important atmospheric deposition process for assessing mercury's environmental and human health impacts.

Sampling Site Locations

The Mercury Deposition Network was designed to evaluate regional concentration and wet deposition patterns of total mercury in precipitation. Sites were selected using an established set of criteria (Bloom and Crecelius, 1983). Most of the sites are in rural areas at least 10 to 20 kilometers from major air pollution sources and at least 100 meters from local sources. Most sites are in open, grass-covered areas well away from overhanging vegetation and buildings. About half of the MDN sites are collocated with NADP/NTN acidic deposition collectors. The locations of active (as of November 2007) MDN sites are shown in Figure 3. Site names and descriptions are available on the NADP/MDN web site: (http://nadp.sws.uiuc.edu). Eight sites were in operation in Pennsylvania in 2005 and 2006 (Table 1, Figure 4). These sites are located in Tioga County (PA90) near Wellsboro, in Cambria County (PA13) near Cresson, in Erie County (PA30) near Erie, in Greene County (PA37) near Holbrook, in Adams County (PA00) near Arendtsville, in Montgomery County (PA60) near Valley Forge, in Pike County (PA72) near Milford, and in Lancaster County (PA47) near Millersville. The latitude, longitude,

Table 1. Location of National Atmospheric Deposition Program/Mercury Deposition Network (NADP/MDN) sites in Pennsylvania in 2005 and 2006.

Site No.	Latitude	Longitude	County	Elevation Meters	Sampling Started
PA00	39.9231	-77.3078	Adams	269	11/16/2000
PA13	40.457	-78.56	Cambria	739	01/07/1997
PA30	42.1558	-80.1134	Erie	177	06/20/2000
PA37	39.8161	-80.285	Greene	347	05/27/1999
PA47	39.99	-76.3862	Lancaster	85	11/26/2002
PA60	40.1166	-75.8833	Montgomery	46	11/23/1999
PA72	41.3275	-74.8203	Pike	212	09/15/2000
PA90	41.8043	-77.1903	Tioga	476	01/07/1997

Table 2. Annual summary of weekly sampling periods indicating the number and distribution of sample types and quality at each Mercury Deposition Network site in Pennsylvania from 1997 through 2006.

Site	Year	# Samples Collected	# Samples Without Precipitation	# Trace Samples Analyzed	# Trace Samples Not Analyzed	# Invalid Samples	# Samples Missing	# Valid Samples	Total Amount of Precipitation Collected	Total Amount of Precipitation With Analysis
									Inches	
PA00	2000*	5	2	0	0	2	0	3	3.62	3.62
	2001	51	7	0	1	7	0	44	23.56	23.45
	2002	52	3	0	1	7	0	45	40.13	39.38
	2003	52	4	0	1	5	2	47	46.46	45.94
	2004	52	6	0	0	7	0	45	50.30	49.40
	2005	53	6	0	1	4	0	49	41.40	41.35
	2006	52	8	0	0	2	0	50	42.58	42.05
PA13	1997	51	4	0	0	1	0	50	46.56	46.56
	1998	52	1	0	0	0	0	52	37.79	37.79
	1999	52	5	0	0	2	0	50	38.23	38.06
	2000	53	3	0	0	9	0	44	36.40	34.37
	2001	52	3	0	0	8	0	44	31.71	30.36
	2002	52	1	0	0	4	0	48	40.83	40.79
	2003	52	0	0	2	5	0	47	53.78	52.58
	2004	53	2	0	1	4	0	49	55.00	54.50
	2005	53	4	0	0	1	0	52	39.72	39.72
	2006	52	3	0	0	3	0	49	44.34	44.33
PA30	2000*	28	2	0	0	2	0	26	22.71	22.04
	2001	52	5	0	0	10	0	42	32.93	30.55
	2002	52	7	0	0	2	0	50	38.96	38.96
	2003	52	3	0	1	1	0	51	40.32	39.87
	2004	52	3	0	0	5	0	47	48.39	47.47
	2005	52	6	0	0	2	0	50	39.46	37.73
	2006	52	2	0	0	4	0	48	43.47	42.42
PA37	1999*	31	5	0	0	0	0	31	19.48	19.48
	2000	53	4	0	0	4	0	49	33.37	32.97
	2001	51	0	0	0	3	0	48	37.50	37.33
	2002	52	3	0	0	3	0	49	43.38	43.27
	2003	53	2	0	2	2	0	51	49.19	49.16
	2004	52	4	0	0	2	0	50	52.66	52.63
	2005	53	10	0	0	5	0	48	39.83	39.30
	2006	52	6	0	0	3	0	49	40.00	39.34

Table 2 (continued).

