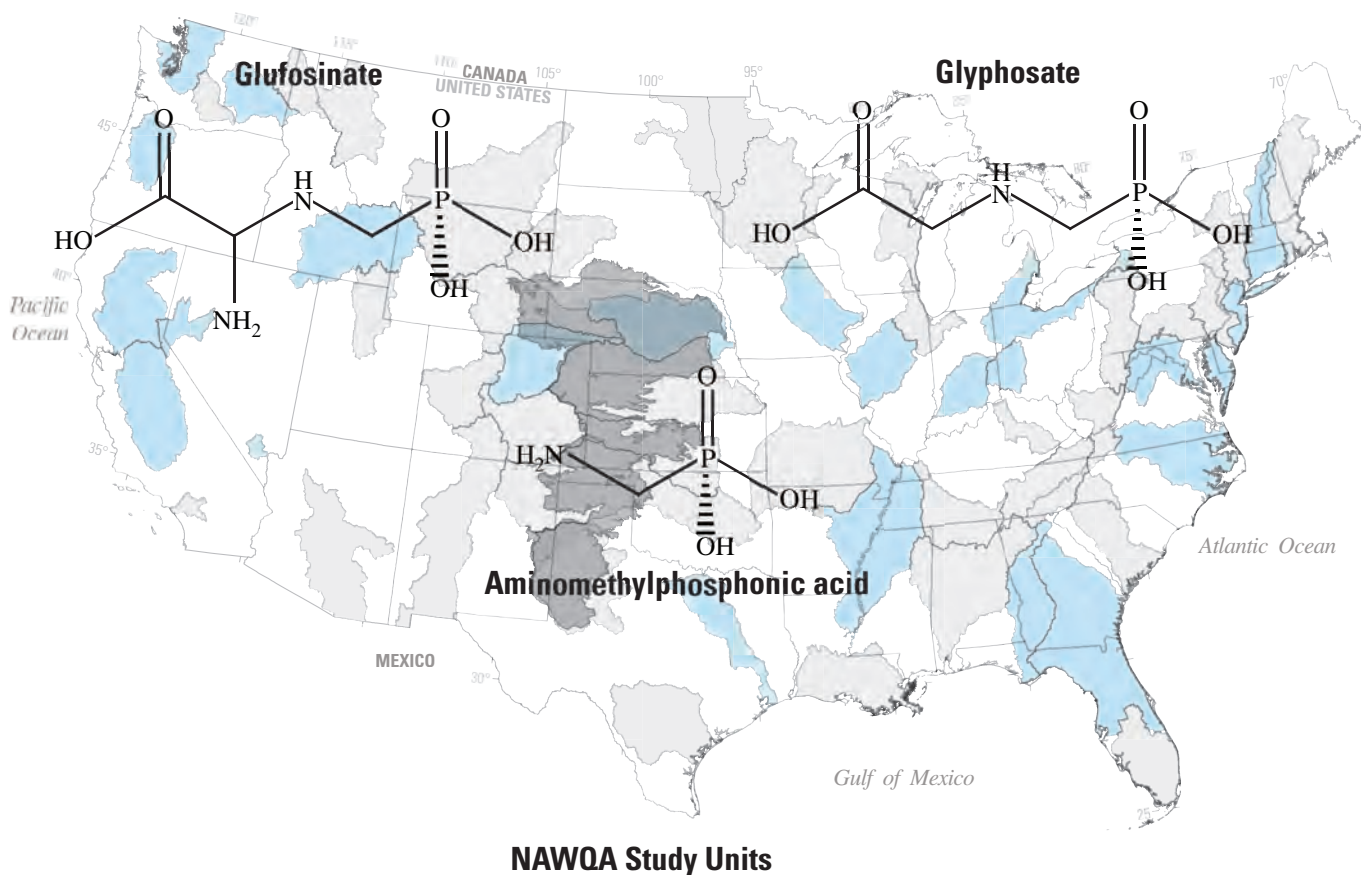


# Concentrations of Glyphosate, Its Degradation Product, Aminomethylphosphonic Acid, and Glufosinate in Ground- and Surface-Water, Rainfall, and Soil Samples Collected in the United States, 2001–06



Scientific Investigations Report 2007–5122



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By Elisabeth A. Scribner, William A. Battaglin, Robert J. Gilliom, and Michael T. Meyer

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## Conversion Factors

Multiply	By	To obtain
acre	4,047	square meter (m <sup>2</sup> )
liter (L)	0.2642	gallon (gal)
microgram (μg)	3.527 x 10 <sup>-8</sup>	ounce (oz)
micrometer (μm)	3.937 x 10 <sup>-5</sup>	inch (in.)
milligram (mg)	3.53 x 10 <sup>-5</sup>	ounce (oz)
pound (lb)	0.45359	kilogram (k)
pound per square inch (lb/in <sup>2</sup> )	0.07031	kilogram per square centimeter (kg/cm <sup>2</sup> )
square mile (mi <sup>2</sup> )	2.590	square kilometer (km <sup>2</sup> )

Temperature in degrees Celsius (°C) may be converted to degrees Fahrenheit (°F) as follows:

$$^{\circ}\text{F}=(1.8\times^{\circ}\text{C})+32.$$

Temperature in degrees Fahrenheit (°F) may be converted to degrees Celsius (°C) as follows:

$$^{\circ}\text{C}=(^{\circ}\text{F}-32)/1.8.$$

## Abbreviated Water-Quality Units

gram (g)

microgram per kilogram (μg/kg)

microgram per liter (μg/L)

microgram per milliliter (μg/mL)

microliter (μL)

milligram per liter (mg/L)

milliliter (mL)

milliliter per minute (mL/min)

molar (M)

parts per billion (ppb)

## Other Abbreviations Used in This Report

ACN	acetonitrile
AMPA	aminomethylphosphonic acid
AP	atmospheric pressure ionization
COB	carry-over blank
EDTA	ethylenediaminetetraacetic acid
FMOOC	fluorenylmethylchloroformate
GC/MS	gas chromatography/mass spectrometry
HCl	hydrochloric acid
HPLC	high-performance liquid chromatography
KOH	potassium hydroxide
LC	liquid chromatography
LC/MS	liquid chromatography/mass spectrometry
LC/MS/MS	liquid chromatography/tandem mass spectrometry
MRL	minimum reporting level
NaOH	sodium hydroxide
NASQAN	National Stream Quality Accounting Network
NAWQA	National Water-Quality Assessment Program
OGRL	Organic Geochemistry Research Laboratory
SPE	Solid-phase extraction
Toxics	Toxic Substances Hydrology Program
USGS	U.S. Geological Survey

## Definition

Minimum reporting level (MRL)—smallest measured concentration of a constituent that may be reliably reported by using a given analytical method (Timme, 1995).

## Datum

Horizontal coordinate information is referenced to the North American Datum of 1983 (NAD 83).



# Concentrations of Glyphosate, Its Degradation Product, Aminomethylphosphonic Acid, and Glufosinate in Ground- and Surface-Water, Rainfall, and Soil Samples Collected in the United States, 2001–06

By Elisabeth A. Scribner<sup>1</sup>, William A. Battaglin<sup>2</sup>, Robert J. Gilliom<sup>3</sup>, and Michael T. Meyer<sup>1</sup>

## Abstract

The U.S. Geological Survey conducted a number of studies from 2001 through 2006 to investigate and document the occurrence, fate, and transport of glyphosate, its degradation product, aminomethylphosphonic acid (AMPA), and glufosinate in 2,135 ground- and surface-water samples, 14 rainfall samples, and 193 soil samples. Analytical methods were developed to detect and measure glyphosate, AMPA, and glufosinate in water, rainfall, and soil. Results show that AMPA was detected more frequently and occurred at similar or higher concentrations than the parent compound, glyphosate, whereas glufosinate was seldom found in the environment. Glyphosate and AMPA were detected more frequently in surface water than in ground water. Trace levels of glyphosate and AMPA may persist in the soil from year to year. The methods and data described in this report are useful to researchers and regulators interested in the occurrence, fate, and transport of glyphosate and AMPA in the environment.

## Introduction

Nonpoint-source contamination of water resources from herbicides became a major water-quality concern during the 1990s in the United States. To address this issue, numerous studies of ground and surface water, rainfall, and soil were completed by the U.S. Geological Survey (USGS) (Scribner and others, 2005). The Organic Geochemistry Research Laboratory (OGRL) was established by the USGS in Lawrence, Kansas, to identify new or seldom-studied contaminants that may have deleterious effects on water quality or may be useful indicators of geochemical transport processes and to conduct

research on the fate and transport of contaminants in the hydrogeologic system.

To accomplish this, analytical methods have been developed by OGRL using solid-phase extraction (SPE), gas chromatography/mass spectrometry (GC/MS), liquid chromatography/mass spectrometry (LC/MS), and liquid chromatography/tandem spectrometry (LC/MS/MS) to detect and measure pesticides, antibiotics, and their degradation products, including glyphosate, its degradation product, aminomethylphosphonic acid (AMPA), and glufosinate in ground and surface water, rainfall, and soil throughout the United States as identified in this report.

Glyphosate, often referred to as Roundup™, currently (2007) is the most commonly used agricultural herbicide in the United States and the world. Glyphosate herbicides have been popular since first marketed in 1974. In agriculture, glyphosate is used extensively with genetically modified herbicide-tolerant crops, but it also is commonly used around homes in yards, gardens, and other nonagricultural areas (Williams and others, 2000; Cox, 2004). In the past 10 years, it has become one of the most extensively used herbicides for weed control in corn and soybeans in the United States.

Glufosinate, a shortened name for glufosinate-ammonium salt, is a broad-spectrum, contact herbicide first introduced in the United States in 1997 and is used to control a wide range of weeds after the crop emerges or for total vegetation control. Glufosinate herbicides also are often used to desiccate crops before harvest (Friends of the Earth, 2001). Use of glufosinate is expected to increase substantially in the next few years due to the cultivation of crops, such as corn and soybeans, that have been genetically engineered to tolerate it (Cox, 1996).

## Purpose and Scope

The purpose of this report is to present methods and data that document the occurrence and concentrations of glyphosate, its degradation product, AMPA, and glufosinate (chemical structures shown in fig. 1) in 873 ground- and 1,262 surface-water samples, 14 rainfall samples, and 193 soil

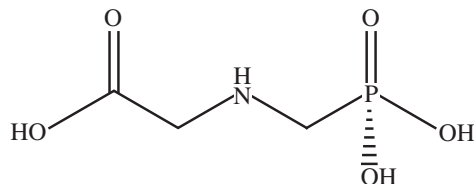
<sup>1</sup>U.S. Geological Survey, Lawrence, Kansas.

<sup>2</sup>U.S. Geological Survey, Lakewood, Colorado.

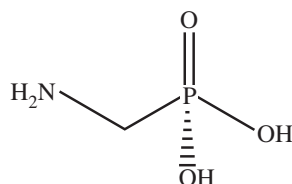
<sup>3</sup>U.S. Geological Survey, Sacramento, California.

## 2 Concentrations of Glyphosate, Aminomethylphosphonic Acid, and Glufosinate in Water and Soil Samples

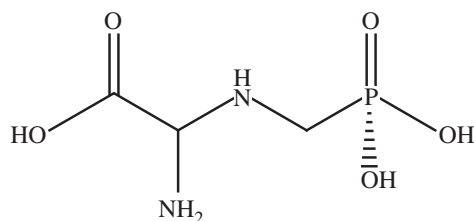
### Glyphosate



### Aminomethylphosphonic acid (AMPA)



### Glufosinate



**Figure 1.** Chemical structures of glyphosate, its degradation product, aminomethylphosphonic acid, and glufosinate.

samples collected from 2001 through 2006. These samples were collected as part of several ongoing USGS studies being conducted throughout the United States, including studies conducted with Federal and State cooperative agencies and other USGS programs such as the National Stream Quality Accounting Network (NASQAN) Program, the National Water-Quality Assessment (NAWQA) Program, and the Toxic Substances Hydrology (Toxics) Program. The data in this report were collected from studies funded, in part or whole, by these programs. This report also includes a chemical description of glyphosate, AMPA, and glufosinate and documents the sample-collection and processing methods in addition to laboratory and analytical methods.

### Description of Study Sites

Water samples were collected and analyzed as part of various USGS studies listed below.

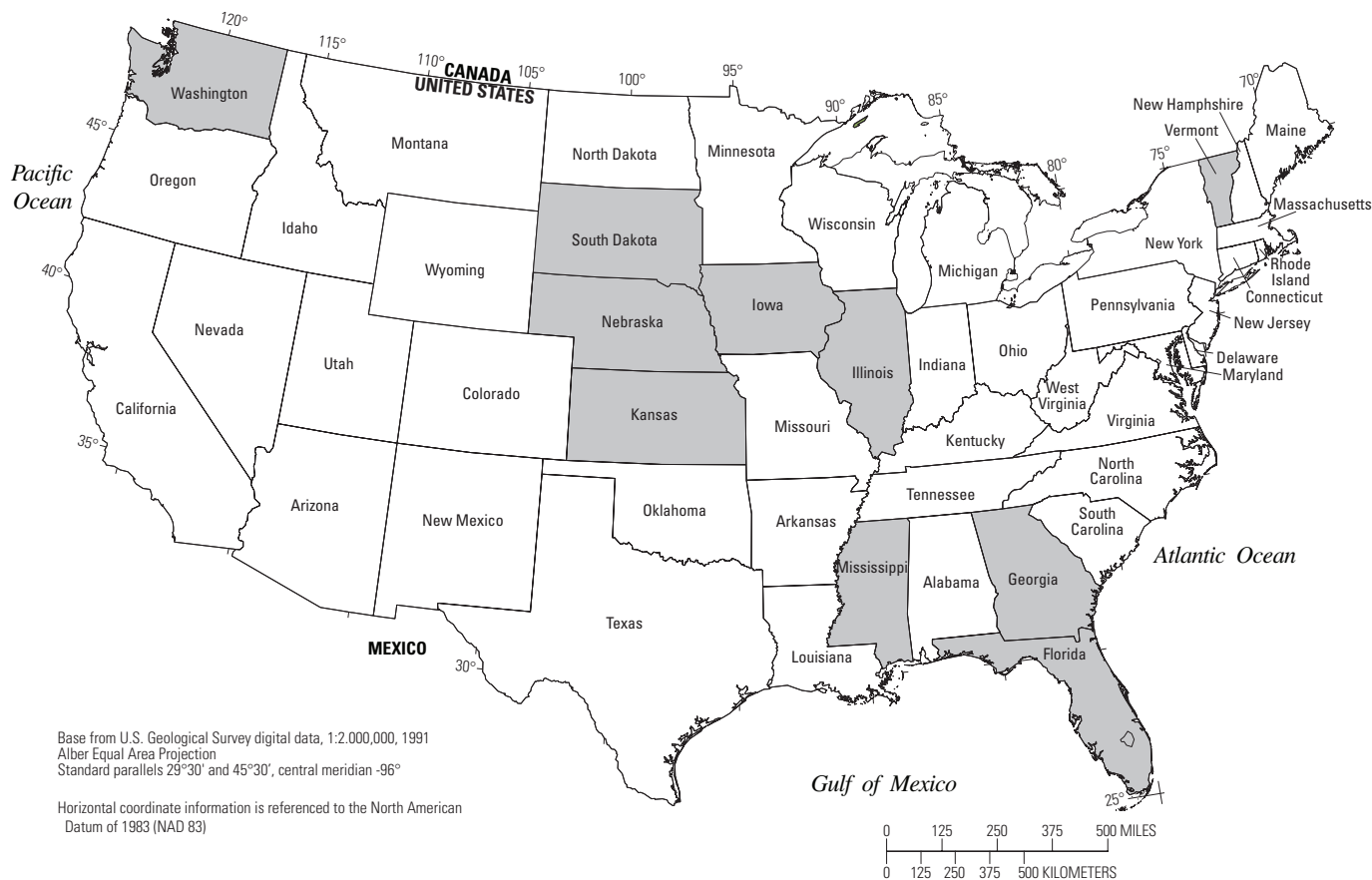
1. USGS cooperative studies with various Federal and State agencies investigated glyphosate, AMPA, and glufosinate

transport in aquatic ecosystems (fig. 2). In some cases, these cooperative studies evaluated agricultural contamination of ground and surface water from nonpoint and distributed point sources. For example, herbicide-related samples were collected in 2002 in cooperation with the U.S. Environmental Protection Agency to study urban contributions of glyphosate and AMPA to streams in the United States (Scribner and others, 2003).

2. The NASQAN program was established to develop a long-term water chemistry data set from five major river basins—the Colorado, Columbia, Mississippi, Rio Grande, and Yukon (fig. 3). In 2002, water samples from four streamflow-gaging stations in the Mississippi River Basin were collected for analysis (fig. 3) and results for glyphosate, AMPA, and glufosinate are reported herein. These data are important in characterizing baseline hydrology conditions and variations in chemical and sediment concentrations that occur throughout the year, during different seasons, during periods of high and low streamflow, and under different conditions of land use (Hooper and others, 1997; Coupe and Goolsby, 1999; Hooper and others, 2001; U.S. Geological Survey, 2006a).
3. NAWQA includes investigations of 51 major river basins and aquifer system study units (fig. 4) that provide the framework for national and regional status and trends in the quality of the Nation's ground- and surface-water resources (U.S. Geological Survey, 2003; Gilliom and Hamilton, 2006; Gilliom and others, 2006). Data for glyphosate, AMPA, and glufosinate from 23 of the 51 study units are included in this report.
4. The USGS Toxic Substances Hydrology (Toxics) Program, Pesticide Research Group, provides unbiased scientific information on the occurrence, movement, flux, fate, and effects of agricultural chemicals in the Nation's hydrologic environments. The program includes development and quantification of methods to measure contaminants and their degradation products at concentrations low enough to understand fate and transport in hydrologic systems (Buxton, 2000). An example of studies funded by Toxics includes herbicide and degradation product concentrations evidenced during a reconnaissance of 51 streams in nine Midwestern States in the Midwest Corn Belt during 2002 (fig. 5; Scribner and others, 2003; Battaglin and others, 2005; Kolpin and others, 2006).

### Description and Use of Glyphosate, Aminomethylphosphonic Acid, and Glufosinate

Glyphosate [N-(phosphonomethyl)-glycine] is a non-selective, postemergence herbicide used for perennial weed control. Glyphosate was developed by J.E. Franz, Monsanto Corp., in 1971 and was released commercially in 1974 (Iowa State University, 1997). In the early 1980s, it became the first



### EXPLANATION

 State where samples were collected—Results are shown in table 3

**Figure 2.** Ten States where samples were collected for analysis of glyphosate, its degradation product, aminomethylphosphonic acid, and glufosinate, 2001–06.

individual pesticide with worldwide sales of over 1 billion dollars (Iowa State University, 1997). Glyphosate use in the United States rapidly increased with the introduction of genetically modified glyphosate-resistant soybeans in 1997 and corn in 1998. Glyphosate also is used extensively in yards, gardens, parks, and other nonagricultural areas (Cox, 2004). Glyphosate was the world's most extensively used herbicide in 2000 (Baylis, 2000). In the United States, estimated usage is between 103 and 113 million lbs (Cox, 2004; Kiely and others, 2004). Herbicide use is an important factor affecting the concentrations of herbicides measured in Midwestern streams (Battaglin and Goolsby, 1999; Scribner and others, 2000; Battaglin and others, 2005). About 55 million lbs of glyphosate were applied to agricultural land in nine Midwestern States (fig. 6) during 2003 compared to atrazine, which decreased to about 40 million lbs during the same timeframe (Scribner and others, 2005; U.S. Department of Agriculture, 2006).

Glyphosate is absorbed directly through plant leaves and rapidly spreads throughout the plant. It blocks the activity of an enzyme used by plants to make amino acids. Without

these amino acids, the plant cannot make proteins required for various life processes, resulting in the death of the plant (Monsanto Company, 2002; Cox, 2004). Glyphosate is known to bind tightly to particles that are adsorbed to soils that may prevent excessive leaching or being taken up from the soil by nontarget plants (Carlisle and Trevors, 1988). Glyphosate is degraded primarily by microbial processes producing AMPA [alpha-amino-3-hydroxy-5-methyl-4-isoxazolepropionic acid] (Sprankle and others, 1975; Rueppel and others, 1977). Studies show that glyphosate has a water solubility of 12,000 to 900,000 mg/L at 20°C and that the half-life can vary from 2 to 174 days (Extension Toxicology Network, 1994).

Glufosinate [2-amino-4-(hydroxy-methylphosphinyl) butanoic acid], a broad-spectrum contact herbicide used to control a wide range of weeds after the crop emerges or for total vegetation control on land not used for cultivation, is produced by AgrEvo, a joint venture by the German chemical corporations, Hoechst and Schering. The herbicide was first introduced in Japan and the United Kingdom in 1984. Registration in the United States was in 1993. Glufosinate is

#### 4 Concentrations of Glyphosate, Aminomethylphosphonic Acid, and Glufosinate in Water and Soil Samples



**Figure 3.** Location of streamflow-gaging stations where samples were collected for analysis of glyphosate, its degradation product, aminomethylphosphonic acid, and glufosinate as part of the U.S. Geological Survey National Stream Quality Accounting Network Program, 2002.

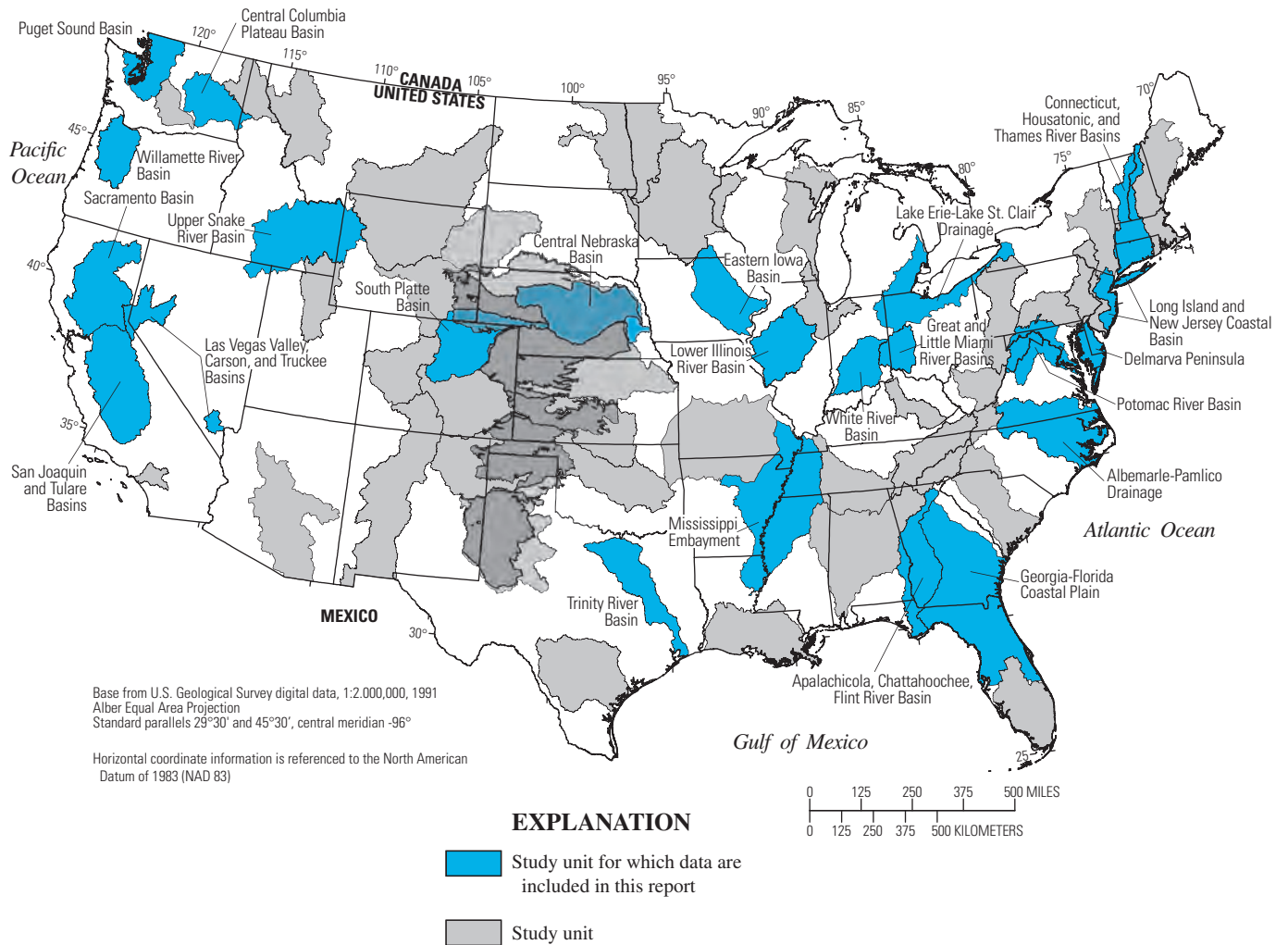
registered for use in more than 40 countries. AgrEvo introduced a glufosinate formulation for use on crops resistant to glufosinate in the late 1990s (Pesticide Action Network UK, 1998).

Studies show that 1,370 g of glufosinate can be dissolved in 1 L of water and the half-life will vary from 12 to 70 days, with an average of about 40 days (Cox, 1996). Usage of glufosinate in the United States was 847,000 lbs during 2003 (U.S. Department of Agriculture, 2006) and included nine

States (California, Iowa, Michigan, Minnesota, North Dakota, Oregon, South Dakota, Washington, and Wisconsin).

#### Acknowledgments

The authors wish to acknowledge the USGS scientists and hydrologic technicians who provided essential support to the studies just described by identifying candidate stream



**Figure 4.** Location of National Water-Quality Assessment Program study units where samples were collected for analysis of glyphosate, its degradation product, aminomethylphosphonic acid, and glufosinate, 2001–06.

sites across the United States and in collecting and processing stream samples. In addition, thanks go to E. Michael Thurman (retired USGS research scientist) and Edward A. Lee (former OGRL staff member) for their important contributions in developing and interpreting the analytical methods used on samples described in this report.

## Sampling Methods and Procedures

### Sampling Sites

Drainage basins for surface-water sampling sites ranged in size from just a few acres to one of the largest river basins in the world (the Mississippi) and everywhere in-between. The data presented in this report are not meant to be a representative examination of the occurrence of glyphosate in the Nation’s water but rather are a compilation of individual studies conducted for various purposes and with different

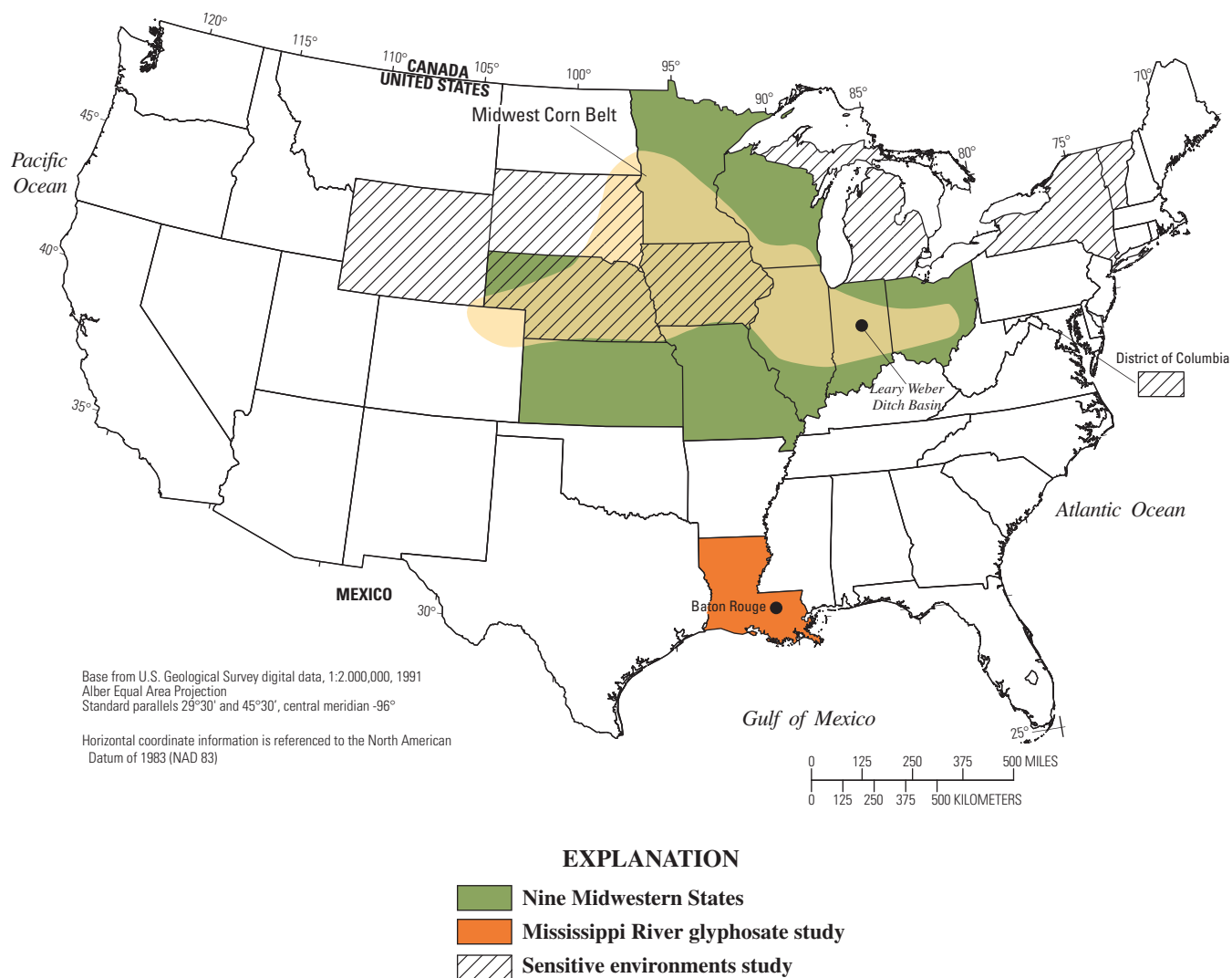
objectives. The interpretation of these data as a whole should reflect this fact. However, these data do give an indication of the breadth and scope of the occurrence of glyphosate in the Nation’s water from 2001–06.

### Sample Collection and Processing

Hydrologic technicians collected water samples that accurately represent the water-quality characteristics of the ground water, surface water, rainfall, or soil at a given time or location following instructions of the USGS National Field Manual for Collection of Water-Quality Data (U.S. Geological Survey, 2006b). Sample-collection equipment was made of Teflon or stainless-steel material and was free of materials that might leach interfering compounds into water samples or absorb the target analytical compounds from the water samples.

Ground-water samples were discharged directly into the filtering device through tubing connected to sample taps at water-supply wells or the discharge outlet on sampling pumps.

## 6 Concentrations of Glyphosate, Aminomethylphosphonic Acid, and Glufosinate in Water and Soil Samples



**Figure 5.** Location of Midwest Corn Belt and Toxic Substances Hydrology Program studies where samples were collected for analysis of glyphosate, its degradation product, aminomethylphosphonic acid, and glufosinate, 2001–06.

The water samples from each surface-water site were composited in a single container and filtered through a nominal 0.7- $\mu\text{m}$  glass-fiber filter using a peristaltic pump. Filters were preconditioned with about 200 mL of sample water prior to collection of the sample. The filtrate for analysis was collected in baked 125-mL amber glass bottles with Teflon-lined lids. All samples were chilled immediately and shipped to OGRL and stored at approximately 4°C until analyzed.

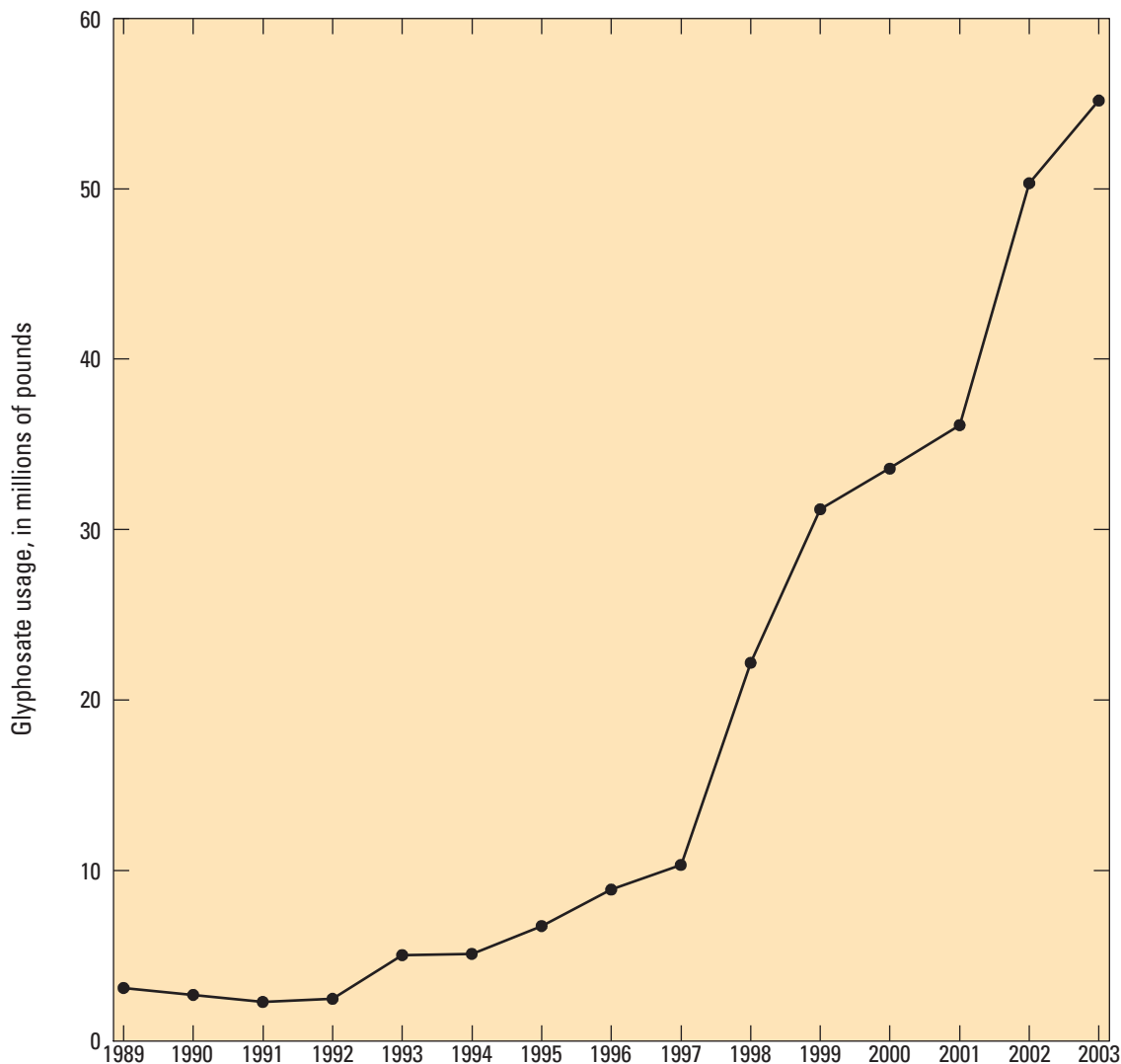
Rainfall samples were collected by a refrigerated wet-deposition sampler as described in Baker and others (2006). Soil samples were collected at three depths at each site (for a total of nine samples per site for every sample-collection period). A soil core sampler was used to collect samples from 0–6 in., 6–12 in., and 12–18 in. at each of the three randomly chosen sample locations. Clean aluminum sampling tubes were inserted in the core sampler and the first 6-in. section (0–6 in.) of soil was extracted. The section was removed from the sampling tube (with nitrile gloves) and placed in a labeled

glass jar. Clean sampling tubes were inserted in the core sampler, and the second 6-in. section (6–12 in.) of soil was extracted from the same hole. The same procedure was used on the third 6-in. section (12–18 in.) of soil.

## Analytical Methods and Procedures

### Liquid Chromatography/Mass Spectrometry and Liquid Chromatography/Tandem Mass Spectrometry

The analytical method for glyphosate, AMPA, and glufosinate compounds in water is described in Lee and others (2002a,b) and is suitable for the determination of concentrations, using online SPE and LC/MS (from 2001 to 2004), and was modified to use an LC/MS/MS method in 2004.



**Figure 6.** Glyphosate use in nine Midwestern States, 1989–2003 (data from U.S. Department of Agriculture, 2006).

## Materials

Analytical grade standards of glyphosate, AMPA, and glufosinate were obtained from ChemService, Inc. (West Chester, Pennsylvania) for use as internal standards. Stable isotope-labeled glyphosate ( $2\text{-}^{13}\text{C}$ ,  $^{15}\text{N}$ ) purchased from Cambridge Isotope Laboratories (Andover, Massachusetts) was used as an internal standard for LC/MS method as described in Lee and others (2002a). Stable isotope-labeled [ $^{13}\text{C}_2$ ,  $^{15}\text{N}$  – glyphosate (glyphosate +3)] and [ $^{13}\text{C}$ ,  $^{15}\text{N}$ , methylene- $\text{D}_2$  – AMPA (AMPA +4)] were purchased from GmbH Company (Germany). The second isotope-labeled AMPA [ $^{13}\text{C}$ ,  $^{15}\text{N}$  – AMPA (AMPA +2)] came from Cerfilliant Corporation (Round Rock, Texas). There was no stabilized isotope-labeled internal standard available for glufosinate. The internal standard cysteic acid was obtained from Sigma, St. Louis, Missouri. All solvents were high-performance liquid chromatography (HPLC) grade.

## Derivatization of Samples

### Water

As described in Lee and others (2002a), each water sample (ground water, surface water, rainfall) was derivatized by dispensing 10 mL into two labeled, 19-mL, screw-capped plastic tubes. The sample in the tube labeled “standard addition” was fortified with 1  $\mu\text{g/L}$  of each compound to be analyzed. Internal standard solutions were added to both tubes, the sample was buffered to pH 9.0 standard units by adding borate buffer, and after mixing, a solution of 9-fluorenylmethylchloroformate (FMOC) was added to all tubes. Derivatization was conducted in the dark in a water bath at 40°C. After 24 hours, the reaction was stopped and stabilized by adding 2-percent phosphoric acid, then tubes were stored in a refrigerator at 4°C until analyzed.

## 8 Concentrations of Glyphosate, Aminomethylphosphonic Acid, and Glufosinate in Water and Soil Samples

### Soil

Soil samples were placed on an aluminum foil sheet, and a spatula was used to break up and mix the sample. Five grams (5 g) of soil sample were weighed into a labeled 50-mL plastic centrifuge tube using at least ten 0.5-g aliquots from different areas of the sample. Twenty-five milliliters (25 mL) of 0.5 M potassium hydroxide (KOH) were added to the sample tube, which was placed on a mechanical shaker for 45 min at medium speed, then centrifuged for 10 min to extract the compounds.

Five milliliters (5 mL) of the centrifuged KOH soil extracts were pipetted into a new labeled 50-mL centrifuged tube to which 5.1 mL of 0.5 M hydrochloric acid (HCl) were added. Five-tenths M HCl was added drop-wise until a pH of 3.0 to 4.0 standard units was obtained. Ten milliliters (10 mL) of borate buffer were added by drop until pH was adjusted to 9.0 standard units. The internal standard and Fmoc solutions then were added to the sample eluate and placed in a 40°C water bath for 24 hours. The reaction was stopped and stabilized by adding 2-percent phosphoric acid, then tubes were stored in a refrigerator at 4°C until analyzed.

### Online Solid-Phase Extraction

A Prospekt automated online SPE instrument with the Triathlon autosampler (Spark-Holland, The Netherlands) were used to extract the samples. Each sample and the matching standard-addition sample were loaded into the sample tray of the autosampler. The SPE instrument were loaded with cartridges. The Prospekt had one cartridge clamp to rinse the cartridge and load the sample and another cartridge clamp to elute the previously prepared cartridge. The sample lines were rinsed and deactivated with a sodium hydroxide (NaOH) and ethylenediaminetetraacetic acid (EDTA) solution between samples. The SPE cartridge was rinsed with methanol and conditioned with reagent water, and then 10 mL of soil sample were loaded onto the cartridge from the autosampler at a rate of 2 mL/min. The cartridge was washed with reagent water at the same rate for 15 sec. The SPE cartridge then was eluted with 750  $\mu$ L of acetonitrile (ACN) and by diverting the liquid chromatography (LC) mobile-phase stream through the cartridge. The mobile-phase composition was set to elute the compounds of interest and leave the excess derivatization reagent on the cartridge (Lee and others, 2002a).

### Liquid Chromatography/Mass Spectrometry

Samples were analyzed on a Hewlett Packard (Wilmington, Delaware) model 1100 high-performance liquid chromatograph (HPLC) with autoinjector and mass spectrometry detector. The concentration of each compound was calculated by determining the ratio of the compound to the internal standard to the ratio of the same compound in the standard-addition sample minus the ratio of the sample. The sample and

standard-addition sample were analyzed sequentially using the same method and instruments (Lee and others, 2002a). The reporting limit for the LC/MS method was 0.10  $\mu$ g/L from 2001 through 2004.

### Liquid Chromatography/Tandem Mass Spectrometry

Samples were analyzed on an Agilent 1100 series liquid chromatography (LC) system (Wilmington, Delaware) and a Waters Quattro Micro atmospheric pressure ionization (API) tandem mass spectrometer (MS/MS) system with electrospray ionization in negative-ion mode (Milford, Massachusetts). A Luna C-18 (2) analytical column (Phenomenex, Torrance, California) was used to separate glyphosate, AMPA, and glufosinate. The LC column was equilibrated with the mobile phase approximately 2 hours prior to analysis. A reporting level of 0.02  $\mu$ g/L for the LC/MS/MS method has been used since 2004.

## Quality Assurance

### Sample Collection

All water samples for these studies were collected either by or under the direction of USGS personnel in accordance with a written work plan for the study. Field blank and equipment blank samples were collected to ensure cross contamination did not occur due to contaminated equipment. Field replicate samples were collected to document analytical variability. Quality-control samples included 28 field blanks and 184 field replicates. The blanks were free of glyphosate, AMPA, and glufosinate. Of the 184 field replicates, 135 samples contained analytes, whereas 49 samples were nondetections. All replicates matched the regular sample within 20 percent. The analytical results from these samples are listed along with the results from the regular samples in tables 3 through 6 at the end of this report.

