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PESTICIDE AND FERTILIZER MANAGEMENT

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ABBREVIATIONS

MDA	Minnesota Department of Agriculture
MDH	Minnesota Department of Health
MPCA	Minnesota Pollution Control Agency
MCES	Metropolitan Council Environmental Services
USGS	United States Geological Survey
USEPA/OPP	United States Environmental Protection Agency/Office of Pesticide Programs
DNR	Department of Natural Resources
TCMA	Twin Cities Metropolitan Area
PMR	Pesticide Monitoring Region
EFI	Equal-Flow Increment
ETI	Equal-Time Increment
ppm	parts per million (equivalent to milligrams of chemical per liter of water sample or mg/L)
ppb	parts per billion (equivalent to micrograms chemical per liter of water sample or μg/L)
HRL	Health Risk Limit
HBV	Health Based Value
MCL	Maximum Contaminant Level
MRL	Method Reporting Limit
ERL	Estimated Reporting Limit
MS	Maximum Standard Value

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DEFINITIONS

Chronic Standard, Criterion or Advisory Value
The highest water concentration of a chemical to which organisms can be exposed without causing chronic toxicity to organisms in question. Established for individual chemicals based on toxicity to aquatic life (the "toxicity-based") and based on toxicity to human life (the "human health-based"), when sufficient information exists to establish one or both of these numbers. The more stringent of the two numbers is used as the chronic standard, criterion or advisory value for purposes of implementation of Minnesota Rules Chapter 7050. The underlying exposure assumptions (e.g., timeframes for exposure comparisons) and applicability of any numbers are established by the MPCA and may vary depending on the state classification of the water body, the nature of the data comparisons being made, and the regulatory status of the number being used for comparison.

Enzyme-linked immunosorbent assays (ELISA)
ELISA is an alternative laboratory analysis method. The MAU used this methodology to screen water quality samples for both surface and groundwater for atrazine and acetochlor in 2009.

Estimated reporting Limit (ERL)
An estimate of the lowest concentration that a given method may be capable of reporting when final validation of the method is complete. Used for reporting mass estimates for analytes of interest before the analytical method is fully developed and validated. Analytes with an ERL may be reported as "present" when there is enough mass of the chemical to be measured although total mass is below the ERL.

Final Acute Value (FAV) and Maximum Standard (MS)
An estimate of the concentration of a pollutant corresponding to the cumulative probability of 0.05 in the distribution of all the acute toxicity values for the genera or species from the acceptable acute toxicity tests conducted on a chemical. The FAV is the value found to be toxic in 5% of all studies conducted. Ninety five percent of all tests conducted found toxicity values to be higher than the FAV chosen. One-half the value of the FAV is the Maximum Standard (MS), and is the highest concentration of a toxicant in water to which aquatic organisms can be exposed for a brief time with zero to slight mortality. The MS is often used as a remedial action cleanup goal to protect surface waters in some groundwater contamination situations.

Health Based Value (HBV)
Identical to an HRL except that the value is issued on an interim basis for specific situations and until such time that the basis of its derivation and calculation are reviewed and subject to rule-making.

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Health Risk Limit (HRL)
The concentration of a substance or chemical (i.e., one that has been determined to be a potential private well drinking water contaminant) in drinking water that can produce a potential toxicological result due to systemic or carcinogenic effect in humans upon consumption. The underlying exposure assumptions (e.g., volume of water consumed and timeframes for exposure comparisons) and the general applicability of any HRL are established for Minnesota by the MDH and adopted by rule of the MDH Commissioner.

Maximum Contaminant Level (MCL)
A value set by the USEPA as the maximum amount of a chemical allowed in a federally regulated public water supply, considering health, economic or other factors including technological factors such as treatment cost and feasibility.

Method Reporting Limit (MRL)
Represents the minimum concentration of an analyte that can be reliably quantified and reported by the laboratory. Analytes may be positively identified via qualitative procedures and reported as "Present" below the MRL.

Erratum August 2010: Text in the Annual Report was modified in August 2010. To clearly identify what data was used in the creation of the groundwater graphics, a note describing the dataset was added after each graphic. These additions are reflected from pages 17 through 57.

SECTION 1: INTRODUCTION

This report presents ground and surface water quality data collected by the Monitoring and Assessment Unit (MAU) of the Minnesota Department of Agriculture (MDA). This report presents pesticide results for the 2009 monitoring year as well as summaries of historical pesticide data. In addition, the report presents monitoring results for select nutrients and also for sediments (turbidity and total suspended solids). The information presented in this report is used to characterize and assess the nature and general extent of pesticide impacts to Minnesota's water resources.

1.1. Program history

In 1985 the MDA and Minnesota Department of Health (MDH) undertook a cooperative survey of groundwater for pesticides and nitrate-nitrogen in areas of agricultural land use considered susceptible to contamination (outwash sands and karst bedrock areas). This survey found that pesticides commonly applied to fields in agricultural production (normal use) were showing up in groundwater in detectable concentrations. The most frequently detected pesticides were atrazine and alachlor (both herbicides) (Klaseus, Buzicky, and Schneider, 1988). A second survey by the MDH in 1986 targeted primarily toward private (farm) drinking water wells showed similar results (Klaseus and Hines, 1989).

In 1987 Minnesota Legislature amended the Minnesota Pesticide Control Law (Chapter 18B of Minnesota State Statutes). Minnesota Statute 18B.04 requires: "*The commissioner shall:*

(1) determine the impact of pesticides on the environment, including the impacts on surface water and groundwater in this state;
(2) develop best management practices involving pesticide distribution, storage, handling, use, and disposal; and
(3) cooperate with and assist other state agencies and local governments to protect public health and the environment from harmful exposure to pesticides."

In response to this charge the MDA initiated a groundwater monitoring program in 1987 and began monitoring surface water in 1991.

In 1989 the Minnesota Comprehensive Groundwater Protection Act (Chapter 103H of Minnesota State Statutes) expanded groundwater protection responsibilities of the MDA, including specific direction regarding monitoring for agricultural chemicals and the management of those chemicals when found to impact groundwater. The Groundwater Protection Act mandated development of a State Pesticide Management Plan with monitoring to act as the primary support to management decisions within that Plan.

In response to these mandates, MDA has developed regionally based water quality monitoring networks for the purpose of collecting and reporting groundwater and surface water monitoring data. These ten Pesticide Monitoring Regions (PMRs) are based on areas of similar agricultural practices and hydrologic/geologic characteristics. The PMR boundaries follow county boundaries, but also generally represent different hydrologic regions of Minnesota. These distinct hydrologic regions include parts of: 1) the Red River of the North Basin, 2) the Rainy

River Basin, 3) Lake Superior Basin, 4) the Upper Mississippi River Basin, 5) the St. Croix River Basin, 6) the Upper Minnesota River Basin, 7) the Missouri and Des Moines River Basins, 8) the Middle and Lower Minnesota River Basin, 9) the Lower Mississippi River Basin, and 10) the Twin Cities Metropolitan Region. The MDA PMRs are depicted in Figure 1.

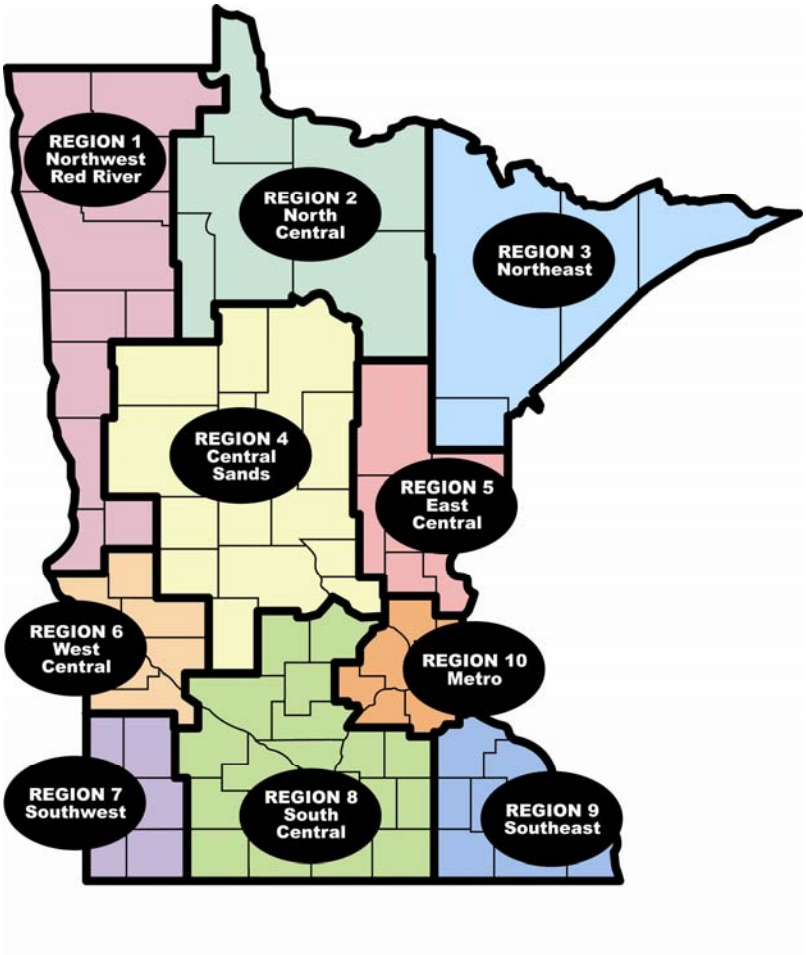


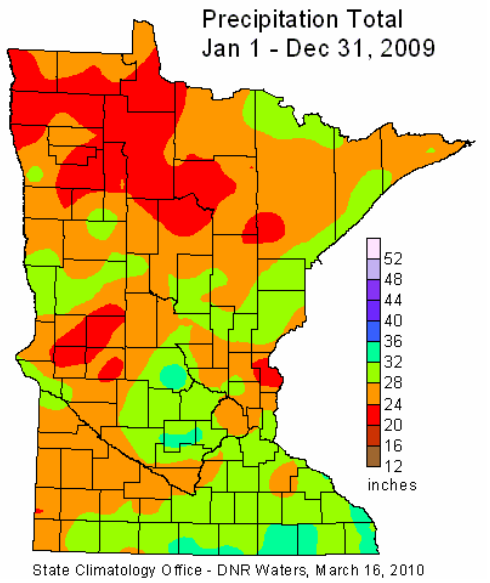
Figure 1. MDA's Pesticide Monitoring Regions (PMRs).

1.2. Hydrologic information specific to 2009

1.2.1. Precipitation

Total annual precipitation and annual precipitation departure from normal for 2009, as reported by the State Climatology Office, are shown in Figures 2 and 3, respectively. Precipitation amounts were lowest in the northwestern part of the state, with areas ranging from 20 to 28 inches. The southeastern portion of the state received the most precipitation, ranging from 28 to 36 inches. The departure from normal map indicates that although the state as a whole had nearly normal precipitation, PMR 10 (metro area) saw less than normal precipitation while locations along the Red River Valley received six to 16 inches more than normal. The distribution of rainfall was a factor in sampling in 2009, with limited rainfall occurring in May and June, and more precipitation events in the fall. Annual precipitation summaries can provide useful information on the general conditions that existed during the monitoring year and may

also provide clues as to why pesticides may be detected in surface or groundwater in a particular location during the given year.



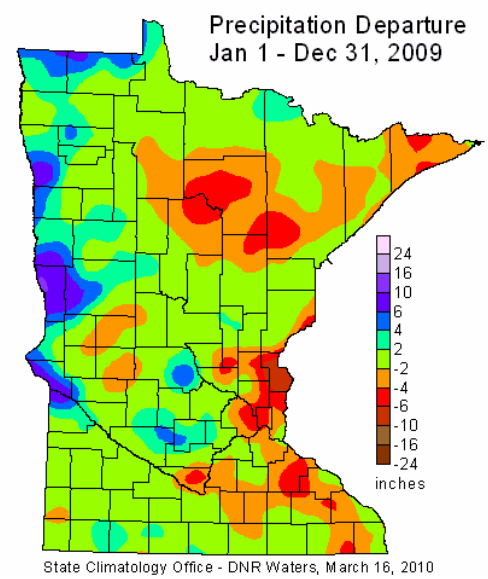


Figure 2 (left) and Figure 3 (right). 2009 statewide precipitation total and annual precipitation departure from normal.

1.3. Program elements

1.3.1. New in 2009

The MAU undertook three special projects in 2009 which are highlighted below. Special projects are selected based on opportunities for partnerships, the desire to know more about transport of pesticides to our water resources and availability of funds. Further information on each of these topics can be found in the sections indicated within the text.

Atrazine screen in PMR 9 drinking water wells.

In the spring of 2009, the MDA conducted a triazine immunoassay screen (triazine ELISA) using the enzyme-linked immunosorbant assays (ELISA) method on water samples collected from a pre-existing network of volunteered, private drinking water wells (originally established to assess the impacts of nitrate) in Minnesota's southeastern karst region to screen for atrazine. All samples were collected by the well owner and MDA provided the triazine ELISA analysis at no charge to the well owner. Ninety-two of the 100 sample kits mailed out were returned for analysis. All 92 sample results were below the currently applicable MDH drinking water standard of 3.0 µg/L for atrazine. For further information on the screen and results see Section 5.2.4. For a copy of the report, visit the MAU website (www.mda.state.mn.us/monitoring).

Private well samples in PMR 9.
In the fall of 2009, the MDA sampled 14 private drinking water wells in PMR 9 to augment current spring sampling. These wells were selected from the existing population of domestic drinking water wells. For further information on these results, see Section 2.3.

ELISA analysis for acetochlor in the Le Sueur River Watershed
In the spring of 2009, the MDA conducted an evaluation of the use of an acetochlor immunoassay screen (acetochlor ELISA) for the analysis of acetochlor in surface water samples collected from within the Le Sueur River Watershed in south central Minnesota. Both composite and grab samples were collected from a network of existing stream gage locations. For further information on the results, see Section 5.2.3. For a copy of the report, visit the MAU website (www.mda.state.mn.us/monitoring).

1.3.2. Upcoming in 2010
Several new projects and upcoming changes in the MAU program are highlighted here:

New analytical methodology
In 2008 the MDA was awarded a Legislative-Citizen Commission on Minnesota Resources (LCCMR) grant for the purpose of developing additional capabilities for analyzing for pesticides in groundwater and surface water. Previous laboratory analyses consisted of a separate analytical procedure for base neutral pesticides, chloroacetanilide degradates, and chlorophenoxy acid herbicides. To increase laboratory efficiency and capacity, the MDA used the LCCMR grant to purchase equipment for a liquid chromatography with tandem mass spectrometry (LC-MS/MS) analytical method capable of detecting a much broader suite of chemicals, and at lower concentrations for some chemicals. In addition to LCCMR funding, funding from the Clean Water Legacy Fund were used to purchase a second set of LC-MS/MS equipment for running additional samples. Basic development of the method was complete by January 1, 2010, and final validation was completed in May. During 2010, the MAU will be submitting samples for analysis by the new methods. The new analytical methods are termed GC/MS (gas chromatography mass spectrometry) and LC-MS/MS.

Public drinking water well reconnaissance sampling
As a first use of the new analytical methods, during February 2010 the MDH collected samples from a select set of community drinking water supplies. This was a one-time raw water sampling of 100 systems and will serve to provide information previously unavailable to the MDH, the MDA and the selected communities.

ELISA
Glyphosate ELISA analysis will be used to assess glyphosate concentrations in surface water around the state along with limited groundwater samples. Acetochlor ELISA will provide additional acetochlor surface water monitoring data in the Le Sueur River Watershed.

1.3.3. MDA's selection of pesticides
Both ground and surface water samples are collected and analyzed for many commonly used agricultural chemicals. Analysis of water samples for pesticides is extremely expensive. As a result the MDA carefully selects which pesticides to include in its monitoring program. To be included, a

pesticide must be used in the state, it must have environmental fate characteristics that could result in water resource impacts, and it must have a laboratory analytical method that can achieve reasonable results given reasonable resource limitations. Potential Health Risk Limits for pollutants in groundwater are also considered. More details about the selection methodology of pesticides can be found within the MAU's Ground and Surface Water Design Documents located at the MDA monitoring program website (www.mda.state.mn.us/monitoring) as well as in the following section.

1.3.4. Chemical analytes

Water resource samples are analyzed for pesticides and inorganic compounds in the laboratory which are referred to as analytes. A pesticide may be included in a "target analyte" list for a given water sample based on the relative expectation of detecting the pesticide. This expectation may depend on the mobility of the pesticide in soil or water, the general use of the pesticide in the monitoring area or other programmatic reasons or concerns.

A pesticide target analyte list helps MDA monitoring efforts focus limited resources on the chemicals of greatest concern to water resources. The target analyte list typically includes many of the most commonly used pesticide products or degradates; however, there might also be detection and identification of additional pesticides that are "non-target" analytes. When this occurs, the "non-target" analytes are added to the data evaluation and are considered for further method development as target analytes.

In 2002, the MDA laboratory began analysis of groundwater samples for the primary (ESA) and secondary (OXA) degradates of acetochlor, alachlor, dimethenamid and metolachlor. This analysis began with the second quarter of the calendar year. For that reporting period, these methods were limited to groundwater samples only. In late May 2004, six additional base neutral pesticide analytes and three degradates of metribuzin were added to the list of target analytes. Beginning in 2007, select surface water samples were also analyzed for the primary (ESA) and secondary (OXA) degradates of acetochlor, alachlor, dimethenamid and metolachlor.

All pesticides analyzed by the MDA laboratory are listed in Table 1. This table also indicates if the analyte was found in either surface or groundwater in 2009, along with the method reporting limit (MRL). The MDA contracted with an outside laboratory to conduct ELISA analysis of select ground and surface water samples for diaminochlorotriazine (DACT), which is a degradate of atrazine. There was also ELISA analysis of acetochlor in surface water only (Table 2). A list of inorganic analytes is provided in Table 3. For a historic view of all pesticide analytes detected in either surface or groundwater, see Appendix 1. For additional details regarding MDA sampling, as well as analytical and reporting methods, visit the MAU website (www.mda.state.mn.us/monitoring).

Table 1. 2009 list for target and non–target base neutral pesticides, chloroacetanilide degradates and chlorophenoxy acid herbicides analyzed in both surface water and groundwater with associated method reporting limit (MRL).

Common Name	Type	2009 Detected Target or Non-Target Analyte in Surface Water	2009 Detected Target or Non-Target Analyte in Groundwater	MRL (µg/L)
target analytes				
2,4-D	Herbicide	x		0.20
Acetochlor	Herbicide	x	x	0.05
Acetochlor ESA	Degradate	x	x	0.07
Acetochlor OXA	Degradate	x	x	0.07
Alachlor	Herbicide	x		0.05
Alachlor ESA	Degradate	x	x	0.07
Alachlor OXA	Degradate	x	x	0.07
Atrazine	Herbicide	x	x	0.05
Deethylatrazine	Degradate	x	x	0.05
Deisopropylatrazine	Degradate	x	x	0.20
Boscalid	Fungicide	x		0.30
Chlorpyrifos	Insecticide	x		0.04
Cyanazine	Herbicide			0.20
Diazinon	Insecticide	x		0.12
Dicamba	Herbicide	x		0.20
Dichlorprop	Herbicide	x		0.20
Dimethenamid	Herbicide	x	x	0.05
Dimethenamid ESA	Degradate	x	x	0.07
Dimethenamid OXA	Degradate	x	x	0.07
Dimethoate	Insecticide			0.22
EPTC	Herbicide			0.23
Fonofos	Insecticide			0.10
Malathion	Insecticide			0.09
MCPA	Herbicide	x		0.20
MCPP	Herbicide	x	x	0.20
Methyl Parathion	Insecticide			0.12
Metolachlor	Herbicide	x	x	0.07
Metolachlor ESA	Degradate	x	x	0.07
Metolachlor OXA	Degradate	x	x	0.07
Metribuzin	Herbicide	x	x	0.10
Metribuzin DA	Degradate		x	1.00 (estimated)
Metribuzin DADK	Degradate	x	x	1.00 (estimated)
Metribuzin DK	Degradate		x	1.00 (estimated)
Myclobutanil	Fungicide			0.20

Table 1 continued. 2009 list for target and non–target base neutral pesticides, chloroacetanilide degradates and chlorophenoxy acid herbicides analyzed in both surface water and groundwater with associated method reporting limit (MRL).

Common Name	Type	2009 Detected Target or Non-Target Analyte in Surface Water	2009 Detected Target or Non-Target Analyte in Groundwater	MRL (µg/L)
Pendimethalin	Herbicide			0.08
Phorate	Insecticide			0.12
Propiconazole	Fungicide	x		0.20
Tebucanazole	Fungicide			0.20
Tebuprimiphos	Fungicide			0.10
Terbufos	Insecticide			0.19
Tetraconazole	Fungicide	x		0.15
Triclopyr	Herbicide	x		0.20
Trifluralin	Herbicide			0.17
Triclopyr	Herbicide	x		0.20
non-target analytes				
2,6-Dichlorobenzamide	Herbicide	x		0.05
Dichlobenil	Herbicide	x		0.10
Oxadiazon	Herbicide	x		0.10
Prometon	Herbicide	x	x	0.10
Propazine	Herbicide	x		0.10
Simazine	Herbicide	x	x	0.10

Table 2. ELISA target analyte list.

Common Name	Type	2009 Detected Target or Non-Target Analyte in SW	2009 Detected Target or Non-Target Analyte in GW	MRL (µg/L)
Diaminochlorotriazine (DACT)	Atrazine Degradate	x	x	0.10
Atrazine	Herbicide		x	0.10
Acetochlor	Herbicide	x		0.10

Table 3. Nutrient and sediment target analyte list.

Compound	Method	MRL (mg/L)
Ammonia	MDA Method # WC-230, Standard Method 4500-NH3	0.20
Nitrate/Nitrite-Nitrogen	#WC-105	0.40
Orthophosphorus	MDA Method #260	0.005
Turbidity	EPA method # 180.1	0.20 NTU[1]
Total Phosphorus	MDA Method #250	0.01
Total Suspended Solids	Standard Method #2540D	0.10

[1] Nephelometric Turbidity Units (NTU) is how turbidity is expressed.

1.4. Water quality reference values and standards

Water quality reference values and standards are used by MDA's monitoring program to help guide water monitoring activities. These reference values come from several state and federal agency sources. The development of surface and groundwater reference values is an ongoing process and new values are continually being developed over time. For this reason, each website shown on the following pages should be checked for the most current water quality reference values or standards.

1.4.1. Groundwater

The MDH develops Health Risk Limits (HRLs) through a rule-making process for pollutants detected in groundwater. A pollutant is defined as a "chemical or substance for which a health risk limit has been adopted" (Minn. Stat. 103H.005 subd. 11). HRLs are used to evaluate contaminated wells and provide advice to consumers and well owners about the suitability of their water supply for consumption and other uses. If a pollutant is detected between rule-making events and it does not have a HRL, the MDH has issued, with sufficient toxicological data, an interim Health Based Value (HBV) or Risk Assessment Advice (RAA) unless the MDH Commissioner determines the need for emergency HRL development. When the MDA detects pollutants in groundwater samples for which a HRL has not been developed, a request is made to the MDH for HRL, HBV, or RAA development. In the absence of compound-specific toxicological information for pesticide degradates, the MDH has used a conservative default approach by assuming a pesticide degradate has the same toxicological effect as the pesticide parent compound. HRLs, HBVs, or RAAs have been requested by MDA from the MDH for frequently detected pesticide degradates. For the most current MDH health-based guidance values for groundwater, go to (www.health.state.mn.us/divs/eh/risk/rules/hrlrule.html).

1.4.2. Surface water

The federal Clean Water Act, as administered by states, requires review and where necessary, revision of water quality rules every three years. The Minnesota Pollution Control Agency (MPCA) develops, through a rule-making process, toxicity-based (for aquatic life) or human health-based enforceable chronic standards for pollutants detected in surface water. The toxicity-based standard (protective for aquatic life exposure) is typically based on exposure duration of four days. The human health-based standard (protective for drinking water plus fish consumption) is based on exposure duration of 30 days. When the MDA detects pollutants in water resource samples for which a chronic standard has not been developed, a request is made to the MPCA for standards development. The MPCA should be contacted for specific information related to the development of these values. For the most current MPCA water

quality rules see Chapter 7050: Standards for Protection of Waters of the State (www.revisor.leg.state.mn.us/rules/?id=7050).

The United States Environmental Protection Agency (USEPA) provides Aquatic Life Benchmarks for surface waters for individual pesticides. Aquatic Life Benchmarks are based on toxicity values derived from data available to the USEPA's Office of Pesticide Programs (OPP) supporting registration of the pesticide. These values are derived from risk assessments developed during registration or re-registration. Toxicity values are adjusted by Levels-of-Concern established by OPP for different aquatic taxa. The methodology used by USEPA for pesticide risk assessments is outlined in detail in *"Overview of the Ecological Risk Assessment Process in the Office of Pesticide Programs (OPP), U.S. Environmental Protection Agency"* (www.epa.gov/espp/consultation/ecorisk-overview.pdf).

In general, MPCA water quality reference values supersede other reference values because they have been reviewed for their applicability to Minnesota's water resources and because of their potential use in making water body impairment decisions under the federal Clean Water Act. USEPA benchmarks can help direct MDA in monitoring activities and can serve as screening tools for evaluating potential risks of pesticides in the aquatic environment if an MPCA reference value is not available. The most current USEPA Aquatic Life Benchmarks are located at their website (www.epa.gov/oppefed1/ecorisk_ders/aquatic_life_benchmark.htm).

1.4.3. Federally-regulated public drinking water

The USEPA, using authorities in the federal Safe Drinking Water Act, has established a set of Maximum Contaminant Levels (MCLs) used to protect federally-regulated public drinking water sources (usually treated, or "finished" water). For the most current USEPA drinking water standards go to (www.epa.gov/safewater/index.html).

Summary tables of both groundwater and surface water reference values current for the date of this report are provided below.

Table 4 provides a summary of human health-based groundwater standards, values or limits used by state and federal agencies in risk evaluation for select registered and commonly used pesticides or their degradates.

Table 5 provides a summary of applicable toxicity-based and human health-based chronic surface water standards and aquatic life benchmarks used by state and federal agencies in risk evaluation for pesticides detected in surface water and for select registered pesticides.

Table 4. Summary of available groundwater reference values associated with target and detected non-target pesticide analytes as of February 2010.

Pesticide Analyte	Value (µg/L)	Value Type
2,4-D	70	HRL_{93}[1]
Acetochlor	9	HRL_{08}
Acetochlor ESA	300	HBV_{09}[2]
Acetochlor OXA	100	HBV_{09}
Alachlor	5	HRL_{08}
Alachlor ESA	70	RAA_{09}[3]
Alachlor OXA	70	RAA_{09}
Atrazine	3	HRL_{MCL}
Deisopropylatrazine	3	Parent HRL_{MCL}
Deethylatrazine	3	Parent HRL_{MCL}
Diaminochlorotriazine	3	Parent HRL_{MCL}
Boscalid	-[4]	-
Chlorpyrifos	20	$HBV_{pre\text{-}2007}$
Cyanazine	1	HRL_{08}
Diazinon	-	-
Dicamba	200	HRL_{93}
Dichlorprop	-	-
Dimethenamid	40	HBV_{99}
Dimethenamid ESA	40	Parent HBV_{99}
Dimethenamid OXA	40	Parent HBV_{99}
Dimethoate	1	HBV_{96}
EPTC	200	HRL_{93}
Fonofos	10	$HBV_{pre\text{-}2007}$
Malathion	100	$HBV_{pre\text{-}2007}$
MCPA	3	HRL_{93}
MCPP	7	HBV_{96}
Methyl Parathion	2	$HBV_{pre\text{-}2007}$
Metolachlor	300	HBV_{09}
Metolachlor ESA	800	HBV_{09}
Metolachlor OXA	800	HBV_{09}
Metribuzin	200	HRL_{93}
Metribuzin DA	200	Parent HRL_{93}
Metribuzin DADK	200	Parent HRL_{93}
Metribuzin DK	200	Parent HRL_{93}
Myclobutanil	-	-
Pendimethalin	90	$HBV_{pre\text{-}2007}$
Phorate	1	$HBV_{pre\text{-}2007}$
Prometon	100	HRL_{93}
Propiconazole	90	HBV_{00}
Simazine	4	HRL_{MCL}
Tebuconazole	-	-
Tebuprimifos	-	-
Terbufos	0.2	$HBV_{pre\text{-}2007}$
Tetraconazole	-	-
Triclopyr	300	$HBV_{pre\text{-}2007}$

[1] HRL - Health Risk Limit promulgated by the Minnesota Department of Health (MDH) in 1993 or 2008 or set in 2007 to the U.S. Environmental Protection Agency Maximum Contaminant Level (MCL) as required by law. A human health-based groundwater guidance value for private wells.

[2] HBV - Health Based-Value, a non-promulgated value established by the MDH in the year indicated. A human health-based groundwater guidance value for private wells.

[3] RAA – Risk Assessment Advice, a non-promulgated value established by the MDH in the year indicated. A human health-based groundwater guidance value for private wells.

[4] Not all analytes have available reference values, in which case, a - is entered. In the absence of compound-specific toxicological information for pesticide degradates, the MDH has used a conservative default approach by assuming a pesticide degradate has the same toxicological effect as the pesticide parent compound.

Guidance for evaluating concurrent exposures to multiple chemicals can be found at the MDH website (www.health.state.mn.us/divs/eh/risk/guidance/gw/additivity.html).

Table 5. Summary of available surface water reference values and standards associated with target and detected non-target pesticide analytes as of February 2010.

Pesticide Analyte	Surface Water Reference Values as of February 2010 (µg/L)[1]					
	MPCA				USEPA/OPP Aquatic Life Benchmark[2]	
	Chronic Standards[3]			Maximum Standard[4]	Acute Value	Chronic Value
	Class 2A[5]	Class 2Bd[6]	Class 2B,C,D[7]			
2,4-Dichlorophenoxyacetic acid (2,4-D)[8]	–	–	–	–	299.2 (v)	14,200 (f)
2,6-Dichlorobenzamide	–	–	–	–	–	–
Acetochlor	3.6 T	3.6 T	3.6 T	86 T	na	na
Acetochlor ESA	–	–	–	–	9,900.00 (n)	–
Acetochlor OXA	–	–	–	–	–	–
Alachlor	3.8 H; 59 T	4.2 H; 59 T	59 T	800 T	na	na
Alachlor ESA	–	–	–	–	52,000 (f)	–
Alachlor OXA	–	–	–	–	47,500 (f)	–
Atrazine	3.4 H; 10 T	3.4 H; 10 T	10 T	323 T	na	na
Deethylatrazine	–	–	–	–	1,000 (n)	–
Deisopropylatrazine	–	–	–	–	2,500 (n)	–
Diaminochlorotriazine (DACT)	–	–	–	–	> 50,000 (f) (i)	–
Boscalid	–	–	–	–	–	–
Chlorpyrifos	0.041 T	0.041 T	0.041 T	0.083 T	na	na
Cyanazine	–	–	–	–	–	–
Diazinon	–	–	–	–	0.105 (i)	0.17 (i)
Dicamba	–	–	–	–	61 (n)	–
Dichlobenil	–	–	–	–	30 (v)	< 330 (f)
Dichlorprop	–	–	–	–	–	–
Dimethenamid	–	–	–	–	8.9 (v)	300 (f)
Dimethenamid ESA	–	–	–	–	–	–
Dimethoate	–	–	–	–	21.5 (i)	0.5 (i)
EPTC	–	–	–	–	1,400 (n)	810 (i)

– - no value currently available

na - not applicable

(f) - USEPA/OPP benchmark value for fish.

(i) - USEPA/OPP benchmark value for invertebrates.

(n) - USEPA/OPP benchmark value for nonvascular plants

(v) - USEPA/OPP benchmark value for vascular plants.

H - "H" Chronic Standard values are human health-based and protective for an exposure duration of 30 days.

T - "T" Chronic Standard values are toxicity-based for aquatic organisms and protective for exposure duration of 4 days.

[1] Reference Values are given for all target and detected non-target analytes for which there is a reference value. Other analytes have been analyzed for and/or detected, but have no associated reference value. For a complete list of all target analytes and detected non-target analytes in 2009, please refer to Table 1.

[2] Aquatic Life Benchmarks based on toxicity values derived from data available to the United States Environmental Protection Agency's (USEPA's) Office of Pesticide Programs (OPP) supporting registration of the pesticide and are provided only when an MPCA value is not available. Toxicity values are adjusted by Levels-of-Concern established by OPP for different aquatic taxa. Current values posted by the USEPA's OPP on 4/11/09 may differ from those of previous reports. See USEPA's website for more detailed information and definitions.

[3] Chronic Standard as defined in Minn. Rule Chap. 7050. "H" value is human health-based and is protective for an exposure duration of 30 days. Human health-based values are shown only when they are less than toxicity-based values. "T" value is toxicity-based for aquatic organisms and is protective for exposure duration of 4 days.

[4] Maximum Standard Value for Aquatic Life & Recreation as defined on MPCA's website and Minn. Rule Chap. 7050. Values are the same for all classes of surface waters.

[5] State Water Classification for aquatic life (cold water streams) & all recreation. Protected as drinking water sources.

[6] State Water Classification for aquatic life (cold and warm water streams) & all recreation. Protected as drinking water sources.

[7] State Water Classification for aquatic life (2B – sport and commercial; 2C – non-commercial; 2D – wetlands) & recreation (2B – all types; 2C,D – limited types). Not protected as drinking water sources.

[8] 2,4-Dichlorophenoxyacetic acid (2,4-D) reference values were taken from a previous posting. Reference values for 2,4-D are currently under review by the USEPA's OPP.

Table 5 continued. Summary of available surface water reference values and standards associated with target and detected non-target pesticide analytes as for February 2010.

Pesticide Analyte	Surface Water Reference Values as of February 2010 (µg/L)					
	MPCA				USEPA/OPP Aquatic Life Benchmark	
	Chronic Standards			Maximum Standard	Acute Value	Chronic Value
	Class 2A	Class 2Bd	Class 2B,C,D			
Fonfos	–	–	–	–	–	–
Malathion	–	–	–	–	0.005 (i)	0.000026 (i)
MCPA	–	–	–	–	20 (v)	11,000 (i)
MCPP	–	–	–	–	14 (n)	50,800 (i)
Methyl Parathion	–	–	–	–	0.485 (i)	0.25 (i)
Metolachlor	23 T	23 T	23 T	271 T	na	na
Metolachlor ESA	–	–	–	–	24,000 (f)	–
Metolachlor OXA	–	–	–	–	7,700 (i)	–
Metribuzin	–	–	–	–	8.7 (n)	1.29 (i)
Metribuzin DA	–	–	–	–	–	–
Metribuzin DADK	–	–	–	–	–	–
Metribuzin DK	–	–	–	–	–	–
Myclobutanil	–	–	–	–	–	–
Oxidiazon	–	–	–	–	–	–
Pendimethalin	–	–	–	–	5.4 (n)	6.3 (f)
Phorate	–	–	–	–	0.3 (i)	0.21 (i)
Prometon	–	–	–	–	98 (n)	3500 (i)
Propazine	–	–	–	–	–	–
Propiconazole	–	–	–	–	93 (n)	95 (f)
Simazine	–	–	–	–	36 (n)	960 (f)
Tebuconazole	–	–	–	–	–	–
Tebuprimiphos	–	–	–	–	–	–
Terbufos	–	–	–	–	–	–
Tetraconazole	–	–	–	–	0.1 (i)	0.03 (i)
Triclopyr	–	–	–	–	100 (n)	80,700 (i)
Trifluralin	–	–	–	–	7.52 (n)	1.14 (f)

See footnotes from page 11 for complete reference.

SECTION 2: GROUNDWATER MONITORING RESULTS

MDA's groundwater monitoring network seeks to provide information on impacts to the state's groundwater from the routine use of agricultural chemicals. Information is made available so management decisions can be made to reduce, or eliminate, impacts to groundwater.

The MDA began monitoring groundwater in November of 1985 and redesigned the program in 1998. New wells were installed in 1999, and the MDA began sampling the re-designed network wells in January 2000. The current program is established around the goal of providing the information necessary to manage pesticide use for water quality protection on a sub-state, regional basis. Each monitoring site is established to evaluate pesticide impacts to the most vulnerable groundwater conditions in their associated Pesticide Monitoring Region (PMR). The first network was established in PMR 4 (central sands). It consists of the majority of sites in the program, and was designed for the purpose of tracking trends over time. PMRs 1, 5, 6, 7 and 8 were started in 2004 while PMR 9 groundwater has been sampled via naturally occurring springs for many years. In 2009 natural spring monitoring in PMR 9 was augmented with the sampling of domestic drinking water wells. PMRs 2 and 3 are not currently monitored for groundwater due to very limited agricultural production in these heavily forested regions.

2.1. Groundwater sampling

Samples were collected from 169 groundwater monitoring sites in 2009 (Figure 4). Of the total sites, 143 consisted of one or more specifically designed and installed monitoring or observation wells, 14 were private drinking water wells, and 12 consisted of naturally occurring springs emerging from bedrock formations of interest in the southeastern karst area of the state. All of the locations are considered sensitive to contamination from activities at the surface. Network design and sampling protocols are available in the program's groundwater design document on the MDA website at: (www.mda.state.mn.us/monitoring).

A total of 205 samples were collected in 2009. Table 6 lists all the pesticides that were detected in those samples during 2009. Acetochlor, atrazine, dimethenamid, metolachlor, and metribuzin, along with their degradates, were detected. Alachlor degradates were detected in 2009 but not alachlor parent. MCPP, simazine and prometon were the only pesticides detected other than those previously mentioned. Tables, graphics and discussion of detection trends over time for frequently detected pesticides can be found in subsequent sections of this report. Groundwater quality analytical results for each of the PMRs are located in Appendix 2.

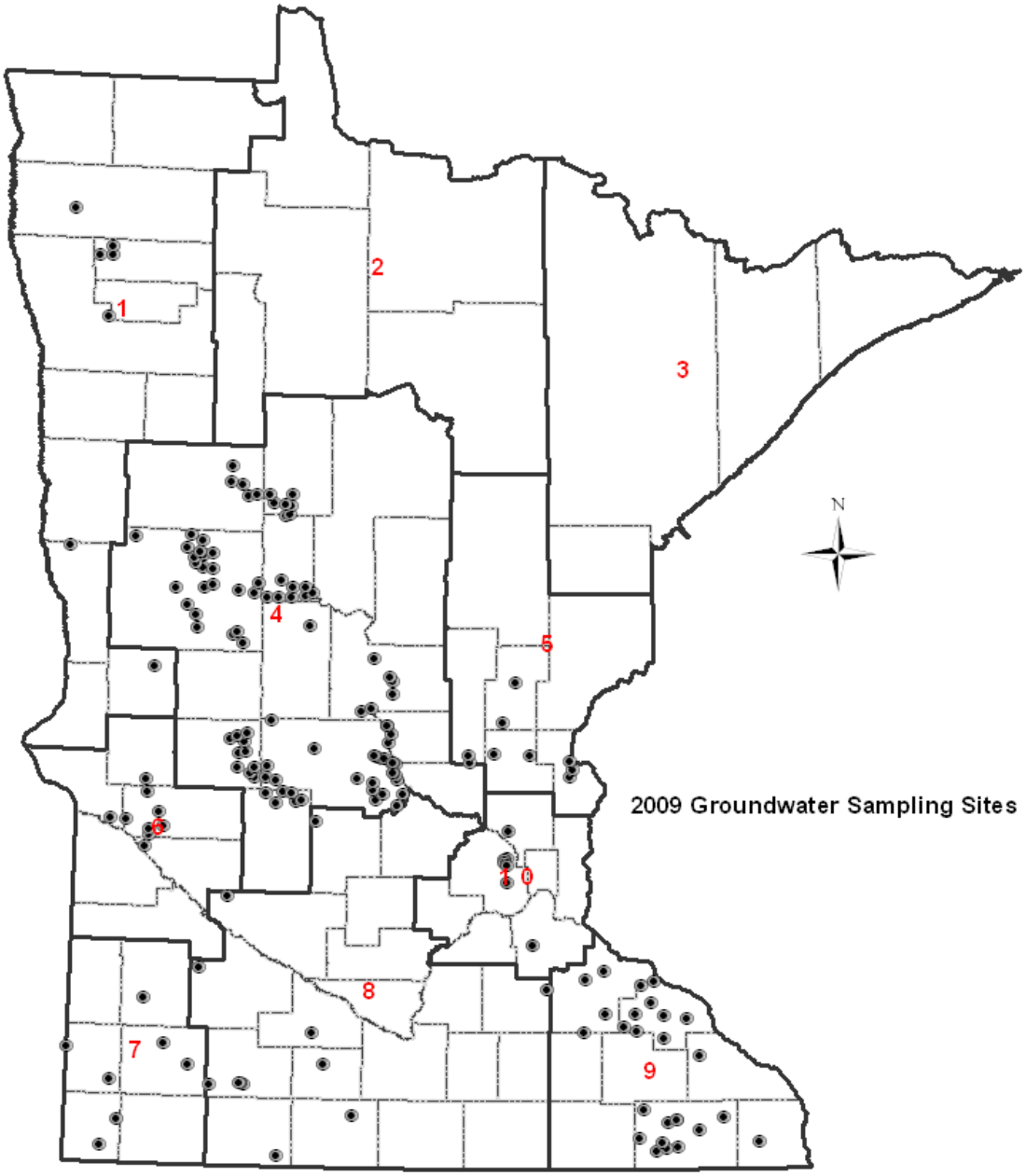


Figure 4. Location of groundwater monitoring sites samples in 2009.

Table 6. Pesticides and degradates detected in 205 groundwater monitoring samples collected by MDA during 2009.

Common Name	Type of Pesticide	Number of Samples With Detections
Acetochlor	herbicide parent	8
Acetochlor ESA	Acetochlor herbicide degradate	48
Acetochlor OXA	Acetochlor herbicide degradate	12
Alachlor ESA	Alachlor herbicide degradate	90
Alachlor OXA	Alachlor herbicide degradate	5
Atrazine	herbicide parent	119
Deethylatrazine	Atrazine herbicide degradate	149
Deisopropylatrazine	Atrazine herbicide degradate	43
Diaminochlorotriazine	Atrazine herbicide degradate	68 (173 samples)
Dimethenamid	herbicide parent	2
Dimethenamid ESA	Dimethenamid herbicide degradate	6
Dimethenamid OXA	Dimethenamid herbicide degradate	4
Metolachlor	herbicide parent	26
Metolachlor ESA	Metolachlor herbicide degradate	137
Metolachlor OXA	Metolachlor herbicide degradate	46
Metribuzin	herbicide parent	11
Metribuzin DA	Metribuzin herbicide degradate	7
Metribuzin DADK	Metribuzin herbicide degradate	21
Metribuzin DK	Metribuzin herbicide degradate	13
MCPP	herbicide parent	1
Prometon	herbicide parent	3
Simazine	herbicide parent	1

2.2. Analysis of the most frequently detected pesticides collected from MDA PMRs

Acetochlor, alachlor, atrazine, metolachlor, and metribuzin were designated as commonly detected pesticides in years previous to 2009. Figure 5 graphically displays the common detection relationship of these chemicals spatially. Dimethenamid has been detected for several years and is included in this section, even though it is not currently in common detection status. As a result of their common detection status, these pesticides, and their degradates, receive heightened scrutiny from the MDA during reporting of monitoring results. Common detection is an official state designation made by the Minnesota Commissioner of Agriculture when a pesticide is detected in groundwater as a result of normal use. The process of designating common detection is described in the Minnesota Pesticide Management Plan (www.mda.state.mn.us/pesticides).

The MDA groundwater monitoring program is designed to determine the frequency of detections, the concentration of detections, and changes in detections and concentrations over space and time for pesticides. Various analyses were performed and summaries prepared for this report to meet these objectives, specifically for these commonly detected pesticides. Figures have been prepared to display the spatial variability in pesticide detections across Minnesota in 2009. Tables are utilized to present pesticide concentration data (median, 75th percentile, 90th percentile and maximum). Concentration time-trend data is presented through the use of graphical displays of median, 75th percentile, 90th percentile, and maximum concentration values with a separate graphical display of detection frequencies. The quartiles reported are utilized because of their similarity to the classic five-number summary commonly used for describing

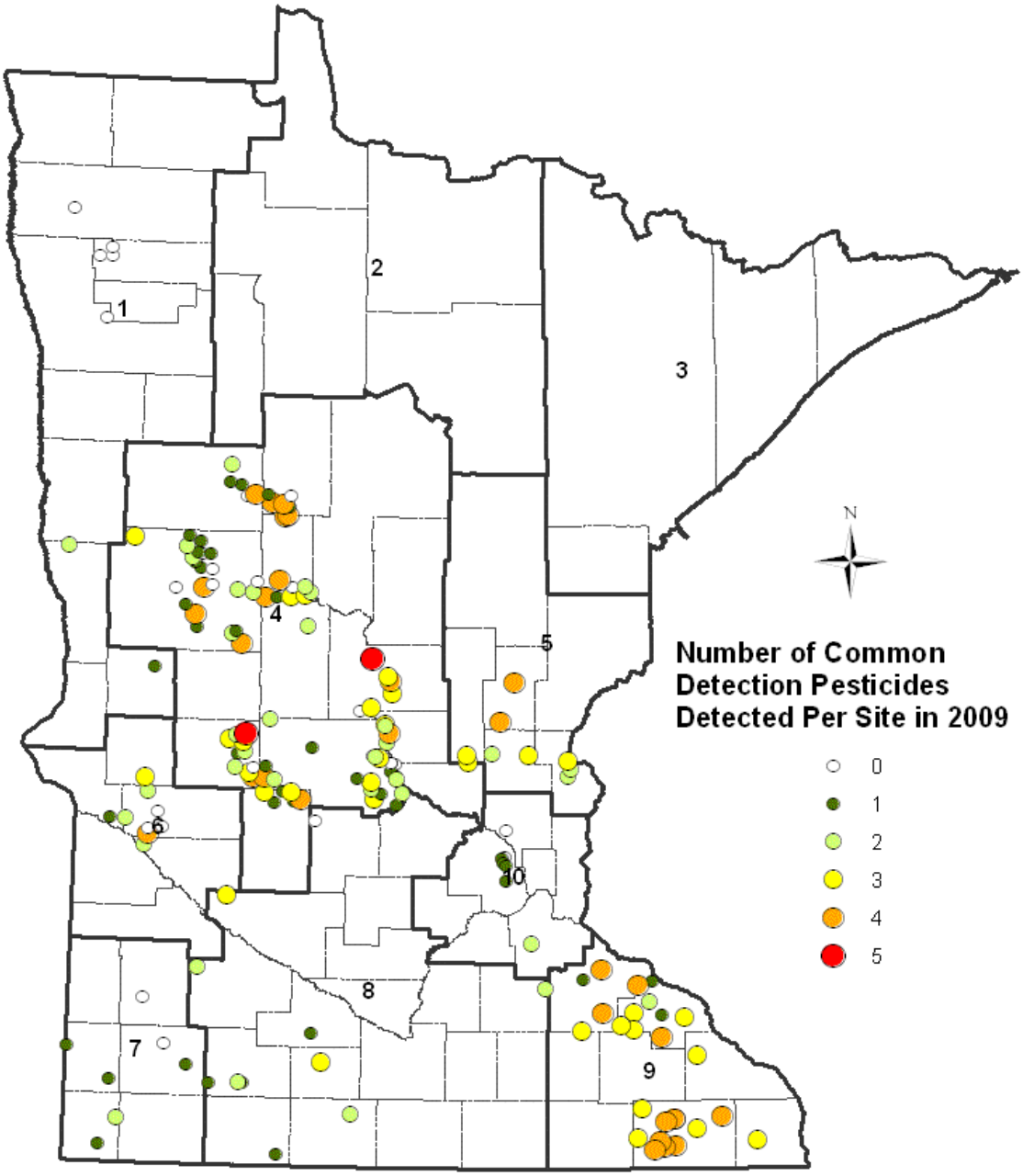


Figure 5. Number of common detection pesticides detected in groundwater samples per site in 2009.

data. Minimum and lower quartile values are not included because they are typically less than detectable concentrations. The 90th percentile is added to give a more detailed look at the tendencies of the data at higher concentrations. Because of a change in sampling strategy in June 2008, the PMR 4 graphs use only spring and fall quarter concentration data. Data presented in the tables does use all sampling results, regardless of which quarter it was collected. For further information on this change in sampling strategy, please refer to the Groundwater Monitoring Design Document at (www.mda.state.mn.us/monitoring).

Trend analyses on the MDA monitoring data are accomplished on all five graphically displayed parameters. Time-trend analysis on median values is the most widely accepted measure on which to base decisions. Trend analyses on 75th and 90th percentile concentrations may also be quite valuable in decision-making processes. Caution is advised, however, in interpreting maximum concentration trends because maximum values represent extremes that are subject to significant variability and the concomitant inability to accurately anticipate future values. All trend analyses conducted on MDA groundwater monitoring data utilizes the nonparametric Mann-Kendall test for trend, coupled with the Thiel-Sen slope estimation procedure and calculation of Kendall's tau (a nonparametric correlation estimate). Tabulated results of trend analyses on concentrations and detections are located in the Appendix 3.

For various reasons, including newly developed analytical methods, the best data set currently available for assessing changes in groundwater impacts over time is from PMR 4. PMR 9 has a long history of sample analyses on three DNR fish hatchery springs and is included in trend analyses specifically for atrazine. For all parent compounds, as well as atrazine and metribuzin degradates, data back to 2000 was utilized for looking at trends in pesticide levels in groundwater. Degradate data for the other four chemicals is available dating back to 2002, when degradate analysis began for these analytes.

2.2.1. Acetochlor results

Figure 6 shows the distribution of sites where acetochlor and its degradates were detected in 2009 sampling. Summary information on groundwater monitoring results for acetochlor is located in Table 7 and Figure 7. Acetochlor ESA is the most common form of acetochlor detected (see Table 8 and Figure 7) and is the principal factor when analyzing acetochlor impacts to groundwater. Acetochlor was first registered for use in 1994, although it was unlikely to have been applied to crop land before April 1995. Acetochlor or its degradates have been found in every PMR tested, although the median concentration has remained at near non-detectable levels through all the years represented in Table 7. In PMR 4, median, 75thpercentile, and 90th percentile concentrations of acetochlor and its degradates have remained relatively constant over the time period of interest (Figure 8). The concentration of acetochlor and its degradate compounds was analyzed statistically using a Mann-Kendall test for trend which found no overall statistically significant trend. Acetochlor or its degradates have been detected in over 35 percent of samples in a single year, although detection frequencies for each form of acetochlor shows a general decline from 2002 through 2009 (Figure 8). Upon graphical inspection of results for acetochlor ESA detection frequencies, there is an obvious downward trend. Analysis of the apparent trend in acetochlor ESA detection frequencies over time indicates the decrease is statistically significant. Trend test results for concentration and detection frequency can be found in Appendix A3-1.

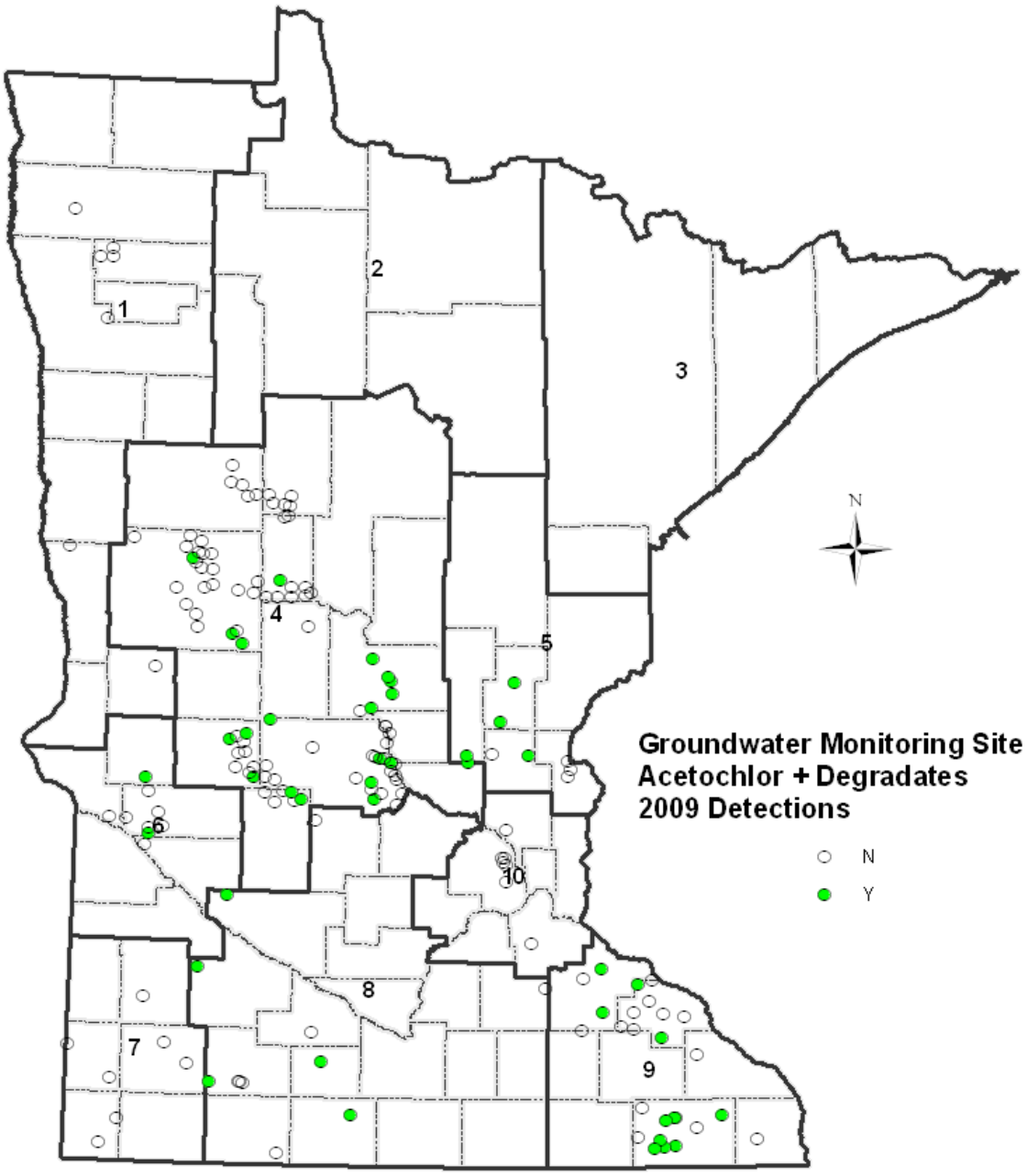


Figure 6. Pesticide Monitoring Regions and groundwater monitoring sites with acetochlor or acetochlor degradate detections in 2009.

Table 7. MDA analytical results 2004 through 2009 in groundwater for acetochlor and its degradates.

	Median (µg/L)						75th Percentile (µg/L)						90th Percentile (µg/L)						Maximum (µg/L)					
PMR 1	**04**	**05**	**06**	**07**	**08**	**09**	**04**	**05**	**06**	**07**	**08**	**09**	**04**	**05**	**06**	**07**	**08**	**09**	**04**	**05**	**06**	**07**	**08**	**09**
Acetochlor	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd
Aceto. ESA	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd
Aceto. OXA	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd
PMR 4																								
Acetochlor	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	P	nd	0.14	nd	nd	nd
Aceto. ESA	nd	nd	nd	nd	nd	nd	0.04	0.1	nd	nd	nd	nd	0.73	0.65	0.60	1.12	0.32	0.57	5.97	16.4	26.5	8.68	8.29	5.62
Aceto. OXA	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	1.12	7.89	2.21	2.23	0.28	1.24
PMR 5																								
Acetochlor	-	-	-	nd	nd	nd	-	-	-	nd	nd	nd	-	-	-	nd	nd	nd	-	-	-	nd	nd	nd
Aceto. ESA	-	-	-	0.08	nd	0.24	-	-	-	0.94	0.46	0.63	-	-	-	1.31	1.44	2.09	-	-	-	1.41	1.79	2.98
Aceto. OXA	-	-	-	nd	nd	nd	-	-	-	nd	nd	nd	-	-	-	0.08	nd	nd	-	-	-	0.13	nd	nd
PMR 6																								
Acetochlor	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd
Aceto. ESA	nd	nd	nd	nd	nd	nd	0.16	0.08	nd	nd	nd	0.02	0.21	0.16	nd	0.05	nd	0.12	0.21	0.17	nd	0.09	nd	0.15
Aceto. OXA	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd
PMR 7																								
Acetochlor	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd
Aceto. ESA	nd	nd	nd	nd	nd	nd	0.07	0.05	nd	0.07	0.05	nd	0.09	0.11	nd	0.15	0.09	nd	0.09	0.11	nd	0.17	0.1	nd
Aceto. OXA	nd	0.03	nd	nd	nd	nd	0.05	0.08	nd	nd	nd	nd	0.07	0.09	nd	0.09	nd	nd	0.07	0.09	nd	0.09	nd	nd
PMR 8																								
Acetochlor	-	-	nd	nd	nd	nd	-	-	nd	nd	nd	nd	-	-	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd
Aceto. ESA	-	-	nd	0.07	nd	nd	-	-	nd	0.19	nd	0.12	-	-	nd	0.29	0.08	0.30	nd	nd	nd	0.39	0.09	0.31
Aceto. OXA	-	-	nd	nd	nd	nd	-	-	nd	nd	nd	nd	-	-	nd	0.07	nd	0.02	nd	nd	nd	0.14	nd	0.08
PMR 9																								
Acetochlor	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	P	nd	nd	P	0.46	0.06	0.15
Aceto. ESA	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	0.07	0.07	nd	nd	0.11	0.1	0.11	0.16	nd	nd	0.62	0.28	0.24	0.56
Aceto. OXA	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	0.02	nd	nd	0.66	0.71	0.14	0.31
Urban																								
Acetochlor	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd
Aceto. ESA	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	0.07	nd	nd	nd	nd	0.16	0.27	nd	0.36
Aceto. OXA	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd

Table 8. Total number of detections and detection frequencies in groundwater samples for acetochlor and its degradates, 2004-2009 by PMR.

	Detections						Percent Detections					
PMR 1	**04**	**05**	**06**	**07**	**08**	**09**	**04**	**05**	**06**	**07**	**08**	**09**
Acetochlor	0/9	0/17	0/9	0/8	0/8	0/7	0%	0%	0%	0%	0%	0%
Acetochlor ESA	0/9	0/17	0/9	0/8	0/8	0/7	0%	0%	0%	0%	0%	0%
Acetochlor OXA	0/9	0/17	0/9	0/8	0/8	0/7	0%	0%	0%	0%	0%	0%
Acetochlor + Degradates	0/9	0/17	0/9	0/8	0/8	0/7	0%	0%	0%	0%	0%	0%
PMR 4												
Acetochlor	4/108	0/113	1/112	0/110	0/84	0/84	4%	0%	1%	0%	0%	0%
Acetochlor ESA	27/108	33/113	24/113	25/111	14/84	18/84	25%	29%	21%	23%	17%	21%
Acetochlor OXA	3/108	3/113	2/113	5/111	2/84	5/84	3%	3%	2%	5%	2%	6%
Acetochlor + Degradates	32/108	34/113	25/112	25/110	14/84	18/84	30%	30%	22%	23%	17%	21%
PMR 5												
Acetochlor	-	-	-	0/9	0/9	0/9	-	-	-	0%	0%	0%
Acetochlor ESA	-	-	-	5/9	4/9	5/9	-	-	-	56%	44%	56%
Acetochlor OXA	-	-	-	1/9	0/9	0/9	-	-	-	11%	0%	0%
Acetochlor + Degradates	-	-	-	5/9	4/9	5/9	-	-	-	56%	44%	56%
PMR 6												
Acetochlor	0/3	0/6	0/9	0/9	0/9	0/9	0%	0%	0%	0%	0%	0%
Acetochlor ESA	1/3	2/6	0/9	1/9	0/9	2/9	33%	33%	0%	11%	0%	22%
Acetochlor OXA	0/3	0/6	0/9	0/9	0/9	0/9	0%	0%	0%	0%	0%	0%
Acetochlor + Degradates	1/3	2/6	0/9	1/9	0/9	2/9	33%	33%	0%	11%	0%	22%
PMR 7												
Acetochlor	0/3	0/4	0/7	0/7	0/7	0/7	0%	0%	0%	0%	0%	0%
Acetochlor ESA	1/3	1/4	0/7	2/7	2/7	0/7	33%	25%	0%	29%	29%	0%
Acetochlor OXA	1/3	2/4	0/7	1/7	0/7	0/7	33%	50%	0%	14%	0%	0%
Acetochlor + Degradates	1/3	2/4	0/7	2/7	2/7	0/7	33%	50%	0%	29%	29%	0%
PMR 8												
Acetochlor	0/1	0/1	0/9	0/10	0/12	0/12	0%	0%	0%	0%	0%	0%
Acetochlor ESA	0/1	0/1	0/9	5/10	2/12	5/12	0%	0%	0%	50%	17%	42%
Acetochlor OXA	0/1	0/1	0/9	1/10	0/12	1/12	0%	0%	0%	10%	0%	8%
Acetochlor + Degradates	0/1	0/1	0/9	5/10	2/12	5/12	0%	0%	0%	50%	17%	42%
PMR 9												
Acetochlor	0/72	0/63	2/40	2/55	4/46	8/62	0%	0%	5%	4%	9%	13%
Acetochlor ESA	0/72	0/64	6/40	9/55	12/46	17/62	0%	0%	15%	16%	26%	27%
Acetochlor OXA	0/72	0/64	3/40	1/55	3/46	6/62	0%	0%	7%	2%	7%	10%
Acetochlor + Degradates	0/71	0/63	6/40	10/55	13/46	17/62	0%	0%	15%	18%	28%	31%
Urban												
Acetochlor	0/10	0/22	0/22	0/19	0/17	0/15	0%	0%	0%	0%	0%	0%
Acetochlor ESA	0/10	0/22	1/22	2/19	0/17	1/15	0%	0%	5%	11%	0%	7%
Acetochlor OXA	0/10	0/22	0/22	0/19	0/17	0/15	0%	0%	0%	0%	0%	0%
Acetochlor + Degradates	0/10	0/22	1/22	2/19	0/17	1/15	0%	0%	5%	11%	0%	7%

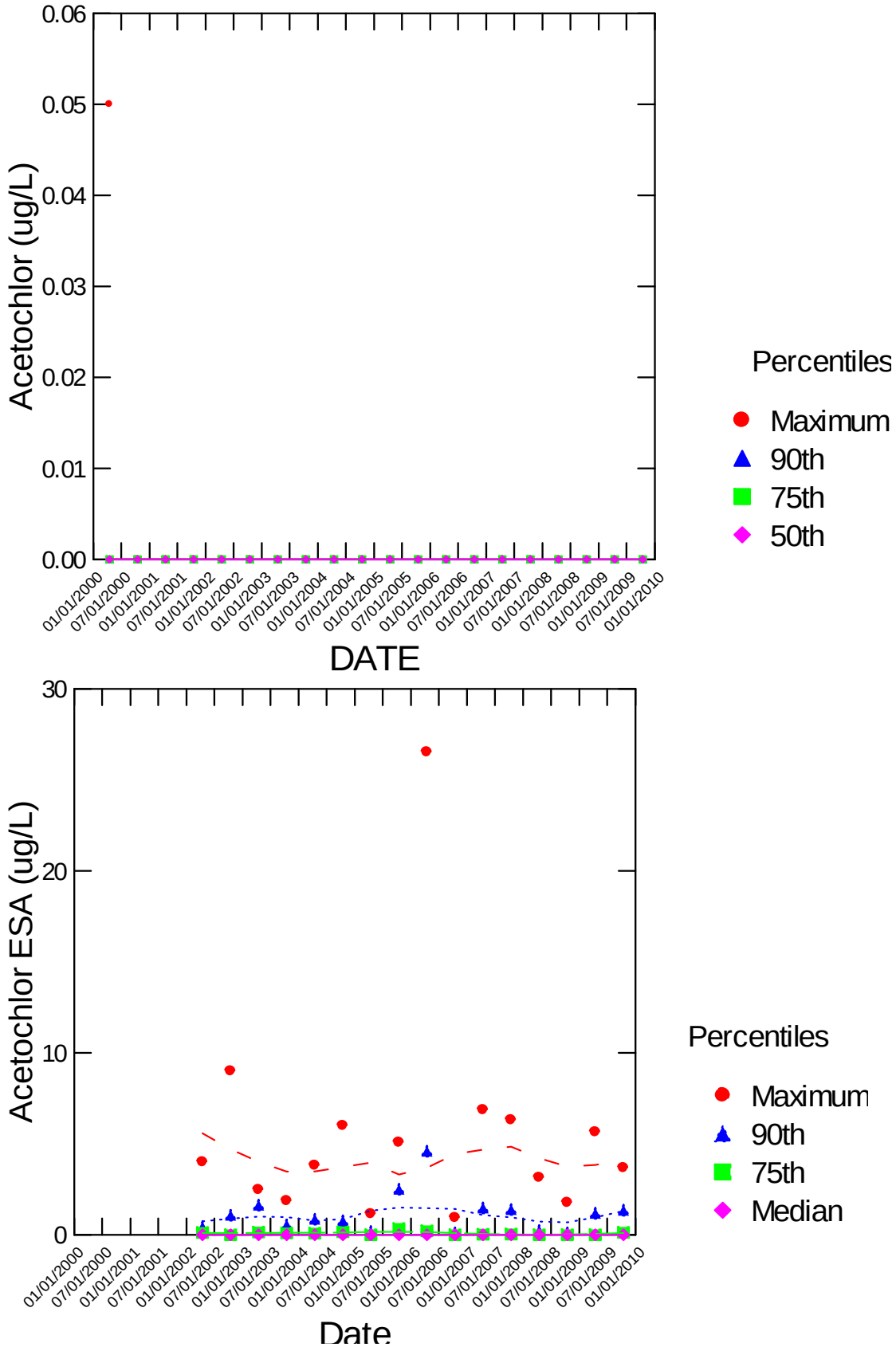


Figure 7. Acetochlor and acetochlor degradate groundwater sample analysis results over time for MDA PMR 4 (please note scale difference on Y- axis). NOTE: Graphics contain only spring and fall quarter results.

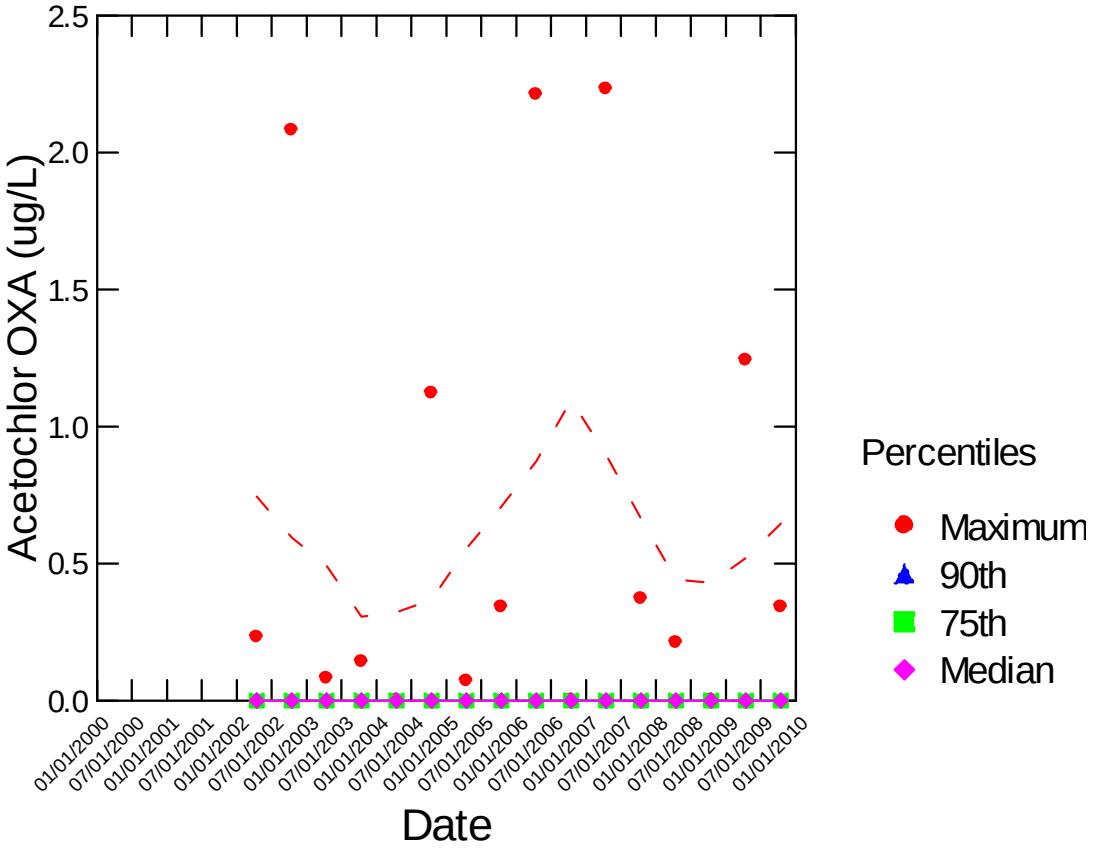


Figure 7 continued. Acetochlor and acetochlor degradate groundwater sample analysis results over time for MDA PMR 4 (please note scale difference on Y- axis) NOTE: Graphics contain only spring and fall quarter results.

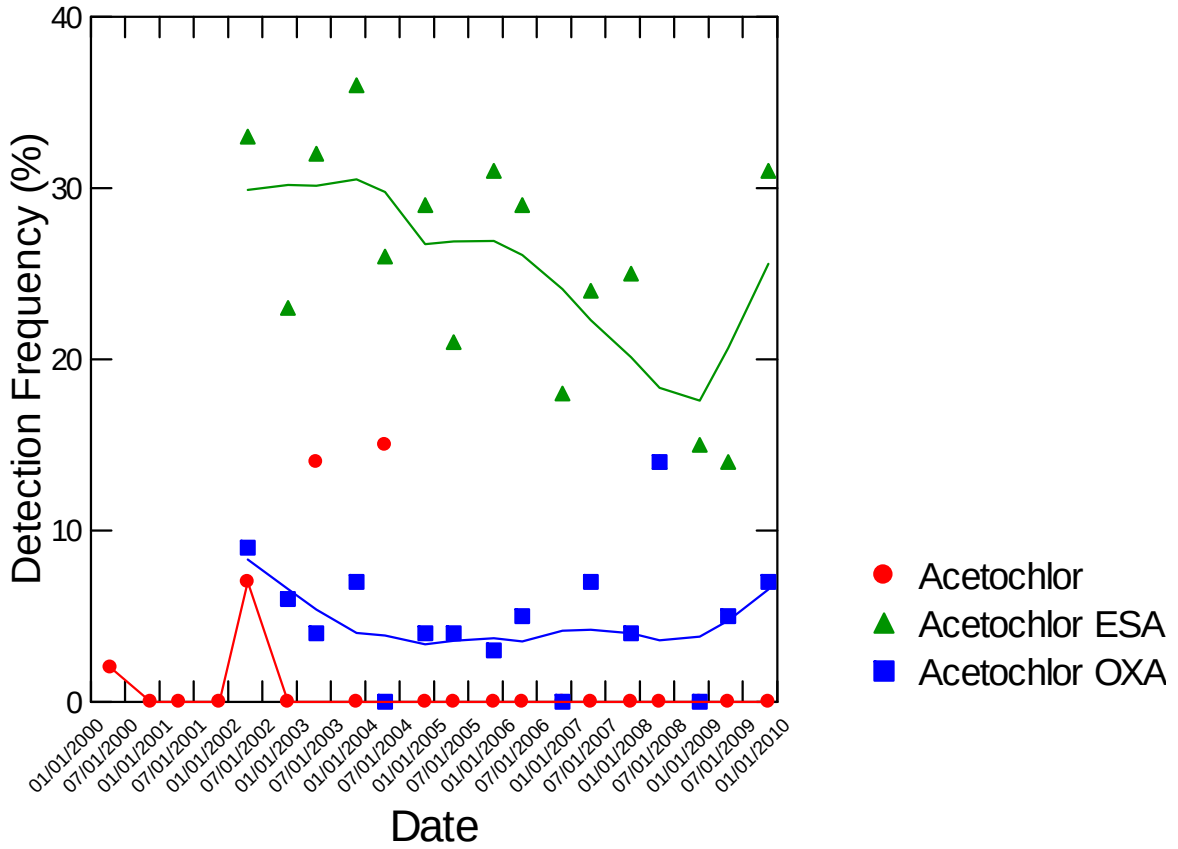


Figure 8. Acetochlor and degradate detection frequency over time for MDA groundwater monitoring in PMR 4. NOTE: Graphics contain only spring and fall quarter results.

2.2.2. Alachlor results

Summary information for alachlor groundwater monitoring results is located in Tables 9 and 10 and Figure 9. Alachlor has been an included analyte in MDA monitoring since 1985. MDA laboratory analysis of degradates (breakdown products) of alachlor began in 2002. Alachlor or its degradates have been found in every sampled PMR except PMR 1, which is characterized by heavier, more clay rich soils than many other locations in the state. The median concentration of alachlor and degradates is normally near non-detectable levels, as evidenced in Table 9. As with acetochlor, the ESA degradate of alachlor is the most frequently occurring form, as found in Table 10, and drives all analyses and conclusions regarding alachlor. Figure 9 shows the distribution of sites where alachlor or its degradates was detected in 2009 sampling. In monitoring PMR 4, detectable levels for alachlor and its degradates have been generally declining in magnitude since 2002 (Figure 10). The decline in concentration for alachlor ESA was analyzed using the Mann-Kendall test for trend which found statistically significant downward trends for the 75th percentile, 90th percentile and maximum concentrations. Detection frequencies of alachlor or its degradates in PMR 4 have also shown a statistically significant decrease over time (Figure 11). Trend test results for concentration and detection frequency can be found in Appendix A3-2.

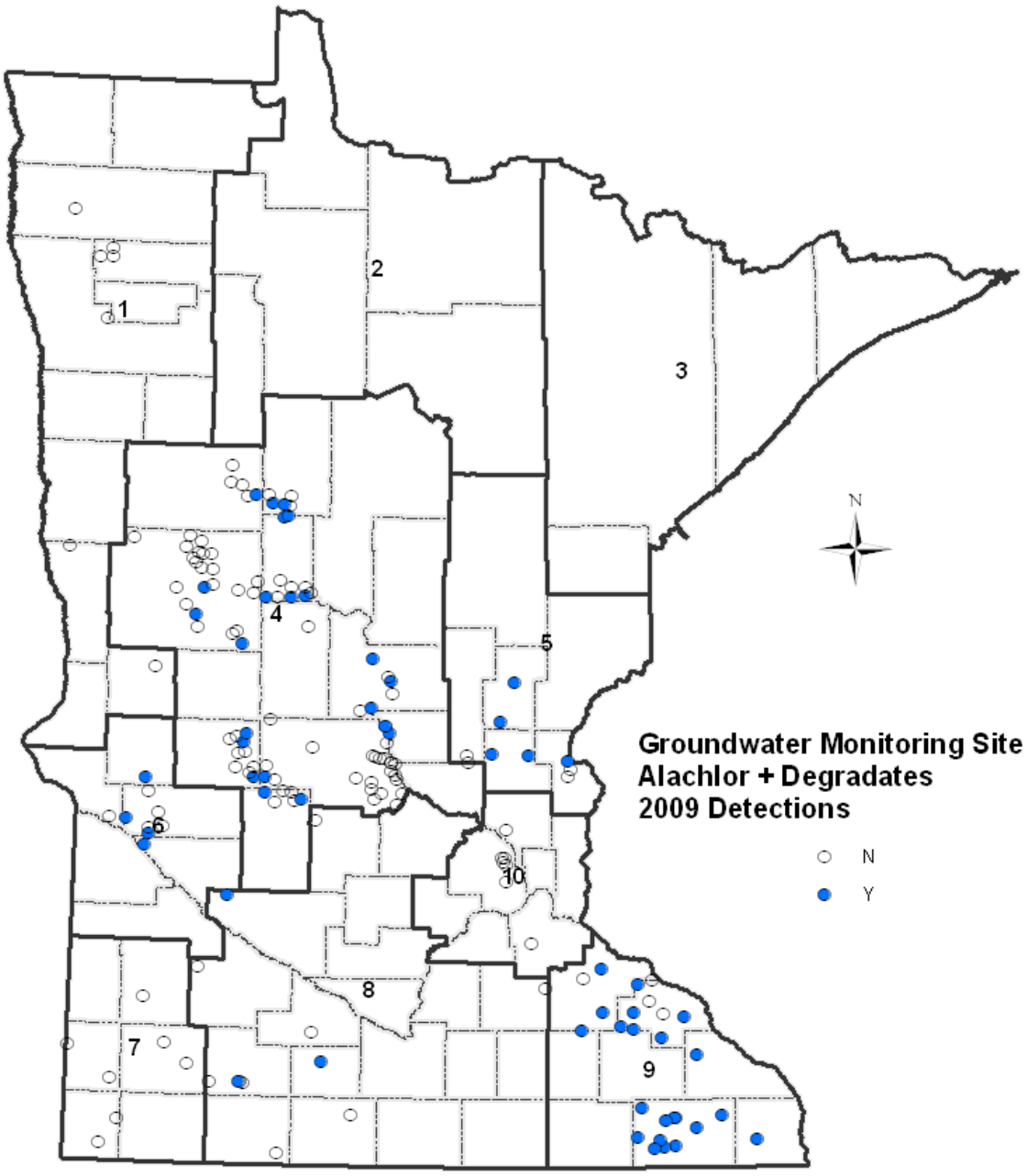


Figure 9. Pesticide Monitoring Regions and groundwater monitoring sites with alachlor or alachlor degradate detections in 2009.

Table 9. MDA analytical results 2004 through 2009 in groundwater for alachlor and its degradates.

	Median (µg/L)						75th Percentile (µg/L)						90th Percentile (µg/L)						Maximum (µg/L)					
PMR 1	**04**	**05**	**06**	**07**	**08**	**09**	**04**	**05**	**06**	**07**	**08**	**09**	**04**	**05**	**06**	**07**	**08**	**09**	**04**	**05**	**06**	**07**	**08**	**09**
Alachlor	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd
Alachlor ESA	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd
Alachlor OXA	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd
PMR 4																								
Alachlor	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd
Alachlor ESA	0.10	nd	nd	nd	nd	nd	0.68	0.27	0.20	0.19	0.15	0.03	1.90	1.23	0.77	0.65	0.46	0.27	8.93	4.26	4.55	6.74	2.33	2.16
Alachlor OXA	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	1.55	1.20	1.50	1.05	0.82	0.91
PMR 5																								
Alachlor	-	-	-	nd	nd	nd	-	-	-	nd	nd	nd	-	-	-	nd	nd	nd	-	-	-	nd	nd	nd
Alachlor ESA	-	-	-	0.13	nd	0.07	-	-	-	1.01	1.03	1.24	-	-	-	7.44	7.25	6.97	-	-	-	10.4	10.2	9.24
Alachlor OXA	-	-	-	nd	nd	nd	-	-	-	nd	nd	nd	-	-	-	0.23	0.16	0.30	-	-	-	0.38	0.27	0.50
PMR 6																								
Alachlor	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd
Alachlor ESA	0.21	0.14	nd	nd	nd	nd	0.88	0.75	nd	0.26	0.16	0.16	1.11	0.88	nd	1.46	0.92	1.23	1.11	0.90	nd	1.97	1.31	1.79
Alachlor OXA	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd
PMR 7																								
Alachlor	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd
Alachlor ESA	nd	0.03	nd	nd	nd	nd	0.07	0.08	nd	nd	nd	nd	0.10	0.10	nd	0.07	nd	nd	0.10	0.10	nd	0.09	nd	nd
Alachlor OXA	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd
PMR 8																								
Alachlor	-	-	nd	nd	nd	nd	-	-	nd	nd	nd	nd	-	-	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd
Alachlor ESA	-	-	nd	nd	nd	nd	-	-	nd	0.10	0.14	0.11	-	-	nd	0.85	0.55	0.78	0.98	0.38	nd	1.29	0.78	1.03
Alachlor OXA	-	-	nd	nd	nd	nd	-	-	nd	nd	nd	nd	-	-	nd	0.05	nd	nd	nd	nd	nd	0.10	nd	nd
PMR 9																								
Alachlor	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd
Alachlor ESA	0.13	0.10	0.13	0.20	0.24	0.19	0.21	0.14	0.40	0.43	0.45	0.42	0.25	0.17	0.61	0.62	0.55	0.69	0.29	0.24	0.78	0.77	0.71	1.93
Alachlor OXA	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	0.73	nd	0.11
Urban																								
Alachlor	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd
Alachlor ESA	nd	nd	0.13	nd	nd	nd	nd	nd	0.40	nd	nd	nd	nd	nd	0.61	0.22	0.32	nd	nd	0.44	0.78	2.16	1.31	0.13
Alachlor OXA	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	0.15	nd	0.29	0.13	nd

Table 10. Total number of detections and detection frequencies in groundwater samples for alachlor and its degradates, 2004-2009 by PMR.

	Detections						Percent Detections					
PMR 1	**04**	**05**	**06**	**07**	**08**	**09**	**04**	**05**	**06**	**07**	**08**	**09**
Alachlor	0/9	0/17	0/9	0/8	0/8	0/7	0%	0%	0%	0%	0%	0%
Alachlor ESA	0/9	0/17	0/9	0/8	0/8	0/7	0%	0%	0%	0%	0%	0%
Alachlor OXA	0/9	0/17	0/9	0/8	0/8	0/7	0%	0%	0%	0%	0%	0%
Alachlor + Degradates	0/9	0/17	0/9	0/8	0/8	0/7	0%	0%	0%	0%	0%	0%
PMR 4												
Alachlor	0/108	0/113	0/112	0/110	0/84	0/84	0%	0%	0%	0%	0%	0%
Alachlor ESA	55/108	50/113	47/113	44/111	26/84	21/84	51%	44%	42%	40%	31%	25%
Alachlor OXA	8/108	7/113	5/113	7/111	3/84	3/84	7%	6%	5%	6%	6%	6%
Alachlor + Degradates	56/108	50/113	47/112	44/110	26/84	21/84	52%	44%	42%	40%	31%	25%
PMR 5												
Alachlor	-	-	-	0/9	0/9	0/9	-	-	-	0%	0%	0%
Alachlor ESA	-	-	-	5/9	4/9	5/9	-	-	-	56%	44%	56%
Alachlor OXA	-	-	-	1/9	1/9	1/9	-	-	-	11%	11%	11%
Alachlor + Degradates	-	-	-	5/9	4/9	5/9	-	-	-	56%	44%	56%
PMR 6												
Alachlor	0/3	0/6	0/9	0/9	0/9	0/9	0%	0%	0%	0%	0%	0%
Alachlor ESA	3/3	6/6	0/9	4/9	3/9	4/9	100%	100%	0%	44%	33%	44%
Alachlor OXA	0/3	0/6	0/9	0/9	0/9	0/9	0%	0%	0%	0%	0%	0%
Alachlor + Degradates	3/3	6/6	0/9	4/9	3/9	4/9	100%	100%	0%	44%	33%	44%
PMR 7												
Alachlor	0/3	0/4	0/7	0/7	0/7	0/7	0%	0%	0%	0%	0%	0%
Alachlor ESA	1/3	2/4	0/7	1/7	0/7	0/7	33%	50%	0%	14%	0%	0%
Alachlor OXA	0/3	0/4	0/7	0/7	0/7	0/7	0%	0%	0%	0%	0%	0%
Alachlor + Degradates	1/3	2/4	0/7	1/7	0/7	0/7	33%	50%	0%	14%	0%	0%
PMR 8												
Alachlor	0/1	0/1	0/9	0/10	0/12	0/12	0%	0%	0%	0%	0%	0%
Alachlor ESA	1/1	1/1	0/9	4/10	3/12	3/12	100%	100%	0%	40%	25%	25%
Alachlor OXA	0/1	0/1	0/9	1/10	0/12	0/12	0%	0%	0%	10%	0%	0%
Alachlor + Degradates	1/1	1/1	0/9	4/10	3/12	3/12	100%	100%	0%	40%	25%	25%
PMR 9												
Alachlor	0/72	0/63	0/40	0/55	0/46	0/62	0%	0%	0%	0%	0%	0%
Alachlor ESA	59/72	52/64	23/40	46/55	45/46	56/62	82%	81%	57%	84%	98%	90%
Alachlor OXA	0/72	0/64	0/40	1/55	0/46	1/62	0%	0%	0%	2%	0%	2%
Alachlor + Degradates	58/71	51/63	23/40	46/55	45/46	56/62	82%	81%	57%	84%	98%	90%
Urban												
Alachlor	0/10	0/22	0/22	0/19	0/17	0/15	0%	0%	0%	0%	0%	0%
Alachlor ESA	0/10	1/22	2/22	2/19	3/17	1/15	0%	5%	9%	11%	18%	7%
Alachlor OXA	0/10	1/22	0/22	1/19	1/17	0/15	0%	5%	0%	5%	6%	0%
Alachlor + Degradates	0/10	1/22	2/22	2/19	3/17	1/15	0%	5%	9%	11%	18%	7%

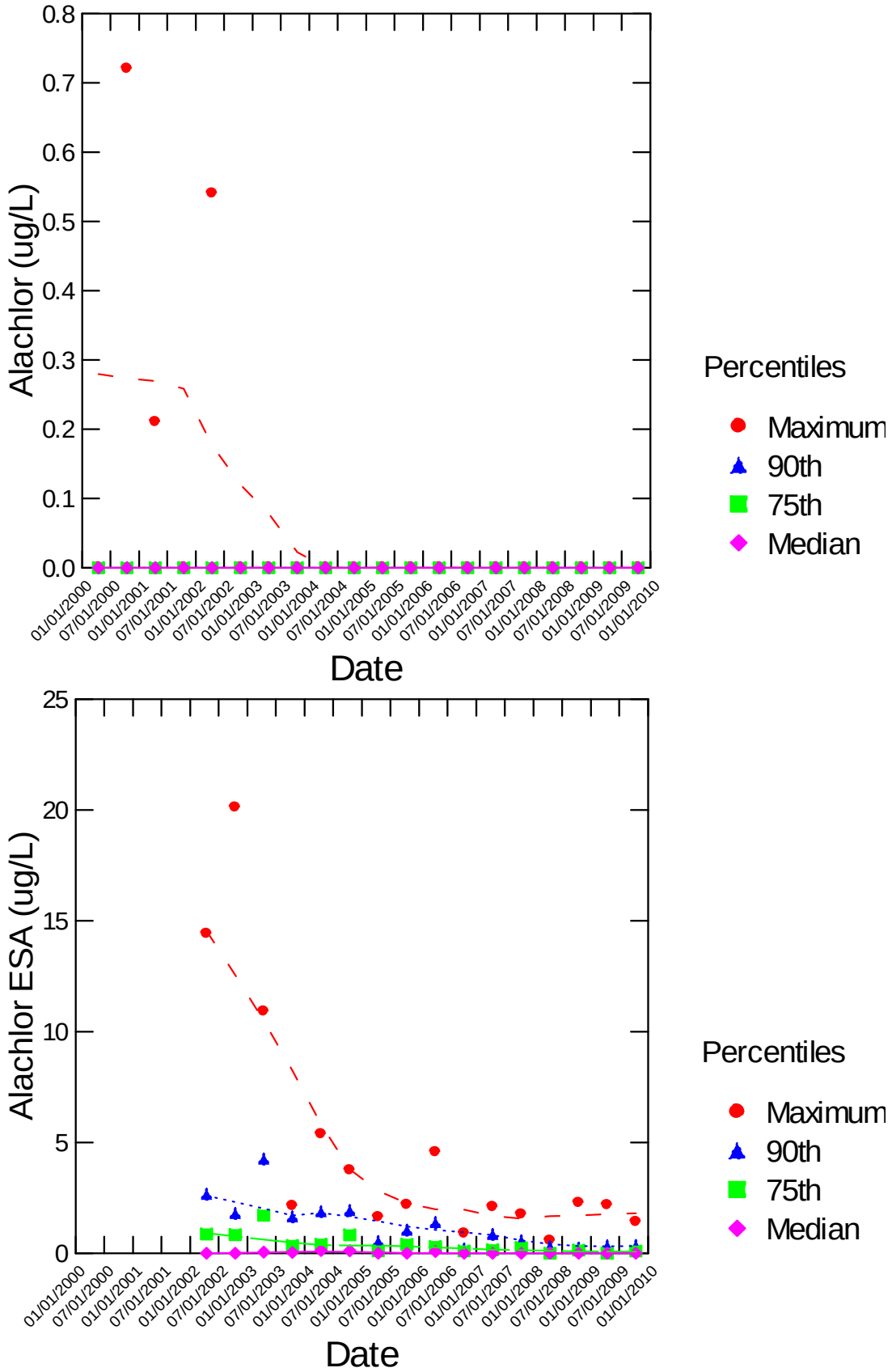


Figure 10. Alachlor and alachlor degradate groundwater sample analysis results over time for MDA PMR 4 (please note scale difference on Y- axis). NOTE: Graphics contain only spring and fall quarter results.

