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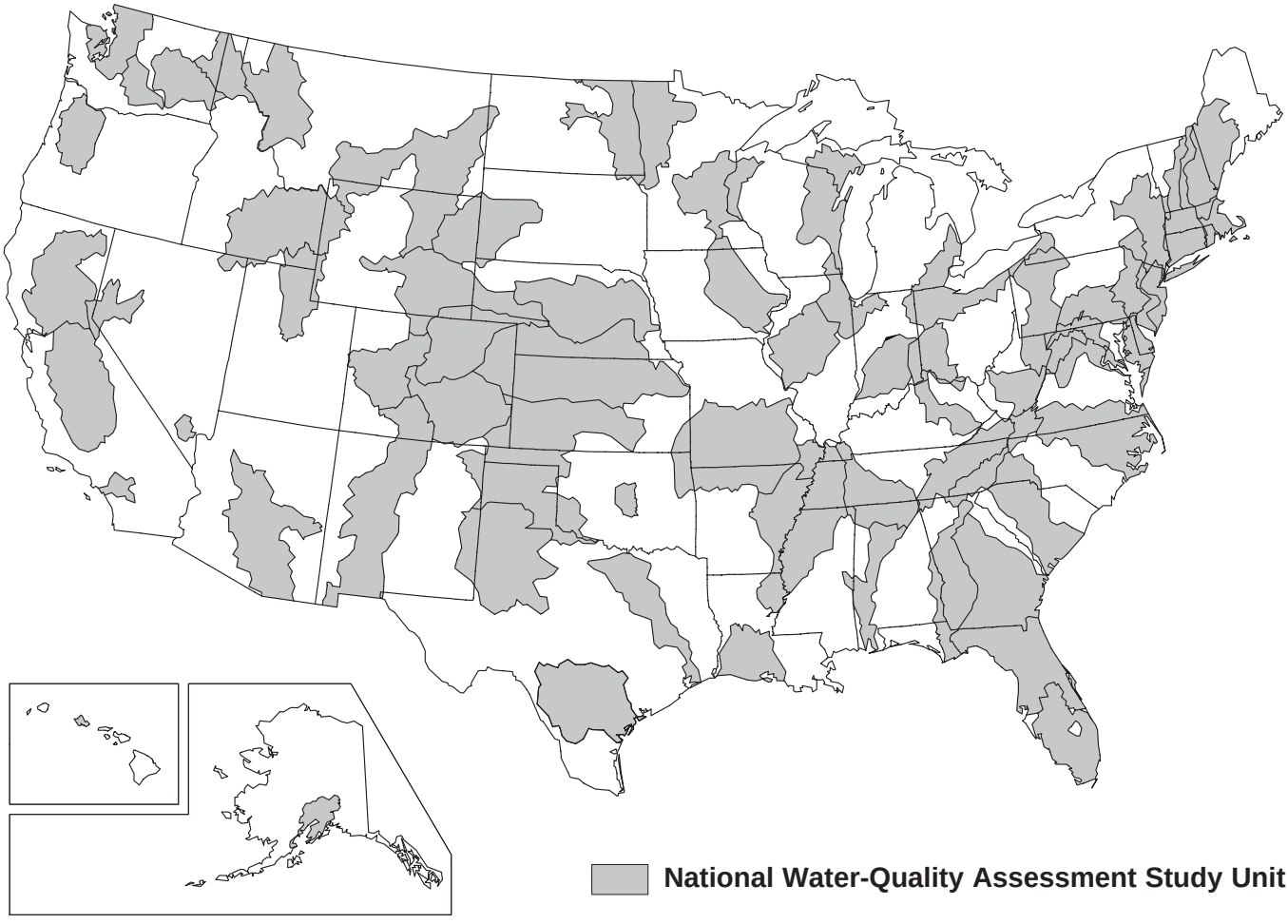
Summary and Evaluation of Pesticides in Field Blanks Collected for the National Water-Quality Assessment Program, 1992–95

Open-File Report 98-412



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National Water-Quality Assessment Program

U.S. Department of the Interior
U.S. Geological Survey

Summary and Evaluation of Pesticides in Field Blanks Collected for the National Water-Quality Assessment Program, 1992–95

By Jeffrey D. Martin, Robert J. Gilliom, and Terry L. Schertz

National Water-Quality Assessment Program
Open-File Report 98-412

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<URL:http://wwwrvares.er.usgs.gov/nawqa/nawqa_home.html>

FOREWORD

The mission of the U.S. Geological Survey (USGS) is to assess the quantity and quality of the earth resources of the Nation and to provide information that will assist resource managers and policymakers at Federal, State, and local levels in making sound decisions. Assessment of water-quality conditions and trends is an important part of this overall mission.

One of the greatest challenges faced by water-resources scientists is acquiring reliable information that will guide the use and protection of the Nation's water resources. That challenge is being addressed by Federal, State, interstate, and local water-resource agencies and by many academic institutions. These organizations are collecting water-quality data for a host of purposes that include: compliance with permits and water-supply standards; development of remediation plans for specific contamination problems; operational decisions on industrial, wastewater, or water-supply facilities; and research on factors that affect water quality. An additional need for water-quality information is to provide a basis on which regional- and national-level policy decisions can be based. Wise decisions must be based on sound information. As a society we need to know whether certain types of water-quality problems are isolated or ubiquitous, whether there are significant differences in conditions among regions, whether the conditions are changing over time, and why these conditions change from place to place and over time. The information can be used to help determine the efficacy of existing water-quality policies and to help analysts determine the need for and likely consequences of new policies.

To address these needs, the U.S. Congress appropriated funds in 1986 for the USGS to begin a pilot program in seven project areas to develop and refine the National Water-Quality Assessment (NAWQA) Program. In 1991, the USGS began full implementation of the program. The NAWQA Program builds upon an existing base of water-quality studies of the USGS, as well as those of other Federal, State, and local agencies. The objectives of the NAWQA Program are to:

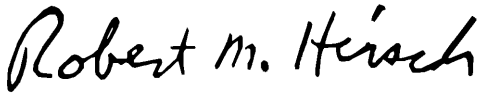
- Describe current water-quality conditions for a large part of the Nation's freshwater streams, rivers, and aquifers.
- Describe how water quality is changing over time.
- Improve understanding of the primary natural and human factors that affect water-quality conditions.

This information will help support the development and evaluation of management, regulatory, and monitoring decisions by other Federal, State, and local agencies to protect, use, and enhance water resources.

The goals of the NAWQA Program are being achieved through ongoing and proposed investigations of 59 of the Nation's most important river basins and aquifer systems, which are referred to as Study Units. These Study Units are distributed throughout the Nation and cover a diversity of hydrogeologic settings. More than two-thirds of the Nation's freshwater use occurs within the 59 Study Units and more than two-thirds of the people served by public water-supply systems live within their boundaries.

National synthesis of data analysis, based on aggregation of comparable information obtained from the Study Units, is a major component of the program. This effort focuses on selected water-quality topics using nationally consistent information. Comparative studies will explain differences and similarities in observed water-quality conditions among study areas and will identify changes and trends and their causes. The first topics addressed by the national synthesis are pesticides, nutrients, volatile organic compounds, and aquatic biology. Discussions on these and other water-quality topics will be published in periodic summaries of the quality of the Nation's ground and surface water as the information becomes available.

This report is an element of the comprehensive body of information developed as part of the NAWQA Program. The program depends heavily on the advice, cooperation, and information from many Federal, State, interstate, Tribal, and local agencies and the public. The assistance and suggestions of all are greatly appreciated.



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Water-Quality Units and Abbreviations

Water-quality units used in this report: Chemical concentration is given in micrograms per liter (µg/L). Micrograms per liter is a unit expressing the concentration of chemical constituents in solution as weight (micrograms) of solute per unit volume (liter) of water. For concentrations less than 7,000,000 µg/L, the numerical value is the same as for concentrations in parts per billion.

The following abbreviations are used in this report:

Abbreviation	Description
E	Concentration is estimated
GC/MS	Gas chromatography/mass spectrometry
HPLC	High-performance liquid chromatography
MDL	Method detection limit
NAWQA	National Water-Quality Assessment
NWQL	National Water Quality Laboratory
QC	Quality control
USGS	U.S. Geological Survey

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Abstract

Field blanks are quality-control samples used to assess contamination in environmental water samples. Contamination is the unintentional introduction of a chemical (pesticides in this instance) into an environmental water sample from sources such as inadequately cleaned equipment, dirty hands, dust, rain, or fumes. Contamination causes a positive bias in analytical measurements that may need to be considered in the analysis and interpretation of the environmental data. Estimates of pesticide contamination in environmental water samples collected for the National Water-Quality Assessment (NAWQA) Program are used to qualify, where needed, interpretations of the occurrence and distribution of pesticides in the surface and ground waters of the United States.

Field blanks collected from 1992 to 1995 as part of the NAWAQA Program were analyzed for 88 pesticides and pesticide metabolites. Of 47 pesticides determined by gas chromatography/mass spectrometry, 23 were detected at least once in 175 surface-water field blanks and 15 were detected at least once in 145 ground-water field blanks. The most frequently detected pesticides in surface-water field blanks were atrazine (in 10.9 percent of blanks), simazine (9.1 percent), and metolachlor (4.6 percent). The most frequently detected pesticides in ground-water field blanks were p,p′-DDE (4.1 percent) and atrazine (2.8 percent). The maximum pesticide concentration detected by gas chromatography/mass spectrometry in a surface-water field blank was 0.120 microgram per liter (µg/L) for pronamide; the maximum concentration detected in a ground-water field blank was 0.013 µg/L for chlorpyrifos and prometon. Of 41 pesticides determined by high-performance liquid chromatography, diuron and 2,4-D were detected once in 109 surface-water field blanks and bromacil, diuron, and fenuron were detected once in 104 ground-water field blanks. Except for a detection of 2,4-D at 0.230 µg/L, the detectable concentrations of these pesticides were less than or equal to 0.020 µg/L.

Field blanks showed no evidence of contamination by most pesticides. Of the 88 pesticides for which the field blanks were analyzed, 63 were not detected in field blanks from surface-water sites and 70 were not detected in field blanks from ground-water sites. Therefore, environmental data for the pesticides not detected in field blanks can be interpreted without qualification for contamination.

Field blanks did show evidence of contamination by some pesticides. Most of the pesticides detected in field blanks, however, were detected more frequently and at higher concentrations in environmental water samples. Two criteria were used to evaluate the need to consider contamination in water-quality assessments: (1) a ratio of the frequency of pesticide detection in environmental water samples to the frequency of detection in field blanks of 5.0 or less and

(2) a ratio of the median concentration detected in environmental water samples to the maximum concentration detected in field blanks of 2.0 or less. These criteria indicate that contamination, for the majority of the pesticide data collected for the NAWQA Program, probably does not need to be considered in the analysis and interpretation of (1) the frequency of pesticide detection or (2) the median concentration of pesticides detected. Contamination must be considered, however, in detection frequency for cis-permethrin, pronamide, p,p′-DDE, pebulate, propargite, ethalfluralin, and triallate in surface water and fenuron, benfluralin, pronamide, cis-permethrin, triallate, chlorpyrifos, trifluralin, propanil, p,p′-DDE, bromacil, dacthal, diazinon, and diuron in ground water. Contamination also must be considered in median concentrations detected for pronamide, p,p′-DDE, propargite, napropamide, and triallate in surface water and benfluralin, cis-permethrin, triallate, chlorpyrifos, trifluralin, p,p′-DDE, dacthal, and diazinon in ground water.

Introduction

The U.S. Geological Survey (USGS) began implementing the National Water-Quality Assessment (NAWQA) Program in 1991. The goals of the NAWQA Program are to describe current water-quality conditions and trends in the Nation's rivers, streams, and ground water and to understand the natural characteristics and human influences that affect water quality (Hirsch and others, 1988, p. 1).

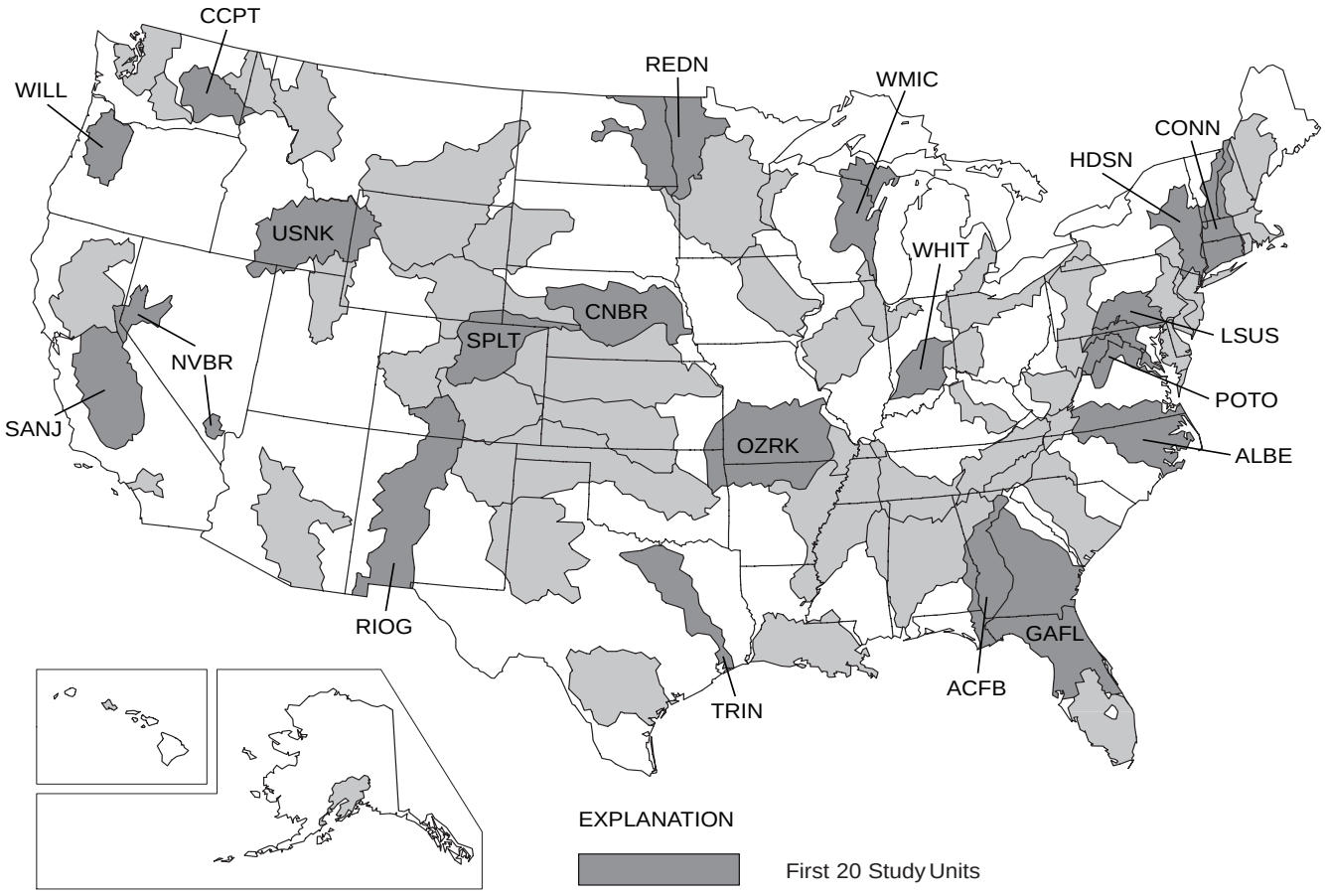
The NAWQA Program is assessing the water quality of 59 of the Nation's largest river basins and aquifers (fig. 1). These 59 river basins and aquifers, known as NAWQA Study Units, account for about half the land area of the conterminous United States and approximately 60 to 70 percent of the Nation's water use and population served by public water supplies (Leahy and Wilber, 1991, p. 1). The 59 Study-Unit investigations are divided into three groups that assess water quality on a rotational schedule. Investigations of water quality in 20 Study Units began in 1991 (fig. 1), and water samples were collected during 1992 through 1995. Study-Unit investigations and national synthesis are the major design features of the NAWQA Program that allow water-quality information collected and interpreted locally to be integrated into a national description of water quality (Gilliom and others, 1995, p. 2–3).

One of the major tasks of the NAWQA Program is to assess the occurrence and distribution of pesticides in surface and ground water. The goal for Study-Unit investigations is to identify which pesticides occurred in the water resources of the Study Unit and to characterize and explain the geographic and seasonal distributions of pesticides (Gilliom and others, 1995, p. 4–6). The goal for national synthesis is to characterize, compare, and explain the geographic and seasonal distributions of pesticides among the broad range of land-use and hydrologic settings in the United States.

Purpose and Scope

The purpose of this report is to describe the frequency and magnitude of pesticide contamination in field blanks and, from the data for field blanks, estimate the frequency and magnitude of pesticide contamination in environmental water samples collected from the surface- and ground-water-quality-data networks of the NAWQA Program. This report summarizes concentrations of 88 pesticides and pesticide metabolites (hereafter referred to as "pesticides") in field blanks collected for the NAWQA Program, interprets patterns of pesticide contamination, and evaluates the need to consider contamination in the analysis and interpretation of pesticide data for assessments of water quality. Estimates of the frequency and magnitude of contamination are used to qualify, where needed, interpretations of the occurrence and distribution of pesticides in the waters of the United States.

Analytical data for 175 surface-water field blanks and 145 ground-water field blanks for pesticides analyzed by gas chromatography/mass spectrometry (GC/MS) and data for 109 surface-water field blanks and 104 ground-water field blanks for pesticides analyzed by high-performance liquid chromatography (HPLC) are



EXPLANATION

First 20 Study Units

Other Study Units

Map Acronym	NAWQA Study Units
ALBE	Albemarle-Pamlico Drainage
ACFB	Apalachicola-Chattahoochee-Flint River Basin
CCPT	Central Columbia Plateau
CNBR	Central Nebraska Basin
CONN	Connecticut, Housatonic, and Thames River Basins
GAFL	Georgia-Florida Coastal Plain
HDSN	Hudson River Basin
LSUS	Lower Susquehanna River Basin
NVBR	Nevada Basin and Range
OZRK	Ozark Plateaus
POTO	Potomac River Basin
REDN	Red River of the North
RIOG	Rio Grande Valley
SANJ	San Joaquin-Tulare Basins
SPLT	South Platte River Basin
TRIN	Trinity River Basin
USNK	Upper Snake River Basin
WMIC	Western Lake Michigan Drainage
WHIT	White River Basin
WILL	Willamette Basin

Figure 1. Locations of National Water-Quality Assessment Program Study Units.

presented in tables that provide national summaries of pesticide detections for these combinations of analytical methods and site types. Analytical data for pesticides also are summarized in tables that show (1) pesticide detections in individual field blanks and (2) the distribution of pesticide detections among NAWQA Study Units. These tables are in the appendixes.

The need to consider pesticide contamination in the analysis and interpretation of pesticide data for assessments of water quality was evaluated by comparing the frequency and magnitude of pesticide detections in field blanks to those in environmental water samples. In addition, upper confidence limits for the 95th-percentile concentrations of pesticides in field blanks were calculated and interpreted for use in evaluating the need to consider contamination in the analysis and interpretation of pesticide data.

Acknowledgments

The authors thank the NAWQA field teams that collected, reviewed, compiled, and answered questions about the analytical data for the field blanks summarized in this report. We thank U.S. Geological Survey employees: Jonathon C. Scott for invaluable programming and data-base assistance; Barbara C. Ruddy for processing Study-Unit data sets for the NAWQA quality-control data base; Kimberly D. Pirkey for summary statistics of atrazine in laboratory blanks; Steven J. Larson and Dana W. Kolpin for summary statistics of pesticide concentrations in environmental water samples; Jack E. Barbash, Mark E. Brigham, David K. Mueller, and Mark W. Sandstrom for technical review of early drafts of the report; Charles G. Crawford for technical review of the final draft of the report; and Patricia H. Long for editorial review and assistance in production of the text.

Objectives and Procedures for the Collection and Analysis of Field Blanks

Blanks are used to assess contamination in environmental water samples. A blank is a quality-control (QC) sample that is expected to be free of the chemical of interest. Contamination is the unintentional introduction of a chemical (pesticides in this instance) into a blank (or an environmental water sample) from sources such as inadequately cleaned equipment, dirty hands, dust, rain, or fumes. Contamination in a blank is indicated when pesticides are detected in a blank but not in the water used to make the blank. Contamination causes a positive bias in analytical measurements that may need to be considered in the analysis and interpretation of the environmental data.

Objectives and Use

Field blanks are a particular type of blank that are collected to determine if any part of the data-generation process (sample collection, processing, transport, or laboratory analysis) has introduced contamination into the field blank. Field blanks measure all of the possible sources of contamination that might affect environmental water samples. If contamination is found in field blanks (if pesticides are detected), other types of blanks can be collected to try to identify the part of the data-generation process causing contamination. Because field blanks are collected in a manner that simulates the collection of environmental water samples as much as practicable and because the sources and mechanisms of contamination for field blanks are expected to be similar to the sources and mechanisms of contamination for environmental water samples, statistics of the frequency and magnitude of contamination in field blanks are used to estimate the frequency and magnitude of contamination in environmental water samples.

Information on contamination is used to (1) document the quality of the data, (2) decide if data quality is sufficient to meet the study objectives or if changes to the data program or objectives are needed, and (3) qualify, where needed, interpretation of water-quality data. Data-quality goals for the NAWQA Program are (1) documented data-collection methods are used, (2) the quality of the data is known and documented, and (3) the data are suitable for water-quality assessments (Koterba and others, 1995, p. 5).

Collection Guidelines

Guidelines for the collection of QC samples for ground- and surface-water sites (P. Patrick Leahy, U.S. Geological Survey, written commun., December 21, 1992, and June 9, 1993) recommend that approximately 15 percent of the Study-Unit analytical budget be allocated for the analysis of QC samples collected by NAWQA field teams. Field blanks (for estimating bias), field replicates (for estimating precision), and replicate field matrix spikes (for estimating bias and precision) were the recommended types of QC samples, but NAWQA field teams had the flexibility to collect the types of QC samples that addressed individual Study-Unit conditions and the concerns of field teams.

The guidelines recommended that field blanks are (1) collected routinely during the collection period of environmental water samples; (2) collected during periods when contamination is most probable, such as after field equipment has been in contact with high concentrations of pesticides or during the seasons of pesticide applications; and (3) distributed among sites to assess a broad range of locations, hydrologic conditions, and water types. Guidelines for the collection of QC samples for the NAWQA Program have been revised and published (Koterba and others, 1995; Mueller and others, 1997).

Field Procedures

Field blanks were collected, processed, and analyzed in a manner that simulates the collection, processing, transport, and analysis of environmental water samples. Procedures for the collection and processing of environmental water samples for the NAWQA Program are described by Shelton (1994) for surface water and by Koterba and others (1995) for ground water.

In brief, the collection and processing of surface-water samples were simulated by pouring blank water (pesticide-grade water suitable for use in the collection of field blanks) into the sampler bottle, capping the sampler bottle with the cap and nozzle assembly, shaking, and pouring the blank water into a splitter. Blank water from the splitter was filtered into sample bottles. The collection and processing of ground-water samples were simulated by pouring blank water into a standpipe, placing a submersible pump in the standpipe, and pumping the blank water through a filter into sample bottles. Field blanks were shipped to the National Water Quality Laboratory (NWQL) of the USGS in Arvada, Colo., for analysis for pesticides.

Field blanks from ground-water sites generally were collected with equipment cleaned on site after the collection of environmental water samples to determine if cleaning procedures removed contamination introduced by water at the site. Field blanks from surface-water sites were collected prior to the collection of environmental water samples to determine if cleaning procedures removed contamination introduced by water at the previous site and if contamination was introduced by the transport of equipment to the current site. Field blanks from both types of sites measure contamination introduced by the site environment (atmosphere) and by sample handling, processing, and analysis.