Site	Year	# Samples Collected	# Samples Without Precipitation	# Trace Samples Analyzed	# Trace Samples Not Analyzed	# Invalid Samples	# Samples Missing	# Valid Samples	Total Amount of Precipitation Collected	Total Amount of Precipitation With Analysis
									Inches	
PA47	2002*	5	0	0	0	1	0	4	4.95	2.65
	2003	53	3	0	0	3	0	50	53.94	53.91
	2004	52	8	0	0	5	0	47	46.92	45.79
	2005	53	4	0	2	3	0	50	44.39	44.38
	2006	52	5	0	2	5	0	47	48.71	48.62
PA60	1999*	5	1	0	0	0	0	5	4.36	4.36
	2000	53	8	0	0	1	0	52	47.10	47.10
	2001	51	10	0	0	6	0	45	29.56	28.75
	2002	52	7	0	0	2	2	50	47.15	46.74
	2003	52	6	0	2	2	0	50	54.69	54.68
	2004	50	7	0	1	4	0	46	54.18	53.70
	2005	53	9	0	0	4	0	49	45.12	42.89
	2006	52	4	0	0	12	0	40	52.86	52.84
PA72	2000*	16	1	0	0	3	0	13	11.15	11.13
	2001	52	4	0	0	2	0	50	35.20	35.17
	2002	52	3	0	0	4	0	48	46.72	45.10
	2003	52	4	0	0	5	0	47	60.30	60.11
	2004	52	5	0	0	1	0	51	51.73	51.31
	2005	53	5	0	0	1	0	52	59.98	59.98
	2006	52	4	0	0	4	0	48	53.09	48.33
PA90	1997	51	2	0	0	3	0	48	29.91	29.08
	1998	52	1	0	0	1	0	51	32.91	32.91
	1999	52	6	0	0	4	0	48	31.52	31.08
	2000	53	3	0	0	14	0	39	30.35	26.42
	2001	52	1	0	0	17	0	35	29.47	26.96
	2002	52	4	0	0	1	0	51	33.24	33.19
	2003	52	2	0	0	4	0	48	43.28	43.22
	2004	52	2	0	2	0	0	52	48.34	48.33
	2005	53	2	0	0	2	0	51	41.69	41.62
	2006	52	3	0	0	5	0	47	40.16	40.11
Total	1997	102	6	0	0	4	0	98	76.48	75.65
	1998	104	2	0	0	1	0	103	70.71	70.71
	1999	140	17	0	0	6	0	134	93.58	92.97
	2000	261	23	0	0	35	0	226	184.70	177.66
	2001	361	30	0	1	53	0	308	219.93	212.56
	2002	369	28	0	1	24	2	345	295.35	290.07
	2003	418	24	0	8	27	2	391	401.95	399.45
	2004	415	37	0	4	28	0	387	407.51	403.13
	2005	423	46	0	3	22	0	401	351.59	346.97
	2006	416	35	0	2	38	0	378	365.21	358.04

* Sampling conducted at this site for less than one year.

Table 3. Maximum and minimum weekly total mercury concentrations (ng/L) and wet depositions (ng/m^2) at eight Mercury Deposition Network (MDN) sites in Pennsylvania from 1997 through 2006.