### Internal Standards

Internal standards were added to correct quantitative results for slight differences in extract volume as well as to compensate for differences in the injected sample volume. Internal standards also were used to monitor instrument conditions, such as extract injection errors, retention time shifts, or instrument abnormalities or malfunctions.

### Laboratory Blank

The laboratory blank was reagent water prepared to monitor the entire sample preparation and analytical procedure for



possible laboratory contamination. The blank was considered acceptable when a compound was undetected or detected at less than the minimum reporting level (MRL; Timme, 1995). On the basis of data analysis, there were no interferences in the laboratory blanks.

## Laboratory Spike

The percentage recovery from the laboratory reagent spike was calculated from the spiking procedure described. The recovery was used to monitor the method performance for the sample preparation without considering the effects of sample matrix. The laboratory spike results were compiled for long-term recovery performance used for creating control limits and charts. If the recovery of a compound was not within control limits, the source of the problem was identified and corrected before continuing the procedure.

## Instrumental Analysis Quality Control

A sample analytical sequence used for this method is listed in table 1. Sample extracts were analyzed in an instrument sequence to provide additional information to facilitate corrective actions that might be required if performance criteria were not met.

## Concentrations of Glyphosate, Aminomethylphosphonic Acid, and Glufosinate

A summary of ground-water, surface-water, rainfall, and soil samples collected for State cooperative studies, the National Stream Quality Accounting Network Program, the National Water-Quality Assessment Program, and the Toxic Substances Hydrology Program, and analyzed by OGRL for glyphosate, AMPA, and glufosinate is presented in table 2.

Analytical results for glyphosate, AMPA, and glufosinate in 2,135 ground- and surface-water samples, 14 rainfall samples, and 193 soil samples collected from various study areas throughout the United States are provided in tables 3 through 6 at the end of this report. Laboratory duplicates also are shown in tables 3 through 6 but not included in the sample count in table 2.

## State Cooperative Studies

During the State cooperative studies, 271 ground- and 281 surface-water samples were analyzed (table 3 at end of report) from 10 States ranging from Washington to Vermont and south to Mississippi. In the ground-water samples analyzed, there was no glyphosate detection and only one AMPA detection of 0.33  $\mu\text{g/L}$  in water from a well in Kansas. There

also were no samples from the State cooperative studies with a reportable glufosinate concentration. The lack of ground-water detections may have been the result of a higher reporting level (0.1  $\mu\text{g/L}$ ) prior to 2004 compared to a reporting level (0.02  $\mu\text{g/L}$ ) that was later achieved with the LC/MS/MS system. Glyphosate was detected in about 50 percent of the surface-water samples. A maximum glyphosate concentration of 99  $\mu\text{g/L}$  was found in a sample collected in April 2002 from a site in Mississippi surrounded by cotton fields being treated with glyphosate to prepare for planting.

## National Stream Quality Accounting Network (NASQAN) Program

Twenty-seven samples (table 4 at end of report) were collected from four NASQAN river sites in the Mississippi River Basin during 2002 (fig. 2). Overall, AMPA was detected at greater frequencies than glyphosate in these surface-water samples. There were two glyphosate detections with concentrations of 0.33 and 0.14  $\mu\text{g/L}$ , and 17 AMPA detections with a maximum concentration of 0.38  $\mu\text{g/L}$  (tables 2 and 4).

## National Water-Quality Assessment (NAWQA) Program

A total of 1,093 water samples were collected from 23 study units for the NAWQA Program during 2001–06 (fig. 3 and table 5 at end of report). In 485 ground-water samples, maximum concentrations were 0.67  $\mu\text{g/L}$  for glyphosate (28 detections) and 0.62  $\mu\text{g/L}$  for AMPA (47 detections). In 608 surface-water samples, maximum concentrations were 9.7  $\mu\text{g/L}$  for glyphosate (196 detections) and 8.7  $\mu\text{g/L}$  for AMPA (313 detections). There were two detections (0.11 and 0.56  $\mu\text{g/L}$ ) of glufosinate in surface water from the Mississippi Embayment and White River Basin NAWQA study units. These results concur with results from previous studies that found the glyphosate degradation product, AMPA, occurs more frequently or at similar or higher concentrations than glyphosate, whereas glufosinate was seldom found in the environment (Scribner and others, 2003; Battaglin and others, 2005).

## Toxic Substances Hydrology (Toxics) Program

The USGS Toxic Substances Hydrology Program funded several studies focused on the fate and transport of glyphosate and AMPA in ground and surface water including overland flow, tile-drain flow, rainfall, and soil since 2001 (table 6 at end of report). Overall, these studies show that glyphosate and AMPA were detected more frequently in surface water than in ground water, and AMPA was detected at greater frequencies than glyphosate in surface water. The data also indicate that levels of glyphosate and AMPA may persist in the soil from year to year (Baker and others, 2006). Table 2 shows

**10 Concentrations of Glyphosate, Aminomethylphosphonic Acid, and Glufosinate in Water and Soil Samples**

**Table 1.** Example of analytical sequence for use in determining glyphosate, aminomethylphosphonic acid, and glufosinate in water samples.

[Study code, code used by study to identify samples; LCGY 102, glyphosate method acronym and run number; COB, carryover blank sample; ppb, parts per billion; L, laboratory duplicate; A, B, C, letters assigned to first, second, third sample bottles, respectively, at login; --, not applicable]

LCGY run sheet		LCGY 102	Date: 08/24/05	Login initials
Method			Derivatized	
Vial number	Study code			
1,2	--	COB A & 1.0 ppb	08/25/05	EG
3,4	LIG	05254 A	08/25/05	EG
5,6	PUB	05255 A	08/25/05	EG
7,8	RCM	05263 A	08/25/05	EG
9,10	LIG	05264 A	08/25/05	EG
11,12	LIG	05265 A	08/25/05	EG
13,14	LIG	05266 A	08/25/05	EG
15,16	LIG	05275 A	09/01/05	EG
17,18	LIG	05276 A	09/01/05	EG
19,20	LIG	05277 A	09/01/05	EG
21,22	PUG	05312 A	09/01/05	EG
23,24	LIG	05254 L	08/25/05	EG
25,26	--	COB B & 2.0 ppb	08/25/05	EG
27,28	PUG	05313 A	09/01/05	EG
29,30	LIG	05318 A	09/01/05	EG
31,32	LIG	05319 A	09/01/05	EG
33,34	LIG	05324 A	09/07/05	EG
35,36	LIG	05325 A	09/07/05	EG
37,38	LIG	05326 A	09/07/05	EG
39,40	USG	05335 A	09/07/05	EG
41,42	LIG	05349 A	09/07/05	EG
43,44	RCM	05350 A	09/07/05	EG
45,46	PUB	05351 A	09/07/05	EG
47,48	SKF	05353 A	09/13/05	EG
49,50	SKF	05354 A	09/13/05	EG
51,52	SKF	05355 A	09/13/05	EG
53,54	SKF	05356 A	09/13/05	EG
55,56	SKF	05357 A	09/13/05	EG
57,58	ILG	05367 A	09/13/05	EG
59,60	PUB	05313 L	09/01/05	EG
61,62	--	COB C & 1.0 ppb	09/01/05	EG

**Table 2.** Summary of glyphosate, aminomethylphosphonic acid, and glufosinate concentrations analyzed by the U.S. Geological Survey Organic Geochemistry Research Laboratory, Lawrence, Kansas, for ground-water, surface-water, rainfall, and soil samples collected for State cooperative, National Stream Quality Accounting Program, National Water-Quality Assessment Program, and Toxic Substances Hydrology Program studies, 2001–06.

[--, no data; <, less than; µg/kg, microgram per kilogram; µg/L, microgram per liter]

U.S. Geological Survey studies	Number of samples	Glyphosate			Aminomethylphosphonic acid			Glufosinate		
		Number of detections	Maximum concentration	Minimum concentration	Number of detections	Maximum concentration	Minimum concentration	Number of detections	Maximum concentration	Minimum concentration
Ground water (µg/L)										
State cooperative studies	271	0	<0.10	<0.10	1	0.33	<0.10	0	<0.10	<0.10
National Stream Quality Accounting Network Program (NASQAN)	--	--	--	--	--	--	--	--	--	--
National Water-Quality Assessment Program (NAWQA)	485	28	.67	.02	47	.62	.02	0	<.10	<.10
Toxic Substances Hydrology Program (Toxics)										
Reconnaissance Data	--	--	--	--	--	--	--	--	--	--
Lower Mississippi River Basin	--	--	--	--	--	--	--	--	--	--
Sensitive Environments	--	--	--	--	--	--	--	--	--	--
Leary Weber Ditch Basin	117	40	4.7	.02	85	2.6	.03	0	<.02	<.02
Surface water (µg/L)										
State cooperative studies	281	143	99	.02	165	22	.04	0	<.02	<.02
National Stream Quality Accounting Network Program (NASQAN)	27	2	.33	.14	17	.38	.12	0	<.10	<.10
National Water-Quality Assessment Program (NAWQA)	608	196	9.7	.03	313	8.7	.03	2	.56	.11
Toxic Substances Hydrology Program (Toxics)										
Reconnaissance Data	171	63	8.7	.11	117	3.6	.10	2	.26	.14
Lower Mississippi River Basin	35	0	<.10	<.10	31	.38	.10	0	<.10	<.10
Sensitive Environments	76	31	328	.02	30	41	.02	1	.05	<.02
Leary Weber Ditch Basin	64	54	427	.03	52	29	.06	2	1.5	.24
Rainfall (µg/L)										
Toxic Substances Hydrology Program (Toxics)										
Leary Weber Ditch Basin	14	12	1.1	.03	12	.47	.02	0	<.02	<.02
Soil (µg/kg)										
Toxic Substances Hydrology Program (Toxics)										
Leary Weber Ditch Basin	193	119	476	1.0	154	956	1.0	1	1.0	<1.0

the number of ground- and surface-water, rainfall, and soil samples collected, number of detections, and the minimum and maximum concentrations.

## Reconnaissance Data From 51 Streams in Nine Midwestern States

During 2002, 171 samples were collected from 51 streams in nine Midwestern States during three periods of runoff (table 6 at end of report). Glyphosate was detected in 63 samples with a maximum concentration of 8.7 µg/L, AMPA was detected in 117 samples with a maximum concentration of 3.6 µg/L, and glufosinate was detected in two samples at concentrations of 0.26 and 0.14 µg/L (table 2; Scribner and others, 2003; Battaglin and others, 2005).

## Lower Mississippi River Basin

Results from systematic water-quality sampling from sites in the lower Mississippi River were used to investigate the occurrence, fate, and transport of selected pesticides and their degradation products (U.S. Geological Survey, 2006a). Water samples were collected from the lower Mississippi River at Baton Rouge, Louisiana (site 07374000) (fig. 5) during April 1991 through December 2003 to help determine the occurrence and transport of selected herbicides, their degradation products, and nutrients in the lower Mississippi River Basin and the delivery to the Gulf of Mexico (Scribner and others, 2006).

During 2001–03, water samples were collected twice monthly to study the occurrence of glyphosate, AMPA, and glufosinate. There were no detections of either glyphosate or glufosinate in the 35 samples; however, there were 31 detections of AMPA, with a maximum concentration of 0.38 µg/L (tables 2 and 6).

## Sensitive Environments Study

Vernal pools are sensitive environments of natural water that provide critical habitats for many species, including amphibians. These small water bodies are not always protected by pesticide label requirements for no-spray buffer zones, and the occurrence of pesticides detected is poorly documented. In the Sensitive Environments study (W.A. Battaglin, USGS written commun., June 19, 2007), glyphosate was detected in 31 of 76 samples with a maximum concentration of 328 µg/L, whereas AMPA was detected in 30 samples with a maximum concentration of 41 µg/L. Glufosinate was detected in one sample at 0.05 µg/L (table 2).

## Leary Weber Ditch Basin, Indiana

A joint collaboration between Toxics and NAWQA was formed to study the agricultural chemicals source, transport,

and fate within the Leary Weber Ditch Basin, a part of the White River Basin, a NAWQA study unit in Indiana (figs. 4 and 5). In 2004–05, samples were collected from various hydrologic compartments in the Leary Weber Ditch Basin and analyzed for glyphosate, AMPA, and glufosinate.

Agricultural chemicals were found in Leary Weber Ditch and every other hydrologic compartment sampled during 2004–05 (Baker and others, 2006). Of the 117 ground-water samples analyzed, glyphosate was detected in 40 samples with a maximum of 4.7 µg/L, and AMPA was detected in 85 samples with a maximum of 2.6 µg/L (tables 2 and 6). There were no glufosinate detections. Glyphosate was detected in 54 of the 64 surface-water samples with a maximum concentration of 427 µg/L, and AMPA was detected in 52 of the 64 samples with a maximum concentration of 29 µg/L at Mohawk, Indiana (table 6). In the Leary Weber Ditch, 51 of 64 water samples analyzed contained both glyphosate and AMPA. Higher concentrations in the Leary Weber Ditch occurred soon after application to fields and coincided with rainfall. Glufosinate was found in two surface-water samples from the Leary Weber Ditch at concentrations of 1.5 and 0.24 µg/L (tables 2 and 6).

Both glyphosate and AMPA were detected in 12 of the 14 rainfall samples collected. Concentrations ranged from 0.02 to 1.1 µg/L. Glufosinate was not detected in any of the rainfall samples.

To examine the potential transport of glyphosate and AMPA through the unsaturated zone, soil cores were collected from April through October 2004 from both the north and south field sites in the Leary Weber Ditch Basin. Agricultural practices were the same for both fields. The maximum concentration for glyphosate was 476 µg/kg, whereas the maximum concentration for AMPA was 956 µg/kg (table 2). The data show that the maximum concentration of AMPA during preapplication (April) was 23 µg/kg. These data results may indicate that trace levels of glyphosate can persist in the soil from year to year (Baker and others, 2006). One north field soil sample (6–12 in. depth) contained glufosinate at a concentration of 1.0 µg/kg (table 6).

## Summary

The Organic Geochemistry Research Laboratory (OGRL) was established by the USGS in Lawrence, Kansas, to identify contaminants that may have deleterious effects on water quality or be useful indicators of geochemical transport processes and to conduct research on the fate and transport of contaminants in the hydrogeologic system. Essential analytical methods have been developed using state-of-the-art liquid chromatography and mass spectrometry to accomplish this.

This report presents results of analyses by OGRL for glyphosate, its degradation product, aminomethylphosphonic acid (AMPA), and glufosinate in 2,135 ground- and surface-water samples, 14 rainfall samples, and 193 soil samples collected from 2001 through 2006. The data are used to document

the occurrence, distribution, and concentrations of glyphosate, its degradation product, aminophosphonic acid (AMPA), and glufosinate at locations across the United States. The data were collected as part of various ongoing USGS studies, such as those done for Federal and State cooperative agencies, the National Stream Quality Accounting Network (NASQAN) Program, the National Water-Quality Assessment (NAWQA) Program, and the Toxic Substances Hydrology (Toxics) Program.

Glyphosate is among the most commonly used herbicides in the world. Its use has substantially increased in the United States with the introduction of genetically modified glyphosate-resistant corn and soybeans; however, it also is used extensively in yards, gardens, parks, and other nonagricultural areas. Studies show glyphosate is degraded primarily by microbial processes producing aminomethylphosphonic acid (AMPA). Samples also were analyzed for glufosinate, a broad-spectrum contact herbicide, used to control a wide range of weeds after the crop emerges or for total vegetation control on land not used for cultivation.

Results show that AMPA was detected more frequently and occurred at similar or higher concentrations than the parent compound, glyphosate, whereas glufosinate was seldom found in the environment. Further study also shows that glyphosate and AMPA were detected more frequently in surface water than in ground water. Both glyphosate and AMPA were detected in rainfall samples in Indiana. The data also indicate that trace levels of glyphosate and AMPA may persist in the soil from year to year. These data were valuable for acquiring information about the occurrence, fate, and transport of these compounds and to show the importance of analyzing not only glyphosate but also AMPA in water-quality studies.

Analytical results show that the methods developed at OGRl were valuable for acquiring information about the fate and transport of glyphosate, AMPA, and glufosinate in ground and surface water, rainfall, and soil. The data also indicate the importance of including both parent compounds and their degradation products in herbicide studies.

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# Data Tables

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**16 Concentrations of Glyphosate, Aminomethylphosphonic Acid, and Glufosinate in Water and Soil Samples**

**Table 3.** Analytical results for glyphosate, aminomethylphosphonic acid, and glufosinate in State cooperative surface- and ground-water studies, 2001–06.

[Sample type: FB, field blank; FR, field replicate; LD, laboratory duplicate; R, regular; --, no data; <, less than; µg/L, micrograms per liter]

Site number	Site location	Sam- ple type	Date of col- lection (month/ day/year)	Col- lection time (24- hour)	Concentrations		
					Gly- pho- sate (µg/L)	Amino- meth- ylphos- phonic acid (µg/L)	Glu- fos- inate (µg/L)
Florida Surface-Water Study (SKF)							
02266923	Swim Lake near Alcoma	R	03/23/04	1050	<.02	<.02	<.02
		R	06/08/04	1130	<.02	.06	<.02
02270655	Lake Lynn near DeSoto City	R	03/22/04	1050	<.02	<.02	<.02
		LD	03/22/04	1050	<.02	<.02	<.02
		R	06/07/04	1010	<.02	.14	<.02
02270700	Lake Annie near Lake Placid	R	03/23/05	1150	<.02	<.02	<.02
		R	06/22/05	1300	<.02	<.02	<.02
		R	09/06/05	1400	<.02	<.02	<.02
273323081290800	Lake Denton near Avon Park	R	03/22/04	1440	<.02	<.02	<.02
		R	06/07/04	1350	<.02	.06	<.02
273850081310800	Pabor Lake near Avon Park	R	03/23/05	0815	<.02	<.02	<.02
		R	06/22/05	0850	<.02	<.02	<.02
		R	09/07/05	1300	<.02	<.02	<.02
274648081315100	Lake Moody near Frostproof	R	03/22/05	1215	<.02	<.02	<.02
		R	03/22/05	1310	<.02	<.02	<.02
		R	06/21/05	1300	<.02	<.02	<.02
		FR	06/21/05	1400	<.02	<.02	<.02
		R	09/06/05	0930	<.02	<.02	<.02
		R	09/07/05	1215	<.02	<.02	<.02
274744081304200	Lake Leonore near Frostproof	R	03/22/05	0930	<.02	<.02	<.02
		LD	03/22/05	0930	<.02	<.02	<.02
		R	06/21/05	0900	<.02	<.02	<.02
		LD	06/21/05	0900	<.02	<.02	<.02
		R	09/07/05	0850	<.02	<.02	<.02
275256081275900	Lake Aurora at Hesperides	R	03/23/04	0805	<.02	<.02	<.02



**Table 3.** Analytical results for glyphosate, aminomethylphosphonic acid, and glufosinate in State cooperative surface- and ground-water studies, 2001–06.—Continued

[Sample type: FB, field blank; FR, field replicate; LD, laboratory duplicate; R, regular; --, no data; &lt;, less than; µg/L, micrograms per liter]

Site number	Site location	Sample type	Date of collection (month/day/year)	Collection time (24-hour)	Concentrations		
					Glyphosate (µg/L)	Aminomethylphosphonic acid (µg/L)	Glufosinate (µg/L)
Florida Surface-Water Study (SKF)—Continued							
275256081275900	Lake Aurora at Hesperides	R	06/08/04	0815	0.02	0.08	<0.02
Georgia Ground-Water Study (BGG)							
311015084511901	07H021	R	11/14/01	1500	<.10	<.10	<.10
		R	06/19/02	1300	<.10	<.10	<.10
310552084455601	08G008	R	11/15/01	1100	<.10	<.10	<.10
		R	06/19/02	1100	<.10	<.10	<.10
312119084215601	11J021	R	11/15/01	1400	<.10	<.10	<.10
		LD	11/15/01	1400	<.10	<.10	<.10
		R	06/19/02	1600	<.10	<.10	<.10
312908084151901	11K045	R	11/16/01	1000	<.10	<.10	<.10
		LD	11/16/01	1000	<.10	<.10	<.10
		R	06/19/02	1800	<.10	<.10	<.10
320001084032801	13Q051	R	11/16/01	1300	<.10	<.10	<.10
		R	06/18/02	1500	<.10	<.10	<.10
		FR	06/18/02	1500	<.10	<.10	<.10
		LD	06/18/02	1502	<.10	<.10	<.10
Illinois Ground-Water Study (EPI)							
421506088550001	Illinois-BCCDGIS	R	09/10/01	1708	<.10	<.10	<.10
403143088054701	Illinois-47583	R	10/09/01	1145	<.10	<.10	<.10
		LD	10/09/01	1145	<.10	<.10	<.10
403143088054701	Illinois-00823	R	10/10/01	1330	<.10	<.10	<.10
412603087452601	Illinois-20458	R	10/10/01	1440	<.10	<.10	<.10
403432089380901	Illinois-50060	R	10/15/01	1047	<.10	<.10	<.10
		LD	10/15/01	1047	<.10	<.10	<.10
383932090012601	Illinois-60053	R	10/16/01	1126	<.10	<.10	<.10
415551088575201	Illinois-11782	R	10/23/01	1000	<.10	<.10	<.10
		LD	10/23/01	1000	<.10	<.10	<.10
404418089011802	Illinois-31409	R	10/23/01	1240	<.10	<.10	<.10

**18 Concentrations of Glyphosate, Aminomethylphosphonic Acid, and Glufosinate in Water and Soil Samples**

**Table 3.** Analytical results for glyphosate, aminomethylphosphonic acid, and glufosinate in State cooperative surface- and ground-water studies, 2001–06.—Continued

[Sample type: FB, field blank; FR, field replicate; LD, laboratory duplicate; R, regular; --, no data; <, less than; µg/L, micrograms per liter]

Site number	Site location	Sam- ple type	Date of col- lection (month/ day/year)	Col- lection time (24- hour)	Concentrations		
					Gly- pho- sate (µg/L)	Amino- meth- ylphos- phonic acid (µg/L)	Glu- fos- inate (µg/L)
Illinois Ground-Water Study (EPI)—Continued							
404418089011802	Illinois-31409	R	10/23/01	1645	<0.10	<0.10	<0.10
403404089390701	Illinois-50057	R	10/30/01	1007	<.10	<.10	<.10
421433088002701	Illinois-20250	R	10/31/01	1115	<.10	<.10	<.10
403116089251401	Illinois-50055	R	10/30/01	1235	<.10	<.10	<.10
		R	10/30/01	1310	<.10	<.10	<.10
413654088475601	Illinois-11470	R	11/07/01	1035	<.10	<.10	<.10
414319089203501	Illinois-01079	R	11/07/01	1250	<.10	<.10	<.10
421256088593801	Illinois-11678	R	11/07/01	1445	<.10	<.10	<.10
401754090032001	Illinois-50308	R	11/13/01	1035	<.10	<.10	<.10
		LD	11/13/01	1035	<.10	<.10	<.10
422225088102501	Illinois-02305	R	11/20/01	955	<.10	<.10	<.10
421840088033001	Illinois-00366	R	11/20/01	1100	<.10	<.10	<.10
412608088121401	Illinois-20357	R	11/21/01	1320	<.10	<.10	<.10
404625087335301	Illinois-47561	R	11/27/01	1110	<.10	<.10	<.10
411928089073001	Illinois-11509	R	12/04/01	1030	<.10	<.10	<.10
		FR	12/04/01	1031	<.10	<.10	<.10
400112090312301	Illinois-01118	R	12/04/01	1115	<.10	<.10	<.10
410002088313401	Illinois- 47518	R	12/04/01	1320	<.10	<.10	<.10
		LD	12/04/01	1320	<.10	<.10	<.10
		FR	12/04/01	1321	<.10	<.10	<.10
421222088152701	Illinois-20141	R	12/09/01	0955	<.10	<.10	<.10
422219088222601	Illinois-00595	R	12/09/01	1120	<.10	<.10	<.10
--	Illinois-11891	R	12/11/01	1110	<.10	<.10	<.10
--	Illinois-20330	R	12/11/01	1230	<.10	<.10	<.10
403737089365401	Illinois-50376	R	12/12/01	1055	<.10	<.10	<.10
--	Illinois-50251	R	12/12/01	1315	<.10	<.10	<.10
		FR	12/12/01	1317	<.10	<.10	<.10
404417090360801	Illinois-50094	R	12/18/01	1155	<.10	<.10	<.10
		FR	12/18/01	1157	<.10	<.10	<.10

**Table 3.** Analytical results for glyphosate, aminomethylphosphonic acid, and glufosinate in State cooperative surface- and ground-water studies, 2001–06.—Continued

[Sample type: FB, field blank; FR, field replicate; LD, laboratory duplicate; R, regular; --, no data; &lt;, less than; µg/L, micrograms per liter]

Site number	Site location	Sample type	Date of collection (month/day/year)	Collection time (24-hour)	Concentrations		
					Glyphosate (µg/L)	Aminomethylphosphonic acid (µg/L)	Glufosinate (µg/L)
Illinois Ground-Water Study (EPI)—Continued							
385946088020701	Illinois-47819	R	12/19/01	1130	<0.10	<0.10	<0.10
394602090360801	Illinois-52121	R	01/09/02	1045	<.10	<.10	<.10
394605089155301	Illinois-50224	R	01/09/02	1425	<.10	<.10	<.10
421803087554801	Illinois-20285	R	01/14/02	1055	<.10	<.10	<.10
		LD	01/14/02	1055	<.10	<.10	<.10
404532088111201	Illinois-47532	R	01/15/02	0950	<.10	<.10	<.10
		FR	01/15/02	0952	<.10	<.10	<.10
404614087512502	Illinois-47551	R	01/15/02	1150	<.10	<.10	<.10
372000088431001	Illinois-00757	R	01/22/02	1340	<.10	<.10	<.10
415410088034301	Illinois-20700	R	01/23/02	1020	<.10	<.10	<.10
410134089244503	Illinois-31307	R	01/29/02	1110	<.10	<.10	<.10
405404089022301	Illinois-31428	R	01/29/02	1310	<.10	<.10	<.10
421611089031101	Illinois-11636	R	02/04/02	1050	<.10	<.10	<.10
415035089175901	Illinois-11562	R	02/04/02	1400	<.10	<.10	<.10
415552088465601	Illinois-11406	R	02/05/02	0830	<.10	<.10	<.10
413805088405102	Illinois-11438	R	02/05/02	1000	<.10	<.10	<.10
--	Illinois-20497	R	02/11/02	1317	<.10	<.10	<.10
395411087485701	Illinois-47692	R	02/19/02	1330	<.10	<.10	<.10
381238090160001	Illinois-60127	R	02/25/02	1205	<.10	<.10	<.10
390644087391802	Illinois-47811	R	03/04/02	1035	<.10	<.10	<.10
		LD	03/04/02	1035	<.10	<.10	<.10
		FR	03/04/02	1300	<.10	<.10	<.10
391251087393801	Illinois-00251	R	03/04/02	1200	<.10	<.10	<.10
412534089550901	Illinois-11347	R	03/05/02	1110	<.10	<.10	<.10
		FR	03/05/02	1111	<.10	<.10	<.10
412534089215601	Illinois-11327	R	03/05/02	1230	<.10	<.10	<.10
		R	03/05/02	1530	<.10	<.10	<.10
414305089550901	Illinois-11904	R	03/06/02	1130	<.10	<.10	<.10
420559088322101	Illinois-00795	R	03/11/02	0930	<.10	<.10	<.10
395640088515501	Illinois-47725	R	03/12/02	0955	<.10	<.10	<.10

**20 Concentrations of Glyphosate, Aminomethylphosphonic Acid, and Glufosinate in Water and Soil Samples**

**Table 3.** Analytical results for glyphosate, aminomethylphosphonic acid, and glufosinate in State cooperative surface- and ground-water studies, 2001–06.—Continued

[Sample type: FB, field blank; FR, field replicate; LD, laboratory duplicate; R, regular; --, no data; <, less than; µg/L, micrograms per liter]

Site number	Site location	Sam- ple type	Date of col- lection (month/ day/year)	Col- lection time (24- hour)	Concentrations			
					Gly- pho- sate (µg/L)	Amino- meth- ylphos- phonic acid (µg/L)	Glu- fos- inate (µg/L)	
Illinois Ground-Water Study (EPI)—Continued								
--	Illinois-01416	R	03/12/02	1315	<0.10	<0.10	<0.10	
392418087392101	Illinois-45155	R	03/18/02	1055	<.10	<.10	<.10	
		FR	03/18/02	1056	<.10	<.10	<.10	
		FR	03/18/02	1100	<.10	<.10	<.10	
--	Illinois-11892	R	03/19/02	1110	<.10	<.10	<.10	
412421090334501	Illinois-31889	R	03/19/02	1350	<.10	<.10	<.10	
400022090522301	Illinois-50227	R	04/01/02	1115	<.10	<.10	<.10	
394212090344901	Illinois-50101	R	04/01/02	1410	<.10	<.10	<.10	
		FR	04/01/02	1411	<.10	<.10	<.10	
--	Illinois-20207	R	04/02/02	0935	<.10	<.10	<.10	
401217088220301	Illinois-47687	R	04/08/02	1055	<.10	<.10	<.10	
400836088185101	Illinois-45081	R	04/08/02	1410	<.10	<.10	<.10	
413328089274501	Illinois-11363	R	04/09/02	1030	<.10	<.10	<.10	
		FR	04/09/02	1032	<.10	<.10	<.10	
		LD	04/09/02	1032	<.10	<.10	<.10	
383124088135401	Illinois-71531	R	04/16/02	1200	<.10	<.10	<.10	
391411090072001	Illinois-50395	R	04/22/02	1120	<.10	<.10	<.10	
		FR	04/22/02	1125	<.10	<.10	<.10	
		LD	04/22/02	1125	<.10	<.10	<.10	
420947087561801	Illinois-20297	R	04/23/02	1035	<.10	<.10	<.10	
413337088055501	Illinois-20447	R	04/23/02	1350	<.10	<.10	<.10	
403758089370801	Illinois-50383	R	04/29/02	1030	<.10	<.10	<.10	
		FR	04/29/02	1035	<.10	<.10	<.10	
401930090361701	Illinois-50298	R	04/29/02	1350	<.10	<.10	<.10	
		FR	04/29/02	1352	<.10	<.10	<.10	
412232089275101	Illinois-11367	R	04/30/02	1020	<.10	<.10	<.10	
411529089105701	Illinois-11600	R	04/30/02	1215	<.10	<.10	<.10	
412030089001901	Illinois-11495	R	04/30/02	1325	<.10	<.10	<.10	
422322088140901	Illinois-20180	R	05/14/02	1135	<.10	<.10	<.10	
412143088254901	Illinois-22040	R	05/14/02	1325	<.10	<.10	<.10	

**Table 3.** Analytical results for glyphosate, aminomethylphosphonic acid, and glufosinate in State cooperative surface- and ground-water studies, 2001–06.—Continued

[Sample type: FB, field blank; FR, field replicate; LD, laboratory duplicate; R, regular; --, no data; &lt;, less than; µg/L, micrograms per liter]

Site number	Site location	Sample type	Date of collection (month/day/year)	Collection time (24-hour)	Concentrations		
					Glyphosate (µg/L)	Aminomethylphosphonic acid (µg/L)	Glufosinate (µg/L)
Illinois Ground-Water Study (EPI)—Continued							
412143088254901	Illinois-22040	R	05/14/02	1425	<0.10	<0.10	<0.10
421359088323201	Illinois-00276	R	05/20/02	0800	<.10	<.10	<.10
		FR	05/20/02	0802	<.10	<.10	<.10
415027089175501	Illinois-11560	R	05/20/02	1030	<.10	<.10	<.10
49332088363201	Illinois-00572	R	05/21/02	1035	<.10	<.10	<.10
		FR	05/21/02	1040	<.10	<.10	<.10
392439089262001	Illinois-50237	R	05/21/02	1335	<.10	<.10	<.10
394338090542001	Illinois-52062	R	06/05/02	1130	<.10	<.10	<.10
415839088113901	Illinois-20613	R	06/11/02	0950	<.10	<.10	<.10
404511090004001	Illinois-50351	R	06/11/02	1425	<.10	<.10	<.10
412854087503501	Illinois-20442	R	06/17/02	1335	<.10	<.10	<.10
403551088021302	Illinois-47573	R	06/17/02	1120	<.10	<.10	<.10
421656089031301	Illinois-11629	R	06/18/02	0905	<.10	<.10	<.10
414955089291901	Illinois-11557	R	06/18/02	1125	<.10	<.10	<.10
420727088153901	Illinois-20029	R	06/24/02	0950	<.10	<.10	<.10
4155090089032801	Illinois-11943	R	06/25/02	1005	<.10	<.10	<.10
414122088585401	Illinois-11570	R	06/25/02	1130	<.10	<.10	<.10
414945088115101	Illinois-20766	R	07/01/02	1255	<.10	<.10	<.10
395106089432801	Illinois-50003	R	07/02/02	1040	<.10	<.10	<.10
		FR	07/02/02	1045	<.10	<.10	<.10
385235090072601	Illinois-60058	R	07/02/02	1055	<.10	<.10	<.10
395106089432801	Illinois-50003	R	07/02/02	1040	<.10	<.10	<.10
404126089305001	Illinois-50051	R	07/17/02	1325	<.10	<.10	<.10
420608089501401	Illinois-11707	R	07/29/02	1030	<.10	<.10	<.10
		LD	07/29/02	1030	<.10	<.10	<.10
410931088384401	Illinois-11514	R	07/30/02	1300	<.10	<.10	<.10
Iowa Surface-Water Study (DJS)							
05418500	Maquoketa River near Maquoketa	R	06/05/02	1200	<.10	.18	<.10
		LD	06/05/02	1200	<.10	.17	<.10
05420500	Mississippi River at Clinton	R	05/23/03	1040	<.10	<.10	<.10
05422000	Wapsipinicon River near DeWitt	R	06/05/02	1430	<.10	.22	<.10

## 22 Concentrations of Glyphosate, Aminomethylphosphonic Acid, and Glufosinate in Water and Soil Samples

**Table 3.** Analytical results for glyphosate, aminomethylphosphonic acid, and glufosinate in State cooperative surface- and ground-water studies, 2001–06.—Continued

[Sample type: FB, field blank; FR, field replicate; LD, laboratory duplicate; R, regular; --, no data; <, less than; µg/L, micrograms per liter]

Site number	Site location	Sample type	Date of collection (month/day/year)	Collection time (24-hour)	Concentrations		
					Glyphosate (µg/L)	Aminomethylphosphonic acid (µg/L)	Glufosinate (µg/L)
Iowa Surface-Water Study (DJS)—Continued							
05457470	Cedar River at St. Ansgar	R	09/23/02	1058	0.47	0.81	<0.10
05458500	Cedar River at Janesville	R	09/24/02	0752	<.10	.41	<.10
05458900	West Fork Cedar River at Finchford	R	09/24/02	0950	<.10	.26	<.10
05462000	Shell Rock River at Shell Rock	R	09/23/02	1705	<.10	.44	<.10
05464090	Cedar River near LaPorte City	R	09/25/02	0905	<.10	.27	<.10
05464220	Wolf Creek near Dysart	R	09/24/02	1410	<.10	.21	<.10
05464420	Cedar River at Blairs Ferry Road at Palo	R	09/23/02	1415	<.10	.28	<.10
		LD	09/23/02	1415	<.10	.26	<.10
05464480	Cedar River at Edgewood Road at Cedar Rapids	R	09/04/02	0915	<.10	<.10	<.10
		LD	09/04/02	0915	<.10	<.10	<.10
122	--	R	06/14/03	1015	<.10	<.10	<.10
123	--	R	06/14/03	1000	<.10	<.10	<.10
124	--	R	06/14/03	0945	<.10	<.10	<.10
124	--	LD	06/14/03	0945	<.10	<.10	<.10
126	--	R	06/14/03	0920	<.10	<.10	<.10
164	--	R	06/14/03	1058	<.10	.16	<.10
164	--	LD	06/14/03	1058	<.10	.16	<.10
192	--	R	06/14/03	1025	<.10	.18	<.10
341	--	R	06/14/03	0935	<.10	.14	<.10
351	--	R	06/14/03	1045	<.10	<.10	<.10
352	--	R	06/14/03	1030	<.10	<.10	<.10
381	--	R	06/14/03	1018	<.10	<.10	<.10
382	--	R	06/14/03	0954	<.10	<.10	<.10
383	--	R	06/14/03	1045	<.10	<.10	<.10
384	--	R	06/14/03	0910	<.10	<.10	<.10
573	--	R	06/14/03	1140	<.10	<.10	<.10
574	--	R	06/14/03	1215	<.10	<.10	<.10
61	--	R	06/14/03	1325	<.10	<.10	<.10
62	--	R	06/14/03	0730	<.10	<.10	<.10
662	--	R	06/14/03	0801	3.5	.68	<.10

**Table 3.** Analytical results for glyphosate, aminomethylphosphonic acid, and glufosinate in State cooperative surface- and ground-water studies, 2001–06.—Continued

[Sample type: FB, field blank; FR, field replicate; LD, laboratory duplicate; R, regular; --, no data; &lt;, less than; µg/L, micrograms per liter]

Site number	Site location	Sample type	Date of collection (month/day/year)	Collection time (24-hour)	Concentrations			
					Glyphosate (µg/L)	Aminomethylphosphonic acid (µg/L)	Glufosinate (µg/L)	
Iowa Surface-Water Study (DJS)—Continued								
701	--	R	06/14/03	0857	<0.10	<0.10	<0.10	
702	--	R	06/14/03	0812	<.10	.19	<.10	
704	--	R	06/14/03	0933	<.10	.13	<.10	
71	--	R	06/14/03	0930	<.10	.10	<.10	
73	--	R	06/14/03	0800	<.10	<.10	<.10	
74	--	R	06/14/03	1000	<.10	.13	<.10	
77	--	R	06/14/03	1000	<.10	<.10	<.10	
861	--	R	06/14/03	1215	<.10	<.10	<.10	
862	--	R	06/14/03	1115	<.10	<.10	<.10	
865	--	R	06/14/03	1200	<.10	<.10	<.10	
93	--	R	06/14/03	0820	<.10	.15	<.10	
Iowa Ground-Water Study (DJS)								
415949091405401	CRM-1	R	09/05/02	1330	<.10	<.10	<.10	
415953091435301	CRM-4	R	09/05/02	0930	<.10	<.10	<.10	
420009091432101	CRM-27	R	09/03/02	1400	<.10	<.10	<.10	
		R	09/04/02	1715	<.10	<.10	<.10	
420012091432601	CRM-25	R	09/03/02	1200	<.10	<.10	<.10	
420013091431001	CRM-22	R	09/04/02	1045	<.10	<.10	<.10	
420015091431301	CRM-23	R	09/04/02	1315	<.10	<.10	<.10	
420018091430801	CRM-26	R	09/04/02	1530	<.10	<.10	<.10	
		FR	09/04/02	1535	<.10	<.10	<.10	
420033091420301	CRM-2	R	09/05/02	1130	<.10	<.10	<.10	
420002091403200	Water treatment plant	R	09/05/02	1515	<.10	<.10	<.10	
420010091431801	Seminole Ranney	R	05/29/03	1315	<.10	<.10	<.10	
420035091422301	Edgewood Ranney	R	05/29/03	1400	<.10	<.10	<.10	
Iowa Ground-Water Study (DKW)								
--	Fairfield 94-1	R	09/06/01	1000	<.10	<.10	<.10	
403659094285301	Blockton #1	R	08/14/01	0915	<.10	<.10	<.10	
		LD	08/14/01	0915	<.10	<.10	<.10	
403745091174701	Fort Madison 4	R	09/06/01	1300	<.10	<.10	<.10	
		LD	09/06/01	1300	<.10	<.10	<.10	

## 24 Concentrations of Glyphosate, Aminomethylphosphonic Acid, and Glufosinate in Water and Soil Samples

**Table 3.** Analytical results for glyphosate, aminomethylphosphonic acid, and glufosinate in State cooperative surface- and ground-water studies, 2001–06.—Continued

[Sample type: FB, field blank; FR, field replicate; LD, laboratory duplicate; R, regular; --, no data; <, less than; µg/L, micrograms per liter]

Site number	Site location	Sam- ple type	Date of col- lection (month/ day/year)	Col- lection time (24- hour)	Concentrations		
					Gly- pho- sate (µg/L)	Amino- meth- ylphos- phonic acid (µg/L)	Glu- fos- inate (µg/L)
Iowa Ground-Water Study (DKW)—Continued							
403906095015001	Shambaugh #3	R	08/14/01	0715	<0.10	<0.10	<0.10
		FR	08/14/01	0720	<.10	<.10	<.10
		R	08/27/01	0830	<.10	<.10	<.10
		FR	08/27/01	0838	<.10	<.10	<.10
		LD	08/27/01	0838	<.10	<.10	<.10
		R	08/29/01	1400	<.10	<.10	<.10
		LD	08/29/01	1400	<.10	<.10	<.10
404327095284801	Farragut # 79–2 North	R	08/13/01	1140	<.10	<.10	<.10
405632094534401	Nodaway #4	R	08/13/01	1645	<.10	<.10	<.10
405850095061701	Stanton #1	R	08/13/01	1430	<.10	<.10	<.10
405858093175701	Russell #1	R	08/15/01	1215	<.10	<.10	<.10
410907092375301	Eddyville 3	R	09/05/01	1515	<.10	<.10	<.10
411501095251301	Carson # (5), 3	R	08/13/01	0830	<.10	<.10	<.10
411622094520901	Cumberland #1	R	08/14/01	1315	<.10	<.10	<.10
411639094521101	Cumberland # (5), 4	R	08/14/01	1200	<.10	<.10	<.10
411644091110703	Grandview 3	R	08/08/01	1345	<.10	<.10	<.10
411727094374001	Fontanelle #5	R	08/14/01	1500	<.10	<.10	<.10
412013091485701	West Chester	R	08/08/01	1230	<.10	<.10	<.10
412138091571501	Keota 2	R	08/08/01	0915	<.10	<.10	<.10
412850091342901	Riverside 5	R	08/02/01	1511	<.10	<.10	<.10
		LD	08/02/01	1511	<.10	<.10	<.10
413040090455001	Blue Grass (2), 1	R	08/07/01	1130	<.10	<.10	<.10
		FR	08/07/01	1135	<.10	<.10	<.10
413040093290501	Carlisle #5	R	07/27/01	0915	<.10	<.10	<.10
413049095254501	Shelby #5	R	08/17/01	1345	<.10	<.10	<.10
413234094552401	Brayton #1	R	08/17/01	1100	<.10	<.10	<.10
413521090511001	Stockton 1	R	08/07/01	0915	<.10	<.10	<.10
413836094161701	Linden #3	R	08/15/01	0815	<.10	<.10	<.10
413913093070001	Newton 13	R	09/05/01	1230	<.10	<.10	<.10
413923090350901	Eldridge 2	R	08/06/01	1500	<.10	<.10	<.10