Analytical Methods for Pesticides

The NWQL developed two analytical methods for identification and quantitation of a variety of pesticides at concentrations as low as 0.001 to 0.050 µg/L. NAWQA field teams select these analytical methods by requesting NWQL laboratory schedules, which are specific lists of pesticides that are analyzed by particular types of laboratory instrumentation and procedures (Timme, 1995, p. 22). NWQL schedules are identified for the benefit of USGS readers of this report. Chemical Abstract Service registry numbers, analytical methods, and USGS National Water Information System and U.S. Environmental Protection Agency Data Storage and Retrieval System parameter codes are presented in appendix A.

NWQL schedules 2001 and 2010 (Timme, 1995, p. 60, 80) request analyses for 47 pesticides that are isolated from filtered water by C-18 solid-phase extraction and identified and quantitated by capillary-column GC/MS with selected-ion monitoring (Zaugg and others, 1995). The pesticide acetochlor was added to the GC/MS method in June 1994 (Lindley and others, 1996). NWQL schedules 2050 and 2051 (Timme, 1995, p. 61, 80) request analyses for 41 pesticides that are isolated from filtered water by Carbopak-B solid-phase

extraction and identified and quantitated by HPLC with a photodiode-array detector (Werner and others, 1996). The pesticides carbaryl, carbofuran, and linuron are analyzed by both analytical methods. Both methods have optional procedures for the on-site extraction of water samples by field personnel. Schedules 2010 and 2051 request analyses for pesticides that were extracted from filtered water samples on site, whereas schedules 2001 and 2050 request analyses for pesticides that were extracted from filtered water samples at the NWQL.

Statistically determined method detection limits have been calculated for all pesticides in both methods. The method detection limit (MDL) is defined as

> The minimum concentration of a substance that can be identified, measured, and reported with 99 percent confidence that the analyte concentration is greater than zero; determined from analysis of a sample in a given matrix containing [the] analyte (Wershaw and others, 1987, p. 4)

and was determined by the procedure described by the U.S. Environmental Protection Agency (1992). The calculated MDL controls the rate of false-positive errors (determining that a pesticide is present in a sample when, in truth, it is absent) primarily on the basis of quantitation variability at concentrations near the MDL.

The MDL is matrix specific for pesticide-grade water and does not account for matrix interference from environmental water samples.

> With clean environmental samples, analysts are able to detect analytes in concentrations less than the MDL; while conversely, with complex samples, analysts may be unable to detect analytes in concentrations greater than the MDL (Jeffrey W. Pritt, U.S. Geological Survey, written commun., July 8, 1994).

Field blanks are made with pesticide-grade water and, therefore, matrix interference is not expected for field blanks (Mark W. Sandstrom, U.S. Geological Survey, written commun., April 25, 1997).

Low-level detections of pesticides are not censored at the MDL. All detections (pesticides conclusively identified by retention time and spectral characteristics) are quantitated, and concentrations less than the MDL are reported by the NWQL with an "E" remark (for example, E0.004 µg/L) to indicate that the concentration of the pesticide (not the presence) is estimated. Any detections of five pesticides analyzed by GC/MS (azinphos-methyl, carbaryl, carbofuran, desethylatrazine, and terbacil) and five pesticides analyzed by HPLC (chlorothalonil, dichlobenil, DNOC, esfenvalerate, and 1-naphthol) also are reported by the NWQL with an "E" remark. These pesticides have lower or more variable recovery in laboratory quality-control spikes than the other pesticides analyzed by the method (Zaugg and others, 1995, p. 35; Werner and others, 1996, p. 27, 34).

Nondetections (pesticides that could not be conclusively identified by retention time and spectral characteristics) are reported by the NWQL as less than the method detection limit (< MDL). In this report, nondetections are shown as "nd" in the tables.

Data Compilation and Analysis

Water-quality data for field blanks and other types of QC samples were reviewed by NAWQA field teams and submitted for aggregation into a national QC data base for the NAWQA Program (P. Patrick Leahy, U.S. Geological Survey, written commun., December 3, 1994). Most field teams submitted QC data in early 1995. Development of the NAWQA QC data base progressed throughout 1995 as field teams submitted data or updated previously submitted data.

All of the field blanks summarized in this report were made with either pesticide-grade or volatile-organic-compound-grade blank water obtained from the NWQL. These grades of blank water are purchased by the NWQL from commercial suppliers, analyzed for pesticides by the NWQL, and determined to be acceptable for use as blank water for pesticides (U.S. Geological Survey, 1992). Field blanks made with inorganic-grade blank water or with blank waters of unknown or unspecified grades were excluded from this summary.

Blanks with concentrations of a pesticide equal to or greater than 0.010 µg/L were referred back to field teams for verification that the samples were field blanks. Three samples were identified as environmental water samples that had been miscoded as field blanks; these samples were excluded from this summary.

The Univariate procedure of SAS (SAS Institute, Inc., 1990, p. 617–634) was used to calculate maximum, minimum, and selected percentiles of pesticide concentrations in field blanks. Pesticides detected in field blanks, but at estimated concentrations less than the MDL, were ranked higher than nondetections for the purposes of calculating the maximum, minimum, and percentiles of concentration. Minimum sample sizes were selected for the calculation of percentiles. The 99th percentile was not calculated for sample sizes less than 101, the 95th percentile was not calculated for sample sizes less than 21, the 90th percentile was not calculated for sample sizes less than 11, and the 75th percentile was not calculated for sample sizes less than 5.

One-sided, nonparametric upper confidence limits were calculated for the 95th-percentile (and other percentile) concentrations of pesticides in field blanks following the method of Hahn and Meeker (1991, p. 84–90). The 95th-percentile concentration was selected to indicate a magnitude of contamination that occurs infrequently (in 5 percent or less of the field blanks). A 90-percent confidence level was selected for the calculation of the upper confidence limit. The confidence limit is conservative because the calculation is based on discrete values (the ranks of the concentrations and the number of field blanks) and the calculated confidence levels are greater than 90 percent. Upper confidence limits for the 99th-percentile pesticide concentrations at the 90-percent confidence level could not be calculated because of insufficient sample size (Hahn and Meeker, 1991, p. 83).

Summary of Pesticides in Field Blanks

Although field blanks were collected from 1992 to 1995, the majority of the field blanks summarized in this report were collected in 1993 and 1994 (fig. 2), the first 2 years of the main 3-year data-collection phase for the first 20 NAWQA Study Units. More field blanks were analyzed by the GC/MS method than by the HPLC method, which reflects the greater number of environmental water samples analyzed by GC/MS. More field blanks were collected at surface-water sites than at ground-water sites. The majority of the field blanks (72 to 78 percent) were collected during April through August (fig. 2), a time period that corresponds to the planting and growing season in much of the United States.

The number of field blanks, their distribution among analytical methods and site types, and their distribution through time varied among the 20 NAWQA Study Units (fig. 3). Most of this variation can be attributed to the starting date of water-sample collection, the frequency of water-sample collection, the receipt date of analytical data from the NWQL, or the submission date of data to the NAWQA QC data base. For some Study Units, surface- or ground-water-data collection for pesticides did not begin until 1994, and routine analysis by the HPLC method did not become operational until March 1993. Analytical data for some blanks collected in late 1994 may not have been received by field teams prior to aggregation into the NAWQA QC data base and, consequently, are not summarized in this report. The field teams for five Study Units collected field blanks in 1992, but most field teams collected field blanks for pesticides periodically from 1993 through 1995. Only the field team for the Potomac River Basin Study Unit submitted data for field blanks collected in 1995 (fig. 3).

The temporal distribution of field blanks for the Nevada Basin and Range Study Unit is shown in figures 3 and 5; however, these blanks are not included in the national summaries of field blanks because of problems in transmitting the data to the NAWQA QC data base. Analytical data for these blanks are discussed in the text where appropriate.

National Summary of Field Blanks

Analytical data for 175 surface-water field blanks (table 1) and 145 ground-water field blanks (table 2) analyzed by GC/MS (NWQL schedules 2001 and 2010) and data for 109 surface-water field blanks (table 3) and 104 ground-water field

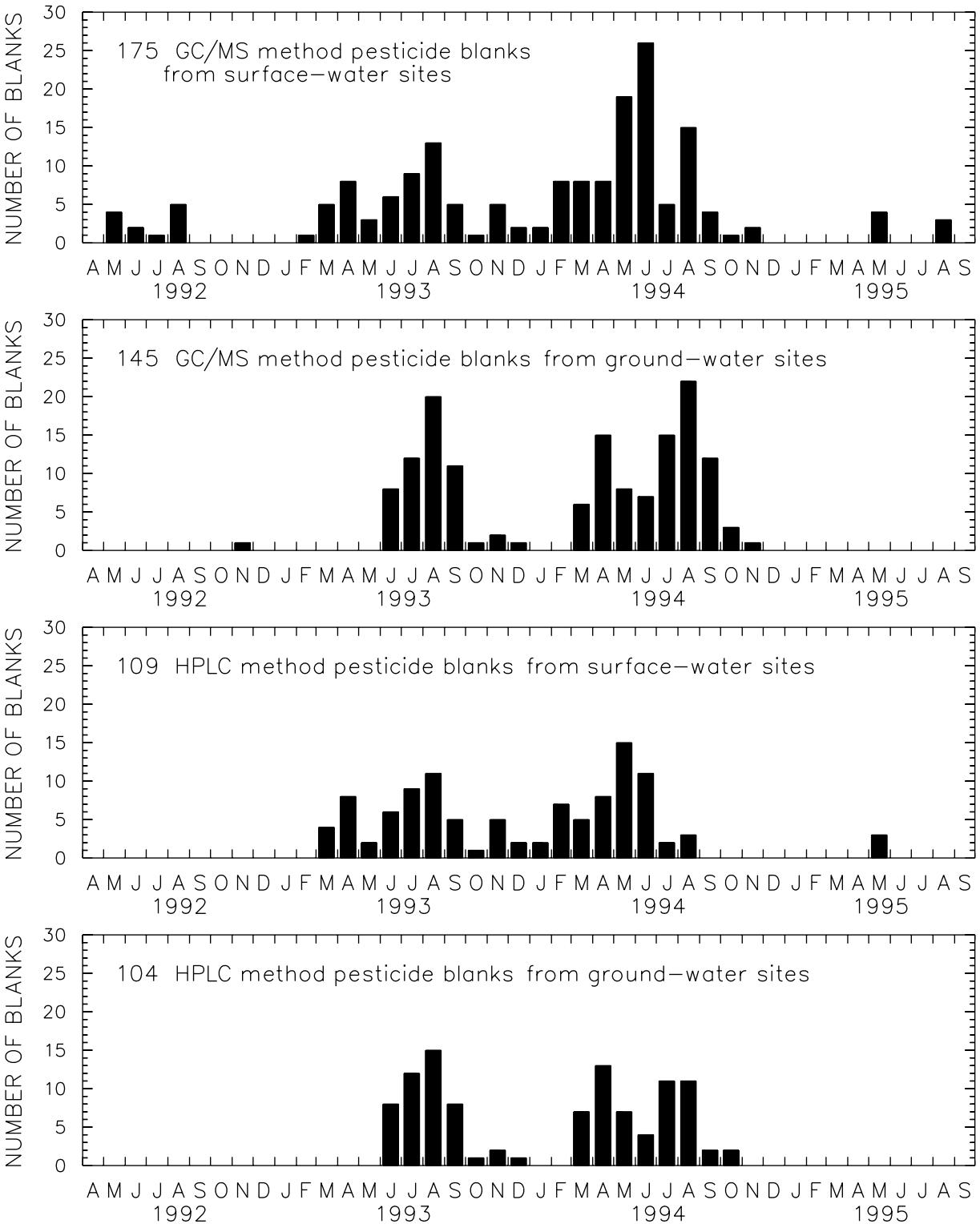


Figure 2. Temporal distribution of field blanks collected from surface- and ground-water sites of the National Water-Quality Assessment Program, 1992-95. (GC/MS, gas chromatography/mass spectrometry; HPLC, high-performance liquid chromatography.)

blanks (table 4) analyzed by HPLC (NWQL schedules 2050 and 2051) provide information on the frequency and magnitude of pesticide contamination in water samples for the NAWQA Program. Except for acetochlor, which was added to the GC/MS method in 1994, variations in the number of analytical values (the number of blanks) for pesticides in tables 1 to 4 are caused primarily by delays or difficulties in transmitting or receiving analytical data for some pesticides between the NWQL and Study-Unit data bases rather than being deleted values caused by matrix interferences or other analytical problems.

All pesticide detections are summarized by analytical method and site type to show relations among the pesticides detected in individual field blanks (appendix B). Analytical data for pesticides with detections in one or more field blanks are summarized by analytical method, site type, and Study Unit to show the frequency and magnitude of pesticide contamination among Study Units (appendixes C–F).

Field Blanks Analyzed by Gas Chromatography/Mass Spectrometry

In field blanks analyzed by GC/MS, pesticides generally were detected more frequently and at higher concentrations in surface-water field blanks than in ground-water field blanks. One or more pesticides were detected in 41 of 175 (23.4 percent) surface-water field blanks (table B1) and 16 of 145 (11.0 percent) ground-water field blanks (table B2). Of the 47 pesticides determined by GC/MS, 23 were detected at least once in 175 surface-water field blanks (table 1) and 15 were detected at least once in 145 ground-water field blanks (table 2). The most frequently detected pesticides in surface-water field blanks were atrazine (10.9 percent), simazine (9.1 percent), and metolachlor (4.6 percent). The most frequently detected pesticides in ground-water field blanks were p,p′-DDE (4.1 percent) and atrazine (2.8 percent).

When detected in field blanks, atrazine and simazine often were detected together, whereas p,p′-DDE generally was detected in isolation from other pesticides. In the 23 field blanks where atrazine was detected, simazine was detected in 15; and in the 18 field blanks where simazine was detected, atrazine was detected in 15 (tables B1 and B2). In 8 out of 10 field blanks where p,p′-DDE was detected, it was the only pesticide detected (tables B1 and B2).

Of the 23 pesticides detected at least once in surface-water field blanks, the maximum concentrations detected were less than or equal to 0.009 µg/L for 13 pesticides but were greater than or equal to 0.010 µg/L for 10 pesticides (table 1). The maximum pesticide concentration detected in a surface-water field blank was 0.120 µg/L for pronamide (table 1). Except for one detection of metolachlor, all detections of atrazine, simazine, and metolachlor were less than or equal to 0.009 µg/L (tables 1, B1, C3, C23, and C39). Except for pronamide and propargite, the 99th-percentile concentrations of pesticides in surface-water field blanks were less than or equal to 0.009 µg/L or were nondetections (table 1).

Of the 15 pesticides detected at least once in ground-water field blanks, the maximum concentrations detected were less than or equal to 0.006 µg/L for 11 pesticides but were greater than or equal to 0.011 µg/L for 4 pesticides (table 2). The maximum pesticide concentration detected in a ground-water field blank was 0.013 µg/L for chlorpyrifos and prometon (table 2). Except for chlorpyrifos, the 99th-percentile concentrations of pesticides in ground-water field blanks were less than or equal to 0.004 µg/L or were nondetections (table 2).

The Nevada Basin and Range Study Unit had detections of pesticides in 3 of 20 surface-water field blanks analyzed by GC/MS. A blank in September 1993 had detections of atrazine (0.004 µg/L) and simazine (0.005 µg/L), a blank in June 1994 had a detection of alpha-HCH (0.062 µg/L), and a blank in July 1994 had a detection of pendimethalin (0.032 µg/L). No pesticides were detected in four ground-water field blanks analyzed by GC/MS (Sharon A. Watkins, U.S. Geological Survey, written commun., April 28, 1997).

Field Blanks Analyzed by High-Performance Liquid Chromatography

Pesticides were detected infrequently in field blanks analyzed by HPLC. One or more pesticides were detected in 2 of 109 (1.8 percent) surface-water field blanks (table B3) and 2 of 104

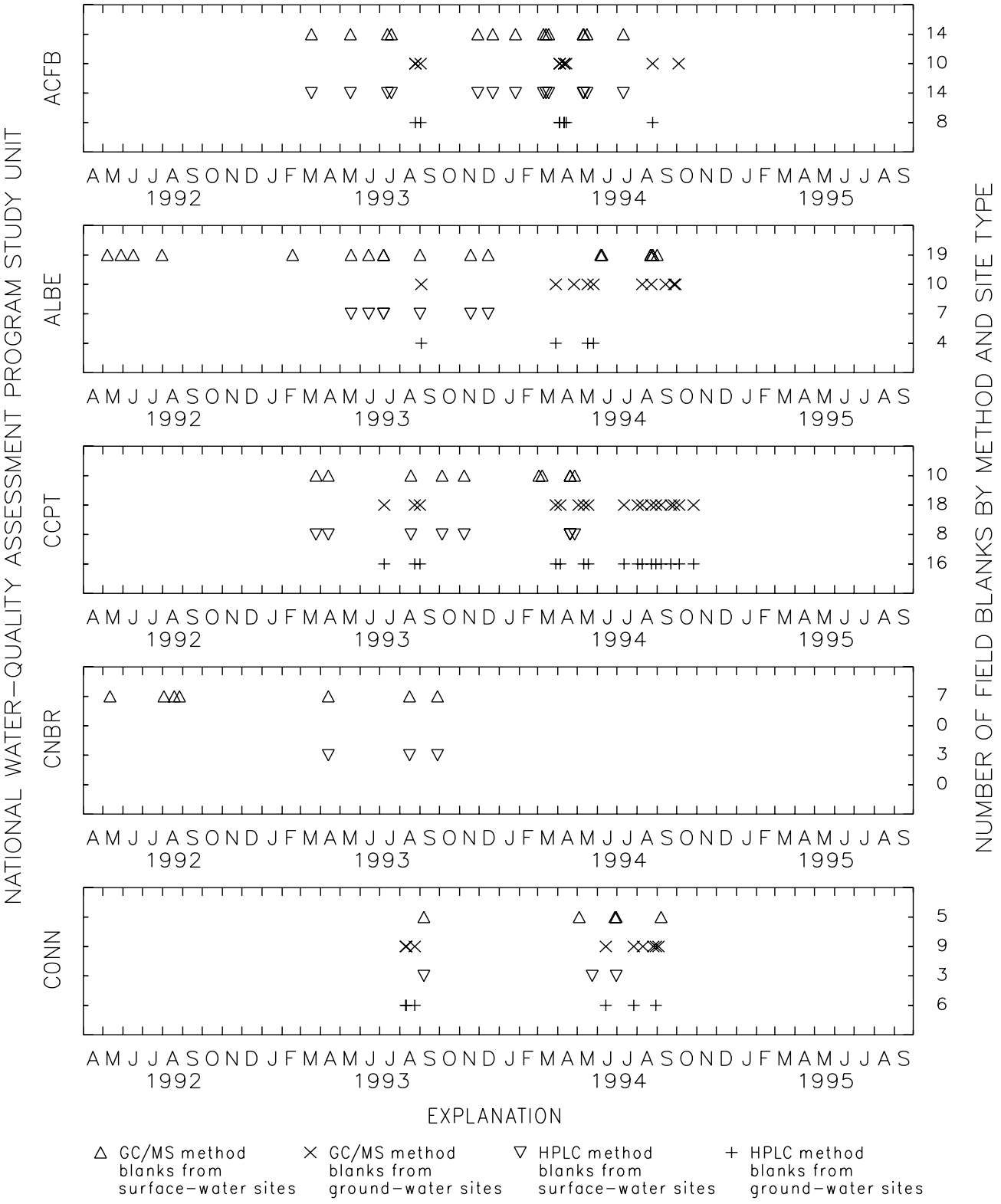


Figure 3. Temporal distribution of field blanks collected from surface- and ground-water sites of the National Water-Quality Assessment Program, 1992-95, by Study Unit. (Study-Unit abbreviations are explained in figure 1. GC/MS, gas chromatography/mass spectrometry; HPLC, high-performance liquid chromatography.)

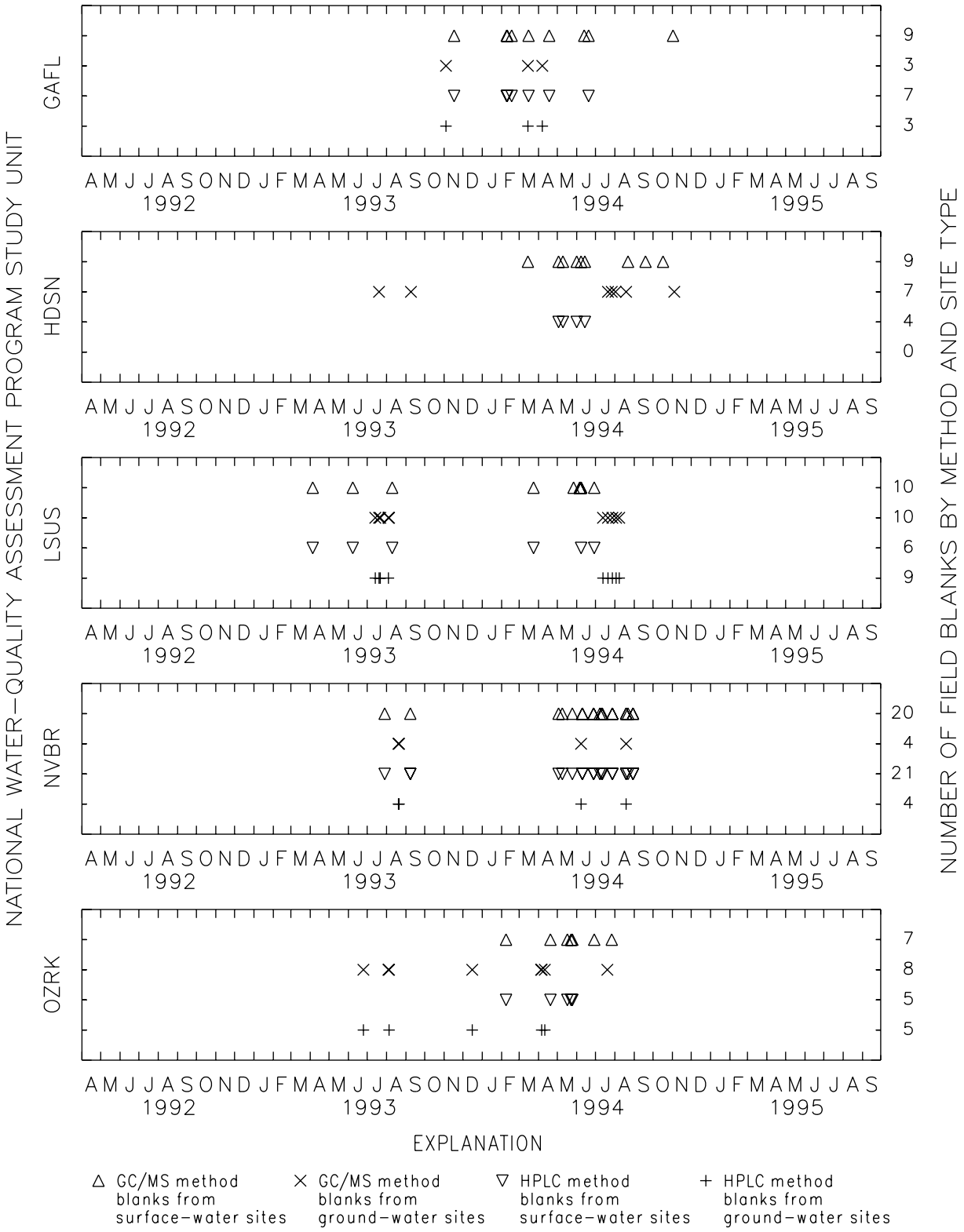


Figure 3. Temporal distribution of field blanks collected from surface- and ground-water sites of the National Water-Quality Assessment Program, 1992-95, by Study Unit—Continued.

