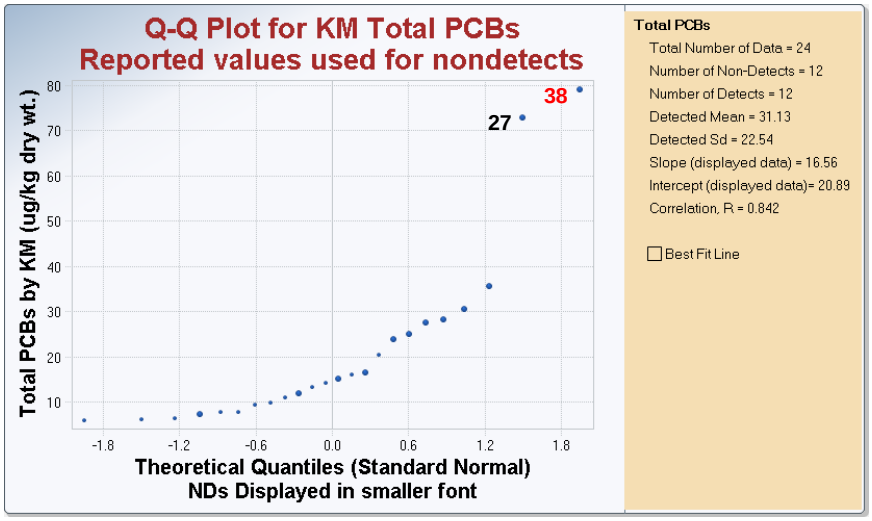

Q-Q Plot for PCBs: 196+203
Reported values used for nondetects
PCBs: 196+203 (ug/kg dry wt.)
0.60
0.50
0.40
0.30
0.20
0.10
-1.8
-1.2
-0.6
0.0
0.6
1.2
1.8
Theoretical Quantiles (Standard Normal)
NDs Displayed in smaller font
PCBs: 196+203
Total Number of Data = 24
Number of Non-Detects = 18
Number of Detects = 6
Detected Mean = 0.27
Detected Sd = 0.225
Slope (displayed data) = 0.104
Intercept (displayed data)= 0.109
Correlation, R = 0.708
Best Fit Line


Q-Q Plot for PCB: 199
Reported values used for nondetects
PCB: 199 (ug/kg dry wt.)
1.00
0.90
0.80
0.70
0.60
0.50
0.40
0.30
0.20
0.10
-1.8
-1.2
-0.6
0.0
0.6
1.2
1.8
Theoretical Quantiles (Standard Normal)
NDs Displayed in smaller font
PCB: 199
Total Number of Data = 24
Number of Non-Detects = 15
Number of Detects = 9
Detected Mean = 0.453
Detected Sd = 0.323
Slope (displayed data) = 0.21
Intercept (displayed data)= 0.238
Correlation, R = 0.793
Best Fit Line

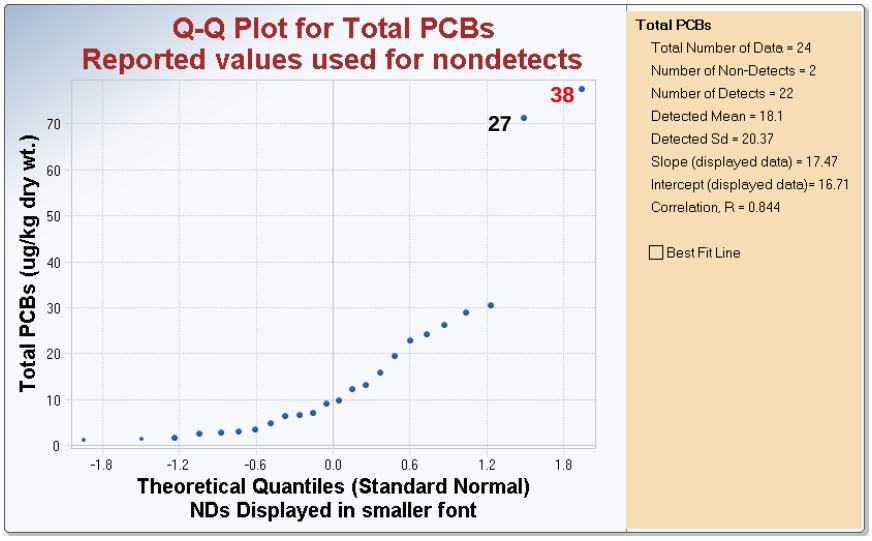

Q-Q Plot for PCB: 201
Reported values used for nondetects
PCB: 201 (ug/kg dry wt.)
0.120
0.110
0.100
0.090
0.080
0.070
0.060
0.050
0.040
-1.8
-1.2
-0.6
0.0
0.6
1.2
1.8
Theoretical Quantiles (Standard Normal)
NDs Displayed in smaller font
PCB: 201
Total Number of Data = 24
Number of Non-Detects = 22
Number of Detects = 2
Detected Mean = 0.127
Detected Sd = 7.0711E-4
Slope (displayed data) = 0.0228
Intercept (displayed data)= 0.0603
Correlation, R = 0.886
Best Fit Line


Q-Q Plot for PCB: 205
Reported values used for nondetects
PCB: 205 (ug/kg dry wt.)
0.50
0.40
0.30
0.20
0.10
-1.8
-1.2
-0.6
0.0
0.6
1.2
1.8
Theoretical Quantiles (Standard Normal)
NDs Displayed in smaller font
PCB: 205
Total Number of Data = 24
Number of Non-Detects = 23
Number of Detects = 1
Detected Mean = 0.556
Detected Sd = N/A
Slope (displayed data) = 0.058
Intercept (displayed data)= 0.0741
Correlation, R = 0.541
Best Fit Line



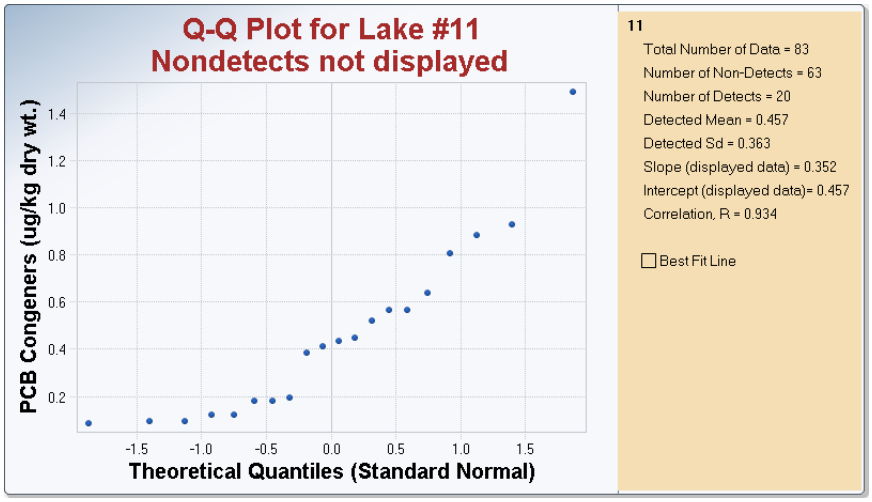


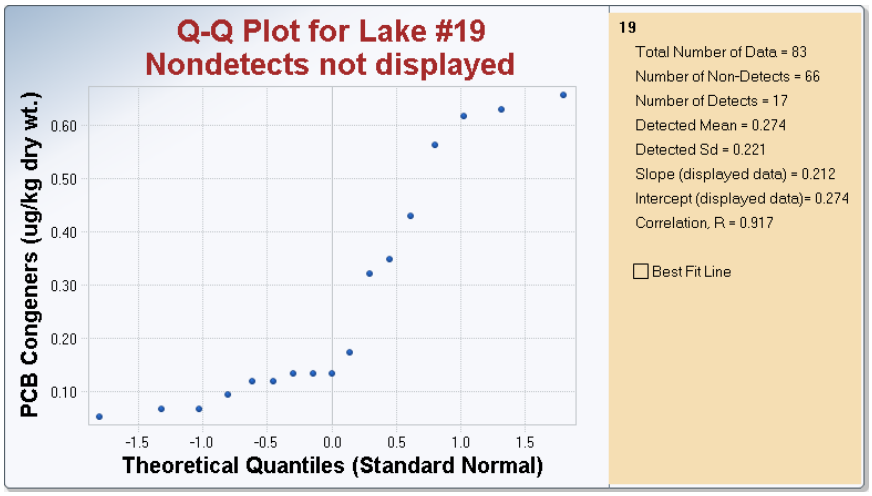
KM = Kaplan-Meier

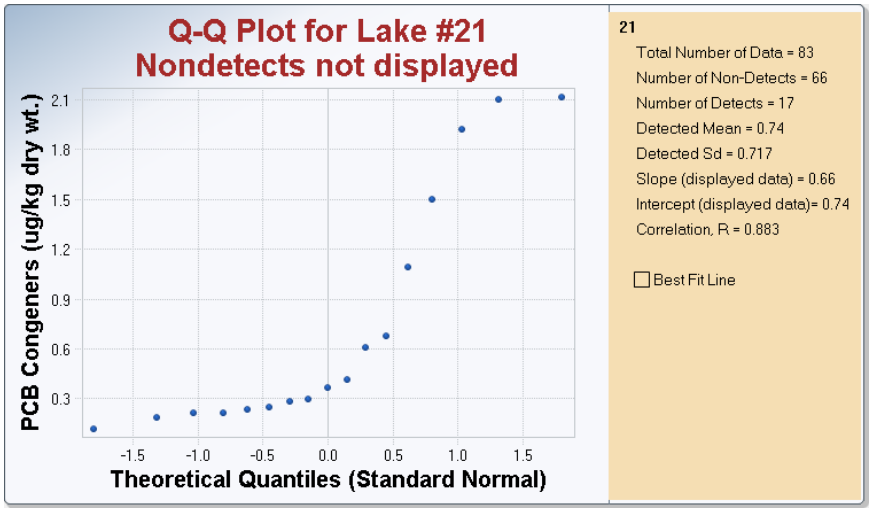


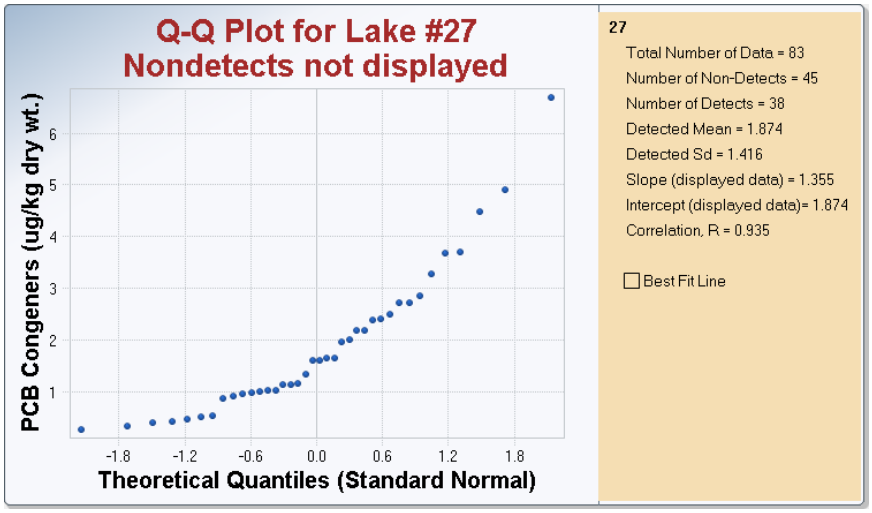
These Total PCBs were determined as part of the pesticide scan.

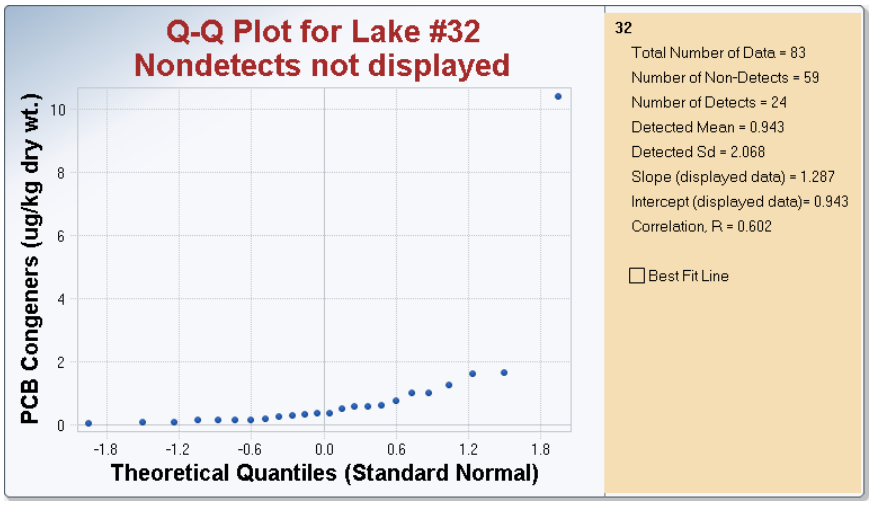
Q-Q Plots for Lakes with <80% Nondetects of PCB Congeners (outlier tests not needed)

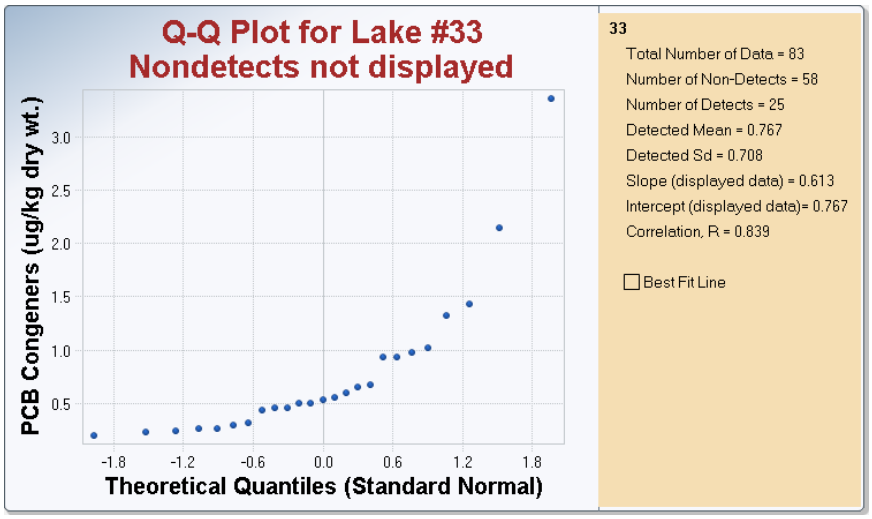


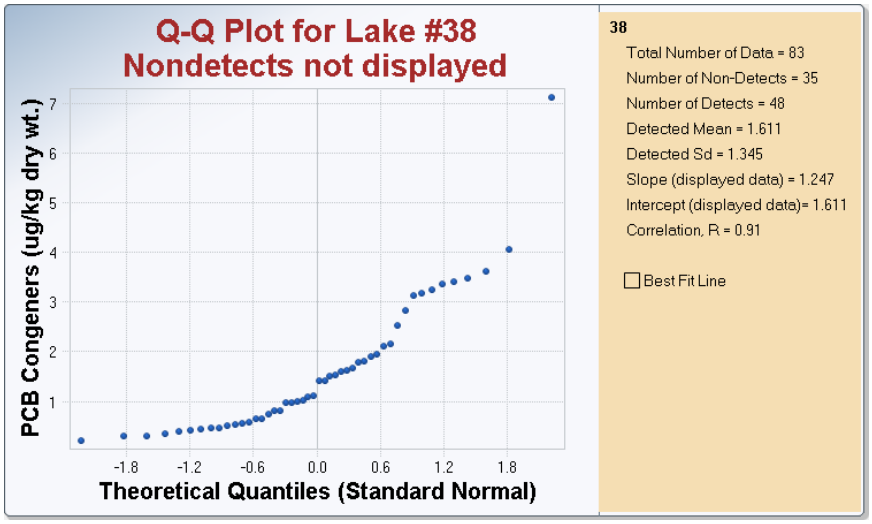


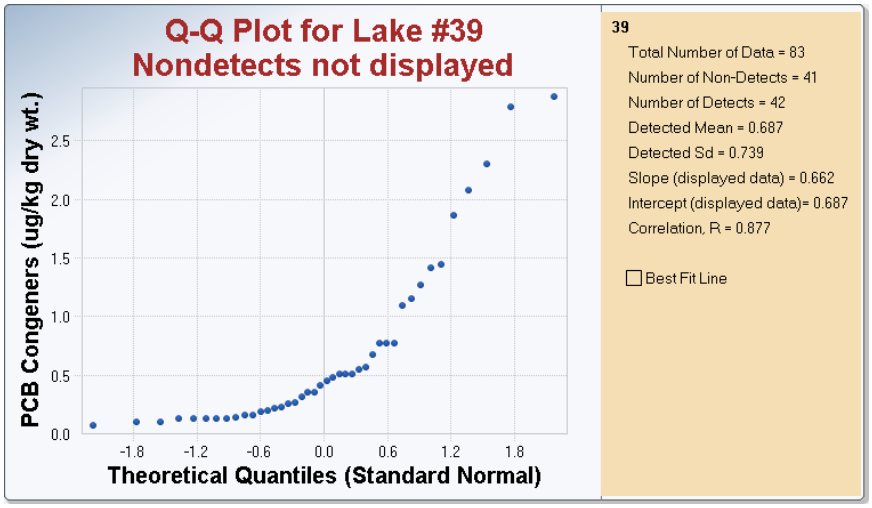


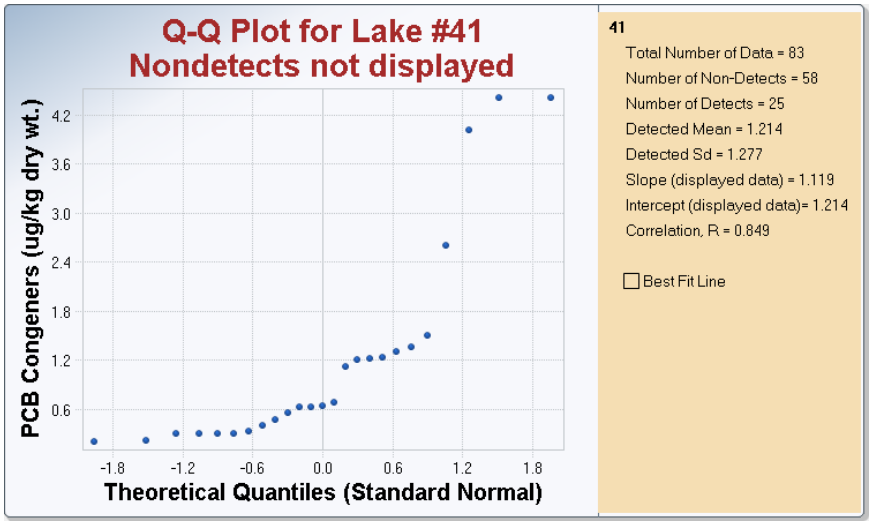

Q-Q Plot for Lake #27
Nondetects not displayed
PCB Congeners (ug/kg dry wt.)
Theoretical Quantiles (Standard Normal)
27
Total Number of Data = 83
Number of Non-Detects = 45
Number of Detects = 38
Detected Mean = 1.874
Detected Sd = 1.416
Slope (displayed data) = 1.355
Intercept (displayed data)= 1.874
Correlation, R = 0.935
Best Fit Line

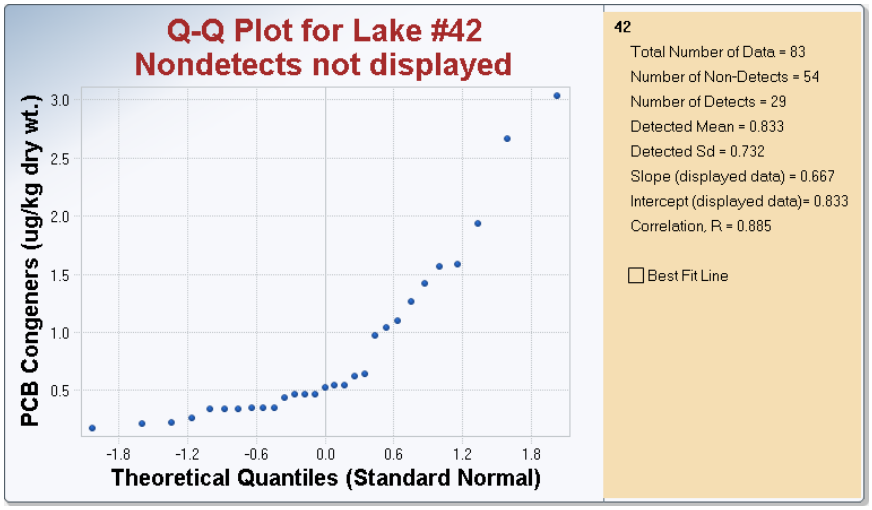

Q-Q Plot for Lake #32
Nondetects not displayed
PCB Congeners (ug/kg dry wt.)
Theoretical Quantiles (Standard Normal)
32
Total Number of Data = 83
Number of Non-Detects = 59
Number of Detects = 24
Detected Mean = 0.943
Detected Sd = 2.068
Slope (displayed data) = 1.287
Intercept (displayed data)= 0.943
Correlation, R = 0.602
Best Fit Line

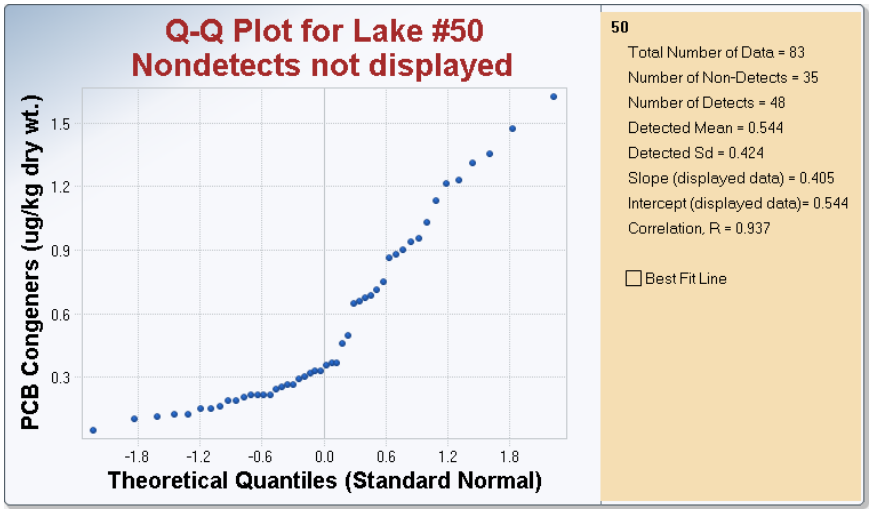

Q-Q Plot for Lake #33
Nondetects not displayed
PCB Congeners (ug/kg dry wt.)
Theoretical Quantiles (Standard Normal)
33
Total Number of Data = 83
Number of Non-Detects = 58
Number of Detects = 25
Detected Mean = 0.767
Detected Sd = 0.708
Slope (displayed data) = 0.613
Intercept (displayed data)= 0.767
Correlation, R = 0.839
Best Fit Line

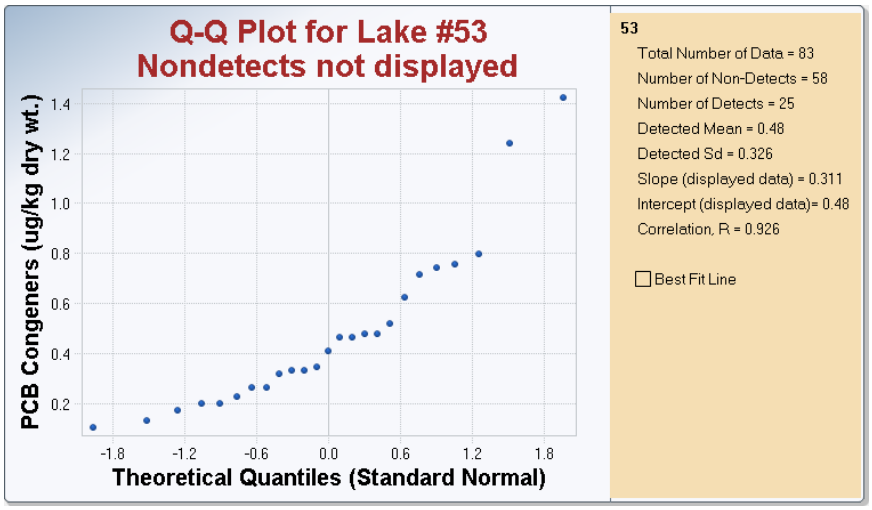

Q-Q Plot for Lake #38
Nondetects not displayed
PCB Congeners (ug/kg dry wt.)
Theoretical Quantiles (Standard Normal)
38
Total Number of Data = 83
Number of Non-Detects = 35
Number of Detects = 48
Detected Mean = 1.611
Detected Sd = 1.345
Slope (displayed data) = 1.247
Intercept (displayed data)= 1.611
Correlation, R = 0.91
Best Fit Line


Q-Q Plot for Lake #39
Nondetects not displayed
PCB Congeners (ug/kg dry wt.)
Theoretical Quantiles (Standard Normal)
39
Total Number of Data = 83
Number of Non-Detects = 41
Number of Detects = 42
Detected Mean = 0.687
Detected Sd = 0.739
Slope (displayed data) = 0.662
Intercept (displayed data)= 0.687
Correlation, R = 0.877
Best Fit Line


Q-Q Plot for Lake #41
Nondetects not displayed
PCB Congeners (ug/kg dry wt.)
Theoretical Quantiles (Standard Normal)
41
Total Number of Data = 83
Number of Non-Detects = 58
Number of Detects = 25
Detected Mean = 1.214
Detected Sd = 1.277
Slope (displayed data) = 1.119
Intercept (displayed data)= 1.214
Correlation, R = 0.849
Best Fit Line


Q-Q Plot for Lake #42
Nondetects not displayed
PCB Congeners (ug/kg dry wt.)
3.0
2.5
2.0
1.5
1.0
0.5
-1.8
-1.2
-0.6
0.0
0.6
1.2
1.8
Theoretical Quantiles (Standard Normal)
42
Total Number of Data = 83
Number of Non-Detects = 54
Number of Detects = 29
Detected Mean = 0.833
Detected Sd = 0.732
Slope (displayed data) = 0.667
Intercept (displayed data)= 0.833
Correlation, R = 0.885
Best Fit Line


Q-Q Plot for Lake #50
Nondetects not displayed
PCB Congeners (ug/kg dry wt.)
1.5
1.2
0.9
0.6
0.3
-1.8
-1.2
-0.6
0.0
0.6
1.2
1.8
Theoretical Quantiles (Standard Normal)
50
Total Number of Data = 83
Number of Non-Detects = 35
Number of Detects = 48
Detected Mean = 0.544
Detected Sd = 0.424
Slope (displayed data) = 0.405
Intercept (displayed data)= 0.544
Correlation, R = 0.937
Best Fit Line


Q-Q Plot for Lake #53
Nondetects not displayed
PCB Congeners (ug/kg dry wt.)
1.4
1.2
1.0
0.8
0.6
0.4
0.2
-1.8
-1.2
-0.6
0.0
0.6
1.2
1.8
Theoretical Quantiles (Standard Normal)
53
Total Number of Data = 83
Number of Non-Detects = 58
Number of Detects = 25
Detected Mean = 0.48
Detected Sd = 0.326
Slope (displayed data) = 0.311
Intercept (displayed data)= 0.48
Correlation, R = 0.926
Best Fit Line

Appendix I
Metal PEC-Qs and Mean PEC-Qs

Table I-1. Other Summary Statistics for Mean PEC-Qs and Metal PEC-Qs (n = 54)

Parameter	SEM	MAD/0.675	CV
Mean PEC-Q	0.0085	0.036	0.56
Metal PEC-Q	0.018	0.093	0.55

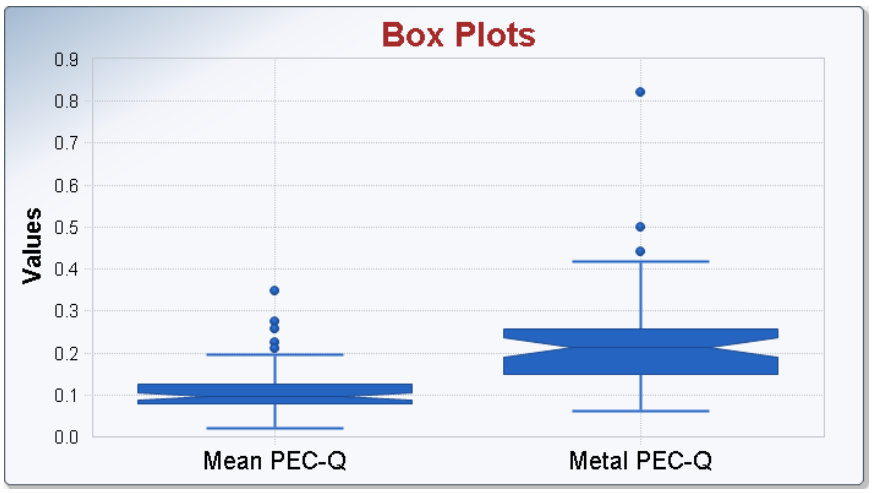
SEM = standard error of the mean; MAD = median absolute deviation; CV = coefficient of variation; PEC-Q = probable effect concentration quotient.

Table I-2. Percentiles of Mean PEC-Qs and Metal PEC-Qs. Highlighted Values are Based on Detected Data.

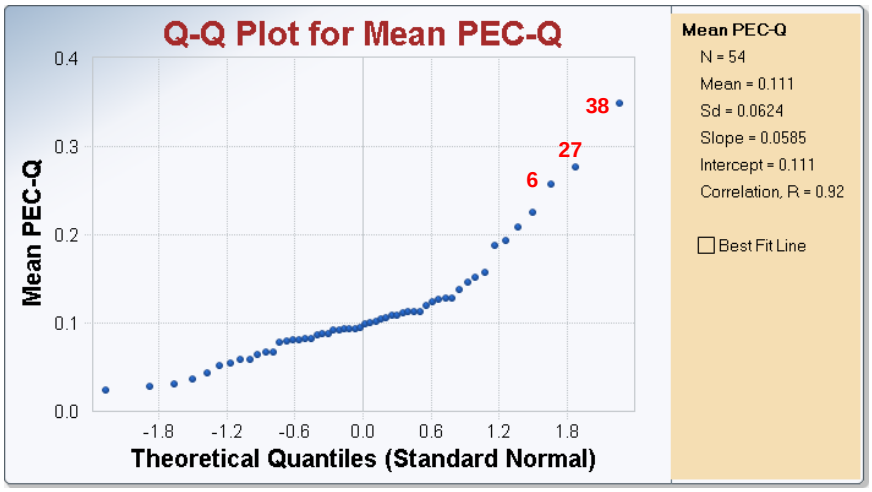
Parameter	25%ile (Q1)	50%ile (Q2)	75%ile (Q3)	95%ile	99%ile
Mean PEC-Q	0.080	0.097	0.13	0.24	0.31
Metal PEC-Q	0.15	0.21	0.26	0.42	0.65

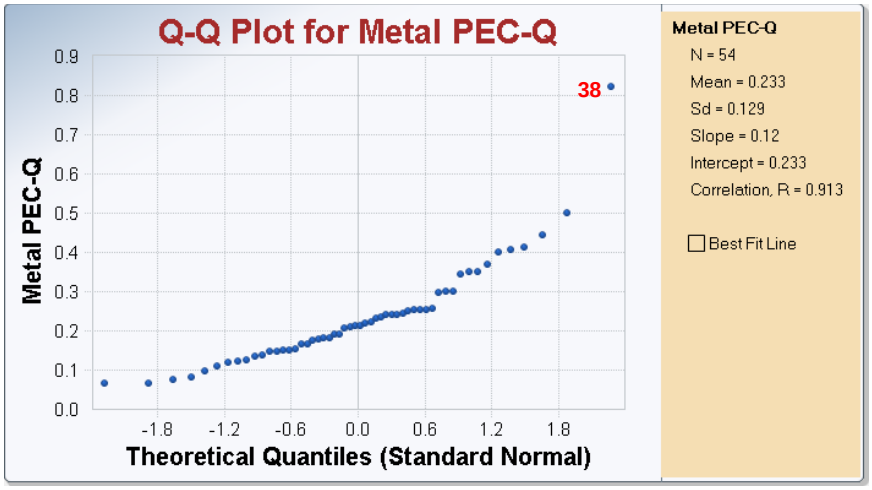
Q = quantile; PEC-Q = probable effect concentration quotient.

Box Plots for Mean PEC-Qs and Metal PEC-Qs



Q-Q Plots (samples noted in red font are significant at the 5% significance level)





Appendix J
Legacy Pesticides

Table J-1. Additional Summary Statistics for Pesticides and Metabolites, as well as Total PCBs (n = 24 samples). Values are Sorted by the Percent of Nondetects.

Parameter	% NDs	Minimum ND (µg/kg dry wt.)	Maximum ND (µg/kg dry wt.)	KM Variance* (µg/kg dry wt.)^2	KM CV*
p,p'-DDE	4.2	<0.047	<0.047	614.9	2.0
Total DDT	4.2	<0.151	<0.151	2880.0	2.1
Total PCBs	8.3	<1.26	<1.42	384.6	1.2
p,p'-DDD	16.7	<0.053	<0.054	423.9	2.6
o,p'-DDD	29.2	<0.045	<0.081	33.1	2.6
Endosulfan sulfate	29.2	<0.042	<0.088	0.061	0.91
cis-Nonachlor	29.2	<0.044	<0.1	0.087	1.2
DDMU	33.3	0.068	0.15	17.2	2.4
Total Hexachlorocyclohexane	37.5	<0.098	<0.203	0.14	0.99
alpha-Endosulfan	41.7	<0.04	<0.083	2.9	2.5
beta-Hexachlorocyclohexane	41.7	<0.05	<0.104	0.018	0.83
trans-Nonachlor	45.8	<0.049	<0.087	0.17	1.4
Pentachloroanisole	50.0	0.046	0.10	0.062	1.0
o,p'-DDE	54.2	<0.057	<0.129	0.71	2.3
Mirex	54.2	<0.058	<0.102	0.15	1.6
gamma-Chlordane	62.5	<0.055	<0.098	0.83	2.4
Dieldrin	62.5	<0.049	<0.111	0.0068	0.81
p,p'-DDT	62.5	<0.046	<0.106	0.22	1.2
beta-Endosulfan	66.7	<0.039	<0.081	0.39	2.3
alpha-Chlordane	70.8	<0.046	<0.086	0.40	1.8
Heptachlor	75.0	<0.041	<0.094	0.044	1.8
Hexachlorobenzene	75.0	<0.054	<0.123	0.0024	0.62
Oxychlordane	79.2	<0.063	<0.142	0.030	1.5
alpha-Hexachlorocyclohexane	83.3	<0.076	<0.173	-	-
delta-Hexachlorocyclohexane	83.3	<0.046	<0.106	-	-
gamma-Hexachlorocyclohexane	87.5	<0.037	<0.083	-	-
o,p'-DDT	87.5	<0.046	<0.104	-	-
Aldrin	95.8	<0.055	<0.126	-	-
Endrin	100.0	<0.055	<0.126	-	-
Heptachlor epoxide	100.0	<0.06	<0.136	-	-
Toxaphene	100.0	<4.93	<11.2	-	-

n = number of samples; ND = nondetect value; KM = Kaplan-Meier; CV = coefficient of variation; DDD = dichlorodiphenyldichloroethane; DDE = dichlorodiphenyldichloroethylene; DDT = dichlorodiphenyltrichloro-ethane; DDMU = 2,2-bis(chlorophenyl)-1-chloroethylene.

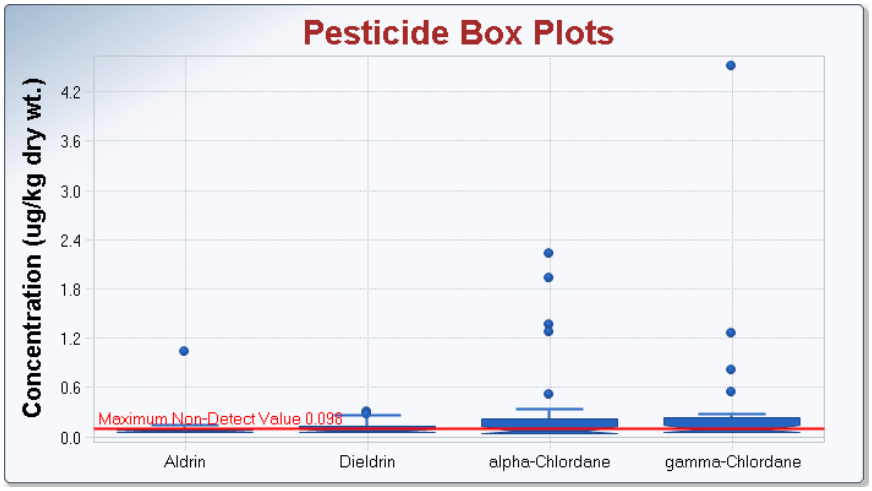
* Estimated using the Kaplan-Meier method for nondetects <80%.

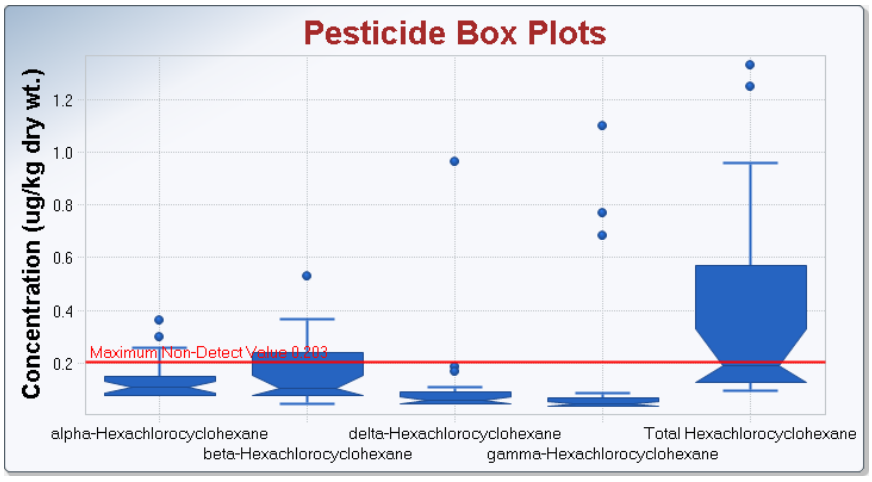
Table J-2. Percentiles of Pesticide and Metabolite Data. Highlighted Values are Based on Detected Data.

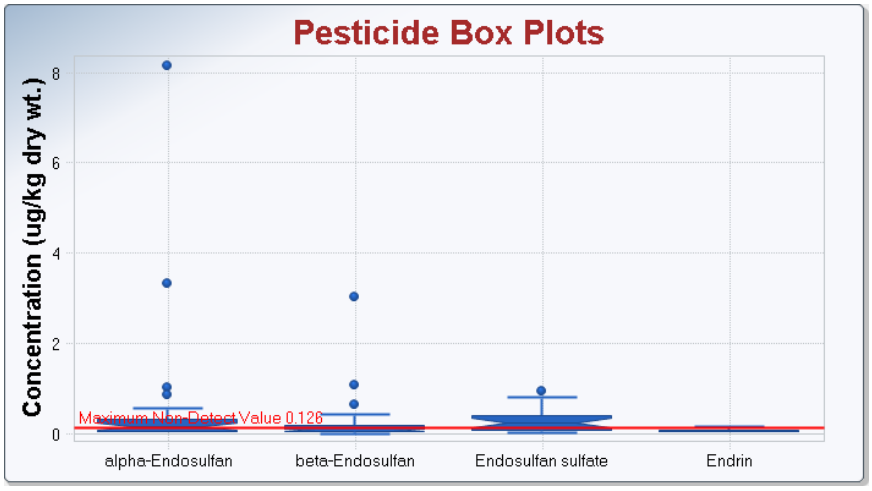
Pesticide	25%ile (Q1) (µg/kg dry wt.)	50%ile (Q2) (µg/kg dry wt.)	75%ile (Q3) (µg/kg dry wt.)	95%ile (µg/kg dry wt.)	99%ile (µg/kg dry wt.)
Aldrin	<0.056	<0.070	<0.088	<0.12	<0.83
alpha-Chlordane	<0.046	<0.069	0.17	1.8	2.2
gamma-Chlordane	<0.061	<0.084	0.23	1.2	3.8
p,p'-DDD	0.31	1.2	4.5	36.0	85.2
o,p'-DDD	<0.078	0.79	1.1	8.8	24.0
p,p'-DDE	1.5	3.3	7.2	76.6	91.6
o,p'-DDE	<0.066	<0.098	0.16	2.1	3.4
p,p'-DDT	<0.048	<0.074	0.69	1.3	1.4
o,p'-DDT	<0.046	<0.057	<0.074	0.12	0.12
Total DDT	2.8	5.9	15.8	149.3	211.7
DDMU	<0.12	0.34	0.78	12.9	15.7
Dieldrin	<0.049	<0.069	0.13	0.27	0.30
alpha-Endosulfan	<0.052	0.15	0.29	3.0	7.0
beta-Endosulfan	<0.047	<0.063	0.19	1.0	2.6
Endosulfan sulfate	<0.076	0.23	0.37	0.76	0.91
Endrin	<0.056	<0.066	<0.085	<0.11	<0.12
Heptachlor	<0.046	<0.063	<0.076	0.41	0.89
Heptachlor epoxide	<0.060	<0.072	<0.092	<0.12	<0.13
Hexachlorobenzene	<0.054	<0.072	<0.11	0.16	0.22
alpha-Hexachlorocyclohexane	<0.076	<0.11	<0.15	0.29	0.35
beta-Hexachlorocyclohexane	<0.076	0.11	0.23	0.36	0.49
delta-Hexachlorocyclohexane	<0.047	<0.058	<0.089	0.18	0.79
gamma-Hexachlorocyclohexane	<0.037	<0.046	<0.066	0.76	1.0
Total Hexachlorocyclohexane	<0.14	<0.19	0.55	1.2	1.3
Mirex	<0.068	<0.092	0.17	1.0	1.5
cis-Nonachlor	<0.064	0.16	0.22	0.97	1.2
trans-Nonachlor	<0.070	0.21	0.39	0.65	1.7
Oxychlordane	<0.063	<0.088	<0.13	0.18	0.75
Pentachloroanisole	<0.050	<0.087	0.44	0.69	0.73
Toxaphene	<4.9	<5.9	<7.6	<10.1	<11.0

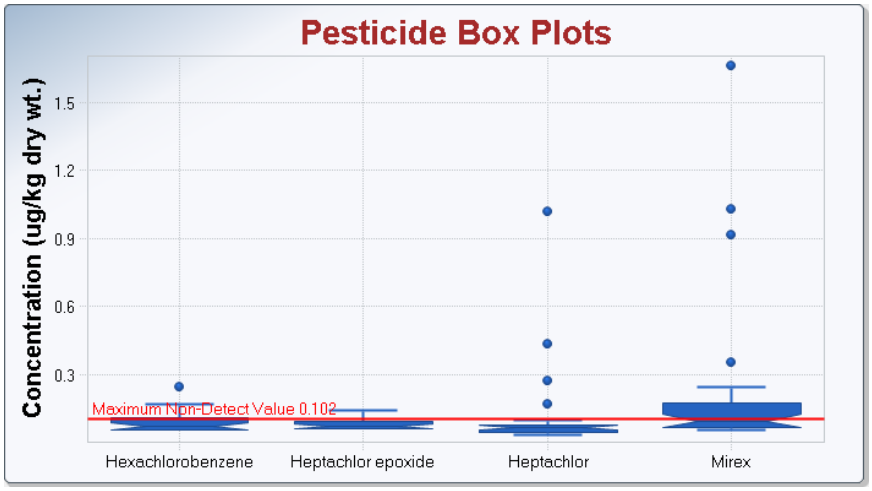
Q = quantile; DDD = dichlorodiphenyldichloroethane; DDE = dichlorodiphenyldichloroethylene; DDT = dichlorodiphenyltrichloroethane; DDMU = 2,2-bis(chlorophenyl)-1-chloroethylene.