**Table 3.** Analytical results for glyphosate, aminomethylphosphonic acid, and glufosinate in State cooperative surface- and ground-water studies, 2001–06.—Continued

[Sample type: FB, field blank; FR, field replicate; LD, laboratory duplicate; R, regular; --, no data; &lt;, less than; µg/L, micrograms per liter]

Site number	Site location	Sam- ple type	Date of col- lection (month/ day/year)	Col- lection time (24- hour)	Concentrations		
					Gly- pho- sate (µg/L)	Amino- meth- ylphos- phonic acid (µg/L)	Glu- fos- inate (µg/L)
Iowa Ground-Water Study (DKW)—Continued							
414032091210001	West Branch 4	R	09/19/01	0930	<0.10	<0.10	<0.10
		FR	09/19/01	0935	<.10	<.10	<.10
		LD	09/19/01	0935	<.10	<.10	<.10
414236096012501	Mondamin #2, South	R	08/27/01	1130	<.10	<.10	<.10
414400924330001	Grinnell 7	R	09/18/01	1230	<.10	<.10	<.10
414520092211201	Ladora 1	R	09/20/01	0830	<.10	<.10	<.10
		FR	09/20/01	0915	<.10	<.10	<.10
		LD	09/20/01	0915	<.10	<.10	<.10
414652090153201	Cammanche 2	R	08/06/01	1115	<.10	<.10	<.10
414825091511201	East Amana #2	R	08/30/01	1145	<.10	<.10	<.10
414930090321601	Dewitt 3	R	08/06/01	1315	<.10	<.10	<.10
415057094065301	Perry #9R	R	07/26/01	1500	<.10	<.10	<.10
415233094403201	Coon Rapids #1 North	R	08/02/01	1345	<.10	<.10	<.10
415252093411401	Slater #1	R	07/26/01	1300	<.10	<.10	<.10
415417092180101	Belle Plaine #4	R	08/29/01	0900	<.10	<.10	<.10
415753092350201	Tama 5	R	09/04/01	1115	<.10	<.10	<.10
420005091431201	Cedar Rapids Sb	R	08/02/01	931	<.10	<.10	<.10
420336095115601	Vail #(1), 2	R	08/02/01	1600	<.10	<.10	<.10
420352092552401	Marshalltown 14	R	09/04/01	1330	<.10	<.10	<.10
420405092545601	Marshalltown 8	R	06/09/01	1430	<.10	<.10	<.10
420414090113201	Subula 1	R	08/06/01	0930	<.10	<.10	<.10
420451093561301	Boone #20	R	07/26/01	1030	<.10	<.10	<.10
420535091524002	Shellsburg 2	R	08/02/01	1131	<.10	<.10	<.10
420955095475601	Mapleton #5	R	08/02/01	1015	<.10	<.10	<.10
		FR	08/02/01	1020	<.10	<.10	<.10
420959094001901	Pilot Mound #3	R	07/26/01	0845	<.10	<.10	<.10
421135092275002	Traer 2, South	R	09/04/01	0845	<.10	<.10	<.10
421322092522001	Conrad 3	R	09/05/01	0900	<.10	<.10	<.10
421442091120001	Monticello 4	R	09/19/01	1230	<.10	<.10	<.10
		FR	09/19/01	1300	<.10	<.10	<.10

**26 Concentrations of Glyphosate, Aminomethylphosphonic Acid, and Glufosinate in Water and Soil Samples**

**Table 3.** Analytical results for glyphosate, aminomethylphosphonic acid, and glufosinate in State cooperative surface- and ground-water studies, 2001–06.—Continued

[Sample type: FB, field blank; FR, field replicate; LD, laboratory duplicate; R, regular; --, no data; <, less than; µg/L, micrograms per liter]

Site number	Site location	Sam- ple type	Date of col- lection (month/ day/year)	Col- lection time (24- hour)	Concentrations		
					Gly- pho- sate (µg/L)	Amino- meth- ylphos- phonic acid (µg/L)	Glu- fos- inate (µg/L)
Iowa Ground-Water Study (DKW)—Continued							
422106095280201	Ida Grove #3	R	08/01/01	1345	<0.10	<0.10	<0.10
		LD	08/01/01	1345	<.10	<.10	<.10
422611092552501	Wellsburg 1	R	09/18/01	0945	<.10	<.10	<.10
422819092212701	Waterloo #17	R	08/29/01	0945	<.10	<.10	<.10
422831095465102	Correctionville #1W	R	08/01/01	0900	<.10	<.10	<.10
422852092040101	Jesup #2	R	08/29/01	1130	<.10	<.10	<.10
422915095323504	Holstein #3	R	08/02/01	0830	<.10	<.10	<.10
422929096254501	Sioux City River #4	R	07/31/01	0930	<.10	<.10	<.10
423028094115101	Ft. Dodge #12	R	07/25/01	1130	<.10	<.10	<.10
423135090383201	Dubuque 9	R	09/11/01	1215	<.10	<.10	<.10
423537095583901	Kingsley #1	R	07/31/01	1215	<.10	<.10	<.10
423602090595201	Holy Cross 1	R	09/11/01	1530	<.10	<.10	<.10
		LD	09/11/01	1530	<.10	<.10	<.10
423744095383301	Quimby #1	R	08/01/01	1115	<.10	<.10	<.10
423954093535801	Eagle Grove #3	R	08/27/01	1030	<.10	<.10	<.10
424341095331301	Cherokee #10	R	08/01/01	1545	<.10	<.10	<.10
425330092483701	Greene 1	R	09/14/01	1215	<.10	<.10	<.10
425341093132501	Sheffield #2	R	07/25/01	0815	<.10	<.10	<.10
		FR	07/25/01	0820	<.10	<.10	<.10
		LD	07/25/01	0820	<.10	<.10	<.10
425528093364501	Goodell #2	R	07/24/01	1730	<.10	<.10	<.10
425717091382602	Elgin 2	R	09/12/01	0930	<.10	<.10	<.10
425731094270801	West Bend #2	R	07/23/01	1615	<.10	<.10	<.10
430015093360501	Klemme #2	R	07/24/01	1415	<.10	<.10	<.10
430015093360502	Klemme #1	R	08/27/01	1425	<.10	<.10	<.10
430017096285301	Hawarden #2	R	07/31/01	1415	<.10	<.10	<.10
431157095502901	Sheldon #5	R	07/31/01	1615	<.10	<.10	<.10
431556093375401	Forest City #2	R	07/24/01	1045	<.10	<.10	<.10
431638091282902	Waukon 2	R	09/12/01	1230	<.10	<.10	<.10
431654092484501	Osage 5	R	09/13/01	1515	<.10	<.10	<.10

**Table 3.** Analytical results for glyphosate, aminomethylphosphonic acid, and glufosinate in State cooperative surface- and ground-water studies, 2001–06.—Continued

[Sample type: FB, field blank; FR, field replicate; LD, laboratory duplicate; R, regular; --, no data; &lt;, less than; µg/L, micrograms per liter]

Site number	Site location	Sample type	Date of collection (month/day/year)	Collection time (24-hour)	Concentrations		
					Glyphosate (µg/L)	Aminomethylphosphonic acid (µg/L)	Glufosinate (µg/L)
Iowa Ground-Water Study (DKW)—Continued							
431828091473201	Decorah 6	R	09/12/01	1530	<0.10	<0.10	<0.10
432150092332401	Riceville	R	09/13/01	1215	<.10	<.10	<.10
432241092550802	St. Ansgar 2	R	09/14/01	0915	<.10	<.10	<.10
432349094285201	Armstrong #7	R	07/24/01	0815	<.10	<.10	<.10
432608096201503	Lester #(4), 2	R	07/31/01	1930	<.10	<.10	<.10
432650092170401	Lime Springs	R	09/13/01	0930	<.10	<.10	<.10
Kansas Surface-Water Study (AZE)							
07143672	Little Arkansas River at Hwy 50 near Halstead	FB	05/14/02	0730	<.10	<.10	<.10
		R	05/14/02	1005	.16	.41	<.10
		R	06/06/02	1200	<.10	.26	<.10
		R	06/17/02	0915	.75	.50	<.10
		R	04/22/03	1010	<.10	.28	<.10
		R	05/28/03	1030	.28	.36	<.10
07144100	Little Arkansas River near Sedgwick	R	05/13/02	1115	.98	.54	<.10
		R	06/06/02	0900	.66	.41	<.10
		R	06/13/02	0930	.43	.49	<.10
		R	04/23/03	0950	<.10	.27	<.10
		R	05/29/03	1000	.32	.37	<.10
Kansas Ground-Water Study (AZE)							
380643097353001	Alta Mills well	R	05/29/02	1245	<.10	<.10	<.10
380424097343801	TH-10-95	R	05/28/02	0945	<.10	<.10	<.10
		R	05/29/02	1020	<.10	<.10	<.10
380237097324401	TH-02-95	R	05/29/02	1025	<.10	<.10	<.10
375304097291301	TH-06-95	R	05/29/02	1255	<.10	<.10	<.10
375628097270801	TH-08-A3	R	05/30/02	0910	<.10	<.10	<.10
375628097271701	TH-08-A5	R	05/30/02	1110	<.10	<.10	<.10
375259097252901	Sedgwick well	R	05/31/02	0925	<.10	<.10	<.10
380028097311001	EB-145-A1	R	06/03/02	0945	<.10	<.10	<.10
		FR	06/03/02	1145	<.10	<.10	<.10

**28 Concentrations of Glyphosate, Aminomethylphosphonic Acid, and Glufosinate in Water and Soil Samples**

**Table 3.** Analytical results for glyphosate, aminomethylphosphonic acid, and glufosinate in State cooperative surface- and ground-water studies, 2001–06.—Continued

[Sample type: FB, field blank; FR, field replicate; LD, laboratory duplicate; R, regular; --, no data; <, less than; µg/L, micrograms per liter]

Site number	Site location	Sam- ple type	Date of col- lection (month/ day/year)	Col- lection time (24- hour)	Concentrations		
					Gly- pho- sate (µg/L)	Amino- meth- ylphos- phonic acid (µg/L)	Glu- fos- inate (µg/L)
Kansas Ground-Water Study (AZE)—Continued							
380143097344201	IW-06A	R	06/24/02	1005	<0.10	0.33	<0.10
380143097344202	IW-06C	R	06/24/02	1225	<.10	<.10	<.10
380016097384901	IW-08A	R	06/25/02	0950	<.10	<.10	<.10
380016097384902	IW-08C	R	06/25/02	1245	<.10	<.10	<.10
380328097342501	IW-03A	R	06/26/02	0950	<.10	<.10	<.10
380328097342502	IW-03C (deep)	R	06/26/02	1150	<.10	<.10	<.10
380421097385001	IW-01A	R	06/27/02	0945	<.10	<.10	<.10
		LD	06/27/02	0945	<.10	<.10	<.10
380421097385002	IW-01C	R	06/27/02	1205	<.10	<.10	<.10
		LD	06/27/02	1205	<.10	<.10	<.10
375958097300001	IW-12A	R	07/08/02	0940	<.10	<.10	<.10
375958097300002	IW-12C	R	07/08/02	1200	<.10	<.10	<.10
375630097342701	IW-20A	R	07/10/02	0905	<.10	<.10	<.10
375630097342702	IW-20C	R	07/10/02	1150	<.10	<.10	<.10
375629097293701	IW-22A	R	07/11/02	0930	<.10	<.10	<.10
375629097293702	IW-22C	R	07/11/02	1200	<.10	<.10	<.10
375446097390701	IW-24A	R	07/16/02	0950	<.10	<.10	<.10
375446097390702	IW-24C	R	07/16/02	1140	<.10	<.10	<.10
		LD	07/16/02	1140	<.10	<.10	<.10
375258097340601	IW-30A	R	07/18/02	0850	<.10	<.10	<.10
375258097340602	IW-30C	R	07/18/02	1105	<.10	<.10	<.10
375116097274701	IW-37A	R	07/25/02	0900	<.10	<.10	<.10
375116097274702	IW-37C	R	07/25/02	1130	<.10	<.10	<.10
380356097340901	DW-TW-06	R	12/03/02	1305	<.10	<.10	<.10
380358097341301	DW-TW-07	R	12/03/02	1040	<.10	<.10	<.10
380142097363601	RRW-03	R	12/09/02	1050	<.10	<.10	<.10
380329097363703	RRW-01	R	12/10/02	1300	<.10	<.10	<.10
		LD	12/10/02	1300	<.10	<.10	<.10
380336097335801	DW-TW-03	R	12/10/02	1015	<.10	<.10	<.10

**Table 3.** Analytical results for glyphosate, aminomethylphosphonic acid, and glufosinate in State cooperative surface- and ground-water studies, 2001–06.—Continued

[Sample type: FB, field blank; FR, field replicate; LD, laboratory duplicate; R, regular; --, no data; &lt;, less than; µg/L, micrograms per liter]

Site number	Site location	Sample type	Date of collection (month/day/year)	Collection time (24-hour)	Concentrations		
					Glyphosate (µg/L)	Aminomethylphosphonic acid (µg/L)	Glufosinate (µg/L)
Kansas Ground-Water Study (AZE)—Continued							
380338097340201	DW–TW–04	R	12/11/02	1015	<0.10	<0.10	<0.10
380344097340401	DW–TW–05	R	12/11/02	1215	<.10	<.10	<.10
380329097334601	DW–TW–01	R	12/12/02	1030	<.10	<.10	<.10
380333097335001	DW–TW–02	R	12/12/02	1015	<.10	<.10	<.10
380235097363801	RRW–02	R	03/06/03	1225	<.10	<.10	<.10
Kansas Surface-Water Study (JUR)							
--	Bronson City Lake	R	04/03/03	1300	<.10	<.10	<.10
		LD	04/03/03	1300	<.10	<.10	<.10
--	Centralia Lake, Centralia	R	05/02/03	1000	<.10	<.10	<.10
		LD	05/02/03	1000	<.10	.10	<.10
--	Crystal Lake, Garnett	R	04/10/03	1030	<.10	<.10	<.10
--	Edgerton City Lake	R	11/12/02	1000	<.10	.19	<.10
--	Gardner City Lake	R	10/21/02	1100	<.10	<.10	<.10
--	Hiawatha City Lake	R	10/02/02	1200	<.10	.19	<.10
--	Lake Afton	R	10/17/02	1230	<.10	<.10	<.10
--	Mission Lake	R	10/23/02	1000	<.10	.27	<.10
--	Mission Lake	R	05/21/03	1300	<.10	.31	<.10
--	Pony Creek Lake, Sabetha	R	05/21/03	1000	<.10	<.10	<.10
Kansas Surface-Water Study (KSU)							
--	9F–D Manhattan	R	10/18/01	--	<.02	<.02	<.02
		FR	10/18/01	--	<.02	<.02	<.02
--	9F–G	FR	10/18/01	--	<.02	<.02	<.02
--	Fairway #1	R	05/21/03	1000	3.3	6.1	<.02
--	Fairway #2	R	05/07/02	1200	5.2	22	<.02
--	Fairway #3	R	07/02/03	0845	.63	.80	<.02
		R	07/23/03	0830	<.02	.64	<.02
--	Fairway Drain #1	R	05/07/02	1200	1.2	5.4	<.02
		R	05/12/03	0900	.33	1.0	<.02
--	Fairway Drain #2	R	05/12/03	0900	.59	1.6	<.02
		R	06/20/02	0930	.42	1.2	<.02

### 30 Concentrations of Glyphosate, Aminomethylphosphonic Acid, and Glufosinate in Water and Soil Samples

**Table 3.** Analytical results for glyphosate, aminomethylphosphonic acid, and glufosinate in State cooperative surface- and ground-water studies, 2001–06.—Continued

[Sample type: FB, field blank; FR, field replicate; LD, laboratory duplicate; R, regular; --, no data; <, less than; µg/L, micrograms per liter]

Site number	Site location	Sample type	Date of collection (month/day/year)	Collection time (24-hour)	Concentrations		
					Glyphosate (µg/L)	Aminomethylphosphonic acid (µg/L)	Glufosinate (µg/L)
Kansas Surface-Water Study (KSU)—Continued							
--	Fairway Drain #3	R	05/07/02	1200	0.47	1.2	<0.02
		R	05/12/03	0900	1.0	2.5	<.02
--	Inlet #1	R	05/05/02	1932	<.02	<.02	<.02
		R	05/10/02	2200	<.02	<.02	<.02
--	Inlet #4	R	04/23/03	1504	<.02	<.02	<.02
		LD	04/23/03	1504	<.02	<.02	<.02
		R	04/29/02	0306	.16	<.02	<.02
--	Outlet #5	R	05/24/03	0643	<.02	<.02	<.02
		R	05/24/03	0726	<.02	.26	<.02
--	Pond #1, Site #1, 0.75 foot	R	04/16/03	--	<.02	<.02	<.02
--	Pond #2, Site #1, 1.0 foot	R	04/16/03	--	<.02	<.02	<.02
--	Pond 2, Sample 4, 6 foot	R	08/06/03	--	<.02	<.02	<.02
--	Pond 2, Sample 5, 8 foot	R	08/06/03	--	<.02	<.02	<.02
Mississippi Surface-Water Study (RRM)							
--	1617-TL3	R	08/27/01	2114	<.10	<.10	<.10
--	1610-BL3	R	08/31/01	0626	1.0	2.5	<.10
--	1618-TL3	R	08/31/01	0729	<.10	<.10	<.10
--	1622-UL1	R	08/31/01	0800	.23	.81	<.10
--	1619-TL3	R	09/01/01	0806	<.10	<.10	<.10
--	1614-BL4B	R	08/31/01	0837	.52	1.1	<.10
--	1609-BL4	R	08/31/01	0912	.68	2.5	<.10
--	1611-BL3	R	09/01/01	0823	.88	2.9	<.10
--	1623-UL1	R	09/01/01	0920	.22	.74	<.10
--	1615-UL2	R	09/01/01	0945	.25	1.7	<.10
--	1616-UL2	R	09/02/01	0820	.32	1.2	<.10
--	1616-TL2	R	09/02/01	1305	.58	.68	<.10
--	1615-BL4B	R	09/02/01	1412	.31	1.4	<.10
		LD	09/02/01	1412	.20	1.0	<.10
--	2601-UL1	R	10/11/01	1437	.43	.77	<.10

**Table 3.** Analytical results for glyphosate, aminomethylphosphonic acid, and glufosinate in State cooperative surface- and ground-water studies, 2001–06.—Continued

[Sample type: FB, field blank; FR, field replicate; LD, laboratory duplicate; R, regular; --, no data; &lt;, less than; µg/L, micrograms per liter]

Site number	Site location	Sam- ple type	Date of col- lection (month/ day/year)	Col- lection time (24- hour)	Concentrations		
					Gly- pho- sate (µg/L)	Amino- meth- ylphos- phonic acid (µg/L)	Glu- fos- inate (µg/L)
Mississippi Surface-Water Study (RRM)—Continued							
--	2601-UL2	R	10/11/01	1537	0.23	1.0	<0.10
--	2601-TL2	R	10/12/01	1312	.20	.33	<.10
--	2602-UL1	R	10/13/01	0850	.40	1.1	<.10
--	2602-UL2	R	10/13/01	0913	.22	.85	<.10
--	2601-BL4A	R	10/13/01	0945	1.3	2.4	<.10
--	2601-BL3	R	11/26/01	1855	.88	2.0	<.10
--	2603-UL2	R	11/27/01	0827	.49	1.6	<.10
--	2602-TL2	R	11/27/01	0215	.25	.49	<.10
--	2601-TL3	R	11/27/01	0255	.60	<.10	<.10
--	2602-BL4A	R	11/27/01	0258	.40	1.7	<.10
--	2603-UL1	R	11/27/01	0300	.29	.86	<.10
--	2604-UL2	R	11/28/01	1111	.42	.86	<.10
--	2604-UL1	R	11/28/01	1118	.52	.76	<.10
--	2603-TL2	R	11/28/01	1341	.43	.33	<.10
--	2602-BL3	R	11/28/01	1402	.49	1.5	<.10
--	2602-TL3	R	11/28/01	1812	.41	<.10	<.10
--	2604-BL4A	R	11/28/01	1815	.27	.63	<.10
--	2605-BL4A	R	12/12/01	1251	.34	.70	<.10
		LD	12/12/01	1251	.29	.55	<.10
--	2603-TL3	R	12/12/01	1314	<.10	<.10	<.10
--	2604-TL2	R	12/12/01	1316	.43	.24	<.10
--	2605-UL1	R	12/12/01	1319	2.0	.66	<.10
--	2605-UL2	R	12/12/01	1353	.14	.66	<.10
--	2606-UL2	R	12/12/01	2318	.11	.89	<.10
--	2601-BL1	R	12/13/01	1558	.48	1.1	<.10
--	2606-BL4A	R	12/15/01	1452	.14	.36	<.10
--	2604-TL3	R	12/17/01	0311	.13	<.10	<.10
--	2607-UL2	R	12/17/01	0347	.17	.75	<.10
--	2606-UL1	R	01/22/02	1845	<.10	.47	<.10
--	2601-BL4	R	01/23/02	0138	.33	.70	<.10

## 32 Concentrations of Glyphosate, Aminomethylphosphonic Acid, and Glufosinate in Water and Soil Samples

**Table 3.** Analytical results for glyphosate, aminomethylphosphonic acid, and glufosinate in State cooperative surface- and ground-water studies, 2001–06.—Continued

[Sample type: FB, field blank; FR, field replicate; LD, laboratory duplicate; R, regular; --, no data; <, less than; µg/L; micrograms per liter]

Site number	Site location	Sample type	Date of collection (month/day/year)	Collection time (24-hour)	Concentrations			
					Glyphosate (µg/L)	Aminomethylphosphonic acid (µg/L)	Glufosinate (µg/L)	
Mississippi Surface-Water Study (RRM)—Continued								
--	2601-BL4B	R	01/23/02	0248	0.15	0.24	<0.10	
--	2602-BL1	R	01/23/02	0249	1.1	1.4	<.10	
--	2607-BL4A	R	01/23/02	2302	.18	.84	<.10	
--	2607-UL1	R	01/24/02	0541	.13	.45	<.10	
--	2605-TL3	R	01/24/02	0634	<.10	<.10	<.10	
--	2608-BL4A	R	01/24/02	0650	.17	.49	<.10	
--	2603-BL1	R	01/24/02	0653	.17	.83	<.10	
--	2605-TL2	R	01/24/02	0658	.16	.18	<.10	
--	2603-BL3	R	01/24/02	0658	.37	.77	<.10	
--	2602-BL4B	R	01/24/02	0706	.19	.47	<.10	
		LD	01/24/02	0800	.27	.44	<.10	
--	2604-BL1	R	01/31/02	1742	.25	1.2	<.10	
--	2609-BL4A	R	01/31/02	1757	.11	.71	<.10	
--	2605-BL1	R	02/06/02	0117	.27	1.1	<.10	
--	2608-UL2	R	02/06/02	0132	<.10	.60	<.10	
--	2604-BL3	R	02/06/02	0203	.20	.77	<.10	
--	2606-TL3	R	02/06/02	0235	<.10	<.10	<.10	
--	2606-TL2	R	02/06/02	0241	.25	.31	<.10	
--	2603-BL4B	R	02/06/02	0501	<.10	.19	<.10	
--	2610-BL4A	R	02/06/02	0520	<.10	.57	<.10	
--	2606-BL1	R	02/19/02	0240	.39	1.1	<.10	
--	2611-BL4A	R	02/19/02	0250	.12	.77	<.10	
--	2607-BIL3	R	02/19/02	0256	.24	.93	<.10	
--	2607-TL3	R	02/19/02	2109	<.10	<.10	<.10	
--	2604-BL4	R	02/19/02	2140	<.10	.26	<.10	
--	2603-BL4	R	02/19/02	2234	<.10	.51	<.10	
		LD	02/19/02	2234	<.10	.59	<.10	
--	2612-BL4A	R	03/12/02	0213	.22	.98	<.10	
--	2608-TL3	R	03/12/02	0237	<.10	<.10	<.10	
--	2609-UL2	R	03/12/02	0309	.36	1.5	<.10	



**Table 3.** Analytical results for glyphosate, aminomethylphosphonic acid, and glufosinate in State cooperative surface- and ground-water studies, 2001–06.—Continued

[Sample type: FB, field blank; FR, field replicate; LD, laboratory duplicate; R, regular; --, no data; &lt;, less than; µg/L; micrograms per liter]

Site number	Site location	Sample type	Date of collection (month/day/year)	Collection time (24-hour)	Concentrations		
					Glyphosate (µg/L)	Aminomethylphosphonic acid (µg/L)	Glufosinate (µg/L)
Mississippi Surface-Water Study (RRM)—Continued							
--	2605-BL4B	R	03/12/02	0350	0.49	0.44	<0.10
		LD	03/12/02	0350	.43	.33	<.10
--	2604-BL4	R	03/12/02	0500	.21	.90	<.10
--	2606-BL4B	R	03/16/02	0100	2.7	1.2	<.10
--	2613-BL4A	R	03/16/02	0122	5.7	2.3	<.10
--	2609-TL3	R	03/16/02	0128	.28	.22	<0.10
--	2608-UL1	R	03/16/02	0147	.20	.62	<.10
--	2609-TL2	R	03/16/02	0155	.53	.72	<.10
--	2610-UL2	R	03/16/02	0158	.27	1.3	<.10
--	2605-BL4	R	03/16/02	0309	9.8	2.5	<.10
--	2607-BL1	R	03/20/02	0515	.48	2.0	<.10
		LD	03/20/02	0515	.44	2.2	<.10
--	2609-UL1	R	03/20/02	0526	.25	.76	<.10
--	2611-UL2	R	03/20/02	0545	.36	1.4	<.10
--	2610-TL3	R	03/20/02	1148	.43	<.10	<.10
--	2614-BL4A	R	03/20/02	1155	1.1	1.5	<.10
--	2607-BL4B	R	03/20/02	1155	.36	1.6	<.10
--	2606-BL4	R	03/20/02	1304	1.1	1.4	<.10
--	2608-BL1	R	03/30/02	2136	.47	1.9	<.10
--	2611-TL3	R	03/30/02	2139	<.10	<.10	<.10
--	2611-TL3	LD	03/30/02	2139	.10	<.10	<.10
--	2615-BL4A	R	03/30/02	2156	.51	1.1	<.10
--	2612-UL2	R	03/30/02	2309	.11	1.2	<.10
--	2611-TL2	R	03/30/02	2310	2.1	.67	<.10
--	2608-BL4B	R	03/31/02	0150	.38	2.2	<.10
--	2607-BL4	R	03/31/02	0320	.59	.65	<.10
--	2607-BL4	LD	03/31/02	0320	.49	.54	<.10
--	2612-TL3	R	04/08/02	1107	<.10	<.10	<.10
--	2609-BL1	R	04/08/02	1110	99	3.4	<.10
--	2616-BL4A	R	04/08/02	1143	.80	.58	<.10

### 34 Concentrations of Glyphosate, Aminomethylphosphonic Acid, and Glufosinate in Water and Soil Samples

**Table 3.** Analytical results for glyphosate, aminomethylphosphonic acid, and glufosinate in State cooperative surface- and ground-water studies, 2001–06.—Continued

[Sample type: FB, field blank; FR, field replicate; LD, laboratory duplicate; R, regular; --, no data; <, less than; µg/L, micrograms per liter]

Site number	Site location	Sample type	Date of collection (month/day/year)	Collection time (24-hour)	Concentrations			
					Glyphosate (µg/L)	Aminomethylphosphonic acid (µg/L)	Glufosinate (µg/L)	
Mississippi Surface-Water Study (RRM)—Continued								
--	2613-UL2	R	04/08/02	1213	0.16	0.63	<0.10	
--	2608-BL4	R	04/08/02	1404	.45	.59	<.10	
--	2610-UL1	R	05/26/02	1415	7.0	2.7	<.10	
--	2614-UL2	R	05/26/02	1425	6.8	2.2	<.10	
--	2611-UL1	R	05/29/02	1915	1.3	.93	<.10	
--	201-DCVP	R	09/04/02	1030	<.10	<.10	<.10	
--	201-DCC	R	09/04/02	1500	<.10	1.0	<.10	
		LD	09/04/02	1500	.10	2.1	<.10	
--	201-DCRF	R	09/05/02	0945	.48	3.1	<.10	
--	201-DCh	R	09/05/02	1200	.86	4.1	<.10	
--	202-DCH	R	09/05/02	1400	<.10	.14	<.10	
--	201-DCS	R	09/05/02	1730	.11	1.1	<.10	
--	202-DCS	FR	09/05/02	1731	.10	.90	<.10	
--	202-DCS	LD	09/05/02	1731	.13	.78	<.10	
--	201-DCEL	R	09/05/02	1600	.71	4.9	<.10	
Nebraska Surface-Water Study (JPN)								
403119815550020	MW-7	R	07/31/02	1145	<.10	<.10	<.10	
403119815550030	MW-8	R	07/31/02	0830	<.10	<.10	<.10	
403119885550010	BLD 550	R	07/29/02	1330	<.10	<.10	<.10	
		LD	07/29/02	1330	<.10	<.10	<.10	
403119981555004	MW-9	R	07/30/02	1245	<.10	<.10	<.10	
403401981701003	MW-3	R	07/30/02	0845	<.10	<.10	<.10	
403403981652010	MW-6	R	08/28/02	0815	<.10	<.10	<.10	
403403981656010	MW-1	R	08/29/02	0930	<.10	<.10	<.10	
		LD	08/29/02	0930	<.10	<.10	<.10	
403403981656020	MW-2	R	08/28/02	1400	<.10	<.10	<.10	
40334498164601	PWS	R	09/03/02	0915	<.10	<.10	<.10	
40340398165202	MW-4	R	09/04/02	0800	<.10	<.10	<.10	
40340398165203	MW-5	R	09/04/02	0945	<.10	<.10	<.10	

**Table 3.** Analytical results for glyphosate, aminomethylphosphonic acid, and glufosinate in State cooperative surface- and ground-water studies, 2001–06.—Continued

[Sample type: FB, field blank; FR, field replicate; LD, laboratory duplicate; R, regular; --, no data; &lt;, less than; µg/L, micrograms per liter]

Site number	Site location	Sample type	Date of collection (month/day/year)	Collection time (24-hour)	Concentrations		
					Glyphosate (µg/L)	Aminomethylphosphonic acid (µg/L)	Glufosinate (µg/L)
South Dakota Surface-Water Study (BSD)							
425740098161100	YST Wetlands Number 19 near Greenwood	R	06/15/05	0915	0.39	1.5	<0.02
		R	06/15/05	0945	.08	.14	<.02
425941098173400	YST Wetlands Number 18 near Wagner	R	06/15/05	0835	.16	.08	<.02
		R	06/15/05	1045	.07	.04	<.02
		R	06/15/05	1635	.66	.34	<.02
430125098120600	YST Wetlands Number 17 near Dante	R	06/13/05	1540	<.02	.26	<.02
430226098281400	YST Wetlands Number 12 near Pickstown	R	06/16/05	0840	<.02	<.02	<.02
		FR	06/16/05	0845	<.02	<.02	<.02
430300098253300	YST Wetlands Number 8 near Pickstown	R	06/15/05	1655	.08	.38	<.02
		R	06/16/05	0755	<.02	.29	<.02
		FR	06/16/05	0800	.40	.32	<.02
430311098253000	YST Wetlands Number 23 near Ravinia	R	06/16/05	1650	.18	.36	<.02
430443098102200	YST Wetlands Number 16 near Dry Choteau Creek near Dante	R	06/13/05	1215	.07	<.02	<.02
430500098064000	YST Wetlands Number 15 near Dry Choteau Creek near Dante	FR	06/13/05	1445	.10	<.02	<.02
430618098275800	YST Wetlands Number 22 near Old Landfill near Ravinia	R	06/16/05	1255	<.02	<.02	<.02
		FR	06/16/05	1300	.07	<.02	<.02
430735098193000	YST Wetlands Number 14 near Wagner	R	06/13/05	1115	<.02	.32	<.02
		LD	06/13/05	1115	<.02	.21	<.02
431116098355600	YST Wetlands Number 6 near Lake Andes	R	06/16/05	1405	.13	<.02	<.02
431426098345800	YST Wetlands Number 5 (Goose Lake) near Geddes	R	06/16/05	1455	.19	.20	<.02
431759098334000	YST Wetlands Number 4 (WPA) near Geddes	R	06/16/05	1545	<.02	<.02	<.02
431853098322600	YST Wetlands Number 2 (Pheasant Acres) near Geddes	R	06/14/05	0830	.10	<.02	<.02
		LD	06/14/05	0830	.09	<.02	<.02
431907098321000	YST Wetlands Number 3 (Pheasant Acres East) near Geddes	R	06/14/05	0955	.04	<.02	<.02
Vermont Surface-Water Study (ACV)							
04282815	Englesby Brook at Burlington	R	06/26/06	1200	.08	.05	<.02
		LD	06/26/06	1200	.06	.03	<.02
04282813	Potash Brook at Queen City Park Road near Burlington	R	06/26/06	1245	.03	<.02	<.02
04292775	Stevens Brook at Lower Newton Street at St. Albans	R	06/26/06	1445	.62	.09	<.02
04294000	Missiquoi River at Swanton	R	06/27/06	1100	<.02	<.02	<.02

**36 Concentrations of Glyphosate, Aminomethylphosphonic Acid, and Glufosinate in Water and Soil Samples**

**Table 3.** Analytical results for glyphosate, aminomethylphosphonic acid, and glufosinate in State cooperative surface- and ground-water studies, 2001–06.—Continued

[Sample type: FB, field blank; FR, field replicate; LD, laboratory duplicate; R, regular; --, no data; <, less than; µg/L, micrograms per liter]

Site number	Site location	Sample type	Date of collection (month/day/year)	Collection time (24-hour)	Concentrations		
					Glyphosate (µg/L)	Aminomethylphosphonic acid (µg/L)	Glufosinate (µg/L)
Washington Surface-Water Study (LMW)							
12113499	Taylor Creek at Lakeridge Park near Renton	R	07/08/03	1305	<0.10	<0.10	<0.10
		R	08/05/03	1300	<.10	<.10	<.10
		R	10/18/03	0730	.16	<.10	<.10
		R	11/18/03	1145	.10	<.10	<.10
12119600	May Creek at mouth near Renton	R	07/08/03	1110	<.10	<.10	<.10
		R	08/05/03	1105	<.10	<.10	<.10
		R	10/16/03	1130	.23	<.10	<.10
		R	11/18/03	1100	.21	<.10	<.10
12120000	Mercer Creek near Bellevue	R	07/08/03	1505	.43	.14	<.10
		R	08/05/03	1145	<.10	.10	<.10
		R	10/16/03	0930	.48	<.10	<.10
		R	11/18/03	1000	.68	<.10	<.10
		LD	11/18/03	1000	.59	<.10	<.10
12125500	Bear Creek at Woodinville	R	06/28/02	2145	2.0	.38	<.10
		R	07/10/02	1115	<.10	<.10	<.10
		R	08/21/02	1130	.12	.10	<.10
		R	11/12/02	1230	.31	.15	<.10
12126200	North Creek at North Creek Parkway near Bothell	R	06/28/02	2245	.10	<.10	<.10
		R	07/10/02	1300	<.10	<.10	<.10
		R	08/21/02	1215	<.10	<.10	<.10
		R	11/12/02	1300	<.10	<.10	<.10
		FB	11/12/02	1305	<.10	<.10	<.10
		LD	11/12/02	1305	<.10	<.10	<.10
474243122083001	Sammamish River Irrigation Return at 124th Street	R	06/28/02	2045	1.2	.52	<.10
		LD	06/28/02	2045	.97	.53	<.10
		R	07/10/02	1000	.79	.82	<.10
		R	08/21/02	0945	1.3	1.3	<.10
		LD	08/21/02	0945	.86	1.7	<.10
		R	11/12/02	1200	.84	.48	<.10
		LD	11/12/02	1200	.80	.45	<.10

**Table 4.** Analytical results for glyphosate, aminomethylphosphonic acid, and glufosinate in National Stream Quality Accounting Network Program (NASQAN) surface- and ground-water studies, 2002.

[ Sample type: FR, field replicate; R, regular; LD, laboratory duplicate; --, no data; &lt;, less than; µg/L, micrograms per liter]

Site number (fig. 3)	Site location	Sample type	Date of collection (day/month/year)	Collection time (24-hour)	Concentrations		
					Glyphosate (µg/L)	Amino-methylphosphonic acid (µg/L)	Glufosinate (µg/L)
03612500	Ohio River at Dam 53 near Grand Chain, Illinois	R	04/25/02	1320	<0.10	<0.10	<0.10
		R	05/07/02	1410	<.10	<.10	<.10
		R	05/29/02	1400	<.10	<.10	<.10
		R	06/12/02	1510	<.10	.15	<.10
		R	06/26/02	1330	<.10	<.10	<.10
		FR	06/26/02	1340	<.10	<.10	<.10
		R	08/08/02	1410	<.10	.15	<.10
		R	09/10/02	1410	<.10	.16	<.10
		LD	09/10/02	1410	<.10	.16	<.10
		FR	09/10/02	1420	<.10	.17	<.10
07022000	Mississippi River at Thebes, Illinois	R	04/29/02	1410	<.10	.19	<.10
		R	05/09/02	1010	<.10	<.10	<.10
		R	05/14/02	1050	<.10	.13	<.10
		R	06/12/02	1300	<.10	.32	<.10
		R	07/10/02	1510	<.10	.27	<.10
		R	08/14/02	1415	<.10	.29	<.10
		LD	08/14/02	1415	<.10	.32	<.10
		R	09/11/02	1305	<.10	.30	<.10
		R	10/23/02	1355	<.10	.18	<.10
		LD	10/23/02	1355	<.10	.12	<.10
07288955	Yazoo River below Steele Bayou near Long Lake, Mississippi	R	04/12/02	1200	.33	<.10	<.10
		R	05/10/02	1200	<.10	.17	<.10
		R	06/27/02	1200	.14	.38	<.10
		R	07/09/02	1200	<.10	<.10	<.10
07373420	Mississippi River near St. Francisville, Mississippi	R	04/22/02	1130	<.10	<.10	<.10
		R	05/07/02	1030	<.10	.12	<.10
		R	05/28/02	1000	<.10	<.10	<.10
		R	08/05/02	--	<.10	.25	<.10
		R	08/19/02	1000	<.10	.20	<.10
		R	09/09/02	1000	<.10	.23	<.10

**38 Concentrations of Glyphosate, Aminomethylphosphonic Acid, and Glufosinate in Water and Soil Samples**

**Table 5.** Analytical results for glyphosate, aminomethylphosphonic acid, and glufosinate in National Water-Quality Assessment (NAWQA) Program surface- and ground-water studies, 2001–06.