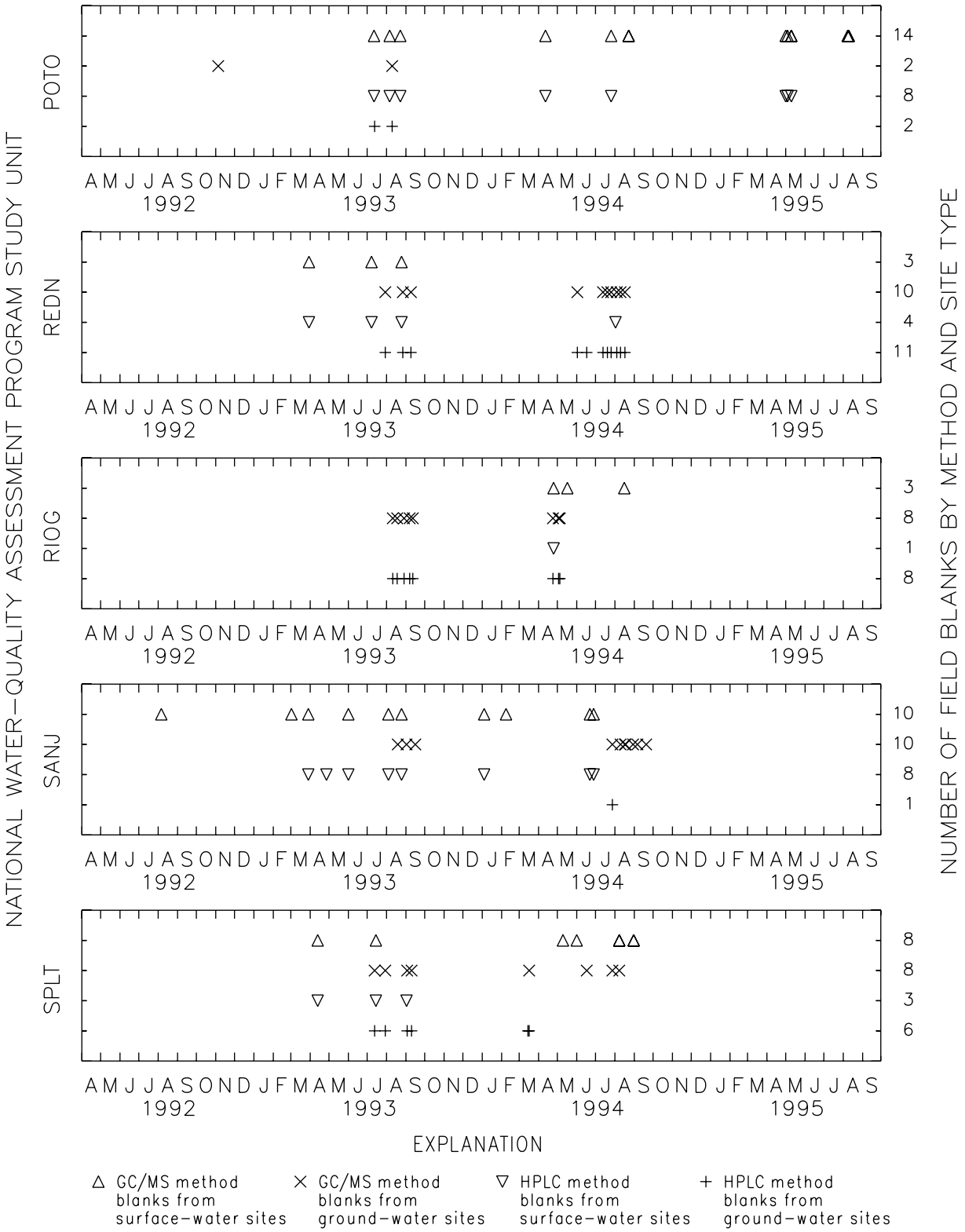


Figure 3. Temporal distribution of field blanks collected from surface- and ground-water sites of the National Water-Quality Assessment Program, 1992-95, by Study Unit—Continued.

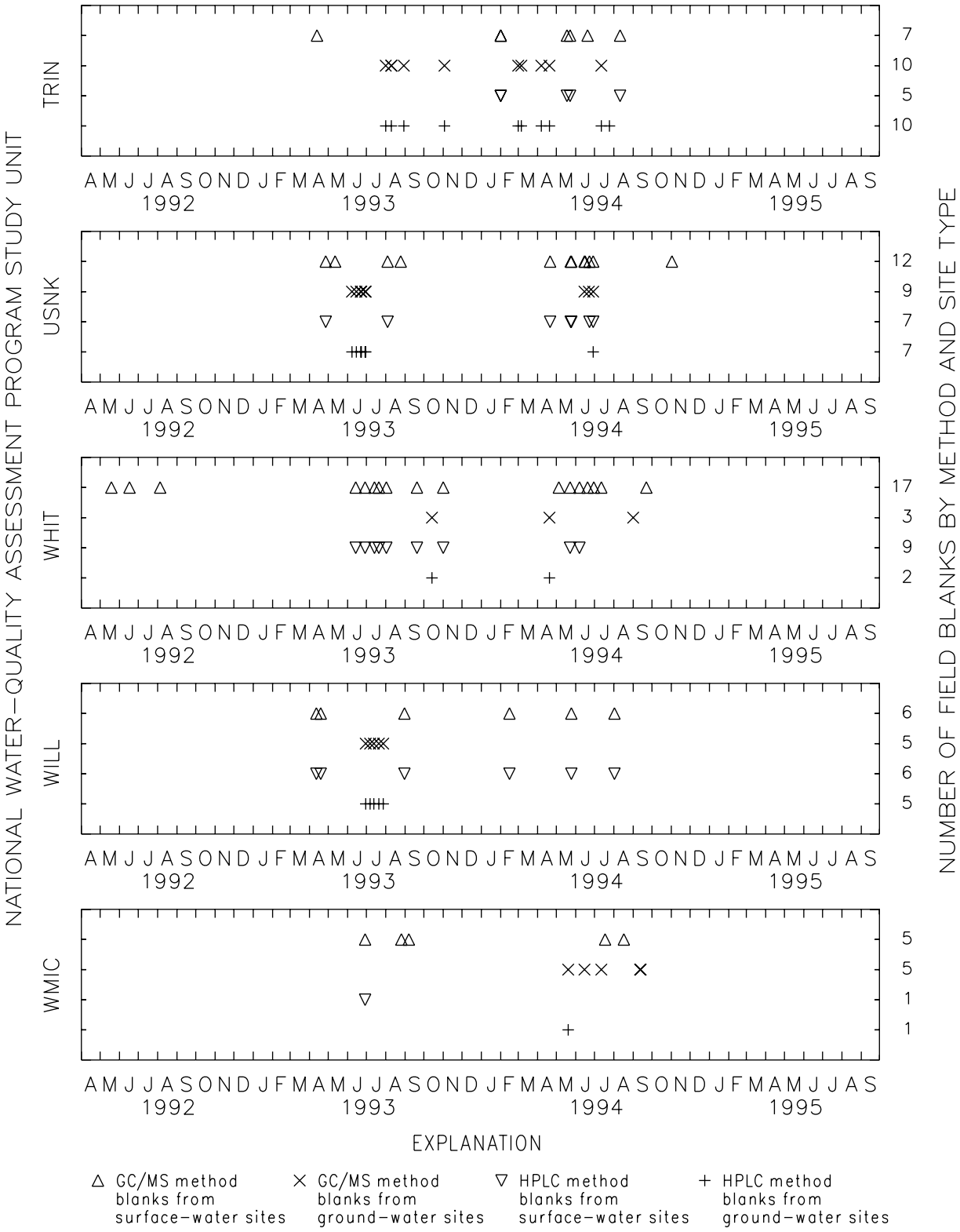


Figure 3. Temporal distribution of field blanks collected from surface- and ground-water sites of the National Water-Quality Assessment Program, 1992-95, by Study Unit—Continued.

Table 1. Statistical summary of pesticides in field blanks analyzed by gas chromatography/mass spectrometry from surface-water sites of the National Water-Quality Assessment Program, 1992–95

[Parameter code, the number used to identify a pesticide in the U.S. Geological Survey National Water Information System and the U.S. Environmental Protection Agency Data Storage and Retrieval System; MDL, method detection limit; µg/L, micrograms per liter; --, percentile not calculated; nd, pesticide not detected; E, pesticide detected and concentration estimated]

Parameter code	Pesticide	MDL (µg/L)	Number of field blanks	Number of detections	Percentage of detections	Percentiles of concentrations		Maximum concentration (µg/L)	Minimum concentration detected (µg/L)
						95th (µg/L)	99th (µg/L)		
49260	Acetochlor	0.002	17	0	0.0	--	--	nd	nd
46342	Alachlor	.002	175	3	1.7	nd	.005	.005	.002
39632	Atrazine	.001	175	19	10.9	.005	.008	.009	.003
82686	Azinphos-methyl	.001	164	0	.0	nd	nd	nd	nd
82673	Benfluralin	.002	171	0	.0	nd	nd	nd	nd
04028	Butylate	.002	175	0	.0	nd	nd	nd	nd
82680	Carbaryl	.003	171	2	1.2	nd	E .009	E .012	E .009
82674	Carbofuran	.003	171	0	.0	nd	nd	nd	nd
38933	Chlorpyrifos	.004	175	1	.6	nd	nd	.006	.006
04041	Cyanazine	.004	175	0	.0	nd	nd	nd	nd
82682	Dacthal	.002	171	1	.6	nd	nd	.003	.003
34653	p,p′-DDE	.006	175	4	2.3	nd	.008	.010	E .002
04040	Desethylatrazine	.002	175	1	.6	nd	nd	E .004	E .004
39572	Diazinon	.002	175	4	2.3	nd	.006	.038	.003
39381	Dieldrin	.001	175	0	.0	nd	nd	nd	nd
82660	2,6-Diethylaniline	.003	171	0	.0	nd	nd	nd	nd
82677	Disulfoton	.017	171	0	.0	nd	nd	nd	nd
82668	EPTC	.002	171	3	1.8	nd	.004	.086	.002
82663	Ethalfluralin	.004	171	1	.6	nd	nd	.006	.006
82672	Ethoprop	.003	171	0	.0	nd	nd	nd	nd
04095	Fonofos	.003	175	0	.0	nd	nd	nd	nd
34253	alpha-HCH	.002	175	0	.0	nd	nd	nd	nd
39341	gamma-HCH	.004	175	0	.0	nd	nd	nd	nd
82666	Linuron	.002	171	0	.0	nd	nd	nd	nd
39532	Malathion	.005	175	3	1.7	nd	.007	.015	E .003

Table 1. Statistical summary of pesticides in field blanks analyzed by gas chromatography/mass spectrometry from surface-water sites of the National Water-Quality Assessment Program, 1992–95—Continued

Parameter code	Pesticide	MDL (µg/L)	Number of field blanks	Number of detections	Percentage of detections	Percentiles of concentrations		Maximum concentration (µg/L)	Minimum concentration detected (µg/L)
						95th (µg/L)	99th (µg/L)		
82667	Methyl parathion	0.006	171	0	0.0	nd	nd	nd	nd
39415	Metolachlor	.002	175	8	4.6	nd	.008	.020	E .001
82630	Metribuzin	.004	175	1	.6	nd	nd	.007	.007
82671	Molinate	.004	171	0	.0	nd	nd	nd	nd
82684	Napropamide	.003	171	2	1.2	nd	.009	.100	.009
39542	Parathion	.004	175	0	.0	nd	nd	nd	nd
82669	Pebulate	.004	171	1	.6	nd	nd	.005	.005
82683	Pendimethalin	.004	171	0	.0	nd	nd	nd	nd
82687	cis-Permethrin	.005	171	1	.6	nd	nd	E .003	E .003
82664	Phorate	.002	171	0	.0	nd	nd	nd	nd
04037	Prometon	.018	175	3	1.7	nd	E .004	E .004	E .004
82676	Pronamide	.003	171	2	1.2	nd	.066	.120	.066
04024	Propachlor	.007	175	0	.0	nd	nd	nd	nd
82679	Propanil	.004	171	0	.0	nd	nd	nd	nd
82685	Propargite	.013	171	2	1.2	nd	.016	.074	.016
04035	Simazine	.005	175	16	9.1	E .004	.007	.007	E .002
82670	Tebuthiuron	.010	171	1	.6	nd	nd	.053	.053
82665	Terbacil	.007	164	0	.0	nd	nd	nd	nd
82675	Terbufos	.013	171	0	.0	nd	nd	nd	nd
82681	Thiobencarb	.002	171	0	.0	nd	nd	nd	nd
82678	Triallate	.001	171	2	1.2	nd	.001	.004	.001
82661	Trifluralin	.002	171	1	.6	nd	nd	.006	.006

Table 2. Statistical summary of pesticides in field blanks analyzed by gas chromatography/mass spectrometry from ground-water sites of the National Water-Quality Assessment Program, 1992–95

[Parameter code, the number used to identify a pesticide in the U.S. Geological Survey National Water Information System and the U.S. Environmental Protection Agency Data Storage and Retrieval System; MDL, method detection limit; µg/L, micrograms per liter; --, percentile not calculated; nd, pesticide not detected; E, pesticide detected and concentration estimated]

Parameter code	Pesticide	MDL (µg/L)	Number of field blanks	Number of detections	Percentage of detections	Percentiles of concentrations		Maximum concentration (µg/L)	Minimum concentration detected (µg/L)
						95th (µg/L)	99th (µg/L)		
49260	Acetochlor	0.002	15	0	0.0	--	--	nd	nd
46342	Alachlor	.002	145	0	.0	nd	nd	nd	nd
39632	Atrazine	.001	145	4	2.8	nd	.004	.012	.004
82686	Azinphos-methyl	.001	144	0	.0	nd	nd	nd	nd
82673	Benfluralin	.002	145	2	1.4	nd	.002	.003	.002
04028	Butylate	.002	145	0	.0	nd	nd	nd	nd
82680	Carbaryl	.003	145	0	.0	nd	nd	nd	nd
82674	Carbofuran	.003	145	0	.0	nd	nd	nd	nd
38933	Chlorpyrifos	.004	145	2	1.4	nd	.008	.013	.008
04041	Cyanazine	.004	145	0	.0	nd	nd	nd	nd
82682	Dacthal	.002	145	1	.7	nd	nd	E .001	E .001
34653	p,p′-DDE	.006	145	6	4.1	nd	E .002	E .002	E .001
04040	Desethylatrazine	.002	145	1	.7	nd	nd	E .005	E .005
39572	Diazinon	.002	145	1	.7	nd	nd	.011	.011
39381	Dieldrin	.001	145	0	.0	nd	nd	nd	nd
82660	2,6-Diethylaniline	.003	145	0	.0	nd	nd	nd	nd
82677	Disulfoton	.017	145	0	.0	nd	nd	nd	nd
82668	EPTC	.002	145	0	.0	nd	nd	nd	nd
82663	Ethalfluralin	.004	145	0	.0	nd	nd	nd	nd
82672	Ethoprop	.003	145	0	.0	nd	nd	nd	nd
04095	Fonofos	.003	145	0	.0	nd	nd	nd	nd
34253	alpha-HCH	.002	145	0	.0	nd	nd	nd	nd
39341	gamma-HCH	.004	145	0	.0	nd	nd	nd	nd
82666	Linuron	.002	145	0	.0	nd	nd	nd	nd
39532	Malathion	.005	145	0	.0	nd	nd	nd	nd

Table 2. Statistical summary of pesticides in field blanks analyzed by gas chromatography/mass spectrometry from ground-water sites of the National Water-Quality Assessment Program, 1992–95—Continued

Parameter code	Pesticide	MDL (μg/L)	Number of field blanks	Number of detections	Percentage of detections	Percentiles of concentrations		Maximum concentration (μg/L)	Minimum concentration detected (μg/L)
						95th (μg/L)	99th (μg/L)		
82667	Methyl parathion	0.006	145	0	0.0	nd	nd	nd	nd
39415	Metolachlor	.002	145	2	1.4	nd	.002	.006	.002
82630	Metribuzin	.004	145	0	.0	nd	nd	nd	nd
82671	Molinate	.004	145	0	.0	nd	nd	nd	nd
82684	Napropamide	.003	145	0	.0	nd	nd	nd	nd
39542	Parathion	.004	145	0	.0	nd	nd	nd	nd
82669	Pebulate	.004	145	0	.0	nd	nd	nd	nd
82683	Pendimethalin	.004	145	0	.0	nd	nd	nd	nd
82687	cis-Permethrin	.005	145	1	.7	nd	nd	E .003	E .003
82664	Phorate	.002	145	0	.0	nd	nd	nd	nd
04037	Prometon	.018	145	1	.7	nd	nd	E .013	E .013
82676	Pronamide	.003	145	1	.7	nd	nd	E .002	E .002
04024	Propachlor	.007	145	0	.0	nd	nd	nd	nd
82679	Propanil	.004	145	1	.7	nd	nd	E .002	E .002
82685	Propargite	.013	145	0	.0	nd	nd	nd	nd
04035	Simazine	.005	145	2	1.4	nd	E .001	E .001	E .001
82670	Tebuthiuron	.010	145	0	.0	nd	nd	nd	nd
82665	Terbacil	.007	144	0	.0	nd	nd	nd	nd
82675	Terbufos	.013	145	0	.0	nd	nd	nd	nd
82681	Thiobencarb	.002	145	0	.0	nd	nd	nd	nd
82678	Triallate	.001	145	2	1.4	nd	.001	.001	.001
82661	Trifluralin	.002	145	1	.7	nd	nd	.002	.002

Table 3. Statistical summary of pesticides in field blanks analyzed by high-performance liquid chromatography from surface-water sites of the National Water-Quality Assessment Program, 1992–95

[Parameter code, the number used to identify a pesticide in the U.S. Geological Survey National Water Information System and the U.S. Environmental Protection Agency Data Storage and Retrieval System; MDL, method detection limit; µg/L, micrograms per liter; --, percentile not calculated; nd, pesticide not detected; E, pesticide detected and concentration estimated]

Parameter code	Pesticide	MDL (µg/L)	Number of field blanks	Number of detections	Percentage of detections	Percentiles of concentrations		Maximum concentration (µg/L)	Minimum concentration detected (µg/L)
						95th (µg/L)	99th (µg/L)		
49315	Acifluorfen	0.035	91	0	0.0	nd	--	nd	nd
49312	Aldicarb	.016	92	0	.0	nd	--	nd	nd
49313	Aldicarb sulfone	.016	92	0	.0	nd	--	nd	nd
49314	Aldicarb sulfoxide	.021	92	0	.0	nd	--	nd	nd
38711	Bentazon	.014	96	0	.0	nd	--	nd	nd
04029	Bromacil	.035	109	0	.0	nd	nd	nd	nd
49311	Bromoxynil	.035	91	0	.0	nd	--	nd	nd
49310	Carbaryl	.008	92	0	.0	nd	--	nd	nd
49309	Carbofuran	.028	92	0	.0	nd	--	nd	nd
49307	Chloramben	.011	92	0	.0	nd	--	nd	nd
49306	Chlorothalonil	.035	91	0	.0	nd	--	nd	nd
49305	Clopyralid	.050	91	0	.0	nd	--	nd	nd
39732	2,4-D	.035	108	1	.9	nd	nd	.230	.230
49304	Dacthal monoacid	.017	91	0	.0	nd	--	nd	nd
38746	2,4-DB	.035	96	0	.0	nd	--	nd	nd
38442	Dicamba	.035	96	0	.0	nd	--	nd	nd
49303	Dichlobenil	.020	92	0	.0	nd	--	nd	nd
49302	Dichlorprop	.032	91	0	.0	nd	--	nd	nd
49301	Dinoseb	.035	91	0	.0	nd	--	nd	nd
49300	Diuron	.020	92	1	1.1	nd	--	E .010	E .010
49299	DNOC	.035	91	0	.0	nd	--	nd	nd
49298	Esfenvalerate	.019	92	0	.0	nd	--	nd	nd
49297	Fenuron	.013	92	0	.0	nd	--	nd	nd
38811	Fluometuron	.035	97	0	.0	nd	--	nd	nd
49308	3-Hydroxycarbofuran	.014	92	0	.0	nd	--	nd	nd

Table 3. Statistical summary of pesticides in field blanks analyzed by high-performance liquid chromatography from surface-water sites of the National Water-Quality Assessment Program, 1992–95—Continued

Parameter code	Pesticide	MDL (μg/L)	Number of field blanks	Number of detections	Percentage of detections	Percentiles of concentrations		Maximum concentration (μg/L)	Minimum concentration detected (μg/L)
						95th (μg/L)	99th (μg/L)		
38478	Linuron	0.018	97	0	0.0	nd	--	nd	nd
38482	MCPA	.050	96	0	.0	nd	--	nd	nd
38487	MCPB	.035	96	0	.0	nd	--	nd	nd
38501	Methiocarb	.026	97	0	.0	nd	--	nd	nd
49296	Methomyl	.017	92	0	.0	nd	--	nd	nd
49295	1-Naphthol	.007	92	0	.0	nd	--	nd	nd
49294	Neburon	.015	92	0	.0	nd	--	nd	nd
49293	Norflurazon	.024	92	0	.0	nd	--	nd	nd
49292	Oryzalin	.019	92	0	.0	nd	--	nd	nd
38866	Oxamyl	.018	97	0	.0	nd	--	nd	nd
49291	Picloram	.050	91	0	.0	nd	--	nd	nd
49236	Propham	.035	92	0	.0	nd	--	nd	nd
38538	Propoxur	.035	93	0	.0	nd	--	nd	nd
39762	Silvex	.021	108	0	.0	nd	nd	nd	nd
39742	2,4,5-T	.035	108	0	.0	nd	nd	nd	nd
49235	Triclopyr	.050	91	0	.0	nd	--	nd	nd

Table 4. Statistical summary of pesticides in field blanks analyzed by high-performance liquid chromatography from ground-water sites of the National Water-Quality Assessment Program, 1992–95

[Parameter code, the number used to identify a pesticide in the U.S. Geological Survey National Water Information System and the U.S. Environmental Protection Agency Data Storage and Retrieval System; MDL, method detection limit; µg/L, micrograms per liter; --, percentile not calculated; nd, pesticide not detected; E, pesticide detected and concentration estimated]

Parameter code	Pesticide	MDL (µg/L)	Number of field blanks	Number of detections	Percentage of detections	Percentiles of concentrations		Maximum concentration (µg/L)	Minimum concentration detected (µg/L)
						95th (µg/L)	99th (µg/L)		
49315	Acifluorfen	0.035	97	0	0.0	nd	--	nd	nd
49312	Aldicarb	.016	98	0	.0	nd	--	nd	nd
49313	Aldicarb sulfone	.016	98	0	.0	nd	--	nd	nd
49314	Aldicarb sulfoxide	.021	98	0	.0	nd	--	nd	nd
38711	Bentazon	.014	97	0	.0	nd	--	nd	nd
04029	Bromacil	.035	104	1	1.0	nd	nd	E .010	E .010
49311	Bromoxynil	.035	97	0	.0	nd	--	nd	nd
49310	Carbaryl	.008	98	0	.0	nd	--	nd	nd
49309	Carbofuran	.028	98	0	.0	nd	--	nd	nd
49307	Chloramben	.011	98	0	.0	nd	--	nd	nd
49306	Chlorothalonil	.035	96	0	.0	nd	--	nd	nd
49305	Clopyralid	.050	97	0	.0	nd	--	nd	nd
39732	2,4-D	.035	103	0	.0	nd	nd	nd	nd
49304	Dacthal monoacid	.017	97	0	.0	nd	--	nd	nd
38746	2,4-DB	.035	97	0	.0	nd	--	nd	nd
38442	Dicamba	.035	97	0	.0	nd	--	nd	nd
49303	Dichlobenil	.020	98	0	.0	nd	--	nd	nd
49302	Dichlorprop	.032	97	0	.0	nd	--	nd	nd
49301	Dinoseb	.035	97	0	.0	nd	--	nd	nd
49300	Diuron	.020	98	1	1.0	nd	--	.020	.020
49299	DNOC	.035	97	0	.0	nd	--	nd	nd
49298	Esfenvalerate	.019	98	0	.0	nd	--	nd	nd
49297	Fenuron	.013	98	1	1.0	nd	--	E .010	E .010
38811	Fluometuron	.035	98	0	.0	nd	--	nd	nd
49308	3-Hydroxycarbofuran	.014	98	0	.0	nd	--	nd	nd

Table 4. Statistical summary of pesticides in field blanks analyzed by high-performance liquid chromatography from ground-water sites of the National Water-Quality Assessment Program, 1992–95—Continued

Parameter code	Pesticide	MDL (µg/L)	Number of field blanks	Number of detections	Percentage of detections	Percentiles of concentrations		Maximum concentration (µg/L)	Minimum concentration detected (µg/L)
						95th (µg/L)	99th (µg/L)		
38478	Linuron	0.018	98	0	0.0	nd	--	nd	nd
38482	MCPA	.050	97	0	.0	nd	--	nd	nd
38487	MCPB	.035	97	0	.0	nd	--	nd	nd
38501	Methiocarb	.026	98	0	.0	nd	--	nd	nd
49296	Methomyl	.017	98	0	.0	nd	--	nd	nd
49295	1-Naphthol	.007	98	0	.0	nd	--	nd	nd
49294	Neburon	.015	98	0	.0	nd	--	nd	nd
49293	Norflurazon	.024	98	0	.0	nd	--	nd	nd
49292	Oryzalin	.019	98	0	.0	nd	--	nd	nd
38866	Oxamyl	.018	98	0	.0	nd	--	nd	nd
49291	Picloram	.050	97	0	.0	nd	--	nd	nd
49236	Propham	.035	98	0	.0	nd	--	nd	nd
38538	Propoxur	.035	96	0	.0	nd	--	nd	nd
39762	Silvex	.021	103	0	.0	nd	nd	nd	nd
39742	2,4,5-T	.035	103	0	.0	nd	nd	nd	nd
49235	Triclopyr	.050	97	0	.0	nd	--	nd	nd

(1.9 percent) ground-water field blanks (table B4). Of the 41 pesticides determined by HPLC, diuron and 2,4-D were detected once in 109 surface-water field blanks (table 3) and bromacil, diuron, and fenuron were detected once in 104 ground-water field blanks (table 4). Except for a detection of 2,4-D at 0.230 µg/L in a surface-water field blank (the highest concentration of any pesticide in any field blank), the detectable concentrations of pesticides analyzed by HPLC were E0.010 or 0.020 µg/L.

