Statewide Endocrine Disrupting Compound Monitoring Study, 2007 – 2008

Addendum

January, 2010

tdr-g1-08a

This Addendum provides data on pesticide samples that were collected from the four rivers that were included in the Statewide Endocrine Disrupting Chemical Study. This data was collected as part of the Minnesota Department of Agriculture's routine surface water monitoring program. The data shown in Table MDA1 includes samples collected from the Redwood River, the Little Cobb River, the Le Sueur River, and Seven Mile Creek. Table MDA2 presents summary statistics for the chloroacetanilide degradates which were collected from the Le Sueur River and Seven Mile Creek. The pesticide data is separated into base flow and storm flow sample collection periods. The majority of the samples collected from the rivers targeted storm flow conditions since pesticide concentrations are often higher during storm flow periods. The Little Cobb and Redwood Rivers were sampled with grab samples in May and June whereas the Le Sueur River and Seven Mile Creek locations were monitored year-round in 2008 with a mixture of grab, equal-time increment composite, and equal-flow increment composite samples. For the complete dataset and further discussion, please refer the *Minnesota Department of Agriculture 2008 Water Quality Monitoring Report* available at http://www.mda.state.mn.us/monitoring.

Appendix A1: Base Neutral Pesticide List.

Common Name	Type	MRL (ug/L)
Acetochlor	Herbicide	0.05
Alachlor	Herbicide	0.05
Atrazine	Herbicide	0.05
Boscalid	Fungicide	0.30
Chlorpyrifos	Insecticide	0.04
Cyanazine	Herbicide	0.20
De-ethyl Atrazine	Metabolite	0.05
De-isopropyl atrazine	Metabolite	0.20
Diazinon	Insecticide	0.12
Dimethenamid	Herbicide	0.05
Dimethoate	Insecticide	0.22
EPTC	Herbicide	0.23
Fonofos	Insecticide	0.10
Malathion	Insecticide	0.09
Metolachlor	Herbicide	0.07
Metribuzin	Herbicide	0.10
Metribuzin DA	Metabolite	1.00
Metribuzin DADK	Metabolite	1.00
Metribuzin DK	Metabolite	1.00
Methyl Parathion	Insecticide	0.12
Myclobutanil	Fungicide	0.20
Pendimethalin	Herbicide	0.08
Phorate	Insecticide	0.12
Propiconazole	Fungicide	0.20
Tebucanazole	Fungicide	0.20
Tebuprimiphos	Fungicide	0.10
Terbufos	Insecticide	0.19
Tetraconazole	Fungicide	0.15
Trifluralin	Herbicide	0.17

Appendix A2: Chloroacetanilide Degradates Analyte List.

Compound	Type	MRL (ug/L)
Acetochlor ESA	Acetochlor Degradate	0.07
Acetochlor OXA	Acetochlor Degradate	0.07
Alachlor ESA	Alachlor Degradate	0.07
Alachlor OXA	Alachlor Degradate	0.07
Dimethenamid ESA	Dimethenamid Degradate	0.07
Dimethenamid OXA	Dimethenamid Degradate	0.07
Metolachlor ESA	Metolachlor Degradate	0.07
Metolachlor OXA	Metolachlor Degradate	0.07

Table MDA1. Summary statistics for base neutral pesticide compounds detected at each site.

Redwood River 2008 Base Neutral Pesticides	Total n	Total Detects	Total % Detects	Total Max (ug/L)	Total Median (ug/L)	Base flow n	Base flow Detects	Base flow % Detects	Base flow Max (ug/L)	Base flow Median (ug/L)	Storm flow n	Storm flow Detects	Storm flow % Detects	Storm flow Max (ug/L)	Storm flow Median (ug/L)
Acetochlor	4	4	100	0.21	P	2	2	100	P	P	2	2	100	0.21	0.11
Atrazine	4	4	100	P	P	2	2	100	P	P	2	2	100	P	P
Boscalid	4	1	25	P	nd	2	0	0	nd	nd	2	1	50	P	P
Deethylatrazine	4	4	100	P	P	2	2	100	P	P	2	2	100	P	P
Metolachlor	4	3	75	P	P	2	1	50	P	P	2	2	100	P	P
Little Cobb River 2008 Base Neutral Pesticides	**Total n**	**Total Detects**	**Total % Detects**	**Total Max (ug/L)**	**Total Median (ug/L)**	**Base flow n**	**Base flow Detects**	**Base flow % Detects**	**Base flow Max (ug/L)**	**Base flow Median (ug/L)**	**Storm flow n**	**Storm flow Detects**	**Storm flow % Detects**	**Storm flow Max (ug/L)**	**Storm flow Median (ug/L)**
Acetochlor	3	2	67	0.38	P	-	-	-	-	-	3	2	67	0.38	P
Atrazine	3	1	33	0.08	nd	-	-	-	-	-	3	1	33	0.08	nd
Deethylatrazine	3	2	67	P	P	-	-	-	-	-	3	2	67	P	P
Dimethenamid	3	2	67	P	P	-	-	-	-	-	3	2	67	P	P
Metolachlor	3	2	67	P	P	-	-	-	-	-	3	2	67	P	P
Le Sueur River 2008 Base Neutral Pesticides	**Total n**	**Total Detects**	**Total % Detects**	**Total Max (ug/L)**	**Total Median (ug/L)**	**Base flow n**	**Base flow Detects**	**Base flow % Detects**	**Base flow Max (ug/L)**	**Base flow Median (ug/L)**	**Storm flow n**	**Storm flow Detects**	**Storm flow % Detects**	**Storm flow Max (ug/L)**	**Storm flow Median (ug/L)**
Acetochlor	21	14	67	2.05	P	7	0	0	nd	nd	14	14	100	2.05	0.17
Atrazine	21	18	86	0.66	P	7	4	57	0.1	P	14	14	100	0.66	P
Deethylatrazine	21	17	81	0.16	P	7	3	43	0.16	nd	14	14	100	0.06	P
Dimethenamid	21	13	62	0.21	P	7	0	0	nd	nd	14	13	93	0.21	P
Metolachlor	21	19	90	1.54	0.10	7	5	71	P	P	14	14	100	1.54	0.15
Prometon	21	1	5	P	nd	7	1	14	P	nd	14	0	0	nd	Nd
Seven Mile Creek 2008 Base Neutral Pesticides	**Total n**	**Total Detects**	**Total % Detects**	**Total Max (ug/L)**	**Total Median (ug/L)**	**Base flow n**	**Base flow Detects**	**Base flow % Detects**	**Base flow Max (ug/L)**	**Base flow Median (ug/L)**	**Storm flow n**	**Storm flow Detects**	**Storm flow % Detects**	**Storm flow Max (ug/L)**	**Storm flow Median (ug/L)**
Acetochlor	15	9	60	0.12	P	6	0	0	nd	nd	9	9	100	0.12	P
Atrazine	15	14	93	0.09	P	6	5	83	P	P	9	9	100	0.09	P
Deethylatrazine	15	13	87	P	P	6	5	83	P	P	9	8	89	P	P
Dimethenamid	15	8	53	0.05	P	6	1	17	P	nd	9	7	78	0.05	P
Metolachlor	15	12	80	0.30	P	6	4	67	0.30	P	9	8	89	0.22	P