Site	Year	Weekly Mercury Concentrations (ng/L) Maximum	Minimum	Weekly Mercury Deposition (ng/m^2) Maximum	Minimum
PA00	2001	63.77	2.67	503.62	25.97
	2002	29.85	2.06	566.93	17.60
	2003	19.99	1.36	946.88	42.84
	2004	29.23	2.18	966.81	22.27
	2005	42.11	2.12	715.06	10.06
	2006	50.23	1.47	1018.37	18.27
PA13	1997	48.47	2.15	879.54	8.37
	1998	50.57	2.80	722.88	5.82
	1999	55.41	2.19	762.76	20.80
	2000	23.92	3.07	547.97	24.20
	2001	124.10	3.32	3183.38	17.38
	2002	108.93	1.69	727.85	9.54
	2003	35.20	2.43	851.76	12.38
	2004	45.60	1.65	955.81	13.62
	2005	28.88	1.55	635.81	7.10
	2006	32.75	1.93	1194.94	8.32
PA30	2000*	30.78	0.83	1251.90	2.07
	2001	158.97	1.38	759.84	7.54
	2002	29.18	1.39	1302.96	14.94
	2003	218.66	2.84	779.27	15.40
	2004	35.04	1.55	929.75	3.00
	2005	54.96	1.40	992.12	11.22
	2006	39.28	2.61	894.28	17.19
PA37	1999*	46.20	2.15	830.10	8.40
	2000	62.58	2.13	715.29	9.32
	2001	35.56	1.86	633.42	4.72
	2002	25.67	0.08	1040.37	0.22
	2003	36.45	1.61	1398.73	8.05
	2004	26.74	1.15	1031.98	6.03
	2005	35.82	1.32	761.82	3.19
	2006	39.34	0.16	1087.73	1.54
PA47	2002*	12.14	1.21	132.04	17.21
	2003	30.39	2.14	913.53	23.48
	2004	44.23	2.77	676.66	9.15
	2005	29.56	1.11	853.25	5.98
	2006	56.42	2.06	1165.71	22.40

Table 3 (continued).

Site	Year	Weekly Mercury Concentrations (ng/L) Maximum	Minimum	Weekly Mercury Deposition (ng/m^2) Maximum	Minimum
PA60	1999*	9.32	3.82	420.19	37.84
	2000	154.73	2.84	1234.26	16.42
	2001	44.24	2.08	875.20	10.59
	2002	54.32	1.97	919.70	20.65
	2003	71.87	1.48	922.52	22.72
	2004	34.56	1.96	1258.62	17.56
	2005	58.60	3.23	1001.15	5.32
	2006	562.37	2.01	1070.98	42.37
PA72	2000*	25.92	2.60	759.00	14.53
	2001	36.55	2.58	663.37	16.69
	2002	53.04	1.94	2393.82	4.28
	2003	27.93	1.10	1217.17	6.25
	2004	84.93	1.29	1520.26	4.22
	2005	77.60	0.86	586.70	7.16
	2006	36.64	1.57	1181.93	17.84
PA90	1997	68.60	1.65	629.53	14.69
	1998	40.36	0.78	654.59	1.88
	1999	671.49	1.70	1193.91	7.12
	2000	38.91	1.82	481.93	7.57
	2001	56.42	1.42	474.35	21.40
	2002	38.88	0.59	858.09	3.35
	2003	27.27	1.46	1131.66	11.16
	2004	22.37	1.75	723.03	14.17
	2005	39.04	0.60	866.57	14.58
	2006	25.74	2.06	2002.64	7.89

* Sampling conducted at this site for less than one year.

Table 4. Mean annual and seasonal volume-weighted total mercury concentrations (ng/L) in precipitation at eight Pennsylvania Mercury Deposition Network sites from 1997 through 2006. Seasonal means are based on weekly samples collected from December-February (winter) March-May (spring), June-August (summer), and September-November (fall). Annual values are presented for both climatic (December-November) and calendar years (January-December).