No pesticides were detected in 21 surface-water field blanks or 4 ground-water field blanks collected by the Nevada Basin and Range Study Unit and analyzed by HPLC (Sharon A. Watkins, U.S. Geological Survey, written commun., April 28, 1997).

Relation of Pesticide Detections in Field Blanks to Analytical Methods and Environmental Concentrations

The greater frequency of pesticide contamination in field blanks analyzed by GC/MS compared to HPLC probably is related to differences in the detection limits of the analytical methods and to differences in the amounts of pesticides used and their concentrations in the environment. MDL's for the HPLC method generally are 3 to 10 times higher than MDL's for the GC/MS method and range from 0.007 to 0.050 µg/L (table 3) and from 0.001 to 0.018 µg/L (table 1), respectively. Most of the pesticide detections in field blanks analyzed by GC/MS were at concentrations of 0.009 µg/L or less, concentrations that are less than the MDL's for 39 of the 41 pesticides determined by HPLC. Because the frequency of pesticide detection in the environment generally tends to increase with decreasing detection limits (Burkart and Kolpin, 1993, p. 646, 651), it is likely that the higher frequency of detection of pesticides in field blanks analyzed by GC/MS, compared to HPLC, can be attributed in part to differences in the detection limits of the analytical methods.

Exposure to the environment or exposure to inadequately cleaned sampling equipment are possible sources and mechanisms of sample contamination. Pesticides that are extensively used and are frequently detected in the environment might be expected to cause a higher frequency of contamination of field blanks than pesticides that are rarely used or are infrequently detected in the environment. Pesticides determined by the GC/MS method are used more extensively, detected more frequently, and detected at higher concentrations in the environment than pesticides determined by the HPLC method. In surface-water samples of the NAWQA Program, atrazine (80.7 percent of samples), metolachlor (73.1 percent), and simazine (69.4 percent) were the pesticides most frequently detected by the GC/MS method; 2,4-D (12.7 percent) and diuron (10.0 percent) were the pesticides most frequently detected by the HPLC method (Steven J. Larson, U.S. Geological Survey, written commun., August 2, 1997). That these pesticides also were the pesticides detected most frequently in field blanks is consistent with the hypothesis that contamination is associated with high concentrations of pesticides in the environment.

Similarly, atrazine (30.2 percent of samples) was the most frequently detected pesticide in ground-water samples of the NAWQA Program (Dana W. Kolpin, U.S. Geological Survey, written commun., July 29, 1997) and was the second most frequently detected pesticide in field blanks from ground-water sites. Whereas, p,p′-DDE (3.4 percent) was the sixth most frequently detected pesticide in ground-water samples but was the most frequently detected pesticide in field blanks. The higher rate of detections of p,p′-DDE in field blanks relative to the rate of detection in ground-water samples may indicate that the sources and mechanisms of contamination for p,p′-DDE were different from those for atrazine.

The greater frequency and magnitude of contamination by pesticides in field blanks analyzed by GC/MS from surface-water sites than from ground-water sites probably are related to differences in environmental concentrations of pesticides in surface and ground water, differences in sampling equipment, and differences in protocols for collecting field blanks. Pesticides are detected more frequently and at higher concentrations in surface water than in ground water. Of approximately 2,450 surface-water samples of the

NAWQA Program, 18 pesticides were detected in more than 10 percent of the samples; of these, atrazine, metolachlor, simazine, desethylatrazine, and prometon were detected in more than 50 percent of the samples (Steven J. Larson, U.S. Geological Survey, written commun., August 2, 1997). Of approximately 2,650 ground-water samples of the NAWQA Program, five pesticides were detected in more than 10 percent of the samples; no pesticide was detected in more than 50 percent of the samples (Dana W. Kolpin, U.S. Geological Survey, written commun., July 29, 1997). The more frequent occurrence and higher concentrations of pesticides in surface water than in ground water mean that the potential for contamination from inadequately cleaned field equipment is greater for field blanks collected from surface-water sites than from ground-water sites.

The equipment used to collect surface-water samples is more susceptible to contamination from the environment than the equipment used to collect ground-water samples. Surface water is collected in bottles with a sampler and must be removed by hand from the sampler and poured through a splitter into several containers prior to filtration. The bottles, splitter, and containers are exposed to the atmosphere, although care is taken to minimize exposure. Ground water is collected with a pump and lines that deliver water directly to the filter. Ground water requires less handling than does surface water and is more isolated from the atmosphere, which probably results in a lower frequency and magnitude of contamination compared to surface water. Additionally, field blanks from ground-water sites typically are collected after the collection of environmental water samples, immediately following onsite equipment cleanup. Field blanks from surface-water sites are collected before the collection of environmental water samples with equipment that has been cleaned off site, stored, and transported to the field site. Consequently, field blanks from surface-water sites measure additional potential sources of contamination from the storage of equipment in field vehicles and the transport of equipment to the field site.

Investigation of Atrazine in Surface-Water Field Blanks

Atrazine was the most frequently detected pesticide in field blanks from surface-water sites; therefore, contamination by atrazine was investigated in greater detail than contamination by other pesticides. Atrazine was detected in 2 of 12 blanks (16.7 percent) in 1992, 15 of 58 blanks (25.9 percent) in 1993, 2 of 98 blanks (2.0 percent) in 1994, and 0 of 7 blanks (0.0 percent) in 1995. Detections of atrazine in field blanks exhibited a temporal trend. Most of the atrazine detections (79.0 percent) occurred in 1993 (fig. 4) even though many more field blanks were collected in 1994 (fig. 2).

The greater percentage of atrazine detections in 1993 was associated with the start of data collection and implementation of sample-collection and processing protocols in most NAWQA Study Units. The review of analytical data for field blanks may have caused field teams to review their technique and make improvements to reduce contamination. Improvements in field technique may have caused a decrease in the detection frequency of atrazine in field blanks in 1994 for some Study Units (fig. 5).

Although laboratory processing and analysis are potential sources of the contamination measured in field blanks, quality-control data from the NWQL show that atrazine was detected infrequently in laboratory blanks. Atrazine was detected in 1 of 31 laboratory blanks (3.2 percent) in 1993, 4 of 381 blanks (1.0 percent) in 1994, and 2 of 286 blanks (0.7 percent) in 1995 (Kimberly D. Pirkey, U.S. Geological Survey, written commun., January 9, 1997). Analytical data for laboratory blanks prior to late 1993 are not readily available; therefore, the role of laboratory contamination in the frequency of atrazine detection in field blanks from surface-water sites in 1993 could not be determined directly. Atrazine, however, was detected in field blanks from ground-water sites with approximately the same frequency in 1993 (1 of 55 blanks, 1.8 percent) as in 1994 (2 of 89 blanks, 2.2 percent). Similar detection frequencies for atrazine in ground-water field blanks in 1993 and 1994 indicate that atrazine

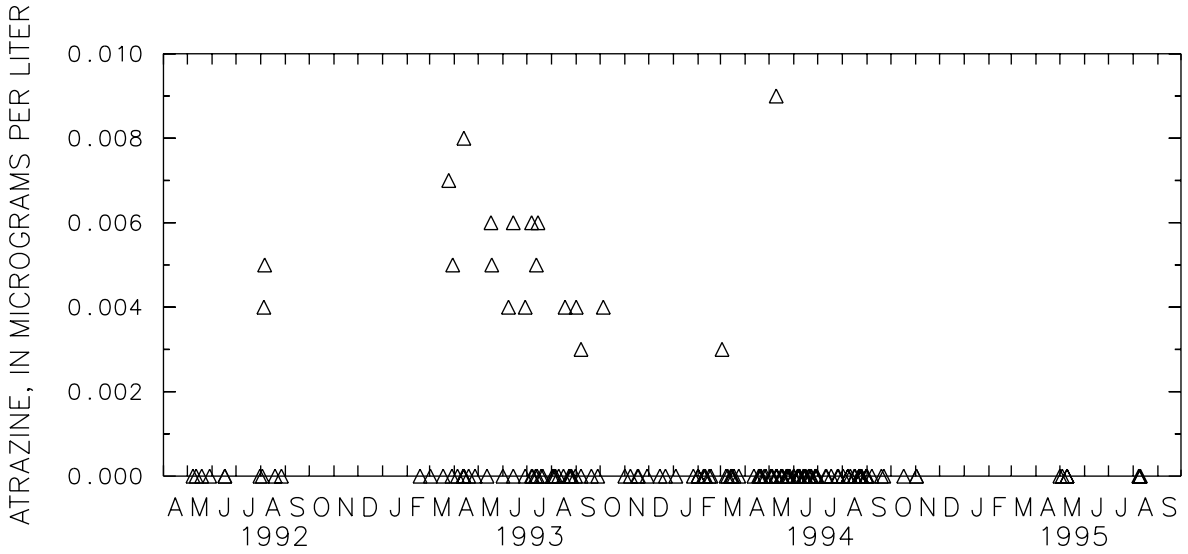


Figure 4. Atrazine in field blanks collected from surface-water sites of the National Water-Quality Assessment Program, 1992-95. (Nondetections of atrazine are plotted as zero.)

contamination from the laboratory was not appreciably different between years. Given that atrazine was detected infrequently in laboratory blanks, the sources of atrazine contamination probably are associated with sample collection and processing in the field environment rather than laboratory processing and analysis.

Evaluation of the Need to Consider Contamination in Assessments of Water Quality

Whether or not contamination needs to be considered in the analysis and interpretation of pesticide data for assessments of water quality depends on the types of assessments to be made. The need to consider contamination may differ, even for the same pesticide, for assessments such as detection frequency, median concentrations detected, concentrations near a water-quality criterion, or maximum concentrations measured. The need to consider contamination in the analysis and interpretation of pesticide data for assessments of detection frequency and median concentrations detected was evaluated by (1) comparing the frequency of pesticide detections in field blanks to the frequency of detections in environmental water samples and (2) comparing the maximum concentration detected in field blanks to the median concentration detected in environmental water samples. In addition, confidence limits were calculated and interpreted. Confidence limits provide a probability-based measure of the uncertainty in selected estimates of the frequency and magnitude of contamination in field blanks that can be used in evaluating the need to consider contamination in the analysis and interpretation of pesticide data.

Most field blanks showed no evidence of pesticide contamination. No pesticides were detected by GC/MS in 76.6 percent of the blanks from surface-water sites and in 89.0 percent of the blanks from ground-water sites. No pesticides were detected by HPLC in 98.2 percent of the blanks from surface-water sites and in 98.1 percent of the blanks from ground-water sites.

Field blanks showed no evidence of contamination by most pesticides. Of the 88 pesticides for which the field blanks were analyzed, 63 were not

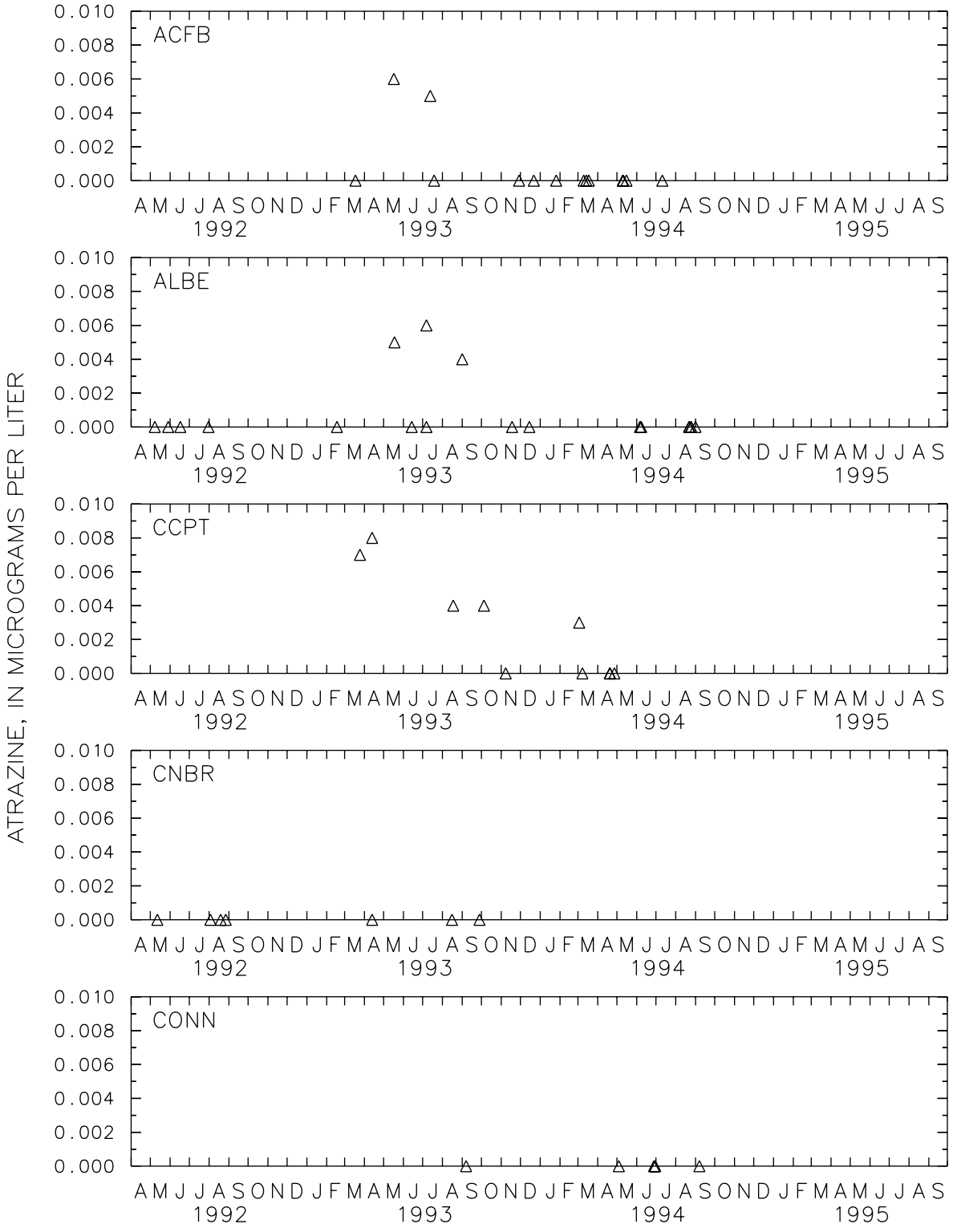


Figure 5. Atrazine in field blanks collected from surface-water sites of the National Water-Quality Assessment Program, 1992-95, by Study Unit. (Nondetections of atrazine are plotted as zero. Study-Unit abbreviations are explained in figure 1.)

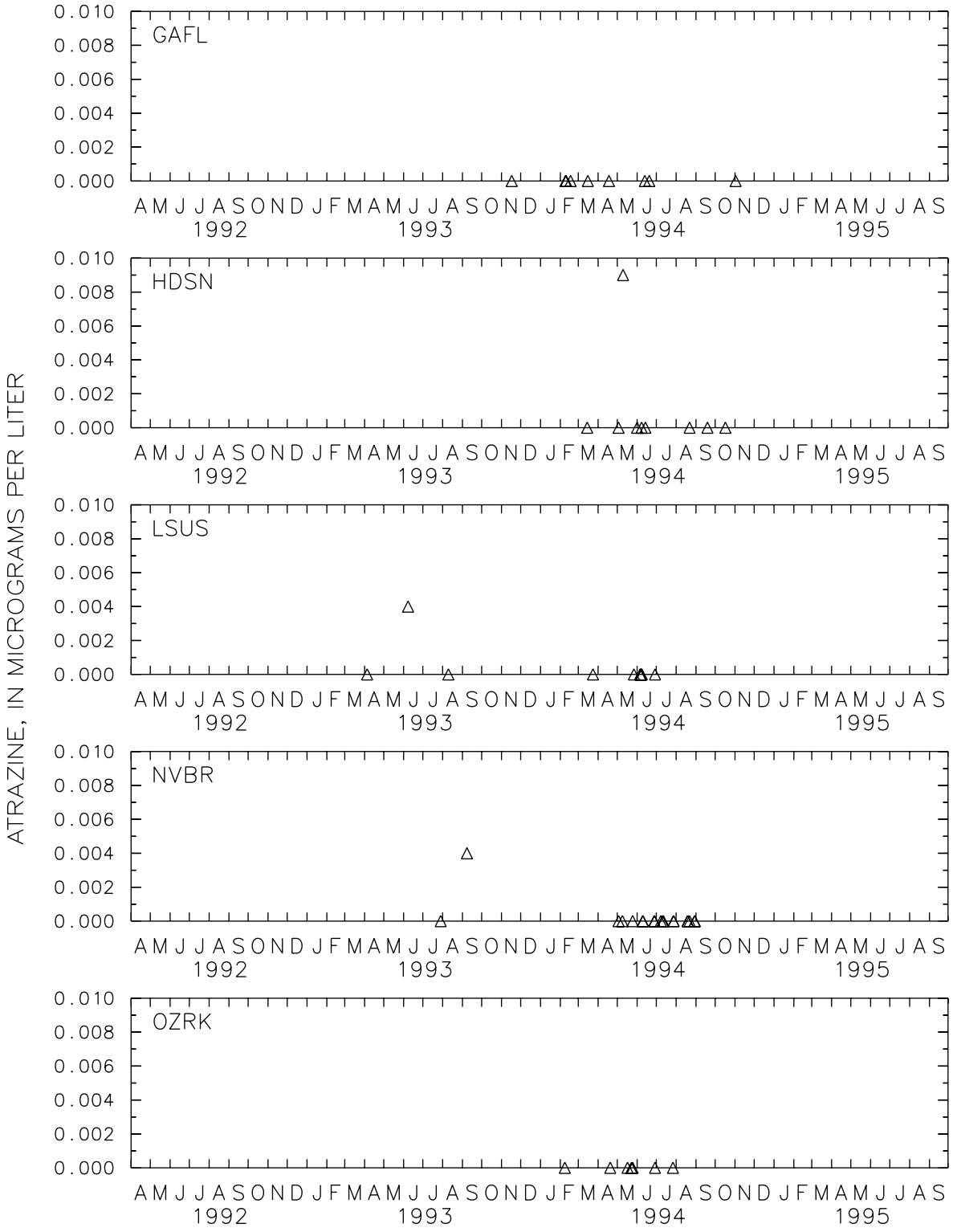


Figure 5. Atrazine in field blanks collected from surface-water sites of the National Water-Quality Assessment Program, 1992-95, by Study Unit—Continued.

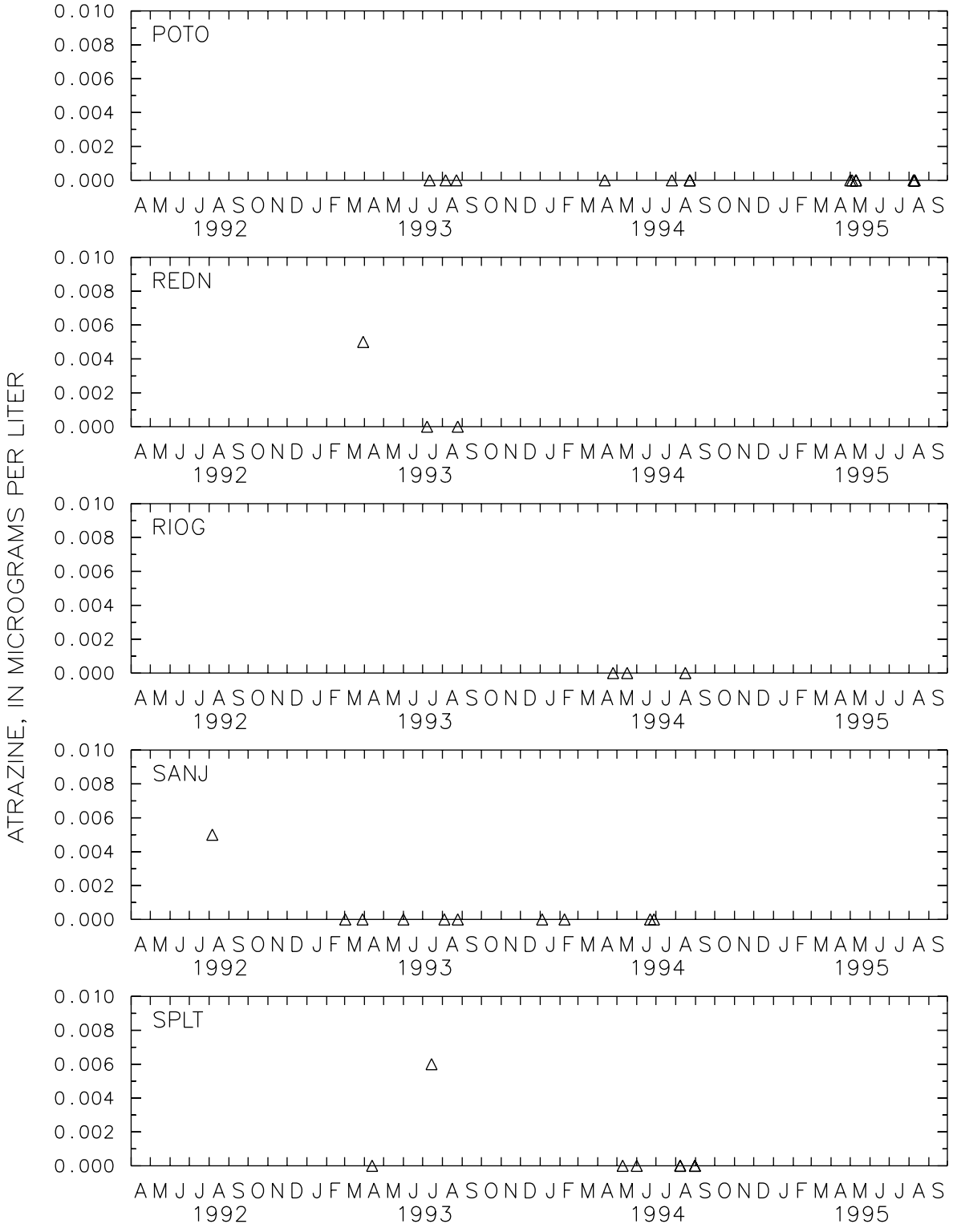


Figure 5. Atrazine in field blanks collected from surface-water sites of the National Water-Quality Assessment Program, 1992-95, by Study Unit—Continued.