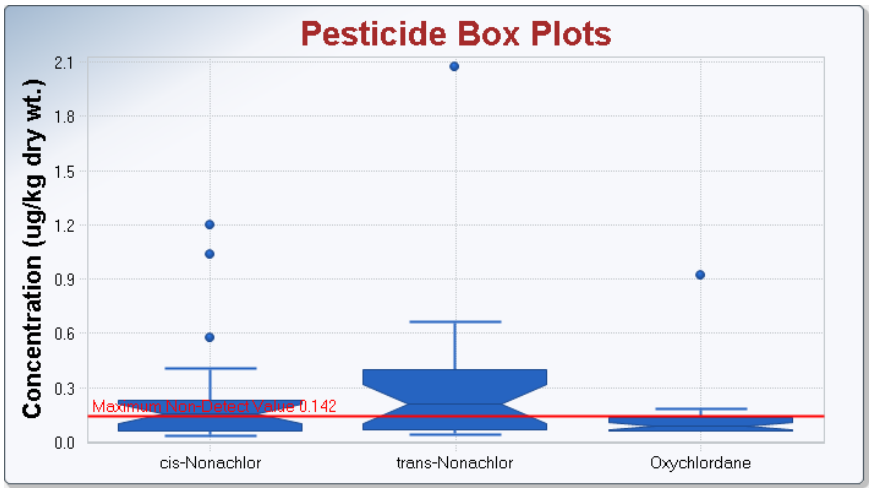
Pesticide Box Plots

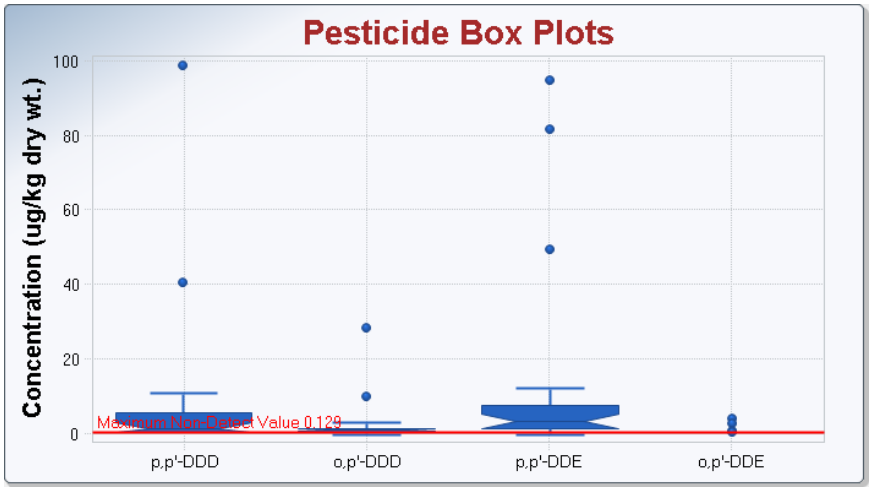


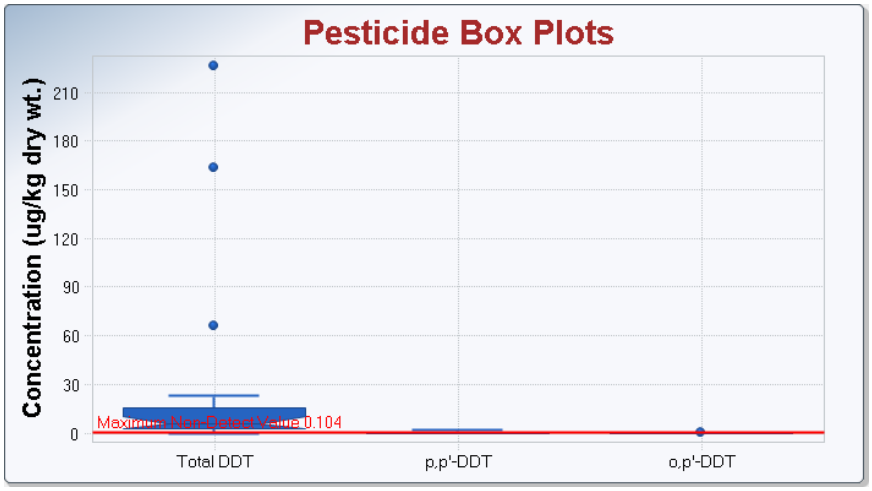


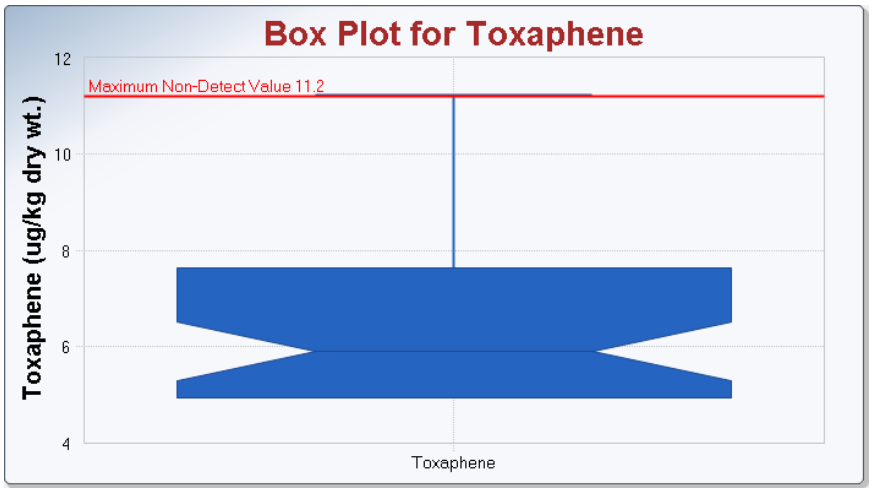


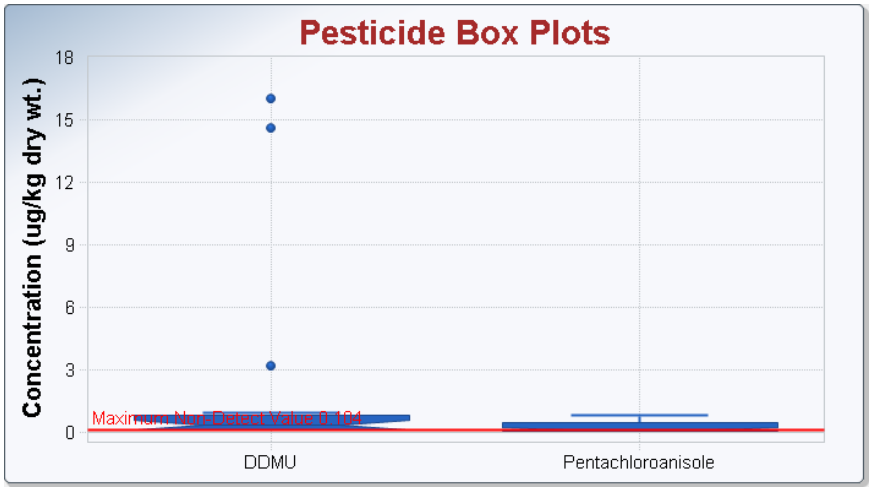

Pesticide Box Plots
Concentration (ug/kg dry wt.)
1.5
1.2
0.9
0.6
0.3
Maximum Non-Detect Value 0.102
Hexachlorobenzene
Heptachlor epoxide
Heptachlor
Mirex


Pesticide Box Plots
Concentration (ug/kg dry wt.)
2.1
1.8
1.5
1.2
0.9
0.6
0.3
0.0
Maximum Non-Detect Value 0.142
cis-Nonachlor
trans-Nonachlor
Oxychlordane

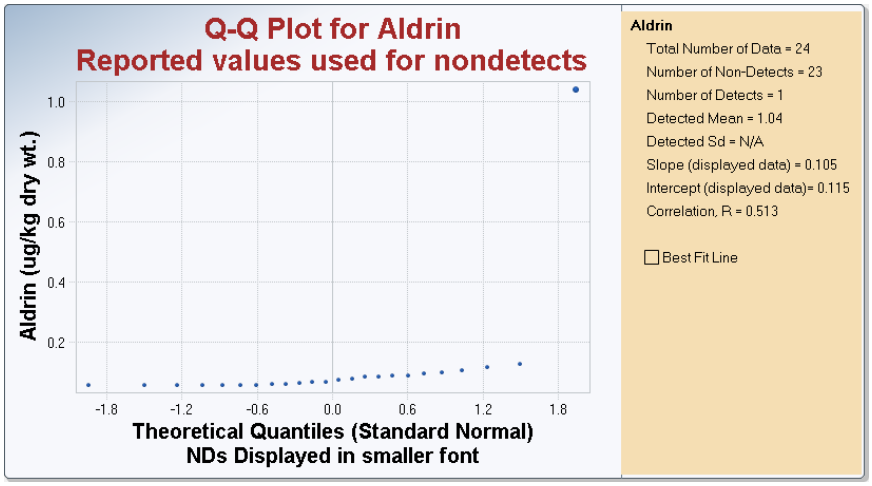

Pesticide Box Plots
Concentration (ug/kg dry wt.)
100
80
60
40
20
0
Maximum Non-Detect Value 0.129
p,p'-DDD
o,p'-DDD
p,p'-DDE
o,p'-DDE

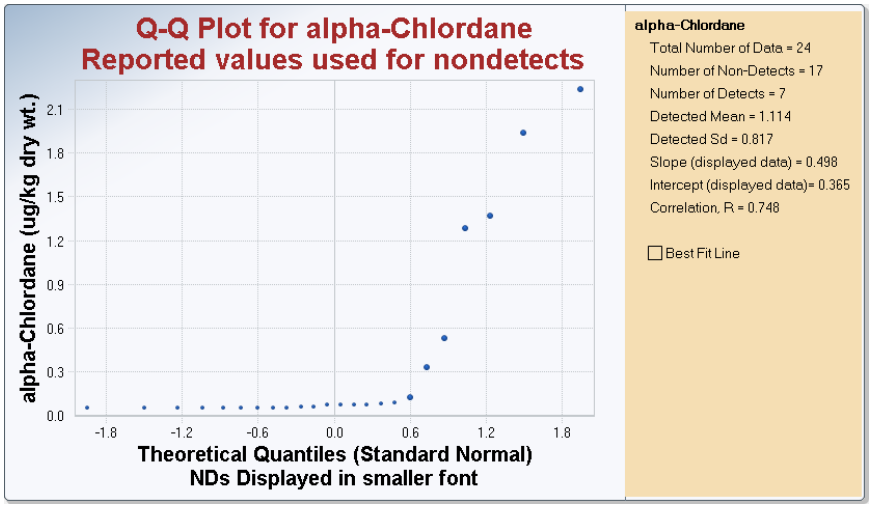

Pesticide Box Plots
Concentration (ug/kg dry wt.)
210
180
150
120
90
60
30
0
Maximum Non-Detect Value 0.104
Total DDT
p,p'-DDT
o,p'-DDT

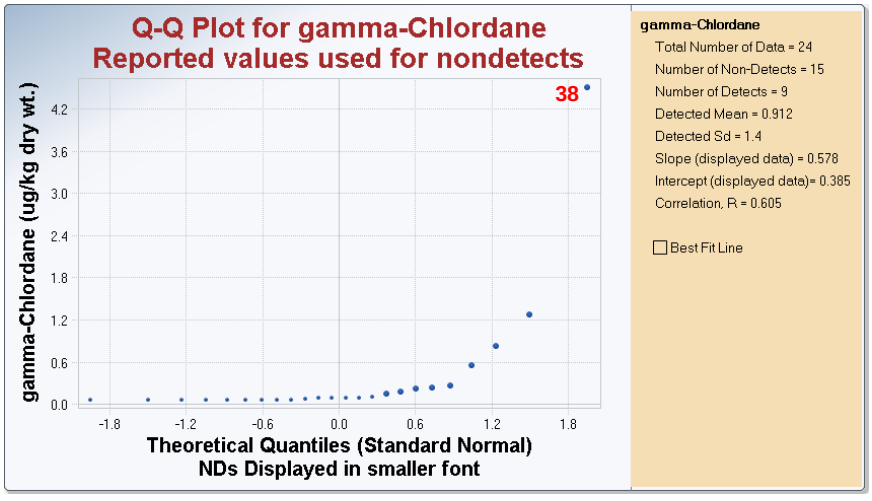

Box Plot for Toxaphene
Toxaphene (ug/kg dry wt.)
12
10
8
6
4
Maximum Non-Detect Value 11.2
Toxaphene

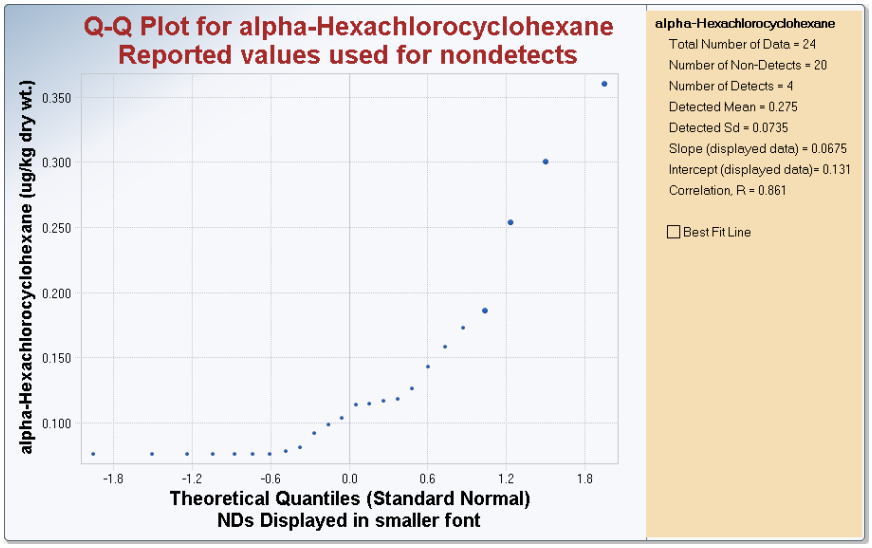

Pesticide Box Plots
Concentration (ug/kg dry wt.)
18
15
12
9
6
3
0
Maximum Non-Detect Value 0.104
DDMU
Pentachloroanisole

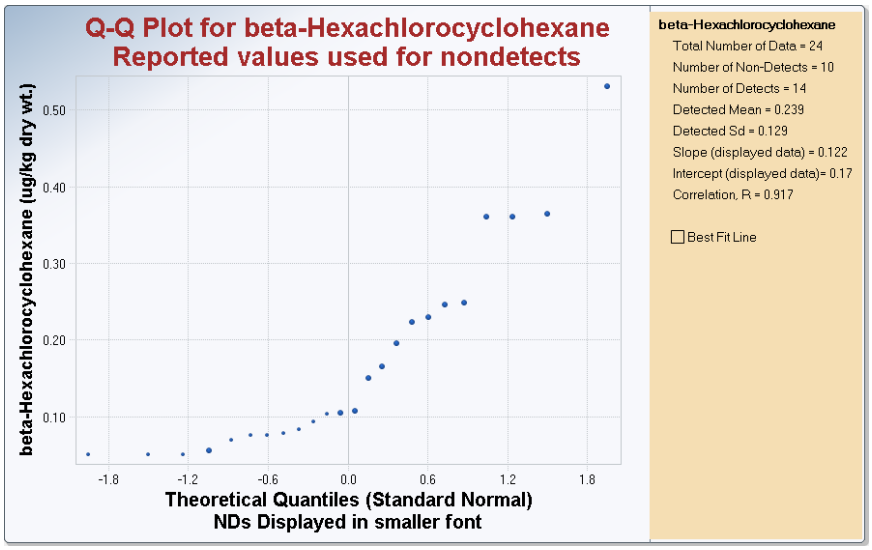
Q-Q Plots for Pesticides with <80% Nondetects (samples noted in red font are significant at the 5% significance level and those noted in black font were excluded based on professional judgment)

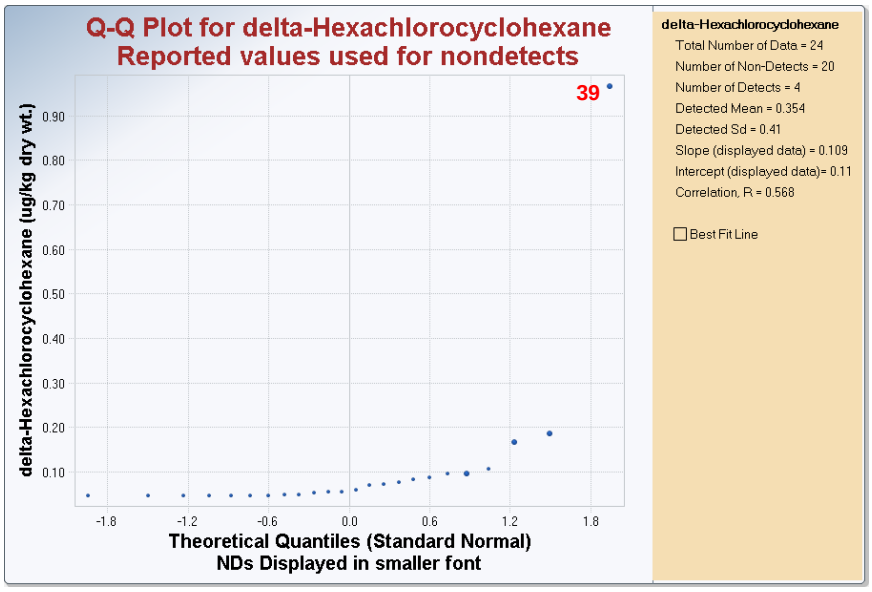


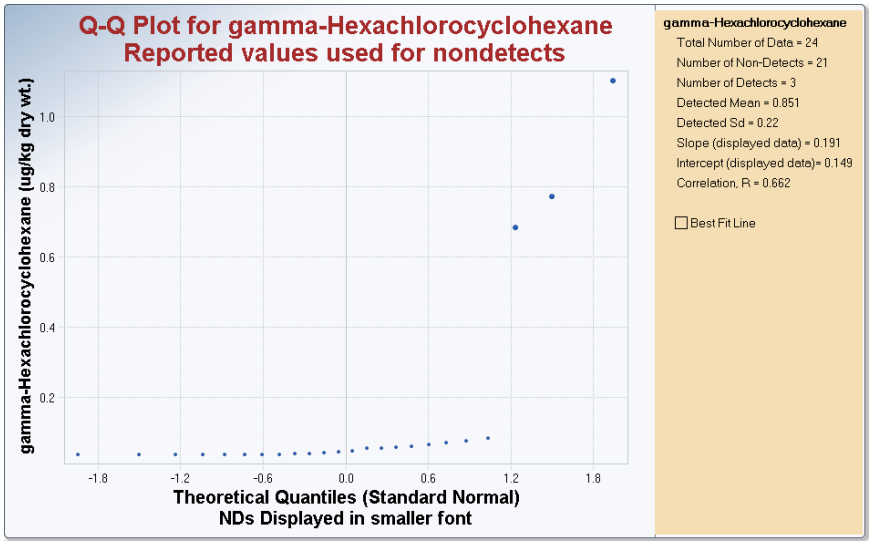


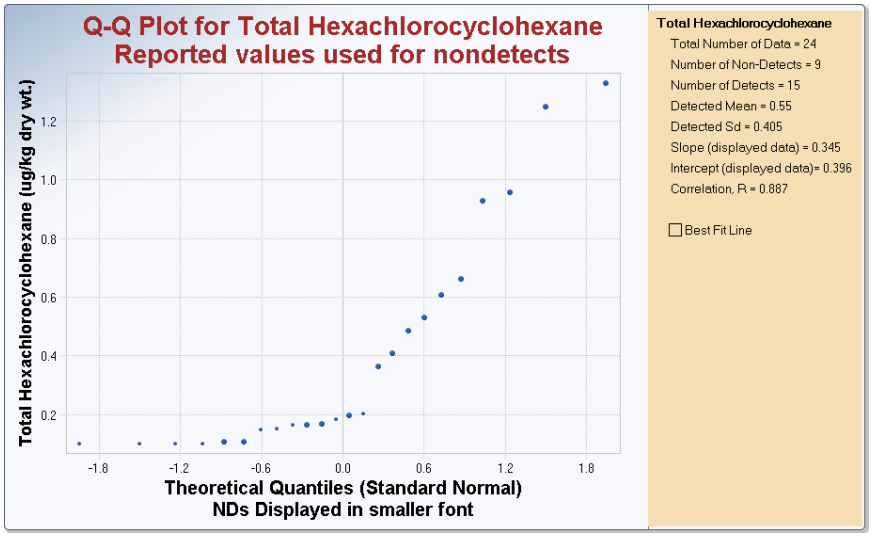


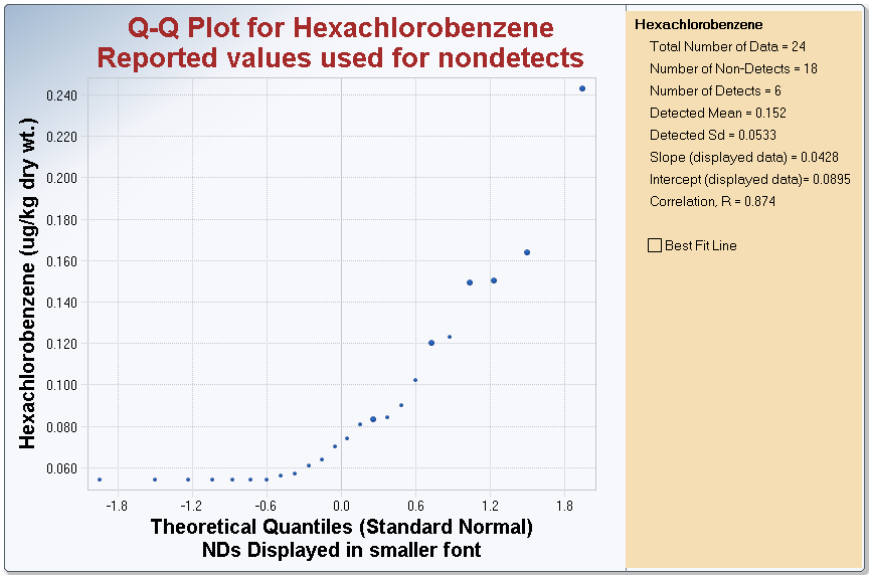

Q-Q Plot for alpha-Hexachlorocyclohexane
Reported values used for nondetects
alpha-Hexachlorocyclohexane (ug/kg dry wt.)
0.350
0.300
0.250
0.200
0.150
0.100
-1.8
-1.2
-0.6
0.0
0.6
1.2
1.8
Theoretical Quantiles (Standard Normal)
NDs Displayed in smaller font
alpha-Hexachlorocyclohexane
Total Number of Data = 24
Number of Non-Detects = 20
Number of Detects = 4
Detected Mean = 0.275
Detected Sd = 0.0735
Slope (displayed data) = 0.0675
Intercept (displayed data)= 0.131
Correlation, R = 0.861
Best Fit Line

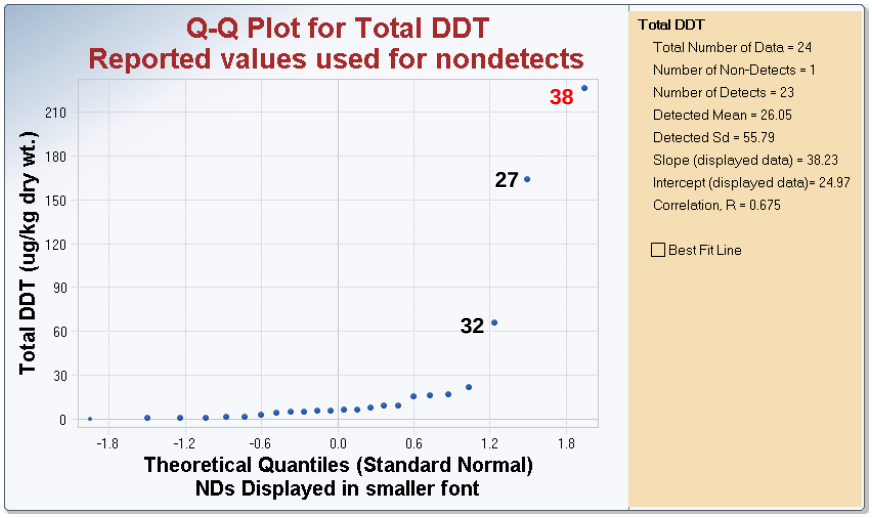

Q-Q Plot for beta-Hexachlorocyclohexane
Reported values used for nondetects
beta-Hexachlorocyclohexane (ug/kg dry wt.)
0.50
0.40
0.30
0.20
0.10
-1.8
-1.2
-0.6
0.0
0.6
1.2
1.8
Theoretical Quantiles (Standard Normal)
NDs Displayed in smaller font
beta-Hexachlorocyclohexane
Total Number of Data = 24
Number of Non-Detects = 10
Number of Detects = 14
Detected Mean = 0.239
Detected Sd = 0.129
Slope (displayed data) = 0.122
Intercept (displayed data)= 0.17
Correlation, R = 0.917
Best Fit Line

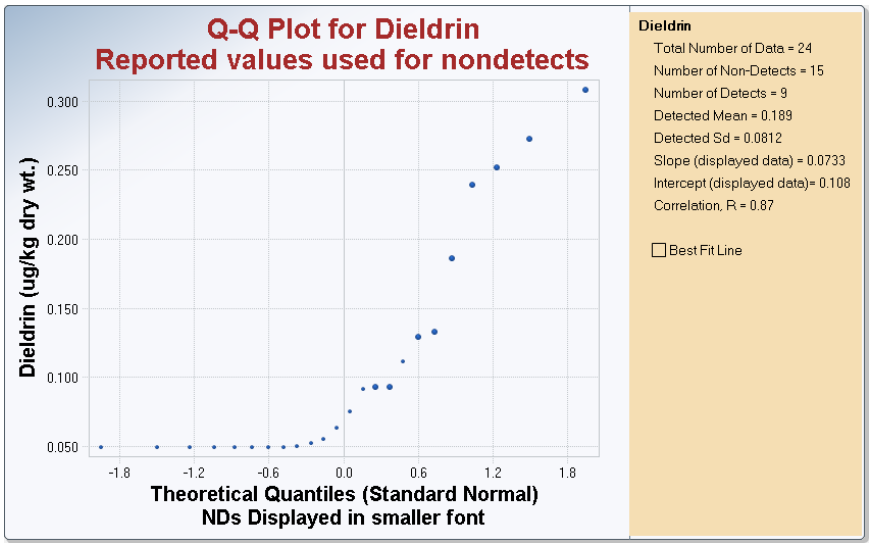

Q-Q Plot for delta-Hexachlorocyclohexane
Reported values used for nondetects
39
delta-Hexachlorocyclohexane (ug/kg dry wt.)
0.90
0.80
0.70
0.60
0.50
0.40
0.30
0.20
0.10
-1.8
-1.2
-0.6
0.0
0.6
1.2
1.8
Theoretical Quantiles (Standard Normal)
NDs Displayed in smaller font
delta-Hexachlorocyclohexane
Total Number of Data = 24
Number of Non-Detects = 20
Number of Detects = 4
Detected Mean = 0.354
Detected Sd = 0.41
Slope (displayed data) = 0.109
Intercept (displayed data)= 0.11
Correlation, R = 0.568
Best Fit Line

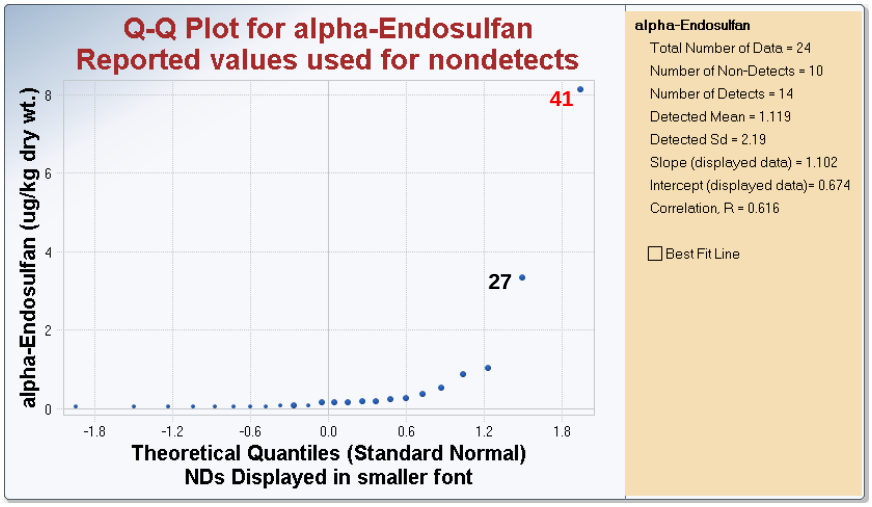

Q-Q Plot for gamma-Hexachlorocyclohexane
Reported values used for nondetects
gamma-Hexachlorocyclohexane (ug/kg dry wt.)
1.0
0.8
0.6
0.4
0.2
-1.8
-1.2
-0.6
0.0
0.6
1.2
1.8
Theoretical Quantiles (Standard Normal)
NDs Displayed in smaller font
gamma-Hexachlorocyclohexane
Total Number of Data = 24
Number of Non-Detects = 21
Number of Detects = 3
Detected Mean = 0.851
Detected Sd = 0.22
Slope (displayed data) = 0.191
Intercept (displayed data)= 0.149
Correlation, R = 0.662
Best Fit Line

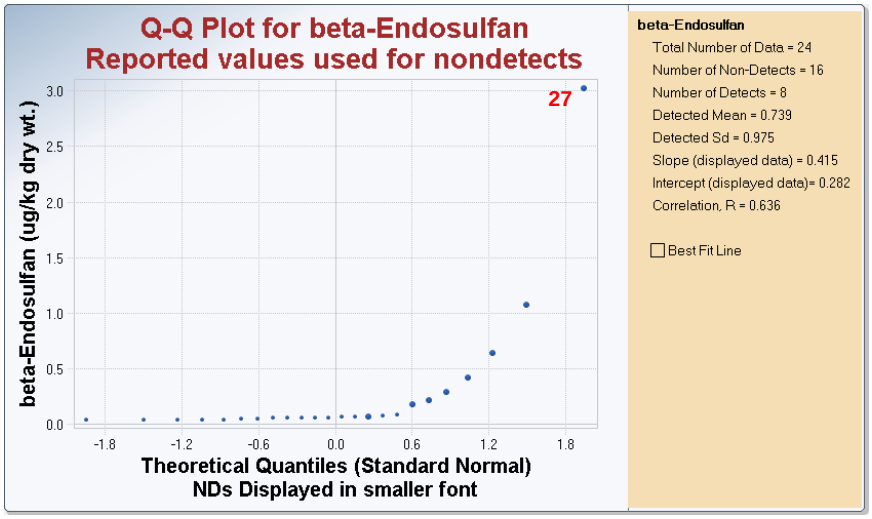

Q-Q Plot for Total Hexachlorocyclohexane
Reported values used for nondetects
Total Hexachlorocyclohexane (ug/kg dry wt.)
1.2
1.0
0.8
0.6
0.4
0.2
-1.8
-1.2
-0.6
0.0
0.6
1.2
1.8
Theoretical Quantiles (Standard Normal)
NDs Displayed in smaller font
Total Hexachlorocyclohexane
Total Number of Data = 24
Number of Non-Detects = 9
Number of Detects = 15
Detected Mean = 0.55
Detected Sd = 0.405
Slope (displayed data) = 0.345
Intercept (displayed data)= 0.396
Correlation, R = 0.887
Best Fit Line

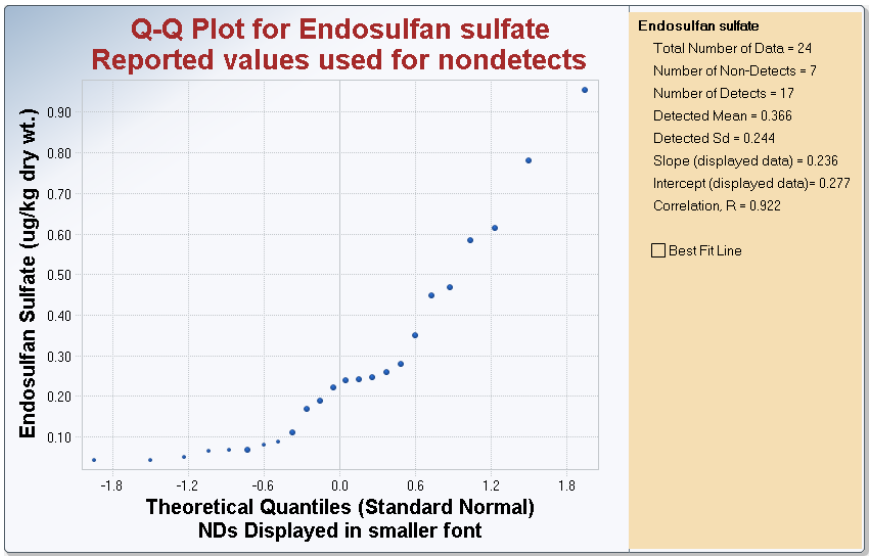

Q-Q Plot for Hexachlorobenzene
Reported values used for nondetects
Hexachlorobenzene (ug/kg dry wt.)
0.240
0.220
0.200
0.180
0.160
0.140
0.120
0.100
0.080
0.060
-1.8
-1.2
-0.6
0.0
0.6
1.2
1.8
Theoretical Quantiles (Standard Normal)
NDs Displayed in smaller font
Hexachlorobenzene
Total Number of Data = 24
Number of Non-Detects = 18
Number of Detects = 6
Detected Mean = 0.152
Detected Sd = 0.0533
Slope (displayed data) = 0.0428
Intercept (displayed data)= 0.0895
Correlation, R = 0.874
Best Fit Line

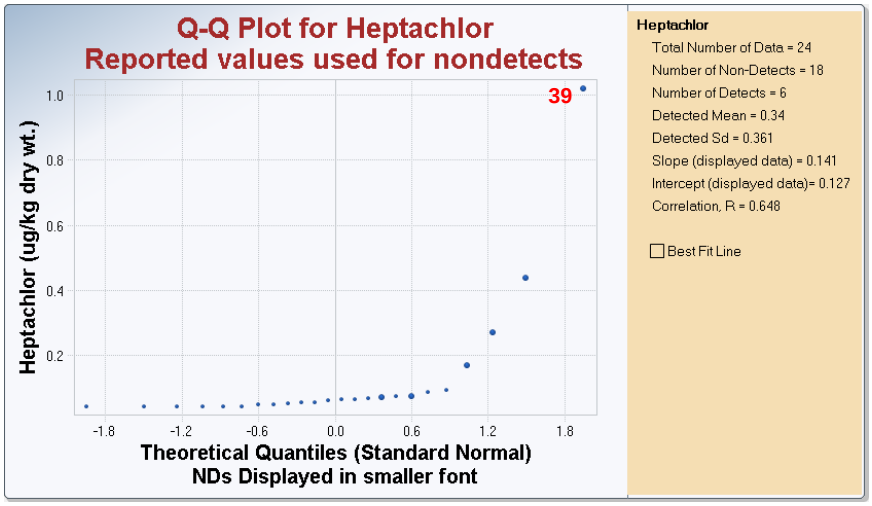

Q-Q Plot for Total DDT
Reported values used for nondetects
Total DDT (ug/kg dry wt.)
210
180
150
120
90
60
30
0
38
27
32
-1.8
-1.2
-0.6
0.0
0.6
1.2
1.8
Theoretical Quantiles (Standard Normal)
NDs Displayed in smaller font
Total DDT
Total Number of Data = 24
Number of Non-Detects = 1
Number of Detects = 23
Detected Mean = 26.05
Detected Sd = 55.79
Slope (displayed data) = 38.23
Intercept (displayed data)= 24.97
Correlation, R = 0.675
Best Fit Line

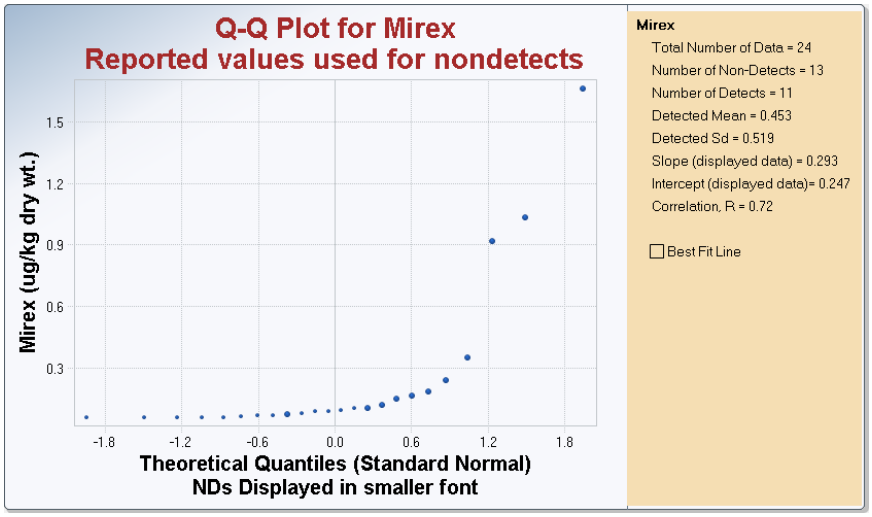

Q-Q Plot for Dieldrin
Reported values used for nondetects
Dieldrin (ug/kg dry wt.)
0.300
0.250
0.200
0.150
0.100
0.050
-1.8
-1.2
-0.6
0.0
0.6
1.2
1.8
Theoretical Quantiles (Standard Normal)
NDs Displayed in smaller font
Dieldrin
Total Number of Data = 24
Number of Non-Detects = 15
Number of Detects = 9
Detected Mean = 0.189
Detected Sd = 0.0812
Slope (displayed data) = 0.0733
Intercept (displayed data)= 0.108
Correlation, R = 0.87
Best Fit Line

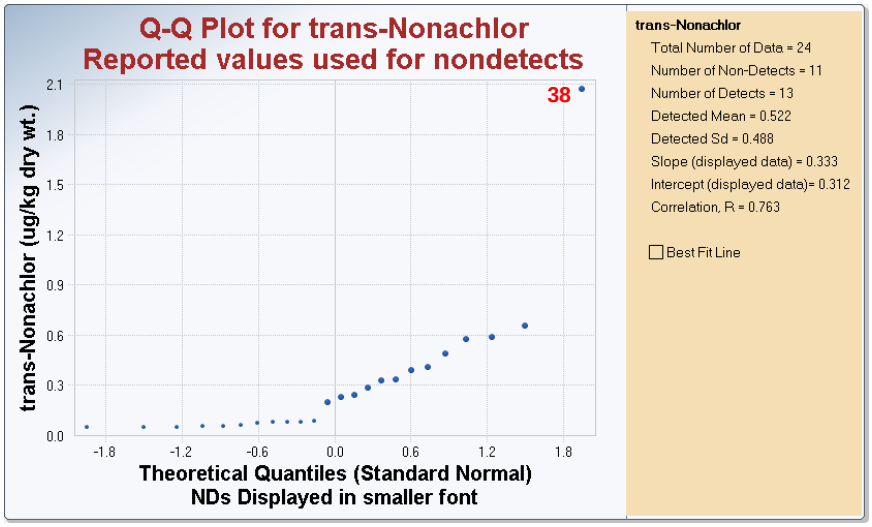

Q-Q Plot for alpha-Endosulfan
Reported values used for nondetects
alpha-Endosulfan (ug/kg dry wt.)
8
6
4
2
0
41
27
-1.8
-1.2
-0.6
0.0
0.6
1.2
1.8
Theoretical Quantiles (Standard Normal)
NDs Displayed in smaller font
alpha-Endosulfan
Total Number of Data = 24
Number of Non-Detects = 10
Number of Detects = 14
Detected Mean = 1.119
Detected Sd = 2.19
Slope (displayed data) = 1.102
Intercept (displayed data)= 0.674
Correlation, R = 0.616
Best Fit Line

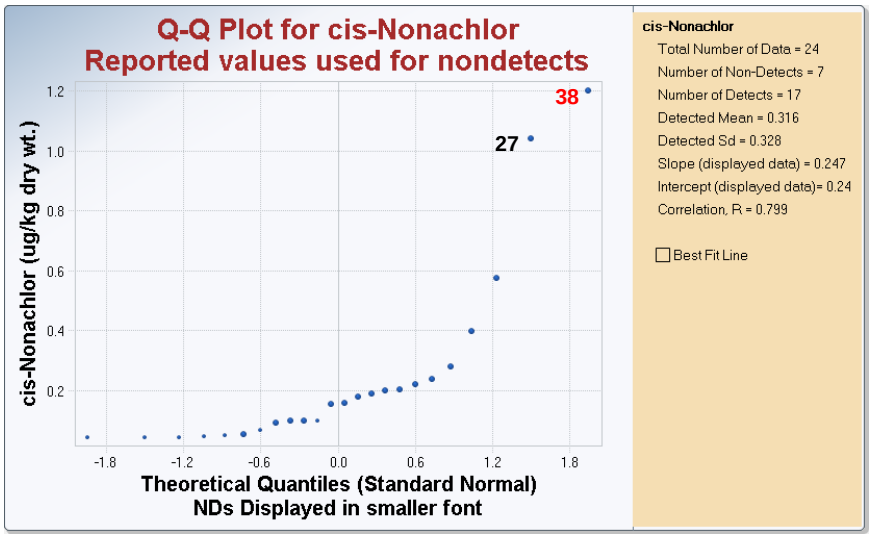

Q-Q Plot for beta-Endosulfan
Reported values used for nondetects
27
beta-Endosulfan (ug/kg dry wt.)
3.0
2.5
2.0
1.5
1.0
0.5
0.0
-1.8
-1.2
-0.6
0.0
0.6
1.2
1.8
Theoretical Quantiles (Standard Normal)
NDs Displayed in smaller font
beta-Endosulfan
Total Number of Data = 24
Number of Non-Detects = 16
Number of Detects = 8
Detected Mean = 0.739
Detected Sd = 0.975
Slope (displayed data) = 0.415
Intercept (displayed data)= 0.282
Correlation, R = 0.636
Best Fit Line

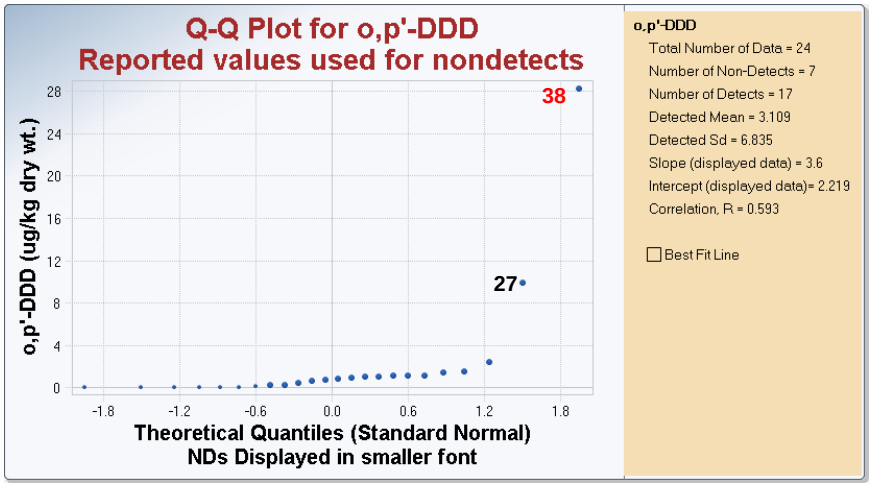

Q-Q Plot for Endosulfan sulfate
Reported values used for nondetects
Endosulfan Sulfate (ug/kg dry wt.)
0.90
0.80
0.70
0.60
0.50
0.40
0.30
0.20
0.10
-1.8
-1.2
-0.6
0.0
0.6
1.2
1.8
Theoretical Quantiles (Standard Normal)
NDs Displayed in smaller font
Endosulfan sulfate
Total Number of Data = 24
Number of Non-Detects = 7
Number of Detects = 17
Detected Mean = 0.366
Detected Sd = 0.244
Slope (displayed data) = 0.236
Intercept (displayed data)= 0.277
Correlation, R = 0.922
Best Fit Line

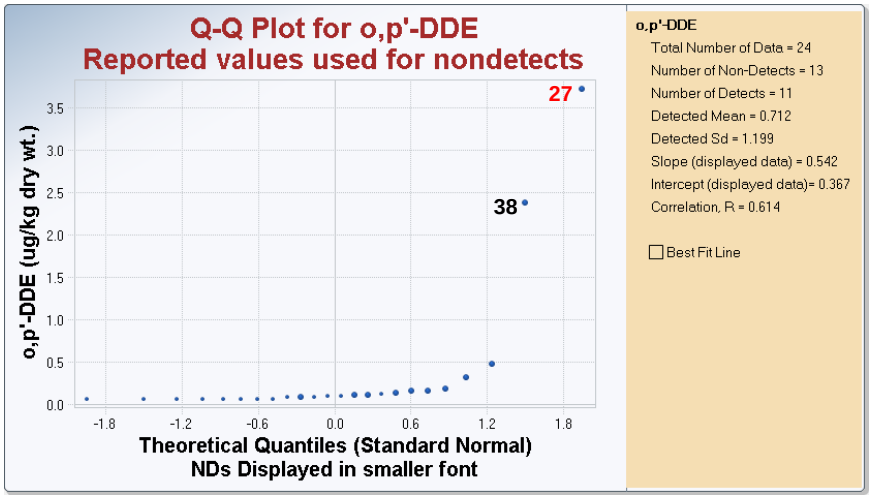

Q-Q Plot for Heptachlor
Reported values used for nondetects
39
Heptachlor (ug/kg dry wt.)
1.0
0.8
0.6
0.4
0.2
-1.8
-1.2
-0.6
0.0
0.6
1.2
1.8
Theoretical Quantiles (Standard Normal)
NDs Displayed in smaller font
Heptachlor
Total Number of Data = 24
Number of Non-Detects = 18
Number of Detects = 6
Detected Mean = 0.34
Detected Sd = 0.361
Slope (displayed data) = 0.141
Intercept (displayed data)= 0.127
Correlation, R = 0.648
Best Fit Line

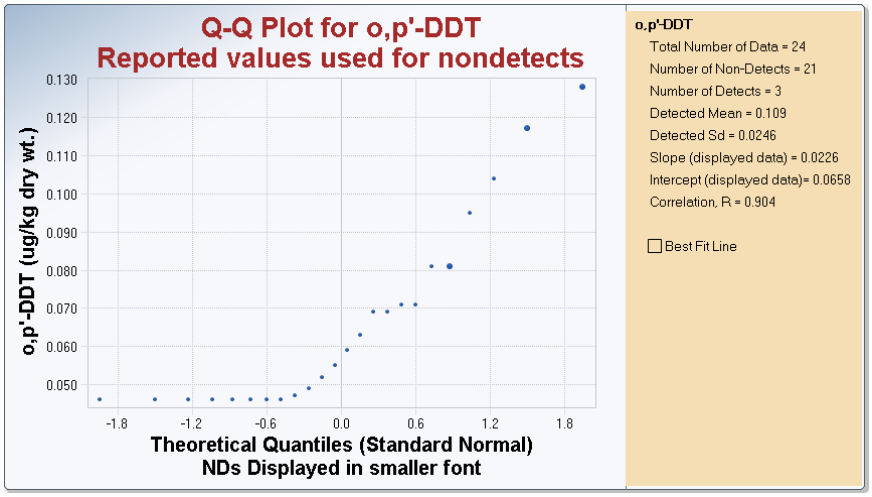

Q-Q Plot for Mirex
Reported values used for nondetects
Mirex (ug/kg dry wt.)
1.5
1.2
0.9
0.6
0.3
-1.8
-1.2
-0.6
0.0
0.6
1.2
1.8
Theoretical Quantiles (Standard Normal)
NDs Displayed in smaller font
Mirex
Total Number of Data = 24
Number of Non-Detects = 13
Number of Detects = 11
Detected Mean = 0.453
Detected Sd = 0.519
Slope (displayed data) = 0.293
Intercept (displayed data)= 0.247
Correlation, R = 0.72
Best Fit Line

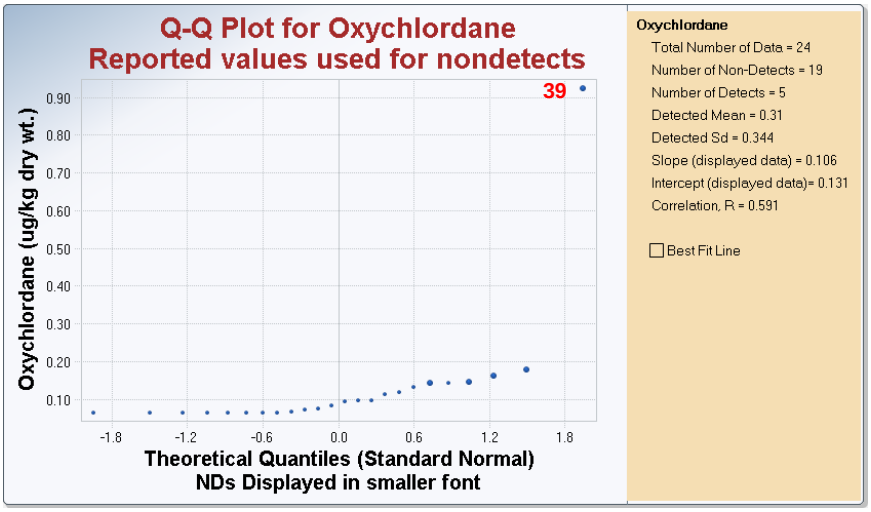

Q-Q Plot for trans-Nonachlor
Reported values used for nondetects
trans-Nonachlor (ug/kg dry wt.)
38
2.1
1.8
1.5
1.2
0.9
0.6
0.3
0.0
-1.8
-1.2
-0.6
0.0
0.6
1.2
1.8
Theoretical Quantiles (Standard Normal)
NDs Displayed in smaller font
trans-Nonachlor
Total Number of Data = 24
Number of Non-Detects = 11
Number of Detects = 13
Detected Mean = 0.522
Detected Sd = 0.488
Slope (displayed data) = 0.333
Intercept (displayed data)= 0.312
Correlation, R = 0.763
Best Fit Line

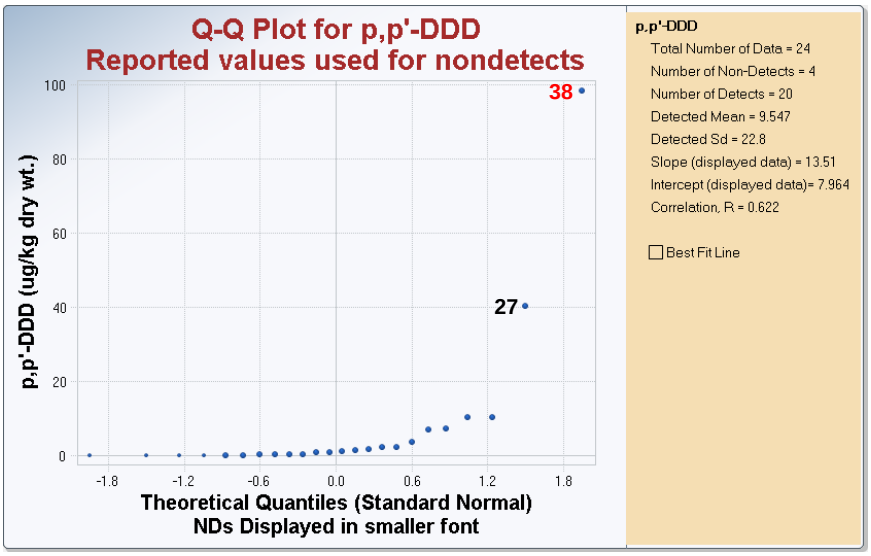

Q-Q Plot for cis-Nonachlor
Reported values used for nondetects
cis-Nonachlor (ug/kg dry wt.)
38
27
1.2
1.0
0.8
0.6
0.4
0.2
-1.8
-1.2
-0.6
0.0
0.6
1.2
1.8
Theoretical Quantiles (Standard Normal)
NDs Displayed in smaller font
cis-Nonachlor
Total Number of Data = 24
Number of Non-Detects = 7
Number of Detects = 17
Detected Mean = 0.316
Detected Sd = 0.328
Slope (displayed data) = 0.247
Intercept (displayed data)= 0.24
Correlation, R = 0.799
Best Fit Line

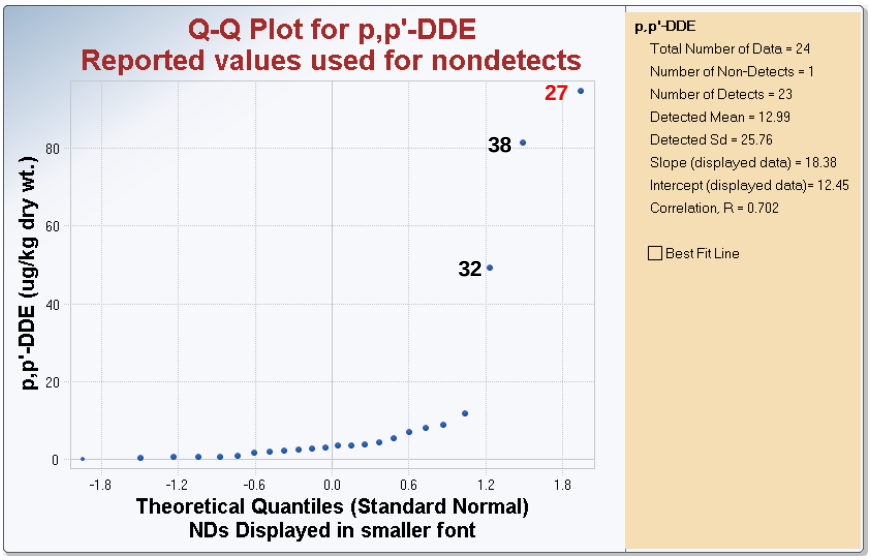

Q-Q Plot for o,p'-DDD
Reported values used for nondetects
o,p'-DDD (ug/kg dry wt.)
28
24
20
16
12
8
4
0
38
27
-1.8
-1.2
-0.6
0.0
0.6
1.2
1.8
Theoretical Quantiles (Standard Normal)
NDs Displayed in smaller font
o,p'-DDD
Total Number of Data = 24
Number of Non-Detects = 7
Number of Detects = 17
Detected Mean = 3.109
Detected Sd = 6.835
Slope (displayed data) = 3.6
Intercept (displayed data)= 2.219
Correlation, R = 0.593
Best Fit Line

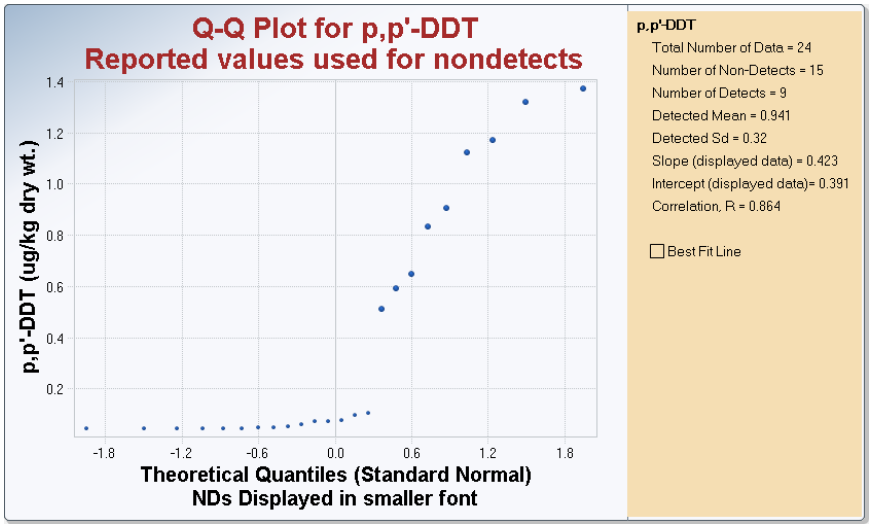

Q-Q Plot for o,p'-DDE
Reported values used for nondetects
o,p'-DDE (ug/kg dry wt.)
3.5
3.0
2.5
2.0
1.5
1.0
0.5
0.0
27
38
-1.8
-1.2
-0.6
0.0
0.6
1.2
1.8
Theoretical Quantiles (Standard Normal)
NDs Displayed in smaller font
o,p'-DDE
Total Number of Data = 24
Number of Non-Detects = 13
Number of Detects = 11
Detected Mean = 0.712
Detected Sd = 1.199
Slope (displayed data) = 0.542
Intercept (displayed data)= 0.367
Correlation, R = 0.614
Best Fit Line

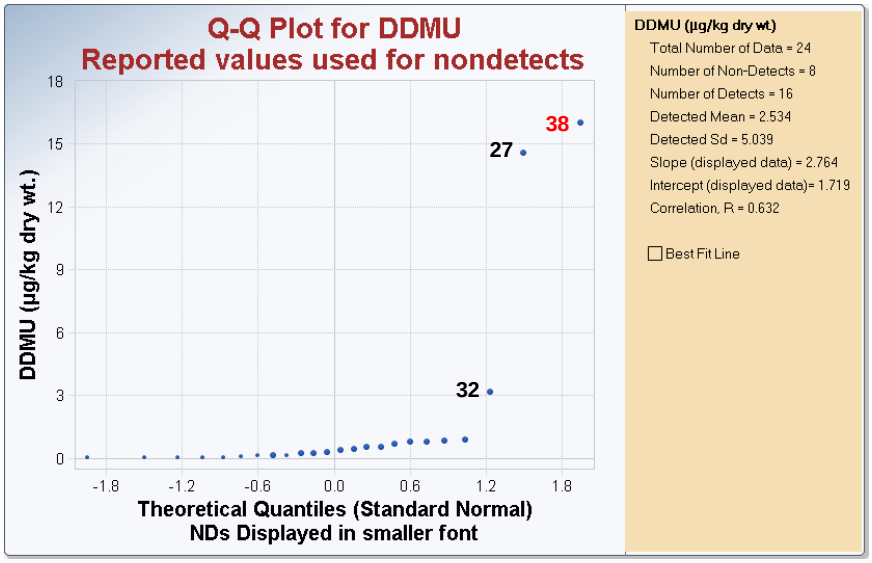

Q-Q Plot for o,p'-DDT
Reported values used for nondetects
o,p'-DDT (ug/kg dry wt.)
0.130
0.120
0.110
0.100
0.090
0.080
0.070
0.060
0.050
-1.8
-1.2
-0.6
0.0
0.6
1.2
1.8
Theoretical Quantiles (Standard Normal)
NDs Displayed in smaller font
o,p'-DDT
Total Number of Data = 24
Number of Non-Detects = 21
Number of Detects = 3
Detected Mean = 0.109
Detected Sd = 0.0246
Slope (displayed data) = 0.0226
Intercept (displayed data)= 0.0658
Correlation, R = 0.904
Best Fit Line