		Volume-Weighted Mean Concentration (ng/L)									
Site	Season	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006
PA00	Winter	-----	-----	-----	-----	10.47	10.19	5.24	4.88	6.12	6.60
	Spring	-----	-----	-----	-----	10.67	11.77	10.36	7.80	7.29	8.44
	Summer	-----	-----	-----	-----	16.00	9.20	10.99	10.43	12.44	9.85
	Fall	-----	-----	-----	-----	6.76	4.91	8.03	6.95	4.49	5.56
	Ann[1]	-----	-----	-----	-----	10.74	8.31	8.76	7.68	7.67	7.55
	Ann[2]	-----	-----	-----	-----	11.59	7.73	8.78	7.77	7.72	7.52
PA13	Winter	10.55	7.62	6.19	7.26	7.25	6.95	5.40	6.25	4.51	4.58
	Spring	12.64	8.65	9.85	8.76	27.95	10.65	9.62	9.05	7.63	9.77
	Summer	11.41	14.09	14.47	12.03	12.31	12.70	10.54	10.64	13.22	10.66
	Fall	4.21	13.04	6.80	9.37	7.74	5.68	6.57	5.60	5.00	6.04
	Ann[1]	9.01	10.32	9.44	9.37	15.26	9.29	8.53	8.12	7.06	7.87
	Ann[2]	9.18	10.17	9.25	9.58	14.82	9.25	8.51	8.02	6.68	8.36
PA30	Winter	-----	-----	-----	-----	12.00	8.77	6.18	7.01	6.29	7.66
	Spring	-----	-----	-----	-----	8.63	10.98	10.89	11.07	8.55	10.21
	Summer	-----	-----	-----	12.82	11.66	13.30	14.81	11.24	14.06	8.56
	Fall	-----	-----	-----	11.95	8.61	5.87	7.69	4.87	7.20	7.81
	Ann[1]	-----	-----	-----	12.44	10.10	9.02	10.27	8.75	8.73	8.47
	Ann[2]	-----	-----	-----	12.55	9.12	9.22	10.30	8.62	8.96	8.13
PA37	Winter	-----	-----	-----	6.04	7.50	7.34	4.85	4.79	5.25	5.69
	Spring	-----	-----	46.20	13.39	9.07	9.27	12.20	9.37	7.44	9.93
	Summer	-----	-----	15.51	12.63	11.29	11.26	12.18	11.59	11.16	12.98
	Fall	-----	-----	7.94	10.91	9.89	5.29	7.58	6.39	6.76	6.83
	Ann[1]	-----	-----	11.18	10.99	9.88	8.68	10.02	8.27	7.42	8.98
	Ann[2]	-----	-----	10.48	11.28	9.95	8.30	10.09	8.17	7.80	8.69

[1]Annual Period (December-November).
[2]Annual Period (January-December).

Table 4 (continued).

Site	Season	Volume-Weighted Mean Concentration (ng/L) 1997	1998	1999	2000	2001	2002	2003	2004	2005	2006
PA47	Winter	-----	-----	-----	-----	-----	-----	4.62	5.47	5.69	4.47
	Spring	-----	-----	-----	-----	-----	-----	8.13	11.44	8.08	8.68
	Summer	-----	-----	-----	-----	-----	-----	9.67	10.46	11.45	11.33
	Fall	-----	-----	-----	-----	-----	9.27	6.74	6.28	4.87	5.75
	Ann[1]	-----	-----	-----	-----	-----	9.27	7.59	8.68	7.85	7.72
	Ann[2]	-----	-----	-----	-----	-----	4.59	7.61	8.84	7.40	7.99
PA60	Winter	-----	-----	-----	7.86	11.36	7.06	4.86	6.25	5.50	8.20
	Spring	-----	-----	-----	11.92	10.99	13.64	11.56	16.09	6.34	16.41
	Summer	-----	-----	-----	9.53	12.13	11.15	9.97	9.77	13.79	8.99
	Fall	-----	-----	8.17	10.50	8.04	4.61	7.57	5.43	10.79	8.06
	Ann[1]	-----	-----	8.17	10.14	11.27	9.34	8.31	8.81	8.22	9.75
	Ann[2]	-----	-----	7.95	10.45	10.93	8.36	8.72	8.71	8.65	10.01
PA72	Winter	-----	-----	-----	-----	7.07	8.85	4.77	3.75	4.51	3.64
	Spring	-----	-----	-----	-----	8.17	15.53	7.37	9.85	6.17	10.13
	Summer	-----	-----	-----	-----	13.92	10.46	11.13	12.90	10.92	7.85
	Fall	-----	-----	-----	8.75	7.10	3.00	6.08	8.64	3.84	7.75
	Ann[1]	-----	-----	-----	8.75	9.11	8.80	7.89	9.29	5.71	6.91
	Ann[2]	-----	-----	-----	7.81	9.39	8.34	7.63	9.64	5.36	7.50
PA90	Winter	8.71	5.34	12.45	5.14	7.04	7.73	3.67	3.36	3.77	3.55
	Spring	10.64	9.14	7.64	7.01	6.80	7.69	8.52	8.66	4.93	8.36
	Summer	13.36	14.14	10.70	14.99	7.99	10.22	9.53	8.59	12.68	12.42
	Fall	5.12	7.94	5.39	10.17	5.54	4.18	5.60	5.17	4.62	4.83
	Ann[1]	9.57	9.07	8.62	9.41	6.79	7.52	7.33	6.88	6.71	7.77
	Ann[2]	9.50	8.97	8.56	9.69	6.58	7.36	7.13	7.06	6.37	8.40