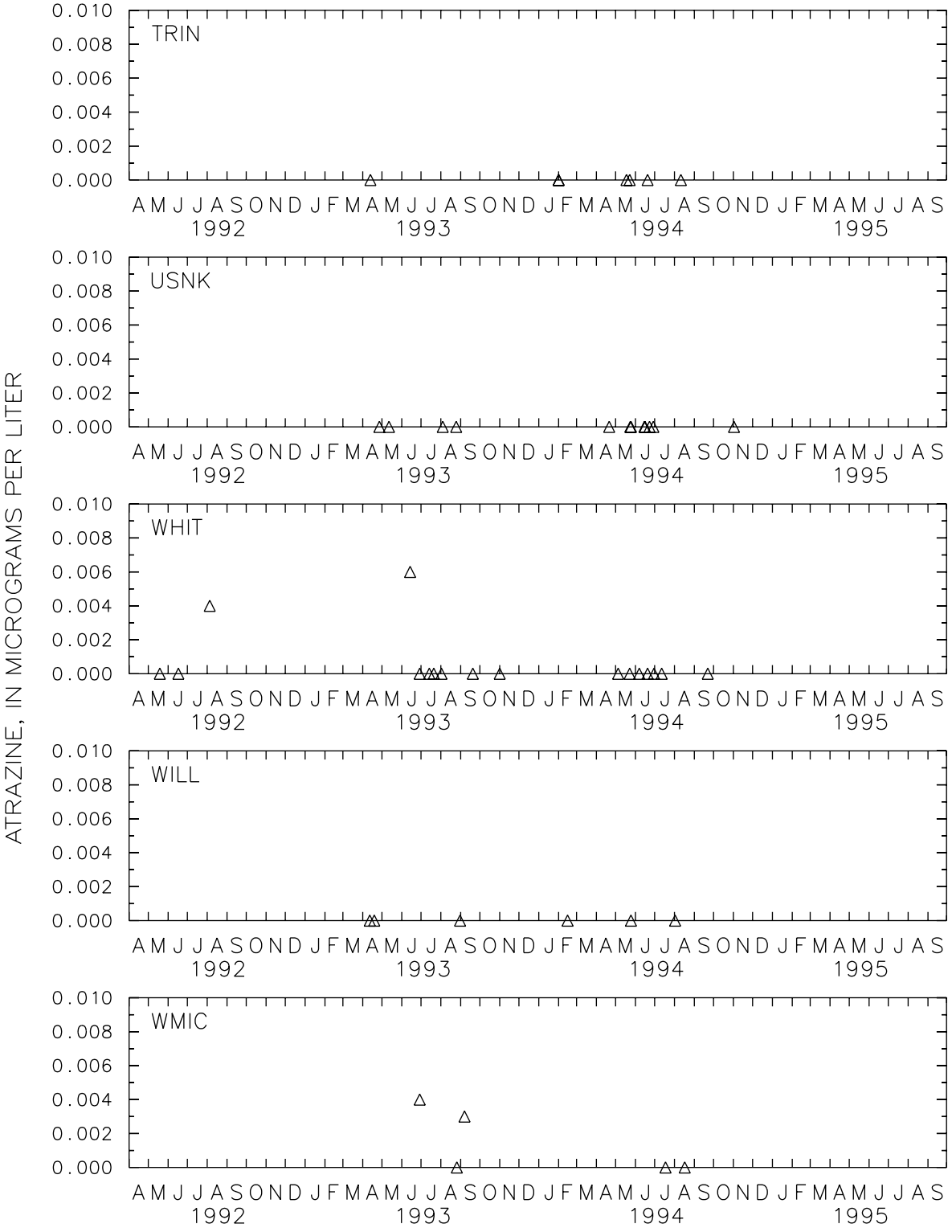


Figure 5. Atrazine in field blanks collected from surface-water sites of the National Water-Quality Assessment Program, 1992-95, by Study Unit—Continued.

detected in field blanks from surface-water sites (table 5) and 70 were not detected in field blanks from ground-water sites (table 6). Therefore, environmental data for the pesticides not detected in field blanks can be interpreted without qualification for contamination, especially for pesticides that were detected frequently and at high concentrations in environmental water samples (tables 5 and 6).

Field blanks did show evidence of contamination by some pesticides. Most of the pesticides detected in field blanks, however, were detected more frequently and at higher concentrations in environmental water samples. Of 25 pesticides detected in surface-water field blanks, 24 were detected more frequently in environmental surface-water samples; 21 were detected 3 or more times more frequently; 13 were detected 10 or more times more frequently; and 5 (desethylatrazine, dacthal, tebuthiuron, chlorpyrifos, and prometon) were detected 30 or more times more frequently in environmental surface-water samples than in field blanks (table 5). The median concentration of pesticides detected in environmental surface-water samples was greater than the maximum concentration detected in field blanks for 17 of 25 pesticides. Median concentrations of detections of diuron, atrazine, prometon, and desethylatrazine in environmental surface-water samples were more than five times greater than the maximum concentrations detected in field blanks (table 5).

Of 18 pesticides detected in ground-water field blanks, 9 were detected more frequently in environmental ground-water samples; 5 were detected 3 or more times more frequently; 4 were detected 10 or more times more frequently; and 1 (desethylatrazine) was detected 30 or more times more frequently in environmental ground-water samples than in field blanks (table 6). The median concentration of pesticides detected in environmental ground-water samples was greater than the maximum concentration detected in field blanks for 16 of 18 pesticides. Median concentrations of detections of bromacil, fenuron, simazine, and pronamide in environmental ground-water samples were more than five times greater than the maximum concentrations detected in field blanks (table 6).

Contamination probably does not need to be considered in assessments for pesticides that are detected much more frequently and in much higher concentrations in environmental water samples than in field blanks. Higher detection frequencies and concentrations in environmental water samples than in field blanks indicate that contamination is an infrequent and minor source of the pesticides measured in environmental water samples and is not an important process that needs to be considered in the interpretation of the environmental data. Contamination must be considered in assessments for pesticides that are detected with approximately the same or lower frequency and in the same or lower concentrations in environmental water samples than in field blanks. Similar or lower detection frequencies and concentrations in environmental water samples than in field blanks indicate that contamination may be the sole source of the pesticides measured in environmental water samples and must be considered in the interpretation of the environmental data.

A ratio of the frequency of pesticide detection in environmental water samples to the frequency of detection in field blanks of 5.0 or less (tables 5 and 6) was used as a criterion to evaluate the need to consider contamination in the analysis and interpretation of the frequency of detection of pesticides in environmental water samples. This criterion indicates that contamination, for the majority of the pesticide data collected for the NAWQA Program, probably does not need to be considered in the analysis and interpretation of the frequency of detection of pesticides in the environmental water samples. Contamination must be considered, however, in the analysis and interpretation of the frequency of detection of pesticides in environmental water samples for cis-permethrin, pronamide, p,p′-DDE, pebulate, propargite, ethalfluralin, and triallate from surface-water sites (table 5) and fenuron, benfluralin, pronamide, cis-permethrin, triallate, chlorpyrifos, trifluralin, propanil, p,p′-DDE, bromacil, dacthal, diazinon, and diuron from ground-water sites (table 6).

In conjunction with an evaluation of the frequency of detection, the magnitude of detection also should be evaluated. A ratio of the median concentration detected in environmental water samples to the maximum concentration detected in field blanks of 2.0 or less (tables 5 and 6) was used as a criterion to evaluate the need to consider

Table 5. Comparison of pesticides in environmental water samples and field blanks from surface-water sites of the National Water-Quality Assessment Program, 1992–95

[Parameter code, the number used to identify a pesticide in the U.S. Geological Survey National Water Information System and the U.S. Environmental Protection Agency Data Storage and Retrieval System; µg/L, micrograms per liter; --, not calculated; nd, pesticide not detected; E, pesticide detected and concentration estimated; GCMS, gas chromatography/mass spectrometry; HPLC, high-performance liquid chromatography]

Parameter code	Method	Pesticide	Percentage of pesticide detections in		Ratio of percent detections	Concentration of pesticide detections		Ratio of concentrations
			Water samples[1]	Field blanks		Median in water samples[1] (µg/L)	Maximum in field blanks (µg/L)	
39742	HPLC	2,4,5-T	nd	nd	--	nd	nd	--
49308	HPLC	3-Hydroxycarbofuran	nd	nd	--	nd	nd	--
49313	HPLC	Aldicarb sulfone	nd	nd	--	nd	nd	--
49307	HPLC	Chloramben	nd	nd	--	nd	nd	--
49305	HPLC	Clopyralid	nd	nd	--	nd	nd	--
49298	HPLC	Esfenvalerate	nd	nd	--	nd	nd	--
38487	HPLC	MCPB	nd	nd	--	nd	nd	--
38866	HPLC	Oxamyl	nd	nd	--	nd	nd	--
49291	HPLC	Picloram	nd	nd	--	nd	nd	--
39762	HPLC	Silvex	nd	nd	--	nd	nd	--
49294	HPLC	Neburon	.1	nd	--	.020	nd	--
49299	HPLC	DNOC	.1	nd	--	E .320	nd	--
38501	HPLC	Methiocarb	.1	nd	--	.165	nd	--
49312	HPLC	Aldicarb	.1	nd	--	.485	nd	--
49236	HPLC	Propham	.2	nd	--	.060	nd	--
49314	HPLC	Aldicarb sulfoxide	.2	nd	--	.920	nd	--
38746	HPLC	2,4-DB	.2	nd	--	.120	nd	--
82664	GC/MS	Phorate	.2	nd	--	.058	nd	--
38538	HPLC	Propoxur	.2	nd	--	.065	nd	--
49295	HPLC	1-Naphthol	.3	nd	--	E .120	nd	--
49303	HPLC	Dichlobenil	.3	nd	--	E .040	nd	--
49297	HPLC	Fenuron	.3	nd	--	.080	nd	--
39542	GC/MS	Parathion	.3	nd	--	.023	nd	--
49306	HPLC	Chlorothalonil	.3	nd	--	E .135	nd	--
82675	GC/MS	Terbufos	.4	nd	--	.030	nd	--

Table 5. Comparison of pesticides in environmental water samples and field blanks from surface-water sites of the National Water-Quality Assessment Program, 1992–95—Continued

Parameter code	Method	Pesticide	Percentage of pesticide detections in		Ratio of percent detections	Concentration of pesticide detections		Ratio of concentrations
			Water samples[1]	Field blanks		Median in water samples[1] (µg/L)	Maximum in field blanks (µg/L)	
34253	GC/MS	alpha-HCH	0.4	nd	--	0.007	nd	--
49304	HPLC	Dacthal monoacid	.4	nd	--	.180	nd	--
82677	GC/MS	Disulfoton	.4	nd	--	E .007	nd	--
49296	HPLC	Methomyl	.5	nd	--	.205	nd	--
49302	HPLC	Dichlorprop	.6	nd	--	.060	nd	--
82667	GC/MS	Methyl parathion	.7	nd	--	.028	nd	--
38478	HPLC	Linuron	.8	nd	--	.110	nd	--
82681	GC/MS	Thiobencarb	.9	nd	--	.006	nd	--
04029	HPLC	Bromacil	.9	nd	--	.250	nd	--
38442	HPLC	Dicamba	.9	nd	--	.120	nd	--
49315	HPLC	Acifluorfen	.9	nd	--	.310	nd	--
82679	GC/MS	Propanil	.9	nd	--	.007	nd	--
49311	HPLC	Bromoxynil	1.0	nd	--	.115	nd	--
49235	HPLC	Triclopyr	1.2	nd	--	.130	nd	--
49309	HPLC	Carbofuran	1.2	nd	--	.280	nd	--
49292	HPLC	Oryzalin	1.4	nd	--	.280	nd	--
82673	GC/MS	Benfluralin	1.4	nd	--	.009	nd	--
82671	GC/MS	Molinate	1.4	nd	--	.011	nd	--
49293	HPLC	Norflurazon	1.5	nd	--	.180	nd	--
38482	HPLC	MCPA	1.9	nd	--	.150	nd	--
39341	GC/MS	gamma-HCH	2.1	nd	--	.015	nd	--
82686	GC/MS	Azinphos-methyl	2.1	nd	--	.057	nd	--
82660	GC/MS	2,6-Diethylaniline	2.5	nd	--	.003	nd	--
04024	GC/MS	Propachlor	2.6	nd	--	E .004	nd	--
49310	HPLC	Carbaryl	2.7	nd	--	.100	nd	--

Table 5. Comparison of pesticides in environmental water samples and field blanks from surface-water sites of the National Water-Quality Assessment Program, 1992–95—Continued

Parameter code	Method	Pesticide	Percentage of pesticide detections in		Ratio of percent detections	Concentration of pesticide detections		Ratio of concentrations
			Water samples[1]	Field blanks		Median in water samples[1] (µg/L)	Maximum in field blanks (µg/L)	
38811	HPLC	Fluometuron	2.7	nd	--	0.270	nd	--
82672	GC/MS	Ethoprop	2.8	nd	--	.009	nd	--
49301	HPLC	Dinoseb	3.0	nd	--	.715	nd	--
82666	GC/MS	Linuron	3.1	nd	--	.028	nd	--
82665	GC/MS	Terbacil	4.4	nd	--	.025	nd	--
39381	GC/MS	Dieldrin	4.9	nd	--	.010	nd	--
38711	HPLC	Bentazon	5.6	nd	--	.120	nd	--
04095	GC/MS	Fonofos	5.8	nd	--	.009	nd	--
04028	GC/MS	Butylate	7.2	nd	--	.012	nd	--
82674	GC/MS	Carbofuran	9.1	nd	--	E .040	nd	--
82683	GC/MS	Pendimethalin	12.0	nd	--	.016	nd	--
49260	GC/MS	Acetochlor	19.7	nd	--	.027	nd	--
04041	GC/MS	Cyanazine	31.9	nd	--	.053	nd	--
82687	GC/MS	cis-Permethrin	.4	.6	.7	.010	E .003	3.2
82676	GC/MS	Pronamide	1.6	1.2	1.3	.010	.120	.1
34653	GC/MS	p,p′-DDE	4.1	2.3	1.8	E .003	.010	.3
82669	GC/MS	Pebulate	1.5	.6	2.5	.011	.005	2.2
82685	GC/MS	Propargite	3.5	1.2	3.0	.021	.074	.3
82663	GC/MS	Ethalfluralin	2.3	.6	3.9	.019	.006	3.2
82678	GC/MS	Triallate	5.6	1.2	4.7	.008	.004	2.0
39532	GC/MS	Malathion	8.6	1.7	5.1	.020	.015	1.3
82684	GC/MS	Napropamide	7.6	1.2	6.3	.015	.100	.2
39632	GC/MS	Atrazine	80.7	10.9	7.4	.060	.009	6.6
04035	GC/MS	Simazine	69.4	9.1	7.6	.034	.007	4.9
49300	HPLC	Diuron	10.0	1.1	9.1	.210	E .010	21.0

Table 5. Comparison of pesticides in environmental water samples and field blanks from surface-water sites of the National Water-Quality Assessment Program, 1992–95—Continued

Parameter code	Method	Pesticide	Percentage of pesticide detections in		Ratio of percent detections	Concentration of pesticide detections		Ratio of concentrations
			Water samples[1]	Field blanks		Median in water samples[1] (μg/L)	Maximum in field blanks (μg/L)	
82668	GC/MS	EPTC	20.4	1.8	11.3	0.010	0.086	0.1
39732	HPLC	2,4-D	12.7	.9	14.1	.170	.230	.7
39415	GC/MS	Metolachlor	73.1	4.6	15.9	.026	.020	1.3
39572	GC/MS	Diazinon	36.6	2.3	15.9	.023	.038	.6
82680	GC/MS	Carbaryl	20.4	1.2	17.0	E .021	E .012	1.8
46342	GC/MS	Alachlor	33.1	1.7	19.5	.019	.005	3.8
82661	GC/MS	Trifluralin	14.9	.6	24.8	.008	.006	1.3
82630	GC/MS	Metribuzin	14.9	.6	24.9	.017	.007	2.4
04037	GC/MS	Prometon	51.2	1.7	30.1	.026	E .004	6.5
38933	GC/MS	Chlorpyrifos	22.4	.6	37.3	.013	.006	2.2
82670	GC/MS	Tebuthiuron	23.3	.6	38.8	.013	.053	.2
82682	GC/MS	Dacthal	24.8	.6	41.3	.004	.003	1.3
04040	GC/MS	Desethylatrazine	57.9	.6	96.5	E .023	E .004	5.8

[1]Statistics of pesticides in environmental water samples from Steven J. Larson, U.S. Geological Survey, written commun., August 2, 1997.

Table 6. Comparison of pesticides in environmental water samples and field blanks from ground-water sites of the National Water-Quality Assessment Program, 1992–95

[Parameter code, the number used to identify a pesticide in the U.S. Geological Survey National Water Information System and the U.S. Environmental Protection Agency Data Storage and Retrieval System; µg/L, micrograms per liter; --, not calculated; nd, pesticide not detected; E, pesticide detected and concentration estimated; GCMS, gas chromatography/mass spectrometry; HPLC, high-performance liquid chromatography]

Parameter code	Method	Pesticide	Percentage of pesticide detections in		Ratio of percent detections	Concentration of pesticide detections		Ratio of concentrations
			Water samples[1]	Field blanks		Median in water samples[1] (µg/L)	Maximum in field blanks (µg/L)	
49308	HPLC	3-Hydroxycarbofuran	nd	nd	--	nd	nd	--
49313	HPLC	Aldicarb sulfone	nd	nd	--	nd	nd	--
49307	HPLC	Chloramben	nd	nd	--	nd	nd	--
49306	HPLC	Chlorothalonil	nd	nd	--	nd	nd	--
49299	HPLC	DNOC	nd	nd	--	nd	nd	--
49298	HPLC	Esfenvalerate	nd	nd	--	nd	nd	--
38501	HPLC	Methiocarb	nd	nd	--	nd	nd	--
49294	HPLC	Neburon	nd	nd	--	nd	nd	--
38866	HPLC	Oxamyl	nd	nd	--	nd	nd	--
49236	HPLC	Propham	nd	nd	--	nd	nd	--
82677	GC/MS	Disulfoton	.04	nd	--	E .002	nd	--
82664	GC/MS	Phorate	.04	nd	--	.002	nd	--
49295	HPLC	1-Naphthol	.04	nd	--	E .070	nd	--
39742	HPLC	2,4,5-T	.04	nd	--	.040	nd	--
49311	HPLC	Bromoxynil	.04	nd	--	.070	nd	--
49310	HPLC	Carbaryl	.04	nd	--	.020	nd	--
38482	HPLC	MCPA	.04	nd	--	.070	nd	--
38487	HPLC	MCPB	.04	nd	--	.070	nd	--
39762	HPLC	Silvex	.04	nd	--	.050	nd	--
49235	HPLC	Triclopyr	.04	nd	--	.070	nd	--
49305	HPLC	Clopyralid	.04	nd	--	.070	nd	--
82672	GC/MS	Ethoprop	.1	nd	--	.006	nd	--
04095	GC/MS	Fonofos	.1	nd	--	.006	nd	--
82667	GC/MS	Methyl parathion	.1	nd	--	.042	nd	--
39542	GC/MS	Parathion	.1	nd	--	.059	nd	--

Table 6. Comparison of pesticides in environmental water samples and field blanks from ground-water sites of the National Water-Quality Assessment Program, 1992–95—Continued

Parameter code	Method	Pesticide	Percentage of pesticide detections in		Ratio of percent detections	Concentration of pesticide detections		Ratio of concentrations
			Water samples[1]	Field blanks		Median in water samples[1] (µg/L)	Maximum in field blanks (µg/L)	
82675	GC/MS	Terbufos	0.1	nd	--	E0.010	nd	--
82681	GC/MS	Thiobencarb	.1	nd	--	.004	nd	--
34253	GC/MS	alpha-HCH	.1	nd	--	.030	nd	--
49293	HPLC	Norflurazon	.1	nd	--	.215	nd	--
49292	HPLC	Oryzalin	.1	nd	--	.065	nd	--
38746	HPLC	2,4-DB	.1	nd	--	.065	nd	--
49315	HPLC	Acifluorfen	.1	nd	--	.130	nd	--
49312	HPLC	Aldicarb	.1	nd	--	.265	nd	--
49304	HPLC	Dacthal monoacid	.1	nd	--	.565	nd	--
49302	HPLC	Dichlorprop	.1	nd	--	.040	nd	--
38538	HPLC	Propoxur	.1	nd	--	.180	nd	--
49296	HPLC	Methomyl	.1	nd	--	.380	nd	--
82666	GC/MS	Linuron	.1	nd	--	.006	nd	--
82685	GC/MS	Propargite	.1	nd	--	E .008	nd	--
38442	HPLC	Dicamba	.1	nd	--	.140	nd	--
82663	GC/MS	Ethalfluralin	.2	nd	--	.005	nd	--
82671	GC/MS	Molinate	.2	nd	--	.020	nd	--
82669	GC/MS	Pebulate	.2	nd	--	.005	nd	--
82686	GC/MS	Azinphos-methyl	.2	nd	--	.039	nd	--
38478	HPLC	Linuron	.2	nd	--	E .010	nd	--
82683	GC/MS	Pendimethalin	.2	nd	--	.012	nd	--
04024	GC/MS	Propachlor	.2	nd	--	E .002	nd	--
49314	HPLC	Aldicarb sulfoxide	.2	nd	--	.260	nd	--
04028	GC/MS	Butylate	.2	nd	--	.002	nd	--
39341	GC/MS	gamma-HCH	.2	nd	--	.028	nd	--

Table 6. Comparison of pesticides in environmental water samples and field blanks from ground-water sites of the National Water-Quality Assessment Program, 1992–95—Continued