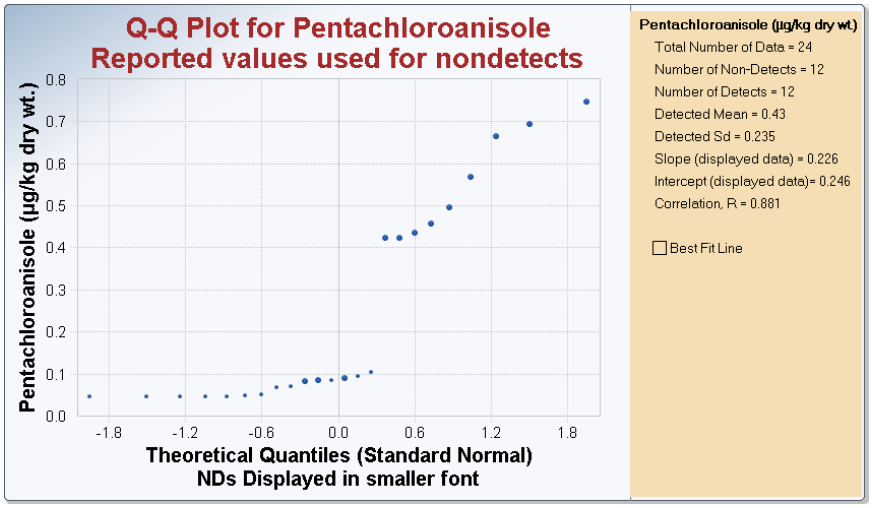

Q-Q Plot for Oxychlordane
Reported values used for nondetects
Oxychlordane (ug/kg dry wt.)
0.90
0.80
0.70
0.60
0.50
0.40
0.30
0.20
0.10
39
-1.8
-1.2
-0.6
0.0
0.6
1.2
1.8
Theoretical Quantiles (Standard Normal)
NDs Displayed in smaller font
Oxychlordane
Total Number of Data = 24
Number of Non-Detects = 19
Number of Detects = 5
Detected Mean = 0.31
Detected Sd = 0.344
Slope (displayed data) = 0.106
Intercept (displayed data)= 0.131
Correlation, R = 0.591
Best Fit Line


Q-Q Plot for p,p'-DDD
Reported values used for nondetects
p,p'-DDD (ug/kg dry wt.)
100
80
60
40
20
0
38
27
-1.8
-1.2
-0.6
0.0
0.6
1.2
1.8
Theoretical Quantiles (Standard Normal)
NDs Displayed in smaller font
p,p'-DDD
Total Number of Data = 24
Number of Non-Detects = 4
Number of Detects = 20
Detected Mean = 9.547
Detected Sd = 22.8
Slope (displayed data) = 13.51
Intercept (displayed data)= 7.964
Correlation, R = 0.622
Best Fit Line


Q-Q Plot for p,p'-DDE
Reported values used for nondetects
p,p'-DDE (ug/kg dry wt.)
80
60
40
20
0
27
38
32
-1.8
-1.2
-0.6
0.0
0.6
1.2
1.8
Theoretical Quantiles (Standard Normal)
NDs Displayed in smaller font
p,p'-DDE
Total Number of Data = 24
Number of Non-Detects = 1
Number of Detects = 23
Detected Mean = 12.99
Detected Sd = 25.76
Slope (displayed data) = 18.38
Intercept (displayed data)= 12.45
Correlation, R = 0.702
Best Fit Line


Q-Q Plot for p,p'-DDT
Reported values used for nondetects
p,p'-DDT (ug/kg dry wt.)
1.4
1.2
1.0
0.8
0.6
0.4
0.2
-1.8
-1.2
-0.6
0.0
0.6
1.2
1.8
Theoretical Quantiles (Standard Normal)
NDs Displayed in smaller font
p,p'-DDT
Total Number of Data = 24
Number of Non-Detects = 15
Number of Detects = 9
Detected Mean = 0.941
Detected Sd = 0.32
Slope (displayed data) = 0.423
Intercept (displayed data)= 0.391
Correlation, R = 0.864
Best Fit Line


Q-Q Plot for DDMU
Reported values used for nondetects
DDMU (µg/kg dry wt.)
18
15
12
9
6
3
0
38
27
32
-1.8
-1.2
-0.6
0.0
0.6
1.2
1.8
Theoretical Quantiles (Standard Normal)
NDs Displayed in smaller font
DDMU (µg/kg dry wt.)
Total Number of Data = 24
Number of Non-Detects = 8
Number of Detects = 16
Detected Mean = 2.534
Detected Sd = 5.039
Slope (displayed data) = 2.764
Intercept (displayed data)= 1.719
Correlation, R = 0.632
Best Fit Line


Q-Q Plot for Pentachloroanisole
Reported values used for nondetects
Pentachloroanisole (µg/kg dry wt.)
0.8
0.7
0.6
0.5
0.4
0.3
0.2
0.1
0.0
-1.8
-1.2
-0.6
0.0
0.6
1.2
1.8
Theoretical Quantiles (Standard Normal)
NDs Displayed in smaller font
Pentachloroanisole (µg/kg dry wt.)
Total Number of Data = 24
Number of Non-Detects = 12
Number of Detects = 12
Detected Mean = 0.43
Detected Sd = 0.235
Slope (displayed data) = 0.226
Intercept (displayed data)= 0.246
Correlation, R = 0.881
Best Fit Line

Appendix K
PCDD/Fs

Table K-1. TEF Values for Mammals/Humans and Fish

Group	CHEMCODE	Isomer	Mammal/Human TEFs (Van den Berg et al. 2006)	Fish TEFs (Van den Berg et al. 1998)
Dioxins	PCD2378	2,3,7,8-TCDD	1	1
Dioxins	PCD12378	**1,2,3,7,8-PeCDD**	**1**	1
Dioxins	PCD123478	1,2,3,4,7,8-HxCDD	0.1	0.5
Dioxins	PCD123678	1,2,3,6,7,8-HxCDD	0.1	0.01
Dioxins	PCD123789	1,2,3,7,8,9-HxCDD	0.1	0.01
Dioxins	PCD1234678	1,2,3,4,6,7,8-HpCDD	0.01	0.001
Dioxins	OCDD	**1,2,3,4,6,7,8,9-OCDD**	**0.0003**	0.0001
Furans	PCF2378	2,3,7,8-TCDF	0.1	0.05
Furans	PCF12378	1,2,3,7,8-PeCDF	0.03	0.05
Furans	PCF23478	2,3,4,7,8-PeCDF	0.3	0.5
Furans	PCF123478	1,2,3,4,7,8-HxCDF	0.1	0.1
Furans	PCF123678	1,2,3,6,7,8-HxCDF	0.1	0.1
Furans	PCF234678	2,3,4,6,7,8-HxCDF	0.1	0.1
Furans	PCF123789	1,2,3,7,8,9-HxCDF	0.1	0.1
Furans	PCF1234678	1,2,3,4,6,7,8-HpCDF	0.01	0.01
Furans	PCF1234789	1,2,3,4,7,8,9-HpCDF	0.01	0.01
Furans	OCDF	**1,2,3,4,6,7,8,9-OCDF**	**0.0003**	0.0001
PCBs	PCB077	**3,3'4,4'-TeCB (PCB (77)**	**0.0001**	0.0001
PCBs	PCB081	**3,4,4',5-TeCB (PCB 81)**	**0.0003**	0.0005
PCBs	PCB105	2,3,3',4,4'-PeCB (PCB 105)	0.00003	0.000005
PCBs	PCB114	2,3,4,4',5-PeCB (PCB 114)	0.00003	0.000005
PCBs	PCB118	2,3',4,4',5-PeCB (PCB 118)	0.00003	0.000005
PCBs	PCB123_149	2',3,4,4',5-PeCB (PCB 123)	0.00003	0.000005
PCBs	PCB126	3,3',4,4',5-PeCB (PCB 126)	0.1	0.005
PCBs	PCB156	2,3,3',4,4',5-HxCB (PCB 156)	0.00003	0.000005
PCBs	PCB157	2,3,3',4,4',5'-HxCB (PCB 157)	0.00003	0.000005
PCBs	PCB167	2,3',4,4',5,5'-HxCB (PCB 167)	0.00003	0.000005
PCBs	PCB169	3,3',4,4',5,5'-HxCB (PCB 169)	0.03	0.00005
PCBs	PCB189	2,3,3',4,4',5,5'-HpCB (PCB 189)	0.00003	0.000005

Table K-2. Additional Summary Statistics for Detected PCDD/F Congeners and Homologs, as well as ∑PCDD/F Congeners (n = 23)

Parameter	Minimum (ng/kg dry wt.)	Maximum (ng/kg dry wt.)	SEM (ng/kg dry wt.)	MAD/0.675 (ng/kg dry wt.)	Skewness	Kurtosis	CV
OCDD	3.3	1920.0	93.3	145.3	2.9	8.5	1.4
PCD_T4	1.3	51.6	2.5	3.1	2.6	7.6	1.3
PCD_T5	0.54	41.0	2.0	5.4	2.2	5.2	0.91
PCD_T6	4.8	113.0	5.9	14.5	2.0	4.3	0.89
PCD_T7	1.6	570.0	27.9	40.9	2.7	7.4	1.2
PCD1234678	0.59	254.0	12.7	23.6	2.6	6.6	1.2
PCD123789	0.093	11.9	0.64	2.1	1.7	2.7	0.84
PCF_T6	0.11	143.0	6.6	11.9	3.1	10.2	1.4
PCF1234678	0.15	66.1	3.2	5.1	2.9	8.4	1.3
∑PCDD/F Congeners	4.6	2504.0	122.5	162.4	2.9	8.2	1.4

PCDD/Fs = polychlorinated dibenzo-*p*-dioxins/dibenzofurans; n = number of samples; SEM = standard error of the mean; MAD = median absolute deviation; CV = coefficient of variation; other PCDD/F abbreviations are identified in Table 3-61.

Table K-3. Additional Summary Statistics for Censored PCDD/F Congeners and Homologs (n = 23)

Parameter	% NDs	Minimum ND (ng/kg dry wt.)	Maximum ND (ng/kg dry wt.)	KM Variance (ng/kg dry wt.)²*	KM CV*
OCDF	4.4	<0.191	<0.191	1757.0	1.6
PCD123478	4.4	<0.0714	<0.0714	0.99	0.89
PCD123678	4.4	<0.084	<0.084	9.1	0.93
PCD12378	4.4	<0.0474	<0.0474	0.84	0.92
PCD2378	39.1	<0.0821	<0.77	0.52	1.8
PCF_T4	4.4	<0.078	<0.078	1592.0	1.2
PCF_T5	4.4	<0.0358	<0.0358	2991.0	1.7
PCF_T7	4.4	<0.0524	<0.0524	1573.0	1.6
PCF123478	4.4	<0.0358	<0.0358	3.7	0.87
PCF1234789	8.7	<0.0548	<0.513	0.67	1.2
PCF123678	4.4	<0.0368	<0.0368	3.6	1.2
PCF12378	4.4	<0.0341	<0.0341	1.3	0.99
PCF123789	82.6	<0.023	<0.496	-	-
PCF234678	4.4	<0.0396	<0.0396	10.2	1.4
PCF23478	4.4	<0.0358	<0.0358	3.1	1.1
PCF2378	8.7	<0.053	<0.078	18.4	1.5

PCDD/F = polychlorinated dibenzo-*p*-dioxins/dibenzofurans; n = number of samples; ND = nondetect value; KM = Kaplan-Meier; CV = coefficient of variation; other PCDD/F abbreviations are identified in the report.

* Estimated using Kaplan-Meier method for nondetects <80%.

Table K-4. Additional Summary Statistics for Human Health and Aquatic Life TEQs

Parameter	SEM (ng TEQ/kg dry wt.)	MAD/0.675 (ng TEQ/kg dry wt.)	CV
Human Health TEQ			
HH_TEQ	1.1	3.5	0.55
HH_TEQ_KMDF	0.99	1.9	1.1
HH_TEQ_KMDFP	1.0	1.7	1.1
Aquatic Life TEQ			
W_TEQ	0.87	1.8	1.0
W_TEQ_KMDF	0.87	1.8	1.1
W_TEQ_KMDFP	0.87	1.9	1.1

TEQ = toxic equivalent; SEM = standard error of the mean; MAD = median absolute deviation; CV = coefficient of variation; HH = human health; KMDF = Kaplan-Meier calculation of TEQs using polychlorinated dibenzo-*p*-dioxins/dibenzofurans (PCDD/Fs); KMDFP = Kaplan-Meier calculation of TEQs using PCDD/Fs and coplanar polychlorinated biphenyls (PCBs); W = aquatic life.

Table K-5. Percentiles of PCDD/F Data. Highlighted Values are Based on Detected Data.

Parameter	25%ile (Q1) (ng/kg dry wt.)	50%ile (Q2) (ng/kg dry wt.)	75%ile (Q3) (ng/kg dry wt.)	95%ile (ng/kg dry wt.)	99%ile (ng/kg dry wt.)
Detected Data					
OCDD	112.2	187	287	1309	1806
PCD_T4	2.6	3.6	8.7	29.0	46.8
PCD_T5	5.5	7.6	12.0	29.9	38.8
PCD_T6	14.4	28.1	34	106	112.8
PCD_T7	45.8	76.4	102.5	414.3	541.6
PCD1234678	19.3	36.7	51.1	195.2	243.7
PCD123789	1.8	3.0	4.2	11.0	11.8
PCF_T6	7.0	15	22.2	84.2	131.5
PCF1234678	4.0	7.9	10.5	45.9	62.4
∑PCDD/F Congeners	156.0	284.8	380.8	1763.0	2369.0
Detected & Censored Data					
OCDF	5.8	16.7	21.8	131.8	167
PCD123478	0.43	0.88	1.3	3.6	3.8
PCD123678	1.4	2.8	3.2	11.3	12.0
PCD12378	0.48	0.77	1.0	2.7	3.9
PCD2378	0.15	<0.26	0.35	<1.1	3.1
PCF_T4	16.8	21.7	32.0	140.2	161.1
PCF_T5	11.0	18.9	25.6	114.4	233
PCF_T7	6.9	14.7	21.0	111.7	163.9
PCF123478	1.0	1.8	2.7	6.9	7.8
PCF1234789	0.27	0.48	0.79	2.4	3.5
PCF123678	0.62	1.2	1.6	5.1	8.2
PCF12378	0.61	0.89	1.2	4.0	4.8
PCF123789	<0.070	0.10	<0.16	<0.48	<0.58
PCF234678	0.73	1.6	2.4	6.8	13.8
PCF23478	0.72	1.0	1.6	5.6	7.3
PCF2378	1.0	1.6	2.6	9.3	18.1

Q = quantile.

Table K-6. Percentiles of Human Health and Aquatic Life TEQs. Highlighted Values Include Detected Data (units in ng TEQ/kg dry wt.).

Parameter	25%ile (Q1)	50%ile (Q2)	75%ile (Q3)	95%ile	99%ile
Human Health TEQ					
HH_TEQ	5.8	8.0	10.4	20.3	23.7
HH_TEQ_KMDF	2.0	3.4	4.1	16.2	19.1
HH_TEQ_KMDFP	2.1	3.3	4.2	16.4	19.8
Aquatic Life TEQ					
W_TEQ	1.9	3.1	3.9	14.4	16.8
W_TEQ_KMDF	1.7	3.0	3.7	14.2	16.6
W_TEQ_KMDFP	1.8	3.0	3.8	14.3	16.7

TEQ = toxic equivalent; Q = quantile; HH = human health; KMDF = Kaplan-Meier calculation of TEQs using polychlorinated dibenzo-*p*-dioxins/dibenzofurans (PCDD/Fs); KMDFP = Kaplan-Meier calculation of TEQs using PCDD/Fs and coplanar polychlorinated biphenyls (PCBs); W = aquatic life.

Table K-7. Spearman Rank Order Correlation (Rho Values) of PCDD/Fs with <5% Nondetects

Parameter	PCD_T4	PCD_T5	PCD_T6	PCD_T7	PCD12378	PCD123478	PCD123678	PCD123789	PCD1234678	PCF_T4
PCD_T4										
PCD_T5	0.380									
PCD_T6	0.151	**0.809**								
PCD_T7	0.108	**0.669**	**0.913**							
OCDD	0.112	**0.692**	**0.931**	**0.971**						
PCD12378	-0.119	***0.575***	**0.872**	**0.858**						
PCD123478	-0.0919	***0.564***	**0.862**	**0.888**	**0.964**					
PCD123678	-0.0445	***0.592***	**0.911**	**0.925**	**0.936**	**0.945**				
PCD123789	-0.0593	**0.649**	**0.914**	**0.881**	**0.969**	**0.972**	**0.953**			
PCD1234678	0.0825	**0.679**	**0.935**	**0.995**	**0.879**	**0.907**	**0.942**	**0.911**		
PCF_T4	0.226	***0.533***	**0.803**	**0.809**	**0.773**	**0.819**	**0.815**	**0.800**	**0.827**	
PCF_T5	0.114	***0.603***	**0.897**	**0.833**	**0.868**	**0.868**	**0.892**	**0.903**	**0.867**	**0.846**
PCF_T6	0.0810	***0.631***	**0.897**	**0.894**	**0.875**	**0.905**	**0.925**	**0.919**	**0.912**	**0.785**
PCF_T7	0.115	**0.699**	**0.933**	**0.965**	**0.858**	**0.889**	**0.918**	**0.902**	**0.974**	**0.772**
OCDF	0.119	***0.595***	**0.858**	**0.859**	**0.791**	**0.854**	**0.872**	**0.869**	**0.879**	**0.718**
PCF12378	-0.000988	***0.580***	**0.830**	**0.816**	**0.912**	**0.908**	**0.893**	**0.912**	**0.837**	**0.875**
PCF23478	-0.0939	***0.505***	**0.852**	**0.840**	**0.965**	**0.948**	**0.953**	**0.942**	**0.862**	**0.844**
PCF123478	-0.0998	***0.496***	**0.828**	**0.840**	**0.962**	**0.972**	**0.950**	**0.949**	**0.856**	**0.789**
PCF123678	-0.0751	***0.542***	**0.857**	**0.832**	**0.965**	**0.956**	**0.939**	**0.968**	**0.861**	**0.816**
PCF234678	-0.0741	***0.541***	**0.857**	**0.852**	**0.960**	**0.952**	**0.950**	**0.958**	**0.875**	**0.777**
PCF1234678	0.0326	***0.626***	**0.905**	**0.931**	**0.897**	**0.921**	**0.944**	**0.939**	**0.948**	**0.766**
∑PCDD/F Congeners	0.112	**0.676**	**0.931**	**0.964**	**0.835**	**0.869**	**0.916**	**0.891**	**0.979**	**0.789**

PCDD/Fs = polychlorinated dibenzo-*p*-dioxins/dibenzofurans; other PCDD/F congeners and homologs are identified in Table 3-61.

Spearman rho values:

Black font: not statistically significant, p>0.05

Blue, bold, italic font: statistically significant, p<0.05 and >0.001

Orange, bold font: highly statistically significant, p<0.001.

Table K-7. Continued

Parameter	PCF_T5	PCF_T6	PCF_T7	OCDF	PCF12378	PCF23478	PCF123478	PCF123678	PCF234678	PCF1234678
PCD_T4										
PCD_T5										
PCD_T6										
PCD_T7										
OCDD										
PCD12378										
PCD123478										
PCD123678										
PCD123789										
PCD1234678										
PCF_T4										
PCF_T5										
PCF_T6	**0.950**									
PCF_T7	**0.889**	**0.958**								
OCDF	**0.836**	**0.885**	**0.916**							
PCF12378	**0.852**	**0.809**	**0.790**	**0.779**						
PCF23478	**0.897**	**0.876**	**0.831**	**0.791**	**0.953**					
PCF123478	**0.865**	**0.898**	**0.846**	**0.814**	**0.910**	**0.976**				
PCF123678	**0.918**	**0.908**	**0.859**	**0.834**	**0.948**	**0.980**	**0.972**			
PCF234678	**0.930**	**0.952**	**0.888**	**0.821**	**0.882**	**0.960**	**0.972**	**0.975**		
PCF1234678	**0.908**	**0.958**	**0.973**	**0.938**	**0.845**	**0.882**	**0.897**	**0.920**	**0.935**	
∑PCDD/F Congeners	**0.867**	**0.905**	**0.975**	**0.935**	**0.803**	**0.821**	**0.810**	**0.840**	**0.841**	**0.955**

PCDD/Fs = polychlorinated dibenzo-*p*-dioxins/dibenzofurans; other PCDD/F congeners and homologs are identified in Table 3-61.

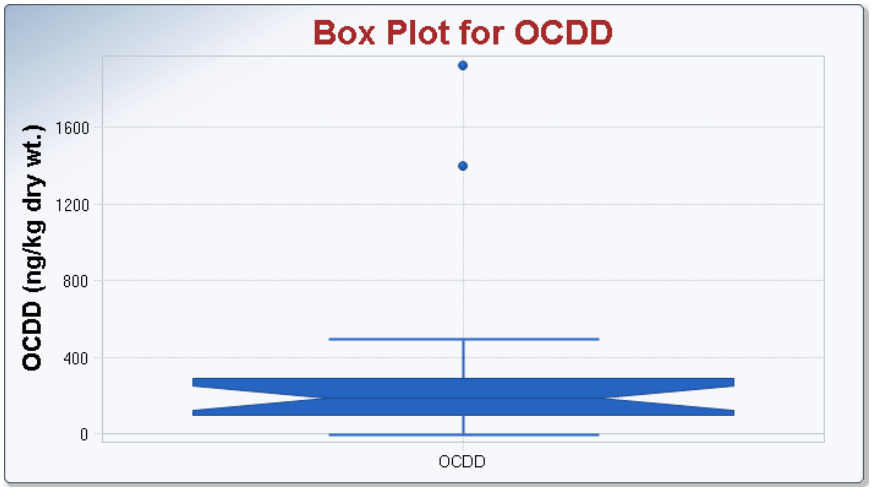
Spearman rho values:

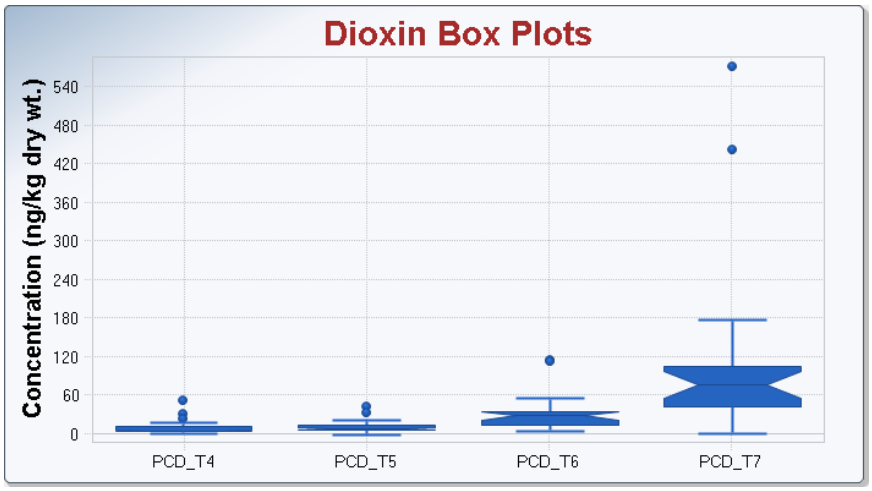
Black font: not statistically significant, p>0.05

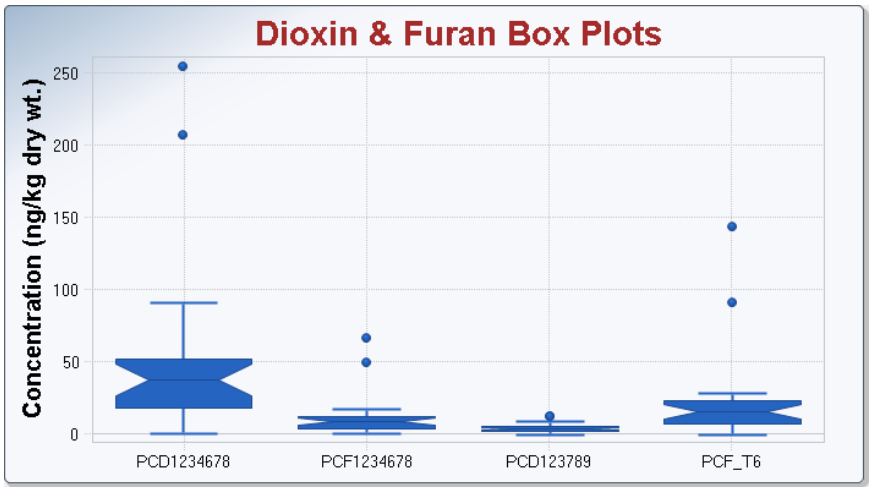
Blue, bold, italic font: statistically significant, p<0.05 and >0.001

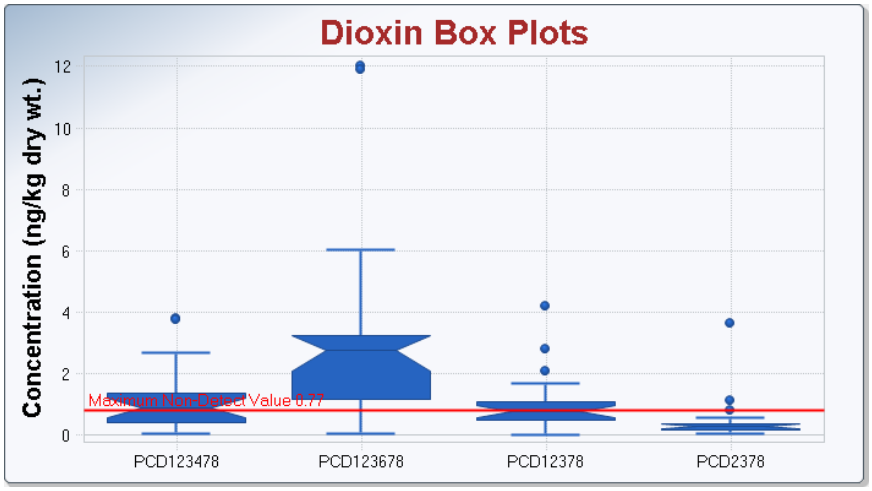
Orange, bold font: highly statistically significant, p<0.001.

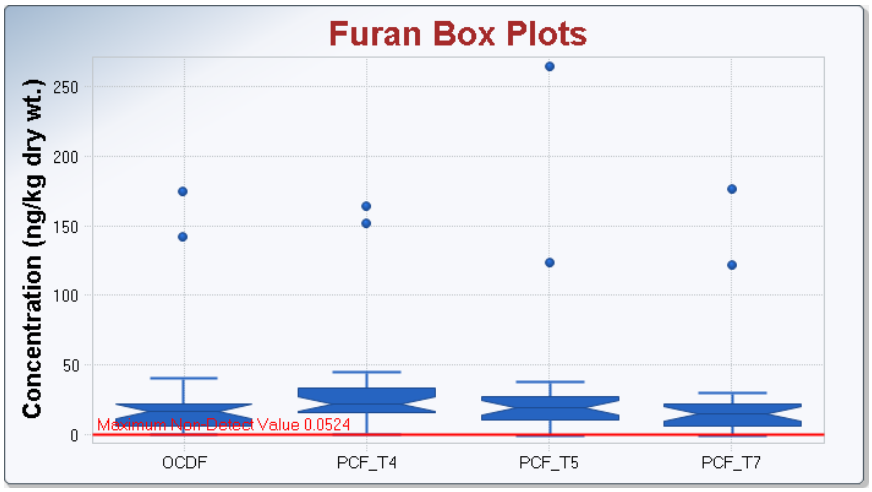
PCDD/F Box Plots

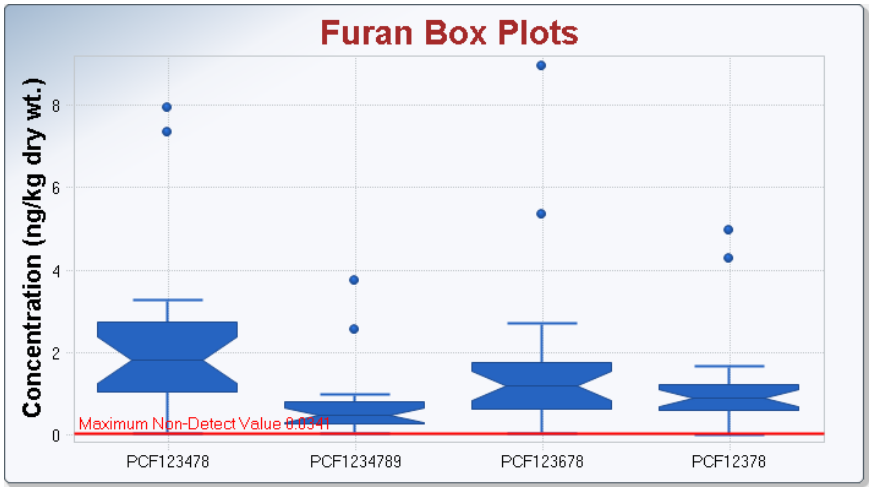


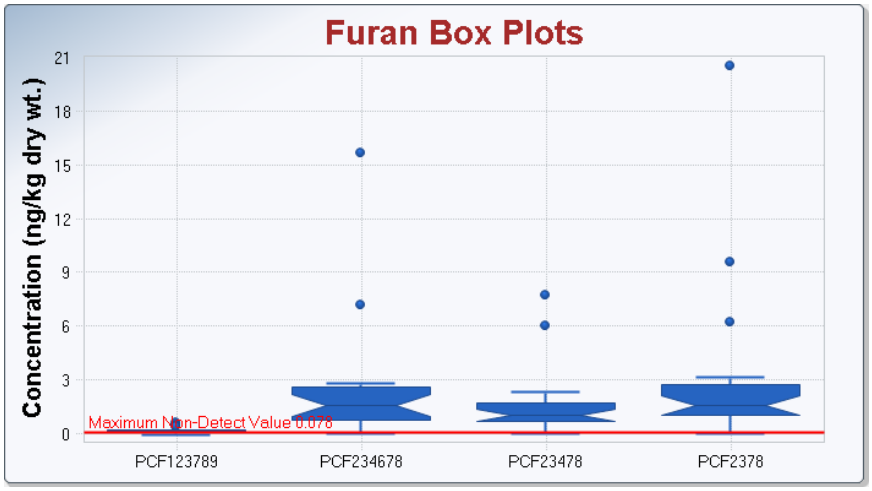


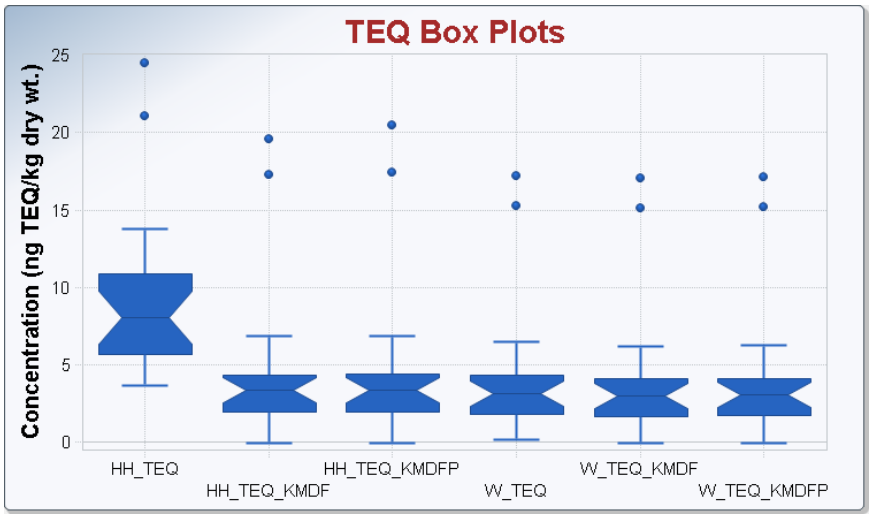


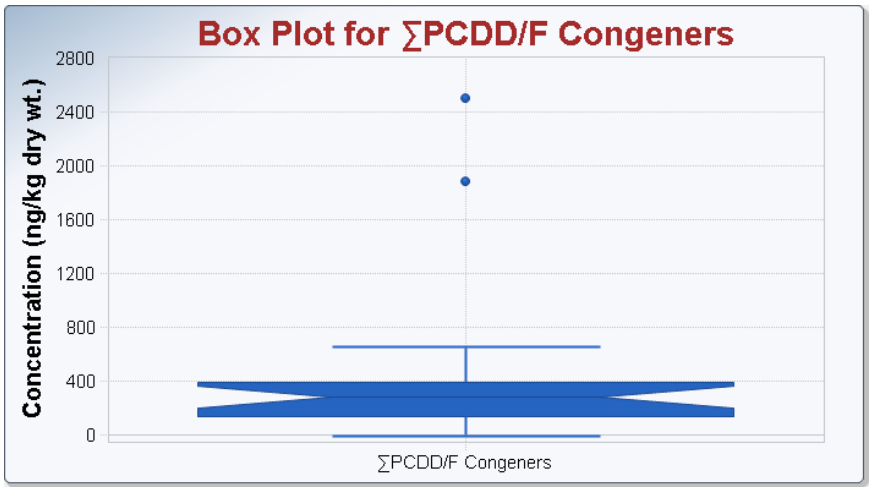

Dioxin Box Plots
Concentration (ng/kg dry wt.)
12
10
8
6
4
2
0
Maximum Non-Detect Value 0.77
PCD123478
PCD123678
PCD12378
PCD2378


Furan Box Plots
Concentration (ng/kg dry wt.)
250
200
150
100
50
0
Maximum Non-Detect Value 0.0524
OCDF
PCF_T4
PCF_T5
PCF_T7

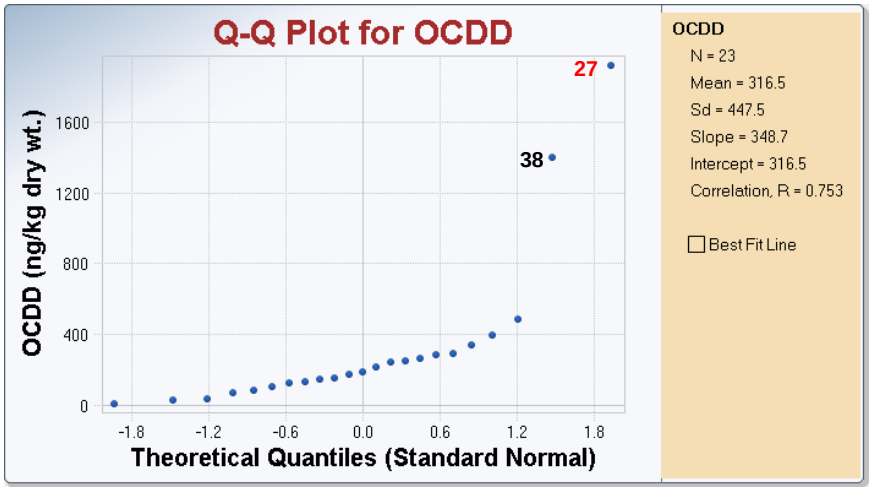

Furan Box Plots
Concentration (ng/kg dry wt.)
8
6
4
2
0
Maximum Non-Detect Value 0.0341
PCF123478
PCF1234789
PCF123678
PCF12378

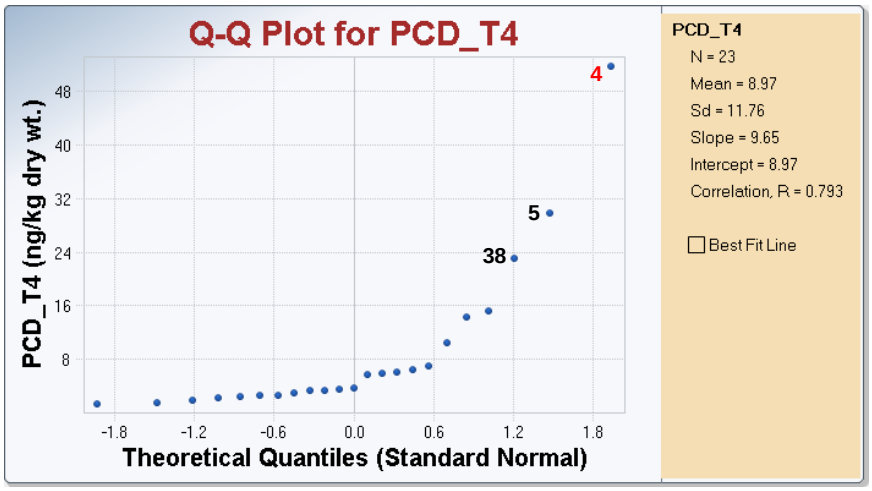

Furan Box Plots
Concentration (ng/kg dry wt.)
21
18
15
12
9
6
3
0
Maximum Non-Detect Value 0.076
PCF123789
PCF234678
PCF23478
PCF2378

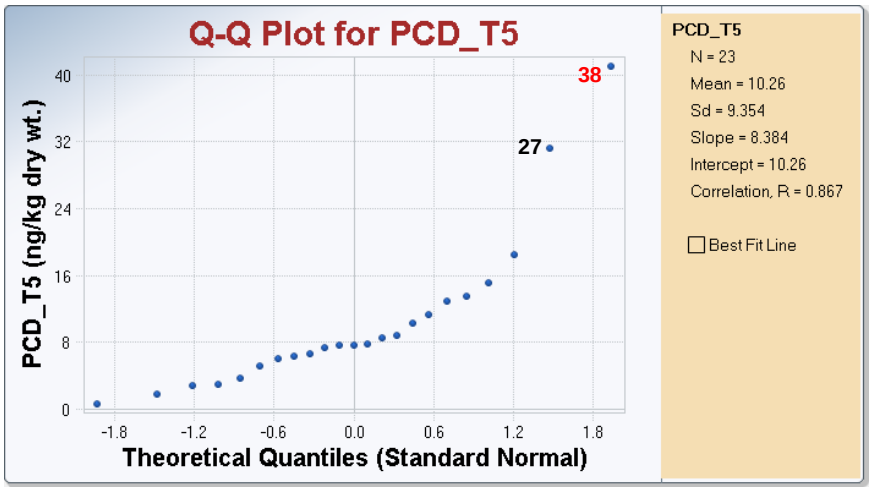

TEQ Box Plots
Concentration (ng TEQ/kg dry wt.)
25
20
15
10
5
0
HH_TEQ
HH_TEQ_KMDF
HH_TEQ_KMDFP
W_TEQ
W_TEQ_KMDF
W_TEQ_KMDFP

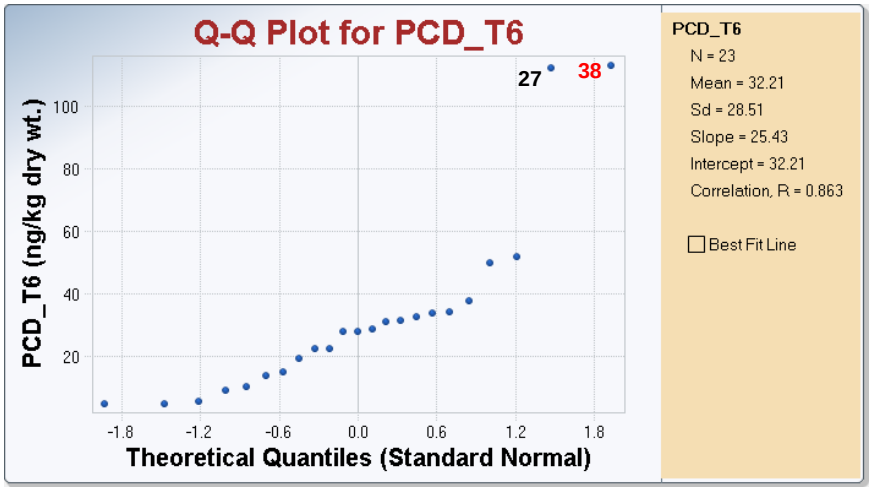

Box Plot for ∑PCDD/F Congeners
Concentration (ng/kg dry wt.)
2800
2400
2000
1600
1200
800
400
0
∑PCDD/F Congeners

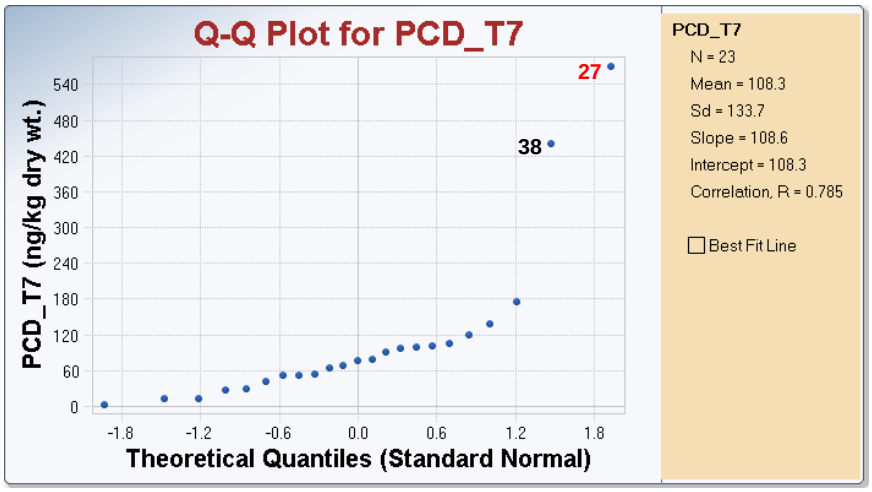
Q-Q Plots for Detected PCDD/Fs (samples noted in red font are significant at the 5% significance level and those noted in black font were excluded based on professional judgment)

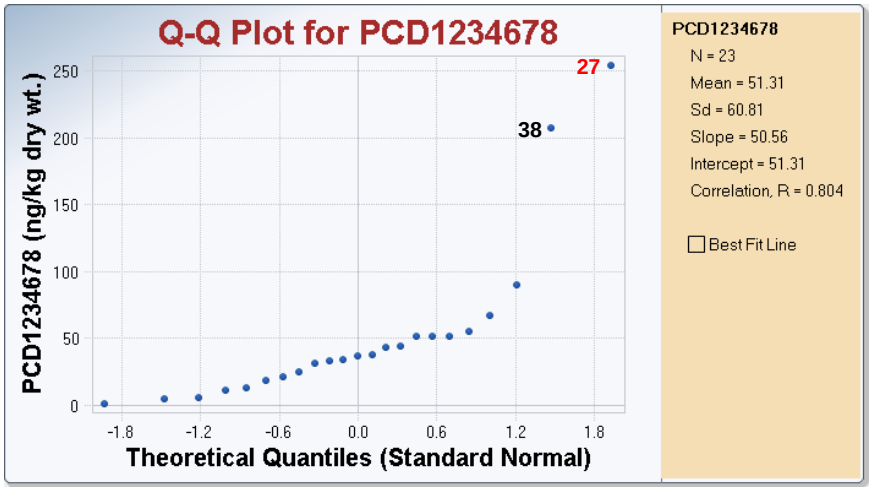


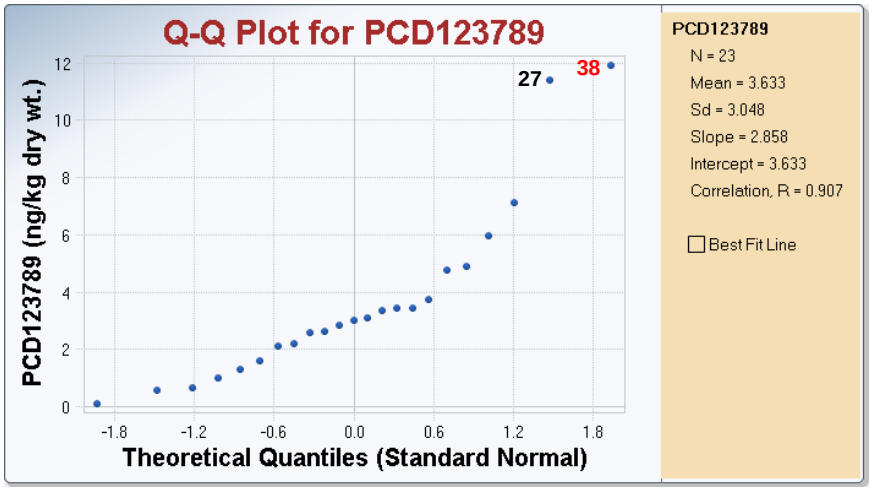


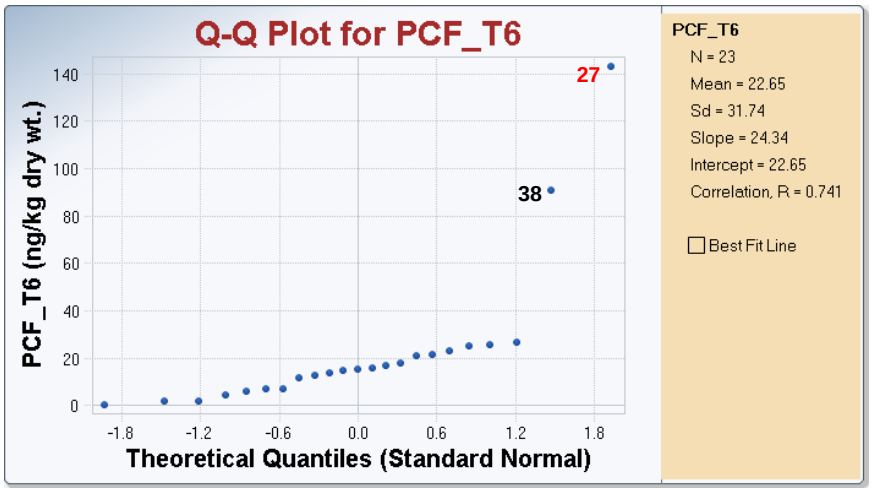


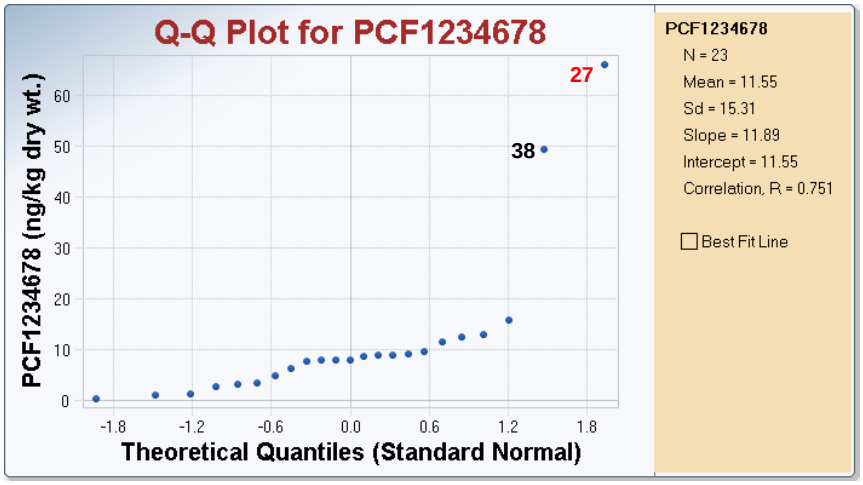

Q-Q Plot for PCD_T6
PCD_T6 (ng/kg dry wt.)
Theoretical Quantiles (Standard Normal)
27
38
PCD_T6
N = 23
Mean = 32.21
Sd = 28.51
Slope = 25.43
Intercept = 32.21
Correlation, R = 0.863
Best Fit Line

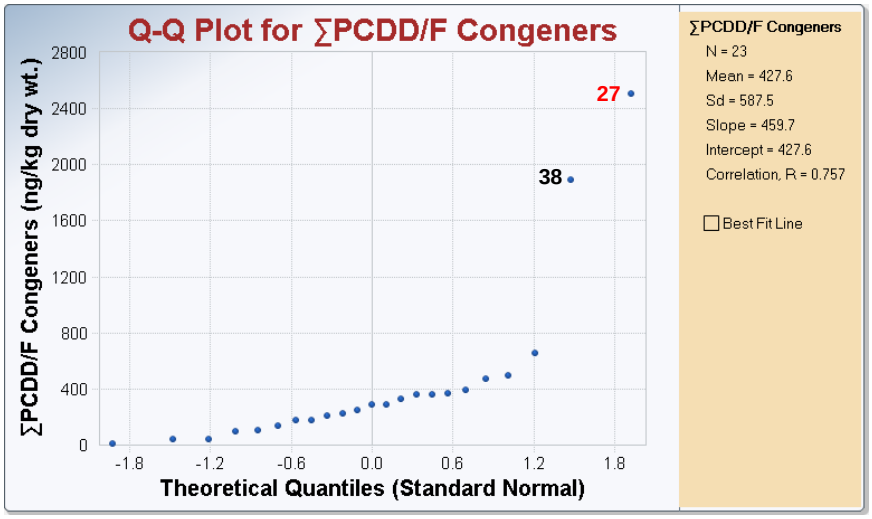

Q-Q Plot for PCD_T7
PCD_T7 (ng/kg dry wt.)
Theoretical Quantiles (Standard Normal)
27
38
PCD_T7
N = 23
Mean = 108.3
Sd = 133.7
Slope = 108.6
Intercept = 108.3
Correlation, R = 0.785
Best Fit Line


Q-Q Plot for PCD1234678
PCD1234678 (ng/kg dry wt.)
Theoretical Quantiles (Standard Normal)
27
38
PCD1234678
N = 23
Mean = 51.31
Sd = 60.81
Slope = 50.56
Intercept = 51.31
Correlation, R = 0.804
Best Fit Line