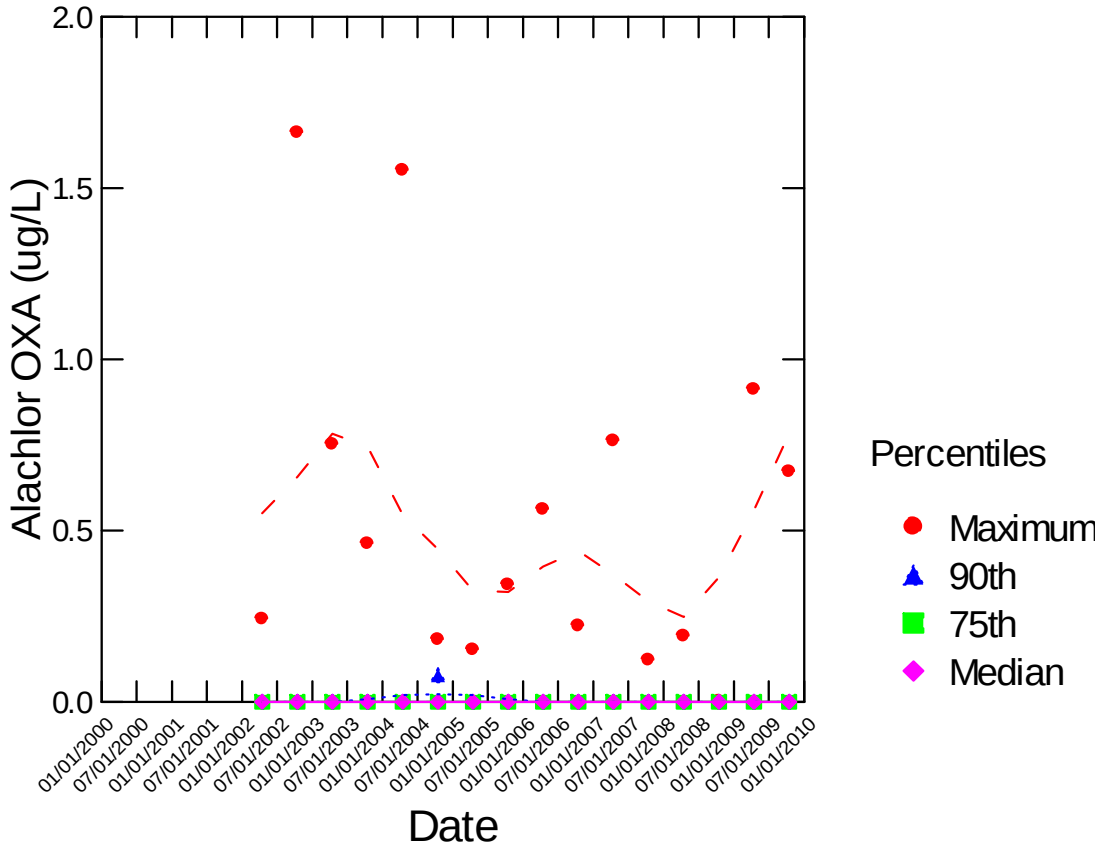


Figure 10 continued. Alachlor and alachlor degradate groundwater sample analysis results over time for MDA PMR 4 (please note scale difference on Y- axis). NOTE: Graphics contain only spring and fall quarter results.

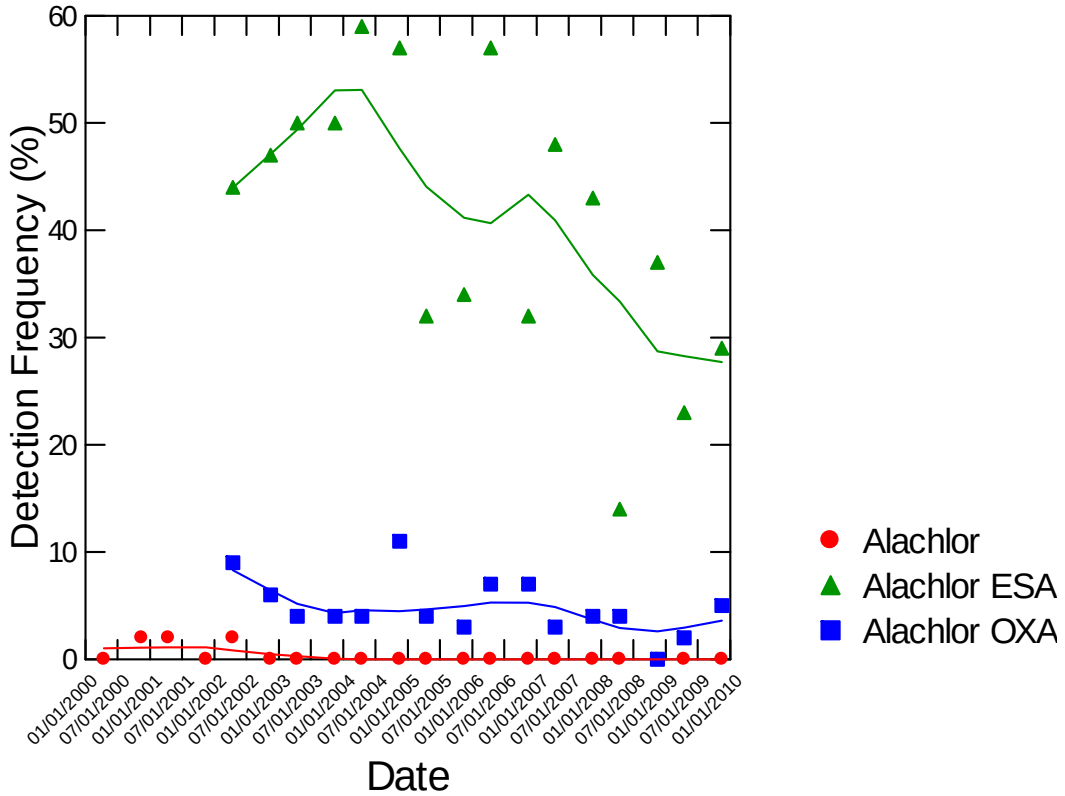


Figure 11. Alachlor and its degradates detection frequencies over time for MDA groundwater monitoring in PMR 4. NOTE: Graphics contain only spring and fall quarter results.

2.2.3. Atrazine results

Summary information for atrazine groundwater monitoring results is located in Tables 11 and 12 and Figure 12. Atrazine has been detected more frequently over more years and across more locations, including differing land uses, than any other single pesticide (Table 12). Figure 12 shows the distribution of sites where atrazine or degradates was detected in 2009 sampling. The deethylatrazine degradate is the most frequently occurring atrazine species (Table 11), although not to the same level as the ESA degradates of the acetanilide pesticides. As seen in Figure 13, the PMR 4 concentrations of atrazine and its degradates, at all percentiles, is declining. The decline in concentration for atrazine plus its degradate compounds was analyzed statistically using a Mann-Kendall test for trend which found a statistically significant downward trend. Detection frequencies for atrazine and deethylatrazine in PMR 4 (Figure 14) are relatively high and display a small, but statistically significant, increase over time, which is directly opposite of the trend in concentration over time. Deisopropylatrazine detection frequencies (Figure 14) show a slight, although statistically significant, decline over time, similar to the concentration trend.

Atrazine data from PMR 9 is of sufficient quantity to evaluate trends in the data collected. Extrapolating the available PMR 9 data to general conditions is problematic, however, due to the small number of sample locations. The available data for PMR 9 shows decreasing trends that are statistically significant for atrazine plus its degradates (Figure 15). All trend test results for concentration and detection frequency can be found in Appendix A3-3.

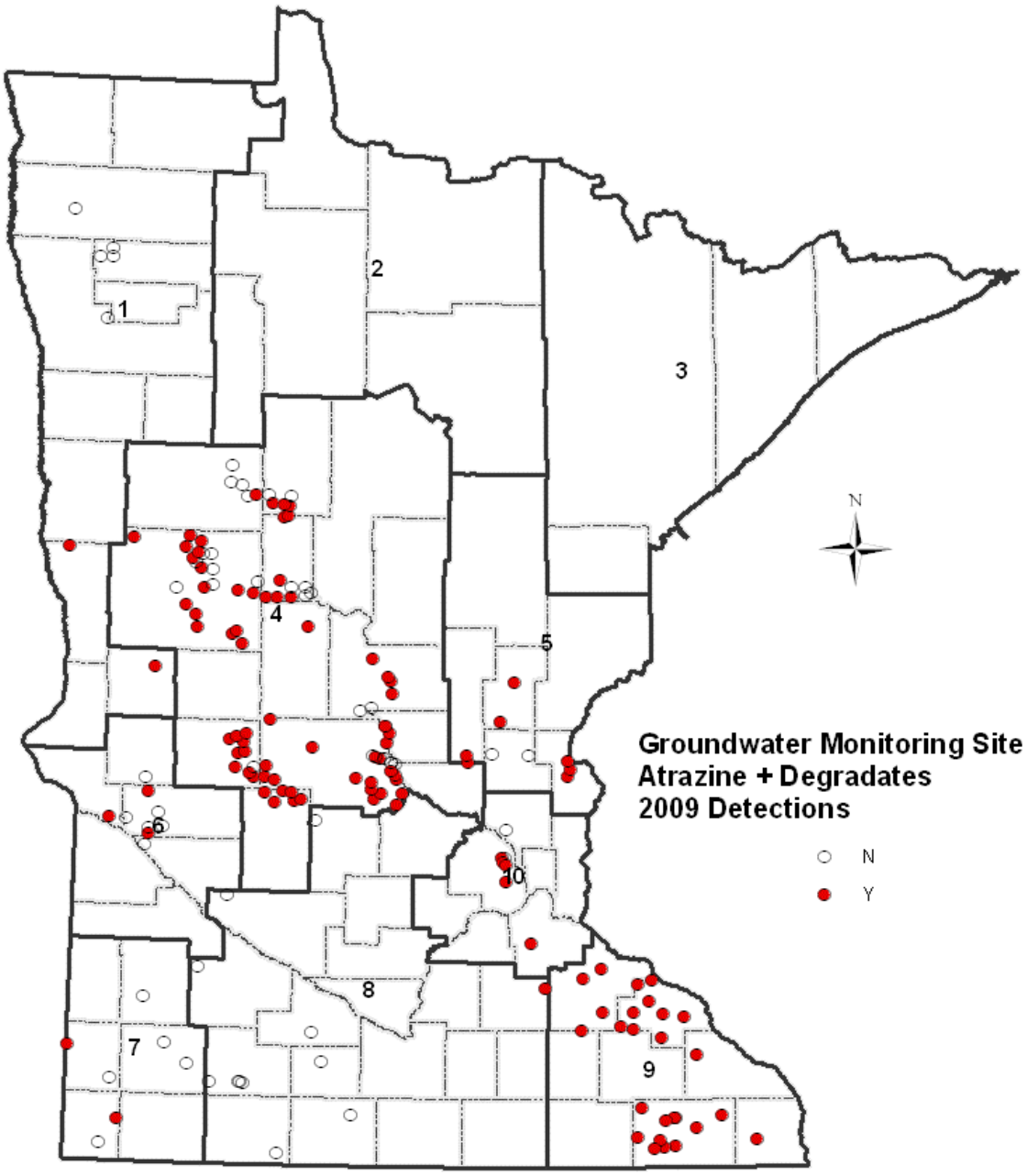


Figure 12. Pesticide Monitoring Regions and groundwater monitoring sites with atrazine or atrazine degradate detections in 2009.

Table 11. MDA analytical results 2004 through 2009 in groundwater for atrazine and its degradates.

	Median (µg/L)						75th Percentile (µg/L)						90th Percentile (µg/L)						Maximum (µg/L)					
PMR 1	**04**	**05**	**06**	**07**	**08**	**09**	**04**	**05**	**06**	**07**	**08**	**09**	**04**	**05**	**06**	**07**	**08**	**09**	**04**	**05**	**06**	**07**	**08**	**09**
Atrazine	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	P	P	nd	nd	0.13	0.14	0.11	P	nd	nd	0.18	0.20	0.14
Deethylatrazine	nd	nd	nd	nd	nd	nd	nd	nd	nd	0.03	P	P	P	P	nd	0.15	0.48	0.13	P	0.06	nd	0.18	0.69	0.16
Deisopropylatrazine	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	P	P	nd	nd	nd	nd	P	P	nd
Atrazine + degs	nd	nd	nd	nd	nd	nd	nd	nd	nd	0.03	P	P	P	P	nd	0.27	0.62	0.24	P	0.06	nd	0.36	0.89	0.30
PMR 4																								
Atrazine	P	P	P	P	nd	P	P	P	P	P	P	P	0.08	0.05	0.05	0.05	P	P	0.26	0.32	0.18	0.17	0.18	0.20
Deethylatrazine	0.07	0.06	P	0.05	P	P	0.12	0.09	0.08	0.08	0.05	0.05	0.21	0.15	0.12	0.11	0.08	0.07	0.63	0.42	0.37	0.42	0.22	0.33
Deisopropylatrazine	nd	nd	nd	nd	nd	nd	P	P	nd	nd	P	nd	0.20	P	P	P	P	P	1.43	0.72	0.42	0.53	0.28	0.36
Atrazine + degs	0.07	0.06	P	0.05	P	P	0.15	0.10	0.09	0.08	0.06	0.05	0.42	0.18	0.16	0.18	0.09	0.08	2.32	1.17	0.91	1.11	0.65	0.89
PMR 5																								
Atrazine	-	-	-	nd	nd	nd	-	-	-	0.05	0.01	0.01	-	-	-	0.11	0.07	0.05	-	-	-	0.14	0.09	0.05
Deethylatrazine	-	-	-	.07	P	P	-	-	-	0.13	0.04	0.08	-	-	-	0.17	0.18	0.20	-	-	-	0.17	0.20	0.26
Deisopropylatrazine	-	-	-	nd	nd	nd	-	-	-	nd	nd	nd	-	-	-	nd	P	P	-	-	-	nd	P	P
Atrazine + degs	-	-	-	.07	P	P	-	-	-	0.19	0.12	0.11	-	-	-	0.23	0.20	0.21	-	-	-	0.23	0.20	0.26
PMR 6																								
Atrazine	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	P	P	P	P	nd	nd	P	P	P	P
Deethylatrazine	nd	nd	nd	nd	nd	nd	P	nd	0.02	0.05	P	P	P	nd	0.08	0.08	P	P	P	nd	0.08	0.09	P	P
Deisopropylatrazine	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd
Atrazine + degs	nd	nd	nd	nd	nd	nd	P	nd	0.02	0.05	P	P	P	nd	0.08	0.08	P	P	P	nd	0.08	0.09	P	P
PMR 7																								
Atrazine	nd	nd	nd	nd	nd	nd	nd	nd	nd	P	P	P	nd	nd	P	0.05	0.24	0.04	nd	nd	P	0.06	0.30	0.05
Deethylatrazine	nd	nd	nd	nd	nd	nd	nd	nd	nd	0.06	P	P	nd	nd	0.09	0.12	0.07	0.06	nd	nd	0.11	0.13	0.09	0.07
Deisopropylatrazine	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	P	P	nd	nd	nd	nd	P	P	nd
Atrazine + degs	nd	nd	nd	nd	nd	nd	nd	nd	nd	0.06	P	P	nd	nd	0.09	0.17	0.31	0.10	nd	nd	0.11	0.19	0.39	0.12
PMR 8																								
Atrazine	-	-	nd	nd	nd	nd	-	-	nd	nd	nd	nd	-	-	P	P	nd	nd	nd	nd	P	P	P	P
Deethylatrazine	-	-	nd	nd	nd	nd	-	-	nd	0.06	nd	nd	-	-	0.04	0.06	P	0.02	nd	nd	0.06	0.06	P	0.08
Deisopropylatrazine	-	-	nd	nd	nd	nd	-	-	nd	nd	nd	nd	-	-	nd	nd	nd	nd	nd	nd	nd	nd	P	nd
Atrazine + degs	-	-	nd	nd	nd	nd	-	-	nd	0.06	nd	nd	-	-	0.04	0.06	P	0.02	nd	nd	0.06	0.06	P	0.08
PMR 9																								
Atrazine	0.06	.05	P	.05	0.02	0.05	0.08	0.07	0.08	0.08	0.07	0.09	0.10	0.08	0.10	0.11	0.09	0.13	0.14	0.10	0.26	0.13	0.19	1.10
Deethylatrazine	0.10	0.09	0.10	0.10	0.08	0.08	0.12	0.10	0.13	0.12	0.09	0.10	0.15	0.11	0.14	0.13	0.11	0.13	0.18	0.13	0.15	0.15	0.12	0.50
Deisopropylatrazine	nd	nd	nd	P	nd	nd	nd	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P
Atrazine + degs	0.17	0.13	0.12	0.15	0.11	0.11	0.20	0.16	0.19	0.21	0.17	0.19	0.24	0.18	0.24	0.24	0.19	0.25	0.26	0.21	0.40	0.26	0.28	1.24
Urban																								
Atrazine	nd	nd	nd	nd	nd	nd	nd	nd	nd	P	nd	nd	nd	nd	P	0.04	P	P	nd	P	0.08	0.23	0.16	0.05
Deethylatrazine	nd	nd	nd	P	nd	P	nd	P	0.05	P	P	P	nd	0.02	0.06	0.12	P	0.05	nd	0.08	0.10	0.17	0.09	0.09
Deisopropylatrazine	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	P	P	P	nd
Atrazine + degs	nd	nd	nd	P	nd	P	nd	P	0.05	P	P	P	nd	0.02	0.06	0.14	P	0.05	nd	0.08	0.18	0.40	0.25	0.14

Table 12. Total number of detections and detection frequencies in groundwater samples for atrazine and its degradates, 2004-2009 by PMR.

	Detections						Percent Detections					
PMR 1	**04**	**05**	**06**	**07**	**08**	**09**	**04**	**05**	**06**	**07**	**08**	**09**
Atrazine	1/9	0/17	0/9	2/8	2/8	2/7	11%	0%	0%	25%	25%	29%
Deethylatrazine	1/9	2/17	0/9	2/8	3/8	2/7	11%	12%	0%	25%	37%	29%
Deisopropylatrazine	0/9	0/17	0/9	1/8	1/8	0/7	0%	0%	0%	13%	13%	0%
Atrazine + degradates	1/9	2/17	0/9	2/8	3/8	2/7	11%	12%	0%	25%	37%	29%
PMR 4												
Atrazine	55/108	58/113	62/112	66/110	42/84	45/84	51%	51%	55%	60%	50%	54%
Deethylatrazine	89/108	96/113	89/112	90/110	55/84	64/84	82%	85%	79%	82%	66%	76%
Deisopropylatrazine	36/108	32/113	28/112	21/110	23/84	13/84	33%	28%	25%	19%	27%	16%
Atrazine + degradates	91/108	97/113	91/112	90/110	59/84	64/84	84%	86%	81%	82%	70%	76%
PMR 5												
Atrazine	-	-	-	4/9	4/9	4/9	-	-	-	46%	46%	46%
Deethylatrazine	-	-	-	7/9	5/9	7/9	-	-	-	78%	56%	78%
Deisopropylatrazine	-	-	-	0/9	2/9	1/9	-	-	-	0%	22%	11%
Atrazine + degradates	-	-	-	7/9	6/9	7/9	-	-	-	78%	67%	78%
PMR 6												
Atrazine	0/3	0/6	2/9	1/9	2/9	1/9	0%	0%	22%	11%	22%	11%
Deethylatrazine	1/3	0/6	2/9	3/9	3/9	3/9	33%	0%	22%	33%	33%	33%
Deisopropylatrazine	0/3	0/6	0/9	0/9	0/9	0/9	0%	0%	0%	0%	0%	0%
Atrazine + degradates	1/3	0/6	2/9	3/9	3/9	3/9	33%	0%	22%	33%	33%	33%
PMR 7												
Atrazine	0/3	0/4	1/7	2/7	2/7	2/7	0%	0%	14%	29%	29%	29%
Deethylatrazine	0/3	0/4	1/7	3/7	2/7	2/7	0%	0%	14%	43%	29%	29%
Deisopropylatrazine	0/3	0/4	0/7	1/7	1/7	0/7	0%	0%	0%	14%	14%	0%
Atrazine + degradates	0/3	0/4	1/7	3/7	2/7	2/7	0%	0%	14%	43%	29%	29%
PMR 8												
Atrazine	0/1	0/1	1/9	1/10	1/12	1/12	0%	0%	11%	10%	8%	8%
Deethylatrazine	0/1	0/1	2/9	3/10	2/12	1/12	0%	0%	22%	30%	17%	8%
Deisopropylatrazine	0/1	0/1	0/9	0/10	1/12	0/12	0%	0%	0%	0%	8%	0%
Atrazine + degradates	0/1	0/1	2/9	3/10	2/12	1/12	0%	0%	22%	30%	17%	8%
PMR 9												
Atrazine	67/72	61/63	35/40	53/55	23/46	61/62	93%	97%	88%	96%	50%	98%
Deethylatrazine	72/72	63/63	40/40	55/55	42/46	62/62	100%	100%	100%	100%	96%	100%
Deisopropylatrazine	16/72	16/63	18/40	29/55	21/46	29/62	22%	25%	45%	53%	46%	47%
Atrazine + degradates	72/72	63/63	40/40	55/55	46/46	62/62	100%	100%	100%	100%	100%	100%
Urban												
Atrazine	0/10	2/22	4/22	9/19	3/17	3/15	0%	9%	18%	47%	18%	20%
Deethylatrazine	0/10	7/22	10/22	14/19	7/17	8/15	0%	32%	46%	74%	41%	53%
Deisopropylatrazine	0/10	0/22	1/22	1/19	1/17	0/15	0%	0%	4%	5%	6%	0%
Atrazine + degradates	0/10	7/22	10/22	15/19	7/17	8/15	0%	32%	46%	79%	41%	53%

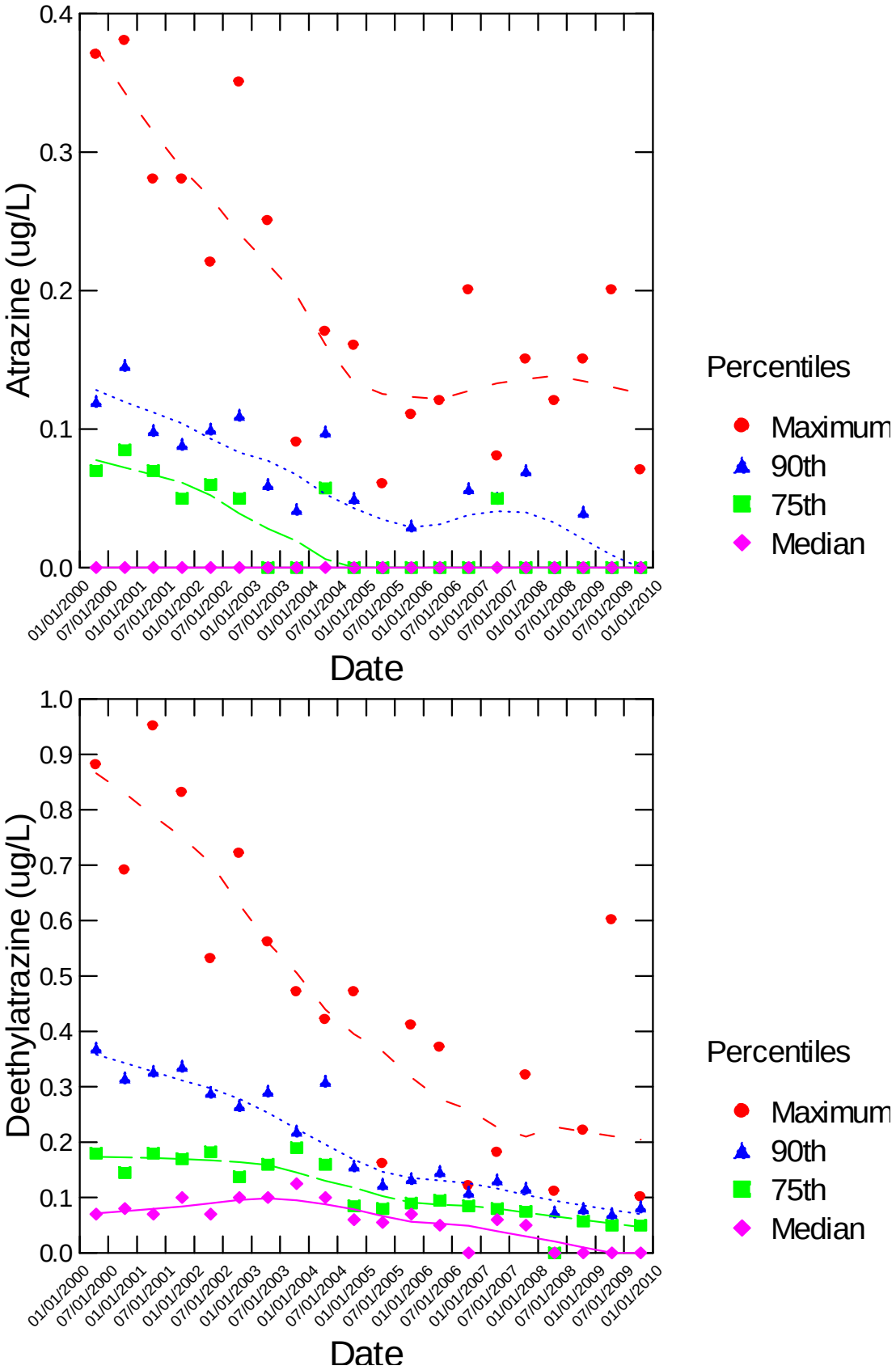


Figure 13. Atrazine and atrazine degradate groundwater sample analysis results over time for MDA PMR 4 (please note scale difference on Y- axis). NOTE: Graphics contain only spring and fall quarter results.

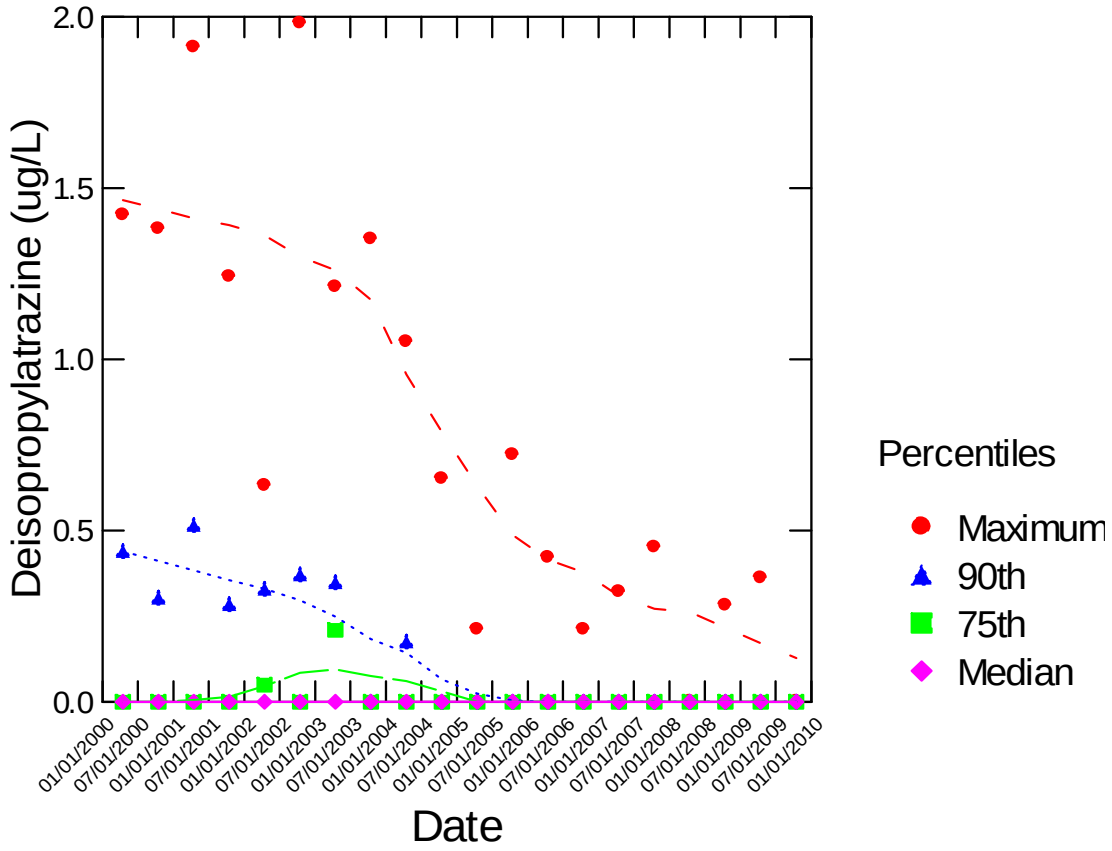


Figure 13 continued. Atrazine and atrazine degradate groundwater sample analysis results over time for MDA PMR 4 (please note scale difference on Y- axis). NOTE: Graphics contain only spring and fall quarter results.

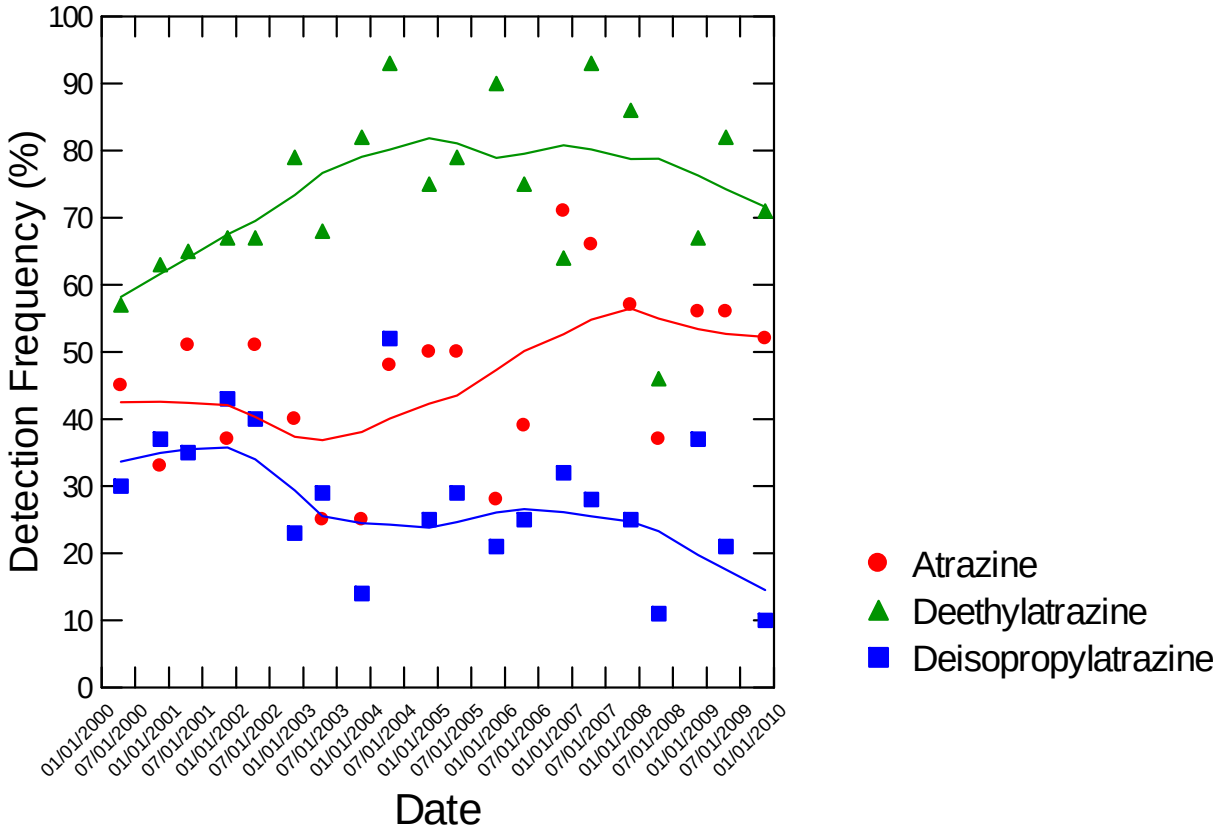


Figure 14. Atrazine and degradates detection frequencies over time for MDA groundwater monitoring MDA PMR 4. NOTE: Graphics contain only spring and fall quarter results.

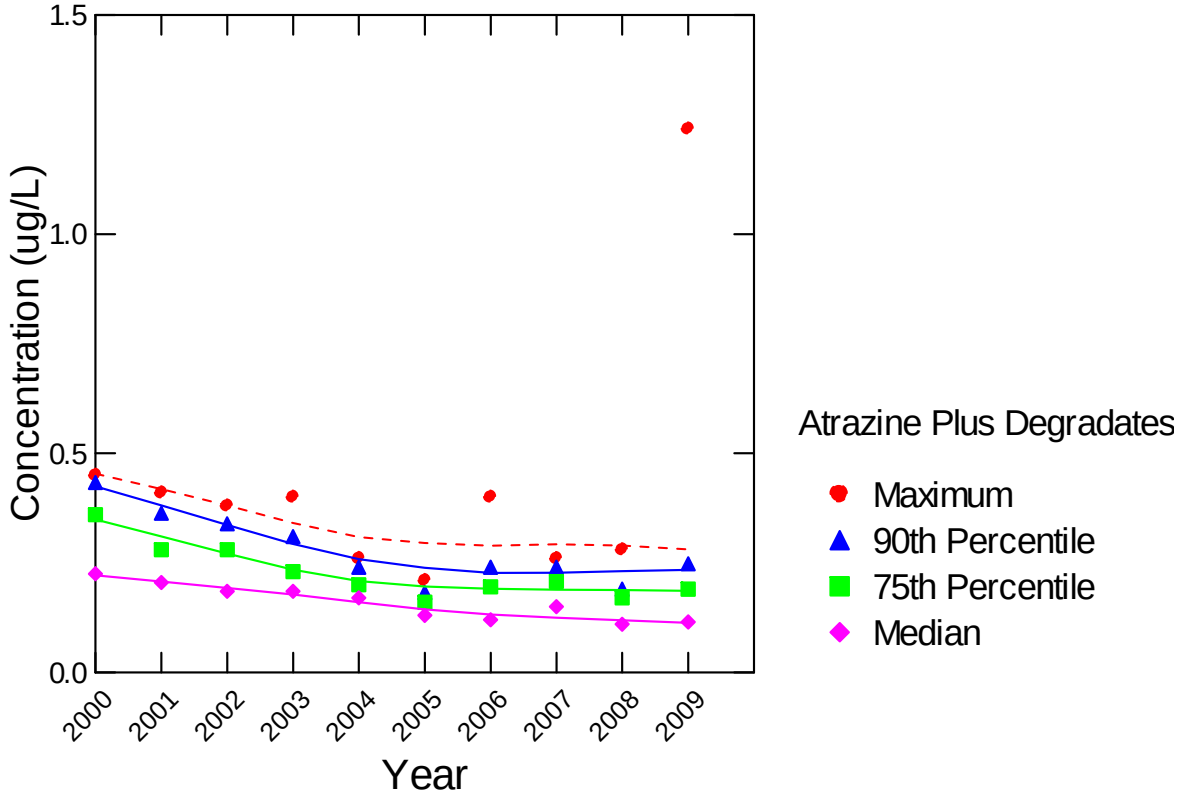


Figure 15. Atrazine and atrazine degradate groundwater sample analysis results over time for MDA PMR 9.

2.2.4. Dimethenamid results

Summary information for dimethenamid groundwater monitoring results is located in Tables 13 and 14 and Figure 16. Dimethenamid is normally detected in less than 10 percent of groundwater samples analyzed (Table 14). Accordingly, percentile concentrations are typically less than detectable levels. Maximum values of dimethenamid have all been less that 1.0 µg /L, with the ESA and OXA degradates showing maximum concentrations significantly higher than the parent compound (Table 13). Figure 16 shows the distribution of sites where dimethenamid or its degradates were detected in 2009 sampling. Graphical representations of dimethenamid results (Figures 17 and 18) display increasing trends in maximum concentrations and detection frequency in PMR 4. Statistical analysis of the dimethenamid plus degradates data indicates the detection frequency trend to be statistically significant with an increasing slope. Concentration trend analysis shows no sign of being statistically significant for the majority of percentiles and forms of dimethenamid. This lack of statistically significant results for concentration trend analysis may be the result of few detections. Trend test results for concentration and detection frequency can be found in Appendix A3-4. Continued monitoring will be needed in order to determine whether concentration trends are present in the dimethenamid data.

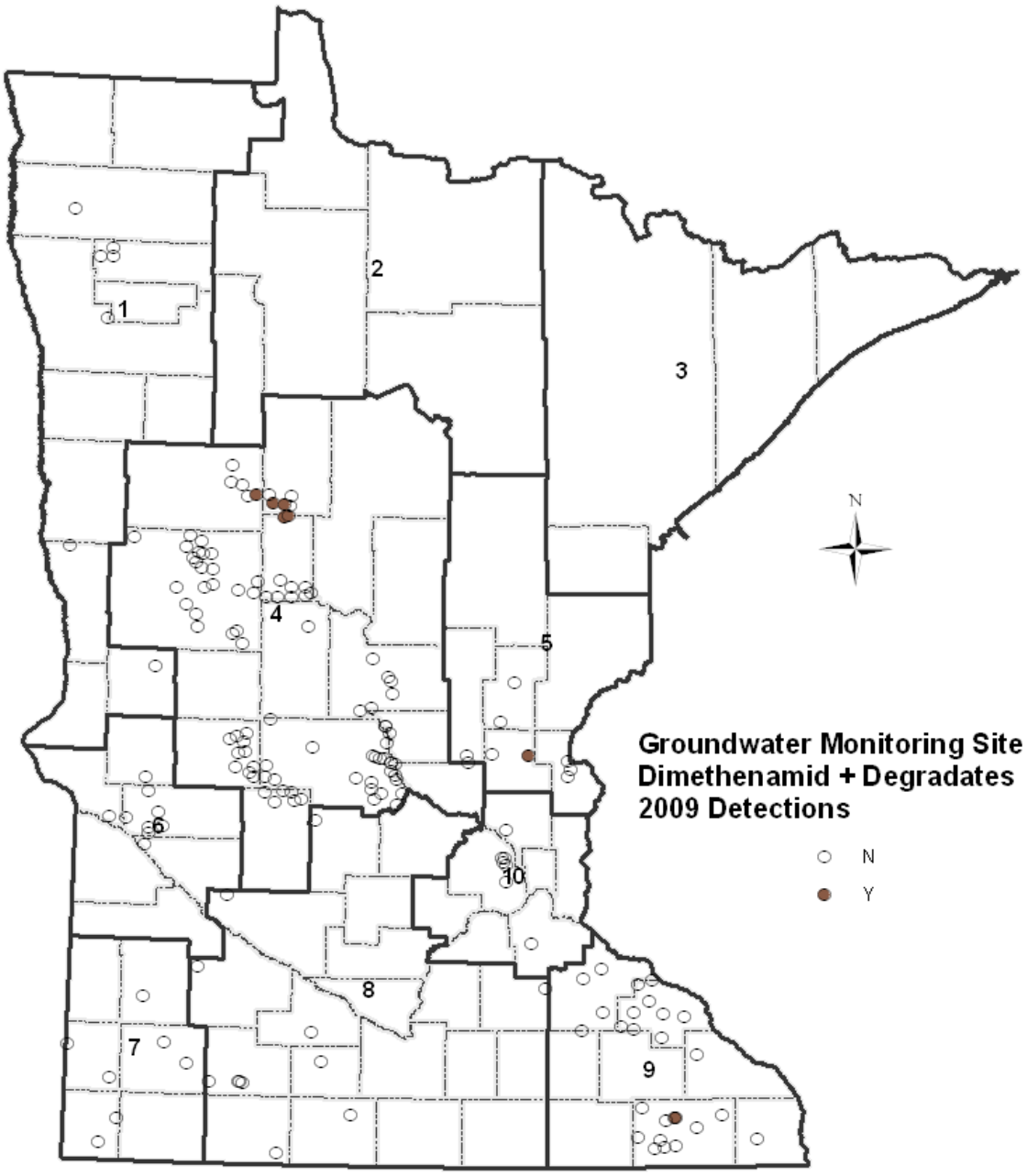


Figure 16. Pesticide Monitoring Regions and groundwater monitoring sites with dimethenamid or dimethenamid degradate detections in 2009.

Table 13. MDA analytical results 2004 through 2009 in groundwater for dimethenamid and its degradates.

	Median (µg/L)						75th Percentile (µg/L)						90th Percentile (µg/L)						Maximum (µg/L)					
PMR 1	**04**	**05**	**06**	**07**	**08**	**09**	**04**	**05**	**06**	**07**	**08**	**09**	**04**	**05**	**06**	**07**	**08**	**09**	**04**	**05**	**06**	**07**	**08**	**09**
Dimethenamid	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd
Dimethenamid ESA	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd
Dimethenamid OXA	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd
Dimethenamid + degs	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd
PMR 4																								
Dimethenamid	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	0.07	nd	nd	P	0.13
Dimethenamid ESA	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	0.1	nd	nd	nd	nd	2.22	7.06	2.06	4.7	4.2	10.10
Dimethenamid OXA	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	1.09	3.01	0.65	3.19	2.49	5.11
Dimethenamid + degs	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	0.1	nd	nd	nd	nd	3.06	10.07	2.71	7.89	6.69	15.34
PMR 5																								
Dimethenamid	-	-	-	nd	nd	nd	-	-	-	nd	nd	nd	-	-	-	nd	nd	nd	-	-	-	nd	nd	nd
Dimethenamid ESA	-	-	-	nd	nd	nd	-	-	-	nd	nd	nd	-	-	-	0.06	0.08	0.05	-	-	-	0.1	0.13	0.09
Dimethenamid OXA	-	-	-	nd	nd	nd	-	-	-	nd	nd	nd	-	-	-	nd	nd	nd	-	-	-	nd	nd	nd
Dimethenamid + degs	-	-	-	nd	nd	nd	-	-	-	nd	nd	nd	-	-	-	0.06	0.08	0.05	-	-	-	0.1	0.13	0.09
PMR 6																								
Dimethenamid	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd
Dimethenamid ESA	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd
Dimethenamid OXA	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd
Dimethenamid + degs	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd
PMR 7																								
Dimethenamid	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd
Dimethenamid ESA	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd
Dimethenamid OXA	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd
Dimethenamid + degs	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd
PMR 8																								
Dimethenamid	-	-	nd	nd	nd	nd	-	-	nd	nd	nd	nd	-	-	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd
Dimethenamid ESA	-	-	nd	nd	nd	nd	-	-	nd	nd	nd	nd	-	-	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd
Dimethenamid OXA	-	-	nd	nd	nd	nd	-	-	nd	nd	nd	nd	-	-	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd
Dimethenamid + degs	-	-	nd	nd	nd	nd	-	-	nd	nd	nd	nd	-	-	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd

Table 13 continued. MDA analytical results 2004 through 2009 in groundwater for dimethenamid and its degradates.

PMR 9																								
Dimethenamid	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	P	nd	P	nd	nd	nd	0.07	0.51	0.35	0.12
Dimethenamid ESA	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	0.07	0.19	nd	nd
Dimethenamid OXA	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	0.1	0.38	nd	nd
Dimethenamid + degs	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	P	nd	P	nd	nd	nd	0.24	1.08	0.35	0.12
Urban																								
Dimethenamid	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd
Dimethenamid ESA	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd
Dimethenamid OXA	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd
Dimethenamid + degs	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd

Table 14. Total number of detections and detection frequencies in groundwater samples for dimethenamid and its degradates, 2004-2009 by PMR.

	Detections						Percent Detections					
PMR 1	**04**	**05**	**06**	**07**	**08**	**09**	**04**	**05**	**06**	**07**	**08**	**09**
Dimethenamid	0/9	0/17	0/9	0/8	0/8	0/7	0%	0%	0%	0%	0%	0%
Dimethenamid ESA	0/9	0/17	0/9	0/8	0/8	0/7	0%	0%	0%	0%	0%	0%
Dimethenamid OXA	0/9	0/17	0/9	0/8	0/8	0/7	0%	0%	0%	0%	0%	0%
Dimethenamid + degradates	0/9	0/17	0/9	0/8	0/8	0/7	0%	0%	0%	0%	0%	0%
PMR 4												
Dimethenamid	0/108	2/113	0/112	0/110	2/84	1/84	0%	2%	0%	0%	2%	1%
Dimethenamid ESA	7/108	12/113	9/113	9/111	7/84	5/84	7%	11%	8%	8%	8%	6%
Dimethenamid OXA	2/108	5/113	6/113	7/111	5/84	4/84	2%	4%	5%	6%	6%	5%
Dimethenamid + degradates	7/108	12/113	9/112	9/110	7/84	5/84	7%	11%	8%	8%	8%	6%
PMR 5												
Dimethenamid	-	-	-	0/9	0/9	0/9	-	-	-	0%	0%	0%
Dimethenamid ESA	-	-	-	1/9	1/9	1/9	-	-	-	11%	11%	11%
Dimethenamid OXA	-	-	-	0/9	0/9	0/9	-	-	-	0%	0%	0%
Dimethenamid + degradates	-	-	-	1/9	1/9	1/9	-	-	-	11%	11%	11%
PMR 6												
Dimethenamid	0/3	0/6	0/9	0/9	0/9	0/9	0%	0%	0%	0%	0%	0%
Dimethenamid ESA	0/3	0/6	0/9	0/9	0/9	0/9	0%	0%	0%	0%	0%	0%
Dimethenamid OXA	0/3	0/6	0/9	0/9	0/9	0/9	0%	0%	0%	0%	0%	0%
Dimethenamid + degradates	0/3	0/6	0/9	0/9	0/9	0/9	0%	0%	0%	0%	0%	0%
PMR 7												
Dimethenamid	0/3	0/4	0/7	0/7	0/7	0/7	0%	0%	0%	0%	0%	0%
Dimethenamid ESA	0/3	0/4	0/7	0/7	0/7	0/7	0%	0%	0%	0%	0%	0%
Dimethenamid OXA	0/3	0/4	0/7	0/7	0/7	0/7	0%	0%	0%	0%	0%	0%
Dimethenamid + degradates	0/3	0/4	0/7	0/7	0/7	0/7	0%	0%	0%	0%	0%	0%
PMR 8												
Dimethenamid	0/1	0/1	0/9	0/10	0/12	0/12	0%	0%	0%	0%	0%	0%
Dimethenamid ESA	0/1	0/1	0/9	0/10	0/12	0/12	0%	0%	0%	0%	0%	0%
Dimethenamid OXA	0/1	0/1	0/9	0/10	0/12	0/12	0%	0%	0%	0%	0%	0%
Dimethenamid + degradates	0/1	0/1	0/9	0/10	0/12	0/12	0%	0%	0%	0%	0%	0%
PMR 9												
Dimethenamid	0/72	0/63	4/40	4/55	5/46	1/62	0%	0%	10%	7%	11%	2%
Dimethenamid ESA	0/72	0/64	2/40	1/55	0/46	0/62	0%	0%	5%	2%	0%	0%
Dimethenamid OXA	0/72	0/64	1/40	1/55	0/46	0/62	0%	0%	2%	2%	0%	0%
Dimethenamid + degradates	0/71	0/63	4/40	4/55	5/46	1/62	0%	0%	10%	7%	11%	2%
Urban												
Dimethenamid	0/10	0/22	0/22	0/19	0/17	0/15	0%	0%	0%	0%	0%	0%
Dimethenamid ESA	0/10	0/22	0/22	0/19	0/17	0/15	0%	0%	0%	0%	0%	0%
Dimethenamid OXA	0/10	0/22	0/22	0/19	0/17	0/15	0%	0%	0%	0%	0%	0%
Dimethenamid + degradates	0/10	0/22	0/22	0/19	0/17	0/15	0%	0%	0%	0%	0%	0%

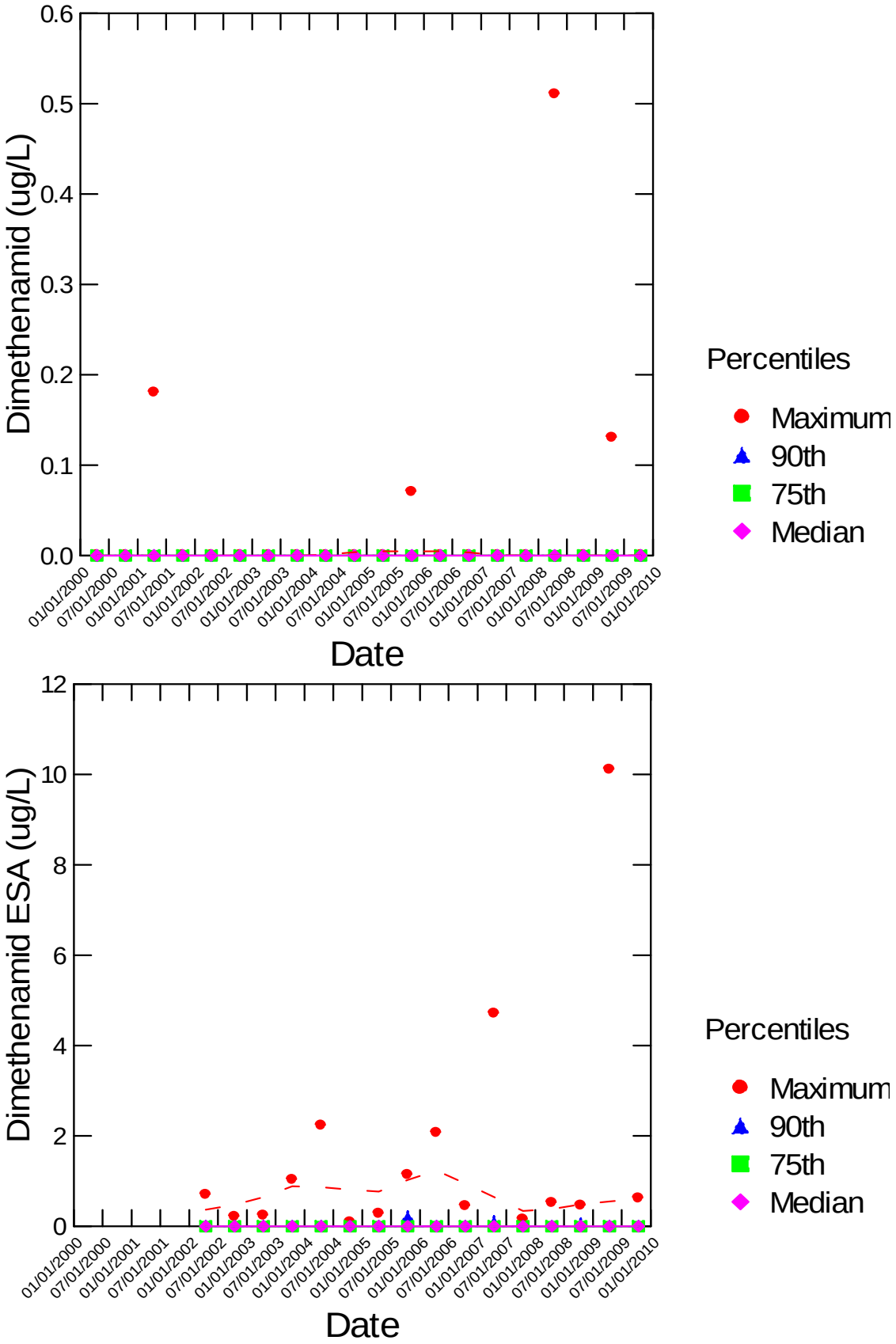


Figure 17. Dimethenamid and dimethenamid degradate groundwater sample analysis results over time for MDA PMR 4 (please note scale difference on Y- axis). NOTE: Graphics contain only spring and fall quarter

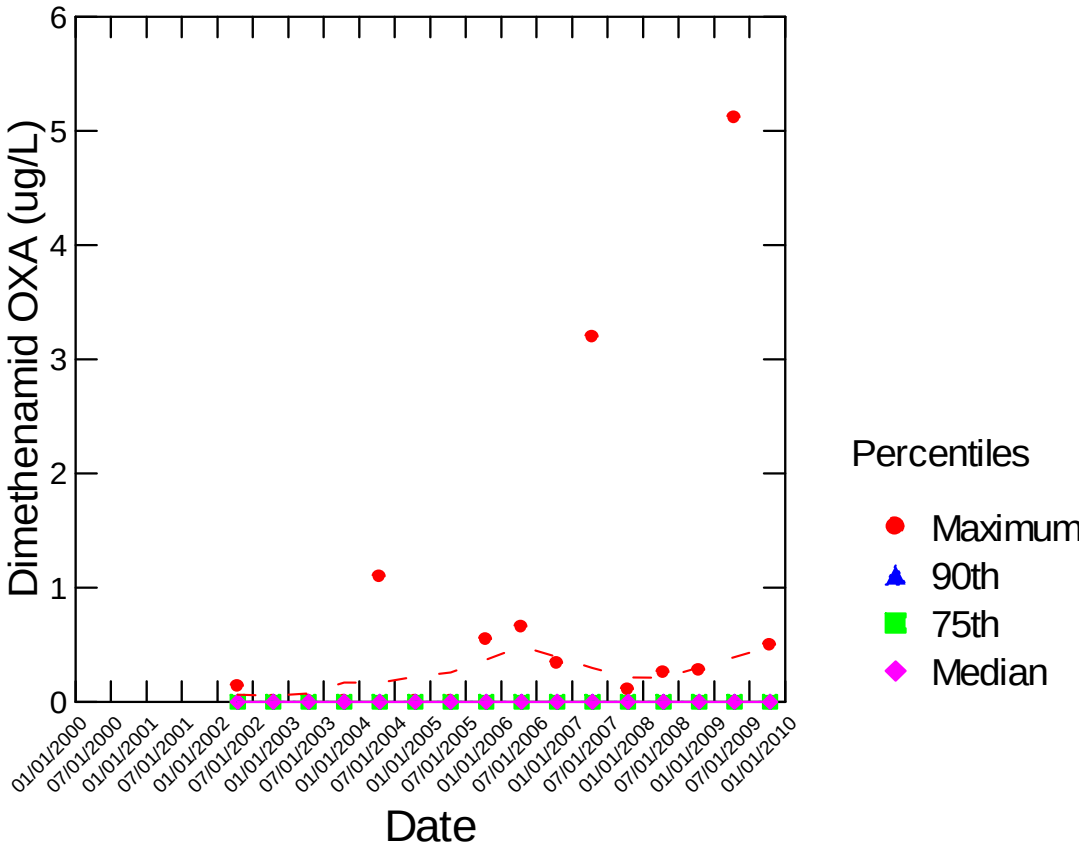


Figure 17 continued. Dimethenamid and dimethenamid degradate groundwater sample analysis results over time for MDA PMR 4 (please note scale difference on Y- axis). NOTE: Graphics contain only spring and fall quarter results.

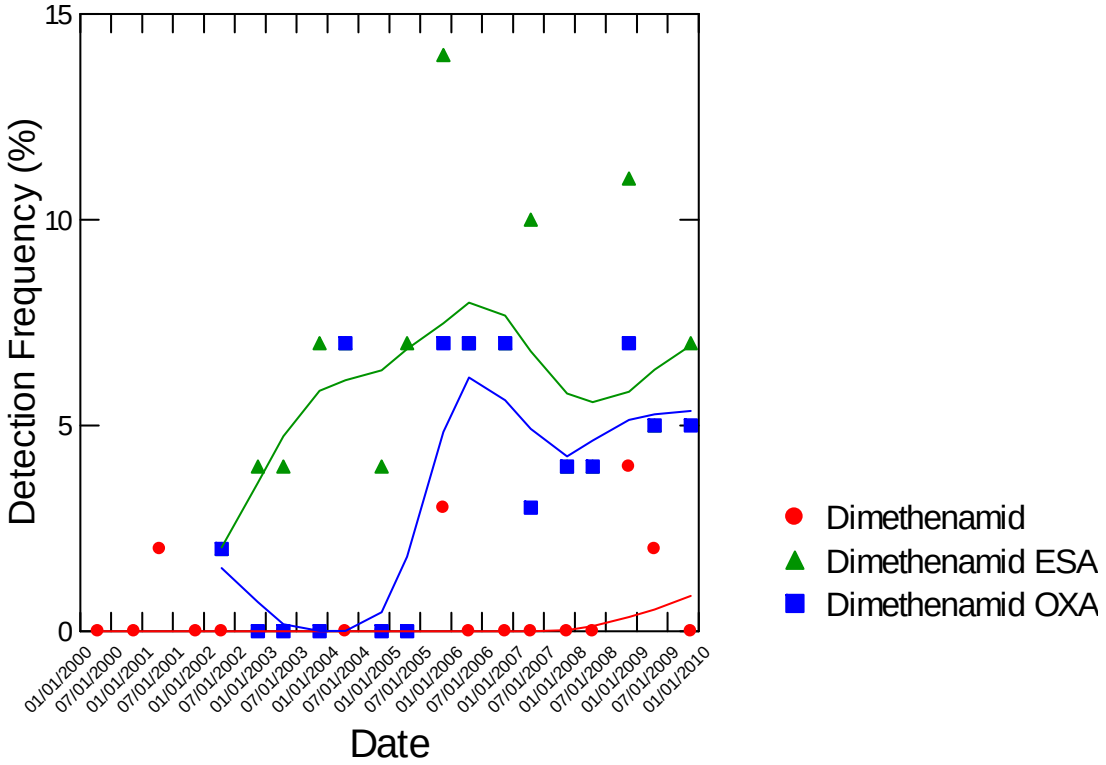


Figure 18. Dimethenamid and degradates detection frequencies over time for MDA groundwater monitoring MDA PMR 4. NOTE: Graphics contain only spring and fall quarter results.

2.2.5. Metolachlor results

Summary information for metolachlor groundwater monitoring results is located in Tables 15 and 16. Metolachlor has been an included analyte in MDA monitoring since 1985. MDA laboratory analysis of degradates of metolachlor began in 2002. Metolachlor or its degradates has been found in every PMR sampled. Figure 19 shows the distribution of sites where metolachlor and/or degradates were detected in 2009 sampling. As with the other acetanilide pesticides, metolachlor ESA is the most frequently detected form of metolachlor (Table 16) and typically is detected at the highest concentrations (Table 15). Overall, concentrations for metolachlor and its degradate compounds appear to be in a general decline over time (Figure 20). This general decline in concentration has been found to be statistically significant for many of the percentile values greater than the median for all three metolachlor species. This indicates that higher level concentrations are not as prevalent compared to earlier monitoring data. Detection frequency of metolachlor parent material is declining at a statistically significant rate; however, the ESA and OXA degradates show no statistically significant trends (Figure 21). The lack of quantifiable trends for metolachlor degradate data may be an artifact of the high variability present in the data and the non-linear nature of the results over time. Trend test results for concentration and detection frequency can be found in Appendix A3-5.

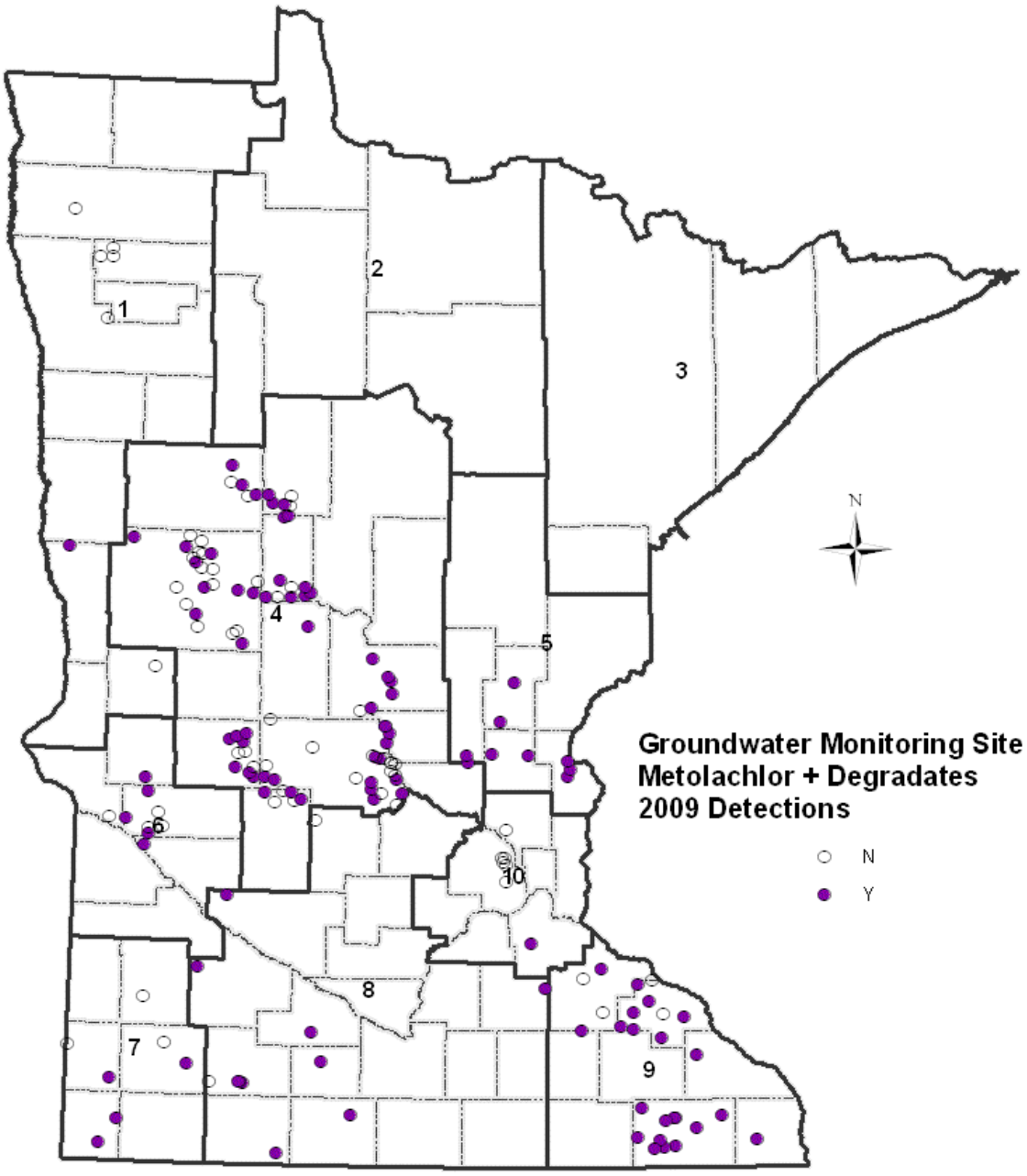


Figure 19. Pesticide Monitoring Regions and groundwater monitoring sites with metolachlor or metolachlor degradate detections in 2009.

Table 15. MDA analytical results 2004 through 2009 in groundwater for metolachlor and its degradates.

	Median (µg/L)						75th Percentile (µg/L)						90th Percentile (µg/L)						Maximum (µg/L)					
PMR 1	**4**	**5**	**6**	**7**	**8**	**9**	**4**	**5**	**6**	**7**	**8**	**9**	**4**	**5**	**6**	**7**	**8**	**9**	**4**	**5**	**6**	**7**	**8**	**9**
Metolachlor	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	0.17	nd	nd	nd	nd	nd	0.21
Metolachlor ESA	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	1.53	1.74	nd	nd	nd	nd	2.19	2.18
Metolachlor OXA	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	0.28	0.98	nd	nd	nd	nd	0.4	1.23
PMR 4																								
Metolachlor	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	P	nd	nd	0.27	1.87	0.76	0.24	0.75	1.79
Metolachlor ESA	0.17	0.23	0.2	0.2	0.19	0.13	1.72	1.13	1.24	1.66	1.14	1.21	6.15	2.68	3.33	4.10	2.39	2.95	15.60	10.20	12.70	34.20	12.30	20.70
Metolachlor OXA	nd	nd	nd	nd	nd	nd	0.13	0.11	0.12	0.19	0.11	0.16	1.41	0.66	0.64	0.64	0.49	0.68	8.54	6.75	4.9	8.03	5.41	13.00
PMR 5																								
Metolachlor	-	-	-	nd	nd	nd	-	-	-	nd	nd	nd	-	-	-	nd	nd	P	-	-	-	nd	nd	P
Metolachlor ESA	-	-	-	0.6	0.29	0.54	-	-	-	1.85	2.71	1.80	-	-	-	4.63	3.61	4.82	-	-	-	4.66	4	4.89
Metolachlor OXA	-	-	-	nd	nd	0.09	-	-	-	0.37	0.49	0.17	-	-	-	1.89	2.98	2.15	-	-	-	2.86	4.15	3.47
PMR 6																								
Metolachlor	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd
Metolachlor ESA	nd	nd	nd	nd	nd	0.07	0.68	0.75	nd	0.05	0.16	0.30	0.91	0.76	nd	0.49	0.38	0.75	0.91	0.76	nd	0.67	0.47	0.81
Metolachlor OXA	nd	nd	nd	nd	nd	nd	0.05	nd	nd	nd	nd	nd	0.07	nd	nd	nd	nd	nd	0.07	nd	nd	nd	nd	nd
PMR 7																								
Metolachlor	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	P	nd	nd	nd	nd	nd	P	nd	nd
Metolachlor ESA	1.09	1.09	nd	0.12	0.08	0.09	1.25	1.21	nd	0.65	0.39	0.56	1.3	1.23	nd	1.08	0.62	0.89	1.3	1.23	nd	1.16	0.65	0.94
Metolachlor OXA	nd	0.05	nd	nd	nd	nd	0.10	0.13	nd	nd	nd	nd	0.13	0.15	nd	0.07	nd	nd	0.13	0.15	nd	0.09	nd	nd
PMR 8																								
Metolachlor	-	-	nd	nd	nd	nd	-	-	nd	nd	nd	nd	-	-	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd
Metolachlor ESA	-	-	nd	nd	nd	0.22	-	-	nd	nd	0.25	0.53	-	-	P	nd	0.51	0.97	nd	nd	P	nd	0.89	1.43
Metolachlor OXA	-	-	nd	0.07	nd	nd	-	-	nd	0.59	nd	nd	-	-	nd	2.00	0.02	0.02	0.2	0.12	nd	2.69	0.07	0.07
PMR 9																								
Metolachlor	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	P	P	nd	P	0.11	P	P	0.17	P	P	0.58	P	0.12	5.00
Metolachlor ESA	0.16	0.13	0.11	0.27	0.53	0.52	0.3	0.26	0.73	0.81	1.21	0.79	0.36	0.36	1.49	1.26	1.70	1.48	0.44	0.43	2.77	2.6	2.7	3.63
Metolachlor OXA	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	0.07	nd	nd	nd	0.12	nd	0.14	0.15	0.07	nd	0.61	0.16	0.22	0.59
Urban																								
Metolachlor	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	0.41	0.3	nd
Metolachlor ESA	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	0.03	nd	0.11	5.40	0.36	0.26	0.07	nd	1.59	11.60	9.71	0.76
Metolachlor OXA	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	0.39	0.11	nd	nd	0.07	nd	6.86	5.43	nd

Table 16. Total number of detections and detection frequencies in groundwater samples for metolachlor and its degradates, 2004-2009 by PMR.

	Detections						Percent Detections					
PMR 1	**04**	**05**	**06**	**07**	**08**	**09**	**04**	**05**	**06**	**07**	**08**	**09**
Metolachlor	0/9	0/17	0/9	0/8	0/8	1/7	0%	0%	0%	0%	0%	14%
Metolachlor ESA	0/9	0/17	0/9	0/8	1/8	1/7	0%	0%	0%	0%	13%	14%
Metolachlor OXA	0/9	0/17	0/9	0/8	1/8	1/7	0%	0%	0%	0%	13%	14%
Metolachlor + Degradates	0/9	0/17	0/9	0/8	1/8	1/7	0%	0%	0%	0%	13%	14%
PMR 4												
Metolachlor	10/108	9/113	11/112	14/110	7/84	6/84	9%	8%	9%	13%	8%	7%
Metolachlor ESA	68/108	74/113	66/113	69/111	54/84	51/84	63%	66%	58%	62%	64%	61%
Metolachlor OXA	34/108	30/113	30/113	37/111	26/84	26/84	32%	27%	27%	33%	31%	31%
Metolachlor + Degradates	68/108	74/113	65/112	69/110	55/84	52/84	63%	66%	58%	63%	66%	62%
PMR 5												
Metolachlor	-	-	-	0/9	0/9	1/9	-	-	-	0%	0%	12%
Metolachlor ESA	-	-	-	8/9	7/9	9/9	-	-	-	89%	78%	100%
Metolachlor OXA	-	-	-	3/9	3/9	6/9	-	-	-	33%	33%	67%
Metolachlor + Degradates	-	-	-	8/9	7/9	9/9	-	-	-	89%	78%	100%
PMR 6												
Metolachlor	0/3	0/6	0/9	0/9	0/9	0/9	0%	0%	0%	0%	0%	0%
Metolachlor ESA	1/3	2/6	0/9	2/9	3/9	5/9	33%	33%	0%	22%	33%	56%
Metolachlor OXA	1/3	0/6	0/9	0/9	0/9	0/9	33%	0%	0%	0%	0%	0%
Metolachlor + Degradates	1/3	2/6	0/9	2/9	3/9	5/9	33%	33%	0%	22%	33%	56%
PMR 7												
Metolachlor	0/3	0/4	0/7	1/7	0/7	0/7	0%	0%	0%	14%	0%	0%
Metolachlor ESA	2/3	4/4	0/7	4/7	5/7	4/7	67%	100%	0%	57%	71%	57%
Metolachlor OXA	1/3	2/4	0/7	1/7	0/7	0/7	33%	50%	0%	14%	0%	0%
Metolachlor + Degradates	2/3	4/4	0/7	4/7	5/7	4/7	67%	100%	0%	57%	71%	57%
PMR 8												
Metolachlor	0/1	0/1	0/9	0/10	0/12	0/12	0%	0%	0%	0%	0%	0%
Metolachlor ESA	0/1	0/1	1/9	0/10	5/12	9/12	0%	0%	11%	0%	42%	75%
Metolachlor OXA	1/1	1/1	0/9	5/10	1/12	1/12	100%	100%	0%	50%	8%	8%
Metolachlor + Degradates	1/1	1/1	1/9	5/10	5/12	9/12	100%	100%	11%	50%	42%	75%
PMR 9												
Metolachlor	3/72	8/63	10/40	13/55	14/46	18/62	4%	13%	25%	24%	30%	29%
Metolachlor ESA	59/72	49/64	26/40	47/55	41/46	56/62	82%	77%	65%	86%	89%	90%
Metolachlor OXA	1/72	0/64	6/40	5/55	12/46	12/62	1%	0%	15%	9%	26%	19%
Metolachlor + Degradates	58/71	48/63	29/40	47/55	41/46	56/62	82%	76%	73%	86%	89%	90%
Urban												
Metolachlor	0/10	0/22	0/22	1/19	1/17	0/15	0%	0%	0%	5%	6%	0%
Metolachlor ESA	1/10	0/22	4/22	4/19	2/17	2/15	10%	0%	18%	21%	12%	13%
Metolachlor OXA	0/10	1/22	0/22	2/19	2/17	0/15	0%	5%	0%	11%	12%	0%
Metolachlor + Degradates	1/10	1/22	4/22	4/19	3/17	2/15	10%	5%	18%	21%	18%	13%

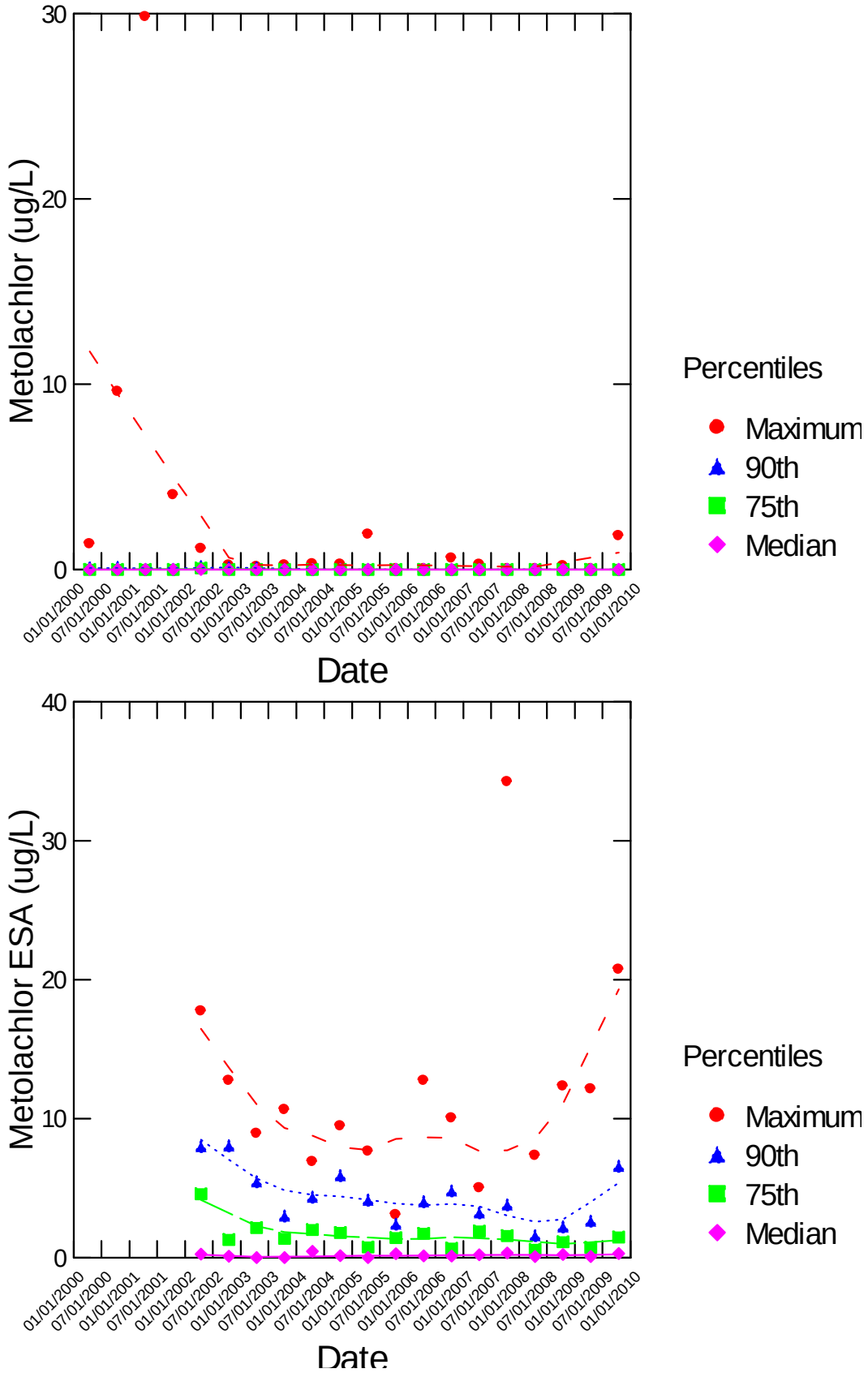


Figure 20. Metolachlor and metolachlor degradate groundwater sample analysis results over time for MDA PMR 4 (please note scale difference on Y- axis). NOTE: Graphics contain only spring and fall quarter results.

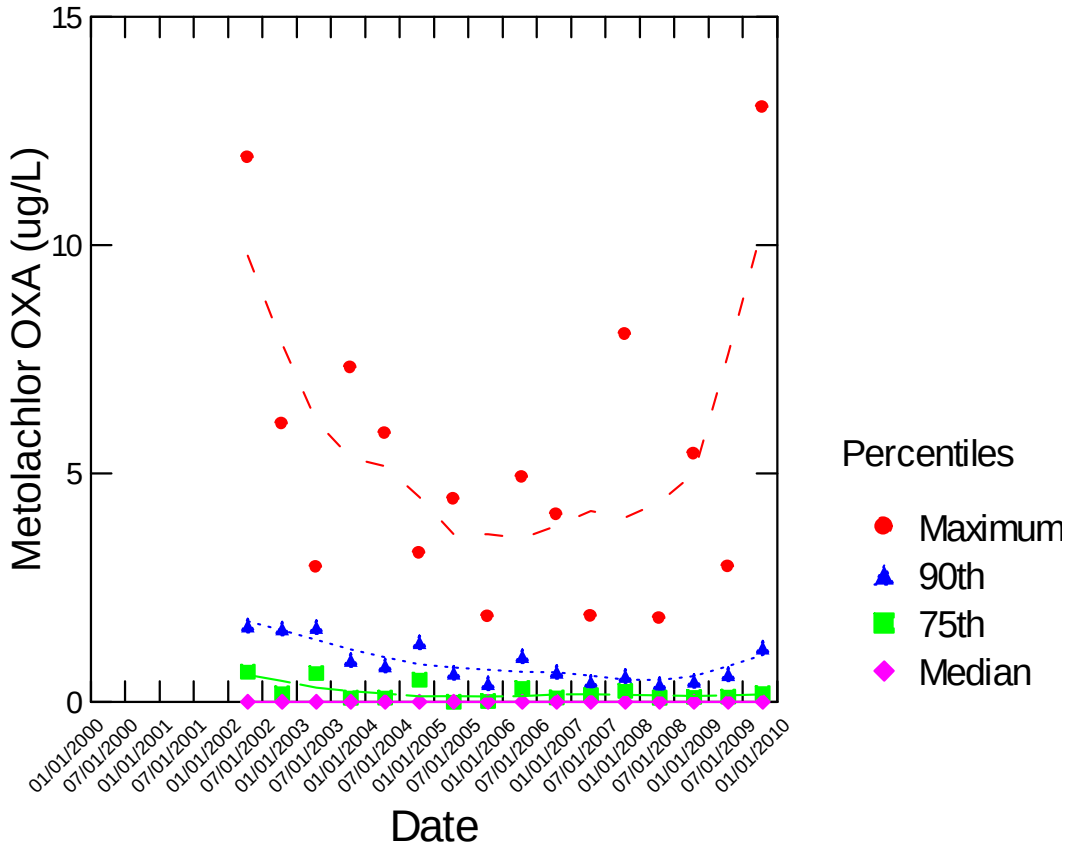


Figure 20 continued. Metolachlor and metolachlor degradate groundwater sample analysis results over time for MDA PMR 4 (please note scale difference on Y- axis). NOTE: Graphics contain only spring and fall quarter results.

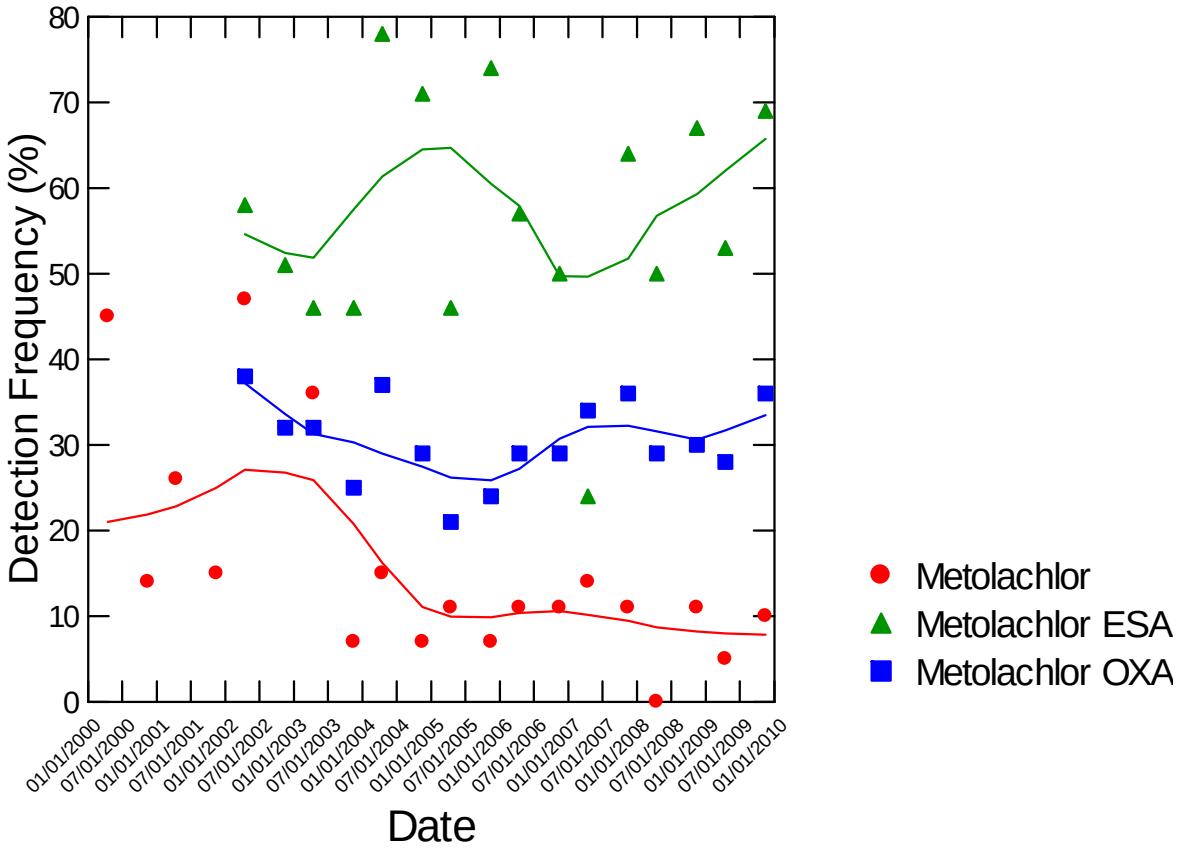


Figure 21. Metolachlor and degradates detection frequencies over time for MDA groundwater monitoring in PMR 4. NOTE: Graphics contain only spring and fall quarter results.

2.2.6. Metribuzin results

Summary information for metribuzin groundwater monitoring results is found in Tables 17 and 18. Metribuzin has been an included analyte in MDA monitoring since 1985. MDA laboratory analysis of degradates of metribuzin has been included in analyses, but with an Estimated Reporting Limit (ERL) rather than a method reporting limit. ERLs are used when there has not been a statistical study done to verify the laboratory's confidence in quantifying low-level concentrations.