Parameter code	Method	Pesticide	Percentage of pesticide detections in		Ratio of percent detections	Concentration of pesticide detections		Ratio of concentrations
			Water samples[1]	Field blanks		Median in water samples[1] (µg/L)	Maximum in field blanks (µg/L)	
49303	HPLC	Dichlobenil	0.2	nd	--	E0.095	nd	--
49291	HPLC	Picloram	.3	nd	--	.710	nd	--
49301	HPLC	Dinoseb	.3	nd	--	.130	nd	--
82684	GC/MS	Napropamide	.3	nd	--	.009	nd	--
38811	HPLC	Fluometuron	.3	nd	--	.085	nd	--
49260	GC/MS	Acetochlor	.4	nd	--	.023	nd	--
49309	HPLC	Carbofuran	.4	nd	--	.120	nd	--
39532	GC/MS	Malathion	.4	nd	--	.008	nd	--
39732	HPLC	2,4-D	.5	nd	--	.110	nd	--
82660	GC/MS	2,6-Diethylaniline	.5	nd	--	.008	nd	--
82665	GC/MS	Terbacil	.5	nd	--	.024	nd	--
82674	GC/MS	Carbofuran	.6	nd	--	E .054	nd	--
82680	GC/MS	Carbaryl	.9	nd	--	E .018	nd	--
82668	GC/MS	EPTC	.9	nd	--	.007	nd	--
38711	HPLC	Bentazon	1.1	nd	--	.120	nd	--
04041	GC/MS	Cyanazine	1.1	nd	--	.015	nd	--
39381	GC/MS	Dieldrin	1.7	nd	--	.013	nd	--
46342	GC/MS	Alachlor	2.1	nd	--	.008	nd	--
82630	GC/MS	Metribuzin	2.2	nd	--	.011	nd	--
82670	GC/MS	Tebuthiuron	2.6	nd	--	.020	nd	--
49297	HPLC	Fenuron	.04	1.0	.04	.140	E .010	14.0
82673	GC/MS	Benfluralin	.2	1.4	.1	.004	.003	1.3
82676	GC/MS	Pronamide	.1	.7	.2	.013	E .002	6.5
82687	GC/MS	cis-Permethrin	.1	.7	.2	E .004	E .003	1.3
82678	GC/MS	Triallate	.3	1.4	.2	.002	.001	2.0

Table 6. Comparison of pesticides in environmental water samples and field blanks from ground-water sites of the National Water-Quality Assessment Program, 1992–95—Continued

Parameter code	Method	Pesticide	Percentage of pesticide detections in		Ratio of percent detections	Concentration of pesticide detections		Ratio of concentrations
			Water samples[1]	Field blanks		Median in water samples[1] (µg/L)	Maximum in field blanks (µg/L)	
38933	GC/MS	Chlorpyrifos	0.4	1.4	0.3	0.006	0.013	0.5
82661	GC/MS	Trifluralin	.3	.7	.5	.004	.002	2.0
82679	GC/MS	Propanil	.6	.7	.8	.007	E .002	3.5
34653	GC/MS	p,p′-DDE	3.4	4.1	.8	E .001	E .002	.5
04029	HPLC	Bromacil	1.1	1.0	1.1	.300	E .010	30.0
82682	GC/MS	Dacthal	.8	.7	1.1	.002	E .001	2.0
39572	GC/MS	Diazinon	1.2	.7	1.7	.012	.011	1.1
49300	HPLC	Diuron	1.8	1.0	1.8	.055	.020	2.8
39415	GC/MS	Metolachlor	10.9	1.4	7.8	.007	.006	1.2
04035	GC/MS	Simazine	14.0	1.4	10.0	.011	E .001	11.0
39632	GC/MS	Atrazine	30.2	2.8	10.8	.019	.012	1.6
04037	GC/MS	Prometon	11.1	.7	15.8	.020	E .013	1.5
04040	GC/MS	Desethylatrazine	27.9	.7	39.8	E .020	E .005	4.0

[1]Statistics of pesticides in envrionmental water samples from Dana W. Kolpin, U.S. Geological Survey, written commun., July 29, 1997.

contamination in the analysis and interpretation of the median concentration of pesticides detected in environmental water samples (when the ratio of detection frequencies in environmental water samples and field blanks is 5.0 or less). If detection frequencies in environmental water samples and field blanks are similar but the median concentration detected in environmental water samples is two times greater than the maximum concentration detected in field blanks, data users may infer that the pesticide was present in environmental water samples and only a small fraction of the median concentration of pesticides in environmental water samples was caused by contamination. The criteria of 2.0 or less for the ratio of concentrations and 5.0 or less for the ratio of detection frequencies indicates that contamination, for the majority of the pesticide data collected for the NAWQA Program, probably does not need to be considered in the analysis and interpretation of the median concentration of pesticides detected in environmental water samples. Bromacil is a notable example where detection frequencies were similar but the median concentration detected in environmental ground-water samples was more than 30 times greater than the maximum concentration detected in ground-water field blanks (table 6).

The criteria set above (ratios of concentrations of 2.0 or less and ratios of detection frequencies of 5.0 or less) were not met for pronamide, p,p′-DDE, propargite, napropamide, and triallate from surface-water sites (table 5) and benfluralin, cis-permethrin, triallate, chlorpyrifos, trifluralin, p,p′-DDE, dacthal, and diazinon from ground-water sites (table 6). Contamination must be considered in the analysis and interpretation of the median concentrations detected in environmental water samples for these pesticides. Although the ratio of concentrations for environmental water samples and field blanks was 2.0 or less for several additional pesticides (malathion, napropamide, EPTC, 2,4-D, metolachlor, diazinon, carbaryl, trifluralin, tebuthiuron, and dacthal from surface-water sites and metolachlor, atrazine, and prometon from ground-water sites), contamination is unlikely to influence the median detected concentrations of these pesticides because pesticides were detected much more frequently in environmental water samples than in field blanks (the ratio of detection frequencies was more than 5.0).

Percentiles of concentrations of pesticides in field blanks (tables 1 to 4) provide an estimate of the frequency and magnitude of contamination in field blanks. Confidence limits for percentiles provide information on the uncertainty in the estimated frequency and magnitude of contamination. One-sided, conservative, 90-percent upper confidence limits were calculated for the 95th-percentile concentrations of all pesticides (except acetochlor) in field blanks. Confidence limits provide a probability-based estimate of the uncertainty in the 95th-percentile concentration of pesticides in the population of field blanks (and by association, the population of environmental water samples). Upper confidence limits for the 95th-percentile concentrations of atrazine, metolachlor, and simazine in field blanks from surface-water sites were 0.006, 0.002, and 0.005 µg/L, respectively. The upper confidence limit for the 95th-percentile concentration of p,p′-DDE in field blanks from ground-water sites was E0.001 µg/L. Upper confidence limits for the 95-percentile concentrations of all other pesticides in field blanks analyzed by GC/MS or HPLC from both types of sites were nondetections.

Because the upper confidence limits for the 95th-percentile concentrations of atrazine, metolachlor, simazine, and p,p′-DDE were detectable concentrations, upper confidence limits were calculated for smaller percentiles to estimate the percent of environmental water samples that are unaffected by contamination (nondetections). Upper confidence limits for the 90th-percentile concentrations of metolachlor and p,p′-DDE in field blanks from surface- and ground-water sites, respectively, and for the 85th-percentile concentrations of atrazine and simazine in field blanks from surface-water sites were nondetections. Upper confidence limits for percentiles are interpreted as follows in examples for alachlor and simazine.

The 95th-percentile concentration of alachlor in a sample of 175 field blanks from surface-water sites was a nondetection (table 1). The 90-percent upper confidence limit for the 95-percentile concentration of alachlor in the population of surface-water field blanks also was a nondetection. Therefore, the probability that the true 95th-percentile concentration of alachlor in the

population of surface-water field blanks (and environmental surface-water samples) was a detectable concentration (exceeded the upper confidence limit—which is a nondetection) is less than 10 percent. Data users are more than 90-percent confident that there was no detectable contamination by alachlor in at least 95 percent of environmental surface-water samples and that 5 percent or less of environmental surface-water samples were contaminated by alachlor.

The 95th-percentile concentration of simazine in a sample of 175 field blanks from surface-water sites was E0.004 µg/L (table 1). The 90-percent upper confidence limit for the 95-percentile concentration of simazine in the population of surface-water field blanks was 0.005 µg/L. Therefore, the probability that the true 95th-percentile concentration of simazine in the population of surface-water field blanks (and environmental surface-water samples) exceeded 0.005 µg/L (exceeded the upper confidence limit) is less than 10 percent. Data users are more than 90-percent confident that the magnitude of contamination by simazine in at least 95 percent of environmental surface-water samples was less than or equal to 0.005 µg/L and that 5 percent or less of environmental surface-water samples were contaminated by 0.005 µg/L or more of simazine. Because the upper confidence limit for the 85th-percentile concentration of simazine was a nondetection, data users also are more than 90-percent confident that there was no detectable contamination by simazine in at least 85 percent of environmental surface-water samples and that 15 percent or less of environmental surface-water samples were contaminated by simazine.

Data analysts can use the information provided in this report in qualitative or quantitative ways to consider contamination in their analysis and interpretation of water-quality data. Appropriate statistics of the frequency distributions of pesticides concentrations in environmental water samples could be compared to those for field blanks to provide a more-detailed evaluation of contamination and the need to consider contamination in the analysis and interpretation of pesticide data for various types of water-quality assessments. Quality criteria could be developed, as was done in this report, and pesticides could be assigned to groups where contamination (1) needs to be, (2) may need to be, or (3) does not need to be considered in analysis and interpretation of pesticide data for different types of water-quality assessments. In cases where contamination needs to be considered, analysts could qualify their interpretations or alter their analysis of the pesticide data in an effort to account for contamination.

For an analysis of detection frequencies, analysts could choose to calculate a worst-case effect of contamination by subtracting detection frequencies in field blanks from detection frequencies in environmental water samples. For example, atrazine was detected in 80.7 percent of environmental water samples and 10.9 percent of the field blanks from surface-water sites (table 5). If contamination affected only environmental water samples that, otherwise, were free of atrazine (the worst case), then the detection frequency in the environment is 69.8 percent (80.7 percent minus 10.9 percent). Conversely, if contamination affected only environmental water samples that, otherwise, contained atrazine anyway (the best case), then contamination had no effect on the detection of atrazine in environmental water samples and the detection frequency in the environment is 80.7 percent. Contamination probably affected both types of environmental water samples, so the unbiased (unaffected by contamination) detection frequency in the environment probably is between 69.8 and 80.7 percent.

An alternative approach for detection frequencies is to censor concentrations detected in environmental water samples at some statistic of concentrations detected in field blanks or upper confidence limit of the statistic. For example, the upper confidence limit for the 95th-percentile concentration of metolachlor in surface-water field blanks was 0.002 µg/L. Analysts could censor (set to "nondetections") all detections of metolachlor at 0.002 µg/L or less in environmental surface-water samples and recalculate detection frequencies using the censored data. Generally, a more conservative approach is to censor pesticide concentrations in environmental water samples at the 99th-percentile concentration detected in field blanks. Use of the maximum concentration detected in field blanks for censoring may be too conservative for pesticides where a single field blank has an unusually high concentration.

Analysts also might choose to adjust concentrations detected in environmental water samples by subtracting some statistic of concentrations detected in field blanks or upper confidence limit of the statistic. For example, the 99th-percentile concentration of p,p′-DDE in ground-water field blanks is E0.002 µg/L (table 2). Analysts could subtract 0.002 µg/L from all detections of p,p′-DDE in environmental ground-water samples and recalculate statistics of the frequency distributions of pesticide concentrations in environmental ground-water samples using the adjusted data. This type of adjustment would be most appropriate for pesticides detected at similar frequencies in environmental water samples and field blanks and where the magnitude of contamination in field blanks is relatively uniform, as it is for p,p′-DDE in ground water (tables 6 and D10).

Summary

Field blanks are quality-control samples that are used to assess contamination in environmental water samples. Contamination is the unintentional introduction of a chemical (pesticides in this instance) into an environmental water sample from sources such as inadequately cleaned equipment, dirty hands, dust, rain, or fumes. Contamination causes a positive bias in analytical measurements that may need to be considered in the analysis and interpretation of the environmental data.

This report describes the frequency and magnitude of pesticide contamination in field blanks and, from the data for field blanks, estimates the frequency and magnitude of pesticide contamination in environmental water samples collected from the surface- and ground-water-quality-data networks of the National Water-Quality Assessment (NAWQA) Program. The report interprets patterns of pesticide contamination and evaluates the need to consider contamination in the analysis and interpretation of pesticide data for assessments of water quality. Estimates of contamination are used to qualify, where needed, interpretations of the occurrence and distribution of pesticides in the waters of the United States.

Field blanks were collected routinely to determine if any part of the data-generation process (sample collection, processing, transport, or laboratory analysis) introduced contamination into the blank. Because field blanks were collected in a manner that simulates the collection of environmental water samples as much as practicable and because the sources and mechanisms of contamination for field blanks are expected to be similar to the sources and mechanisms of contamination for environmental water samples, statistics of the frequency and magnitude of contamination in field blanks are used to estimate the frequency and magnitude of contamination in environmental water samples.

Concentrations of 88 pesticides and pesticide metabolites in field blanks collected for the first 20 NAWQA Study Units from 1992 through 1995 are summarized. Pesticides in field blanks analyzed by GC/MS (NWQL schedules 2001 and 2010) generally were detected more frequently and at higher concentrations in surface-water field blanks than in ground-water field blanks. Of the 47 pesticides determined by GC/MS, 23 were detected at least once in 175 surface-water field blanks and 15 were detected at least once in 145 ground-water field blanks. The most frequently detected pesticides in surface-water blanks were atrazine (10.9 percent), simazine (9.1 percent), and metolachlor (4.6 percent). The most frequently detected pesticides in ground-water blanks were p,p′-DDE (4.1 percent) and atrazine (2.8 percent). The maximum pesticide concentration detected by GC/MS in a surface-water field blank was 0.120 µg/L for pronamide; the maximum concentration detected in a ground-water field blank was 0.013 µg/L for chlorpyrifos and prometon.

Pesticides in field blanks analyzed by HPLC (NWQL schedules 2050 and 2051) were detected infrequently in field blanks. Of the 41 pesticides determined by HPLC, diuron and 2,4-D were detected once in 109 surface-water field blanks and bromacil, diuron, and fenuron were detected once in 104 ground-water field blanks. Except for a detection of 2,4-D at 0.230 µg/L, the detectable concentrations of these pesticides were E0.010 or 0.020 µg/L.

Most field blanks showed no evidence of contamination. No pesticides were detected by GC/MS in 76.6 percent of the blanks from surface-water sites and in 89.0 percent of the blanks from ground-water sites. Field blanks showed no evidence of contamination by most pesticides. Of the 88 pesticides for which the field blanks were analyzed, 63 were not detected in field blanks from surface-water sites and 70 were not detected in field blanks from ground-water sites. Therefore, environmental data for the pesticides not detected in field blanks can be interpreted without qualification for contamination, especially for pesticides that were detected frequently and at high concentrations in environmental water samples.

Field blanks did show evidence of contamination by some pesticides. Most of the pesticides detected in field blanks, however, were detected more frequently and at higher concentrations in environmental water samples. Two criteria were used to evaluate the need to consider contamination in two types of water-quality assessments: (1) a ratio of the frequency of pesticide detection in environmental water samples to the frequency of detection in field blanks of 5.0 or less was used to evaluate the need to consider contamination in the analysis and interpretation of the frequency of detection of pesticides in environmental water samples, and (2) a ratio of the median concentration detected in environmental water samples to the maximum concentration detected in field blanks of 2.0 or less was used to evaluate the need to consider contamination in the analysis and interpretation of the median concentration of pesticides detected in environmental water samples.

These criteria indicate that contamination, for the majority of the pesticide data collected for the NAWQA Program, probably does not need to be considered in the analysis and interpretation of (1) the frequency of pesticide detection in environmental water samples or (2) the median concentration of pesticides detected in environmental water samples. Contamination must be considered, however, in the analysis and interpretation of the frequency of detection of pesticides in environmental water samples for cis-permethrin, pronamide, p,p′-DDE, pebulate, propargite, ethalfluralin, and triallate from surface-water sites and fenuron, benfluralin, pronamide, cis-permethrin, triallate, chlorpyrifos, trifluralin, propanil, p,p′-DDE, bromacil, dacthal, diazinon, and diuron from ground-water sites. Contamination also must be considered in the analysis and interpretation of the median concentrations detected in environmental water samples for pronamide, p,p′-DDE, propargite, napropamide, and triallate from surface-water sites and benfluralin, cis-permethrin, triallate, chlorpyrifos, trifluralin, p,p′-DDE, dacthal, and diazinon from ground-water sites.

Data analysts can use the information provided in this report in qualitative or quantitative ways to consider contamination in their analysis and interpretation of water-quality data. Appropriate statistics of the frequency distributions of pesticide concentrations in environmental water samples could be compared to those for field blanks to provide a more-detailed evaluation of contamination and the need to consider contamination in the analysis and interpretation of pesticide data for various types of water-quality assessments. In cases where contamination needs to be considered, analysts could qualify their interpretations or alter their analysis of the pesticide data in an effort to account for contamination. For an analysis of detection frequencies, analysts could choose to calculate a worst-case effect of contamination by subtracting detection frequencies in field blanks from detection frequencies in environmental water samples. An alternative approach for detection frequencies is to censor concentrations detected in environmental water samples at some statistic of concentrations detected in field blanks or upper confidence limit of the statistic. Analysts also might choose to adjust concentrations detected in environmental water samples by subtracting some statistic of concentrations detected in field blanks or upper confidence limit of the statistic.

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APPENDIX A

Pesticide Registry Numbers, Analytical Methods, and Parameter Codes

Table A1

Table A1. Pesticide registry numbers, analytical methods, and parameter codes

[Parameter code, the number used to identify a pesticide in the U.S. Geological Survey National Water Information System and the U.S. Environmental Protection Agency Data Storage and Retrieval System. Analytical method: GC/MS, gas chromatography/mass spectrometry; HPLC, high-performance liquid chromatography. Use: F, fungicide; H, herbicide; I, insecticide; M, metabolite. Class: ACID, miscellaneous acids; AMID, amides; CB, carbamates; CPA, chlorophenoxy acids; DNA, dinitroanilines; MISC, miscellaneous; OC, organochlorines; OP, organophosphates; PY, pyrethroids; TRI, triazines; UR, uracils; UREA, ureas]

Parameter code	Analytical method	Pesticide	Other names	Use	Class	Chemical Abstract Service registry number
49260	GC/MS	Acetochlor	Harness Plus, Acenit	H	AMID	34256-82-1
49315	HPLC	Acifluorfen	Blazer, Tackle 2S	H	ACID	50594-66-6
46342	GC/MS	Alachlor	Lasso, Bullet, Alagan	H	AMID	15972-60-8
49312	HPLC	Aldicarb	Temik, Sanacarb	I	CB	116-06-3
49313	HPLC	Aldicarb sulfone	Aldicarb metabolite	M	CB	1646-88-4
49314	HPLC	Aldicarb sulfoxide	Aldicarb metabolite	M	CB	1646-87-3
39632	GC/MS	Atrazine	AAtrex, Gesaprim	H	TRI	1912-24-9
82686	GC/MS	Azinphos-methyl	Guthion, Carfene	I	OP	86-50-0
82673	GC/MS	Benfluralin	Benefin, Balan, Bonalan	H	DNA	1861-40-1
38711	HPLC	Bentazon	Bentazone, Basagran	H	MISC	25057-89-0
04029	HPLC	Bromacil	Bromax, Hyvar X, Urox B	H	UR	314-40-9
49311	HPLC	Bromoxynil	Torch, Buctril, Brominal	H	ACID	1689-84-5
04028	GC/MS	Butylate	Genate Plus, Sutan +	H	CB	2008-41-5
82680	GC/MS	Carbaryl	Sevin, Savit	I	CB	63-25-2
49310	HPLC	Carbaryl	Sevin, Savit	I	CB	63-25-2
82674	GC/MS	Carbofuran	Furadan, Carbodan	I	CB	1563-66-2
49309	HPLC	Carbofuran	Furadan, Carbodan	I	CB	1563-66-2
49307	HPLC	Chloramben	Methyl amiben	H	ACID	133-90-4
49306	HPLC	Chlorothalonil	Bravo, Echo	F	OC	1897-45-6
38933	GC/MS	Chlorpyrifos	Dursban, Lorsban	I	OP	2921-88-2
49305	HPLC	Clopyralid	Stinger, Lontrel, Reclaim	H	ACID	1702-17-6
04041	GC/MS	Cyanazine	Bladex, Fortrol	H	TRI	21725-46-2
39732	HPLC	2,4-D	2,4-PA; Ded-Weed SULV	H	CPA	94-75-7
82682	GC/MS	Dacthal	DCPA, Chlorthal-dimethyl	H	OC	1861-32-1
49304	HPLC	Dacthal monoacid	Dacthal metabolite	M	OC	887-54-7
38746	HPLC	2,4-DB	Butyrac, Embutox	H	CP	94-82-6
34653	GC/MS	p,p′-DDE	DDT metabolite	M	OC	72-55-9
04040	GC/MS	Desethylatrazine	Atrazine metabolite	M	TRI	6190-65-4
39572	GC/MS	Diazinon	Diazol, Basudin, Neocidol	I	OP	333-41-5
38442	HPLC	Dicamba	Banval, Mediben, Dianat	H	ACID	1918-00-9

Table A1. Pesticide registry numbers, analytical methods, and parameter codes—Continued

Parameter code	Analytical method	Pesticide	Other names	Use	Class	Chemical Abstract Service registry number
49303	HPLC	Dichlobenil	Barrier, Casoron	H	OC	1194-65-6
49302	HPLC	Dichlorprop	2,4-DP; Seritox 50; Kildip	H	CPA	120-36-5
39381	GC/MS	Dieldrin	Panoram D-31, Octalox	I	OC	60-57-1
82660	GC/MS	2,6-Diethylaniline	Alachlor metabolite	M	AMID	579-66-8
49301	HPLC	Dinoseb	DNPB, Dinosebe	H	ACID	88-85-7
82677	GC/MS	Disulfoton	Disyston, Dithiosystox	I	OP	298-04-4
49300	HPLC	Diuron	DCMU, Karmex, Direx	H	UREA	330-54-1
49299	HPLC	DNOC	Sinox, Trifocide	H	ACID	534-52-1
82668	GC/MS	EPTC	Eptam, Alirox, Niptan	H	CB	759-94-4
49298	HPLC	Esfenvalerate	Asana XL, Sumi-alpha	I	MISC	66230-04-4
82663	GC/MS	Ethalfluralin	Sonalan, Sonalen	H	DNA	55283-68-6
82672	GC/MS	Ethoprop	Ethoprophos, Mocap	I	OP	13194-48-4
49297	HPLC	Fenuron	Beet-Klean, Dybar, Urab	H	UREA	101-42-8
38811	HPLC	Fluometuron	Flo-Met, Cotoran, Cottonex	H	UREA	2164-17-2
04095	GC/MS	Fonofos	Dyfonate, Capfos	I	OP	944-22-9
34253	GC/MS	alpha-HCH	Lindane metabolite	M	OC	319-84-6
39341	GC/MS	gamma-HCH	Lindane, Lintox	I	OC	58-89-9
49308	HPLC	3-Hydroxycarbofuran	Carbofuran metabolite	M	CB	16655-82-6
82666	GC/MS	Linuron	Lorox, Linex, Linurex	H	UREA	330-55-2
38478	HPLC	Linuron	Lorox, Linex, Linurex	H	UREA	330-55-2
39532	GC/MS	Malathion	Cythion, Fyfanon	I	OP	121-75-5
38482	HPLC	MCPA	Metaxon, Agritox	H	CPA	94-74-6
38487	HPLC	MCPB	Tropotox, Thistrol	H	CPA	94-81-5
38501	HPLC	Methiocarb	Mesurol, Draza	I	CB	2032-65-7
49296	HPLC	Methomyl	Lannate, Nudrin	I	CB	16752-77-5
82667	GC/MS	Methyl parathion	Penncap-M, Romethyl-P	I	OP	298-00-0
39415	GC/MS	Metolachlor	Dual, Pennant	H	AMID	51218-45-2
82630	GC/MS	Metribuzin	Lexone, Sencor	H	TRI	21087-64-9
82671	GC/MS	Molinate	Ordram, Sakkimol	H	CB	2212-67-1
49295	HPLC	1-Naphthol	Carbaryl metabolite	M	CB	90-15-3