[1]Annual Period (December-November).
[2]Annual Period (January-December).

Table 5. Annual and seasonal total mercury wet depositions (µg/m2) at eight Pennsylvania Mercury Deposition Network sites from 1997 through 2006. Seasonal depositions are based on weekly samples collected from December- February (winter) March-May (spring), June-August (summer), and September-November (fall). Annual values are presented for both climatic (December-November) and calendar years (January-December).

		Wet Deposition (µg/m²)									
Site	Season	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006
PA00	Winter	-----	-----	-----	-----	1.808	1.139	1.341	1.195	1.352	1.684
	Spring	-----	-----	-----	-----	2.506	3.317	3.473	2.562	1.950	1.604
	Summer	-----	-----	-----	-----	1.842	1.881	3.432	3.918	3.293	3.306
	Fall	-----	-----	-----	-----	0.962	1.855	2.434	2.463	1.161	1.867
	Ann[1]	-----	-----	-----	-----	7.118	8.192	10.681	10.138	7.756	8.461
	Ann[2]	-----	-----	-----	-----	7.250	7.932	10.617	9.951	8.116	8.135
PA13	Winter	0.931	1.923	1.204	1.149	0.936	1.175	1.197	1.714	1.337	1.291
	Spring	4.511	3.072	2.443	2.865	6.429	3.785	3.007	3.572	1.541	1.831
	Summer	2.956	3.395	3.553	2.666	3.196	3.244	4.867	3.911	2.469	4.429
	Fall	1.786	1.755	1.845	1.958	1.256	1.527	2.245	2.190	1.282	1.969
	Ann[1]	10.183	10.145	9.044	8.639	11.818	9.732	11.315	11.387	6.629	9.520
	Ann[2]	10.863	9.767	8.985	8.854	11.933	9.596	11.628	11.233	6.744	9.414
PA30	Winter	-----	-----	-----	-----	1.600	2.588	0.985	1.066	1.813	1.283
	Spring	-----	-----	-----	-----	2.041	3.588	2.872	3.580	1.603	2.023
	Summer	-----	-----	-----	3.895	1.988	1.879	4.180	3.858	3.024	2.590
	Fall	-----	-----	-----	2.756	2.050	2.167	2.337	1.693	2.747	2.998
	Ann[1]	-----	-----	-----	6.650	7.678	10.222	10.374	10.197	9.188	8.894
	Ann[2]	-----	-----	-----	7.236	7.939	9.778	10.390	10.727	8.980	8.977
PA37	Winter	-----	-----	-----	1.271	1.005	1.129	0.779	0.979	1.548	0.931
	Spring	-----	-----	0.016	3.505	2.464	3.818	3.716	3.193	1.883	2.208
	Summer	-----	-----	2.817	3.354	4.179	3.258	6.283	3.792	2.628	3.340
	Fall	-----	-----	1.961	1.405	1.576	1.353	2.116	2.399	1.630	2.566
	Ann[1]	-----	-----	4.795	9.536	9.224	9.558	12.895	10.363	7.689	9.045
	Ann[2]	-----	-----	5.185	9.563	9.523	9.151	12.609	10.374	7.890	8.828

[1]Annual Period (December-November).
[2]Annual Period (January-December).

Table 5 (continued).