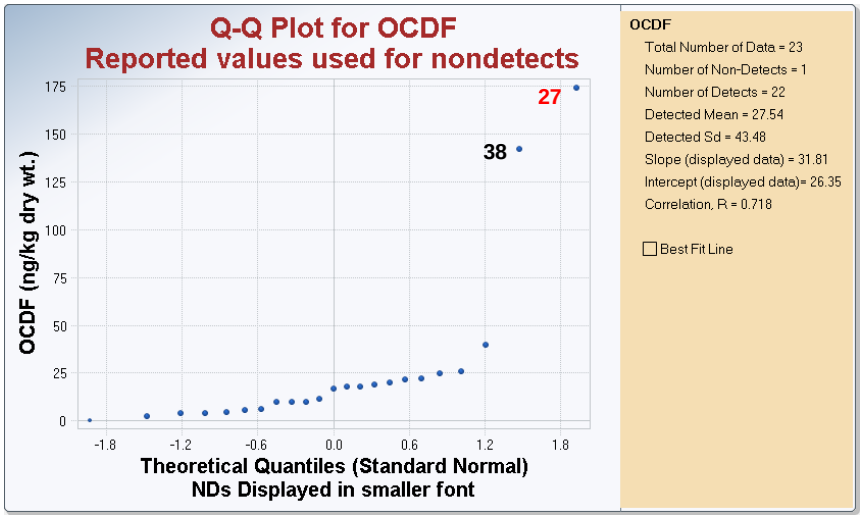

Q-Q Plot for PCD123789
PCD123789 (ng/kg dry wt.)
Theoretical Quantiles (Standard Normal)
27
38
PCD123789
N = 23
Mean = 3.633
Sd = 3.048
Slope = 2.858
Intercept = 3.633
Correlation, R = 0.907
Best Fit Line

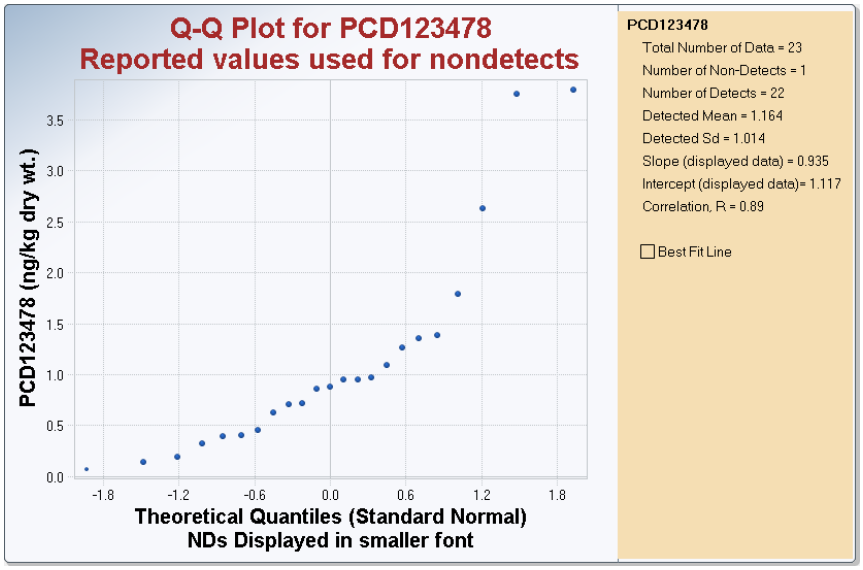

Q-Q Plot for PCF_T6
PCF_T6 (ng/kg dry wt.)
Theoretical Quantiles (Standard Normal)
27
38
PCF_T6
N = 23
Mean = 22.65
Sd = 31.74
Slope = 24.34
Intercept = 22.65
Correlation, R = 0.741
Best Fit Line

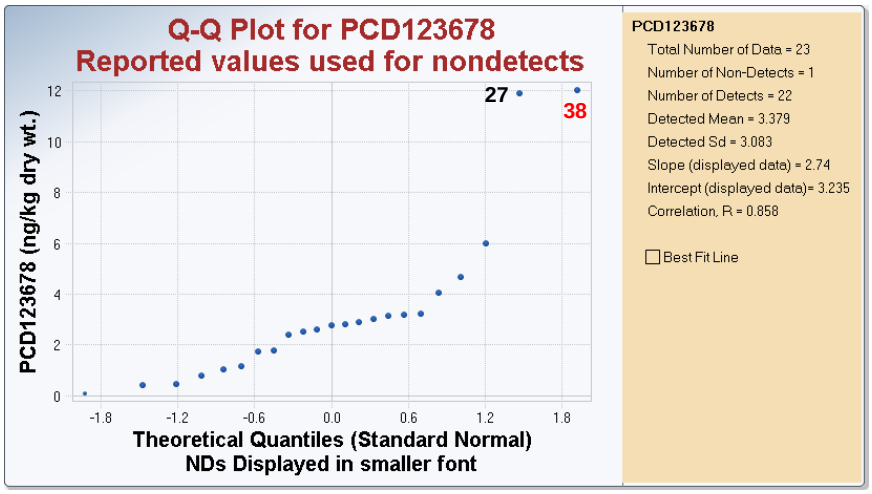

Q-Q Plot for PCF1234678
PCF1234678 (ng/kg dry wt.)
Theoretical Quantiles (Standard Normal)
27
38
PCF1234678
N = 23
Mean = 11.55
Sd = 15.31
Slope = 11.89
Intercept = 11.55
Correlation, R = 0.751
Best Fit Line

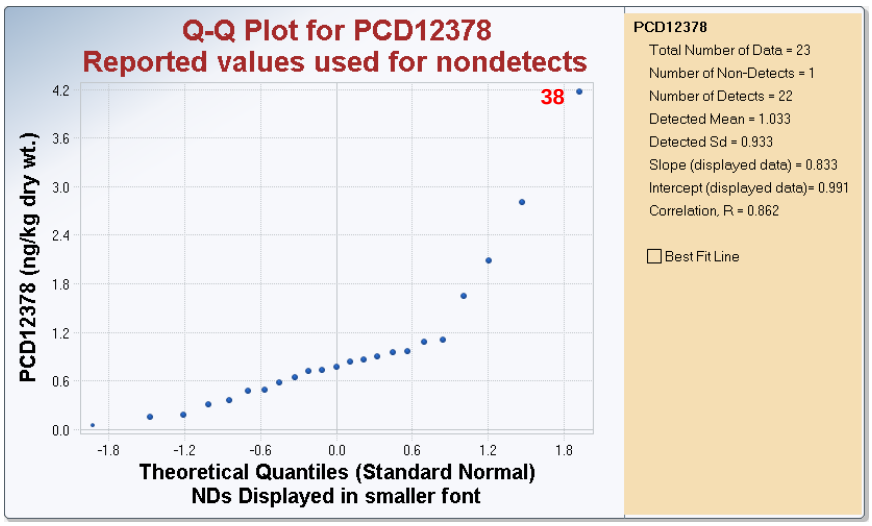


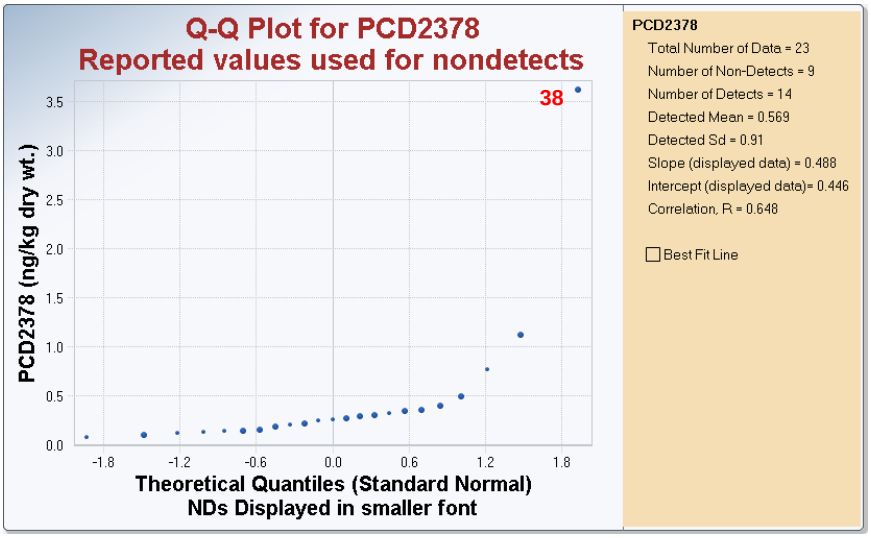
Q-Q Plots for PCDD/Fs with Censored Data (samples noted in red font are significant at the 5% significance level and those noted in black font were excluded based on professional judgment)

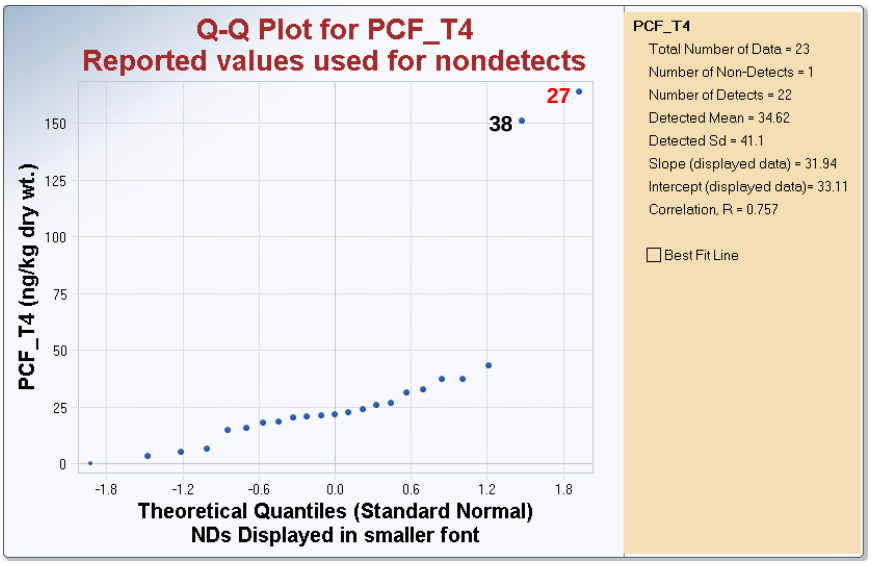


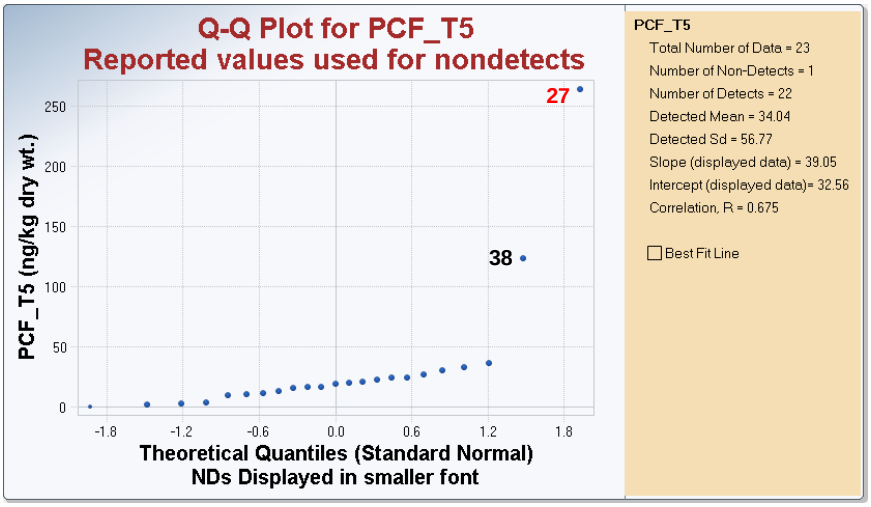

Q-Q Plot for PCD123478
Reported values used for nondetects
PCD123478 (ng/kg dry wt.)
Theoretical Quantiles (Standard Normal)
NDs Displayed in smaller font
PCD123478
Total Number of Data = 23
Number of Non-Detects = 1
Number of Detects = 22
Detected Mean = 1.164
Detected Sd = 1.014
Slope (displayed data) = 0.935
Intercept (displayed data)= 1.117
Correlation, R = 0.89
Best Fit Line

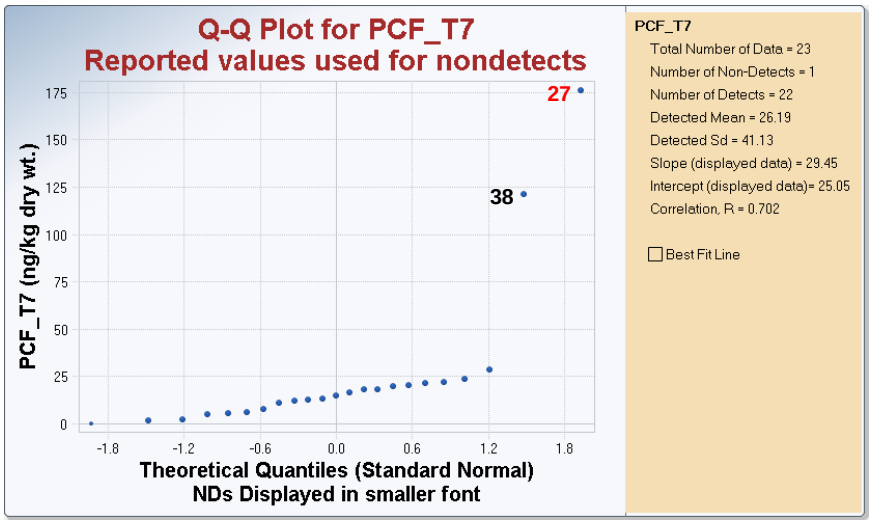

Q-Q Plot for PCD123678
Reported values used for nondetects
27
38
PCD123678 (ng/kg dry wt.)
Theoretical Quantiles (Standard Normal)
NDs Displayed in smaller font
PCD123678
Total Number of Data = 23
Number of Non-Detects = 1
Number of Detects = 22
Detected Mean = 3.379
Detected Sd = 3.083
Slope (displayed data) = 2.74
Intercept (displayed data)= 3.235
Correlation, R = 0.858
Best Fit Line

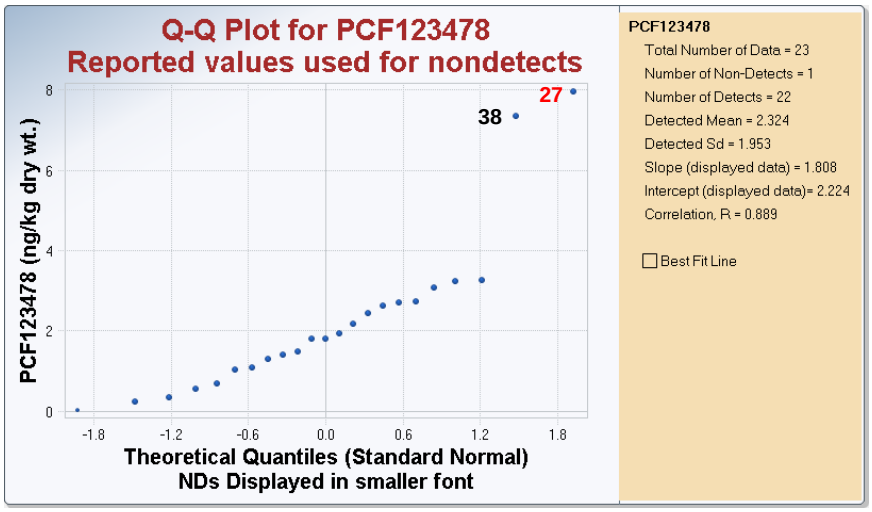

Q-Q Plot for PCD12378
Reported values used for nondetects
38
PCD12378 (ng/kg dry wt.)
Theoretical Quantiles (Standard Normal)
NDs Displayed in smaller font
PCD12378
Total Number of Data = 23
Number of Non-Detects = 1
Number of Detects = 22
Detected Mean = 1.033
Detected Sd = 0.933
Slope (displayed data) = 0.833
Intercept (displayed data)= 0.991
Correlation, R = 0.862
Best Fit Line

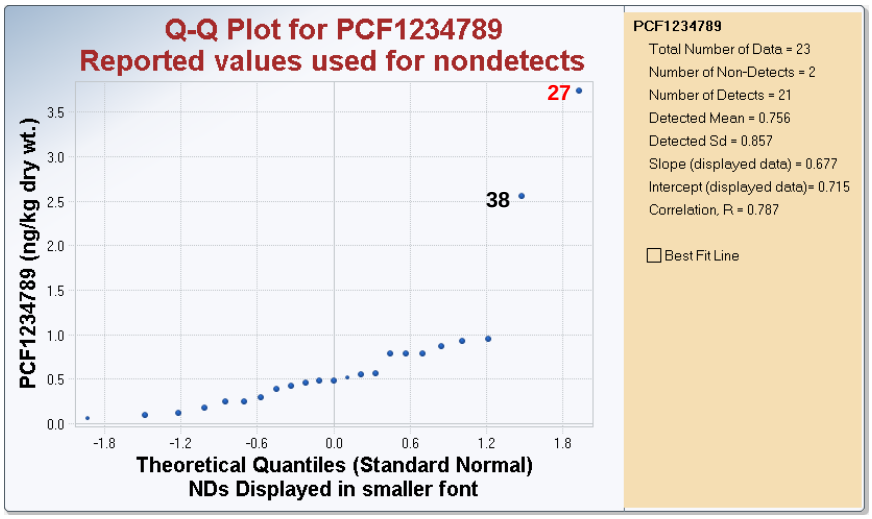

Q-Q Plot for PCD2378
Reported values used for nondetects
38
PCD2378 (ng/kg dry wt.)
3.5
3.0
2.5
2.0
1.5
1.0
0.5
0.0
-1.8
-1.2
-0.6
0.0
0.6
1.2
1.8
Theoretical Quantiles (Standard Normal)
NDs Displayed in smaller font
PCD2378
Total Number of Data = 23
Number of Non-Detects = 9
Number of Detects = 14
Detected Mean = 0.569
Detected Sd = 0.91
Slope (displayed data) = 0.488
Intercept (displayed data)= 0.446
Correlation, R = 0.648
Best Fit Line

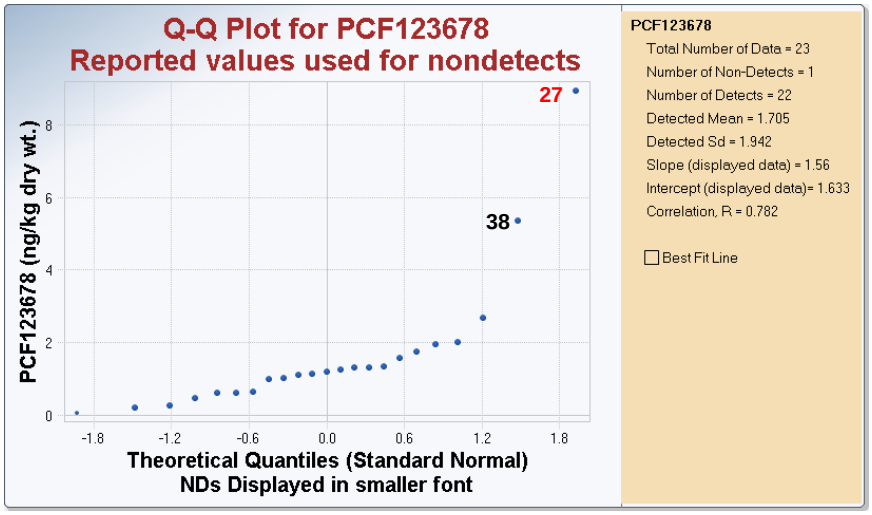

Q-Q Plot for PCF_T4
Reported values used for nondetects
27
38
PCF_T4 (ng/kg dry wt.)
150
125
100
75
50
25
0
-1.8
-1.2
-0.6
0.0
0.6
1.2
1.8
Theoretical Quantiles (Standard Normal)
NDs Displayed in smaller font
PCF_T4
Total Number of Data = 23
Number of Non-Detects = 1
Number of Detects = 22
Detected Mean = 34.62
Detected Sd = 41.1
Slope (displayed data) = 31.94
Intercept (displayed data)= 33.11
Correlation, R = 0.757
Best Fit Line

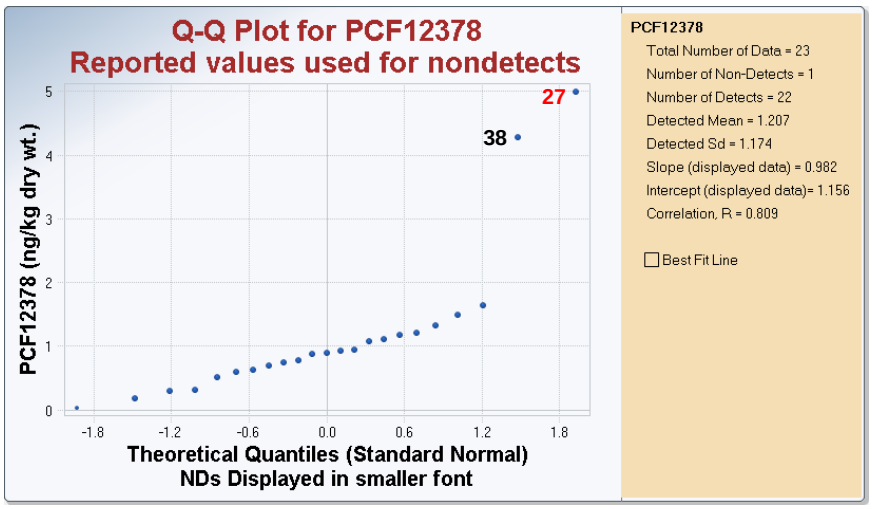

Q-Q Plot for PCF_T5
Reported values used for nondetects
27
38
PCF_T5 (ng/kg dry wt.)
250
200
150
100
50
0
-1.8
-1.2
-0.6
0.0
0.6
1.2
1.8
Theoretical Quantiles (Standard Normal)
NDs Displayed in smaller font
PCF_T5
Total Number of Data = 23
Number of Non-Detects = 1
Number of Detects = 22
Detected Mean = 34.04
Detected Sd = 56.77
Slope (displayed data) = 39.05
Intercept (displayed data)= 32.56
Correlation, R = 0.675
Best Fit Line

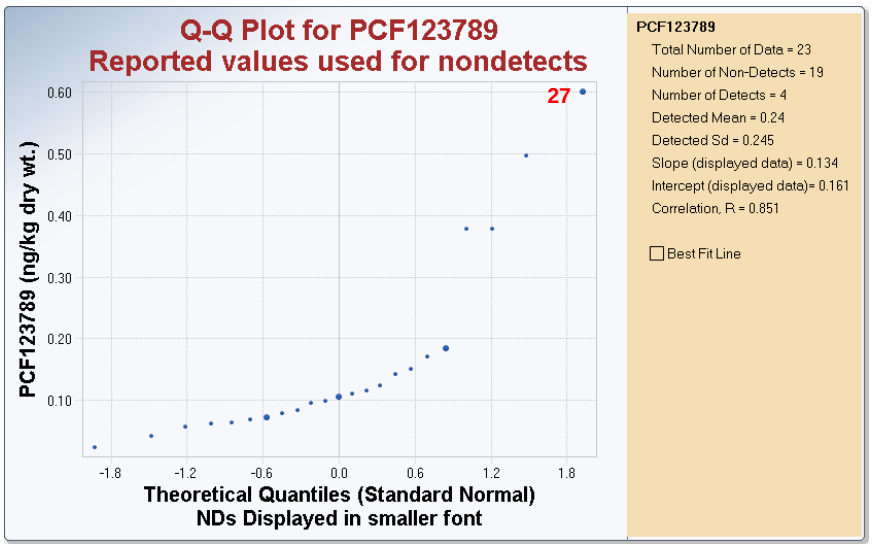

Q-Q Plot for PCF_T7
Reported values used for nondetects
PCF_T7 (ng/kg dry wt.)
175
150
125
100
75
50
25
0
27
38
-1.8
-1.2
-0.6
0.0
0.6
1.2
1.8
Theoretical Quantiles (Standard Normal)
NDs Displayed in smaller font
PCF_T7
Total Number of Data = 23
Number of Non-Detects = 1
Number of Detects = 22
Detected Mean = 26.19
Detected Sd = 41.13
Slope (displayed data) = 29.45
Intercept (displayed data)= 25.05
Correlation, R = 0.702
Best Fit Line

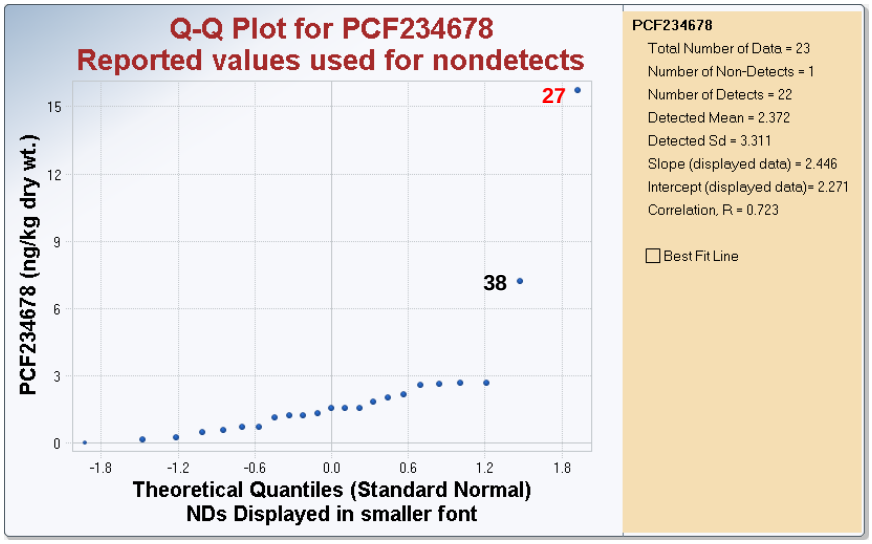

Q-Q Plot for PCF123478
Reported values used for nondetects
PCF123478 (ng/kg dry wt.)
8
6
4
2
0
27
38
-1.8
-1.2
-0.6
0.0
0.6
1.2
1.8
Theoretical Quantiles (Standard Normal)
NDs Displayed in smaller font
PCF123478
Total Number of Data = 23
Number of Non-Detects = 1
Number of Detects = 22
Detected Mean = 2.324
Detected Sd = 1.953
Slope (displayed data) = 1.808
Intercept (displayed data)= 2.224
Correlation, R = 0.889
Best Fit Line

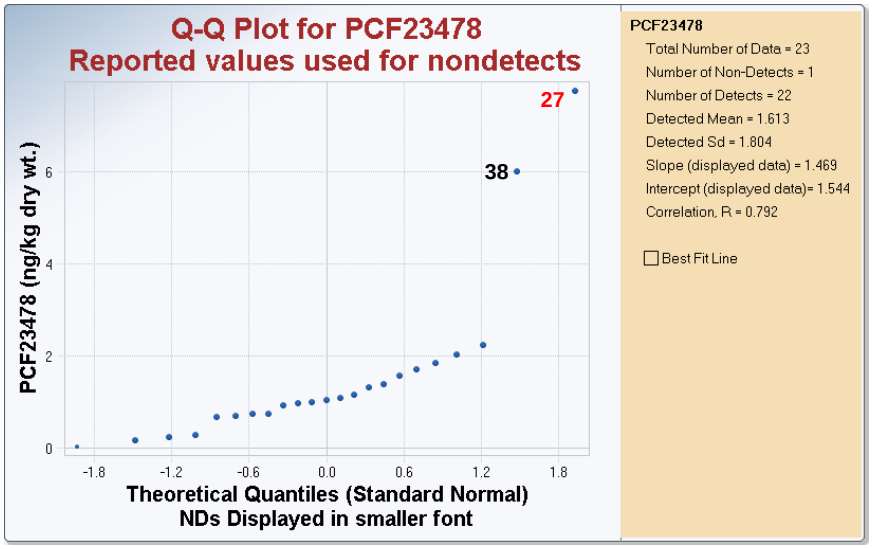

Q-Q Plot for PCF1234789
Reported values used for nondetects
PCF1234789 (ng/kg dry wt.)
3.5
3.0
2.5
2.0
1.5
1.0
0.5
0.0
27
38
-1.8
-1.2
-0.6
0.0
0.6
1.2
1.8
Theoretical Quantiles (Standard Normal)
NDs Displayed in smaller font
PCF1234789
Total Number of Data = 23
Number of Non-Detects = 2
Number of Detects = 21
Detected Mean = 0.756
Detected Sd = 0.857
Slope (displayed data) = 0.677
Intercept (displayed data)= 0.715
Correlation, R = 0.787
Best Fit Line

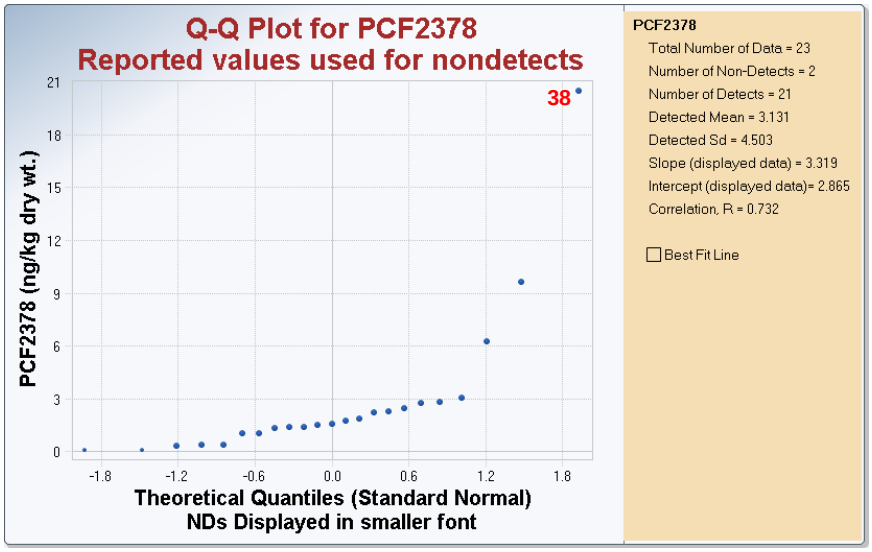

Q-Q Plot for PCF123678
Reported values used for nondetects
PCF123678 (ng/kg dry wt.)
Theoretical Quantiles (Standard Normal)
NDs Displayed in smaller font
27
38
PCF123678
Total Number of Data = 23
Number of Non-Detects = 1
Number of Detects = 22
Detected Mean = 1.705
Detected Sd = 1.942
Slope (displayed data) = 1.56
Intercept (displayed data)= 1.633
Correlation, R = 0.782
Best Fit Line


Q-Q Plot for PCF12378
Reported values used for nondetects
PCF12378 (ng/kg dry wt.)
Theoretical Quantiles (Standard Normal)
NDs Displayed in smaller font
27
38
PCF12378
Total Number of Data = 23
Number of Non-Detects = 1
Number of Detects = 22
Detected Mean = 1.207
Detected Sd = 1.174
Slope (displayed data) = 0.982
Intercept (displayed data)= 1.156
Correlation, R = 0.809
Best Fit Line

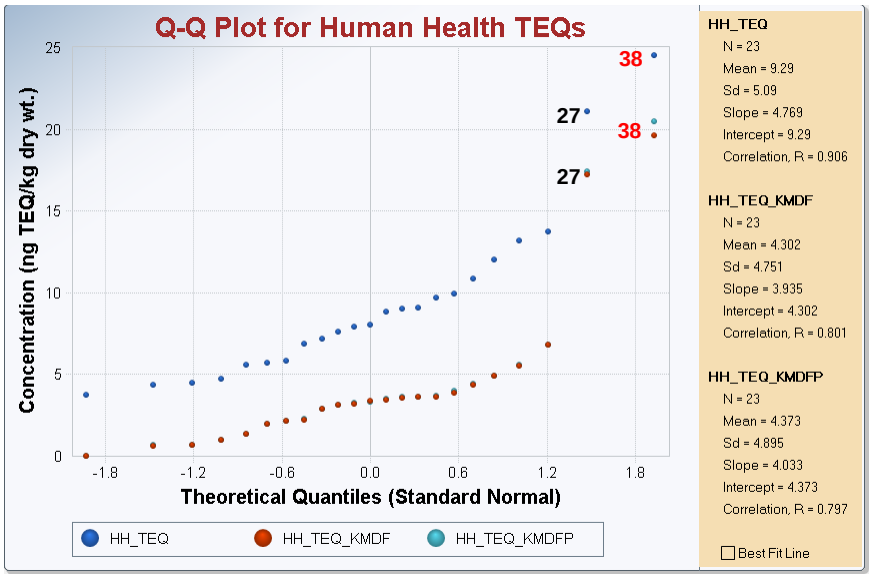

Q-Q Plot for PCF123789
Reported values used for nondetects
PCF123789 (ng/kg dry wt.)
Theoretical Quantiles (Standard Normal)
NDs Displayed in smaller font
27
PCF123789
Total Number of Data = 23
Number of Non-Detects = 19
Number of Detects = 4
Detected Mean = 0.24
Detected Sd = 0.245
Slope (displayed data) = 0.134
Intercept (displayed data)= 0.161
Correlation, R = 0.851
Best Fit Line

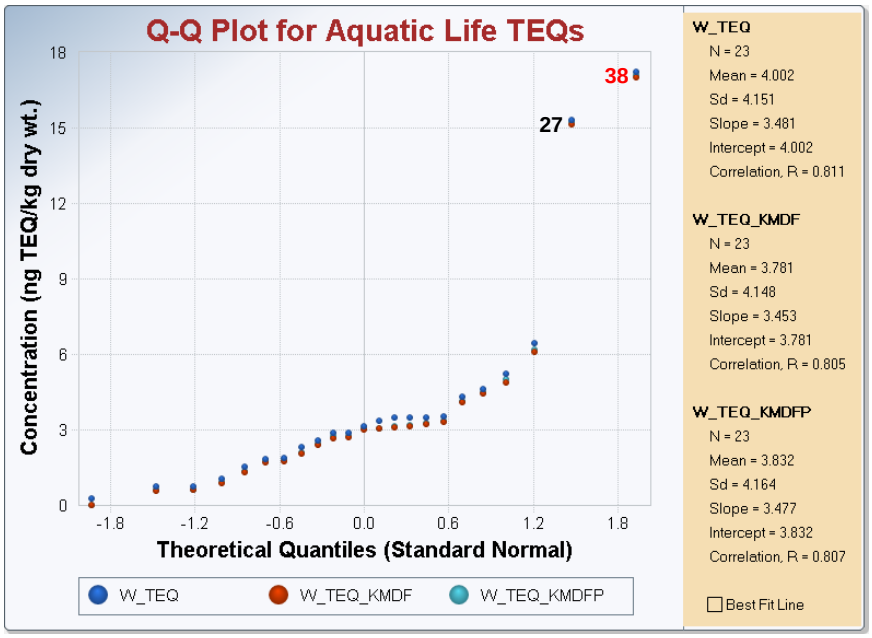

Q-Q Plot for PCF234678
Reported values used for nondetects
27
38
PCF234678 (ng/kg dry wt.)
0
3
6
9
12
15
-1.8
-1.2
-0.6
0.0
0.6
1.2
1.8
Theoretical Quantiles (Standard Normal)
NDs Displayed in smaller font
PCF234678
Total Number of Data = 23
Number of Non-Detects = 1
Number of Detects = 22
Detected Mean = 2.372
Detected Sd = 3.311
Slope (displayed data) = 2.446
Intercept (displayed data)= 2.271
Correlation, R = 0.723
Best Fit Line


Q-Q Plot for PCF23478
Reported values used for nondetects
27
38
PCF23478 (ng/kg dry wt.)
0
2
4
6
-1.8
-1.2
-0.6
0.0
0.6
1.2
1.8
Theoretical Quantiles (Standard Normal)
NDs Displayed in smaller font
PCF23478
Total Number of Data = 23
Number of Non-Detects = 1
Number of Detects = 22
Detected Mean = 1.613
Detected Sd = 1.804
Slope (displayed data) = 1.469
Intercept (displayed data)= 1.544
Correlation, R = 0.792
Best Fit Line


Q-Q Plot for PCF2378
Reported values used for nondetects
38
PCF2378 (ng/kg dry wt.)
0
3
6
9
12
15
18
21
-1.8
-1.2
-0.6
0.0
0.6
1.2
1.8
Theoretical Quantiles (Standard Normal)
NDs Displayed in smaller font
PCF2378
Total Number of Data = 23
Number of Non-Detects = 2
Number of Detects = 21
Detected Mean = 3.131
Detected Sd = 4.503
Slope (displayed data) = 3.319
Intercept (displayed data)= 2.865
Correlation, R = 0.732
Best Fit Line

Q-Q Plots for PCDD/F Toxic Equivalents (TEQs; samples noted in red font are significant at the 5% significance level and those noted in black font were excluded based on professional judgment)





Appendix L

BDEs and Total PBDEs with at Least One Detected Value

Table L-1. Additional Summary Statistics for Censored BDEs (n = 52)

BDE or Total PBDEs	% NDs	Minimum ND (ng/kg dry wt.)	Maximum ND (ng/kg dry wt.)	KM Variance (ng/kg dry wt.)^2*	KM CV*
BDE-1	100	<438	<1100	-	-
BDE-2	100	<438	<1100	-	-
BDE-3	100	<438	<1100	-	-
BDE-7	100	<438	<1100	-	-
BDE-8	100	<438	<1100	-	-
BDE-10	100	<438	<1100	-	-
BDE-11	100	<438	<1100	-	-
BDE-12	100	<438	<1100	-	-
BDE-13	100	<438	<1100	-	-
BDE-15	100	<438	<1100	-	-
BDE-17	100	<438	<1100	-	-
BDE-25	96.2	<438	<1100	-	-
BDE-28	100	<274	<686	-	-
BDE-30	98.1	<438	<1100	-	-
BDE-32	100	<438	<1100	-	-
BDE-33	100	<438	<1100	-	-
BDE-35	100	<438	<1100	-	-
BDE-37	100	<438	<1100	-	-
BDE-47	67.3	<647	<1620	2.4E+05	0.53
BDE-49+71	98.1	<740	<1850	-	-
BDE-66	100	<1410	<3540	-	-
BDE-75	92.3	<740	<1850	-	-
BDE-77	100	<740	<1850	-	-
BDE-85	100	<581	<1450	-	-
BDE-99	78.9	<879	<2200	2.3E+05	0.44
BDE-100	100	<777	<1940	-	-
BDE-116	100	<777	<1940	-	-
BDE-118	98.1	<777	<1940	-	-
BDE-119	100	<777	<1940	-	-
BDE-126	100	<777	<1940	-	-
BDE-138	100	<655	<1640	-	-
BDE-153	100	<1930	<4820	-	-
BDE-154	100	<951	<2380	-	-
BDE-155	94.2	<951	<2380	-	-
BDE-166	100	<951	<2380	-	-
BDE-181	94.2	<1410	<3520	-	-
BDE-183	100	<1410	<3520	-	-
BDE-190	100	<1650	<4130	-	-
BDE-194	98.1	<1650	<4130	-	-

Table L-1. Continued

BDE or Total PBDEs	% NDs	Minimum ND (ng/kg dry wt.)	Maximum ND (ng/kg dry wt.)	KM Variance (ng/kg dry wt.)^2*	KM CV*
BDE-195	100	<1650	<4130	-	-
BDE-196	100	<1650	<4130	-	-
BDE-197	100	<1650	<4130	-	-
BDE-198+199+203+200	98.1	<1650	<4130	-	-
BDE-201	100	<1650	<4130	-	-
BDE-202	94.2	<1650	<4130	-	-
BDE-204	100	<1650	<4130	-	-
BDE-205	80.8	<1650	<4130	-	-
BDE-206	69.2	<1650	<4130	6.9E+07	1.8
BDE-207	94.2	<1650	<4130	-	-
BDE-208	98.1	<1650	<4130	-	-
BDE-209	15.4	<1650	<4130	4.8E+09	3.6
Total PBDEs	17.3	<4800	<10400	6.9E+09	2.5

n = number of samples; BDE = brominated diphenyl ether; PBDE = polybrominated diphenyl ethers; ND = nondetect value; KM = Kaplan-Meier; CV = coefficient of variation.

* Estimated for nondetects <80%.

Table L-2. Percentiles of BDE and Total PBDE Data. Highlighted Values are Based on Detected Data.

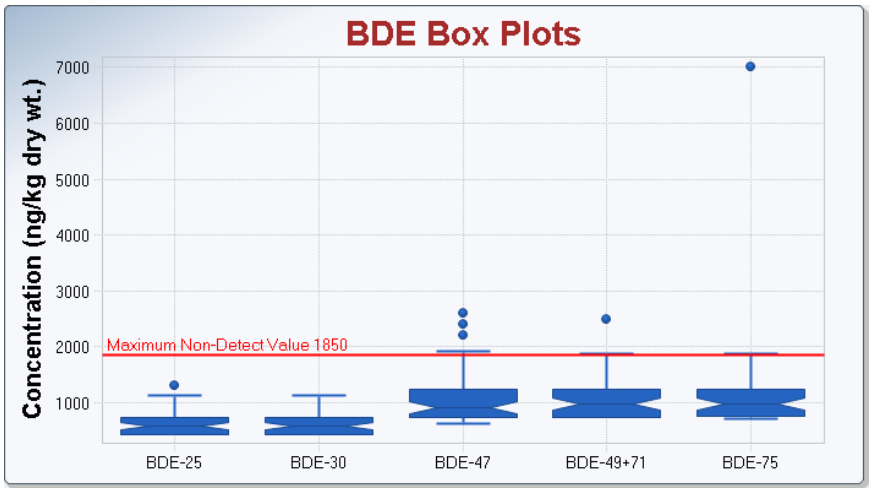
Parameter	25%ile (Q1) (µg/kg dw)	50%ile (Q2) (µg/kg dw)	75%ile (Q3) (µg/kg dw)	95%ile (µg/kg dw)	99%ile (µg/kg dw)
BDE-1	<0.44	<0.57	<0.73	<0.97	<1.1
BDE-2	<0.44	<0.57	<0.73	<0.97	<1.1
BDE-3	<0.44	<0.57	<0.73	<0.97	<1.1
BDE-7	<0.44	<0.57	<0.73	<0.97	<1.1
BDE-8	<0.44	<0.57	<0.73	<0.97	<1.1
BDE-10	<0.44	<0.57	<0.73	<0.97	<1.1
BDE-11	<0.44	<0.57	<0.73	<0.97	<1.1
BDE-12	<0.44	<0.57	<0.73	<0.97	<1.1
BDE-13	<0.44	<0.57	<0.73	<0.97	<1.1
BDE-15	<0.44	<0.57	<0.73	<0.97	<1.1
BDE-17	<0.44	<0.57	<0.73	<0.97	<1.1
BDE-25	<0.44	<0.57	<0.73	<0.97	<1.2
BDE-28	<0.27	<0.36	<0.46	<0.61	<0.68
BDE-30	<0.44	<0.57	<0.73	<0.97	<1.1
BDE-32	<0.44	<0.57	<0.73	<0.97	<1.1
BDE-33	<0.44	<0.57	<0.73	<0.97	<1.1
BDE-35	<0.44	<0.57	<0.73	<0.97	<1.1
BDE-37	<0.44	<0.57	<0.73	<0.97	<1.1
BDE-47	<0.76	0.90	1.2	2.0	2.5
BDE-49+71	<0.74	<0.97	<1.2	<1.8	<2.2
BDE-66	<1.4	<1.8	<2.3	<3.1	<3.5
BDE-75	<0.77	<0.97	<1.2	<1.8	<4.4
BDE-77	<0.74	<0.97	<1.2	<1.6	<1.8
BDE-85	<0.58	<0.76	<0.96	<1.3	<1.4
BDE-99	0.90	<1.2	<1.5	<2.3	2.8
BDE-100	<0.78	<1.0	<1.3	<1.7	<1.9
BDE-116	<0.78	<1.0	<1.3	<1.7	<1.9
BDE-118	<0.79	<1.0	<1.3	<1.7	<1.9
BDE-119	<0.78	<1.0	<1.3	<1.7	<1.9
BDE-126	<0.78	<1.0	<1.3	<1.7	<1.9
BDE-138	<0.66	<0.86	<1.1	<1.4	<1.6
BDE-153	<1.9	<2.5	<3.2	<4.3	<4.8
BDE-154	<0.95	<1.2	<1.6	<2.1	<2.4
BDE-155	<0.97	<1.2	<1.6	<2.2	<2.5
BDE-166	<0.95	<1.2	<1.6	<2.1	<2.4
BDE-181	<1.4	<1.8	<2.4	<3.6	6.2
BDE-183	<1.4	<1.8	<2.3	<3.1	<3.5
BDE-190	<1.6	<2.2	<2.7	<3.7	<4.1
BDE-194	<1.6	<2.2	<2.7	<3.7	<4.1
BDE-195	<1.6	<2.2	<2.7	<3.7	<4.1
BDE-196	<1.6	<2.2	<2.7	<3.7	<4.1

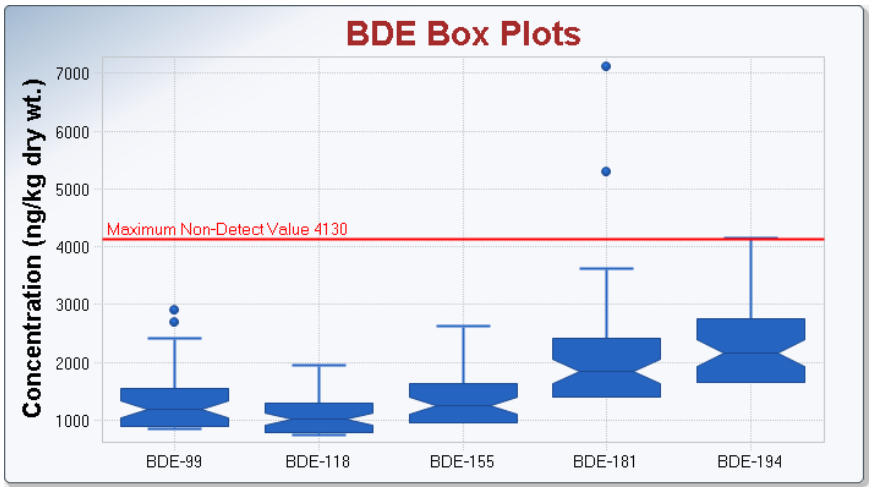
Table L-2. Continued

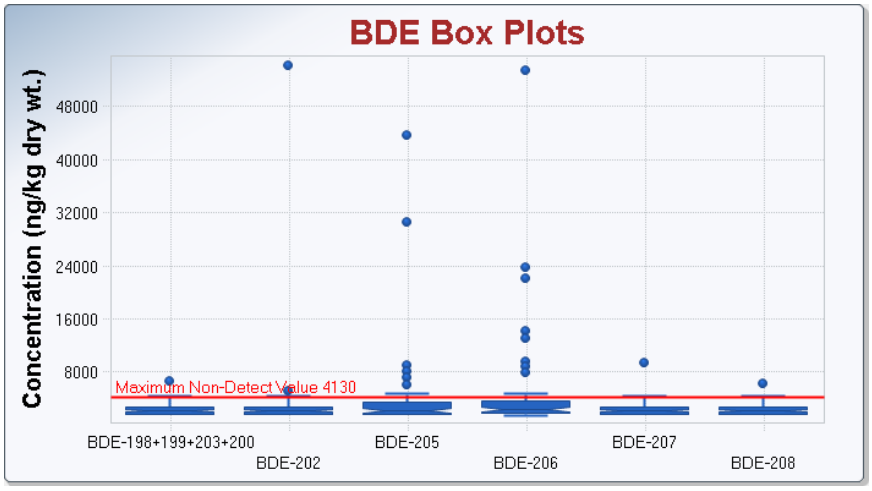
Parameter	25%ile (Q1) (µg/kg dw)	50%ile (Q2) (µg/kg dw)	75%ile (Q3) (µg/kg dw)	95%ile (µg/kg dw)	99%ile (µg/kg dw)
BDE-197	<1.6	<2.2	<2.7	<3.7	<4.1
BDE-198+199-+203+200	<1.6	<2.2	<2.8	<3.9	<5.3
BDE-201	<1.6	<2.2	<2.7	<3.7	<4.1
BDE-202	<1.6	<2.2	<2.8	<4.1	29.1
BDE-204	<1.6	<2.2	<2.7	<3.7	<4.1
BDE-205	<1.7	<2.2	<3.3	8.5	37.0
BDE-206	<1.9	2.4	<3.6	17.7	38.2
BDE-207	<1.6	<2.2	<2.7	<3.7	<6.7
BDE-208	<1.6	<2.2	<2.7	<3.7	<5.2
BDE-209	4.0	7.5	14.2	27.1	274.6
Total PBDEs	<9.1	14.5	28.2	56.1	369.9

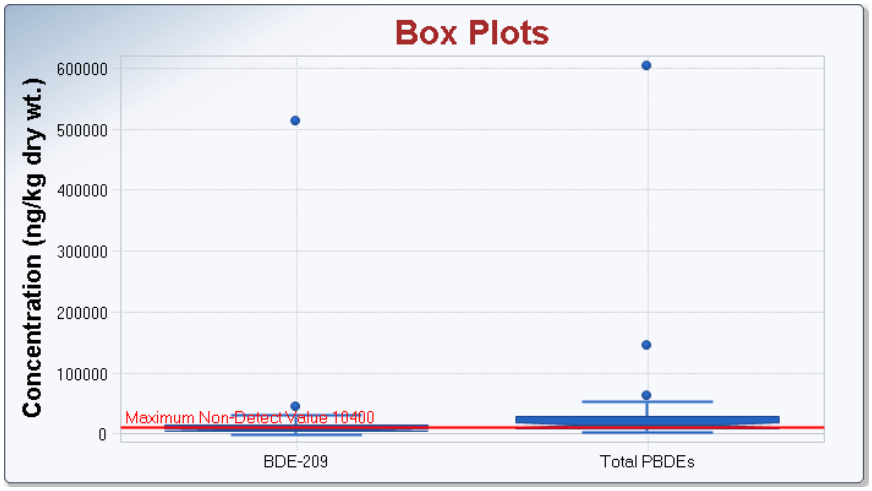
Q = quantile; dw = dry wt.; BDE = brominated diphenyl ethers; PBDE = polybrominated diphenyl ethers.