Table A1. Pesticide registry numbers, analytical methods, and parameter codes—Continued

Parameter code	Analytical method	Pesticide	Other names	Use	Class	Chemical Abstract Service registry number
82684	GC/MS	Napropamide	Devrinol, Naproquard	H	AMID	15299-99-7
49294	HPLC	Neburon	Neberex, Neburea, Neburyl	H	UREA	555-37-3
49293	HPLC	Norflurazon	Telok, Evital, Solicam	H	MISC	27314-13-2
49292	HPLC	Oryzalin	Surflan, Dirimal, Ryzelan	H	DNA	19044-88-3
38866	HPLC	Oxamyl	Vydate L, Pratt	I	CB	23135-22-0
39542	GC/MS	Parathion	Thiophos, Bladan, Folidol	I	OP	56-38-2
82669	GC/MS	Pebulate	Tillam, PEBC	H	CB	1114-71-2
82683	GC/MS	Pendimethalin	Prowl, Stomp	H	DNA	40487-42-1
82687	GC/MS	cis-Permethrin	Ambush, Pounce	I	PY	54774-45-7
82664	GC/MS	Phorate	Thimet, Rampart	I	OP	298-02-2
49291	HPLC	Picloram	Amdon, Grazon, Tordon	H	ACID	1918-02-1
04037	GC/MS	Prometon	Prometone, Gesagran	H	TRI	1610-18-0
82676	GC/MS	Pronamide	Kerb, Propyzamid	H	AMID	23950-58-5
04024	GC/MS	Propachlor	Propachlore, Ramrod	H	AMID	1918-16-7
82679	GC/MS	Propanil	Stampede, Surcopur	H	AMID	709-98-8
82685	GC/MS	Propargite	Omite, Comite, BPPS	I	ACID	2312-35-8
49236	HPLC	Propham	IPC, Tuberite	H	CB	122-42-9
38538	HPLC	Propoxur	Baygon, Blattanex, Unden	I	CB	114-26-1
39762	HPLC	Silvex	2,4,5-TP; Fenoprop	H	CPA	93-72-1
04035	GC/MS	Simazine	Aquazine, Princep, GEsatop	H	TRI	122-34-9
39742	HPLC	2,4,5-T	Brush Killer, Esterone	H	CPA	93-76-5
82670	GC/MS	Tebuthiuron	Spike, Perflan	H	UREA	34014-18-1
82665	GC/MS	Terbacil	Sinbar, Geonter	H	UR	5902-51-2
82675	GC/MS	Terbufos	Counter, Contraven	I	OP	13071-79-9
82681	GC/MS	Thiobencarb	Benthiocarb, Bolero, Saturn	H	CB	28249-77-6
82678	GC/MS	Triallate	Avadex BW, Far-Go	H	CB	2303-17-5
49235	HPLC	Triclopyr	Crossbow, Garlon, Grazon	H	ACID	55335-06-3
82661	GC/MS	Trifluralin	Treflan, Elancolan, Trinin	H	DNA	1582-09-8

APPENDIX B

Relations Among Pesticides Detected in Field Blanks by Analytical Method and Site Type

Tables B1–4

Table B1. Relations among pesticides detected in field blanks analyzed by gas chromatography/mass spectrometry from surface-water sites of the National Water-Quality Assessment Program, 1992–95

[Study-Unit abbreviations are explained in figure 1; µg/L, micrograms per liter; E, pesticide detected and concentration estimated]

Study Unit	Site identification number	Date	Time	Concentration (µg/L)	Pesticide
acfb	02335870	17MAY93	915	0.006	Atrazine
acfb	02335870	17MAY93	915	.006	Simazine
acfb	02350080	13JUL93	1045	.005	Atrazine
acfb	02350080	13JUL93	1045	.006	Diazinon
acfb	02350080	13JUL93	1045	E .004	Simazine
acfb	02332825	10MAR94	1430	E .002	p,p′-DDE
albe	02084160	29MAY92	2100	.002	Alachlor
albe	02084160	17JUN92	2100	.010	p,p′-DDE
albe	02084160	31JUL92	2100	.120	Pronamide
albe	02083500	18MAY93	2100	.005	Atrazine
albe	02083500	18MAY93	2100	.002	Metolachlor
albe	02083500	18MAY93	2100	E .003	Simazine
albe	02083833	07JUL93	2100	.006	Atrazine
albe	02083833	07JUL93	2100	E .004	Prometon
albe	02083833	07JUL93	2100	.005	Simazine
albe	02083833	01SEP93	2100	.004	Atrazine
albe	02083833	01SEP93	2100	E .003	Malathion
albe	02083833	01SEP93	2100	.005	Simazine
ccpt	13351000	25MAR93	1308	.007	Atrazine
ccpt	12472380	13APR93	1108	.008	Atrazine
ccpt	12473740	18AUG93	1008	.004	Atrazine
ccpt	12473740	18AUG93	1008	.006	Simazine
ccpt	13351000	05OCT93	1208	.004	Atrazine
ccpt	13351000	05OCT93	1208	E .004	Simazine

Table B1. Relations among pesticides detected in field blanks analyzed by gas chromatography/mass spectrometry from surface-water sites of the National Water-Quality Assessment Program, 1992–95—Continued

Study Unit	Site identification number	Date	Time	Concentration (µg/L)	Pesticide
ccpt	13351000	03MAR94	1308	0.003	Atrazine
ccpt	13351000	03MAR94	1308	E .004	Simazine
cnbr	06800000	27AUG92	1109	.002	Metolachlor
cnbr	06773050	16AUG93	1132	E .009	Carbaryl
cnbr	06800000	28SEP93	1309	E .002	Simazine
hdsn	01356190	03MAY94	1109	.038	Diazinon
hdsn	01349150	10MAY94	958	.009	Atrazine
hdsn	01349150	10MAY94	958	E .004	Desethylatrazine
hdsn	01349150	10MAY94	958	.086	EPTC
hdsn	01356190	22AUG94	1448	.020	Metolachlor
hdsn	01356190	22AUG94	1448	.100	Napropamide
hdsn	01356190	22AUG94	1448	.066	Pronamide
hdsn	01356190	19SEP94	1208	.002	Metolachlor
lsus	401435076540910	08JUN93	1400	.004	Atrazine
lsus	401435076540910	08JUN93	1400	E .004	Simazine
redn	473000097000010	30MAR93	1000	.005	Atrazine
redn	473000097000010	30MAR93	1000	.007	Simazine
sanj	11274538	06AUG92	2000	.005	Atrazine
sanj	11274538	06AUG92	2000	.008	p,p′-DDE
sanj	11274538	06AUG92	2000	.002	EPTC
sanj	11274538	06AUG92	2000	.006	Ethalfluralin
sanj	11274538	06AUG92	2000	.002	Metolachlor
sanj	11274538	06AUG92	2000	.009	Napropamide
sanj	11274538	06AUG92	2000	E .003	cis-Permethrin
sanj	11274538	06AUG92	2000	.074	Propargite
sanj	11274538	06AUG92	2000	E .003	Simazine
sanj	11274538	06AUG92	2000	.053	Tebuthiuron
sanj	11274538	06AUG92	2000	.006	Trifluralin

Table B1. Relations among pesticides detected in field blanks analyzed by gas chromatography/mass spectrometry from surface-water sites of the National Water-Quality Assessment Program, 1992–95—Continued

Study Unit	Site identification number	Date	Time	Concentration (µg/L)	Pesticide
sanj	11303500	04AUG93	930	E0.012	Carbaryl
sanj	11261100	25AUG93	1110	.016	Propargite
splt	06713500	15JUL93	1138	.006	Atrazine
splt	06713500	15JUL93	1138	.003	Dacthal
splt	06713500	15JUL93	1138	E .004	Prometon
splt	06713500	15JUL93	1138	E .004	Simazine
trin	08049240	13APR93	1051	E .003	p,p′-DDE
trin	323322096395599	18MAY94	1248	.006	Chlorpyrifos
trin	323322096395599	18MAY94	1248	.005	Diazinon
trin	295001094384699	11AUG94	838	.003	Diazinon
usnk	13092747	27APR93	1253	.007	Metribuzin
usnk	13055000	12MAY93	1323	.004	Triallate
usnk	13055000	29JUN94	1253	.001	Triallate
whit	03353637	19MAY92	1031	.005	Alachlor
whit	03353637	19MAY92	1031	.002	Metolachlor
whit	03353637	05AUG92	1030	.004	Atrazine
whit	03353637	05AUG92	1030	E .003	Simazine
whit	03353637	14JUN93	1038	.005	Alachlor
whit	03353637	14JUN93	1038	.006	Atrazine
whit	03353637	14JUN93	1038	.007	Simazine
whit	394340085524601	21JUL93	1308	E .001	Metolachlor
whit	03374100	20SEP93	1408	.015	Malathion
whit	03374100	20SEP93	1408	.008	Metolachlor
whit	03374100	20SEP93	1408	.005	Pebulate

Table B1. Relations among pesticides detected in field blanks analyzed by gas chromatography/mass spectrometry from surface-water sites of the National Water-Quality Assessment Program, 1992–95—Continued

Study Unit	Site identification number	Date	Time	Concentration (µg/L)	Pesticide
will	14200400	19APR93	1250	0.004	EPTC
wmic	04087000	29JUN93	945	.004	Atrazine
wmic	04087000	29JUN93	945	.007	Malathion
wmic	04087000	29JUN93	945	E .004	Prometon
wmic	04072050	07SEP93	1110	.003	Atrazine
wmic	04072050	07SEP93	1110	E .004	Simazine

Table B2. Relations among pesticides detected in field blanks analyzed by gas chromatography/mass spectrometry from ground-water sites of the National Water-Quality Assessment Program, 1992-95

[Study-Unit abbreviations are explained in figure 1; µg/L, micrograms per liter; E, pesticide detected and concentration estimated]

Study Unit	Site identification number	Date	Time	Concentration (µg/L)	Pesticide
albe	354649077294202	03SEP93	1008	E0.001	Simazine
ccpt	470947119392901	08JUL93	1008	E .002	p,p′-DDE
ccpt	463824119120301	29MAR94	1208	.013	Chlorpyrifos
hdsn	425612074252501	21JUL94	1138	.004	Atrazine
hdsn	425612074252501	21JUL94	1138	.002	Metolachlor
lsus	401435076540910	21JUL94	1130	.004	Atrazine
lsus	401435076540910	21JUL94	1130	.002	Benfluralin
lsus	401435076540910	21JUL94	1130	E .001	Dacthal
lsus	401435076540910	21JUL94	1130	E .005	Desethylatrazine
lsus	401435076540910	21JUL94	1130	.006	Metolachlor
lsus	401435076540910	21JUL94	1130	E .002	Pronamide
lsus	401435076540910	21JUL94	1130	E .002	Propanil
lsus	401435076540910	21JUL94	1130	.001	Triallate
lsus	401435076540910	21JUL94	1130	.002	Trifluralin

Table B2. Relations among pesticides detected in field blanks analyzed by gas chromatography/mass spectrometry from ground-water sites of the National Water-Quality Assessment Program, 1992-95—Continued

Study Unit	Site identification number	Date	Time	Concentration (μg/L)	Pesticide
poto	390151076561501	05NOV92	1600	0.004	Atrazine
redn	473000097000020	27AUG93	1830	.012	Atrazine
riog	350344106391201	11AUG93	1038	E .003	cis-Permethrin
riog	373849106124501	07SEP93	1008	.003	Benfluralin
riog	373849106124501	07SEP93	1008	E .001	p,p′-DDE
riog	373849106124501	07SEP93	1008	E .001	Simazine
riog	373849106124501	07SEP93	1008	.001	Triallate
splt	401750104143101	28JUL94	915	E .001	p,p′-DDE
trin	324234097082301	30AUG93	838	.008	Chlorpyrifos
trin	330245097344201	01MAR94	1108	.011	Diazinon
usnk	424227113381301	15JUN93	1238	E .002	p,p′-DDE
usnk	424609113312001	30JUN93	1208	E .001	p,p′-DDE
will	444128122520901	07JUL93	1008	E .001	p,p′-DDE
wmic	433715088015801	15JUN94	938	E .013	Prometon

Table B3. Relations among pesticides detected in field blanks analyzed by high-performance liquid chromatography from surface-water sites of the National Water-Quality Assessment Program, 1992–95

[Study-Unit abbreviations are explained in figure 1; µg/L, micrograms per liter; E, pesticide detected and concentration estimated]

Study Unit	Site identification number	Date	Time	Concentration (µg/L)	Pesticide
acfb	02335870	17MAY93	915	0.230	2,4-D
whit	394340085524601	21JUL93	1308	E .010	Diuron

Table B4. Relations among pesticides detected in field blanks analyzed by high-performance liquid chromatography from ground-water sites of the National Water-Quality Assessment Program, 1992–95

[Study-Unit abbreviations are explained in figure 1; µg/L, micrograms per liter; E, pesticide detected and concentration estimated]

Study Unit	Site identification number	Date	Time	Concentration (µg/L)	Pesticide
ccpt	462330119115001	05OCT94	1008	E0.010	Bromacil
ccpt	462330119115001	05OCT94	1008	E .020	Diuron
trin	300240094551401	25JUL94	1218	E .010	Fenuron

APPENDIX C

Detections of Pesticides in Field Blanks Analyzed by Gas Chromatography/Mass Spectrometry from Surface-Water Sites of the National Water-Quality Assessment Program, by Pesticide and Study Unit

Tables C1–46

Table C1. Statistical summary of concentrations of alachlor in field blanks analyzed by gas chromatography/mass spectrometry from surface-water sites of the National Water-Quality Assessment Program, by Study Unit, 1992-95

[The method detection limit is 0.002 µg/L and the parameter code is 46342. Study-Unit abbreviations are explained in figure 1; µg/L, micrograms per liter; --, percentile not calculated; nd, pesticide not detected]

Study Unit	Number of field blanks	Number of detections	Percent detections	Study-Unit detections as a percent of national detections	Percentiles		Maximum (µg/L)	Minimum concentration detected (µg/L)
					75th (µg/L)	90th (µg/L)		
acfb	14	0	0.0	0.0	nd	nd	nd	nd
albe	19	1	5.3	33.3	nd	nd	.002	.002
ccpt	10	0	.0	.0	nd	--	nd	nd
cnbr	7	0	.0	.0	nd	--	nd	nd
conn	5	0	.0	.0	nd	--	nd	nd
gafl	9	0	.0	.0	nd	--	nd	nd
hdsn	9	0	.0	.0	nd	--	nd	nd
lsus	10	0	.0	.0	nd	--	nd	nd
ozrk	7	0	.0	.0	nd	--	nd	nd
poto	14	0	.0	.0	nd	nd	nd	nd
redn	3	0	.0	.0	--	--	nd	nd
riog	3	0	.0	.0	--	--	nd	nd
sanj	10	0	.0	.0	nd	--	nd	nd
splt	8	0	.0	.0	nd	--	nd	nd
trin	7	0	.0	.0	nd	--	nd	nd
usnk	12	0	.0	.0	nd	nd	nd	nd
whit	17	2	11.8	66.7	nd	.005	.005	.005
will	6	0	.0	.0	nd	--	nd	nd
wmic	5	0	.0	.0	nd	--	nd	nd

Table C2. Detections of alachlor in field blanks analyzed by gas chromatography/mass spectrometry from surface-water sites of the National Water-Quality Assessment Program, by Study Unit, 1992-95

[The method detection limit is 0.002 µg/L and the parameter code is 46342. Study-Unit abbreviations are explained in figure 1; µg/L, micrograms per liter]

Study Unit	Site number	Date	Time	Concentration (µg/L)
albe	02084160	29MAY92	2100	0.002
whit	03353637	19MAY92	1031	.005
whit	03353637	14JUN93	1038	.005

Table C3. Statistical summary of concentrations of atrazine in field blanks analyzed by gas chromatography/mass spectrometry from surface-water sites of the National Water-Quality Assessment Program, by Study Unit, 1992-95

[The method detection limit is 0.001 µg/L and the parameter code is 39632. Study-Unit abbreviations are explained in figure 1; µg/L, micrograms per liter; --, percentile not calculated; nd, pesticide not detected]

Study Unit	Number of field blanks	Number of detections	Percent detections	Study-Unit detections as a percent of national detections	Percentiles		Maximum (µg/L)	Minimum concentration detected (µg/L)
					75th (µg/L)	90th (µg/L)		
acfb	14	2	14.3	10.5	nd	0.005	0.006	0.005
albe	19	3	15.8	15.8	nd	.005	.006	.004
ccpt	10	5	50.0	26.3	.004	--	.008	.003
cnbr	7	0	.0	.0	nd	--	nd	nd
conn	5	0	.0	.0	nd	--	nd	nd
gafl	9	0	.0	.0	nd	--	nd	nd
hdsn	9	1	11.1	5.3	nd	--	.009	.009
lsus	10	1	10.0	5.3	nd	--	.004	.004
ozrk	7	0	.0	.0	nd	--	nd	nd
poto	14	0	.0	.0	nd	nd	nd	nd
redn	3	1	33.3	5.3	--	--	.005	.005
riog	3	0	.0	.0	--	--	nd	nd
sanj	10	1	10.0	5.3	nd	--	.005	.005
splt	8	1	12.5	5.3	nd	--	.006	.006
trin	7	0	.0	.0	nd	--	nd	nd
usnk	12	0	.0	.0	nd	nd	nd	nd
whit	17	2	11.8	10.5	nd	.004	.006	.004
will	6	0	.0	.0	nd	--	nd	nd
wmic	5	2	40.0	10.5	.003	--	.004	.003

Table C4. Detections of atrazine in field blanks analyzed by gas chromatography/mass spectrometry from surface-water sites of the National Water-Quality Assessment Program, by Study Unit, 1992-95

[The method detection limit is 0.001 µg/L and the parameter code is 39632. Study-Unit abbreviations are explained in figure 1; µg/L, micrograms per liter]

Study Unit	Site number	Date	Time	Concentration (µg/L)
acfb	02335870	17MAY93	915	0.006
acfb	02350080	13JUL93	1045	.005
albe	02083500	18MAY93	2100	.005
albe	02083833	07JUL93	2100	.006
albe	02083833	01SEP93	2100	.004
ccpt	13351000	25MAR93	1308	.007
ccpt	12472380	13APR93	1108	.008
ccpt	12473740	18AUG93	1008	.004
ccpt	13351000	05OCT93	1208	.004
ccpt	13351000	03MAR94	1308	.003
hdsn	01349150	10MAY94	958	.009
lsus	401435076540910	08JUN93	1400	.004
redn	473000097000010	30MAR93	1000	.005
sanj	11274538	06AUG92	2000	.005
splt	06713500	15JUL93	1138	.006
whit	03353637	05AUG92	1030	.004
whit	03353637	14JUN93	1038	.006
wmic	04087000	29JUN93	945	.004
wmic	04072050	07SEP93	1110	.003

Table C5. Statistical summary of concentrations of carbaryl in field blanks analyzed by gas chromatography/mass spectrometry from surface-water sites of the National Water-Quality Assessment Program, by Study Unit, 1992-95

[The method detection limit is 0.003 µg/L and the parameter code is 82680. Study-Unit abbreviations are explained in figure 1; µg/L, micrograms per liter; --, percentile not calculated; nd, pesticide not detected; E, pesticide detected and concentration estimated]

Study Unit	Number of field blanks	Number of detections	Percent detections	Study-Unit detections as a percent of national detections	Percentiles		Maximum (µg/L)	Minimum concentration detected (µg/L)
					75th (µg/L)	90th (µg/L)		
acfb	14	0	0.0	0.0	nd	nd	nd	nd
albe	19	0	.0	.0	nd	nd	nd	nd
ccpt	10	0	.0	.0	nd	--	nd	nd
cnbr	3	1	33.3	50.0	--	--	E .009	E .009
conn	5	0	.0	.0	nd	--	nd	nd
gafl	9	0	.0	.0	nd	--	nd	nd
hdsn	9	0	.0	.0	nd	--	nd	nd
lsus	10	0	.0	.0	nd	--	nd	nd
ozrk	7	0	.0	.0	nd	--	nd	nd
poto	14	0	.0	.0	nd	nd	nd	nd
redn	3	0	.0	.0	--	--	nd	nd
riog	3	0	.0	.0	--	--	nd	nd
sanj	10	1	10.0	50.0	nd	--	E .012	E .012
splt	8	0	.0	.0	nd	--	nd	nd
trin	7	0	.0	.0	nd	--	nd	nd
usnk	12	0	.0	.0	nd	nd	nd	nd
whit	17	0	.0	.0	nd	nd	nd	nd
will	6	0	.0	.0	nd	--	nd	nd
wmic	5	0	.0	.0	nd	--	nd	nd

Table C6. Detections of carbaryl in field blanks analyzed by gas chromatography/mass spectrometry from surface-water sites of the National Water-Quality Assessment Program, by Study Unit, 1992-95

[The method detection limit is 0.003 µg/L and the parameter code is 82680. Study-Unit abbreviations are explained in figure 1; µg/L, micrograms per liter; E, pesticide detected and concentration estimated]

Study Unit	Site number	Date	Time	Concentration (µg/L)
cnbr	06773050	16AUG93	1132	E .009
sanj	11303500	04AUG93	930	E .012

Table C7. Statistical summary of concentrations of chlorpyrifos in field blanks analyzed by gas chromatography/mass spectrometry from surface-water sites of the National Water-Quality Assessment Program, by Study Unit, 1992-95

[The method detection limit is 0.004 µg/L and the parameter code is 38933. Study-Unit abbreviations are explained in figure 1; µg/L, micrograms per liter; --, percentile not calculated; nd, pesticide not detected]

Study Unit	Number of field blanks	Number of detections	Percent detections	Study-Unit detections as a percent of national detections	Percentiles		Maximum (µg/L)	Minimum concentration detected (µg/L)
					75th (µg/L)	90th (µg/L)		
acfb	14	0	0.0	0.0	nd	nd	nd	nd
albe	19	0	.0	.0	nd	nd	nd	nd
ccpt	10	0	.0	.0	nd	--	nd	nd
cnbr	7	0	.0	.0	nd	--	nd	nd
conn	5	0	.0	.0	nd	--	nd	nd
gafl	9	0	.0	.0	nd	--	nd	nd
hdsn	9	0	.0	.0	nd	--	nd	nd
lsus	10	0	.0	.0	nd	--	nd	nd
ozrk	7	0	.0	.0	nd	--	nd	nd
poto	14	0	.0	.0	nd	nd	nd	nd
redn	3	0	.0	.0	--	--	nd	nd
riog	3	0	.0	.0	--	--	nd	nd
sanj	10	0	.0	.0	nd	--	nd	nd
splt	8	0	.0	.0	nd	--	nd	nd
trin	7	1	14.3	100.0	nd	--	.006	.006
usnk	12	0	.0	.0	nd	nd	nd	nd
whit	17	0	.0	.0	nd	nd	nd	nd
will	6	0	.0	.0	nd	--	nd	nd
wmic	5	0	.0	.0	nd	--	nd	nd

Table C8. Detections of chlorpyrifos in field blanks analyzed by gas chromatography/mass spectrometry from surface-water sites of the National Water-Quality Assessment Program, by Study Unit, 1992-95

[The method detection limit is 0.004 µg/L and the parameter code is 38933. Study-Unit abbreviations are explained in figure 1; µg/L, micrograms per liter]

Study Unit	Site number	Date	Time	Concentration (µg/L)
trin	323322096395599	18MAY94	1248	0.006

Table C9. Statistical summary of concentrations of dacthal in field blanks analyzed by gas chromatography/mass spectrometry from surface-water sites of the National Water-Quality Assessment Program, by Study Unit, 1992-95