[Location of NAWQA study units shown in figure 4. Sample type: FB, field blank; FR, field replicate; R, regular; LD, laboratory duplicate; --, no data; <, less than; µg/L, micrograms per liter]

Site number	Site location	Sample type	Date of collection (day/month/year)	Collection time (24-hour)	Concentrations		
					Glyphosate (µg/L)	Amino-methylphosphonic acid (µg/L)	Glufosinate (µg/L)
Albemarle-Pamlico Drainage Surface Water (APD)							
02091500	Contentnea Creek at Hookerton, North Carolina	R	10/22/02	1430	<0.10	<0.10	<0.10
		R	11/07/02	1600	<.10	<.10	<.10
		FR	11/07/02	1601	<.10	<.10	<.10
		LD	11/07/02	1601	<.10	<.10	<.10
		R	12/10/02	1500	<.10	<.10	<.10
		R	01/22/03	1400	<.10	<.10	<.10
		LD	01/22/03	1400	<.10	<.10	<.10
		FR	01/22/03	1401	<.10	<.10	<.10
		FR	01/22/03	1402	<.10	<.10	<.10
		R	02/12/03	1330	<.10	<.10	<.10
		LD	02/12/03	1330	<.10	<.10	<.10
		R	03/07/03	1315	<.10	<.10	<.10
		R	03/18/03	1330	<.10	<.10	<.10
		LD	03/18/03	1330	<.10	<.10	<.10
		R	04/04/03	1200	<.10	<.10	<.10
		R	04/21/03	1415	<.10	<.10	<.10
		LD	04/21/03	1415	<.10	<.10	<.10
		R	05/05/03	1445	<.10	<.10	<.10
		R	05/28/03	1100	.18	<.10	<.10
		R	06/05/03	1400	<.10	<.10	<.10
		R	06/27/03	1120	<.10	<.10	<.10
		FR	06/27/03	1121	<.10	<.10	<.10
		R	07/16/03	1430	.17	<.10	<.10
R	07/29/03	1045	.12	<.10	<.10		
R	08/05/03	1000	.11	.14	<.10		
LD	08/05/03	1000	.13	.19	<.10		
R	08/19/03	1400	<.10	<.10	<.10		

**Table 5.** Analytical results for glyphosate, aminomethylphosphonic acid, and glufosinate in National Water-Quality Assessment (NAWQA) Program surface- and ground-water studies, 2001–06.—Continued

[Location of NAWQA study units shown in figure 4. Sample type: FB, field blank; FR, field replicate; R, regular; LD, laboratory duplicate; --, no data; &lt;, less than; µg/L, micrograms per liter]

Site number	Site location	Sample type	Date of collection (day/month/year)	Collection time (24-hour)	Concentrations		
					Glyphosate (µg/L)	Amino-methylphosphonic acid (µg/L)	Glufosinate (µg/L)
Albemarle-Pamlico Drainage Surface Water (APD)—Continued							
02091500	Contentnea Creek at Hookerton, North Carolina	FR	08/19/03	1401	<0.10	<0.10	<0.10
		R	09/02/03	1415	<.10	<.10	<.10
		LD	09/02/03	1415	<.10	<.10	<.10
Albemarle-Pamlico Drainage Ground Water (APG)							
344737076354301	LU-S17A	R	04/01/02	1230	<.10	<.10	<.10
344837076401701	LU-19A	R	04/01/02	1430	<.10	<.10	<.10
345434076301501	LU-17	R	04/03/02	1000	<.10	<.10	<.10
345516077190001	LU-20	R	04/02/02	1000	<.10	<.10	<.10
345630077163501	LU-S20B	R	04/02/02	1130	<.10	<.10	<.10
352305077321701	LU-15	R	04/18/02	1000	<.10	<.10	<.10
352548077012701	LU-14	R	04/17/02	1000	<.10	<.10	<.10
352702077302501	LU-S15A	R	04/04/02	1200	<.10	<.10	<.10
352905077594501	LU-013	R	03/28/02	1015	<.10	<.10	<.10
		LD	03/28/02	1015	<.10	<.10	<.10
352905077594501	LU-013	R	03/28/02	1030	<.10	<.10	<.10
353037077502601	LU-11A	R	04/03/02	1600	<.10	<.10	<.10
		LD	04/03/02	1600	<.10	<.10	<.10
353050077333402	L-24	R	04/29/02	1000	<.10	<.10	<.10
353111077334402	L6	R	04/29/02	1130	<.10	<.10	<.10
		LD	04/29/02	1130	<.10	<.10	<.10
353148077332103	L11S	R	04/29/02	1300	<.10	<.10	<.10
353219077153801	PI-532	R	05/09/02	1115	<.10	<.10	<.10
353221076105501	LU-S9C	R	04/15/02	1245	<.10	<.10	<.10
353547076473301	LU-10A	R	04/16/02	1430	<.10	<.10	<.10
035473307729802	ED-174	R	06/07/02	1130	<.10	<.10	<.10
		LD	06/07/02	1130	<.10	<.10	<.10
354750076344501	LU-08	R	04/16/02	1200	<.10	<.10	<.10
355601076352401	LU-07A	R	04/16/02	1015	<.10	<.10	<.10
361420077111401	BE-080	R	05/14/02	1215	<.10	<.10	<.10

**40 Concentrations of Glyphosate, Aminomethylphosphonic Acid, and Glufosinate in Water and Soil Samples**

**Table 5.** Analytical results for glyphosate, aminomethylphosphonic acid, and glufosinate in National Water-Quality Assessment (NAWQA) Program surface- and ground-water studies, 2001–06.—Continued

[Location of NAWQA study units shown in figure 4. Sample type: FB, field blank; FR, field replicate; R, regular; LD, laboratory duplicate; --, no data; <, less than; µg/L, micrograms per liter]

Site number	Site location	Sample type	Date of collection (day/month/year)	Collection time (24-hour)	Concentrations		
					Glyphosate (µg/L)	Amino-methylphosphonic acid (µg/L)	Glufosinate (µg/L)
Albemarle-Pamlico Drainage Ground Water (APG)—Continued							
361420077111401	BE-080	LD	05/14/02	1215	<0.10	<0.10	<0.10
361702076330101	LU-05	R	05/01/02	1515	<.10	<.10	<.10
		R	05/01/02	1530	<.10	<.10	<.10
361714076201301	LU-04A	R	04/30/02	1345	.16	<.10	<.10
		R	04/30/02	1400	.12	<.10	<.10
362527076163301	LU-03	R	05/01/02	1130	<.10	<.10	<.10
		LD	05/01/02	1130	<.10	<.10	<.10
362646076361607	GA-067	R	05/13/02	1215	<.10	<.10	<.10
		R	05/13/02	1230	<.10	<.10	<.10
363106076113201	LU-S3A	R	05/01/02	1315	<.10	<.10	<.10
363529076291701	LU-12	R	03/26/02	1000	<.10	<.10	<.10
		R	03/26/02	1200	<.10	<.10	<.10
363948076112601	LU-02A	R	05/06/02	1200	<.10	<.10	<.10
364535076041201	LU-01	R	05/06/02	1430	<.10	<.10	<.10
364535076041201	LU-12	R	05/07/02	1130	<.10	<.10	<.10
Apalachicola-Chattahoochee-Flint River Basin Surface Water (ACF)							
02335870	Sope Creek near Marietta, Georgia	R	05/30/02	1145	<.10	<.10	<.10
		R	06/12/02	1030	<.10	<.10	<.10
		FR	06/12/02	1031	<.10	<.10	<.10
		R	06/24/02	1030	<.10	<.10	<.10
		R	07/09/02	1115	<.10	<.10	<.10
		R	08/06/02	1200	<.10	<.10	<.10
		R	08/21/02	1530	.11	<.10	<.10
		R	10/09/02	1400	<.10	<.10	<.10
		R	11/08/02	1700	<.10	<.10	<.10
		R	12/18/02	1130	<.10	<.10	<.10
		R	01/14/03	1600	<.10	<.10	<.10
		R	02/13/03	1315	<.10	<.10	<.10
		R	03/17/03	1330	.32	<.10	<.10



**Table 5.** Analytical results for glyphosate, aminomethylphosphonic acid, and glufosinate in National Water-Quality Assessment (NAWQA) Program surface- and ground-water studies, 2001–06.—Continued

[Location of NAWQA study units shown in figure 4. Sample type: FB, field blank; FR, field replicate; R, regular; LD, laboratory duplicate; --, no data; &lt;, less than; µg/L, micrograms per liter]

Site number	Site location	Sample type	Date of collection (day/month/year)	Collection time (24-hour)	Concentrations		
					Glyphosate (µg/L)	Amino-methylphosphonic acid (µg/L)	Glufosinate (µg/L)
Apalachicola-Chattahoochee-Flint River Basin Surface Water (ACF)—Continued							
02335870	Sope Creek near Marietta, Georgia—Continued	FR	03/17/03	1337	0.38	<0.10	<0.10
		R	04/04/03	1315	<.10	<.10	<.10
		R	04/15/03	1400	<.10	<.10	<.10
		R	05/01/03	1030	<.10	<.10	<.10
		R	05/13/03	1402	<.10	<.10	<.10
		R	05/13/03	1430	<.10	<.10	<.10
		R	05/28/03	1345	<.10	<.10	<.10
		R	06/16/03	1130	<.10	<.10	<.10
		R	07/01/03	1415	.11	<.10	<.10
		FR	07/01/03	1417	<.10	<.10	<.10
		R	07/14/03	1545	<.10	.11	<.10
		R	07/30/03	0830	<.10	.15	<.10
		R	08/11/03	1130	.13	.11	<.10
		R	08/26/03	1202	<.10	<.10	<.10
		FR	08/26/03	--	<.10	<.10	<.10
R	09/09/03	1130	<.10	<.10	<.10		
02338523	Hillabahatchee Creek at Franklin Road near Franklin, Georgia	R	06/12/02	1500	<.10	<.10	<.10
		R	07/10/02	1500	<.10	<.10	<.10
02350080	Lime Creek near Cobb, Georgia	R	05/31/02	0930	<.10	<.10	<.10
		R	06/05/02	--	<.10	<.10	<.10
		R	06/13/02	0900	<.10	<.10	<.10
		R	06/26/02	0900	<.10	<.10	<.10
		LD	06/26/02	0900	<.10	<.10	<.10
		LD	07/11/02	0915	<.10	.10	<.10
		R	07/11/02	0915	<.10	.10	<.10
R	08/22/02	0900	<.10	<.10	<.10		

42 Concentrations of Glyphosate, Aminomethylphosphonic Acid, and Glufosinate in Water and Soil Samples

**Table 5.** Analytical results for glyphosate, aminomethylphosphonic acid, and glufosinate in National Water-Quality Assessment (NAWQA) Program surface- and ground-water studies, 2001–06.—Continued

[Location of NAWQA study units shown in figure 4. Sample type: FB, field blank; FR, field replicate; R, regular; LD, laboratory duplicate; --, no data; <, less than; µg/L, micrograms per liter]

Site number	Site location	Sample type	Date of collection (day/month/year)	Collection time (24-hour)	Concentrations		
					Glyphosate (µg/L)	Amino-methylphosphonic acid (µg/L)	Glufosinate (µg/L)
Apalachicola-Chattahoochee-Flint River Basin Surface Water (ACF)—Continued							
02350080	Lime Creek near Cobb, Georgia—Continued	R	10/10/02	1000	<0.10	<0.10	<0.10
		R	11/08/02	1045	<.10	<.10	<.10
		LD	11/08/02	1045	<.10	<.10	<.10
		R	12/04/02	1030	<.10	<.10	<.10
		R	01/16/03	1130	<.10	<.10	<.10
		R	02/12/03	1000	<.10	<.10	<.10
		R	03/20/03	1145	<.10	<.10	<.10
		R	04/03/03	0915	<.10	<.10	<.10
		R	04/17/03	1100	<.10	<.10	<.10
		R	05/01/03	1530	<.10	<.10	<.10
		R	05/15/03	1045	<.10	<.10	<.10
		R	05/28/03	0900	<.10	<.10	<.10
		LD	05/28/03	0900	<.10	<.10	<.10
		R	06/18/03	0830	<.10	<.10	<.10
		R	07/03/03	1030	<.10	<.10	<.10
		FR	07/03/03	1037	<.10	<.10	<.10
		R	07/24/03	1030	<.10	.38	<.10
		R	07/30/03	1300	<.10	.13	<.10
		R	08/14/03	1230	<.10	<.10	<.10
		FR	08/14/03	1237	<.10	<.10	<.10
R	08/29/03	1045	<.10	<.10	<.10		
R	09/10/03	0915	<.10	<.10	<.10		
Apalachicola-Chattahoochee-Flint River Basin Ground Water (ACG)							
304450084402801	08DO92	R	08/28/03	1200	<.10	<.10	<.10
305641084542001	06F087	R	04/22/02	1200	<.10	<.10	<.10
		LD	04/22/02	1200	<.10	<.10	<.10
310552084435601	08G008	R	04/11/02	1600	<.10	<.10	<.10
		FR	04/11/02	1601	<.10	<.10	<.10

**Table 5.** Analytical results for glyphosate, aminomethylphosphonic acid, and glufosinate in National Water-Quality Assessment (NAWQA) Program surface- and ground-water studies, 2001–06.—Continued

[Location of NAWQA study units shown in figure 4. Sample type: FB, field blank; FR, field replicate; R, regular; LD, laboratory duplicate; --, no data; &lt;, less than; µg/L, micrograms per liter]

Site number	Site location	Sample type	Date of collection (day/month/year)	Collection time (24-hour)	Concentrations			
					Glyphosate (µg/L)	Amino-methylphosphonic acid (µg/L)	Glufosinate (µg/L)	
Apalachicola-Chattahoochee-Flint River Basin Ground Water (ACG)—Continued								
310604084351901	09G011	R	09/24/03	1500	<0.10	<0.10	<0.10	
310752085271301	CP 13	R	03/20/02	1200	.13	.10	<.10	
310913084195301	11H014	R	04/10/02	1200	<.10	<.10	<.10	
311015084511901	07H021	R	04/22/02	1700	<.10	<.10	<.10	
		FR	04/22/02	1702	<.10	<.10	<.10	
311141084513401	AC 35	R	03/05/02	1400	<.10	<.10	<.10	
311327084484101	REF 41	R	03/21/02	1600	<.10	<.10	<.10	
		LD	03/21/02	1600	<.10	<.10	<.10	
311505085140101	CP 14	R	03/07/02	1200	<.10	<.10	<.10	
		FR	03/07/02	1201	<.10	<.10	<.10	
311707084433302	08JK017	R	09/03/03	1400	<.10	<.10	<.10	
311714084275101	REF 44	R	03/21/02	1200	<.10	<.10	<.10	
312119084215601	11J021	R	04/08/02	1700	<.10	<.10	<.10	
312241084244401	10K007	R	09/24/03	0900	<.10	<.10	<.10	
312346084520401	CP 17	R	03/06/02	1500	<.10	<.10	<.10	
312908084151901	11K045	R	04/09/02	1700	<.10	<.10	<.10	
		LD	04/09/02	1700	<.10	<.10	<.10	
313415084475201	07L021	R	04/23/02	1200	<.10	<.10	<.10	
313521083501402	15L033	R	11/04/03	0900	<.10	<.10	<.10	
		FR	11/04/03	0902	<.10	<.10	<.10	
314040084110201	CP 28	R	03/18/02	1200	<.10	<.10	<.10	
314357084380001	CP15	R	03/06/02	1100	<.10	<.10	<.10	
314727084043502	13N012	R	09/25/03	1700	<.10	<.10	<.10	
314858084194901	11N010	R	04/08/02	1200	<.10	<.10	<.10	
315009083571001	CP 27	R	03/18/02	1600	<.10	<.10	<.10	
		FR	03/18/02	1603	<.10	<.10	<.10	
315237084023402	13PO13	R	09/02/03	1700	<.10	<.10	<.10	
320001084032801	LC 8	R	03/22/02	1200	<.10	<.10	<.10	

**44 Concentrations of Glyphosate, Aminomethylphosphonic Acid, and Glufosinate in Water and Soil Samples**

**Table 5.** Analytical results for glyphosate, aminomethylphosphonic acid, and glufosinate in National Water-Quality Assessment (NAWQA) Program surface- and ground-water studies, 2001–06.—Continued

[Location of NAWQA study units shown in figure 4. Sample type: FB, field blank; FR, field replicate; R, regular; LD, laboratory duplicate; --, no data; <, less than; µg/L, micrograms per liter]

Site number	Site location	Sample type	Date of collection (day/month/year)	Collection time (24-hour)	Concentrations		
					Glyphosate (µg/L)	Amino-methylphosphonic acid (µg/L)	Glufosinate (µg/L)
Apalachicola-Chattahoochee-Flint River Basin Ground Water (ACG)—Continued							
320011084121501	CP 26	R	03/04/02	1100	<0.10	<0.10	<0.10
		LD	03/04/02	1100	<.10	<.10	<.10
320051084061401	LC 6	R	03/08/02	1100	<.10	<.10	<.10
Central Columbia Plateau Surface Water (CCY)							
12505450	Granger Drain at Granger, Washington	R	10/16/02	1230	<.10	<.10	<.10
		R	11/20/02	1130	<.10	<.10	<.10
		LD	11/20/02	1130	<.10	<.10	<.10
		R	12/18/02	1220	<.10	<.10	<.10
		R	01/21/03	1300	<.10	<.10	<.10
		R	02/19/03	1100	<.10	<.10	<.10
		FR	02/19/03	1108	<.10	<.10	<.10
		FR	02/19/03	1109	<.10	<.10	<.10
		R	03/04/03	0940	<.10	<.10	<.10
		R	03/18/03	0930	<.10	<.10	<.10
		R	04/03/03	0951	<.10	<.10	<.10
		FR	04/03/03	0950	<.10	<.10	<.10
		R	04/15/03	1020	.17	<.10	<.10
		R	05/08/03	0940	.17	<.10	<.10
		LD	05/08/03	0940	.19	<.10	<.10
		R	05/20/03	0950	<.10	<.10	<.10
		R	06/02/03	0950	.88	.12	<.10
		LD	06/02/03	0950	.85	.12	<.10
		R	06/16/03	1100	.16	<.10	<.10
		R	07/07/03	0930	.19	<.10	<.10
		R	07/21/03	0950	.38	.14	<.10
		R	08/06/03	0830	.62	.19	<.10
		R	08/20/03	1000	.13	<.10	<.10

**Table 5.** Analytical results for glyphosate, aminomethylphosphonic acid, and glufosinate in National Water-Quality Assessment (NAWQA) Program surface- and ground-water studies, 2001–06.—Continued

[Location of NAWQA study units shown in figure 4. Sample type: FB, field blank; FR, field replicate; R, regular; LD, laboratory duplicate; --, no data; &lt;, less than; µg/L, micrograms per liter]

Site number	Site location	Sample type	Date of collection (day/month/year)	Collection time (24-hour)	Concentrations		
					Glyphosate (µg/L)	Amino-methylphosphonic acid (µg/L)	Glufosinate (µg/L)
Central Columbia Plateau Surface Water (CCY)—Continued							
12505450	Granger Drain at Granger, Washington	R	09/16/03	0850	<0.10	<0.10	<0.10
12510500	Yakima River at Kiona, Washington	R	10/15/02	1140	<.10	<.10	<.10
462023120075200	DR2 at Yakima Valley Highway near Granger, Washington	R	09/16/03	1320	.11	<.10	<.10
Central Nebraska Basin Surface Water (CNB)							
06799750	K7	R	03/25/04	1115	<.02	<.02	<.02
06799750	K7 (fall)	R	05/08/04	2320	.65	1.6	.13
06799750	K7 (fall)	LD	05/08/04	2320	.65	1.6	<.02
06799750	K7 (composite)	R	05/10/04	0100	.24	.76	.13
06799750	K7 (rise)	R	05/10/04	0148	.17	.85	<.02
06799750	K7 (peak)	R	05/10/04	0244	.26	.96	<.02
06799750	K7 (fall)	R	05/10/04	0446	.27	1.1	.15
06799750	K7 (composite)	R	05/13/04	0450	.15	.80	<.02
06799750	K7 (rise/peak)	R	05/13/04	0554	.14	.66	<.02
06799750	K7 (fall)	R	05/13/04	0739	.26	.76	<.02
06799750	K7 (fall)	LD	05/13/04	0739	.26	.76	<.02
06799750	K7	R	05/22/04	1020	.22	.66	<.02
		R	05/22/04	1831	.10	.50	<.02
		R	05/22/04	1930	.05	.40	<.02
		R	05/22/04	2047	.17	.74	<.02
		R	06/02/04	2030	.06	.34	<.02
		R	06/16/04	1026	.65	.70	<.02
		LD	06/16/04	1026	.70	.52	<.02
		R	06/29/04	1010	1.0	1.2	<.02
		FR	06/29/04	1020	1.4	1.0	<.02
		R	07/07/04	1447	4.6	5.4	<.02
		FR	07/07/04	1500	1.0	1.4	<.02

46 Concentrations of Glyphosate, Aminomethylphosphonic Acid, and Glufosinate in Water and Soil Samples

**Table 5.** Analytical results for glyphosate, aminomethylphosphonic acid, and glufosinate in National Water-Quality Assessment (NAWQA) Program surface- and ground-water studies, 2001–06.—Continued

[Location of NAWQA study units shown in figure 4. Sample type: FB, field blank; FR, field replicate; R, regular; LD, laboratory duplicate; --, no data; <, less than; µg/L, micrograms per liter]

Site number	Site location	Sample type	Date of collection (day/month/year)	Collection time (24-hour)	Concentrations		
					Glyphosate (µg/L)	Amino-methylphosphonic acid (µg/L)	Glufosinate (µg/L)
Central Nebraska Basin Surface Water (CNB)—Continued							
06799750	K7	FR	07/07/04	1655	9.7	5.2	<0.02
		R	07/22/04	0905	1.4	2.3	<.02
		R	08/25/04	1400	.32	1.7	<.02
		R	08/31/04	1030	.12	.09	<.02
		R	09/23/04	0250	<.02	.33	<.02
		LD	09/23/04	0250	<.02	.49	<.02
06800000	Maple Creek near Nickerson, Nebraska	R	07/22/02	1000	<.10	.56	<.10
		R	10/08/02	1000	<.10	.34	<.10
		R	11/13/02	1000	<.10	<.10	<.10
		FR	11/13/02	1001	<.10	<.10	<.10
		R	12/10/02	1030	<.10	<.10	<.10
		R	01/14/03	1000	<.10	<.10	<.10
		LD	01/14/03	1000	<.10	<.10	<.10
		R	02/11/03	0930	<.10	<.10	<.10
		R	03/11/03	0930	<.10	.20	<.10
		R	04/16/03	1000	<.10	.13	<.10
		R	04/30/03	1030	<.10	.59	<.10
		LD	04/30/03	1030	<.10	.48	<.10
		R	05/13/03	1000	<.10	.45	<.10
		R	05/27/03	1000	<.10	.26	<.10
		LD	05/27/03	1000	<.10	.28	<.10
		FR	05/27/03	1010	<.10	.27	<.10
		R	06/10/03	1000	<.10	.45	<.10
		R	06/23/03	1300	.29	.69	<.10
R	06/23/03	1301	<.10	<.10	<.10		
R	07/09/03	1000	.35	1.1	<.10		

**Table 5.** Analytical results for glyphosate, aminomethylphosphonic acid, and glufosinate in National Water-Quality Assessment (NAWQA) Program surface- and ground-water studies, 2001–06.—Continued

[Location of NAWQA study units shown in figure 4. Sample type: FB, field blank; FR, field replicate; R, regular; LD, laboratory duplicate; --, no data; &lt;, less than; µg/L, micrograms per liter]

Site number	Site location	Sample type	Date of collection (day/month/year)	Collection time (24-hour)	Concentrations		
					Glyphosate (µg/L)	Amino-methylphosphonic acid (µg/L)	Glufosinate (µg/L)
Central Nebraska Basin Surface Water (CNB)—Continued							
06800000	Maple Creek near Nickerson, Nebraska— Continued	R	08/04/03	1000	<0.10	0.50	<0.10
		FR	08/04/03	1010	<.10	.46	<.10
		R	08/19/03	1100	<.10	.27	<.10
		R	09/02/03	1100	<.10	.12	<.10
		R	09/16/03	0930	.16	.35	<.10
		LD	09/16/03	0930	.15	.43	<.10
		R	03/31/04	1030	.16	.29	<.10
		R	04/07/04	1100	<.10	1.4	<.10
		LD	04/07/04	1100	<.10	1.4	<.10
		R	04/12/04	1000	.06	.15	.15
		FR	04/12/04	1007	.05	.16	.16
		R	04/19/04	1000	<.02	1.6	<.02
		FR	04/19/04	1007	<.02	1.5	<.02
		R	04/27/04	1000	.11	.62	.11
		LD	04/27/04	1000	.15	.62	.12
		R	05/03/04	1030	.08	.19	.12
		LD	05/03/04	1030	.07	.19	.11
		R	05/13/04	1030	.20	.56	.12
		LD	05/13/04	1030	.26	.56	.13
		R	05/18/04	0930	.06	.63	<.02
		LD	05/18/04	0930	<.02	.63	<.02
		R	05/25/04	1030	.09	.58	<.02
		LD	05/25/04	1030	.09	.59	<.02
R	06/01/04	1100	.28	.38	<.02		
LD	06/01/04	1100	.27	.82	<.02		
R	06/08/04	1030	.20	.70	<.02		
R	06/15/04	1030	.26	.64	<.02		

48 Concentrations of Glyphosate, Aminomethylphosphonic Acid, and Glufosinate in Water and Soil Samples

**Table 5.** Analytical results for glyphosate, aminomethylphosphonic acid, and glufosinate in National Water-Quality Assessment (NAWQA) Program surface- and ground-water studies, 2001–06.—Continued

[Location of NAWQA study units shown in figure 4. Sample type: FB, field blank; FR, field replicate; R, regular; LD, laboratory duplicate; --, no data; <, less than; µg/L, micrograms per liter]

Site number	Site location	Sample type	Date of collection (day/month/year)	Collection time (24-hour)	Concentrations		
					Glyphosate (µg/L)	Amino-methylphosphonic acid (µg/L)	Glufosinate (µg/L)
Central Nebraska Basin Surface Water (CNB)—Continued							
06800000	Maple Creek near Nickerson, Nebraska— Continued	R	06/22/04	0930	0.18	0.52	<0.02
		R	06/29/04	0830	.08	.36	<.02
		LD	06/29/04	0830	.06	.42	<.02
		R	07/06/04	1300	.53	1.1	<.02
		LD	07/06/04	1300	.53	1.1	<.02
		R	07/13/04	1030	.50	1.9	<.02
		R	07/13/04	1032	<.02	<.02	<.02
		R	07/20/04	1000	.37	1.1	<.02
		R	07/27/04	0945	.35	.63	<.02
		LD	07/27/04	0945	.35	1.3	<.02
		R	08/04/04	1000	.27	.77	<.02
		FR	08/04/04	1007	.23	.90	<.02
		R	08/10/04	0930	.32	1.5	<.02
		R	08/17/04	1030	.11	.43	<.02
		R	08/24/04	1030	1.1	.43	<.02
		FB	08/24/04	1032	<.02	<.02	<.02
		R	08/30/04	0900	<.02	.44	<.02
		R	09/07/04	0930	<.02	.35	<.02
		06800500	Elkhorn River near Waterloo, Nebraska	R	10/09/02	1030	<.10
R	11/14/02			1100	<.10	.41	<.10
R	12/11/02			1100	<.10	.19	<.10
R	01/15/03			0930	<.10	.32	<.10
R	02/12/03			1000	<.10	.22	<.10
R	03/12/03			1100	<.10	.42	<.10
FR	03/12/03			1110	<.10	.38	<.10
R	04/17/03			1100	<.10	.39	<.10
R	05/01/03			1000	<.10	.37	<.10



**Table 5.** Analytical results for glyphosate, aminomethylphosphonic acid, and glufosinate in National Water-Quality Assessment (NAWQA) Program surface- and ground-water studies, 2001–06.—Continued

[Location of NAWQA study units shown in figure 4. Sample type: FB, field blank; FR, field replicate; R, regular; LD, laboratory duplicate; --, no data; &lt;, less than; µg/L, micrograms per liter]

Site number	Site location	Sample type	Date of collection (day/month/year)	Collection time (24-hour)	Concentrations		
					Glyphosate (µg/L)	Amino-methylphosphonic acid (µg/L)	Glufosinate (µg/L)
Central Nebraska Basin Surface Water (CNB)—Continued							
06800500	Elkhorn River near Waterloo, Nebraska— Continued	R	05/14/03	1000	<0.10	0.21	<0.10
		R	05/28/03	1000	<.10	.34	<.10
		FR	05/28/03	1010	<.10	.50	<.10
		R	06/11/03	0930	<.10	.45	<.10
		LD	06/11/03	0930	<.10	.50	<.10
		R	06/24/03	1100	.26	.68	<.10
		R	07/07/03	1401	<.10	<.10	<.10
		R	07/10/03	0930	.3	.84	<.10
		R	07/23/03	1000	<.10	.58	<.10
		R	08/06/03	1030	<.10	.60	<.10
		R	08/20/03	1000	<.10	1.4	<.10
		R	09/03/03	1200	<.10	1.1	<.10
		R	09/17/03	1000	.11	.92	<.10
		Central Nebraska Basin Ground Water (CNG)					
413302097090530	Vadose zone ACT VZ1–1A near Schuyler, Nebraska	R	05/10/04	2005	.13	.28	.28
		R	05/11/04	1105	.18	.32	.30
		R	05/14/04	0815	.15	.53	<.02
		R	05/24/04	1005	.14	.25	<.02
		R	06/22/04	1020	.21	.62	<.02
		R	07/06/04	1035	<.02	<.02	<.02
		R	07/22/04	0925	<.02	<.02	<.02
		R	07/23/04	0900	.10	.31	<.02
413302097090533	Vadose zone ACT VZ1–1D near Schuyler, Nebraska	R	04/02/04	1040	<.02	<.02	<.02
413334096325330	Vadose zone ACT VZ1–2A near Nickerson, Nebraska	R	05/11/04	1400	.02	.14	.31
		R	05/14/04	1030	.03	.18	<.02
		R	05/18/04	1605	.03	.08	<.02
		R	05/24/04	1235	.02	.09	<.02

**50 Concentrations of Glyphosate, Aminomethylphosphonic Acid, and Glufosinate in Water and Soil Samples**

**Table 5.** Analytical results for glyphosate, aminomethylphosphonic acid, and glufosinate in National Water-Quality Assessment (NAWQA) Program surface- and ground-water studies, 2001–06.—Continued

[Location of NAWQA study units shown in figure 4. Sample type: FB, field blank; FR, field replicate; R, regular; LD, laboratory duplicate; --, no data; <, less than; µg/L, micrograms per liter]

Site number	Site location	Sample type	Date of collection (day/month/year)	Collection time (24-hour)	Concentrations		
					Glyphosate (µg/L)	Amino-methylphosphonic acid (µg/L)	Glufosinate (µg/L)
Central Nebraska Basin Ground Water (CNG)—Continued							
413334096325330	Vadose zone ACT VZ1–2A near Nickerson, Nebraska	R	07/06/04	1240	<0.02	<0.02	<0.02
413334096325331	Vadose zone ACT VZ1–2B near Nickerson, Nebraska	R	03/30/04	1200	<.02	<.02	<.02
		R	04/12/05	1518	<.02	.02	<.02
		R	05/11/04	1405	.03	.07	.26
		R	06/14/04	1140	<.02	.30	<.02
		R	07/06/04	1245	<.02	<.02	<.02
413334096325332	Vadose zone ACT VZ1–2C near Nickerson, Nebraska	R	04/15/04	1035	<.02	<.02	<.02
		FR	04/15/04	1040	<.02	<.02	<.02
413341096325530	Vadose zone ACT VZ1–3A near Nickerson, Nebraska	R	06/14/04	1200	<.02	.29	<.02
		R	07/06/04	1255	<.02	<.02	<.02
413341096325531	Vadose zone ACT VZ1–3B near Nickerson, Nebraska	R	05/11/04	1430	.04	.14	.29
		R	05/14/04	1015	.04	.16	<.02
		R	05/18/04	1555	.04	.15	<.02
		R	05/24/04	1225	.03	.10	<.02
		R	06/14/04	1205	<.02	.19	<.02
		R	07/06/04	1300	<.02	.17	<.02
		R	08/19/04	1150	<.02	.06	<.26
		R	04/12/05	1540	<.02	.46	<.02
413350096324730	Vadose zone ACT VZ1–4A near Nickerson, Nebraska	R	05/11/04	1345	.02	.08	.26
		R	05/24/04	1250	<.02	.04	<.02
		R	06/14/04	1120	.08	.33	<.02
413350096324731	Vadose zone ACT VZ1–4B near Nickerson, Nebraska	R	05/24/04	1255	.02	.06	<.02
		R	06/14/04	1125	.06	.20	<.02
		R	08/19/04	1405	<.02	.04	<.02
		R	07/06/04	1225	.67	.21	<.02

**Table 5.** Analytical results for glyphosate, aminomethylphosphonic acid, and glufosinate in National Water-Quality Assessment (NAWQA) Program surface- and ground-water studies, 2001–06.—Continued

[Location of NAWQA study units shown in figure 4. Sample type: FB, field blank; FR, field replicate; R, regular; LD, laboratory duplicate; --, no data; &lt;, less than; µg/L, micrograms per liter]

Site number	Site location	Sample type	Date of collection (day/month/year)	Collection time (24-hour)	Concentrations		
					Glyphosate (µg/L)	Amino-methylphosphonic acid (µg/L)	Glufosinate (µg/L)
Central Nebraska Basin Ground Water (CNG)—Continued							
413350096324731	Vadose zone ACT VZ1–4B near Nickerson, Nebraska	R	04/12/05	1605	<0.02	<0.02	<0.02
413350096324732	Vadose zone ACT VZ1–4C near Nickerson, Nebraska	R	03/31/04	0815	<.02	<.02	<.02
		R	05/11/04	1355	.05	.12	<.02
		R	05/14/04	1120	.03	.17	<.02
		R	05/24/04	1300	<.02	.03	<.02
		R	06/14/04	1130	<.02	.24	<.02
		R	08/19/04	1410	<.02	<.02	<.02
		R	04/12/05	1607	<.02	<.02	<.02
Connecticut, Housatonic, and Thames River Basins Surface Water (CON)							
01209710	Norwalk River at Winnipauk, Connecticut	R	10/21/02	1030	<.10	<.10	<.10
		R	11/14/02	1320	<.10	<.10	<.10
		R	12/23/02	1310	<.10	<.10	<.10
		LD	12/23/02	1310	<.10	<.10	<.10
		R	01/16/03	1040	<.10	<.10	<.10
		R	01/16/03	1140	<.10	<.10	<.10
		R	02/11/03	1245	<.10	<.10	<.10
		R	03/25/03	1145	<.10	<.10	<.10
		FR	03/25/03	1146	<.10	<.10	<.10
		R	03/31/03	1140	<.10	<.10	<.10
		R	04/10/03	1030	<.10	<.10	<.10
		FR	04/10/03	1110	<.10	<.10	<.10
		LD	04/10/03	1110	<.10	<.10	<.10
		R	04/21/03	1015	<.10	<.10	<.10
		R	05/06/03	1045	<.10	<.10	<.10
		R	05/21/03	1200	<.10	<.10	<.10
		R	06/03/03	1030	<.10	<.10	<.10
		FR	06/03/03	1031	<.10	<.10	<.10

52 Concentrations of Glyphosate, Aminomethylphosphonic Acid, and Glufosinate in Water and Soil Samples

**Table 5.** Analytical results for glyphosate, aminomethylphosphonic acid, and glufosinate in National Water-Quality Assessment (NAWQA) Program surface- and ground-water studies, 2001–06.—Continued

[Location of NAWQA study units shown in figure 4. Sample type: FB, field blank; FR, field replicate; R, regular; LD, laboratory duplicate; --, no data; <, less than; µg/L, micrograms per liter]

Site number	Site location	Sample type	Date of collection (day/month/year)	Collection time (24-hour)	Concentrations		
					Glyphosate (µg/L)	Amino-methylphosphonic acid (µg/L)	Glufosinate (µg/L)
Connecticut, Housatonic, and Thames River Basins Surface Water (CON)—Continued							
01209710	Norwalk River at Winnipauk, Connecticut— Continued	R	07/08/03	1030	<0.10	<0.10	<0.10
		LD	07/08/03	1030	<.10	<.10	<.10
		R	06/24/03	0930	<.10	<.10	<.10
		FR	06/24/03	1000	<.10	<.10	<.10
		R	07/30/03	1115	<.10	<.10	<.10
		R	08/06/03	0910	<.10	<.10	<.10
		R	08/14/03	0950	<.10	.12	<.10
		R	09/03/03	1130	<.10	.12	<.10
Delmarva Peninsula Ground Water (JMD)							
380027075410802	SOD344	R	08/02/01	0930	<0.10	<0.10	<0.10
380358075292901	WO Fe 1	R	01/15/03	1100	<.10	<.10	<.10
380403075292901	WOFc46	FB	09/06/01	1000	<.10	<.10	<.10
		R	09/06/01	0950	<.10	<.10	<.10
		FR	09/06/01	1030	<.10	<.10	<.10
381245075404001	26D–R	R	11/01/01	1200	<.10	<.10	<.10
381245075404002	SO Be 114	R	01/16/03	1100	<.10	<.10	<.10
381543075273801	WOCc2	R	08/08/01	1100	<.10	<.10	<.10
		LD	08/08/01	1100	<.10	<.10	<.10
381543075273802	WOCc3	R	08/08/01	1430	<.10	<.10	<.10
381754075083601	WOCg76	R	08/09/01	0900	<.10	<.10	<.10
381754075083603	WOCg78	R	08/09/01	1300	<.10	<.10	<.10
382403075233201	WICH50	R	09/24/01	1000	<.10	<.10	<.10
		FR	09/24/01	1030	<.10	<.10	<.10
382824075081502	Ri22–10	R	01/14/03	1400	<.10	<.10	<.10
382825075081601	Ri22–03	R	09/05/01	1100	<.10	<.10	<.10
382833075213701	Rf24–08	R	01/16/03	1400	<.10	<.10	<.10
		LD	01/16/03	1400	<.10	<.10	<.10
382927075211701	Rf14–02	R	10/11/01	1000	<.10	<.10	<.10

**Table 5.** Analytical results for glyphosate, aminomethylphosphonic acid, and glufosinate in National Water-Quality Assessment (NAWQA) Program surface- and ground-water studies, 2001–06.—Continued

[Location of NAWQA study units shown in figure 4. Sample type: FB, field blank; FR, field replicate; R, regular; LD, laboratory duplicate; --, no data; &lt;, less than; µg/L, micrograms per liter]

Site number	Site location	Sample type	Date of collection (day/month/year)	Collection time (24-hour)	Concentrations		
					Glyphosate (µg/L)	Amino-methylphosphonic acid (µg/L)	Glufosinate (µg/L)
Delmarva Peninsula Ground Water (JMD)—Continued							
383051075495601	DOCh1	R	11/13/01	1100	<0.10	<0.10	<0.10
383225075565002	DOCf36	R	10/10/01	1100	<.10	<.10	<.10
		FR	10/10/01	1110	<.10	<.10	<.10
		R	10/10/01	1130	<.10	<.10	<.10
383231075383101	22–D–R	R	10/30/01	1100	<.10	<.10	<.10
383308075382301	Qc22–04	R	08/28/01	1100	<.10	<.10	<.10
383328076153602	DOCb8	R	08/07/01	1030	<.10	<.10	<.10
		LD	08/07/01	1030	<.10	<.10	<.10
384418075231101	Of12–05	R	01/22/03	1130	<.10	<.10	<.10
384606075115801	19–D–R	R	10/29/01	1100	<.10	<.10	<.10
384630075524801	COEc25	R	08/27/01	1200	<.10	<.10	<.10
		LD	08/27/01	1200	<.10	<.10	<.10
384631075524901	COEc36	R	12/10/02	1100	<.10	<.10	<.10
384637075153201	Ng45–02	R	12/19/02	1100	<.10	<.10	<.10
		FR	12/19/02	1105	<.10	<.10	<.10
		R	12/19/02	1300	<.10	<.10	<.10
384946076002201	TA Cc53	R	12/10/02	1400	<.10	<.10	<.10
385009075445001	CODe15	R	08/22/01	1000	<.10	<.10	<.10
		R	08/22/01	1230	<.10	<.10	<.10
385023076012601	TABe83	R	11/07/01	1100	<.10	<.10	<.10
		LD	11/07/01	1100	<.10	<.10	<.10
385134075480401	CO Db79	R	12/17/02	1100	<.10	<.10	<.10
385208075460801	CODd74	R	11/06/01	1100	<.10	<.10	<.10
385305076042901	TABe83	R	11/07/01	1000	<.10	<.10	<.10
390156076184001	QADb45	R	10/04/01	1000	<.10	<.10	<.10
		FR	10/04/01	1010	<.10	<.10	<.10
390217076181401	QADb40	R	08/29/01	1100	<.10	<.10	<.10

**54 Concentrations of Glyphosate, Aminomethylphosphonic Acid, and Glufosinate in Water and Soil Samples**

**Table 5.** Analytical results for glyphosate, aminomethylphosphonic acid, and glufosinate in National Water-Quality Assessment (NAWQA) Program surface- and ground-water studies, 2001–06.—Continued

[Location of NAWQA study units shown in figure 4. Sample type: FB, field blank; FR, field replicate; R, regular; LD, laboratory duplicate; --, no data; <, less than; µg/L, micrograms per liter]

Site number	Site location	Sample type	Date of collection (day/month/year)	Collection time (24-hour)	Concentrations		
					Glyphosate (µg/L)	Amino-methylphosphonic acid (µg/L)	Glufosinate (µg/L)
Delmarva Peninsula Ground Water (JMD)—Continued							
390217076181401	QADb40	LD	08/29/01	1100	<0.10	<0.10	<0.10
390918075291701	Equipment blank	R	11/29/01	1300	<.10	<.10	<.10
		LD	11/29/01	1330	<.10	<.10	<.10
		R	12/09/02	1530	<.10	<.10	<.10
391240075432001	Ib32–08	R	12/17/02	1500	<.10	<.10	<.10
392057075443601	Gb51–07	R	01/28/03	1100	<.10	<.10	<.10
392403075362101	GC14–04	R	12/09/02	1200	<.10	<.10	<.10
		LD	12/09/02	1200	<.10	<.10	<.10
		FR	12/09/02	1205	<.10	<.10	<.10
392414075361001	Ib32–05 DLMV NAWQA	R	08/23/01	0930	<.10	<.10	<.10
394224075340501	Cd31–19 DLMV NAWQA	R	08/06/01	1000	<.10	<.10	<.10
Eastern Iowa Basin Surface Water (SKI)							
05420500	Mississippi River at Clinton, Iowa	R	05/09/01	1040	<.10	<.10	<.10
		LD	05/09/01	1040	<.10	<.10	<.10
05448095	Mississippi River at Buffalo, Iowa	R	04/25/01	0915	<.10	<.10	<.10
05466000	Mississippi River at Keith, Iowa	R	04/26/01	1730	<.10	<.10	<.10
05492200	Mississippi River at Alexandria, Missouri	R	04/26/01	1215	<.10	.12	<.10
05587455	Mississippi River below Grafton, Illinois	R	05/14/01	1445	<.10	<.10	<.10
Eastern Iowa Basin Ground Water (SKI)							
421850093092501	USGS Monitoring Well FS1–11	R	12/20/05	1700	<.02	<.02	<.02
421853093091601	USGS Monitoring Well FS1–3A	R	12/21/05	1330	<.02	<.02	<.02
421853093091603	USGS Monitoring Well FS1–3C	R	12/21/05	1600	<.02	<.02	<.02
421854093091501	USGS Monitoring Well FS1–4A	R	12/22/05	1615	<.02	<.02	<.02
		LD	12/22/05	1615	<.02	<.02	<.02
421854093091502	USGS Monitoring Well FS1–4B	R	12/22/05	1415	<.02	<.02	<.02
		FR	12/22/05	1420	<.02	<.02	<.02
421854093091503	USGS Monitoring Well FS1–4C	R	12/22/05	1315	<.02	<.02	<.02
421855093091601	USGS Monitoring Well FS1–5A	R	12/29/05	1745	<.02	<.02	<.02
421855093091602	USGS Monitoring Well FS1–5B	R	12/30/05	1200	<.02	<.02	<.02

**Table 5.** Analytical results for glyphosate, aminomethylphosphonic acid, and glufosinate in National Water-Quality Assessment (NAWQA) Program surface- and ground-water studies, 2001–06.—Continued

[Location of NAWQA study units shown in figure 4. Sample type: FB, field blank; FR, field replicate; R, regular; LD, laboratory duplicate; --, no data; &lt;, less than; µg/L, micrograms per liter]