Box Plots for BDEs and Total PBDEs, Excluding 100% Nondetects

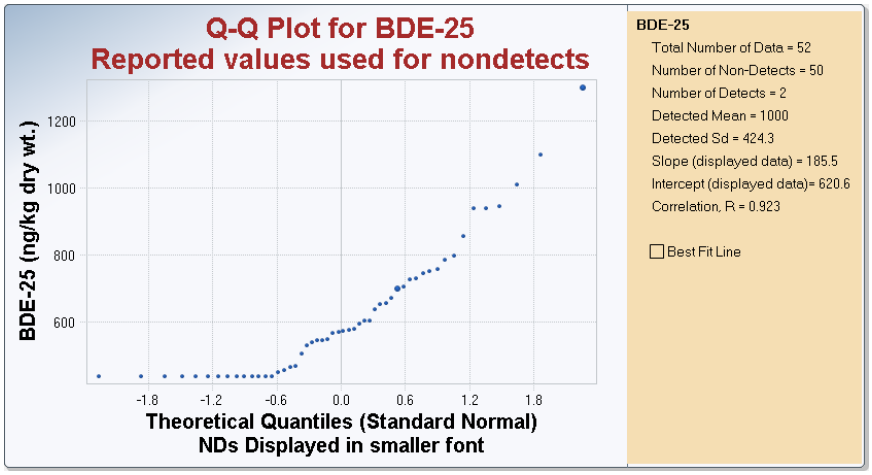


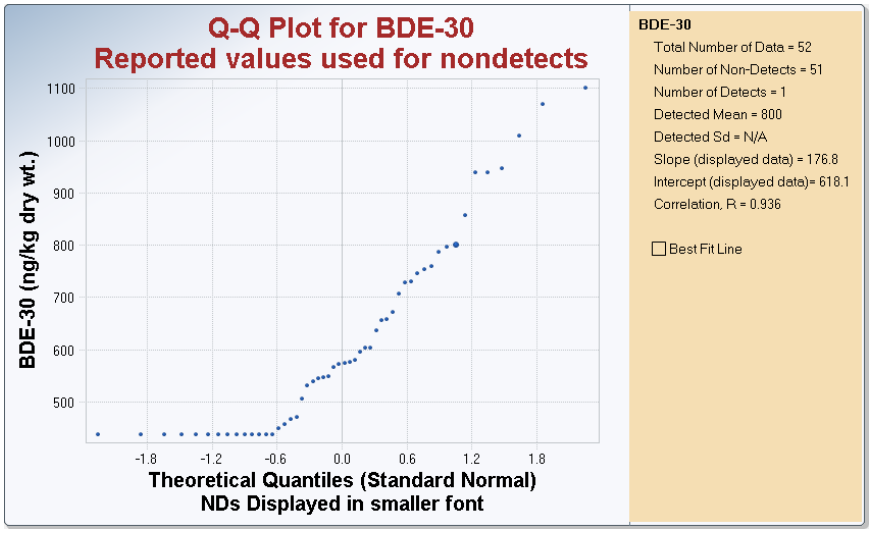


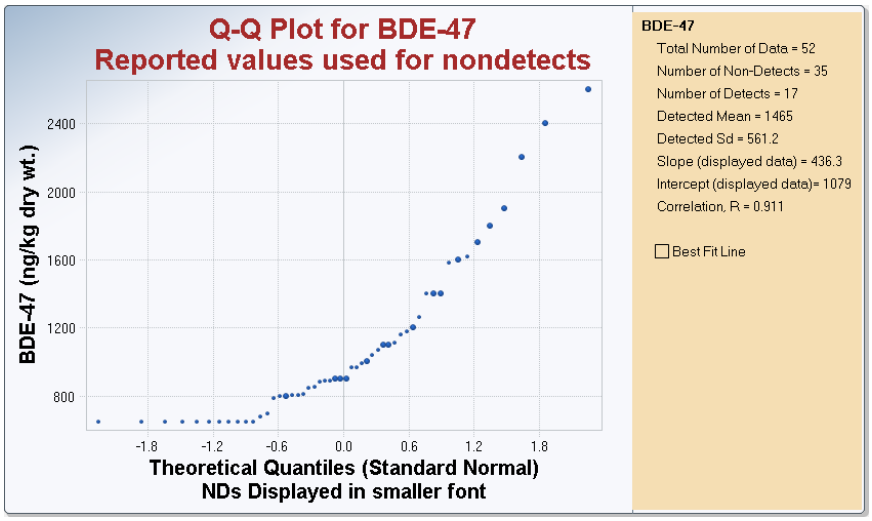


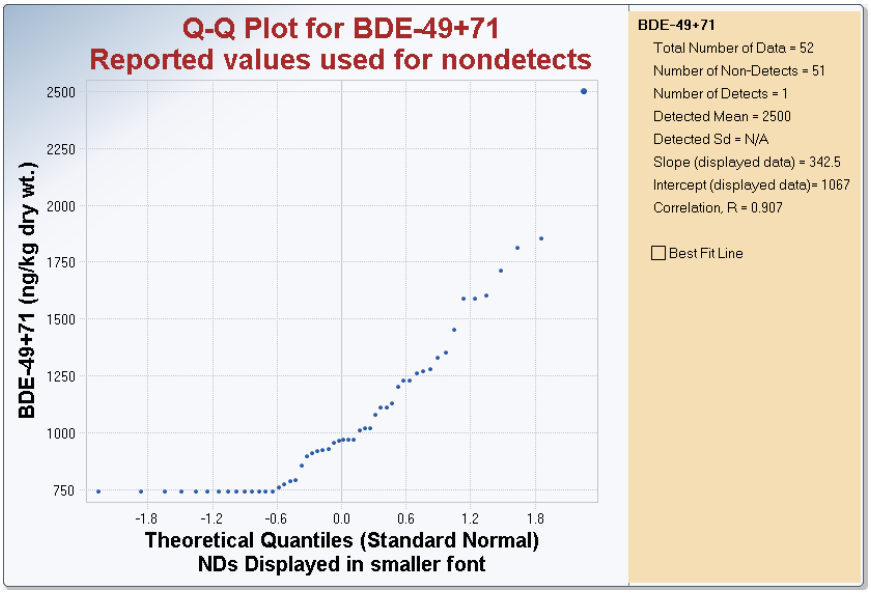

Box Plots
Concentration (ng/kg dry wt.)
600000
500000
400000
300000
200000
100000
0
Maximum Non-Detect Value 10400
BDE-209
Total PBDEs

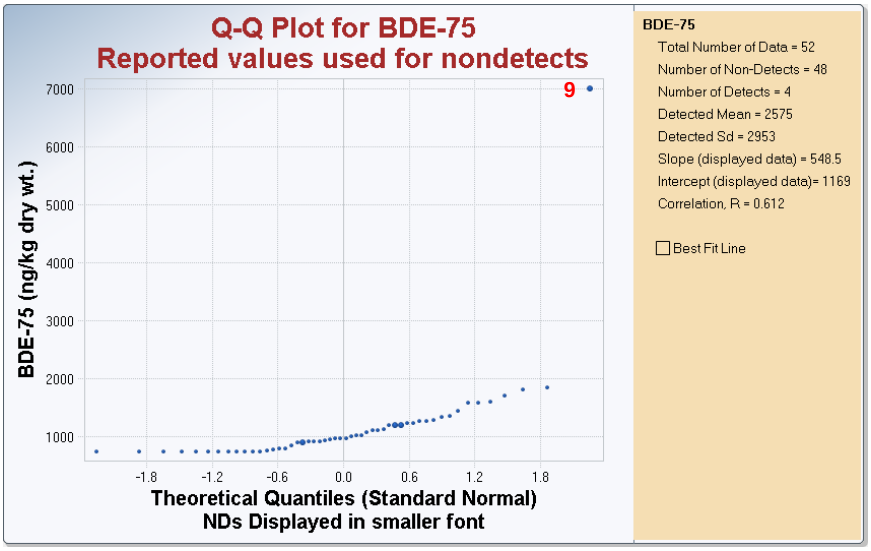
Q-Q Plots for BDEs and Total PBDEs, Excluding 100% Nondetects (samples noted in red font are significant at the 5% significance level)

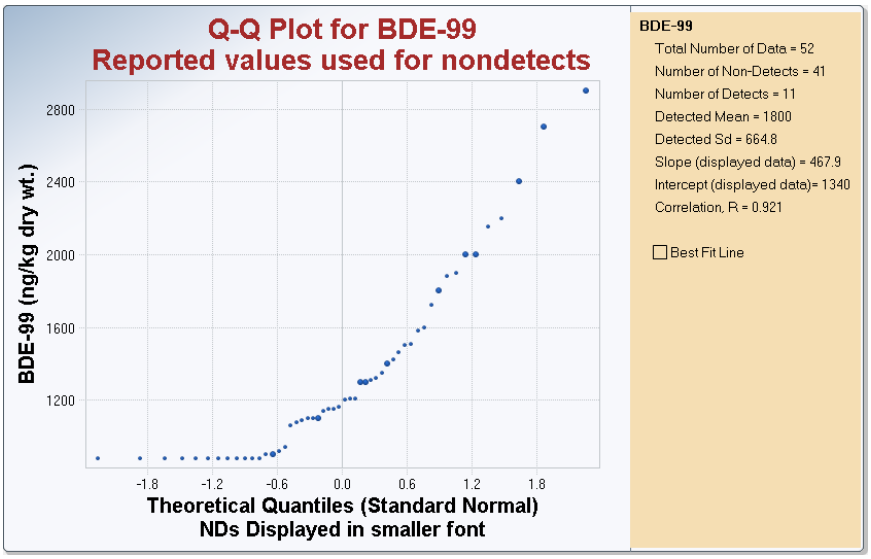


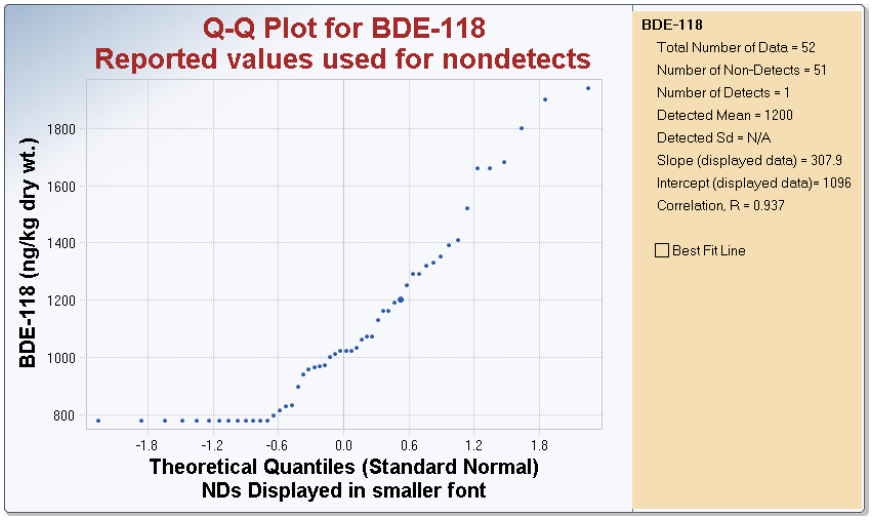


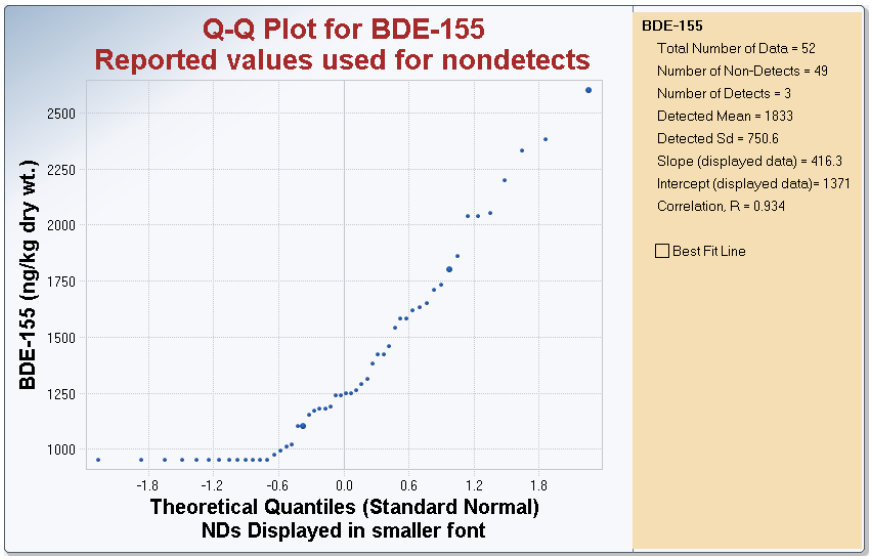


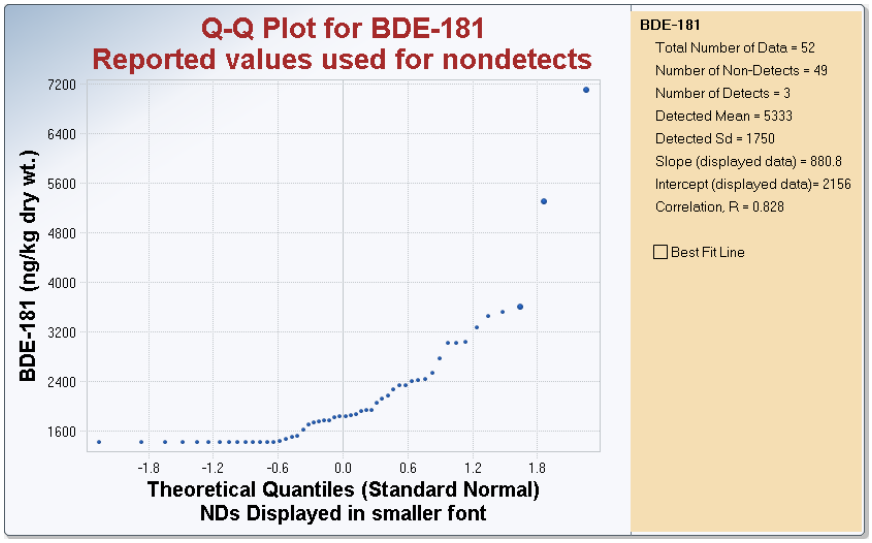

Q-Q Plot for BDE-49+71
Reported values used for nondetects
BDE-49+71 (ng/kg dry wt.)
2500
2250
2000
1750
1500
1250
1000
750
-1.8
-1.2
-0.6
0.0
0.6
1.2
1.8
Theoretical Quantiles (Standard Normal)
NDs Displayed in smaller font
BDE-49+71
Total Number of Data = 52
Number of Non-Detects = 51
Number of Detects = 1
Detected Mean = 2500
Detected Sd = N/A
Slope (displayed data) = 342.5
Intercept (displayed data)= 1067
Correlation, R = 0.907
Best Fit Line

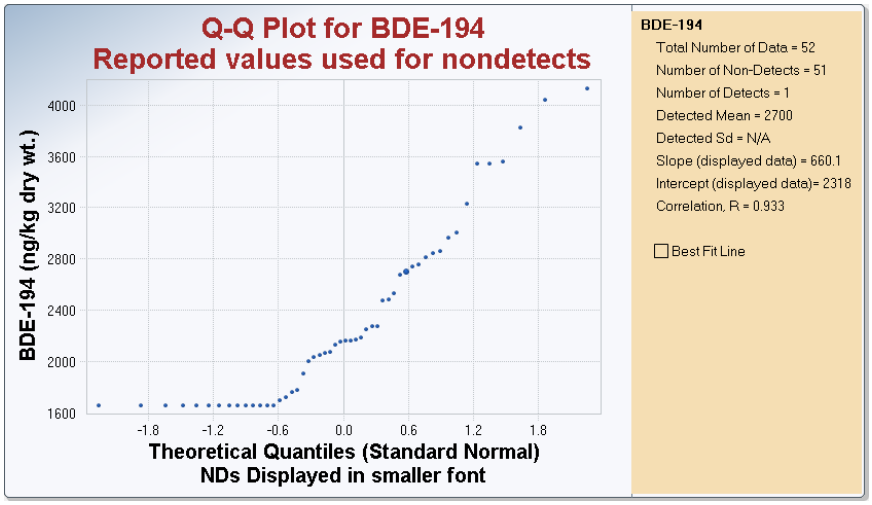

Q-Q Plot for BDE-75
Reported values used for nondetects
BDE-75 (ng/kg dry wt.)
7000
6000
5000
4000
3000
2000
1000
9
-1.8
-1.2
-0.6
0.0
0.6
1.2
1.8
Theoretical Quantiles (Standard Normal)
NDs Displayed in smaller font
BDE-75
Total Number of Data = 52
Number of Non-Detects = 48
Number of Detects = 4
Detected Mean = 2575
Detected Sd = 2953
Slope (displayed data) = 548.5
Intercept (displayed data)= 1169
Correlation, R = 0.612
Best Fit Line

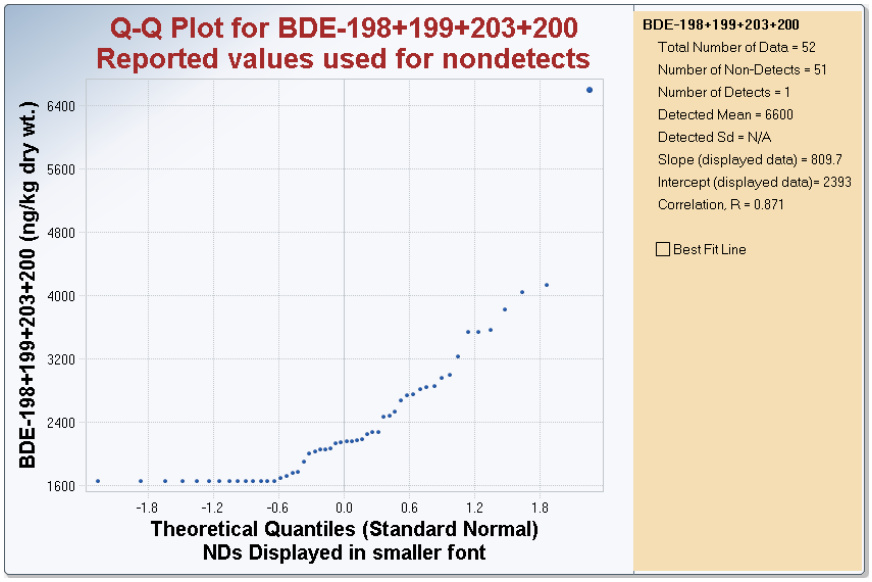

Q-Q Plot for BDE-99
Reported values used for nondetects
BDE-99 (ng/kg dry wt.)
2800
2400
2000
1600
1200
-1.8
-1.2
-0.6
0.0
0.6
1.2
1.8
Theoretical Quantiles (Standard Normal)
NDs Displayed in smaller font
BDE-99
Total Number of Data = 52
Number of Non-Detects = 41
Number of Detects = 11
Detected Mean = 1800
Detected Sd = 664.8
Slope (displayed data) = 467.9
Intercept (displayed data)= 1340
Correlation, R = 0.921
Best Fit Line

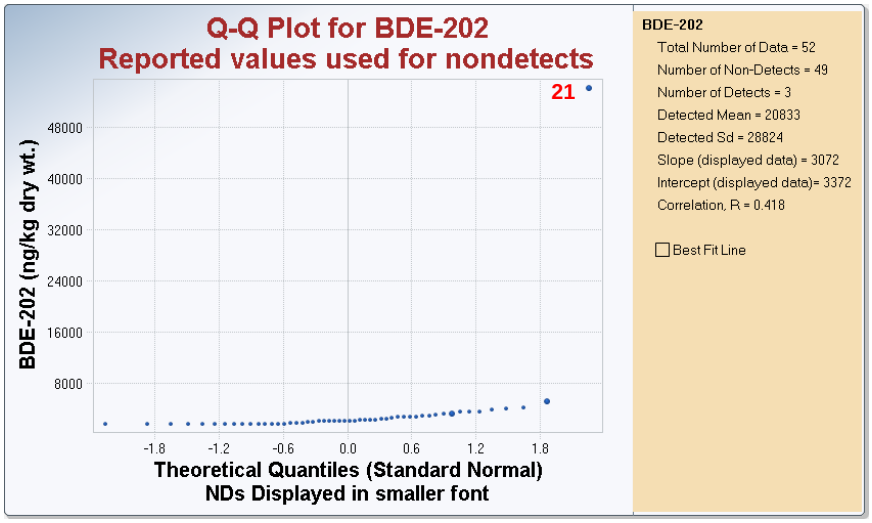

Q-Q Plot for BDE-118
Reported values used for nondetects
BDE-118 (ng/kg dry wt.)
1800
1600
1400
1200
1000
800
-1.8
-1.2
-0.6
0.0
0.6
1.2
1.8
Theoretical Quantiles (Standard Normal)
NDs Displayed in smaller font
BDE-118
Total Number of Data = 52
Number of Non-Detects = 51
Number of Detects = 1
Detected Mean = 1200
Detected Sd = N/A
Slope (displayed data) = 307.9
Intercept (displayed data)= 1096
Correlation, R = 0.937
Best Fit Line

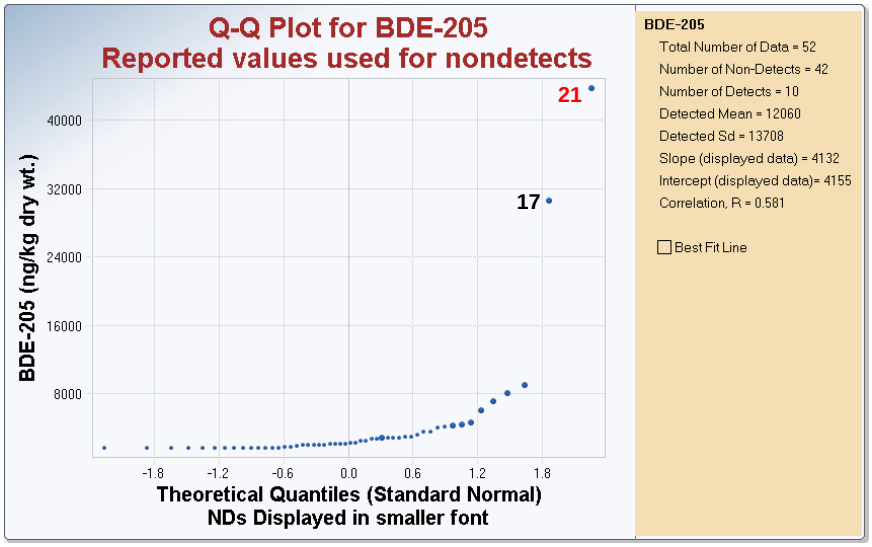

Q-Q Plot for BDE-155
Reported values used for nondetects
BDE-155 (ng/kg dry wt.)
2500
2250
2000
1750
1500
1250
1000
-1.8
-1.2
-0.6
0.0
0.6
1.2
1.8
Theoretical Quantiles (Standard Normal)
NDs Displayed in smaller font
BDE-155
Total Number of Data = 52
Number of Non-Detects = 49
Number of Detects = 3
Detected Mean = 1833
Detected Sd = 750.6
Slope (displayed data) = 416.3
Intercept (displayed data)= 1371
Correlation, R = 0.934
Best Fit Line


Q-Q Plot for BDE-181
Reported values used for nondetects
BDE-181 (ng/kg dry wt.)
7200
6400
5600
4800
4000
3200
2400
1600
-1.8
-1.2
-0.6
0.0
0.6
1.2
1.8
Theoretical Quantiles (Standard Normal)
NDs Displayed in smaller font
BDE-181
Total Number of Data = 52
Number of Non-Detects = 49
Number of Detects = 3
Detected Mean = 5333
Detected Sd = 1750
Slope (displayed data) = 880.8
Intercept (displayed data)= 2156
Correlation, R = 0.828
Best Fit Line

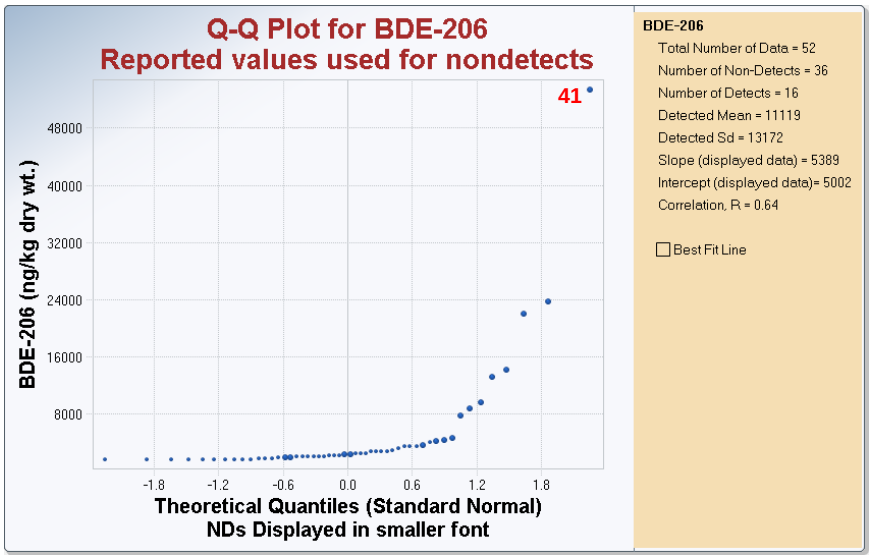

Q-Q Plot for BDE-194
Reported values used for nondetects
BDE-194 (ng/kg dry wt.)
4000
3600
3200
2800
2400
2000
1600
-1.8
-1.2
-0.6
0.0
0.6
1.2
1.8
Theoretical Quantiles (Standard Normal)
NDs Displayed in smaller font
BDE-194
Total Number of Data = 52
Number of Non-Detects = 51
Number of Detects = 1
Detected Mean = 2700
Detected Sd = N/A
Slope (displayed data) = 660.1
Intercept (displayed data)= 2318
Correlation, R = 0.933
Best Fit Line

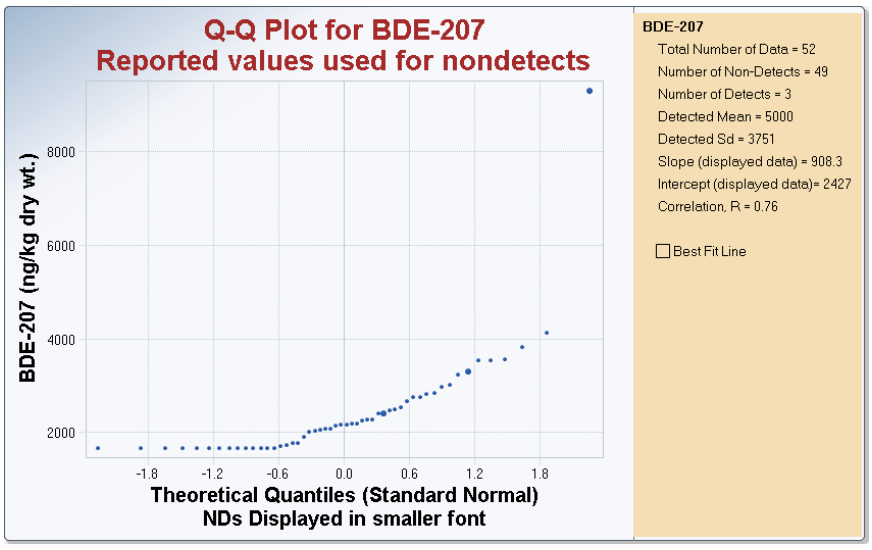

Q-Q Plot for BDE-198+199+203+200
Reported values used for nondetects
BDE-198+199+203+200 (ng/kg dry wt.)
6400
5600
4800
4000
3200
2400
1600
-1.8
-1.2
-0.6
0.0
0.6
1.2
1.8
Theoretical Quantiles (Standard Normal)
NDs Displayed in smaller font
BDE-198+199+203+200
Total Number of Data = 52
Number of Non-Detects = 51
Number of Detects = 1
Detected Mean = 6600
Detected Sd = N/A
Slope (displayed data) = 809.7
Intercept (displayed data)= 2393
Correlation, R = 0.871
Best Fit Line

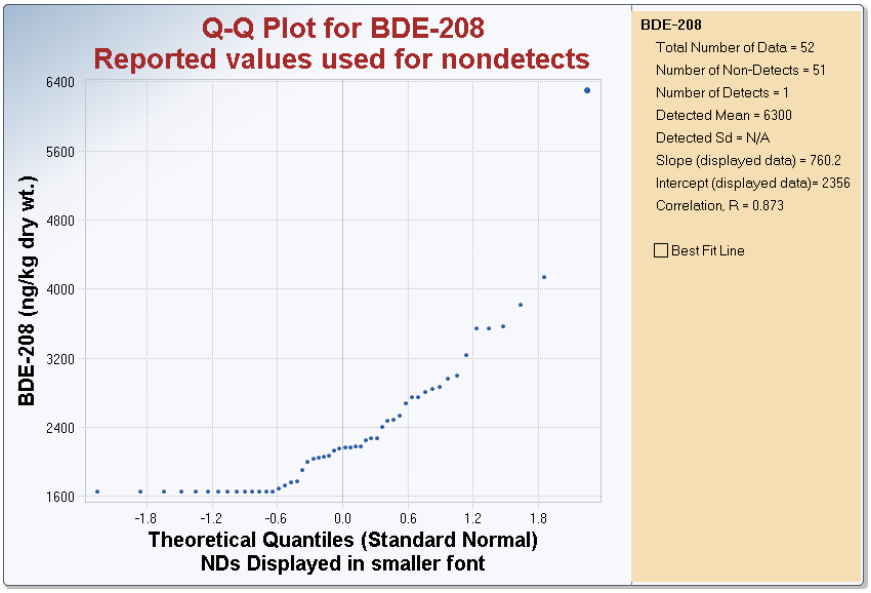

Q-Q Plot for BDE-202
Reported values used for nondetects
21
BDE-202 (ng/kg dry wt.)
48000
40000
32000
24000
16000
8000
-1.8
-1.2
-0.6
0.0
0.6
1.2
1.8
Theoretical Quantiles (Standard Normal)
NDs Displayed in smaller font
BDE-202
Total Number of Data = 52
Number of Non-Detects = 49
Number of Detects = 3
Detected Mean = 20833
Detected Sd = 28824
Slope (displayed data) = 3072
Intercept (displayed data)= 3372
Correlation, R = 0.418
Best Fit Line

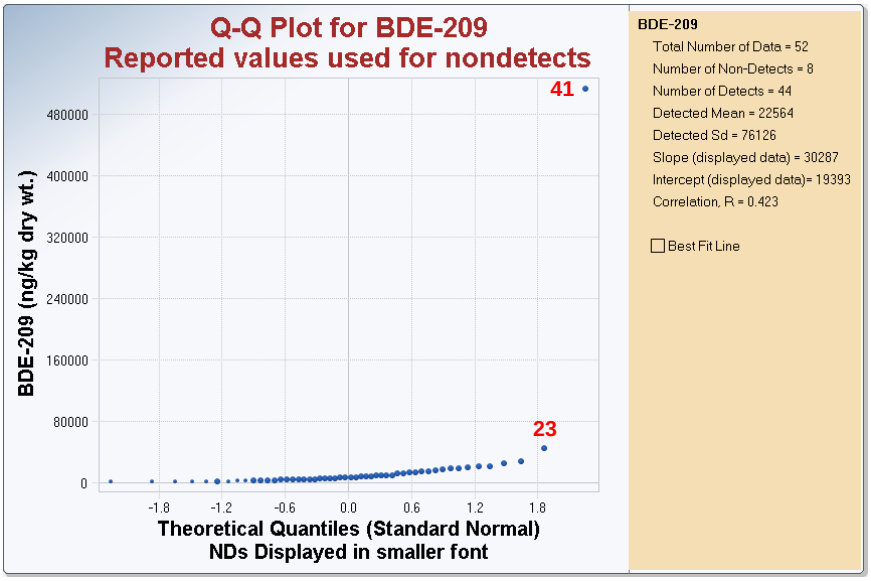


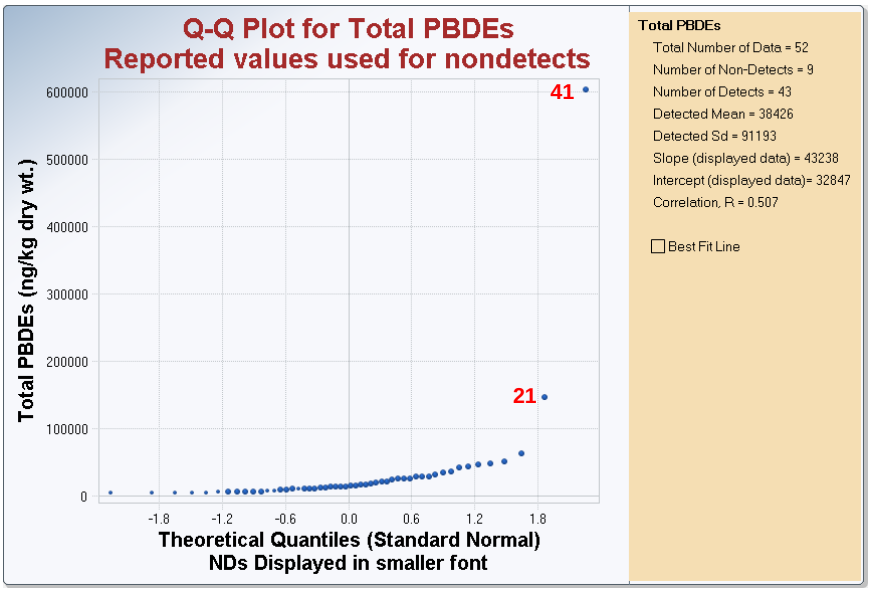
The value for lake #17 was excluded based on professional judgment.





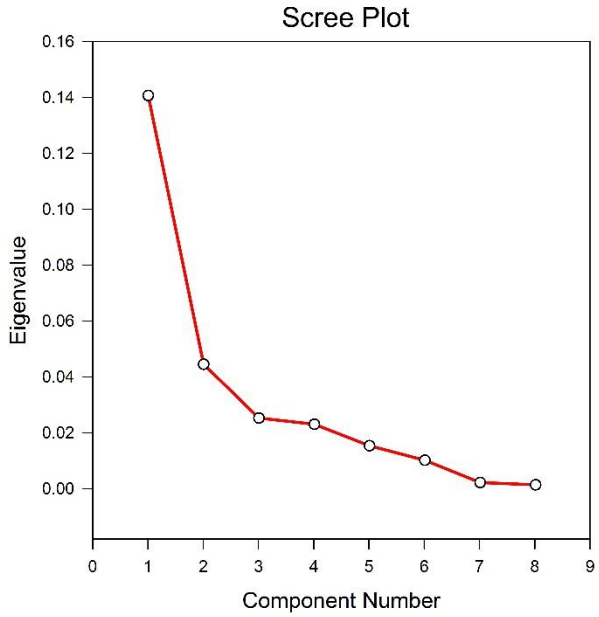

Q-Q Plot for BDE-208
Reported values used for nondetects
BDE-208 (ng/kg dry wt.)
6400
5600
4800
4000
3200
2400
1600
-1.8
-1.2
-0.6
0.0
0.6
1.2
1.8
Theoretical Quantiles (Standard Normal)
NDs Displayed in smaller font
BDE-208
Total Number of Data = 52
Number of Non-Detects = 51
Number of Detects = 1
Detected Mean = 6300
Detected Sd = N/A
Slope (displayed data) = 760.2
Intercept (displayed data)= 2356
Correlation, R = 0.873
Best Fit Line

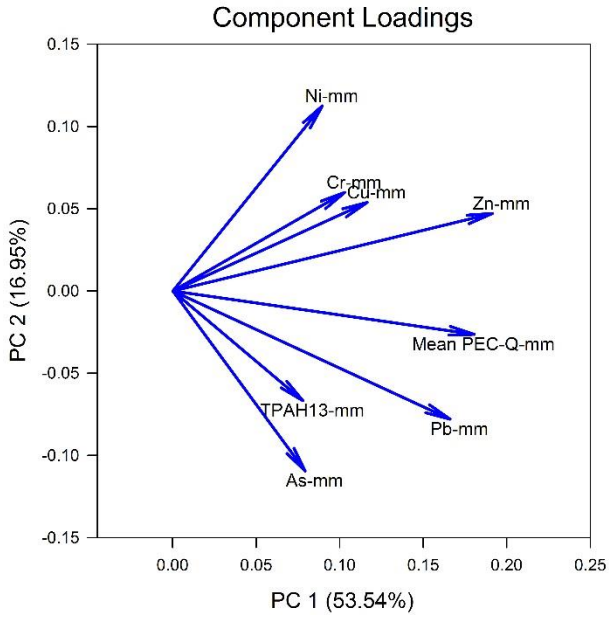

Q-Q Plot for BDE-209
Reported values used for nondetects
BDE-209 (ng/kg dry wt.)
41
23
480000
400000
320000
240000
160000
80000
0
-1.8
-1.2
-0.6
0.0
0.6
1.2
1.8
Theoretical Quantiles (Standard Normal)
NDs Displayed in smaller font
BDE-209
Total Number of Data = 52
Number of Non-Detects = 8
Number of Detects = 44
Detected Mean = 22564
Detected Sd = 76126
Slope (displayed data) = 30287
Intercept (displayed data)= 19393
Correlation, R = 0.423
Best Fit Line

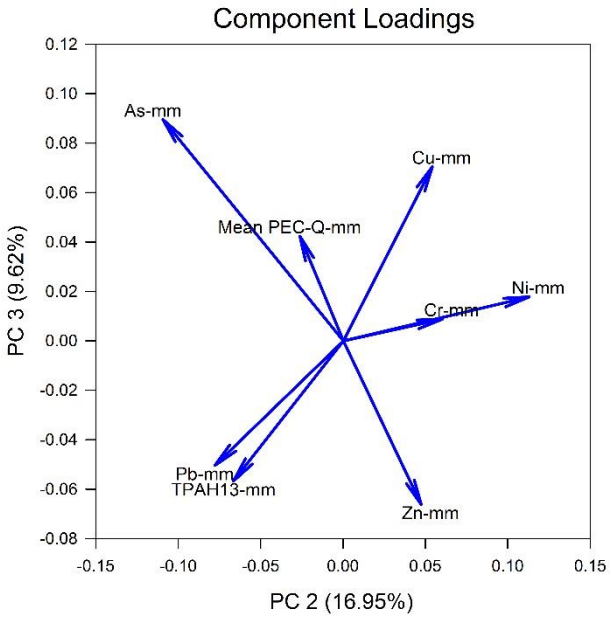

Q-Q Plot for Total PBDEs
Reported values used for nondetects
Total PBDEs (ng/kg dry wt.)
41
21
600000
500000
400000
300000
200000
100000
0
-1.8
-1.2
-0.6
0.0
0.6
1.2
1.8
Theoretical Quantiles (Standard Normal)
NDs Displayed in smaller font
Total PBDEs
Total Number of Data = 52
Number of Non-Detects = 9
Number of Detects = 43
Detected Mean = 38426
Detected Sd = 91193
Slope (displayed data) = 43238
Intercept (displayed data)= 32847
Correlation, R = 0.507
Best Fit Line

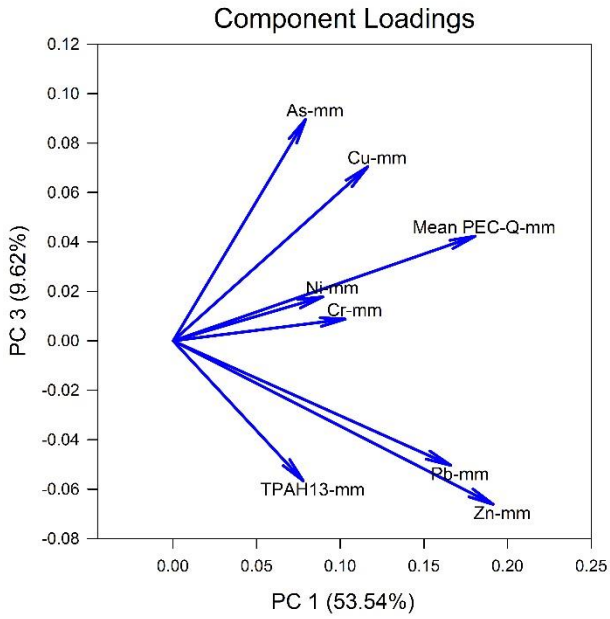
Appendix M
Compilation of Data

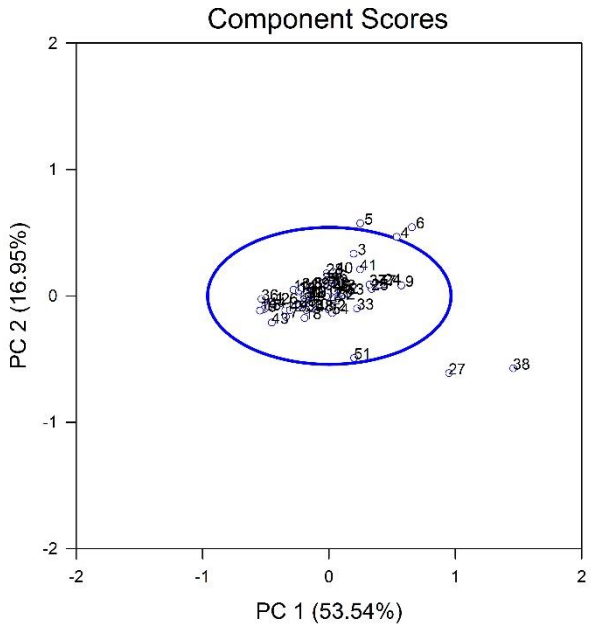
Supporting Information for Principal Components Analysis of Six Metals, Mean PEC-Qs, and ∑PAH$_{13}$

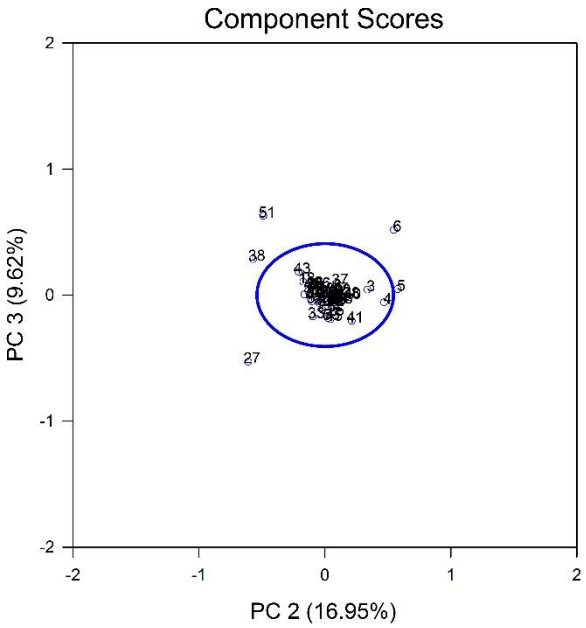


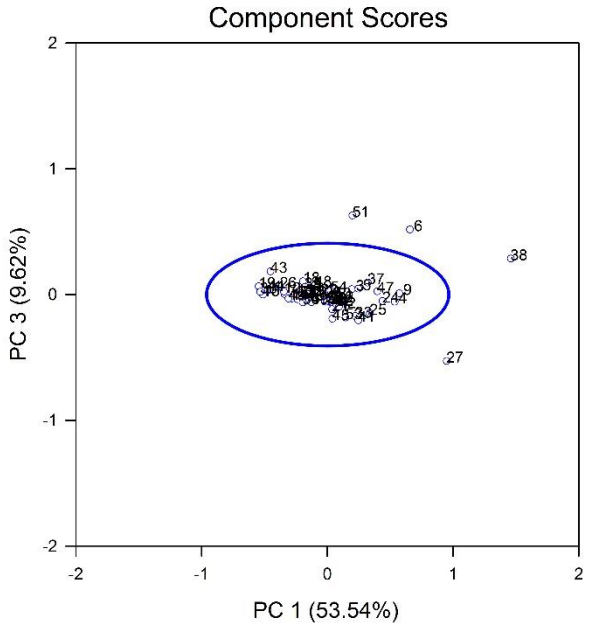












The data point numbers correspond to the lake ID numbers (e.g., #27 corresponds to Lake Nokomis).

Eigenvectors of the Covariance Matrix:

	PC 1	PC 2	PC 3
As-mm	0.211	-0.518	0.563
Cr-mm	0.274	0.284	0.0553
Cu-mm	0.310	0.255	0.443
Pb-mm	0.442	-0.369	-0.317
Ni-mm	0.238	0.533	0.112
Zn-mm	0.509	0.223	-0.416
Mean PEC-Q-mm	0.480	-0.125	0.266
TPAH13-mm	0.207	-0.316	-0.356

Each principal component is a linear combination of the original variables, after each original variable has been centered about its mean. The coefficients of this linear combination are the entries in the corresponding column of the above table. These coefficients provide the interpretation of the principal components in terms of the original variables.

Percentage of Variance Explained by the In-Model Components:

	PC 1	PC 2	PC 3	Unexplained Variance
As-mm	20.206	38.736	25.983	15.075
Cr-mm	38.493	13.104	0.282	48.120
Cu-mm	41.611	8.951	15.297	34.141
Pb-mm	71.253	15.742	6.587	6.418
Ni-mm	29.086	46.172	1.153	23.589
Zn-mm	72.905	4.440	8.740	13.915
Mean PEC-Q-mm	87.944	1.884	4.858	5.314
TPAH13-mm	31.465	23.200	16.754	28.581

Component Scores:

The significance level is 0.050. Significant P-values are flagged.

ID	PC 1	PC 2	PC 3	T-square	P
1	-0.463	-0.0493	0.0395	1.638	0.667
2	0.106	0.0516	-0.0478	0.231	0.974
3	0.192	0.334	0.0433	2.839	0.442
4	0.532	0.467	-0.0570	7.036	0.0929
5	0.245	0.574	0.0478	7.917	0.0667
6	0.653	0.544	0.518	20.293	0.000819 <
7	-0.344	-0.166	0.00506	1.463	0.705
8	-0.152	0.0704	0.0484	0.369	0.949
9	0.569	0.0826	0.0106	2.459	0.506
10	-0.140	-0.0979	-0.00625	0.357	0.951
11	-0.285	0.0495	-0.0312	0.670	0.886
12	-0.348	-0.115	0.0247	1.183	0.768
13	-0.244	0.0290	0.00907	0.445	0.934
14	-0.240	0.0428	-0.0371	0.504	0.922
15	-0.516	-0.104	0.000177	2.135	0.565
16	-0.156	-0.00597	-0.0334	0.219	0.976
17	-0.0241	-0.00553	-0.0565	0.131	0.988

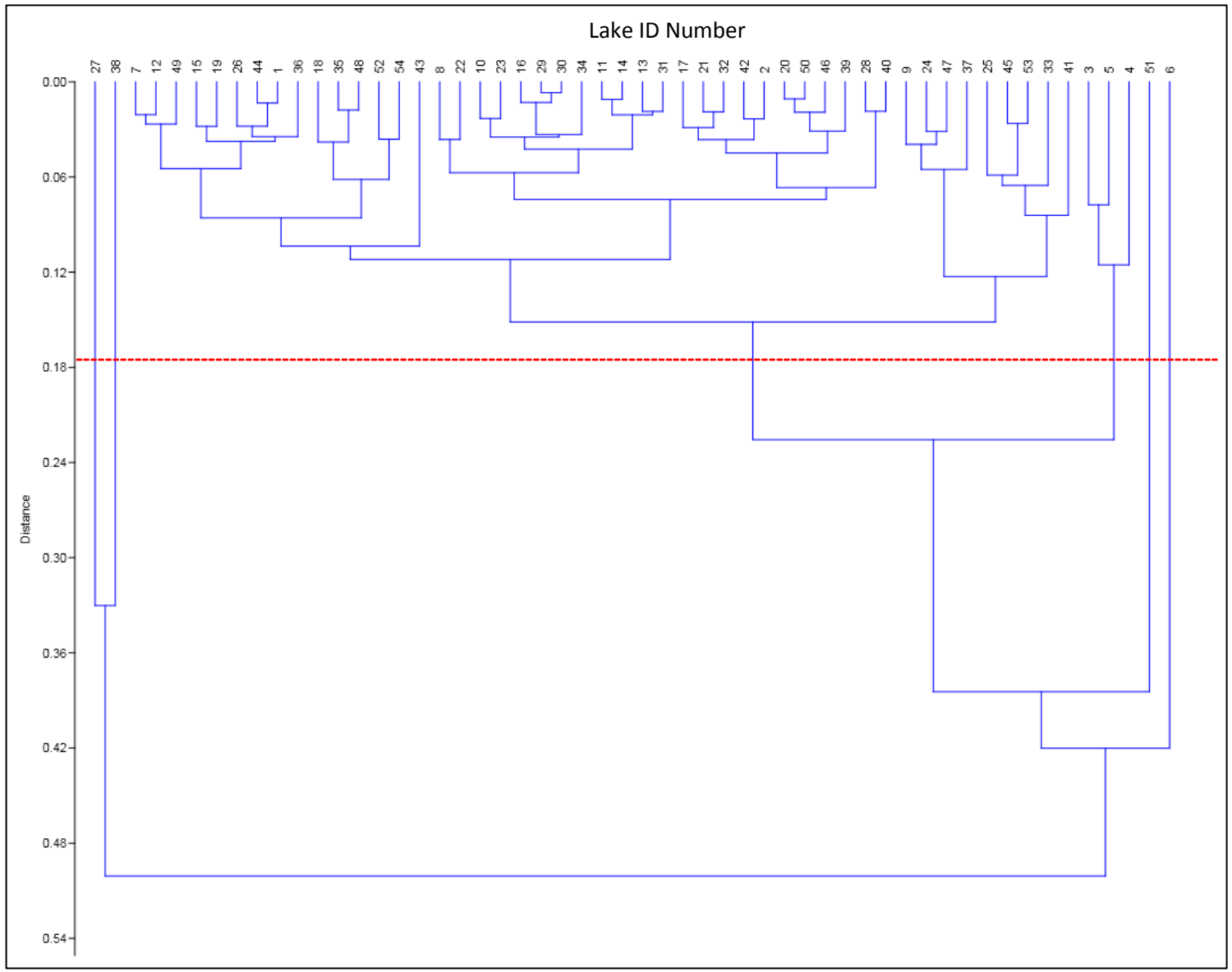
Component Scores (continued):

ID	PC 1	PC 2	PC 3	T-square	P
18	-0.197	-0.176	0.106	1.416	0.715
19	-0.550	-0.116	0.0663	2.624	0.477
20	0.0243	0.0685	-0.0631	0.267	0.968
21	0.0353	-0.0246	-0.117	0.567	0.908
22	-0.0552	0.106	0.0127	0.281	0.965
23	-0.237	-0.0748	-0.00781	0.526	0.917
24	0.435	0.0960	-0.0505	1.653	0.664
25	0.335	0.0554	-0.149	1.739	0.645
26	-0.382	-0.0550	0.0678	1.286	0.745
27	0.946	-0.612	-0.529	25.823	0.000138 <
28	-0.0231	0.178	-0.00969	0.718	0.875
29	-0.161	-0.000587	0.00321	0.184	0.981
30	-0.181	-0.00664	-0.00305	0.234	0.973
31	-0.217	0.0636	-0.00613	0.427	0.937
32	0.0694	-0.0196	-0.0759	0.270	0.967
33	0.219	-0.100	-0.170	1.715	0.650
34	-0.199	-0.0503	-0.0627	0.494	0.924
35	-0.183	-0.111	0.0615	0.665	0.887
36	-0.537	-0.0249	0.0229	2.088	0.574
37	0.318	0.0911	0.0965	1.273	0.748
38	1.455	-0.573	0.286	25.659	0.000145 <
39	-0.130	0.0673	-0.0615	0.371	0.949
40	0.0542	0.190	-0.0176	0.840	0.847
41	0.243	0.210	-0.204	3.058	0.409
42	0.0900	0.0270	-0.0957	0.436	0.936
43	-0.455	-0.212	0.185	3.838	0.308
44	-0.477	-0.0872	0.0409	1.856	0.621
45	0.0375	0.0424	-0.192	1.502	0.697
46	0.0117	0.125	-0.0534	0.465	0.930
47	0.394	0.0879	0.0266	1.305	0.740
48	-0.102	-0.113	0.0747	0.583	0.905
49	-0.312	-0.114	-0.0319	1.023	0.805
50	-0.0106	0.0802	-0.0575	0.276	0.966
51	0.196	-0.492	0.629	21.346	0.000578 <
52	-0.00446	-0.109	-0.0501	0.364	0.950
53	0.141	0.0195	-0.183	1.476	0.702
54	0.0230	-0.136	0.0332	0.463	0.930

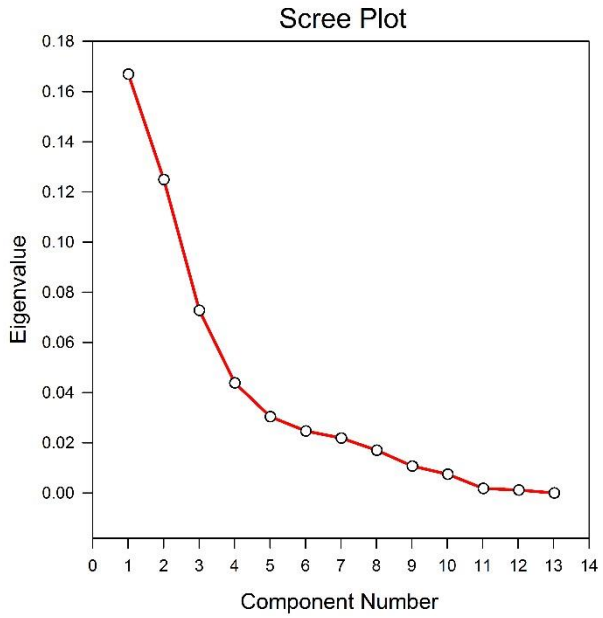
A significant P-value indicates that the corresponding observation is a possible outlier.