Site	Season	Wet Deposition (µg/m²) 1997	1998	1999	2000	2001	2002	2003	2004	2005	2006
PA47	Winter	-----	-----	-----	-----	-----	-----	1.294	1.330	1.307	1.137
	Spring	-----	-----	-----	-----	-----	-----	2.154	3.411	1.866	1.724
	Summer	-----	-----	-----	-----	-----	-----	4.044	4.226	3.444	4.628
	Fall	-----	-----	-----	-----	-----	0.052	2.780	1.758	1.525	2.463
	Ann[1]	-----	-----	-----	-----	-----	0.052	10.273	10.725	8.142	9.951
	Ann[2]	-----	-----	-----	-----	-----	0.577	10.422	10.502	8.348	9.886
PA60	Winter	-----	-----	-----	1.691	2.951	1.147	1.786	1.446	2.055	2.269
	Spring	-----	-----	-----	4.023	2.898	3.704	3.402	4.772	1.767	3.193
	Summer	-----	-----	-----	3.263	2.352	2.562	4.453	4.467	2.456	4.274
	Fall	-----	-----	0.315	2.865	0.851	1.647	3.519	2.277	3.308	3.691
	Ann[1]	-----	-----	0.315	11.842	9.051	9.060	13.160	12.962	9.586	13.426
	Ann[2]	-----	-----	0.879	12.613	8.447	9.843	12.779	12.521	9.910	13.439
PA72	Winter	-----	-----	-----	-----	1.867	1.213	1.292	0.989	1.630	1.383
	Spring	-----	-----	-----	-----	2.181	5.184	2.214	2.658	1.826	2.384
	Summer	-----	-----	-----	-----	3.309	2.667	4.928	5.611	2.606	3.438
	Fall	-----	-----	-----	1.172	1.422	1.242	2.987	3.416	2.046	3.164
	Ann[1]	-----	-----	-----	1.172	8.778	10.306	11.420	12.674	8.108	10.370
	Ann[2]	-----	-----	-----	2.213	8.400	9.892	11.725	12.673	8.172	10.109
PA90	Winter	0.505	1.179	2.051	0.798	0.560	0.950	0.651	0.625	0.927	0.810
	Spring	1.985	2.754	1.401	2.023	1.469	1.836	1.808	2.354	0.965	1.451
	Summer	3.182	2.668	2.120	3.024	1.782	2.599	4.196	3.642	3.530	5.241
	Fall	1.230	1.085	1.303	1.394	1.153	0.939	1.378	1.666	1.300	1.351
	Ann[1]	6.902	7.685	6.875	7.238	4.964	6.323	8.033	8.287	6.721	8.853
	Ann[2]	7.217	7.500	6.853	7.599	4.929	6.214	7.838	8.343	6.743	8.570

[1]Annual Period (December-November).
[2]Annual Period (January-December).

Table 6. Pearson correlation coefficients (r) between total mercury and the major cation and anion concentrations in precipitation as measured at eight Pennsylvania collocated mercury (MDN) and acid rain monitoring sites. All concentrations were log-transformed. Precipitation was transformed by taking its square root.

Site	sulfate	nitrate	chloride	calcium	magnesium	potassium	sodium	ammonium	precipitation
PA00									
r	0.607	0.566	0.165	0.610	0.526	0.481	0.110	0.434	−0.427
Prob> | *r* |	0.0001	0.0001	0.0412	0.0001	0.0001	0.0001	0.1839	0.0001	0.0001
No. Obs.	148	148	154	148	148	148	148	154	169
PA13									
r	0.617	0.480	−0.016	0.432	0.374	0.333	0.092	0.150	−0.360
Prob> | *r* |	0.0001	0.0001	0.8290	0.0001	0.0001	0.0001	0.2341	0.0432	0.0001
No. Obs	171	171	183	168	168	168	168	183	185
PA30									
r	0.593	0.477	−0.057	0.468	0.450	0.258	0.273	0.040	−0.438
Prob> | *r* |	0.0001	0.0001	0.4474	0.0001	0.0001	0.0007	0.0003	0.5902	0.0001
No. Obs	168	168	180	168	168	168	168	180	181
PA37									
r	0.427	0.215	0.158	0.320	0.405	0.281	0.161	0.302	−0.143
Prob> | *r* |	0.0001	0.0053	0.0369	0.0001	0.0001	0.0002	0.0377	0.0001	0.0597
No. Obs	167	167	174	167	167	167	167	174	174
PA47									
r	0.648	0.642	0.149	0.717	0.563	0.552	0.022	0.138	−0.043
Prob> | *r* |	0.0001	0.0001	0.5368	0.0001	0.0001	0.0001	0.7932	0.0819	0.001
No. Obs	140	140	161	140	140	140	140	161	170
PA60									
r	0.615	0.540	0.207	0.508	0.453	0.462	0.257	0.345	−0.508
Prob> | *r* |	0.0001	0.0001	0.0094	0.0001	0.0001	0.0001	0.0019	0.0001	0.0001
No. Obs	145	145	156	142	142	142	142	156	157
PA72									
r	0.700	0.631	0.148	0.688	0.536	0.591	0.069	0.509	−0.422
Prob> | *r* |	0.0001	0.0001	0.0499	0.0001	0.0001	0.0001	0.3830	0.0001	0.0001
No. Obs	161	161	176	161	161	161	161	176	180
PA90									
r	0.689	0.528	0.182	0.608	0.667	0.388	0.394	0.441	−0.285
Prob> | *r* |	0.0001	0.0001	0.0129	0.0001	0.0001	0.0001	0.0001	0.0001	0.0001
No. Obs	179	179	186	178	178	178	178	186	187