Site number	Site location	Sample type	Date of collection (day/month/year)	Collection time (24-hour)	Concentrations		
					Glyphosate (µg/L)	Amino-methylphosphonic acid (µg/L)	Glufosinate (µg/L)
Eastern Iowa Basin Ground Water (SKI)—Continued							
421856093091501	USGS Monitoring Well TR1–1A	R	12/23/05	1145	<0.02	<0.02	<0.02
421856093091502	USGS Monitoring Well TR1–2B	R	12/29/05	1145	<.02	<.02	<.02
Georgia-Florida Coastal Plain Surface Water (GFL)							
02317797	Little River at Upper Ty Ty Road near Tifton, Georgia	R	11/04/02	1250	<.10	<.10	<.10
		FR	11/04/02	1300	<.10	<.10	<.10
		R	12/03/02	1300	<.10	<.10	<.10
		R	02/04/03	1200	<.10	<.10	<.10
		FR	02/04/03	1210	<.10	<.10	<.10
		R	02/18/03	1140	<.10	<.10	<.10
		LD	02/18/03	1140	<.10	<.10	<.10
		R	03/04/03	1300	<.10	<.10	<.10
		R	03/19/03	1210	<.10	<.10	<.10
		R	03/31/03	1240	<.10	<.10	<.10
		R	04/14/03	1220	<.10	<.10	<.10
		R	05/06/03	1330	<.10	<.10	<.10
		R	05/16/03	1020	<.10	<.10	<.10
		FR	05/16/03	1030	<.10	<.10	<.10
		R	06/02/03	1120	<.10	<.10	<.10
		R	06/30/03	1130	<.10	<.10	<.10
		R	08/05/03	1200	<.10	<.10	<.10
		R	08/19/03	1230	<.10	<.10	<.10
		R	09/02/03	1300	<.10	<.10	<.10
		R	06/16/03	1300	<.10	<.10	<.10
R	01/07/03	1310	<.10	<.10	<.10		
R	01/21/03	1300	<.10	<.10	<.10		
02318500	Withlacoochee River at U.S. 84 near Quitman, Georgia	R	10/01/02	1130	<.10	.15	<.10
		R	11/06/02	1400	<.10	<.10	<.10

56 Concentrations of Glyphosate, Aminomethylphosphonic Acid, and Glufosinate in Water and Soil Samples

**Table 5.** Analytical results for glyphosate, aminomethylphosphonic acid, and glufosinate in National Water-Quality Assessment (NAWQA) Program surface- and ground-water studies, 2001–06.—Continued

[Location of NAWQA study units shown in figure 4. Sample type: FB, field blank; FR, field replicate; R, regular; LD, laboratory duplicate; --, no data; <, less than; µg/L, micrograms per liter]

Site number	Site location	Sample type	Date of collection (day/month/year)	Collection time (24-hour)	Concentrations		
					Glyphosate (µg/L)	Amino-methylphosphonic acid (µg/L)	Glufosinate (µg/L)
Georgia-Florida Coastal Plain Surface Water (GFL)—Continued							
02318500	Withlacoochee River at U.S. 84 near Quitman, Georgia	R	12/04/02	1100	<0.10	<0.10	<0.10
		R	01/08/03	1310	<.10	<.10	<.10
		R	02/03/03	1340	<.10	<.10	<.10
		FR	02/03/03	1330	<.10	<.10	<.10
Great and Little Miami River Basins Surface Water (BET)							
03267900	Mad River at St. Paris Pike at Eagle City, Ohio	R	09/19/01	1200	<.10	<.10	<.10
		FR	09/19/01	1208	<.10	<.10	<.10
		R	12/05/01	1100	<.10	.16	<.10
		R	10/17/01	1200	<.10	<.10	<.10
		R	11/06/01	0930	<.10	.11	<.10
		LD	11/06/01	0930	<.10	.14	<.10
		R	01/09/02	1030	<.10	.14	<.10
		LD	01/09/02	1030	<.10	.10	<.10
03274000	Great Miami River at Hamilton, Ohio	R	09/18/01	1100	.1	1.2	<.10
Great and Little Miami River Basins Ground Water (BET)							
390744084212501	URB–02 at Newton, Ohio	R	11/29/01	1100	<.10	<.10	<.10
		LD	11/29/01	1100	<.10	<.10	<.10
391226084272501	URB–31 at Cincinnati, Ohio	R	11/28/01	1000	<.10	<.10	<.10
391518084485201	URB–04 at Harrison, Ohio	R	11/15/01	1400	<.10	<.10	<.10
		R	11/15/01	1000	<.10	<.10	<.10
		FR	11/15/01	1005	<.10	<.10	<.10
391849084381901	URB–01 at Ross, Ohio	R	11/27/01	1400	<.10	<.10	<.10
392008084335501	URB–06 at Fairfield, Ohio	R	11/14/01	1500	<.10	<.10	<.10
392008084343801	URB–07 at Fairfield, Ohio	R	11/26/01	1500	<.10	<.10	<.10
392047084325101	URB–15 at Fairfield, Ohio	R	11/14/01	1100	<.10	<.10	<.10
		FR	11/14/01	1101	<.10	<.10	<.10
392049084340301	URB–08 at Fairfield, Ohio	R	11/27/01	1000	<.10	<.10	<.10
392121084332101	URB–29 at Hamilton, Ohio	R	11/13/01	1600	<.10	<.10	<.10
392917084205601	URB–11 at Middletown, Ohio	R	11/07/01	1500	<.10	<.10	<.10



**Table 5.** Analytical results for glyphosate, aminomethylphosphonic acid, and glufosinate in National Water-Quality Assessment (NAWQA) Program surface- and ground-water studies, 2001–06.—Continued

[Location of NAWQA study units shown in figure 4. Sample type: FB, field blank; FR, field replicate; R, regular; LD, laboratory duplicate; --, no data; &lt;, less than; µg/L, micrograms per liter]

Site number	Site location	Sample type	Date of collection (day/month/year)	Collection time (24-hour)	Concentrations		
					Glyphosate (µg/L)	Amino-methylphosphonic acid (µg/L)	Glufosinate (µg/L)
Great and Little Miami River Basins Ground Water (BET)—Continued							
393405084203701	URB–12 at Carlisle, Ohio	R	11/06/01	1100	<0.10	<0.10	<0.10
393453084131801	URB–13 at Carlisle, Ohio	R	11/05/01	1400	<.10	<.10	<.10
393812084240001	REF–02 at Germantown Dam, Ohio	R	11/07/01	1100	<.10	<.10	<.10
393944084120700	Holes Creek at Huffman Park at Kettering, Ohio	R	08/15/01	1400	<.10	<.10	<.10
		R	09/20/01	1200	<.10	<.10	<.10
		LD	09/20/01	1200	<.10	<.10	<.10
393954084132001	URB–17 at West Carrollton, Ohio	R	11/01/01	1200	<.10	<.10	<.10
393956083575601	URB–23 at Xenia, Ohio	R	10/25/01	1200	<.10	<.10	<.10
		LD	10/25/01	1200	<.10	<.10	<.10
394025084132501	URB–14 at West Carrollton, Ohio	R	10/31/01	1200	<.10	<.10	<.10
394103084124901	URB–18 at Moraine, Ohio	R	10/31/01	1600	<.10	<.10	<.10
		FR	10/31/01	1605	<.10	<.10	<.10
394234084024301	URB–16 at Beaver creek, Ohio	R	10/22/01	1600	<.10	<.10	<.10
394256084040701	URB–19 at Beaver creek, Ohio	R	10/23/01	1200	<.10	<.10	<.10
		FR	10/23/01	1201	<.10	<.10	<.10
394320084044301	URB–20	R	10/04/01	1400	<.10	<.10	<.10
395210083565001	URB–22 at Enon, Ohio	R	10/24/01	1200	<.10	<.10	<.10
395218084100801	REF–01 at Taylorsville, Ohio	R	10/18/01	1200	<.10	<.10	<.10
395244084011901	URB–26 at Medway, Ohio	R	12/03/01	1500	<.10	<.10	<.10
		LD	12/03/01	1500	<.10	<.10	<.10
395247084015801	URB–25 at Crystal Lakes, Ohio	R	12/03/01	1100	<.10	<.10	<.10
395614084020301	URB–24 at New Carlisle, Ohio	R	10/17/01	1400	<.10	<.10	<.10
400642083441601	URB–21 at Ur, Ohio	R	10/03/01	1400	<.10	<.10	<.10
Lake Erie-Lake St. Clair Drainage Surface Water (BET)							
04161820	Clinton River at Sterling Heights, Michigan	R	08/29/01	1000	.15	.28	<.10
		R	09/18/01	1030	<.10	<.10	<.10
04175600	River Raisin near Manchester, Michigan	R	08/29/01	1330	<.10	<.10	<.10
		R	09/18/01	1400	<.10	<.10	<.10
04178000	St. Joseph River near Newville, Indiana	R	08/28/01	1400	<.10	<.10	<.10

58 Concentrations of Glyphosate, Aminomethylphosphonic Acid, and Glufosinate in Water and Soil Samples

**Table 5.** Analytical results for glyphosate, aminomethylphosphonic acid, and glufosinate in National Water-Quality Assessment (NAWQA) Program surface- and ground-water studies, 2001–06.—Continued

[Location of NAWQA study units shown in figure 4. Sample type: FB, field blank; FR, field replicate; R, regular; LD, laboratory duplicate; --, no data; <, less than; µg/L, micrograms per liter]

Site number	Site location	Sample type	Date of collection (day/month/year)	Collection time (24-hour)	Concentrations		
					Glyphosate (µg/L)	Amino-methylphosphonic acid (µg/L)	Glufosinate (µg/L)
Lake Erie-Lake St. Clair Drainage Surface Water (BET)—Continued							
04178000	St. Joseph River near Newville, Indiana	R	09/17/01	1500	<0.10	<0.10	<0.10
04186500	Auglaize River near Ft. Jennings, Ohio	R	08/28/01	1130	<.10	.57	<.10
		R	09/17/01	1300	<.10	<.10	<.10
04193500	Maumee River at Waterville, Ohio	R	08/30/01	0900	.12	.46	<.10
		LD	08/30/01	0900	<.10	.66	<.10
		R	09/19/01	0730	<.10	<.10	<.10
Las Vegas Valley, Carson and Truckee Basins Surface Water (NVB)							
094196783	Las Vegas Wash below Flamingo Wash confluence near Las Vegas, Nevada	R	10/09/02	0930	.75	.62	<.10
		R	10/24/02	0930	.68	.23	<.10
		R	11/14/02	0930	.48	.37	<.10
		R	11/26/02	0830	.52	.25	<.10
		LD	11/26/02	0830	.55	.23	<.10
		R	12/16/02	1030	<.10	.30	<.10
		R	12/30/02	1000	<.10	.18	<.10
		FB	01/15/03	0940	<.10	<.10	<.10
		FR	01/15/03	0950	<.10	<.10	<.10
		R	01/15/03	1000	<.10	.14	<.10
		R	01/28/03	0945	<.10	<.10	<.10
		FR	01/28/03	0950	<.10	<.10	<.10
		LD	01/28/03	0950	<.10	<.10	<.10
		R	02/10/03	1000	<.10	.14	<.10
		LD	02/10/03	1000	<.10	.15	<.10
		R	02/24/03	0830	<.10	.33	<.10
		LD	02/24/03	0830	<.10	.25	<.10
		FB	03/12/03	0845	<.10	<.10	<.10
		R	03/12/03	0850	.34	.40	<.10
LD	03/12/03	0850	.34	.42	<.10		

**Table 5.** Analytical results for glyphosate, aminomethylphosphonic acid, and glufosinate in National Water-Quality Assessment (NAWQA) Program surface- and ground-water studies, 2001–06.—Continued

[Location of NAWQA study units shown in figure 4. Sample type: FB, field blank; FR, field replicate; R, regular; LD, laboratory duplicate; --, no data; &lt;, less than; µg/L, micrograms per liter]

Site number	Site location	Sample type	Date of collection (day/month/year)	Collection time (24-hour)	Concentrations		
					Glyphosate (µg/L)	Amino-methylphosphonic acid (µg/L)	Glufosinate (µg/L)
Las Vegas Valley, Carson and Truckee Basins Surface Water (NVB)—Continued							
094196783	Las Vegas Wash below Flamingo Wash confluence near Las Vegas, Nevada—Continued	FR	03/12/03	0855	0.34	0.42	<0.10
		R	03/13/03	1000	.59	.26	<.10
		LD	03/13/03	1000	.551	.24	<.10
		R	03/26/03	0945	.79	.26	<.10
		LD	03/26/03	0945	.79	.26	<.10
		R	04/10/03	0930	.60	.22	<.10
		R	04/28/03	1000	<.10	.64	<.10
		R	05/21/03	0930	.35	.30	<.10
		LD	05/21/03	0930	.28	.28	<.10
		R	07/02/03	0830	.79	<.10	<.10
		R	08/13/03	0800	2.0	.93	<.10
		R	09/09/03	0900	.46	.88	<.10
		Long Island and New Jersey Coastal Drainages (LIG)					
393946074582901	NU-10	R	08/31/05	1600	<.02	<.02	<.02
394018074590801	NU-09	R	08/18/05	1445	<.02	<.02	<.02
394145074591301	NU-22	R	09/20/05	1430	<.02	<.02	<.02
394153075011101	NU-23	R	08/18/05	1200	<.02	<.02	<.02
394233074574401	NU-16	R	09/21/05	1200	<.02	<.02	<.02
394243075034401	NU-25	R	08/22/05	1115	<.02	<.02	<.02
394254074590501	NU-19	R	08/17/05	1400	<.02	<.02	<.02
394258075061101	NU-18	R	08/30/05	1200	<.02	<.02	<.02
		FR	08/30/05	1201	<.02	<.02	<.02
394300074532701	NU-15	R	08/31/05	1035	<.02	<.02	<.02
		FR	08/31/05	1230	<.02	<.02	<.02
394323075063701	NU-17	R	08/25/05	1045	<.02	<.02	<.02
		FR	08/25/05	1150	<.02	<.02	<.02
394325075045801	NU-01	R	08/23/05	1600	<.02	<.02	<.02
		LD	08/23/05	1600	<.02	<.02	<.02

**60 Concentrations of Glyphosate, Aminomethylphosphonic Acid, and Glufosinate in Water and Soil Samples**

**Table 5.** Analytical results for glyphosate, aminomethylphosphonic acid, and glufosinate in National Water-Quality Assessment (NAWQA) Program surface- and ground-water studies, 2001–06.—Continued

[Location of NAWQA study units shown in figure 4. Sample type: FB, field blank; FR, field replicate; R, regular; LD, laboratory duplicate; --, no data; <, less than; µg/L, micrograms per liter]

Site number	Site location	Sample type	Date of collection (day/month/year)	Collection time (24-hour)	Concentrations		
					Glyphosate (µg/L)	Amino-methylphosphonic acid (µg/L)	Glufosinate (µg/L)
Long Island and New Jersey Coastal Drainages (LIG)—Continued							
394340075012701	NU-08	R	08/17/05	1100	<0.02	<0.02	<0.02
394342075040301	NU-02	R	08/23/05	1300	<.02	<.02	<.02
394348074595301	NU-13	R	08/16/05	1530	<.02	<.02	<.02
394428075044601	NU-03	R	08/23/05	1050	<.02	<.02	<.02
394446075031001	NU-29	R	08/22/05	1400	<.02	<.02	<.02
394457075040001	NU-04	R	08/24/05	1115	<.02	<.02	<.02
		FR	08/24/05	1120	<.02	<.02	<.02
394504075051001	NU-05	R	08/24/05	1350	<.02	<.02	<.02
394507075023801	NU-30	R	08/25/05	1530	<.02	<.02	<.02
394528075004301	NU-06	R	08/16/05	1130	<.02	<.02	<.02
394604075003601	NU-11	R	09/20/05	1120	<.02	<.02	<.02
394606074591801	NU-07	R	08/15/05	1440	<.02	.18	<.02
394657074554501	NU-26	R	08/11/05	1500	<.02	.16	<.02
394736074564201	NU-12	R	08/15/05	1145	<.02	.13	<.02
394934074550801	NU-27	R	08/11/05	1200	.03	.20	<.02
		R	09/01/05	1415	<.02	<.02	<.02
395007074562501	NU-14	R	08/10/05	1400	<.02	.28	<.02
395116074562901	NU-21	R	09/21/05	1545	<.02	<.02	<.02
400000074000094	Equipment blank	FB	06/21/05	1120	<.02	<.02	<.02
		FB	06/21/05	1335	<.02	<.02	<.02
Lower Illinois River Basin Ground Water (ILG)							
383214089571501	1N8W14-3.f1 SIL-25 Whiteside Elementary School	R	08/03/05	1400	<.02	<.02	<.02
383321089594601	1N8W9-6.h1 SIL-23 Wolf Branch Middle School	R	08/03/05	1000	<.02	<.02	<.02
383445089535701	2N7W32-3.e1 SIL-27 Evans Elementary School	R	08/01/05	1300	<.02	<.02	<.02
		FR	08/01/05	1305	<.02	<.02	<.02
383453089545001	2N7W31-2.g1 SIL-27A O'Fallon Public Library	R	08/04/05	0900	<.02	<.02	<.02
		FR	08/04/05	0901	<.02	<.02	<.02
383847090003501	2N8W5-3.b1	R	07/12/05	1100	<.02	<.02	<.02
384058090010601	3N9W29-7.f1	R	07/12/05	1500	<.02	<.02	<.02

**Table 5.** Analytical results for glyphosate, aminomethylphosphonic acid, and glufosinate in National Water-Quality Assessment (NAWQA) Program surface- and ground-water studies, 2001–06.—Continued

[Location of NAWQA study units shown in figure 4. Sample type: FB, field blank; FR, field replicate; R, regular; LD, laboratory duplicate; --, no data; &lt;, less than; µg/L, micrograms per liter]

Site number	Site location	Sample type	Date of collection (day/month/year)	Collection time (24-hour)	Concentrations		
					Glyphosate (µg/L)	Amino-methylphosphonic acid (µg/L)	Glufosinate (µg/L)
Lower Illinois River Basin Ground Water (ILG)—Continued							
384323090405801	46N3E22–8.b2 SMO–12 Ozark Way	R	08/09/05	0900	<0.02	<0.02	<0.02
384411090354601	46N4E17–3.a1 SMO–14 / Ramona Lane	R	07/27/05	1000	<.02	<.02	<.02
384422090420701	46N3E17–1.b1 SMO–02 Sports Park	R	08/09/05	1400	<.02	<.02	<.02
		LD	08/09/05	1400	.06	<.02	<.02
384504090394701	46N3E10–1.a1 SMO–10 / Strehl Fields	R	07/27/05	1500	<.02	<.02	<.02
384515089591801	4N8W33–2.f1 SIL–28 / Olivia Lane	R	08/08/05	1500	<.02	<.02	<.02
384546089575801	4N8W27–1.b1 SIL–21 Public Works Garage	R	08/02/05	0900	<.02	.16	<.02
384613089572001	4N8W26–4.f1 SIL–30 South Station Road	R	08/02/05	1300	<.02	<.02	<.02
		LD	08/02/05	1300	<.02	<.02	<.02
384619090382701	46N3E2–7.d1 SMO–08 Woodlands Sports Park	R	07/26/05	0900	<.02	<.02	<.02
		FR	07/26/05	0901	<.02	<.02	<.02
384629090350901	46N4E4–8.f1 XMO–17A Covenant Park	R	08/10/05	1500	<.02	<.02	<.02
384634090430201	46N3E5–8.f1 SMO–05 Stoney Brook Drive	R	07/25/05	1400	<.02	<.02	<.02
384635090355101	46N4E5–5.g1 SMO–18 Oak Creek Park	R	08/10/05	0900	<.02	.35	<.02
384646090375501	47N3E36–3.a1 SMO–09A Rabbit Run Park	R	07/26/05	1400	<.02	<.02	<.02
		FR	07/26/05	1405	<.02	<.02	<.02
384656089582001	4N8W22–3.e1	R	07/13/05	1000	<.02	<.02	<.02
384659090003701	4N8W20–4.e1	R	07/14/05	0900	<.02	<.02	<.02
384714089585301	4N8W22–7.g1	R	07/13/05	1500	<.02	<.02	<.02
384734090384801	47N3E35.2.h1	R	07/28/05	0900	<.02	<.02	<.02
384955089473001	5N6W32–4.a1 MRN–1	R	09/07/05	1100	<.02	<.02	<.02
385446090015901	5N8W6–5.b1	R	07/11/05	1400	<.02	<.02	<.02
385735089513901	6N7W22–5.g1 WDN–1	R	09/07/05	1500	<.02	<.02	<.02
		R	09/07/05	1500	<.02	<.02	<.02
Mississippi Embayment Surface Water (RCM)							
07288650	Bogue Phalia near Leland, Mississippi	R	10/13/04	1115	.59	1.1	<.02
		R	11/03/04	1130	.35	1.8	<.02
		R	12/07/04	1035	.28	1.1	<.02

**62 Concentrations of Glyphosate, Aminomethylphosphonic Acid, and Glufosinate in Water and Soil Samples**

**Table 5.** Analytical results for glyphosate, aminomethylphosphonic acid, and glufosinate in National Water-Quality Assessment (NAWQA) Program surface- and ground-water studies, 2001–06.—Continued

[Location of NAWQA study units shown in figure 4. Sample type: FB, field blank; FR, field replicate; R, regular; LD, laboratory duplicate; --, no data; <, less than; µg/L, micrograms per liter]

Site number	Site location	Sample type	Date of collection (day/month/year)	Collection time (24-hour)	Concentrations		
					Glyphosate (µg/L)	Amino-methylphosphonic acid (µg/L)	Glufosinate (µg/L)
Mississippi Embayment Surface Water (RCM)—Continued							
07288650	Bogue Phalia near Leland, Mississippi— Continued	FB	01/04/05	0855	<0.02	<0.02	<0.02
		R	01/04/05	1015	.12	1.5	<.02
		FB	02/08/05	0830	<.02	<.02	<.02
		LD	02/08/05	0830	<.02	<.02	<.02
		R	02/08/05	0930	.59	1.8	<.02
		R	02/22/05	0800	.4	1.2	<.02
		R	03/07/05	1110	.38	1.7	<.02
		R	03/21/05	0910	.11	<.02	<.02
		R	03/22/05	1110	2.4	1.5	<.02
		R	03/28/05	1135	1.0	2.6	<.02
		R	04/04/05	1139	.17	2.4	<.02
		LD	04/04/05	1139	.17	1.9	<.02
		FR	04/04/05	1140	.22	2.1	<.02
		R	04/20/05	1010	.38	3.3	.56
		R	05/02/05	1010	.85	1.5	<.02
		R	05/26/05	1100	.4	1.9	<.02
		R	05/31/05	1100	1.3	2.8	<.02
		FB	06/07/05	1100	<.02	<.02	<.02
		R	06/07/05	1100	1.1	3.9	<.02
		FB	06/20/05	1100	<.02	<.02	<.02
		R	06/20/05	1100	1.8	8.7	<.02
		R	07/05/05	1000	1.7	5.0	<.02
		R	07/20/05	1200	1.1	3.9	<.02
LD	07/20/05	1200	1.5	4.6	<.02		
R	08/08/05	1200	1.8	4.9	<.02		
R	08/09/05	0900	2.3	4.1	<.02		

**Table 5.** Analytical results for glyphosate, aminomethylphosphonic acid, and glufosinate in National Water-Quality Assessment (NAWQA) Program surface- and ground-water studies, 2001–06.—Continued

[Location of NAWQA study units shown in figure 4. Sample type: FB, field blank; FR, field replicate; R, regular; LD, laboratory duplicate; --, no data; &lt;, less than; µg/L, micrograms per liter]

Site number	Site location	Sample type	Date of collection (day/month/year)	Collection time (24-hour)	Concentrations		
					Glyphosate (µg/L)	Amino-methylphosphonic acid (µg/L)	Glufosinate (µg/L)
Mississippi Embayment Surface Water (RCM)—Continued							
07288650	Bogue Phalia near Leland, Mississippi— Continued	R	08/23/05	1000	1.4	6.7	<0.02
		R	08/24/05	1100	.84	4.1	<.02
		R	09/06/05	1000	.53	1.7	<.02
07288955	Yazoo River below Steele Bayou near Long Lake	R	10/14/04	1200	.13	.79	<.02
		R	11/04/04	1300	.13	.48	<.02
		R	12/08/04	1310	.12	.41	<.02
		R	02/10/05	1400	.13	.61	<.02
		R	02/24/05	1100	<.02	.23	<.02
		R	03/14/05	1200	.17	.43	<.02
		R	03/23/05	1145	.12	.26	<.02
		R	04/07/05	1145	<.02	.45	<.02
		FR	04/07/05	1146	<.02	.51	<.02
		R	04/21/05	1200	.38	.29	<.02
		R	05/24/05	1205	.24	.77	<.02
		R	06/09/05	1200	<.02	.61	<.02
		R	06/22/05	1000	.08	.52	<.02
		R	07/07/05	1100	<.02	.73	<.02
		R	07/25/05	1200	.13	1.1	<.02
		R	08/10/05	1100	.19	.8	<.02
		R	09/07/05	1130	.13	.95	<.02
		FB	05/04/05	1000	<.02	<.02	<.02
		R	05/04/05	1020	.09	.44	<.02
		LD	05/04/05	1020	.18	.39	<.02
332440090502101	FO135 Bogue Phalia—right bank	FB	09/15/05	1030	<.02	<.02	<.02
		LD	09/15/05	1030	<.02	<.02	<.02
332440090502103	FO137 Bogue Phalia—left bank	FB	09/15/05	1045	<.02	<.02	<.02
332541090503301	FO005 Washington	R	09/21/05	1400	<.02	<.02	<.02

**64 Concentrations of Glyphosate, Aminomethylphosphonic Acid, and Glufosinate in Water and Soil Samples**

**Table 5.** Analytical results for glyphosate, aminomethylphosphonic acid, and glufosinate in National Water-Quality Assessment (NAWQA) Program surface- and ground-water studies, 2001–06.—Continued

[Location of NAWQA study units shown in figure 4. Sample type: FB, field blank; FR, field replicate; R, regular; LD, laboratory duplicate; --, no data; <, less than; µg/L, micrograms per liter]

Site number	Site location	Sample type	Date of collection (day/month/year)	Collection time (24-hour)	Concentrations		
					Glyphosate (µg/L)	Amino-methylphosphonic acid (µg/L)	Glufosinate (µg/L)
Mississippi Embayment Surface Water (RCM)—Continued							
335910090532901	C0028 Bolivar	R	09/20/05	1600	<0.02	<0.02	<0.02
Potomac River Basin Surface Water (POD)							
01493500	Morgan Creek near Kennedyville, Maryland	R	11/14/02	1000	<.10	<.10	<.10
		LD	11/14/02	1000	<.10	<.10	<.10
		R	10/23/02	1100	<.10	<.10	<.10
		R	01/07/03	1100	<.10	<.10	<.10
		R	02/05/03	1130	<.10	<.10	<.10
		R	03/06/03	1130	<.10	<.10	<.10
		FR	03/06/03	1200	<.10	<.10	<.10
		R	03/18/03	1100	<.10	<.10	<.10
		R	04/07/03	1000	<.10	<.10	<.10
		LD	04/07/03	1000	<.10	<.10	<.10
		R	05/08/03	1300	<.10	<.10	<.10
		R	05/09/03	2145	<.10	<.10	<.10
		R	05/15/03	1000	<.10	<.10	<.10
		R	05/22/03	1000	<.10	<.10	<.10
		LD	05/22/03	1000	<.10	<.10	<.10
		R	06/04/03	1200	<.10	<.10	<.10
		R	06/17/03	1000	<.10	<.10	<.10
		FR	06/17/03	1005	<.10	.14	<.10
		LD	06/17/03	1005	<.10	.13	<.10
		FB	07/17/03	1030	<.10	<.10	<.10
LD	07/17/03	1030	<.10	<.10	<.10		
R	07/17/03	1100	<.10	.16	<.10		
R	07/31/03	1100	<.10	.13	<.10		
LD	07/31/03	1100	<.10	.13	<.10		
FR	07/31/03	1130	<.10	<.10	<.10		



**Table 5.** Analytical results for glyphosate, aminomethylphosphonic acid, and glufosinate in National Water-Quality Assessment (NAWQA) Program surface- and ground-water studies, 2001–06.—Continued

[Location of NAWQA study units shown in figure 4. Sample type: FB, field blank; FR, field replicate; R, regular; LD, laboratory duplicate; --, no data; &lt;, less than; µg/L, micrograms per liter]

Site number	Site location	Sample type	Date of collection (day/month/year)	Collection time (24-hour)	Concentrations		
					Glyphosate (µg/L)	Amino-methylphosphonic acid (µg/L)	Glufosinate (µg/L)
Potomac River Basin Surface Water (POD)—Continued							
01493500	Morgan Creek near Kennedyville, Maryland— Continued	R	08/14/03	1000	<0.10	0.21	<0.10
		FB	08/14/03	0930	<.10	<.10	<.10
		LD	08/14/03	0930	<.10	<.10	<.10
		R	09/05/03	1000	<.10	.32	<.10
		R	09/30/03	1100	<.10	.11	<.10
		R	12/13/02	1030	<.10	<.10	<.10
		R	04/21/03	0930	<.10	<.10	<.10
Puget Sound Basin Surface Water (PUB)							
12128000	Thornton Creek near Seattle, Washington	R	10/13/04	1330	.06	.14	<.02
		R	10/13/04	1338	<.02	<.02	<.02
		FR	10/13/04	1339	<.02	<.02	<.02
		R	11/10/04	1230	.05	.15	<.02
		LD	11/10/04	1230	.10	.11	<.02
		R	12/14/04	1340	.07	.15	<.02
		R	01/12/05	1310	<.02	.17	<.02
		R	02/09/05	1220	<.02	.11	<.02
		R	03/09/05	1210	<.02	<.02	<.02
		R	03/22/05	1150	<.02	<.02	<.02
		R	04/12/05	1210	<.02	<.02	<.02
		R	04/28/05	1210	<.02	<.02	<.02
		R	05/12/05	1210	.14	.08	<.02
		R	05/24/05	1240	.08	<.02	<.02
		FR	05/24/05	1241	.06	.07	<.02
		R	06/01/05	1200	.53	.12	<.02
		R	06/08/05	1200	.18	<.02	<.02
R	06/15/05	1330	.08	.11	<.02		
R	06/21/05	0950	.05	.11	<.02		
LD	06/21/05	0950	.05	.10	<.02		

66 Concentrations of Glyphosate, Aminomethylphosphonic Acid, and Glufosinate in Water and Soil Samples

**Table 5.** Analytical results for glyphosate, aminomethylphosphonic acid, and glufosinate in National Water-Quality Assessment (NAWQA) Program surface- and ground-water studies, 2001–06.—Continued

[Location of NAWQA study units shown in figure 4. Sample type: FB, field blank; FR, field replicate; R, regular; LD, laboratory duplicate; --, no data; <, less than; µg/L, micrograms per liter]

Site number	Site location	Sample type	Date of collection (day/month/year)	Collection time (24-hour)	Concentrations		
					Glyphosate (µg/L)	Amino-methylphosphonic acid (µg/L)	Glufosinate (µg/L)
Puget Sound Basin Surface Water (PUB)—Continued							
12128000	Thornton Creek near Seattle, Washington— Continued	R	06/28/05	0930	0.07	0.09	<0.02
		LD	06/28/05	0930	.06	<.02	<.02
		R	07/13/05	1000	<.02	.07	<.02
		FR	07/13/05	1008	<.02	<.02	<.02
		R	07/20/05	1150	<.02	.07	<.02
		LD	07/20/05	1150	.02	.07	<.02
		R	07/25/05	1050	.03	.11	<.02
		R	08/10/05	1140	<.02	.20	<.02
		R	08/16/05	1140	<.02	.09	<.02
		R	08/23/05	1130	<.02	<.02	<.02
		R	09/06/05	1230	.45	.33	<.02
		R	09/20/05	1200	.09	.18	<.02
Puget Sound Basin Ground Water (PUG)							
465958122481001	UR–05	R	08/08/05	1100	<.02	<.02	<.02
470005122502301	UR–11	R	08/10/05	1320	.03	.31	<.02
470035122444601	UR–12	R	08/11/05	1120	<.02	.21	<.02
470035122444601	UR–12	LD	08/11/05	1120	<.02	.19	<.02
470035122444601	UR–12	FR	08/11/05	1121	<.02	.13	<.02
470040122463601	UR–1	R	08/04/05	1158	<.02	<.02	<.02
470040122463601	UR–1	R	08/12/05	1200	<.02	<.02	<.02
470040122463601	UR–1	FR	08/12/05	1208	<.02	<.02	<.02
470045122463801	--	R	07/07/05	1310	<.02	<.02	<.02
470046122522301	UR–08	R	08/09/05	1530	<.02	<.02	<.02
470110122484201	--	R	07/07/05	1040	<.02	<.02	<.02
470110122484201	--	LD	07/07/05	1040	<.02	<.02	<.02
470112122493501	UR–07	R	08/09/05	1200	<.02	<.02	<.02
470112122493501	UR–07	FR	08/09/05	1208	<.02	<.02	<.02
470135122202501	UR–21	R	08/03/05	1420	<.02	<.02	<.02

**Table 5.** Analytical results for glyphosate, aminomethylphosphonic acid, and glufosinate in National Water-Quality Assessment (NAWQA) Program surface- and ground-water studies, 2001–06.—Continued

[Location of NAWQA study units shown in figure 4. Sample type: FB, field blank; FR, field replicate; R, regular; LD, laboratory duplicate; --, no data; &lt;, less than; µg/L, micrograms per liter]

Site number	Site location	Sample type	Date of collection (day/month/year)	Collection time (24-hour)	Concentrations			
					Glyphosate (µg/L)	Amino-methylphosphonic acid (µg/L)	Glufosinate (µg/L)	
Puget Sound Basin Ground Water (PUG)—Continued								
470135122514001	UR-06	R	08/08/05	1420	<0.02	<0.02	<0.02	
470208122223501	UR-37	R	08/05/05	1130	<.02	<.02	<.02	
470228122441701	UR-10	R	08/10/05	1040	<.02	.31	<.02	
470230122203001	UR-25	R	08/02/05	1340	<.02	<.02	<.02	
470240122214501	UR-24	R	08/03/05	1120	<.02	<.02	<.02	
470306122450301	UR-14	R	08/11/05	1400	<.02	.14	<.02	
470328122215501	UR-23	R	07/29/05	0900	<.02	<.02	<.02	
470330122181501	UR-31	R	08/02/05	1030	<.02	<.02	<.02	
470343122504501	UR-09	R	08/04/05	1510	<.02	<.02	<.02	
470603122300501	LC149C	R	08/01/05	1500	<.02	<.02	<.02	
470644122160801	UR-30	R	07/27/05	1040	<.02	<.02	<.02	
470705122230501	UR-26	R	07/28/05	0940	<.02	<.02	<.02	
470720122162101	UR-29B	R	08/26/05	1230	<.02	<.02	<.02	
470720122162101	UR-29B	FR	08/26/05	1231	<.02	<.02	<.02	
470720122162101	UR-29B	LD	08/26/05	1231	<.02	<.02	<.02	
470732122252801	UR-32	R	07/28/05	1310	<.02	<.02	<.02	
470958122154301	UR-34	R	07/26/05	1250	<.02	<.02	<.02	
471018122143302	UR-35B	R	07/26/05	1000	<.02	<.02	<.02	
471018122143302	UR-35B	LD	07/26/05	1000	<.02	<.02	<.02	
471133122335501	--	R	07/25/05	1220	<.02	<.02	<.02	
471133122335501	--	LD	07/25/05	1220	<.02	<.02	<.02	
Sacramento Basin Ground Water (SCG)								
383000121313601	8N/4E-34K1	R	07/12/05	1000	<.02	<.02	<.02	
382941121320501	8N/3E-3D1	R	07/12/05	1230	<.02	<.02	<.02	
382906121322201	7N/3E-4J1 (Charter Pointe)	R	07/20/05	1000	.02	<.02	<.02	
382911121312301	7N/4E-3K2	R	07/20/05	1330	<.02	<.02	<.02	
382757121261101	7N/5E-16C1 Hite	R	08/02/05	0930	<.02	<.02	<.02	
382800121270701	7N/5E-17B1 Mesa Grande	R	08/02/05	1130	<.02	<.02	<.02	

68 Concentrations of Glyphosate, Aminomethylphosphonic Acid, and Glufosinate in Water and Soil Samples

**Table 5.** Analytical results for glyphosate, aminomethylphosphonic acid, and glufosinate in National Water-Quality Assessment (NAWQA) Program surface- and ground-water studies, 2001–06.—Continued

[Location of NAWQA study units shown in figure 4. Sample type: FB, field blank; FR, field replicate; R, regular; LD, laboratory duplicate; --, no data; <, less than; µg/L, micrograms per liter]

Site number	Site location	Sample type	Date of collection (day/month/year)	Collection time (24-hour)	Concentrations		
					Glyphosate (µg/L)	Amino-methylphosphonic acid (µg/L)	Glufosinate (µg/L)
Sacramento Basin Ground Water (SCG)—Continued							
382800121270701	7N/5E–17B1 Mesa Grande	LD	08/02/05	1130	<0.02	<0.02	<0.02
		FR	08/02/05	1131	<.02	<.02	<.02
382537121260001	7N/5E–28Q1 Case	R	08/03/05	0940	<.02	<.02	<.02
382515121262501	7N/5E–33D1 Pedersen	R	08/03/05	1120	<.02	<.02	<.02
382517121252601	7N/5E–34D1 Laguna Strip 4	R	08/03/05	1310	<.02	<.02	<.02
382629121254801	7N/5E–21R1 North Laguna Creek	R	08/04/05	0940	<.02	<.02	<.02
382450121253601	7N/5E–33J1 Lichtenberger	R	08/04/05	1200	<.02	<.02	<.02
		FR	08/04/05	1205	<.02	<.02	<.02
383655121230161	9N/4E–23R2 (Bannon Creek)	R	08/16/05	0940	<.02	<.02	<.02
383746121291101	9N/4E–13R1 (Chuckwagon)	R	08/16/05	1120	<.02	<.02	<.02
		FR	08/16/05	1121	<.02	<.02	<.02
383727121301801	9N/4E–23A1 (Jefferson)	R	08/17/05	0930	<.02	<.02	<.02
383659121292201	9N/4E–24Q1 (Northgate)	R	08/17/05	1120	<.02	<.02	<.02
		LD	08/17/05	1120	<.02	<.02	<.02
		FR	08/17/05	1125	<.02	<.02	<.02
384303121211701	10N/6E–18R1 Antelope Community	R	09/21/05	1000	<.02	<.02	<.02
		LD	09/21/05	1000	<.02	<.02	<.02
384145121184101	10N/6E–27F1	R	09/21/05	1220	<.02	<.02	<.02
San Joaquin-Tulare Basins Surface Water (SAN)							
11273500	Merced River at River Road Bridge near Newman, California	R	10/15/02	1220	<.10	<.10	<.10
		R	11/07/02	1230	<.10	<.10	<.10
		R	12/12/02	1230	<.10	<.10	<.10
		FR	12/12/02	1231	<.10	<.10	<.10
		LD	12/12/02	1231	<.10	<.10	<.10
		R	01/09/03	1200	<.10	<.10	<.10
		R	01/23/03	1140	<.10	<.10	<.10
		R	02/06/03	1300	<.10	<.10	<.10
		R	02/20/03	1220	<.10	<.10	<.10
		R	03/12/03	1340	<.10	<.10	<.10

**Table 5.** Analytical results for glyphosate, aminomethylphosphonic acid, and glufosinate in National Water-Quality Assessment (NAWQA) Program surface- and ground-water studies, 2001–06.—Continued

[Location of NAWQA study units shown in figure 4. Sample type: FB, field blank; FR, field replicate; R, regular; LD, laboratory duplicate; --, no data; &lt;, less than; µg/L, micrograms per liter]

Site number	Site location	Sample type	Date of collection (day/month/year)	Collection time (24-hour)	Concentrations		
					Glyphosate (µg/L)	Amino-methylphosphonic acid (µg/L)	Glufosinate (µg/L)
San Joaquin-Tulare Basins Surface Water (SAN)							
11273500	Merced River at River Road Bridge near Newman, California—Continued	FR	03/12/03	1348	<0.10	<0.10	<0.10
		R	03/28/03	1320	<.10	<.10	<.10
		R	04/09/03	1330	<.10	<.10	<.10
		R	04/29/03	1450	<.10	<.10	<.10
		R	05/14/03	1500	<.10	<.10	<.10
		R	05/28/03	1250	<.10	<.10	<.10
		R	06/11/03	1340	<.10	<.10	<.10
		R	06/25/03	1350	<.10	<.10	<.10
		LD	06/25/03	1350	<.10	<.10	<.10
		FR	06/25/03	1351	<.10	<.10	<.10
		R	07/10/03	1340	<.10	<.10	<.10
		R	07/24/03	1250	<.10	<.10	<.10
		R	08/07/03	1340	.18	.22	<.10
		R	09/04/03	1130	<.10	<.10	<.10
		11274538	Orestimba Creek at River Road near Crows Landing, California	R	10/15/02	1150	<.10
R	11/07/02			1130	.19	.24	<.10
R	02/06/03			1220	.22	.23	<.10
R	02/20/03			1150	.20	.60	<.10
R	03/12/03			1300	7.5	.69	<.10
LD	03/12/03			1300	6.8	1.0	<.10
R	03/12/03			1301	7.7	.83	<.10
FR	03/12/03			1308	<.10	<.10	<.10
LD	03/12/03			1308	<.10	<.10	<.10
R	03/28/03			1240	3.0	.61	<.10
LD	03/28/03			1240	3.1	.61	<.10
R	04/09/03			1250	1.3	.65	<.10
R	04/29/03			1420	.63	.59	<.10

**70 Concentrations of Glyphosate, Aminomethylphosphonic Acid, and Glufosinate in Water and Soil Samples**

**Table 5.** Analytical results for glyphosate, aminomethylphosphonic acid, and glufosinate in National Water-Quality Assessment (NAWQA) Program surface- and ground-water studies, 2001–06.—Continued

[Location of NAWQA study units shown in figure 4. Sample type: FB, field blank; FR, field replicate; R, regular; LD, laboratory duplicate; --, no data; <, less than; µg/L, micrograms per liter]