Figure 22 shows the distribution of sites where metribuzin and its degradates were detected in 2009 sampling. Metribuzin and/or degradates of metribuzin have been found primarily in PMR 4, which is characterized by glacial outwash sand plains. Much of the cropped land in this region is irrigated and includes potatoes in the cropping rotation. There is no clear trend in metribuzin and degradate concentrations over time (Figure 23). Graphical inspection of the detection frequency data (Figure 24) shows an apparent downward trend, although statistical analysis does not indicate that it is statistically significant. It is not unusual to have difficulty analyzing for trends in environmental data due to high variability and extreme values data. As a consequence, trends in water quality data frequently become graphically apparent before statistical analysis provides supporting evidence. Trend test results for concentration and detection frequency can be found in Appendix A3-6.

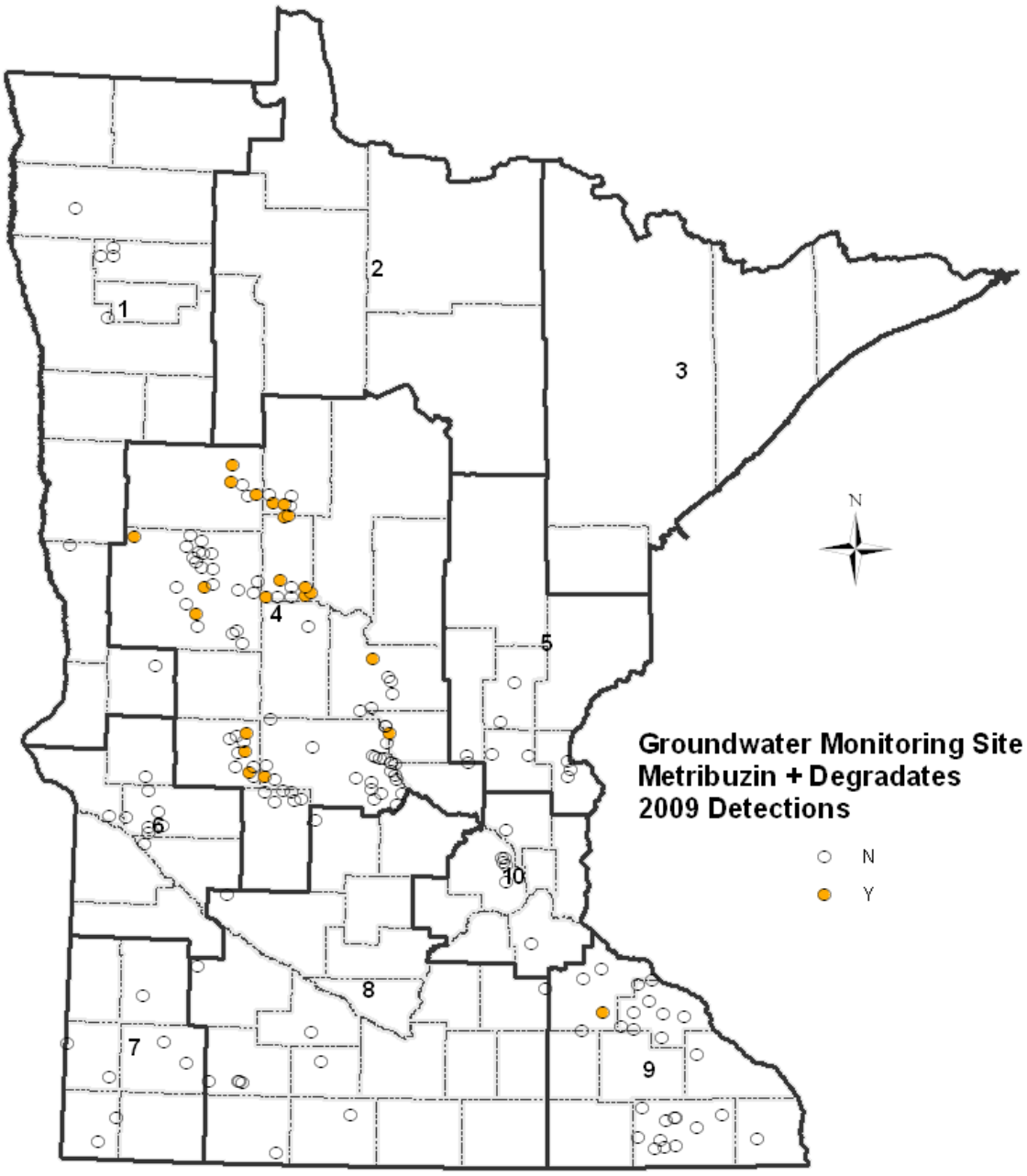


Figure 22. Pesticide Monitoring Regions and groundwater monitoring sites with metribuzin or metribuzin degradate detections in 2009.

Table 17. MDA analytical results 2004 through 2009 in groundwater for metribuzin and its degradates.

	Median (µg/L)						75th Percentile (µg/L)						90th Percentile (µg/L)						Maximum (µg/L)					
PMR 1	**04**	**05**	**06**	**07**	**08**	**09**	**04**	**05**	**06**	**07**	**08**	**09**	**04**	**05**	**06**	**07**	**08**	**09**	**04**	**05**	**06**	**07**	**08**	**09**
Metribuzin	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd
Metribuzin DADK	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd
Metribuzin DK	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd
Metribuzin DA	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd
Metribuzin + degradates	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd
PMR 4																								
Metribuzin	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	P	P	P	P	P	P	0.43	1.24	1.06	0.72	0.1	1.89
Metribuzin DADK	nd	nd	nd	nd	nd	nd	nd	nd	nd	P	nd	nd	2.74	1.1	1.5	1.31	1.29	1.2	8.55	5.60	9.28	5.76	2.23	5.2
Metribuzin DK	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	P	nd	P	P	P	P	1.06	1.20	1.49	P	P	1.5
Metribuzin DA	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	1.17	P	P	P	P	P
Metribuzin + degradates	nd	nd	nd	nd	nd	nd	P	nd	nd	P	nd	nd	2.74	1.07	1.5	1.3	1.3	1.4	10.0	7.34	9.52	6.3	2.23	7.04
PMR 5																								
Metribuzin	-	-	-	nd	nd	nd	-	-	-	nd	nd	nd	-	-	-	nd	0.09	nd	-	-	-	nd	0.15	nd
Metribuzin DADK	-	-	-	nd	nd	nd	-	-	-	nd	nd	nd	-	-	-	nd	nd	nd	-	-	-	nd	nd	nd
Metribuzin DK	-	-	-	nd	nd	nd	-	-	-	nd	nd	nd	-	-	-	nd	nd	nd	-	-	-	nd	nd	nd
Metribuzin DA	-	-	-	nd	nd	nd	-	-	-	nd	nd	nd	-	-	-	nd	nd	nd	-	-	-	nd	nd	nd
Metribuzin + degradates	-	-	-	nd	nd	nd	-	-	-	nd	nd	nd	-	-	-	nd	0.09	nd	-	-	-	nd	0.15	nd
PMR 6																								
Metribuzin	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd
Metribuzin DADK	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	P	nd	nd	nd	nd	nd	P	nd
Metribuzin DK	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd
Metribuzin DA	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd
Metribuzin + degradates	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	P	nd	nd	nd	nd	nd	P	nd
PMR 7																								
Metribuzin	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd
Metribuzin DADK	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd
Metribuzin DK	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd
Metribuzin DA	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd
Metribuzin + degradates	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd
PMR 8																								
Metribuzin	-	-	nd	nd	nd	nd	-	-	nd	nd	nd	nd	-	-	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd
Metribuzin DADK	-	-	nd	nd	nd	nd	-	-	nd	nd	nd	nd	-	-	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd
Metribuzin DK	-	-	nd	nd	nd	nd	-	-	nd	nd	nd	nd	-	-	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd
Metribuzin DA	-	-	nd	nd	nd	nd	-	-	nd	nd	nd	nd	-	-	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd
Metribuzin + degradates	-	-	nd	nd	nd	nd	-	-	nd	nd	nd	nd	-	-	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd

Table 17 continued. MDA analytical results 2004 through 2009 in groundwater for metribuzin and its degradates.

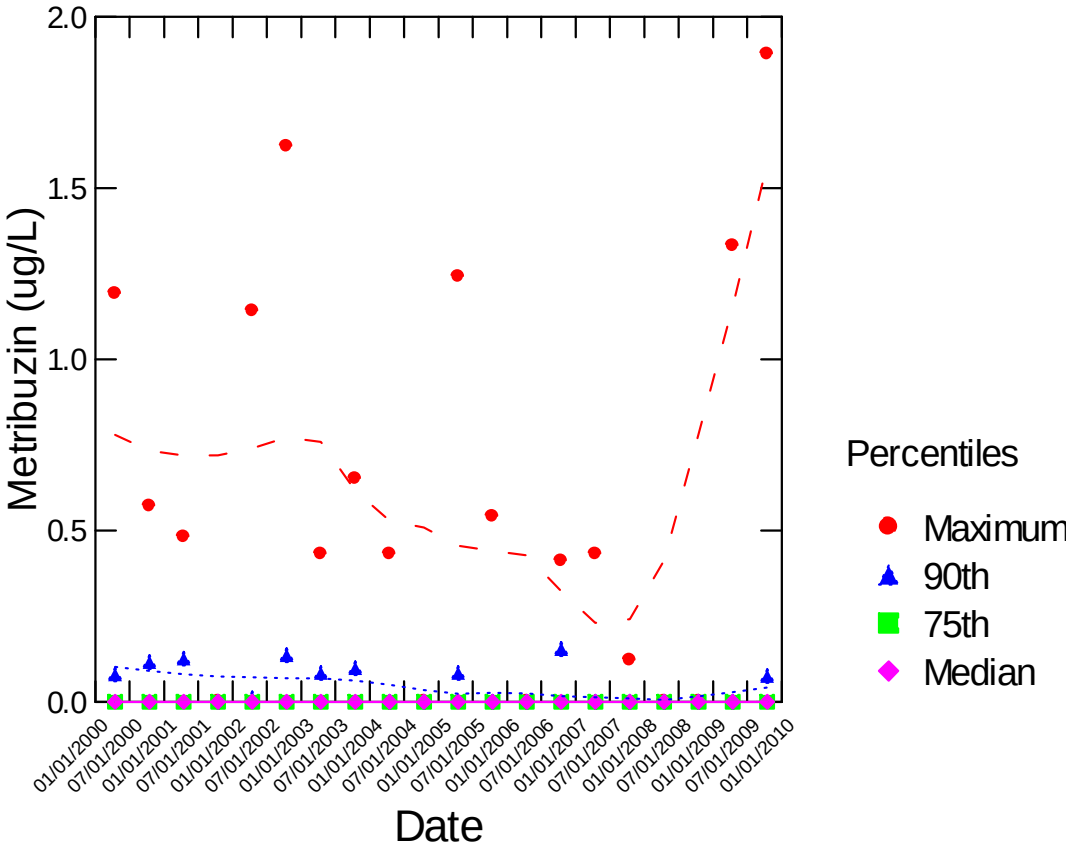
PMR 9																								
Metribuzin	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd
Metribuzin DADK	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd
Metribuzin DK	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd
Metribuzin DA	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd
Metribuzin + degradates	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd
Urban																								
Metribuzin	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	0.66	0.37	nd
Metribuzin DADK	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	1.83	2.03	nd
Metribuzin DK	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	P	P	nd
Metribuzin DA	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	P	nd	nd
Metribuzin + degradates	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	2.49	2.40	nd

Table 18. Total number of detections and detection frequencies in groundwater samples for metribuzin and its degradates, 2004-2009 by PMR.

	Detections						Percent Detections					
PMR 1	**04**	**05**	**06**	**07**	**08**	**09**	**04**	**05**	**06**	**07**	**08**	**09**
Metribuzin	0/9	0/17	0/9	0/8	0/8	0/7	0%	0%	0%	0%	0%	0%
Metribuzin DADK	0/9	0/17	0/9	0/8	0/8	0/7	0%	0%	0%	0%	0%	0%
Metribuzin DK	0/9	0/17	0/9	0/8	0/8	0/7	0%	0%	0%	0%	0%	0%
Metribuzin DA	0/9	0/17	0/9	0/8	0/8	0/7	0%	0%	0%	0%	0%	0%
Metribuzin + degradates	0/9	0/17	0/9	0/8	0/8	0/7	0%	0%	0%	0%	0%	0%
PMR 4												
Metribuzin	14/108	14/113	13/112	15/110	10/84	11/84	13%	12%	12%	14%	12%	13%
Metribuzin DADK	24/105	23/113	23/112	28/110	19/84	21/84	23%	20%	21%	25%	23%	25%
Metribuzin DK	15/105	8/113	17/112	21/110	14/84	13/84	14%	9%	15%	19%	17%	16%
Metribuzin DA	7/105	4/113	8/112	6/110	1/84	7/84	7%	4%	7%	5%	1%	8%
Metribuzin + degradates	28/105	25/113	25/112	30/110	19/84	21/84	27%	22%	22%	27%	23%	25%
PMR 5												
Metribuzin	-	-	-	0/9	1/9	0/9	-	-	-	0%	11%	0%
Metribuzin DADK	-	-	-	0/9	0/9	0/9	-	-	-	0%	0%	0%
Metribuzin DK	-	-	-	0/9	0/9	0/9	-	-	-	0%	0%	0%
Metribuzin DA	-	-	-	0/9	0/9	0/9	-	-	-	0%	0%	0%
Metribuzin + degradates	-	-	-	0/9	1/9	0/9	-	-	-	0%	11%	0%
PMR 6												
Metribuzin	0/3	0/6	0/9	0/9	0/9	0/9	0%	0%	0%	0%	0%	0%
Metribuzin DADK	0/3	0/6	0/9	0/9	1/9	0/9	0%	0%	0%	0%	11%	0%
Metribuzin DK	0/3	0/6	0/9	0/9	0/9	0/9	0%	0%	0%	0%	0%	0%
Metribuzin DA	0/3	0/6	0/9	0/9	0/9	0/9	0%	0%	0%	0%	0%	0%
Metribuzin + degradates	0/3	0/6	0/9	0/9	1/9	0/9	0%	0%	0%	0%	11%	0%
PMR 7												
Metribuzin	0/3	0/4	0/7	0/7	0/7	0/7	0%	0%	0%	0%	0%	0%
Metribuzin DADK	0/3	0/4	0/7	0/7	0/7	0/7	0%	0%	0%	0%	0%	0%
Metribuzin DK	0/3	0/4	0/7	0/7	0/7	0/7	0%	0%	0%	0%	0%	0%
Metribuzin DA	0/3	0/4	0/7	0/7	0/7	0/7	0%	0%	0%	0%	0%	0%
Metribuzin + degradates	0/3	0/4	0/7	0/7	0/7	0/7	0%	0%	0%	0%	0%	0%
PMR 8												
Metribuzin	0/1	0/1	0/9	0/10	0/12	0/12	0%	0%	0%	0%	0%	0%
Metribuzin DADK	0/1	0/1	0/9	0/10	0/12	0/12	0%	0%	0%	0%	0%	0%
Metribuzin DK	0/1	0/1	0/9	0/10	0/12	0/12	0%	0%	0%	0%	0%	0%
Metribuzin DA	0/1	0/1	0/9	0/10	0/12	0/12	0%	0%	0%	0%	0%	0%
Metribuzin + degradates	0/1	0/1	0/9	0/10	0/12	0/12	0%	0%	0%	0%	0%	0%
PMR 9												
Metribuzin	0/72	0/64	0/40	0/55	0/46	0/62	0%	0%	0%	0%	0%	0%
Metribuzin DADK	0/72	0/64	0/40	0/55	0/46	0/62	0%	0%	0%	0%	0%	0%
Metribuzin DK	0/72	0/64	0/40	0/55	0/46	0/62	0%	0%	0%	0%	0%	0%
Metribuzin DA	0/72	0/64	0/40	0/55	0/46	0/62	0%	0%	0%	0%	0%	0%
Metribuzin + degradates	0/72	0/64	0/40	0/55	0/46	0/62	0%	0%	0%	0%	0%	0%

Table 18 continued. Total number of detections and detection frequencies in groundwater samples for metribuzin and its degradates, 2004-2009 by PMR.

Urban												
Metribuzin	0/10	0/22	0/22	1/19	1/17	0/15	0%	0%	0%	5%	6%	0%
Metribuzin DADK	0/10	0/22	0/22	1/19	1/17	0/15	0%	0%	0%	5%	6%	0%
Metribuzin DK	0/10	0/22	0/22	1/19	1/17	0/15	0%	0%	0%	5%	6%	0%
Metribuzin DA	0/10	0/22	0/22	1/19	0/17	0/15	0%	0%	0%	5%	0%	0%
Metribuzin + degradates	0/10	0/22	0/22	1/19	1/17	0/15	0%	0%	0%	5%	6%	0%



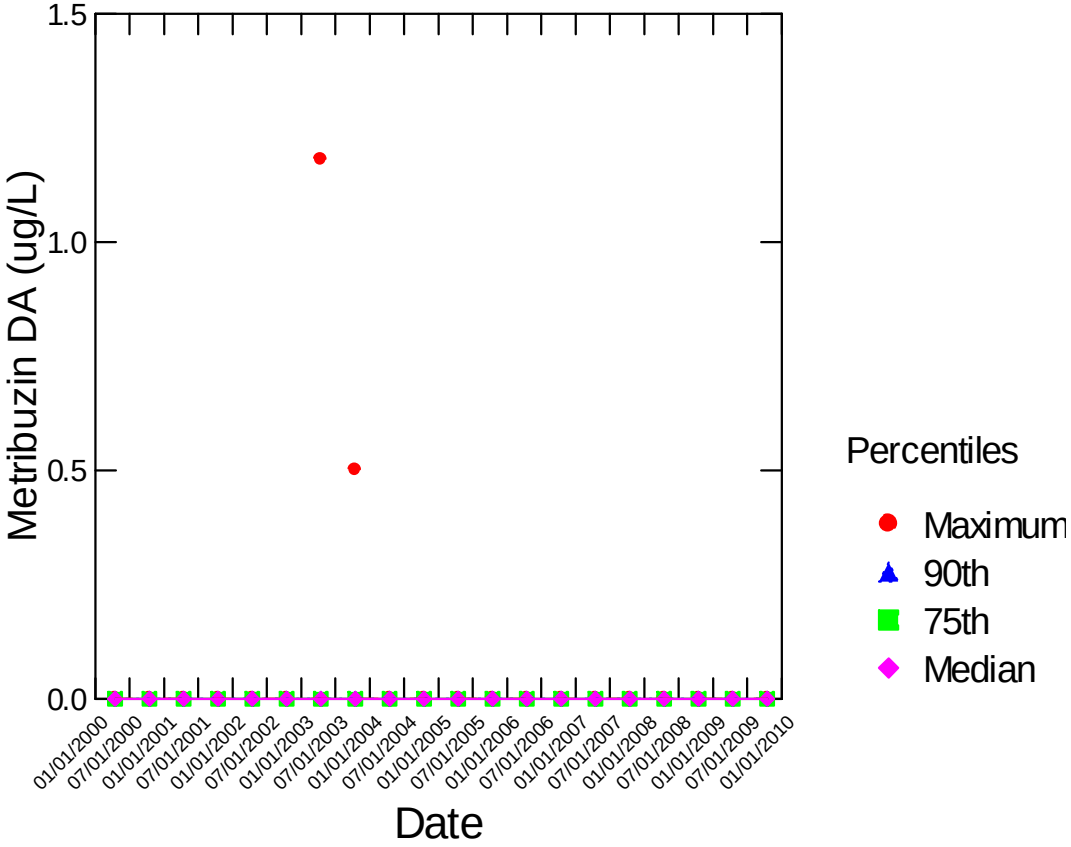
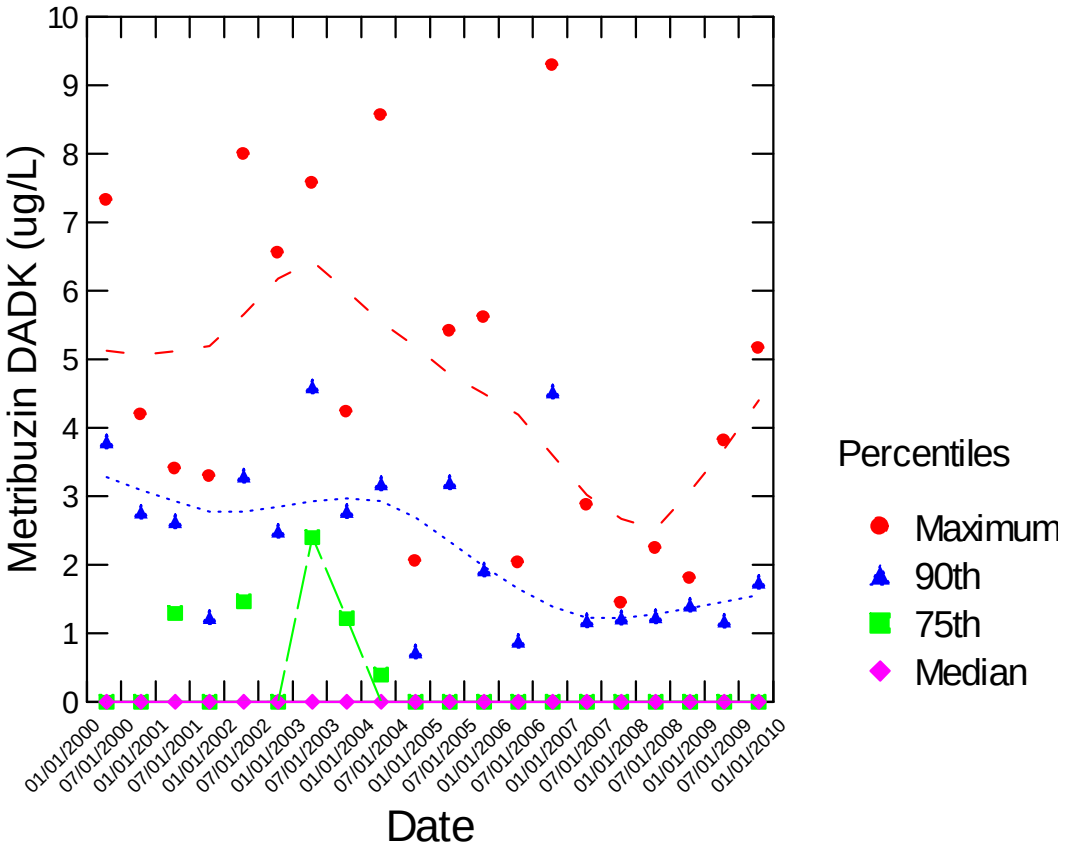


Figure 23. Metribuzin and its degradates groundwater sample analysis results over time for MDA PMR 4 (please note scale difference on Y- axis). NOTE: Graphics contain only spring and fall quarter results.



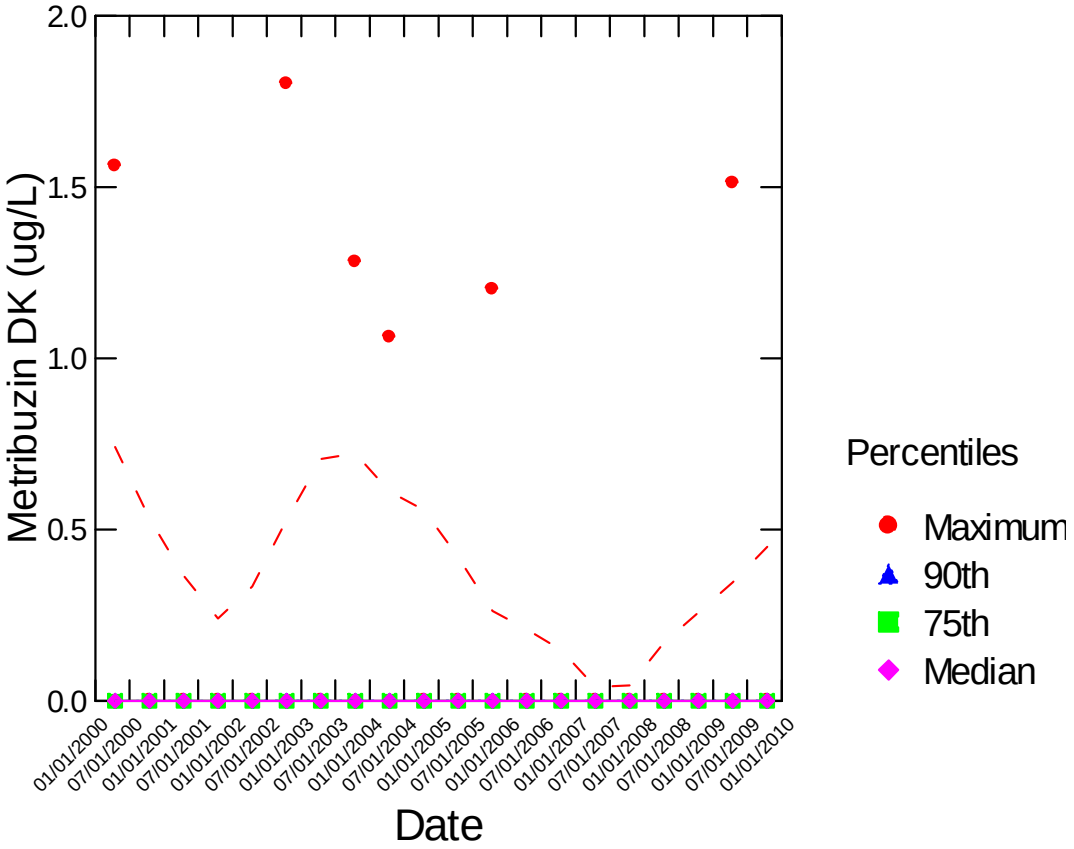


Figure 23 continued. Metribuzin and metribuzin degradate groundwater sample analysis results over time for MDA PMR 4 (please note scale difference on Y- axis). NOTE: Graphics contain only spring and fall quarter results.

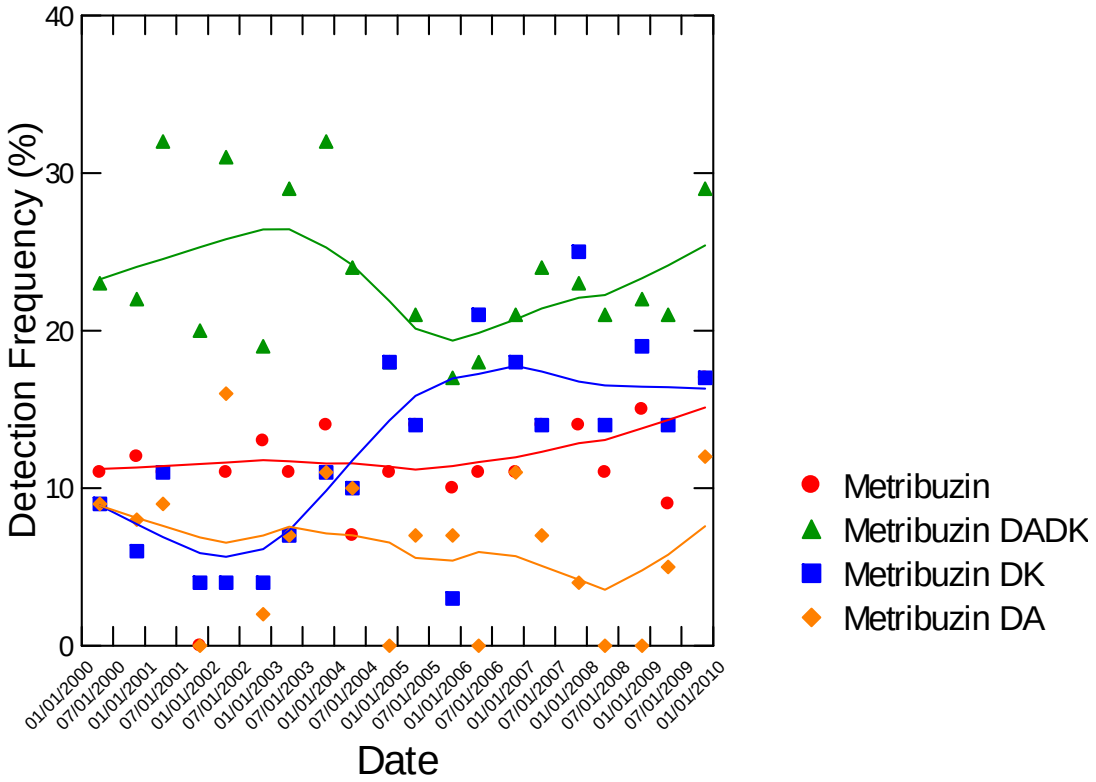


Figure 24. Metribuzin and degradates detection frequencies over time for MDA groundwater monitoring in PMR 4. NOTE: Graphics contain only spring and fall quarter results.

2.3. Southeast Minnesota residential monitoring

Fourteen wells were selected as part of a long-term effort to monitor residential wells in Southeastern Minnesota. A target group of wells from Fillmore, Goodhue, and Wabasha counties were identified through the use of selection criteria. The selection criteria were as follows:

1. Be completed in the aquifer of interest (first aquifer below the land surface).
2. Have a well owner willing to participate.
3. Lie outside of flood prone areas (so water cannot pond around the well head).
4. Be up-gradient of point sources of agricultural chemicals, or be at least ¼ mile from such sources if the well is down-gradient.
5. Have a readily available and accessible location (not inside a building of any kind) from which to collect the water sample.
6. Have a well log or other construction information available (such as owner reported depth).
7. Be located in areas where the majority land use is agricultural and where row crop agriculture is present on approximately 25 percent or more of the land area.

Sampling was conducted in September of 2009 for nitrate and pesticides analysis. Results from the residential well samples can be found in Table 19. Of the 14 water samples analyzed, none were found to have concentrations of compounds above the listed health-based guidance values for pesticides; three samples had nitrate concentrations that were at, or slightly above, the listed health-based guidance value. Only deethylatrazine and nitrate were detected in all 14 samples, with median values of 0.08 µg/L and 7.26 mg/L, respectively.

Table 19. Nutrient and pesticide data summary from Southeast Minnesota residential sampling in 2009.

County	Aquifer	Nitrate-nitrogen (mg/L)	Atrazine (µg/L)	Acetochlor (µg/L)	Metolachlor (µg/L)	Deisopropylatrazine (µg/L)	Deethylatrazine (µg/L)	Metolachlor ESA (µg/L)	Acetochlor ESA (µg/L)	Alachlor ESA (µg/L)	Alachlor OXA (µg/L)	Acetochlor OXA (µg/L)	Metolachlor OXA (µg/L)	Diaminochlorotriazine (DACT) ELISA (µg/L)
Fillmore	Wapsipinicon	2.35	P	nd	nd	nd	P	0.13	0.14	0.56	nd	nd	nd	nd
Fillmore	Wapsipinicon	7.55	0.07	nd	nd	nd	0.14	1.47	nd	1.68	nd	nd	nd	nd
Fillmore	Galena	10.40	0.06	nd	nd	nd	0.12	3.63	0.24	0.38	nd	nd	0.59	0.18
Fillmore	Galena	5.99	P	nd	nd	nd	P	0.69	nd	0.26	nd	nd	nd	nd
Goodhue	Platteville-Glenwood	7.13	P	nd	nd	nd	P	0.47	nd	0.82	nd	nd	nd	0.14
Goodhue	Prairie du Chien	7.39	P	nd	nd	P	0.11	0.64	0.09	1.03	nd	nd	nd	0.18
Goodhue	Prairie du Chien	3.77	P	nd	nd	nd	0.05	nd	nd	nd	nd	nd	nd	0.14
Wabasha	Eau Claire	3.05	nd	nd	nd	nd	P	nd	nd	nd	nd	nd	nd	nd
Wabasha	Prairie du Chien	11.50	0.07	P	nd	P	0.10	1.53	0.25	1.93	nd	nd	0.15	0.21
Wabasha	Prairie du Chien	9.42	P	nd	nd	nd	P	0.39	nd	0.67	nd	nd	nd	nd
Wabasha	Prairie du Chien	10.80	P	nd	nd	nd	P	nd	nd	nd	nd	nd	nd	nd
Wabasha	Prairie du Chien-Jordan	4.81	0.12	nd	nd	P	0.18	0.56	nd	0.16	nd	nd	nd	0.32
Wabasha	Prairie du Chien-Jordan	6.99	0.14	nd	nd	nd	0.15	0.45	nd	nd	nd	nd	nd	0.16
Wabasha	Prairie du Chien-Jordan	11.70	0.14	P	P	P	0.50	0.70	0.48	0.92	0.11	0.12	0.15	0.45
# of detections		14/14	13/14	2/14	1/14	4/14	14/14	11/14	5/14	10/14	1/14	1/14	3/14	8/14
median value		7.26	P	nd	nd	nd	0.08	0.52	nd	0.47	nd	nd	nd	0.14

SECTION 3: SURFACE WATER MONITORING RESULTS

3.1. 2009 sampling season summary

In 2006, the MDA began monitoring surface water utilizing the tiered structure defined and described in the MDA Surface Water Monitoring Design Document (www.mda.state.mn.us/monitoring). Within the tiered structure, there are three different levels (tiers) of monitoring intensity. Tier 1 site locations are distributed throughout most of the agricultural areas of the state and are sampled four times during an eight week period from May 1st through June 30th. The objective is to provide a general assessment of water quality during peak pesticide detection periods from watersheds throughout the state. At Tier 2 and 3 site locations, the frequency of sampling increases to provide better information for duration assessment or the length of time pesticide concentrations remain at a particular level.

Seven of the 369 base neutral (BN) pesticide samples collected from rivers and streams in 2009 were measured at concentrations greater than the concentrations associated with the established aquatic life standards or reference values. However, there were no exceedences when the concentrations were properly time-weighted to the applicable standard. Two storm flow samples from the upper portion of the Lower South Branch of the Root River contained acetochlor at concentrations of 4.25 µg/L and 12.3 µg/L in May and June (Class 2B, 4-day aquatic life standard 3.6 µg/L). A single grab sample collected from the Beauford Ditch during a February snowmelt event contained metolachlor at 76 µg/L (aquatic life 4-day standard is 23 µg/L). Four samples from the South Branch of the Root River near Carimona collected in June contained atrazine compounds at concentrations greater than the 30-day concentration standard for Class 2A waters of 3.4 µg/L. One of these samples contained atrazine at 4.7 µg/L. The other three samples were measured at concentrations greater than the standard only when the atrazine degradates are added to assess cumulative atrazine concentration. For the atrazine standard, atrazine and atrazine degradates are considered a cumulative concentration.

In addition to the samples discussed above, a sample collected from the Straight River near Faribault had a detectable concentration of diazinon qualified by the MDA laboratory as "present". Samples qualified as "present" generally indicate concentrations of the chemical less than the method reporting limit (MRL). The USEPA Aquatic Life Benchmark values for diazinon (acute = 0.10 µg/L and chronic = 0.17 µg/L) are nearly the same as the MDA method reporting limit of 0.12 µg/L. Expanded sampling will occur at this location in 2010 as a result of the detection.

2009 marked the second consecutive year that chlorpyrifos was detected in precipitation in south central Minnesota. A sample collected on August 24, 2009 had chlorpyrifos quantified at 0.26 µg/L. In addition, there was a detection of chlorpyrifos from the Buffalo River near Georgetown on September 9, 2009 that was qualified by the MDA laboratory as "present". The MPCA reference values for chlorpyrifos (acute = 0.083 µg/L and chronic = 0.041 µg/L) are nearly the same as the MDA method reporting limit of 0.04 µg/L. The Buffalo River was elevated to a Tier 3 site in 2009 as a response to chlorpyrifos detections in the past.

Greater detail on the assessment of the detections of pesticides at levels of concern for the 2009 season is provided in the 2010 Surface Water Quality Monitoring Work Plan developed by the MDA (www.mda.state.mn.us/monitoring).

3.2. Surface water Tier 1 and 2 sampling

From May through June 2009 (mid-May through mid-August for Urban Tier locations), MDA coordinated sampling from 52 surface water sites to evaluate pesticide detection patterns in watersheds throughout agricultural and urban areas of the state. The goal of this effort was to evaluate the presence of commonly used pesticides in the rivers and streams draining agricultural and urban areas of the state. The sampling protocol was generally consistent with the historic sampling conducted by MDA (2006 – 2008). At least four sites were sampled from each PMR at the Tier 1 and Tier 2 levels, except PMRs 2 and 3 which had limited pesticide samples collected from rivers and streams due to the low amount of overall pesticide use in those areas. Many of the sites sampled at the Tier 1 and Tier 2 level were sampled by cooperators and have been sampled over several years. Returning to the same location allows for the expression of climatic and pesticide use variability that may not be apparent in any given year. Additional information regarding specific locations can be found in the MDA 2010 Surface Water Quality Monitoring Work Plan.

3.2.1. 2009 Tier 1 and 2 results

Samples were collected at the Tier 1 and Tier 2 level from the 52 locations shown on Figures 25 and 26. During the 2009 season, 179 samples were collected from the Tier 1 sites and 60 samples were collected from the Tier 2 sites. A main objective was to collect grab samples from each stream during major storm events once in each of the four two-week periods beginning on May 1 and ending on June 30. If no storm events were anticipated during a given period, a base flow grab sample was collected near the end of the two-week period. Analysis was generally limited to the base neutral pesticide list. Additionally, some non-target analytes were reported by the laboratory if they were detected in the routine analysis of samples. All analysis was conducted by the MDA Laboratory in St. Paul. Inorganic samples were collected for analysis at most locations as well. Inorganic analytes include the nutrients nitrate-nitrogen, orthophosphorus, total phosphorus and limited samples for ammonia-N. A small number of samples for total suspended solids were also collected at some sites. Results for inorganic analyses will be discussed in Section 6.

Two new sites in northern and northeastern Minnesota were sampled in 2009 in response to pesticide detections in lakes. Pesticide use is limited in these areas. The Kawishiwi River near Winton did not have pesticide compounds detected. However, the Big Fork River at Big Falls did have two samples with detectable levels of atrazine or atrazine degradates. The detections in the Big Fork River may have been a result of atmospheric deposition of pesticides into the watershed, as was the assumed case with lakes in this region when monitoring occurred in 2007 (See Minnesota National Lakes Assessment Project: Pesticide in Minnesota Lakes, 2008).

Urban tiered sampling has a slightly longer season, from mid-May through mid-August. The objective is the same, to collect grab samples from each stream during major storm events once in each two-week period through that time frame. If no storm events were anticipated during a period, a base flow grab sample was taken near, or at, the end of the two week period. Along

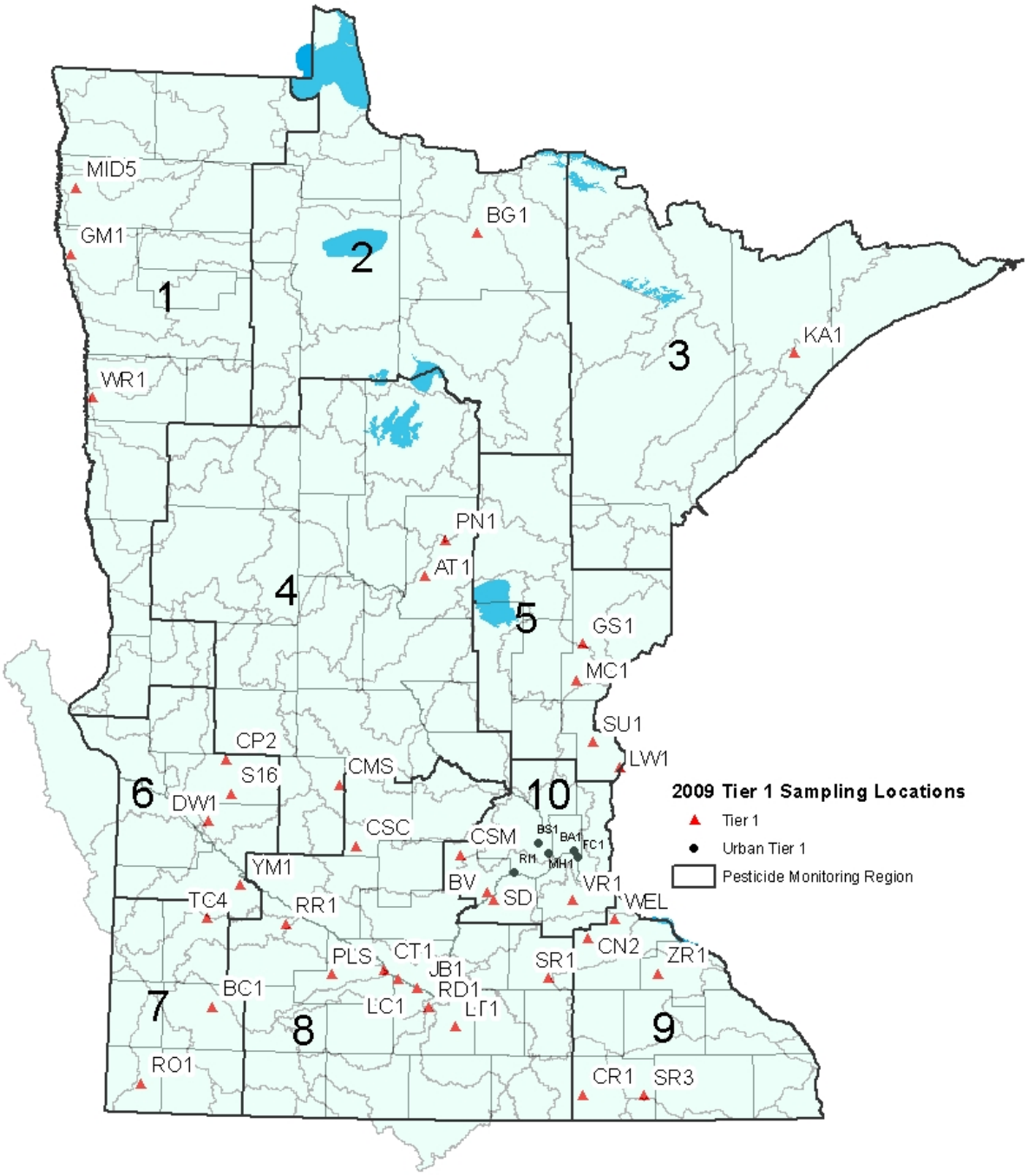


Figure 25. Tier 1 2009 surface water sampling locations.

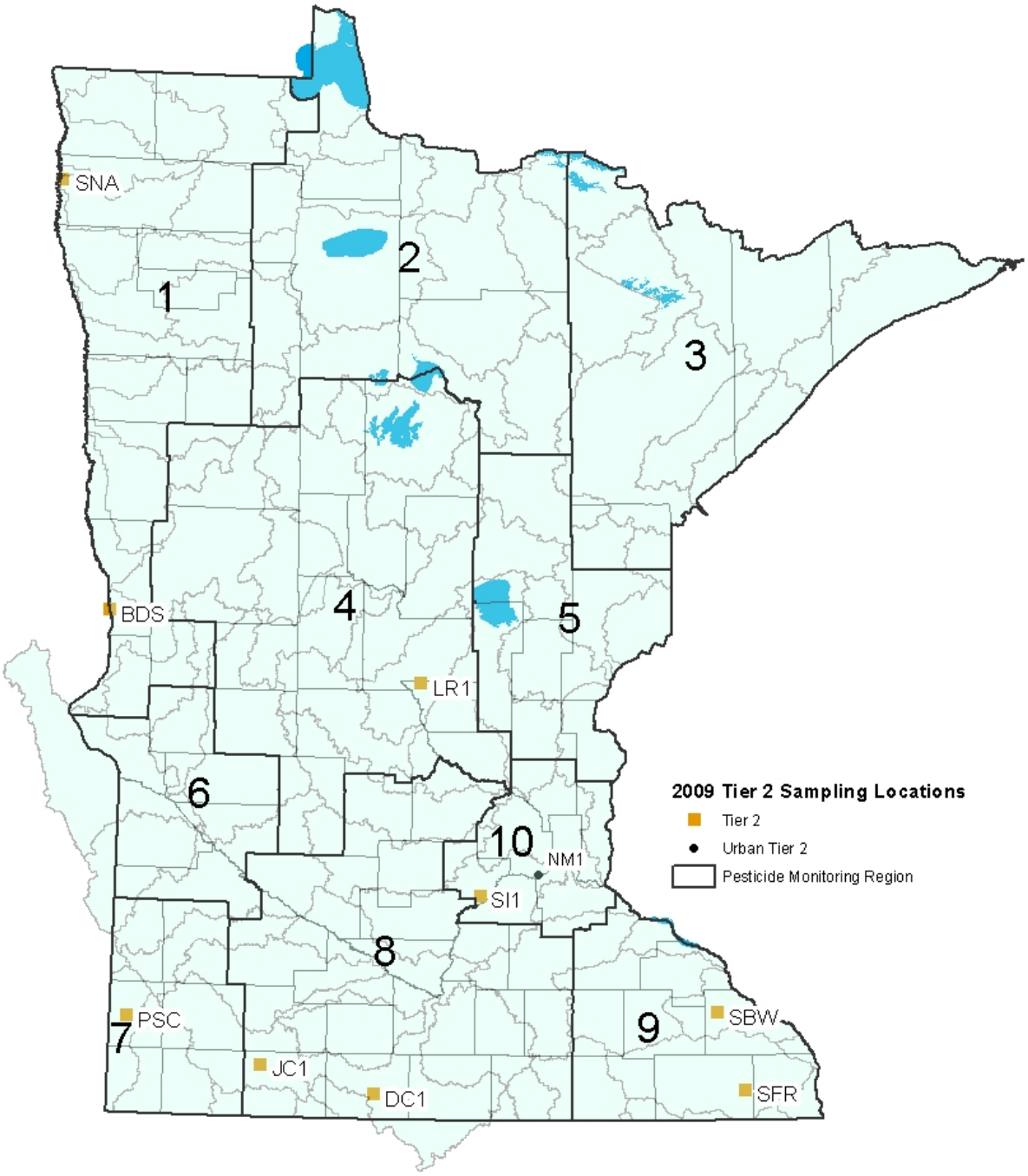


Figure 26. Tier 2 2009 surface water sampling locations.

with base neutral analysis, acid herbicides were also collected. All analysis was conducted by the MDA Laboratory in St. Paul.

A summary of all MDA Tier 1 and Tier 2 surface water monitoring site names and physical characteristics are provided in Appendix 4. A summary of the water quality results can be found in Appendix 5. MDA and STORET ID numbers for current and historic stream monitoring locations are found in Appendix 6.

As Tables 20 and 21 indicate, pesticide samples collected during storm flow events generally had a greater frequency and magnitude of detection when compared to samples collected during base flow periods. Atrazine was the most commonly detected pesticide in 2009. Metolachlor, acetochlor and dimethenamid were also frequently found. A breakdown product of atrazine, deethylatrazine, was the second most frequently detected compound at both Tier 1 and 2 sites. Data from the limited sampling for acid herbicides from urban streams is discussed in more detail in the Urban Tier 1 and Tier 2 sampling section (Section 4).

Table 22 presents statistics for the four most frequently detected pesticides by PMR. There were two samples collected in PMR 9 whose concentration exceeded 50 percent of the acetochlor standard and one detection of atrazine, also from PMR 9, that exceeded 50 percent of the standard. All of these detections came from the same location on the Lower South Branch of the Root River. As a result, this location will be elevated to the Tier 2 level and will be sampled more frequently for pesticides in 2010. Overall, statewide detection frequency ranged from 80 percent for atrazine to 16 percent for dimethenamid.

Table 20. 2009 Tier 1 base neutrals and acid herbicides surface water results.

Tier 1 2009 Base Neutral Pesticides Total n = 179	Total Detects	Total % Detects	Total Max (µg/L)	Total Median (µg/L)	Base flow n = 110				Storm flow n = 69			
					Base flow Detects	Base flow % Detects	Base flow Max (µg/L)	Base flow Median (µg/L)	Storm flow Detects	Storm flow % Detects	Storm flow Max (µg/L)	Storm flow Median (µg/L)
2,6-Dichlorobenzamide (not a target analyte)	5	3%	0.49	nd	1	1%	0.09	nd	4	6%	0.49	nd
Acetochlor	92	51%	12.3	P	53	48%	0.28	nd	39	57%	12.3	P
Atrazine	140	78%	9.4	P	80	73%	0.34	P	60	87%	9.4	P
Deisopropylatrazine	4	2%	0.23	nd	2	2%	P	nd	2	3%	0.23	nd
Deethylatrazine	111	62%	0.73	P	65	59%	0.1	P	46	67%	0.73	P
Boscalid	1	1%	6.8	nd	0	0%	nd	nd	1	1%	6.8	nd
Diazinon	1	1%	P	nd	1	1%	P	nd	0	0%	nd	nd
Dichlobenil (not a target analyte)	1	1%	P	nd	0	0%	nd	nd	1	1%	P	nd
Dimethenamid	34	19%	0.27	nd	17	15%	P	nd	17	25%	0.27	nd
Metolachlor	89	50%	4.45	nd	50	45%	0.23	nd	39	57%	4.45	P
Oxadiazon (not a target analyte)	1	1%	0.25	nd	0	0%	nd	nd	1	1%	0.25	nd
Prometon (not a target analyte)	5	3%	2.24	nd	1	1%	0.74	nd	4	6%	2.24	nd
Propazine (not a target analyte)	2	1%	P	nd	0	0%	nd	nd	2	3%	P	nd
Simazine (not a target analyte)	1	1%	P	nd	1	1%	P	nd	0	0%	nd	nd
Tetraconazole	2	1%	P	nd	2	2%	P	nd	0	0%	nd	nd
Tier 1 2009 Acid Herbicides Total n = 29	**Total Detects**	**Total % Detects**	**Total Max (µg/L)**	**Total Median (µg/L)**	**Base flow n = 7**				**Storm flow n = 22**			
					Base flow Detects	**Base flow % Detects**	**Base flow Max (µg/L)**	**Base flow Median (µg/L)**	**Storm flow Detects**	**Storm flow % Detects**	**Storm flow Max (µg/L)**	**Storm flow Median (µg/L)**
2,4-D	16	55%	6.0	P	2	29%	1.91	nd	14	64%	6.0	0.3
Dicamba	14	48%	0.45	nd	3	43%	P	nd	11	50%	0.45	P
Dichlorprop	1	3%	P	nd	0	0%	nd	nd	1	5%	P	nd
MCPA	8	28%	0.48	nd	1	14%	P	nd	7	32%	0.48	nd
MCPP	9	31%	0.97	nd	0	0%	nd	nd	9	41%	0.97	nd

Table 21. 2009 Tier 2 base neutral and acid herbicide surface water results.

Tier 2 2009 Base Neutral Pesticides Total n = 60	Total Detects	Total % Detects	Total Max (µg/L)	Total Median (µg/L)	Base flow n = 41				Storm flow n = 19			
					Base flow Detects	Base flow % Detects	Base flow Max (µg/L)	Base flow Median (µg/L)	Storm flow Detects	Storm flow % Detects	Storm flow Max (µg/L)	Storm flow Median (µg/L)
Acetochlor	33	55%	0.32	P	23	56%	0.14	P	10	53%	0.32	P
Atrazine	52	87%	0.58	P	37	90%	0.58	P	15	79%	0.5	0.06
Deisopropylatrazine	5	8%	P	nd	4	10%	P	nd	1	5%	P	nd
Deethylatrazine	47	78%	0.19	P	35	85%	0.19	P	12	63%	0.12	P
Dimethenamid	4	7%	0.06	nd	2	5%	P	nd	2	11%	0.06	nd
Metolachlor	39	65%	1.44	P	26	63%	1.44	P	13	68%	0.72	P
Metribuzin	1	2%	P	nd	0	0%	nd	nd	1	5%	P	nd
Metribuzin DADK	3	5%	P	nd	2	5%	P	nd	1	5%	P	nd
Prometon (not a target analyte)	3	5%	P	nd	2	5%	P	nd	1	5%	P	nd
Tier 2 2009 Acid Herbicides Total n = 10	**Total Detects**	**Total % Detects**	**Total Max (µg/L)**	**Total Median (µg/L)**	**Base flow n = 5**				**Storm flow n = 5**			
					Base flow Detects	**Base flow % Detects**	**Base flow Max (µg/L)**	**Base flow Median (µg/L)**	**Storm flow Detects**	**Storm flow % Detects**	**Storm flow Max (µg/L)**	**Storm flow Median (µg/L)**
2,4-D	9	90%	4.8	0.21	4	80%	0.2	0.2	5	100%	4.8	0.36
Dicamba	6	60%	P	P	2	40%	P	nd	4	80%	P	P
MCPA	1	10%	0.24	nd	0	0%	nd	nd	1	20%	0.24	nd
MCPP	2	20%	0.25	nd	0	0%	nd	nd	2	40%	0.25	nd
Triclopyr	3	30%	0.55	nd	0	0%	nd	nd	3	60%	0.55	P

Table 22. 2009 Tier 1 and Tier 2 acetochlor, atrazine, dimethenamid and metolachlor surface water results by PMR.

Surface Water Samples Collected in 2009	Positive Samples/Total Samples (and %) for Pesticide	Maximum Value Detected (µg/L)	90th percentile (µg/L)	75th percentile (µg/L)	Median Value of Samples (µg/L)	Samples, Exceeding 50% of Reference Value (%)	Positive Samples/Total Samples (and %) for Pesticide	Maximum Value Detected (µg/L)	90th percentile (µg/L)	75th percentile (µg/L)	Median Value of Samples (µg/L)	Samples Exceeding 50% of a Reference Value (%)
	Acetochlor						**Atrazine**					
PMR 1	6/22 (27%)	0.06	P	nd	nd	0 (0%)	15/22 (68%)	0.06	0.05	P	P	0 (0%)
PMR 2	0/4 (0%)	nd	nd	nd	nd	0 (0%)	2/4 (50%)	P	P	P	nd	0 (0%)
PMR 3	0/4 (0%)	nd	nd	nd	nd	0 (0%)	0/4 (0%)	nd	nd	nd	nd	0 (0%)
PMR 4	6/17 (35%)	0.07	P	P	nd	0 (0%)	11/17 (65%)	P	P	P	P	0 (0%)
PMR 5	4/16 (25%)	P	P	nd	nd	0 (0%)	11/16 (69%)	P	P	P	P	0 (0%)
PMR 6	10/16 (63%)	0.06	P	P	P	0 (0%)	13/16 (81%)	0.09	P	P	P	0 (0%)
PMR 7	11/16 (69%)	0.57	0.2	P	P	0 (0%)	16/16 (100%)	0.26	0.2	0.1	P	0 (0%)
PMR 8	46/51 (90%)	0.6	0.13	0.06	P	0 (0%)	51/51 (100%)	0.9	0.1	0.05	P	0 (0%)
PMR 9	23/31 (74%)	12.3	0.69	0.13	P	2 (7%)	31/31 (100%)	9.4	0.58	0.19	0.07	1 (3%)
PMR 10	19/62 (31%)	0.08	P	P	nd	0 (0%)	42/62 (68%)	0.5	0.08	0.06	P	0 (0%)
Statewide Total	125/239 (52%)	12.3	0.08	P	P	2 (1%)	192/239 (80%)	9.4	0.1	0.05	P	1 (0.4%)
	Dimethenamid						**Metolachlor**					
PMR 1	0/22 (0%)	nd	nd	nd	nd	0 (0%)	3/22 (14%)	P	nd	nd	nd	0 (0%)
PMR 2	0/4 (0%)	nd	nd	nd	nd	0 (0%)	0/4 (0%)	nd	nd	nd	nd	0 (0%)
PMR 3	0/4 (0%)	nd	nd	nd	nd	0 (0%)	0/4 (0%)	nd	nd	nd	nd	0 (0%)
PMR 4	0/17 (0%)	nd	nd	nd	nd	0 (0%)	4/17 (24%)	P	P	nd	nd	0 (0%)
PMR 5	0/16 (0%)	nd	nd	nd	nd	0 (0%)	2/16 (13%)	P	nd	nd	nd	0 (0%)
PMR 6	4/16 (25%)	P	P	nd	nd	0 (0%)	4/16 (25%)	P	P	nd	nd	0 (0%)
PMR 7	2/16 (13%)	P	nd	nd	nd	0 (0%)	9/16 (56%)	0.78	0.11	P	P	0 (0%)
PMR 8	14/51 (27%)	0.19	P	P	nd	0 (0%)	48/51 (94%)	1.43	0.12	0.08	P	0 (0%)
PMR 9	15/31 (48%)	0.27	0.15	P	nd	0 (0%)	27/31 (87%)	4.45	1.01	0.22	0.07	0 (0%)
PMR 10	3/62 (5%)	0.1	nd	nd	nd	0 (0%)	31/62 (50%)	0.72	0.13	P	nd	0 (0%)
Statewide Total	38/239 (16%)	0.27	P	nd	nd	0 (0%)	128/239 (54%)	4.45	0.12	P	P	0 (0%)

3.3. Surface water Tier 3 sampling

Minnesota Department of Agriculture's long-term intensive surface water monitoring efforts (known as Tier 3) has historically focused on two primary areas of the state: southeastern Minnesota and the Minnesota River Basin. In 2009, an additional Tier 3 location was established in the Red River Valley in northwestern Minnesota on the Buffalo River near Georgetown. As a result, in 2009 there were seven MDA Tier 3 monitoring sites in operation, three of which are located in the Minnesota River Basin, three in southeastern Minnesota and one in the Red River Basin. Surface water monitoring at most of the intensively monitored sites includes both equal-flow increment (EFI) and equal-time increment (ETI) composite sample collection during storm flow periods using stage activated automated samplers. Since 2006, the MDA has made an effort to collect storm flow samples on an ETI basis at Tier 3 sites to generate data that was more readily comparable to duration based standards or reference values. Base flow periods are typically characterized by grab samples collected between storm events. In some instances, when presenting data, MDA staff has elected to present composite sample concentrations collected before and after 2006 in the same table or graph. In these instances, the contrasting data is typically foot-noted to highlight the different nature of the collection method.

Monitoring data for long-term sites sampled prior to this report can be found in previously published MDA reports, as well as in the datasets used to prepare these reports. A summary of MDA Tier 3 surface water monitoring site names and physical characteristics are provided in Appendix 4, water quality results in Appendix 5 and MDA and STORET ID numbers in Appendix 6.

3.3.1. 2009 Tier 3 results

The 2009 Tier 3 sites included the Beauford Ditch, Le Sueur River and Seven Mile Creek in the Minnesota River Basin (south central); the Middle Branch of the Whitewater, the North Branch of the Root River and South Branch of the Root River in southeastern Minnesota; and the Buffalo River near Georgetown in northwestern Minnesota (Figure 27).

During the 2009 monitoring season, 131 pesticide samples were collected from these seven sites (primarily during April, May, June and July). Table 23 presents pesticide information related to the frequency of detections, as well as information on the general flow condition of the river or stream as it relates to pesticide detection. Of these, there were a few samples with pesticide concentrations that are notable.

A grab sample was collected from flow over channel ice in the Beauford Ditch during an unusual snowmelt event on February 11, 2009. This snowmelt grab sample had a detection of metolachlor at 76 μg/L. This is the highest metolachlor concentration ever measured by the MDA in ambient surface water monitoring, and is well above the concentration associated with MPCA 7050 chronic standard of 23 μg/L but below the maximum standard of 271 μg/L. Other pesticide compounds, including acetochlor and dimethenamid, were also detected in the sample but at levels below the method reporting limits. It is likely that the measured metolachlor concentration was related to fall application of the product. Because the sample was collected during a period not typically associated with elevated pesticide concentration, insufficient samples were collected to assess the associated concentration duration. The data will be provided to MPCA for further assessment and expanded snowmelt sampling will occur at all Tier 3 sites in 2010.

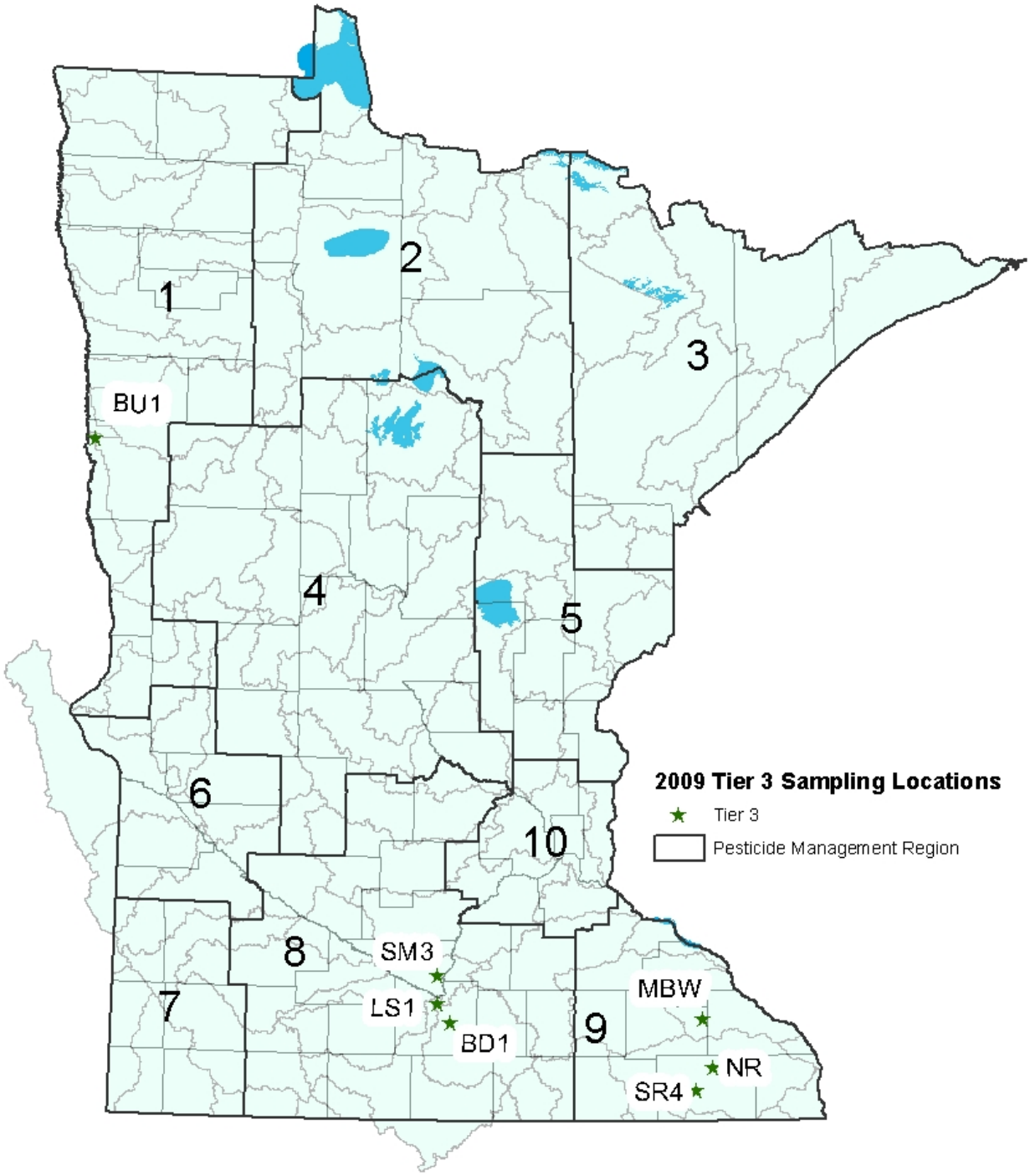


Figure 27. Tier 3 2009 surface water sampling locations.

Table 23. 2009 Tier 3 base neutrals and chloroacetanilide degradate surface water results.

Tier 3 2009 Base Neutral Pesticides Total n = 131	Total Detects	Total % Detects	Total Max (µg/L)	Total Median (µg/L)	Base flow n = 50				Storm flow n = 78			
					Base flow Detects	Base flow % Detects	Base flow Max (µg/L)	Base flow Median (µg/L)	Storm flow Detects	Storm flow % Detects	Storm flow Max (µg/L)	Storm flow Median (µg/L)
Acetochlor	68	53%	1.88	P	15	30%	0.08	nd	53	68%	1.88	0.06
Atrazine	111	87%	4.7	P	42	84%	0.12	P	69	88%	4.7	0.08
Deisopropylatrazine	15	12%	P	nd	5	10%	P	nd	10	13%	P	nd
Deethylatrazine	109	85%	0.48	0.05	41	82%	0.14	P	68	87%	0.48	0.05
Chlorpyrifos	1	1%	P	nd	1	2%	P	nd	0	0%	nd	nd
Dimethenamid	45	35%	0.33	nd	3	6%	P	nd	42	54%	0.33	P
Metolachlor	97	76%	76.0	P	30	60%	0.32	P	67	86%	76.0	0.1
Metribuzin	6	5%	0.12	nd	0	0%	nd	nd	6	8%	0.12	nd
Prometon (not a target analyte)	2	2%	P	nd	1	2%	P	nd	1	1%	P	nd
Propazine (not a target analyte)	9	7%	P	nd	0	0%	nd	nd	9	12%	P	nd
Propiconazole	4	3%	P	nd	0	0%	nd	nd	4	5%	P	nd
Simazine (not a target analyte)	3	2%	P	nd	0	0%	nd	nd	3	4%	P	nd
Tetraconazole	5	4%	P	nd	0	0%	nd	nd	5	6%	P	nd
Tier 3 2009 Chloroacetanilide Degradates Total n = 68	**Total Detects**	**Total % Detects**	**Total Max (µg/L)**	**Total Median (µg/L)**	**Base flow n = 27**				**Storm flow n = 41**			
					Base flow Detects	**Base flow % Detects**	**Base flow Max (µg/L)**	**Base flow Median (µg/L)**	**Storm flow Detects**	**Storm flow % Detects**	**Storm flow Max (µg/L)**	**Storm flow Median (µg/L)**
Acetochlor ESA	48	71%	1.84	0.13	20	74%	1.1	0.09	28	68%	1.84	0.21
Acetochlor OXA	35	51%	2.29	0.1	12	44%	1.68	nd	23	56%	2.29	0.11
Alachlor ESA	43	63%	0.61	0.13	23	85%	0.61	0.19	20	49%	0.25	nd
Alachlor OXA	5	7%	0.07	nd	3	11%	0.07	nd	2	5%	0.07	nd
Dimethenamid ESA	7	10%	0.16	nd	1	4%	0.13	nd	6	15%	0.16	nd
Dimethenamid OXA	3	4%	0.2	nd	1	4%	0.2	nd	2	5%	0.1	nd
Metolachlor ESA	59	87%	2.07	0.68	25	93%	1.28	0.71	34	83%	2.07	0.17
Metolachlor OXA	32	47%	0.65	nd	12	44%	0.42	nd	20	49%	0.65	nd

During the month of June, atrazine concentrations were measured in the South Branch of the Root River near Carimona at levels of concern. When the atrazine degradates were added to the parent compound concentration, levels were measured temporarily above the numeric concentration associated with the 30-day standard for 2A waters (3.4 µg/L) during June 8-9, 2009, and again on June 18-19, 2009. However, the events were of relatively short duration, and the 30-day duration assessment indicates an exceedance of the standard did not occur. Based on the samples collected, the 4-day MPCA 7050 atrazine standard of 10 µg/L was not exceeded during these two events, or at any of the locations monitored by MDA in 2009.

Table 24 presents a summary of the 2009 Tier 3 monitoring data by chemical and by site. For most pesticide compounds, samples collected during storm flow events have a higher detection frequency than samples collected during base flow periods. Many of the maximum concentrations observed in 2009 were collected during storm flow events. Two degradates of atrazine, deisopropylatrazine and deethylatrazine, had similar maximum concentrations and detection frequencies in both storm flow and base flow. There were a number of pesticide compounds that were only detected in samples collected during storm flow events.

Degradate monitoring assists in the assessment of the long-term fate of pesticides applied to the landscape. The 2009 surface water monitoring data for the primary (ESA) and secondary (OXA) chloroacetanilide degradates of acetochlor, alachlor, dimethenamid and metolachlor is presented in Table 25. Approximately 68 surface water samples were analyzed by the MDA laboratory for chloroacetanilide degradates at Tier 3 sites. Detection frequency and magnitude of detection for many of the degradate concentrations were higher than for the parent compounds found in Table 24. Similar to 2007 and 2008, in 2009 the chemical alachlor was not found as a parent but alachlor ESA was found 100 percent of the time. Aquatic life standards are currently available for some degradates (Table 5). There is a general indication from the available literature that the chloroacetanilide degradates are less toxic than the parent compounds.

Table 24. Pesticide and pesticide degradate analyte detections in storm event and base flow samples for MDA Tier 3 surface water monitoring sites, 2009.

2009		Storm Event Samples (µg/L)					Base Flow Samples (µg/L)				
Base Neutral Pesticide Analyte	Tier 3 Surface Water Monitoring Site	No. of samples	% Detection	Max. Concentration	Date of Max.	Median Concentration	No. of samples	% Detection	Max. Concentration	Date of Max.	Median Concentration
Acetochlor	Beauford Ditch	6	83%	0.43	May 6	0.05	7	71%	0.06	Oct 7	P
	Buffalo River-Georgetown	22	50%	0.44	May 28	nd	4	25%	P	July 6	nd
	Le Sueur River-Hwy66	13	100%	0.47	June 24	0.16	7	43%	0.08	May 5	nd
	Root River-North Branch	16	56%	0.92	June 9	P	6	17%	0.06	May 14	nd
	Root River-South Branch-Carimona	16	75%	1.23	June 9	0.26	7	14%	P	May 14	nd
	Seven Mile Creek #3	2	0%	nd	-	nd	10	40%	0.07	May 29	nd
	Whitewater River-Middle Branch	3	100%	1.88	May 27	0.82	9	0%	nd	-	nd
Atrazine	Beauford Ditch	6	67%	0.08	May 6	P	7	71%	P	multiple	P
	Buffalo River-Georgetown	22	77%	0.88	May 28	0.06	4	75%	0.12	July 30	0.05
	Le Sueur River-Hwy66	13	92%	0.29	June 24	0.06	7	57%	P	multiple	P
	Root River-North Branch	16	100%	3.25	June 9	0.08	6	100%	0.11	May 14	0.05
	Root River-South Branch-Carimona	16	100%	4.7	June 18	1.05	7	100%	0.07	June 27	P
	Seven Mile Creek #3	2	50%	P	Feb 11	nd	10	80%	0.11	June 29	P
	Whitewater River-Middle Branch	3	100%	0.69	May 27	0.35	9	100%	0.08	multiple	0.08
Deisopropylatrazine	Root River-North Branch	16	13%	P	multiple	nd	6	17%	P	May 14	nd
	Root River-South Branch-Carimona	16	50%	P	multiple	nd	7	14%	P	May 14	nd
	Whitewater River-Middle Branch	3	0%	nd	-	nd	9	33%	P	multiple	nd

Table 24 continued. Pesticide and pesticide degradate analyte detections in storm event and base flow samples for MDA Tier 3 surface water monitoring sites, 2009.

2009		Storm Event Samples (µg/L))					Base Flow Samples (µg/L)				
Base Neutral Pesticide Analyte	Tier 3 Surface Water Monitoring Site	No. of samples	% Detection	Max. Concentration	Date of Max.	Median Concentration	No. of samples	% Detection	Max. Concentration	Date of Max.	Median Concentration
Deethylatrazine	Beauford Ditch	6	50%	P	multiple	nd	7	57%	P	multiple	P
	Buffalo River-Georgetown	22	73%	0.05	multiple	P	4	75%	0.05	July 30	P
	Le Sueur River-Hwy66	13	92%	0.05	multiple	P	7	43%	P	multiple	nd
	Root River-North Branch	16	100%	0.33	June 19	0.07	6	100%	0.08	Aug 10	0.07
	Root River-South Branch-Carimona	16	100%	0.48	June 18	0.17	7	100%	0.1	Aug 10	0.07
	Seven Mile Creek #3	2	100%	P	Multiple	P	10	90%	0.05	Jan 30	P
	Whitewater River-Middle Branch	3	100%	0.12	June 8	0.1	9	100%	0.14	Aug 10	0.11
Chlorpyrifos	Buffalo River-Georgetown	22	0%	nd	-	nd	4	25%	P		nd
Dimethenamid	Beauford Ditch	6	100%	0.06	Apr 27	P	7	29%	P	multiple	nd
	Buffalo River-Georgetown	22	27%	0.33	June 20	nd	4	0%	nd	-	nd
	Le Sueur River-Hwy66	13	85%	0.06	June 24	P	7	0%	nd	-	nd
	Root River-North Branch	16	44%	0.23	June 9	nd	6	17%	P	May 14	nd
	Root River-South Branch-Carimona	16	56%	0.11	June 9	P	7	0%	nd	-	nd
	Seven Mile Creek #3	2	50%	P	Feb 11	nd	10	0%	nd	-	nd
	Whitewater River-Middle Branch	3	67%	P	multiple	P	9	0%	nd	-	nd
Metolachlor	Beauford Ditch	6	100%	76.0	Feb 11	0.12	7	100%	0.32	Apr 23	0.12
	Buffalo River-Georgetown	22	59%	1.47	May 28	P	4	50%	P	multiple	nd
	Le Sueur River-Hwy66	13	100%	9.44	Feb 11	0.1	7	100%	0.11	May 5	P
	Root River-North Branch	16	94%	3.15	June 9	0.08	6	67%	P	multiple	P
	Root River-South Branch-Carimona	16	100%	5.0	June 8	0.77	7	57%	P	multiple	P
	Seven Mile Creek #3	2	100%	0.1	Feb 11	0.07	10	60%	P	multiple	P
	Whitewater River-Middle Branch	3	67%	0.45	May 28	P	9	0%	nd	-	nd

Table 24 continued. Pesticide and pesticide degradate analyte detections in storm event and base flow samples for MDA Tier 3 surface water monitoring sites, 2009.

2009		Storm Event Samples (µg/L)					Base Flow Samples (µg/L)				
Base Neutral Pesticide Analyte	**Tier 3 Surface Water Monitoring Site**	**No. of samples**	**% Detection**	**Max. Concentration**	**Date of Max.**	**Median Concentration**	**No. of samples**	**% Detection**	**Max. Concentration**	**Date of Max.**	**Median Concentration**
Metribuzin	Buffalo River-Georgetown	22	18%	0.12	June 20	nd	4	0%	nd	-	nd
	Le Sueur River-Hwy66	13	8%	P	June 24	nd	7	0%	nd	-	nd
	Whitewater River-Middle Branch	3	33%	P	May 28	nd	9	0%	nd	-	nd
Prometon (not a target analyte)	Root River-North Branch	16	6%	P	June 19	nd	6	0%	nd	-	nd
	Le Sueur River-Hwy66	13	0%	nd	-	nd	7	14%	P	Oct 7	nd
Propazine (not a target analyte)	Root River-North Branch	16	19%	P	multiple	nd	6	0%	nd	-	nd
	Root River-South Branch-Carimona	16	38%	P	multiple	nd	7	0%	nd	-	nd
Propiconazole	Buffalo River-Georgetown	22	18%	P	multiple	nd	4	0%	nd	-	nd
Simazine (not a target analyte)	Root River-North Branch	16	19%	P	multiple	nd	6	0%	nd	-	nd
Tetraconazole	Buffalo River-Georgetown	22	23%	P	multiple	nd	4	0%	nd	-	nd

Table 25. Chloroacetanilide pesticide degradate analyte detections in storm event and base flow samples for MDA Tier 3 surface water monitoring sites, 2009.

2009		Storm Event Samples (µg/L)					Base Flow Samples (µg/L)				
Chloroacetanilide Pesticide Degradate Analyte	Tier 3 Surface Water Monitoring Site	No. of samples	% Detection	Max. Concentration	Date of Max.	Median Concentration	No. of samples	% Detection	Max. Concentration	Date of Max.	Median Concentration
Acetochlor ESA	Beauford Ditch	1	100%	1.28	Oct 30	1.28	4	100%	1.1	Oct 7	0.74
	Buffalo River-Georgetown	21	36%	0.28	June 25	nd	4	25%	0.09	June 6	nd
	Le Sueur River-Hwy66	4	100%	1.84	June 23	0.59	6	100%	0.44	June 1	0.31
	Root River-North Branch	14	100%	1.2	June 19	0.62	6	50%	0.12	July 27	P
	Root River-South Branch-Carimona	0	0%	nd	-	nd	1	100%	0.1	Feb 4	0.1
	Seven Mile Creek #3	1	100%	0.14	Nov 2	0.14	5	80%	0.52	May 29	0.09
	Whitewater River-Middle Branch	0	0%	nd	-	nd	1	100%	0.09	Feb 4	0.09
Acetochlor OXA	Beauford Ditch	1	100%	0.77	Oct 30	0.77	4	100%	1.68	Oct 7	0.28
	Buffalo River-Georgetown	21	32%	0.37	June 25	nd	4	25%	0.14	July 6	nd
	Le Sueur River-Hwy66	4	100%	2.29	June 23	0.4	6	83%	0.27	Apr 24	0.16
	Root River-North Branch	14	79%	1.02	June 9	0.19	6	0%	nd	-	nd
	Seven Mile Creek #3	1	0%	nd	-	nd	5	40%	0.34	May 29	nd
Alachlor ESA	Beauford Ditch	1	100%	0.25	Oct 30	0.25	4	100%	0.24	June 29	0.21
	Le Sueur River-Hwy66	4	100%	0.21	June 8	0.16	6	100%	0.2	Aug 26	0.16
	Root River-North Branch	14	100%	0.22	Oct 29	0.16	6	100%	0.26	July 27	0.22
	Root River-South Branch-Carimona	0	0%	nd	-	nd	1	100%	0.61	Feb 4	0.61
	Seven Mile Creek #3	1	100%	0.12	Nov 2	0.12	5	100%	0.39	Jan 30	0.23
	Whitewater River-Middle Branch	0	0%	nd	-	nd	1	100%	0.27	Feb 4	0.27
Alachlor OXA	Beauford Ditch	1	100%	0.07	Oct 30	0.07	4	25%	0.07	Oct 7	nd
	Le Sueur River-Hwy66	4	25%	0.07	June 8	nd	6	33%	0.07	multiple	nd

Table 25 continued. Chloroacetanilide pesticide degradate analyte detections in storm event and base flow samples for MDA Tier 3 surface water monitoring sites, 2009.

2009		Storm Event Samples (µg/L)					Base Flow Samples (µg/L)				
Chloroacetanilide Pesticide Degradate Analyte	**Tier 3 Surface Water Monitoring Site**	**No. of samples**	**% Detection**	**Max. Concentration**	**Date of Max.**	**Median Concentration**	**No. of samples**	**% Detection**	**Max. Concentration**	**Date of Max.**	**Median Concentration**
Dimethenamid ESA	Beauford Ditch	1	100%	0.08	Oct 30	0.08	4	25%	0.13	Oct 7	nd
	Root River-North Branch	14	36%	0.16	June 9	nd	6	0%	nd	-	nd
Dimethenamid OXA	Beauford Ditch	1	100%	0.07	Oct 30	0.07	4	25%	0.20	Oct 7	nd
	Root River-North Branch	14	7%	0.1	June 9	nd	6	0%	nd	-	nd
Metolachlor ESA	Beauford Ditch	1	100%	1.08	Oct 30	1.08	4	100%	0.96	June 29	0.87
	Buffalo River-Georgetown	21	64%	0.17	June 20	0.09	4	50%	0.07	multiple	P
	Le Sueur River-Hwy66	4	100%	1.32	June 15	0.92	6	100%	0.79	June 1	0.58
	Root River-North Branch	14	100%	2.07	Oct 29	1.75	6	100%	0.93	May 14	0.77
	Root River-South Branch-Carimona	0	0%	nd	-	nd	1	100%	0.65	Feb 4	0.65
	Seven Mile Creek #3	1	100%	0.8	Nov 2	0.8	5	100%	1.28	June 29	0.95
	Whitewater River-Middle Branch	0	0%	nd	-	nd	1	100%	1.12	Feb 4	1.12
Metolachlor OXA	Beauford Ditch	1	100%	0.47	Oct 30	0.47	4	100%	0.42	Oct 7	0.16
	Buffalo River-Georgetown	21	5%	0.07	June 22	nd	4	0%	nd	-	nd
	Le Sueur River-Hwy66	4	100%	0.28	Multiple	0.27	6	83%	0.18	June 1	0.12
	Root River-North Branch	14	93%	0.65	June 19	0.34	6	17%	0.07	Aug 10	nd
	Seven Mile Creek #3	1	100%	0.16	Nov 2	0.16	5	40%	0.31	May 29	nd

On September 3, 2009, a sample collected from the Buffalo River near Georgetown had a chlorpyrifos concentration reported by the MDA laboratory as "present" but below the MRL of 0.04 µg/L. Because the MRL and reference values for chlorpyrifos are nearly the same (acute = 0.083 µg/L and chronic = 0.041 µg/L), all samples qualified as "present" by the laboratory are considered to be at levels of concern. Chlorpyrifos has been detected at the "present" level in at least one sample from the Buffalo River for each of the last four years. Expanded monitoring in 2010, including the collection of automated time-based composite samples, should provide greater detail for the on-going assessment of chlorpyrifos and other pesticides in the Buffalo River. Table 26 below presents all of the chlorpyrifos detections in surface waters of Minnesota since 2005.

Table 26. Detections of chlorpyrifos in Minnesota surface waters since 2005.

Site	PMR	Date	Chlorpyrifos (µg/L)	Reference Value
Buffalo River- Georgetown	1	7/17/2006	P	0.041 µg/L (4-day aquatic toxicity)
Buffalo River- Georgetown	1	5/23/2007	P	
Buffalo River- Georgetown	1	6/9/2008	P	
Buffalo River- Georgetown	1	9/3/2009	P	
Snake River	1	7/5/2005	P	
Snake River	1	7/18/2006	P	
Beauford Ditch	8	5/13/2005	P	
Le Sueur River- Hwy 66	8	8/2/2007	P	

3.4. Long-term analysis of pesticides in surface water

This section presents a review of MDA's long-term data from surface water sites located throughout the state. In most years, acetochlor, atrazine and metolachlor are detected more often in streams and rivers around the state than any other pesticide. Two of these three chemicals (acetochlor and atrazine) have been identified as "surface water pesticides of concern" by the Commissioner of Agriculture. This section of the report will focus on long-term results for these three chemicals at Tier 1, Tier 2 and Tier 3 locations. Reference values for these chemicals can be found in Table 5 as well as in Table 27.

Table 27. Surface water reference values for acetochlor, atrazine and metolachlor.

Pesticide	Surface Water Reference Value (human health-based value shown if lower than aquatic toxicity value)
Acetochlor	3.6 µg/L (4-day aquatic toxicity) 6.5 µg/L (30-day human health based; applicable only to class 2A and 2Bd waters designated by Minn. R. ch. 7050)
Atrazine	10 µg/L (4-day aquatic toxicity) 3.4 µg/L (30-day human health based; applicable only to class 2A and 2Bd waters designated by Minn. R. ch. 7050)
Metolachlor	23 µg/L (4-day aquatic toxicity) 561 µg/L (30-day human health based; applicable only to class 2A and 2Bd waters designated by Minn. R. ch. 7050)

3.4.1. Long-term results for Tier 1 and Tier 2 from 2004 through 2009

Tables 28 - 30 present annual detection frequency of acetochlor, atrazine, and metolachlor respectively, by PMR from 2004 through 2009. Table 31 provides a statistical summary of acetochlor, atrazine, and metolachlor results by PMR from 2004 through 2009. Formal Tier 1 sample collection began in 2006; however limited Tier 1 type sampling was available back to 2004 and this was used as the starting point for this analysis. Tier 1 and Tier 2 locations have and will change over time, so comparison of these results should be at the PMR level. For a complete list of 2009 sites, see Appendix 4.

Table 31 contains the following four values of interest to the MDA for evaluating pesticide water quality results:

Median – the middle value of the data when ranked from high to low;
75th Percentile – 75 percent of the data is less than this value;
90th Percentile – 90 percent of the data is less than this value;
Maximum – the largest value.

Maximum values are unusual occurrences, frequently much higher than the associated statistics with a data set. A specific maximum concentration may never be repeated, and annual maximum values are impossible to accurately predict.

Samples were collected from all PMRs during May, June and/or July. Data presented in this section from PMR 10 is comparable to other statewide Tier 1 and Tier 2 locations. The Urban Tier 1/Tier 2 sites data have not been used for this specific analysis. The urban locations have a longer sampling season (May through August) to better align with pesticide applications in urban

settings. Data from these sites are presented in Section 4 of this report. Site locations over the period are presented in Figure 27.

Further information on sampling guidelines can be found in the 2009 Tier 1 and Tier 2 sampling section of this report or the MDA Surface Water Monitoring Design Document (www.mda.state.mn.us/monitoring).

Acetochlor

In six years of statewide Tier 1 and Tier 2 surface water pesticide sampling, the highest single concentration of acetochlor was 12.3 µg/L and was detected at the Lower South Branch of the Root River (PMR) on June 8, 2009 (Table 31). Prior to the 2009 detection, the maximum acetochlor concentration measured at a Tier 1 or Tier 2 site was 4.88 µg/L from Pipestone Creek (PMR 7) on June 6, 2008. Maximum acetochlor surface water concentrations in 2009 were less than those measured in 2008 for all PMRs except for PMR 9.

PMRs 7, 8 and 9 usually have higher acetochlor concentrations at the 75th percentile and 90th percentile levels than the other PMRs. In general, percentile concentrations were lower in 2009 than in 2008 at most PMRs. The 90th percentile acetochlor concentration for PMR 9, where the 2009 maximum concentration occurred, was significantly less than the maximum concentration (0.69 µg/L vs. 12.3µg/L).