Table 7. Summary of stepwise regression analyses with dependent variable log_{10}Mercury concentrations and log_{10} transformed major cation and anion concentrations in precipitation collected at 8 Pennsylvania collocated mercury (MDN) and acid rain monitoring sites. All variables in each model are significant at the 0.050 level or higher.

Site	Variables In Model	Partial R-square	Model R-square	C(p) Value	F-value	Pr > F
PA00	Ca^{2+}	0.372		20.699	86.45	< 0.0001
	SO_4^{2-}	0.080	0.45	1.864	21.00	< 0.0001
PA13	SO_4^{2-}	0.393	0.39	0.396	107.57	< 0.0001
PA30	SO_4^{2-}	0.352		17.960	90.29	< 0.0001
	Ca^{2+}	0.052	0.40	5.433	14.32	0.0002
PA37	SO_4^{2-}	0.182		12.063	36.82	< 0.0001
	Mg^{2+}	0.046	0.23	4.200	9.79	0.0021
PA47	Ca^{2+}	0.514		15.875	145.94	< 0.0001
	SO_4^{2-}	0.034	0.55	7.399	10.15	0.0018
PA60	SO_4^{2-}	0.364		17.971	80.06	< 0.0001
	K^+	0.054		6.867	12.75	0.0005
	Ca^{2+}	0.019	0.44	4.283	4.57	0.0342
PA72	SO_4^{2-}	0.490		37.696	152.47	< 0.0001
	Ca^{2+}	0.089	0.58	5.696	33.43	< 0.0001
PA90	SO_4^{2-}	0.476		61.253	159.67	< 0.0001
	Mg^{2+}	0.119		9.635	51.66	< 0.0001
	Ca^{2+}	0.015		4.857	6.74	0.0102
	NH_4^+	0.009	0.62	2.783	4.13	0.0438
----------If the square root of precipitation is included as an independent variable----------						
PA30	SO_4^{2-}	0.352		24.702	90.29	< 0.0001
	Ppt	0.056		10.384	15.62	0.0001
	Mg^{2+}	0.025	0.43	5.079	7.26	0.0078
PA60	SO_4^{2-}	0.364		22.341	80.06	< 0.0001
	Ppt	0.060		9.222	14.47	0.0002
	K^+	0.041	0.46	1.027	10.42	0.0016

Table 8. Pearson correlation coefficients (*r*) between wet total mercury deposition and cation and anion wet depositions as measured at eight Pennsylvania collocated mercury (MDN) and acid rain monitoring sites. All depositions were log-transformed. Precipitation was transformed by taking its square root.