Site number	Site location	Sample type	Date of collection (day/month/year)	Collection time (24-hour)	Concentrations				
					Glyphosate (µg/L)	Amino-methylphosphonic acid (µg/L)	Glufosinate (µg/L)		
San Joaquin-Tulare Basins Surface Water (SAN)—Continued									
11274538	Orestimba Creek at River Road near Crows Landing, California—Continued	R	05/14/03	1420	1.2	0.58	<0.10		
		R	05/14/03	1428	<.10	<.10	<.10		
		R	05/28/03	1220	.10	.32	<.10		
		R	06/11/03	1300	.34	.50	<.10		
		R	06/25/03	1320	.45	.68	<.10		
		R	07/10/03	1310	.32	.41	<.10		
		LD	07/10/03	1310	.22	.45	<.10		
		R	07/24/03	1200	.38	1.1	<.10		
		LD	07/24/03	1200	.36	1.0	<.10		
		R	08/07/03	1300	.83	.66	<.10		
		R	09/04/03	1050	.35	.50	<.10		
		11303500	San Joaquin River near Vernalis, California	R	10/15/02	1020	<.10	.28	<.10
				R	12/11/02	1140	<.10	.13	<.10
				FR	12/11/02	1141	<.10	.11	<.10
R	01/24/03			1050	<.10	.21	<.10		
R	02/06/03			1420	<.10	.17	<.10		
R	02/19/03			1130	<.10	.27	<.10		
R	03/11/03			1240	.16	.36	<.10		
R	03/11/03			1248	<.10	<.10	<.10		
R	03/27/03			1300	<.10	.24	<.10		
R	04/08/03			1300	<.10	.20	<.10		
R	04/29/03			1300	<.10	.12	<.10		
R	05/13/03			1330	<.10	.19	<.10		
R	05/28/03			1100	<.10	.15	<.10		
R	06/10/03			1400	<.10	.21	<.10		
R	06/24/03	1220	<.10	.20	<.10				

**Table 5.** Analytical results for glyphosate, aminomethylphosphonic acid, and glufosinate in National Water-Quality Assessment (NAWQA) Program surface- and ground-water studies, 2001–06.—Continued

[Location of NAWQA study units shown in figure 4. Sample type: FB, field blank; FR, field replicate; R, regular; LD, laboratory duplicate; --, no data; &lt;, less than; µg/L, micrograms per liter]

Site number	Site location	Sample type	Date of collection (day/month/year)	Collection time (24-hour)	Concentrations		
					Glyphosate (µg/L)	Amino-methylphosphonic acid (µg/L)	Glufosinate (µg/L)
San Joaquin-Tulare Basins Surface Water (SAN)—Continued							
11303500	San Joaquin River near Vernalis, California— Continued	R	07/09/03	1330	0.18	0.22	<0.10
		R	07/23/03	1210	<.10	.48	<.10
		R	08/06/03	1400	<.10	.56	<.10
		R	09/03/03	1130	.24	.31	<.10
		R	11/08/02	1130	.13	.14	<.10
		LD	11/08/02	1130	.17	.16	<.10
		R	01/08/03	1230	<.10	.15	<.10
		LD	01/08/03	1230	<.10	.10	<.10
San Joaquin-Tulare Basins Ground Water (SAG)							
355750119185101	23S/25E–6	R	08/07/02	1010	<.10	<.10	<.10
360310119201901	021S024E36N002M	R	07/24/02	1000	<.10	<.10	<.10
360310119201901	021S024E36N002M	FR	07/24/02	1005	<.10	<.10	<.10
360710119145301	21S/25E–10	R	07/30/02	1350	<.10	<.10	<.10
360719119205501	21S/24E–11	R	07/29/02	1420	<.10	<.10	<.10
360807119114901	21S/26E–06	R	07/30/02	1000	<.10	<.10	<.10
361338119275501	019S023E34P002M	R	08/08/02	1000	<.10	<.10	<.10
361338119275501	019S023E34P002M	LD	08/08/02	1000	<.10	<.10	<.10
361341119280102	019S023E34P004M	R	06/18/02	1500	<.10	<.10	<.10
361519119433401	019S021E19R001M	R	07/25/02	0950	<.10	<.10	<.10
361717119234202	019S024E08L002M	R	06/18/02	1040	<.10	<.10	<.10
361726119241101	019S024E07J001M	R	07/23/02	1330	<.10	<.10	<.10
361852119350601	018S022E33R001M	R	07/31/02	1000	<.10	<.10	<.10
361852119350601	018S022E33R001M	LD	07/31/02	1000	<.10	<.10	<.10
361948119412201	018S021E27N003M	R	07/26/02	1010	<.10	<.10	<.10
362417119533701	017S019E34Q002M	R	07/17/02	1050	<.10	<.10	<.10
362525119450601	017S020E25K001M	R	07/16/02	1220	<.10	<.10	<.10
362525119450601	017S020E25K001M	FR	07/16/02	1225	<.10	<.10	<.10
362537119450902	017S020E25G002M	R	06/19/02	1240	<.10	<.10	<.10
363123119585001	016S018E23K001M	R	07/17/02	1540	<.10	<.10	<.10

**72 Concentrations of Glyphosate, Aminomethylphosphonic Acid, and Glufosinate in Water and Soil Samples**

**Table 5.** Analytical results for glyphosate, aminomethylphosphonic acid, and glufosinate in National Water-Quality Assessment (NAWQA) Program surface- and ground-water studies, 2001–06.—Continued

[Location of NAWQA study units shown in figure 4. Sample type: FB, field blank; FR, field replicate; R, regular; LD, laboratory duplicate; --, no data; <, less than; µg/L, micrograms per liter]

Site number	Site location	Sample type	Date of collection (day/month/year)	Collection time (24-hour)	Concentrations			
					Glyphosate (µg/L)	Amino-methylphosphonic acid (µg/L)	Glufosinate (µg/L)	
San Joaquin-Tulare Basins Ground Water (SAG)—Continued								
363924119530401	015S019E03G001M	R	07/15/02	1620	<0.10	<0.10	<0.10	
370046120212001	010S015E32P001M	R	07/18/02	1100	<.10	<.10	<.10	
370618120190101	009S015E34K001M	R	07/18/02	1530	<.10	<.10	<.10	
371548120224101	008S015E06M001M	R	07/11/02	1230	<.10	<.10	<.10	
371548120224101	008S015E06M001M	LD	07/11/02	1230	<.10	<.10	<.10	
372323120554401	006S009E25B001M	R	08/06/02	1130	<.10	<.10	<.10	
372617120530301	006S010E04M001M	R	07/11/02	1000	<.10	<.10	<.10	
372624120530302	006S010E04M003M	R	07/22/02	1150	<.10	<.10	<.10	
372933120565901	005S009E23C002M	R	07/10/02	1320	<.10	<.10	<.10	
373114120595001	005S009E08A001M	R	07/09/02	1200	<.10	<.10	<.10	
373349121032302	004S008E26B002M	R	06/20/02	1220	<.10	<.10	<.10	
373351121032301	004S008E26B003M	R	07/08/02	1330	<.10	<.10	<.10	
373700121071001	4S/8E–5E1	R	08/29/02	0920	<.10	<.10	<.10	
374043121100301	003S007E14B001M	R	07/10/02	1040	<.10	<.10	<.10	
374902121031101	001S008E–26	R	09/12/02	1030	<.10	<.10	<.10	
South Platte Basin Surface Water (SPL)								
06713500	Cherry Creek at Denver, Colorado	R	10/09/02	0959	<.10	<.10	<.10	
		LD	10/09/02	0959	<.10	<.10	<.10	
		FR	10/09/02	1000	<.10	<.10	<.10	
		R	10/09/02	1020	<.10	.30	<.10	
		R	11/05/02	1010	<.10	.88	<.10	
		R	12/03/02	0945	<.10	.27	<.10	
		R	01/08/03	1010	<.10	.16	<.10	
		LD	01/08/03	1010	<.10	.15	<.10	
		FR	01/08/03	1011	<.10	.20	<.10	
		R	02/04/03	0940	<.10	.33	<.10	
		R	03/05/03	1030	<.10	.23	<.10	
		R	04/10/03	1010	<.10	<.10	<.10	
		R	04/22/03	1000	<.10	<.10	<.10	



**Table 5.** Analytical results for glyphosate, aminomethylphosphonic acid, and glufosinate in National Water-Quality Assessment (NAWQA) Program surface- and ground-water studies, 2001–06.—Continued

[Location of NAWQA study units shown in figure 4. Sample type: FB, field blank; FR, field replicate; R, regular; LD, laboratory duplicate; --, no data; &lt;, less than; µg/L, micrograms per liter]

Site number	Site location	Sample type	Date of collection (day/month/year)	Collection time (24-hour)	Concentrations		
					Glyphosate (µg/L)	Amino-methylphosphonic acid (µg/L)	Glufosinate (µg/L)
South Platte Basin Surface Water (SPL)—Continued							
06713500	Cherry Creek at Denver, Colorado—Continued	FR	04/22/03	1020	<0.10	0.12	<0.10
		R	05/07/03	1000	<.10	.15	<.10
		R	05/20/03	1020	<.10	.14	<.10
		FR	05/20/03	1021	<.10	.17	<.10
		R	06/02/03	0845	.78	.49	<.10
		LD	06/02/03	0845	.80	.56	<.10
		R	06/23/03	0900	.25	.31	<.10
		LD	06/23/03	0900	.25	.35	<.10
		R	07/08/03	1000	<.10	.14	<.10
		R	08/05/03	1110	.43	.37	<.10
		R	08/15/03	1030	.30	.49	<.10
		R	09/11/03	1030	<.10	.29	<.10
		R	09/22/03	1030	<.10	.14	<.10
Trinity River Basin Ground Water (TRG)							
294503095373201	MW29	R	12/14/03	0958	<.10	<.10	<.10
		LD	12/14/03	0958	<.10	<.10	<.10
		FR	12/14/03	1001	<.10	<.10	<.10
294620095440501	MW17	R	12/15/03	1001	<.10	<.10	<.10
294405095412301	REF01	R	12/15/03	1401	<.10	<.10	<.10
294957095310801	MW26	R	12/12/03	1101	<.10	<.10	<.10
		FR	12/12/03	1103	<.10	<.10	<.10
294919095320501	MW25	R	12/13/03	0931	<.10	<.10	<.10
294807095452701	MW27	R	12/13/03	1401	<.10	<.10	<.10
294800095415801	MW28A	R	12/21/03	1701	<.10	<.10	<.10
295049095253101	MW23	R	12/10/03	1001	<.10	<.10	<.10
		LD	12/10/03	1001	<.10	<.10	<.10
295133095273201	MW22	R	12/11/03	1001	<.10	<.10	<.10
295150095302401	MW20	R	12/12/03	1358	<.10	<.10	<.10

**74 Concentrations of Glyphosate, Aminomethylphosphonic Acid, and Glufosinate in Water and Soil Samples**

**Table 5.** Analytical results for glyphosate, aminomethylphosphonic acid, and glufosinate in National Water-Quality Assessment (NAWQA) Program surface- and ground-water studies, 2001–06.—Continued

[Location of NAWQA study units shown in figure 4. Sample type: FB, field blank; FR, field replicate; R, regular; LD, laboratory duplicate; --, no data; <, less than; µg/L, micrograms per liter]

Site number	Site location	Sample type	Date of collection (day/month/year)	Collection time (24-hour)	Concentrations			
					Glyphosate (µg/L)	Amino-methylphosphonic acid (µg/L)	Glufosinate (µg/L)	
Trinity River Basin Ground Water (TRG)—Continued								
295150095302401	MW20	FR	12/12/03	1401	<0.10	<0.10	<0.10	
295232095294101	MW21	R	12/11/03	1401	<.10	<.10	<.10	
295249095411301	MW16	R	12/16/03	1101	<.10	<.10	<.10	
295358095374101	MW18	R	12/18/03	1101	<.10	<.10	<.10	
295421095305801	MW19	R	12/19/03	1001	<.10	<.10	<.10	
295557095360901	MW11	R	12/16/03	1401	<.10	<.10	<.10	
295633095335201	MW12	R	12/17/03	1101	<.10	<.10	<.10	
295711095222301	MW07	R	12/17/03	1101	<.10	<.10	<.10	
		LD	12/17/03	1101	<.10	<.10	<.10	
295720095290001	MW08	R	12/17/03	1601	<.10	<.10	<.10	
300011095251801	MW10	R	12/17/03	1601	<.10	<.10	<.10	
300026095225401	MW06	R	12/19/03	1001	<.10	<.10	<.10	
300036095400101	REF02	R	12/29/03	1101	<.10	<.10	<.10	
300044095312001	MW01	R	12/19/03	1501	<.10	<.10	<.10	
300155095200201	MW05	R	12/20/03	1101	<.10	<.10	<.10	
		FR	12/20/03	1103	<.10	<.10	<.10	
300333095291701	MW03	R	12/29/03	1701	<.10	<.10	<.10	
300351095232601	MW02	R	12/18/03	1201	<.10	<.10	<.10	
300825095274801	MW14	R	12/30/03	1701	<.10	<.10	<.10	
301008095302901	MW13	R	12/22/03	1801	<.10	<.10	<.10	
		LD	12/22/03	1801	<.10	<.10	<.10	
301220095305501	MW15	R	12/22/03	1101	<.10	<.10	<.10	
		LD	12/22/03	1101	<.10	<.10	<.10	
301716095400501	REF03	R	12/30/03	1001	<.10	<.10	<.10	
Upper Snake River Basin Ground Water (USG)								
423723113495801	09S 22E 23DAD1	R	06/21/05	0732	<.02	<.02	<.02	
423805113465501	09S 23E 16CCC1	R	06/21/05	1000	<.02	<.02	<.02	
423857113493301	09S 22E 12 CDC1	R	06/21/05	1200	<.02	<.02	<.02	
423934113430001	09S 23E 12BAB1	R	06/21/05	1330	<.02	<.02	<.02	
424226113454901	08S 23E 21DDD1	R	06/22/05	0800	<.02	<.02	<.02	

**Table 5.** Analytical results for glyphosate, aminomethylphosphonic acid, and glufosinate in National Water-Quality Assessment (NAWQA) Program surface- and ground-water studies, 2001–06.—Continued

[Location of NAWQA study units shown in figure 4. Sample type: FB, field blank; FR, field replicate; R, regular; LD, laboratory duplicate; --, no data; &lt;, less than; µg/L, micrograms per liter]

Site number	Site location	Sample type	Date of collection (day/month/year)	Collection time (24-hour)	Concentrations		
					Glyphosate (µg/L)	Amino-methylphosphonic acid (µg/L)	Glufosinate (µg/L)
Upper Snake River Basin Ground Water (USG)—Continued							
424159113432801	08S 23E 26 ADD2	R	06/22/05	1000	<0.02	<0.02	<0.02
424133113432401	08S 23E 25CCC1	R	06/22/05	1130	<.02	<.02	<.02
424355113503201	08S 22E 14ABCC1	R	06/23/05	0800	<.02	<.02	<.02
424352113235601	08S 26E 15ABD1	R	06/27/05	1200	<.02	<.02	<.02
424421113293201	08S 25E 11DAD1	R	06/27/05	1400	<.02	<.02	<.02
424448113332501	08S 25E 8ABA1	R	06/28/05	0800	<.02	<.02	<.02
424544113303201	08S 25E 2BBB1	R	06/28/05	1000	<.02	<.02	<.02
424333113363301	08S 24E 14DAD1	R	06/28/05	1200	<.02	<.02	<.02
424629113385201	07S 24E 33ADA1	R	06/29/05	0800	<.02	<.02	<.02
424550113400301	08S 24E 05AAA2	R	06/29/05	0930	<.02	<.02	<.02
424647113444201	07S 23E 27DDD1	R	06/29/05	1200	<.02	<.02	<.02
424227113381301	08S 24E 22DCC1	R	06/30/05	0730	<.02	<.02	<.02
424041113392501	08S 24E 33DCC1	R	06/30/05	1000	<.02	<.02	<.02
424220113362701	08S 24E 25BBB1	R	06/30/05	1200	<.02	<.02	<.02
		FR	06/30/05	1208	<.02	<.02	<.02
		FR	06/30/05	1210	<.02	<.02	<.02
424629113385201	07S 24E 33ADA1	R	06/29/05	0800	<.02	<.02	<.02
424448113332501	08S 25E 8ABA1	R	06/28/05	0800	<.02	<.02	<.02
424220113362701	08S 24E 25BBB1	R	06/30/05	1210	<.02	<.02	<.02
424617113421901	07S 23E 36DAA1	R	07/20/05	1000	<.02	<.02	<.02
424407113412001	08S 24E 18AAA1	R	07/20/05	1230	<.02	<.02	<.02
424555113463901	07S 23E 33CDC1	R	07/20/05	1600	<.02	<.02	<.02
424146113402201	08S 24E 29DBD1	R	07/21/05	0930	<.02	<.02	<.02
424609113312001	07S 25E 34CAD1	R	07/21/05	1230	<.02	<.02	<.02
424251113443401	08S 23E 23BCC1	R	07/21/05	1500	<.02	<.02	<.02
423857113473301	09S 23E 08CDD1	R	07/25/05	1200	<.02	0.02	<.02
423857113532701	09S 22E 09CCC1	R	07/25/05	1445	<.02	<.02	<.02
423806113543701	09S 22E 17CCC1	R	07/25/05	1700	<.02	<.02	<.02

**76 Concentrations of Glyphosate, Aminomethylphosphonic Acid, and Glufosinate in Water and Soil Samples**

**Table 5.** Analytical results for glyphosate, aminomethylphosphonic acid, and glufosinate in National Water-Quality Assessment (NAWQA) Program surface- and ground-water studies, 2001–06.—Continued

[Location of NAWQA study units shown in figure 4. Sample type: FB, field blank; FR, field replicate; R, regular; LD, laboratory duplicate; --, no data; <, less than; µg/L, micrograms per liter]

Site number	Site location	Sample type	Date of collection (day/month/year)	Collection time (24-hour)	Concentrations		
					Glyphosate (µg/L)	Amino-methylphosphonic acid (µg/L)	Glufosinate (µg/L)
Upper Snake River Basin Ground Water (USG)—Continued							
424317113485101	08S 22E 13DDC1	R	07/26/05	1015	<0.02	<0.02	<0.02
423948113522201	09S 22E 04DDD1	R	07/26/05	1200	<.02	<.02	<.02
423948113522201	09S 22E 04DDD1	FR	07/26/05	1208	<.02	<.02	<.02
423948113522201	09S 22E 04DDD1	FR	07/26/05	1212	<.02	<.02	<.02
424132113322102	8S 25E 28 DCC2	R	08/31/05	1645	<.02	<.02	<.02
White River Basin Surface Water (WHM)							
03267900	Mad River at St. Paris Pike at Eagle City, Ohio	R	10/02/02	1100	<.10	<.10	<.10
		R	11/06/02	1030	<.10	<.10	<.10
		R	12/04/02	1130	<.10	<.10	<.10
		R	12/05/02	1330	<.10	<.10	<.10
		R	12/17/02	1300	<.10	<.10	<.10
		R	02/12/03	1130	<.10	<.10	<.10
		R	03/13/03	1115	<.10	<.10	<.10
		R	04/08/03	1300	<.10	<.10	<.10
		R	04/22/03	1200	<.10	<.10	<.10
		R	05/13/03	1200	<.10	<.10	<.10
		R	05/28/03	1330	<.10	.11	<.10
		R	06/11/03	1345	<.10	<.10	<.10
		R	06/25/03	1200	<.10	<.10	<.10
		R	07/08/03	1016	.50	.94	<.10
		FB	07/08/03	1015	<.10	<.10	<.10
		LD	07/08/03	1015	<.10	<.10	<.10
		R	07/30/03	1100	<.10	<.10	<.10
		R	08/06/03	1114	<.10	<.10	<.10
		R	08/06/03	1115	<.10	.22	<.10
		R	08/26/03	1045	<.10	<.10	<.10
LD	08/26/03	1045	<.10	<.10	<.10		

**Table 5.** Analytical results for glyphosate, aminomethylphosphonic acid, and glufosinate in National Water-Quality Assessment (NAWQA) Program surface- and ground-water studies, 2001–06.—Continued

[Location of NAWQA study units shown in figure 4. Sample type: FB, field blank; FR, field replicate; R, regular; LD, laboratory duplicate; --, no data; &lt;, less than; µg/L, micrograms per liter]

Site number	Site location	Sample type	Date of collection (day/month/year)	Collection time (24-hour)	Concentrations		
					Glyphosate (µg/L)	Amino-methylphosphonic acid (µg/L)	Glufosinate (µg/L)
White River Basin Surface Water (WHM)—Continued							
03267900	Mad River at St. Paris Pike at Eagle City, Ohio—Continued	R	09/04/03	1130	<0.10	0.13	<0.10
		R	01/22/03	1115	<.10	.13	<.10
03353637	Little Buck Creek near Indianapolis, Indiana	R	10/08/02	1130	<.10	.31	<.10
		R	11/06/02	1230	<.10	<.10	<.10
		R	11/27/02	1330	<.10	<.10	<.10
		R	12/09/02	1230	<.10	<.10	<.10
		R	01/15/03	1110	<.10	<.10	<.10
		R	02/13/03	1130	<.10	<.10	<.10
		R	03/17/03	1040	.12	<.10	<.10
		R	04/09/03	1150	<.10	<.10	<.10
		R	04/22/03	1210	<.10	<.10	<.10
		LD	04/22/03	1210	<.10	<.10	<.10
		R	05/05/03	1120	.21	<.10	<.10
		R	05/20/03	1040	<.10	<.10	<.10
		R	06/02/03	1328	<.10	<.10	<.10
		FR	06/02/03	1329	<.10	<.10	<.10
		FB	06/02/03	1330	<.10	<.10	<.10
		R	06/25/03	1110	<.10	<.10	<.10
		R	07/08/03	1040	<.10	.18	<.10
		R	07/21/03	1210	1.1	.41	<.10
		FR	07/21/03	1211	.73	.49	<.10
R	08/05/03	1258	<.10	<.10	<.10		
R	08/05/03	1300	.35	.35	.11		
R	09/02/03	1130	.16	.10	<.10		
03374100	White River at Hazelton, Indiana	R	10/15/02	1500	<.10	.60	<.10
		R	11/12/02	1340	<.10	.14	<.10

**78 Concentrations of Glyphosate, Aminomethylphosphonic Acid, and Glufosinate in Water and Soil Samples**

**Table 5.** Analytical results for glyphosate, aminomethylphosphonic acid, and glufosinate in National Water-Quality Assessment (NAWQA) Program surface- and ground-water studies, 2001–06.—Continued

[Location of NAWQA study units shown in figure 4. Sample type: FB, field blank; FR, field replicate; R, regular; LD, laboratory duplicate; --, no data; <, less than; µg/L, micrograms per liter]

Site number	Site location	Sample type	Date of collection (day/month/year)	Collection time (24-hour)	Concentrations				
					Glyphosate (µg/L)	Amino-methylphosphonic acid (µg/L)	Glufosinate (µg/L)		
White River Basin Surface Water (WHM)—Continued									
03374100	White River at Hazelton, Indiana—Continued	R	11/26/02	1430	<0.10	0.11	<0.10		
		R	12/19/02	1410	<.10	.11	<.10		
		R	01/23/03	1340	<.10	.11	<.10		
		R	02/20/03	1400	<.10	<.10	<.10		
		R	03/13/03	1430	<.10	.13	<.10		
		R	04/03/03	1520	<.10	<.10	<.10		
		R	04/17/03	1430	<.10	.11	<.10		
		R	05/01/03	1350	<.10	.19	<.10		
		R	05/22/03	1310	<.10	<.10	<.10		
		R	06/05/03	1350	<.10	.15	<.10		
		R	06/26/03	1430	<.10	.17	<.10		
		R	07/10/03	1330	<.10	.32	<.10		
		R	07/23/03	1358	<.10	<.10	<.10		
		FR	07/23/03	1400	.11	.49	<.10		
		FR	07/23/03	1401	.12	.58	<.10		
		R	08/06/03	1330	<.10	.32	<.10		
		R	08/20/03	1330	<.10	.28	<.10		
		R	09/04/03	1330	<.10	.21	<.10		
		393944084120700	Holes Creek at Huffman Park at Kettering, Ohio	R	10/04/02	1445	<.10	.32	<.10
				R	11/06/02	1330	<.10	<.10	<.10
R	12/18/02			1130	<.10	<.10	<.10		
R	01/23/03			1230	<.10	<.10	<.10		
R	02/13/03			1230	<.10	<.10	<.10		
R	03/11/03			1100	<.10	<.10	<.10		
LD	03/11/03			1100	<.10	<.10	<.10		
R	04/09/03			1230	<.10	<.10	<.10		
R	04/23/03			1130	<.10	<.10	<.10		

**Table 5.** Analytical results for glyphosate, aminomethylphosphonic acid, and glufosinate in National Water-Quality Assessment (NAWQA) Program surface- and ground-water studies, 2001–06.—Continued

[Location of NAWQA study units shown in figure 4. Sample type: FB, field blank; FR, field replicate; R, regular; LD, laboratory duplicate; --, no data; &lt;, less than; µg/L, micrograms per liter]

Site number	Site location	Sample type	Date of collection (day/month/year)	Collection time (24-hour)	Concentrations		
					Glyphosate (µg/L)	Amino-methylphosphonic acid (µg/L)	Glufosinate (µg/L)
White River Basin Surface Water (WHM)—Continued							
393944084120700	Holes Creek at Huffman Park at Kettering, Ohio—Continued	R	05/28/03	1130	0.23	<0.10	<0.10
		R	06/11/03	1100	.67	.25	<.10
		R	06/26/03	1200	<.10	<.10	<.10
		FR	06/26/03	1201	<.10	<.10	<.10
		R	07/10/03	1200	<.10	.19	<.10
		FR	07/10/03	1201	<.10	<.10	<.10
		R	07/31/03	1230	<.10	.14	<.10
		R	08/05/03	1229	<.10	<.10	<.10
		FR	08/05/03	1230	<.10	.27	<.10
		R	08/27/03	1315	1.2	.15	<.10
		R	09/03/03	1130	.36	.24	<.10
		LD	09/03/03	1130	.30	.31	<.10
		R	05/14/03	1100	<.10	.10	<.10
		394340085524601	Sugar Creek at County Road 400 South, New Palestine, Indiana	R	10/09/02	1310	<.10
R	11/05/02			1330	<.10	<.10	<.10
R	11/25/02			1330	<.10	<.10	<.10
R	12/16/02			1100	<.10	<.10	<.10
R	01/16/03			1100	<.10	<.10	<.10
R	02/18/03			1130	<.10	<.10	<.10
R	03/11/03			1200	<.10	.26	<.10
R	04/01/03			1140	<.10	<.10	<.10
R	04/15/03			1130	<.10	<.10	<.10
R	05/06/03			1340	.18	.11	<.10
R	05/06/03			1341	.16	.13	<.10
R	05/21/03			1100	<.10	<.10	<.10
LD	05/21/03			1100	<.10	<.10	<.10

**80 Concentrations of Glyphosate, Aminomethylphosphonic Acid, and Glufosinate in Water and Soil Samples**

**Table 5.** Analytical results for glyphosate, aminomethylphosphonic acid, and glufosinate in National Water-Quality Assessment (NAWQA) Program surface- and ground-water studies, 2001–06.—Continued

[Location of NAWQA study units shown in figure 4. Sample type: FB, field blank; FR, field replicate; R, regular; LD, laboratory duplicate; --, no data; <, less than; µg/L, micrograms per liter]

Site number	Site location	Sample type	Date of collection (day/month/year)	Collection time (24-hour)	Concentrations		
					Glyphosate (µg/L)	Amino-methylphosphonic acid (µg/L)	Glufosinate (µg/L)
White River Basin Surface Water (WHM) —Continued							
394340085524601	Sugar Creek at County Road 400 South, New Palestine, Indiana—Continued	R	06/04/03	1400	<0.10	<0.10	<0.10
		R	06/24/03	1300	<.10	<.10	<.10
		R	07/09/03	1040	.81	.54	<.10
		R	07/22/03	1358	<.10	<.10	<.10
		R	07/22/03	1400	.24	.43	<.10
		R	08/04/03	1320	.13	.22	<.10
		LD	08/04/03	1320	.15	.21	<.10
		R	08/19/03	1150	<.10	.24	<.10
		R	09/03/03	1240	.46	.54	<.10
03353637	Little Buck Creek near Indianapolis, Indianapolis	R	09/02/03	1130	.14	.11	<.10
White River Basin Ground Water (WHG)							
393119086154101	Well TP23	R	09/10/02	1130	<.10	<.10	<.10
		LD	09/10/02	1130	<.10	<.10	<.10
393223085534001	Well TP7	R	08/07/02	1200	<.10	<.10	<.10
393230085375302	Well TP2 reset	R	09/09/02	1500	<.10	<.10	<.10
393405086322001	Well TP20	R	09/10/02	1600	<.10	<.10	<.10
393433085320301	Well TP6	R	08/22/02	1600	<.10	<.10	<.10
		FR	08/22/02	1605	<.10	<.10	<.10
394032085543101	Well TP17	R	08/06/02	1200	<.10	<.10	<.10
		FR	08/06/02	1201	<.10	<.10	<.10
394157085430401	Well TP1	R	08/09/02	1030	<.10	<.10	<.10
394226085275601	Well TP22	R	08/07/02	1600	<.10	<.10	<.10
394516086555601	Well TP15	R	08/13/02	1200	<.10	<.10	<.10
		LD	08/13/02	1200	<.10	<.10	<.10
394849086273001	Well TP21	R	09/03/02	1700	<.10	<.10	<.10
		LD	09/03/02	1700	<.10	<.10	<.10
395159086171501	Well TPREF1	R	09/06/02	1100	<.10	<.10	<.10



**Table 5.** Analytical results for glyphosate, aminomethylphosphonic acid, and glufosinate in National Water-Quality Assessment (NAWQA) Program surface- and ground-water studies, 2001–06.—Continued

[Location of NAWQA study units shown in figure 4. Sample type: FB, field blank; FR, field replicate; R, regular; LD, laboratory duplicate; --, no data; &lt;, less than; µg/L, micrograms per liter]

Site number	Site location	Sample type	Date of collection (day/month/year)	Collection time (24-hour)	Concentrations		
					Glyphosate (µg/L)	Amino-methylphosphonic acid (µg/L)	Glufosinate (µg/L)
White River Basin Ground Water (WHG)—Continued							
395253086314001	Well TP4	R	08/08/02	1305	<0.10	<0.10	<0.10
		R	09/04/02	1030	<.10	<.10	<.10
395633085460801	Well TP5	R	08/19/02	1500	<.10	<.10	<.10
		FR	08/19/02	1501	<.10	<.10	<.10
395656086191601	Well TP25	R	08/21/02	1100	<.10	<.10	<.10
395713085202901	Well TP8	R	08/23/02	1300	<.10	<.10	<.10
		LD	08/23/02	1300	<.10	<.10	<.10
400356085562101	Well TP18	R	08/15/02	1300	<.10	<.10	<.10
400401085044701	Well TP11	R	09/05/02	1630	<.10	<.10	<.10
400713086132801	Well TP3	R	09/04/02	1500	<.10	<.10	<.10
400717085032801	Well TP10 reset	R	09/11/02	1130	<.10	<.10	<.10
400746084551101	Well TP24	R	09/05/02	1300	<.10	<.10	<.10
400836085205901	Well TP9 reset	R	09/11/02	1600	<.10	<.10	<.10
400844086095201	Well TP16	R	09/04/02	1800	<.10	<.10	<.10
401945085321501	Well TP14	R	08/20/02	1600	<.10	<.10	<.10
		LD	08/20/02	1600	<.10	<.10	<.10
401952085460101	Well TP13	R	08/20/02	1200	<.10	<.10	<.10
Willamette Basin Surface Water (WIL)							
14201300	Zollner Creek near Mount Angel, Oregon	R	10/16/02	1220	.59	4.0	<.10
		LD	10/16/02	1220	.65	3.4	<.10
		R	10/16/02	1228	<.10	.28	<.10
		R	10/30/02	1100	.29	1.3	<.10
		LD	10/30/02	1100	.74	1.2	<.10
		R	11/06/02	1110	.25	1.1	<.10
		R	11/20/02	1130	.21	.90	<.10
		R	12/04/02	1200	.14	.95	<.10
		R	12/19/02	1020	<.10	.16	<.10
		LD	12/19/02	1020	<.10	.15	<.10

**82 Concentrations of Glyphosate, Aminomethylphosphonic Acid, and Glufosinate in Water and Soil Samples**

**Table 5.** Analytical results for glyphosate, aminomethylphosphonic acid, and glufosinate in National Water-Quality Assessment (NAWQA) Program surface- and ground-water studies, 2001–06.—Continued

[Location of NAWQA study units shown in figure 4. Sample type: FB, field blank; FR, field replicate; R, regular; LD, laboratory duplicate; --, no data; <, less than; µg/L, micrograms per liter]

Site number	Site location	Sample type	Date of collection (day/month/year)	Collection time (24-hour)	Concentrations		
					Glyphosate (µg/L)	Amino-methylphosphonic acid (µg/L)	Glufosinate (µg/L)
Willamette Basin Surface Water (WIL)—Continued							
14201300	Zollner Creek near Mount Angel, Oregon— Continued	R	01/09/03	1050	<0.10	<0.10	<0.10
		R	02/10/03	1140	.17	.10	<.10
		FR	02/10/03	1141	.12	.14	<.10
		R	03/03/03	1240	.78	.45	<.10
		LD	03/03/03	1240	.77	.41	<.10
		R	04/01/03	1120	.17	.16	<.10
		FB	04/01/03	1129	<.10	<.10	<.10
		R	04/16/03	1420	.86	.26	<.10
		R	04/30/03	1350	.46	.22	<.10
		R	05/14/03	1150	.44	.15	<.10
		R	06/03/03	1120	.21	.52	<.10
		R	06/25/03	1140	.16	1.7	<.10
		R	07/09/03	1210	<.10	.66	<.10
		R	08/13/03	1150	.40	4.5	<.10
R	09/03/03	1320	<.10	1.5	<.10		
Willamette Basin Ground Water (WIG)							
441155123152801	Well 65	R	07/08/02	1700	<.10	<.10	<.10
441556123092001	Well 63	R	07/09/02	1400	<.10	<.10	<.10
441719123033101	Well 64	R	07/10/02	1500	<.10	<.10	<.10
442208123080501	Well 60	R	08/20/02	1700	<.10	<.10	<.10
442252122592201	Well 61	R	07/10/02	1700	<.10	<.10	<.10
442642123091201	Well 58	R	08/20/02	1400	<.10	<.10	<.10
443226123121701	Well 54	R	07/08/02	1600	<.10	<.10	<.10
443437123133901	Well 49	R	07/08/02	1300	<.10	<.10	<.10
		FR	07/08/02	1301	<.10	<.10	<.10
		LD	07/08/02	1301	<.10	<.10	<.10
443646122552701	Well 51	R	06/28/02	1300	<.10	<.10	<.10
		FR	06/28/02	1308	<.10	<.10	<.10
444055123035401	Well 46	R	07/11/02	1700	<.10	<.10	<.10

**Table 5.** Analytical results for glyphosate, aminomethylphosphonic acid, and glufosinate in National Water-Quality Assessment (NAWQA) Program surface- and ground-water studies, 2001–06.—Continued

[Location of NAWQA study units shown in figure 4. Sample type: FB, field blank; FR, field replicate; R, regular; LD, laboratory duplicate; --, no data; &lt;, less than; µg/L, micrograms per liter]

Site number	Site location	Sample type	Date of collection (day/month/year)	Collection time (24-hour)	Concentrations		
					Glyphosate (µg/L)	Amino-methylphosphonic acid (µg/L)	Glufosinate (µg/L)
Willamette Basin Ground Water (WIG)—Continued							
444055123035401	Well 46	LD	07/11/02	1700	<0.10	<0.10	<0.10
444128122520901	Well 47	R	06/27/02	1300	<.10	<.10	<.10
444213122481301	Well 48	R	07/11/02	1300	<.10	<.10	<.10
444807123140101	Well 41	R	08/21/02	1600	<.10	<.10	<.10
444915122493801	Well 44	R	06/27/02	1600	<.10	<.10	<.10
444955123105901	Well 40	R	08/21/02	1300	<.10	<.10	<.10
450122122470301	Well 35	R	08/22/02	1700	<.10	<.10	<.10
		FR	08/22/02	1708	<.10	<.10	<.10
450745123015801	Well 29	R	07/12/02	1600	<.10	<.10	<.10
450808122440101	Well 31	R	06/25/02	1200	<.10	<.10	<.10
450910123113701	Well 28	R	07/12/02	1300	<.10	<.10	<.10
450921122361201	Well 32	R	06/24/02	1600	<.10	<.10	<.10
		FR	06/24/02	1601	<.10	<.10	<.10
451048122420501	Well 25	R	06/25/02	1700	<.10	<.10	<.10
451250122364001	Well 26	R	06/24/02	1300	<.10	<.10	<.10
451340123043401	Well 22	R	08/22/02	1300	<.10	<.10	<.10
451708122204801	Well 20	R	06/10/02	1300	<.10	<.10	<.10
		LD	06/10/02	1300	<.10	<.10	<.10
451711122563401	Well 16	R	06/11/02	1200	<.10	<.10	<.10
		LD	06/11/02	1200	<.10	<.10	<.10
452222122145301	Well 15	R	08/19/02	1700	<.10	<.10	<.10
452335122320801	Well 12	R	08/19/02	1300	<.10	<.10	<.10
452842122305801	Well 08	R	05/28/02	1500	<.10	<.10	<.10
		LD	05/28/02	1500	<.10	<.10	<.10
453417122572901	Well 02	R	06/26/02	1300	<.10	<.10	<.10

**84 Concentrations of Glyphosate, Aminomethylphosphonic Acid, and Glufosinate in Water and Soil Samples**

**Table 6.** Analytical results for glyphosate, aminomethylphosphonic acid, and glufosinate in Toxic Substances Hydrology Program studies, 2001–06.