Additional information on the frequency of surface water detection of acetochlor in each PMR from 2004 through 2009 can be found in Table 28. Acetochlor is detected in streams around the state (with the exception of PMRs 2 and 3); however, the detection frequency is generally highest in PMR 8. In 2009, each PMR had a lower detection frequency than 2008. PMRs 8 and 9 historically have had the most samples collected each year in comparison to the PMRs.

Table 28. Total number of detections and frequency of surface water detections for acetochlor at Tier 1 and Tier 2 locations, 2004 through 2009.

	Detections						Percent Detections					
PMR	**04**	**05**	**06**	**07**	**08**	**09**	**04**	**05**	**06**	**07**	**08**	**09**
1	1/8	3/19	3/18	13/28	16/26	6/23	13%	16%	17%	46%	62%	26%
2	--	--	--	--	--	0/4	--	--	--	--	--	0%
3	--	--	--	--	--	0/4	--	--	--	--	--	0%
4	5/9	16/28	7/25	10/29	9/18	3/13	56%	57%	28%	34%	50%	23%
5	--	5/12	--	3/16	6/16	4/26	--	42%	--	19%	38%	15%
6	1/4	8/12	2/12	4/9	13/16	10/16	25%	67%	17%	44%	81%	63%
7	1/4	13/20	8/22	10/24	13/17	11/16	25%	65%	36%	42%	76%	69%
8	7/9	41/51	46/67	45/64	48/51	50/57	78%	80%	69%	70%	94%	88%
9	8/11	18/42	13/47	18/44	28/31	23/31	73%	43%	28%	41%	90%	74%
10	12/12	9/25	7/22	7/25	17/22	15/25	83%	36%	32%	28%	77%	60%
Statewide	33/57	113/209	86/213	110/239	150/197	122/215	58%	54%	40%	46%	76%	57%

Atrazine

The maximum atrazine surface water concentration detected at a Tier 1 or Tier 2 location was

13.2 µg/L from Silver Creek (PMR 10) on June 8, 2005 (Table 31). During 2009, a maximum measured concentration of 9.40 µg/L was detected at the Lower South Branch of the Root River on June 8 (PMR 9). In 2009, maximum atrazine concentrations in all PMRs (except PMRs 8 and 9), were less than in 2008. In addition, all PMRs had lower 90th percentile levels than in 2008. Atrazine concentration median values in each PMR ranged from non-detect to 0.19 µg/L in 2009.

Additional information on the frequency of atrazine surface water detection in each PMR from 2004 through 2009 can be found in Table 29. Atrazine is commonly detected in streams around the state, frequently at levels greater than 80 percent. The lowest frequency of detection recorded for PMR 4 occurred in 2009 at 54 percent. Tier 1 monitoring was conducted for PMR 2 and PMR 3 for the first time in 2009. PMR 2 had a 50 percent frequency of detection (four samples collected), while atrazine was not detected in PMR 3 (four samples collected).

Table 29. Total number of detections and frequency surface water of detections for atrazine at Tier 1 and Tier 2 locations, 2004 through 2009.

	Detections						Percent Detections					
PMR	**04**	**05**	**06**	**07**	**08**	**09**	**04**	**05**	**06**	**07**	**08**	**09**
1	8/8	18/19	11/18	28/28	20/26	15/23	100%	95%	61%	100%	77%	65%
2	--	--	--	--	--	2/4	--	--	--	--	--	50%
3	--	--	--	--	--	0/4	--	--	--	--	--	0%
4	9/9	26/28	24/25	28/29	18/18	7/13	100%	93%	96%	97%	100%	54%
5	--	12/12	--	14/16	13/16	21/26	--	100%	--	88%	81%	81%
6	4/4	12/12	12/12	9/9	16/16	13/16	100%	100%	100%	100%	100%	81%
7	4/4	20/20	22/22	24/24	16/17	16/16	100%	100%	100%	100%	94%	100%
8	8/9	50/51	52/67	62/64	49/51	56/57	89%	98%	92%	97%	96%	98%
9	11/11	42/42	45/47	44/44	31/31	31/31	100%	100%	96%	100%	100%	100%
10	12/12	25/25	21/22	23/25	21/22	25/25	100%	100%	95%	92%	95%	100%
Statewide	56/57	205/209	197/213	232/239	184/197	186/215	98%	98%	92%	97%	93%	87%

Metolachlor

The overall maximum metolachlor surface water concentration at a Tier 1 or Tier 2 site of 14.0 µg/L was detected in the Cannon River near Welch, MN on June 2, 2004 (Table 31). In 2009 the highest metolachlor concentration detected at a Tier 1 or Tier 2 site was 4.45 µg/L, detected at the Lower South Branch of the Root River on June 8 (PMR 9). The maximum concentration of metolachlor has occurred in PMR 9 for five of the six years presented, including 2009. The median metolachlor concentration for each PMR in 2009 ranged from non-detect to 0.07 µg/L.

Information on the frequency of surface water detection of metolachlor in each PMR from 2004 through 2009 can be found in Table 30. With the exception of PMR 2 and PMR 3, metolachlor is detected in streams around the state. In 2009, metolachlor detection frequency in each PMR was less than in 2008. The maximum frequency of metolachlor detection in 2009 was in PMR 9 at 87 percent.

Table 30. Total number of detections and frequency of surface water detections for metolachlor at Tier 1 and Tier 2 locations, 2004 through 2009.

	Detections						Percent Detections					
PMR	**04**	**05**	**06**	**07**	**08**	**09**	**04**	**05**	**06**	**07**	**08**	**09**
1	6/8	8/19	8/18	20/28	12/26	3/23	75%	42%	44%	71%	46%	13%
2	--	--	--	--	--	0/4	--	--	--	--	--	0%
3	--	--	--	--	--	0/4	--	--	--	--	--	0%
4	1/9	20/28	8/25	17/29	12/18	4/13	11%	71%	32%	59%	67%	31%
5	--	4/12	--	3/16	9/16	2/26	--	33%	--	19%	56%	8%
6	3/4	12/12	6/12	5/9	13/16	4/16	75%	100%	50%	56%	81%	25%
7	2/4	18/20	16/22	19/24	14/17	9/16	50%	90%	73%	79%	82%	56%
8	7/9	48/51	61/67	61/64	46/51	48/57	78%	94%	91%	95%	90%	84%
9	8/11	30/42	31/47	40/44	31/31	27/31	91%	71%	66%	91%	100%	87%
10	12/12	20/25	16/22	19/25	21/22	21/25	100%	80%	73%	76%	95%	84%
Statewide	39/57	160/209	146/213	184/239	158/197	121/215	68%	77%	69%	77%	80%	56%

Table 31. Tier 1 and Tier 2 acetochlor, atrazine and metolachlor surface water concentration results 2004 through 2009.

	Acetochlor						Atrazine							Metolachlor						
Maximum (µg L)							**Maximum (µg L)**							**Maximum (µg L)**						
PMR	**2004**	**2005**	**2006**	**2007**	**2008**	**2009**	**PMR**	**2004**	**2005**	**2006**	**2007**	**2008**	**2009**	**PMR**	**2004**	**2005**	**2006**	**2007**	**2008**	**2009**
1	0.12	0.44	0.09	0.18	3.08	0.06	**1**	0.16	0.83	0.16	0.71	0.97	0.06	**1**	0.18	0.18	0.11	0.58	1.00	P
2	--	--	--	--	--	nd	**2**	--	--	--	--	--	P	**2**	--	--	--	--	--	nd
3	--	--	--	--	--	nd	**3**	--	--	--	--	--	nd	**3**	--	--	--	--	--	nd
4	0.13	0.23	P	0.42	0.09	0.07	**4**	0.20	1.87	0.35	0.73	0.77	P	**4**	0.07	1.45	P	0.15	0.11	P
5	--	0.06	--	0.36	0.85	P	**5**	--	0.16	--	0.96	0.96	P	**5**	--	P	--	0.62	0.20	P
6	0.05	0.48	P	0.17	0.50	0.06	**6**	0.26	3.20	0.10	1.05	0.96	0.09	**6**	0.10	0.53	P	0.09	0.20	P
7	--	1.16	0.20	0.14	4.88	0.57	**7**	--	5.70	1.26	2.11	0.78	0.26	**7**	--	0.98	0.50	0.09	0.31	0.78
8	1.85	1.43	0.75	1.28	1.82	0.60	**8**	2.00	1.10	1.73	1.80	0.68	0.90	**8**	0.31	0.87	0.99	3.36	0.91	1.43
9	1.01	1.35	0.23	1.39	1.62	12.3	**9**	7.40	5.70	1.59	1.46	3.52	9.40	**9**	14.0	3.10	1.04	0.56	9.84	4.45
10	1.44	0.92	0.07	0.58	2.17	0.08	**10**	1.39	13.2	0.54	1.26	1.45	0.50	**10**	2.02	2.74	0.36	3.44	1.78	0.72
90th Percentile (µg L)							**90th Percentile (µg L)**							**90th Percentile (µg L)**						
PMR	**2004**	**2005**	**2006**	**2007**	**2008**	**2009**	**PMR**	**2004**	**2005**	**2006**	**2007**	**2008**	**2009**	**PMR**	**2004**	**2005**	**2006**	**2007**	**2008**	**2009**
1	0.12	0.12	0.15	0.13	0.33	P	**1**	0.16	0.70	0.08	0.47	0.50	P	**1**	0.18	0.13	0.07	0.14	0.24	nd
2	--	--	--	--	--	nd	**2**	--	--	--	--	--	P	**2**	--	--	--	--	--	nd
3	--	--	--	--	--	nd	**3**	--	--	--	--	--	nd	**3**	--	--	--	--	--	nd
4	0.13	0.12	0.16	0.05	0.20	P	**4**	0.20	0.73	P	0.21	0.15	P	**4**	0.07	0.18	P	P	P	P
5	--	0.03	--	0.26	0.14	P	**5**	--	0.09	--	0.34	0.28	P	**5**	--	P	--	P	P	nd
6	0.05	0.30	0.09	0.09	0.29	P	**6**	0.26	1.73	P	0.48	0.09	P	**6**	0.10	0.39	P	0.08	0.12	P
7	--	0.28	0.13	0.05	0.67	0.20	**7**	--	1.53	0.15	0.37	0.46	0.20	**7**	--	0.40	0.07	0.07	0.20	0.10
8	1.13	0.27	0.40	0.34	0.58	0.12	**8**	1.85	0.61	0.17	0.43	P	0.08	**8**	0.30	0.24	0.15	0.20	0.33	0.12
9	0.43	0.22	0.22	0.24	0.39	0.69	**9**	6.80	0.89	0.12	0.42	0.81	0.58	**9**	2.02	0.45	0.13	0.27	0.79	1.01
10	0.82	0.57	0.23	0.07	0.14	P	**10**	0.99	1.36	P	0.16	0.26	0.09	**10**	1.78	1.25	0.07	0.09	0.21	0.17

Table 31 continued. Tier 1 and Tier 2 acetochlor, atrazine and metolachlor surface water concentration results 2004 through 2009.

	Acetochlor						Atrazine							Metolachlor						
75th Percentile (µg L)							75th Percentile (µg L)							75th Percentile (µg L)						
PMR	**2004**	**2005**	**2006**	**2007**	**2008**	**2009**	**PMR**	**2004**	**2005**	**2006**	**2007**	**2008**	**2009**	**PMR**	**2004**	**2005**	**2006**	**2007**	**2008**	**2009**
1	nd	nd	0.07	P	P	nd	**1**	0.09	0.13	nd	0.33	P	nd	**1**	0.06	0.08	P	P	P	nd
2	--	--	--	--	--	nd	**2**	--	--	--	--	--	P	**2**	--	--	--	--	--	nd
3	--	--	--	--	--	nd	**3**	--	--	--	--	--	nd	**3**	--	--	--	--	--	nd
4	0.11	P	0.06	P	0.06	nd	**4**	0.08	0.25	P	0.10	0.08	P	**4**	nd	P	P	P	P	P
5	--	P	--	nd	P	nd	**5**	--	0.06	--	0.07	0.07	P	**5**	--	P	--	nd	P	nd
6	P	0.06	0.07	P	0.11	P	**6**	0.19	0.57	nd	0.35	0.05	P	**6**	0.09	0.11	P	0.05	P	nd
7	--	0.13	0.10	P	0.11	P	**7**	--	0.71	P	0.15	P	0.10	**7**	--	0.09	P	P	P	P
8	0.24	0.11	0.17	0.12	0.26	0.05	**8**	0.81	0.29	0.06	0.16	0.12	P	**8**	0.14	0.14	0.08	0.11	0.13	0.07
9	0.25	0.05	0.10	P	0.13	0.13	**9**	2.07	0.35	P	0.20	0.31	0.19	**9**	0.64	0.22	0.07	0.17	0.26	0.22
10	0.71	0.09	0.11	nd	P	P	**10**	0.68	0.71	nd	0.12	0.06	0.07	**10**	0.73	0.28	P	P	P	0.08
Median (µg L)							**Median (µg L)**							**Median (µg L)**						
PMR	**2004**	**2005**	**2006**	**2007**	**2008**	**2009**	**PMR**	**2004**	**2005**	**2006**	**2007**	**2008**	**2009**	**PMR**	**2004**	**2005**	**2006**	**2007**	**2008**	**2009**
1	nd	nd	nd	nd	nd	nd	**1**	0.07	P	P	0.16	P	nd	**1**	P	nd	nd	P	nd	nd
2	--	--	--	--	--	nd	**2**	--	--	--	--	--	nd	**2**	--	--	--	--	--	nd
3	--	--	--	--	--	nd	**3**	--	--	--	--	--	nd	**3**	--	--	--	--	--	nd
4	P	P	nd	nd	P	nd	**4**	0.08	0.08	P	0.06	P	P	**4**	nd	P	nd	P	P	nd
5	--	nd	--	nd	nd	nd	**5**	--	P	--	0.06	P	P	**5**	--	nd	--	nd	P	nd
6	nd	P	nd	nd	P	P	**6**	0.14	0.26	P	0.14	P	P	**6**	0.06	P	nd	P	P	nd
7	--	P	nd	nd	P	P	**7**	--	0.17	0.05	0.09	P	P	**7**	--	P	P	P	P	P
8	0.09	0.05	P	P	0.06	P	**8**	0.38	0.12	0.07	0.08	P	P	**8**	0.08	0.07	P	P	P	P
9	0.06	nd	nd	nd	P	P	**9**	1.49	0.08	0.07	0.14	0.14	0.07	**9**	0.33	P	P	P	0.10	0.07
10	0.12	nd	nd	nd	nd	P	**10**	0.44	0.14	0.05	0.08	P	0.05	**10**	0.23	0.05	nd	P	P	P

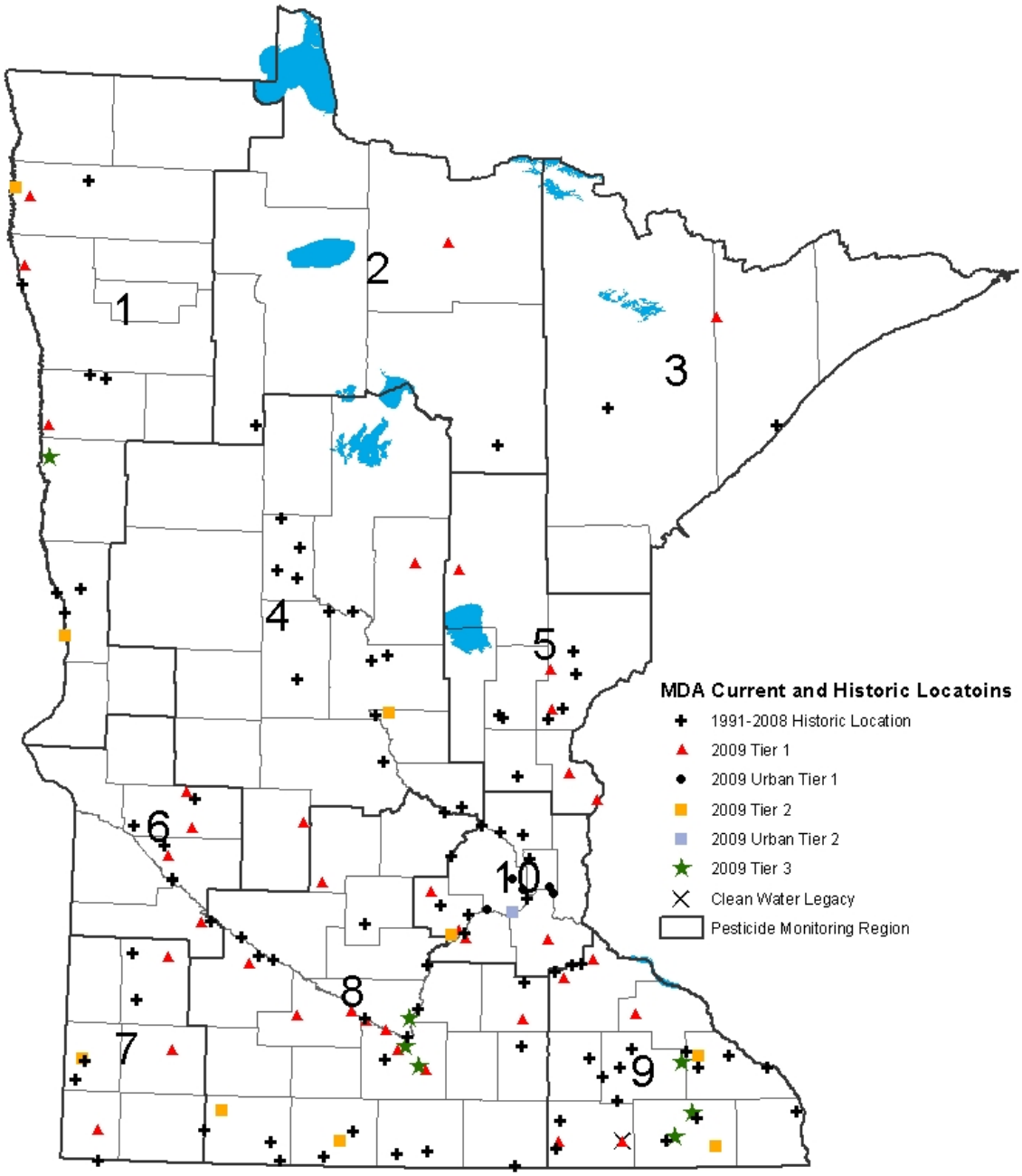


Figure 28. Current and historic surface water sampling locations.

3.4.2. Number of sample concentrations above 10 percent or 50 percent of surface water standards at Tier 3 locations from 1992 to 2009

Sample concentrations occurring at either greater than 10 percent or 50 percent of the surface water standard for atrazine, acetochlor and metolachlor are shown in Tables 32 through 39. All current and historic Tier 3 locations are included in this analysis. All results are compared against the current standards, which may or may not have been the standard in place at the time of sampling. Further information on sampling guidelines for Tier 3 stations can be found in the 2009 Tier 3 sampling section of this report or the MDA Surface Water Monitoring Design Document (www.mda.state.mn.us/monitoring).

MDA uses the thresholds of 10 percent and 50 percent of applicable water quality standards for analyzing water quality data in accordance with the Minnesota Pesticide Management Plan (PMP). These thresholds provide context to historical data and in some instances, trigger specific actions by MDA (such as initiating the development of pesticide-specific best management practices. It should be noted that the following tables do not consider the duration component of these standards. These tables simply note whether a concentration was detected at levels above 10 or 50 percent of a concentration associated with a standard.

Acetochlor

Acetochlor results for the seven active Tier 3 locations from 1995 through 2009 are shown in Table 32. Acetochlor results from the ten former Tier 3 locations from 1995 through 2004 are in Table 33. For every year that acetochlor has been analyzed, it has been detected, though not necessarily at greater than 10 percent of the standard. The Middle Branch of the Whitewater River has had the most detections above both 10 percent of the standard (15 in 2000) and above 50 percent of the standard (7 in 2002). The Le Sueur River also had seven detections above the 50 percent of the standard in 2001. The greatest number of occurrences above 10 or 50 percent of the standard occurred between 1999 and 2004. Chaska Creek (operational from 1999 – 2002) did not have any exceedences of 10 percent of the standard. The number of occurrences above 10 or 50 percent of the standard increased in 2009 from 2008 at four of seven locations. Acetochlor was present at detectable levels in 68 of 131 samples collected at Tier 3 locations in 2009.

Atrazine

Atrazine results for current Tier 3 sites are presented in Table 34 (1993 – 2009) and atrazine results from historic sites are presented in Table 35 (1992 – 2004). The Middle Branch of the Whitewater River has the longest record of atrazine results, from 1993 through 2009. The number of occurrences of 10 percent of the standard in this stream has varied from none (1997, 2006, 2007 and 2009) to 24 (2004). The majority of occurrences above 10 percent of the standard occurred between 2000 and 2004 at the Middle Branch of the Whitewater River. In the Buffalo River, atrazine has been detected but never above 10 percent of the standard. As shown in Table 35, Bent Creek (operational from 1997 – 2002) did not have any exceedences of 10 percent of the standard. In 2009, there were five occurrence of atrazine above 10 percent of the standard at the North Branch of the Root River and eight occurrences above 10 percent of the standard at the South Branch of the Root River. Atrazine was present at detectable levels in 111 of 131 samples collected at Tier 3 locations in 2009.

Atrazine has two applicable standards for streams that are designated by Minnesota Rules chapter 7050 as class 2A. In addition to the 10 μg/L standard (4-day duration aquatic toxicity

based), there is a 3.4 µg/L standard (30 day-human heath based). Tables 36 and 37 present data from current and former Tier 3 sites relative to the 3.4 µg/L standard. The Middle Branch of the Whitewater River has the longest record of atrazine results, from 1993 through 2009. The number of occurrences above 10 percent of the standard has varied from none in 2006 to 31 in 2004 for this stream. The majority of occurrences above 50 percent of the standard occurred between 2000 and 2004 at the Middle Branch of the Whitewater River. Seven Mile Creek has not had a concentration above 10 or 50 percent of the standard since 2006. Atrazine was present at detectable levels in 46 of 49 samples collected at Tier 3 locations located on 2A streams in 2009.

Metolachlor

Metolachlor results from current Tier 3 sites are presented in Table 38 (1993 – 2009) and metolachlor results for historic Tier 3 sites are in Table 39 (1992 – 2004). Of the three compounds listed in this section, metolachlor has had the fewest occurrences above 10 percent of the standard. The highest number of occurrences occurred in 2000 with 10 samples above 10 percent of the standard at the Middle Branch of the Whitewater River. In the Buffalo River, metolachlor has never been detected above 10 percent of the standard. Measured metolachlor levels at historic Tier 3 locations Bent Creek, Bevens Creek and Chaska Creek also never went above 10 percent of the standard. In both 2006 and 2007 metolachlor was not detected above 10 percent of the standard at any of the Tier 3 locations. The number of occurrences above 10 or 50 percent of the standard increased in 2009 from 2008 at four of seven locations. Metolachlor was present at detectable levels in 97 of 131 samples collected at Tier 3 locations in 2009.

Table 32. Number of sample concentrations above 10% or 50% of the acetochlor standard from 1995 - 2009 for current Tier 3 sites.

Current Tier 3 Locations	*Standard of 3.6 µg/L*	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009
Beauford Ditch	Total Detections	--	--	--	--	--	--	--	--	--	--	26/34	7/11	8/14	13/20	10/13
	# > 10% Standard	--	--	--	--	--	--	--	--	--	--	**9**	**1**	**0**	**3**	**1**
	# > 50% Standard	--	--	--	--	--	--	--	--	--	--	**5**	**0**	**0**	**0**	**0**
Buffalo River	Total Detections	--	--	--	--	--	--	--	2/2	--	1/4	0/4	0/4	4/6	3/5	12/26
	# > 10% Standard	--	--	--	--	--	--	--	**0**	--	**0**	**0**	**0**	**0**	**2**	**1**
	# > 50% Standard	--	--	--	--	--	--	--	**0**	--	**0**	**0**	**0**	**0**	**0**	**0**
Le Sueur River	Total Detections	--	--	--	--	19/26	22/33	27/37	18/26	17/28	26/34	14/27	11/15	17/24	15/23	16/20
	# > 10% Standard	--	--	--	--	**5**	**9**	**10**	**5**	**5**	**10**	**3**	**3**	**4**	**3**	**5**
	# > 50% Standard	--	--	--	--	**2**	**4**	**7**	**1**	**1**	**0**	**2**	**0**	**0**	**1**	**0**
Seven Mile Creek	Total Detections	--	--	--	--	--	--	--	2/2	14/19	12/20	10/21	10/11	5/12	9/15	4/13
	# > 10% Standard	--	--	--	--	--	--	--	**1**	**3**	**5**	**3**	**3**	**0**	**0**	**0**
	# > 50% Standard	--	--	--	--	--	--	--	**0**	**1**	**1**	**0**	**0**	**0**	**0**	**0**
North Branch of the Root River	Total Detections	--	--	--	--	--	--	--	3/3	3/4	15/33	6/15	5/14	5/19	8/20	10/23
	# > 10% Standard	--	--	--	--	--	--	--	**2**	**2**	**7**	**0**	**1**	**2**	**2**	**3**
	# > 50% Standard	--	--	--	--	--	--	--	**1**	**0**	**1**	**0**	**0**	**1**	**0**	**0**
South Branch of the Root River	Total Detections	--	--	--	--	--	--	--	3/3	2/4	4/5	2/5	0/5	3/15	4/14	13/23
	# > 10% Standard	--	--	--	--	--	--	--	**2**	**1**	**2**	**0**	**0**	**0**	**0**	**6**
	# > 50% Standard	--	--	--	--	--	--	--	**1**	**0**	**0**	**0**	**0**	**0**	**0**	**0**
Middle Branch of the Whitewater	Total Detections	6/42	12/68	5/54	20/50	26/61	29/56	16/62	19/38	9/25	34/68	8/31	2/11	3/21	8/22	3/13
	# > 10% Standard	**2**	**3**	**0**	**4**	**8**	**15**	**7**	**14**	**3**	**10**	**2**	**0**	**0**	**2**	**3**
	# > 50% Standard	**1**	**0**	**0**	**1**	**4**	**4**	**4**	**7**	**0**	**1**	**1**	**0**	**0**	**0**	**1**

Gray shading indicates change in sampling beginning in 2006 from equal-flow increment composite sampling to equal-time increment based composite sampling. For further discussion, refer to the MDA's Surface Water Design Document.

Table 33. Number of sample concentrations above 10% or 50% of the acetochlor standard from 1995 - 2004 for former Tier 3 sites.

Former Tier 3 Locations	*Standard of 3.6 µg/L*	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004
Bent Creek	Total Detections	--	--	1/13	0/20	7/20	4/24	5/39	2/17	--	--
	# > 10% Standard	--	--	**0**	**0**	**1**	**0**	**0**	**0**	--	--
	# > 50% Standard	--	--	**0**	**0**	**0**	**0**	**0**	**0**	--	--
Bevens Creek	Total Detections	9/29	8/19	15/30	17/28	7/25	3/7	7/17	11/20	--	--
	# > 10% Standard	**4**	**2**	**2**	**6**	**1**	**1**	**3**	**5**	--	--
	# > 50% Standard	**0**	**2**	**0**	**2**	**0**	**0**	**1**	**0**	--	--
Blue Earth River – Frost	Total Detections	11/23	12/27	9/30	--	--	--	--	--	--	--
	# > 10% Standard	**5**	**0**	**1**	--	--	--	--	--	--	--
	# > 50% Standard	**1**	**0**	**0**	--	--	--	--	--	--	--
Blue Earth River – Rapidan	Total Detections	--	--	--	--	16/24	19/29	25/34	17/24	17/26	17/25
	# > 10% Standard	--	--	--	--	**4**	**4**	**10**	**4**	**3**	**5**
	# > 50% Standard	--	--	--	--	**0**	**2**	**3**	**0**	**0**	**0**
Cascade Creek	Total Detections	--	--	--	20/31	30/39	0/6	--	--	--	--
	# > 10% Standard	--	--	--	**2**	**8**	**0**	--	--	--	--
	# > 50% Standard	--	--	--	**0**	**3**	**0**	--	--	--	--
Chaska Creek	Total Detections	--	--	--	--	0/9	3/19	12/36	5/22	--	--
	# > 10% Standard	--	--	--	--	**0**	**0**	**0**	**0**	--	--
	# > 50% Standard	--	--	--	--	**0**	**0**	**0**	**0**	--	--
MN River at Judson	Total Detections	--	--	--	--	15/29	10/24	26/39	14/26	5/20	15/23
	# > 10% Standard	--	--	--	--	**0**	**4**	**1**	**3**	**1**	**6**
	# > 50% Standard	--	--	--	--	**0**	**0**	**0**	**0**	**0**	**0**
MN River at Jordan	Total Detections	--	9/25	21/44	10/19	16/26	8/12	--	--	--	--
	# > 10% Standard	--	**3**	**1**	**2**	**2**	**6**	--	--	--	--
	# > 50% Standard	--	**0**	**0**	**0**	**0**	**1**	--	--	--	--
Sand Creek	Total Detections	8/38	7/17	10/33	17/33	4/26	9/19	7/17	9/20	--	--
	# > 10% Standard	**0**	**1**	**0**	**4**	**1**	**1**	**1**	**2**	--	--
	# > 50% Standard	**0**	**0**	**0**	**1**	**0**	**0**	**0**	**0**	--	--
Whitewater River – South Branch	Total Detections	18/45	--	--	--	5/15	6/14	--	--	--	--
	# > 10% Standard	**9**	--	--	--	**4**	**1**	--	--	--	--
	# > 50% Standard	**3**	--	--	--	**0**	**0**	--	--	--	--

Table 34. Number of sample concentrations above 10% or 50% of the atrazine standard from 1993 - 2009 for current Tier 3 sites.

Current Tier 3 Locations	*Standard of 10.0 µg/L*	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009
Beauford Ditch	Total Detections	--	--	--	--	--	--	--	--	--	--	--	--	32/34	5/11	12/14	13/20	9/13
	# > 10% Standard	--	--	--	--	--	--	--	--	--	--	--	--	**3**	**0**	**0**	**0**	**0**
	# > 50% Standard	--	--	--	--	--	--	--	--	--	--	--	--	**0**	**0**	**0**	**0**	**0**
Buffalo River	Total Detections	--	--	--	--	--	--	--	--	--	2/2	--	4/4	4/4	3/4	6/6	4/5	20/26
	# > 10% Standard	--	--	--	--	--	--	--	--	--	**0**	--	**0**	**0**	**0**	**0**	**0**	**0**
	# > 50% Standard	--	--	--	--	--	--	--	--	--	**0**	--	**0**	**0**	**0**	**0**	**0**	**0**
Le Sueur River	Total Detections	--	--	--	--	--	--	15/26	28/33	29/37	19/26	19/28	32/34	27/27	14/15	24/24	20/23	16/20
	# > 10% Standard	--	--	--	--	--	--	**2**	**8**	**4**	**8**	**0**	**3**	**0**	**0**	**0**	**0**	**0**
	# > 50% Standard	--	--	--	--	--	--	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**
Seven Mile Creek	Total Detections	--	--	--	--	--	--	--	--	--	2/2	15/19	20/20	21/21	10/11	11/12	14/15	10/13
	# > 10% Standard	--	--	--	--	--	--	--	--	--	**2**	**3**	**3**	**2**	**3**	**0**	**0**	**0**
	# > 50% Standard	--	--	--	--	--	--	--	--	--	**0**	**0**	**0**	**1**	**0**	**0**	**0**	**0**
North Branch of the Root River	Total Detections	--	--	--	--	--	--	--	--	--	3/3	4/4	30/33	15/15	14/14	19/19	20/20	23/23
	# > 10% Standard	--	--	--	--	--	--	--	--	--	**2**	**0**	**7**	**2**	**0**	**1**	**1**	**5**
	# > 50% Standard	--	--	--	--	--	--	--	--	--	**1**	**0**	**2**	**0**	**0**	**0**	**0**	**0**
South Branch of the Root River	Total Detections	--	--	--	--	--	--	--	--	--	3/3	4/4	5/5	5/5	5/5	14/15	13/14	23/23
	# > 10% Standard	--	--	--	--	--	--	--	--	--	**2**	**3**	**4**	**0**	**0**	**0**	**0**	**8**
	# > 50% Standard	--	--	--	--	--	--	--	--	--	**1**	**1**	**2**	**0**	**0**	**0**	**0**	**0**
Middle Branch of the Whitewater	Total Detections	43/56	41/41	37/42	68/68	52/54	45/50	49/61	54/56	60/62	34/38	23/25	67/68	30/31	11/11	21/21	22/22	13/13
	# > 10% Standard	**9**	**5**	**2**	**5**	**0**	**4**	**2**	**21**	**6**	**16**	**7**	**24**	**1**	**0**	**0**	**3**	**0**
	# > 50% Standard	**1**	**1**	**1**	**0**	**0**	**0**	**0**	**11**	**4**	**8**	**2**	**8**	**0**	**0**	**0**	**0**	**0**

Gray shading indicates change in sampling beginning in 2006 from equal-flow increment composite sampling to equal-time increment based composite sampling. For further discussion, refer to the MDA's Surface Water Design Document.

Table 35. Number of sample concentrations above 10% or 50% of the atrazine standard from 1992 - 2004 for former Tier 3 sites.

Former Tier 3 Locations	*Standard of 10.0 µg/L*	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004
Bent Creek	Total Detections	--	--	--	--	--	10/13	2/20	9/20	7/24	15/39	13/17	--	--
	# > 10% Standard	--	--	--	--	--	**0**	**0**	**0**	**0**	**0**	**0**	--	--
	# > 50% Standard	--	--	--	--	--	**0**	**0**	**0**	**0**	**0**	**0**	--	--
Bevens Creek	Total Detections	16/19	22/29	44/47	28/29	16/19	29/30	21/28	7/25	4/7	9/17	16/20	--	--
	# > 10% Standard	**5**	**11**	**7**	**2**	**1**	**3**	**4**	**3**	**2**	**1**	**4**	--	--
	# > 50% Standard	**0**	**1**	**0**	**0**	**0**	**0**	**1**	**0**	**0**	**0**	**1**	--	--
Blue Earth River – Frost	Total Detections	17/40	16/26	18/18	22/23	24/27	24/30	--	--	--	--	--	--	--
	# > 10% Standard	**0**	**5**	**0**	**3**	**0**	**0**	--	--	--	--	--	--	--
	# > 50% Standard	**0**	**0**	**0**	**0**	**0**	**0**	--	--	--	--	--	--	--
Blue Earth River – Rapidan	Total Detections	--	--	--	--	--	--	--	13/24	23/29	24/34	17/24	17/26	23/25
	# > 10% Standard	--	--	--	--	--	--	--	**1**	**4**	**3**	**5**	**0**	**3**
	# > 50% Standard	--	--	--	--	--	--	--	**0**	**0**	**0**	**0**	**0**	**0**
Cascade Creek	Total Detections	--	--	--	--	--	--	26/31	32/39	4/6	--	--	--	--
	# > 10% Standard	--	--	--	--	--	--	**2**	**5**	**0**	--	--	--	--
	# > 50% Standard	--	--	--	--	--	--	**0**	**0**	**0**	--	--	--	--
Chaska Creek	Total Detections	--	--	--	--	--	--	--	6/9	6/19	13/36	16/22	--	--
	# > 10% Standard	--	--	--	--	--	--	--	**0**	**1**	**0**	**3**	--	--
	# > 50% Standard	--	--	--	--	--	--	--	**0**	**0**	**0**	**1**	--	--
MN River at Judson	Total Detections	--	--	--	--	--	--	--	12/29	18/24	24/39	14/26	16/20	23/23
	# > 10% Standard	--	--	--	--	--	--	--	**0**	**0**	**0**	**4**	**0**	**3**
	# > 50% Standard	--	--	--	--	--	--	--	**0**	**0**	**0**	**0**	**0**	**0**
MN River at Jordan	Total Detections	--	--	--	--	25/25	42/44	17/19	13/26	10/12	--	--	--	--
	# > 10% Standard	--	--	--	--	**2**	**1**	**1**	**3**	**4**	--	--	--	--
	# > 50% Standard	--	--	--	--	**0**	**0**	**0**	**0**	**0**	--	--	--	--
Sand Creek	Total Detections	19/24	21/33	36/36	32/38	12/17	31/33	17/33	9/26	5/19	10/17	17/20	--	--
	# > 10% Standard	**10**	**6**	**4**	**2**	**1**	**0**	**6**	**1**	**4**	**0**	**3**	--	--
	# > 50% Standard	**0**	**0**	**0**	**0**	**0**	**0**	**1**	**0**	**0**	**0**	**2**	--	--
Whitewater River – South Branch	Total Detections	16/38	46/65	42/45	42/45	--	--	--	8/15	8/14	--	--	--	--
	# > 10% Standard	**2**	**11**	**2**	**3**	--	--	--	**0**	**0**	--	--	--	--
	# > 50% Standard	**1**	**0**	**0**	**2**	--	--	--	**0**	**0**	--	--	--	--

Table 36. Number of sample concentrations above 10% or 50% of the atrazine standard from 1993 - 2009 for current Tier 3 sites located on class 2A waters.

Current Tier 3 Locations	*Standard of 3.4 µg/L*	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009
Seven Mile Creek	Total Detections	--	--	--	--	--	--	--	--	--	2/2	15/19	20/20	21/21	10/11	11/12	14/15	10/13
	# > 10% Standard	--	--	--	--	--	--	--	--	--	**2**	**4**	**8**	**3**	**3**	**0**	**0**	**0**
	# > 50% Standard	--	--	--	--	--	--	--	--	--	**2**	**1**	**0**	**2**	**3**	**0**	**0**	**0**
South Branch of the Root River	Total Detections	--	--	--	--	--	--	--	--	--	3/3	4/4	5/5	5/5	5/5	14/15	13/14	23/23
	# > 10% Standard	--	--	--	--	--	--	--	--	--	**3**	**3**	**4**	**1**	**0**	**1**	**2**	**11**
	# > 50% Standard	--	--	--	--	--	--	--	--	--	**3**	**3**	**4**	**0**	**0**	**0**	**0**	**6**
Middle Branch of the Whitewater	Total Detections	43/56	41/41	37/42	68/68	52/54	45/50	49/61	54/56	60/62	34/38	23/25	67/68	30/31	11/11	21/21	22/22	13/13
	# > 10% Standard	**17**	**14**	**4**	**8**	**3**	**6**	**5**	**28**	**8**	**18**	**9**	**31**	**3**	**0**	**1**	**4**	**2**
	# > 50% Standard	**4**	**3**	**2**	**2**	**0**	**4**	**0**	**13**	**5**	**15**	**6**	**20**	**1**	**0**	**0**	**2**	**0**

Gray shading indicates change in sampling beginning in 2006 from equal-flow increment composite sampling to equal-time increment based composite sampling. For further discussion, refer to the MDA's Surface Water Design Document.

Table 37. Number of sample concentrations above 10% or 50% of the atrazine standard from 1992 - 2004 for a former Tier 3 site located on a class 2A water.

Former Tier 3 Location	*Standard of 3.4 µg/L*	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004
Whitewater River – South Branch	Total Detections	16/38	46/65	42/45	42/45	--	--	--	8/15	8/14	--	--	--	--
	# > 10% Standard	**6**	**29**	**13**	**7**	--	--	--	**5**	**0**	--	--	--	--
	# > 50% Standard	**1**	**8**	**2**	**2**	--	--	--	**0**	**0**	--	--	--	--

Table 38. Number of sample concentrations above 10% or 50% of the metolachlor standard from 1993 - 2009 for current Tier 3 sites.

Current Tier 3 Locations	*Standard of 23.0 µg/L**	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009
Beauford Ditch	Total Detections	--	--	--	--	--	--	--	--	--	--	--	--	30/34	7/11	14/14	18/20	13/13
	# > 10% Standard	--	--	--	--	--	--	--	--	--	--	--	--	**1**	**0**	**0**	**0**	**1**
	# > 50% Standard	--	--	--	--	--	--	--	--	--	--	--	--	**0**	**0**	**0**	**0**	**1**
Buffalo River	Total Detections	--	--	--	--	--	--	--	--	--	2/2	--	3/4	2/4	1/4	6/6	3/5	15/26
	# > 10% Standard	--	--	--	--	--	--	--	--	--	**0**	--	**0**	**0**	**0**	**0**	**0**	**0**
	# > 50% Standard	--	--	--	--	--	--	--	--	--	**0**	--	**0**	**0**	**0**	**0**	**0**	**0**
Le Sueur River	Total Detections	--	--	--	--	--	--	24/26	26/33	36/37	25/26	20/28	32/34	27/27	15/15	23/24	21/23	20/20
	# > 10% Standard	--	--	--	--	--	--	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**1**
	# > 50% Standard	--	--	--	--	--	--	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**
Seven Mile Creek	Total Detections	--	--	--	--	--	--	--	--	--	2/2	17/19	17/20	18/21	10/11	8/12	12/15	8/13
	# > 10% Standard	--	--	--	--	--	--	--	--	--	**0**	**0**	**1**	**0**	**0**	**0**	**0**	**0**
	# > 50% Standard	--	--	--	--	--	--	--	--	--	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**
North Branch of the Root River	Total Detections	--	--	--	--	--	--	--	--	--	3/3	3/4	30/33	8/15	13/14	18/19	15/20	20/23
	# > 10% Standard	--	--	--	--	--	--	--	--	--	**0**	**0**	**2**	**0**	**0**	**0**	**0**	**2**
	# > 50% Standard	--	--	--	--	--	--	--	--	--	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**
South Branch of the Root River	Total Detections	--	--	--	--	--	--	--	--	--	3/3	4/4	5/5	4/5	5/5	12/15	11/14	20/23
	# > 10% Standard	--	--	--	--	--	--	--	--	--	**1**	**0**	**0**	**0**	**0**	**0**	**0**	**4**
	# > 50% Standard	--	--	--	--	--	--	--	--	--	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**
Middle Branch of the Whitewater	Total Detections	23/56	15/41	12/42	31/68	15/54	36/50	36/61	36/56	39/62	20/38	12/25	52/68	16/31	6/11	12/21	12/22	2/13
	# > 10% Standard	**3**	**0**	**0**	**0**	**0**	**0**	**0**	**10**	**0**	**6**	**1**	**0**	**1**	**0**	**0**	**2**	**0**
	# > 50% Standard	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**

*Gray shading indicates change in sampling beginning in 2006 from equal-flow increment composite sampling to equal-time increment based composite sampling. For further discussion, refer to the MDA's Surface Water Design Document.

*Method Report Limit for metolachlor was changed from 0.10 µg/L from 1993 – 1999 to 0.07 µg/L starting in 2000.

Table 39. Number of sample concentrations above 10% or 50% of the metolachlor standard from 1992 – 04 for former Tier 3 sites.

Former Tier 3 Locations	*Standard of 23.0 µg/L**	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004
Bent Creek	Total Detections	--	--	--	--	--	0/13	1/20	2/20	1/24	0/39	1/17	--	--
	# > 10% Standard	--	--	--	--	--	**0**	**0**	**0**	**0**	**0**	**0**	--	--
	# > 50% Standard	--	--	--	--	--	**0**	**0**	**0**	**0**	**0**	**0**	--	--
Bevens Creek	Total Detections	5/19	13/29	4/47	9/29	7/19	22/30	6/28	1/25	2/7	8/17	10/20	--	--
	# > 10% Standard	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	--	--
	# > 50% Standard	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	--	--
Blue Earth River – Frost	Total Detections	13/40	15/26	14/18	18/23	25/27	12/30	--	--	--	--	--	--	--
	# > 10% Standard	**0**	**3**	**0**	**0**	**0**	**0**	--	--	--	--	--	--	--
	# > 50% Standard	**0**	**0**	**0**	**0**	**0**	**0**	--	--	--	--	--	--	--
Blue Earth River – Rapidan	Total Detections	--	--	--	--	--	--	--	23/24	25/29	33/34	21/24	22/26	24/25
	# > 10% Standard	--	--	--	--	--	--	--	**0**	**0**	**1**	**0**	**0**	**0**
	# > 50% Standard	--	--	--	--	--	--	--	**0**	**0**	**0**	**0**	**0**	**0**
Cascade Creek	Total Detections	--	--	--	--	--	--	27/31	34/39	4/6	--	--	--	--
	# > 10% Standard	--	--	--	--	--	--	**0**	**2**	**2**	--	--	--	--
	# > 50% Standard	--	--	--	--	--	--	**0**	**0**	**1**	--	--	--	--
Chaska Creek	Total Detections	--	--	--	--	--	--	--	0/9	1/19	2/36	6/22	--	--
	# > 10% Standard	--	--	--	--	--	--	--	**0**	**0**	**0**	**0**	--	--
	# > 50% Standard	--	--	--	--	--	--	--	**0**	**0**	**0**	**0**	--	--
MN River at Judson	Total Detections	--	--	--	--	--	--	--	25/29	15/24	33/39	16/26	9/20	22/23
	# > 10% Standard	--	--	--	--	--	--	--	**0**	**1**	**3**	**0**	**0**	**1**
	# > 50% Standard	--	--	--	--	--	--	--	**0**	**0**	**0**	**0**	**0**	**0**
MN River at Jordan	Total Detections	--	--	--	--	25/25	41/42	19/19	25/26	10/12	--	--	--	--
	# > 10% Standard	--	--	--	--	**0**	**0**	**1**	**0**	**0**	--	--	--	--
	# > 50% Standard	--	--	--	--	**0**	**0**	**0**	**0**	**0**	--	--	--	--
Sand Creek	Total Detections	15/24	20/33	13/36	21/38	10/17	26/33	25/33	4/26	15/19	10/17	14/20	--	--
	# > 10% Standard	**3**	**2**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	--	--
	# > 50% Standard	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	--	--
Whitewater R. South Branch	Total Detections	9/38	38/65	19/45	24/45	--	--	--	3/15	6/14	--	--	--	--
	# > 10% Standard	**1**	**3**	**0**	**0**	--	--	--	**0**	**0**	--	--	--	--
	# > 50% Standard	**0**	**0**	**0**	**0**	--	--	--	**0**	**0**	--	--	--	--

*Method Report Limit for metolachlor was changed from 0.10 µg/L from 1993 – 1999 to 0.07 µg/L starting in 2000.

3.4.3. Period of record data at current Tier 3 locations

Surface water monitoring at most of the Tier 3 sites has included both EFI and ETI composite sample collection during storm flow periods using stage activated automated samplers. Since 2006, the MDA has made an effort to collect storm flow samples on an ETI basis at Tier 3 sites to generate data that was more readily comparable to duration based standards or reference values. Grab samples are also collected during and between storm events. In the following tables, composite sample concentrations collected before 2006 (generally EFI) and starting in 2006 (generally ETI) are presented together with grab concentration data.

Table 40 summarizes results for the period of record at each of the current Tier 3 locations. The Tier 3 period of record ranges from 17 years at the Middle Branch of the Whitewater River to one year at the Buffalo River near Georgetown. The number of samples per year varies, though on average it generally consists of 20 to 30 samples per Tier 3 site.

Acetochlor

Acetochlor results are reported from 1995 through 2009. The maximum acetochlor surface water concentration occurred at Beauford Ditch in 2005 with a result of 12.10 μg/L. Maximum acetochlor concentrations decreased slightly in 2009 at three of seven locations. Median values ranged from non-detect to 0.06 μg/L in 2009. During the period of record, the median range was from non-detect to 0.13 μg/L. Median values at the North Branch of the Root River, South Branch of the Root River and the Middle Branch of the Whitewater River have been at non-detect or "present" levels since monitoring began at these locations. The 90th percentile increased at only two locations in 2009: the South Branch of the Root River and the Middle Branch of the Whitewater River.

Atrazine

Maximum atrazine surface water concentrations have ranged from "present" at Beauford Ditch in 2006 and 2008 to 32.0 μg/L at the Middle Branch of the Whitewater River in 2004. The Middle Branch of the Whitewater River experienced several years of high maximum values from 2000 to 2004. Since then, maximum atrazine concentrations have declined substantially at the Middle Branch of the Whitewater River, with the exception being in 2008 when 3.64 μg/L was detected. In contrast to acetochlor, there is only one non-detect median value for atrazine (2006 in Beauford Ditch). In 2000, the highest median concentrations of 0.48 μg/L and 0.34 μg/L occurred in the Le Sueur and Middle Branch of the Whitewater River, respectively. Median values have generally declined at these stations since 2000. In 2009, the 90th percentile atrazine surface water concentrations ranged from "present" to 3.27 μg/L.

Metolachlor

The highest metolachlor surface water concentration in the period of record for MDA's surface water program was measured at 76.0 μg/L from a sample collected during snowmelt in Beauford Ditch in 2009. During that same event, the second highest metolachlor concentration (9.44 μg/L) from a Tier 3 site was measured on the Le Sueur River. During the period of record, median metolachlor concentrations ranged from non-detect to 0.32 μg/L. The median value decreased in 2009 from 2008 at all locations except at the Beauford Ditch, where the median in 2009 was 0.12 μg/L. The 90th percentile increased at the South Branch of the Root River to 3.42 μg/L in 2009 from 0.30 μg/L in 2008. A slight increase also occurred at Beauford Ditch.

Table 40. Period of record surface water concentration results at current Tier 3 locations for acetochlor, atrazine and metolachlor.

	Acetochlor (µg/L)			Atrazine (µg/L)			Metolachlor (µg/L)		
Beauford Ditch	**Median**	**90th %-tile**	**Maximum**	**Median**	**90th %-tile**	**Maximum**	**Median**	**90th %-tile**	**Maximum**
2005	P	3.88	12.1	P	0.43	2.85	P	0.74	3.70
2006	0.06	0.21	1.58	nd	P	P	P	0.14	0.17
2007	0.04	0.14	0.19	0.04	0.20	0.22	P	0.15	0.42
2008	P	0.70	1.46	P	P	P	P	0.28	1.99
2009	P	0.16	0.43	P	P	0.08	0.12	0.34	76.0
Buffalo River - Georgetown	**Median**	**90th %-tile**	**Maximum**	**Median**	**90th %-tile**	**Maximum**	**Median**	**90th %-tile**	**Maximum**
2009	nd	0.29	0.44	0.06	0.35	0.88	P	0.27	1.47
Le Sueur River	**Median**	**90th %-tile**	**Maximum**	**Median**	**90th %-tile**	**Maximum**	**Median**	**90th %-tile**	**Maximum**
1999	0.09	1.08	3.63	0.04	0.77	2.04	0.13	0.36	0.70
2000	0.11	1.90	3.55	0.48	1.55	2.80	0.21	0.73	1.41
2001	0.13	2.67	9.00	0.10	1.38	3.80	0.22	0.90	1.44
2002	0.08	0.91	7.10	0.24	1.83	2.97	0.10	0.31	0.65
2003	0.09	1.42	2.38	0.07	0.30	0.43	0.08	0.52	0.68
2004	0.06	0.82	1.52	0.22	0.82	1.95	0.11	0.37	1.30
2005	P	0.42	5.30	0.07	0.28	0.72	0.07	0.37	0.98
2006	0.13	0.58	1.24	0.05	0.17	0.29	P	0.08	0.24
2007	P	1.74	1.50	0.08	0.27	0.47	P	1.60	0.57
2008	P	0.91	2.05	P	0.16	0.66	0.10	0.29	1.54
2009	0.06	0.40	0.47	P	0.20	0.29	0.08	0.28	9.44
Seven Mile Creek	**Median**	**90th %-tile**	**Maximum**	**Median**	**90th %-tile**	**Maximum**	**Median**	**90th %-tile**	**Maximum**
2003	0.07	0.58	2.19	0.09	1.26	2.59	0.11	0.60	1.65
2004	0.09	1.17	2.45	0.16	1.21	1.35	0.32	1.45	3.20
2005	nd	0.45	1.18	0.05	1.00	10.0	0.05	0.32	0.90
2006	0.06	0.43	0.48	0.06	1.03	1.06	P	0.33	0.40
2007	nd	P	0.21	0.04	0.11	0.22	P	P	P
2008	P	0.08	0.12	P	P	0.09	P	0.20	0.30
2009	nd	nd	0.07	P	P	0.11	P	P	0.10
N. Branch Root River	**Median**	**90th %-tile**	**Maximum**	**Median**	**90th %-tile**	**Maximum**	**Median**	**90th %-tile**	**Maximum**
2004	nd	0.81	1.83	0.24	4.06	7.40	0.12	1.60	5.80
2005	nd	P	0.06	0.07	0.88	1.27	P	0.15	1.59
2006	nd	0.12	1.71	0.15	0.55	0.72	0.05	0.40	1.55
2007	nd	0.10	2.16	0.08	0.23	1.06	P	0.61	2.01
2008	nd	0.18	0.69	P	0.25	1.02	P	0.36	1.57
2009	nd	0.18	0.69	P	0.25	1.02	P	0.36	1.57
S. Branch Root River	**Median**	**90th %-tile**	**Maximum**	**Median**	**90th %-tile**	**Maximum**	**Median**	**90th %-tile**	**Maximum**
2008	nd	0.12	0.60	P	0.40	0.96	P	0.30	1.08
2009	P	0.69	1.23	0.08	3.27	4.70	P	3.42	5.00

Table 40 continued. Period of record surface water concentration results at current Tier 3 locations for acetochlor, atrazine and metolachlor.

	Acetochlor (µg/L)			Atrazine (µg/L)			Metolachlor (µg/L)		
Middle Branch Whitewater River	**Median**	**90th %-tile**	**Maximum**	**Median**	**90th %-tile**	**Maximum**	**Median**	**90th %-tile**	**Maximum**
1993	--	--	--	0.23	1.26	5.14	nd	1.57	6.15
1994	--	--	--	0.25	1.15	5.01	nd	0.18	1.41
1995	nd	0.11	2.53	0.18	0.25	5.58	nd	0.24	0.98
1996	nd	0.08	1.50	0.20	0.43	3.42	nd	0.20	1.85
1997	nd	nd	0.22	0.14	0.27	0.64	nd	0.12	0.37
1998	nd	0.12	2.55	0.12	0.62	3.75	P	0.46	1.27
1999	nd	0.26	6.35	0.12	0.56	1.55	P	0.18	1.58
2000	P	1.48	4.89	0.34	6.98	16.5	0.19	3.49	7.79
2001	nd	0.55	7.80	0.13	0.43	17.4	P	0.14	0.69
2002	nd	2.38	9.60	0.17	11.8	29.4	P	2.57	4.30
2003	nd	0.37	1.19	0.16	3.61	7.15	nd	1.09	3.90
2004	P	0.53	2.17	0.18	6.24	32.0	0.13	0.37	1.62
2005	nd	P	2.20	0.09	0.33	2.00	P	0.28	3.70
2006	nd	P	P	0.08	0.14	0.16	P	P	P
2007	nd	P	P	0.07	0.11	0.35	P	0.08	0.39
2008	nd	0.10	0.53	0.07	1.14	3.64	P	1.53	3.32
2009	nd	0.74	1.88	0.08	0.34	0.69	nd	P	0.45

3.5. Lake sampling

In 2009, six different lakes were sampled twice for pesticides by MPCA as part of their Sentinel Lakes Program. This sampling follows cooperative efforts with MPCA and USGS that occurred in 2007 and 2008. The 2007 sampling was part of the National Lakes Assessment Program sponsored by EPA where 53 randomly selected lakes were sampled across the state. A report was produced by MDA in 2008 titled "Pesticides in Minnesota Lakes" that summarizes the results from the 2007 study. The report is available at (www.mda.state.mn.us/monitoring).

Replicate visits to all six lakes were incorporated into the 2009 lake sampling plan. The visits were scheduled to include a sample collection date during or directly after the primary agricultural pesticide application period (May and/or June) and then a follow up visit was completed during the fall (September or October). The goal was to evaluate seasonal changes in lakes to guide future lake sample efforts. Figure 29 shows the locations of lakes sampled in 2009. As was the case in past sampling, samples were collected as surface grab samples over the deepest area of the lake.

Table 41 below shows summary statistics for pesticide compounds detected in 2009 lake sampling efforts. All pesticide detections in lakes in 2009 were well below applicable water quality standards. Atrazine was detected in 42 percent of the lake samples with a maximum concentration of 0.08 μg/L. Acetochlor was detected in 25 percent of the lake samples with a maximum detected concentration of 0.07 μg/L. Atrazine and acetochlor were the only two pesticide parent compounds detected. As with previous sampling, pesticide degradate compounds were detected in higher frequencies and concentrations than the parent compounds.

Seasonal variability was assessed in 2009 between the two samples collected from each lake. In lakes where pesticides were detected, there was a slight decrease in the number and in the total concentrations of pesticides during the fall visit. All 2009 lake data is available in Appendix 5.

There was a large difference between the average total pesticide concentrations in lakes that were located in areas dominated by agricultural land use as opposed to those located in areas with less agricultural land use. The lakes from southern Minnesota, which included Carrie, Artichoke, and St. Olaf, had average total pesticide concentrations greater than 1.32 μg/L on two visits. The watersheds of these lakes are dominated by cultivated agricultural land (Table 42). The lakes from northern Minnesota, including Elk, Elephant, and Hill, have watersheds dominated by forest, water and wetlands. The maximum average total pesticide concentration detected in these lakes on two visits was 0.04 μg/L. The lakes located in southern Minnesota likely have higher total pesticide concentrations as a result of local pesticide use within the lake's immediate watershed area.

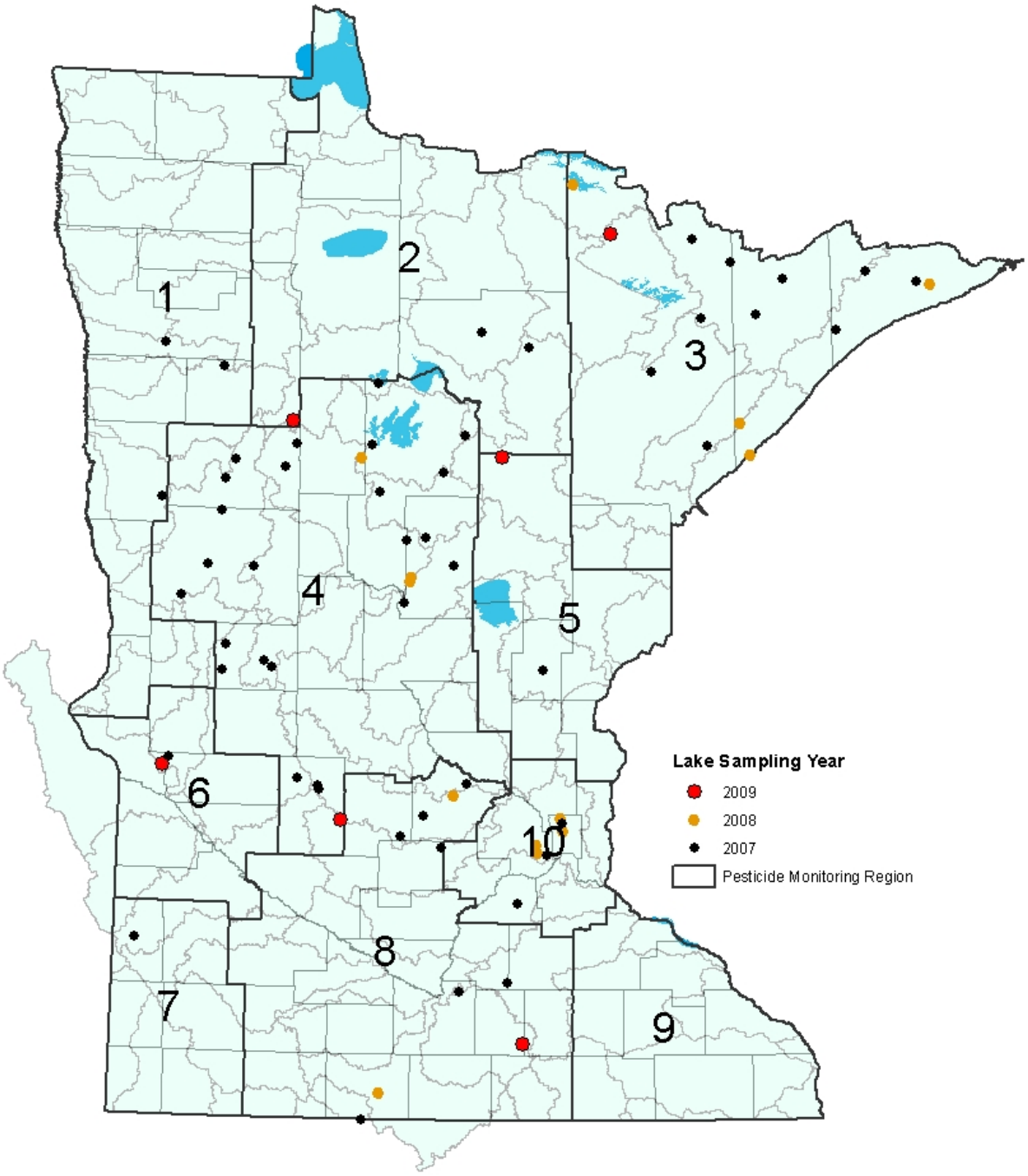


Figure 29. 2009 MDA lake sampling locations.

Table 41. Summary statistics for pesticide compounds detected in lake sampling 2009 (12 samples).

Pesticide Compound	Median (µg/L)	Maximum (µg/L)	Detection Frequency %
Acetochlor	nd	0.07	25% of 12 samples 50% of 6 lakes
Atrazine	nd	0.08	42% of 12 samples 67% of 6 lakes
Deethylatrazine	nd	0.06	25% of 12 samples 33% of 6 lakes
Acetochlor ESA	nd	0.59	33% of 12 samples 33% of 6 lakes
Acetochlor OSA	nd	0.78	33% of 12 samples 33% of 6 lakes
Alachlor ESA	nd	0.64	33% of 12 samples 33% of 6 lakes
Alachlor OSA	nd	0.09	17% of 12 samples 17% of 6 lakes
Metolachlor ESA	nd	0.79	58% of 12 samples 67% of 6 lakes
Metolachlor OSA	nd	0.28	33% of 12 samples 33% of 6 lakes

Table 42. Lakeshed land use of sampled lakes, 2009.

					Relative Lakeshed Land use				
Lake	**PMR**	**Average # of Pesticide Compounds Detected**	**Average Total Pesticide Concentration (µg/L)**	**Total Lakeshed Area (Acres)**	**Developed (%)**	**Cultivated Ag. (%)**	**Pasture and Open (%)**	**Forest (%)**	**Water and Wetland (%)**
Elk	2	0	0	1,984	<1	<1	<1	86	14
Elephant	3	1	0.04	3,695	<1	0	<1	74	24
Carrie	4	4	1.32	4,042	4	65	10	8	13
Hill	5	0	0	24,721	3	1	13	75	9
Artichoke	6	5	1.34	41,855	5	63	3	1	28
St. Olaf	8	8	2.51	189	10	44	5	0	7

3.6. Precipitation sampling

Precipitation monitoring for base neutral pesticides, nitrate/nitrogen, total phosphorus and orthophosphorus began in south central Minnesota in 2008 at the Little Cobb River (LTP) near Beauford and in southeastern Minnesota in 2009 at the MDA office (ZRP) in Rochester. Samples were collected via wet precipitation collectors for rainfall sampling from May through early October. These collectors automatically open a collection vessel at the onset of rainfall. The sampler collects composite rainfall samples over the event, or over a series of events. Samples were transferred to a refrigerator on-site at the time of collection for temporary storage until sufficient volume was available for pesticide analysis. Nitrate/nitrogen, total phosphorous and orthophosphorus samples were collected when sufficient volume was available. The pesticide and nutrient data are presented in Tables 43 and 44.

Nitrate-nitrogen was detected in two of seven samples at LTP and was not detected at ZRP. Total phosphorous was frequently detected at both stations, and orthophosphorus was more commonly detected at ZRP. Additional monitoring in 2010 will be completed to further evaluate atmospheric nitrate and phosphorous contributions in southern Minnesota.

In May and June, acetochlor and atrazine were detected in all samples (seven total), and metolachlor was detected in six of seven samples collected at both LTP and ZRP. Alachlor was only detected at LTP on May 11, 2009. Two atrazine degradate compounds were detected in May and June at LTP. The insecticide chlorpyrifos and fungicide propiconazole were detected at LTP on August 24, 2009. Both of these compounds are applied later in the growing season. Pesticide detections in precipitation appear to be strongly related to the application period for the given compound. Figures 30 and 31 display the seasonal aspect of pesticide detections in 2009 at sites LTP and ZRP.

There was a large difference in pesticide detections between samples collected at the two locations monitored. LTP had more detections and generally higher concentrations of pesticides. Possible explanations for the difference include the timing of the monitoring and location of samplers. ZRP was not operational until June 6, 2009; LTP was collecting pesticide samples throughout May. The May samples from LTP contained the highest number of detections, and highest concentrations measured in 2009. Secondly, LTP is located in closer proximity to an intensive agricultural area, whereas ZRP is located in eastern Rochester where locally prevailing westerly winds blow across an urban area up gradient of the site. These characteristics may also account for some of the differences measured in pesticide concentrations in 2009.

Table 43. Nutrient data summary from rainfall precipitation sampling in 2009.

Analyte	Location	PMR	Detections/ Total Samples	Detection Frequency (%)	Median (mg/L)	Maximum (mg/L)	Date of Maximum (2009)
Nitrate / Nitrogen	LTP	8	2/7	29	nd	0.71	July 29
	ZRP	9	0/11	--	--	--	--
Total Phosphorus	LTP	8	4/7	59	0.012	0.023	June 8
	ZRP	9	9/11	82	0.018	0.046	July 22
Ortho Phosphorus	LTP	8	1/7	14	nd	0.009	June 8
	ZRP	9	8/11	67	0.007	0.018	July 22

Table 44. Pesticide data summary from rainfall precipitation sampling in 2009.

Analyte	Location	PMR	Detections/ Total Samples	Detection Frequency (%)	Median (µg/L)	Maximum (µg/L)	Date of Maximum (2009)
Acetochlor	LTP	8	5/7	71	0.07	0.57	May 5
	ZRP	9	2/10	20	nd	0.09	June 6
Alachlor	LTP	8	1/7	14	nd	P	May 11
	ZRP	9	0/10	--	--	--	--
Atrazine	LTP	8	5/7	71	0.07	0.48	June 8
	ZRP	9	2/10	20	nd	0.09	June 6 June16
Deisopropylatrazine	LTP	8	2/7	29	nd	P	May 11 June 8
	ZRP	9	0/10	--	--	--	--
Deethylatrazine	LTP	8	5/7	71	P	0.11	June 8
	ZRP	9	2/10	20	nd	0.09	June 6 June16
Chlorpyrifos	LTP	8	1/7	14	nd	0.26	August 24
	ZRP	9	0/10	--	--	--	--
Dimethenamid	LTP	8	1/7	14	nd	P	May 5
	ZRP	9	0/10	--	--	--	--
Metolachlor	LTP	8	4/7	59	P	0.19	June 8
	ZRP	9	2/10	20	nd	0.07	June 6
Propiconazole	LTP	8	1/7	14	nd	P	August 24
	ZRP	9	0/10	--	--	--	--

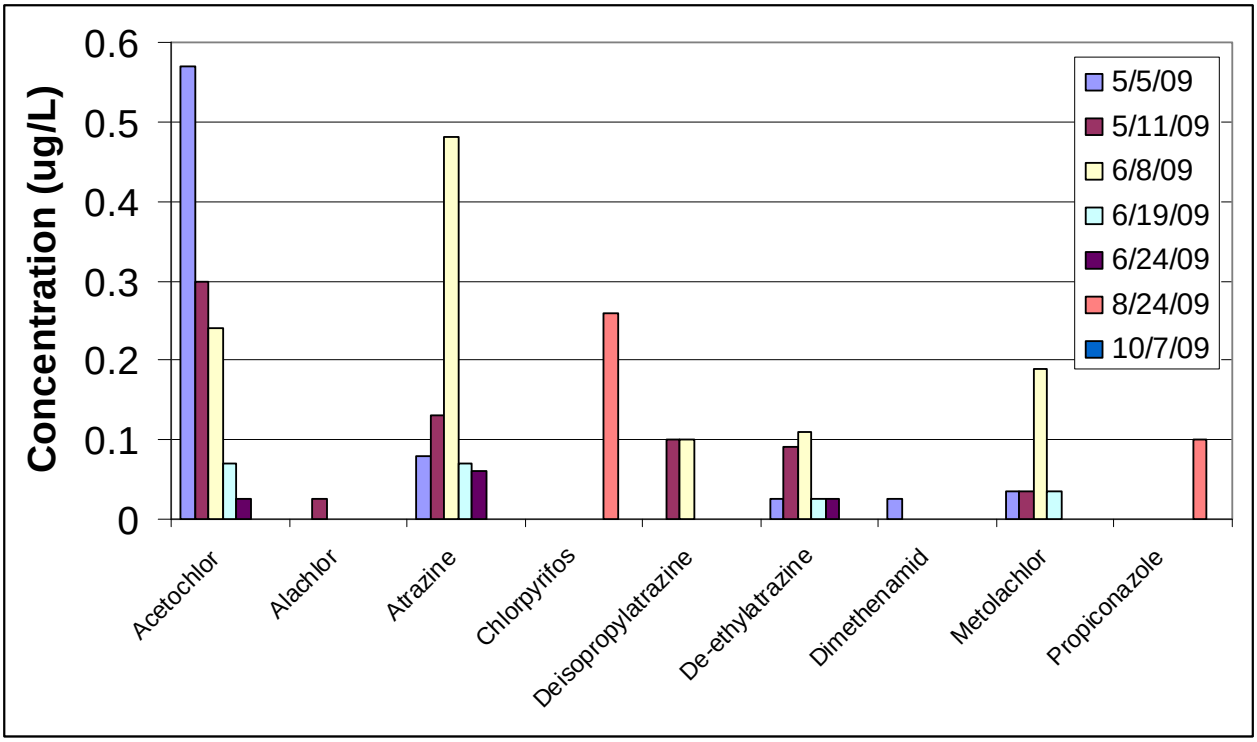


Figure 30. Concentration pesticide results from rainfall precipitation collected at Little Cobb River (LTP).

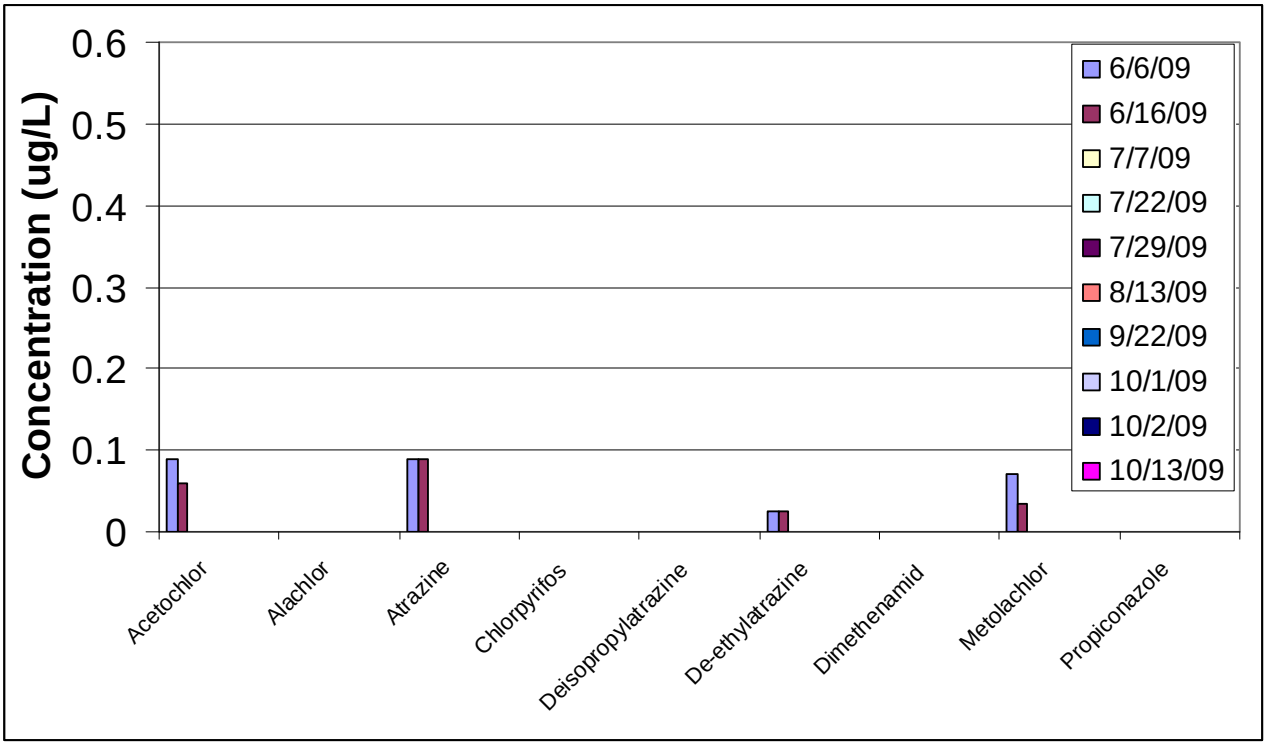


Figure 31. Concentration pesticide results from rainfall precipitation collected in Rochester (ZRP).

SECTION 4: URBAN SAMPLING

4.1. Urban groundwater sampling

In 2004, the MDA began a cooperative effort with the MPCA to sample wells within urban/suburban or developing urban settings where there is a high likelihood that turf management pesticide products are used. In this effort, samples were collected by MPCA staff for pesticide analysis from a select number of sites among those sampled as part of ongoing MPCA monitoring. Each year since 2004, MPCA sends MDA information regarding approximately 20 candidate sites for MDA's review and concurrence for planned sampling for pesticides. Sites from previous years' sampling efforts that had detectable levels of pesticides are given preference for inclusion in sampling for following years, to allow for determination of trend in these wells over time. These urban sampling wells may occur in urban settings throughout Minnesota, not just PMR 10 which includes the Twin Cities metro area. Table 45 shows results for all samples collected in 2009; Figure 32 depicts the locations. Only 15 wells were sampled in 2009 due to logistical problems. Detection frequencies and concentrations tend to be quite low for most compounds. Interestingly, the compounds detected are similar between rural and urban wells. The reasons for the similarity in the pesticides detected are unknown, although are suggestive of atmospheric transport, deposition and historic application.

Table 45. Summary of pesticides detected in 2009 urban groundwater samples.

	Detections/Total Samples		
	Detections/Total Samples	Detection Frequency (%)	Maximum (µg/L)
Acetochlor ESA	1/15	7%	0.36
Alachlor ESA	1/15	7%	0.13
Atrazine	3/15	20%	0.05
Deethylatrazine	8/15	53%	0.09
MCPP	1/15	7%	P
Metolachlor ESA	2/15	13%	0.76
Prometon	2/15	13	P
Simazine	1/15	7%	P

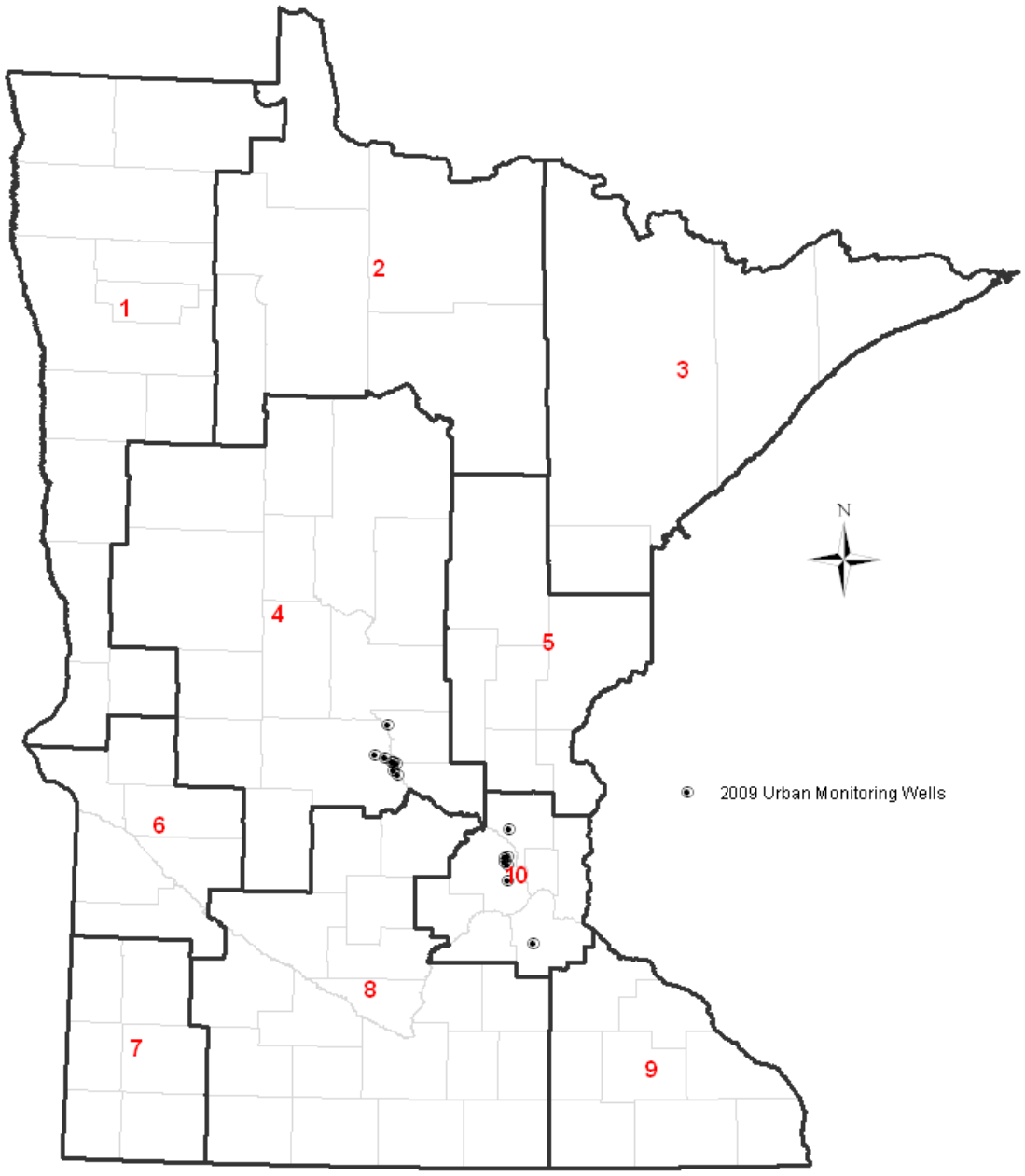


Figure 32. 2009 MDA urban groundwater monitoring wells by Pesticide Monitoring Region.

4.2. Urban Tier 1 and Tier 2 surface water sampling

Urban watershed sampling is used to evaluate the concentrations of commonly used urban pesticides in runoff from urban watersheds. These sites are sampled essentially in the same manner as the Tier 1 and Tier 2 sites, except that the monitoring season is slightly longer (mid-May through mid-August). This time frame was selected to capture the main application period for turf management pesticide products in urban locations.

In 2009, five sites were sampled using the Urban Tier 1 protocol and one site was sampled using an Urban Tier 2 protocol (Figure 33). These sites are all located in the Twin Cities Metropolitan area (PMR 10). Most sites were sampled six times for acid herbicides and base neutral compounds, for a total of 39 samples. Results found in Table 46 show that 16 different compounds were detected in the urban streams including detections of six of the acid herbicide compounds; 2,4-D (64 percent), dicamba (51 percent), dichlorprop (3 percent), MCPA (23 percent), MCPP (28 percent) and triclopyr (8 percent). In addition, several common agricultural chemicals including atrazine (49 percent), metolachlor (31 percent) and acetochlor (13 percent) were detected at low levels in these urban streams. There were also three detections of non-target analytes (2,6,-dichlorobenzamide, oxidiazon and prometon), which were the same three detected in 2008.

Of the 39 pesticide samples collected from the urban streams in 2009, none of the samples indicated pesticide concentrations above the reference values listed in Table 5.

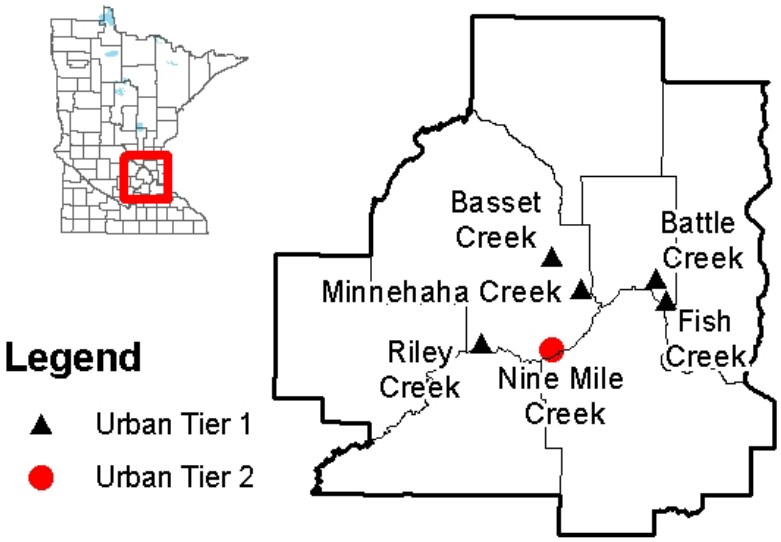


Figure 33. 2009 surface water urban monitoring locations.

Table 46. Summary of base neutral and acid herbicide pesticide detections in Urban Tier 1 and Tier 2 surface water monitoring samples, 2009.

Detected Base Neutral Pesticide	Number of Detections and Detection %	Maximum (µg/L)	Date of Maximum	90th Percentile (µg/L)	Median (µg/L)	Of Total Samples, Number Exceeding 50% of a Surface Water Reference Value (and %)
2,6-Dichlorobenzamide	5 (13%)	0.49	July 21	0.1	nd	NA
Acetochlor	5 (13%)	0.08	June 8	P	nd	0 (0%)
Atrazine	19 (49%)	0.2	June 8	0.08	nd	0 (0%)
Deethylatrazine	9 (23%)	P	multiple	P	nd	NA
Boscalid	1 (3%)	6.8	Aug 7	nd	nd	NA
Dichlobenil	1 (3%)	P	June 17	nd	nd	NA
Dimethenamid	2 (5%)	0.1	Aug 7	nd	nd	0 (0%)
Metolachlor	12 (31%)	0.16	Aug 10	P	nd	0 (0%)
Oxadiazon	1 (3%)	0.25	Aug 7	nd	nd	NA
Prometon	2 (5%)	0.26	July 21	nd	nd	NA
Detected Pesticide	**Number of Detections and Detection %**	**Maximum (µg/L)**	**Date of Maximum**	**90th Percentile (µg/L)**	**Median (µg/L)**	**Of Total Samples, Number Exceeding 50% of a Surface Water Reference Value (and %)**
2,4-D	25 (64%)	6.0	June 8	1.12	0.2	NA
Dicamba	20 (51%)	0.45	multiple	P	P	0 (0%)
Dichlorprop	1 (3%)	P	July 21	nd	nd	NA
MCPA	9 (23%)	0.48	July 21	0.26	nd	0 (0%)
MCPP	11 (28%)	0.97	July 21	0.23	nd	0 (0%)
Triclopyr	3 (8%)	0.55	Aug 7	nd	nd	0 (0%)

SECTION 5: SPECIAL MONITORING STUDIES IN 2009

5.1. Plot and field scale evaluation of Best Management Practices

During the 2007 and 2008 growing seasons the MDA coordinated nutrient and pesticide monitoring studies at three agricultural drainage tile locations in southern Minnesota. This was a

collaborative effort with the Acetochlor Registration Partnership, Minnesota State University Mankato, and the University of Minnesota (UM) Southern Research and Outreach Center (SROC). Although subsurface tile drainage water was analyzed, these studies are focused on surface water quality since tile drainage water is discharged directly to surface water. In 2009, pesticide analysis from the drainage sites was limited to plot scale evaluations for acetochlor at the SROC at Waseca, MN.

The focus of the pesticide portion of the studies was acetochlor, a common corn herbicide in Minnesota. Acetochlor has been detected in surface water at concentrations of concern by MDA. Two south central Minnesota water bodies, the Le Sueur River and the Little Beauford Ditch (both current Tier 3 stations), have been included on the Minnesota 2008 303(d) Total Maximum Daily Load (TMDL) list of impaired waters due to violations of the four-day aquatic toxicity standard of acetochlor (3.6 µg/L). The violations occurred in 2001 for the Le Sueur River and 2005 for the Little Beauford Ditch. Subsurface agricultural drainage systems are dominant hydrologic features in the Le Sueur River and Little Beauford Ditch watersheds. These studies were initiated to evaluate the potential for acetochlor movement to subsurface drainage systems.

MDA has developed Best Management Practices (BMPs) designed to minimize water quality impacts associated with acetochlor use. One of the BMPs, reduced application rate, was evaluated in these studies with two field locations receiving a reduced rate of acetochlor and one location receiving both a full rate and a reduced rate (See Table 47).

Table 47. Acetochlor applications rates at demonstration projects, 2007 – 2009.

Location	Year	Sponsor	Treatment
Highway 90 Demonstration Site	2007, 2008	MDA	Reduced rate
Red Top Demonstration Site	2007	MDA	Reduced rate
UM South Central Research Center	2008, 2009	UM	Reduced and full rates

The Monsanto Analytical Laboratory in Saint Louis, MO analyzed tile drainage water samples for the parent compound acetochlor as part of the Acetochlor Registration Partnership's involvement in the project. Samples for acetochlor degradates and quality control samples for the parent compound acetochlor were analyzed by the MDA laboratory in St Paul, MN.