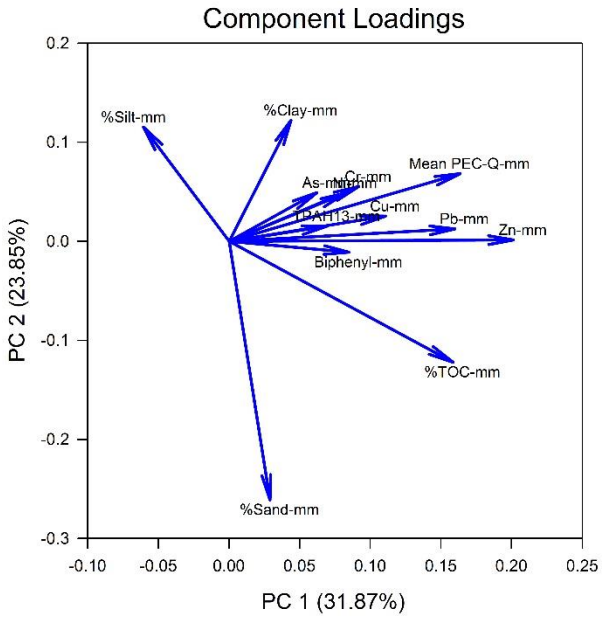
The above PC1, PC2, and PC3 component scores were used in the hierarchical cluster analysis of these data.

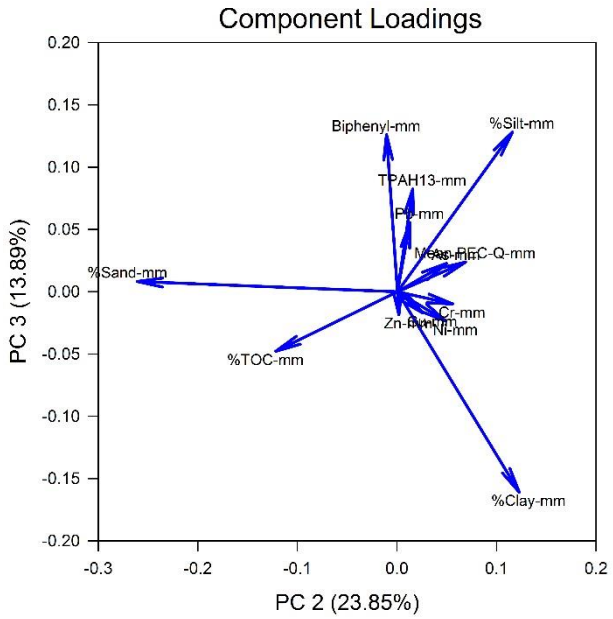
HCA plot of the PCA Component Scores for six metals, mean PEC-Qs, and $\sum PAH_{13}$ that had been range transformed. The HCA was set-up with the paired group (UPGMA) algorithm and the Gower similarity index. Six groups of data were considered at a distance of ~0.17.

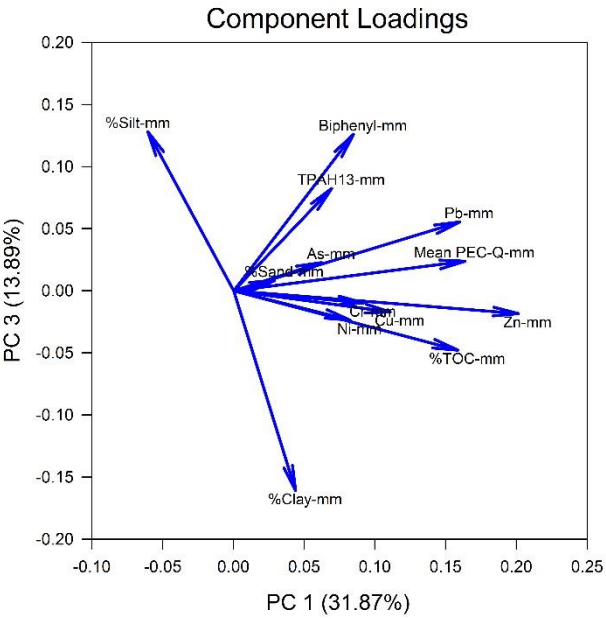


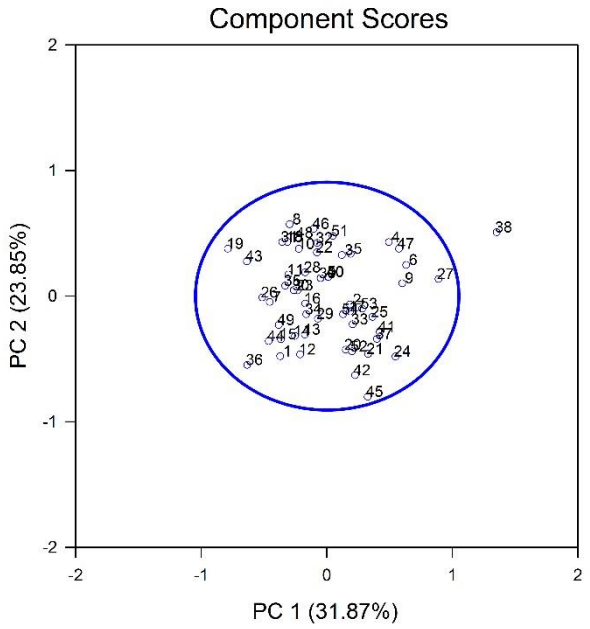
Supporting Information for Principal Components Analysis of Six Metals, Biphenyl, Mean PEC-Q, ∑PAH$_{13}$, Sand, Silt, Clay, and TOC

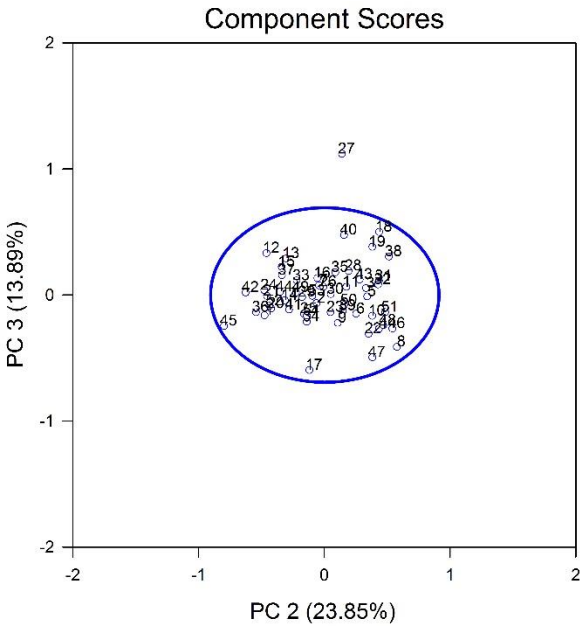


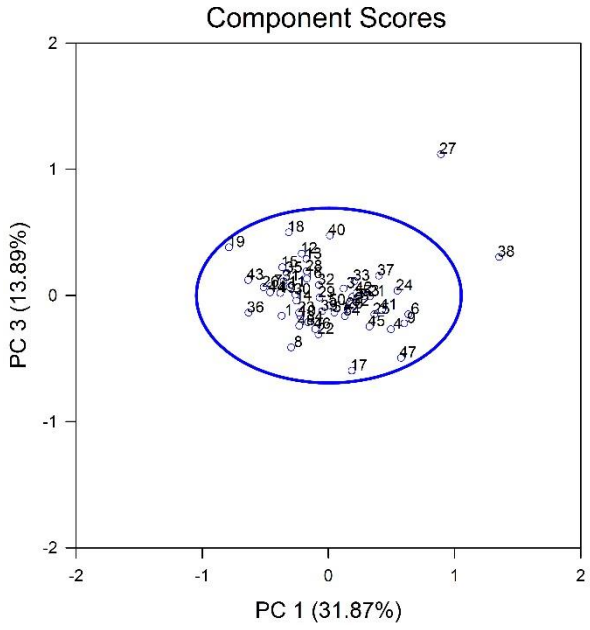












The data point numbers correspond to the lake ID numbers (e.g., #27 corresponds to Lake Nokomis).

Eigenvectors of the Covariance Matrix:

	PC 1	PC 2	PC 3
Biphenyl-mm	0.207	-0.0310	0.467
As-mm	0.151	0.139	0.0844
Cr-mm	0.224	0.157	-0.0363
Cu-mm	0.270	0.0719	-0.0632
Pb-mm	0.391	0.0356	0.206
Ni-mm	0.201	0.138	-0.0877
Zn-mm	0.492	0.00415	-0.0682
Mean PEC-Q-mm	0.399	0.193	0.0887
TPAH13-mm	0.169	0.0434	0.305
%Clay-mm	0.107	0.346	-0.596
%Silt-mm	-0.148	0.326	0.475
%Sand-mm	0.0704	-0.738	0.0307
%TOC-mm	0.387	-0.346	-0.177

Each principal component is a linear combination of the original variables, after each original variable has been centered about its mean. The coefficients of this linear combination are the entries in the corresponding column of the above table. These coefficients provide the interpretation of the principal components in terms of the original variables.

Percentage of Variance Explained by the In-Model Components:

	PC 1	PC 2	PC 3	Unexplained Variance
Biphenyl-mm	17.567	0.294	39.043	43.097
As-mm	12.412	7.840	1.680	78.069
Cr-mm	30.534	11.173	0.350	57.942
Cu-mm	37.623	1.990	0.896	59.492
Pb-mm	66.066	0.410	7.990	25.534
Ni-mm	24.564	8.633	2.039	64.764
Zn-mm	80.645	0.00430	0.676	18.675
Mean PEC-Q-mm	72.156	12.668	1.549	13.627
TPAH13-mm	24.921	1.226	35.461	38.391
%Clay-mm	3.837	30.133	52.218	13.812
%Silt-mm	9.134	33.074	40.807	16.985
%Sand-mm	1.131	93.157	0.0940	5.618
%TOC-mm	43.551	25.981	3.975	26.493

Component Scores:

The significance level is 0.050. Significant P-values are flagged.

ID	PC 1	PC 2	PC 3	T-square	P
1	-0.375	-0.479	-0.161	3.036	0.412
2	0.181	-0.0666	-0.0641	0.289	0.964
3	0.117	0.328	0.0554	0.985	0.814
4	0.491	0.430	-0.267	3.903	0.301
5	0.187	0.338	-0.0108	1.123	0.782
6	0.629	0.249	-0.149	3.171	0.393
7	-0.458	-0.0465	0.0768	1.355	0.729
8	-0.300	0.573	-0.411	5.490	0.166

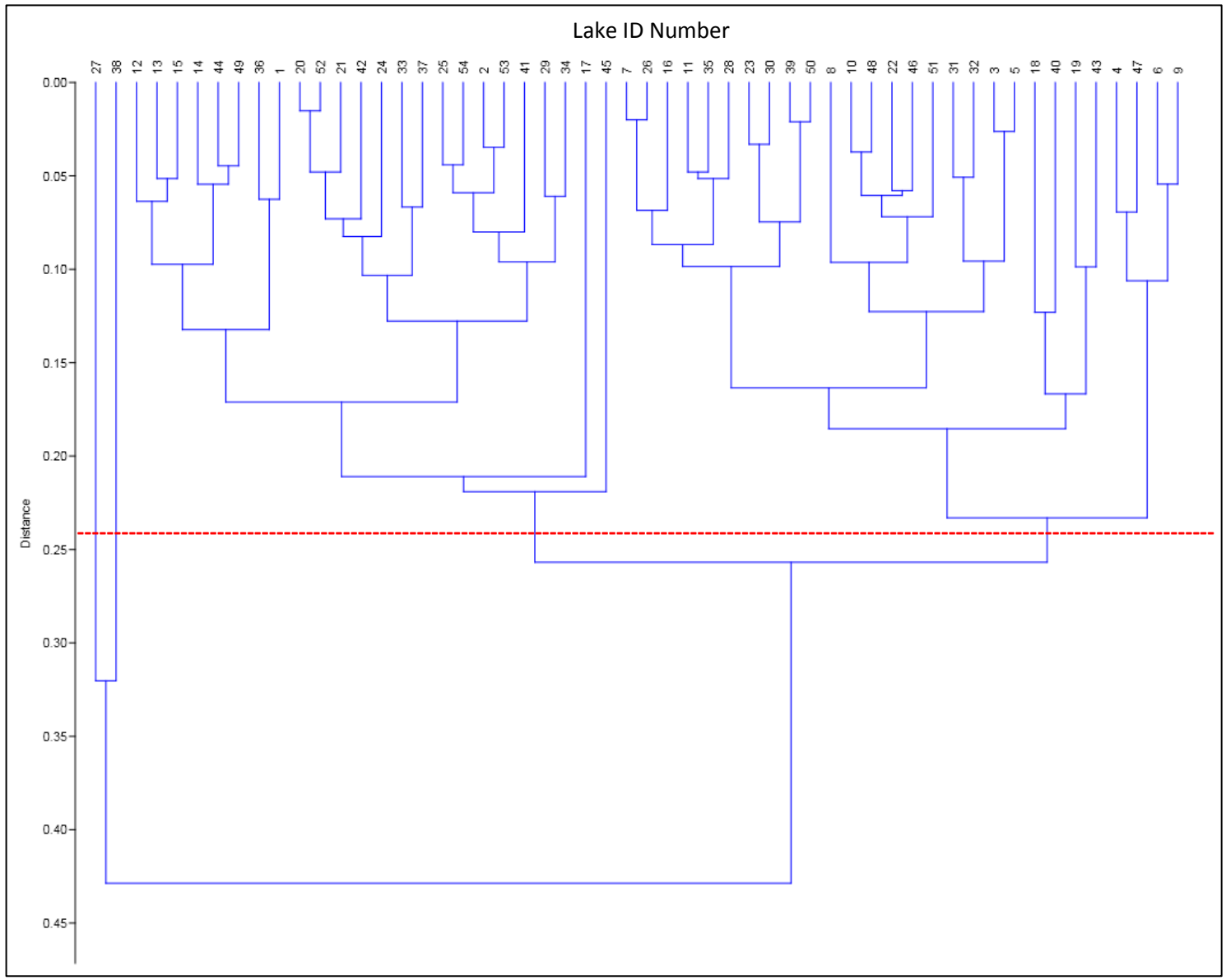
Component Scores (continued):

ID	PC 1	PC 2	PC 3	T-square	P
9	0.597	0.103	-0.221	2.896	0.434
10	-0.226	0.377	-0.165	1.820	0.628
11	-0.310	0.172	0.0653	0.869	0.840
12	-0.216	-0.465	0.333	3.528	0.345
13	-0.179	-0.306	0.290	2.099	0.572
14	-0.257	-0.318	-0.0414	1.230	0.758
15	-0.369	-0.343	0.224	2.451	0.507
16	-0.176	-0.0595	0.135	0.464	0.930
17	0.182	-0.123	-0.596	5.195	0.186
18	-0.318	0.431	0.501	5.543	0.163
19	-0.791	0.378	0.383	6.910	0.0975
20	0.148	-0.426	-0.107	1.744	0.644
21	0.326	-0.460	-0.00677	2.333	0.528
22	-0.0830	0.348	-0.308	2.314	0.532
23	-0.237	0.0458	-0.136	0.608	0.899
24	0.544	-0.482	0.0386	3.648	0.330
25	0.360	-0.166	-0.149	1.301	0.741
26	-0.518	-0.0109	0.0662	1.666	0.661
27	0.887	0.137	1.120	22.109	0.000451 <
28	-0.175	0.189	0.193	0.981	0.815
29	-0.0749	-0.180	-0.0157	0.297	0.962
30	-0.267	0.0478	0.00797	0.446	0.934
31	-0.359	0.431	0.113	2.434	0.510
32	-0.0796	0.424	0.0846	1.573	0.681
33	0.203	-0.225	0.115	0.833	0.849
34	-0.167	-0.145	-0.212	0.950	0.822
35	-0.335	0.0833	0.181	1.175	0.770
36	-0.638	-0.548	-0.136	5.092	0.193
37	0.397	-0.341	0.158	2.216	0.550
38	1.349	0.509	0.306	14.258	0.00653 <
39	-0.0533	0.144	-0.124	0.392	0.945
40	0.00764	0.153	0.476	3.302	0.375
41	0.419	-0.284	-0.115	1.880	0.616
42	0.221	-0.630	0.0202	3.474	0.352
43	-0.639	0.277	0.123	3.273	0.379
44	-0.466	-0.358	0.0263	2.339	0.527
45	0.322	-0.801	-0.246	6.592	0.110
46	-0.108	0.537	-0.266	3.344	0.369
47	0.571	0.378	-0.495	6.459	0.116
48	-0.236	0.464	-0.240	2.851	0.441
49	-0.386	-0.230	0.0207	1.323	0.736
50	0.00998	0.154	-0.0790	0.276	0.966
51	0.0437	0.479	-0.136	2.104	0.571
52	0.197	-0.440	-0.0858	1.884	0.615
53	0.278	-0.101	-0.00627	0.545	0.913
54	0.127	-0.145	-0.163	0.628	0.895

A significant P-value indicates that the corresponding observation is a possible outlier.

The above PC1, PC2, and PC3 component scores were used in the hierarchical cluster analysis of these data.

HCA plot of the PCA Component Scores for six metals, biphenyl, mean PEC-Qs, $\sum PAH_{13}$, sand, silt, clay, and TOC that had been range transformed. The HCA was set-up with the paired group (UPGMA) algorithm and the Gower similarity index. Six groups of data were considered at a distance of ~0.24.



Appendix N
Wetland Data from Mark Gernes (MPCA)

Table N-1. Summary Statistics for Detected Wetland Metals

Variable	N	Minimum (mg/kg dry wt.)	Maximum (mg/kg dry wt.)	Mean (mg/kg dry wt.)	SD (mg/kg dry wt.)	SEM (mg/kg dry wt.)	MAD/0.675 (mg/kg dry wt.)	Skewness	Kurtosis	CV
Aluminum	178	1585	45400	14818	9459	708.9	9325	0.82	0.20	0.64
Barium	157	16.5	347	152.3	76.9	6.1	81.0	0.20	-0.64	0.51
Chromium	178	3.5	56.5	23.2	11.0	0.8	12.4	0.37	-0.43	0.47
Cobalt	157	1.4	94.6	7.3	7.9	0.6	2.7	8.9	95.4	1.1
Copper	178	1.9	389.9	22.7	36.0	2.7	8.2	7.6	68.5	1.6
Iron	178	2401	57334	14842	7867	589.7	7874	1.3	4.2	0.53
Manganese	178	42.4	4469	448.2	490.7	36.8	210.6	4.5	28.6	1.1
Silicon	63	102.9	2195	972.5	507.7	64.0	472.6	0.49	-0.46	0.52
Strontium	157	4.2	310	48.5	50.3	4.0	24.6	2.9	10.3	1.0
Titanium	63	29.7	952.4	195.8	181.2	22.8	106.9	2.4	6.5	0.93
Vanadium	157	5.0	115	46.6	26.0	2.1	28.9	0.39	-0.77	0.56
Zinc	178	11.0	1040	87.7	108.4	8.1	35.1	6.2	46.2	1.2

N = number of samples; SD = standard deviation; SEM = standard error of the mean; MAD = median absolute deviation; CV = coefficient of variation.

Table N-2. Percentiles for Detected Wetland Metals. Highlighted Values are Based on Detected Data (units in mg/kg dry wt.).

Variable	N	10%ile	20%ile	25%ile (Q1)	50%ile (Q2)	75%ile (Q3)	80%ile	90%ile	95%ile	99%ile
Aluminum	178	3989	6375	7559	12681	20550	22020	28967	31790	41645
Barium	157	46.6	78.7	94.5	156	202	212.2	260.2	285.2	323
Chromium	178	9.5	12.6	14.0	22.9	31.0	31.8	37.4	42.4	48.7
Cobalt	157	2.9	3.8	4.3	6.0	8.0	8.4	10.8	13.8	25.3
Copper	178	6.9	9.7	11.3	16.9	22.4	24.0	31.5	46.0	193.5
Iron	178	5572	8083	9100	13933	19575	21000	24241	26901	37146
Manganese	178	128.5	167.4	199.3	335	494.9	526.8	870.9	1222	2474
Silicon	63	414.2	551	597.5	851.1	1339	1430	1714	1877	2112
Strontium	157	11.0	17.2	19.4	33	60	67	98.8	132	278.8
Titanium	63	52.7	68.9	81.5	141	235.7	251.9	369.3	571.9	879.1
Vanadium	157	14.5	21.4	25.1	44.2	63.8	69.9	83.3	93.3	101
Zinc	178	30.6	40.3	45.3	66.6	95.1	103.4	122.1	177.9	528.7

N = number of samples; Q = quantile.

Table N-3. General Statistics for Censored Wetland Metals and Metalloids using the Kaplan-Meier Method

Variable	N	Number Detects	Number NDs	% NDs	Minimum ND (mg/kg dry wt.)	Maximum ND (mg/kg dry wt.)	KM Mean (mg/kg dry wt.)	KM Variance (mg/kg dry wt.)	KM SD (mg/kg dry wt.)	KM CV
Antimony	94	74	20	21.3	<0.75	<0.75	1.0	0.42	0.65	0.64
Arsenic	178	149	29	16.3	<1.2	<5.2	5.2	13.4	3.7	0.70
Beryllium	157	142	15	9.6	<0.040	<0.50	0.63	0.12	0.35	0.55
Boron	178	156	22	12.4	<1.8	<2.3	22.1	416.9	20.4	0.93
Cadmium	178	139	39	21.9	<0.12	<0.80	0.63	0.15	0.39	0.62
Lead	178	158	20	11.2	<6.7	<11.2	24.1	2197	46.9	1.9
Lithium	157	75	82	52.2	<2.7	<25.0	9.3	49.6	7.0	0.76
Molybdenum	157	84	73	46.5	<0.88	<1.5	1.6	2.0	1.4	0.89
Nickel	178	177	1	0.56	<1.8	<1.8	17.0	65.0	8.1	0.47
Rubidium	63	0	63	100.0	<211.7	<353.9	N/A	N/A	N/A	N/A
Selenium	94	82	12	12.8	<0.1	<1.2	2.3	13.8	3.7	1.6
Silver	94	72	22	23.4	<0.25	<0.25	0.22	0.013	0.11	0.51
Thallium	94	72	22	23.4	<1.0	<1.25	0.57	0.044	0.21	0.37

N = number of samples; ND = nondetect; KM = Kaplan-Meier; SD = standard deviation; CV = coefficient of variation; N/A = not applicable since there were 100% nondetects.

Table N-4. Percentiles of Censored Wetland Metals and Metalloids. Highlighted Values are Based on Detected Data (units in mg/kg dry wt.).

Variable	N	10%ile	20%ile	25%ile (Q1)	50%ile (Q2)	75%ile (Q3)	80%ile	90%ile	95%ile	99%ile
Antimony	94	0.62	0.73	0.74	0.79	1.0	1.2	1.7	2.2	3.8
Arsenic	178	2.9	<3.1	<3.1	4.6	6.6	7.4	9.0	10.5	17.4
Beryllium	157	0.26	0.32	0.40	0.59	0.84	0.92	1.1	1.3	1.5
Boron	178	<2.1	4.7	6.1	17.0	32.8	37.0	46.0	56.3	92.8
Cadmium	178	0.35	0.47	<0.48	0.55	0.78	0.82	1.0	1.3	2.0
Lead	178	<6.7	7.9	9.1	13.2	17.8	20.5	38.8	68.0	280.4
Lithium	157	4.4	7.2	8.2	<25.0	<25.0	<25.0	<25.0	27.0	32.9
Molybdenum	157	<0.88	<0.88	0.95	1.3	2.1	2.3	3.2	4.5	6.6
Nickel	178	7.1	9.4	10.4	16.8	22.0	23.1	27.0	29.9	37.9
Rubidium	63	<212	<212.1	<212.1	<235.1	<265.3	<265.5	<342.9	<353.3	<353.8
Selenium	94	0.66	1.1	1.3	1.6	2.3	2.5	3.7	6.0	15.8
Silver	94	0.14	0.16	0.17	0.24	<0.25	0.28	0.37	0.44	0.54
Thallium	94	0.36	0.42	0.44	0.64	<1.0	<1.2	<1.2	<1.2	<1.2

N = number of samples; Q = quantile.

Table N-5. Summary Statistics for Wetland Metal PEC-Qs

Variable	N	Minimum	Maximum	Mean	SD	SEM	MAD/0.675	Skewness	Kurtosis	CV
Metal PEC-Q	178	0.037	0.85	0.19	0.12	0.0088	0.084	2.3	8.3	0.60

PEC-Q = probable effect concentration quotient; N = number of samples; SD = standard deviation; SEM = standard error of the mean; MAD = median absolute deviation; CV = coefficient of variation.

Table N-6. Percentiles for Wetland Metal PEC-Qs. Highlighted Values are Based on Detected Data.

Variable	N	10%ile	20%ile	25%ile (Q1)	50%ile (Q2)	75%ile (Q3)	80%ile	90%ile	95%ile	99%ile
Metal PEC-Q	178	0.083	0.10	0.12	0.18	0.23	0.24	0.29	0.40	0.64

PEC-Q = probable effect concentration quotient; N = number of samples; Q = quantile.

Table N-7. General Statistics for Censored Wetland Chloride Data using the Kaplan-Meier Method

Variable	N	Number Detects	Number NDs	% NDs	Minimum ND (mg/kg dry wt.)	Maximum ND (mg/kg dry wt.)	KM Mean (mg/kg dry wt.)	KM Variance (mg/kg dry wt.)	KM SD (mg/kg dry wt.)	KM CV
Chloride	163	159	4	2.4	9.1	9.8	147.1	242214	492.2	3.3

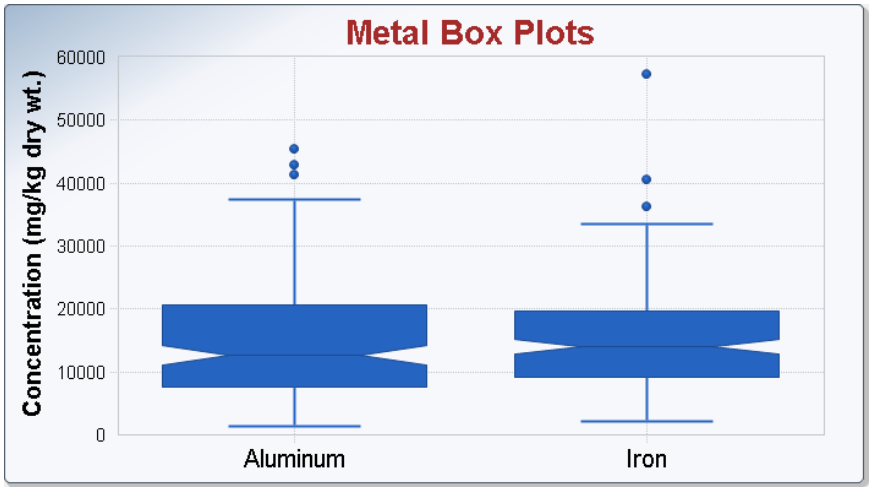
N = number of samples; ND = nondetect; KM = Kaplan-Meier; SD = standard deviation; CV = coefficient of variation.

Table N-8. Percentiles for Censored Wetland Chloride Data. Highlighted Values are Based on Detected Data (units in mg/kg dry wt.).

Variable	N	10%ile	20%ile	25%ile (Q1)	50%ile (Q2)	75%ile (Q3)	80%ile	90%ile	95%ile	99%ile
Chloride	163	10.1	18.2	22.5	62	120	130.6	218	378.6	1423

N = number of samples; Q = quantile.

Box Plots


Metal Box Plots
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40000
30000
20000
10000
0
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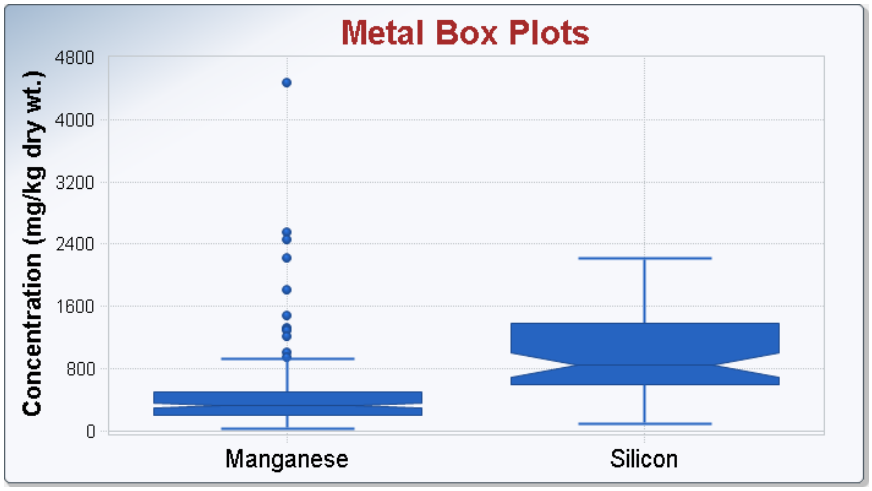
Iron


Metal Box Plots
Concentration (mg/kg dry wt.)
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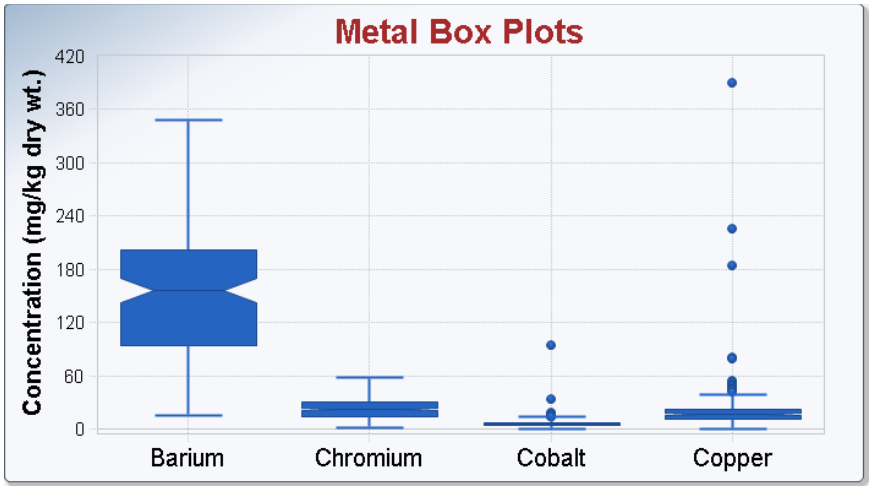
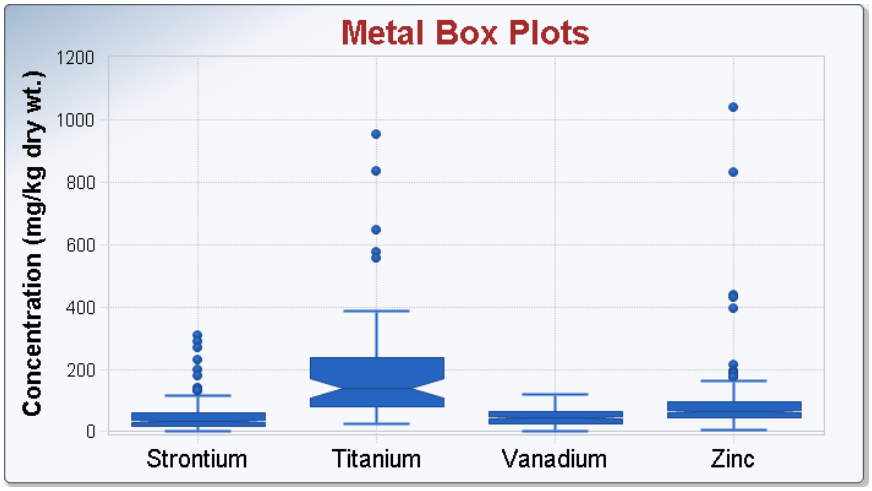
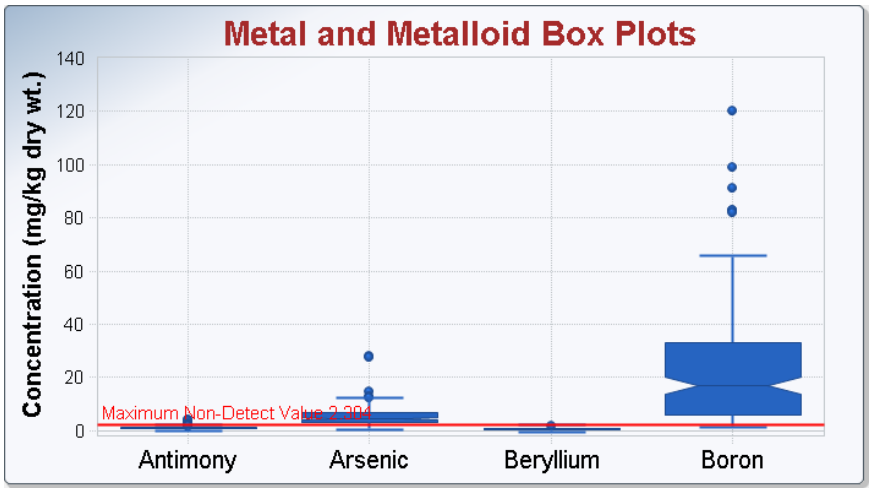
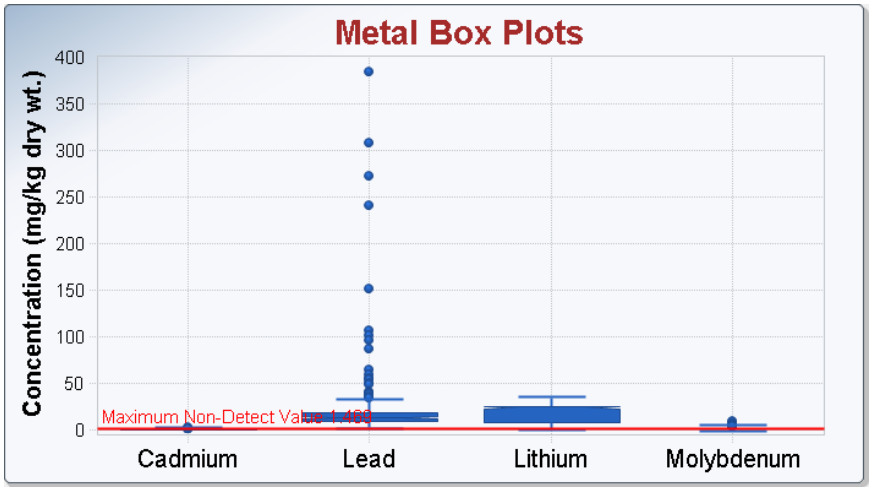
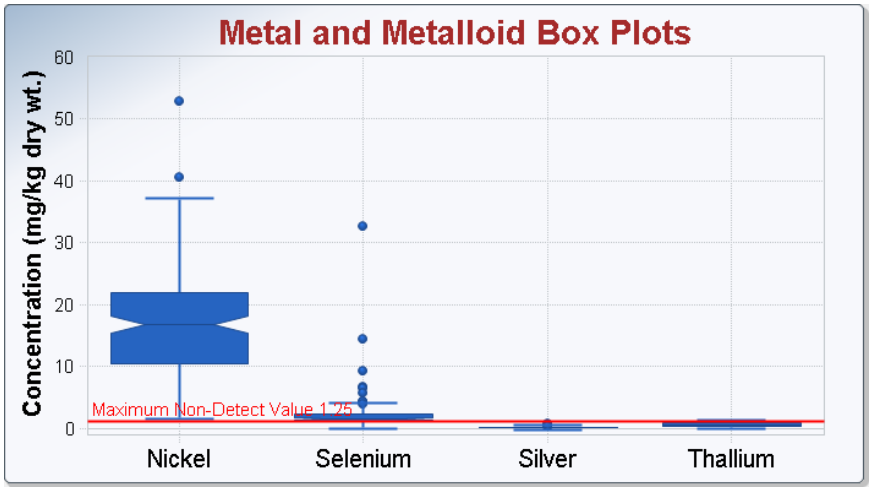
4000
3200
2400
1600
800
0
Manganese
Silicon

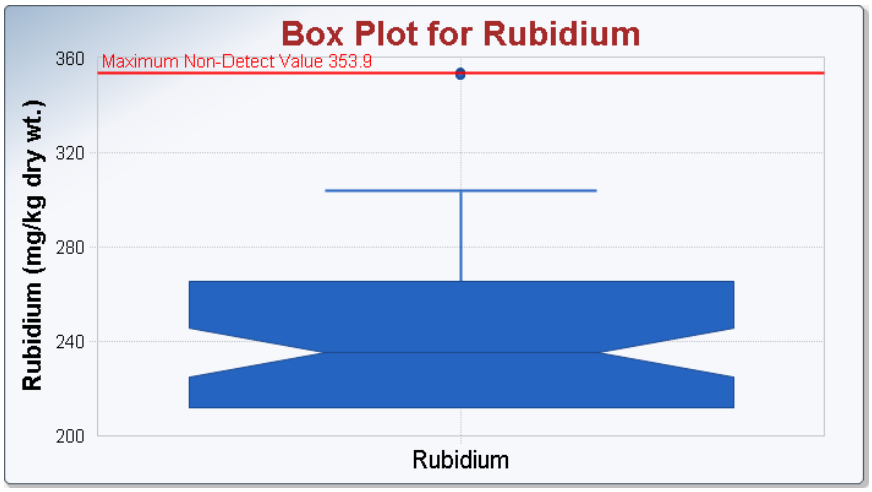

Metal Box Plots
Concentration (mg/kg dry wt.)
420
360
300
240
180
120
60
0
Barium
Chromium
Cobalt
Copper

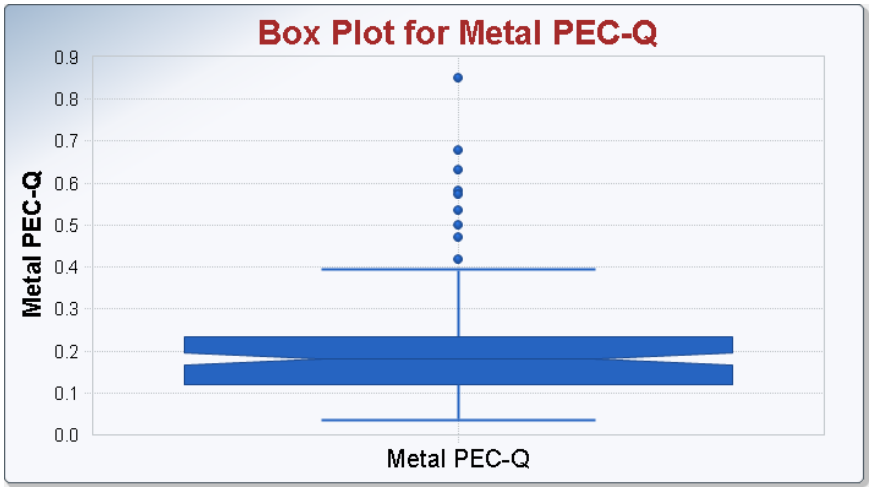

Metal Box Plots
Concentration (mg/kg dry wt.)
1200
1000
800
600
400
200
0
Strontium
Titanium
Vanadium
Zinc

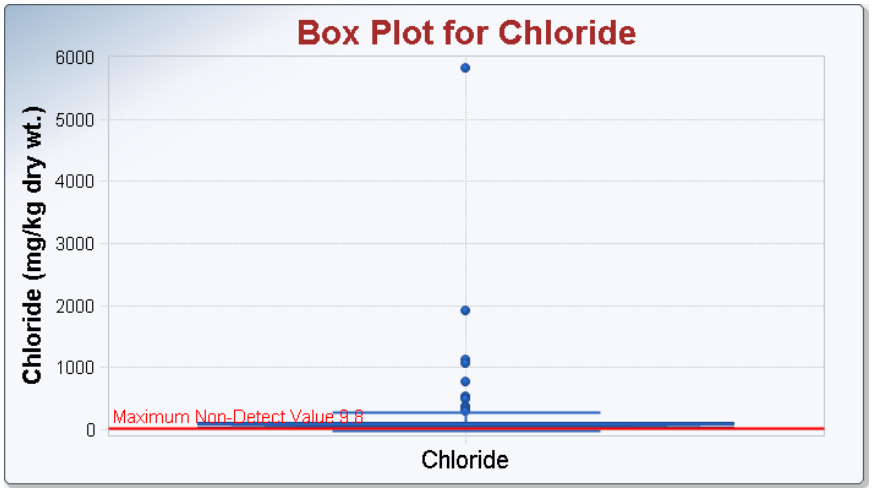

Metal and Metalloid Box Plots
Concentration (mg/kg dry wt.)
140
120
100
80
60
40
20
0
Maximum Non-Detect Value 2.204
Antimony
Arsenic
Beryllium
Boron


Metal Box Plots
Concentration (mg/kg dry wt.)
400
350
300
250
200
150
100
50
0
Maximum Non-Detect Value 1.400
Cadmium
Lead
Lithium
Molybdenum

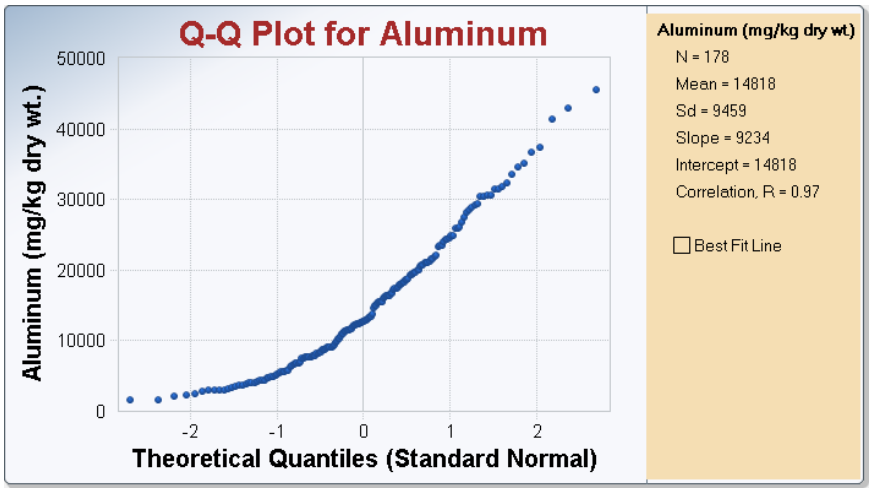

Metal and Metalloid Box Plots
Concentration (mg/kg dry wt.)
60
50
40
30
20
10
0
Maximum Non-Detect Value 1.75
Nickel
Selenium
Silver
Thallium

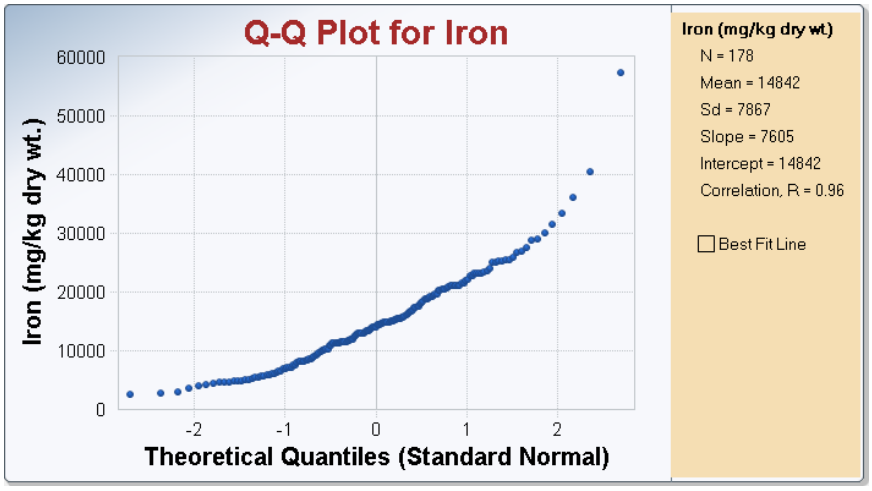

Box Plot for Rubidium
Rubidium (mg/kg dry wt.)
360
320
280
240
200
Maximum Non-Detect Value 353.9
Rubidium


Box Plot for Metal PEC-Q
Metal PEC-Q
0.9
0.8
0.7
0.6
0.5
0.4
0.3
0.2
0.1
0.0
Metal PEC-Q

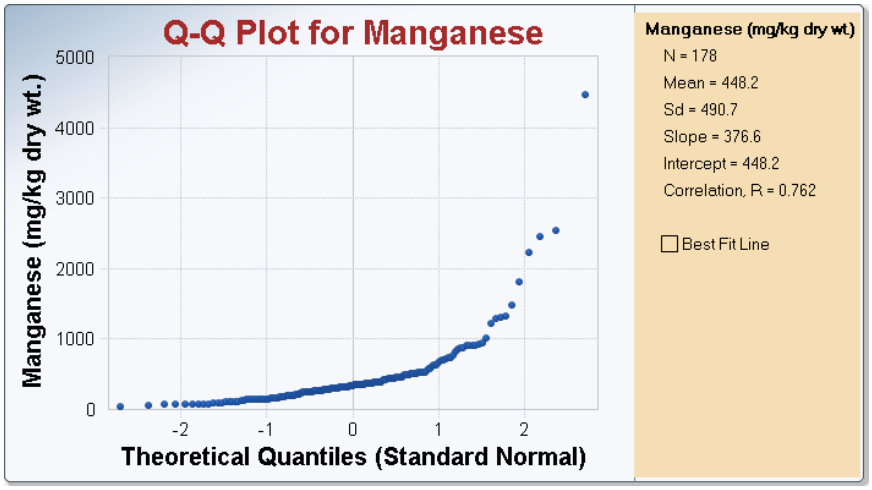

Box Plot for Chloride
Chloride (mg/kg dry wt.)
6000
5000
4000
3000
2000
1000
0
Maximum Non-Detect Value 9.8
Chloride

Q-Q Plots (outliers noted are based on the 5% significance level using Rosner's outlier test)

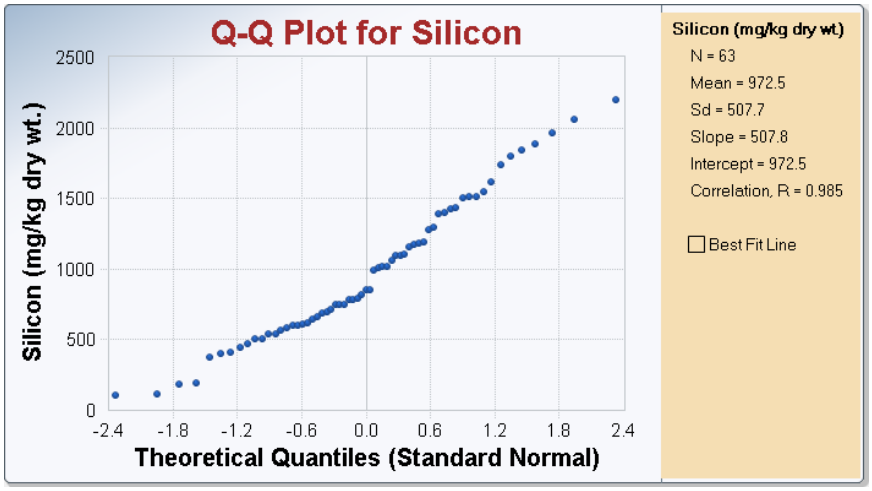


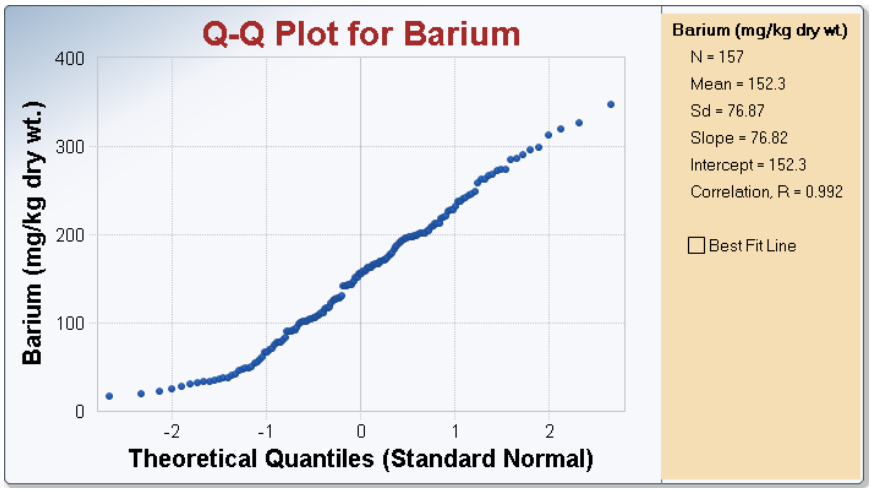


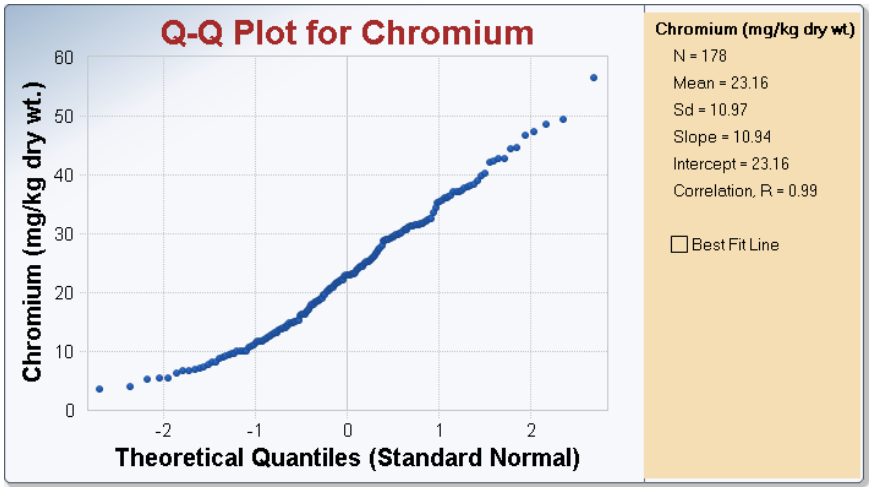
Two outliers were noted for iron.