[Sample type: FB, field blank; FR, field replicate; R, regular; LD, laboratory duplicate; --, no data; <, less than; µg/L, micrograms per liter]

Site number	Site location	Sample type	Date of collection (month/day/year)	Collection time (24-hour)	Concentrations		
					Glyphosate (µg/L)	Amino-methylphosphonic acid (µg/L)	Glufosinate (µg/L)
Reconnaissance data for glyphosate in nine Midwestern States							
Illinois							
03378000	Bonpas Creek at Browns	R	06/06/02	1030	<0.10	0.33	<0.10
		FR	06/06/02	1031	<.10	.26	<.10
		R	06/25/02	1300	4.5	.91	<.10
		R	09/25/02	1015	.44	.55	<.10
03381495	Little Wabash River at Main Street at Carmi	R	06/06/02	1230	<.10	<.10	<.10
		R	06/25/02	1430	1.4	.83	<.10
		FR	06/25/02	1431	2.3	.91	<.10
		R	09/25/02	0830	.34	.80	<.10
05439500	South Branch Kishwaukee River near Fairdale	R	05/14/02	1600	.33	.19	<.10
		R	08/02/02	1430	<.10	.26	<.10
		R	09/25/02	0930	<.10	.28	<.10
05526000	Iroquois River near Chebanse	R	06/06/02	0925	<.10	<.10	<.10
		R	06/28/02	0910	.19	.29	<.10
		LD	06/28/02	0910	.25	.18	<.10
		R	09/25/02	1345	<.10	.21	<.10
05540500	Dupage River at Shorewood	R	05/15/02	1030	<.10	.10	<.10
		R	06/27/02	1240	.34	.44	<.10
		R	09/25/02	1145	<.10	.89	<.10
05569500	Spoon River at London Mills	R	05/14/02	1035	.19	.23	<.10
		R	07/30/02	1000	<.10	.24	<.10
		R	09/24/02	0905	<.10	.10	<.10
05576500	Sangamon River at Riverton	R	05/29/02	1015	.36	.16	<.10
		R	07/17/02	1515	<.10	.61	<.10
		LD	07/17/02	1515	<.10	.74	<.10
		R	09/25/02	0845	<.10	1.8	<.10
		LD	09/25/02	0845	<.10	1.7	<.10
05587000	Macoupin Creek near Kane	R	06/06/02	1000	<.10	<.10	<.10

**Table 6.** Analytical results for glyphosate, aminomethylphosphonic acid, and glufosinate in Toxic Substances Hydrology Program studies, 2001–06.—Continued

[Sample type: FB, field blank; FR, field replicate; R, regular; LD, laboratory duplicate; --, no data; &lt;, less than; µg/L, micrograms per liter]

Site number	Site location	Sample type	Date of collection (month/day/year)	Collection time (24-hour)	Concentrations		
					Glyphosate (µg/L)	Amino-methylphosphonic acid (µg/L)	Glufosinate (µg/L)
Reconnaissance data for glyphosate in nine Midwestern States—Continued							
Illinois—Continued							
05587000	Macoupin Creek near Kane—Continued	R	07/29/02	1115	0.13	0.39	<0.10
		R	09/24/02	1120	<.10	.51	<.10
05592100	Kaskaskia River near Cowden	R	05/29/02	0930	.20	.17	<.10
		R	06/25/02	1200	<.10	.27	<.10
		R	09/25/02	1330	<.10	.21	<.10
05594000	Shoal Creek near Breese	R	06/06/02	1330	<.10	.22	<.10
		R	07/29/02	1410	.17	.22	<.10
		R	09/24/02	1420	.14	.23	<.10
Indiana							
03275000	Whitewater River near Alpine	FB	06/14/02	1145	<.10	<.10	<.10
		R	06/14/02	1230	1.0	.43	<.10
		R	06/28/02	1205	.34	.28	<.10
		R	10/29/02	1715	<.10	.17	<.10
03302800	Blue River at Fredericksburg	R	06/06/02	1130	.34	.28	<.10
		R	08/21/02	1130	<.10	<.10	<.10
		R	09/27/02	1200	.26	.36	<.10
03328500	Eel River near Logansport	R	06/05/02	1200	<.10	<.10	<.10
		R	07/30/02	1130	<.10	.18	<.10
		R	07/31/02	1250	<.10	.31	<.10
		R	12/10/02	1000	<.10	<.10	<.10
03333450	Wildcat Creek near Jerome	R	05/30/02	1250	.16	.12	<.10
		R	08/19/02	1110	<.10	.13	<.10
		R	09/20/02	1316	<.10	.10	<.10
		LD	09/20/02	1316	<.10	.10	<.10
03335000	Wildcat Creek near Lafayette	R	05/30/02	1630	.19	.23	<.10
		R	07/23/02	1000	<.10	.36	<.10
		R	11/12/02	1215	<.10	.79	<.10

86 Concentrations of Glyphosate, Aminomethylphosphonic Acid, and Glufosinate in Water and Soil Samples

**Table 6.** Analytical results for glyphosate, aminomethylphosphonic acid, and glufosinate in Toxic Substances Hydrology Program studies, 2001–06.—Continued

[Sample type: FB, field blank; FR, field replicate; R, regular; LD, laboratory duplicate; --, no data; <, less than; µg/L, micrograms per liter]

Site number	Site location	Sample type	Date of collection (month/day/year)	Collection time (24-hour)	Concentrations		
					Glyphosate (µg/L)	Amino-methylphosphonic acid (µg/L)	Glufosinate (µg/L)
Reconnaissance data for glyphosate in nine Midwestern States—Continued							
Indiana—Continued							
03362500	Sugar Creek near Edinburgh	R	06/07/02	1345	0.45	0.34	<0.10
		R	06/26/02	1020	1.5	.38	<.10
		R	06/26/02	1120	1.0	.51	<.10
		FR	06/26/02	1121	.58	.33	<.10
		R	10/26/02	1340	.30	.62	<.10
03371500	East Fork White River near Bedford	R	06/06/02	1600	.23	.22	<.10
		R	07/23/02	1605	<.10	.37	<.10
		LD	07/23/02	1605	<.10	.42	<.10
		R	10/01/02	1140	.13	.34	<.10
		FR	10/01/02	1141	.20	.33	<.10
Iowa							
05411850	Turkey River near Eldorado	R	05/14/02	1400	<.10	<.10	<.10
		FR	05/14/02	1405	<.10	<.10	<.10
		R	06/24/02	0950	<.10	<.10	<.10
		R	10/29/02	1300	<.10	<.10	<.10
05421000	Wapsipinicon River at Independence	R	05/14/02	1100	<.10	<.10	<.10
		R	06/24/02	1245	<.10	<.10	<.10
		R	10/29/2002	0930	<.10	<.10	<.10
05455100	Old Mans Creek near Iowa City	R	05/13/02	1100	<.10	<.10	<.10
		R	06/27/02	0955	.46	.26	<.10
		R	10/30/02	1140	<.10	.13	<.10
05472500	North Skunk River near Sigourney	R	05/13/02	1630	<.10	<.10	<.10
		R	07/08/02	1015	<.10	.18	<.10
		R	10/29/2002	1435	<.10	<.10	<.10
05474000	Skunk River at Augusta	R	05/13/02	1230	<.10	<.10	<.10
		R	06/27/02	1235	.36	.26	<.10
		R	10/29/2002	1015	<.10	.11	<.10

**Table 6.** Analytical results for glyphosate, aminomethylphosphonic acid, and glufosinate in Toxic Substances Hydrology Program studies, 2001–06.—Continued

[Sample type: FB, field blank; FR, field replicate; R, regular; LD, laboratory duplicate; --, no data; &lt;, less than; µg/L, micrograms per liter]

Site number	Site location	Sample type	Date of collection (month/day/year)	Collection time (24-hour)	Concentrations		
					Glyphosate (µg/L)	Amino-methylphosphonic acid (µg/L)	Glufosinate (µg/L)
Reconnaissance data for glyphosate in nine Midwestern States—Continued							
Iowa—Continued							
05480500	Des Moines River at Fort Dodge	R	05/17/02	1230	<0.10	<0.10	<0.10
		R	06/13/02	0730	<.10	.19	<.10
		R	10/30/02	1500	<.10	.10	<.10
05484500	Raccoon River at Van Meter	R	05/17/02	0930	<.10	<.10	<.10
		R	06/12/02	1630	<.10	.17	<.10
		FR	06/12/02	1635	.27	.25	<.10
		R	10/30/02	1200	<.10	<.10	<.10
06606600	Little Sioux River at Correctionville	R	05/17/02	1615	<.10	<.10	<.10
		R	06/11/02	1100	<.10	.27	<.10
		R	10/31/02	0930	<.10	.13	<.10
06607200	Maple River at Mapleton	R	05/29/02	1200	<.10	<.10	<.10
		LD	05/29/02	1200	<.10	<.10	<.10
		R	06/11/02	1330	.36	.64	.14
		R	10/31/02	1200	<.10	.42	<.10
06609500	Boyer River at Logan	R	05/29/02	0945	<.10	.33	<.10
		R	06/11/02	1545	.32	.45	<.10
		R	11/01/02	0900	.12	.20	<.10
Kansas							
06885500	Black Vermillion near Frankfort	R	05/07/02	1145	<.10	<.10	<.10
		LD	05/07/02	1145	<.10	<.10	<.10
		R	05/07/02	1150	<.10	<.10	<.10
		R	08/17/02	1235	<.10	.11	<.10
		R	10/03/02	1135	8.7	3.6	<.10
06890100	Delaware River near Muscotah	R	05/07/02	1315	<.10	<.10	<.10
		R	06/27/02	0950	1.7	.41	.26
		LD	06/27/02	0950	1.6	.63	.27
		R	09/19/02	1110	<.10	<.10	<.10

**88 Concentrations of Glyphosate, Aminomethylphosphonic Acid, and Glufosinate in Water and Soil Samples**
**Table 6.** Analytical results for glyphosate, aminomethylphosphonic acid, and glufosinate in Toxic Substances Hydrology Program studies, 2001–06.—Continued

[Sample type: FB, field blank; FR, field replicate; R, regular; LD, laboratory duplicate; --, no data; &lt;, less than; µg/L, micrograms per liter]

Site number	Site location	Sample type	Date of collection (month/day/year)	Collection time (24-hour)	Concentrations		
					Glyphosate (µg/L)	Amino-methylphosphonic acid (µg/L)	Glufosinate (µg/L)
Reconnaissance data for glyphosate in nine Midwestern States—Continued							
Minnesota							
05317000	Cottonwood River near New Ulm	R	05/30/02	1350	<0.10	<0.10	<0.10
		R	06/25/02	1620	.77	.42	<.10
		R	10/04/02	0935	<.10	<.10	<.10
05320270	Little Cobb River near Beauford	R	06/06/02	1315	<.10	<.10	<.10
		R	06/27/02	1045	.30	.15	<.10
		R	10/02/02	1105	<.10	<.10	<.10
05476000	Des Moines River at Jackson	R	05/31/02	0720	<.10	<.10	<.10
		R	06/25/02	1215	<.10	<.10	<.10
		FR	06/25/02	1220	<.10	<.10	<.10
		R	10/08/02	1145	<.10	<.10	<.10
Missouri							
06817700	Nodaway River near Graham	R	05/14/02	1230	<.10	<.10	<.10
		LD	05/14/02	1230	<.10	<.10	<.10
		R	07/29/02	1200	<.10	.36	<.10
		R	10/04/02	1215	<.10	.25	<.10
Nebraska							
06804000	Wahoo Creek at Ithaca	R	05/13/02	1330	<.10	.19	<.10
		R	06/12/02	0840	<.10	.38	<.10
		R	10/04/02	0930	<.10	.65	<.10
06815000	Big Nemaha River at Falls City	R	05/06/02	1400	<.10	<.10	<.10
		LD	05/06/02	1400	<.10	<.10	<.10
		R	07/12/02	1400	<.10	.19	<.10
		R	10/04/02	1520	<.10	.34	<.10
06880800	West Fork Big Blue River near Dorchester	R	05/07/02	0900	.11	1.3	<.10
		R	07/26/02	1100	.17	2.0	<.10
		R	10/04/02	0920	.21	1.3	<.10
06882000	Big Blue River at Barneston	R	05/07/02	1530	.31	1.3	<.10
		R	06/15/02	0900	.21	1.8	<.10



**Table 6.** Analytical results for glyphosate, aminomethylphosphonic acid, and glufosinate in Toxic Substances Hydrology Program studies, 2001–06.—Continued

[Sample type: FB, field blank; FR, field replicate; R, regular; LD, laboratory duplicate; --, no data; &lt;, less than; µg/L, micrograms per liter]

Site number	Site location	Sample type	Date of collection (month/day/year)	Collection time (24-hour)	Concentrations		
					Glyphosate (µg/L)	Amino-methylphosphonic acid (µg/L)	Glufosinate (µg/L)
Reconnaissance data for glyphosate in nine Midwestern States—Continued							
Nebraska—Continued							
06882000	Big Blue River at Barneston—Continued	R	10/04/02	1300	0.54	1.3	<0.10
		R	10/04/02	1310	.36	1.2	<.10
		R	10/04/02	1310	.46	1.5	<.10
06884000	Little Blue River near Fairbury	R	05/07/02	1230	<.10	.42	<.10
		R	06/13/02	0930	.52	.64	<.10
		R	10/02/02	2000	.33	.71	<.10
Ohio							
03157000	Clear Creek near Rockbridge	R	06/05/02	1115	.27	.23	<.10
		R	07/29/02	1200	<.10	<.10	<.10
		R	10/26/02	1300	<.10	<.10	<.10
03219500	Scioto River near Prospect	R	06/04/02	1230	.58	.55	<.10
		LD	06/04/02	1230	.59	.51	<.10
		FR	06/04/02	1231	.65	.67	<.10
		R	07/31/02	0930	.48	.82	<.10
		R	10/01/02	1030	.28	.47	<.10
03223000	Olentangy River at Claridon	R	06/04/02	1100	.24	.27	<.10
		R	07/31/02	1100	<.10	.34	<.10
		R	10/26/02	1500	<.10	.13	<.10
03230500	Big Darby Creek at Darbyville	R	06/03/02	1200	.60	.31	<.10
		R	08/01/02	0930	<.10	.25	<.10
		LD	08/01/02	0930	<.10	.32	<.10
		R	10/01/02	1105	.25	.34	<.10
03234500	Scioto River at Higby	R	06/04/02	1015	.24	.36	<.10
		R	07/30/02	1100	.23	.94	<.10
		R	10/28/02	1000	.28	.89	<.10
		LD	10/28/02	1000	.29	.99	<.10
03240000	Little Miami River near Oldtown	R	06/05/02	1320	<.10	<.10	<.10

90 Concentrations of Glyphosate, Aminomethylphosphonic Acid, and Glufosinate in Water and Soil Samples

**Table 6.** Analytical results for glyphosate, aminomethylphosphonic acid, and glufosinate in Toxic Substances Hydrology Program studies, 2001–06.—Continued

[Sample type: FB, field blank; FR, field replicate; R, regular; LD, laboratory duplicate; --, no data; <, less than; µg/L, micrograms per liter]

Site number	Site location	Sample type	Date of collection (month/day/year)	Collection time (24-hour)	Concentrations		
					Glyphosate (µg/L)	Amino-methylphosphonic acid (µg/L)	Glufosinate (µg/L)
Reconnaissance data for glyphosate in nine Midwestern States—Continued							
Ohio—Continued							
03240000	Little Miami River near Oldtown—Continued	R	07/17/02	1200	<0.10	<0.10	<0.10
		R	10/27/2002	0700	.45	.17	<.10
032667900	Mad River at St. Paris Pike at Eagle City	R	06/05/02	1130	<.10	.11	<.10
		R	07/17/02	1030	<.10	<.10	<.10
		FR	07/17/02	1031	<.10	<.10	<.10
		R	10/27/2002	0800	<.10	<.10	<.10
04185000	Tiffin River at Stryker	R	05/29/02	1700	.16	<.10	<.10
		R	07/23/02	1530	<.10	.26	<.10
		R	11/06/02	1200	<.10	<.10	<.10
		FR	11/06/02	1201	<.10	<.10	<.10
04186500	Auglaize River near Fort Jennings	R	05/28/02	1115	<.10	.28	<.10
		R	07/23/02	1100	.17	.58	<.10
		R	10/30/02	1300	<.10	.30	<.10
Wisconsin							
04087240	Root River at Racine	R	06/03/02	1350	<.10	.10	<.10
		FR	06/03/02	1351	<.10	.18	<.10
		R	07/26/02	1130	<.10	.29	<.10
		LD	07/26/02	1130	<.10	.23	<.10
		R	09/03/02	1110	.12	.35	<.10
05340500	St. Croix River at St Croix Falls	R	06/20/02	1130	<.10	<.10	<.10
		R	06/27/02	1130	<.10	<.10	<.10
		LD	06/27/02	1130	<.10	<.10	<.10
		R	09/03/02	1520	<.10	<.10	<.10
		LD	09/03/02	1520	<.10	<.10	<.10
05407000	Wisconsin River at Muscoda	R	05/28/02	1330	<.10	<.10	<.10
		R	06/27/02	1215	<.10	<.10	<.10
		R	09/23/02	1130	<.10	<.10	<.10

**Table 6.** Analytical results for glyphosate, aminomethylphosphonic acid, and glufosinate in Toxic Substances Hydrology Program studies, 2001–06.—Continued

[Sample type: FB, field blank; FR, field replicate; R, regular; LD, laboratory duplicate; --, no data; &lt;, less than; µg/L, micrograms per liter]

Site number	Site location	Sample type	Date of collection (month/day/year)	Collection time (24-hour)	Concentrations		
					Glyphosate (µg/L)	Amino-methylphosphonic acid (µg/L)	Glufosinate (µg/L)
Reconnaissance data for glyphosate in nine Midwestern States—Continued							
Wisconsin—Continued							
05430500	Rock River at Afton	R	06/04/02	1300	<0.10	0.16	<0.10
		R	07/11/02	1229	<.10	.33	<.10
		FB	07/11/02	1230	<.10	<.10	<.10
		R	09/20/02	0945	<.10	.41	<.10
Mississippi River glyphosate study, 2001–03							
07374000	Mississippi River at Baton Rouge, Louisiana	R	10/31/01	1300	<.10	.18	<.10
		R	11/14/01	1300	<.10	.18	<.10
		R	11/28/01	1200	<.10	.23	<.10
		R	12/10/01	1300	<.10	.14	<.10
		LD	12/10/01	1300	<.10	.11	<.10
		R	01/03/02	1140	<.10	.15	<.10
		LD	01/03/02	1140	<.10	.10	<.10
		R	01/17/02	1100	<.10	.12	<.10
		LD	01/17/02	1100	<.10	.13	<.10
		R	02/04/02	1300	<.10	.15	<.10
		LD	02/04/02	1300	<.10	.14	<.10
		R	02/28/02	1230	<.10	.15	<.10
		LD	02/28/02	1230	<.10	.18	<.10
		R	03/11/02	1300	<.10	.24	<.10
		R	03/28/02	1300	<.10	.38	<.10
		R	04/12/02	1115	<.10	<.10	<.10
		R	05/02/02	1300	<.10	<.10	<.10
		R	05/15/02	1300	<.10	.12	<.10
		R	06/05/02	1200	<.10	.16	<.10
		R	06/11/02	1030	<.10	.16	<.10
R	07/02/02	1130	<.10	.17	<.10		
R	07/25/02	1400	<.10	.21	<.10		
R	08/21/02	1100	<.10	.21	<.10		
R	09/17/02	1400	<.10	.27	<.10		
LD	09/17/02	1400	<.10	.22	<.10		

92 Concentrations of Glyphosate, Aminomethylphosphonic Acid, and Glufosinate in Water and Soil Samples

**Table 6.** Analytical results for glyphosate, aminomethylphosphonic acid, and glufosinate in Toxic Substances Hydrology Program studies, 2001–06.—Continued

[Sample type: FB, field blank; FR, field replicate; R, regular; LD, laboratory duplicate; --, no data; <, less than; µg/L, micrograms per liter]

Site number	Site location	Sample type	Date of collection (month/day/year)	Collection time (24-hour)	Concentrations		
					Glyphosate (µg/L)	Amino-methylphosphonic acid (µg/L)	Glufosinate (µg/L)
Mississippi River glyphosate study, 2001–03—Continued							
07374000	Mississippi River at Baton Rouge, Louisiana— Continued	R	10/16/02	1500	<0.10	0.24	<0.10
		R	11/19/02	1400	<.10	.12	<.10
		LD	11/19/02	1400	<.10	.13	<.10
		R	12/18/02	1330	<.10	.10	<.10
		R	01/15/03	1400	<.10	<.10	<.10
		R	02/20/03	1330	<.10	.12	<.10
		LD	02/20/03	1330	<.10	.17	<.10
		R	03/13/03	1200	<.10	.11	<.10
		R	04/03/03	1100	<.10	.20	<.10
		R	05/19/03	1330	<.10	.18	<.10
		LD	05/19/03	1330	<.10	.20	<.10
		R	06/03/03	1230	<.10	.19	<.10
		R	06/19/03	0830	<.10	.20	<.10
		R	07/03/03	1330	<.10	<.10	<.10
		R	07/15/03	1230	<.10	.31	<.10
		R	07/30/03	1130	<.10	.31	<.10
		R	09/17/03	1400	<.10	.30	<.10
		R	09/29/03	1300	<.10	.33	<.10
		R	10/15/03	1430	<.10	.27	<.10
		LD	10/15/03	1430	<.10	.31	<.10
Sensitive environments study, 2004–06							
District of Columbia							
C&O1	Carderock Vernal Pool	R	03/08/06	1230	<.02	<.02	<.02
		LD	03/08/06	1230	<.02	<.02	<.02
		R	04/05/06	1245	<.02	<.02	<.02
C&O2	Lock 7 Vernal Pool	R	03/08/06	1300	<.02	<.02	<.02
		R	04/05/06	1330	<.02	<.02	<.02
C&O3	C&O Canal at Lock 7	R	03/08/06	1330	<.02	<.02	<.02
		R	04/05/06	1345	.06	<.02	<.02

**Table 6.** Analytical results for glyphosate, aminomethylphosphonic acid, and glufosinate in Toxic Substances Hydrology Program studies, 2001–06.—Continued

[Sample type: FB, field blank; FR, field replicate; R, regular; LD, laboratory duplicate; --, no data; &lt;, less than; µg/L, micrograms per liter]

Site number	Site location	Sample type	Date of collection (month/day/year)	Collection time (24-hour)	Concentrations		
					Glyphosate (µg/L)	Amino-methylphosphonic acid (µg/L)	Glufosinate (µg/L)
Sensitive environments study, 2004–06—Continued							
District of Columbia—Continued							
C&O3	C&O Canal at Lock 7—Continued	FR	04/05/06	1450	<0.02	<0.02	<0.02
RC1	Weir Pond at RCNP	R	03/14/05	1000	<.02	<.02	<.02
		R	03/24/05	0900	<.02	<.02	<.02
		R	03/08/06	1615	<.02	<.02	<.02
		R	04/05/06	1500	<.02	<.02	<.02
RC3	Riley Spring Pond at RCNP	R	03/14/05	1100	<.02	<.02	<.02
		LD	03/14/05	1100	<.02	<.02	<.02
		R	03/24/05	1030	328	15	<.02
		FR	03/24/05	1031	301	41	<.02
RC4	Rock Creek at Riley Spring Pond	R	03/14/05	1200	1.1	.21	<.02
		R	03/24/05	1100	.60	<.02	<.02
		R	03/08/06	1530	<.02	.09	<.02
		R	04/05/06	1520	.12	.12	<.02
Iowa							
DS1	Fieldside Wetlands at DNWR	R	04/13/05	1115	<.02	<.02	<.02
		LD	04/13/05	1115	<.02	<.02	<.02
		R	06/08/05	1200	12	3.2	<.02
DS2	Rands Ditch at DNWR	R	04/13/05	1130	.05	.09	<.02
		R	06/08/05	1110	.12	.18	<.02
		LD	06/08/05	1110	.10	.17	<.02
		R	05/24/06	0840	1.5	2.9	<.02
		LD	05/24/06	0840	1.4	2.9	<.02
DS3	Browns Ditch at DNWR	R	04/13/05	1145	<.02	1.0	<.02
		R	06/08/05	1225	.56	.75	<.02
		R	05/24/06	0920	<.02	<.02	<.02
DS4	Browns Pond at DNWR	R	04/13/05	1200	.05	<.02	<.02
		R	06/08/05	1230	.09	<.02	<.02

94 Concentrations of Glyphosate, Aminomethylphosphonic Acid, and Glufosinate in Water and Soil Samples

**Table 6.** Analytical results for glyphosate, aminomethylphosphonic acid, and glufosinate in Toxic Substances Hydrology Program studies, 2001–06.—Continued

[Sample type: FB, field blank; FR, field replicate; R, regular; LD, laboratory duplicate; --, no data; <, less than; µg/L, micrograms per liter]

Site number	Site location	Sample type	Date of collection (month/day/year)	Collection time (24-hour)	Concentrations		
					Glyphosate (µg/L)	Amino-methylphosphonic acid (µg/L)	Glufosinate (µg/L)
Sensitive environments study, 2004–06—Continued							
Iowa—Continued							
DS5	East Bend Pond at DNWR	R	06/08/05	1145	<0.02	<0.02	<0.02
Michigan							
WYMO-10	Lake RSL near Saginaw	R	08/12/05	1000	.04	<.02	<.02
		LD	08/12/05	1000	<.02	<.02	<.02
Nebraska							
06880000	Lincoln Creek near Seward	R	07/09/04	1310	1.4	1.5	<.02
		R	08/05/04	1100	.26	.97	<.02
TH1080	Creek at Field 413	R	07/09/04	1125	21	5.8	<.02
		R	08/05/04	1430	<.02	.03	<.02
		R	08/06/04	1100	<.02	.02	<.02
TH1090	Pond at Field 413	R	07/09/04	1200	.08	.21	<.02
		R	08/05/04	1400	1.2	1.2	<.02
WYMI112	Frenchman Creek near Champion	R	08/05/04	1045	<.02	<.02	<.02
WYMI113	Pond near Champion	R	08/12/04	0845	1.1	.02	<.02
WYMI114	Rock Creek near Parks	R	08/12/04	0857	<.02	<.02	<.02
WYMI19	Pond near Republican River near Stratton	R	07/21/04	2130	.25	.12	<.02
WYMI33	Pond near Republican River near Franklin	R	07/22/04	2040	<.02	.08	<.02
WYMI46	Elkhorn River near Nickerson	R	07/25/04	2015	.16	.51	<.02
New York							
WYMO-09	Lake Champlain near Plattsburg	R	08/10/05	0800	.07	.29	<.02
South Dakota							
WYMI104	North Fork Rapid Creek near Silver City	R	08/04/04	1945	<.02	<.02	<.02
		LD	08/04/04	1945	<.02	<.02	<.02
WYMI67	North Bend Creek	R	07/29/04	1416	<.02	<.02	<.02
WYMI83	Big Sioux River near Egan	R	07/31/04	2149	<.02	<.02	<.02
WYMI91	Buffalo Lakes near Lake City	R	08/01/04	1005	<.02	<.02	<.02
WYMI98	Dry House Creek near Buffalo	R	08/02/04	1401	<.02	.04	<.02

**Table 6.** Analytical results for glyphosate, aminomethylphosphonic acid, and glufosinate in Toxic Substances Hydrology Program studies, 2001–06.—Continued

[Sample type: FB, field blank; FR, field replicate; R, regular; LD, laboratory duplicate; --, no data; &lt;, less than; µg/L, micrograms per liter]

Site number	Site location	Sample type	Date of collection (month/day/year)	Collection time (24-hour)	Concentrations				
					Glyphosate (µg/L)	Amino-methylphosphonic acid (µg/L)	Glufosinate (µg/L)		
Sensitive environments study, 2004–06—Continued									
Vermont									
WYMO-06	Lake Champlain near Swanton	R	08/10/05	1200	0.04	<0.02	<0.02		
WYMO-08	Lake Champlain near Addison	R	08/10/05	1600	<.02	.06	<.02		
		LD	08/10/05	1600	<.02	<.02	<.02		
Wyoming									
TH1010	Pond at Dugway Campground, Wyoming	R	07/13/04	0800	.02	.27	<.02		
		R	07/18/04	0748	<.02	<.02	<.02		
		R	08/16/04	1115	<.02	<.02	<.02		
		R	04/19/05	0745	<.02	<.02	<.02		
		LD	04/19/05	0745	<.02	<.02	<.02		
		R	05/05/05	1525	<.02	<.02	<.02		
		LD	05/05/05	1525	.02	<.02	<.02		
		R	05/24/05	0950	.06	<.02	<.02		
		R	05/31/05	1545	.02	<.02	<.02		
		R	07/15/05	0815	<.02	<.02	<.02		
		R	07/27/05	0800	.08	.06	<.02		
		R	08/09/05	0800	.06	.04	<.02		
		R	08/15/05	0945	<.02	<.02	<.02		
		R	04/21/06	0915	<.02	<.02	<.02		
		R	06/26/06	1020	<.02	<.02	<.02		
		TH1020	North Platte above Seminoe Reservation	R	07/13/04	0745	.04	.66	<.02
				R	07/18/04	0925	<.02	<.02	<.02
R	08/16/04			1330	<.02	<.02	.05		
R	04/19/05			0830	<.02	<.02	<.02		
R	05/05/05			1505	<.02	<.02	<.02		
R	05/24/05			1040	<.02	<.02	<.02		
R	05/31/05			1530	<.02	<.02	<.02		
R	07/15/05			0745	<.02	<.02	<.02		
R	08/09/05			1000	.07	.05	<.02		
R	08/15/05			1100	<.02	<.02	<.02		

96 Concentrations of Glyphosate, Aminomethylphosphonic Acid, and Glufosinate in Water and Soil Samples

**Table 6.** Analytical results for glyphosate, aminomethylphosphonic acid, and glufosinate in Toxic Substances Hydrology Program studies, 2001–06.—Continued

[Sample type: FB, field blank; FR, field replicate; R, regular; LD, laboratory duplicate; --, no data; <, less than; µg/L, micrograms per liter]

Site number	Site location	Sample type	Date of collection (month/day/year)	Collection time (24-hour)	Concentrations		
					Glyphosate (µg/L)	Amino-methylphosphonic acid (µg/L)	Glufosinate (µg/L)
Sensitive environments study, 2004–06—Continued							
Wyoming—Continued							
TH1020	North Platte above Seminole Reservation—Continued	R	04/21/06	0930	<0.02	<0.02	<0.02
		R	06/26/06	1000	<.02	<.02	<.02
Leary Weber Ditch Basin, Indiana (ground water)							
395023085492802	ACTTR1–1–B piezometer at Mohawk	R	06/29/04	1015	<.02	.04	<.02
395023085492804	ACTTR1–1–D piezometer at Mohawk	FR	06/29/04	1045	<.02	.04	<.02
		R	10/25/04	1230	.05	.10	<.02
395023085492810	ACTTR1–1–2 piezometer at Mohawk	R	06/28/04	1600	<.02	.07	<.02
		R	10/25/04	1300	.12	.22	<.02
395023085492811	ACTTR1–1–2–C piezometer at Mohawk	R	06/28/04	1645	<.02	.05	<.02
395023085492812	ACTTR1–1–2–D piezometer at Mohawk	R	10/25/04	1330	.17	.22	<.02
395023085492814	ACTTR1–1–3–B piezometer at Mohawk	R	06/29/04	1400	<.02	.08	<.02
		R	10/25/04	1430	.27	.33	<.02
395023085492816	ACTTR1–1–3–D piezometer at Mohawk	R	06/29/04	1230	<.02	.08	<.02
		R	10/25/04	1500	.12	.17	<.02
395023085492822	ACTTR1–1–4–A piezometer at Mohawk	R	06/28/04	1230	<.02	.08	<.02
		R	10/25/04	1600	.02	.10	<.02
395023085492824	ACTTR1–1–4–C piezometer at Mohawk	R	06/28/04	1500	<.02	.07	<.02
		R	10/25/04	1200	<.02	.35	<.02
		R	10/25/04	1630	<.02	<.02	<.02
		FR	10/25/04	1631	<.02	<.02	<.02
395023085492840	ACTTR1–3–1–B piezometer at Mohawk	R	06/29/04	1530	<.02	.04	<.02
		R	10/22/04	1300	<.02	<.02	<.02
395023085492842	ACTTR1–3–1–D piezometer at Mohawk	R	06/29/04	1615	<.02	.06	<.02
		R	10/22/04	1330	<.02	<.02	<.02
395023085492844	ACTTR1–3–2–B piezometer at Mohawk	R	06/29/04	1745	<.02	.07	<.02
		R	06/30/04	1015	<.02	.06	<.02
		R	10/22/04	1100	<.02	<.02	<.02
		R	10/22/04	1400	<.02	.15	<.02



**Table 6.** Analytical results for glyphosate, aminomethylphosphonic acid, and glufosinate in Toxic Substances Hydrology Program studies, 2001–06.—Continued

[Sample type: FB, field blank; FR, field replicate; R, regular; LD, laboratory duplicate; --, no data; &lt;, less than; µg/L, micrograms per liter]

Site number	Site location	Sample type	Date of collection (month/day/year)	Collection time (24-hour)	Concentrations		
					Glyphosate (µg/L)	Amino-methylphosphonic acid (µg/L)	Glufosinate (µg/L)
Sensitive environments study, 2004–06—Continued							
Leary Weber Ditch Basin, Indiana (ground water)—Continued							
395023085492846	ACTTR1–3–2–D piezometer at Mohawk	R	06/29/04	1830	<0.02	0.05	<0.02
		R	10/22/04	1200	<.02	<.02	<.02
395023085492850	ACTTR1–3–3–D piezometer at Mohawk	R	06/30/04	1100	<.02	.05	<.02
		R	10/22/04	1430	<.02	<.02	<.02
395023085492853	ACTTR1–3–4–A piezometer at Mohawk	FB	06/30/04	1258	<.02	<.02	<.02
		R	06/30/04	1300	<.02	.06	<.02
		FR	06/30/04	1301	<.02	.03	<.02
		R	10/22/04	1500	<.02	.09	<.02
395023085492822	ACTTR1–3–4–A piezometer at Mohawk	FB	10/25/04	1608	<.02	<.02	<.02
395023085492856	ACTTR1–3–4–D piezometer at Mohawk	R	06/30/04	1430	<.02	.04	<.02
		FR	06/30/04	1431	<.02	.05	<.02
		R	10/22/04	1530	<.02	<.02	<.02
395124085510801	Tile drain ACTTD1–1 at Mohawk	R	03/22/04	1030	<.02	<.02	<.02
		R	03/30/04	1030	<.02	.07	<.02
		R	05/15/04	1335	.28	.09	<.02
		R	05/19/04	0230	3.8	2.6	<.02
		R	05/19/04	0330	1.2	.18	<.02
		R	05/19/04	0440	.74	.69	<.02
		FR	05/19/04	0441	.93	.19	<.02
		R	05/19/04	1510	.27	.07	<.02
		R	05/20/04	1345	.15	.07	<.02
		R	05/30/04	2130	1.5	.17	<.02
		R	05/30/04	2130	2.6	.61	<.02
		R	05/30/04	2330	3.7	.54	<.02
		R	05/31/04	0530	4.7	1.0	<.02
		R	05/31/04	1215	1.2	0.82	<0.02
		R	06/01/04	1215	.34	.21	<.02
		R	06/01/04	1216	.32	.20	<.02

98 Concentrations of Glyphosate, Aminomethylphosphonic Acid, and Glufosinate in Water and Soil Samples

**Table 6.** Analytical results for glyphosate, aminomethylphosphonic acid, and glufosinate in Toxic Substances Hydrology Program studies, 2001–06.—Continued

[Sample type: FB, field blank; FR, field replicate; R, regular; LD, laboratory duplicate; --, no data; <, less than; µg/L, micrograms per liter]

Site number	Site location	Sample type	Date of collection (month/day/year)	Collection time (24-hour)	Concentrations		
					Glyphosate (µg/L)	Amino-methylphosphonic acid (µg/L)	Glufosinate (µg/L)
Sensitive environments study, 2004–06—Continued							
Leary Weber Ditch Basin, Indiana (ground water)—Continued							
395124085510801	Tile drain ACTTD1–1 at Mohawk	R	06/30/04	1745	0.08	0.15	<0.02
		FB	08/26/04	1200	<.02	<.02	<.02
		R	04/19/05	1545	<.02	.43	<.02
		R	06/12/05	2100	.04	.25	<.02
		R	06/12/05	2200	.04	.19	<.02
		R	06/12/05	2300	<.02	.16	<.02
		R	06/13/05	0600	.04	.15	<.02
		R	06/13/05	2200	<.02	.15	<.02
		R	06/14/05	1130	<.02	.14	<.02
395045085510930	Vadose zone ACTVZ1–1A at Mohawk	R	05/25/04	1110	<.02	.06	<.02
		R	06/22/04	1630	<.02	.09	<.02
		R	10/20/04	1145	<.02	<.02	<.02
		R	06/22/05	1130	<.02	.06	<.02
395045085510931	Vadose zone ACTVZ1–1B at Mohawk	R	04/06/04	1100	<.02	.05	<.02
		R	05/25/04	1100	<.02	.05	<.02
		R	06/22/04	1640	<.02	.03	<.02
		R	10/20/04	1155	<.02	<.02	<.02
		R	06/22/05	1140	.03	<.02	<.02
395045085510932	Vadose zone ACTVZ1–1C at Mohawk	R	04/06/04	1100	.03	.09	<.02
		R	05/25/04	1130	<.02	.08	<.02
		R	06/22/04	1650	<.02	.03	<.02
		R	08/24/04	0925	<.02	<.02	<.02
		R	10/20/04	1205	<.02	<.02	<.02
		R	06/22/05	1150	<.02	<.02	<.02
395045085510933	Vadose zone ACTVZ1–1D at Mohawk (saturated)	R	04/06/04	1100	.05	.29	<.02
		R	05/25/04	1140	.14	.20	<.02
		R	06/22/04	1700	.04	.24	<.02

**Table 6.** Analytical results for glyphosate, aminomethylphosphonic acid, and glufosinate in Toxic Substances Hydrology Program studies, 2001–06.—Continued

[Sample type: FB, field blank; FR, field replicate; R, regular; LD, laboratory duplicate; --, no data; &lt;, less than; µg/L, micrograms per liter]

Site number	Site location	Sample type	Date of collection (month/day/year)	Collection time (24-hour)	Concentrations		
					Glyphosate (µg/L)	Amino-methylphosphonic acid (µg/L)	Glufosinate (µg/L)
Sensitive environments study, 2004–06—Continued							
Leary Weber Ditch Basin, Indiana (ground water)—Continued							
395045085510933	Vadose zone ACTVZ1–1D at Mohawk (unsaturated)	R	10/20/04	1215	<0.02	<0.02	<0.02
		R	06/22/05	1200	<.02	<.02	<.02
395151085504540	Vadose zone ACTVZ1–2F at Mohawk (unsaturated)	R	05/25/04	1000	.02	.17	<.02
395151085504541	Vadose zone ACTVZ1–2F at Mohawk (unsaturated)	R	05/25/04	1010	.02	.14	<.02
395151085504530	Vadose zone ACTVZ1–2A at Mohawk (saturated)	R	05/25/04	1015	<.02	.06	<.02
395151085504530	Vadose zone ACTVZ1–2A at Mohawk (saturated)	R	06/22/04	1200	<.02	.08	<.02
395151085504530	Vadose zone ACTVZ1–2A at Mohawk (unsaturated)	R	08/24/04	1015	<.02	<.02	<.02
395151085504530	Vadose zone ACTVZ1–2A at Mohawk (unsaturated)	R	10/20/04	1300	<.02	<.02	<.02
395151085504530	Vadose zone ACTVZ1–2A at Mohawk (saturated)	R	06/22/05	0900	<.02	<.02	<.02
395151085504531	Vadose zone ACTVZ1–2A at Mohawk (saturated)	R	05/25/04	1025	.02	.08	<.02
395151085504531	Vadose zone ACTVZ1–2B at Mohawk (unsaturated)	R	08/24/04	1020	<.02	.11	<.02
395151085504531	Vadose zone ACTVZ1–2B at Mohawk (unsaturated)	R	10/20/04	1310	<.02	<.02	<.02
395151085504531	Vadose zone ACTVZ1–2B at Mohawk (unsaturated)	R	06/22/05	0910	<.02	.12	<.02
395151085504532	Vadose zone ACTVZ1–2C at Mohawk (unsaturated)	R	08/24/04	1025	<.02	.16	<.02
395151085504532	Vadose zone ACTVZ1–2C at Mohawk (unsaturated)	R	10/20/04	1320	.05	<.02	<.02
395151085504532	Vadose zone ACTVZ1–2C at Mohawk (saturated)	R	06/22/05	0920	<.02	.09	<.02
395151085504533	Vadose zone ACTVZ1–2D at Mohawk (saturated)	R	08/24/04	1030	<.02	.12	<.02
395151085504533	Vadose zone ACTVZ1–2D at Mohawk (saturated)	R	06/22/05	0930	<.02	.08	<.02
395025085493501	Well ACTAS1–3A at Mohawk	R	06/21/04	1245	<.02	.05	<.02
395025085493501	Well ACTAS1–3A at Mohawk	FR	06/21/04	1246	<.02	.05	<.02
395025085493501	Well ACTAS1–3A at Mohawk	FR	06/21/04	1248	<.02	.04	<.02
395025085493501	Well ACTAS1–3A at Mohawk	R	10/15/04	1200	<.02	<.02	<.02
395046085510903	Well ACTAS1–1B at Mohawk (saturated)	R	06/22/04	1430	.13	.16	<.02
395046085510903	Well ACTAS1–1B at Mohawk (saturated)	R	06/22/05	1200	.12	<.02	<.02
395046085510901	Well ACTAS1–1C at Mohawk (saturated)	R	10/21/04	1100	<.02	.10	<.02
395046085510901	Well ACTAS1–1C at Mohawk (saturated)	R	06/22/05	1300	.08	<.02	<.02

100 Concentrations of Glyphosate, Aminomethylphosphonic Acid, and Glufosinate in Water and Soil Samples

**Table 6.** Analytical results for glyphosate, aminomethylphosphonic acid, and glufosinate in Toxic Substances Hydrology Program studies, 2001–06.—Continued

[Sample type: FB, field blank; FR, field replicate; R, regular; LD, laboratory duplicate; --, no data; <, less than; µg/L, micrograms per liter]

Site number	Site location	Sample type	Date of collection (month/day/year)	Collection time (24-hour)	Concentrations		
					Glyphosate (µg/L)	Amino-methylphosphonic acid (µg/L)	Glufosinate (µg/L)
Sensitive environments study, 2004–06—Continued							
Leary Weber Ditch Basin, Indiana (ground water)—Continued							
395046085510902	Well ACTAS1–1D at Mohawk (saturated)	R	10/21/04	1200	0.03	<0.02	<0.02
395046085510902	Well ACTAS1–1D at Mohawk	R	06/22/04	1530	<.02	.05	<.02
395046085510902	Well ACTAS1–1D at Mohawk	R	06/22/05	1230	<.02	<.02	<.02
395151085504504	Well ACTAS1–2A at Mohawk	R	06/22/04	1100	.04	.09	<.02
395151085504504	Well ACTAS1–2A at Mohawk	R	06/22/05	0930	.02	.11	<.02
395151085504503	Well ACTAS1–2B at Mohawk	R	11/08/04	1130	<.02	.17	<.02
395151085504503	Well ACTAS1–2B at Mohawk	R	06/22/05	1000	<.02	.06	<.02
395151085504502	Well ACTAS1–2C at Mohawk	R	06/22/05	1030	.04	.05	<.02
395151085504501	Well ACTAS1–2D at Mohawk	R	06/22/04	1200	<.02	.05	<.02
395151085504501	Well ACTAS1–2D at Mohawk	R	11/08/04	1200	<.02	<.02	<.02
395151085504501	Well ACTAS1–2D at Mohawk	R	06/22/05	1100	<.02	<.02	<.02
Leary Weber Ditch Basin, Indiana (surface water)							
03361638	Leary Weber Ditch near Mohawk (composite)	R	11/02/04	0845	<.02	<.02	<.02
03361638	Leary Weber Ditch near Mohawk	R	11/02/04	0845	1.7	.13	<.02
03361638	Leary Weber Ditch near Mohawk	R	11/02/04	1045	.14	.26	<.02
03361638	Leary Weber Ditch near Mohawk	R	11/02/04	1345	<.02	<.02	<.02
03361638	Leary Weber Ditch near Mohawk	R	11/03/04	1100	<.02	<.02	<.02
03361638	Leary Weber Ditch near Mohawk	R	04/19/05	1845	<.02	<.02	<.02
03361638	Leary Weber Ditch near Mohawk	R	03/22/04	1015	<.02	<.02	<.02
03361638	Leary Weber Ditch near Mohawk	R	03/30/04	1015	<.02	.10	<.02
03361638	Leary Weber Ditch near Mohawk	LD	03/30/04	1015	<.02	.06	<.02
03361638	Leary Weber Ditch near Mohawk	R	05/14/04	1545	.50	.06	<.02
03361638	Leary Weber Ditch near Mohawk	R	05/19/04	0315	2.1	.23	<.02
03361638	Leary Weber Ditch near Mohawk	FR	05/19/04	0315	1.1	.23	<.02
03361638	Leary Weber Ditch near Mohawk	R	05/19/04	0715	1.1	.13	<.02
03361638	Leary Weber Ditch near Mohawk	R	05/19/04	1100	.72	.23	<.02
03361638	Leary Weber Ditch near Mohawk	R	05/20/04	0330	.27	.08	<.02

**Table 6.** Analytical results for glyphosate, aminomethylphosphonic acid, and glufosinate in Toxic Substances Hydrology Program studies, 2001–06.—Continued

[Sample type: FB, field blank; FR, field replicate; R, regular; LD, laboratory duplicate; --, no data; &lt;, less than; µg/L, micrograms per liter]