In 2009, acetochlor was not applied to the Highway 90 or Red Top Demonstration Sites because they were in the soybean portion of the rotation. As a result, neither location was sampled for acetochlor. However, the nine plots at the SROC were sampled for acetochlor in 2009 and a summary of those results is presented in Table 48.

Table 48. Acetochlor concentrations in tile drainage samples from SROC plots collected in 2009.

Treatment:	No Acetochlor Application			Reduced Rate Acetochlor			Full Rate Acetochlor		
Plot	**1503**	**2109**	**3510**	**1103**	**2307**	**3513**	**1506**	**2309**	**3512**
Date	**Concentration (µg/L)**								
6/12/2010	nd	nd	nd	nd	nd	*dry*	0.09	*dry*	*dry*

11/2/2010	nd	0.04	nd	nd	nd	*dry*	*dry*	*dry*	*dry*
11/16/2010	nd	nd	dry	nd	nd	*dry*	nd	*dry*	*dry*

nd = not detected at the MDL of 0.03 (µg/L). All samples analyzed by Monsanto Laboratory in St. Louis, MO.

Nine small plots in a 36-plot tile drainage research facility located on a Canisteo-Webster clay loam soil complex were used to conduct the acetochlor phase of the study. The nine plots were part of a larger study examining nitrogen rate and timing practices in a corn-corn-soybean rotation study. Due to dry conditions in 2009, there was limited drainage from the plots and only 14 total acetochlor samples were collected from the nine plots. Because of the dry conditions and limited data collected, the results for the 2009 monitoring are inconclusive but do indicate that under such conditions only very small amounts of acetochlor were present in the tile water. The detection of acetochlor in the control plot (2109) at a concentration of 0.04 µg/L may be related to low level contamination of the manhole where samples were collected. Additional information related to the results of the SROC study can be found in the report "*Evaluation of Reduced Application Rates of Acetochlor to Reduce Concentration in Tile Drainage Water*" by Randall and Vetch (2010).

5.2. Enzyme Linked Immunosorbant Assay (ELISA) sampling

During 2009, the MDA completed three different projects using the ELISA method of analysis. The lab work was contracted to the Water and Environmental Analysis Laboratory (WEAL) at the University of Wisconsin-Stevens Point. The work included analyses for an additional degradate of atrazine (diaminochlorotriazine (DACT)), atrazine and acetochlor. The three different projects and results are found below.

5.2.1. Groundwater DACT

MDA has sampled for DACT in 2007 and 2008, and those results can be found in earlier Annual Reports. This degradate is considered in addition to the parent and other atrazine degradates when comparing to the atrazine water quality standard for drinking water (groundwater samples). In 2009, sampling for DACT was not completed for all groundwater sites sampled due to contract timing issues. Table 49 includes a summary of results for the samples collected in 2009 from groundwater sites. Results indicate that 68 of 173 samples, or 39 percent of all samples analyzed, had detectable amounts of DACT and the 90th percentile of all samples analyzed was 0.26 µg/L. The maximum concentration of DACT found at a groundwater site was 1.53 µg/L and, when added with other atrazine constituents at that site, resulted in a maximum of 2.42 µg/L. This is less than the applicable HRL/MCL atrazine standard of 3.0 µg/L.

Table 49. Summary of the atrazine degradate diaminochlorotriazine (DACT) results in groundwater samples as determined through ELISA method for 2009.

PMR	Detections/Total Samples	Total % Detects	Median (µg/L)	75th percentile (µg/L)	90th percentile (µg/L)	Maximum (µg/L)	Maximum Atrazine + all degradates (µg/L)[1]
1	1/7	14%	nd	nd	0.10	0.13	0.43

4	19/81	23%	nd	nd	0.20	1.53	2.42
5	2/9	22%	nd	0.04	0.15	0.15	0.41
6	2/8	25%	nd	0.06	0.30	0.38	0.38
7	2/7	29%	nd	0.11	0.21	0.22	0.27
8	1/12	8%	nd	nd	0.08	0.27	0.35
9	41/49	84%	0.14	0.21	0.30	0.45	1.37
All Samples	68/173	39%	nd	0.14	0.26	1.53	2.42

5.2.2. Surface Water DACT

Table 50 presents summary results for DACT samples collected from Tier 3 sites in 2009. DACT was detected in 65 percent of the surface water samples collected in 2009 as compared to 66 percent in 2008. The maximum concentration detected was 0.17 µg/L from a storm flow sample collected from the South Branch of the Root River near Carimona. There were fewer samples collected in 2009 and the samples were generally collected later in the year. However, the pattern of detections is similar to 2008. Most notably, there were no detections in either year from the samples collected in PMR 8, whereas the detection frequency in PMR 9 was 100 and 93 percent in 2008 and 2009, respectively. The MDA laboratory is currently developing a new analytical method that will include DACT. It is anticipated that the 2010 monitoring season will include many more DACT samples from surface water.

Table 50. Summary of atrazine degradate diaminochlorotriazine (DACT) results in surface water for 2009 monitoring samples as determined through ELISA method.

PMR	Sample Number	Total Detects	Total % Detects	Total Max (µg/L)	Total Median (µg/L)
8	6	0	0	0	0
9	14	13	93	0.17	0.14
Both 8 and 9	20	13	65	0.17	0.12

5.2.3. Acetochlor evaluation in the Le Sueur River Watershed and tributaries

In the spring of 2009, MDA conducted an evaluation of the use of ELISA for the analysis of acetochlor in surface water samples collected from within the Le Sueur River Watershed in south central Minnesota (Figure 34). Both composite and grab samples were collected from a network of existing stream gage locations and submitted to the WEAL for ELISA analysis.

Of the 90 samples submitted for acetochlor ELISA analysis, 39 were also submitted to the MDA Laboratory for acetochlor analysis, using GC/MS.

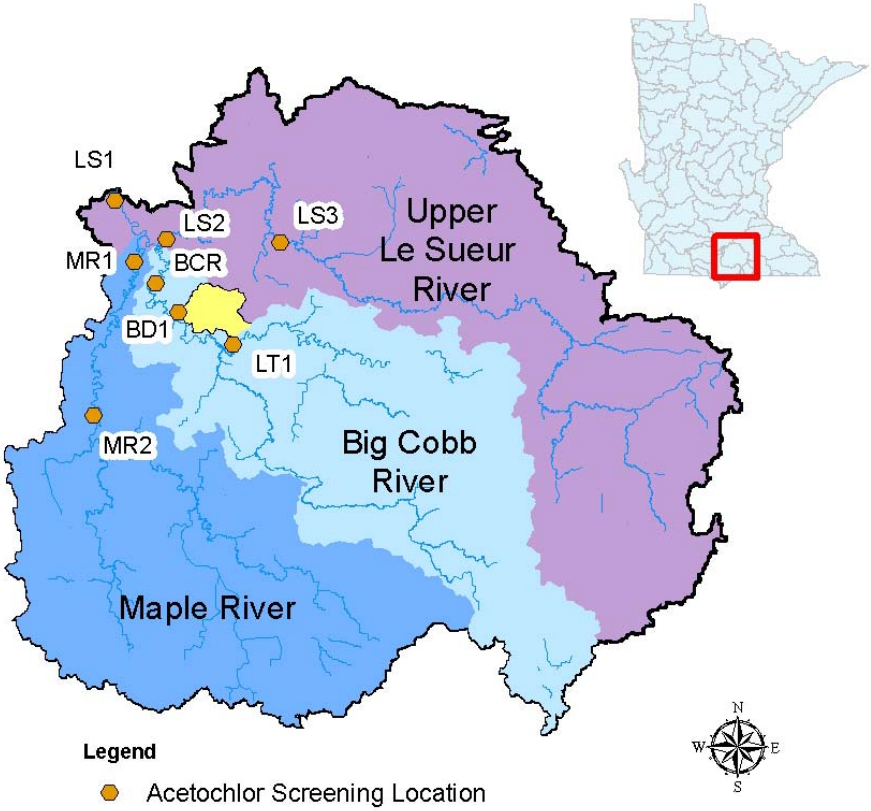


Figure 34. Le Sueur River Watershed with the three major sub-watersheds and the Beauford Ditch Watershed identified along with the sampling locations.

Acetochlor ELISA results indicated that 11 percent of the samples exceeded an acetochlor concentration of 1 µg/L. No samples collected had concentrations greater than the current Minnesota aquatic life concentration standard for acetochlor of 3.6 µg/L.

An acetochlor cross-reactivity analysis was completed using samples that had both ELISA and GC/MS analysis. The results of the acetochlor analysis for the two methods indicated a strong relationship existed ($R^2=0.80$) between the acetochlor ELISA and GC/MS methods. The relationship improved ($R^2=0.92$) when the acetochlor ELISA results were compared to the cumulative GC/MS results of acetochlor and metolachlor. Approximately 10 percent of the Acetochlor ELISA samples were submitted for additional LC/MS analysis for eight chloroacetanilide degradates. There did not appear to be cross-reactivity between the acetochlor ELISA method and the chloroacetanilide degradates, although the data collected in this study was limited. Metolachlor appeared to be the primary analyte causing cross-reactivity concerns in the acetochlorELISA method.

Results of this study strongly suggest that the acetochlor ELISA analysis is a reasonable screening tool for evaluating acetochlor concentrations in surface water, especially when combined with GC/MS analysis of an appropriate number of split samples above a pre-determined critical concentration to verify the presence of acetochlor and metolachlor. However because of the potential for cross-reactivity with metolachlor, which is a common contaminant in

Minnesota waters, and a slight bias towards high (more protective) values in sampling results, the acetochlor ELISA is not suitable as a method for the precise quantification of the concentration of acetochlor.

Table 51 below presents a summary of the acetochlor ELISA results from the study. A full report of the results of the acetochlor study, "Evaluation of an ELISA Method for Acetochlor Analysis in the Le Sueur River Watershed" can be found on the MDA website (www.mda.state.mn.us/monitoring).

Table 51. Summary statistics from the acetochlor ELISA analysis in the Le Sueur River Watershed for each of the eight sampling locations.

	LS1	LS2	LS3	BCR	LT1	BD1	MR1	MR2
# of Samples	14	8	10	9	9	10	11	9
Watershed Size (acres)	710,041	285,189	225,078	195,145	82,868	5,111	216,879	197,362
Median (µg/L)	0.29	0.19	0.18	0.23	0.23	0.24	0.18	0.21
Max (µg/L)	1.13	0.74	1.56	1.38	1.07	0.89	1.89	2.28
Min (µg/L)	0.13	0.12	0.17	0.16	0.13	0.13	0.15	<0.10

5.2.4. Triazine screen in drinking water

In the spring of 2009, the MDA conducted triazine immunoassay analyses for water samples collected from a pre-existing network of volunteered, private drinking water wells in Minnesota's southeastern karst region to screen for atrazine. Previous work indicated that wells with high nitrate-nitrogen concentrations had a higher likelihood of pesticide contamination. Therefore, available wells in the network with high nitrate levels were selected for sampling. The results should be viewed as a representation of vulnerable wells rather than all wells in southeast Minnesota. All samples were collected by the well owner and MDA provided the immunoassay analysis at no charge to the well owner. Ninety-two of the 100 sample kits mailed out were returned for analysis. County level summary statistics of the project are presented in Table 52. Of the 92 samples, 44 had detectable levels of triazine compounds that were assumed to be atrazine compounds. The median triazine concentration across the region was <0.05 µg/L, the 90th percentile was 0.22 µg/L, and the maximum was 1.26 µg/L. All 92 samples results were below the currently applicable MDH drinking water standard of 3.0 µg/L for atrazine. The results were analyzed in conjunction with additional information on nitrate-nitrogen concentration in the well, well installation date, and the presence, or lack, of an overlaying confining layer.

A special MDA report titled: "Use of a Triazine Immunoassay Method in a Volunteer Drinking Water Monitoring Network in Southeast Minnesota to Screen for Atrazine Compounds" was completed in 2009 and is available (www.mda.state.mn.us/monitoring).

Table 52. County level statistics of the 2009 MDA triazine screen of vulnerable private drinking water wells in southeast Minnesota. Human health risk values are HRL/MCL Parent = 3.0 μg/L; Parent + Degradates = 3.0 μg/L.

County	Samples	Mean (μg/L)	Minimum (μg/L	25th Percentile (μg/L)	Median (μg/L	75th Percentile (μg/L)	90th Percentile (μg/L)	Maximum (μg/L)
Dodge	4	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
Fillmore	17	0.09	<0.05	<0.05	0.06	0.10	0.12	0.53
Goodhue	12	0.06	<0.05	<0.05	<0.05	0.11	0.16	0.25
Houston	7	0.24	<0.05	<0.05	0.11	0.17	0.17	1.26
Mower	6	0.05	<0.05	<0.05	<0.05	<0.05	0.30	0.30
Olmsted	9	0.07	<0.05	<0.05	0.07	0.12	0.15	0.15
Rice	8	<0.05	<0.05	<0.05	<0.05	<0.05	0.07	0.07
Wabasha	16	0.15	<0.05	<0.05	0.12	0.20	0.47	0.68
Winona	13	0.08	<0.05	<0.05	0.06	0.16	0.21	0.24
All Samples	*92*	*0.09*	*<0.05*	*<0.05*	*<0.05*	0.12	0.22	*1.26*

5.3. Clean Water Legacy project sites

There were two sites installed in the upper portion of the South Branch of the Root River in 2007 that were sampled as intensive nutrient and turbidity monitoring locations in 2009. The two sites (SR2 and SR3) are on parallel ditch systems that drain the flatter upland portions of the South Branch of the Root River Watershed in Mower County. These small watersheds are extensively drained with subsurface tile. They have automatic sampling systems and continuous turbidity monitoring. 2009 marked the third year of data collection, which included intensive nutrient and sediment sampling, limited pesticide sampling at SR3, and stage-discharge relationship development by the Minnesota DNR.

These two systems are being monitored over time and may be used as paired watersheds for BMP evaluation once a reasonable baseline data set is established. These sites were used to calibrate and validate SWAT (Soil and Water Assessment Tool) modeling being conducted by University of Minnesota researchers. Data from these sites will also be analyzed as part of a study being conducted near Adams, MN evaluating alternative ditch designs.

SR2 and SR3 differ from most other automated monitoring stations in the state because they are using a turbidity-based threshold to trigger automated sampling. This is possible because there are in-stream probes that continuously record the turbidity concentration. Turbidity-based sampling, or turbidity threshold sampling (TTS), was developed to provide better sample collection during dynamic sediment concentration periods. Figure 35 presents monitoring results of nutrient and sediment analytes and an associated photograph of sample bottles at the time of collection. Note the short duration of the event, and how various analytes have different concentration trends resulting from their different transport mechanisms. It is apparent from the data collected at these sites that conventional sampling approaches that are largely controlled by flow conditions may not be capturing the dynamic nature of turbidity in these systems. Collecting representative total suspended solid (TSS) samples during these dynamic periods should improve estimates of sediment load. Evaluating the dynamic nature of turbidity will also

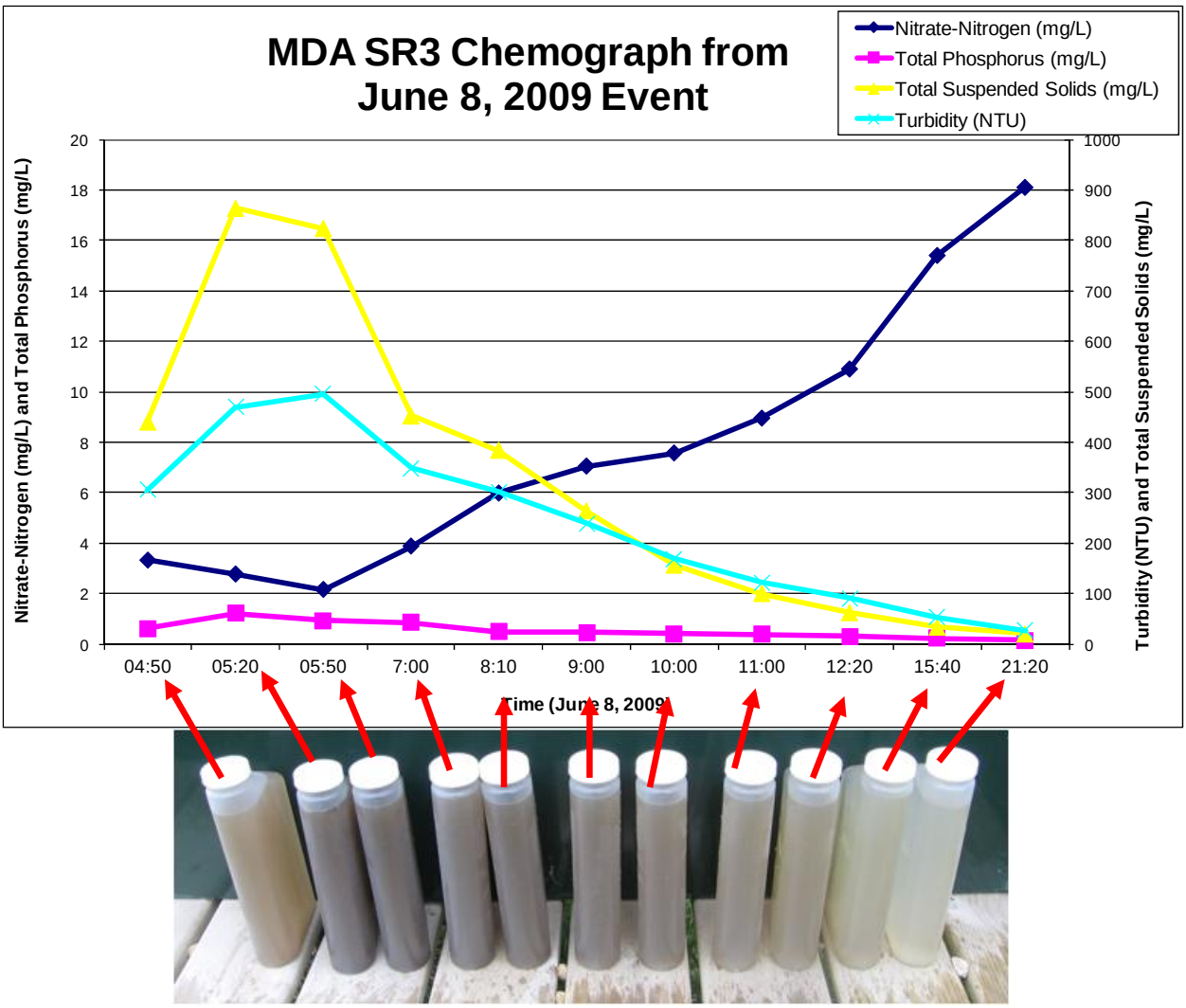


Figure 35. Chemograph from SR3 collected on June 8, 2009.

help better predict when to sample for other pollutants, like pesticides, that may be transported with surface runoff and behave similar to TSS in some systems.

For a complete record of results, see Appendix 5. A special MDA report will be produced in 2010 highlighting results from data collected from 2007 to 2009 at these stations.

5.4. Flow and chemistry monitoring at a large spring

In 2006, MDA expanded groundwater monitoring in the karst region of the state (PMR 9) to include sampling at the emergence point of several perenial springs. There were notable changes in flow and turbidity at several of the springs during the year, related strongly to climatic conditions. In 2008, MDA installed flow monitoring equipment at one of the larger springs in Fillmore County to assess variability in flow and rainfall response and to allow for evaluation of groundwater-surface water interaction. The spring is instrumented to continuously measure water level and velocity near the emergence point. Estimated daily discharge is determined

from recorded velocity, and calculated stream cross-sectional area (from recorded water level). Estimated 2009 mean daily discharge and daily rainfall is presented in Figure 36.

There was great variablity in mean daily discharge, and values ranged from under 5 cubic feet per second (cfs) to an estimated 169 cfs. There were increases in flow related to snowmelt in early March, elevated flow from rainfall events in May and June, and a period of sustained elevated flows in October and November. Presented rainfall data was collected in a nearby state park and totaled 31.18 inches in 2009, which is very near the 30 year (1971-2000) normal amount for Rochester, MN (31.40 inches) calculated by the National Climatic Data Center. The spring is less responsive to rainfall following extended dry periods and rainfall observed during weeks of high plant water uptake. Due to complications of winter monitoring, a major flow event was not recorded that occurred around February 10, 2009.

Pesticide and nutrient monitoring at this spring began in 2009. Samples were collected as part of MDA's PMR 9 regional groundwater program. Samples are collected once in late May, twice in June, and once in September, and the sampling events are indicated in Figure 35 as black diamonds. Two of the sample events occurred during elevated flows and two occurred during low flow periods. Table 53 below presents monitoring results from each sampling event.

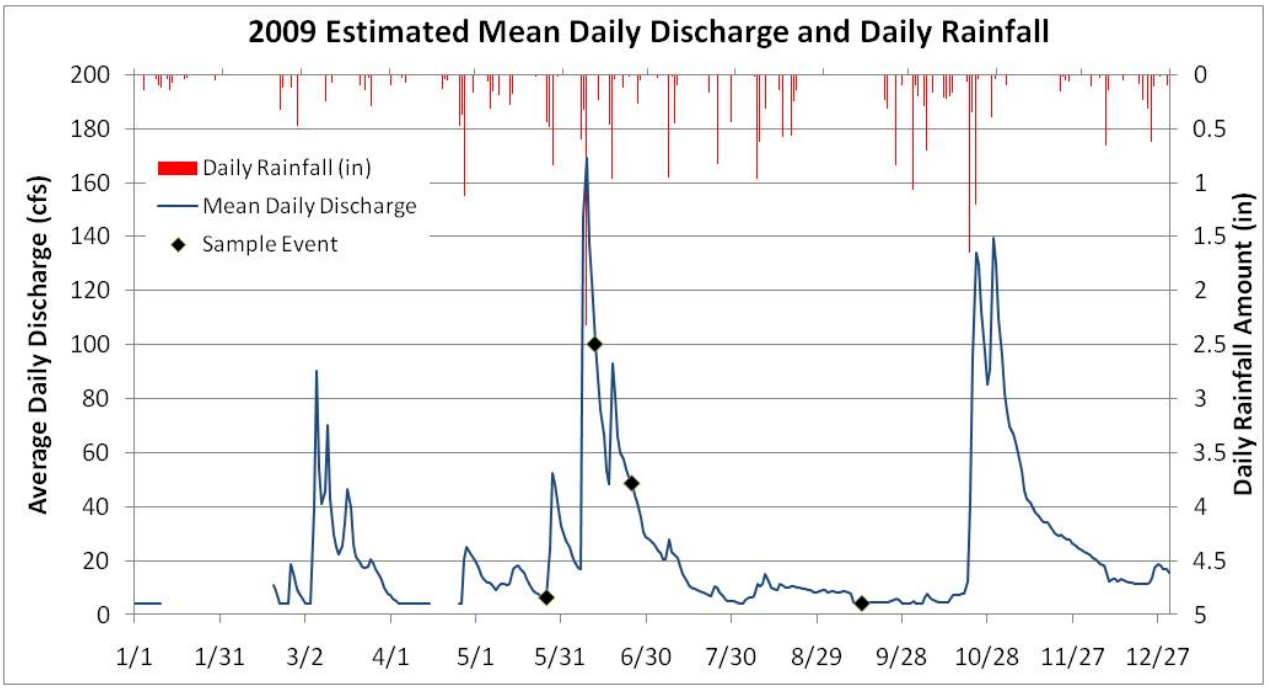


Figure 36. Estimated mean daily discharge and daily rainfall at a large spring in PMR 9.

Table 53. Nitrate-N and pesticide monitoring results for all detected compounds collected at a large spring in PMR 9.

Sample Date	Estimated Mean Daily Discharge (cfs)	Nitrate-Nitrogen (mg/L)	Acetochlor (µg/L)	Atrazine (µg/L)	Deisopropylatrazine (µg/L)	Deethylatrazine (µg/L)	Metolachlor (µg/L)	Acetochlor ESA (µg/L)	Acetochlor OXA (µg/L)	Alachlor ESA (µg/L)	Metolachlor ESA (µg/L)	Metolachlor OXA (µg/L)
5/26/2009	6.54	7.35	nd	P	nd	0.05	nd	0.12	nd	0.22	0.79	nd
6/12/2009	100	13.2	0.06	0.42	P	0.13	0.33	0.56	0.31	0.21	1.57	0.38
6/25/2009	48.8	12.4	nd	0.35	P	0.14	0.29	0.41	0.07	0.17	1.68	0.24
9/14/2009	4.38	8.21	nd	0.05	nd	0.07	P	0.08	nd	0.42	0.6	nd

Pesticide results were strongly related to estimated mean daily discharge. Two samples were collected at lower flow levels, one was collected at moderate flows, and one was collected at higher flows. Pesticide and nitrate-nitrogen concentrations tended to increase as flow increased. Nitrate-nitrogen ranged from 7.35 and 8.21 mg/L during low flows and to 12.4 and 13.2 mg/L during the higher sampled flows. Pesticide concentrations, and the number of detected compounds, were highest during the higher flows. The sample collected on June 12, 2009 had ten pesticide compounds detected and had a total pesticide concentration (all pesticide and pesticide degradate compounds combined) of 3.97 µg/L. The sample collected on May 26, 2009 had five pesticide compound detected and had a total pesticide concentration of 1.18 µg/L.

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SECTION 6: NUTRIENTS AND TOTAL SUSPENDED SOLIDS

Although the primary focus of the MDA's surface water monitoring efforts are towards the collection of pesticide data, nutrients (including nitrate-N, orthophosphorus, and total phosphorus), sediment data (total suspended solids) and, in limited locations, turbidity, have also been collected along with the pesticide data. Nutrient and sediment samples are collected along with pesticide samples to provide additional information about the possible transport mechanisms and pathways (overland flow, sub-surface tile, groundwater, etc.) that the pesticides may have used to enter the water body. These additional analytes also provide information associated with the potential impact of non-pesticide related agricultural chemical application, such as fertilizers and manure.

6.1. Groundwater

Samples for nitrate-nitrogen were collected from 190 of the 205 groundwater sampling events in 2009. Table 54 is a summary of results for the samples collected in 2009. In total, 170 samples, or 89 percent of all samples analyzed, had detectable levels of nitrate-nitrogen, with 40 percent exceeding the health risk limit of 10.0 mg/L. The highest value of 51.6 mg/L was recorded in PMR 4. Every PMR, except PMR 1, had at least 50 percent of the samples with detectable levels of nitrate-nitrogen. PMRs 4 and 5, both areas of irrigated agriculture and sandier soils, displayed the highest median values of 15.2 and 8.5 mg/L, respectively.

Generally, groundwater nitrate-nitrogen concentrations are divided into four categories when assessing sample results. Samples with no measurable levels are considered unimpacted by any source; levels between the MDL and 3.0 mg/L are considered background; levels greater than 3.0 to 10.0 mg/L are considered impacted; concentrations greater than 10.0 mg/L exceed the state's health risk limit. As evidenced in Table 55, it is fairly common throughout Minnesota to have shallow groundwater exceed MDH health risk limits for nitrate-nitrogen. The extent to which these concentrations exist for the entire volume of the aquifers represented here cannot be determined from this set of data.

The present groundwater monitoring network was not designed to determine the quality of the state's groundwater with respect to nitrate-nitrogen, making extrapolation of the information presented here inappropriate.

Table 54. Summary of nitrate-nitrogen results in groundwater samples for 2009.

PMR	Detections/Total Samples	% detections	Median (mg/L)	75% (mg/L)	90% (mg/L)	Maximum (mg/L)	% Exceeding 10 mg/L Standard
1	2/7	28%	nd	0.4	23.1	28.7	14%
4	80/84	95%	15.2	20.9	33.2	51.6	59%
5	8/9	89%	8.5	16.0	21.7	21.9	33%
6	6/9	67%	0.9	7.6	31.2	40.4	23%
7	4/7	58%	5.2	10.4	18.0	19.6	29%
8	8/12	67%	0.9	7.9	25.1	47.9	17%
9	62/62	100%	6.6	10.3	11.9	13.7	27%
All samples	170/190	89%	7.3	15.5	26.6	51.6	40%

Table 55. Summary of nitrate-nitrogen results in groundwater samples for 2009 compared against MDH health risk limits.

PMR	% < MDL	% MDL to 3.0 mg/L	% 3.01 to 10.0 mg/L	% > 10.0 mg/L
1	72%	14%	0%	14%
4	5%	19%	17%	59%
5	11%	23%	33%	33%
6	33%	33%	11%	23%
7	42%	0%	29%	29%
8	33%	33%	17%	17%
9	0%	2%	71%	27%
Total	11%	14%	35%	40%

6.2. Surface water Tier 1 and Tier 2

Overall statistics for inorganic results are shown for Tier 1, Urban Tier 1, and Tier 2 in Table 56. Ammonia samples were only collected in PMR 1 at the request of the cooperators. Ammonia was detected 45 percent of the time during base flow conditions and 25 percent during storm flow conditions. The maximum value detected was 0.42 mg/L. Limited total suspended solids (TSS) samples were collected in PMR 8 and PMR 9. There were no storm events captured in 2009 in PMRs 2, 3 or 5.

Nutrient sample counts for nitrate/nitrogen (NO_3-N), total phosphorus (TP) and orthophosphorus (OP) numbered at 226 for each nutrient. Base flow median NO_3-N concentrations were higher than storm flow concentrations in PMRs 7, 9, 10 and Urban Tier 1. Total phosphorus had 100 percent detection frequencies in all PMRs. Orthophosphorus had 100 percent detection frequencies except in PMR 4 (75 percent) during storm flow samples, but lower detection frequency in base flow samples. Median concentrations for TP ranged from 0.02 mg/L (base flow) in PMR 3 and 0.05 (storm flow) in PMR 4 to 0.16 mg/L (base flow) and 0.32 mg/L (storm flow) both in PMR 1. Median concentrations for OP ranged from 0.007 mg/L (base flow) in PMRs 3 and 7, and 0.016 (storm flow) in PMR 4 to 0.061 mg/L (base flow) and 0.198 mg/L (storm flow), both in PMR 1.

Table 56. Tier 1 and Tier 2 inorganic results for surface water samples by PMR.

2009		Base Flow Samples					Storm Event Samples				
Inorganic Analyte	Tier 1 and Tier 2 Surface Water Monitoring Site	No. of samples	% Detection	Maximum Value Detected (mg/L)	90th percentile (mg/L)	Median Value of Samples (mg/L)	No. of samples	% Detection	Maximum Value Detected (mg/L)	90th percentile (mg/L)	Median Value of Samples (mg/L)
Ammonia	PMR 1	13	45%	0.11	0.09	0	4	25%	0.419	0.29	0
	PMR 2	0	--	--	--	--	--	--	--	--	--
	PMR 3	0	--	--	--	--	--	--	--	--	--
	PMR 4	0	--	--	--	--	--	--	--	--	--
	PMR 5	0	--	--	--	--	--	--	--	--	--
	PMR 6	0	--	--	--	--	--	--	--	--	--
	PMR 7	0	--	--	--	--	--	--	--	--	--
	PMR 8	0	--	--	--	--	--	--	--	--	--
	PMR 9	0	--	--	--	--	--	--	--	--	--
	PMR 10	0	--	--	--	--	--	--	--	--	--
	Urban Tier 1	0	--	--	--	--	--	--	--	--	--
Nitrate/Nitrite-Nitrogen	PMR 1	16	0%	--	--	--	6	14%	1.38	0.69	0
	PMR 2	4	0%	--	--	--	--	--	--	--	--
	PMR 3	4	0%	--	--	--	--	--	--	--	--
	PMR 4	9	33%	5.34	5.32	0.00	4	50%	5.95	5.81	2.74
	PMR 5	16	50%	2.13	2.11	0.60	--	--	--	--	--
	PMR 6	10	70%	2.71	1.92	0.54	6	67%	2.76	1.79	0.62
	PMR 7	12	100%	13.5	11.9	4.09	4	100%	13.3	10.5	3.5
	PMR 8	39	90%	13.4	10.3	4.54	15	93%	13.6	12.3	7.28
	PMR 9	17	100%	8.4	7.82	4.89	15	100%	15.1	13.0	4.5
	PMR 10	9	100%	12.5	7.92	2.16	8	100%	11.6	8.63	1.61
	Urban Tier 1	10	60%	1.79	1.75	0.88	22	32%	1.6	1.51	0

Table 56 continued. Tier 1 and Tier 2 inorganic results for surface water samples by PMR.

2009		Base Flow Samples					Storm Event Samples				
Inorganic Analyte	Tier 1 and Tier 2 Surface Water Monitoring Site	No. of samples	% Detection	Maximum Value Detected (mg/L)	90th percentile (mg/L)	Median Value of Samples (mg/L)	No. of samples	% Detection	Maximum Value Detected (mg/L)	90th percentile (mg/L)	Median Value of Samples (mg/L)
Orthophosphorus	PMR 1	16	100%	0.470	0.316	0.061	6	100%	0.205	0.204	0.198
	PMR 2	4	100%	0.012	0.011	0.008	--	--	--	--	--
	PMR 3	4	25%	0.007	0.007	0.007	--	--	--	--	--
	PMR 4	9	100%	0.023	0.020	0.014	4	75%	0.021	0.021	0.016
	PMR 5	16	100%	0.069	0.049	0.025	--	--	--	--	--
	PMR 6	10	100%	0.045	0.041	0.025	6	100%	0.064	0.064	0.037
	PMR 7	12	83%	0.029	0.026	0.007	4	100%	0.042	0.040	0.026
	PMR 8	39	100%	0.360	0.143	0.031	15	100%	0.274	0.202	0.031
	PMR 9	17	94%	0.119	0.102	0.036	15	100%	0.217	0.168	0.092
	PMR 10	9	100%	0.128	0.123	0.054	8	100%	0.201	0.198	0.109
	Urban Tier 1	10	100%	0.245	0.114	0.031	22	100%	0.179	0.060	0.042
Total Phosphorus	PMR 1	16	100%	0.64	0.40	0.16	6	100%	0.35	0.34	0.32
	PMR 2	4	100%	0.04	0.04	0.03	--	--	--	--	--
	PMR 3	4	100%	0.02	0.02	0.02	--	--	--	--	--
	PMR 4	9	100%	0.06	0.05	0.04	4	100%	0.06	0.06	0.05
	PMR 5	16	100%	0.13	0.11	0.09	--	--	--	--	--
	PMR 6	10	100%	0.14	0.13	0.07	6	100%	0.26	0.23	0.15
	PMR 7	12	100%	0.10	0.08	0.05	4	100%	0.15	0.14	0.10
	PMR 8	39	100%	0.52	0.22	0.10	15	100%	0.40	0.29	0.12
	PMR 9	17	100%	0.15	0.14	0.08	15	100%	0.50	0.36	0.22
	PMR 10	9	100%	0.29	0.20	0.15	8	100%	0.40	0.39	0.21
	Urban Tier 1	10	100%	0.38	0.30	0.08	22	100%	0.76	0.20	0.12

Table 56 continued. Tier 1 and Tier 2 inorganic results for surface water samples by PMR.

2009		Base Flow Samples					Storm Event Samples				
Inorganic Analyte	Tier 1 and Tier 2 Surface Water Monitoring Site	No. of samples	% Detection	Maximum Value Detected (mg/L)	90th percentile (mg/L)	Median Value of Samples (mg/L)	No. of samples	% Detection	Maximum Value Detected (mg/L)	90th percentile (mg/L)	Median Value of Samples (mg/L)
Total Suspended Solids	PMR 1	0	--	--	--	--	--	--	--	--	--
	PMR 2	0	--	--	--	--	--	--	--	--	--
	PMR 3	0	--	--	--	--	--	--	--	--	--
	PMR 4	0	--	--	--	--	--	--	--	--	--
	PMR 5	0	--	--	--	--	--	--	--	--	--
	PMR 6	0	--	--	--	--	--	--	--	--	--
	PMR 7	0	--	--	--	--	--	--	--	--	--
	PMR 8	0	--	--	--	--	1	100%	43	43	43
	PMR 9	3	100%	2.9	2.86	2.7	--	--	--	--	--
	PMR 10	0	--	--	--	--	--	--	--	--	--
	Urban Tier 1	0	--	--	--	--	--	--	--	--	--

6.3. Surface Water Tier 3

Tier 3 nutrient and total suspended solid results from 2009 are shown in Table 57. Nutrient and sediment samples are not always collected. Field personnel determine whether or not a collection should take place based on a variety of factors, including current field conditions and volume of water available if collecting from composite samplers.

6.3.1 Nitrate-Nitrogen

The maximum NO_3-N concentration in 2009 was detected at Seven Mile Creek at a concentration of 15.4 mg/L. In southeast Minnesota, baseflow NO_3-N levels in streams are heavily influenced by the source aquifer that discharges to the stream. There are a number of streams that have annual maximum NO_3-N levels measured during base periods. In 2009, this was true only at the Middle Branch of the Whitewater River, with a median of 10.1 mg/L during base flow and 6.93 mg/L during storm flow samples. The newest Tier 3 location, the Buffalo River at Georgetown, exhibited the lowest NO_3-N concentrations of all the Tier 3 stations. The median values during base flow periods ranged from 0.22 mg/L at the Buffalo River at Georgetown to 10.1 mg/L at the Middle Branch of the Whitewater River.

6.3.2. Total phosphorus/orthophosphorus

Out of the 130 samples collected, there was a 100 percent detection frequency for TP and OP in all Tier 3 sites, except for Seven Mile Creek where it was 90 percent for TP and 80 percent for OP during base flow conditions. The maximum TP concentration detected during storm flow periods (2.34 mg/L) occurred at the Beauford Ditch along with a coincident OP concentration of 2.15 mg/L. Median TP concentrations for storm event samples ranged from 0.14 mg/L to 0.75 mg/L and for base flow samples 0.04 mg/L to 0.14 mg/L. Median OP concentrations for storm event samples were 0.064 mg/L to 0.360 mg/L and for base flow samples 0.011 mg/L to 0.079 mg/L.

In an effort to achieve better comparability with other laboratories and water monitoring projects, the MAU, in cooperation with the MDA laboratory, conducted an evaluation of analytical methods for dissolved phosphorus. Historically the MDA had used a method that relied on physical settling and decanting of samples when analyzing for orthophosphorus. In the fall of 2009, 50 duplicate samples were analyzed using the "settling" method as well as a method that utilized sample filtration. Results from the comparison indicated good comparability between the methods. In response, the MAU has requested that all future orthophosphorus analysis be filtered and run as "dissolved orthophosphorus." Based on the results of the study, the MAU believes future analysis will continue to be comparable with historical data.

6.3.3. Total suspended solids and turbidity

There were 104 TSS samples collected from Tier 3 locations in 2009. Median TSS concentrations during storm events ranged from 24 mg/L to 668 mg/L. The median TSS concentration during base flow events ranged from3.6 mg/L to 39 mg/L.

Turbidity samples were collected at three Tier 3 locations in 2009. These included both the Root River sites and the Middle Branch of the Whitewater River. Out of this limited sample set of 39, the maximum turbidity was 545 NTU. As expected, the median values during base flow were low (around 3 NTUs) and much higher during storm flow samples (ranging from 39 to 323 NTUs).

Table 57. Inorganic analyte detections in storm event and base flow samples for MDA Tier 3 surface water monitoring sites, 2009.

2009		Base Flow Samples					Storm Event Samples				
Inorganic Analyte	Tier 3 Surface Water Monitoring Site	No. of samples	% Detection	Maximum Value Detected (mg/L)	90th percentile (mg/L)	Median Value of Samples (mg/L)	No. of samples	% Detection	Maximum Value Detected (mg/L)	90th percentile (mg/L)	Median Value of Samples (mg/L)
Ammonia	Beauford Ditch	--	--	--	--	--	--	--	--	--	--
	Buffalo River-Georgetown	--	--	--	--	--	--	--	--	--	--
	Le Sueur River-Hwy66	--	--	--	--	--	--	--	--	--	--
	Root River-North Branch	--	--	--	--	--	2	100%	1.44	1.33	0.90
	Root River-South Branch	--	--	--	--	--	2	100%	0.33	0.31	0.27
	Seven Mile Creek #3	--	--	--	--	--	--	--	--	--	--
	Whitewater River-Middle Branch	1	100%	0.28	0.28	0.28	2	100%	0.86	0.85	0.83
Nitrate/Nitrite	Beauford Ditch	7	100%	12.7	11.9	8.59	4	100%	14.1	12.4	8.05
	Buffalo River-Georgetown	4	50%	0.46	0.45	0.22	16	50%	2.92	1.12	0.20
	Le Sueur River-Hwy66	7	57%	6.54	4.30	1.48	5	100%	11.2	10.8	9.46
	Root River-North Branch	8	100%	5.39	4.83	4.12	20	100%	13.7	11.9	6.80
	Root River-South Branch	9	100%	9.32	7.92	6.03	18	100%	12.9	12.7	7.77
	Seven Mile Creek #3	10	100%	9.45	8.40	5.29	4	100%	15.4	14.4	8.85
	Whitewater River-Middle Branch	11	100%	11.8	10.6	10.1	5	100%	9.16	8.65	6.93
Total Phosphorus	Beauford Ditch	7	100%	0.33	0.17	0.04	4	100%	2.34	1.70	0.14
	Buffalo River-Georgetown	4	100%	0.25	0.22	0.14	16	100%	0.35	0.32	0.21
	Le Sueur River-Hwy66	7	100%	0.09	0.09	0.08	5	100%	0.68	0.56	0.33
	Root River-North Branch	8	100%	0.11	0.10	0.05	21	100%	1.31	0.53	0.24
	Root River-South Branch	9	100%	0.06	0.05	0.04	18	100%	0.65	0.51	0.19
	Seven Mile Creek #3	10	90%	0.09	0.08	0.04	4	100%	0.83	0.80	0.69
	Whitewater River-Middle Branch	11	100%	0.26	0.23	0.05	6	100%	1.54	1.38	0.75

Table 57 cont. Inorganic analyte detections in storm event and base flow samples for MDA Tier 3 surface water monitoring sites, 2009.

2009		Base Flow Samples					Storm Event Samples				
Inorganic Analyte	Tier 3 Surface Water Monitoring Site	No. of samples	% Detection	Maximum Value Detected (mg/L)	90th percentile (mg/L)	Median Value of Samples (mg/L)	No. of samples	% Detection	Maximum Value Detected (mg/L)	90th percentile (mg/L)	Median Value of Samples (mg/L)
Orthophosphorus	Beauford Ditch	7	100%	0.225	0.104	0.011	4	100%	2.15	1.55	0.092
	Buffalo River-Georgetown	4	100%	0.146	0.129	0.079	16	100%	0.245	0.206	0.100
	Le Sueur River-Hwy66	7	100%	0.036	0.032	0.017	5	100%	0.572	0.408	0.155
	Root River-North Branch	8	100%	0.063	0.039	0.021	21	100%	0.322	0.264	0.068
	Root River-South Branch	9	100%	0.026	0.024	0.020	18	100%	0.222	0.136	0.064
	Seven Mile Creek #3	10	80%	0.048	0.043	0.013	4	100%	0.573	0.532	0.360
	Whitewater River-Middle Branch	11	100%	0.156	0.128	0.021	6	100%	0.710	0.566	0.325
Total Suspended Solids	Beauford Ditch	2	100%	7.4	7.3	7.1	3	100%	38	35	24
	Buffalo River-Georgetown	4	100%	83	73	39	15	100%	339	103	69
	Le Sueur River-Hwy66	3	100%	37	36	33	4	100%	428	325	79
	Root River-North Branch	8	100%	55	35	8.9	19	100%	1,560	1,028	138
	Root River-South Branch	9	100%	12	8	3.6	18	100%	1,260	606	97
	Seven Mile Creek #3	--	--	--	--	--	3	100%	1,010	942	668
	Whitewater River-Middle Branch	11	100%	26	23	9.1	5	100%	814	806	49

2009		Base Flow Samples					Storm Event Samples				
Inorganic Analyte	Tier 3 Surface Water Monitoring Site	No. of samples	% Detection	Maximum Value Detected (NTU)	90th percentile (NTU)	Median Value of Samples (NTU)	No. of samples	% Detection	Maximum Value Detected (NTU)	90th percentile (NTU)	Median Value of Samples (NTU)
Turbidity	Beauford Ditch	--	--	--	--	--	--	--	--	--	--
	Buffalo River-Georgetown	--	--	--	--	--	--	--	--	--	--
	Le Sueur River-Hwy66	--	--	--	--	--	--	--	--	--	--
	Root River-North Branch	6	100%	5.8	5.1	3.3	12	100%	476	352	39
	Root River-South Branch	5	100%	3.1	3.1	2.2	10	100%	545	278	85
	Seven Mile Creek #3	--	--	--	--	--	--	--	--	--	--
	Whitewater River-Middle Branch	4	100%	11	9.1	4.0	2	100%	346	341	323

SECTION 7: REFERENCES

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Appendix 1

Pesticide Compounds Detected in Minnesota Water Resources by Minnesota Department of Agriculture

Pesticide Compound*	Ground Water Analyte	Detection in Minnesota Ground Water (1985-2009)**	Surface Water*** Analyte	Detection in Minnesota Surface Water (1991-2009)**
2,4-D	x	x	x	x
2,6-Dichlorobenzamide			x	x
3-hydroxycarbofuran	x		x	
Acetochlor	x	x	x	x
Acetochlor ESA	x	x	x	x
Acetochlor OXA	x	x	x	x
Alachlor	x	x	x	x
Alachlor ESA	x	x	x	x
Alachlor OXA	x	x	x	x
Aldicarb	x	x	x	
Aldicarb Sulfoxide	x		x	
Alfdicarb Sulfone	x		x	
AMPA			x	x
Atrazine	x	x	x	x
Bentazon	x	x	x	x
Boscalid	x		x	x
Butylate	x		x	
Carbaryl	x		x	
Carbofuran	x		x	
Chloramben	x		x	
Chlorimuron ethyl****			x	
Chlorothalonil	x	x	x	X
Chlorpyrifos	x		x	x
Chlorsulfuron****			x	
Clomazone	x	x	x	x
Clopyralid	x	x	x	x
Cyanazine	x	x	x	x
Cyanazine Acid	x	x		
Cyanazine Amide	x	x		
Di-dealkyl atrazine (DACT)	x	x	x	x
Deisopropylatrazine	x	x	x	x
Deethylatrazine	x	x	x	x
De-ethylcyanazine Acid	x	x		
De-ethylcyanazine Amide	x			
Diazinon	x		x	x
Dicamba	x	x	x	x
Dichlobenil				
Dichlorprop	x		x	x
Dimethenamid	x	x	x	x
Dimethenamid ESA	x	x	x	x
Dimethenamid OXA	x	x	x	x
Dimethoate	x	x	x	X
Disulfoton	x		x	
EPTC	x		x	x
Ethofumesate			x	x
Fenoprop****			x	x*****
Flumetsulam****			x	
Fonofos	x		x	
Glyphosate			x	x

*Laboratory analytes have changed during years presented. All target and detected non-target analytes (1985-2009) are presented.

**Detection is defined as compound occurring in water sample at concentration of "present" or higher.

***Surface water sites include lakes, precipitation, streams, rivers, and tile demonstration sites.

****Analysis of pesticide compound only completed at tile demonstration sites.

*****Analyte only detected in tile demonstration site.

Pesticide Compounds Detected in Minnesota Water Resources by Minnesota Department of Agriculture

Pesticide Compound*	Ground Water Analyte	Detection in Minnesota Ground Water (1985-2009)**	Surface Water*** Analyte	Detection in Minnesota Surface Water (1991-2009)**
Halosulfuron methyl****			x	
Imazamethabenz methyl****			x	
Imazamox****			x	
Imazapyr****			x	
Imazaquin****			x	
Imazethapyr****			x	x*****
Linuron	x		x	
Malathion	x		x	
MCPA	x	x	x	x
MCPP	x	x	x	x
Methylparathion	x		x	
Metolachlor	x	x	x	x
Metolachlor ESA	x	x	x	x
Metolachlor OXA	x	x	x	x
Metribuzin	x	x	x	x
Metribuzin DA	x	x	x	x
Metribuzin DADK	x	x	x	x
Metribuzin DK	x	x	x	x
Metsulfuron methyl****			x	
Myclobutinol	x		x	
Nicosulfuron****			x	
Oxadiazon			x	x
Pendamethalin	x		x	
Pentachlorophenol (PCP)	x	x	x	X
Phorate	X		x	x*****
Phosphamidon	x		x	
Picloram	x		x	
Primisulfuron methyl****			x	x*****
Prometon	x	x	x	x
Propachlor	x		x	x
Propazine	x	x	x	x
Propiconazole	x		x	x
Prosulfuron****			x	
Rimisulfuron****			x	
Simazine	x	x	x	x
Sulfometuron methyl****			x	
Tebuconazole	x		x	x
Tebuprimiphos	x		x	x
Tebuthiuron****			x	
Terbufos	x		x	x
Tetraconazole	x		x	x
Thifensulfuron methyl****			x	
Triasulfuron****			x	
Tribenuron methyl****			x	
Triclopyr	x		x	x
Trifluralin	x		x	x
Triflusulfuron methyl****			x	

*Laboratory analytes have changed during years presented. All target and detected non-target analytes (1985-2009) are presented.

**Detection is defined as compound occurring in water sample at concentration of "present" or higher.

***Surface water sites include lakes, precipitation, streams, rivers, and tile demonstration sites.

****Analysis of pesticide compound only completed at tile demonstration sites.

*****Analyte only detected in tile demonstration site.

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Appendix 2

PMR 1 Groundwater Monitoring Network Sample Results

				Pesticide Concentrations in µg/L																																							
County	Site ID	Date	nitrate nitrogen (mg/l)	acetochlor	acetochlor ESA	acetochlor OXA	alachlor	alachlor ESA	alachlor OXA	atrazine	desethylatrazine	deisopropylatrazine	bentazon	boscalid	chlorpyrifos	clopyralid	cyanazine	diazinon	dimethenamid	dimethenamid ESA	dimethenamid OXA	dimethoate	EPTC	fonofos	malathion	methyl parathion	metolachlor	metolachlor ESA	metolachlor OXA	metribuzin	metribuzin dadk	metribuzin dk	metribuzin da	myclobutanil	pendimethalin	phorate	prometon	propiconazole	simazine	tebuconazole	tebupirimiphos	terbufos	tetraconazole	trifluralin
Grant	26101	9/24/2009	28.70	ND	ND	ND	ND	ND	ND	P	P	ND	na	ND	ND	na	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	na	ND	na	ND	ND	ND	ND	ND
Marshall	45006	9/21/2009	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	na	ND	ND	na	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	na	ND	na	ND	ND	ND	ND	ND
Pennington	57003	9/21/2009	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	na	ND	ND	na	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	na	ND	na	ND	ND	ND	ND	ND
Pennington	57005	9/21/2009	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	na	ND	ND	na	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	na	ND	na	ND	ND	ND	ND	ND
Pennington	57008	9/21/2009	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	na	ND	ND	na	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	na	ND	na	ND	ND	ND	ND	ND
Polk	60201	9/21/2009	0.49	ND	ND	ND	ND	ND	ND	ND	ND	ND	na	ND	ND	na	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	na	ND	na	ND	ND	ND	ND	ND
Wilkin	84101	9/24/2009	ND	ND	ND	ND	ND	ND	ND	0.14	0.16	ND	na	ND	ND	na	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	0.21	2.18	1.23	ND	ND	ND	ND	ND	ND	ND	na	ND	na	ND	ND	ND	ND	ND

NOTE: ND = non-detect; P = present; = detection

PMR 4 Groundwater Monitoring Network Sample Results

				Pesticide Concentrations in µg/L																																						
County	Site ID	Date	nitrate nitrogen (mg/l)	acetochlor	acetochlor ESA	acetochlor OXA	alachlor	alachlor ESA	alachlor OXA	atrazine	desethylatrazine	deisopropylatrazine	bentazon	boscalid	chlorpyrifos	clopyralid	cyanazine	diazinon	dimethenamid	dimethenamid ESA	dimethenamid OXA	dimethoate	EPTC	fonofos	malathion	methyl parathion	metolachlor	metolachlor ESA	metolachlor OXA	metribuzin	metribuzin dadk	metribuzin dk	metribuzin da	myclobutanil	pendimethalin	phorate	prometon	propiconazole	simazine	tebuconazole	tebuprimiphos	terbufos	tetraconazole	trifluralin
Becker	03-I2	11/9/2009	7.33	ND	ND	ND	ND	ND	ND	ND	ND	ND	na	ND	ND	na	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	0.97	0.37	0.44	1.50	P	P	ND	ND	ND	na	ND	na	ND	ND	ND	ND	ND
Becker	03-I3	5/29/2009	14.90	ND	ND	ND	ND	ND	ND	ND	ND	ND	na	ND	ND	na	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	P	ND	ND	ND	ND	ND	na	ND	na	ND	ND	ND	ND	ND
Becker	03-J3	11/9/2009	0.77	ND	ND	ND	ND	ND	ND	ND	ND	ND	na	ND	ND	na	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	0.34	0.33	0.20	ND	ND	ND	ND	ND	ND	ND	na	ND	na	ND	ND	ND	ND	ND
Becker	03-J4	11/9/2009	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	na	ND	ND	na	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	na	ND	na	ND	ND	ND	ND	ND
Becker	03-K4	5/29/2009	16.70	ND	ND	ND	ND	0.21	ND	P	0.05	ND	na	ND	ND	na	ND	ND	ND	0.61	0.22	ND	ND	ND	ND	ND	ND	0.66	0.26	ND	1.40	P	ND	ND	ND	ND	na	ND	na	ND	ND	ND	ND	ND
Benton	05-B2	5/19/2009	10.80	ND	ND	ND	ND	ND	ND	P	0.05	ND	na	ND	ND	na	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	0.18	ND	ND	ND	ND	ND	ND	ND	ND	na	ND	na	ND	ND	ND	ND	ND
Benton	05-C3	5/19/2009	15.90	ND	ND	ND	ND	0.12	ND	P	0.05	ND	na	ND	ND	na	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	P	3.29	0.60	P	P	P	ND	ND	ND	ND	na	ND	na	ND	ND	ND	ND	ND
Hubbard	29-A7	5/29/2009	17.00	ND	ND	ND	ND	ND	ND	ND	ND	ND	na	ND	ND	na	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	0.47	ND	ND	ND	ND	ND	ND	ND	ND	na	ND	na	ND	ND	ND	ND	ND
Hubbard	29-A8	11/9/2009	26.30	ND	ND	ND	ND	0.14	0.10	P	P	ND	na	ND	ND	na	ND	ND	ND	0.61	0.49	ND	ND	ND	ND	ND	ND	1.39	0.94	P	2.46	P	ND	ND	ND	ND	na	ND	na	ND	ND	ND	ND	ND
Hubbard	29-B8	11/9/2009	27.50	ND	ND	ND	ND	0.11	ND	ND	0.05	ND	na	ND	ND	na	ND	ND	ND	0.38	ND	ND	ND	ND	ND	ND	ND	0.64	0.14	ND	1.12	ND	ND	ND	ND	ND	na	ND	na	ND	ND	ND	ND	ND
Hubbard	29-C7	5/29/2009	2.28	ND	ND	ND	ND	ND	ND	ND	ND	ND	na	ND	ND	na	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	na	ND	na	ND	ND	ND	ND	ND
Hubbard	29-C8	5/29/2009	4.11	ND	ND	ND	ND	ND	ND	ND	P	ND	na	ND	ND	na	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	na	ND	na	ND	ND	ND	ND	ND
Hubbard	29-C9	11/9/2009	33.10	ND	ND	ND	ND	0.36	ND	ND	P	ND	na	ND	ND	na	ND	ND	ND	0.13	0.14	ND	ND	ND	ND	ND	ND	0.72	0.53	P	2.34	P	P	ND	ND	ND	na	ND	na	ND	ND	ND	ND	ND
Kandiyohi	34-C1	5/20/2009	21.10	ND	ND	ND	ND	0.08	ND	0.20	0.33	0.36	na	ND	ND	na	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	0.07	ND	ND	ND	ND	ND	ND	ND	ND	na	ND	na	ND	ND	ND	ND	ND
Kandiyohi	34-D1	5/20/2009	43.50	ND	ND	ND	ND	ND	ND	ND	P	ND	na	ND	ND	na	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	na	ND	na	ND	ND	ND	ND	ND
Kandiyohi	34-D2	11/1/2009	7.66	ND	ND	ND	ND	ND	ND	P	P	ND	na	ND	ND	na	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	na	ND	na	ND	ND	ND	ND	ND
Kandiyohi	34-E1	11/1/2009	8.34	ND	0.34	ND	ND	ND	ND	0.06	0.10	ND	na	ND	ND	na	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	0.17	ND	ND	ND	ND	ND	ND	ND	ND	na	ND	na	ND	ND	ND	ND	ND
Kandiyohi	34-E2	11/1/2009	20.40	ND	ND	ND	ND	ND	ND	P	0.05	ND	na	ND	ND	na	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	na	ND	na	ND	ND	ND	ND	ND
Kandiyohi	34-F2	11/1/2009	31.80	ND	1.88	ND	ND	0.34	ND	P	0.05	P	na	ND	ND	na	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	1.48	0.14	ND	ND	ND	ND	ND	ND	ND	na	ND	na	ND	ND	ND	ND	ND
Morrison	49-C9	11/2/2009	1.83	ND	ND	ND	ND	ND	ND	ND	ND	ND	na	na	na	na	na	na	ND	ND	ND	na	na	na	na	na	ND	ND	ND	ND	ND	ND	ND	na	na	na	na	na	na	na	na	na	na	na
Morrison	49-D5	11/2/2009	47.50	ND	0.13	0.11	ND	0.71	0.67	0.07	0.06	P	na	ND	ND	na	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	1.79	8.94	6.75	0.35	3.85	P	P	ND	ND	ND	na	ND	na	ND	ND	ND	ND	ND
Morrison	49-D9	11/6/2009	51.60	ND	3.65	0.34	ND	0.26	ND	ND	ND	ND	na	ND	ND	na	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	0.66	ND	ND	ND	ND	ND	ND	ND	ND	na	ND	na	ND	ND	ND	ND	ND
Morrison	49-F6	5/7/2009	29.60	ND	1.18	ND	ND	ND	ND	P	0.08	ND	na	ND	ND	na	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	0.10	ND	ND	ND	ND	ND	ND	ND	ND	na	ND	na	ND	ND	ND	ND	ND
Morrison	49-F7	5/7/2009	24.90	ND	5.62	ND	ND	1.39	ND	P	0.06	ND	na	ND	ND	na	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	2.61	0.50	ND	ND	ND	ND	ND	ND	ND	na	ND	na	ND	ND	ND	ND	ND
Morrison	49-F8	11/2/2009	30.50	ND	0.50	ND	ND	ND	ND	ND	P	ND	na	ND	ND	na	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	6.93	0.20	ND	ND	ND	ND	ND	ND	ND	na	ND	na	ND	ND	ND	ND	ND
Otter Tail	56-A1	5/6/2009	14.90	ND	ND	ND	ND	ND	ND	P	0.05	ND	na	ND	ND	na	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	P	2.58	0.65	0.31	1.18	P	P	ND	ND	ND	na	ND	na	ND	ND	ND	ND	ND
Otter Tail	56-D6	5/27/2009	2.57	ND	ND	ND	ND	ND	ND	ND	ND	ND	na	ND	ND	na	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	na	ND	na	ND	ND	ND	ND	ND
Otter Tail	56-E1	5/8/2009	7.16	ND	ND	ND	ND	ND	ND	P	0.05	P	na	ND	ND	na	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	na	ND	na	ND	ND	ND	ND	ND

NOTE: ND = non-detect; P = present; = detection

PMR 4 Groundwater Monitoring Network Sample Results, Contd.

				Pesticide Concentrations in µg/L																																							
County	Site ID	Date	nitrate nitrogen (mg/l)	acetochlor	acetochlor ESA	acetochlor OXA	alachlor	alachlor ESA	alachlor OXA	atrazine	desethylatrazine	deisopropylatrazine	bentazon	boscalid	chlorpyrifos	clopyralid	cyanazine	diazinon	dimethenamid	dimethenamid ESA	dimethenamid OXA	dimethoate	EPTC	fonofos	malathion	methyl parathion	metolachlor	metolachlor ESA	metolachlor OXA	metribuzin	metribuzin dadk	metribuzin dk	metribuzin da	myclobutanil	pendimethalin	phorate	prometon	propiconazole	simazine	tebuconazole	tebuprimiphos	terbufos	tetraconazole	trifluralin
Otter Tail	56-E2	5/7/2009	15.50	ND	ND	ND	ND	ND	ND	ND	P	ND	na	ND	ND	na	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	0.23	ND	ND	ND	ND	ND	ND	ND	ND	na	ND	na	ND	ND	ND	ND	ND
Otter Tail	56-E3	5/12/2009	20.50	ND	0.15	0.10	ND	ND	ND	P	P	P	na	ND	ND	na	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	na	ND	na	ND	ND	ND	ND	ND
Otter Tail	56-E7	11/4/2009	6.59	ND	ND	ND	ND	ND	ND	ND	P	ND	na	ND	ND	na	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	P	ND	ND	ND	ND	ND	ND	ND	ND	ND	na	ND	na	ND	ND	ND	ND	ND
Otter Tail	56-F1	5/8/2009	0.48	ND	ND	ND	ND	ND	ND	P	0.06	P	na	ND	ND	na	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	na	ND	na	ND	ND	ND	ND	ND
Otter Tail	56-F2	5/12/2009	3.70	ND	ND	ND	ND	ND	ND	P	P	ND	na	ND	ND	na	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	na	ND	na	ND	ND	ND	ND	ND
Otter Tail	56-F3-1	11/3/2009	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	na	ND	ND	na	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	1.52	ND	ND	ND	ND	ND	ND	ND	ND	na	ND	na	ND	ND	ND	ND	ND
Otter Tail	56-F3-2	5/14/2009	2.84	ND	ND	ND	ND	ND	ND	ND	ND	ND	na	ND	ND	na	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	na	ND	na	ND	ND	ND	ND	ND
Otter Tail	56-F4	5/12/2009	1.14	ND	ND	ND	ND	ND	ND	P	P	ND	na	ND	ND	na	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	na	ND	na	ND	ND	ND	ND	ND
Otter Tail	56-F6	5/27/2009	20.40	ND	ND	ND	ND	0.17	ND	ND	P	ND	na	ND	ND	na	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	12.10	2.94	P	2.37	P	ND	ND	ND	ND	na	ND	na	ND	ND	ND	ND	ND
Otter Tail	56-F8	5/27/2009	12.70	ND	ND	ND	ND	2.16	ND	P	P	ND	na	ND	ND	na	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	2.92	0.54	ND	P	ND	ND	ND	ND	ND	na	ND	na	ND	ND	ND	ND	ND
Otter Tail	56-F9	11/4/2009	1.08	ND	ND	ND	ND	ND	ND	P	P	ND	na	ND	ND	na	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	na	ND	na	ND	ND	ND	ND	ND
Otter Tail	56-G3	5/14/2009	1.63	ND	ND	ND	ND	ND	ND	ND	ND	ND	na	ND	ND	na	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	0.15	0.09	ND	ND	ND	ND	ND	ND	ND	na	ND	na	ND	ND	ND	ND	ND
Otter Tail	56-G4	11/3/2009	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	na	ND	ND	na	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	na	ND	na	ND	ND	ND	ND	ND
Otter Tail	56-G5	11/3/2009	17.40	ND	ND	ND	ND	ND	ND	ND	ND	ND	na	ND	ND	na	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	na	ND	na	ND	ND	ND	ND	ND
Otter Tail	56-I10	11/4/2009	15.50	ND	0.50	0.11	ND	ND	ND	P	0.08	ND	na	ND	ND	na	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	na	ND	na	ND	ND	ND	ND	ND
Otter Tail	56-I6	11/4/2009	1.86	ND	ND	ND	ND	ND	ND	P	P	ND	na	ND	ND	na	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	0.07	ND	ND	ND	ND	ND	ND	ND	ND	na	ND	na	ND	ND	ND	ND	ND
Otter Tail	56-I9	11/4/2009	1.53	ND	ND	ND	ND	ND	ND	ND	P	ND	na	ND	ND	na	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	na	ND	na	ND	ND	ND	ND	ND
Otter Tail	56-J10	11/4/2009	47.40	ND	1.25	ND	ND	0.49	ND	P	0.09	ND	na	ND	ND	na	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	19.20	5.02	ND	ND	ND	ND	ND	ND	ND	na	ND	na	ND	ND	ND	ND	ND
Otter Tail	56-K5	5/28/2009	0.84	ND	ND	ND	ND	ND	ND	ND	ND	ND	na	ND	ND	na	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	na	ND	na	ND	ND	ND	ND	ND
Otter Tail	56-K6	5/28/2009	27.00	ND	ND	ND	ND	ND	ND	P	P	ND	na	ND	ND	na	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	0.80	ND	ND	ND	ND	ND	ND	ND	ND	na	ND	na	ND	ND	ND	ND	ND
Pope	61-F2	11/5/2009	4.27	ND	ND	ND	ND	ND	ND	ND	P	ND	na	ND	ND	na	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	0.11	ND	ND	ND	ND	ND	ND	ND	ND	na	ND	na	ND	ND	ND	ND	ND
Pope	61-F3	11/6/2009	18.80	ND	0.41	ND	ND	ND	ND	P	P	ND	na	ND	ND	na	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	0.08	ND	ND	ND	ND	ND	ND	ND	ND	na	ND	na	ND	ND	ND	ND	ND
Pope	61-F4	11/6/2009	0.90	ND	ND	ND	ND	ND	ND	ND	P	ND	na	ND	ND	na	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	na	ND	na	ND	ND	ND	ND	ND
Pope	61-F5	11/5/2009	17.70	ND	ND	ND	ND	ND	ND	ND	0.05	ND	na	ND	ND	na	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	1.01	ND	ND	ND	ND	ND	ND	ND	ND	na	ND	na	ND	ND	ND	ND	ND
Pope	61-G2	11/5/2009	18.60	ND	0.11	ND	ND	0.10	ND	P	0.07	P	na	ND	ND	na	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	6.42	0.19	P	1.04	ND	ND	ND	ND	ND	na	ND	na	ND	ND	ND	ND	ND
Pope	61-G3	5/20/2009	16.50	ND	ND	ND	ND	0.10	ND	ND	P	ND	na	ND	ND	na	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	1.57	1.07	ND	ND	ND	ND	ND	ND	ND	na	ND	na	ND	ND	ND	ND	ND
Pope	61-G4	5/20/2009	14.80	ND	ND	ND	ND	ND	ND	P	P	P	na	ND	ND	na	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	P	ND	ND	ND	ND	ND	na	ND	na	ND	ND	ND	ND	ND
Pope	61-G6	10/18/2009	20.70	ND	ND	ND	ND	ND	ND	P	0.08	ND	na	ND	ND	na	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	0.25	ND	ND	P	P	ND	ND	ND	ND	na	ND	na	ND	ND	ND	ND	ND

NOTE: ND = non-detect; P = present; = detection

PMR 4 Groundwater Monitoring Network Sample Results, Contd.

				Pesticide Concentrations in µg/L																																							
County	Site ID	Date	nitrate nitrogen (mg/l)	acetochlor	acetochlor ESA	acetochlor OXA	alachlor	alachlor ESA	alachlor OXA	atrazine	desethylatrazine	deisopropylatrazine	bentazon	boscalid	chlorpyrifos	clopyralid	cyanazine	diazinon	dimethenamid	dimethenamid ESA	dimethenamid OXA	dimethoate	EPTC	fonofos	malathion	methyl parathion	metolachlor	metolachlor ESA	metolachlor OXA	metribuzin	metribuzin dadk	metribuzin dk	metribuzin da	myclobutanil	pendimethalin	phorate	prometon	propiconazole	simazine	tebuconazole	tebuprimiphos	terbufos	tetraconazole	trifluralin
Pope	61-H5	11/1/2009	10.00	ND	ND	ND	ND	ND	ND	ND	ND	ND	na	ND	ND	na	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	na	ND	na	ND	ND	ND	ND	ND
Pope	61-H6	10/18/2009	19.70	ND	0.10	ND	ND	0.26	ND	P	P	ND	na	ND	ND	na	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	0.26	ND	ND	ND	ND	ND	ND	ND	ND	na	ND	na	ND	ND	ND	ND	ND
Stearns	73-A1	5/14/2009	40.30	ND	1.38	1.24	ND	ND	ND	P	0.05	ND	na	ND	ND	na	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	na	ND	na	ND	ND	ND	ND	ND
Stearns	73-A5	5/14/2009	18.20	ND	ND	ND	ND	ND	ND	P	P	P	na	ND	ND	na	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	na	ND	na	ND	ND	ND	ND	ND
Stearns	73-A6	10/18/2009	19.70	ND	ND	ND	ND	0.07	ND	P	P	ND	na	ND	ND	na	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	1.63	0.09	ND	P	ND	ND	ND	ND	ND	na	ND	na	ND	ND	ND	ND	ND
Stearns	73-B6	10/18/2009	44.00	ND	ND	ND	ND	ND	ND	P	0.05	ND	na	ND	ND	na	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	0.11	ND	ND	ND	ND	ND	ND	ND	ND	na	ND	na	ND	ND	ND	ND	ND
Stearns	73-E3	5/14/2009	31.00	ND	ND	ND	ND	ND	ND	P	0.07	P	na	ND	ND	na	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	P	ND	na	ND	ND	ND	ND	ND
Stearns	73-I6	10/19/2009	4.76	ND	ND	ND	ND	ND	ND	P	P	ND	na	ND	ND	na	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	na	ND	na	ND	ND	ND	ND	ND
Stearns	73-J4	5/19/2009	1.28	ND	ND	ND	ND	ND	ND	P	P	P	na	ND	ND	na	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	0.07	ND	ND	ND	ND	ND	ND	ND	ND	na	ND	na	ND	ND	ND	ND	ND
Stearns	73-J6	10/19/2009	34.50	ND	2.99	ND	ND	ND	ND	P	0.09	P	na	ND	ND	na	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	0.15	ND	ND	ND	ND	ND	ND	ND	ND	na	ND	na	ND	ND	ND	ND	ND
Stearns	73-J7	5/21/2009	39.70	ND	ND	ND	ND	ND	ND	ND	P	ND	na	ND	ND	na	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	0.08	ND	ND	ND	ND	ND	ND	ND	ND	na	ND	na	ND	ND	ND	ND	ND
Stearns	73-J8	10/19/2009	16.00	ND	0.34	ND	ND	ND	ND	0.05	0.10	ND	na	ND	ND	na	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	0.77	ND	ND	ND	ND	ND	ND	ND	ND	na	ND	na	ND	ND	ND	ND	ND
Stearns	73-K3	5/19/2009	7.79	ND	ND	ND	ND	ND	ND	P	P	ND	na	ND	ND	na	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	0.10	ND	ND	ND	ND	ND	ND	ND	ND	na	ND	na	ND	ND	ND	ND	ND
Stearns	73-K4	10/19/2009	19.00	ND	1.58	ND	ND	ND	ND	P	0.06	ND	na	ND	ND	na	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	1.08	0.19	ND	ND	ND	ND	ND	ND	ND	na	ND	na	ND	ND	ND	ND	ND
Stearns	73-K7	5/21/2009	ND	ND	ND	ND	ND	ND	ND	P	0.06	ND	na	ND	ND	na	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	na	ND	na	ND	ND	ND	ND	ND
Stearns	73-L6	5/21/2009	10.10	ND	ND	ND	ND	ND	ND	ND	P	P	na	ND	ND	na	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	0.98	0.14	ND	ND	ND	ND	ND	ND	ND	na	ND	na	ND	ND	ND	ND	ND
Stearns	73-L8	5/21/2009	6.70	ND	ND	ND	ND	ND	ND	ND	P	ND	na	ND	ND	na	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	na	ND	na	ND	ND	ND	ND	ND
Stearns	73-M7	11/6/2009	16.20	ND	ND	ND	ND	ND	ND	P	P	ND	na	ND	ND	na	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	1.34	ND	ND	ND	ND	ND	ND	ND	ND	na	ND	na	ND	ND	ND	ND	ND
Todd	77-E3	5/28/2009	21.30	ND	ND	ND	ND	ND	ND	P	P	ND	na	ND	ND	na	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	0.24	ND	ND	ND	ND	ND	ND	ND	ND	na	ND	na	ND	ND	ND	ND	ND
Wadena	80-A8	11/16/2009	19.20	ND	ND	ND	ND	1.40	ND	P	0.05	ND	na	ND	ND	na	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	3.22	ND	ND	P	ND	ND	ND	ND	ND	na	ND	na	ND	ND	ND	ND	ND
Wadena	80-B1	5/29/2009	23.60	ND	ND	ND	ND	1.84	0.91	ND	P	ND	na	ND	ND	na	ND	ND	0.13	10.10	5.11	ND	ND	ND	ND	ND	ND	2.74	2.18	1.33	3.80	1.51	P	ND	ND	ND	na	ND	na	ND	ND	ND	ND	ND
Wadena	80-B7	5/29/2009	14.30	ND	0.09	ND	ND	ND	ND	ND	P	ND	na	ND	ND	na	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	1.81	0.47	ND	1.22	P	ND	ND	ND	ND	na	ND	na	ND	ND	ND	ND	ND
Wadena	80-B8	5/29/2009	6.67	ND	ND	ND	ND	ND	ND	P	P	ND	na	ND	ND	na	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	na	ND	na	ND	ND	ND	ND	ND
Wadena	80-C7	5/29/2009	0.48	ND	ND	ND	ND	ND	ND	ND	ND	ND	na	ND	ND	na	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	na	ND	na	ND	ND	ND	ND	ND
Wadena	80-C8	5/29/2009	1.97	ND	ND	ND	ND	0.12	ND	ND	P	ND	na	ND	ND	na	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	0.40	ND	ND	ND	ND	ND	ND	ND	ND	na	ND	na	ND	ND	ND	ND	ND
Wadena	80-D7	11/16/2009	8.39	ND	ND	ND	ND	ND	ND	ND	ND	ND	na	ND	ND	na	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	2.50	1.76	0.25	P	ND	P	ND	ND	ND	na	ND	na	ND	ND	ND	ND	ND
Wadena	80-D8	11/16/2009	13.00	ND	ND	ND	ND	0.15	ND	ND	ND	ND	na	ND	ND	na	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	2.80	0.64	ND	P	P	ND	ND	ND	ND	na	ND	na	ND	ND	ND	ND	ND
Wadena	80-E8	11/16/2009	32.90	ND	ND	ND	ND	ND	ND	ND	ND	ND	na	ND	ND	na	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	P	20.70	13.00	1.89	5.15	P	P	ND	ND	ND	na	ND	na	ND	ND	ND	ND	ND

NOTE: ND = non-detect; P = present; = detection

PMR 5 Groundwater Monitoring Network Sample Results

				Pesticide Concentrations in µg/L																																						
County	Site ID	Date	nitrate nitrogen (mg/l)	acetochlor	acetochlor ESA	acetochlor OXA	alachlor	alachlor ESA	alachlor OXA	atrazine	desethylatrazine	deisopropylatrazine	bentazon	boscalid	chlorpyrifos	clopyralid	cyanazine	diazinon	dimethenamid	dimethenamid ESA	dimethenamid OXA	dimethoate	EPTC	fonofos	malathion	methyl parathion	metolachlor	metolachlor ESA	metolachlor OXA	metribuzin	metribuzin dadk	metribuzin dk	metribuzin da	myclobutanil	pendimethalin	phorate	prometon	propiconazole	simazine	tebuconazole	tebupirimiphos	terbufos	tetraconazole	trifluralin
Chisago	13101	9/29/2009	2.63	ND	ND	ND	ND	0.24	ND	0.05	0.05	ND	na	ND	ND	na	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	P	0.83	0.15	ND	ND	ND	ND	ND	ND	ND	na	ND	na	ND	ND	ND	ND	ND
Chisago	13102	9/29/2009	8.49	ND	ND	ND	ND	ND	ND	0.05	0.08	P	na	ND	ND	na	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	0.19	ND	ND	ND	ND	ND	ND	ND	ND	na	ND	na	ND	ND	ND	ND	ND
Chisago	13103	9/29/2009	0.51	ND	ND	ND	ND	ND	ND	ND	P	ND	na	ND	ND	na	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	0.76	ND	ND	ND	ND	ND	ND	ND	ND	na	ND	na	ND	ND	ND	ND	ND
Isanti	30005	9/15/2009	ND	ND	ND	ND	ND	0.47	ND	ND	ND	ND	na	ND	ND	na	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	0.48	0.07	ND	ND	ND	ND	ND	ND	ND	na	ND	na	ND	ND	ND	ND	ND
Isanti	30008	9/29/2009	8.94	ND	0.75	ND	ND	9.24	0.50	ND	ND	ND	na	ND	ND	na	ND	ND	ND	0.09	ND	ND	ND	ND	ND	ND	ND	4.89	3.47	ND	ND	ND	ND	ND	ND	ND	na	ND	na	ND	ND	ND	ND	ND
Kanabec	33006	9/16/2009	14.20	ND	0.44	ND	ND	3.57	ND	ND	P	ND	na	ND	ND	na	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	4.71	0.18	ND	ND	ND	ND	ND	ND	ND	na	ND	na	ND	ND	ND	ND	ND
Kanabec	33101	9/16/2009	5.81	ND	0.24	ND	ND	0.07	ND	P	0.10	ND	na	ND	ND	na	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	0.46	0.17	ND	ND	ND	ND	ND	ND	ND	na	ND	na	ND	ND	ND	ND	ND
Mille Lacs	48101	9/15/2009	21.30	ND	0.59	ND	ND	ND	ND	ND	0.26	ND	na	ND	ND	na	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	0.54	0.09	ND	ND	ND	ND	ND	ND	ND	na	ND	na	ND	ND	ND	ND	ND
Mille Lacs	48102	9/16/2009	21.90	ND	2.98	ND	ND	ND	ND	P	P	ND	na	ND	ND	na	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	0.12	ND	ND	ND	ND	ND	ND	ND	ND	na	ND	na	ND	ND	ND	ND	ND

NOTE: ND = non-detect; P = present; = detection

PMR 6 Groundwater Monitoring Network Sample Results

				Pesticide Concentrations in µg/L																																							
County	Site ID	Date	nitrate nitrogen (mg/l)	acetochlor	acetochlor ESA	acetochlor OXA	alachlor	alachlor ESA	alachlor OXA	atrazine	desethylatrazine	deisopropylatrazine	bentazon	boscalid	chlorpyrifos	clopyralid	cyanazine	diazinon	dimethenamid	dimethenamid ESA	dimethenamid OXA	dimethoate	EPTC	fonofos	malathion	methyl parathion	metolachlor	metolachlor ESA	metolachlor OXA	metribuzin	metribuzin dadk	metribuzin dk	metribuzin da	myclobutanil	pendimethalin	phorate	prometon	propiconazole	simazine	tebuconazole	tebuprimiphos	terbufos	tetraconazole	trifluralin
Big Stone	6101	10/1/2009	4.36	ND	ND	ND	ND	ND	ND	ND	P	ND	na	ND	ND	na	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	na	ND	na	ND	ND	ND	ND	ND
Chippewa	12101	9/15/2009	40.40	ND	ND	ND	ND	0.07	ND	ND	ND	ND	na	ND	ND	na	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	0.66	ND	ND	ND	ND	ND	ND	ND	ND	na	ND	na	ND	ND	ND	ND	ND
Stevens	75002	9/18/2009	ND	ND	0.15	ND	ND	0.39	ND	ND	ND	ND	na	ND	ND	na	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	0.81	ND	ND	ND	ND	ND	ND	ND	ND	na	ND	na	ND	ND	ND	ND	ND
Swift	76042	9/18/2009	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	na	ND	ND	na	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	na	ND	na	ND	ND	ND	ND	ND
Swift	76045	9/15/2009	0.56	ND	0.08	ND	ND	0.08	ND	ND	P	ND	na	ND	ND	na	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	0.07	ND	ND	ND	ND	ND	ND	ND	ND	na	ND	na	ND	ND	ND	ND	ND
Swift	76101	9/15/2009	2.27	ND	ND	ND	ND	ND	ND	ND	ND	ND	na	ND	ND	na	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	na	ND	na	ND	ND	ND	ND	ND
Swift	76102	9/15/2009	0.86	ND	ND	ND	ND	1.79	ND	ND	ND	ND	na	ND	ND	na	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	0.14	ND	ND	ND	ND	ND	ND	ND	ND	na	ND	na	ND	ND	ND	ND	ND
Swift	76103	9/18/2009	17.40	ND	ND	ND	ND	ND	ND	P	P	ND	na	ND	ND	na	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	0.18	ND	ND	ND	ND	ND	ND	ND	ND	na	ND	na	ND	ND	ND	ND	ND
Swift	76104	9/18/2009	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	na	ND	ND	na	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	na	ND	na	ND	ND	ND	ND	ND

NOTE: ND = non-detect; P = present; = detection

PMR 7 Groundwater Monitoring Network Sample Results

				Pesticide Concentrations in µg/L																																							
County	Site ID	Date	nitrate nitrogen (mg/l)	acetochlor	acetochlor ESA	acetochlor OXA	alachlor	alachlor ESA	alachlor OXA	atrazine	desethylatrazine	deisopropylatrazine	bentazon	boscalid	chlorpyrifos	clopyralid	cyanazine	diazinon	dimethenamid	dimethenamid ESA	dimethenamid OXA	dimethoate	EPTC	fonofos	malathion	methyl parathion	metolachlor	metolachlor ESA	metolachlor OXA	metribuzin	metribuzin dadk	metribuzin dk	metribuzin da	myclobutanil	pendimethalin	phorate	prometon	propiconazole	simazine	tebuconazole	tebuprimiphos	terbufos	tetraconazole	trifluralin
Lyon	42101	9/19/2009	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	na	ND	ND	na	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	na	ND	na	ND	ND	ND	ND	ND
Murray	51008	9/19/2009	11.60	ND	ND	ND	ND	ND	ND	ND	ND	ND	na	ND	ND	na	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	0.94	ND	ND	ND	ND	ND	ND	ND	ND	ND	na	ND	na	ND	ND	ND	ND	ND
Murray	51101	9/19/2009	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	na	ND	ND	na	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	na	ND	na	ND	ND	ND	ND	ND
Pipestone	59101	9/19/2009	5.22	ND	ND	ND	ND	ND	ND	ND	ND	ND	na	ND	ND	na	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	0.16	ND	ND	ND	ND	ND	ND	ND	ND	na	ND	na	ND	ND	ND	ND	ND
Pipestone	59102	9/19/2009	6.66	ND	ND	ND	ND	ND	ND	P	P	ND	na	ND	ND	na	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	na	ND	na	ND	ND	ND	ND	ND
Rock	67006	9/20/2009	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	na	ND	ND	na	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	0.70	ND	ND	ND	ND	ND	ND	ND	ND	na	ND	na	ND	ND	ND	ND	ND
Rock	67102	9/20/2009	19.60	ND	ND	ND	ND	ND	ND	0.05	0.07	ND	na	ND	ND	na	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	0.09	ND	ND	ND	ND	ND	ND	ND	ND	na	ND	na	ND	ND	ND	ND	ND

NOTE: ND = non-detect; P = present; = detection

PMR 8 Groundwater Monitoring Network Sample Results

				Pesticide Concentrations in µg/L																																						
County	Site ID	Date	nitrate nitrogen (mg/l)	acetochlor	acetochlor ESA	acetochlor OXA	alachlor	alachlor ESA	alachlor OXA	atrazine	desethylatrazine	deisopropylatrazine	bentazon	boscalid	chlorpyrifos	clopyralid	cyanazine	diazinon	dimethenamid	dimethenamid ESA	dimethenamid OXA	dimethoate	EPTC	fonofos	malathion	methyl parathion	metolachlor	metolachlor ESA	metolachlor OXA	metribuzin	metribuzin dadk	metribuzin dk	metribuzin da	myclobutanil	pendimethalin	phorate	prometon	propiconazole	simazine	tebuconazole	tebuprimiphos	terbufos	tetraconazole	trifluralin
Brown	8101	9/22/2009	47.90	ND	ND	ND	ND	ND	ND	ND	ND	ND	na	ND	ND	na	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	1.43	ND	ND	ND	ND	ND	ND	ND	ND	na	ND	na	ND	ND	ND	ND	ND
Cottonwood	17007	9/22/2009	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	na	ND	ND	na	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	0.33	ND	ND	ND	ND	ND	ND	ND	ND	na	ND	na	ND	ND	ND	ND	ND
Cottonwood	17101	9/21/2009	2.94	ND	0.12	ND	ND	ND	ND	ND	ND	ND	na	ND	ND	na	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	na	ND	na	ND	ND	ND	ND	ND
Cottonwood	17102	9/21/2009	8.15	ND	ND	ND	ND	ND	ND	ND	ND	ND	na	ND	ND	na	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	na	ND	na	ND	ND	ND	ND	ND
Cottonwood	17103	9/21/2009	1.10	ND	ND	ND	ND	0.22	ND	ND	ND	ND	na	ND	ND	na	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	0.11	ND	ND	ND	ND	ND	ND	ND	ND	na	ND	na	ND	ND	ND	ND	ND
Jackson	32101	9/21/2009	7.66	ND	ND	ND	ND	ND	ND	ND	ND	ND	na	ND	ND	na	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	0.52	ND	ND	ND	ND	ND	ND	ND	ND	na	ND	na	ND	ND	ND	ND	ND
Martin	46101	9/22/2009	0.59	ND	0.12	ND	ND	ND	ND	ND	ND	ND	na	ND	ND	na	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	0.46	ND	ND	ND	ND	ND	ND	ND	ND	na	ND	na	ND	ND	ND	ND	ND
Meeker	47101	9/24/2009	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	na	ND	ND	na	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	na	ND	na	ND	ND	ND	ND	ND
Redwood	64103	9/30/2009	ND	ND	0.31	0.08	ND	ND	ND	ND	ND	ND	na	ND	ND	na	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	0.54	0.07	ND	ND	ND	ND	ND	ND	ND	na	ND	na	ND	ND	ND	ND	ND
Renville	65101	9/30/2009	0.62	ND	0.07	ND	ND	0.68	ND	ND	ND	ND	na	ND	ND	na	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	0.10	ND	ND	ND	ND	ND	ND	ND	ND	na	ND	na	ND	ND	ND	ND	ND
Rice	66101	9/28/2009	15.30	ND	ND	ND	ND	ND	ND	P	0.08	ND	na	ND	ND	na	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	0.78	ND	ND	ND	ND	ND	ND	ND	ND	na	ND	na	ND	ND	ND	ND	ND
Watonwan	83101	9/22/2009	ND	ND	0.30	ND	ND	1.03	ND	ND	ND	ND	na	ND	ND	na	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	0.07	ND	ND	ND	ND	ND	ND	ND	ND	na	ND	na	ND	ND	ND	ND	ND

NOTE: ND = non-detect; P = present; = detection

PMR 9 Groundwater Monitoring Network Sample Results

				Pesticide Concentrations in µg/L																																						
County	Site ID	Date	nitrate nitrogen (mg/l)	acetochlor	acetochlor ESA	acetochlor OXA	alachlor	alachlor ESA	alachlor OXA	atrazine	desethylatrazine	deisopropylatrazine	bentazon	boscalid	chlorpyrifos	clopyralid	cyanazine	diazinon	dimethenamid	dimethenamid ESA	dimethenamid OXA	dimethoate	EPTC	fonofos	malathion	methyl parathion	metolachlor	metolachlor ESA	metolachlor OXA	metribuzin	metribuzin dadk	metribuzin dk	metribuzin da	myclobutanil	pendimethalin	phorate	prometon	propiconazole	simazine	tebuconazole	tebuprimiphos	terbufos	tetraconazole	trifluralin
Fillmore	BURR	5/27/2009	11.00	ND	ND	ND	ND	0.26	ND	P	0.07	P	na	ND	ND	na	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	0.79	ND	ND	ND	ND	ND	ND	ND	ND	na	ND	na	ND	ND	ND	ND	ND
Fillmore	BURR	6/8/2009	10.50	P	ND	ND	ND	0.28	ND	P	0.07	P	na	ND	ND	na	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	2.48	0.76	0.13	ND	ND	ND	ND	ND	ND	ND	na	ND	na	ND	ND	ND	ND	ND
Fillmore	BURR	6/25/2009	12.60	ND	ND	ND	ND	0.25	ND	P	0.09	P	na	ND	ND	na	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	P	1.12	0.10	ND	ND	ND	ND	ND	ND	ND	na	ND	na	ND	ND	ND	ND	ND
Fillmore	BURR	9/15/2009	12.60	ND	ND	ND	ND	0.34	ND	P	0.10	P	na	ND	ND	na	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	1.10	ND	ND	ND	ND	ND	ND	ND	ND	na	ND	na	ND	ND	ND	ND	ND
Fillmore	D	9/24/2009	7.55	ND	ND	ND	ND	1.68	ND	0.07	0.14	ND	na	ND	ND	na	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	1.47	ND	ND	ND	ND	ND	ND	ND	ND	na	ND	na	ND	ND	ND	ND	ND
Fillmore	D	9/24/2009	2.35	ND	0.14	ND	ND	0.56	ND	P	P	ND	na	ND	ND	na	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	0.13	ND	ND	ND	ND	ND	ND	ND	ND	na	ND	na	ND	ND	ND	ND	ND
Fillmore	D	9/24/2009	5.99	ND	ND	ND	ND	0.26	ND	P	P	ND	na	ND	ND	na	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	0.69	ND	ND	ND	ND	ND	ND	ND	ND	na	ND	na	ND	ND	ND	ND	ND
Fillmore	D	9/25/2009	10.40	ND	0.24	ND	ND	0.38	ND	0.06	0.12	ND	na	ND	ND	na	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	3.63	0.59	ND	ND	ND	ND	ND	ND	ND	na	ND	na	ND	ND	ND	ND	ND
Fillmore	FNTNE	5/27/2009	8.85	ND	ND	ND	ND	0.12	ND	P	P	ND	na	ND	ND	na	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	P	1.05	0.09	ND	ND	ND	ND	ND	ND	ND	na	ND	na	ND	ND	ND	ND	ND
Fillmore	FNTNE	6/8/2009	11.40	0.06	0.10	0.12	ND	ND	ND	0.14	0.05	P	na	ND	ND	na	ND	ND	0.12	ND	ND	ND	ND	ND	ND	ND	0.40	0.91	0.23	ND	ND	ND	ND	ND	ND	ND	na	ND	na	ND	ND	ND	ND	ND
Fillmore	FNTNE	6/25/2009	10.10	ND	ND	ND	ND	0.10	ND	P	P	ND	na	ND	ND	na	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	P	1.52	0.09	ND	ND	ND	ND	ND	ND	ND	na	ND	na	ND	ND	ND	ND	ND
Fillmore	FNTNE	9/15/2009	10.30	ND	0.07	ND	ND	0.22	ND	P	0.05	ND	na	ND	ND	na	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	P	1.62	0.08	ND	ND	ND	ND	ND	ND	ND	na	ND	na	ND	ND	ND	ND	ND
Fillmore	FNTNW	5/27/2009	6.56	0.05	ND	ND	ND	0.08	ND	0.06	0.05	ND	na	ND	ND	na	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	P	0.44	ND	ND	ND	ND	ND	ND	ND	ND	na	ND	na	ND	ND	ND	ND	ND
Fillmore	FNTNW	6/8/2009	7.99	0.15	0.20	0.14	ND	ND	ND	1.10	0.14	P	na	ND	ND	na	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	5.00	0.66	0.15	ND	ND	ND	ND	ND	ND	ND	na	ND	na	ND	ND	ND	ND	ND
Fillmore	FNTNW	6/25/2009	9.77	ND	0.07	ND	ND	0.11	ND	0.05	0.06	ND	na	ND	ND	na	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	P	0.89	ND	ND	ND	ND	ND	ND	ND	ND	na	ND	na	ND	ND	ND	ND	ND
Fillmore	FNTNW	9/15/2009	9.59	ND	ND	ND	ND	0.13	ND	P	0.07	ND	na	ND	ND	na	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	P	0.74	ND	ND	ND	ND	ND	ND	ND	ND	na	ND	na	ND	ND	ND	ND	ND
Fillmore	LNSBR2	2/4/2009	6.56	ND	ND	ND	ND	0.08	ND	P	0.07	ND	na	ND	ND	na	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	0.40	ND	ND	ND	ND	ND	ND	ND	ND	na	ND	na	ND	ND	ND	ND	ND
Fillmore	LNSBR2	5/27/2009	6.15	ND	ND	ND	ND	0.08	ND	0.05	0.07	ND	na	ND	ND	na	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	0.38	ND	ND	ND	ND	ND	ND	ND	ND	na	ND	na	ND	ND	ND	ND	ND
Fillmore	LNSBR2	8/25/2009	6.49	ND	ND	ND	ND	0.12	ND	0.05	0.08	ND	na	ND	ND	na	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	0.51	ND	ND	ND	ND	ND	ND	ND	ND	na	ND	na	ND	ND	ND	ND	ND
Fillmore	LNSBR2	11/16/2009	6.48	ND	ND	ND	ND	0.16	ND	0.05	0.08	P	na	ND	ND	na	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	0.78	ND	ND	ND	ND	ND	ND	ND	ND	na	ND	na	ND	ND	ND	ND	ND
Fillmore	MOTH	5/26/2009	7.35	ND	0.12	ND	ND	0.22	ND	P	0.05	ND	na	ND	ND	na	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	0.79	ND	ND	ND	ND	ND	ND	ND	ND	na	ND	na	ND	ND	ND	ND	ND
Fillmore	MOTH	6/12/2009	13.20	0.06	0.56	0.31	ND	0.21	ND	0.42	0.13	P	na	ND	ND	na	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	0.33	1.57	0.38	ND	ND	ND	ND	ND	ND	ND	na	ND	na	ND	ND	ND	ND	ND
Fillmore	MOTH	6/25/2009	12.40	ND	0.41	0.07	ND	0.17	ND	0.35	0.14	P	na	ND	ND	na	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	0.29	1.68	0.24	ND	ND	ND	ND	ND	ND	ND	na	ND	na	ND	ND	ND	ND	ND
Fillmore	MOTH	9/14/2009	8.21	ND	0.08	ND	ND	0.42	ND	0.05	0.07	ND	na	ND	ND	na	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	P	0.60	ND	ND	ND	ND	ND	ND	ND	ND	na	ND	na	ND	ND	ND	ND	ND
Fillmore	PTRSN1	2/4/2009	3.78	ND	ND	ND	ND	0.25	ND	P	0.07	ND	na	ND	ND	na	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	0.27	ND	ND	ND	ND	ND	ND	ND	ND	na	ND	na	ND	ND	ND	ND	ND
Fillmore	PTRSN1	5/27/2009	3.73	ND	ND	ND	ND	0.20	ND	P	0.05	ND	na	ND	ND	na	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	0.22	ND	ND	ND	ND	ND	ND	ND	ND	na	ND	na	ND	ND	ND	ND	ND
Fillmore	PTRSN1	8/25/2009	3.92	ND	ND	ND	ND	0.20	ND	P	0.07	ND	na	ND	ND	na	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	0.27	ND	ND	ND	ND	ND	ND	ND	ND	na	ND	na	ND	ND	ND	ND	ND
Fillmore	PTRSN1	11/16/2009	3.94	ND	ND	ND	ND	0.18	ND	P	0.06	ND	na	ND	ND	na	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	0.24	ND	ND	ND	ND	ND	ND	ND	ND	na	ND	na	ND	ND	ND	ND	ND
Fillmore	RAINY	5/28/2009	11.40	ND	ND	ND	ND	0.19	ND	P	0.06	P	na	ND	ND	na	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	0.58	ND	ND	ND	ND	ND	ND	ND	ND	na	ND	na	ND	ND	ND	ND	ND
Fillmore	RAINY	6/12/2009	11.60	P	0.07	0.07	ND	0.14	ND	0.05	0.09	P	na	ND	ND	na	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	0.66	0.94	ND	ND	ND	ND	ND	ND	ND	ND	na	ND	na	ND	ND	ND	ND	ND
Fillmore	RAINY	6/25/2009	12.90	ND	ND	ND	ND	0.18	ND	P	0.08	P	na	ND	ND	na	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	0.12	0.80	ND	ND	ND	ND	ND	ND	ND	ND	na	ND	na	ND	ND	ND	ND	ND

NOTE: ND = non-detect; P = present; = detection

PMR 9 Groundwater Monitoring Network Sample Results, Contd.