*P (present) indicates compound detected at levels below method reporting limit (Appendix A1).
*nd indicates compounds were not detected

Table MDA2. Summary statistics for chloroacetanilide pesticide compounds detected at each site.

Le Sueur River 2008 Chloroacetanilide Degradates	Total n	Total Detects	Total % Detects	Total Max (ug/L)	Total Median (ug/L)	Base flow n	Base flow Detects	Base flow % Detects	Base flow Max (ug/L)	Base flow Median (ug/L)	Storm flow n	Storm flow Detects	Storm flow % Detects	Storm flow Max (ug/L)	Storm flow Median (ug/L)
Acetochlor ESA	15	13	87	1.10	0.54	6	4	67	0.29	0.18	9	9	100	1.10	0.63
Acetochlor OXA	15	13	87	1.08	0.37	6	4	67	0.14	0.09	9	9	100	1.08	0.44
Alachlor ESA	15	15	100	0.31	0.16	6	6	100	0.23	0.15	9	9	100	0.31	0.17
Alachlor OXA	15	1	7	0.16	nd	6	0	0	nd	nd	9	1	11	0.16	nd
Dimethenamid ESA	15	1	7	0.10	nd	6	0	0	nd	nd	9	1	11	0.10	nd
Dimethenamid OXA	15	1	7	0.08	nd	6	0	0	nd	nd	9	1	11	0.08	nd
Metolachlor ESA	15	15	100	1.29	0.95	6	6	100	0.81	0.49	9	9	100	1.29	1.12
Metolachlor OXA	15	12	80	0.90	0.24	6	3	50	0.13	P	9	9	100	0.90	0.31
Seven Mile Creek 2008 Chloroacetanilide Degradates	**Total n**	**Total Detects**	**Total % Detects**	**Total Max (ug/L)**	**Total Median (ug/L)**	**Base flow n**	**Base flow Detects**	**Base flow % Detects**	**Base flow Max (ug/L)**	**Base flow Median (ug/L)**	**Storm flow n**	**Storm flow Detects**	**Storm flow % Detects**	**Storm flow Max (ug/L)**	**Storm flow Median (ug/L)**
Acetochlor ESA	6	4	67	0.43	0.12	5	3	60	0.25	0.10	1	1	100	0.43	0.43
Acetochlor OXA	6	2	33	0.19	0	5	1	20	0.07	nd	1	1	100	0.19	0.19
Alachlor ESA	6	6	100	0.38	0.27	5	5	100	0.38	0.28	1	1	100	0.19	0.19
Metolachlor ESA	6	6	100	1.68	1.16	5	5	100	1.68	0.98	1	1	100	1.52	1.52
Metolachlor OXA	6	3	50	0.24	P	5	2	40	0.09	nd	1	1	100	0.24	0.24

*P (present) indicates compound detected at levels below method reporting limit (Appendix A2).
*nd indicates compounds were not detected

Minnesota Rule Chapter 7050 includes water quality standards (acute and chronic standards) for protection of aquatic life and human health for acetochlor, atrazine, and metolachlor. None of the measured concentrations of pesticides exceeded water quality standards during this study. However, the LeSueur River is listed as impaired for acetochlor due to high concentrations in previous years. For more details, please see Minnesota Impaired Waters and Total Maximum Daily Loads Web page at http://pca.state.mn.us/water/tmd//index.html)