Site	sulfate	nitrate	chloride	calcium	magnesium	potassium	sodium	ammonium	precipitation
PA00									
r	0.819	0.779	0.635	0.739	0.741	0.752	0.538	0.690	0.781
Prob> | *r* |	0.0001	0.0001	0.0001	0.0001	0.0001	0.0001	0.0001	0.0001	0.0001
No. Obs.	148	148	154	148	148	148	148	154	169
PA13									
r	0.823	0.708	0.484	0.541	0.517	0.464	0.422	0.656	0.778
Prob> | *r* |	0.0001	0.0001	0.0001	0.0001	0.0001	0.0001	0.0001	0.0001	0.0001
No. Obs	171	171	183	168	168	168	168	183	185
PA30									
r	0.825	0.689	0.441	0.593	0.553	0.528	0.565	0.552	0.751
Prob> | *r* |	0.0001	0.0001	0.0001	0.0001	0.0001	0.0007	0.0001	0.0001	0.0001
No. Obs	168	168	180	168	168	168	168	180	181
PA37									
r	0.612	0.398	0.330	0.366	0.472	0.370	0.353	0.406	0.788
Prob> | *r* |	0.0001	0.0001	0.0001	0.0001	0.0001	0.0001	0.0001	0.0001	0.0001
No. Obs	167	167	174	167	167	167	167	174	174
PA47									
r	0.849	0.803	0.530	0.787	0.743	0.719	0.421	0.510	0.753
Prob> | *r* |	0.0001	0.0001	0.0001	0.0001	0.0001	0.0001	0.0001	0.0001	0.001
No. Obs	140	140	161	140	140	140	140	161	170
PA60									
r	0.788	0.674	0.503	0.565	0.623	0.550	0.540	0.609	0.789
Prob> | *r* |	0.0001	0.0001	0.0001	0.0001	0.0001	0.0001	0.0001	0.0001	0.0001
No. Obs	145	145	156	142	142	142	142	156	157
PA72									
r	0.819	0.763	0.584	0.738	0.685	0.716	0.421	0.686	0.727
Prob> | *r* |	0.0001	0.0001	0.0001	0.0001	0.0001	0.0001	0.0001	0.0001	0.0001
No. Obs	161	161	176	161	161	161	161	176	180
PA90									
r	0.849	0.745	0.565	0.683	0.746	0.562	0.658	0.691	0.750
Prob> | *r* |	0.0001	0.0001	0.0001	0.0001	0.0001	0.0001	0.0001	0.0001	0.0001
No. Obs	179	179	186	178	178	178	178	186	187

Table 9. Summary of stepwise regression analyses of $\log_{10}$-transformed total mercury wet deposition against $\log_{10}$-transformed major cation and anion wet depositions measured at eight Pennsylvania collocated mercury (MDN) and acid rain monitoring sites. All predictors the models are significant at $p < 0.05$.

Site	Variables In Model	Partial R-square	Model R-square	C(p) Value	F-values	P > F
PA00	SO_4^{2-}	0.670		17.550	296.42	< 0.0001
	Ca^{2+}	0.029		5.256	14.07	0.0003
	NO_3^-	0.009	0.71	2.632	4.67	0.0324
PA13	SO_4^{2-}	0.680		11.928	353.38	< 0.0001
	Na^+	0.019	0.70	3.230	10.68	0.0013
PA30	SO_4^{2-}	0.680		17.228	353.08	< 0.0001
	Na^+	0.024		5.509	13.51	0.0003
	Cl^-	0.011	0.71	1.557	6.04	0.0150
PA37	SO_4^{2-}	0.375		10.856	98.82	< 0.0001
	NH_4^+	0.022		6.651	6.07	0.0148
	K^+	0.016	0.41	4.156	4.49	0.0356
PA47	SO_4^{2-}	0.721		16.254	357.16	< 0.0001
	Ca^{2+}	0.027	0.75	3.535	33.43	0.0002
PA60	SO_4^{2-}	0.634		15.543	242.33	< 0.0001
	K^+	0.030		4.941	12.43	0.0006
	Na^+	0.012	0.68	1.802	5.22	0.0238
PA72	SO_4^{2-}	0.671		43.051	324.51	< 0.0001
	Ca^{2+}	0.043		18.972	23.69	< 0.0001
	Cl^-	0.012		13.764	6.79	0.0101
	K^+	0.009		10.417	5.17	0.0244
	NO_3^-	0.010	0.75	6.085	6.33	0.0129
PA90	SO_4^{2-}	0.714		55.380	439.32	< 0.0001
	Mg^{2+}	0.050		17.568	36.75	< 0.0001
	Na^+	0.011		10.751	8.49	0.0040
	NH_4^+	0.007	0.78	7.379	5.30	0.0225