				Pesticide Concentrations in µg/L																																						
County	Site ID	Date	nitrate nitrogen (mg/l)	acetochlor	acetochlor ESA	acetochlor OXA	alachlor	alachlor ESA	alachlor OXA	atrazine	desethylatrazine	deisopropylatrazine	bentazon	boscalid	chlorpyrifos	clopyralid	cyanazine	diazinon	dimethenamid	dimethenamid ESA	dimethenamid OXA	dimethoate	EPTC	fonofos	malathion	methyl parathion	metolachlor	metolachlor ESA	metolachlor OXA	metribuzin	metribuzin dadk	metribuzin dk	metribuzin da	myclobutanil	pendimethalin	phorate	prometon	propiconazole	simazine	tebuconazole	tebuprimiphos	terbufos	tetraconazole	trifluralin
Fillmore	RAINY	9/15/2009	13.70	ND	ND	ND	ND	0.30	ND	P	0.09	ND	na	ND	ND	na	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	P	0.74	ND	ND	ND	ND	ND	ND	ND	ND	na	ND	na	ND	ND	ND	ND	ND
Goodhue	D	9/29/2009	3.77	ND	ND	ND	ND	ND	ND	P	0.05	ND	na	ND	ND	na	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	na	ND	na	ND	ND	ND	ND	ND
Goodhue	D	9/29/2009	7.13	ND	ND	ND	ND	0.82	ND	P	P	ND	na	ND	ND	na	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	0.47	ND	ND	ND	ND	ND	ND	ND	ND	na	ND	na	ND	ND	ND	ND	ND
Goodhue	D	9/29/2009	7.39	ND	0.09	ND	ND	1.03	ND	P	0.11	P	na	ND	ND	na	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	0.64	ND	ND	ND	ND	ND	ND	ND	ND	na	ND	na	ND	ND	ND	ND	ND
Goodhue	SPRCRK	5/28/2009	5.75	ND	0.07	ND	ND	0.53	ND	0.05	0.08	P	na	ND	ND	na	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	0.61	ND	ND	ND	ND	ND	ND	ND	ND	na	ND	na	ND	ND	ND	ND	ND
Goodhue	SPRCRK	6/15/2009	6.38	ND	0.07	ND	ND	0.64	ND	P	0.09	P	na	ND	ND	na	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	0.75	ND	ND	ND	ND	ND	ND	ND	ND	na	ND	na	ND	ND	ND	ND	ND
Goodhue	SPRCRK	6/25/2009	6.43	ND	ND	ND	ND	0.46	ND	0.05	0.09	P	na	ND	ND	na	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	0.54	ND	ND	ND	ND	ND	ND	ND	ND	na	ND	na	ND	ND	ND	ND	ND
Goodhue	SPRCRK	9/15/2009	6.78	ND	0.10	ND	ND	0.54	ND	0.06	0.10	P	na	ND	ND	na	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	0.76	ND	ND	ND	ND	ND	ND	ND	ND	na	ND	na	ND	ND	ND	ND	ND
Houston	BCVSP	5/27/2009	6.38	ND	ND	ND	ND	0.49	ND	0.09	0.09	ND	na	ND	ND	na	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	0.32	ND	ND	ND	ND	ND	ND	ND	ND	na	ND	na	ND	ND	ND	ND	ND
Houston	BCVSP	6/10/2009	6.60	ND	ND	ND	ND	0.50	ND	0.11	0.12	P	na	ND	ND	na	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	0.33	ND	ND	ND	ND	ND	ND	ND	ND	na	ND	na	ND	ND	ND	ND	ND
Houston	BCVSP	6/25/2009	6.73	ND	ND	ND	ND	0.61	ND	0.10	0.10	P	na	ND	ND	na	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	0.44	ND	ND	ND	ND	ND	ND	ND	ND	na	ND	na	ND	ND	ND	ND	ND
Houston	BCVSP	9/15/2009	6.63	ND	ND	ND	ND	0.74	ND	0.11	0.12	ND	na	ND	ND	na	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	P	0.51	ND	ND	ND	ND	ND	ND	ND	ND	na	ND	na	ND	ND	ND	ND	ND
Wabasha	CNFLD	5/28/2009	4.30	ND	ND	ND	ND	0.14	ND	0.10	0.09	P	na	ND	ND	na	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	na	ND	na	ND	ND	ND	ND	ND
Wabasha	CNFLD	6/15/2009	4.52	ND	ND	ND	ND	0.21	ND	0.11	0.11	P	na	ND	ND	na	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	0.08	ND	ND	ND	ND	ND	ND	ND	ND	na	ND	na	ND	ND	ND	ND	ND
Wabasha	CNFLD	6/25/2009	4.44	ND	ND	ND	ND	0.15	ND	0.11	0.10	P	na	ND	ND	na	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	na	ND	na	ND	ND	ND	ND	ND
Wabasha	CNFLD	9/15/2009	4.35	ND	ND	ND	ND	0.15	ND	0.11	0.10	P	na	ND	ND	na	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	na	ND	na	ND	ND	ND	ND	ND
Wabasha	COLDS	5/28/2009	4.67	ND	ND	ND	ND	0.12	ND	0.07	0.10	ND	na	ND	ND	na	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	0.11	ND	ND	ND	ND	ND	ND	ND	ND	na	ND	na	ND	ND	ND	ND	ND
Wabasha	COLDS	6/8/2009	4.33	ND	ND	ND	ND	0.19	ND	0.08	0.12	P	na	ND	ND	na	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	0.17	ND	ND	ND	ND	ND	ND	ND	ND	na	ND	na	ND	ND	ND	ND	ND
Wabasha	COLDS	6/25/2009	4.92	ND	ND	ND	ND	0.12	ND	0.08	0.11	P	na	ND	ND	na	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	0.13	ND	ND	ND	ND	ND	ND	ND	ND	na	ND	na	ND	ND	ND	ND	ND
Wabasha	COLDS	9/15/2009	4.76	ND	ND	ND	ND	0.15	ND	0.09	0.13	ND	na	ND	ND	na	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	0.15	ND	ND	ND	ND	ND	ND	ND	ND	na	ND	na	ND	ND	ND	ND	ND
Wabasha	D	9/28/2009	11.70	P	0.48	0.12	ND	0.92	0.11	0.14	0.50	P	na	ND	ND	na	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	P	0.70	0.15	ND	ND	ND	ND	ND	ND	ND	na	ND	na	ND	ND	ND	ND	ND
Wabasha	D	9/28/2009	3.05	ND	ND	ND	ND	ND	ND	ND	P	ND	na	ND	ND	na	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	na	ND	na	ND	ND	ND	ND	ND
Wabasha	D	9/28/2009	6.99	ND	ND	ND	ND	ND	ND	0.14	0.15	ND	na	ND	ND	na	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	0.45	ND	ND	ND	ND	ND	ND	ND	ND	na	ND	na	ND	ND	ND	ND	ND
Wabasha	D	9/28/2009	10.80	ND	ND	ND	ND	ND	ND	P	P	ND	na	ND	ND	na	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	na	ND	na	ND	ND	ND	ND	ND
Wabasha	D	9/28/2009	11.50	P	0.25	ND	ND	1.93	ND	0.07	0.10	P	na	ND	ND	na	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	1.53	0.15	ND	ND	ND	ND	ND	ND	ND	na	ND	na	ND	ND	ND	ND	ND
Wabasha	D	9/29/2009	9.42	ND	ND	ND	ND	0.67	ND	P	P	ND	na	ND	ND	na	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	0.39	ND	ND	ND	ND	ND	ND	ND	ND	na	ND	na	ND	ND	ND	ND	ND
Wabasha	D	9/29/2009	4.81	ND	ND	ND	ND	0.16	ND	0.12	0.18	P	na	ND	ND	na	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	0.56	ND	ND	ND	ND	ND	ND	ND	ND	na	ND	na	ND	ND	ND	ND	ND
Winona	CRYSTL1	2/4/2009	3.99	ND	ND	ND	ND	0.07	ND	0.05	0.09	P	na	ND	ND	na	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	0.13	ND	ND	ND	ND	ND	ND	ND	ND	na	ND	na	ND	ND	ND	ND	ND
Winona	CRYSTL1	5/27/2009	3.84	ND	ND	ND	ND	0.11	ND	P	P	ND	na	ND	ND	na	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	0.17	ND	ND	ND	ND	ND	ND	ND	ND	na	ND	na	ND	ND	ND	ND	ND
Winona	CRYSTL1	8/25/2009	4.05	ND	ND	ND	ND	0.15	ND	P	0.06	ND	na	ND	ND	na	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	0.26	ND	ND	ND	ND	ND	ND	ND	ND	na	ND	na	ND	ND	ND	ND	ND
Winona	CRYSTL1	11/16/2009	4.08	ND	ND	ND	ND	0.23	ND	P	0.05	ND	na	ND	ND	na	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	0.37	ND	ND	ND	ND	ND	ND	ND	ND	na	ND	na	ND	ND	ND	ND	ND

NOTE: ND = non-detect; P = present; = detection

Urban Groundwater Monitoring Network Sample Results

					Pesticide Concentrations in µg/L																																													
County	Site ID	Date	PMR	nitrate nitrogen (mg/l)	acetochlor	acetochlor ESA	acetochlor OXA	alachlor	alachlor ESA	alachlor OXA	atrazine	deethylatrazine	deisopropylatrazine	bentazon	boscalid	chlorpyrifos	clopyralid	cyanazine	diazinon	dimethenamid	dimethenamid ESA	dimethenamid OXA	dimethoate	EPTC	fonofos	malathion	methyl parathion	metolachlor	metolachlor ESA	metolachlor OXA	metribuzin	metribuzin dadk	metribuzin dk	metribuzin da	myclobutanil	pendimethalin	phorate	prometon	propiconazole	simazine	tebuconazole	tebupirimiphos	terbufos	tetraconazole	trifluralin	2,4-D	dicamba	dichloroprop	MCPA	MCPP	triclopyr
Anoka	PCA	10/5/2009	10	na	ND	ND	ND	ND	ND	ND	ND	ND	ND	na	ND	ND	na	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	na	ND	na	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Benton	PCA	10/7/2009	4	na	ND	ND	ND	ND	0.13	ND	ND	P	ND	na	ND	ND	na	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	0.76	ND	ND	ND	ND	ND	ND	ND	ND	na	ND	na	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Dakota	PCA	8/20/2009	10	na	ND	ND	ND	ND	ND	ND	0.05	0.09	ND	na	ND	ND	na	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	0.26	ND	ND	ND	ND	ND	ND	ND	ND	na	ND	na	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Hennepin	PCA	8/28/2009	10	na	ND	ND	ND	ND	ND	ND	ND	ND	ND	na	ND	ND	na	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	na	ND	na	ND	ND	ND	ND	ND	ND	ND	ND	ND	P	ND
Hennepin	PCA	8/28/2009	10	na	ND	ND	ND	ND	ND	ND	P	P	ND	na	ND	ND	na	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	na	ND	na	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Hennepin	PCA	8/28/2009	10	na	ND	ND	ND	ND	ND	ND	ND	P	ND	na	ND	ND	na	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	na	ND	na	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Hennepin	PCA	8/28/2009	10	na	ND	ND	ND	ND	ND	ND	P	0.05	ND	na	ND	ND	na	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	P	ND	P	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Hennepin	PCA	9/3/2009	10	na	ND	ND	ND	ND	ND	ND	ND	P	ND	na	ND	ND	na	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	P	ND	na	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Stearns	PCA	8/18/2009	4	na	ND	ND	ND	ND	ND	ND	ND	ND	ND	na	ND	ND	na	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	na	ND	na	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Stearns	PCA	9/23/2009	4	na	ND	ND	ND	ND	ND	ND	ND	P	ND	na	ND	ND	na	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	na	ND	na	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Stearns	PCA	9/23/2009	4	na	ND	ND	ND	ND	ND	ND	ND	ND	ND	na	ND	ND	na	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	na	ND	na	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Stearns	PCA	9/23/2009	4	na	ND	0.36	ND	ND	ND	ND	ND	ND	ND	na	ND	ND	na	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	na	ND	na	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Stearns	PCA	10/7/2009	4	na	ND	ND	ND	ND	ND	ND	ND	ND	ND	na	ND	ND	na	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	na	ND	na	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Stearns	PCA	11/13/2009	4	na	ND	ND	ND	ND	ND	ND	ND	ND	ND	na	ND	ND	na	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	na	ND	na	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Stearns	PCA	11/13/2009	4	na	ND	ND	ND	ND	ND	ND	ND	P	ND	na	ND	ND	na	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	na	ND	na	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND

NOTE: ND = non-detect; P = present; = detection

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Appendices 3-1 - 3-6

Comments to accompany trend analysis of pesticide concentration and detection frequency in Minnesota groundwater.

The Minnesota Department of Agriculture utilizes non-parametric trend analysis procedures on its groundwater monitoring data. Non-parametric procedures are necessary because of the nature of the MDA data set. First, MDA groundwater quality data is censored meaning that concentrations below the method reporting limit are reported as not detected; second, there are values reported as detected although unable to be quantified and are entered into the data base as 0.000001 parts-per-billion; third, the data contains missing values; and fourth, the distribution of the measured data is highly skewed, negating the validity of parametric statistical procedures.

Trend analysis procedures utilized by the MDA measure linear (straight line), monotonic (one direction) trends only. Mann-Kendall test results give a measure of the general direction of the up or down trend over time in a data set and cannot account for non-seasonal random time-series fluctuations. Inconclusive results may be due to data that is non-linear over time or contains multiple maximums and minimums. Rates of change can be over or under estimated in situations where the data is does not follow a straight line. Results from MDA trend analysis should only be viewed together with the associated time series graphics to help interpret impacts due to the serial structure of the data.

A3-1. Results of acetochlor concentration and detection frequency trend analysis for common detection pesticides in PMR 4 groundwater.

Parameter	M-K stat	p Value	Statistically Significant at $\alpha = 0.05$	Kendall Tau	slope estimate
Acetochlor Median	0	1.0	No	0	0
Acetochlor 75th %-ile	0	1.0	No	0	0
Acetochlor 90th %-ile	-10	0.57	No	-0.05	0
Acetochlor Maximum	-43	0.05	Yes	-0.23	0
Acetochlor Detection Frequency	-34	0.12	No	-0.18	0
Acetochlor ESA Median	0	1.0	No	0	0
Acetochlor ESA 75th %-ile	-23	0.31	No	-0.19	-0.004
Acetochlor ESA 90th %-ile	-2	0.96	No	-0.02	-0.005
Acetochlor ESA Maximum	-6	0.82	No	-0.05	-0.015
Acetochlor ESA Detection Frequency	-51	0.02	Yes	-0.43	-0.475
Acetochlor OXA Median	0	1.0	No	0	0
Acetochlor OXA 75th %-ile	0	1.0	No	0	0
Acetochlor OXA 90th %-ile	0	1.0	No	0	0
Acetochlor OXA Maximum	6	0.82	No	0.05	0.004
Acetochlor OXA Detection Frequency	-3	0.93	No	-0.025	0

A3-2. Results of alachlor concentration and detection frequency trend analysis for common detection pesticides in PMR 4 groundwater.

Parameter	M-K stat	p Value	Statistically Significant at $\alpha = 0.05$	Kendall Tau	slope estimate
Alachlor Median	0	1.0	No	0	0
Alachlor 75th %-ile	0	1.0	No	0	0
Alachlor 90th %-ile	0	1.0	No	0	0
Alachlor Maximum	-44	0.02	Yes	-0.23	0
Alachlor Detection Frequency	-43	0.03	Yes	-0.23	0
Alachlor ESA Median	-29	0.12	No	-0.24	0
Alachlor ESA 75th %-ile	-82	0.00	Yes	-0.68	-0.027
Alachlor ESA 90th %-ile	-74	0.00	Yes	-0.62	-0.076
Alachlor ESA Maximum	-64	0.00	Yes	-0.53	-0.228
Alachlor ESA Detection Frequency	-47	0.04	Yes	-0.39	-0.797
Alachlor OXA Median	0	1.0	No	0	0
Alachlor OXA 75th %-ile	0	1.0	No	0	0
Alachlor OXA 90th %-ile	-5	0.66	No	-0.04	0
Alachlor OXA Maximum	-22	0.34	No	-0.18	-0.010
Alachlor OXA Detection Frequency	-39	0.08	Yes	-0.33	-0.106

A3-3. Results of atrazine concentration and detection frequency trend analysis for common detection pesticides in PMR 4 groundwater.

Parameter	M-K stat	p Value	Statistically Significant at $\alpha = 0.05$	Kendall Tau	Sen slope estimate
Atrazine Median	52	0.05	Yes	0.27	0
Atrazine 75th %-ile	-94	0.00	Yes	-0.49	-0.002
Atrazine 90th %-ile	-115	0.00	Yes	-0.61	-0.003
Atrazine Maximum	-96	0.00	Yes	-0.51	-0.006
Atrazine Detection Frequency	55	0.08	Yes	0.29	0.388
Deethylatrazine Median	-106	0.00	Yes	-0.56	-0.003
Deethylatrazine 75th %-ile	-133	0.00	Yes	-0.70	-0.004
Deethylatrazine 90th %-ile	-152	0.00	Yes	-0.80	-0.008
Deethylatrazine Maximum	-127	0.00	Yes	-0.67	-0.019
Deethylatrazine Detection Frequency	51	0.10	Yes	0.27	0.500
Deisopropylatrazine Median	-3	0.86	No	-0.02	0
Deisopropylatrazine 75th %-ile	-45	0.10	Yes	-0.24	0
Deisopropylatrazine 90th %-ile	-118	0.00	Yes	-0.62	-0.011
Deisopropylatrazine Maximum	-125	0.00	Yes	-0.66	-0.042
Deisopropylatrazine Detection Frequency	-61	0.05	Yes	-0.32	-0.433
Atrazine+Degradates Median	-108	0.00	Yes	-0.57	-0.006
Atrazine+Degradates 75th %-ile	-146	0.00	Yes	-0.77	-0.011
Atrazine+Degradates 90th %-ile	-158	0.00	Yes	-0.83	-0.028
Atrazine+Degradates Maximum	-128	0.00	Yes	-0.67	-0.076
Atrazine+Degradates Detection Frequency	26	0.42	No	0.14	0.167

A3-4. Results of dimethenamid concentration and detection frequency trend analysis for common detection pesticides in PMR 4 groundwater.

Parameter	M-K stat	p Value	Statistically Significant at $\alpha = 0.05$	Kendall Tau	slope estimate
Dimethenamid Median	0	1.0	No	0	0
Dimethenamid 75th %-ile	0	1.0	No	0	0
Dimethenamid 90th %-ile	0	1.0	No	0	0
Dimethenamid Maximum	31	0.20	No	0.16	0
Dimethenamid Detection Frequency	21	0.35	No	0.11	0
Dimethenamid ESA Median	0	1.0	No	0	0
Dimethenamid ESA 75th %-ile	0	1.0	No	0	0
Dimethenamid ESA 90th %-ile	12	0.46	No	0.10	0
Dimethenamid ESA Maximum	26	0.26	No	0.22	0.015
Dimethenamid ESA Detection Frequency	33	0.13	No	0.28	0.087
Dimethenamid OXA Median	0	1.0	No	0	0
Dimethenamid OXA 75th %-ile	0	1.0	No	0	0
Dimethenamid OXA 90th %-ile	0	1.0	No	0	0
Dimethenamid OXA Maximum	44	0.05	Yes	0.37	0.015
Dimethenamid OXA Detection Frequency	40	0.07	Yes	0.33	0.173
Dimethenamid + Degradates Median	0	1.0	No	0	0
Dimethenamid + Degradates 75th %-ile	0	1.0	No	0	0
Dimethenamid + Degradates 90th %-ile	3	0.87	No	0.03	0
Dimethenamid + Degradates Maximum	32	0.16	No	0.27	0.177
Dimethenamid + Degradates Detection Frequency	39	0.08	Yes	0.33	0.138

A3-5. Results of metolachlor concentration and detection frequency trend analysis for common detection pesticides in PMR 4 groundwater.

Parameter	M-K stat	p Value	Statistically Significant at $\alpha = 0.05$	Kendall Tau	slope estimate
Metolachlor Median	0	1.0	No	0	0
Metolachlor 75th %-ile	-64	0.01	Yes	-0.32	0
Metolachlor 90th %-ile	-82	0.00	Yes	0.43	0
Metolachlor Maximum	-80	0.01	Yes	-0.42	-0.033
Metolachlor Detection Frequency	-91	0.00	Yes	-0.48	-0.500
Metolachlor ESA Median	16	0.50	No	0.13	0.006
Metolachlor ESA 75th %-ile	-44	0.05	Yes	-0.37	-0.03
Metolachlor ESA 90th %-ile	-50	0.03	Yes	0.42	-0.128
Metolachlor ESA Maximum	5	0.86	No	0.04	0.070
Metolachlor ESA Detection Frequency	8	0.75	No	0.07	0.211
Metolachlor OXA Median	0	1.0	No	0	0
Metolachlor OXA 75th %-ile	-15	0.53	No	-0.13	-0.005
Metolachlor OXA 90th %-ile	-58	0.01	Yes	-0.48	-0.034
Metolachlor OXA Maximum	-18	0.44	No	-0.15	-0.075
Metolachlor OXA Detection Frequency	-6	0.82	No	-0.05	0

A3-6. Results of metribuzin concentration and detection frequency trend analysis for common detection pesticides in PMR 4 groundwater.

Parameter	M-K stat	Two-sided p Value	Statistically Significant at $\alpha = 0.10$	Kendall Tau	slope estimate
Metribuzin Median	0	1.0	No	0	0
Metribuzin 75th %-ile	0	1.0	No	0	0
Metribuzin 90th %-ile	-50	0.10	Yes	-0.26	-0.0004
Metribuzin Maximum	-25	0.43	No	-0.13	-0.006
Metribuzin Detection Frequency	44	0.15	No	0.23	0.074
Metribuzin DADK Median	0	1.0	No	0	0
Metribuzin DADK 75th %-ile	-31	0.23	No	-0.16	0
Metribuzin DADK 90th %-ile	-56	0.07	Yes	-0.29	-0.047
Metribuzin DADK Maximum	-46	0.14	No	-0.24	-0.076
Metribuzin DADK Detection Frequency	-22	0.49	No	-0.12	-0.056
Metribuzin DK Median	0	1.0	No	0	0
Metribuzin DK 75th %-ile	0	1.0	No	0	0
Metribuzin DK 90th %-ile	43	0.00	Yes	0.38	0
Metribuzin DK Maximum	-21	0.42	No	-0.11	0
Metribuzin DK Detection Frequency	87	0.00	Yes	0.46	0.357
Metribuzin DA Median	0	1.0	No	0	0
Metribuzin DA 75th %-ile	0	1.0	No	0	0
Metribuzin DA 90th %-ile	7	0.79	No	0.04	0
Metribuzin DA Maximum	-26	0.33	No	-0.14	0
Metribuzin DA Detection Frequency	-32	0.31	No	-0.17	-0.086

A3-6 (continued). Results of metribuzin concentration and detection frequency trend analysis for common detection pesticides in PMR 4 groundwater.

Parameter	M-K stat	Two-sided p Value	Statistically Significant at $\alpha = 0.10$	Kendall Tau	slope estimate
Metribuzin+Degradates Median	0	1.0	No	0	0
Metribuzin+Degradates 75th %-ile	8	0.76	No	0.04	0
Metribuzin+Degradates 90th %-ile	105	0.00	Yes	0.55	0.047
Metribuzin+Degradates Maximum	-24	0.46	No	-0.13	-0.043
Metribuzin+Degradates Detection Frequency	-20	0.53	No	-0.11	-0.030

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Appendix 4

MDA Tier 1 through 3 surface water monitoring site names and characteristics of locations sampled in 2009.

2009 Tier[a]	PMR[b]	Site Code	Site Name	County	State Water Use Classification Rule 7050[c]	Associated Major River Basin	Associated Major Watershed Name	Acres Represented[d]	MDA Sampling History (Prior to 2009)
2	**1**	BDS	Bois de Sioux River	Wilkin	2C	Red River of the North	Bois de Sioux River	1,180,000	Tier 1: 2005-2008.
3	**1**	BU1	Buffalo River-Georgetown	Clay	2B	Red River of the North	Buffalo River	625,000	Tier 1: 2002; 2004-2006. Tier 2: 2007-2008.
1	**1**	GM1	Grand Marais Creek	Polk	2B	Red River of the North	Grand Marais Creek	111,000	Tier 1: 2004-2008.
1	**1**	MID5	Middle River	Marshall	2B	Red River of the North	Snake River	184,380	Tier 1: 2007-2008.
2	**1**	SNA	Snake River	Marshall	2B	Red River of the North	Snake River	736,000	Tier 1: 2005-2006. Tier 2: 2007-2008.
1	**1**	WR1	Wild Rice River	Norman	2B	Red River of the North	Wild Rice River	1,043,000	Tier 1: 2005-2008.
1	**2**	BG1	Big Fork River @ Big Falls	Koochiching	2B	Rainy River	Big Fork River	947,200	--
1	**3**	KA1	Kawishiwi River near Winton	Lake	1B, 2Bd, 3C	Rainy River	Rainy River	787,200	Tier 1: 1991-1993.
2	**4**	LR1	Little Rock Creek-Rice	Benton	1B/2A/3B	Upper Mississippi	Mississippi River-Sartell	12,800	Tier 1: 2005. Tier 2: 2006-2008.
1	**4**	AT1	Mississippi River nr Aitkin	Aitkin	2B	Upper Mississippi	Mississippi River-Brainerd	3,929,600	--
1	**4**	PN1	Pine River near Mission	Crow Wing	2B	Upper Mississippi	Pine River	498,772	--
1	**4**	CMS	Crow River-Middle Fork	Kandiyohi	2B	Upper Mississippi	Crow River- North Fork	106,767	--

2009 Tier[a]	PMR[b]	Site Code	Site Name	County	State Water Use Classification Rule 7050[c]	Associated Major River Basin	Associated Major Watershed Name	Acres Represented[d]	MDA Sampling History (Prior to 2009)
1	**5**	GS1	Grindstone River-South Branch	Pine	1B/2B/3B	St. Croix	Kettle River	--	Tier 1: 2007-2008.
1	**5**	LW1	Lawrence Creek	Chisago	1B/2B/3B	St. Croix	St. Croix River-Stillwater	--	Tier 1: 2007-2008.
1	**5**	MC1	Mission Creek	Pine	1B/2Bd/3B	St. Croix	Snake River	--	Tier 1: 2007-2008.
1	**5**	SU1	Sunrise River-North Branch	Chisago	1B/2Bd/3B	St. Croix	St. Croix River-Stillwater	--	Tier 1: 1993-1993; 2007-2008.
1	**6**	CP9	Chippewa River-West Branch	Swift	2B	Minnesota	Chippewa River	485,095	--
1	**6**	CP1	Dry Weather Creek	Chippewa	2B	Minnesota	Chippewa River	67,200	--
1	**6**	S16	Shakopee Creek	Swift	2C	Minnesota	Chippewa River	197,000	Tier 1: 2005-2007
1	**6**	YM1	Yellow Medicine River	Yellow Medicine	2B	Minnesota	Minnesota River-Granite Falls	424,960	Tier 1: 1991-1993.
1	**7**	BC1	Beaver Creek	Murray	2B	Des Moines River	West Fork Des Moines-Head	113,465	Tier 1: 2007-2008.
2	**7**	PSC	Pipestone Creek	Pipestone	2C	Missouri	Big Sioux River-Pipestone	96,600	Tier 1: 2005, 2008. Tier 2: 2006-2007.
1	**7**	RO1	Rock River	Rock	2B	Missouri	Rock River	262,000	Tier 1: 1991, 2006-2008.
1	**7**	TC4	Three Mile Creek-Green Valley	Lyon	2B	Minnesota	Redwood River	67,200	Tier 1: 2005-2008.

2009 Tier[a]	PMR[b]	Site Code	Site Name	County	State Water Use Classification Rule 7050[c]	Associated Major River Basin	Associated Major Watershed Name	Acres Represented[d]	MDA Sampling History (Prior to 2009)
3	**8**	BD1	Beauford Ditch	Blue Earth	2B	Minnesota	Le Sueur River	4,500	Tier 3: 2005-2008.
1	**8**	RD1	Blue Earth River-Rapidan Dam	Blue Earth	2B	Minnesota	Blue Earth River	1,560,000	Tier 3: 1999-2004. Tier 2: 2006-2007. Tier 1: 2008.
1	**8**	CT1	Cottonwood River-New Ulm	Brown	2B	Minnesota	Cottonwood River	838,000	Tier 1: 1991-1993; 2002; 2005-2008.
1	**8**	CSC	Crow River-South Fork-Cosmos	Meeker	2B	Upper Mississippi	South Fork Crow River	153,000	Tier 1: 2005-2007.
2	**8**	DC1	Dutch Creek	Martin	2B	Minnesota	Blue Earth River	8,650	Tier 1: 2003-2005. Tier 2: 2006-2008.
2	**8**	JC1	Jack Creek	Jackson	2B	Des Moines River	West Fork Des Moines-Head	130,637	Tier 1: 2007-2008.
3	**8**	LS1	Le Sueur River-Hwy 66	Blue Earth	2B	Minnesota	Le Sueur River	710,000	Tier 3: 1999-2008.
1	**8**	LT1	Little Cobb River	Blue Earth	2B	Minnesota	Le Sueur River	83,200	Tier 1: 2003-2005; 2008. Tier 2: 2006-2007.
1	**8**	LC1	Little Cottonwood River	Blue Earth	2B	Minnesota	Middle MN River-Mankato	109,000	Tier 1: 2002; 2005-2008.
1	**8**	JB1	Minnesota River-Judson Bridge	Nicollet	2B	Minnesota	Middle MN River-Mankato	7,170,000	Tier 3: 1999-2004. Tier 1: 2005; 2008. Tier 2: 2006-2007.
1	**8**	RR1	Redwood River-Redwood Falls	Redwood	2B	Minnesota	Redwood River	403,000	Tier 1: 2002; 2005-2008.

2009 Tier[a]	PMR[b]	Site Code	Site Name	County	State Water Use Classification Rule 7050[c]	Associated Major River Basin	Associated Major Watershed Name	Acres Represented[d]	MDA Sampling History (Prior to 2009)
3	**8**	SM3	Seven Mile Creek #3	Nicollet	1B/2A/3B	Minnesota	Middle MN River-Mankato	23,600	Tier 1:2002. Tier 3: 2003- 2008.
1	**8**	PLS	Sleepy Eye Creek-Leavenworth	Brown	2B	Minnesota	Cottonwood River	173,000	Tier 1: 2005. Tier 2: 2006-2008.
1	**8**	SR1	Straight River-Faribault	Rice	2B	Lower Mississippi	Cannon River	276,000	Tier 1: 2002; 2006-2008.
1	**9**	WEL	Cannon River-Welch	Goodhue	2B/3B	Lower Mississippi	Cannon River	838,000	Tier 1: 1991-1993; 2002; 2004-2005; 2008. Tier 2: 2006-2007.
1	**9**	CR1	Cedar River-Austin	Mower	2B	Lower Mississippi	Cedar River	249,000	Tier 1: 2002; 2005-2008.
1	**9**	CN2	Little Cannon River	Goodhue	1B/2A/3B	Lower Mississippi	Cannon River	54,159	--
1	**9**	SR3	Root River-Lower South Branch	Mower	2B	Lower Mississippi	Root River	3,260	Tier 1: 2007; 2008.
3	**9**	NR	Root River-North Branch	Fillmore	2B	Lower Mississippi	Root River	362,000	Tier: 2003-2003. Tier 3: 2004-2008.
3	**9**	SR4	Root River-South Branch-Carimona	Fillmore	1B/2A/3B	Lower Mississippi	Root River	91,445	Tier 1: 2002-2006. Tier 3: 2007-2008.
2	**9**	SFR	Root River-South Fork	Fillmore	1B/2A/3B	Lower Mississippi	Root River	176,000	Tier 1: 2003-2005. Tier 2: 2006-2008.

2009 Tier[a]	PMR[b]	Site Code	Site Name	County	State Water Use Classification Rule 7050[c]	Associated Major River Basin	Associated Major Watershed Name	Acres Represented[d]	MDA Sampling History (Prior to 2009)
3	**9**	MBW	Whitewater River-Middle Branch	Olmstead	1B/2A/3B	Lower Mississippi	Mississippi River-Winona	16,100	Tier 3: 1993-2008.
2	**9**	SBW	Whitewater River-South Branch	Winona	1B/2A/3B	Lower Mississippi	Mississippi River-Winona	49,200	Tier 3: 1992-2000. Tier 1: 2005. Tier 2: 2006-2008.
1	**9**	ZR1	Zumbro River	Wabasha	2B	Lower Mississippi	Zumbro River	236,000	Tier 1: 2007-2008.
1 Urban	**10**	BS1	Basset Creek	Hennepin	2B	Upper Mississippi	Mississippi River	27,500	Tier 1: 2006-2008.
1 Urban	**10**	BA1	Battle Creek	Ramsey	2B	Upper Mississippi	Mississippi River	7,200	Tier 1: 2006-2008.
1	**10**	BV	Bevens Creek	Carver	2B	Minnesota	Lower MN River-Shakopee	83,800	Tier 3: 1995-2001. Tier 1: 2003-2005; 2008. Tier 2: 2006-2007.
1	**10**	CSM	Crow River-South Fork-Mayer	Carver	2B	Upper Mississippi	South Fork Crow River	710,000	Tier 1: 2005-2008.
1 Urban	**10**	FC1	Fish Creek	Ramsey	2C	Upper Mississippi	Mississippi River	3,260	Tier 1: 2006-2008.
1 Urban	**10**	MH1	Minnehaha Creek	Hennepin	2B	Upper Mississippi	Mississippi River	116,000	Tier 1: 2006-2008.
2 Urban	**10**	NM1	9 Mile Creek	Hennepin	2B	Minnesota	Lower MN River-Shakopee	24,500	Tier 1: 2006. Tier 2: 2007-2008.
1 Urban	**10**	RI1	Riley Creek	Hennepin	2B	Minnesota	Lower MN River-Shakopee	8,320	Tier 1: 2006-2008.

2009 Tier[a]	PMR[b]	Site Code	Site Name	County	State Water Use Classification Rule 7050[c]	Associated Major River Basin	Associated Major Watershed Name	Acres Represented[d]	MDA Sampling History (Prior to 2009)
1	**10**	SD	Sand Creek	Scott	2B	Minnesota	Lower MN River-Shakopee	163,000	Tier 3: 1995-2002. Tier 1: 2003 – 2008.
2	**10**	SI1	Silver Creek-CR41	Carver	2B	Minnesota	Lower MN River-Shakopee	21,900	Tier 1: 2005. Tier 2: 2006-2008.
1	**10**	VR1	Vermillion River-Farmington	Dakota	2B	Lower Mississippi	Mississippi River&Lake Pepin [Red Wing]	82,600	Tier 1: 1991-1993; 2002; 2005-2008.

[a] See description of Tier Levels in appropriate Surface Water Monitoring Sections of this report.

[b] Pesticide Monitoring Region (PMR)

[c] Class 2A: for aquatic life (cold) & all recreation. Protected as a drinking water sources. Class 2Bd: for aquatic life (cool/warm) & all recreation. Protected as a drinking water source. Class 2B, C, D: For aquatic life (2B – sport and commercial; 2C – non-commercial; 2D – wetlands & recreation 2B – all types; 2C,D – limited types). Not protected as a drinking water source.

[d] Approximate acreage of watershed area represented by surface water sampling location.

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Appendix 5

COMMENTS FOR MDA SURFACE WATER MONITORING SAMPLE RESULTS TABLES:

1. Shaded results in the accompanying tables indicate detection of a compound.
2. Quantitative results are reported when analytical results are greater than or equal to the Method Reporting Limit or Estimated Reporting Limit shown in the table below.
3. "na" indicates that the pesticide is not a target analyte. Surface water non-target detected analytes are identified in the table below.
4. Unshaded blank spaces indicate that sample analysis was not conducted for the target analyte on the indicated sampling date.
5. "P" (present) indicates that the analytical result meets qualitative reporting criteria for identification of the pesticide, but cannot be quantified below the Method or Estimated Reporting Limit.
6. "ND" (non-detect) indicates that the analytical result does not meet qualitative reporting criteria.
7. "NA" (not analyzed) indicates that the sample could not be analyzed due to laboratory accident.
8. QAQC samples are not included in the following tables.
9. Sample date corresponds to actual collection time for grab samples and start time for composite samples.
10. Sample types are defined as : Base Flow Grab (BF G), Storm Flow Grab (SF G), Equal Time Increment Composite (ETI), and Equal Flow Increment Composite (EFI).

* Estimated Reporting Limit (ERL).

** MRL for Prometon was 0.50 ppb for samples collected on 6/11, 6/17, and 6/18; otherwise MRL was 0.10 ppb.

Surface Water Quality Sample Data for Calendar Year 2009: Pesticide Results - Tier 1 Monitoring Sites

				Base Neutral Pesticide Results [υg/L]																																			
Pesticide Monitoring Region	Sample Site	Sample Type	Sample Date	2,6-Dichlorobenzamide	Acetochlor	Alachlor	Atrazine	Boscalid	Chlorpyrifos	Cyanazine	Deisopropylatrazine	Desethylatrazine	Diazinon	Dichlobenil	Dimethenamid	Dimethoate	EPTC	Fonofos	Malathion	Metolachlor	Metribuzin	Metribuzin DA	Metribuzin DADK	Metribuzin DK	Myclobutanil	Oxadiazon	Parathion, Methyl	Pendimethalin	Phorate	Prometon	Propazine	Propiconazole	Simazine	Tebuconazole	Tebuprimiphos	Terbufos	Tetraconazole	Trifluralin
1	Grand Marais Creek	BF G	5/20/2009	na	ND	ND	ND	ND	ND	ND	ND	ND	ND	na	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	na	ND	ND	ND	na	na	ND	na	ND	ND	ND	P	ND
1	Grand Marais Creek	BF G	5/28/2009	na	P	ND	P	ND	ND	ND	ND	ND	ND	na	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	na	ND	ND	ND	na	na	ND	na	ND	ND	ND	ND	ND
1	Grand Marais Creek	BF G	6/9/2009	na	ND	ND	P	ND	ND	ND	ND	P	ND	na	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	na	ND	ND	ND	na	na	ND	na	ND	ND	ND	P	ND
1	Grand Marais Creek	BF G	6/25/2009	na	ND	ND	ND	ND	ND	ND	ND	ND	ND	na	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	na	ND	ND	ND	na	na	ND	na	ND	ND	ND	ND	ND
1	Middle River	BF G	5/20/2009	na	ND	ND	P	ND	ND	ND	ND	ND	ND	na	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	na	ND	ND	ND	na	na	ND	na	ND	ND	ND	ND	ND
1	Middle River	SF G	5/28/2009	na	ND	ND	P	ND	ND	ND	ND	ND	ND	na	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	na	ND	ND	ND	na	na	ND	na	ND	ND	ND	ND	ND
1	Middle River	BF G	6/9/2009	na	ND	ND	P	ND	ND	ND	ND	P	ND	na	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	na	ND	ND	ND	na	na	ND	na	ND	ND	ND	ND	ND
1	Middle River	BF G	6/25/2009	na	ND	ND	ND	ND	ND	ND	ND	ND	ND	na	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	na	ND	ND	ND	na	na	ND	na	ND	ND	ND	ND	ND
1	Wild Rice River	BF G	5/13/2009	na	ND	ND	ND	ND	ND	ND	ND	ND	ND	na	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	na	ND	ND	ND	na	na	ND	na	ND	ND	ND	ND	ND
1	Wild Rice River	SF G	5/26/2009	na	ND	ND	P	ND	ND	ND	ND	P	ND	na	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	na	ND	ND	ND	na	na	ND	na	ND	ND	ND	ND	ND
1	Wild Rice River	BF G	6/4/2009	na	ND	ND	P	ND	ND	ND	ND	P	ND	na	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	na	ND	ND	ND	na	na	ND	na	ND	ND	ND	ND	ND
1	Wild Rice River	BF G	6/15/2009	na	ND	ND	ND	ND	ND	ND	ND	ND	ND	na	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	na	ND	ND	ND	na	na	ND	na	ND	ND	ND	ND	ND
2	Big Fork River-Big Falls	BF G	5/13/2009	na	ND	ND	ND	ND	ND	ND	ND	ND	ND	na	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	na	ND	ND	ND	na	na	ND	na	ND	ND	ND	ND	ND
2	Big Fork River-Big Falls	BF G	6/1/2009	na	ND	ND	P	ND	ND	ND	ND	ND	ND	na	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	na	ND	ND	ND	na	na	ND	na	ND	ND	ND	ND	ND
2	Big Fork River-Big Falls	BF G	6/30/2009	na	ND	ND	ND	ND	ND	ND	ND	ND	ND	na	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	na	ND	ND	ND	na	na	ND	na	ND	ND	ND	ND	ND
2	Big Fork River-Big Falls	BF G	6/15/2009	na	ND	ND	P	ND	ND	ND	ND	P	ND	na	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	na	ND	ND	ND	na	na	ND	na	ND	ND	ND	ND	ND
3	Kawishiwi River-Winton	BF G	5/13/2009	na	ND	ND	ND	ND	ND	ND	ND	ND	ND	na	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	na	ND	ND	ND	na	na	ND	na	ND	ND	ND	ND	ND
3	Kawishiwi River-Winton	BF G	6/1/2009	na	ND	ND	ND	ND	ND	ND	ND	ND	ND	na	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	na	ND	ND	ND	na	na	ND	na	ND	ND	ND	ND	ND
3	Kawishiwi River-Winton	BF G	6/15/2009	na	ND	ND	ND	ND	ND	ND	ND	ND	ND	na	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	na	ND	ND	ND	na	na	ND	na	ND	ND	ND	ND	ND
3	Kawishiwi River-Winton	BF G	6/30/2009	na	ND	ND	ND	ND	ND	ND	ND	ND	ND	na	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	na	ND	ND	ND	na	na	ND	na	ND	ND	ND	ND	ND
4	Mississippi River-Aitkin	BF G	5/13/2009	na	ND	ND	ND	ND	ND	ND	ND	ND	ND	na	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	na	ND	ND	ND	na	na	ND	na	ND	ND	ND	ND	ND
4	Mississippi River-Aitkin	BF G	5/28/2009	na	ND	ND	ND	ND	ND	ND	ND	ND	ND	na	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	na	ND	ND	ND	na	na	ND	na	ND	ND	ND	ND	ND
4	Mississippi River-Aitkin	BF G	6/15/2009	na	ND	ND	ND	ND	ND	ND	ND	ND	ND	na	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	na	ND	ND	ND	na	na	ND	na	ND	ND	ND	ND	ND
4	Mississippi River-Aitkin	SF G	6/22/2009	na	ND	ND	P	ND	ND	ND	ND	P	ND	na	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	na	ND	ND	ND	na	na	ND	na	ND	ND	ND	ND	ND
4	Crow River-Middle Fork-Spicer	BF G	5/14/2009	na	P	ND	P	ND	ND	ND	ND	P	ND	na	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	na	ND	ND	ND	na	na	ND	na	ND	ND	ND	ND	ND
4	Crow River-Middle Fork-Spicer	BF G	5/21/2009	na	P	ND	P	ND	ND	ND	ND	P	ND	na	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	na	ND	ND	ND	na	na	ND	na	ND	ND	ND	ND	ND
4	Crow River-Middle Fork-Spicer	SF G	6/9/2009	na	P	ND	P	ND	ND	ND	ND	P	ND	na	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	na	ND	ND	ND	na	na	ND	na	ND	ND	ND	ND	ND
4	Crow River-Middle Fork-Spicer	SF G	6/18/2009	na	ND	ND	P	ND	ND	ND	ND	P	ND	na	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	na	ND	ND	ND	na	na	ND	na	ND	ND	ND	ND	ND
4	Pine River-Mission	BF G	5/13/2009	na	P	ND	ND	ND	ND	ND	ND	ND	ND	na	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	na	ND	ND	ND	na	na	ND	na	ND	ND	ND	ND	ND
4	Pine River-Mission	BF G	5/28/2009	na	ND	ND	ND	ND	ND	ND	ND	ND	ND	na	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	na	ND	ND	ND	na	na	ND	na	ND	ND	ND	ND	ND
4	Pine River-Mission	BF G	6/15/2009	na	ND	ND	ND	ND	ND	ND	ND	ND	ND	na	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	na	ND	ND	ND	na	na	ND	na	ND	ND	ND	ND	ND
4	Pine River-Mission	SF G	6/22/2009	na	ND	ND	P	ND	ND	ND	ND	P	ND	na	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	na	ND	ND	ND	na	na	ND	na	ND	ND	ND	ND	ND
5	Grindstone River-South Branch	BF G	5/14/2009	na	P	ND	P	ND	ND	ND	ND	ND	ND	na	ND	ND	ND	ND	ND	P	ND	ND	ND	ND	ND	na	ND	ND	ND	na	na	ND	na	ND	ND	ND	ND	ND
5	Grindstone River-South Branch	BF G	5/26/2009	na	ND	ND	ND	ND	ND	ND	ND	ND	ND	na	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	na	ND	ND	ND	na	na	ND	na	ND	ND	ND	ND	ND
5	Grindstone River-South Branch	BF G	6/9/2009	na	ND	ND	ND	ND	ND	ND	ND	ND	ND	na	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	na	ND	ND	ND	na	na	ND	na	ND	ND	ND	ND	ND
5	Grindstone River-South Branch	BF G	6/29/2009	na	ND	ND	ND	ND	ND	ND	ND	ND	ND	na	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	na	ND	ND	ND	na	na	ND	na	ND	ND	ND	ND	ND
5	Lawrence Creek	BF G	5/14/2009	na	ND	ND	P	ND	ND	ND	ND	P	ND	na	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	na	ND	ND	ND	na	na	ND	na	ND	ND	ND	ND	ND
5	Lawrence Creek	BF G	5/26/2009	na	ND	ND	P	ND	ND	ND	ND	0.06	ND	na	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	na	ND	ND	ND	na	na	ND	na	ND	ND	ND	ND	ND
5	Lawrence Creek	BF G	6/9/2009	na	ND	ND	P	ND	ND	ND	ND	P	ND	na	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	na	ND	ND	ND	na	na	ND	na	ND	ND	ND	ND	ND
5	Lawrence Creek	BF G	6/29/2009	na	ND	ND	P	ND	ND	ND	ND	P	ND	na	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	na	ND	ND	ND	na	na	ND	na	ND	ND	ND	ND	ND
5	Mission Creek	BF G	5/14/2009	na	P	ND	P	ND	ND	ND	ND	ND	ND	na	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	na	ND	ND	ND	na	na	ND	na	ND	ND	ND	ND	ND
5	Mission Creek	BF G	5/26/2009	na	ND	ND	ND	ND	ND	ND	ND	ND	ND	na	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	na	ND	ND	ND	na	na	ND	na	ND	ND	ND	ND	ND
5	Mission Creek	BF G	6/9/2009	na	ND	ND	ND	ND	ND	ND	ND	ND	ND	na	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	na	ND	ND	ND	na	na	ND	na	ND	ND	ND	ND	ND
5	Mission Creek	BF G	6/29/2009	na	ND	ND	P	ND	ND	ND	ND	ND	ND	na	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	na	ND	ND	ND	na	na	ND	na	ND	ND	ND	ND	ND
5	Sunrise River-North Branch	BF G	5/14/2009	na	P	ND	P	ND	ND	ND	ND	P	ND	na	ND	ND	ND	ND	ND	P	ND	ND	ND	ND	ND	na	ND	ND	ND	na	na	ND	na	ND	ND	ND	ND	ND
5	Sunrise River-North Branch	BF G	5/26/2009	na	ND	ND	P	ND	ND	ND	ND	0.06	ND	na	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	na	ND	ND	ND	na	na	ND	na	ND	ND	ND	ND	ND
5	Sunrise River-North Branch	BF G	6/9/2009	na	P	ND	P	ND	ND	ND	ND	P	ND	na	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	na	ND	ND	ND	na	na	ND	na	ND	ND	ND	ND	ND
5	Sunrise River-North Branch	BF G	6/29/2009	na	ND	ND	P	ND	ND	ND	ND	P	ND	na	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	na	ND	ND	ND	na	na	ND	na	ND	ND	ND	ND	ND

Surface Water Quality Sample Data for Calendar Year 2009: Pesticide Results - Tier 1 Monitoring Sites

				Base Neutral Pesticide Results [ug/L]																																			
Pesticide Monitoring Region	Sample Site	Sample Type	Sample Date	2,6-Dichlorobenzamide	Acetochlor	Alachlor	Atrazine	Boscalid	Chlorpyrifos	Cyanazine	Deisopropylatrazine	Desethylatrazine	Diazinon	Dichlobenil	Dimethenamid	Dimethoate	EPTC	Fonofos	Malathion	Metolachlor	Metribuzin	Metribuzin DA	Metribuzin DADK	Metribuzin DK	Myclobutanil	Oxadiazon	Parathion, Methyl	Pendimethalin	Phorate	Prometon	Propazine	Propiconazole	Simazine	Tebuconazole	Tebuprimiphos	Terbufos	Tetraconazole	Trifluralin
6	Chippewa River-West Branch	BF G	5/14/2009	na	P	ND	P	ND	ND	ND	ND	P	ND	na	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	na	ND	ND	ND	na	na	ND	na	ND	ND	ND	ND	ND
6	Chippewa River-West Branch	BF G	5/28/2009	na	P	ND	ND	ND	ND	ND	ND	ND	ND	na	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	na	ND	ND	ND	na	na	ND	na	ND	ND	ND	ND	ND
6	Chippewa River-West Branch	SF G	6/9/2009	na	P	ND	P	ND	ND	ND	ND	ND	ND	na	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	na	ND	ND	ND	na	na	ND	na	ND	ND	ND	ND	ND
6	Chippewa River-West Branch	SF G	6/23/2009	na	ND	ND	P	ND	ND	ND	ND	ND	ND	na	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	na	ND	ND	ND	na	na	ND	na	ND	ND	ND	ND	ND
6	Dry Weather Creek	BF G	5/14/2009	na	P	ND	P	ND	ND	ND	ND	ND	ND	na	P	ND	ND	ND	ND	P	ND	ND	ND	ND	ND	na	ND	ND	ND	na	na	ND	na	ND	ND	ND	ND	ND
6	Dry Weather Creek	BF G	5/28/2009	na	ND	ND	ND	ND	ND	ND	ND	ND	ND	na	P	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	na	ND	ND	ND	na	na	ND	na	ND	ND	ND	ND	ND
6	Dry Weather Creek	SF G	6/9/2009	na	ND	ND	P	ND	ND	ND	ND	ND	ND	na	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	na	ND	ND	ND	na	na	ND	na	ND	ND	ND	ND	ND
6	Dry Weather Creek	SF G	6/23/2009	na	ND	ND	0.09	ND	ND	ND	ND	P	ND	na	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	na	ND	ND	ND	na	na	ND	na	ND	ND	ND	ND	ND
6	Shakopee Creek	BF G	5/14/2009	na	P	ND	P	ND	ND	ND	ND	P	ND	na	P	ND	ND	ND	ND	P	ND	ND	ND	ND	ND	na	ND	ND	ND	na	na	ND	na	ND	ND	ND	ND	ND
6	Shakopee Creek	BF G	5/28/2009	na	P	ND	ND	ND	ND	ND	ND	ND	ND	na	P	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	na	ND	ND	ND	na	na	ND	na	ND	ND	ND	ND	ND
6	Shakopee Creek	SF G	6/9/2009	na	P	ND	P	ND	ND	ND	ND	ND	ND	na	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	na	ND	ND	ND	na	na	ND	na	ND	ND	ND	ND	ND
6	Shakopee Creek	SF G	6/23/2009	na	ND	ND	P	ND	ND	ND	ND	ND	ND	na	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	na	ND	ND	ND	na	na	ND	na	ND	ND	ND	ND	ND
6	Yellow Medicine River-Granite Falls	BF G	5/13/2009	na	0.06	ND	P	ND	ND	ND	ND	P	ND	na	ND	ND	ND	ND	ND	P	ND	ND	ND	ND	ND	na	ND	ND	ND	na	na	ND	na	ND	ND	ND	ND	ND
6	Yellow Medicine River-Granite Falls	BF G	5/28/2009	na	P	ND	P	ND	ND	ND	ND	P	ND	na	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	na	ND	ND	ND	na	na	ND	na	ND	ND	ND	ND	ND
6	Yellow Medicine River-Granite Falls	BF G	6/15/2009	na	P	ND	P	ND	ND	ND	ND	ND	ND	na	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	na	ND	ND	ND	na	na	ND	na	ND	ND	ND	ND	ND
6	Yellow Medicine River-Granite Falls	BF G	6/30/2009	na	ND	ND	0.06	ND	ND	ND	ND	P	ND	na	ND	ND	ND	ND	ND	P	ND	ND	ND	ND	ND	na	ND	ND	ND	na	na	ND	na	ND	ND	ND	ND	ND
7	Beaver Creek	BF G	5/14/2009	na	P	ND	P	ND	ND	ND	ND	P	ND	na	ND	ND	ND	ND	ND	P	ND	ND	ND	ND	ND	na	ND	ND	ND	na	na	ND	na	ND	ND	ND	ND	ND
7	Beaver Creek	BF G	5/31/2009	na	ND	ND	0.12	ND	ND	ND	ND	P	ND	na	ND	ND	ND	ND	ND	P	ND	ND	ND	ND	ND	na	ND	ND	ND	na	na	ND	na	ND	ND	ND	ND	ND
7	Beaver Creek	SF G	6/8/2009	na	0.57	ND	0.24	ND	ND	ND	ND	P	ND	na	P	ND	ND	ND	ND	0.19	ND	ND	ND	ND	ND	na	ND	ND	ND	na	na	ND	na	ND	ND	ND	ND	ND
7	Beaver Creek	SF G	6/22/2009	na	P	ND	0.09	ND	ND	ND	ND	P	ND	na	P	ND	ND	ND	ND	P	ND	ND	ND	ND	ND	na	ND	ND	ND	na	na	ND	na	ND	ND	ND	ND	ND
7	Rock River	BF G	5/14/2009	na	P	ND	P	ND	ND	ND	ND	P	ND	na	ND	ND	ND	ND	ND	P	ND	ND	ND	ND	ND	na	ND	ND	ND	na	na	ND	na	ND	ND	ND	ND	ND
7	Rock River	BF G	5/30/2009	na	P	ND	P	ND	ND	ND	ND	P	ND	na	ND	ND	ND	ND	ND	P	ND	ND	ND	ND	ND	na	ND	ND	ND	na	na	ND	na	ND	ND	ND	ND	ND
7	Rock River	SF G	6/8/2009	na	P	ND	P	ND	ND	ND	ND	P	ND	na	ND	ND	ND	ND	ND	P	ND	ND	ND	ND	ND	na	ND	ND	ND	na	na	ND	na	ND	ND	ND	ND	ND
7	Rock River	SF G	6/22/2009	na	ND	ND	P	ND	ND	ND	ND	P	ND	na	ND	ND	ND	ND	ND	P	ND	ND	ND	ND	ND	na	ND	ND	ND	na	na	ND	na	ND	ND	ND	ND	ND
7	Three Mile Creek-Green Valley	BF G	5/14/2009	na	0.28	ND	0.05	ND	ND	ND	ND	ND	ND	na	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	na	ND	ND	ND	na	na	ND	na	ND	ND	ND	ND	ND
7	Three Mile Creek-Green Valley	BF G	5/27/2009	na	0.12	ND	0.15	ND	ND	ND	ND	P	ND	na	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	na	ND	ND	ND	na	na	ND	na	ND	ND	ND	ND	ND
7	Three Mile Creek-Green Valley	BF G	6/15/2009	na	ND	ND	P	ND	ND	ND	ND	ND	ND	na	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	na	ND	ND	ND	na	na	ND	na	ND	ND	ND	ND	ND
7	Three Mile Creek-Green Valley	BF G	6/30/2009	na	ND	ND	P	ND	ND	ND	ND	P	ND	na	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	na	ND	ND	ND	na	na	ND	na	ND	ND	ND	ND	ND
8	Blue Earth River-Rapidan Dam	BF G	5/14/2009	na	0.1	ND	P	ND	ND	ND	ND	P	ND	na	P	ND	ND	ND	ND	P	ND	ND	ND	ND	ND	na	ND	ND	ND	na	na	ND	na	ND	ND	ND	ND	ND
8	Blue Earth River-Rapidan Dam	BF G	5/29/2009	na	P	ND	P	ND	ND	ND	ND	P	ND	na	ND	ND	ND	ND	ND	P	ND	ND	ND	ND	ND	na	ND	ND	ND	na	na	ND	na	ND	ND	ND	ND	ND
8	Blue Earth River-Rapidan Dam	SF G	6/12/2009	na	0.25	ND	0.15	ND	ND	ND	ND	P	ND	na	P	ND	ND	ND	ND	0.17	ND	ND	ND	ND	ND	na	ND	ND	ND	P	na	ND	na	ND	ND	ND	ND	ND
8	Blue Earth River-Rapidan Dam	SF G	6/29/2009	na	P	ND	0.05	ND	ND	ND	ND	P	ND	na	P	ND	ND	ND	ND	P	ND	ND	ND	ND	ND	na	ND	ND	ND	na	na	ND	na	ND	ND	ND	ND	ND
8	Cottonwood River-New Ulm	BF G	5/14/2009	na	0.27	ND	P	ND	ND	ND	ND	P	ND	na	P	ND	ND	ND	ND	0.09	ND	ND	ND	ND	ND	na	ND	ND	ND	na	na	ND	na	ND	ND	ND	ND	ND
8	Cottonwood River-New Ulm	BF G	5/27/2009	na	P	ND	P	ND	ND	ND	ND	P	ND	na	ND	ND	ND	ND	ND	P	ND	ND	ND	ND	ND	na	ND	ND	ND	na	na	ND	na	ND	ND	ND	ND	ND
8	Cottonwood River-New Ulm	BF G	6/30/2009	na	ND	ND	P	ND	ND	ND	ND	P	ND	na	ND	ND	ND	ND	ND	P	ND	ND	ND	ND	ND	na	ND	ND	ND	na	na	ND	na	ND	ND	ND	ND	ND
8	Cottonwood River-New Ulm	SF G	6/15/2009	na	P	ND	P	ND	ND	ND	ND	P	ND	na	ND	ND	ND	ND	ND	P	ND	ND	ND	ND	ND	na	ND	ND	ND	na	na	ND	na	ND	ND	ND	ND	ND
8	Crow River-South Fork-Cosmos	BF G	5/14/2009	na	P	ND	P	ND	ND	ND	ND	P	ND	na	P	ND	ND	ND	ND	0.07	ND	ND	ND	ND	ND	na	ND	ND	ND	na	na	ND	na	ND	ND	ND	ND	ND
8	Crow River-South Fork-Cosmos	BF G	5/21/2009	na	P	ND	P	ND	ND	ND	ND	P	ND	na	ND	ND	ND	ND	ND	P	ND	ND	ND	ND	ND	na	ND	ND	ND	na	na	ND	na	ND	ND	ND	ND	ND
8	Crow River-South Fork-Cosmos	SF G	6/9/2009	na	P	ND	0.05	ND	ND	ND	ND	P	ND	na	ND	ND	ND	ND	ND	P	ND	ND	ND	ND	ND	na	ND	ND	ND	na	na	ND	na	ND	ND	ND	ND	ND
8	Crow River-South Fork-Cosmos	SF G	6/18/2009	na	P	ND	P	ND	ND	ND	ND	P	ND	na	ND	ND	ND	ND	ND	P	ND	ND	ND	ND	ND	na	ND	ND	ND	na	na	ND	na	ND	ND	ND	ND	ND
8	Little Cobb River	BF G	5/29/2009	na	P	ND	P	ND	ND	ND	ND	P	ND	na	P	ND	ND	ND	ND	0.12	ND	ND	ND	ND	ND	na	ND	ND	ND	na	na	ND	na	ND	ND	ND	ND	ND
8	Little Cobb River	BF G	6/8/2009	na	P	ND	0.06	ND	ND	ND	ND	P	ND	na	ND	ND	ND	ND	ND	0.13	ND	ND	ND	ND	ND	na	ND	ND	ND	na	na	ND	na	ND	ND	ND	ND	ND
8	Little Cobb River	SF G	5/7/2009	na	0.6	ND	0.16	ND	ND	ND	ND	P	ND	na	0.19	ND	ND	ND	ND	0.5	ND	ND	ND	ND	ND	na	ND	ND	ND	na	na	ND	na	ND	ND	ND	ND	ND
8	Little Cobb River	SF G	6/15/2009	na	P	ND	P	ND	ND	ND	ND	P	ND	na	ND	ND	ND	ND	ND	0.1	ND	ND	ND	ND	ND	na	ND	ND	ND	na	na	ND	na	ND	ND	ND	ND	ND
8	Little Cobb River	SF G	6/19/2009	na	P	ND	P	ND	ND	ND	ND	P	ND	na	ND	ND	ND	ND	ND	0.08	ND	ND	ND	ND	ND	na	ND	ND	ND	na	na	ND	na	ND	ND	ND	ND	ND
8	Little Cobb River	SF G	6/29/2009	na	0.05	ND	0.06	ND	ND	ND	ND	P	ND	na	ND	ND	ND	ND	ND	0.09	ND	ND	ND	ND	ND	na	ND	ND	ND	na	na	ND	na	ND	ND	ND	ND	ND
8	Little Cottonwood River	BF G	5/14/2009	na	0.13	ND	P	ND	ND	ND	ND	P	ND	na	P	ND	ND	ND	ND	P	ND	ND	ND	ND	ND	na	ND	ND	ND	na	na	ND	na	ND	ND	ND	ND	ND
8	Little Cottonwood River	BF G	5/29/2009	na	P	ND	P	ND	ND	ND	ND	P	ND	na	ND	ND	ND	ND	ND	P	ND	ND	ND	ND	ND	na	ND	ND	ND	na	na	ND	na	ND	ND	ND	ND	ND
8	Little Cottonwood River	BF G	6/9/2009	na	0.19	ND	0.17	ND	ND	ND	ND	P	ND	na	ND	ND	ND	ND	ND	0.08	ND	ND	ND	ND	ND	na	ND	ND	ND	na	na	ND	na	ND	ND	ND	ND	ND
8	Little Cottonwood River	BF G	6/29/2009	na	ND	ND	P	ND	ND	ND	ND	P	ND	na	ND	ND	ND	ND	ND	P	ND	ND	ND	ND	ND	na	ND	ND	ND	na	na	ND	na	ND	ND	ND	ND	ND

Surface Water Quality Sample Data for Calendar Year 2009: Pesticide Results - Tier 1 Monitoring Sites

				Base Neutral Pesticide Results [υg/L]																																			
Pesticide Monitoring Region	Sample Site	Sample Type	Sample Date	2,6-Dichlorobenzamide	Acetochlor	Alachlor	Atrazine	Boscalid	Chlorpyrifos	Cyanazine	Deisopropylatrazine	Desethylatrazine	Diazinon	Dichlobenil	Dimethenamid	Dimethoate	EPTC	Fonofos	Malathion	Metolachlor	Metribuzin	Metribuzin DA	Metribuzin DADK	Metribuzin DK	Myclobutanil	Oxadiazon	Parathion, Methyl	Pendimethalin	Phorate	Prometon	Propazine	Propiconazole	Simazine	Tebuconazole	Tebuprimiphos	Terbufos	Tetraconazole	Trifluralin
8	Minnesota River-Judson Bridge	BF G	5/14/2009	na	P	ND	P	ND	ND	ND	ND	P	ND	na	ND	ND	ND	ND	ND	P	ND	ND	ND	ND	ND	na	ND	ND	ND	na	na	ND	na	ND	ND	ND	ND	ND
8	Minnesota River-Judson Bridge	BF G	5/29/2009	na	P	ND	P	ND	ND	ND	ND	P	ND	na	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	na	ND	ND	ND	na	na	ND	na	ND	ND	ND	ND	ND
8	Minnesota River-Judson Bridge	BF G	6/9/2009	na	P	ND	P	ND	ND	ND	ND	ND	ND	na	ND	ND	ND	ND	ND	0.08	ND	ND	ND	ND	ND	na	ND	ND	ND	na	na	ND	na	ND	ND	ND	ND	ND
8	Minnesota River-Judson Bridge	BF G	6/29/2009	na	P	ND	0.05	ND	ND	ND	ND	P	ND	na	ND	ND	ND	ND	ND	P	ND	ND	ND	ND	ND	na	ND	ND	ND	na	na	ND	na	ND	ND	ND	ND	ND
8	Redwood River-Redwood Falls	BF G	5/14/2009	na	P	ND	P	ND	ND	ND	ND	P	ND	na	ND	ND	ND	ND	ND	P	ND	ND	ND	ND	ND	na	ND	ND	ND	na	na	ND	na	ND	ND	ND	ND	ND
8	Redwood River-Redwood Falls	BF G	5/27/2009	na	0.09	ND	P	ND	ND	ND	ND	ND	ND	na	ND	ND	ND	ND	ND	P	ND	ND	ND	ND	ND	na	ND	ND	ND	na	na	ND	na	ND	ND	ND	ND	ND
8	Redwood River-Redwood Falls	BF G	6/30/2009	na	ND	ND	P	ND	ND	ND	ND	P	ND	na	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	na	ND	ND	ND	na	na	ND	na	ND	ND	ND	ND	ND
8	Redwood River-Redwood Falls	SF G	6/15/2009	na	P	ND	P	ND	ND	ND	ND	P	ND	na	ND	ND	ND	ND	ND	P	ND	ND	ND	ND	ND	na	ND	ND	ND	na	na	ND	na	ND	ND	ND	ND	ND
8	Sleepy Eye Creek-Leavenworth	BF G	5/14/2009	na	P	ND	P	ND	ND	ND	P	P	ND	na	P	ND	ND	ND	ND	P	ND	ND	ND	ND	ND	na	ND	ND	ND	na	na	ND	na	ND	ND	ND	ND	ND
8	Sleepy Eye Creek-Leavenworth	BF G	5/27/2009	na	0.05	ND	P	ND	ND	ND	ND	ND	ND	na	ND	ND	ND	ND	ND	P	ND	ND	ND	ND	ND	na	ND	ND	ND	na	na	ND	na	ND	ND	ND	ND	ND
8	Sleepy Eye Creek-Leavenworth	BF G	6/30/2009	na	ND	ND	P	ND	ND	ND	ND	P	ND	na	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	na	ND	ND	ND	0.74	na	ND	na	ND	ND	ND	ND	ND
8	Sleepy Eye Creek-Leavenworth	SF G	6/15/2009	na	P	ND	P	ND	ND	ND	ND	P	ND	na	ND	ND	ND	ND	ND	P	ND	ND	ND	ND	ND	na	ND	ND	ND	na	na	ND	na	ND	ND	ND	ND	ND
8	Straight River-Fairbault	BF G	5/14/2009	na	0.06	ND	P	ND	ND	ND	ND	P	ND	na	P	ND	ND	ND	ND	0.12	ND	ND	ND	ND	ND	na	ND	ND	ND	na	na	ND	na	ND	ND	ND	ND	ND
8	Straight River-Fairbault	BF G	5/28/2009	na	P	ND	P	ND	ND	ND	ND	P	P	na	ND	ND	ND	ND	ND	P	ND	ND	ND	ND	ND	na	ND	ND	ND	na	na	ND	na	ND	ND	ND	ND	ND
8	Straight River-Fairbault	SF G	6/8/2009	na	P	ND	P	ND	ND	ND	ND	P	ND	na	ND	ND	ND	ND	ND	P	ND	ND	ND	ND	ND	na	ND	ND	ND	na	na	ND	na	ND	ND	ND	ND	ND
8	Straight River-Fairbault	SF G	6/19/2009	na	0.41	ND	0.9	ND	ND	ND	ND	0.12	ND	na	0.07	ND	ND	ND	ND	1.43	ND	ND	ND	ND	ND	na	ND	ND	ND	na	P	ND	na	ND	ND	ND	ND	ND
9	Cannon River-Welch	BF G	5/15/2009	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
9	Cannon River-Welch	BF G	5/28/2009	na	0.06	ND	P	ND	ND	ND	ND	0.05	ND	na	ND	ND	ND	ND	ND	0.12	ND	ND	ND	ND	ND	na	ND	ND	ND	na	na	ND	na	ND	ND	ND	ND	ND
9	Cannon River-Welch	SF G	6/8/2009	na	P	ND	P	ND	ND	ND	ND	P	ND	na	ND	ND	ND	ND	ND	0.07	ND	ND	ND	ND	ND	na	ND	ND	ND	na	na	ND	na	ND	ND	ND	ND	ND
9	Cannon River-Welch	SF G	6/17/2009	na	P	ND	0.06	ND	ND	ND	ND	P	ND	na	P	ND	ND	ND	ND	0.07	ND	ND	ND	ND	ND	na	ND	ND	ND	na	na	ND	na	ND	ND	ND	ND	ND
9	Cannon River-Welch	SF G	6/22/2009	na	0.05	ND	0.18	ND	ND	ND	ND	P	ND	na	P	ND	ND	ND	ND	0.2	ND	ND	ND	ND	ND	na	ND	ND	ND	na	na	ND	na	ND	ND	ND	ND	ND
9	Cedar River-Austin	SF G	5/7/2009	na	0.69	ND	0.05	ND	ND	ND	ND	P	ND	na	0.15	ND	ND	ND	ND	0.07	ND	ND	ND	ND	ND	na	ND	ND	ND	na	na	ND	na	ND	ND	ND	ND	ND
9	Cedar River-Austin	SF G	5/27/2009	na	0.09	ND	0.11	ND	ND	ND	ND	P	ND	na	P	ND	ND	ND	ND	0.08	ND	ND	ND	ND	ND	na	ND	ND	ND	na	na	ND	na	ND	ND	ND	ND	ND
9	Cedar River-Austin	SF G	6/8/2009	na	0.12	ND	0.13	ND	ND	ND	ND	0.06	ND	na	ND	ND	ND	ND	ND	0.1	ND	ND	ND	ND	ND	na	ND	ND	ND	na	na	ND	na	ND	ND	ND	ND	ND
9	Cedar River-Austin	SF G	6/18/2009	na	1.58	ND	1.13	ND	ND	ND	ND	0.14	ND	na	0.18	ND	ND	ND	ND	0.72	ND	ND	ND	ND	ND	na	ND	ND	ND	na	na	ND	na	ND	ND	ND	ND	ND
9	Little Cannon River-Cannon Falls	BF G	5/15/2009	na	P	ND	P	ND	ND	ND	ND	P	ND	na	P	ND	ND	ND	ND	P	ND	ND	ND	ND	ND	na	ND	ND	ND	na	na	ND	na	ND	ND	ND	ND	ND
9	Little Cannon River-Cannon Falls	BF G	5/28/2009	na	ND	ND	P	ND	ND	ND	ND	P	ND	na	ND	ND	ND	ND	ND	P	ND	ND	ND	ND	ND	na	ND	ND	ND	na	na	ND	na	ND	ND	ND	ND	ND
9	Little Cannon River-Cannon Falls	SF G	6/8/2009	na	P	ND	P	ND	ND	ND	ND	P	ND	na	P	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	na	ND	ND	ND	na	na	ND	na	ND	ND	ND	ND	ND
9	Little Cannon River-Cannon Falls	SF G	6/17/2009	na	ND	ND	P	ND	ND	ND	ND	P	ND	na	ND	ND	ND	ND	ND	P	ND	ND	ND	ND	ND	na	ND	ND	ND	na	na	ND	na	ND	ND	ND	ND	ND
9	Root River-Lower South Branch	BF G	5/14/2009	na	0.28	ND	0.34	ND	ND	ND	P	0.09	ND	na	P	ND	ND	ND	ND	0.08	ND	ND	ND	ND	ND	na	ND	ND	ND	na	na	ND	na	ND	ND	ND	ND	ND
9	Root River-Lower South Branch	SF G	5/27/2009	na	4.25	ND	3.9	ND	ND	ND	P	0.29	ND	na	0.06	ND	ND	ND	ND	0.71	ND	ND	ND	ND	ND	na	ND	ND	ND	na	P	ND	na	ND	ND	ND	ND	ND
9	Root River-Lower South Branch	SF G	6/8/2009	na	12.3	ND	9.4	ND	ND	ND	0.23	0.73	ND	na	0.27	ND	ND	ND	ND	4.45	ND	ND	ND	ND	ND	na	ND	ND	ND	na	na	ND	na	ND	ND	ND	ND	ND
9	Root River-Lower South Branch	SF G	6/18/2009	na	0.53	ND	0.49	ND	ND	ND	ND	0.27	ND	na	0.25	ND	ND	ND	ND	1.01	ND	ND	ND	ND	ND	na	ND	ND	ND	na	na	ND	na	ND	ND	ND	ND	ND
9	Zumbro River	BF G	5/14/2009	na	P	ND	0.07	ND	ND	ND	ND	0.07	ND	na	P	ND	ND	ND	ND	0.07	ND	ND	ND	ND	ND	na	ND	ND	ND	na	na	ND	na	ND	ND	ND	ND	ND
9	Zumbro River	BF G	5/28/2009	na	0.05	ND	0.08	ND	ND	ND	ND	0.05	ND	na	P	ND	ND	ND	ND	P	ND	ND	ND	ND	ND	na	ND	ND	ND	na	na	ND	na	ND	ND	ND	ND	ND
9	Zumbro River	BF G	6/8/2009	na	P	ND	0.06	ND	ND	ND	ND	0.06	ND	na	ND	ND	ND	ND	ND	P	ND	ND	ND	ND	ND	na	ND	ND	ND	na	na	ND	na	ND	ND	ND	ND	ND
9	Zumbro River	BF G	6/25/2009	na	P	ND	0.3	ND	ND	ND	ND	0.1	ND	na	P	ND	ND	ND	ND	0.23	ND	ND	ND	ND	ND	na	ND	ND	ND	na	na	ND	P	ND	ND	ND	ND	ND

Surface Water Quality Sample Data for Calendar Year 2009: Pesticide Results - Tier 1 Monitoring Sites