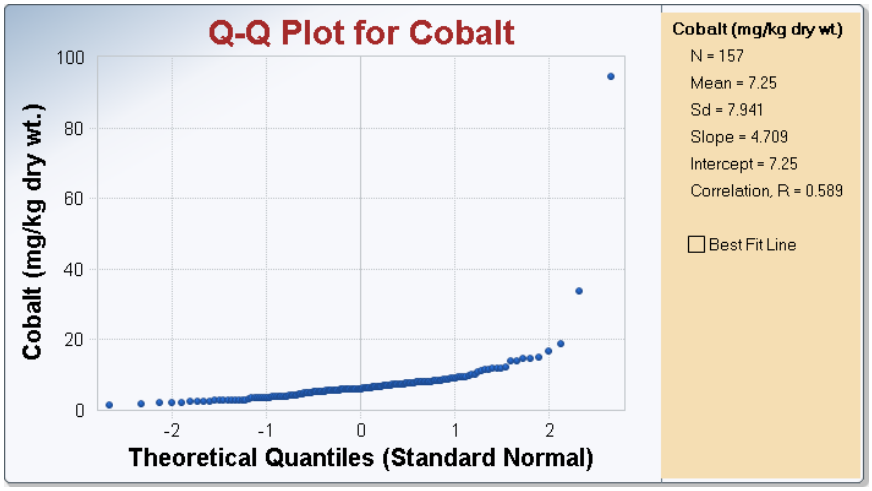


Ten outliers were noted for manganese.

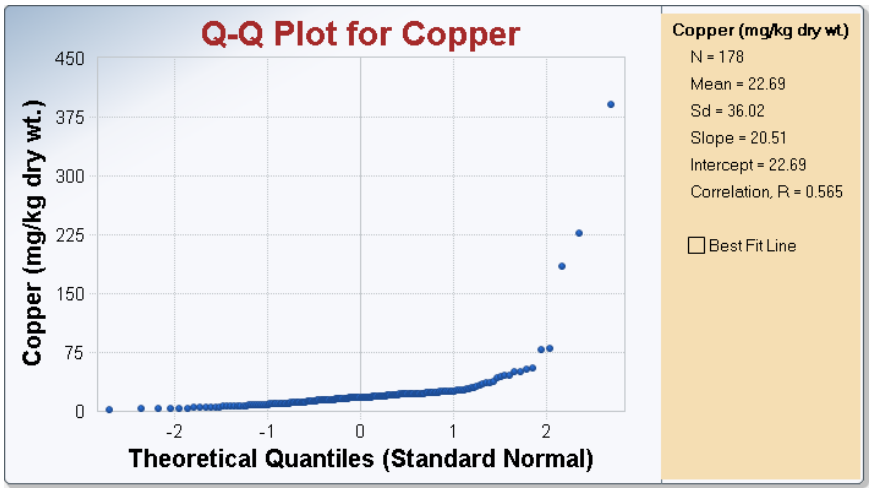

Q-Q Plot for Silicon
Silicon (mg/kg dry wt.)
2500
2000
1500
1000
500
0
-2.4
-1.8
-1.2
-0.6
0.0
0.6
1.2
1.8
2.4
Theoretical Quantiles (Standard Normal)
Silicon (mg/kg dry wt.)
N = 63
Mean = 972.5
Sd = 507.7
Slope = 507.8
Intercept = 972.5
Correlation, R = 0.985
Best Fit Line


Q-Q Plot for Barium
Barium (mg/kg dry wt.)
400
300
200
100
0
-2
-1
0
1
2
Theoretical Quantiles (Standard Normal)
Barium (mg/kg dry wt.)
N = 157
Mean = 152.3
Sd = 76.87
Slope = 76.82
Intercept = 152.3
Correlation, R = 0.992
Best Fit Line

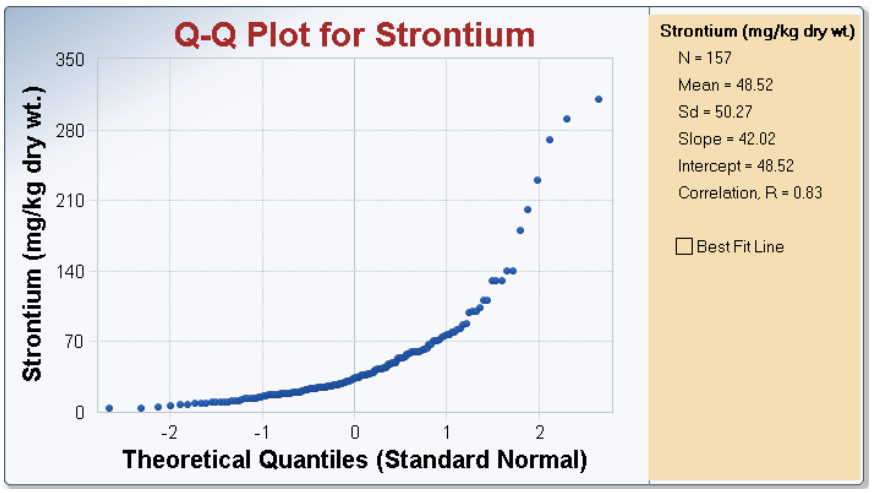

Q-Q Plot for Chromium
Chromium (mg/kg dry wt.)
60
50
40
30
20
10
0
-2
-1
0
1
2
Theoretical Quantiles (Standard Normal)
Chromium (mg/kg dry wt.)
N = 178
Mean = 23.16
Sd = 10.97
Slope = 10.94
Intercept = 23.16
Correlation, R = 0.99
Best Fit Line



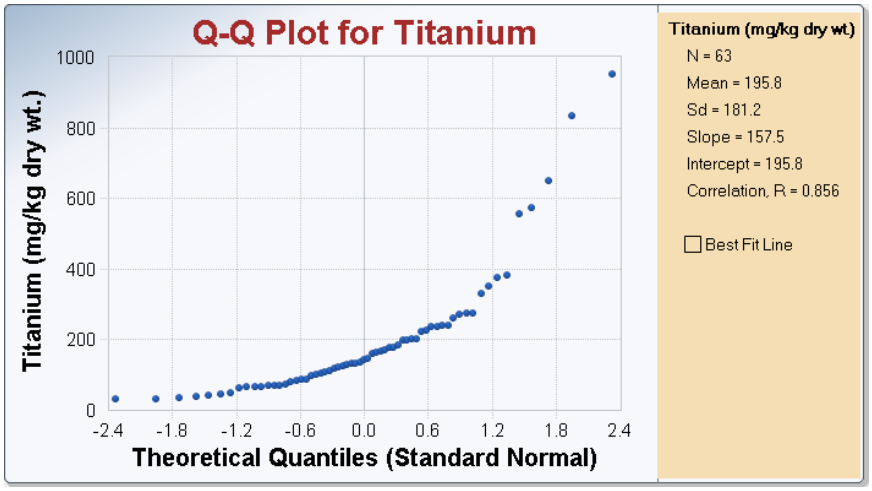
Three outliers were noted for cobalt.



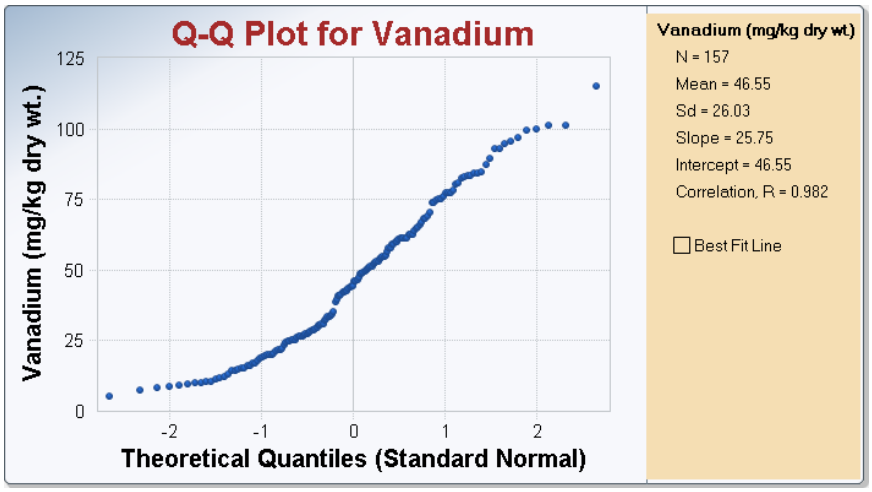
Nine outliers were noted for copper.

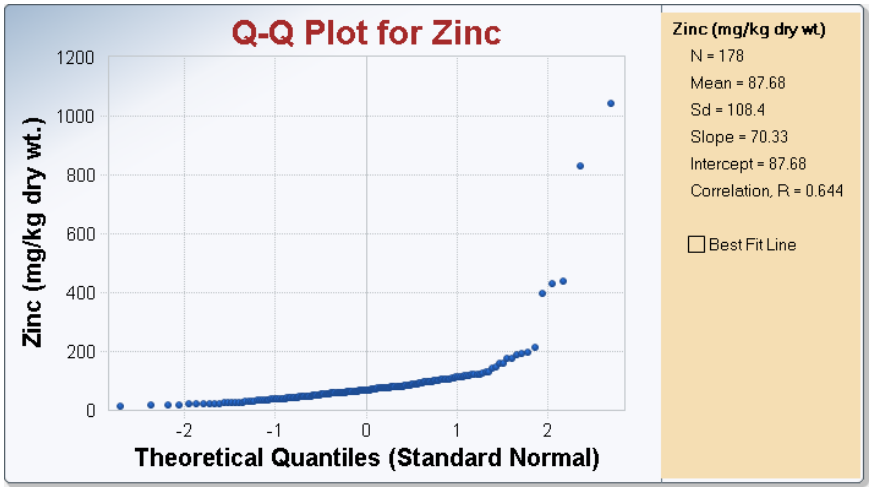


Six outliers were noted for strontium.

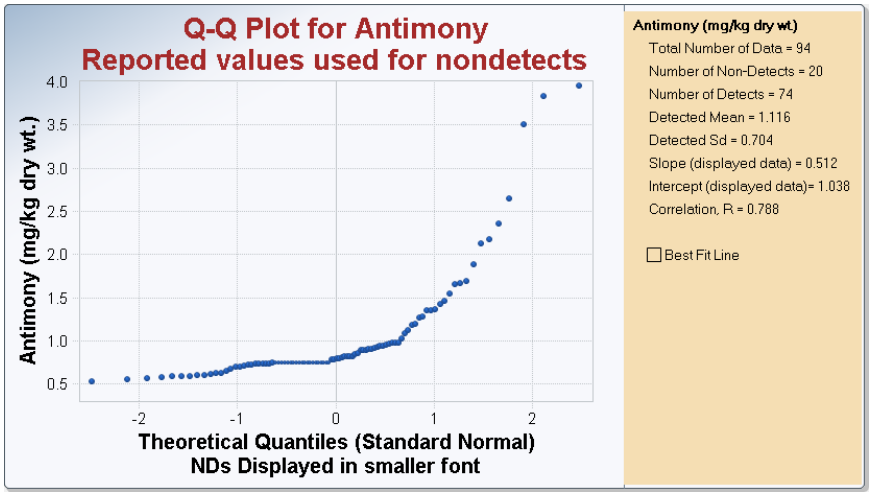


Five outliers were noted for titanium.

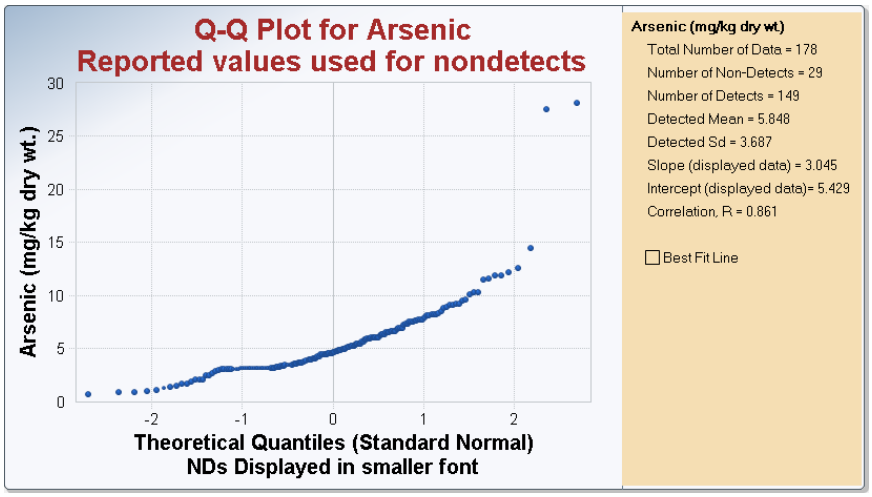




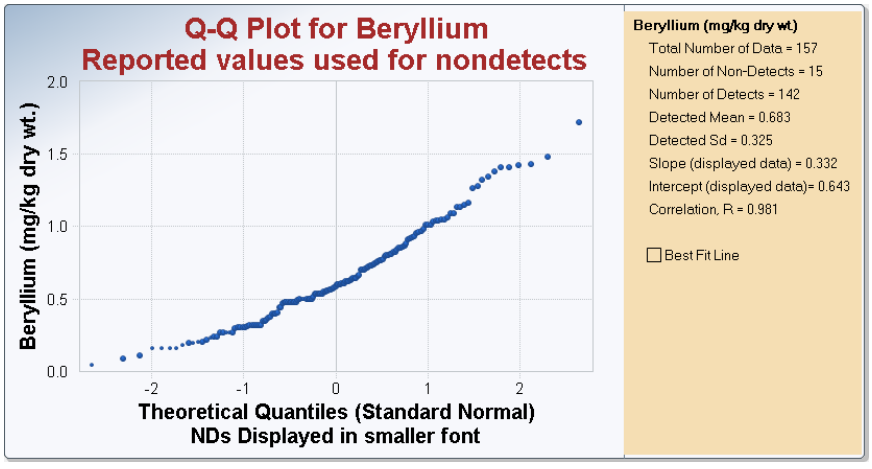
Six outliers were noted for zinc.

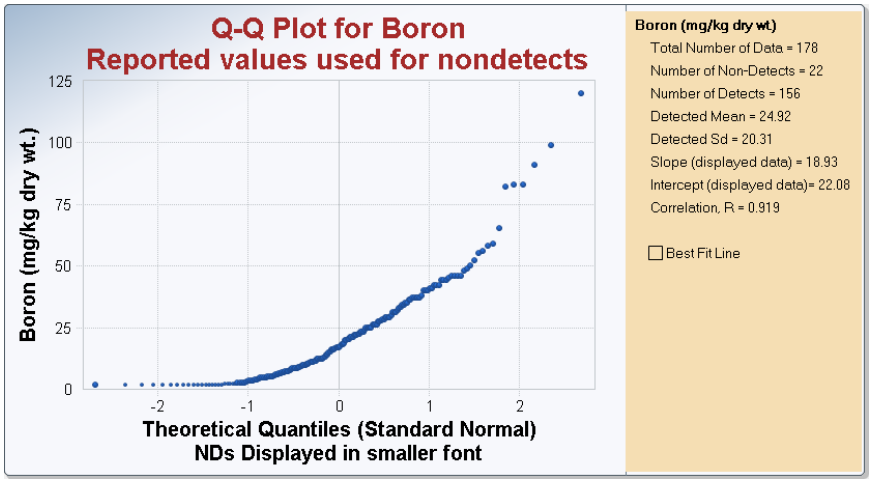


Seven outliers were noted for antimony when excluding the nondetects.

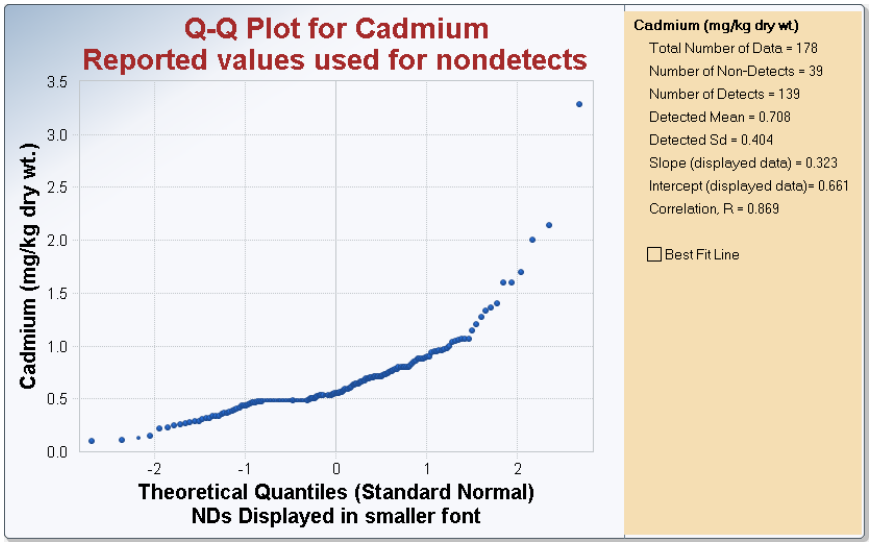


Two outliers were noted for arsenic when excluding the nondetects.

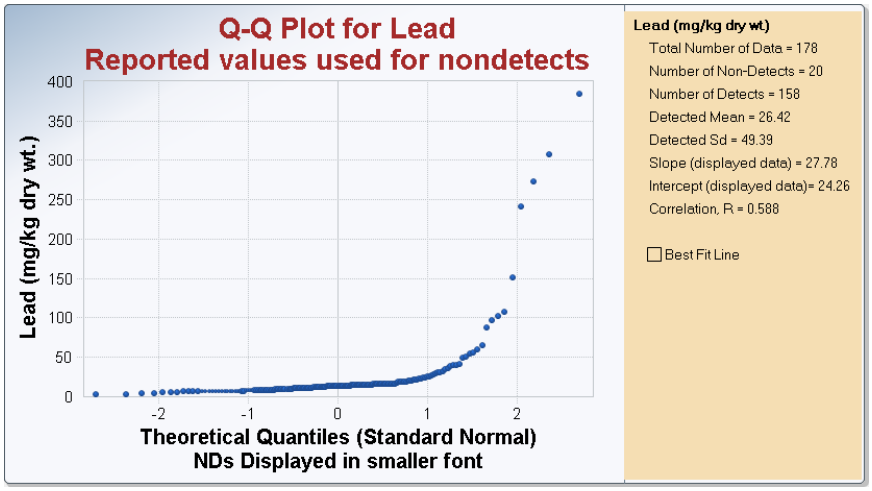




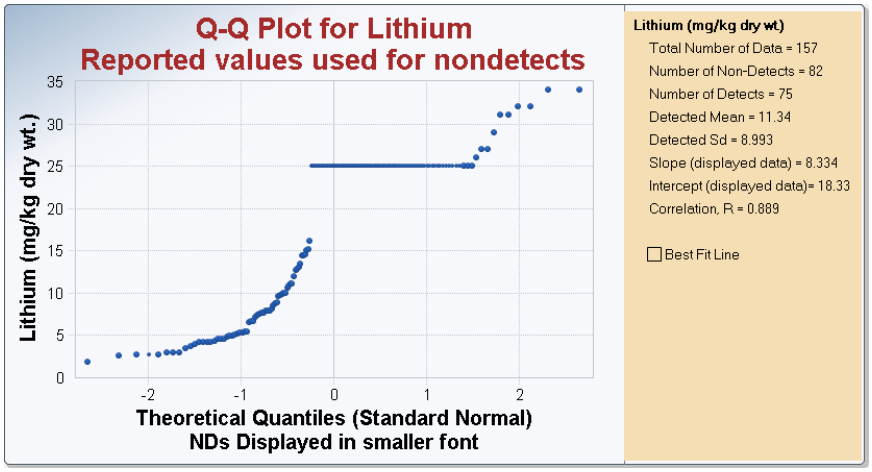
Six outliers were noted for boron when excluding the nondetects.

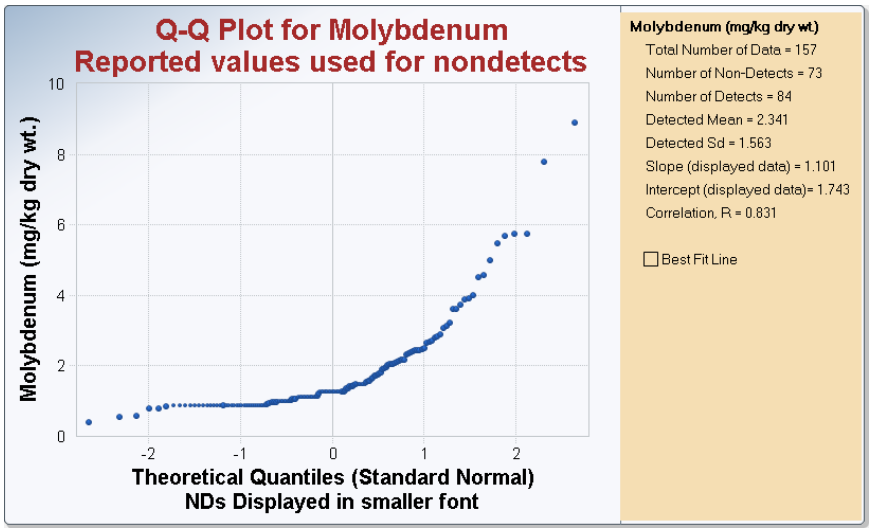


Three outliers were noted for cadmium when excluding the nondetects.

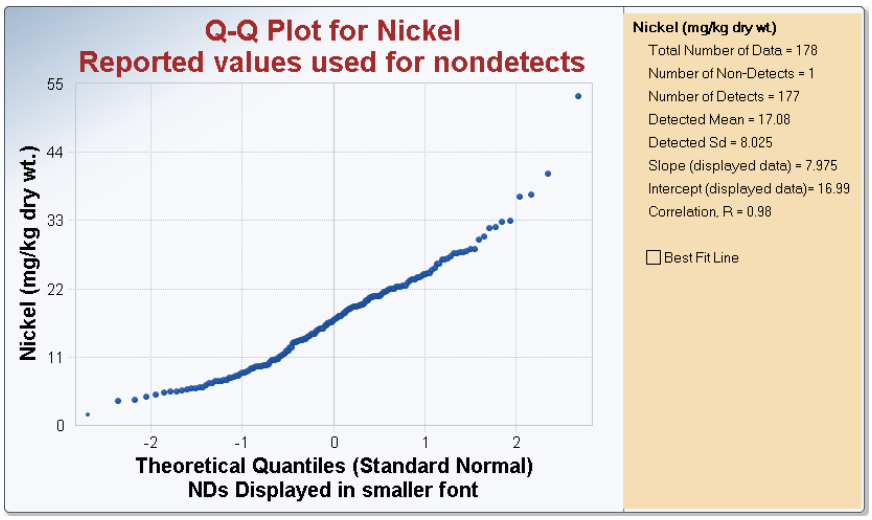


Ten outliers were noted for lead when excluding the nondetects.

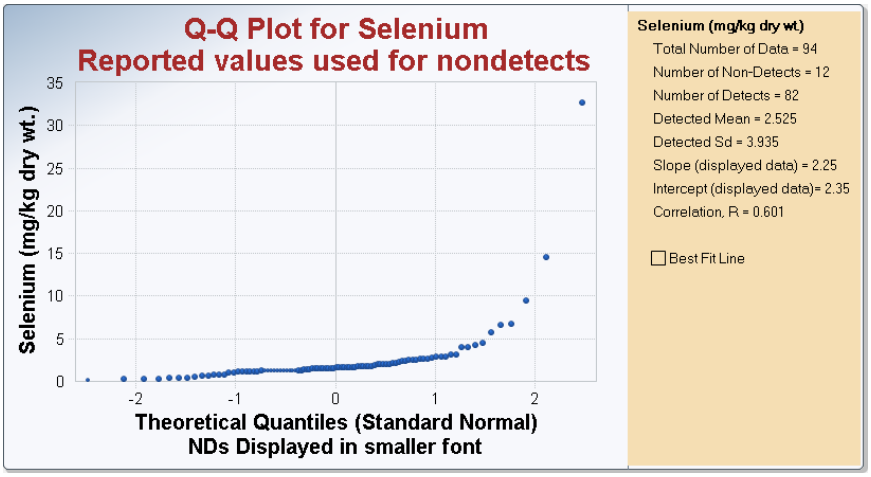




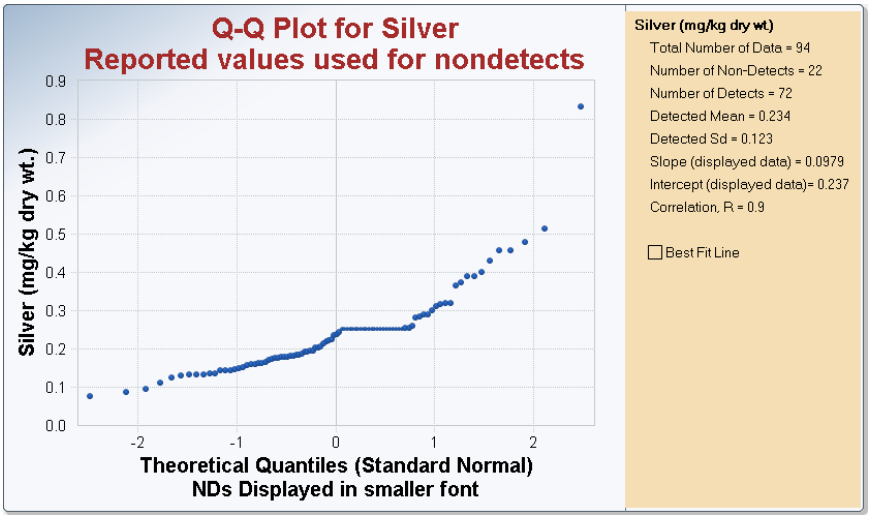
Two outliers were noted for molybdenum when excluding the nondetects.



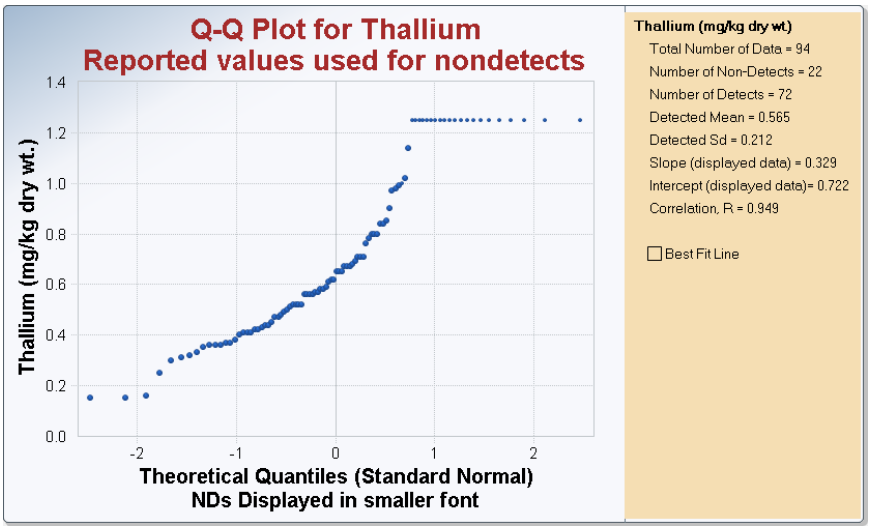
One outlier was noted for nickel when excluding the nondetects.

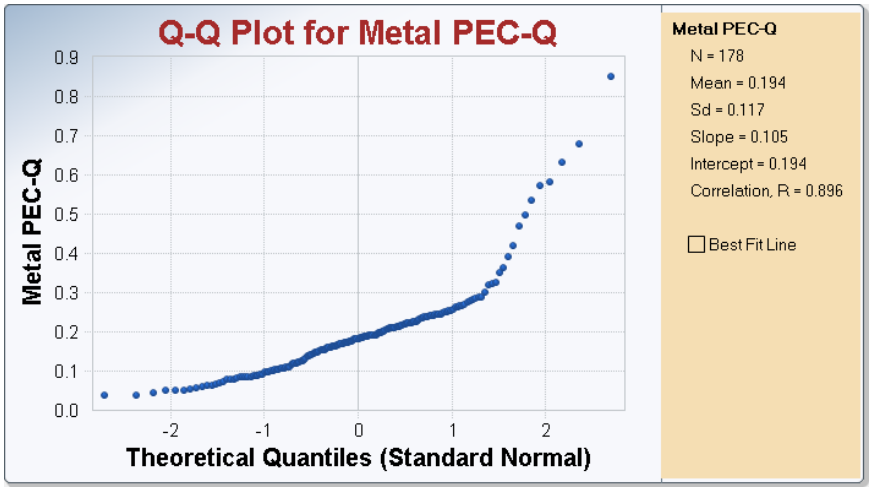


Six outliers were noted for selenium when excluding the nondetects.

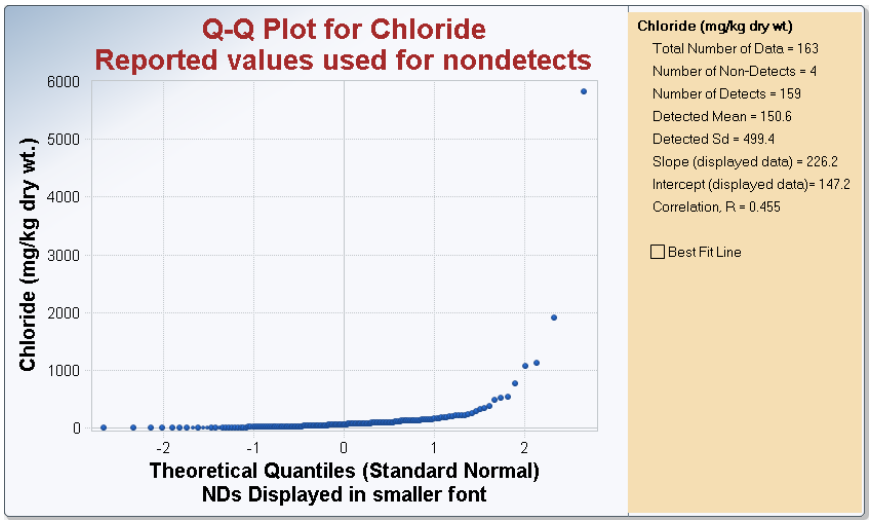


One outlier was noted for silver when excluding the nondetects.





Eight outliers were noted for the metal PEC-Qs. One-half the reporting limit was substituted for nondetect metals used in the calculation.



Ten outliers were noted for chloride when excluding the nondetects.

Appendix O
Sediment Quality Data from the
St. Louis River Area of Concern (SLRAOC)

Table O-1. Summary Statistics for SLRAOC Particle Size Data

Variable	N	Minimum (%)	Maximum (%)	Mean (%)	SD (%)	SEM (%)	MAD/0.675 (%)	Skewness	Kurtosis	CV
Clay	80	0.090	35.1	12.8	9.7	1.1	13.1	0.29	-1.1	0.76
Silt	81	1.6	82.4	44.5	22.4	2.5	22.1	-0.44	-0.90	0.50
Sand	83	0.70	97.8	41.2	29.4	3.2	34.0	0.39	-1.1	0.71

N = number of samples; SD = standard deviation; SEM = standard error of the mean; MAD = median absolute deviation; CV = coefficient of variation.

Table O-2. Percentiles for SLRAOC Particle Size Data. Highlighted Values are Based on Detected Data.

Variable	N	10%ile (%)	20%ile (%)	25%ile (Q1) (%)	50%ile (Q2) (%)	75%ile (Q3) (%)	80%ile (%)	90%ile (%)	95%ile (%)	99%ile (%)
Clay	80	0.79	2.1	3.2	11.6	20.8	22.5	25.3	27.6	32.0
Silt	81	9.1	17.7	31.0	52.1	61.1	62.7	72.3	75.0	77.9
Sand	83	5.3	13.0	14.3	35.7	64.4	69.3	86.2	92.0	97.6

N = number of samples; Q = quantile.

Table O-3. Summary Statistics for Censored SLRAOC TOC Data using the Kaplan-Meier Method

Variable	N	Number Detects	Number NDs	% NDs	Minimum ND (%)	Maximum ND (%)	KM Mean (%)	KM Variance (%)	KM SD (%)	KM CV (%)
TOC	331	324	7	2.1	0	0.5	4.4	34.2	5.8	1.3

SLRAOC = St. Louis River Area of Concern; TOC = total organic carbon; N = number of samples; ND = nondetect; SD = standard deviation; CV = coefficient of variation.

Table O-4. Percentiles for Censored SLRAOC TOC Data. Highlighted Values are Based on Detected Data.

Variable	N	10%ile (%)	20%ile (%)	25%ile (Q1) (%)	50%ile (Q2) (%)	75%ile (Q3) (%)	80%ile (%)	90%ile (%)	95%ile (%)	99%ile (%)
TOC	331	0.50	1.0	1.4	2.8	4.8	5.5	9.5	14.5	30.2

SLRAOC = St. Louis River Area of Concern; TOC = total organic carbon; N = number of samples; Q = quantile.

Table O-5. Summary Statistics for Detected SLRAOC Metals

Variable	N	Minimum (mg/kg dry wt.)	Maximum (mg/kg dry wt.)	Mean (mg/kg dry wt.)	SD (mg/kg dry wt.)	SEM (mg/kg dry wt.)	MAD/0.675 (mg/kg dry wt.)	Skewness	Kurtosis	CV
Aluminum	77	1150	16300	8091	3302	376.3	2980	0.26	-0.065	0.41
Chromium	286	2.3	75	23.9	12.6	0.75	14.8	0.60	-0.013	0.53
Iron	77	2510	30300	16435	6292	717.0	5634	0.27	-0.12	0.38
Manganese	77	43.1	1190	411.6	229.1	26.1	158.6	1.3	2.2	0.56
Vanadium	77	6.9	51.5	25.4	9.4	1.1	8.2	0.60	0.21	0.37

SLRAOC = St. Louis River Area of Concern; N = number of samples; SD = standard deviation; SEM = standard error of the mean; MAD = median absolute deviation; CV = coefficient of variation.

Table O-6. Percentiles for Detected SLRAOC Metals. Highlighted Values are Based on Detected Data (units in mg/kg dry wt.).

Variable	N	10%ile	20%ile	25%ile (Q1)	50%ile (Q2)	75%ile (Q3)	80%ile	90%ile	95%ile	99%ile
Aluminum	77	4048	5272	5970	8090	9790	10600	12200	13220	15996
Chromium	286	9.8	11.3	13.2	22.0	34.0	36.0	41.0	45.8	53.6
Iron	77	9424	11680	12400	15400	20300	21600	25200	28420	30148
Manganese	77	176.0	252.4	268.0	365.0	480.0	555.6	684.4	860.0	1182
Vanadium	77	14.3	17.4	19.4	24.5	30.0	32.2	38.4	41.5	50.9

SLRAOC = St. Louis River Area of Concern; N = number of samples; Q = quantile.

Table O-7. Summary Statistics for Censored SLRAOC Metals and Metalloids using the Kaplan-Meier Method

Variable	N	Number Detects	Number NDs	% NDs	Minimum ND (mg/kg dry wt.)	Maximum ND (mg/kg dry wt.)	KM Mean (mg/kg dry wt.)	KM Variance (mg/kg dry wt.)	KM SD (mg/kg dry wt.)	KM CV
Antimony	77	17	60	77.9	0.24	21.3	0.44	0.025	0.16	0.36
Arsenic	286	284	2	0.70	0.96	6.5	3.4	2.8	1.7	0.50
Barium	286	278	8	2.8	6.2	26.8	108.0	50104	223.8	2.1
Cadmium	286	218	68	23.8	0	1.1	0.88	0.62	0.78	0.90
Cobalt	77	60	17	22.1	1.5	13.1	8.1	12.9	3.6	0.45
Copper	286	284	2	0.70	1.4	3.1	26.6	2957	54.4	2.0
Lead	286	285	1	0.35	1.0	1.0	26.6	1218	34.9	1.3
Mercury	286	239	47	16.4	0.025	0.65	0.12	0.018	0.14	1.1
Nickel	286	285	1	0.35	2.6	2.6	19.9	85.1	9.2	0.46
Selenium	286	163	123	43.0	0	22.7	0.58	0.34	0.59	1.0
Silver	286	207	79	27.6	0.090	6.5	0.25	0.13	0.36	1.4
Thallium	77	0	77	100	2.8	16.2	-	-	-	-
Zinc	286	285	1	0.35	5.8	5.8	98.0	4684	68.4	0.70

SLRAOC = St. Louis River Area of Concern; N = number of samples; ND = nondetect; KM = Kaplan-Meier; SD = standard deviation; CV = coefficient of variation.

Table O-8. Percentiles for Censored SLRAOC Metals and Metalloids. Highlighted Values are Based on Detected Data (units in mg/kg dry wt.).

Variable	N	10%ile	20%ile	25%ile (Q1)	50%ile (Q2)	75%ile (Q3)	80%ile	90%ile	95%ile	99%ile
Antimony	77	0.42	0.53	<0.73	<8.9	<10.0	<10.8	<11.9	<15.0	<17.4
Arsenic	286	1.5	2.0	2.1	3.0	4.4	4.7	5.9	6.4	8.5
Barium	286	<24.0	37.0	41.1	72.2	120.0	130.0	170.0	190.0	1239
Cadmium	286	<0.22	<0.39	0.45	<0.78	1.3	1.4	1.9	2.4	3.1
Cobalt	77	<4.7	<6.2	<6.7	8.4	10.7	<11.2	<13.1	13.8	15.3
Copper	286	6.4	8.6	10.0	19.0	31.0	35.0	42.0	60.5	90.2
Lead	286	4.2	5.6	6.6	15.0	34.7	40.0	61.0	77.8	170.0
Mercury	286	0.020	0.031	0.043	<0.12	<0.18	<0.21	0.31	0.37	0.66
Nickel	286	9.5	11.0	12.9	18.2	27.0	29.0	31.2	35.0	44.1
Selenium	286	<0	<0	0.25	0.68	<1.2	<1.4	2.6	<4.6	<6.5
Silver	286	0.074	0.099	<0.11	0.24	<1.2	<1.3	<1.7	<2.0	<2.8
Thallium	77	<3.1	<3.2	<3.3	<3.9	<4.6	<4.8	<5.6	<6.3	<10.6
Zinc	286	32.5	41.2	46.1	78.7	130.0	157.0	200.0	230.0	300.0

SLRAOC = St. Louis River Area of Concern; N = number of samples; Q = quantile.

Table O-9. Summary Statistics for Censored SLRAOC Organic Contaminants using the Kaplan-Meier Method

Variable	N	Number Detects	Number NDs	% NDs	Minimum ND (µg/kg dry wt.)	Maximum ND (µg/kg dry wt.)	KM Mean (µg/kg dry wt.)	KM Variance (µg/kg dry wt.)	KM SD (µg/kg dry wt.)	KM CV
$\sum PAH_{13}$	238	236	2	0.84	307.9	1700	1542	7160582	2676	1.7
Total PCBs	321	53	268	83.5	0	0	-	-	-	-

SLRAOC = St. Louis River Area of Concern; N = number of samples; ND = nondetect; KM = Kaplan-Meier; SD = standard deviation; CV = coefficient of variation; PAH = polycyclic aromatic hydrocarbon; PCBs = polychlorinated biphenyls.

Table O-10. Percentiles of Censored SLRAOC Organic Contaminants. Highlighted Values are Based on Detected Data (units in µg/kg dry wt.).

Variable	N	10%ile	20%ile	25%ile (Q1)	50%ile (Q2)	75%ile (Q3)	80%ile	90%ile	95%ile	99%ile
$\sum PAH_{13}$	238	130.7	210.8	233.5	430.1	1905	2302	3981	6044	11627
Total PCBs	321	<0	<0	<0	<0	<0	<0	25.0	70.0	166.0

SLRAOC = St. Louis River Area of Concern; N = number of samples; Q = quantile; PAH = polycyclic aromatic hydrocarbon; PCBs = polychlorinated biphenyls.

Table O-11. Summary Statistics for SLRAOC Calculated Values

Variable	N	Minimum	Maximum	Mean	SD	SEM	MAD/0.675	Skewness	Kurtosis	CV
Metal PEC-Q	238	0.028	1.3	0.22	0.15	0.0095	0.11	2.6	14.4	0.68
Mean PEC-Q	238	0.012	0.50	0.10	0.078	0.0050	0.054	1.9	5.2	0.78
PCDD/F TEQs	152	0.0065	87.5	8.0	13.6	1.1	5.2	3.9	17.6	1.7

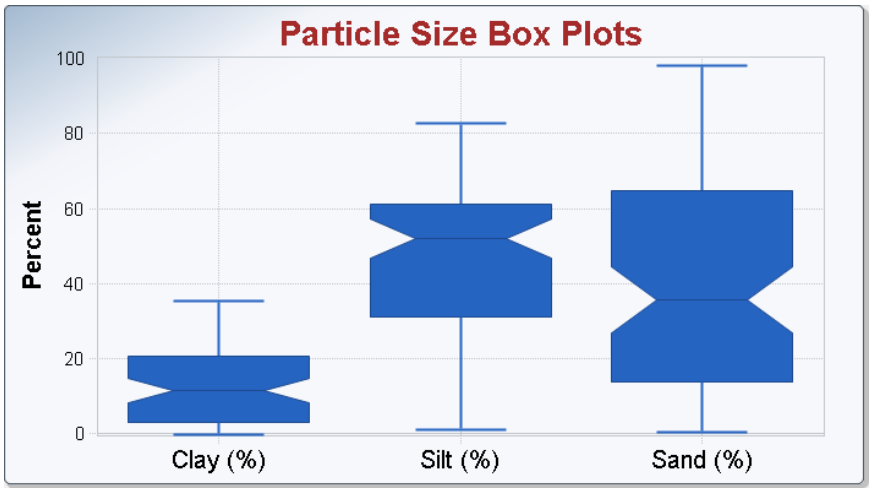
SLRAOC = St. Louis River Area of Concern; N = number of samples; SD = standard deviation; SEM = standard error of the mean; MAD = median absolute deviation; CV = coefficient of variation; PEC-Q = probable effect concentration; PCDD/F = polychlorinated dibenzo-*p*-dioxins/dibenzofurans; TEQs = toxic equivalents for aquatic life PCDD/Fs.

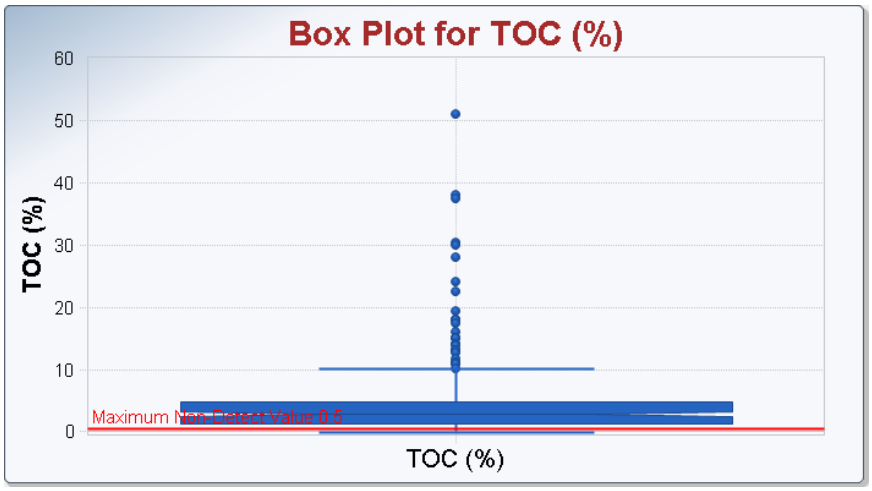
Table O-12. Percentiles for SLRAOC Calculated Values. Highlighted Values are Based on Detected Data.

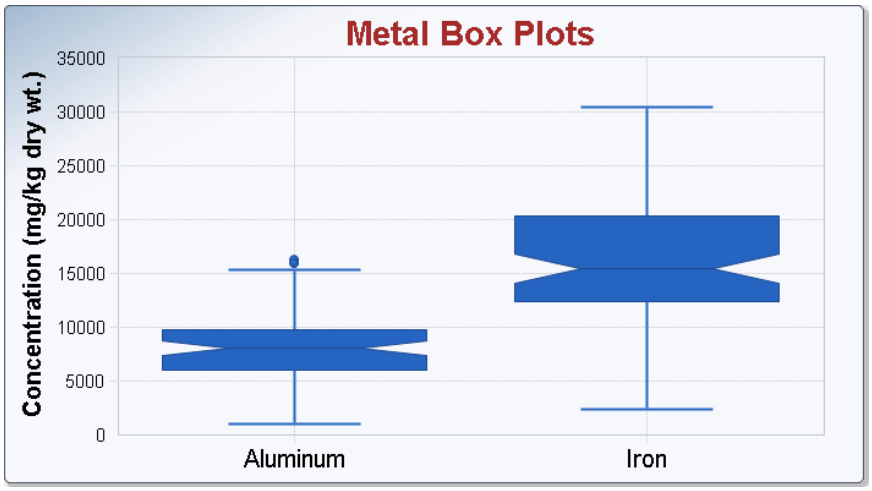
Variable	N	10%ile	20%ile	25%ile (Q1)	50%ile (Q2)	75%ile (Q3)	80%ile	90%ile	95%ile	99%ile
Metal PEC-Q	238	0.082	0.10	0.11	0.18	0.28	0.32	0.39	0.46	0.58
Mean PEC-Q	238	0.031	0.040	0.043	0.075	0.13	0.15	0.20	0.24	0.40
PCDD/F TEQs	152	0.21	0.53	0.69	3.8	9.3	11.3	18.2	22.0	76.1

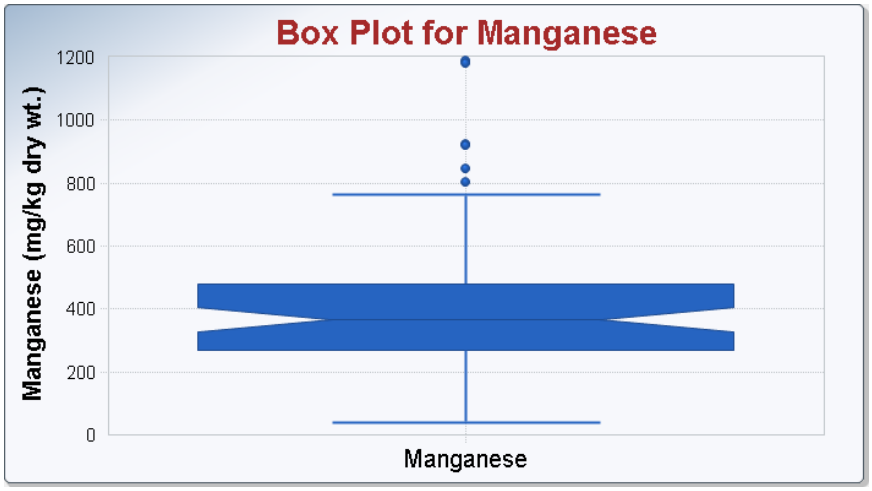
SLRAOC = St. Louis River Area of Concern; N = number of samples; Q = quantile; PEC-Q = probable effect concentration; PCDD/F = polychlorinated dibenzo-*p*-dioxins/dibenzofurans; TEQs = toxic equivalents for aquatic life PCDD/Fs.