Site number	Site location	Sample type	Date of collection (month/day/year)	Collection time (24-hour)	Concentrations		
					Glyphosate (µg/L)	Amino-methylphosphonic acid (µg/L)	Glufosinate (µg/L)
Sensitive environments study, 2004–06—Continued							
Leary Weber Ditch Basin, Indiana (surface water)—Continued							
03361638	Leary Weber Ditch near Mohawk	R	05/20/04	1600	0.16	0.14	<0.02
03361638	Leary Weber Ditch near Mohawk	R	05/30/04	2200	.47	.18	<.02
03361638	Leary Weber Ditch near Mohawk	R	05/30/04	2200	2.1	.62	<.02
03361638	Leary Weber Ditch near Mohawk	R	05/31/04	0100	5.5	.58	<.02
03361638	Leary Weber Ditch near Mohawk	R	05/31/04	0400	4.9	.39	<.02
03361638	Leary Weber Ditch near Mohawk	R	05/31/04	2045	1.1	.07	<.02
03361638	Leary Weber Ditch near Mohawk	R	06/01/04	1400	.55	.25	<.02
03361638	Leary Weber Ditch near Mohawk	R	06/01/04	1401	.54	.31	<.02
03361638	Leary Weber Ditch near Mohawk	R	06/30/04	1800	.08	.23	<.02
03361638	Leary Weber Ditch near Mohawk	FB	08/26/04	1000	<.02	<.02	<.02
03361638	Leary Weber Ditch near Mohawk	R	06/12/05	2045	.20	<.02	<.02
03361638	Leary Weber Ditch near Mohawk	R	06/12/05	2245	.49	.56	<.02
03361638	Leary Weber Ditch near Mohawk	R	06/13/05	0045	2.0	.81	1.5
03361638	Leary Weber Ditch near Mohawk	R	06/13/05	0145	2.9	.69	.24
03361638	Leary Weber Ditch near Mohawk	R	06/13/05	1345	.52	.33	<.02
03361638	Leary Weber Ditch near Mohawk	R	06/14/05	1215	.15	.19	<.02
395120085502401	Overland flow ACTOF1–1 at Mohawk	R	05/19/04	0128	310	27	<0.02
395120085502401	Overland flow ACTOF1–1 at Mohawk	R	05/19/04	0158	418	25	<.02
395120085502401	Overland flow ACTOF1–1 at Mohawk	R	05/19/04	0228	427	29	<.02
395120085502401	Overland flow ACTOF1–1 at Mohawk	R	05/19/04	0258	376	24	<.02
395120085502401	Overland flow ACTOF1–1 at Mohawk	R	05/19/04	0410	359	26	<.02
395120085502401	Overland flow ACTOF1–1 at Mohawk	FR	05/19/04	0411	385	25	<.02
395120085502401	Overland flow ACTOF1–1 at Mohawk	R	05/19/04	0500	377	28	<.02
395120085502401	Overland flow ACTOF1–1 at Mohawk	R	05/30/04	2130	41	8.2	<.02
395120085502401	Overland flow ACTOF1–1 at Mohawk	R	05/30/04	2230	22	3.7	<.02
395120085502401	Overland flow ACTOF1–1 at Mohawk	R	05/30/04	2330	25	4.3	<.02
395120085502401	Overland flow ACTOF1–1 at Mohawk	R	05/31/04	0201	31	6.7	<.02
395120085502401	Overland flow ACTOF1–1 at Mohawk	FR	05/31/04	0200	38	8.5	<.02

102 Concentrations of Glyphosate, Aminomethylphosphonic Acid, and Glufosinate in Water and Soil Samples

**Table 6.** Analytical results for glyphosate, aminomethylphosphonic acid, and glufosinate in Toxic Substances Hydrology Program studies, 2001–06.—Continued

[Sample type: FB, field blank; FR, field replicate; R, regular; LD, laboratory duplicate; --, no data; <, less than; µg/L, micrograms per liter]

Site number	Site location	Sample type	Date of collection (month/day/year)	Collection time (24-hour)	Concentrations		
					Glyphosate (µg/L)	Amino-methylphosphonic acid (µg/L)	Glufosinate (µg/L)
Sensitive environments study, 2004–06—Continued							
Leary Weber Ditch Basin, Indiana (surface water)—Continued							
395120085502401	Overland flow ACTOF1–1 at Mohawk	R	05/31/04	0530	49	11	<0.02
395120085502401	Overland flow ACTOF1–1 at Mohawk	R	05/31/04	1050	34	16	<.02
395120085502401	Overland flow ACTOF1–1 at Mohawk	FB	08/26/04	1100	<.02	<.02	<.02
395120085502401	Overland flow ACTOF1–1 at Mohawk	R	06/12/05	2100	.20	1.3	<.02
394340085524601	Sugar Creek at Co Road 400 South at New Palestine	R	05/19/04	0200	.32	.21	<.02
394340085524601	Sugar Creek at Co Road 400 South at New Palestine	R	05/20/04	1200	.20	.12	<.02
394340085524601	Sugar Creek at Co Road 400 South at New Palestine	R	05/21/04	1330	.15	.14	<.02
394340085524601	Sugar Creek at Co Road 400 South at New Palestine	R	05/14/04	2100	.06	.09	<.02
394340085524601	Sugar Creek at Co Road 400 South at New Palestine	R	05/19/04	0600	.66	.07	<.02
394340085524601	Sugar Creek at Co Road 400 South at New Palestine	R	05/19/04	1000	1.0	.36	<.02
394340085524601	Sugar Creek at Co Road 400 South at New Palestine	R	05/31/04	0430	1.0	.19	<.02
394340085524601	Sugar Creek at Co Road 400 South at New Palestine	R	11/02/04	0400	.03	.07	<.02
394340085524601	Sugar Creek at Co Road 400 South at New Palestine	R	11/02/04	0400	.04	<.02	<.02
394340085524601	Sugar Creek at Co Road 400 South at New Palestine	R	11/02/04	1000	.04	<.02	<.02
394340085524601	Sugar Creek at Co Road 400 South at New Palestine	R	11/03/04	1200	<.02	<.02	<.02
394340085524601	Sugar Creek at Co Road 400 South at New Palestine	R	05/31/04	1030	1.6	.23	<.02
394340085524601	Sugar Creek at Co Road 400 South at New Palestine	R	05/31/04	0430	.74	.39	<.02
394340085524601	Sugar Creek at Co Road 400 South at New Palestine	R	06/01/04	1015	.66	.48	<.02
394340085524601	Sugar Creek at Co Road 400 South at New Palestine	R	06/02/04	1630	.51	.74	<.02
394340085524601	Sugar Creek at Co Road 400 South at New Palestine	R	06/02/04	1631	.37	.44	<.02
394340085524601	Sugar Creek at Co Road 400 South at New Palestine	FB	08/26/04	0900	<.02	<.02	<.02
394340085524601	Sugar Creek at Co Road 400 South at New Palestine	R	11/02/04	1200	.05	.17	<.02
Leary Weber Ditch Basin, Indiana (rainfall)							
395151085504595	Rain sampler ACTRS1–2 at Mohawk	R	04/27/04	1100	1.1	.07	<.02
395151085504595	Rain sampler ACTRS1–2 at Mohawk	R	05/12/04	0930	.67	.21	<.02
395151085504595	Rain sampler ACTRS1–2 at Mohawk	R	05/18/04	1015	.15	.06	<.02
395151085504595	Rain sampler ACTRS1–2 at Mohawk	R	05/25/04	0930	.04	.06	<.02
395151085504595	Rain sampler ACTRS1–2 at Mohawk	R	06/08/04	1000	.12	.08	<.02

**Table 6.** Analytical results for glyphosate, aminomethylphosphonic acid, and glufosinate in Toxic Substances Hydrology Program studies, 2001–06.—Continued

[Sample type: FB, field blank; FR, field replicate; R, regular; LD, laboratory duplicate; --, no data; &lt;, less than; µg/L, micrograms per liter]

Site number	Site location	Sample type	Date of collection (month/day/year)	Collection time (24-hour)	Concentrations		
					Glyphosate (µg/L)	Amino-methylphosphonic acid (µg/L)	Glufosinate (µg/L)
Sensitive environments study, 2004–06—Continued							
Leary Weber Ditch Basin, Indiana (rainfall)—Continued							
395151085504595	Rain sampler ACTRS1–2 at Mohawk (composite)	R	06/15/04	1000	0.10	0.08	<0.02
395151085504595	Rain sampler ACTRS1–2 at Mohawk (composite)	R	06/29/04	1030	.24	.17	<.02
395151085504595	Rain sampler ACTRS1–2 at Mohawk (composite)	R	07/06/04	1215	.20	.07	<.02
395151085504595	Rain sampler ACTRS1–2 at Mohawk (composite)	R	07/20/04	1200	.20	.47	<.02
395151085504595	Rain sampler ACTRS1–2 at Mohawk (composite)	R	08/03/04	1100	.06	.02	<.02
395151085504595	Rain sampler ACTRS1–2 at Mohawk (composite)	R	08/17/04	1200	.11	.04	<.02
395151085504595	Rain sampler ACTRS1–2 at Mohawk (composite)	R	08/24/04	0945	<.02	.03	<.02
395151085504595	Rain sampler ACTRS1–2 at Mohawk	R	11/08/04	1000	<.02	<.02	<.02
395151085504595	Rain sampler ACTRS1–2 at Mohawk	R	06/07/05	1045	.03	<.02	<.02

104 Concentrations of Glyphosate, Aminomethylphosphonic Acid, and Glufosinate in Water and Soil Samples

**Table 6.** Analytical results for glyphosate, aminomethylphosphonic acid, and glufosinate in Toxic Substances Hydrology Program studies, 2001–06.—Continued

[Sample type: FB, field blank; FR, field replicate; R, regular; LD, laboratory duplicate; --, no data; <, less than; µg/L, micrograms per liter]

Site number	Site location/soil core depth in inches (")	Sample type	Date of collection (month/day/year)	Collection time (24-hour)	Concentrations		
					Glyphosate (µg/L)	Amino-methylphosphonic acid (µg/L)	Glufosinate (µg/L)
Sensitive environments study, 2004–06—Continued							
Leary Weber Ditch Basin, Indiana (soils)							
395045085510930	Vadose zone ACTVZ1–1A at Mohawk (South, 0–6")	R	04/15/04	1000	23	109	--
395045085510930	Vadose zone ACTVZ1–1A at Mohawk (South, 0–6")	R	04/15/04	1001	12	109	--
395045085510930	Vadose zone ACTVZ1–1A at Mohawk (South, 0–6")	R	04/15/04	1002	7.0	70	--
395045085510930	Vadose zone ACTVZ1–1A at Mohawk (South, 0–6")	R	05/24/04	1500	110	112	--
395045085510930	Vadose zone ACTVZ1–1A at Mohawk (South, 0–6")	R	05/24/04	1501	332	91	--
395045085510930	Vadose zone ACTVZ1–1A at Mohawk (South, 0–6")	LD	05/24/04	1501	269	99	--
395045085510930	Vadose zone ACTVZ1–1A at Mohawk (South, 0–6")	R	05/24/04	1502	62	136	--
395045085510930	Vadose zone ACTVZ1–1A at Mohawk (South, 6–12")	R	05/24/04	1700	9.0	14	--
395045085510930	Vadose zone ACTVZ1–1A at Mohawk (South, 6–12")	R	05/24/04	1701	14	9.0	--
395045085510930	Vadose zone ACTVZ1–1A at Mohawk (South, 6–12")	R	05/24/04	1702	12	22	--
395045085510930	Vadose zone ACTVZ1–1A at Mohawk (South, 12–18")	R	05/24/04	1730	11	7.0	--
395045085510930	Vadose zone ACTVZ1–1A at Mohawk (South, 12–18")	R	05/24/04	1731	10	10	--
395045085510930	Vadose zone ACTVZ1–1A at Mohawk (South, 12–18")	R	05/24/04	1732	12	13	--
395045085510930	Vadose zone ACTVZ1–1A at Mohawk (South, 0–6")	R	07/07/04	1500	55	167	--
395045085510930	Vadose zone ACTVZ1–1A at Mohawk (South, 0–6")	R	07/07/04	1501	163	185	--
395045085510930	Vadose zone ACTVZ1–1A at Mohawk (South, 0–6")	R	07/07/04	1502	33	116	--
395045085510930	Vadose zone ACTVZ1–1A at Mohawk (South, 6–12")	R	07/07/04	1530	8.6	21	--
395045085510930	Vadose zone ACTVZ1–1A at Mohawk (South, 6–12")	R	07/07/04	1531	22	23	--
395045085510930	Vadose zone ACTVZ1–1A at Mohawk (South, 6–12")	R	07/07/04	1532	46	25	--
395045085510930	Vadose zone ACTVZ1–1A at Mohawk (South, 12–18")	R	07/07/04	1600	11	12	--
395045085510930	Vadose zone ACTVZ1–1A at Mohawk (South, 12–18")	R	07/07/04	1601	15	18	--
395045085510930	Vadose zone ACTVZ1–1A at Mohawk (South, 12–18")	R	07/07/04	1602	4.9	9.2	--
395045085510930	Vadose zone ACTVZ1–1A at Mohawk (South, 0–6")	R	10/21/04	1200	27	132	<1.0
395045085510930	Vadose zone ACTVZ1–1A at Mohawk (South, 0–6")	R	10/21/04	1201	6.9	69	<1.0
395045085510930	Vadose zone ACTVZ1–1A at Mohawk (South, 0–6")	R	10/21/04	1202	44	105	<1.0
395045085510930	Vadose zone ACTVZ1–1A at Mohawk (South, 0–6")	LD	10/21/04	1202	46	113	<1.0
395045085510930	Vadose zone ACTVZ1–1A at Mohawk (South, 6–12")	R	10/21/04	1210	<1.0	2.2	<1.0
395045085510930	Vadose zone ACTVZ1–1A at Mohawk (South, 6–12")	R	10/21/04	1211	<1.0	<1.0	<1.0



**Table 6.** Analytical results for glyphosate, aminomethylphosphonic acid, and glufosinate in Toxic Substances Hydrology Program studies, 2001–06.—Continued

[Sample type: FB, field blank; FR, field replicate; R, regular; LD, laboratory duplicate; --, no data; &lt;, less than; µg/L, micrograms per liter]

Site number	Site location/soil core depth in inches (")	Sample type	Date of collection (month/day/year)	Collection time (24-hour)	Concentrations		
					Glyphosate (µg/L)	Amino-methylphosphonic acid (µg/L)	Glufosinate (µg/L)
Sensitive environments study, 2004–06—Continued							
Leary Weber Ditch Basin, Indiana (soils)—Continued							
395045085510930	Vadose zone ACTVZ1–1A at Mohawk (South, 6–12")	R	10/21/04	1212	<1.0	3.8	<1.0
395045085510930	Vadose zone ACTVZ1–1A at Mohawk (South, 12–18")	R	10/21/04	1220	<1.0	<1.0	<1.0
395045085510930	Vadose zone ACTVZ1–1A at Mohawk (South, 12–18")	R	10/21/04	1221	<1.0	<1.0	<1.0
395045085510930	Vadose zone ACTVZ1–1A at Mohawk (South, 12–18")	R	10/21/04	1222	<1.0	<1.0	<1.0
395045085510930	Vadose zone ACTVZ1–1A at Mohawk (South, 0–6")	R	04/19/05	0930	7.2	39	<1.0
395045085510930	Vadose zone ACTVZ1–1A at Mohawk (South, 0–6")	R	04/19/05	0940	2.2	43	<1.0
395045085510930	Vadose zone ACTVZ1–1A at Mohawk (South, 0–6")	R	04/19/05	0941	<1.0	10	<1.0
395045085510930	Vadose zone ACTVZ1–1A at Mohawk (South, 6–12")	R	04/19/05	0931	1.2	8.5	<1.0
395045085510930	Vadose zone ACTVZ1–1A at Mohawk (South, 6–12")	R	04/19/05	0942	1.7	9.3	<1.0
395045085510930	Vadose zone ACTVZ1–1A at Mohawk (South, 6–12")	LD	04/19/05	0942	1.5	8.8	<1.0
395045085510930	Vadose zone ACTVZ1–1A at Mohawk (South, 6–12")	R	04/19/05	0950	6.4	47	<1.0
395045085510930	Vadose zone ACTVZ1–1A at Mohawk (South, 12–18")	R	04/19/05	0932	<1.0	1.6	<1.0
395045085510930	Vadose zone ACTVZ1–1A at Mohawk (South, 12–18")	R	04/19/05	0951	1.8	9.8	<1.0
395045085510930	Vadose zone ACTVZ1–1A at Mohawk (South, 12–18")	R	04/19/05	0952	<1.0	2.6	<1.0
395045085510930	Vadose zone ACTVZ1–1A at Mohawk (South, 0–6")	R	05/25/05	1500	12	68	<1.0
395045085510930	Vadose zone ACTVZ1–1A at Mohawk (South, 0–6")	R	05/25/05	1510	6.0	33	<1.0
395045085510930	Vadose zone ACTVZ1–1A at Mohawk (South, 0–6")	R	05/25/05	1520	7.9	52	<1.0
395045085510930	Vadose zone ACTVZ1–1A at Mohawk (South, 6–12")	R	05/25/05	1501	<1.0	2.5	<1.0
395045085510930	Vadose zone ACTVZ1–1A at Mohawk (South, 6–12")	R	05/25/05	1511	<1.0	5.4	<1.0
395045085510930	Vadose zone ACTVZ1–1A at Mohawk (South, 6–12")	R	05/25/05	1521	<1.0	4.9	<1.0
395045085510930	Vadose zone ACTVZ1–1A at Mohawk (South, 12–18")	R	05/25/05	1502	<1.0	<1.0	<1.0
395045085510930	Vadose zone ACTVZ1–1A at Mohawk (South, 12–18")	R	05/25/05	1512	<1.0	2.0	<1.0
395045085510930	Vadose zone ACTVZ1–1A at Mohawk (South, 12–18")	R	05/25/05	1522	<1.0	<1.0	<1.0
395151085504530	Vadose zone ACTVZ1–2A at Mohawk (North, 0–6")	R	04/15/04	0900	7.0	144	--
395151085504530	Vadose zone ACTVZ1–2A at Mohawk (North, 0–6")	LD	04/15/04	0900	8.0	144	--
395151085504530	Vadose zone ACTVZ1–2A at Mohawk (North, 0–6")	R	04/15/04	0901	6.0	112	--
395151085504530	Vadose zone ACTVZ1–2A at Mohawk (North, 0–6")	R	04/15/04	0902	10	157	--
395151085504530	Vadose zone ACTVZ1–2A at Mohawk (North, 0–6")	R	05/24/04	1300	47	113	--

106 Concentrations of Glyphosate, Aminomethylphosphonic Acid, and Glufosinate in Water and Soil Samples

**Table 6.** Analytical results for glyphosate, aminomethylphosphonic acid, and glufosinate in Toxic Substances Hydrology Program studies, 2001–06.—Continued

[Sample type: FB, field blank; FR, field replicate; R, regular; LD, laboratory duplicate; --, no data; <, less than; µg/L, micrograms per liter]

Site number	Site location/soil core depth in inches (")	Sample type	Date of collection (month/day/year)	Collection time (24-hour)	Concentrations		
					Glyphosate (µg/L)	Amino-methylphosphonic acid (µg/L)	Glufosinate (µg/L)
Sensitive environments study, 2004–06—Continued							
Leary Weber Ditch Basin, Indiana (soils)—Continued							
395151085504530	Vadose zone ACTVZ1–2A at Mohawk (North, 0–6")	LD	05/24/04	1300	69	85	--
395151085504530	Vadose zone ACTVZ1–2A at Mohawk (North, 0–6")	R	05/24/04	1301	78	116	--
395151085504530	Vadose zone ACTVZ1–2A at Mohawk (North, 0–6")	R	05/24/04	1302	67	208	--
395151085504530	Vadose zone ACTVZ1–2A at Mohawk (North, 6–12")	R	05/24/04	1315	6.0	22	--
395151085504530	Vadose zone ACTVZ1–2A at Mohawk (North, 6–12")	R	05/24/04	1316	3.0	21	--
395151085504530	Vadose zone ACTVZ1–2A at Mohawk (North, 6–12")	R	05/24/04	1317	1.0	13	--
395151085504530	Vadose zone ACTVZ1–2A at Mohawk (North, 12–18")	R	05/24/04	1330	1.0	2.0	--
395151085504530	Vadose zone ACTVZ1–2A at Mohawk (North, 12–18")	R	05/24/04	1331	15	21	--
395151085504530	Vadose zone ACTVZ1–2A at Mohawk (North, 12–18")	R	05/24/04	1332	1.0	3.0	--
395151085504530	Vadose zone ACTVZ1–2A at Mohawk (North, 0–6")	R	07/07/04	1300	85	162	--
395151085504530	Vadose zone ACTVZ1–2A at Mohawk (North, 0–6")	R	07/07/04	1301	23	142	--
395151085504530	Vadose zone ACTVZ1–2A at Mohawk (North, 0–6")	R	07/07/04	1302	90	169	--
395151085504530	Vadose zone ACTVZ1–2A at Mohawk (North, 6–12")	R	07/07/04	1330	17	31	--
395151085504530	Vadose zone ACTVZ1–2A at Mohawk (North, 6–12")	R	07/07/04	1331	2.2	13	--
395151085504530	Vadose zone ACTVZ1–2A at Mohawk (North, 6–12")	R	07/07/04	1332	12	21	--
395151085504530	Vadose zone ACTVZ1–2A at Mohawk (North, 12–18")	R	07/07/04	1400	2.5	9.8	--
395151085504530	Vadose zone ACTVZ1–2A at Mohawk (North, 12–18")	R	07/07/04	1401	3.7	14	--
395151085504530	Vadose zone ACTVZ1–2A at Mohawk (North, 12–18")	R	07/07/04	1402	6.1	12	--
39515108504530	Vadose zone ACTVZ1–2A at Mohawk (North, 0–6")	R	10/21/04	0930	25	127	<1.0
39515108504530	Vadose zone ACTVZ1–2A at Mohawk (North, 0–6")	LD	10/21/04	0930	27	99	<1.0
395151085504530	Vadose zone ACTVZ1–2A at Mohawk (North, 0–6")	R	10/21/04	0931	60	477	<1.0
395151085504530	Vadose zone ACTVZ1–2A at Mohawk (North, 0–6")	R	10/21/04	0932	144	956	<1.0
395151085504530	Vadose zone ACTVZ1–2A at Mohawk (North, 6–12")	R	10/21/04	0940	<1.0	9.5	<1.0
395151085504530	Vadose zone ACTVZ1–2A at Mohawk (North, 6–12")	LD	10/21/04	0940	<1.0	11	<1.0
395151085504530	Vadose zone ACTVZ1–2A at Mohawk (North, 6–12")	R	10/21/04	0941	<1.0	1.9	<1.0
395151085504530	Vadose zone ACTVZ1–2A at Mohawk (North, 6–12")	R	10/21/04	0942	<1.0	4.9	1.0
395151085504530	Vadose zone ACTVZ1–2A at Mohawk (North, 12–18")	R	10/21/04	0950	<1.0	<1.0	<1.0
395151085504530	Vadose zone ACTVZ1–2A at Mohawk (North, 12–18")	R	10/21/04	0951	<1.0	<1.0	<1.0

**Table 6.** Analytical results for glyphosate, aminomethylphosphonic acid, and glufosinate in Toxic Substances Hydrology Program studies, 2001–06.—Continued

[Sample type: FB, field blank; FR, field replicate; R, regular; LD, laboratory duplicate; --, no data; &lt;, less than; µg/L, micrograms per liter]

Site number	Site location/soil core depth in inches (")	Sample type	Date of collection (month/day/year)	Collection time (24-hour)	Concentrations		
					Glyphosate (µg/L)	Amino-methylphosphonic acid (µg/L)	Glufosinate (µg/L)
Sensitive environments study, 2004–06—Continued							
Leary Weber Ditch Basin, Indiana (soils)—Continued							
395151085504530	Vadose zone ACTVZ1–2A at Mohawk (North, 12–18")	R	10/21/04	0952	<1.0	<1.0	<1.0
395151085504530	Vadose zone ACTVZ1–2A at Mohawk (North, 0–6")	R	04/19/05	1030	18	75	<1.0
395151085504530	Vadose zone ACTVZ1–2A at Mohawk (North, 0–6")	R	04/19/05	1040	8.0	62	<1.0
395151085504530	Vadose zone ACTVZ1–2A at Mohawk (North, 0–6")	R	04/19/05	1041	<1.0	6.9	<1.0
395151085504530	Vadose zone ACTVZ1–2A at Mohawk (North, 6–12")	R	04/19/05	1031	1.0	4.1	<1.0
395151085504530	Vadose zone ACTVZ1–2A at Mohawk (North, 6–12")	R	04/19/05	1042	<1.0	<1.0	<1.0
395151085504530	Vadose zone ACTVZ1–2A at Mohawk (North, 6–12")	R	04/19/05	1050	2.6	33	<1.0
395151085504530	Vadose zone ACTVZ1–2A at Mohawk (North, 12–18")	R	04/19/05	1032	<1.0	1.3	<1.0
395151085504530	Vadose zone ACTVZ1–2A at Mohawk (North, 12–18")	R	04/19/05	1051	<1.0	9.3	<1.0
395151085504530	Vadose zone ACTVZ1–2A at Mohawk (North, 12–18")	R	04/19/05	1052	<1.0	<1.0	<1.0
395151085504530	Vadose zone ACTVZ1–2A at Mohawk (North, 0–6")	R	05/25/05	0900	36	148	<1.0
395151085504530	Vadose zone ACTVZ1–2A at Mohawk (North, 0–6")	R	05/25/05	0910	9.7	119	<1.0
395151085504530	Vadose zone ACTVZ1–2A at Mohawk (North, 0–6")	R	05/25/05	0920	28	58	<1.0
395151085504530	Vadose zone ACTVZ1–2A at Mohawk (North, 6–12")	R	05/25/05	0901	3.0	12	<1.0
395151085504530	Vadose zone ACTVZ1–2A at Mohawk (North, 6–12")	R	05/25/05	0911	<1.0	2.0	<1.0
395151085504530	Vadose zone ACTVZ1–2A at Mohawk (North, 6–12")	LD	05/25/05	0911	<1.0	2.3	<1.0
395151085504530	Vadose zone ACTVZ1–2A at Mohawk (North, 6–12")	R	05/25/05	0921	<1.0	1.6	<1.0
395151085504530	Vadose zone ACTVZ1–2A at Mohawk (North, 12–18")	R	05/25/05	0902	1.3	8.4	<1.0
395151085504530	Vadose zone ACTVZ1–2A at Mohawk (North, 12–18")	R	05/25/05	0912	<1.0	<1.0	<1.0
395151085504530	Vadose zone ACTVZ1–2A at Mohawk (North-12-18")	R	05/25/05	0922	<1.0	<1.0	<1.0
395120085502401	Vadose ACT: Overland Flow at Mohawk (0–6")	R	07/07/04	1100	476	341	--
395120085502401	Vadose ACT: Overland Flow at Mohawk (0–6")	R	07/07/04	1101	103	127	--
395120085502401	Vadose ACT: Overland Flow at Mohawk (0–6")	R	07/07/04	1102	88	150	--
395120085502401	Vadose ACT: Overland Flow at Mohawk (6–12")	R	07/07/04	1130	24	21	--
395120085502401	Vadose ACT: Overland Flow at Mohawk (6–12")	R	07/07/04	1131	4.4	9.4	--
395120085502401	Vadose ACT: Overland Flow at Mohawk (6–12")	R	07/07/04	1132	40	54	--
395120085502401	Vadose ACT: Overland Flow at Mohawk (12–18")	R	07/07/04	1200	19	14	--
395120085502401	Vadose ACT: Overland Flow at Mohawk (12–18")	R	07/07/04	1201	17	25	--

**108 Concentrations of Glyphosate, Aminomethylphosphonic Acid, and Glufosinate in Water and Soil Samples**

**Table 6.** Analytical results for glyphosate, aminomethylphosphonic acid, and glufosinate in Toxic Substances Hydrology Program studies, 2001–06.—Continued

[Sample type: FB, field blank; FR, field replicate; R, regular; LD, laboratory duplicate; --, no data; <, less than; µg/L, micrograms per liter]

Site number	Site location/soil core depth in inches (")	Sample type	Date of collection (month/day/year)	Collection time (24-hour)	Concentrations		
					Glyphosate (µg/L)	Amino-methylphosphonic acid (µg/L)	Glufosinate (µg/L)
Sensitive environments study, 2004–06—Continued							
Leary Weber Ditch Basin, Indiana (soils)—Continued							
395120085502401	Vadose ACT: Overland Flow at Mohawk (12–18")	R	07/07/04	1202	19	29	--
395120085502401	Vadose ACT: Overland Flow at Mohawk (0–6")	R	10/21/04	1400	<1.0	6.9	<1.0
395120085502401	Vadose ACT: Overland Flow at Mohawk (0–6")	R	10/21/04	1401	46	257	<1.0
395120085502401	Vadose ACT: Overland Flow at Mohawk (0–6")	R	10/21/04	1402	48	116	<1.0
395120085502401	Vadose ACT: Overland Flow at Mohawk (6–12")	R	10/21/04	1500	<1.0	5.9	<1.0
395120085502401	Vadose ACT: Overland Flow at Mohawk (6–12")	R	10/21/04	1501	1.4	5.7	<1.0
395120085502401	Vadose ACT: Overland Flow at Mohawk (6–12")	R	10/21/04	1502	1.4	<1.0	<1.0
395120085502401	Vadose ACT: Overland Flow at Mohawk (12–18")	R	10/21/04	1520	<1.0	1.0	<1.0
395120085502401	Vadose ACT: Overland Flow at Mohawk (12–18")	R	10/21/04	1521	<1.0	1.0	<1.0
395120085502401	Vadose ACT: Overland Flow at Mohawk (12–18")	R	10/21/04	1522	<1.0	1.1	<1.0
395120085502401	Vadose ACT: Overland Flow at Mohawk (0–6")	R	04/19/05	1130	14	73	<1.0
395120085502401	Vadose ACT: Overland Flow at Mohawk (0–6")	R	04/19/05	1140	17	133	<1.0
395120085502401	Vadose ACT: Overland Flow at Mohawk (0–6")	LD	04/19/05	1140	17	136	<1.0
395120085502401	Vadose ACT: Overland Flow at Mohawk (0–6")	R	04/19/05	1141	4.0	5.0	<1.0
395120085502401	Vadose ACT: Overland Flow at Mohawk (6–12")	R	04/19/05	1131	1.6	<1.0	<1.0
395120085502401	Vadose ACT: Overland Flow at Mohawk (6–12")	R	04/19/05	1142	1.5	10	<1.0
395120085502401	Vadose ACT: Overland Flow at Mohawk (6–12")	R	04/19/05	1150	23	90	<1.0
395120085502401	Vadose ACT: Overland Flow at Mohawk (12–18")	R	04/19/05	1132	<1.0	<1.0	<1.0
395120085502401	Vadose ACT: Overland Flow at Mohawk (12–18")	LD	04/19/05	1132	<1.0	<1.0	<1.0
395120085502401	Vadose ACT: Overland Flow at Mohawk (12–18")	R	04/19/05	1151	2.1	3.4	<1.0
395120085502401	Vadose ACT: Overland Flow at Mohawk (12–18")	R	04/19/05	1152	<1.0	2.4	<1.0
395120085502401	Vadose ACT: Overland Flow at Mohawk (0–6")	R	05/25/05	1000	3.4	29	<1.0
395120085502401	Vadose ACT: Overland Flow at Mohawk (0–6")	R	05/25/05	1010	6.7	58	<1.0
395120085502401	Vadose ACT: Overland Flow at Mohawk (0–6")	R	05/25/05	1020	13	79	<1.0
395120085502401	Vadose ACT: Overland Flow at Mohawk (6–12")	R	05/25/05	1001	<1.0	4.5	<1.0
395120085502401	Vadose ACT: Overland Flow at Mohawk (6–12")	R	05/25/05	1011	1.7	9.7	<1.0
395120085502401	Vadose ACT: Overland Flow at Mohawk (6–12")	R	05/25/05	1021	<1.0	4.6	<1.0
395120085502401	Vadose ACT: Overland Flow at Mohawk (12–18")	R	05/25/05	1002	<1.0	4.2	<1.0

**Table 6.** Analytical results for glyphosate, aminomethylphosphonic acid, and glufosinate in Toxic Substances Hydrology Program studies, 2001–06.—Continued

[Sample type: FB, field blank; FR, field replicate; R, regular; LD, laboratory duplicate; --, no data; &lt;, less than; µg/L, micrograms per liter]

Site number	Site location/soil core depth in inches (")	Sample type	Date of collection (month/day/year)	Collection time (24-hour)	Concentrations		
					Glyphosate (µg/L)	Amino-methylphosphonic acid (µg/L)	Glufosinate (µg/L)
Sensitive environments study, 2004–06—Continued							
Leary Weber Ditch Basin, Indiana (soils)—Continued							
395120085502401	Vadose ACT: Overland Flow at Mohawk (12–18")	R	05/25/05	1012	1.8	22	<1.0
395120085502401	Vadose ACT: Overland Flow at Mohawk (12–18")	LD	05/25/05	1012	<1.0	18	<1.0
395120085502401	Vadose ACT: Overland Flow at Mohawk (12–18")	R	05/25/05	1022	<1.0	<1.0	<1.0
395124085510801	Vadose ACT: Tile drain at Mohawk (0–6")	R	07/07/04	0930	31	60	--
395124085510801	Vadose ACT: Tile drain at Mohawk (0–6")	R	07/07/04	0931	39	74	--
395124085510801	Vadose ACT: Tile drain at Mohawk (0–6")	R	07/07/04	0932	3.3	49	--
395124085510801	Vadose ACT: Tile drain at Mohawk (6–12")	R	07/07/04	1000	1.9	11	--
395124085510801	Vadose ACT: Tile drain at Mohawk (6–12")	R	07/07/04	1001	9.6	15	--
395124085510801	Vadose ACT: Tile drain at Mohawk (6–12")	R	07/07/04	1002	5.2	21	--
395124085510801	Vadose ACT: Tile drain at Mohawk (12–18")	R	07/07/04	1030	<1.0	4.4	--
395124085510801	Vadose ACT: Tile drain at Mohawk (12–18")	R	07/07/04	1031	3.6	5.0	--
395124085510801	Vadose ACT: Tile drain at Mohawk (12–18")	R	07/07/04	1032	2.4	5.2	--
395124085510801	Vadose ACT: Tile drain at Mohawk (0–6")	R	10/21/04	1000	<1.0	3.2	<1.0
395124085510801	Vadose ACT: Tile drain at Mohawk (0–6")	R	10/21/04	1001	<1.0	17	<1.0
395124085510801	Vadose ACT: Tile drain at Mohawk (0–6")	R	10/21/04	1002	21	92	<1.0
395124085510801	Vadose ACT: Tile drain at Mohawk (6–12")	R	10/21/04	1010	<1.0	2.6	<1.0
395124085510801	Vadose ACT: Tile drain at Mohawk (6–12")	R	10/21/04	1011	7.3	9.9	<1.0
395124085510801	Vadose ACT: Tile drain at Mohawk (6–12")	R	10/21/04	1012	<1.0	1.8	<1.0
395124085510801	Vadose ACT: Tile drain at Mohawk (12–18")	R	10/21/04	1020	<1.0	<1.0	<1.0
395124085510801	Vadose ACT: Tile drain at Mohawk (12–18")	R	10/21/04	1021	<1.0	<1.0	<1.0
395124085510801	Vadose ACT: Tile drain at Mohawk (12–18")	R	10/21/04	1022	<1.0	4.2	<1.0
395124085510801	Vadose ACT: Tile drain at Mohawk (0–6")	R	04/19/05	1330	4.7	57	<1.0
395124085510801	Vadose ACT: Tile drain at Mohawk (0–6")	R	04/19/05	1340	16	106	<1.0
395124085510801	Vadose ACT: Tile drain at Mohawk (0–6")	R	04/19/05	1341	<1.0	4.5	<1.0
395124085510801	Vadose ACT: Tile drain at Mohawk (0–6")	R	04/19/05	1530	15	11	<1.0
395124085510801	Vadose ACT: Tile drain at Mohawk (0–6")	R	04/19/05	1540	17	26	<1.0
395124085510801	Vadose ACT: Tile drain at Mohawk (0–6")	R	04/19/05	1541	<1.0	2.1	<1.0
395124085510801	Vadose ACT: Tile drain at Mohawk (6–12")	R	04/19/05	1331	1.0	19	<1.0

**110 Concentrations of Glyphosate, Aminomethylphosphonic Acid, and Glufosinate in Water and Soil Samples**

**Table 6.** Analytical results for glyphosate, aminomethylphosphonic acid, and glufosinate in Toxic Substances Hydrology Program studies, 2001–06.—Continued

[Sample type: FB, field blank; FR, field replicate; R, regular; LD, laboratory duplicate; --, no data; <, less than; µg/L, micrograms per liter]

Site number	Site location/soil core depth in inches (")	Sample type	Date of collection (month/day/year)	Collection time (24-hour)	Concentrations		
					Glyphosate (µg/L)	Amino-methylphosphonic acid (µg/L)	Glufosinate (µg/L)
Sensitive environments study, 2004–06—Continued							
Leary Weber Ditch Basin, Indiana (soils)—Continued							
395124085510801	Vadose ACT: Tile drain at Mohawk (6–12")	R	04/19/05	1342	<1.0	2.5	<1.0
395124085510801	Vadose ACT: Tile drain at Mohawk (6–12")	R	04/19/05	1350	7.0	60	<1.0
395124085510801	Vadose ACT: Tile drain at Mohawk (6–12")	R	04/19/05	1531	<1.0	<1.0	<1.0
395124085510801	Vadose ACT: Tile drain at Mohawk (6–12")	R	04/19/05	1542	<1.0	<1.0	<1.0
395124085510801	Vadose ACT: Tile drain at Mohawk (6–12")	R	04/19/05	1550	17	<1.0	<1.0
395124085510801	Vadose ACT: Tile drain at Mohawk (12–18")	R	04/19/05	1332	<1.0	6.6	<1.0
395124085510801	Vadose ACT: Tile drain at Mohawk (12–18")	R	04/19/05	1351	<1.0	2.6	<1.0
395124085510801	Vadose ACT: Tile drain at Mohawk (12–18")	LD	04/19/05	1351	<1.0	<1.0	<1.0
395124085510801	Vadose ACT: Tile drain at Mohawk (12–18")	R	04/19/05	1352	<1.0	<1.0	<1.0
395124085510801	Vadose ACT: Tile drain at Mohawk (12–18")	R	04/19/05	1532	<1.0	1.1	<1.0
395124085510801	Vadose ACT: Tile drain at Mohawk (12–18")	R	04/19/05	1551	<1.0	<1.0	<1.0
395124085510801	Vadose ACT: Tile drain at Mohawk (12–18")	R	04/19/05	1552	<1.0	<1.0	<1.0
395124085510801	Vadose ACT: Tile drain at Mohawk (0–6")	R	05/25/05	1200	6.6	5.5	<1.0
395124085510801	Vadose ACT: Tile drain at Mohawk (0–6")	R	05/25/05	1210	9.2	1.8	<1.0
395124085510801	Vadose ACT: Tile drain at Mohawk (0–6")	LD	05/25/05	1210	8.3	2.5	<1.0
395124085510801	Vadose ACT: Tile drain at Mohawk (0–6")	R	05/25/05	1220	17	3.7	<1.0
395124085510801	Vadose ACT: Tile drain at Mohawk (0–6")	R	05/25/05	1300	10	104	<1.0
395124085510801	Vadose ACT: Tile drain at Mohawk (0–6")	R	05/25/05	1310	6.9	65	<1.0
395124085510801	Vadose ACT: Tile drain at Mohawk (0–6")	R	05/25/05	1320	<1.0	11	<1.0
395124085510801	Vadose ACT: Tile drain at Mohawk (6–12")	R	05/25/05	1201	<1.0	<1.0	<1.0
395124085510801	Vadose ACT: Tile drain at Mohawk (6–12")	R	05/25/05	1211	1.7	<1.0	<1.0
395124085510801	Vadose ACT: Tile drain at Mohawk (6–12")	R	05/25/05	1221	1.0	<1.0	<1.0
395124085510801	Vadose ACT: Tile drain at Mohawk (6–12")	R	05/25/05	1301	<1.0	13	<1.0
395124085510801	Vadose ACT: Tile drain at Mohawk (6–12")	R	05/25/05	1311	<1.0	4.7	<1.0
395124085510801	Vadose ACT: Tile drain at Mohawk (6–12")	LD	05/25/05	1311	<1.0	3.5	<1.0
395124085510801	Vadose ACT: Tile drain at Mohawk (6–12")	R	05/25/05	1321	<1.0	<1.0	<1.0
395124085510801	Vadose ACT: Tile drain at Mohawk (12–18")	R	05/25/05	1202	4.1	<1.0	<1.0
395124085510801	Vadose ACT: Tile drain at Mohawk (12–18")	R	05/25/05	1212	7.1	<1.0	<1.0

**Table 6.** Analytical results for glyphosate, aminomethylphosphonic acid, and glufosinate in Toxic Substances Hydrology Program studies, 2001–06.—Continued

[Sample type: FB, field blank; FR, field replicate; R, regular; LD, laboratory duplicate; --, no data; &lt;, less than; µg/L, micrograms per liter]

Site number	Site location/soil core depth in inches (")	Sample type	Date of collection (month/day/year)	Collection time (24-hour)	Concentrations		
					Glyphosate (µg/L)	Amino-methylphosphonic acid (µg/L)	Glufosinate (µg/L)
Sensitive environments study, 2004–06—Continued							
Leary Weber Ditch Basin, Indiana (soils)—Continued							
395124085510801	Vadose ACT: Tile drain at Mohawk (12–18")	R	05/25/05	1222	3.5	<1.0	<1.0
395124085510801	Vadose ACT: Tile drain at Mohawk (12–18")	R	05/25/05	1302	<1.0	1.9	<1.0
395124085510801	Vadose ACT: Tile drain at Mohawk (12–18")	R	05/25/05	1312	<1.0	<1.0	<1.0
395124085510801	Vadose ACT: Tile drain at Mohawk (12–18")	R	05/25/05	1322	<1.0	1.7	<1.0
03361638	Leary Weber Ditch at Mohawk (0–6")	R	04/19/05	1730	2.2	4.0	<1.0
03361638	Leary Weber Ditch at Mohawk (0–6")	FR	04/19/05	1740	<1.0	<1.0	<1.0
03361638	Leary Weber Ditch at Mohawk (0–6")	FR	04/19/05	1750	<1.0	<1.0	<1.0
03361638	Leary Weber Ditch at Mohawk (0–6")	FR	04/19/05	1751	<1.0	<1.0	<1.0
03361638	Leary Weber Ditch at Mohawk (0–6")	R	05/25/05	1100	<1.0	<1.0	<1.0
03361638	Leary Weber Ditch at Mohawk (0–6")	FR	05/25/05	1110	<1.0	<1.0	<1.0
03361638	Leary Weber Ditch at Mohawk (0–6")	FR	05/25/05	1120	<1.0	<1.0	<1.0

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