				Base Neutral Pesticide Results [ug/L]																																			
Pesticide Monitoring Region	Sample Site	Sample Type	Sample Date	2,6-Dichlorobenzamide	Acetochlor	Alachlor	Atrazine	Boscalid	Chlorpyrifos	Cyanazine	Deisopropylatrazine	Desethylatrazine	Diazinon	Dichlobenil	Dimethenamid	Dimethoate	EPTC	Fonofos	Malathion	Metolachlor	Metribuzin	Metribuzin DA	Metribuzin DADK	Metribuzin DK	Myclobutanil	Oxadiazon	Parathion, Methyl	Pendimethalin	Phorate	Prometon	Propazine	Propiconazole	Simazine	Tebuconazole	Tebuprimiphos	Terbufos	Tetraconazole	Trifluralin
10	Bevens Creek	BF G	5/13/2009	na	P	ND	P	ND	ND	ND	ND	P	ND	na	P	ND	ND	ND	ND	0.13	ND	ND	ND	ND	ND	na	ND	ND	ND	na	na	ND	na	ND	ND	ND	ND	ND
10	Bevens Creek	BF G	5/27/2009	na	ND	ND	0.05	ND	ND	ND	ND	ND	ND	na	ND	ND	ND	ND	ND	0.16	ND	ND	ND	ND	ND	na	ND	ND	ND	na	na	ND	na	ND	ND	ND	ND	ND
10	Bevens Creek	SF G	6/9/2009	na	P	ND	0.05	ND	ND	ND	ND	P	ND	na	ND	ND	ND	ND	ND	0.08	ND	ND	ND	ND	ND	na	ND	ND	ND	na	na	ND	na	ND	ND	ND	ND	ND
10	Bevens Creek	BF G	6/30/2009	na	ND	ND	P	ND	ND	ND	ND	P	ND	na	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	na	ND	ND	ND	na	na	ND	na	ND	ND	ND	ND	ND
10	Crow River-South Fork-Mayer	BF G	5/15/2009	na	P	ND	P	ND	ND	ND	ND	P	ND	na	ND	ND	ND	ND	ND	P	ND	ND	ND	ND	ND	na	ND	ND	ND	na	na	ND	na	ND	ND	ND	ND	ND
10	Crow River-South Fork-Mayer	BF G	5/27/2009	na	0.05	ND	P	ND	ND	ND	ND	P	ND	na	ND	ND	ND	ND	ND	0.08	ND	ND	ND	ND	ND	na	ND	ND	ND	na	na	ND	na	ND	ND	ND	ND	ND
10	Crow River-South Fork-Mayer	SF G	6/9/2009	na	ND	ND	0.06	ND	ND	ND	ND	P	ND	na	ND	ND	ND	ND	ND	0.08	ND	ND	ND	ND	ND	na	ND	ND	ND	na	na	ND	na	ND	ND	ND	ND	ND
10	Crow River-South Fork-Mayer	SF G	6/18/2009	na	P	ND	0.07	ND	ND	ND	ND	P	ND	na	ND	ND	ND	ND	ND	P	ND	ND	ND	ND	ND	na	ND	ND	ND	na	na	ND	na	ND	ND	ND	ND	ND
10	Sand Creek	BF G	5/13/2009	na	P	ND	P	ND	ND	ND	ND	ND	ND	na	ND	ND	ND	ND	ND	P	ND	ND	ND	ND	ND	na	ND	ND	ND	na	na	ND	na	ND	ND	ND	ND	ND
10	Sand Creek	BF G	5/27/2009	na	ND	ND	0.08	ND	ND	ND	ND	ND	ND	na	ND	ND	ND	ND	ND	P	ND	ND	ND	ND	ND	na	ND	ND	ND	na	na	ND	na	ND	ND	ND	ND	ND
10	Sand Creek	SF G	6/9/2009	na	P	ND	0.08	ND	ND	ND	ND	P	ND	na	ND	ND	ND	ND	ND	0.24	ND	ND	ND	ND	ND	na	ND	ND	ND	na	na	ND	na	ND	ND	ND	ND	ND
10	Sand Creek	BF G	6/30/2009	na	ND	ND	0.05	ND	ND	ND	ND	P	ND	na	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	na	ND	ND	ND	na	na	ND	na	ND	ND	ND	ND	ND
10	Vermillion River-Farmington	BF G	5/14/2009	na	ND	ND	P	ND	ND	ND	ND	P	ND	na	ND	ND	ND	ND	ND	P	ND	ND	ND	ND	ND	na	ND	ND	ND	na	na	ND	na	ND	ND	ND	ND	ND
10	Vermillion River-Farmington	BF G	5/28/2009	na	ND	ND	P	ND	ND	ND	ND	P	ND	na	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	na	ND	ND	ND	na	na	ND	na	ND	ND	ND	ND	ND
10	Vermillion River-Farmington	SF G	6/8/2009	na	P	ND	P	ND	ND	ND	ND	P	ND	na	ND	ND	ND	ND	ND	0.07	ND	ND	ND	ND	ND	na	ND	ND	ND	na	na	ND	na	ND	ND	ND	ND	ND
10	Vermillion River-Farmington	SF G	6/17/2009	na	P	ND	0.11	ND	ND	ND	ND	P	ND	na	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	na	ND	ND	ND	2.24	na	ND	na	ND	ND	ND	ND	ND
Urban	Basset Creek	BF G	5/27/2009	na	ND	ND	ND	ND	ND	ND	ND	ND	ND	na	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	na	ND	ND	ND	na	na	ND	na	ND	ND	ND	ND	ND
Urban	Basset Creek	SF G	6/8/2009	na	P	ND	0.08	ND	ND	ND	ND	ND	ND	na	ND	ND	ND	ND	ND	P	ND	ND	ND	ND	ND	na	ND	ND	ND	na	na	ND	na	ND	ND	ND	ND	ND
Urban	Basset Creek	SF G	6/17/2009	na	ND	ND	0.1	ND	ND	ND	ND	ND	ND	na	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	na	ND	ND	ND	na	na	ND	na	ND	ND	ND	ND	ND
Urban	Basset Creek	BF G	7/15/2009	na	ND	ND	ND	ND	ND	ND	ND	P	ND	na	ND	ND	ND	ND	ND	P	ND	ND	ND	ND	ND	na	ND	ND	ND	na	na	ND	na	ND	ND	ND	ND	ND
Urban	Basset Creek	SF G	7/21/2009	na	ND	ND	ND	ND	ND	ND	ND	ND	ND	na	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	na	ND	ND	ND	0.26	na	ND	na	ND	ND	ND	ND	ND
Urban	Basset Creek	SF G	8/10/2009	na	ND	ND	ND	ND	ND	ND	ND	ND	ND	na	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	na	ND	ND	ND	na	na	ND	na	ND	ND	ND	ND	ND
Urban	Battle Creek	BF G	5/28/2009	0.09	ND	ND	ND	ND	ND	ND	ND	ND	ND	na	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	na	ND	ND	ND	na	na	ND	na	ND	ND	ND	ND	ND
Urban	Battle Creek	SF G	6/8/2009	na	0.08	ND	0.08	ND	ND	ND	ND	ND	ND	na	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	na	ND	ND	ND	na	na	ND	na	ND	ND	ND	ND	ND
Urban	Battle Creek	SF G	6/17/2009	0.22	ND	ND	0.1	ND	ND	ND	ND	ND	ND	P	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	na	ND	ND	ND	na	na	ND	na	ND	ND	ND	ND	ND
Urban	Battle Creek	SF G	7/15/2009	0.14	ND	ND	ND	ND	ND	ND	ND	ND	ND	na	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	na	ND	ND	ND	na	na	ND	na	ND	ND	ND	ND	ND
Urban	Battle Creek	SF G	7/21/2009	0.49	ND	ND	ND	ND	ND	ND	ND	ND	ND	na	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	na	ND	ND	ND	P	na	ND	na	ND	ND	ND	ND	ND
Urban	Battle Creek	SF G	8/7/2009	0.31	ND	ND	ND	ND	ND	ND	ND	ND	ND	na	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	na	ND	ND	ND	na	na	ND	na	ND	ND	ND	ND	ND
Urban	Fish Creek	BF G	5/28/2009	na	ND	ND	ND	ND	ND	ND	ND	ND	ND	na	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	na	ND	ND	ND	na	na	ND	na	ND	ND	ND	ND	ND
Urban	Fish Creek	SF G	6/8/2009	na	P	ND	P	ND	ND	ND	ND	P	ND	na	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	na	ND	ND	ND	na	na	ND	na	ND	ND	ND	ND	ND
Urban	Fish Creek	SF G	6/17/2009	na	ND	ND	P	ND	ND	ND	ND	ND	ND	na	P	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	na	ND	ND	ND	na	na	ND	na	ND	ND	ND	ND	ND
Urban	Fish Creek	SF G	7/15/2009	na	ND	ND	ND	ND	ND	ND	ND	ND	ND	na	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	na	ND	ND	ND	na	na	ND	na	ND	ND	ND	ND	ND
Urban	Fish Creek	SF G	7/21/2009	na	ND	ND	ND	ND	ND	ND	ND	ND	ND	na	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	na	ND	ND	ND	na	na	ND	na	ND	ND	ND	ND	ND
Urban	Fish Creek	SF G	8/7/2009	na	ND	ND	ND	6.8	ND	ND	ND	ND	ND	na	0.1	ND	ND	ND	ND	P	ND	ND	ND	ND	ND	0.25	ND	ND	ND	na	na	ND	na	ND	ND	ND	ND	ND
Urban	Minnehaha Creek	BF G	5/27/2009	na	ND	ND	P	ND	ND	ND	ND	ND	ND	na	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	na	ND	ND	ND	na	na	ND	na	ND	ND	ND	ND	ND
Urban	Minnehaha Creek	SF G	6/8/2009	na	P	ND	0.05	ND	ND	ND	ND	ND	ND	na	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	na	ND	ND	ND	na	na	ND	na	ND	ND	ND	ND	ND
Urban	Minnehaha Creek	SF G	6/17/2009	na	ND	ND	0.06	ND	ND	ND	ND	ND	ND	na	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	na	ND	ND	ND	na	na	ND	na	ND	ND	ND	ND	ND
Urban	Minnehaha Creek	BF G	7/15/2009	na	NA	NA	NA	NA	NA	NA	NA	NA	NA	na	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	na	NA	NA	NA	na	na	NA	NA	NA	NA	NA	NA	NA
Urban	Minnehaha Creek	SF G	7/21/2009	na	ND	ND	ND	ND	ND	ND	ND	ND	ND	na	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	na	ND	ND	ND	na	na	ND	na	ND	ND	ND	ND	ND
Urban	Minnehaha Creek	SF G	8/10/2009	na	ND	ND	P	ND	ND	ND	ND	ND	ND	na	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	na	ND	ND	ND	na	na	ND	na	ND	ND	ND	ND	ND
Urban	Riley Creek	BF G	5/27/2009	na	ND	ND	P	ND	ND	ND	ND	P	ND	na	ND	ND	ND	ND	ND	P	ND	ND	ND	ND	ND	na	ND	ND	ND	na	na	ND	na	ND	ND	ND	ND	ND
Urban	Riley Creek	SF G	6/8/2009	na	ND	ND	0.2	ND	ND	ND	ND	P	ND	na	ND	ND	ND	ND	ND	P	ND	ND	ND	ND	ND	na	ND	ND	ND	na	na	ND	na	ND	ND	ND	ND	ND
Urban	Riley Creek	SF G	6/17/2009	na	ND	ND	P	ND	ND	ND	ND	P	ND	na	ND	ND	ND	ND	ND	P	ND	ND	ND	ND	ND	na	ND	ND	ND	na	na	ND	na	ND	ND	ND	ND	ND
Urban	Riley Creek	BF G	7/15/2009	na	ND	ND	ND	ND	ND	ND	ND	P	ND	na	ND	ND	ND	ND	ND	P	ND	ND	ND	ND	ND	na	ND	ND	ND	na	na	ND	na	ND	ND	ND	ND	ND
Urban	Riley Creek	SF G	7/21/2009	na	ND	ND	P	ND	ND	ND	ND	P	ND	na	ND	ND	ND	ND	ND	P	ND	ND	ND	ND	ND	na	ND	ND	ND	na	na	ND	na	ND	ND	ND	ND	ND
Urban	Riley Creek	SF G	8/10/2009	na	ND	ND	P	ND	ND	ND	ND	P	ND	na	ND	ND	ND	ND	ND	0.16	ND	ND	ND	ND	ND	na	ND	ND	ND	na	na	ND	na	ND	ND	ND	ND	ND

Surface Water Quality Sample Data for Calendar Year 2009: Pesticide Results - Tier 2 Monitoring Sites

				Base Neutral Pesticide Results [υg/L]																																			
Pesticide Monitoring Region	Sample Site	Sample Type	Sample Date	2,6-Dichlorobenzamide	Acetochlor	Alachlor	Atrazine	Boscalid	Chlorpyrifos	Cyanazine	Deisopropylatrazine	Desethylatrazine	Diazinon	Dichlobenil	Dimethenamid	Dimethoate	EPTC	Fonofos	Malathion	Metolachlor	Metribuzin	Metribuzin DA	Metribuzin DADK	Metribuzin DK	Myclobutanil	Oxadiazon	Parathion, Methyl	Pendimethalin	Phorate	Prometon	Propazine	Propiconazole	Simazine	Tebuconazole	Tebuprimiphos	Terbufos	Tetraconazole	Trifluralin
1	Bois de Sioux River	BF G	5/13/2009	na	0.05	ND	0.05	ND	ND	ND	ND	P	ND	na	ND	ND	ND	ND	ND	P	ND	ND	ND	ND	ND	na	ND	ND	ND	na	na	ND	na	ND	ND	ND	ND	ND
1	Bois de Sioux River	BF G	6/4/2009	na	P	ND	P	ND	ND	ND	ND	P	ND	na	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	na	ND	ND	ND	na	na	ND	na	ND	ND	ND	ND	ND
1	Bois de Sioux River	BF G	6/15/2009	na	P	ND	P	ND	ND	ND	ND	P	ND	na	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	na	ND	ND	ND	na	na	ND	na	ND	ND	ND	ND	ND
1	Bois de Sioux River	SF G	5/26/2009	na	0.06	ND	0.06	ND	ND	ND	ND	0.05	ND	na	ND	ND	ND	ND	ND	P	ND	ND	ND	ND	ND	na	ND	ND	ND	na	na	ND	na	ND	ND	ND	ND	ND
1	Bois de Sioux River	SF G	5/29/2009	na	P	ND	0.06	ND	ND	ND	ND	P	ND	na	ND	ND	ND	ND	ND	P	ND	ND	ND	ND	ND	na	ND	ND	ND	na	na	ND	na	ND	ND	ND	ND	ND
1	Snake River	BF G	5/20/2009	na	ND	ND	ND	ND	ND	ND	ND	ND	ND	na	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	na	ND	ND	ND	na	na	ND	na	ND	ND	ND	ND	ND
1	Snake River	BF G	6/9/2009	na	ND	ND	P	ND	ND	ND	ND	P	ND	na	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	na	ND	ND	ND	na	na	ND	na	ND	ND	ND	ND	ND
1	Snake River	BF G	6/25/2009	na	ND	ND	ND	ND	ND	ND	ND	ND	ND	na	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	na	ND	ND	ND	na	na	ND	na	ND	ND	ND	ND	ND
1	Snake River	SF G	5/26/2009	na	ND	ND	P	ND	ND	ND	ND	ND	ND	na	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	na	ND	ND	ND	na	na	ND	na	ND	ND	ND	ND	ND
1	Snake River	SF G	5/28/2009	na	ND	ND	P	ND	ND	ND	ND	ND	ND	na	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	na	ND	ND	ND	na	na	ND	na	ND	ND	ND	ND	ND
4	Little Rock Creek-Rice	BF G	5/13/2009	na	0.07	ND	P	ND	ND	ND	ND	P	ND	na	ND	ND	ND	ND	ND	P	ND	ND	P	ND	ND	na	ND	ND	ND	na	na	ND	na	ND	ND	ND	ND	ND
4	Little Rock Creek-Rice	BF G	5/28/2009	na	ND	ND	P	ND	ND	ND	ND	P	ND	na	ND	ND	ND	ND	ND	ND	ND	ND	P	ND	ND	na	ND	ND	ND	na	na	ND	na	ND	ND	ND	ND	ND
4	Little Rock Creek-Rice	BF G	6/9/2009	na	ND	ND	P	ND	ND	ND	ND	P	ND	na	ND	ND	ND	ND	ND	P	ND	ND	ND	ND	ND	na	ND	ND	ND	na	na	ND	na	ND	ND	ND	ND	ND
4	Little Rock Creek-Rice	SF G	6/16/2009	na	P	ND	P	ND	ND	ND	ND	P	ND	na	ND	ND	ND	ND	ND	P	ND	ND	ND	ND	ND	na	ND	ND	ND	na	na	ND	na	ND	ND	ND	ND	ND
4	Little Rock Creek-Rice	SF G	6/18/2009	na	ND	ND	P	ND	ND	ND	ND	0.05	ND	na	ND	ND	ND	ND	ND	P	P	ND	P	ND	ND	na	ND	ND	ND	na	na	ND	na	ND	ND	ND	ND	ND
7	Pipestone Creek	BF G	5/13/2009	na	P	ND	P	ND	ND	ND	ND	P	ND	na	ND	ND	ND	ND	ND	0.78	ND	ND	ND	ND	ND	na	ND	ND	ND	na	na	ND	na	ND	ND	ND	ND	ND
7	Pipestone Creek	BF G	5/28/2009	na	P	ND	P	ND	ND	ND	ND	P	ND	na	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	na	ND	ND	ND	na	na	ND	na	ND	ND	ND	ND	ND
7	Pipestone Creek	BF G	6/30/2009	na	ND	ND	P	ND	ND	ND	ND	P	ND	na	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	na	ND	ND	ND	na	na	ND	na	ND	ND	ND	ND	ND
7	Pipestone Creek	BF G	6/15/2009	na	0.08	ND	0.26	ND	ND	ND	ND	P	ND	na	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	na	ND	ND	ND	na	na	ND	na	ND	ND	ND	ND	ND
8	Dutch Creek	BF G	5/5/2009	na	0.12	ND	P	ND	ND	ND	ND	P	ND	na	ND	ND	ND	ND	ND	0.07	ND	ND	ND	ND	ND	na	ND	ND	ND	na	na	ND	na	ND	ND	ND	ND	ND
8	Dutch Creek	BF G	5/7/2009	na	0.1	ND	P	ND	ND	ND	ND	P	ND	na	ND	ND	ND	ND	ND	P	ND	ND	ND	ND	ND	na	ND	ND	ND	na	na	ND	na	ND	ND	ND	ND	ND
8	Dutch Creek	BF G	5/27/2009	na	P	ND	P	ND	ND	ND	ND	P	ND	na	ND	ND	ND	ND	ND	P	ND	ND	ND	ND	ND	na	ND	ND	ND	na	na	ND	na	ND	ND	ND	ND	ND
8	Dutch Creek	BF G	5/29/2009	na	P	ND	P	ND	ND	ND	ND	P	ND	na	ND	ND	ND	ND	ND	P	ND	ND	ND	ND	ND	na	ND	ND	ND	na	na	ND	na	ND	ND	ND	ND	ND
8	Dutch Creek	BF G	6/10/2009	na	P	ND	P	ND	ND	ND	ND	P	ND	na	ND	ND	ND	ND	ND	P	ND	ND	ND	ND	ND	na	ND	ND	ND	na	na	ND	na	ND	ND	ND	ND	ND
8	Dutch Creek	BF G	6/12/2009	na	P	ND	P	ND	ND	ND	ND	P	ND	na	ND	ND	ND	ND	ND	P	ND	ND	ND	ND	ND	na	ND	ND	ND	na	na	ND	na	ND	ND	ND	ND	ND
8	Dutch Creek	BF G	7/1/2009	na	ND	ND	P	ND	ND	ND	ND	P	ND	na	ND	ND	ND	ND	ND	P	ND	ND	ND	ND	ND	na	ND	ND	ND	na	na	ND	na	ND	ND	ND	ND	ND
8	Jack Creek	BF G	5/1/2009	na	P	ND	P	ND	ND	ND	ND	P	ND	na	ND	ND	ND	ND	ND	P	ND	ND	ND	ND	ND	na	ND	ND	ND	na	na	ND	na	ND	ND	ND	ND	ND
8	Jack Creek	BF G	5/31/2009	na	P	ND	0.05	ND	ND	ND	ND	P	ND	na	ND	ND	ND	ND	ND	0.18	ND	ND	ND	ND	ND	na	ND	ND	ND	na	na	ND	na	ND	ND	ND	ND	ND
8	Jack Creek	BF G	6/12/2009	na	0.07	ND	0.1	ND	ND	ND	ND	P	ND	na	P	ND	ND	ND	ND	P	ND	ND	ND	ND	ND	na	ND	ND	ND	na	na	ND	na	ND	ND	ND	ND	ND
8	Jack Creek	BF G	6/26/2009	na	P	ND	0.06	ND	ND	ND	ND	P	ND	na	ND	ND	ND	ND	ND	P	ND	ND	ND	ND	ND	na	ND	ND	ND	na	na	ND	na	ND	ND	ND	ND	ND
8	Jack Creek	SF G	6/8/2009	na	0.05	ND	0.07	ND	ND	ND	ND	P	ND	na	0.06	ND	ND	ND	ND	P	ND	ND	ND	ND	ND	na	ND	ND	ND	na	na	ND	na	ND	ND	ND	ND	ND
8	Jack Creek	SF G	6/22/2009	na	0.1	ND	0.21	ND	ND	ND	ND	P	ND	na	0.06	ND	ND	ND	ND	0.09	ND	ND	ND	ND	ND	na	ND	ND	ND	na	na	ND	na	ND	ND	ND	ND	ND
9	Root River-South Fork	BF G	2/4/2009	na	ND	ND	P	ND	ND	ND	ND	0.09	ND	na	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	na	ND	ND	ND	na	na	ND	na	ND	ND	ND	ND	ND
9	Root River-South Fork	BF G	5/13/2009	na	P	ND	0.06	ND	ND	ND	P	0.07	ND	na	ND	ND	ND	ND	ND	P	ND	ND	ND	ND	ND	na	ND	ND	ND	na	na	ND	na	ND	ND	ND	ND	ND
9	Root River-South Fork	BF G	6/25/2009	na	ND	ND	0.58	ND	ND	ND	P	0.19	ND	na	ND	ND	ND	ND	ND	1.42	ND	ND	ND	ND	ND	na	ND	ND	ND	na	na	ND	na	ND	ND	ND	ND	ND
9	Root River-South Fork	SF G	5/27/2009	na	ND	ND	0.07	ND	ND	ND	ND	0.08	ND	na	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	na	ND	ND	ND	na	na	ND	na	ND	ND	ND	ND	ND
9	Root River-South Fork	SF G	6/8/2009	na	0.32	ND	0.19	ND	ND	ND	P	0.12	ND	na	ND	ND	ND	ND	ND	0.43	ND	ND	ND	ND	ND	na	ND	ND	ND	na	na	ND	na	ND	ND	ND	ND	ND
9	Root River-South Fork	SF G	6/10/2009	na	P	ND	0.08	ND	ND	ND	ND	0.09	ND	na	ND	ND	ND	ND	ND	P	ND	ND	ND	ND	ND	na	ND	ND	ND	na	na	ND	na	ND	ND	ND	ND	ND
9	Whitewater River-South Branch	BF G	2/4/2009	na	ND	ND	0.07	ND	ND	ND	ND	0.11	ND	na	ND	ND	ND	ND	ND	P	ND	ND	ND	ND	ND	na	ND	ND	ND	na	na	ND	na	ND	ND	ND	ND	ND
9	Whitewater River-South Branch	BF G	5/14/2009	na	P	ND	0.07	ND	ND	ND	P	0.09	ND	na	ND	ND	ND	ND	ND	1.44	ND	ND	ND	ND	ND	na	ND	ND	ND	na	na	ND	na	ND	ND	ND	ND	ND
9	Whitewater River-South Branch	BF G	5/27/2009	na	ND	ND	0.08	ND	ND	ND	ND	0.1	ND	na	ND	ND	ND	ND	ND	P	ND	ND	ND	ND	ND	na	ND	ND	ND	na	na	ND	na	ND	ND	ND	ND	ND
9	Whitewater River-South Branch	BF G	6/8/2009	na	0.14	ND	0.09	ND	ND	ND	ND	0.09	ND	na	P	ND	ND	ND	ND	0.08	ND	ND	ND	ND	ND	na	ND	ND	ND	na	na	ND	na	ND	ND	ND	ND	ND
9	Whitewater River-South Branch	BF G	6/25/2009	na	ND	ND	0.06	ND	ND	ND	P	0.07	ND	na	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	na	ND	ND	ND	na	na	ND	na	ND	ND	ND	ND	ND

Surface Water Quality Sample Data for Calendar Year 2009: Pesticide Results - Tier 2 Monitoring Sites

				Base Neutral Pesticide Results [ug/L]																																			
Pesticide Monitoring Region	Sample Site	Sample Type	Sample Date	2,6-Dichlorobenzamide	Acetochlor	Alachlor	Atrazine	Boscalid	Chlorpyrifos	Cyanazine	Deisopropylatrazine	Desethylatrazine	Diazinon	Dichlobenil	Dimethenamid	Dimethoate	EPTC	Fonofos	Malathion	Metolachlor	Metribuzin	Metribuzin DA	Metribuzin DADK	Metribuzin DK	Myclobutanil	Oxadiazon	Parathion, Methyl	Pendimethalin	Phorate	Prometon	Propazine	Propiconazole	Simazine	Tebuconazole	Tebuprimiphos	Terbufos	Tetraconazole	Trifluralin
10	Silver Creek-CR41	BF G	5/15/2009	na	0.05	ND	P	ND	ND	ND	ND	P	ND	na	ND	ND	ND	ND	ND	0.17	ND	ND	ND	ND	ND	na	ND	ND	ND	na	na	ND	na	ND	ND	ND	ND	ND
10	Silver Creek-CR41	BF G	5/27/2009	na	P	ND	P	ND	ND	ND	ND	P	ND	na	ND	ND	ND	ND	ND	P	ND	ND	ND	ND	ND	na	ND	ND	ND	na	na	ND	na	ND	ND	ND	ND	ND
10	Silver Creek-CR41	BF G	6/11/2009	na	P	ND	0.1	ND	ND	ND	ND	P	ND	na	ND	ND	ND	ND	ND	0.13	ND	ND	ND	ND	ND	na	ND	ND	ND	P	na	ND	na	ND	ND	ND	ND	ND
10	Silver Creek-CR41	BF G	6/18/2009	na	ND	ND	0.05	ND	ND	ND	ND	P	ND	na	ND	ND	ND	ND	ND	P	ND	ND	ND	ND	ND	na	ND	ND	ND	P	na	ND	na	ND	ND	ND	ND	ND
10	Silver Creek-CR41	SF G	6/8/2009	na	P	ND	0.07	ND	ND	ND	ND	P	ND	na	ND	ND	ND	ND	ND	P	ND	ND	ND	ND	ND	na	ND	ND	ND	na	na	ND	na	ND	ND	ND	ND	ND
10	Silver Creek-CR41	SF G	6/10/2009	na	0.08	ND	0.5	ND	ND	ND	ND	P	ND	na	ND	ND	ND	ND	ND	0.72	ND	ND	ND	ND	ND	na	ND	ND	ND	na	na	ND	na	ND	ND	ND	ND	ND
10	Silver Creek-CR41	SF G	6/17/2009	na	ND	ND	0.06	ND	ND	ND	ND	P	ND	na	ND	ND	ND	ND	ND	P	ND	ND	ND	ND	ND	na	ND	ND	ND	P	na	ND	na	ND	ND	ND	ND	ND
Urban	Nine Mile Creek	BF G	5/27/2009	na	ND	ND	ND	ND	ND	ND	ND	ND	ND	na	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	na	ND	ND	ND	na	na	ND	na	ND	ND	ND	ND	ND
Urban	Nine Mile Creek	BF G	6/10/2009	na	ND	ND	P	ND	ND	ND	ND	ND	ND	na	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	na	ND	ND	ND	na	na	ND	na	ND	ND	ND	ND	ND
Urban	Nine Mile Creek	BF G	6/29/2009	na	ND	ND	0.06	ND	ND	ND	ND	ND	ND	na	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	na	ND	ND	ND	na	na	ND	na	ND	ND	ND	ND	ND
Urban	Nine Mile Creek	BF G	7/15/2009	na	ND	ND	ND	ND	ND	ND	ND	P	ND	na	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	na	ND	ND	ND	na	na	ND	na	ND	ND	ND	ND	ND
Urban	Nine Mile Creek	BF G	7/23/2009	na	ND	ND	P	ND	ND	ND	ND	ND	ND	na	ND	ND	ND	ND	ND	0.07	ND	ND	ND	ND	ND	na	ND	ND	ND	na	na	ND	na	ND	ND	ND	ND	ND
Urban	Nine Mile Creek	SF G	6/8/2009	na	P	ND	0.05	ND	ND	ND	ND	ND	ND	na	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	na	ND	ND	ND	na	na	ND	na	ND	ND	ND	ND	ND
Urban	Nine Mile Creek	SF G	7/21/2009	na	ND	ND	ND	ND	ND	ND	ND	ND	ND	na	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	na	ND	ND	ND	na	na	ND	na	ND	ND	ND	ND	ND
Urban	Nine Mile Creek	SF G	8/7/2009	na	ND	ND	ND	ND	ND	ND	ND	ND	ND	na	ND	ND	ND	ND	ND	0.11	ND	ND	ND	ND	ND	na	ND	ND	ND	na	na	ND	na	ND	ND	ND	ND	ND
Urban	Nine Mile Creek	SF G	8/11/2009	na	ND	ND	ND	ND	ND	ND	ND	ND	ND	na	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	na	ND	ND	ND	na	na	ND	na	ND	ND	ND	ND	ND
Urban	Nine Mile Creek	EFI	8/7/2009	na	ND	ND	ND	ND	ND	ND	ND	ND	ND	na	ND	ND	ND	ND	ND	0.1	ND	ND	ND	ND	ND	na	ND	ND	ND	na	na	ND	na	ND	ND	ND	ND	ND

Surface Water Quality Sample Data for Calendar Year 2009: Pesticide Results - Tier 3 Monitoring Sites

				Base Neutral Pesticide Results [ug/L]																																			
Pesticide Monitoring Region	Sample Site	Sample Type	Sample Date	2,6-Dichlorobenzamide	Acetochlor	Alachlor	Atrazine	Boscalid	Chlorpyrifos	Cyanazine	Deisopropylatrazine	Desethylatrazine	Diazinon	Dichlobenil	Dimethenamid	Dimethoate	EPTC	Fonofos	Malathion	Metolachlor	Metribuzin	Metribuzin DA	Metribuzin DADK	Metribuzin DK	Myclobutanil	Oxadiazon	Parathion, Methyl	Pendimethalin	Phorate	Prometon	Propazine	Propiconazole	Simazine	Tebuconazole	Tebuprimiphos	Terbufos	Tetraconazole	Trifluralin
1	Buffalo River-Dilworth	SF G	3/24/2009	na	ND	ND	ND	ND	ND	ND	ND	P	ND	na	ND	ND	ND	ND	ND	P	ND	ND	ND	ND	ND	na	ND	ND	ND	na	na	ND	na	ND	ND	ND	P	ND
1	Buffalo River-Dilworth	SF G	4/21/2009	na	ND	ND	ND	ND	ND	ND	ND	ND	ND	na	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	na	ND	ND	ND	na	na	ND	na	ND	ND	ND	ND	ND
1	Buffalo River-Dilworth	SF G	5/11/2009	na	ND	ND	P	ND	ND	ND	ND	P	ND	na	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	na	ND	ND	ND	na	na	ND	na	ND	ND	ND	ND	ND
1	Buffalo River-Dilworth	SF G	5/20/2009	na	P	ND	P	ND	ND	ND	ND	P	ND	na	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	na	ND	ND	ND	na	na	ND	na	ND	ND	ND	ND	ND
1	Buffalo River-Dilworth	SF G	5/28/2009	na	0.44	ND	0.88	ND	ND	ND	ND	0.05	ND	na	ND	ND	ND	ND	ND	1.47	ND	ND	ND	ND	ND	na	ND	ND	ND	na	na	ND	na	ND	ND	ND	ND	ND
1	Buffalo River-Dilworth	SF G	5/29/2009	na	0.06	ND	0.09	ND	ND	ND	ND	P	ND	na	ND	ND	ND	ND	ND	0.08	ND	ND	ND	ND	ND	na	ND	ND	ND	na	na	ND	na	ND	ND	ND	ND	ND
1	Buffalo River-Dilworth	SF G	6/1/2009	na	0.28	ND	0.06	ND	ND	ND	ND	P	ND	na	ND	ND	ND	ND	ND	P	ND	ND	ND	ND	ND	na	ND	ND	ND	na	na	ND	na	ND	ND	ND	ND	ND
1	Buffalo River-Dilworth	SF G	6/4/2009	na	P	ND	0.22	ND	ND	ND	ND	P	ND	na	ND	ND	ND	ND	ND	0.31	ND	ND	ND	ND	ND	na	ND	ND	ND	na	na	ND	na	ND	ND	ND	ND	ND
1	Buffalo River-Dilworth	SF G	6/10/2009	na	ND	ND	P	ND	ND	ND	ND	P	ND	na	ND	ND	ND	ND	ND	P	ND	ND	ND	ND	ND	na	ND	ND	ND	na	na	ND	na	ND	ND	ND	ND	ND
1	Buffalo River-Dilworth	SF G	6/18/2009	na	ND	ND	0.05	ND	ND	ND	ND	P	ND	na	ND	ND	ND	ND	ND	P	ND	ND	ND	ND	ND	na	ND	ND	ND	na	na	ND	na	ND	ND	ND	ND	ND
1	Buffalo River-Dilworth	SF G	6/20/2009	na	0.13	ND	0.37	ND	ND	ND	ND	0.05	ND	na	0.33	ND	ND	ND	ND	0.11	0.12	ND	ND	ND	ND	na	ND	ND	ND	na	na	P	na	ND	ND	ND	P	ND
1	Buffalo River-Dilworth	SF G	6/22/2009	na	0.25	ND	0.48	ND	ND	ND	ND	0.05	ND	na	0.16	ND	ND	ND	ND	0.3	P	ND	ND	ND	ND	na	ND	ND	ND	na	na	P	na	ND	ND	ND	P	ND
1	Buffalo River-Dilworth	SF G	6/24/2009	na	0.29	ND	0.32	ND	ND	ND	ND	0.05	ND	na	0.12	ND	ND	ND	ND	0.23	P	ND	ND	ND	ND	na	ND	ND	ND	na	na	P	na	ND	ND	ND	P	ND
1	Buffalo River-Dilworth	SF G	6/25/2009	na	0.34	ND	0.25	ND	ND	ND	ND	0.05	ND	na	0.11	ND	ND	ND	ND	0.22	ND	ND	ND	ND	ND	na	ND	ND	ND	na	na	P	na	ND	ND	ND	P	ND
1	Buffalo River-Dilworth	SF G	6/29/2009	na	0.16	ND	0.15	ND	ND	ND	ND	P	ND	na	0.09	ND	ND	ND	ND	0.12	ND	ND	ND	ND	ND	na	ND	ND	ND	na	na	ND	na	ND	ND	ND	ND	ND
1	Buffalo River-Dilworth	SF G	7/1/2009	na	0.08	ND	0.12	ND	ND	ND	ND	P	ND	na	P	ND	ND	ND	ND	0.08	P	ND	ND	ND	ND	na	ND	ND	ND	na	na	ND	na	ND	ND	ND	ND	ND
1	Buffalo River-Dilworth	BF G	7/6/2009	na	P	ND	0.07	ND	ND	ND	ND	P	ND	na	ND	ND	ND	ND	ND	P	ND	ND	ND	ND	ND	na	ND	ND	ND	na	na	ND	na	ND	ND	ND	ND	ND
1	Buffalo River-Dilworth	BF G	7/30/2009	na	ND	ND	0.12	ND	ND	ND	ND	0.05	ND	na	ND	ND	ND	ND	ND	P	ND	ND	ND	ND	ND	na	ND	ND	ND	na	na	ND	na	ND	ND	ND	ND	ND
1	Buffalo River-Dilworth	SF G	8/20/2009	na	ND	ND	P	ND	ND	ND	ND	ND	ND	na	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	na	ND	ND	ND	na	na	ND	na	ND	ND	ND	ND	ND
1	Buffalo River-Dilworth	SF G	8/25/2009	na	ND	ND	0.06	ND	ND	ND	ND	P	ND	na	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	na	ND	ND	ND	na	na	ND	na	ND	ND	ND	ND	ND
1	Buffalo River-Dilworth	BF G	9/3/2009	na	ND	ND	P	ND	P	ND	ND	P	ND	na	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	na	ND	ND	ND	na	na	ND	na	ND	ND	ND	ND	ND
1	Buffalo River-Dilworth	SF G	10/7/2009	na	ND	ND	P	ND	ND	ND	ND	ND	ND	na	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	na	ND	ND	ND	na	na	ND	na	ND	ND	ND	ND	ND
1	Buffalo River-Dilworth	SF G	10/22/2009	na	ND	ND	ND	ND	ND	ND	ND	ND	ND	na	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	na	ND	ND	ND	na	na	ND	na	ND	ND	ND	ND	ND
1	Buffalo River-Dilworth	SF G	11/6/2009	na	ND	ND	ND	ND	ND	ND	ND	ND	ND	na	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	na	ND	ND	ND	na	na	ND	na	ND	ND	ND	ND	ND
1	Buffalo River-Dilworth	SF G	11/12/2009	na	ND	ND	ND	ND	ND	ND	ND	ND	ND	na	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	na	ND	ND	ND	na	na	ND	na	ND	ND	ND	ND	ND
1	Buffalo River-Dilworth	BF G	11/25/2009	na	ND	ND	ND	ND	ND	ND	ND	ND	ND	na	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	na	ND	ND	ND	na	na	ND	na	ND	ND	ND	ND	ND
8	Beauford Ditch	SF G	2/11/2009	na	P	ND	ND	ND	ND	ND	ND	ND	ND	na	P	ND	ND	ND	ND	76	ND	ND	ND	ND	ND	na	ND	ND	ND	na	na	ND	na	ND	ND	ND	ND	ND
8	Beauford Ditch	BF G	4/23/2009	na	P	ND	ND	ND	ND	ND	ND	ND	ND	na	P	ND	ND	ND	ND	0.32	ND	ND	ND	ND	ND	na	ND	ND	ND	na	na	ND	na	ND	ND	ND	ND	ND
8	Beauford Ditch	SF G	4/27/2009	na	0.07	ND	P	ND	ND	ND	ND	ND	ND	na	0.06	ND	ND	ND	ND	0.35	ND	ND	ND	ND	ND	na	ND	ND	ND	na	na	ND	na	ND	ND	ND	ND	ND
8	Beauford Ditch	BF G	5/5/2009	na	P	ND	P	ND	ND	ND	ND	P	ND	na	ND	ND	ND	ND	ND	0.16	ND	ND	ND	ND	ND	na	ND	ND	ND	na	na	ND	na	ND	ND	ND	ND	ND
8	Beauford Ditch	ETI	5/6/2009	na	0.43	ND	0.08	ND	ND	ND	ND	ND	ND	na	P	ND	ND	ND	ND	0.14	ND	ND	ND	ND	ND	na	ND	ND	ND	na	na	ND	na	ND	ND	ND	ND	ND
8	Beauford Ditch	SF G	5/7/2009	na	0.18	ND	P	ND	ND	ND	ND	P	ND	na	P	ND	ND	ND	ND	0.1	ND	ND	ND	ND	ND	na	ND	ND	ND	na	na	ND	na	ND	ND	ND	ND	ND
8	Beauford Ditch	SF G	5/11/2009	na	P	ND	P	ND	ND	ND	ND	P	ND	na	P	ND	ND	ND	ND	0.1	ND	ND	ND	ND	ND	na	ND	ND	ND	na	na	ND	na	ND	ND	ND	ND	ND
8	Beauford Ditch	BF G	5/29/2009	na	ND	ND	P	ND	ND	ND	ND	ND	ND	na	ND	ND	ND	ND	ND	0.12	ND	ND	ND	ND	ND	na	ND	ND	ND	na	na	ND	na	ND	ND	ND	ND	ND
8	Beauford Ditch	BF G	6/8/2009	na	P	ND	P	ND	ND	ND	ND	P	ND	na	ND	ND	ND	ND	ND	0.11	ND	ND	ND	ND	ND	na	ND	ND	ND	na	na	ND	na	ND	ND	ND	ND	ND
8	Beauford Ditch	BF G	6/10/2009	na	P	ND	P	ND	ND	ND	ND	P	ND	na	ND	ND	ND	ND	ND	0.19	ND	ND	ND	ND	ND	na	ND	ND	ND	na	na	ND	na	ND	ND	ND	ND	ND
8	Beauford Ditch	BF G	6/29/2009	na	ND	ND	P	ND	ND	ND	ND	P	ND	na	ND	ND	ND	ND	ND	P	ND	ND	ND	ND	ND	na	ND	ND	ND	na	na	ND	na	ND	ND	ND	ND	ND
8	Beauford Ditch	BF G	10/7/2009	na	0.06	ND	ND	ND	ND	ND	ND	ND	ND	na	P	ND	ND	ND	ND	0.09	ND	ND	ND	ND	ND	na	ND	ND	ND	na	na	ND	na	ND	ND	ND	ND	ND
8	Beauford Ditch	SF G	10/30/2009	na	ND	ND	ND	ND	ND	ND	ND	P	ND	na	P	ND	ND	ND	ND	P	ND	ND	ND	ND	ND	na	ND	ND	ND	na	na	ND	na	ND	ND	ND	ND	ND

Surface Water Quality Sample Data for Calendar Year 2009: Pesticide Results - Tier 3 Monitoring Sites

				Base Neutral Pesticide Results [ug/L]																																			
Pesticide Monitoring Region	Sample Site	Sample Type	Sample Date	2,6-Dichlorobenzamide	Acetochlor	Alachlor	Atrazine	Boscalid	Chlorpyrifos	Cyanazine	Deisopropylatrazine	Desethylatrazine	Diazinon	Dichlobenil	Dimethenamid	Dimethoate	EPTC	Fonofos	Malathion	Metolachlor	Metribuzin	Metribuzin DA	Metribuzin DADK	Metribuzin DK	Myclobutanil	Oxadiazon	Parathion, Methyl	Pendimethalin	Phorate	Prometon	Propazine	Propiconazole	Simazine	Tebuconazole	Tebuprimiphos	Terbufos	Tetraconazole	Trifluralin
8	LeSueur River-Hwy 66	BF G	1/30/2009	na	ND	ND	ND	ND	ND	ND	ND	ND	ND	na	ND	ND	ND	ND	ND	P	ND	ND	ND	ND	ND	na	ND	ND	ND	na	na	ND	na	ND	ND	ND	ND	ND
8	LeSueur River-Hwy 66	SF G	2/11/2009	na	P	ND	ND	ND	ND	ND	ND	ND	ND	na	P	ND	ND	ND	ND	9.44	ND	ND	ND	ND	ND	na	ND	ND	ND	na	na	ND	na	ND	ND	ND	ND	ND
8	LeSueur River-Hwy 66	BF G	4/24/2009	na	P	ND	ND	ND	ND	ND	ND	ND	ND	na	ND	ND	ND	ND	ND	P	ND	ND	ND	ND	ND	na	ND	ND	ND	na	na	ND	na	ND	ND	ND	ND	ND
8	LeSueur River-Hwy 66	BF G	5/5/2009	na	0.08	ND	P	ND	ND	ND	ND	P	ND	na	ND	ND	ND	ND	ND	0.11	ND	ND	ND	ND	ND	na	ND	ND	ND	na	na	ND	na	ND	ND	ND	ND	ND
8	LeSueur River-Hwy 66	ETI	5/5/2009	na	0.19	ND	P	ND	ND	ND	ND	P	ND	na	P	ND	ND	ND	ND	0.07	ND	ND	ND	ND	ND	na	ND	ND	ND	na	na	ND	na	ND	ND	ND	ND	ND
8	LeSueur River-Hwy 66	SF G	5/7/2009	na	0.43	ND	P	ND	ND	ND	ND	P	ND	na	P	ND	ND	ND	ND	0.09	ND	ND	ND	ND	ND	na	ND	ND	ND	na	na	ND	na	ND	ND	ND	ND	ND
8	LeSueur River-Hwy 66	ETI	5/8/2009	na	0.37	ND	P	ND	ND	ND	ND	P	ND	na	P	ND	ND	ND	ND	0.14	ND	ND	ND	ND	ND	na	ND	ND	ND	na	na	ND	na	ND	ND	ND	ND	ND
8	LeSueur River-Hwy 66	BF G	6/1/2009	na	P	ND	P	ND	ND	ND	ND	P	ND	na	ND	ND	ND	ND	ND	P	ND	ND	ND	ND	ND	na	ND	ND	ND	na	na	ND	na	ND	ND	ND	ND	ND
8	LeSueur River-Hwy 66	SF G	6/8/2009	na	0.05	ND	0.05	ND	ND	ND	ND	P	ND	na	ND	ND	ND	ND	ND	0.08	ND	ND	ND	ND	ND	na	ND	ND	ND	na	na	ND	na	ND	ND	ND	ND	ND
8	LeSueur River-Hwy 66	ETI	6/8/2009	na	0.16	ND	0.16	ND	ND	ND	ND	P	ND	na	P	ND	ND	ND	ND	0.1	ND	ND	ND	ND	ND	na	ND	ND	ND	na	na	ND	na	ND	ND	ND	ND	ND
8	LeSueur River-Hwy 66	SF G	6/15/2009	na	0.06	ND	0.08	ND	ND	ND	ND	P	ND	na	P	ND	ND	ND	ND	0.07	ND	ND	ND	ND	ND	na	ND	ND	ND	na	na	ND	na	ND	ND	ND	ND	ND
8	LeSueur River-Hwy 66	ETI	6/15/2009	na	P	ND	0.06	ND	ND	ND	ND	P	ND	na	P	ND	ND	ND	ND	P	ND	ND	ND	ND	ND	na	ND	ND	ND	na	na	ND	na	ND	ND	ND	ND	ND
8	LeSueur River-Hwy 66	ETI	6/19/2009	na	0.08	ND	0.1	ND	ND	ND	ND	P	ND	na	P	ND	ND	ND	ND	0.1	ND	ND	ND	ND	ND	na	ND	ND	ND	na	na	ND	na	ND	ND	ND	ND	ND
8	LeSueur River-Hwy 66	EFI	6/23/2009	na	0.4	ND	0.24	ND	ND	ND	ND	0.05	ND	na	0.05	ND	ND	ND	ND	0.26	ND	ND	ND	ND	ND	na	ND	ND	ND	na	na	ND	na	ND	ND	ND	ND	ND
8	LeSueur River-Hwy 66	SF G	6/24/2009	na	0.47	ND	0.29	ND	ND	ND	ND	P	ND	na	0.06	ND	ND	ND	ND	0.44	P	ND	ND	ND	ND	na	ND	ND	ND	na	na	ND	na	ND	ND	ND	ND	ND
8	LeSueur River-Hwy 66	ETI	6/24/2009	na	0.37	ND	0.2	ND	ND	ND	ND	0.05	ND	na	P	ND	ND	ND	ND	0.22	ND	ND	ND	ND	ND	na	ND	ND	ND	na	na	ND	na	ND	ND	ND	ND	ND
8	LeSueur River-Hwy 66	BF G	7/29/2009	na	ND	ND	P	ND	ND	ND	ND	P	ND	na	ND	ND	ND	ND	ND	P	ND	ND	ND	ND	ND	na	ND	ND	ND	na	na	ND	na	ND	ND	ND	ND	ND
8	LeSueur River-Hwy 66	BF G	8/26/2009	na	ND	ND	P	ND	ND	ND	ND	ND	ND	na	ND	ND	ND	ND	ND	P	ND	ND	ND	ND	ND	na	ND	ND	ND	na	na	ND	na	ND	ND	ND	ND	ND
8	LeSueur River-Hwy 66	BF G	10/7/2009	na	ND	ND	ND	ND	ND	ND	ND	ND	ND	na	ND	ND	ND	ND	ND	P	ND	ND	ND	ND	ND	na	ND	ND	ND	P	na	ND	na	ND	ND	ND	ND	ND
8	LeSueur River-Hwy 66	SF G	11/2/2009	na	P	ND	P	ND	ND	ND	ND	P	ND	na	ND	ND	ND	ND	ND	P	ND	ND	ND	ND	ND	na	ND	ND	ND	na	na	ND	na	ND	ND	ND	ND	ND
8	Seven Mile Creek #3	BF G	1/30/2009	na	ND	ND	P	ND	ND	ND	ND	0.05	ND	na	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	na	ND	ND	ND	na	na	ND	na	ND	ND	ND	ND	ND
8	Seven Mile Creek #3	SF G	2/11/2009	na	ND	ND	P	ND	ND	ND	ND	P	ND	na	P	ND	ND	ND	ND	0.1	ND	ND	ND	ND	ND	na	ND	ND	ND	na	na	ND	na	ND	ND	ND	ND	ND
8	Seven Mile Creek #3	BF G	4/23/2009	na	ND	ND	ND	ND	ND	ND	ND	P	ND	na	ND	ND	ND	ND	ND	P	ND	ND	ND	ND	ND	na	ND	ND	ND	na	na	ND	na	ND	ND	ND	ND	ND
8	Seven Mile Creek #3	BF G	5/5/2009	na	0.05	ND	P	ND	ND	ND	ND	P	ND	na	ND	ND	ND	ND	ND	P	ND	ND	ND	ND	ND	na	ND	ND	ND	na	na	ND	na	ND	ND	ND	ND	ND
8	Seven Mile Creek #3	BF G	5/14/2009	na	P	ND	P	ND	ND	ND	ND	P	ND	na	ND	ND	ND	ND	ND	P	ND	ND	ND	ND	ND	na	ND	ND	ND	na	na	ND	na	ND	ND	ND	ND	ND
8	Seven Mile Creek #3	BF G	5/29/2009	na	0.07	ND	P	ND	ND	ND	ND	P	ND	na	ND	ND	ND	ND	ND	P	ND	ND	ND	ND	ND	na	ND	ND	ND	na	na	ND	na	ND	ND	ND	ND	ND
8	Seven Mile Creek #3	BF G	6/9/2009	na	P	ND	0.05	ND	ND	ND	ND	P	ND	na	ND	ND	ND	ND	ND	P	ND	ND	ND	ND	ND	na	ND	ND	ND	na	na	ND	na	ND	ND	ND	ND	ND
8	Seven Mile Creek #3	BF G	6/29/2009	na	ND	ND	0.11	ND	ND	ND	ND	P	ND	na	ND	ND	ND	ND	ND	P	ND	ND	ND	ND	ND	na	ND	ND	ND	na	na	ND	na	ND	ND	ND	ND	ND
8	Seven Mile Creek #3	BF G	7/29/2009	na	ND	ND	P	ND	ND	ND	ND	P	ND	na	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	na	ND	ND	ND	na	na	ND	na	ND	ND	ND	ND	ND
8	Seven Mile Creek #3	BF G	8/26/2009	na	ND	ND	P	ND	ND	ND	ND	P	ND	na	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	na	ND	ND	ND	na	na	ND	na	ND	ND	ND	ND	ND
8	Seven Mile Creek #3	BF G	10/7/2009	na	ND	ND	ND	ND	ND	ND	ND	ND	ND	na	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	na	ND	ND	ND	na	na	ND	na	ND	ND	ND	ND	ND
8	Seven Mile Creek #3	SF G	11/2/2009	na	ND	ND	ND	ND	ND	ND	ND	P	ND	na	ND	ND	ND	ND	ND	P	ND	ND	ND	ND	ND	na	ND	ND	ND	na	na	ND	na	ND	ND	ND	ND	ND

Surface Water Quality Sample Data for Calendar Year 2009: Pesticide Results - Tier 3 Monitoring Sites

				Base Neutral Pesticide Results [υg/L]																																			
Pesticide Monitoring Region	Sample Site	Sample Type	Sample Date	2,6-Dichlorobenzamide	Acetochlor	Alachlor	Atrazine	Boscalid	Chlorpyrifos	Cyanazine	Deisopropylatrazine	Desethylatrazine	Diazinon	Dichlobenil	Dimethenamid	Dimethoate	EPTC	Fonofos	Malathion	Metolachlor	Metribuzin	Metribuzin DA	Metribuzin DADK	Metribuzin DK	Myclobutanil	Oxadiazon	Parathion, Methyl	Pendimethalin	Phorate	Prometon	Propazine	Propiconazole	Simazine	Tebuconazole	Tebuprimiphos	Terbufos	Tetraconazole	Trifluralin
9	Root River-North Branch	BF G	1/29/2009	na	ND	ND	P	ND	ND	ND	ND	0.07	ND	na	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	na	ND	ND	ND	na	na	ND	na	ND	ND	ND	ND	ND
9	Root River-North Branch	BF G	5/14/2009	na	0.06	ND	0.11	ND	ND	ND	P	0.07	ND	na	P	ND	ND	ND	ND	P	ND	ND	ND	ND	ND	na	ND	ND	ND	na	na	ND	na	ND	ND	ND	ND	ND
9	Root River-North Branch	SF G	5/28/2009	na	P	ND	0.09	ND	ND	ND	ND	0.06	ND	na	ND	ND	ND	ND	ND	0.08	ND	ND	ND	ND	ND	na	ND	ND	ND	na	na	ND	na	ND	ND	ND	ND	ND
9	Root River-North Branch	SF G	6/8/2009	na	P	ND	0.06	ND	ND	ND	ND	0.07	ND	na	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	na	ND	ND	ND	na	na	ND	na	ND	ND	ND	ND	ND
9	Root River-North Branch	SF G	6/9/2009	na	0.92	ND	1.86	ND	ND	ND	ND	0.19	ND	na	P	ND	ND	ND	ND	2.5	ND	ND	ND	ND	ND	na	ND	ND	ND	na	P	ND	na	ND	ND	ND	ND	ND
9	Root River-North Branch	SF G	6/9/2009	na	0.9	ND	3.25	ND	ND	ND	P	0.24	ND	na	0.23	ND	ND	ND	ND	3.15	ND	ND	ND	ND	ND	na	ND	ND	ND	na	P	ND	na	ND	ND	ND	ND	ND
9	Root River-North Branch	ETI	6/9/2009	na	0.46	ND	1.98	ND	ND	ND	ND	0.2	ND	na	0.13	ND	ND	ND	ND	1.52	ND	ND	ND	ND	ND	na	ND	ND	ND	na	na	ND	na	ND	ND	ND	ND	ND
9	Root River-North Branch	SF G	6/12/2009	na	0.09	ND	0.54	ND	ND	ND	ND	0.13	ND	na	P	ND	ND	ND	ND	0.35	ND	ND	ND	ND	ND	na	ND	ND	ND	na	na	ND	na	ND	ND	ND	ND	ND
9	Root River-North Branch	SF G	6/19/2009	na	0.19	ND	2.01	ND	ND	ND	P	0.33	ND	na	P	ND	ND	ND	ND	1.68	ND	ND	ND	ND	ND	na	ND	ND	ND	P	P	ND	P	ND	ND	ND	ND	ND
9	Root River-North Branch	ETI	6/19/2009	na	0.16	ND	1.03	ND	ND	ND	ND	0.24	ND	na	0.05	ND	ND	ND	ND	0.62	ND	ND	ND	ND	ND	na	ND	ND	ND	na	na	ND	na	ND	ND	ND	ND	ND
9	Root River-North Branch	SF G	6/22/2009	na	P	ND	0.26	ND	ND	ND	ND	0.13	ND	na	P	ND	ND	ND	ND	0.12	ND	ND	ND	ND	ND	na	ND	ND	ND	na	na	ND	na	ND	ND	ND	ND	ND
9	Root River-North Branch	BF G	7/27/2009	na	ND	ND	0.09	ND	ND	ND	ND	0.06	ND	na	ND	ND	ND	ND	ND	P	ND	ND	ND	ND	ND	na	ND	ND	ND	na	na	ND	na	ND	ND	ND	ND	ND
9	Root River-North Branch	BF G	8/10/2009	na	ND	ND	0.07	ND	ND	ND	ND	0.08	ND	na	ND	ND	ND	ND	ND	P	ND	ND	ND	ND	ND	na	ND	ND	ND	na	na	ND	na	ND	ND	ND	ND	ND
9	Root River-North Branch	BF G	8/25/2009	na	ND	ND	P	ND	ND	ND	ND	0.06	ND	na	ND	ND	ND	ND	ND	P	ND	ND	ND	ND	ND	na	ND	ND	ND	na	na	ND	na	ND	ND	ND	ND	ND
9	Root River-North Branch	BF G	10/2/2009	na	ND	ND	P	ND	ND	ND	ND	0.06	ND	na	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	na	ND	ND	ND	na	na	ND	na	ND	ND	ND	ND	ND
9	Root River-North Branch	ETI	10/22/2009	na	ND	ND	P	ND	ND	ND	ND	0.06	ND	na	ND	ND	ND	ND	ND	P	ND	ND	ND	ND	ND	na	ND	ND	ND	na	na	ND	P	ND	ND	ND	ND	ND
9	Root River-North Branch	EFI	10/24/2009	na	ND	ND	0.07	ND	ND	ND	ND	0.06	ND	na	ND	ND	ND	ND	ND	0.07	ND	ND	ND	ND	ND	na	ND	ND	ND	na	na	ND	P	ND	ND	ND	ND	ND
9	Root River-North Branch	SF G	10/29/2009	na	ND	ND	P	ND	ND	ND	ND	0.05	ND	na	ND	ND	ND	ND	ND	P	ND	ND	ND	ND	ND	na	ND	ND	ND	na	na	ND	na	ND	ND	ND	ND	ND
9	Root River-North Branch	SF G	10/30/2009	na	ND	ND	P	ND	ND	ND	ND	0.05	ND	na	ND	ND	ND	ND	ND	P	ND	ND	ND	ND	ND	na	ND	ND	ND	na	na	ND	na	ND	ND	ND	ND	ND
9	Root River-North Branch	EFI	10/30/2009	na	ND	ND	P	ND	ND	ND	ND	0.06	ND	na	ND	ND	ND	ND	ND	P	ND	ND	ND	ND	ND	na	ND	ND	ND	na	na	ND	na	ND	ND	ND	ND	ND
9	Root River-North Branch	ETI	10/30/2009	na	ND	ND	P	ND	ND	ND	ND	0.05	ND	na	ND	ND	ND	ND	ND	P	ND	ND	ND	ND	ND	na	ND	ND	ND	na	na	ND	na	ND	ND	ND	ND	ND
9	Root River-North Branch	SF G	11/2/2009	na	ND	ND	P	ND	ND	ND	ND	0.06	ND	na	ND	ND	ND	ND	ND	P	ND	ND	ND	ND	ND	na	ND	ND	ND	na	na	ND	na	ND	ND	ND	ND	ND
9	Root River-South Branch-Carimona	BF G	2/4/2009	na	ND	ND	P	ND	ND	ND	ND	0.08	ND	na	ND	ND	ND	ND	ND	P	ND	ND	ND	ND	ND	na	ND	ND	ND	na	na	ND	na	ND	ND	ND	ND	ND
9	Root River-South Branch-Carimona	BF G	5/14/2009	na	P	ND	P	ND	ND	ND	P	0.06	ND	na	ND	ND	ND	ND	ND	P	ND	ND	ND	ND	ND	na	ND	ND	ND	na	na	ND	na	ND	ND	ND	ND	ND
9	Root River-South Branch-Carimona	SF G	5/28/2009	na	P	ND	0.08	ND	ND	ND	ND	0.07	ND	na	ND	ND	ND	ND	ND	P	ND	ND	ND	ND	ND	na	ND	ND	ND	na	na	ND	na	ND	ND	ND	ND	ND
9	Root River-South Branch-Carimona	SF G	6/8/2009	na	0.39	ND	2.3	ND	ND	ND	P	0.19	ND	na	ND	ND	ND	ND	ND	5	ND	ND	ND	ND	ND	na	ND	ND	ND	na	P	ND	na	ND	ND	ND	ND	ND
9	Root River-South Branch-Carimona	ETI	6/8/2009	na	0.78	ND	3.35	ND	ND	ND	P	0.25	ND	na	P	ND	ND	ND	ND	4.15	ND	ND	ND	ND	ND	na	ND	ND	ND	na	P	ND	na	ND	ND	ND	ND	ND
9	Root River-South Branch-Carimona	SF G	6/9/2009	na	1.23	ND	3.15	ND	ND	ND	P	0.3	ND	na	0.11	ND	ND	ND	ND	3.55	ND	ND	ND	ND	ND	na	ND	ND	ND	na	P	ND	na	ND	ND	ND	ND	ND
9	Root River-South Branch-Carimona	ETI	6/9/2009	na	0.63	ND	1.52	ND	ND	ND	ND	0.2	ND	na	0.05	ND	ND	ND	ND	1.58	ND	ND	ND	ND	ND	na	ND	ND	ND	na	na	ND	na	ND	ND	ND	ND	ND
9	Root River-South Branch-Carimona	SF G	6/11/2009	na	0.24	ND	0.69	ND	ND	ND	P	0.14	ND	na	P	ND	ND	ND	ND	0.64	ND	ND	ND	ND	ND	na	ND	ND	ND	na	na	ND	na	ND	ND	ND	ND	ND
9	Root River-South Branch-Carimona	SF G	6/12/2009	na	0.11	ND	0.45	ND	ND	ND	P	0.11	ND	na	P	ND	ND	ND	ND	0.38	ND	ND	ND	ND	ND	na	ND	ND	ND	na	na	ND	na	ND	ND	ND	ND	ND
9	Root River-South Branch-Carimona	SF G	6/18/2009	na	0.27	ND	4.7	ND	ND	ND	P	0.48	ND	na	P	ND	ND	ND	ND	2.9	ND	ND	ND	ND	ND	na	ND	ND	ND	na	na	ND	na	ND	ND	ND	ND	ND
9	Root River-South Branch-Carimona	ETI	6/18/2009	na	0.47	ND	2.9	ND	ND	ND	P	0.41	ND	na	0.07	ND	ND	ND	ND	2.03	ND	ND	ND	ND	ND	na	ND	ND	ND	na	P	ND	na	ND	ND	ND	ND	ND
9	Root River-South Branch-Carimona	SF G	6/19/2009	na	0.71	ND	3.3	ND	ND	ND	P	0.43	ND	na	0.09	ND	ND	ND	ND	1.96	ND	ND	ND	ND	ND	na	ND	ND	ND	na	P	ND	na	ND	ND	ND	ND	ND
9	Root River-South Branch-Carimona	ETI	6/19/2009	na	0.28	ND	1.4	ND	ND	ND	ND	0.27	ND	na	P	ND	ND	ND	ND	0.89	ND	ND	ND	ND	ND	na	ND	ND	ND	na	P	ND	na	ND	ND	ND	ND	ND
9	Root River-South Branch-Carimona	SF G	6/22/2009	na	P	ND	0.43	ND	ND	ND	ND	0.15	ND	na	ND	ND	ND	ND	ND	0.19	ND	ND	ND	ND	ND	na	ND	ND	ND	na	na	ND	na	ND	ND	ND	ND	ND
9	Root River-South Branch-Carimona	BF G	7/27/2009	na	ND	ND	0.07	ND	ND	ND	ND	0.07	ND	na	ND	ND	ND	ND	ND	P	ND	ND	ND	ND	ND	na	ND	ND	ND	na	na	ND	na	ND	ND	ND	ND	ND
9	Root River-South Branch-Carimona	BF G	8/10/2009	na	ND	ND	0.06	ND	ND	ND	ND	0.1	ND	na	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	na	ND	ND	ND	na	na	ND	na	ND	ND	ND	ND	ND
9	Root River-South Branch-Carimona	BF G	8/25/2009	na	ND	ND	0.06	ND	ND	ND	ND	0.07	ND	na	ND	ND	ND	ND	ND	P	ND	ND	ND	ND	ND	na	ND	ND	ND	na	na	ND	na	ND	ND	ND	ND	ND
9	Root River-South Branch-Carimona	BF G	10/2/2009	na	ND	ND	P	ND	ND	ND	ND	0.07	ND	na	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	na	ND	ND	ND	na	na	ND	na	ND	ND	ND	ND	ND
9	Root River-South Branch-Carimona	ETI	10/22/2009	na	ND	ND	P	ND	ND	ND	ND	0.05	ND	na	ND	ND	ND	ND	ND	P	ND	ND	ND	ND	ND	na	ND	ND	ND	na	na	ND	na	ND	ND	ND	ND	ND
9	Root River-South Branch-Carimona	BF G	10/28/2009	na	ND	ND	P	ND	ND	ND	ND	P	ND	na	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	na	ND	ND	ND	na	na	ND	na	ND	ND	ND	ND	ND
9	Root River-South Branch-Carimona	ETI	10/29/2009	na	ND	ND	P	ND	ND	ND	ND	0.06	ND	na	ND	ND	ND	ND	ND	P	ND	ND	ND	ND	ND	na	ND	ND	ND	na	na	ND	na	ND	ND	ND	ND	ND
9	Root River-South Branch-Carimona	SF G	10/30/2009	na	ND	ND	P	ND	ND	ND	ND	0.06	ND	na	ND	ND	ND	ND	ND	P	ND	ND	ND	ND	ND	na	ND	ND	ND	na	na	ND	na	ND	ND	ND	ND	ND
9	Root River-South Branch-Carimona	SF G	11/2/2009	na	ND	ND	P	ND	ND	ND	ND	0.06	ND	na	ND	ND	ND	ND	ND	P	ND	ND	ND	ND	ND	na	ND	ND	ND	na	na	ND	na	ND	ND	ND	ND	ND

Surface Water Quality Sample Data for Calendar Year 2009: Pesticide Results - Tier 3 Monitoring Sites

				Base Neutral Pesticide Results [υg/L]																																			
Pesticide Monitoring Region	Sample Site	Sample Type	Sample Date	2,6-Dichlorobenzamide	Acetochlor	Alachlor	Atrazine	Boscalid	Chlorpyrifos	Cyanazine	Deisopropylatrazine	Desethylatrazine	Diazinon	Dichlobenil	Dimethenamid	Dimethoate	EPTC	Fonofos	Malathion	Metolachlor	Metribuzin	Metribuzin DA	Metribuzin DADK	Metribuzin DK	Myclobutanil	Oxadiazon	Parathion, Methyl	Pendimethalin	Phorate	Prometon	Propazine	Propiconazole	Simazine	Tebuconazole	Tebuprimiphos	Terbufos	Tetraconazole	Trifluralin
9	Whitewater River-Middle Branch	BF G	2/4/2009	na	ND	ND	0.08	ND	ND	ND	ND	0.13	ND	na	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	na	ND	ND	ND	na	na	ND	na	ND	ND	ND	ND	ND
9	Whitewater River-Middle Branch	BF G	5/14/2009	na	ND	ND	0.08	ND	ND	ND	P	0.11	ND	na	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	na	ND	ND	ND	na	na	ND	na	ND	ND	ND	ND	ND
9	Whitewater River-Middle Branch	SF G	5/27/2009	na	1.88	ND	0.69	ND	ND	ND	ND	0.1	ND	na	P	ND	ND	ND	ND	P	ND	ND	ND	ND	ND	na	ND	ND	ND	na	na	ND	na	ND	ND	ND	ND	ND
9	Whitewater River-Middle Branch	SF G	5/28/2009	na	0.82	ND	0.32	ND	ND	ND	ND	0.09	ND	na	P	ND	ND	ND	ND	0.45	P	ND	ND	ND	ND	na	ND	ND	ND	na	na	ND	na	ND	ND	ND	ND	ND
9	Whitewater River-Middle Branch	SF G	6/8/2009	na	0.43	ND	0.35	ND	ND	ND	ND	0.12	ND	na	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	na	ND	ND	ND	na	na	ND	na	ND	ND	ND	ND	ND
9	Whitewater River-Middle Branch	BF G	6/15/2009	na	ND	ND	0.07	ND	ND	ND	P	0.11	ND	na	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	na	ND	ND	ND	na	na	ND	na	ND	ND	ND	ND	ND
9	Whitewater River-Middle Branch	BF G	6/25/2009	na	ND	ND	0.08	ND	ND	ND	P	0.1	ND	na	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	na	ND	ND	ND	na	na	ND	na	ND	ND	ND	ND	ND
9	Whitewater River-Middle Branch	BF G	7/27/2009	na	ND	ND	0.08	ND	ND	ND	ND	0.12	ND	na	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	na	ND	ND	ND	na	na	ND	na	ND	ND	ND	ND	ND
9	Whitewater River-Middle Branch	BF G	8/10/2009	na	ND	ND	0.08	ND	ND	ND	ND	0.14	ND	na	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	na	ND	ND	ND	na	na	ND	na	ND	ND	ND	ND	ND
9	Whitewater River-Middle Branch	BF G	8/25/2009	na	ND	ND	0.06	ND	ND	ND	ND	0.12	ND	na	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	na	ND	ND	ND	na	na	ND	na	ND	ND	ND	ND	ND
9	Whitewater River-Middle Branch	BF G	10/2/2009	na	ND	ND	0.08	ND	ND	ND	ND	0.1	ND	na	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	na	ND	ND	ND	na	na	ND	na	ND	ND	ND	ND	ND
9	Whitewater River-Middle Branch	BF G	10/30/2009	na	ND	ND	P	ND	ND	ND	ND	0.05	ND	na	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	na	ND	ND	ND	na	na	ND	na	ND	ND	ND	ND	ND

Surface Water Quality Sample Data for Calendar Year 2009: Pesticide Results - Acetochlor Study Monitoring Sites

				Base Neutral Pesticide Results [ug/L]																																		
Pesticide Monitoring Region	Sample Site	Sample Type	Sample Date	2,6-Dichlorobenzamide	Acetochlor	Alachlor	Atrazine	Boscalid	Chlorpyrifos	Cyanazine	Deisopropylatrazine	Desethylatrazine	Diazinon	Dichlobenil	Dimethenamid	Dimethoate	EPTC	Fonofos	Malathion	Metolachlor	Metribuzin	Metribuzin DA	Metribuzin DADK	Metribuzin DK	Myclobutanil	Oxadiazon	Parathion, Methyl	Pendimethalin	Phorate	Prometon	Propazine	Propiconazole	Simazine	Tebuconazole	Tebuprimiphos	Terbufos	Tetraconazole	Trifluralin	ELISA Acetochlor
8	Big Cobb River	BF G	4/23/2009																																				0.27
8	Big Cobb River	BF G	5/5/2009																																				0.22
8	Big Cobb River	BF G	5/8/2009																																				0.89
8	Big Cobb River	BF G	5/29/2009																																				0.22
8	Big Cobb River	BF G	6/8/2009																																				0.23
8	Big Cobb River	SF G	6/17/2009																																				0.18
8	Big Cobb River	SF G	6/23/2009																																				0.16
8	Big Cobb River	SF G	6/24/2009	na	0.56	ND	0.1	ND	ND	ND	ND	P	ND	na	P	ND	ND	ND	ND	0.12	ND	ND	ND	ND	ND	na	ND	ND	ND	na	na	ND	na	ND	ND	ND	ND	ND	1.38
8	Big Cobb River	SF G	6/26/2009	na	0.43	ND	0.26	ND	ND	ND	ND	0.05	ND	na	P	ND	ND	ND	ND	0.16	ND	ND	ND	ND	ND	na	ND	ND	ND	na	na	ND	na	ND	ND	ND	ND	ND	
8	Big Cobb River	SF G	6/29/2009	na	0.26	ND	0.18	ND	ND	ND	ND	P	ND	na	P	ND	ND	ND	ND	0.12	ND	ND	ND	ND	ND	na	ND	ND	ND	na	na	ND	na	ND	ND	ND	ND	ND	0.63
8	Le Sueur River-CR 8	BF G	4/23/2009																																				0.24
8	Le Sueur River-CR 8	BF G	5/5/2009																																				0.18
8	Le Sueur River-CR 8	BF G	5/8/2009																																				0.74
8	Le Sueur River-CR 8	BF G	6/1/2009																																				0.18
8	Le Sueur River-CR 8	BF G	6/8/2009																																				0.21
8	Le Sueur River-CR 8	SF G	6/15/2009																																				0.19
8	Le Sueur River-CR 8	SF G	6/17/2009																																				0.15
8	Le Sueur River-CR 8	SF G	6/23/2009																																				0.19
8	Le Sueur River-St. Clair	BF G	4/23/2009																																				0.16
8	Le Sueur River-St. Clair	BF G	5/5/2009																																				0.23
8	Le Sueur River-St. Clair	SF G	5/7/2009	na	1.18	ND	P	ND	ND	ND	ND	P	ND	na	P	ND	ND	ND	ND	0.09	ND	ND	ND	ND	ND	na	ND	ND	ND	na	na	ND	na	ND	ND	ND	ND	ND	1.56
8	Le Sueur River-St. Clair	SF G	5/8/2009	na	1.01	ND	P	ND	ND	ND	ND	P	ND	na	0.07	ND	ND	ND	ND	0.23	ND	ND	ND	ND	ND	na	ND	ND	ND	na	na	ND	na	ND	ND	ND	ND	ND	1.47
8	Le Sueur River-St. Clair	BF G	6/1/2009																																				0.12
8	Le Sueur River-St. Clair	BF G	6/8/2009																																				0.17
8	Le Sueur River-St. Clair	SF G	6/15/2009																																				ND
8	Le Sueur River-St. Clair	SF G	6/19/2009																																				0.11
8	Le Sueur River-St. Clair	SF G	6/24/2009																																				0.64
8	Le Sueur River-St. Clair	SF G	6/29/2009																																				0.18
8	Maple River-Lower	BF G	4/23/2009																																				0.15
8	Maple River-Lower	BF G	5/5/2009																																				0.18
8	Maple River-Lower	BF G	5/13/2009																																				0.24
8	Maple River-Lower	BF G	5/20/2009																																				0.13
8	Maple River-Lower	BF G	5/29/2009																																				0.16
8	Maple River-Lower	BF G	6/8/2009																																				0.31
8	Maple River-Lower	SF G	6/17/2009																																				0.15
8	Maple River-Lower	SF G	6/22/2009	na	P	ND	0.05	ND	ND	ND	ND	P	ND	na	P	ND	ND	ND	ND	P	ND	ND	ND	ND	ND	na	ND	ND	ND	na	na	ND	na	ND	ND	ND	ND	ND	0.18
8	Maple River-Lower	SF G	6/23/2009	na	0.05	ND	0.06	ND	ND	ND	ND	P	ND	na	ND	ND	ND	ND	ND	P	ND	ND	ND	ND	ND	na	ND	ND	ND	na	na	ND	na	ND	ND	ND	ND	ND	0.26
8	Maple River-Lower	SF G	6/24/2009	na	0.69	ND	0.34	ND	ND	ND	ND	P	ND	na	0.07	ND	ND	ND	ND	0.49	P	ND	ND	ND	ND	na	ND	ND	ND	na	na	ND	na	ND	ND	ND	ND	ND	1.89
8	Maple River-Lower	SF G	6/28/2009																																				0.61
8	Maple River-Upper	BF G	4/23/2009																																				0.21
8	Maple River-Upper	BF G	5/5/2009																																				0.15
8	Maple River-Upper	BF G	5/18/2009																																				0.13
8	Maple River-Upper	BF G	5/20/2009																																				0.15
8	Maple River-Upper	SF G	6/19/2009																																				0.83
8	Maple River-Upper	SF G	6/22/2009	na	0.07	ND	0.06	ND	ND	ND	ND	P	ND	na	ND	ND	ND	ND	ND	P	ND	ND	ND	ND	ND	na	ND	ND	ND	na	na	ND	na	ND	ND	ND	ND	ND	0.17
8	Maple River-Upper	SF G	6/23/2009	na	0.8	ND	0.51	ND	ND	ND	ND	P	ND	na	0.1	ND	ND	ND	ND	0.77	P	ND	ND	ND	ND	na	ND	ND	ND	na	na	ND	na	ND	ND	ND	ND	ND	2.28
8	Maple River-Upper	SF G	6/24/2009	na	0.56	ND	0.21	ND	ND	ND	ND	P	ND	na	0.05	ND	ND	ND	ND	0.37	ND	ND	ND	ND	ND	na	ND	ND	ND	na	na	ND	na	ND	ND	ND	ND	ND	1.73
8	Maple River-Upper	SF G	6/28/2009																																				0.43

Surface Water Quality Sample Data for Calendar Year 2009:

ELISA Pesticide Results - Tier 1 and 3 Monitoring Sites

Pesticide Monitoring Region	Sample Site	Sample Type	Sample Date	DACT ELISA Results [ug/L] Diaminochloro triazine (DACT)	Acetochlor [ACE]
8	Beauford Ditch	BF G	4/23/2009		0.29
8	Beauford Ditch	SF G	4/27/2009		0.67
8	Beauford Ditch	BF G	5/5/2009		0.18
8	Beauford Ditch	ETI	5/6/2009		0.89
8	Beauford Ditch	SF G	5/7/2009		0.49
8	Beauford Ditch	SF G	5/11/2009		0.16
8	Beauford Ditch	BF G	5/29/2009		0.14
8	Beauford Ditch	BF G	6/8/2009		0.2
8	Beauford Ditch	BF G	6/10/2009		0.27
8	Beauford Ditch	BF G	6/29/2009		0.12
8	Beauford Ditch	BF G	10/7/2009	ND	
8	LeSueur River-Hwy 66	BF G	4/24/2009		0.21
8	LeSueur River-Hwy 66	BF G	4/24/2009		0.16
8	LeSueur River-Hwy 66	BF G	5/5/2009		0.17
8	LeSueur River-Hwy 66	BF G	5/5/2009		0.18
8	LeSueur River-Hwy 66	ETI	5/5/2009		0.31
8	LeSueur River-Hwy 66	SF G	5/7/2009		0.47
8	LeSueur River-Hwy 66	ETI	5/8/2009		0.53
8	LeSueur River-Hwy 66	BF G	6/1/2009		0.14
8	LeSueur River-Hwy 66	SF G	6/8/2009		0.21
8	LeSueur River-Hwy 66	ETI	6/8/2009		0.36
8	LeSueur River-Hwy 66	SF G	6/15/2009		0.24
8	LeSueur River-Hwy 66	ETI	6/15/2009		0.13
8	LeSueur River-Hwy 66	ETI	6/19/2009		0.26
8	LeSueur River-Hwy 66	EFI	6/23/2009		1.04
8	LeSueur River-Hwy 66	SF G	6/24/2009		1.13
8	LeSueur River-Hwy 66	ETI	6/24/2009		1.02
8	LeSueur River-Hwy 66	BF G	8/26/2009	ND	
8	LeSueur River-Hwy 66	SF G	11/2/2009	ND	
8	LeSueur River-Hwy 66	SF G	11/2/2009	NA	
8	Little Cobb River	BF G	4/23/2009		0.28
8	Little Cobb River	BF G	5/5/2009		0.29
8	Little Cobb River	SF G	5/7/2009		1.07
8	Little Cobb River	BF G	5/8/2009		0.42
8	Little Cobb River	BF G	5/29/2009		0.23
8	Little Cobb River	BF G	6/8/2009		0.17
8	Little Cobb River	SF G	6/15/2009		0.2
8	Little Cobb River	SF G	6/19/2009		0.2
8	Little Cobb River	SF G	6/29/2009		0.22
8	Seven Mile Creek #3	BF G	8/26/2009	ND	
8	Seven Mile Creek #3	BF G	10/7/2009	ND	
8	Seven Mile Creek #3	SF G	11/2/2009	ND	
9	Root River-North Branch	BF G	8/10/2009	0.11	
9	Root River-North Branch	BF G	8/25/2009	0.16	
9	Root River-North Branch	BF G	10/2/2009	0.12	
9	Root River-North Branch	ETI	10/22/2009	ND	
9	Root River-North Branch	SF G	10/29/2009	0.14	
9	Root River-North Branch	SF G	10/30/2009	0.11	
9	Root River-North Branch	ETI	10/30/2009	0.14	
9	Root River-North Branch	SF G	11/2/2009	0.13	
9	Root River-South Branch-Carimona	ETI	10/22/2009	0.14	
9	Root River-South Branch-Carimona	BF G	10/28/2009	0.15	
9	Root River-South Branch-Carimona	ETI	10/29/2009	0.13	
9	Root River-South Branch-Carimona	SF G	10/30/2009	0.17	
9	Root River-South Branch-Carimona	SF G	11/2/2009	0.11	
9	Whitewater River-Middle Branch	BF G	10/30/2009	0.16	

Surface Water Quality Sample Data for Calendar Year 2009: Pesticide Results

Tier 2 and 3 Monitoring Sites

				Chloracetamide Degradate Pesticide Results [µg/L]							
Pesticide Monitoring Region	Sample Site	Sample Type	Sample Date	Acetochlor ESA	Acetochlor OXA	Alachlor ESA	Alachlor OXA	Dimethenamid ESA	Dimethenamid OXA	Metolachlor ESA	Metolachlor OXA
1	Buffalo River-Dilworth	SF G	3/24/2009	ND	ND	ND	ND	ND	ND	ND	ND
1	Buffalo River-Dilworth	SF G	4/21/2009	ND	ND	ND	ND	ND	ND	ND	ND
1	Buffalo River-Dilworth	SF G	5/11/2009	ND	ND	ND	ND	ND	ND	ND	ND
1	Buffalo River-Dilworth	SF G	5/20/2009	ND	ND	ND	ND	ND	ND	0.09	ND
1	Buffalo River-Dilworth	SF G	5/28/2009	ND	ND	ND	ND	ND	ND	0.14	ND
1	Buffalo River-Dilworth	SF G	6/1/2009	ND	ND	ND	ND	ND	ND	0.07	ND
1	Buffalo River-Dilworth	SF G	6/4/2009	ND	ND	ND	ND	ND	ND	ND	ND
1	Buffalo River-Dilworth	SF G	6/10/2009	ND	ND	ND	ND	ND	ND	0.07	ND
1	Buffalo River-Dilworth	SF G	6/18/2009	ND	ND	ND	ND	ND	ND	0.1	ND
1	Buffalo River-Dilworth	SF G	6/20/2009	0.12	0.15	ND	ND	ND	ND	0.17	ND
1	Buffalo River-Dilworth	SF G	6/22/2009	0.21	0.31	ND	ND	ND	ND	0.12	0.07
1	Buffalo River-Dilworth	SF G	6/24/2009	0.24	0.33	ND	ND	ND	ND	0.13	ND
1	Buffalo River-Dilworth	SF G	6/25/2009	0.28	0.37	ND	ND	ND	ND	0.12	ND
1	Buffalo River-Dilworth	SF G	6/29/2009	0.21	0.35	ND	ND	ND	ND	0.12	ND
1	Buffalo River-Dilworth	SF G	7/1/2009	0.14	0.25	ND	ND	ND	ND	0.11	ND
1	Buffalo River-Dilworth	BF G	7/6/2009	0.09	0.14	ND	ND	ND	ND	0.07	ND
1	Buffalo River-Dilworth	BF G	7/30/2009	ND	ND	ND	ND	ND	ND	0.07	ND
1	Buffalo River-Dilworth	SF G	8/20/2009	0.12	0.11	ND	ND	ND	ND	ND	ND
1	Buffalo River-Dilworth	SF G	8/25/2009	0.07	ND	ND	ND	ND	ND	ND	ND
1	Buffalo River-Dilworth	BF G	9/3/2009	ND	ND	ND	ND	ND	ND	ND	ND
1	Buffalo River-Dilworth	SF G	10/7/2009	ND	ND	ND	ND	ND	ND	ND	ND
1	Buffalo River-Dilworth	SF G	10/22/2009	ND	ND	ND	ND	ND	ND	0.08	ND
1	Buffalo River-Dilworth	SF G	11/6/2009	ND	ND	ND	ND	ND	ND	0.09	ND
1	Buffalo River-Dilworth	SF G	11/12/2009	ND	ND	ND	ND	ND	ND	0.11	ND
1	Buffalo River-Dilworth	BF G	11/25/2009	ND	ND	ND	ND	ND	ND	ND	ND
8	Beauford Ditch	BF G	5/29/2009	0.69	0.32	0.23	ND	ND	ND	0.86	0.14
8	Beauford Ditch	BF G	6/8/2009	0.72	0.24	0.19	ND	ND	ND	0.88	0.14
8	Beauford Ditch	BF G	6/29/2009	0.75	0.21	0.24	ND	ND	ND	0.96	0.18
8	Beauford Ditch	BF G	10/7/2009	1.1	1.68	0.13	0.07	0.13	0.2	0.64	0.42
8	Beauford Ditch	SF G	10/30/2009	1.28	0.77	0.25	0.07	0.08	0.07	1.08	0.47
8	LeSueur River-Hwy 66	BF G	1/30/2009	0.08	ND	0.11	ND	ND	ND	0.28	ND
8	LeSueur River-Hwy 66	BF G	4/24/2009	0.41	0.27	0.16	ND	ND	ND	0.6	0.13
8	LeSueur River-Hwy 66	BF G	5/5/2009	0.39	0.2	0.11	ND	ND	ND	0.71	0.13
8	LeSueur River-Hwy 66	BF G	6/1/2009	0.44	0.2	0.18	ND	ND	ND	0.79	0.18
8	LeSueur River-Hwy 66	SF G	6/8/2009	0.57	0.37	0.21	0.07	ND	ND	0.79	0.26
8	LeSueur River-Hwy 66	SF G	6/15/2009	0.57	0.4	0.19	ND	ND	ND	1.32	0.24
8	LeSueur River-Hwy 66	EFI	6/23/2009	1.84	2.29	0.1	ND	ND	ND	0.74	0.28
8	LeSueur River-Hwy 66	BF G	8/26/2009	0.22	0.11	0.2	0.07	ND	ND	0.55	0.1
8	LeSueur River-Hwy 66	BF G	10/7/2009	0.18	0.11	0.16	0.07	ND	ND	0.35	0.1
8	LeSueur River-Hwy 66	SF G	11/2/2009	0.6	0.39	0.13	ND	ND	ND	1.04	0.28
8	Seven Mile Creek #3	BF G	1/30/2009	ND	ND	0.39	ND	ND	ND	0.95	ND
8	Seven Mile Creek #3	BF G	5/29/2009	0.52	0.34	0.31	ND	ND	ND	1.27	0.31
8	Seven Mile Creek #3	BF G	6/29/2009	0.4	0.11	0.23	ND	ND	ND	1.28	0.17
8	Seven Mile Creek #3	BF G	8/26/2009	0.09	ND	0.22	ND	ND	ND	0.84	ND
8	Seven Mile Creek #3	BF G	10/7/2009	0.09	ND	0.19	ND	ND	ND	0.54	ND
8	Seven Mile Creek #3	SF G	11/2/2009	0.14	ND	0.12	ND	ND	ND	0.8	0.16
9	Root River-North Branch	BF G	1/29/2009	ND	ND	0.19	ND	ND	ND	0.64	ND
9	Root River-North Branch	BF G	5/14/2009	0.09	ND	0.13	ND	ND	ND	0.93	ND
9	Root River-North Branch	SF G	5/28/2009	0.08	ND	0.15	ND	ND	ND	0.82	0.08
9	Root River-North Branch	SF G	6/8/2009	0.12	ND	0.16	ND	ND	ND	0.98	ND
9	Root River-North Branch	SF G	6/9/2009	0.59	0.66	0.19	ND	ND	ND	1.57	0.39
9	Root River-North Branch	SF G	6/9/2009	0.98	1.02	0.09	ND	0.09	ND	1.45	0.55
9	Root River-North Branch	ETI	6/9/2009	1.04	0.9	0.2	ND	0.16	0.1	1.75	0.61
9	Root River-North Branch	SF G	6/12/2009	0.79	0.45	0.19	ND	0.08	ND	1.8	0.38
9	Root River-North Branch	SF G	6/19/2009	0.71	0.51	0.13	ND	ND	ND	1.98	0.53
9	Root River-North Branch	ETI	6/19/2009	1.2	0.64	0.2	ND	0.15	ND	2.06	0.65
9	Root River-North Branch	SF G	6/22/2009	0.76	0.25	0.19	ND	0.08	ND	1.98	0.31
9	Root River-North Branch	BF G	7/27/2009	0.12	ND	0.26	ND	ND	ND	0.78	ND
9	Root River-North Branch	BF G	8/10/2009	0.09	ND	0.25	ND	ND	ND	0.81	0.07
9	Root River-North Branch	BF G	8/25/2009	ND	ND	0.17	ND	ND	ND	0.76	ND
9	Root River-North Branch	BF G	10/2/2009	ND	ND	0.25	ND	ND	ND	0.47	ND
9	Root River-North Branch	ETI	10/22/2009	0.45	0.11	0.16	ND	ND	ND	1.73	0.28
9	Root River-North Branch	SF G	10/29/2009	0.53	0.08	0.22	ND	ND	ND	2.07	0.32
9	Root River-North Branch	SF G	10/30/2009	0.36	ND	0.16	ND	ND	ND	1.48	0.2
9	Root River-North Branch	ETI	10/30/2009	0.49	0.13	0.12	ND	ND	ND	1.74	0.3
9	Root River-North Branch	SF G	11/2/2009	0.64	0.12	0.15	ND	ND	ND	2.02	0.36
9	Root River-South Branch-Carimona	BF G	2/4/2009	0.1	ND	0.61	ND	ND	ND	0.65	ND
9	Root River-South Fork	BF G	2/4/2009	ND	ND	0.28	ND	ND	ND	1.27	ND
9	Whitewater River-Middle Branch	BF G	2/4/2009	0.09	ND	0.27	ND	ND	ND	1.12	ND
9	Whitewater River-South Branch	BF G	2/4/2009	ND	ND	0.63	ND	ND	ND	0.82	ND