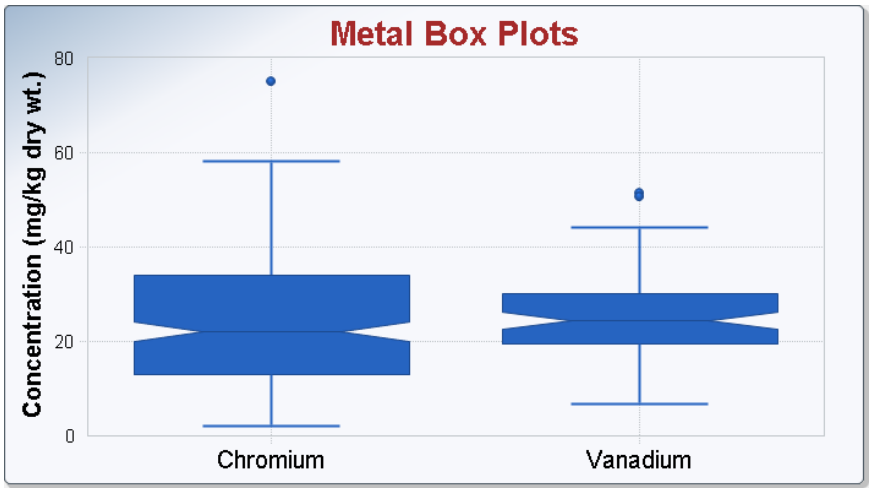
Box Plots

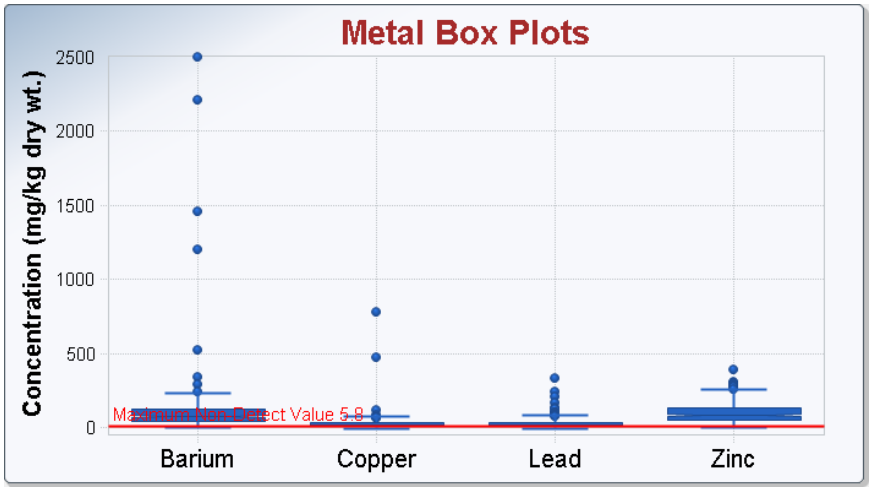

Particle Size Box Plots
Percent
100
80
60
40
20
0
Clay (%)
Silt (%)
Sand (%)

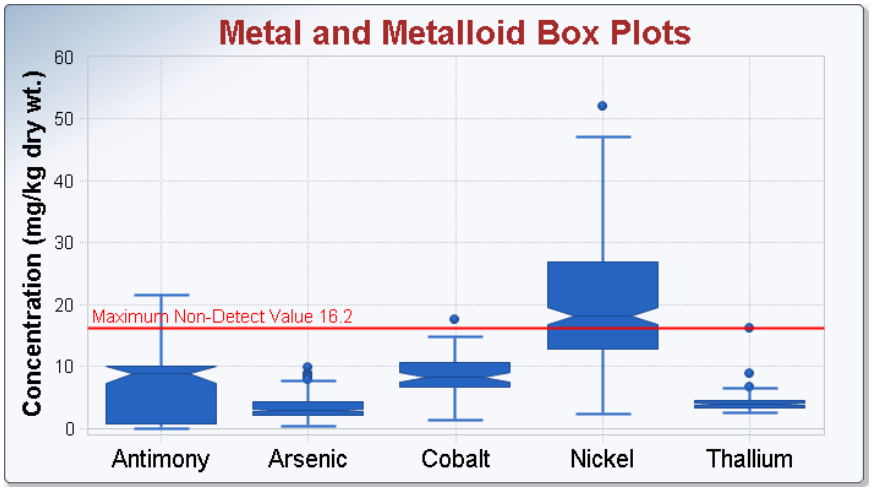

Box Plot for TOC (%)
TOC (%)
60
50
40
30
20
10
0
TOC (%)

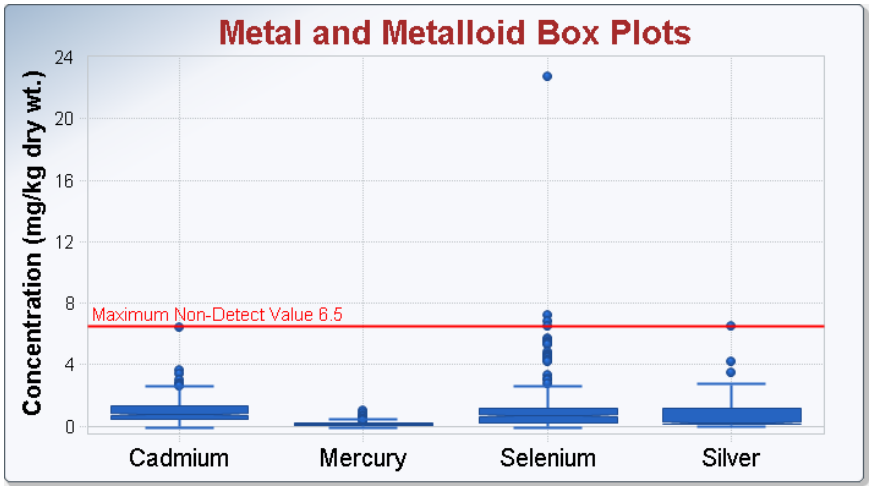

Metal Box Plots
Concentration (mg/kg dry wt.)
35000
30000
25000
20000
15000
10000
5000
0
Aluminum
Iron

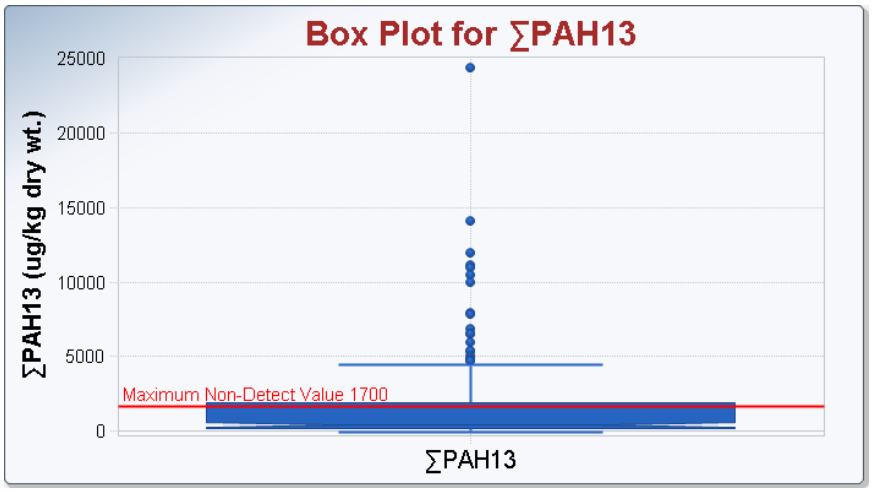

Box Plot for Manganese
Manganese (mg/kg dry wt.)
1200
1000
800
600
400
200
0
Manganese

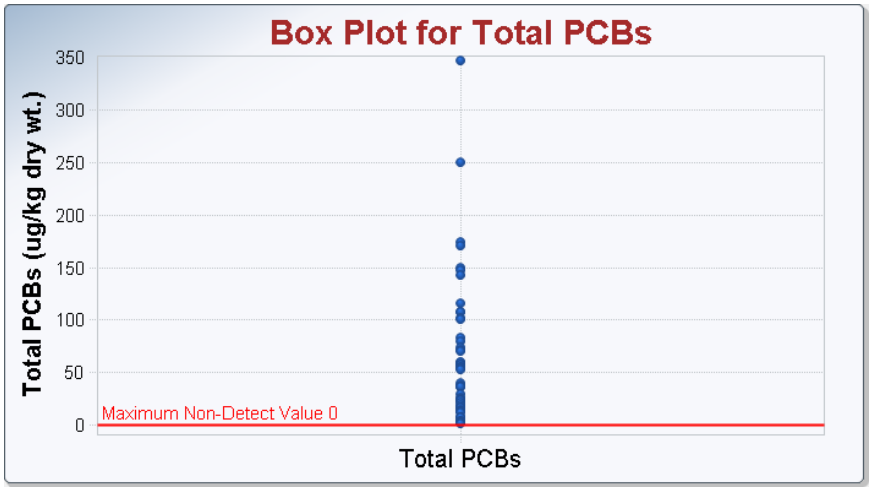

Metal Box Plots
Concentration (mg/kg dry wt.)
80
60
40
20
0
Chromium
Vanadium

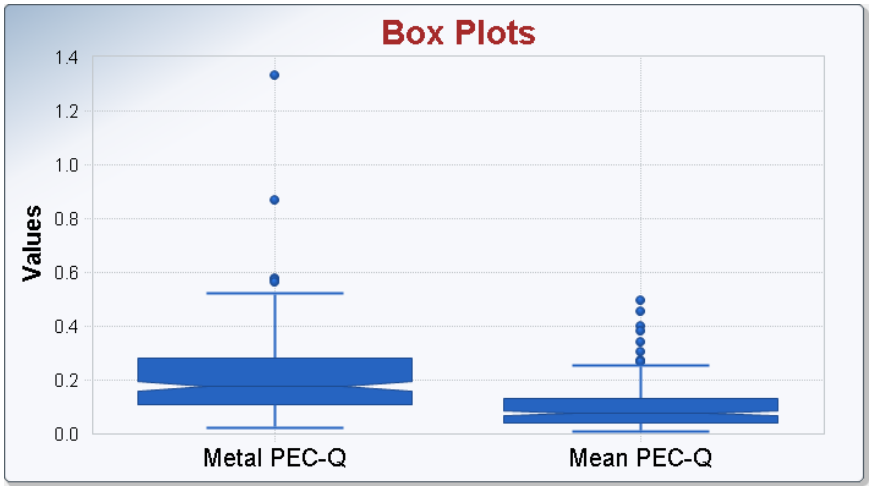

Metal Box Plots
Concentration (mg/kg dry wt.)
2500
2000
1500
1000
500
0
Barium
Copper
Lead
Zinc

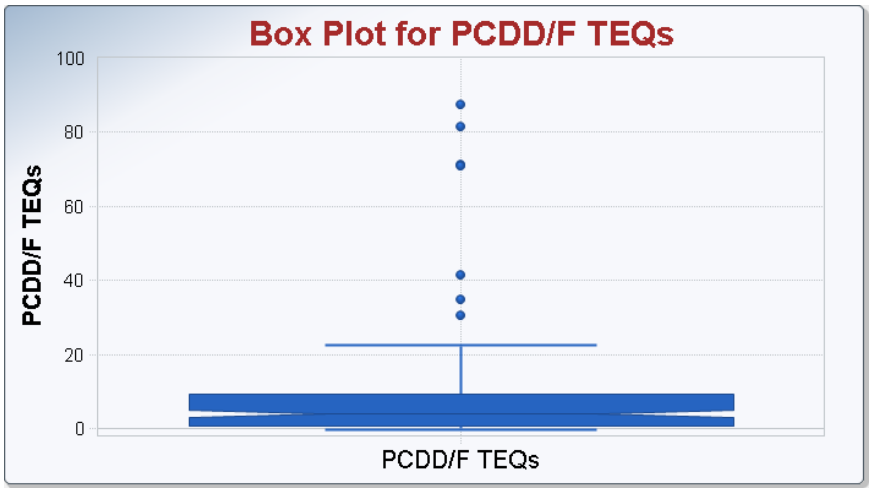

Metal and Metalloid Box Plots
Concentration (mg/kg dry wt.)
60
50
40
30
20
10
0
Maximum Non-Detect Value 16.2
Antimony
Arsenic
Cobalt
Nickel
Thallium


Metal and Metalloid Box Plots
Concentration (mg/kg dry wt.)
24
20
16
12
8
4
0
Maximum Non-Detect Value 6.5
Cadmium
Mercury
Selenium
Silver

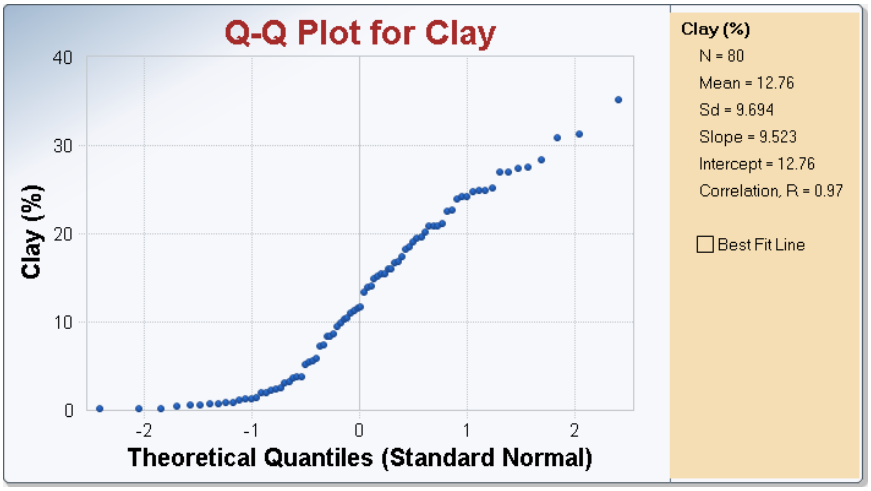

Box Plot for ∑PAH13
∑PAH13 (ug/kg dry wt.)
25000
20000
15000
10000
5000
0
Maximum Non-Detect Value 1700
∑PAH13

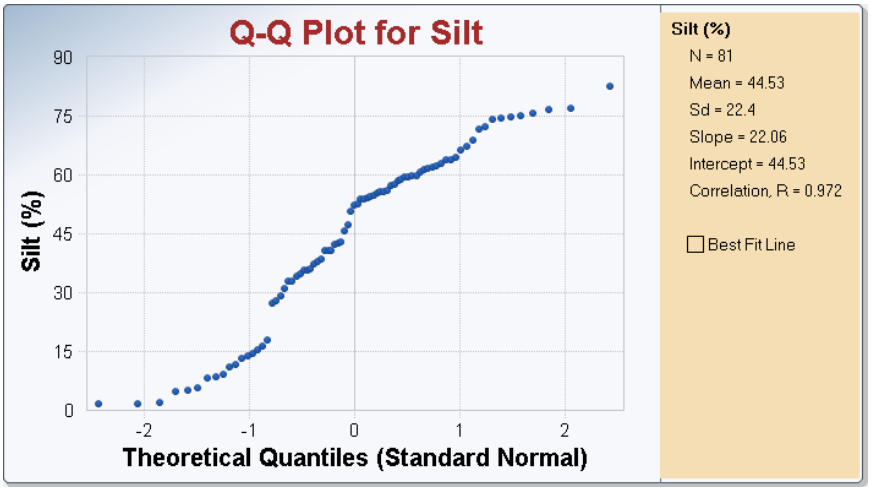

Box Plot for Total PCBs
Total PCBs (ug/kg dry wt.)
350
300
250
200
150
100
50
0
Maximum Non-Detect Value 0
Total PCBs

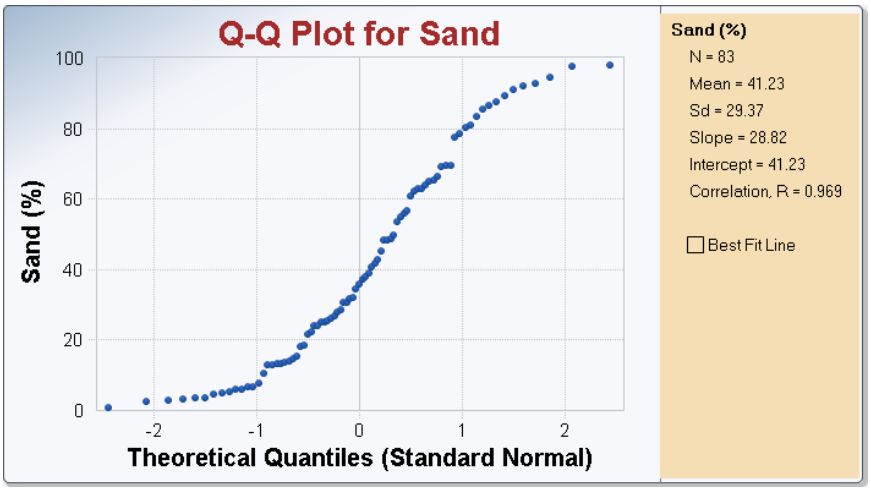

Box Plots
Values
1.4
1.2
1.0
0.8
0.6
0.4
0.2
0.0
Metal PEC-Q
Mean PEC-Q

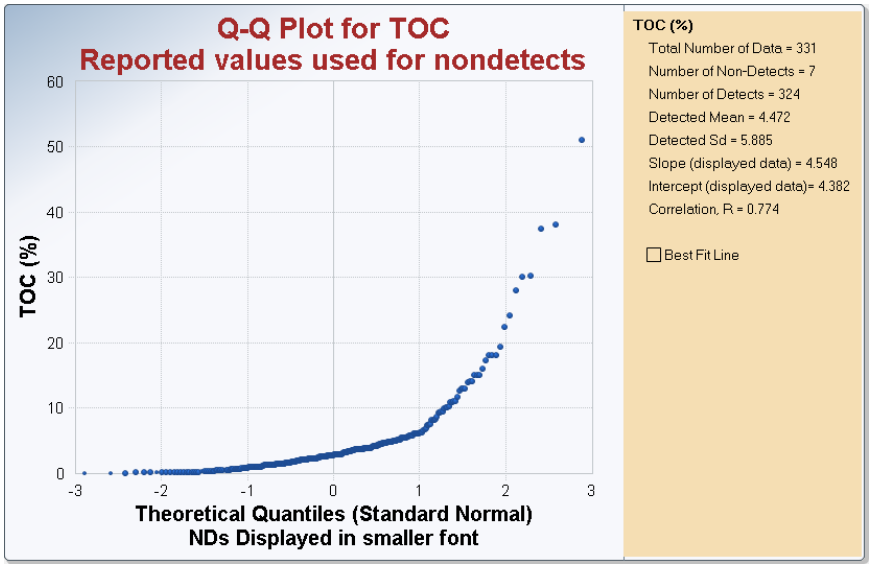

Box Plot for PCDD/F TEQs
PCDD/F TEQs
100
80
60
40
20
0
PCDD/F TEQs

Q-Q Plots (outliers noted are based on the 5% significance level using Rosner's outlier test)

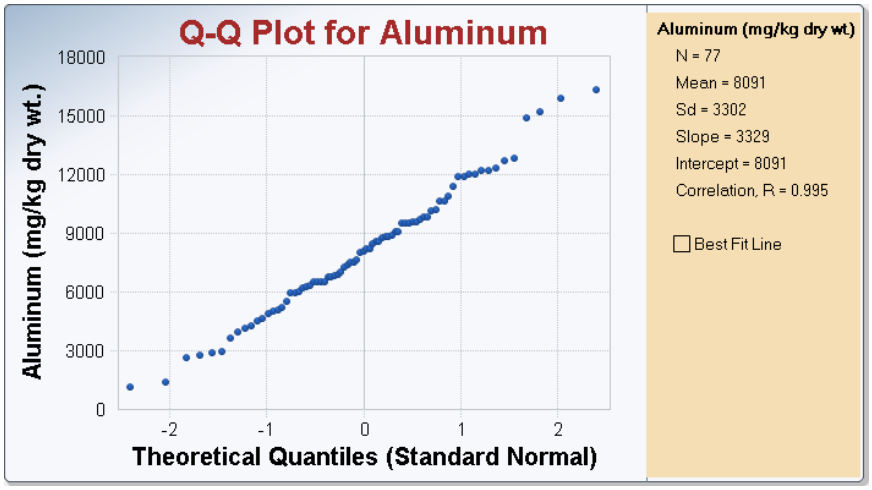


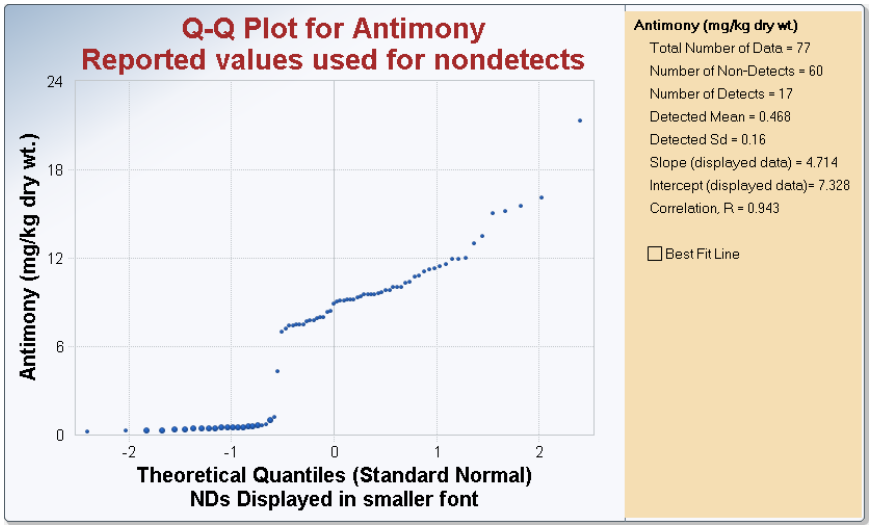




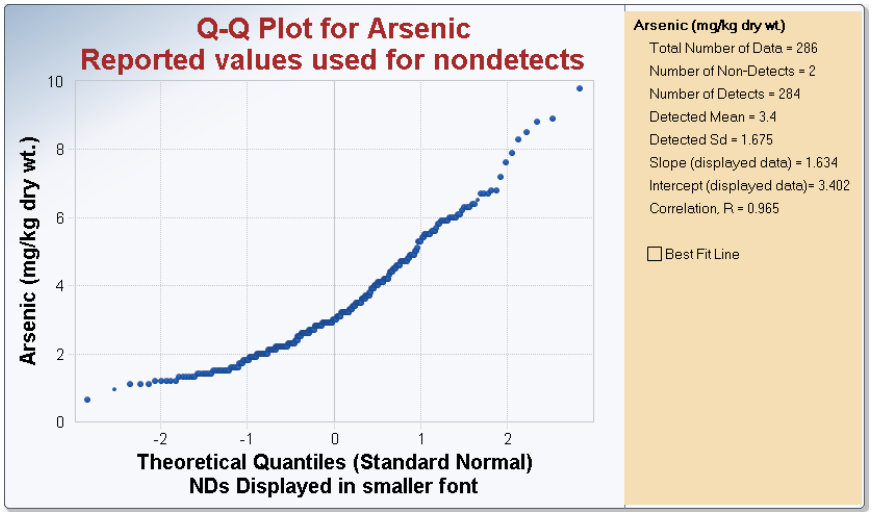


Ten outliers were noted for TOC when excluding the nondetects.

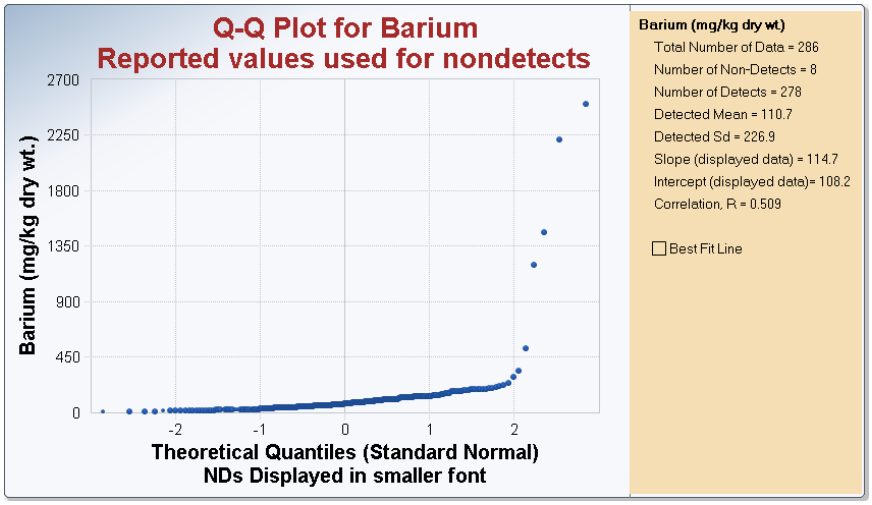




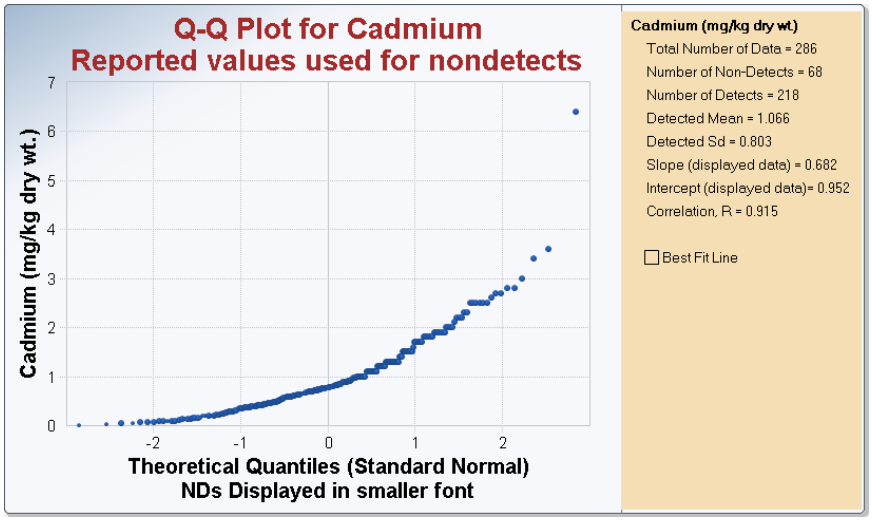
One outlier was noted for antimony when excluding the nondetects.



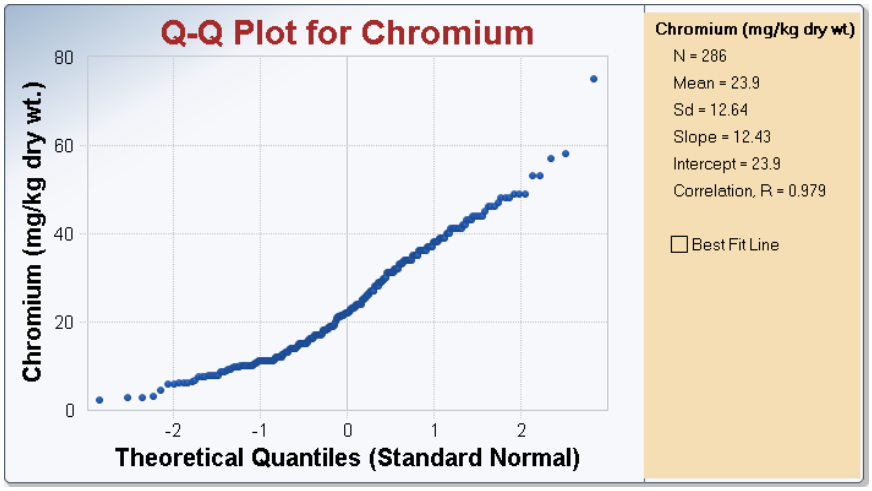
One outlier was noted for arsenic when excluding the nondetects.



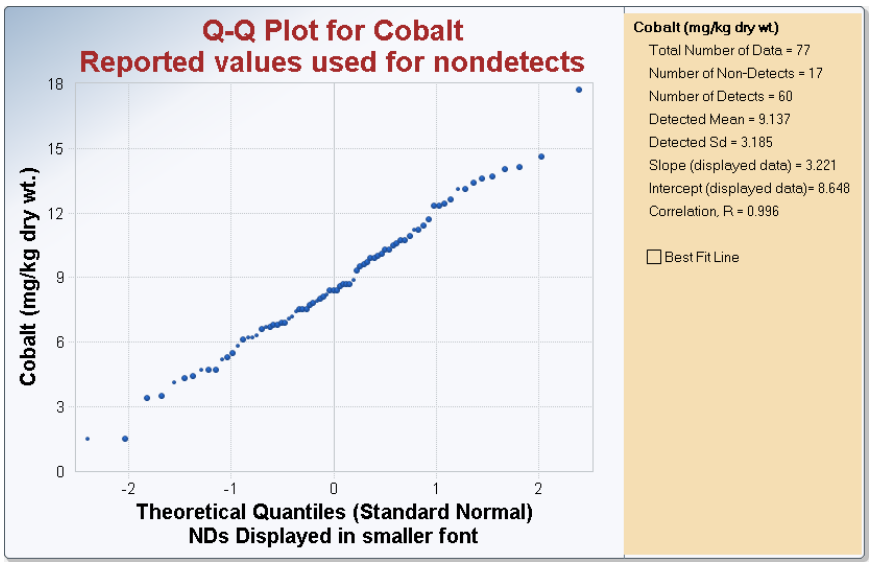
Seven outliers were noted for barium when excluding the nondetects.

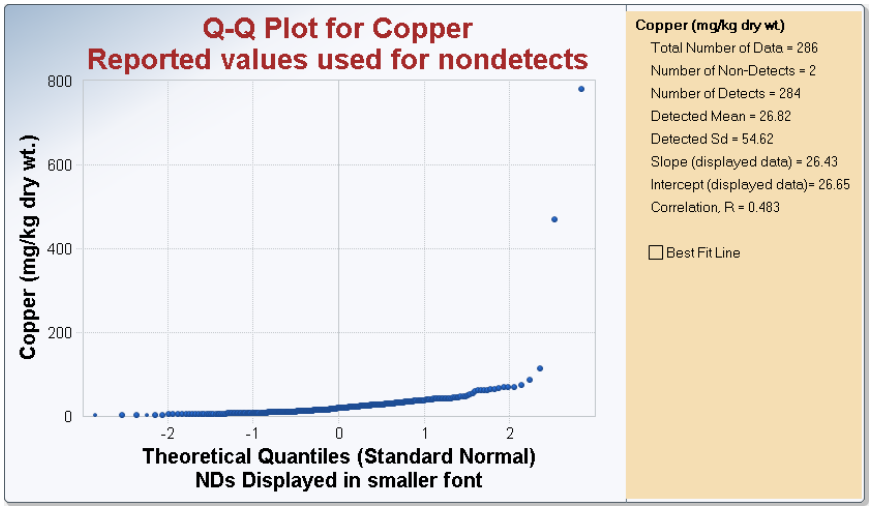


One outlier was noted for cadmium when excluding the nondetects.

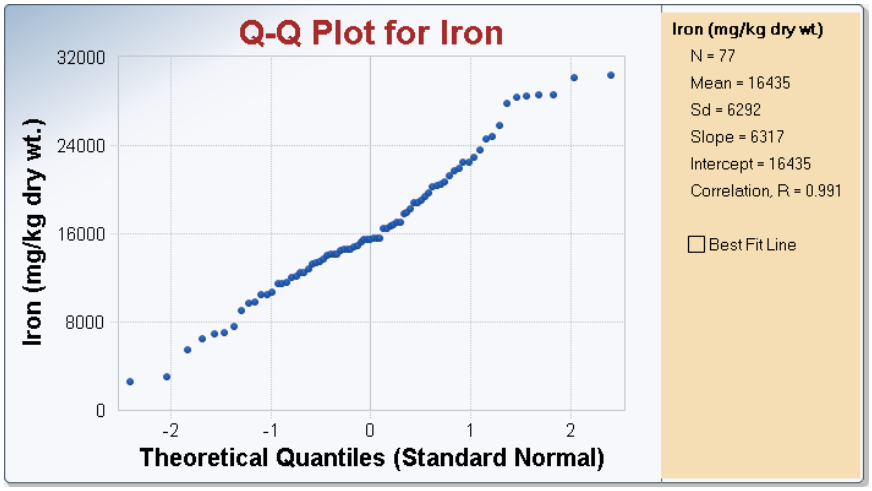


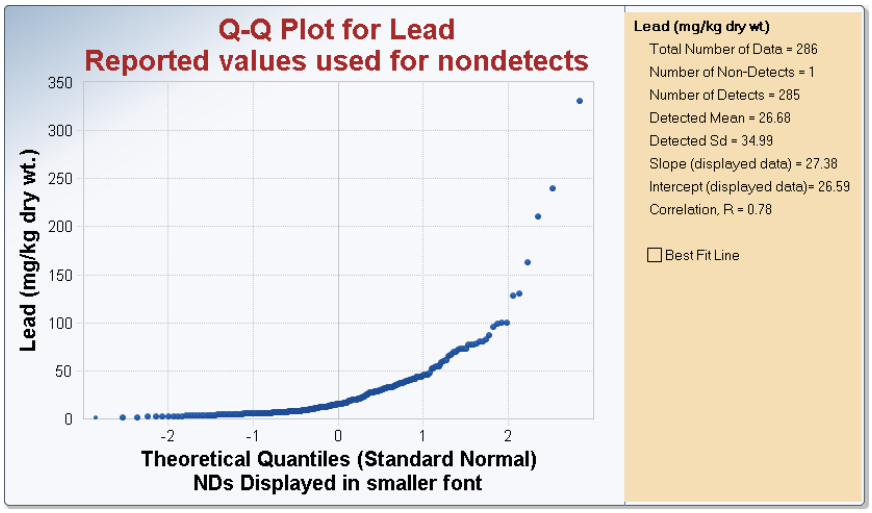
One outlier was noted for chromium.



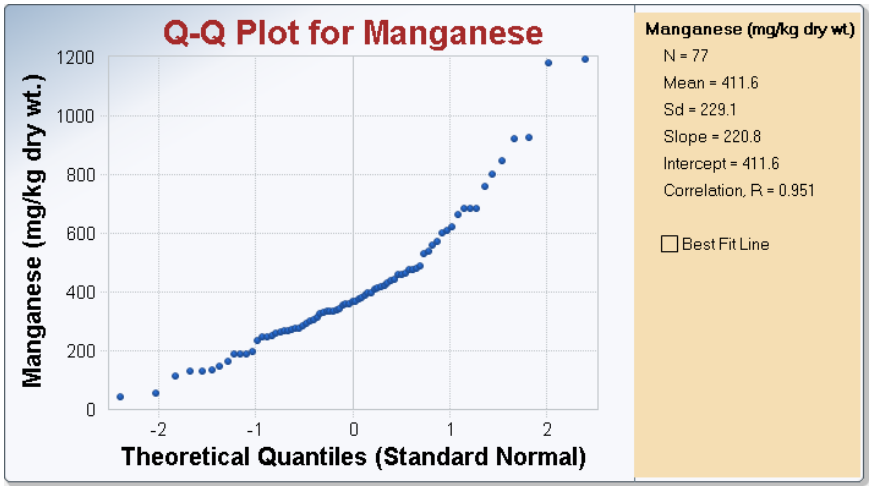


Four outliers were noted for copper when excluding the nondetects.

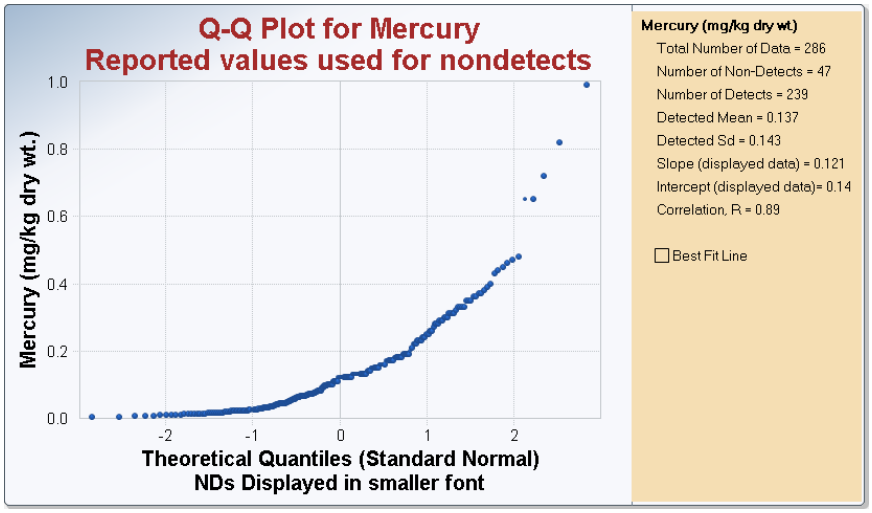




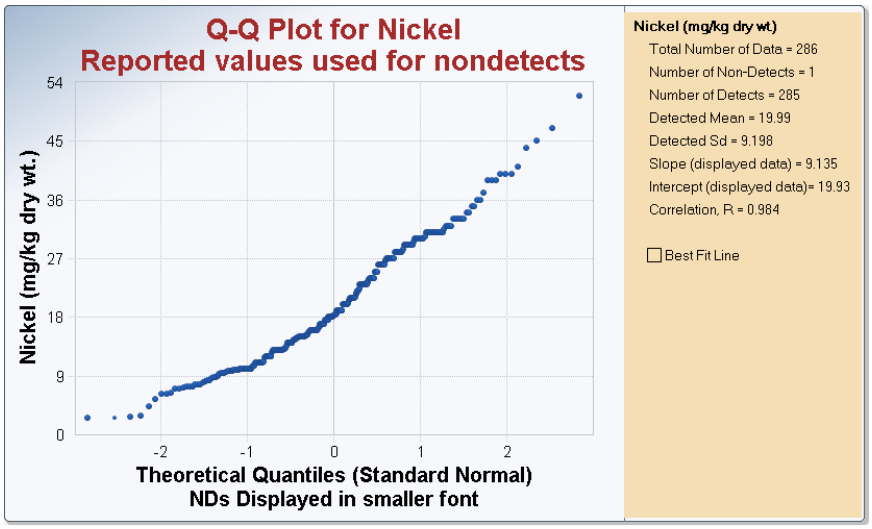
Six outliers were noted for lead when excluding the nondetects.

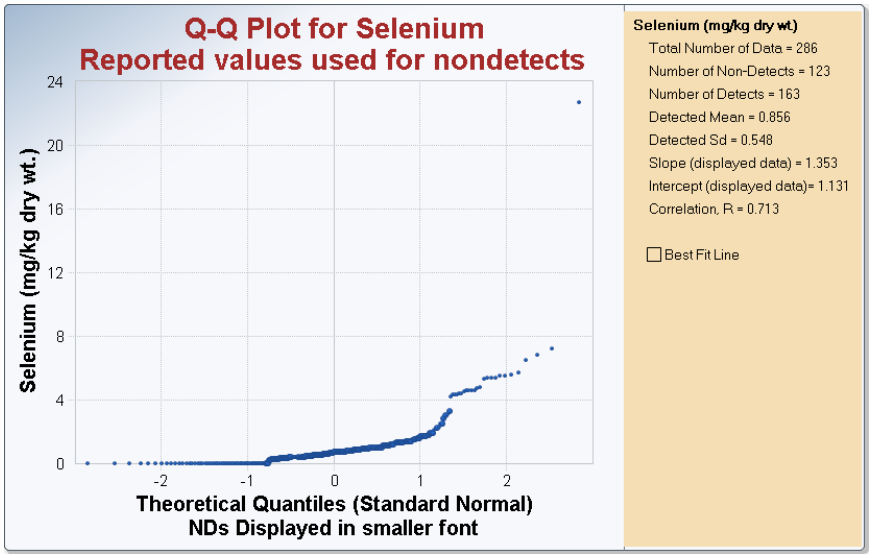


Two outliers were noted for manganese.

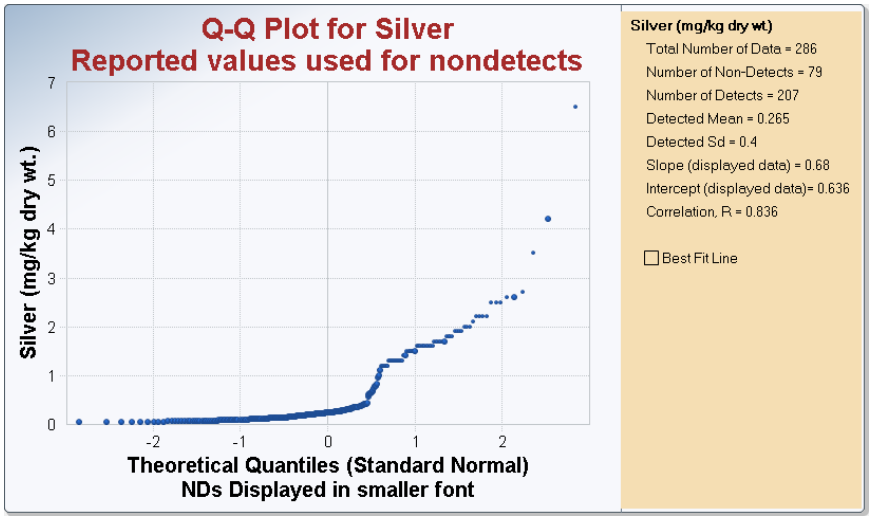


Four outliers were noted for mercury when excluding the nondetects.

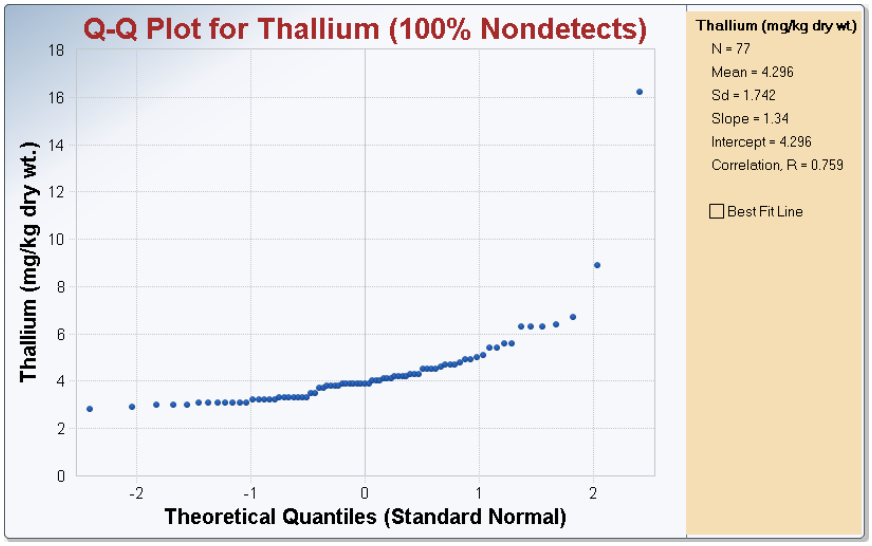


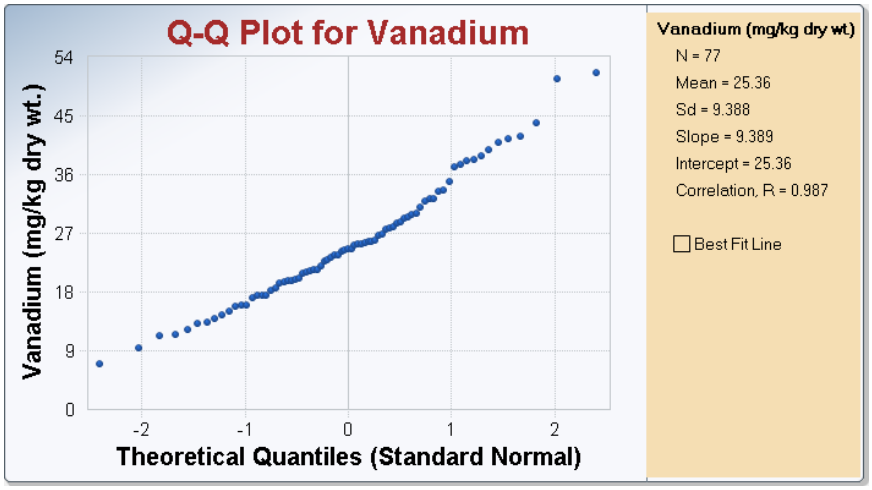


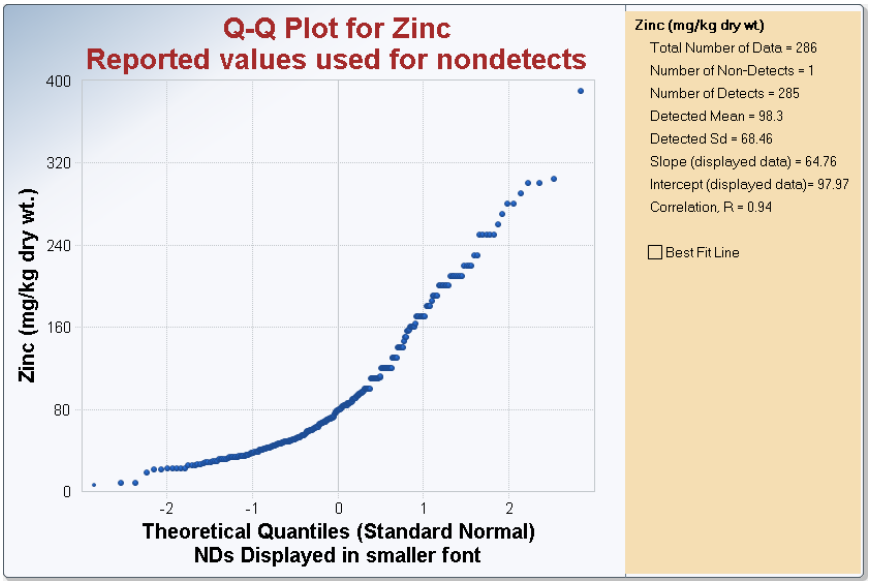
Four outliers were noted for selenium when excluding the nondetects.



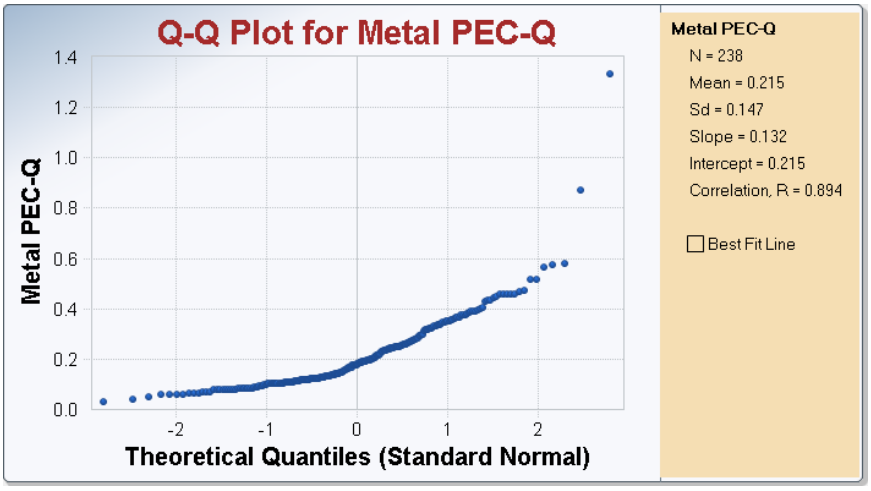
Ten outliers were noted for silver when excluding the nondetects.



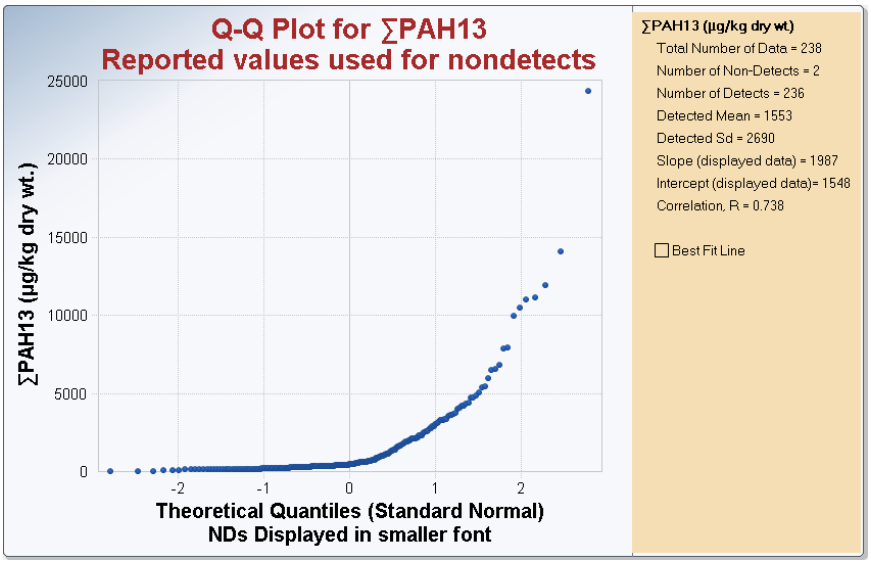




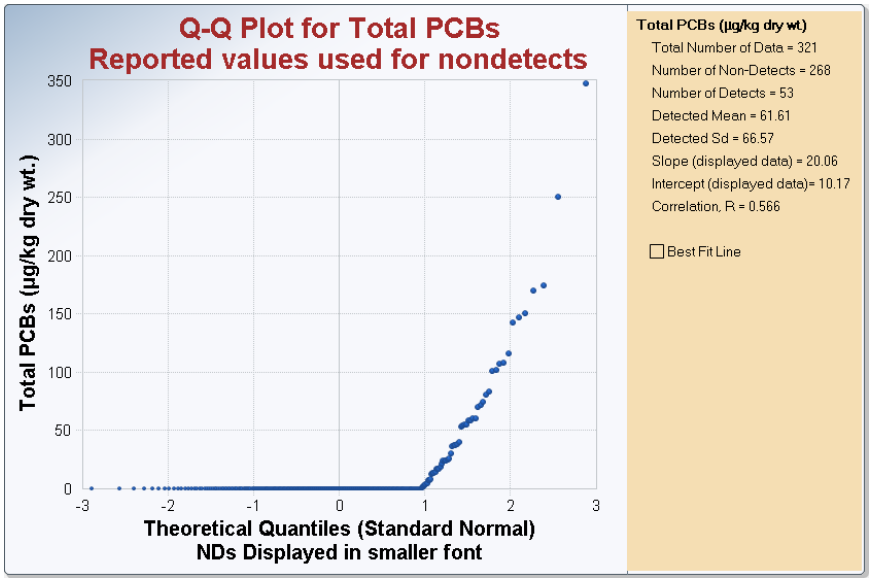
One outlier was noted for zinc when excluding the nondetects.



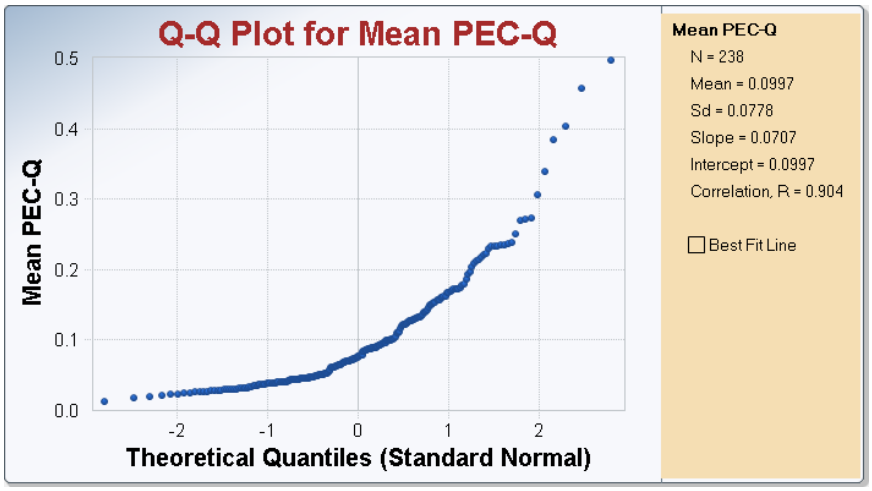
Two outliers were noted for metal PEC-Qs.



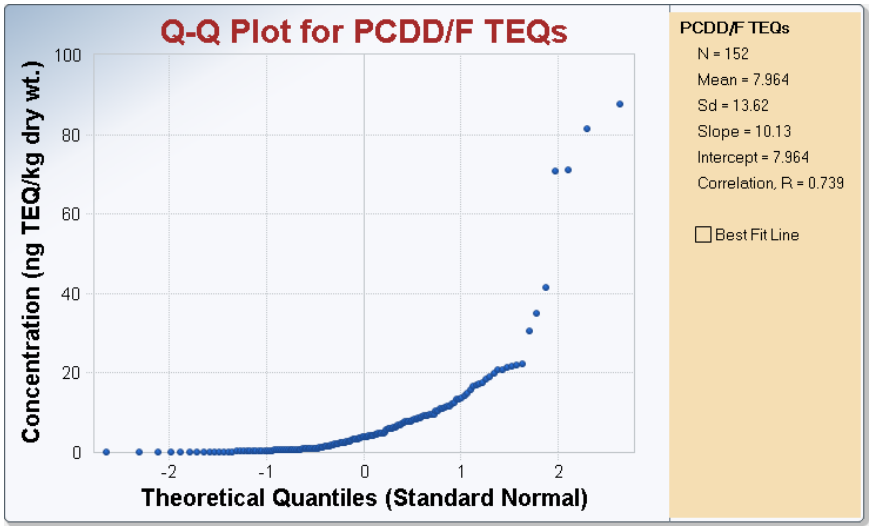
Ten outliers were noted for $\sum PAH_{13}$ when excluding the nondetects.



Two outliers were noted for total PCBs when excluding the nondetects.



Five outliers were noted for mean PEC-Qs.



Seven outliers were noted for aquatic life PCDD/F TEQs.