Surface Water Quality Sample Data for Calendar Year 2009: Pesticide Results - Lake Monitoring Sites

				Base Neutral Pesticide Results [υg/L]																																			
Pesticide Monitoring Region	Sample Site	Sample Type	Sample Date	2,6-Dichlorobenzamide	Acetochlor	Alachlor	Atrazine	Boscalid	Chlorpyrifos	Cyanazine	Deisopropylatrazine	Desethylatrazine	Diazinon	Dichlobenil	Dimethenamid	Dimethoate	EPTC	Fonofos	Malathion	Metolachlor	Metribuzin	Metribuzin DA	Metribuzin DADK	Metribuzin DK	Myclobutanil	Oxadiazon	Parathion, Methyl	Pendimethalin	Phorate	Prometon	Propazine	Propiconazole	Simazine	Tebuconazole	Tebupirimiphos	Terbufos	Tetraconazole	Trifluralin
2	Elk lake	BF G	5/20/2009	na	ND	ND	ND	ND	ND	ND	ND	ND	ND	na	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	na	ND	ND	ND	na	na	ND	na	ND	ND	ND	ND	ND
2	Elk lake	BF G	10/20/2009	na	ND	ND	ND	ND	ND	ND	ND	ND	ND	na	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	na	ND	ND	ND	na	na	ND	na	ND	ND	ND	ND	ND
3	Elephant Lake	BF G	6/10/2009	na	ND	ND	P	ND	ND	ND	ND	ND	ND	na	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	na	ND	ND	ND	na	na	ND	na	ND	ND	ND	ND	ND
3	Elephant Lake	BF G	10/13/2009	na	ND	ND	ND	ND	ND	ND	ND	ND	ND	na	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	na	ND	ND	ND	na	na	ND	na	ND	ND	ND	ND	ND
4	Carrie Lake	BF G	6/2/2009	na	P	ND	P	ND	ND	ND	ND	P	ND	na	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	na	ND	ND	ND	na	na	ND	na	ND	ND	ND	ND	ND
4	Carrie Lake	BF G	10/12/2009	na	ND	ND	ND	ND	ND	ND	ND	0.06	ND	na	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	na	ND	ND	ND	na	na	ND	na	ND	ND	ND	ND	ND
5	Hill (South Basin) Lake	BF G	5/29/2009	na	ND	ND	ND	ND	ND	ND	ND	ND	ND	na	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	na	ND	ND	ND	na	na	ND	na	ND	ND	ND	ND	ND
5	Hill (South Basin) Lake	BF G	9/29/2009	na	ND	ND	ND	ND	ND	ND	ND	ND	ND	na	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	na	ND	ND	ND	na	na	ND	na	ND	ND	ND	ND	ND
6	Artichoke Lake	BF G	5/27/2009	na	P	ND	0.05	ND	ND	ND	ND	ND	ND	na	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	na	ND	ND	ND	na	na	ND	na	ND	ND	ND	ND	ND
6	Artichoke Lake	BF G	10/12/2009	na	ND	ND	ND	ND	ND	ND	ND	ND	ND	na	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	na	ND	ND	ND	na	na	ND	na	ND	ND	ND	ND	ND
8	St. Olaf Lake	BF G	6/10/2009	na	0.07	ND	0.08	ND	ND	ND	ND	P	ND	na	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	na	ND	ND	ND	na	na	ND	na	ND	ND	ND	ND	ND
8	St. Olaf Lake	BF G	10/15/2009	na	ND	ND	0.06	ND	ND	ND	ND	ND	ND	na	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	na	ND	ND	ND	na	na	ND	na	ND	ND	ND	ND	ND

				Chloracetamide Degradate Pesticide Results [υg/L]							
Pesticide Monitoring Region	Sample Site	Sample Type	Sample Date	Acetochlor ESA	Acetochlor OXA	Alachlor ESA	Alachlor OXA	Dimethenamid ESA	Dimethenamid OXA	Metolachlor ESA	Metolachlor OXA
2	Elk lake	BF G	5/20/2009	0.43	0.52	ND	ND	ND	ND	0.25	0.16
2	Elk lake	BF G	10/20/2009	0.39	0.52	ND	ND	ND	ND	0.2	0.15
3	Elephant Lake	BF G	6/10/2009	ND	ND	0.64	ND	ND	ND	0.79	ND
3	Elephant Lake	BF G	10/13/2009	ND	ND	0.6	ND	ND	ND	0.55	ND
4	Carrie Lake	BF G	6/2/2009	ND	ND	ND	ND	ND	ND	0.07	ND
4	Carrie Lake	BF G	10/12/2009	ND	ND	ND	ND	ND	ND	ND	ND
5	Hill (South Basin) Lake	BF G	5/29/2009	ND	ND	ND	ND	ND	ND	ND	ND
5	Hill (South Basin) Lake	BF G	9/29/2009	ND	ND	ND	ND	ND	ND	ND	ND
6	Artichoke Lake	BF G	5/27/2009	ND	ND	ND	ND	ND	ND	ND	ND
6	Artichoke Lake	BF G	10/12/2009	ND	ND	ND	ND	ND	ND	ND	ND
8	St. Olaf Lake	BF G	6/10/2009	0.59	0.78	0.16	0.09	ND	ND	0.61	0.28
8	St. Olaf Lake	BF G	10/15/2009	0.57	0.73	0.16	0.08	ND	ND	0.52	0.24

Surface Water Quality Sample Data for Calendar Year 2009: Pesticide and Inorganic Results - Precipitation Monitoring Sites

				Base Neutral Pesticide Results [ug/L]																																			
Pesticide Monitoring Region	Sample Site	Sample Type	Sample Date	2,6-Dichlorobenzamide	Acetochlor	Alachlor	Atrazine	Boscalid	Chlorpyrifos	Cyanazine	Deisopropylatrazine	Desethylatrazine	Diazinon	Dichlobenil	Dimethenamid	Dimethoate	EPTC	Fonofos	Malathion	Metolachlor	Metribuzin	Metribuzin DA	Metribuzin DADK	Metribuzin DK	Myclobutanil	Oxadiazon	Parathion, Methyl	Pendimethalin	Phorate	Prometon	Propazine	Propiconazole	Simazine	Tebuconazole	Tebuprimiphos	Terbufos	Tetraconazole	Trifluralin
8	Little Cobb River Watershed	BF G	5/5/2009	na	0.57	ND	0.08	ND	ND	ND	ND	P	ND	na	P	ND	ND	ND	ND	P	ND	ND	ND	ND	ND	na	ND	ND	ND	na	na	ND	na	ND	ND	ND	ND	ND
8	Little Cobb River Watershed	BF G	5/11/2009	na	0.3	P	0.13	ND	ND	ND	P	0.09	ND	na	ND	ND	ND	ND	ND	P	ND	ND	ND	ND	ND	na	ND	ND	ND	na	na	ND	na	ND	ND	ND	ND	ND
8	Little Cobb River Watershed	BF G	6/8/2009	na	0.24	ND	0.48	ND	ND	ND	P	0.11	ND	na	ND	ND	ND	ND	ND	0.2	ND	ND	ND	ND	ND	na	ND	ND	ND	na	na	ND	na	ND	ND	ND	ND	ND
8	Little Cobb River Watershed	BF G	6/19/2009	na	0.07	ND	0.07	ND	ND	ND	ND	P	ND	na	ND	ND	ND	ND	ND	P	ND	ND	ND	ND	ND	na	ND	ND	ND	na	na	ND	na	ND	ND	ND	ND	ND
8	Little Cobb River Watershed	BF G	6/24/2009	na	P	ND	0.06	ND	ND	ND	ND	P	ND	na	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	na	ND	ND	ND	na	na	ND	na	ND	ND	ND	ND	ND
8	Little Cobb River Watershed	BF G	7/29/2009	na	NA	NA	NA	NA	NA	NA	NA	NA	NA	na	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	na	NA	NA	NA	na	na	NA	na	NA	NA	NA	NA	NA
8	Little Cobb River Watershed	BF G	8/24/2009	na	ND	ND	ND	ND	0.26	ND	ND	ND	ND	na	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	na	ND	ND	ND	na	na	P	na	ND	ND	ND	ND	ND
8	Little Cobb River Watershed	BF G	10/7/2009	na	ND	ND	ND	ND	ND	ND	ND	ND	ND	na	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	na	ND	ND	ND	na	na	ND	na	ND	ND	ND	ND	ND
8	Little Cobb River Watershed	BF G	10/30/2009	na	ND	ND	ND	ND	ND	ND	ND	ND	ND	na	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	na	ND	ND	ND	na	na	ND	na	ND	ND	ND	ND	ND
9	Zumbro River Watershed	BF G	6/6/2009	na	0.09	ND	0.09	ND	ND	ND	ND	P	ND	na	ND	ND	ND	ND	ND	0.1	ND	ND	ND	ND	ND	na	ND	ND	ND	na	na	ND	na	ND	ND	ND	ND	ND
9	Zumbro River Watershed	BF G	6/16/2009	na	0.06	ND	0.09	ND	ND	ND	ND	P	ND	na	ND	ND	ND	ND	ND	P	ND	ND	ND	ND	ND	na	ND	ND	ND	na	na	ND	na	ND	ND	ND	ND	ND
9	Zumbro River Watershed	BF G	7/7/2009	na	ND	ND	ND	ND	ND	ND	ND	ND	ND	na	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	na	ND	ND	ND	na	na	ND	na	ND	ND	ND	ND	ND
9	Zumbro River Watershed	BF G	7/22/2009	na	ND	ND	ND	ND	ND	ND	ND	ND	ND	na	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	na	ND	ND	ND	na	na	ND	na	ND	ND	ND	ND	ND
9	Zumbro River Watershed	BF G	7/29/2009	na	ND	ND	ND	ND	ND	ND	ND	ND	ND	na	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	na	ND	ND	ND	na	na	ND	na	ND	ND	ND	ND	ND
9	Zumbro River Watershed	BF G	8/13/2009	na	ND	ND	ND	ND	ND	ND	ND	ND	ND	na	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	na	ND	ND	ND	na	na	ND	na	ND	ND	ND	ND	ND
9	Zumbro River Watershed	BF G	9/22/2009	na	ND	ND	ND	ND	ND	ND	ND	ND	ND	na	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	na	ND	ND	ND	na	na	ND	na	ND	ND	ND	ND	ND
9	Zumbro River Watershed	BF G	10/1/2009	na	ND	ND	ND	ND	ND	ND	ND	ND	ND	na	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	na	ND	ND	ND	na	na	ND	na	ND	ND	ND	ND	ND
9	Zumbro River Watershed	BF G	10/2/2009	na	ND	ND	ND	ND	ND	ND	ND	ND	ND	na	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	na	ND	ND	ND	na	na	ND	na	ND	ND	ND	ND	ND
9	Zumbro River Watershed	BF G	10/13/2009	na	ND	ND	ND	ND	ND	ND	ND	ND	ND	na	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	na	ND	ND	ND	na	na	ND	na	ND	ND	ND	ND	ND

				Inorganic Result (mg/L)					
Pesticide Monitoring Region	Sample Site	Sample Type	Sample Date	NO2 + NO3	TP	OP	DOP	TSS	NH3
8	Little Cobb River Watershed	BF G	5/5/2009	ND	0.01	ND			
8	Little Cobb River Watershed	BF G	4/16/2009	0.73	0.017	ND			
8	Little Cobb River Watershed	BF G	5/11/2009	ND	0.01	ND			
8	Little Cobb River Watershed	BF G	6/8/2009	0.48	0.023	0.009			
8	Little Cobb River Watershed	BF G	6/24/2009	ND	0.013	ND			
8	Little Cobb River Watershed	BF G	7/29/2009	0.71	ND	ND			
8	Little Cobb River Watershed	BF G	8/24/2009	ND	ND	ND			
8	Little Cobb River Watershed	BF G	10/7/2009	ND	ND	ND	ND		
9	Zumbro River Watershed	BF G	4/24/09	ND	0.036	0.015			
9	Zumbro River Watershed	BF G	5/26/2009	ND	0.023	0.014			
9	Zumbro River Watershed	BF G	6/6/2009	ND	ND	0.005			
9	Zumbro River Watershed	BF G	6/16/2009	ND	0.012	ND			
9	Zumbro River Watershed	BF G	7/22/2009	ND	0.046	0.018			
9	Zumbro River Watershed	BF G	7/29/2009	ND	0.02	ND			
9	Zumbro River Watershed	BF G	8/13/2009	ND	0.015	0.007			
9	Zumbro River Watershed	BF G	8/21/2009	ND	0.022	0.011			
9	Zumbro River Watershed	BF G	9/22/2009	ND					
9	Zumbro River Watershed	BF G	10/1/2009	ND	0.01	0.005	0.01		
9	Zumbro River Watershed	BF G	10/2/2009	ND	ND	0.007	0.007		
9	Zumbro River Watershed	BF G	10/13/2009	ND	0.01	ND			

Surface Water Quality Sample Data for Calendar Year 2009: Pesticide Results:

Urban Tier 1 and 2 Monitoring Sites

Pesticide Monitoring Region	Sample Site	Sample Type	Sample Date	Acid Herbicide Pesticide Results [υg/L]					
				2,4-D	Dicamba	Dichlorprop	MCPA	MCPP	Triclopyr
Urban	Basset Creek	BF G	5/27/2009	1.91	P	ND	ND	ND	ND
Urban	Basset Creek	SF G	6/8/2009	6	P	ND	ND	0.34	ND
Urban	Basset Creek	SF G	6/17/2009	0.65	P	ND	ND	0.22	ND
Urban	Basset Creek	BF G	7/15/2009	ND	ND	ND	ND	ND	ND
Urban	Basset Creek	SF G	7/21/2009	0.92	P	P	ND	P	ND
Urban	Basset Creek	SF G	8/10/2009	0.36	P	ND	0.2	ND	ND
Urban	Battle Creek	BF G	5/28/2009	ND	P	ND	P	ND	ND
Urban	Battle Creek	SF G	6/8/2009	0.35	P	ND	0.42	0.2	ND
Urban	Battle Creek	SF G	6/17/2009	0.35	P	ND	0.33	P	ND
Urban	Battle Creek	SF G	7/15/2009	P	P	ND	0.32	P	ND
Urban	Battle Creek	SF G	7/21/2009	ND	ND	ND	ND	ND	ND
Urban	Battle Creek	SF G	8/7/2009	0.24	ND	ND	ND	ND	ND
Urban	Fish Creek	BF G	5/28/2009	ND	ND	ND	ND	ND	ND
Urban	Fish Creek	SF G	6/8/2009	P	ND	ND	ND	ND	ND
Urban	Fish Creek	SF G	6/17/2009	ND	ND	ND	ND	ND	ND
Urban	Fish Creek	SF G	7/15/2009	ND	ND	ND	ND	ND	ND
Urban	Fish Creek	SF G	7/21/2009	ND	ND	ND	ND	ND	ND
Urban	Fish Creek	SF G	8/7/2009	ND	ND	ND	ND	ND	ND
Urban	Minnehaha Creek	BF G	5/27/2009	0.26	P	ND	ND	ND	ND
Urban	Minnehaha Creek	SF G	6/8/2009	0.53	P	ND	P	P	ND
Urban	Minnehaha Creek	SF G	6/17/2009	0.71	P	ND	P	0.27	ND
Urban	Minnehaha Creek	BF G	7/15/2009	NA	NA	NA	NA	NA	NA
Urban	Minnehaha Creek	SF G	7/21/2009	4.45	0.45	ND	0.48	0.97	ND
Urban	Minnehaha Creek	SF G	8/10/2009	0.52	P	ND	ND	ND	ND
Urban	Riley Creek	BF G	5/27/2009	ND	ND	ND	ND	ND	ND
Urban	Riley Creek	SF G	6/8/2009	ND	ND	ND	ND	ND	ND
Urban	Riley Creek	SF G	6/17/2009	ND	ND	ND	ND	ND	ND
Urban	Riley Creek	BF G	7/15/2009	ND	ND	ND	ND	ND	ND
Urban	Riley Creek	SF G	7/21/2009	0.39	ND	ND	ND	ND	ND
Urban	Riley Creek	SF G	8/10/2009	ND	ND	ND	ND	ND	ND
Urban	Nine Mile Creek	BF G	5/27/2009	P	ND	ND	ND	ND	ND
Urban	Nine Mile Creek	SF G	6/8/2009	0.33	P	ND	ND	P	0.2
Urban	Nine Mile Creek	BF G	6/10/2009	0.2	P	ND	ND	ND	ND
Urban	Nine Mile Creek	BF G	6/29/2009	0.2	P	ND	ND	ND	ND
Urban	Nine Mile Creek	BF G	7/15/2009	ND	ND	ND	ND	ND	ND
Urban	Nine Mile Creek	SF G	7/21/2009	0.36	P	ND	0.24	ND	ND
Urban	Nine Mile Creek	BF G	7/23/2009	0.2	ND	ND	ND	ND	ND
Urban	Nine Mile Creek	EFI	8/7/2009	0.72	P	ND	ND	ND	P
Urban	Nine Mile Creek	SF G	8/7/2009	4.8	P	ND	ND	0.25	0.55
Urban	Nine Mile Creek	SF G	8/11/2009	0.22	ND	ND	ND	ND	ND

Surface Water Quality Sample Data for Calendar Year 2009: Inorganic Results

Tier 1 Monitoring Sites

Pesticide Monitoring Region	Sample Site	Sample Type	Sample Date	Inorganic Result (mg/L) NO2 + NO3	TP	OP	DOP	TSS	NH3	(NTU) Turbidity
1	Grand Marais Creek	BF G	5/20/2009	ND	0.258	0.177			ND	
1	Grand Marais Creek	BF G	5/28/2009	ND	0.492	0.367			ND	
1	Grand Marais Creek	BF G	6/9/2009	ND	0.312	0.264			ND	
1	Grand Marais Creek	BF G	6/25/2009	ND	0.636	0.47			0.081	
1	Middle River	BF G	5/20/2009	ND	0.116	0.052			0.057	
1	Middle River	SF G	5/28/2009	ND	0.119	0.037			ND	
1	Middle River	BF G	6/9/2009	ND	0.072	0.035			ND	
1	Middle River	BF G	6/25/2009	ND	0.138	0.057			0.049	
1	Wild Rice River	BF G	5/13/2009	ND	0.084	0.022			0.022	
1	Wild Rice River	SF G	5/26/2009	ND	0.074	0.022			ND	
1	Wild Rice River	BF G	6/4/2009	ND	0.101	0.03			ND	
1	Wild Rice River	BF G	6/15/2009	ND	0.081	0.026			ND	
2	Big Fork River-Big Falls	BF G	5/13/2009	ND	0.042	0.006				
2	Big Fork River-Big Falls	BF G	6/1/2009	ND	0.031	0.012				
2	Big Fork River-Big Falls	BF G	6/30/2009	ND	0.03	0.009				
2	Big Fork River-Big Falls	BF G	6/15/2009	ND	0.029	0.007				
3	Kawishiwi River-Winton	BF G	5/13/2009	ND	0.021	ND				
3	Kawishiwi River-Winton	BF G	6/1/2009	ND	0.02	ND				
3	Kawishiwi River-Winton	BF G	6/15/2009	ND	0.017	ND				
3	Kawishiwi River-Winton	BF G	6/30/2009	ND	0.017	0.007				
4	Mississippi River-Aitkin	BF G	5/13/2009	ND	0.033	0.009				
4	Mississippi River-Aitkin	BF G	5/28/2009	ND	0.04	0.01				
4	Mississippi River-Aitkin	BF G	6/15/2009	0.41	0.047	0.013				
4	Mississippi River-Aitkin	SF G	6/22/2009	ND	0.056	0.015				
4	Crow River-Middle Fork-Spicer	BF G	5/14/2009	ND	0.045	0.012				
4	Crow River-Middle Fork-Spicer	BF G	5/21/2009	ND	0.044	0.016				
4	Crow River-Middle Fork-Spicer	SF G	6/9/2009	ND	0.035	0.009				
4	Crow River-Middle Fork-Spicer	SF G	6/18/2009	ND	0.042	0.012				
4	Pine River-Mission	BF G	5/13/2009	ND	0.034	0.008				
4	Pine River-Mission	BF G	5/28/2009	ND	0.035	0.008				
4	Pine River-Mission	BF G	6/15/2009	ND	0.028	0.014				
4	Pine River-Mission	SF G	6/22/2009	ND	0.032	ND				
5	Grindstone River-South Branch	BF G	5/14/2009	ND	0.075	0.014				
5	Grindstone River-South Branch	BF G	5/26/2009	ND	0.089	0.022				
5	Grindstone River-South Branch	BF G	6/9/2009	ND	0.088	0.015				
5	Grindstone River-South Branch	BF G	6/29/2009	ND	0.074	0.025				
5	Lawrence Creek	BF G	5/14/2009	1.2	0.023	0.006				
5	Lawrence Creek	BF G	5/26/2009	1.29	0.029	0.013				
5	Lawrence Creek	BF G	6/9/2009	1.35	0.03	0.016				
5	Lawrence Creek	BF G	6/29/2009	1.41	0.029	0.019				
5	Mission Creek	BF G	5/14/2009	ND	0.093	0.025				
5	Mission Creek	BF G	5/26/2009	ND	0.111	0.04				
5	Mission Creek	BF G	6/9/2009	ND	0.082	0.029				
5	Mission Creek	BF G	6/29/2009	ND	0.133	0.052				
5	Sunrise River-North Branch	BF G	5/14/2009	1.83	0.08	0.039				
5	Sunrise River-North Branch	BF G	5/26/2009	2.13	0.097	0.046				
5	Sunrise River-North Branch	BF G	6/9/2009	2.09	0.108	0.038				
5	Sunrise River-North Branch	BF G	6/29/2009	2.13	0.114	0.069				
6	Chippewa River-West Branch	BF G	5/14/2009	ND	0.052	0.016				
6	Chippewa River-West Branch	BF G	5/28/2009	ND	0.129	0.036				
6	Chippewa River-West Branch	SF G	6/9/2009	ND	0.138	0.028				
6	Chippewa River-West Branch	SF G	6/23/2009	0.53	0.162	0.03				
6	Dry Weather Creek	BF G	5/14/2009	2.71	0.048	0.009				
6	Dry Weather Creek	BF G	5/28/2009	ND	0.083	0.04				
6	Dry Weather Creek	SF G	6/9/2009	ND	0.068	0.025				
6	Dry Weather Creek	SF G	6/23/2009	0.81	0.086	0.043				
6	Shakopee Creek	BF G	5/14/2009	0.92	0.133	0.034				
6	Shakopee Creek	BF G	5/28/2009	0.51	0.139	0.045				
6	Shakopee Creek	SF G	6/9/2009	0.71	0.207	0.064				
6	Shakopee Creek	SF G	6/23/2009	2.76	0.259	0.063				
6	Yellow Medicine River-Granite Falls	BF G	5/13/2009	1.01	0.038	0.006				
6	Yellow Medicine River-Granite Falls	BF G	5/28/2009	0.53	0.048	0.007				
6	Yellow Medicine River-Granite Falls	BF G	6/15/2009	0.54	0.045	0.008				
6	Yellow Medicine River-Granite Falls	BF G	6/30/2009	1.83	0.106	0.039				
7	Beaver Creek	BF G	5/14/2009	8.54	0.052	0.01				
7	Beaver Creek	BF G	5/31/2009	4.21	0.095	0.018				
7	Beaver Creek	SF G	6/8/2009	4.07	0.088	0.016				
7	Beaver Creek	SF G	6/22/2009	13.3	0.152	0.035				
7	Rock River	BF G	5/14/2009	3.97	0.048	0.006				
7	Rock River	BF G	5/30/2009	2.44	0.042	0.007				
7	Rock River	SF G	6/8/2009	2.59	0.038	0.011				
7	Rock River	SF G	6/22/2009	2.93	0.108	0.042				
7	Three Mile Creek-Green Valley	BF G	5/14/2009	2.19	0.048	0.007				
7	Three Mile Creek-Green Valley	BF G	5/27/2009	1.2	0.081	0.029				
7	Three Mile Creek-Green Valley	BF G	6/15/2009	1.36	0.085	0.024				
7	Three Mile Creek-Green Valley	BF G	6/30/2009	1.3	0.081	0.026				

Surface Water Quality Sample Data for Calendar Year 2009: Inorganic Results

Tier 1 Monitoring Sites

				Inorganic Result						
				(mg/L)						(NTU)
Pesticide Monitoring Region	Sample Site	Sample Type	Sample Date	NO2 + NO3	TP	OP	DOP	TSS	NH3	Turbidity
8	Blue Earth River-Rapidan Dam	BF G	5/29/2009	3.17	0.079	0.022				
8	Blue Earth River-Rapidan Dam	SF G	6/12/2009	13.6	0.106	0.027		42.8		
8	Blue Earth River-Rapidan Dam	SF G	6/29/2009	8.28	0.147	0.055				
8	Cottonwood River-New Ulm	BF G	5/14/2009	4.54	0.07	0.009				
8	Cottonwood River-New Ulm	BF G	5/27/2009	1.48	0.056	0.008				
8	Cottonwood River-New Ulm	SF G	6/15/2009	7.5	0.069	0.007				
8	Cottonwood River-New Ulm	BF G	6/30/2009	2.07	0.106	0.032				
8	Crow River-South Fork-Cosmos	BF G	5/14/2009	0.56	0.184	0.049				
8	Crow River-South Fork-Cosmos	BF G	5/21/2009	1.15	0.13	0.031				
8	Crow River-South Fork-Cosmos	SF G	6/9/2009	2.3	0.117	0.031				
8	Crow River-South Fork-Cosmos	SF G	6/18/2009	4.04	0.091	0.015				
8	Little Cobb River	BF G	5/29/2009	4.73	0.12	0.045				
8	Little Cobb River	BF G	6/8/2009	2.69	0.169	0.069				
8	Little Cobb River	SF G	6/19/2009	5.66	0.143	0.036				
8	Little Cobb River	SF G	6/29/2009	9.75	0.175	0.042				
8	Little Cottonwood River	BF G	5/14/2009	5.82	0.037	0.007				
8	Little Cottonwood River	BF G	5/29/2009	2.99	0.072	0.027				
8	Little Cottonwood River	BF G	6/9/2009	5.35	0.087	0.024				
8	Little Cottonwood River	BF G	6/29/2009	3.77	0.145	0.058				
8	Minnesota River-Judson Bridge	BF G	5/14/2009	1.32	0.12	0.034				
8	Minnesota River-Judson Bridge	BF G	5/29/2009	ND	0.13	0.021				
8	Minnesota River-Judson Bridge	BF G	6/9/2009	0.62	0.118	0.017				
8	Minnesota River-Judson Bridge	BF G	6/29/2009	0.45	0.136	0.023				
8	Redwood River-Redwood Falls	BF G	5/14/2009	5.02	0.22	0.143				
8	Redwood River-Redwood Falls	BF G	5/27/2009	2.17	0.463	0.36				
8	Redwood River-Redwood Falls	SF G	6/15/2009	5.67	0.396	0.274				
8	Redwood River-Redwood Falls	BF G	6/30/2009	2.23	0.518	0.351				
8	Sleepy Eye Creek-Leavenworth	BF G	5/14/2009	11.4	0.06	0.01				
8	Sleepy Eye Creek-Leavenworth	BF G	5/27/2009	5.51	0.083	0.016				
8	Sleepy Eye Creek-Leavenworth	SF G	6/15/2009	12.3	0.073	0.03				
8	Sleepy Eye Creek-Leavenworth	BF G	6/30/2009	5.79	0.098	0.043				
8	Straight River-Fairbault	BF G	5/14/2009	4.8	0.141	0.066				
8	Straight River-Fairbault	BF G	5/28/2009	2.43	0.224	0.144				
8	Straight River-Fairbault	SF G	6/8/2009	2.02	0.291	0.253				
8	Straight River-Fairbault	SF G	6/19/2009	12.2	0.297	0.125				
9	Cannon River-Welch	BF G	5/15/2009	3.36	0.152	0.033				
9	Cannon River-Welch	BF G	5/28/2009	2.38	0.083	0.037				
9	Cannon River-Welch	SF G	6/8/2009	2.06	0.098	0.054				
9	Cannon River-Welch	SF G	6/17/2009	2.64	0.219	0.154				
9	Cannon River-Welch	SF G	6/22/2009	4.04	0.235	0.092				
9	Cedar River-Austin	SF G	5/7/2009	4.75	0.23	0.11				
9	Cedar River-Austin	SF G	5/27/2009	4.5	0.352	0.217				
9	Cedar River-Austin	SF G	6/8/2009	4.91	0.218	0.089				
9	Cedar River-Austin	SF G	6/18/2009	13.5	0.369	0.164				
9	Little Cannon River-Cannon Falls	BF G	5/15/2009	1.47	0.04	0.006				
9	Little Cannon River-Cannon Falls	BF G	5/28/2009	1.78	0.054	0.021				
9	Little Cannon River-Cannon Falls	SF G	6/8/2009	1.9	0.139	0.103				
9	Little Cannon River-Cannon Falls	SF G	6/17/2009	2.48	0.072	0.028				
9	Root River-Lower South Branch	BF G	5/14/2009	8.31	0.017	ND		2.9		1.96
9	Root River-Lower South Branch	SF G	5/27/2009	12.2	0.048	0.016				
9	Root River-Lower South Branch	SF G	6/8/2009	6.84	0.496	0.17				
9	Root River-Lower South Branch	SF G	6/18/2009	15.1	0.17	0.093				
9	Zumbro River	BF G	5/14/2009	3.91	0.055	0.018				
9	Zumbro River	BF G	5/28/2009	4.09	0.067	0.036				
9	Zumbro River	BF G	6/8/2009	3.61	0.06	0.019				
9	Zumbro River	BF G	6/25/2009	8.4	0.081	0.043				
10	Crow River-South Fork-Mayer	BF G	5/15/2009	1.77	0.159	0.038				
10	Crow River-South Fork-Mayer	BF G	5/27/2009	0.51	0.294	0.083				
10	Crow River-South Fork-Mayer	SF G	6/9/2009	0.77	0.395	0.168				
10	Crow River-South Fork-Mayer	SF G	6/18/2009	5.01	0.332	0.126				
10	Vermillion River-Farmington	BF G	5/14/2009	1.51	0.063	0.021				
10	Vermillion River-Farmington	BF G	5/28/2009	1.77	0.065	0.027				
10	Vermillion River-Farmington	SF G	6/8/2009	1.45	0.096	0.039				
10	Vermillion River-Farmington	SF G	6/17/2009	1.65	0.086	0.021				

Surface Water Quality Sample Data for Calendar Year 2009: Inorganic Results

Tier 1 Monitoring Sites

				Inorganic Result						
				(mg/L)						(NTU)
Pesticide Monitoring Region	Sample Site	Sample Type	Sample Date	NO2 + NO3	TP	OP	DOP	TSS	NH3	Turbidity
Urban	Basset Creek	BF G	5/27/2009	ND	0.09	0.035				
Urban	Basset Creek	SF G	6/8/2009	ND	0.158	0.031				
Urban	Basset Creek	SF G	6/17/2009	ND	0.167	0.044				
Urban	Basset Creek	BF G	7/15/2009	1.79	0.062	0.027				
Urban	Basset Creek	SF G	7/21/2009	ND	0.169	0.072				
Urban	Basset Creek	SF G	8/10/2009	ND	0.133	0.057				
Urban	Battle Creek	BF G	5/28/2009	0.52	0.264	0.099				
Urban	Battle Creek	SF G	6/8/2009	ND	0.2	0.049				
Urban	Battle Creek	SF G	6/17/2009	ND	0.104	0.04				
Urban	Battle Creek	SF G	7/15/2009	ND	0.127	0.046				
Urban	Battle Creek	SF G	7/21/2009	ND	0.118	0.024				
Urban	Battle Creek	SF G	8/7/2009	ND	0.102	0.03				
Urban	Fish Creek	BF G	5/28/2009	1.24	0.092	0.061				
Urban	Fish Creek	SF G	6/8/2009	0.97	0.084	0.052				
Urban	Fish Creek	SF G	6/17/2009	ND	0.083	0.06				
Urban	Fish Creek	SF G	7/15/2009	1.45	0.106	0.06				
Urban	Fish Creek	SF G	7/21/2009	0.78	0.138	0.045				
Urban	Fish Creek	SF G	8/7/2009	ND	0.755	0.179				
Urban	Minnehaha Creek	BF G	5/27/2009	ND	0.058	0.014				
Urban	Minnehaha Creek	SF G	6/8/2009	ND	0.136	0.03				
Urban	Minnehaha Creek	SF G	6/17/2009	ND	0.14	0.034				
Urban	Minnehaha Creek	BF G	7/15/2009	ND	0.38	0.062				
Urban	Minnehaha Creek	SF G	7/21/2009	ND	0.228	0.043				
Urban	Minnehaha Creek	SF G	8/10/2009	ND	0.109	0.031				
Urban	Riley Creek	BF G	5/27/2009	1.65	0.05	0.024				
Urban	Riley Creek	SF G	6/8/2009	1.6	0.058	0.013				
Urban	Riley Creek	SF G	6/17/2009	1.57	0.066	0.015				
Urban	Riley Creek	BF G	7/15/2009	1.75	0.062	0.027				
Urban	Riley Creek	SF G	7/21/2009	1.28	0.06	0.03				
Urban	Riley Creek	SF G	8/10/2009	1.52	0.057	0.017				

Surface Water Quality Sample Data for Calendar Year 2009: Inorganic Results

Tier 2 Monitoring Sites

Pesticide Monitoring Region	Sample Site	Sample Type	Sample Date	Inorganic Result (mg/L) NO2 + NO3	TP	OP	DOP	TSS	NH3	(NTU) Turbidity
1	Bois de Sioux River	BF G	5/13/2009	ND	0.17	0.101				
1	Bois de Sioux River	SF G	5/26/2009	ND	0.353	0.203				
1	Bois de Sioux River	SF G	5/29/2009	ND	0.321	0.205				
1	Bois de Sioux River	BF G	6/4/2009	ND	0.257	0.098				
1	Bois de Sioux River	BF G	6/15/2009	ND	0.172	0.036				
1	Snake River	BF G	5/20/2009	ND	0.1	0.049			ND	
1	Snake River	SF G	5/26/2009	ND	0.322	0.193			ND	
1	Snake River	SF G	5/28/2009	1.38	0.331	0.202			0.419	
1	Snake River	BF G	6/9/2009	ND	0.211	0.065			0.108	
1	Snake River	BF G	6/25/2009	ND	0.154	0.074			0.092	
4	Little Rock Creek-Rice	BF G	5/13/2009	4.48	0.056	0.019				
4	Little Rock Creek-Rice	BF G	5/28/2009	5.32	0.05	0.023				
4	Little Rock Creek-Rice	BF G	6/9/2009	5.34	0.039	0.017				
4	Little Rock Creek-Rice	SF G	6/16/2009	5.48	0.062	0.02				
4	Little Rock Creek-Rice	SF G	6/18/2009	5.95	0.05	0.021				
7	Pipestone Creek	BF G	5/13/2009	12.3	0.022	ND				
7	Pipestone Creek	BF G	5/28/2009	8.41	0.02	ND				
7	Pipestone Creek	BF G	6/15/2009	7.08	0.042	0.006				
7	Pipestone Creek	BF G	6/30/2009	13.5	0.024	0.006				
8	Dutch Creek	BF G	5/5/2009	8.81	0.062	0.015				
8	Dutch Creek	BF G	5/7/2009	9.84	0.055	0.011				
8	Dutch Creek	BF G	5/27/2009	8.33	0.068	0.032				
8	Dutch Creek	BF G	5/29/2009	7.64	0.08	0.039				
8	Dutch Creek	BF G	6/10/2009	13.4	0.047	0.027				
8	Dutch Creek	BF G	6/12/2009	12.1	0.068	0.036				
8	Dutch Creek	BF G	7/1/2009	6.11	0.072	0.041				
8	Jack Creek	BF G	5/1/2009	8.29	0.068	0.01				
8	Jack Creek	BF G	5/31/2009	5.31	0.099	0.014				
8	Jack Creek	SF G	6/8/2009	7.28	0.111	0.024				
8	Jack Creek	BF G	6/12/2009	12.8	0.118	0.032				
8	Jack Creek	SF G	6/22/2009	10.2	0.246	0.061				
8	Jack Creek	BF G	6/26/2009	10	0.142	0.055				
9	Root River-South Fork	BF G	2/4/2009	5.56	0.033	0.016		2.7		
9	Root River-South Fork	BF G	5/13/2009	4.12	0.037	0.007				
9	Root River-South Fork	SF G	5/27/2009	4.21	0.074	0.033				
9	Root River-South Fork	SF G	6/8/2009	4.17	0.259	0.072				
9	Root River-South Fork	SF G	6/10/2009	4.68	0.084	0.041				
9	Root River-South Fork	BF G	6/25/2009	4.89	0.15	0.067				
9	Whitewater River-South Branch	BF G	2/4/2009	7.49	0.138	0.108		2.6		
9	Whitewater River-South Branch	BF G	5/14/2009	6.33	0.105	0.051				
9	Whitewater River-South Branch	BF G	5/27/2009	6.37	0.138	0.119				
9	Whitewater River-South Branch	BF G	6/8/2009	6.7	0.128	0.098				
9	Whitewater River-South Branch	BF G	6/25/2009	6.84	0.104	0.071				
10	Silver Creek-CR41	BF G	5/15/2009	5.3	0.041	0.01				
10	Silver Creek-CR41	BF G	5/27/2009	2.19	0.17	0.122				
10	Silver Creek-CR41	SF G	6/8/2009	1.57	0.185	0.091				
10	Silver Creek-CR41	SF G	6/10/2009	11.6	0.241	0.196				
10	Silver Creek-CR41	BF G	6/11/2009	12.5	0.145	0.063				
10	Silver Creek-CR41	BF G	6/17/2009	7.35	0.126	0.045				
10	Silver Creek-CR41	SF G	6/18/2009	6.78	0.145	0.054				

Surface Water Quality Sample Data for Calendar Year 2009: Inorganic Results

Tier 3 Monitoring Sites

				Inorganic Result						
				(mg/L)						(NTU)
Pesticide Monitoring Region	Sample Site	Sample Type	Sample Date	NO2 + NO3	TP	OP	DOP	TSS	NH3	Turbidity
1	Buffalo River-Dilworth	SF G	3/24/2009	0.49	0.269	0.103		100		
1	Buffalo River-Dilworth	SF G	4/21/2009	ND	0.151	0.089		20.8		
1	Buffalo River-Dilworth	SF G	5/11/2009	ND	0.104	0.042		21.6		
1	Buffalo River-Dilworth	SF G	5/20/2009	ND	0.11	0.049		31.2		
1	Buffalo River-Dilworth	SF G	5/29/2009	1.3	0.245	0.143				
1	Buffalo River-Dilworth	SF G	6/10/2009	ND	0.115	0.048		69		
1	Buffalo River-Dilworth	SF G	6/20/2009	2.92	0.331	0.206		339		
1	Buffalo River-Dilworth	SF G	6/25/2009	0.53	0.265	0.205		52		
1	Buffalo River-Dilworth	SF G	6/29/2009	ND	0.346	0.245		90.8		
1	Buffalo River-Dilworth	SF G	7/1/2009	0.4	0.316	0.184		105		
1	Buffalo River-Dilworth	BF G	7/6/2009	0.46	0.25	0.146		83		
1	Buffalo River-Dilworth	BF G	7/30/2009	ND	0.165	0.09		52		
1	Buffalo River-Dilworth	SF G	8/20/2009	ND	0.143	0.069		79.2		
1	Buffalo River-Dilworth	SF G	8/25/2009	ND	0.219	0.139		92		
1	Buffalo River-Dilworth	BF G	9/3/2009	ND	0.119	0.068		25.6		
1	Buffalo River-Dilworth	SF G	10/7/2009	0.93	0.2	0.096	0.198	52.8		
1	Buffalo River-Dilworth	SF G	10/22/2009	ND	0.151	0.095	0.09	25.4		
1	Buffalo River-Dilworth	SF G	11/6/2009	0.51	0.226	0.141	0.132	78		
1	Buffalo River-Dilworth	SF G	11/12/2009	0.65	0.134	0.08		30		
1	Buffalo River-Dilworth	BF G	11/25/2009	0.44	0.076	0.046		21		
8	Beauford Ditch	SF G	2/11/2009	4.11	2.34	2.15		38		
8	Beauford Ditch	BF G	4/23/2009	8.59	0.037	0.011		7.4		
8	Beauford Ditch	SF G	4/27/2009	8.26	0.059	0.027		5.2		
8	Beauford Ditch	BF G	5/5/2009	9.82	0.04	0.011		6.8		
8	Beauford Ditch	SF G	5/11/2009	14.1	0.045	0.019				
8	Beauford Ditch	BF G	5/29/2009	7.89	0.042	0.011				
8	Beauford Ditch	BF G	6/8/2009	6.23	0.059	0.024				
8	Beauford Ditch	BF G	6/10/2009	11.4	0.032	0.009				
8	Beauford Ditch	BF G	6/29/2009	12.7	0.05	0.021				
8	Beauford Ditch	BF G	10/7/2009	0.94	0.331	0.225	0.201			
8	Beauford Ditch	SF G	10/30/2009	7.84	0.223	0.156	0.15	24		
8	LeSueur River-Hwy 66	BF G	1/30/2009	1.48	0.054	0.023				
8	LeSueur River-Hwy 66	SF G	2/11/2009	2.8	0.684	0.572		65		
8	LeSueur River-Hwy 66	BF G	4/24/2009	1.74	0.093	0.036		32.8		
8	LeSueur River-Hwy 66	BF G	5/5/2009	6.54	0.092	0.017		37.2		
8	LeSueur River-Hwy 66	BF G	6/1/2009	2.8	0.046	0.01				
8	LeSueur River-Hwy 66	SF G	6/8/2009	2.48	0.102	0.014		73		
8	LeSueur River-Hwy 66	BF G	6/18/2009		0.152	0.063				
8	LeSueur River-Hwy 66	EFI	6/23/2009	11.2	0.327	0.155				
8	LeSueur River-Hwy 66	SF G	6/24/2009	9.46	0.362	0.163		428		
8	LeSueur River-Hwy 66	BF G	7/29/2009	ND	0.028	0.008				
8	LeSueur River-Hwy 66	BF G	8/26/2009	ND	0.085	0.012				
8	LeSueur River-Hwy 66	BF G	10/7/2009	ND	0.082	0.03	0.027	16.2		
8	LeSueur River-Hwy 66	SF G	11/2/2009	10.1	0.18	0.101	0.095	84.8		
8	Seven Mile Creek #3	BF G	1/30/2009	5.17	0.014	0.006				
8	Seven Mile Creek #3	SF G	2/11/2009	4.99	0.742	0.573		27		
8	Seven Mile Creek #3	SF G	3/23/2009	11.9	0.631	0.284		668		
8	Seven Mile Creek #3	EFI	3/23/2009	15.4	0.83	0.239		1010		
8	Seven Mile Creek #3	BF G	4/23/2009	7.88	0.046	0.019				
8	Seven Mile Creek #3	BF G	5/5/2009	7.63	0.031	0.005				
8	Seven Mile Creek #3	BF G	5/14/2009	9.45	0.028	0.005				
8	Seven Mile Creek #3	BF G	5/29/2009	4.61	0.053	0.027				
8	Seven Mile Creek #3	BF G	6/9/2009	8.28	0.073	0.041				
8	Seven Mile Creek #3	BF G	6/29/2009	4.99	0.08	0.042				
8	Seven Mile Creek #3	BF G	7/29/2009	5.4	ND	ND				
8	Seven Mile Creek #3	BF G	8/26/2009	4.71	0.019	ND				
8	Seven Mile Creek #3	BF G	10/7/2009	3.48	0.088	0.048	0.045			
8	Seven Mile Creek #3	SF G	11/2/2009	5.8	0.5	0.435	0.416			

Surface Water Quality Sample Data for Calendar Year 2009: Inorganic Results

Tier 3 Monitoring Sites

				Inorganic Result						
				(mg/L)						(NTU)
Pesticide Monitoring Region	Sample Site	Sample Type	Sample Date	NO2 + NO3	TP	OP	DOP	TSS	NH3	Turbidity
9	Root River-North Branch	BF G	1/29/2009	5.39	0.045	0.02		2.7		
9	Root River-North Branch	SF G	2/10/2009	3.19	1.31	0.281		1560	1.44	276
9	Root River-North Branch	SF G	3/11/2009	3.74	0.412	0.264		138	0.35	57
9	Root River-North Branch	BF G	4/27/09	3.47	0.092	0.022		26.2		
9	Root River-North Branch	BF G	5/13/2009	3.8	0.042	0.006		11.1		4.32
9	Root River-North Branch	SF G	5/27/2009	3.47	0.076	0.026		15.7		5.78
9	Root River-North Branch	SF G	5/28/2009	4.19	0.107	0.048		33.4		
9	Root River-North Branch	SF G	6/8/2009	5.5	0.091	0.024		60.8		18.1
9	Root River-North Branch	SF G	6/8/2009	5.53	0.072	0.022		23.2		9.33
9	Root River-North Branch	SF G	6/9/2009	6.91	0.35	0.064		1020		360
9	Root River-North Branch	SF G	6/9/2009	5.76	0.359	0.116		618		
9	Root River-North Branch	ETI	6/9/2009	10.7	0.502	0.085		841		
9	Root River-North Branch	SF G	6/9/2009	5.44	0.526	0.068		1060		476
9	Root River-North Branch	SF G	6/12/2009	13.6	0.149	0.047		108		45.4
9	Root River-North Branch	SF G	6/19/2009	8.94	0.42	0.102		468		262
9	Root River-North Branch	ETI	6/19/2009	11.7	0.317	0.075		264		
9	Root River-North Branch	SF G	6/22/2009	13.7	0.136	0.051		63		31.8
9	Root River-North Branch	BF G	7/27/2009	4.59	0.066	0.029		5.8		2.5
9	Root River-North Branch	BF G	8/10/2009	4.15	0.108	0.063		9.2		5.78
9	Root River-North Branch	BF G	8/25/2009	4.16	0.036	0.015		8.6		3.73
9	Root River-North Branch	BF G	9/9/2009	3.77	0.023	ND		4.3		2.38
9	Root River-North Branch	BF G	10/2/2009	4.09	0.048	0.025	0.029	55		2.86
9	Root River-North Branch	ETI	10/22/2009	6.68	0.236	0.074	0.072	154		
9	Root River-North Branch	EFI	10/24/2009	6.19	0.346	0.112	0.11			
9	Root River-North Branch	SF G	10/29/2009	8.96	0.09	0.036	0.038	30.6		12.8
9	Root River-North Branch	SF G	10/30/2009	8.18	0.157	0.053	0.051	114		
9	Root River-North Branch	ETI	10/30/2009	7.12	0.227	0.089	0.082	192		
9	Root River-North Branch	SF G	11/2/2009	8.85	0.105	0.047	0.046	47.2		23.7
9	Root River-South Branch-Carimona	BF G	2/4/2009	7.57	0.042	0.022		4.3		
9	Root River-South Branch-Carimona	SF G	2/10/2009	5.12	0.614	0.222		356	0.325	186
9	Root River-South Branch-Carimona	SF G	3/11/2009	4.14	0.286	0.212		24.2	0.218	20.4
9	Root River-South Branch-Carimona	BF G	4/27/09	5.21	0.063	0.026		12.4		
9	Root River-South Branch-Carimona	BF G	5/14/2009	5.49	0.034	0.013		3.6		
9	Root River-South Branch-Carimona	SF G	5/28/2009	6.61	0.112	0.057		57.4		
9	Root River-South Branch-Carimona	SF G	6/8/2009	7.32	0.472	0.08		1020		545
9	Root River-South Branch-Carimona	ETI	6/8/2009	5.75	0.647	0.099		1260		
9	Root River-South Branch-Carimona	SF G	6/9/2009	8.76	0.292	0.102		229		139
9	Root River-South Branch-Carimona	ETI	6/9/2009	11.6	0.135	0.053		92.8		53
9	Root River-South Branch-Carimona	SF G	6/11/2009	12.8	0.079	0.035		50		17
9	Root River-South Branch-Carimona	SF G	6/12/2009	12.7	0.066	0.031		31.8		17.8
9	Root River-South Branch-Carimona	SF G	6/18/2009	7.12	0.29	0.091		354		248
9	Root River-South Branch-Carimona	ETI	6/18/2009	7.23	0.437	0.093		428		
9	Root River-South Branch-Carimona	SF G	6/19/2009	8.21	0.227	0.104		137		117
9	Root River-South Branch-Carimona	ETI	6/19/2009	11.8	0.147	0.054		75		
9	Root River-South Branch-Carimona	SF G	6/22/2009	12.9	0.068	0.027		19.8		8.39
9	Root River-South Branch-Carimona	BF G	7/27/2009	6.26	0.041	0.02		3.4		2.18
9	Root River-South Branch-Carimona	BF G	8/10/2009	6.25	0.039	0.013		2.4		
9	Root River-South Branch-Carimona	BF G	8/25/2009	6.03	0.035	0.014		5.7		3.09
9	Root River-South Branch-Carimona	BF G	9/9/2009	5.77	0.029	0.01		2.3		1.3
9	Root River-South Branch-Carimona	BF G	10/2/2009	5.78	0.043	0.024	0.024	1.7		1.91
9	Root River-South Branch-Carimona	ETI	10/22/2009	6.12	0.16	0.053	0.059	102		
9	Root River-South Branch-Carimona	BF G	10/28/2009	9.32	0.05	0.024		6.9		3.12
9	Root River-South Branch-Carimona	ETI	10/29/2009	7.08	0.222	0.07	0.063	136		
9	Root River-South Branch-Carimona	SF G	10/30/2009	9.08	0.106	0.033	0.031	87.6		
9	Root River-South Branch-Carimona	SF G	11/2/2009	9.25	0.057	0.025		10.6		
9	Whitewater River-Middle Branch	BF G	2/4/2009	11.8	0.032	0.014		2.8		
9	Whitewater River-Middle Branch	SF G	2/10/2009	1.87	1.22	0.422		794	0.858	300
9	Whitewater River-Middle Branch	SF G	3/10/2009	3.24	1.54	0.71		814	0.803	346
9	Whitewater River-Middle Branch	BF G	4/27/09	7.31	0.227	0.128		23.4	0.237	
9	Whitewater River-Middle Branch	BF G	5/14/2009	9.99	0.04	0.012		3.9		
9	Whitewater River-Middle Branch	SF G	5/27/2009	6.93	0.489	0.363		48.8		
9	Whitewater River-Middle Branch	SF G	5/28/2009	9.16	0.203	0.127		37.2		
9	Whitewater River-Middle Branch	SF G	6/8/2009	7.89	0.246	0.122		28.8		
9	Whitewater River-Middle Branch	BF G	6/15/2009	10.6	0.051	0.021		10.3		
9	Whitewater River-Middle Branch	BF G	6/25/2009	10.4	0.059	0.027		8.2		
9	Whitewater River-Middle Branch	BF G	7/27/2009	10.1	0.037	0.013		9.1		
9	Whitewater River-Middle Branch	BF G	8/10/2009	10.2	0.074	0.028		9.9		4.96
9	Whitewater River-Middle Branch	BF G	8/25/2009	10.4	0.042	0.017		7.1		2.94
9	Whitewater River-Middle Branch	BF G	9/9/2009	10.1	0.032	0.009		3.3		1.79
9	Whitewater River-Middle Branch	BF G	10/2/2009	9.54	0.187	0.125	0.126	17.6		10.8
9	Whitewater River-Middle Branch	BF G	10/30/2009	7.38	0.258	0.156	0.148	26		

Surface Water Quality Sample Data for Calendar Year 2009: Inorganic Results

CWL Monitoring Sites

				Inorganic Result						
				(mg/L)						(NTU)
Pesticide Monitoring Region	Sample Site	Sample Type	Sample Date	NO2 + NO3	TP	OP	DOP	TSS	NH3	Turbidity
9	Root River-Upper South Branch	SF G	2/10/2009	1.96	1.12	0.802		86	0.439	55
9	Root River-Upper South Branch	BF G	4/27/09	8.51	0.154	0.093		9.8		11.4
9	Root River-Upper South Branch	BF G	5/14/2009	11.3	0.019	ND		3.9		1.36
9	Root River-Upper South Branch	BF G	5/27/2009	10.5	0.032	0.014		4.4		3.48
9	Root River-Upper South Branch	SF G	5/27/2009	13.6	0.05	0.024		10.1		7.09
9	Root River-Upper South Branch	SF G	6/8/2009	2.85	3.99	0.226		3240		1540
9	Root River-Upper South Branch	SF G	6/8/2009	2.85	1.47	0.139		1210		700
9	Root River-Upper South Branch	SF G	6/8/2009	3.73	1.25	0.132		888		568
9	Root River-Upper South Branch	SF G	6/8/2009	3.01	1.26	0.155		928		600
9	Root River-Upper South Branch	SF G	6/8/2009	2.84	0.978	0.23		616		450
9	Root River-Upper South Branch	SF G	6/8/2009	3.26	0.815	0.237		550		380
9	Root River-Upper South Branch	SF G	6/8/2009	3.84	0.612	0.229		434		335
9	Root River-Upper South Branch	SF G	6/8/2009	5.4	0.489	0.212		286		245
9	Root River-Upper South Branch	SF G	6/8/2009	6.69	0.385	0.2		226		210
9	Root River-Upper South Branch	SF G	6/8/2009	9.79	0.26	0.142		197		149
9	Root River-Upper South Branch	SF G	6/8/2009	13.1	0.305	0.163		132		110
9	Root River-Upper South Branch	SF G	6/8/2009	16.2	0.242	0.138		70		72
9	Root River-Upper South Branch	SF G	6/8/2009	18.6	0.171	0.108		50		46.2
9	Root River-Upper South Branch	SF G	6/17/2009	6.89	0.583	0.116		648		443
9	Root River-Upper South Branch	SF G	6/17/2009	4.51	1.14	0.165		902		650
9	Root River-Upper South Branch	SF G	6/17/2009	5.1	0.679	0.151		786		515
9	Root River-Upper South Branch	SF G	6/17/2009	2.43	0.778	0.199		894		585
9	Root River-Upper South Branch	SF G	6/18/2009	2.59	0.762	0.214		634		458
9	Root River-Upper South Branch	SF G	6/18/2009	3.52	0.656	0.21		420		358
9	Root River-Upper South Branch	SF G	6/18/2009	4.34	0.534	0.196		354		316
9	Root River-Upper South Branch	SF G	6/18/2009	8.62	0.5	0.195		144		187
9	Root River-Upper South Branch	SF G	6/18/2009	13.4	0.26	0.135		49		90.6
9	Root River-Upper South Branch	SF G	6/18/2009	16.7	0.175	0.095		25		51.4
9	Root River-Upper South Branch	SF G	6/18/2009	20.2	0.1	0.051		15.6		24.3
9	Root River-Upper South Branch	BF G	8/10/2009	0.48	0.059	0.008		20.2		17.8
9	Root River-Upper South Branch	BF G	9/8/2009	ND	0.052	0.012		7.6		5.99
9	Root River-Upper South Branch	BF G	9/30/2009	ND	0.017	ND	ND	2.5		2.4
9	Root River-Upper South Branch	SF G	10/23/2009	9.57	0.101	0.054		12.4		14.9
9	Root River-Upper South Branch	SF G	10/23/2009	7.21	0.156	0.073		41.2		50.1
9	Root River-Upper South Branch	SF G	10/23/2009	6.78	0.165	0.088	0.085	37.6		48.3
9	Root River-Upper South Branch	SF G	10/24/2009	10.1	0.078	0.047		11.2		16.3
9	Root River-Upper South Branch	SF G	10/29/2009	7.92	0.148	0.051	0.041	64		73.7
9	Root River-Upper South Branch	SF G	10/29/2009	6.85	0.25	0.096	0.086	101		100
9	Root River-Upper South Branch	SF G	10/29/2009	4.83	0.32	0.118	0.106	109		147
9	Root River-Upper South Branch	SF G	10/29/2009	3.99	0.364	0.127	0.114	119		168
9	Root River-Upper South Branch	SF G	10/29/2009		0.403	0.156	0.149			
9	Root River-Upper South Branch	SF G	11/2/2009	12.1	0.014	0.01		3		1.9

Surface Water Quality Sample Data for Calendar Year 2009: Inorganic Results

CWL Monitoring Sites

				Inorganic Result						
				(mg/L)						(NTU)
Pesticide Monitoring Region	Sample Site	Sample Type	Sample Date	NO2 + NO3	TP	OP	DOP	TSS	NH3	Turbidity
9	Root River-Lower South Branch	BF G	4/27/09	5.81	0.048	0.023		6.3		6.44
9	Root River-Lower South Branch	BF G	5/27/2009	8.69	0.035	0.013		7.2		6.3
9	Root River-Lower South Branch	SF G	6/8/2009	3.32	0.616	0.195		440		305
9	Root River-Lower South Branch	SF G	6/8/2009	2.77	1.2	0.169		864		470
9	Root River-Lower South Branch	SF G	6/8/2009	2.16	0.921	0.165		824		495
9	Root River-Lower South Branch	SF G	6/8/2009	3.88	0.846	0.206		452		348
9	Root River-Lower South Branch	SF G	6/8/2009	5.98	0.473	0.154		384		302
9	Root River-Lower South Branch	SF G	6/8/2009	7.05	0.462	0.167		264		239
9	Root River-Lower South Branch	SF G	6/8/2009	7.57	0.398	0.166		156		168
9	Root River-Lower South Branch	SF G	6/8/2009	8.95	0.37	0.168		100		122
9	Root River-Lower South Branch	SF G	6/8/2009	10.9	0.294	0.155		62		90.4
9	Root River-Lower South Branch	SF G	6/8/2009	15.4	0.221	0.131		33		52.8
9	Root River-Lower South Branch	SF G	6/8/2009	18.1	0.139	0.078		19.6		26.9
9	Root River-Lower South Branch	SF G	6/17/2009	10.2	0.402	0.122		436		278
9	Root River-Lower South Branch	SF G	6/17/2009	4.49	0.701	0.134		856		518
9	Root River-Lower South Branch	SF G	6/17/2009	2.21	1.18	0.207		928		600
9	Root River-Lower South Branch	SF G	6/17/2009	1.86	1.28	0.21		834		610
9	Root River-Lower South Branch	SF G	6/17/2009	2.15	1.19	0.215		724		548
9	Root River-Lower South Branch	SF G	6/17/2009	2.95	0.83	0.209		546		423
9	Root River-Lower South Branch	SF G	6/18/2009	4.66	0.76	0.176				
9	Root River-Lower South Branch	SF G	6/18/2009	5.6	0.75	0.183		476		383
9	Root River-Lower South Branch	SF G	6/18/2009	5.61	0.519	0.199		306		303
9	Root River-Lower South Branch	SF G	6/18/2009	5.86	0.491	0.219		186		240
9	Root River-Lower South Branch	SF G	6/18/2009	9.57	0.351	0.177		76		142
9	Root River-Lower South Branch	SF G	6/18/2009	17.5	0.12	0.062		25.2		29.3
9	Root River-Lower South Branch	BF G	8/10/2009	ND	0.11	0.018		13		11
9	Root River-Lower South Branch	BF G	9/8/2009	ND	0.188	0.02		26		16.8
9	Root River-Lower South Branch	BF G	9/30/2009	ND	0.131	0.021	0.013	22.8		16.2
9	Root River-Lower South Branch	SF G	10/29/2009	3.05	0.343	0.137	0.132	90		150
9	Root River-Lower South Branch	BF G	11/2/2009	9.82	0.014	0.009	0.012	2.2		2.39

Surface Water Quality Sample Data for Calendar Year 2009: Inorganic Results

Tile Drain Monitoring Sites

Pesticide Monitoring Region	Sample Site	Sample Type	Sample Date	Inorganic Result (mg/L)					
				NO2 + NO3	TP	OP	DOP	TSS	NH3
8	Highway 90 North 1	SF G	3/20/2009	4.03	0.115	0.151			
8	Highway 90 North 1	SF G	3/23/2009	7.62	0.122	0.178			
8	Highway 90 North 1	SF G	3/23/2009		0.108	0.178	0.1		
8	Highway 90 North 1	EFI	3/23/2009	8.71	0.14	0.197			
8	Highway 90 North 1	SF G	3/24/2009	8.84	0.138	0.194			
8	Highway 90 North 1	EFI	3/24/2009	9.32	0.057	0.11			
8	Highway 90 North 1	SF G	3/27/2009	7.88	0.021	0.035			
8	Highway 90 North 1	BF G	4/16/2009	9.48	0.012	0.017			
8	Highway 90 North 1	BF G	4/29/2009	10	0.009	ND			
8	Highway 90 North 1	BF G	5/5/2009	8.08	0.009	0.012			
8	Highway 90 North 1	BF G	5/13/2009	10.2	0.007	0.017			
8	Highway 90 North 1	SF G	6/8/2009	11.6	0.014	0.028			
8	Highway 90 North 1	EFI	6/8/2009	11.5	0.012	0.026			
8	Highway 90 North 1	BF G	6/25/2009	8.96	0.008	ND			
8	Highway 90 North 1	BF G	7/15/2009	9.63	0.009	0.014			
8	Highway 90 North 1	BF G	10/26/2009	10.1	0.005	0.013			
8	Highway 90 North 1	SF G	10/30/2009	10.2	0.011	0.018	0.012		
8	Highway 90 North 1	BF G	11/13/2009	9.73	0.009	0.012			
8	Highway 90 North 1	SF G	11/24/2009	9.24	0.116	0.133		NA	
8	Highway 90 North 1	SF G	11/30/2009	9.46	0.011	0.018		NA	
8	Highway 90 North 2	SF G	3/20/2009	3.13	0.35	0.419			
8	Highway 90 North 2	SF G	3/23/2009	7.94	0.411	0.488			
8	Highway 90 North 2	SF G	3/23/2009		0.419	0.487	0.384		
8	Highway 90 North 2	EFI	3/23/2009	8.04	0.32	0.402			
8	Highway 90 North 2	SF G	3/24/2009	8.25	0.334	0.405			
8	Highway 90 North 2	EFI	3/24/2009	8.57	0.276	0.352			
8	Highway 90 North 2	SF G	3/27/2009	11.1	0.046	0.074			
8	Highway 90 North 2	BF G	4/16/2009	13.2	0.017	0.025			
8	Highway 90 North 2	BF G	4/29/2009	11.3	0.021	0.026			
8	Highway 90 North 2	BF G	5/5/2009	12.2	0.017	0.022			
8	Highway 90 North 2	BF G	5/13/2009	13.4	0.016	0.028			
8	Highway 90 North 2	SF G	6/8/2009	13.2	0.05	0.08			
8	Highway 90 North 2	EFI	6/8/2009	13.4	0.037	0.066			
8	Highway 90 North 2	BF G	6/25/2009	11.8	0.016	0.021			
8	Highway 90 North 2	BF G	10/26/2009	11.6	0.036	0.043			
8	Highway 90 North 2	SF G	10/30/2009	12.3	0.05	0.062	0.048		
8	Highway 90 North 2	BF G	11/13/2009	13.8	0.015	0.021			
8	Highway 90 North 2	SF G	11/24/2009	11.9	0.156	0.228		NA	
8	Highway 90 North 2	SF G	11/30/2009	13.6	0.017	0.022		NA	
8	Highway 90 South 1	SF G	3/23/2009	8.92	0.277	0.441			
8	Highway 90 South 1	SF G	3/23/2009		0.317	0.529	0.296		
8	Highway 90 South 1	EFI	3/23/2009	11.3	0.262	0.375			
8	Highway 90 South 1	SF G	3/24/2009	11.5	0.227	0.312			
8	Highway 90 South 1	EFI	3/24/2009	13.4	0.122	0.182			
8	Highway 90 South 1	SF G	3/27/2009	13.5	0.038	0.055			
8	Highway 90 South 1	BF G	4/16/2009	13.8	0.013	0.02			
8	Highway 90 South 1	BF G	4/29/2009	12.9	0.012	0.016			
8	Highway 90 South 1	BF G	5/5/2009	13.2	0.01	0.014			
8	Highway 90 South 1	BF G	5/13/2009	14.1	0.008	0.016			
8	Highway 90 South 1	SF G	6/8/2009	14.6	0.015	0.035			
8	Highway 90 South 1	EFI	6/8/2009	15.3	0.015	0.032			
8	Highway 90 South 1	BF G	6/25/2009	11.4	0.013	0.017			
8	Highway 90 South 1	BF G	7/15/2009	13.1	0.005	ND			
8	Highway 90 South 1	SF G	10/30/2009	15.3	0.024	0.038	0.022		
8	Highway 90 South 1	BF G	11/13/2009	14.1	0.014	0.018			
8	Highway 90 South 1	SF G	11/24/2009	12.9	0.078	0.095		NA	
8	Highway 90 South 1	SF G	11/30/2009	13.8	0.016	0.024		NA	

Surface Water Quality Sample Data for Calendar Year 2009: Inorganic Results

Tile Drain Monitoring Sites

Pesticide Monitoring Region	Sample Site	Sample Type	Sample Date	Inorganic Result (mg/L)					
				NO2 + NO3	TP	OP	DOP	TSS	NH3
8	Highway 90 South 2	SF G	3/23/2009	10.8	0.139	0.216			
8	Highway 90 South 2	SF G	3/23/2009		0.131	0.239	0.126		
8	Highway 90 South 2	EFI	3/23/2009	11.2	0.146	0.221			
8	Highway 90 South 2	SF G	3/24/2009	11.9	0.106	0.161			
8	Highway 90 South 2	EFI	3/24/2009	12.2	0.088	0.14			
8	Highway 90 South 2	SF G	3/27/2009	13	0.015	0.028			
8	Highway 90 South 2	BF G	4/16/2009	12.9	0.009	0.014			
8	Highway 90 South 2	BF G	4/29/2009	11.9	0.007	0.012			
8	Highway 90 South 2	BF G	5/5/2009	12.3	0.007	ND			
8	Highway 90 South 2	BF G	5/13/2009	12.9	0.006	0.014			
8	Highway 90 South 2	SF G	6/8/2009	12.4	0.011	0.029			
8	Highway 90 South 2	EFI	6/8/2009	12.5	0.013	0.023			
8	Highway 90 South 2	BF G	6/25/2009	12.2	0.009	0.015			
8	Highway 90 South 2	BF G	7/15/2009	11.9	0.008	0.016			
8	Highway 90 South 2	SF G	10/30/2009	8.23	0.056	0.077	0.054		
8	Highway 90 South 2	BF G	11/13/2009	12.1	0.008	0.012			
8	Highway 90 South 2	SF G	11/24/2009	10.7	0.1	0.11		NA	
8	Highway 90 South 2	SF G	11/30/2009	12.1	0.013	0.018		NA	
8	Red Top Farm-East Field	SF G	3/24/2009	15.6	0.265	0.322			
8	Red Top Farm-East Field	BF G	4/29/2009	20.4	0.028	0.058			
8	Red Top Farm-East Field	BF G	5/5/2009	21.3	0.027	0.035			
8	Red Top Farm-East Field	BF G	5/13/2009	23.8	0.022	0.032			
8	Red Top Farm-East Field	BF G	6/25/2009	24.5	0.018	0.021			
8	Red Top Farm-East Field	BF G	7/15/2009	25.5	0.021	0.028			
8	Red Top Farm-East Field	BF G	10/26/2009	25.2	0.011	0.013			
8	Red Top Farm-East Weir	SF G	3/23/2009	8.27	0.064	0.118			
8	Red Top Farm-East Weir	SF G	3/24/2009	7.87	0.042	0.084			
8	Red Top Farm-East Weir	SF G	3/30/2009	5.34	0.028	0.042			
8	Red Top Farm-East Weir	BF G	4/29/2009	4.98	0.026	0.033			
8	Red Top Farm-East Weir	BF G	5/5/2009	5.31	0.029	0.034			
8	Red Top Farm-East Weir	BF G	5/13/2009	5.92	0.027	0.037			
8	Red Top Farm-East Weir	BF G	6/25/2009	7.01	0.044	0.056			
8	Red Top Farm-East Weir	BF G	11/13/2009	6.26	0.019	0.024			
8	Red Top Farm-West Field	EFI	3/23/2009		0.044	0.093			
8	Red Top Farm-West Weir	SF G	3/23/2009	10.3	0.091	0.156			
8	Red Top Farm-West Weir	SF G	3/24/2009	9.17	0.068	0.116			
8	Side Inlet A	SF G	6/21/2009	16.9	0.728	1.27			1780
8	Side Inlet C	SF G	6/21/2009		0.632	1.47	0.553		
8	Side Inlet C	SF G	6/21/2009		0.596	0.95	0.568		
8	Side Inlet C	SF G	6/21/2009		0.759	1.57	0.756		
8	Side Inlet C	SF G	6/21/2009		0.788	1.69	0.708		
8	Side Inlet C	SF G	6/21/2009	15.6	0.678	2.02			2690
8	Side Inlet C	SF G	6/21/2009	15.4	0.562	1.34			1960
8	Side Inlet C	SF G	6/21/2009	36.3	0.496	0.942			748
8	Side Inlet C	SF G	6/21/2009	37.1	0.521	0.801			592
8	Side Inlet C	SF G	6/21/2009	20.7	0.712	1.26			1990
8	Side Inlet C	SF G	6/21/2009	16.9	0.766	1.23			780

2009 Water Quality Monitoring Report

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Appendix 6

MDA and STORET IDs for current and historic stream and lake monitoring locations.[1]

MDA Site ID	STORET ID	Site Name
BS1	S005-017	Bassett Creek
BA1	S005-395	Battle Creek
BD1	S001-210	Beauford Ditch
BC1	S002-005	Beaver Creek
BV4	S000-252	BEAVER R SOUTH OF CSAH-3 1.5 MI NW OF BEAVER BAY
BNA	S002-504	Bent Creek
BV1	S005-360	Bevens Creek
BCR	S003-446	Big Cobb River Outlet (CR 16)
BG1	S004-000	Big Fork River at Big Falls
	S000-135	BLUE EARTH RIVER AT CSAH-4, 4 MI S OF BLUE EARTH
	S000-134	BLUE EARTH RIVER IN SIBLEY PARK AT MANKATO
BE1	S005-358	Blue Earth River-East Branch
RD1	S005-379	Blue Earth River-Rapidan Dam
BDS	S000-553	Bois de Sioux River
BF1	S000-461	Buffalo Creek-Brownton
BU1	S002-125	Buffalo River-Georgetown
WEL	S000-003	Cannon River-Welch
CC	S005-361	Cascade Creek
	S000-137	CEDAR RIVER AT CSAH-2, 0.5 MILES EAST OF LANSING
	S000-136	CEDAR RIVER AT CSAH-4, 3 MILES SOUTH OF AUSTIN
CR1	S000-001	Cedar River-Austin
CVC	S004-245	Cedar Valley Creek
	S000-291	CENTER CK BETWEEN S34/35, 1 MILE NE OF FAIRMONT
CHA	S002-548	Chaska Creek
	S000-175	CHIPPEWA RIVER AT BRIDGE ON MN-7 AT MONTEVIDEO
CP9	S005-364	Chippewa River-East Branch
CP1	S000-292	Chippewa River-Milan
CP2	S002-193	Chippewa River- West Branch
CT1	S001-918	Cottonwood River-New Ulm
	S000-004	CROW RIVER AT BRIDGE ON CSAH-36 AT DAYTON
CO1	S000-050	Crow River Hwy 55 Rockford
CMS	S004-463	Crow River- Middle Fork
CSC	S002-015	Crow River-South Fork-Cosmos
CSM	S000-165	Crow River-South Fork-Mayer
CW1	S001-326	Crow Wing River-Nimrod
CW2	S000-176	Crow Wing River-Pillager
DM1	S004-359	Des Moines River-West Fork
DW1	S002-204	Dry Weather Creek
DC1	S003-000	Dutch Creek
	S000-141	EAST FORK DES MOINES R AT MN-263, 2 MI NE CEYLON
EB1	S000-278	Elk River-Big Lake
FC1	S005-376	Fish Creek
GAB	S000-828	Garvin Brook
GM1	S002-083	Grand Marais Creek
GS1	S001-263	Grindstone River-South Branch
GH1	S001-097	Groundhouse River-Headwaters
GH2	S003-532	Groundhouse River-S Fork
JC1	S001-590	Jack Creek

MDA Site ID	STORET ID	Site Name
KA1	S000-108	KAWISHIWI RIVER BR ON MN-1 AT DAM 8 MI SE OF ELY
	S000-121	KETTLE R BRIDGE ON MN-48, 4.5 MI E OF HINCKLEY
KE1	S001-437	Kettle River Hwy 123 in Sandstone
LW1	S004-034	Lawrence Creek
LE1	S001-153	Leaf River-Aldrich
LS1	S000-340	LeSueur River-Hwy 66
LS2	S003-860	LeSueur River- Upper (CR8)
LS3	S003-448	LeSueur River –St. Clair (CR28)
CN2	S004-512	Little Cannon River
LT1	S003-574	Little Cobb River
LC1	S001-377	Little Cottonwood River
LR1	S005-384	Little Rock Creek-Rice
LP1	S000-282	Long Prairie River
LP2	S002-904	Long Prairie River-Long Prairie
MR1	S002-427	Maple River (Lower) Outlet (CR 35)
MR2	S004-101	Maple River – Upper (CR18)
MID5	S000-697	Middle River
MH1	S003-742	Minnehaha Creek
	S000-054	MINNESOTA R CSAH-24 BRIDGE, 1 MI S OF COURTLAND
	S000-310	MINNESOTA R UNDER LANDING LIGHTS FT. SNELLING PK
	S000-040	MINNESOTA RIVER AT MN-19 BRIDGE AT HENDERSON
DE1	S000-780	Minnesota River-Delhi
JO1	S000-039	Minnesota River-Jordan
JB1	S001-759	Minnesota River-Judson Bridge
MN1	S000-740	Minnesota River-Montevideo
MO1	S000-145	Minnesota River-Morton
SP1	S000-041	Minnesota River-St. Peter
MC1	S003-531	Mission Creek
	S000-220	MISSISSIPPI R BR ON CR-441 1 MI SW OF BLACKBERRY
	S000-105	MISSISSIPPI R MN-200 BR 0.5 MI W OF LAKE ITASCA
	S000-151	MISSISSIPPI RIVER AT BR ON MN-115 AT CAMP RIPLEY
AT1	S002-010	Mississippi River at Aitkin
AN1	S000-024	Mississippi River-Anoka
LF1	S005-385	Mississippi River-Little Falls
MT1	S000-221	Mississippi River-Monticello
NM1	S005-377	Nine Mile Creek
	S000-240	OKABENA CREEK AT CSAH-14, 2 MILES SE OF BREWSTER
OT1	S000-006	Ottertail River
PIN	S001-941	Pine Creek
PN1	S000-181	Pine River near Mission
PSC	S000-646	Pipestone Creek
	S000-099	PIPESTONE CREEK BR ON N LINE OF S24 (T106N/R47W)
PL1	S001-930	Platte River-Rice
PT1	S000-195	Pomme de Terre River-Appleton
	S001-186	PRAIRIE CR AT 310TH ST .2 MI UPSTM OF L BYLLESBY
	S000-013	RED LAKE R DNST OF MN-220 BR IN EAST GRAND FORKS
RL1	S002-080	Red Lake River-Crookston
RL2	S005-403	Red Lake River-Fischer
	S000-012	RED RIVER AT BR ON CSAH-18 0.5 MI W OF BRUSHVALE

MDA Site ID	STORET ID	Site Name
RE1	S000-011	Red River Hwy 10 Moorhead
	S000-299	REDWOOD R AT BRIDGE ON CSAH-101 AT NORTH REDWOOD
RR1	S001-679	Redwood River-Redwood Falls
RR2	S000-696	Redwood River-Russell
RI1	S005-380	Riley Creek
	S001-138	ROBINSON CR BRIDG AT DEAD END RD, NW HIGH FOREST
RO1	S000-097	Rock River
	S000-097	ROCK RIVER BR ON STATELINE RD 10 MI S OF LUVERNE
	S000-065	ROOT RIVER AT BRIDGE ON MN-26 3 MI EAST OF HOKAH
NR1	S005-405	Root River- Eagle Bluff
SR3	S001-539	Root River-Lower South Branch
NR	S004-842	Root River-North Branch
SR	S001-320	Root River-South Branch
SR4	S004-839	Root River-South Branch-Carimona
SFR	S004-123	Root River-South Fork
SR2	S001-340	Root River-Upper South Branch
RU1	S005-386	Rum River
	S000-016	RUM RIVER AT BRIDGE ON PLEASANT STREET IN ANOKA
	S000-043	RUM RIVER BRIDGE ON CSAH-5, 0.5 MI W OF ISANTI
	S001-156	S BR YELLOW MEDICINE R AT CSAH-10, AT MINNEOTA
	S001-191	SALEM CR AT UNN CR IN S19 4 MI SW SALEM CORNERS
SD	S004-898	Sand Creek
SK1	S004-621	Sauk River-St. Cloud
SM3	S003-706	Seven Mile Creek #3
S16	S002-201	Shakopee Creek
SHE	S002-962	Shell River-Menahga
	S000-084	SHELL ROCK R BR ON CSAH-1 1 MI W OF GORDONSVILLE
SI1	S000-843	Silver Creek-CR41
PLS	S005-378	Sleepy Eye Creek-Leavenworth
	S000-198	SNAKE R BRIDGE AT CSAH-9, 2 MI NE OF PINE CITY
SNA	S000-185	Snake River
SN1	S002-587	Snake River-Pokegema
SRC	S005-382	Split Rock Creek
SPR		Spring Brook
	S000-119	ST LOUIS R BRIDGE AT CSAH-7, 0.5 MI S OF FORBES
	S000-047	STRAIGHT R NEAR CSAH-1 1 MI SE OF CLINTON FALLS
SR1	S003-557	Straight River-Faribault
ST1	S002-960	Straight River-Park Rapids
SU1	S004-033	Sunrise River-North Branch
TC4	S002-313	Three Mile Creek-Green Valley
TRO	S001-936	Trout Brook
TR1	S005-387	Two Rivers-Hallock
VR1	S000-896	Vermillion River-Farmington
	S000-156	W FK DES MOINES R CSAH-23 BRIDGE S OF PETERSBURG
WA1	S000-163	Watonwan River-Garden City
	S000-288	WHITEWATER R S FK N OF CR-115 3.5 MI NW OF UTICA
MBW	S001-831	Whitewater River-Middle Branch
NBW	S000-451	Whitewater River-North Branch
SBW	S000-321	Whitewater River-South Branch

MDA Site ID	STORET ID	Site Name
WR1	S002-102	Wild Rice River
YM1	S000-159	YELLOW MEDICINE R MN-67 BR 7 MI SE GRANITE FALLS
	S000-268	ZUMBRO R S FORK AT CSAH-14, 3 MI N OF ROCHESTER
ZR1	S000-819	Zumbro River
MFZ	S001-729	Zumbro River-Middle Fork

MDA Site ID	STORET ID	Site Name
1ALL	44-0157	Allen Lake
1ALR	69-0005	Alruss Lake
!ATC	06-0002	Artichoke Lake
1ART	69-0154	Arthur Lake
1AGU	38-0691	August Lake
1BEC	38-0472	Becoosin Lake
1BUD	46-0030	Budd Lake
1CAR	34-0032	Carrie Lake
1CAS	04-0030	Cass Lake
1CED	27-0039	Cedar Lake
1COK	86-0263	Cokato Lake
1CRO	18-0155	Crow Wing Lake
1DAR	21-0080	Darling Lake
1EAG	07-0060-01	Eagle (North) Lake
1ELK	15-0010	Elk Lake
1ELE	69-0810	Elephant Lake
1FAI	56-0356	Fairy Lake
1FAN	21-0336	Fanny Lake
1FIS	70-0069	Fish Lake
1FLA	03-0242	Flat Lake
1HAR	27-0016	Harriet Lake
1HIL	01-0142-02	Hill Lake (South Basin)
1HUN	03-0029	Hungryman Lake
1ISL	11-0102	Island Lake
1JEN	47-0015	Jennie Lake
1KAB	69-0845	Kabetogama Lake
1LAM	69-0341	Lamb Lake
1LON	31-0266-01	Long (Main Bay) Lake
3LON	86-0069	Long Lake
2LON	11-0480	Long Lake (45)
1LOO	18-0123	Lookout Lake
1LOS	69-0611	Lost Lake
1MAI	56-0476	Maine (Round) Lake
1MYO	18-0408	Mayo Lake
1MUS	16-0104	Musquash Lake
1NES	34-0154	Nest Lake
1NOK	27-0019	Nokomis Lake
1NAS	41-0055	North Ash Lake
1NDR	76-0169	North Drywood Lake
1NMA	14-0029	North Mayfield Lake
1NLL	16-0089	Northern Light Lake
1NOR	34-0251	Norway Lake
1OKA	46-0051	Okamanpeedan Lake
1OWA	62-0056	Owasso Lake

MDA Site ID	STORET ID	Site Name
1PEB	56-0829	Pebble Lake
1PEL	18-0308	Pelican Lake
1PIC	03-0287	Pickerel Lake
1PIN	11-0411	Pine Mountain Lake
1UNN	21-0291	Red Rock Lake
1RSA	18-0386	Red Sand Lake
1RIC	16-0643	Richey Lake
1SHI	29-0043	Shingobee Lake
1SNA	62--0073	Snail Lake
1SOU	43-0014	South Lake
1SPR	33-0027	Spring Lake
2SPR	69-0129	Spring Lake
3SPR	11-0022	Spring Lake
1STO	81-0003	St. Olaf Lake
1STE	38-0744	Stewart Lake
1STR	3-0010	Straight Lake
1SUL	86-0119	Sullivan Lake
1TUR	62-0061	Turtle Lake
1THA	16-0001	Two Harbors Lake
2UNN	60-0307	Unnamed Lake
1UHA	31-0770	Upper Hatch Lake
1USA	40-0002	Upper Sakatah Lake
1VES	16-0414	Vesper Lake
1VIC	21-0054	Victoria Lake
1WLE	56-0114	West Leaf Lake
1WSA	18-0379	White Sand Lake
1WOO	34-0141	Woodcock Lake

[1] STORET ID numbers can be used to locate water monitoring data for a site in MPCA's Environmental Data Access (EDA) System, which can be accessed on their website at http://www.pca.state.mn.us/data/eda/index.cfm.