[The method detection limit is 0.002 µg/L and the parameter code is 82682. Study-Unit abbreviations are explained in figure 1; µg/L, micrograms per liter; --, percentile not calculated; nd, pesticide not detected]

Study Unit	Number of field blanks	Number of detections	Percent detections	Study-Unit detections as a percent of national detections	Percentiles		Maximum (µg/L)	Minimum concentration detected (µg/L)
					75th (µg/L)	90th (µg/L)		
acfb	14	0	0.0	0.0	nd	nd	nd	nd
albe	19	0	.0	.0	nd	nd	nd	nd
ccpt	10	0	.0	.0	nd	--	nd	nd
cnbr	3	0	.0	.0	--	--	nd	nd
conn	5	0	.0	.0	nd	--	nd	nd
gafl	9	0	.0	.0	nd	--	nd	nd
hdsn	9	0	.0	.0	nd	--	nd	nd
lsus	10	0	.0	.0	nd	--	nd	nd
ozrk	7	0	.0	.0	nd	--	nd	nd
poto	14	0	.0	.0	nd	nd	nd	nd
redn	3	0	.0	.0	--	--	nd	nd
riog	3	0	.0	.0	--	--	nd	nd
sanj	10	0	.0	.0	nd	--	nd	nd
splt	8	1	12.5	100.0	nd	--	.003	.003
trin	7	0	.0	.0	nd	--	nd	nd
usnk	12	0	.0	.0	nd	nd	nd	nd
whit	17	0	.0	.0	nd	nd	nd	nd
will	6	0	.0	.0	nd	--	nd	nd
wmic	5	0	.0	.0	nd	--	nd	nd

Table C10. Detections of dacthal in field blanks analyzed by gas chromatography/mass spectrometry from surface-water sites of the National Water-Quality Assessment Program, by Study Unit, 1992-95

[The method detection limit is 0.002 µg/L and the parameter code is 82682. Study-Unit abbreviations are explained in figure 1; µg/L, micrograms per liter]

Study Unit	Site number	Date	Time	Concentration (µg/L)
splt	06713500	15JUL93	1138	0.003

Table C11. Statistical summary of concentrations of p,p'-DDE in field blanks analyzed by gas chromatography/mass spectrometry from surface-water sites of the National Water-Quality Assessment Program, by Study Unit, 1992-95

[The method detection limit is 0.006 µg/L and the parameter code is 34653. Study-Unit abbreviations are explained in figure 1; µg/L, micrograms per liter; --, percentile not calculated; nd, pesticide not detected; E, pesticide detected and concentration estimated]

Study Unit	Number of field blanks	Number of detections	Percent detections	Study-Unit detections as a percent of national detections	Percentiles		Maximum (µg/L)	Minimum concentration detected (µg/L)
					75th (µg/L)	90th (µg/L)		
acfb	14	1	7.1	25.0	nd	nd	E0.002	E0.002
albe	19	1	5.3	25.0	nd	nd	.010	.010
ccpt	10	0	.0	.0	nd	--	nd	nd
cnbr	7	0	.0	.0	nd	--	nd	nd
conn	5	0	.0	.0	nd	--	nd	nd
gafl	9	0	.0	.0	nd	--	nd	nd
hdsn	9	0	.0	.0	nd	--	nd	nd
lsus	10	0	.0	.0	nd	--	nd	nd
ozrk	7	0	.0	.0	nd	--	nd	nd
poto	14	0	.0	.0	nd	nd	nd	nd
redn	3	0	.0	.0	--	--	nd	nd
riog	3	0	.0	.0	--	--	nd	nd
sanj	10	1	10.0	25.0	nd	--	.008	.008
splt	8	0	.0	.0	nd	--	nd	nd
trin	7	1	14.3	25.0	nd	--	E .003	E .003
usnk	12	0	.0	.0	nd	nd	nd	nd
whit	17	0	.0	.0	nd	nd	nd	nd
will	6	0	.0	.0	nd	--	nd	nd
wmic	5	0	.0	.0	nd	--	nd	nd

Table C12. Detections of p,p'-DDE in field blanks analyzed by gas chromatography/mass spectrometry from surface-water sites of the National Water-Quality Assessment Program, by Study Unit, 1992-95

[The method detection limit is 0.006 µg/L and the parameter code is 34653. Study-Unit abbreviations are explained in figure 1; µg/L, micrograms per liter; E, pesticide detected and concentration estimated]

Study Unit	Site number	Date	Time	Concentration (µg/L)
acfb	02332825	10MAR94	1430	E0.002
albe	02084160	17JUN92	2100	.010
sanj	11274538	06AUG92	2000	.008
trin	08049240	13APR93	1051	E .003

Table C13. Statistical summary of concentrations of desethylatrazine in field blanks analyzed by gas chromatography/mass spectrometry from surface-water sites of the National Water-Quality Assessment Program, by Study Unit, 1992-95

[The method detection limit is 0.002 µg/L and the parameter code is 04040. Study-Unit abbreviations are explained in figure 1; µg/L, micrograms per liter; --, percentile not calculated; nd, pesticide not detected; E, pesticide detected and concentration estimated]

Study Unit	Number of field blanks	Number of detections	Percent detections	Study-Unit detections as a percent of national detections	Percentiles		Maximum (µg/L)	Minimum concentration detected (µg/L)
					75th (µg/L)	90th (µg/L)		
acfb	14	0	0.0	0.0	nd	nd	nd	nd
albe	19	0	.0	.0	nd	nd	nd	nd
ccpt	10	0	.0	.0	nd	--	nd	nd
cnbr	7	0	.0	.0	nd	--	nd	nd
conn	5	0	.0	.0	nd	--	nd	nd
gafl	9	0	.0	.0	nd	--	nd	nd
hdsn	9	1	11.1	100.0	nd	--	E .004	E .004
lsus	10	0	.0	.0	nd	--	nd	nd
ozrk	7	0	.0	.0	nd	--	nd	nd
poto	14	0	.0	.0	nd	nd	nd	nd
redn	3	0	.0	.0	--	--	nd	nd
riog	3	0	.0	.0	--	--	nd	nd
sanj	10	0	.0	.0	nd	--	nd	nd
splt	8	0	.0	.0	nd	--	nd	nd
trin	7	0	.0	.0	nd	--	nd	nd
usnk	12	0	.0	.0	nd	nd	nd	nd
whit	17	0	.0	.0	nd	nd	nd	nd
will	6	0	.0	.0	nd	--	nd	nd
wmic	5	0	.0	.0	nd	--	nd	nd

Table C14. Detections of desethylatrazine in field blanks analyzed by gas chromatography/mass spectrometry from surface-water sites of the National Water-Quality Assessment Program, by Study Unit, 1992-95

[The method detection limit is 0.002 µg/L and the parameter code is 04040. Study-Unit abbreviations are explained in figure 1; µg/L, micrograms per liter; E, pesticide detected and concentration estimated]

Study Unit	Site number	Date	Time	Concentration (µg/L)
hdsn	01349150	10MAY94	958	E0.004

Table C15. Statistical summary of concentrations of diazinon in field blanks analyzed by gas chromatography/mass spectrometry from surface-water sites of the National Water-Quality Assessment Program, by Study Unit, 1992-95

[The method detection limit is 0.002 µg/L and the parameter code is 39572. Study-Unit abbreviations are explained in figure 1; µg/L, micrograms per liter; --, percentile not calculated; nd, pesticide not detected]

Study Unit	Number of field blanks	Number of detections	Percent detections	Study-Unit detections as a percent of national detections	Percentiles		Maximum (µg/L)	Minimum concentration detected (µg/L)
					75th (µg/L)	90th (µg/L)		
acfb	14	1	7.1	25.0	nd	nd	0.006	0.006
albe	19	0	.0	.0	nd	nd	nd	nd
ccpt	10	0	.0	.0	nd	--	nd	nd
cnbr	7	0	.0	.0	nd	--	nd	nd
conn	5	0	.0	.0	nd	--	nd	nd
gafl	9	0	.0	.0	nd	--	nd	nd
hdsn	9	1	11.1	25.0	nd	--	.038	.038
lsus	10	0	.0	.0	nd	--	nd	nd
ozrk	7	0	.0	.0	nd	--	nd	nd
poto	14	0	.0	.0	nd	nd	nd	nd
redn	3	0	.0	.0	--	--	nd	nd
riog	3	0	.0	.0	--	--	nd	nd
sanj	10	0	.0	.0	nd	--	nd	nd
splt	8	0	.0	.0	nd	--	nd	nd
trin	7	2	28.6	50.0	.003	--	.005	.003
usnk	12	0	.0	.0	nd	nd	nd	nd
whit	17	0	.0	.0	nd	nd	nd	nd
will	6	0	.0	.0	nd	--	nd	nd
wmic	5	0	.0	.0	nd	--	nd	nd

Table C16. Detections of diazinon in field blanks analyzed by gas chromatography/mass spectrometry from surface-water sites of the National Water-Quality Assessment Program, by Study Unit, 1992-95

[The method detection limit is 0.002 µg/L and the parameter code is 39572. Study-Unit abbreviations are explained in figure 1; µg/L, micrograms per liter]

Study Unit	Site number	Date	Time	Concentration (µg/L)
acfb	02350080	13JUL93	1045	0.006
hdsn	01356190	03MAY94	1109	.038
trin	323322096395599	18MAY94	1248	.005
trin	295001094384699	11AUG94	838	.003

Table C17. Statistical summary of concentrations of EPTC in field blanks analyzed by gas chromatography/mass spectrometry from surface-water sites of the National Water-Quality Assessment Program, by Study Unit, 1992-95

[The method detection limit is 0.002 µg/L and the parameter code is 82668. Study-Unit abbreviations are explained in figure 1; µg/L, micrograms per liter; --, percentile not calculated; nd, pesticide not detected]

Study Unit	Number of field blanks	Number of detections	Percent detections	Study-Unit detections as a percent of national detections	Percentiles		Maximum (µg/L)	Minimum concentration detected (µg/L)
					75th (µg/L)	90th (µg/L)		
acfb	14	0	0.0	0.0	nd	nd	nd	nd
albe	19	0	.0	.0	nd	nd	nd	nd
ccpt	10	0	.0	.0	nd	--	nd	nd
cnbr	3	0	.0	.0	--	--	nd	nd
conn	5	0	.0	.0	nd	--	nd	nd
gafl	9	0	.0	.0	nd	--	nd	nd
hdsn	9	1	11.1	33.3	nd	--	.086	.086
lsus	10	0	.0	.0	nd	--	nd	nd
ozrk	7	0	.0	.0	nd	--	nd	nd
poto	14	0	.0	.0	nd	nd	nd	nd
redn	3	0	.0	.0	--	--	nd	nd
riog	3	0	.0	.0	--	--	nd	nd
sanj	10	1	10.0	33.3	nd	--	.002	.002
splt	8	0	.0	.0	nd	--	nd	nd
trin	7	0	.0	.0	nd	--	nd	nd
usnk	12	0	.0	.0	nd	nd	nd	nd
whit	17	0	.0	.0	nd	nd	nd	nd
will	6	1	16.7	33.3	nd	--	.004	.004
wmic	5	0	.0	.0	nd	--	nd	nd

Table C18. Detections of EPTC in field blanks analyzed by gas chromatography/mass spectrometry from surface-water sites of the National Water-Quality Assessment Program, by Study Unit, 1992-95

[The method detection limit is 0.002 µg/L and the parameter code is 82668. Study-Unit abbreviations are explained in figure 1; µg/L, micrograms per liter]

Study Unit	Site number	Date	Time	Concentration (µg/L)
hdsn	01349150	10MAY94	958	0.086
sanj	11274538	06AUG92	2000	.002
will	14200400	19APR93	1250	.004

Table C19. Statistical summary of concentrations of ethalfluralin in field blanks analyzed by gas chromatography/mass spectrometry from surface-water sites of the National Water-Quality Assessment Program, by Study Unit, 1992-95

[The method detection limit is 0.004 µg/L and the parameter code is 82663. Study-Unit abbreviations are explained in figure 1; µg/L, micrograms per liter; --, percentile not calculated; nd, pesticide not detected]

Study Unit	Number of field blanks	Number of detections	Percent detections	Study-Unit detections as a percent of national detections	Percentiles		Maximum (µg/L)	Minimum concentration detected (µg/L)
					75th (µg/L)	90th (µg/L)		
acfb	14	0	0.0	0.0	nd	nd	nd	nd
albe	19	0	.0	.0	nd	nd	nd	nd
ccpt	10	0	.0	.0	nd	--	nd	nd
cnbr	3	0	.0	.0	--	--	nd	nd
conn	5	0	.0	.0	nd	--	nd	nd
gafl	9	0	.0	.0	nd	--	nd	nd
hdsn	9	0	.0	.0	nd	--	nd	nd
lsus	10	0	.0	.0	nd	--	nd	nd
ozrk	7	0	.0	.0	nd	--	nd	nd
poto	14	0	.0	.0	nd	nd	nd	nd
redn	3	0	.0	.0	--	--	nd	nd
riog	3	0	.0	.0	--	--	nd	nd
sanj	10	1	10.0	100.0	nd	--	.006	.006
splt	8	0	.0	.0	nd	--	nd	nd
trin	7	0	.0	.0	nd	--	nd	nd
usnk	12	0	.0	.0	nd	nd	nd	nd
whit	17	0	.0	.0	nd	nd	nd	nd
will	6	0	.0	.0	nd	--	nd	nd
wmic	5	0	.0	.0	nd	--	nd	nd

Table C20. Detections of ethalfluralin in field blanks analyzed by gas chromatography/mass spectrometry from surface-water sites of the National Water-Quality Assessment Program, by Study Unit, 1992-95

[The method detection limit is 0.004 µg/L and the parameter code is 82663. Study-Unit abbreviations are explained in figure 1; µg/L, micrograms per liter]

Study Unit	Site number	Date	Time	Concentration (µg/L)
sanj	11274538	06AUG92	2000	0.006

Table C21. Statistical summary of concentrations of malathion in field blanks analyzed by gas chromatography/mass spectrometry from surface-water sites of the National Water-Quality Assessment Program, by Study Unit, 1992-95

[The method detection limit is 0.005 µg/L and the parameter code is 39532. Study-Unit abbreviations are explained in figure 1; µg/L, micrograms per liter; --, percentile not calculated; nd, pesticide not detected; E, pesticide detected and concentration estimated]

Study Unit	Number of field blanks	Number of detections	Percent detections	Study-Unit detections as a percent of national detections	Percentiles		Maximum (µg/L)	Minimum concentration detected (µg/L)
					75th (µg/L)	90th (µg/L)		
acfb	14	0	0.0	0.0	nd	nd	nd	nd
albe	19	1	5.3	33.3	nd	nd	E .003	E .003
ccpt	10	0	.0	.0	nd	--	nd	nd
cnbr	7	0	.0	.0	nd	--	nd	nd
conn	5	0	.0	.0	nd	--	nd	nd
gafl	9	0	.0	.0	nd	--	nd	nd
hdsn	9	0	.0	.0	nd	--	nd	nd
lsus	10	0	.0	.0	nd	--	nd	nd
ozrk	7	0	.0	.0	nd	--	nd	nd
poto	14	0	.0	.0	nd	nd	nd	nd
redn	3	0	.0	.0	--	--	nd	nd
riog	3	0	.0	.0	--	--	nd	nd
sanj	10	0	.0	.0	nd	--	nd	nd
splt	8	0	.0	.0	nd	--	nd	nd
trin	7	0	.0	.0	nd	--	nd	nd
usnk	12	0	.0	.0	nd	nd	nd	nd
whit	17	1	5.9	33.3	nd	nd	.015	.015
will	6	0	.0	.0	nd	--	nd	nd
wmic	5	1	20.0	33.3	nd	--	.007	.007

Table C22. Detections of malathion in field blanks analyzed by gas chromatography/mass spectrometry from surface-water sites of the National Water-Quality Assessment Program, by Study Unit, 1992-95

[The method detection limit is 0.005 µg/L and the parameter code is 39532. Study-Unit abbreviations are explained in figure 1; µg/L, micrograms per liter; E, pesticide detected and concentration estimated]

Study Unit	Site number	Date	Time	Concentration (µg/L)
albe	02083833	01SEP93	2100	E0.003
whit	03374100	20SEP93	1408	.015
wmic	04087000	29JUN93	945	.007

Table C23. Statistical summary of concentrations of metolachlor in field blanks analyzed by gas chromatography/mass spectrometry from surface-water sites of the National Water-Quality Assessment Program, by Study Unit, 1992-95

[The method detection limit is 0.002 µg/L and the parameter code is 39415. Study-Unit abbreviations are explained in figure 1; µg/L, micrograms per liter; --, percentile not calculated; nd, pesticide not detected; E, pesticide detected and concentration estimated]

Study Unit	Number of field blanks	Number of detections	Percent detections	Study-Unit detections as a percent of national detections	Percentiles		Maximum (µg/L)	Minimum concentration detected (µg/L)
					75th (µg/L)	90th (µg/L)		
acfb	14	0	0.0	0.0	nd	nd	nd	nd
albe	19	1	5.3	12.5	nd	nd	.002	.002
ccpt	10	0	.0	.0	nd	--	nd	nd
cnbr	7	1	14.3	12.5	nd	--	.002	.002
conn	5	0	.0	.0	nd	--	nd	nd
gafl	9	0	.0	.0	nd	--	nd	nd
hdsn	9	2	22.2	25.0	nd	--	.020	.002
lsus	10	0	.0	.0	nd	--	nd	nd
ozrk	7	0	.0	.0	nd	--	nd	nd
poto	14	0	.0	.0	nd	nd	nd	nd
redn	3	0	.0	.0	--	--	nd	nd
riog	3	0	.0	.0	--	--	nd	nd
sanj	10	1	10.0	12.5	nd	--	.002	.002
splt	8	0	.0	.0	nd	--	nd	nd
trin	7	0	.0	.0	nd	--	nd	nd
usnk	12	0	.0	.0	nd	nd	nd	nd
whit	17	3	17.6	37.5	nd	.002	.008	E .001
will	6	0	.0	.0	nd	--	nd	nd
wmic	5	0	.0	.0	nd	--	nd	nd

Table C24. Detections of metolachlor in field blanks analyzed by gas chromatography/mass spectrometry from surface-water sites of the National Water-Quality Assessment Program, by Study Unit, 1992-95

[The method detection limit is 0.002 µg/L and the parameter code is 39415. Study-Unit abbreviations are explained in figure 1; µg/L, micrograms per liter; E, pesticide detected and concentration estimated]

Study Unit	Site number	Date	Time	Concentration (µg/L)
albe	02083500	18MAY93	2100	0.002
cnbr	06800000	27AUG92	1109	.002
hdsn	01356190	22AUG94	1448	.020
hdsn	01356190	19SEP94	1208	.002
sanj	11274538	06AUG92	2000	.002
whit	03353637	19MAY92	1031	.002
whit	394340085524601	21JUL93	1308	E .001
whit	03374100	20SEP93	1408	.008

Table C25. Statistical summary of concentrations of metribuzin in field blanks analyzed by gas chromatography/mass spectrometry from surface-water sites of the National Water-Quality Assessment Program, by Study Unit, 1992-95

[The method detection limit is 0.004 µg/L and the parameter code is 82630. Study-Unit abbreviations are explained in figure 1; µg/L, micrograms per liter; --, percentile not calculated; nd, pesticide not detected]

Study Unit	Number of field blanks	Number of detections	Percent detections	Study-Unit detections as a percent of national detections	Percentiles		Maximum (µg/L)	Minimum concentration detected (µg/L)
					75th (µg/L)	90th (µg/L)		
acfb	14	0	0.0	0.0	nd	nd	nd	nd
albe	19	0	.0	.0	nd	nd	nd	nd
ccpt	10	0	.0	.0	nd	--	nd	nd
cnbr	7	0	.0	.0	nd	--	nd	nd
conn	5	0	.0	.0	nd	--	nd	nd
gafl	9	0	.0	.0	nd	--	nd	nd
hdsn	9	0	.0	.0	nd	--	nd	nd
lsus	10	0	.0	.0	nd	--	nd	nd
ozrk	7	0	.0	.0	nd	--	nd	nd
poto	14	0	.0	.0	nd	nd	nd	nd
redn	3	0	.0	.0	--	--	nd	nd
riog	3	0	.0	.0	--	--	nd	nd
sanj	10	0	.0	.0	nd	--	nd	nd
splt	8	0	.0	.0	nd	--	nd	nd
trin	7	0	.0	.0	nd	--	nd	nd
usnk	12	1	8.3	100.0	nd	nd	.007	.007
whit	17	0	.0	.0	nd	nd	nd	nd
will	6	0	.0	.0	nd	--	nd	nd
wmic	5	0	.0	.0	nd	--	nd	nd

Table C26. Detections of metribuzin in field blanks analyzed by gas chromatography/mass spectrometry from surface-water sites of the National Water-Quality Assessment Program, by Study Unit, 1992-95

[The method detection limit is 0.004 µg/L and the parameter code is 82630. Study-Unit abbreviations are explained in figure 1; µg/L, micrograms per liter]

Study Unit	Site number	Date	Time	Concentration (µg/L)
usnk	13092747	27APR93	1253	0.007

Table C27. Statistical summary of concentrations of napropamide in field blanks analyzed by gas chromatography/mass spectrometry from surface-water sites of the National Water-Quality Assessment Program, by Study Unit, 1992-95

[The method detection limit is 0.003 µg/L and the parameter code is 82684. Study-Unit abbreviations are explained in figure 1; µg/L, micrograms per liter; --, percentile not calculated; nd, pesticide not detected]

Study Unit	Number of field blanks	Number of detections	Percent detections	Study-Unit detections as a percent of national detections	Percentiles		Maximum (µg/L)	Minimum concentration detected (µg/L)
					75th (µg/L)	90th (µg/L)		
acfb	14	0	0.0	0.0	nd	nd	nd	nd
albe	19	0	.0	.0	nd	nd	nd	nd
ccpt	10	0	.0	.0	nd	--	nd	nd
cnbr	3	0	.0	.0	--	--	nd	nd
conn	5	0	.0	.0	nd	--	nd	nd
gafl	9	0	.0	.0	nd	--	nd	nd
hdsn	9	1	11.1	50.0	nd	--	.100	.100
lsus	10	0	.0	.0	nd	--	nd	nd
ozrk	7	0	.0	.0	nd	--	nd	nd
poto	14	0	.0	.0	nd	nd	nd	nd
redn	3	0	.0	.0	--	--	nd	nd
riog	3	0	.0	.0	--	--	nd	nd
sanj	10	1	10.0	50.0	nd	--	.009	.009
splt	8	0	.0	.0	nd	--	nd	nd
trin	7	0	.0	.0	nd	--	nd	nd
usnk	12	0	.0	.0	nd	nd	nd	nd
whit	17	0	.0	.0	nd	nd	nd	nd
will	6	0	.0	.0	nd	--	nd	nd
wmic	5	0	.0	.0	nd	--	nd	nd

Table C28. Detections of napropamide in field blanks analyzed by gas chromatography/mass spectrometry from surface-water sites of the National Water-Quality Assessment Program, by Study Unit, 1992-95

[The method detection limit is 0.003 µg/L and the parameter code is 82684. Study-Unit abbreviations are explained in figure 1; µg/L, micrograms per liter]

Study Unit	Site number	Date	Time	Concentration (µg/L)
hdsn	01356190	22AUG94	1448	0.100
sanj	11274538	06AUG92	2000	.009

Table C29. Statistical summary of concentrations of pebulate in field blanks analyzed by gas chromatography/mass spectrometry from surface-water sites of the National Water-Quality Assessment Program, by Study Unit, 1992-95

[The method detection limit is 0.004 µg/L and the parameter code is 82669. Study-Unit abbreviations are explained in figure 1; µg/L, micrograms per liter; --, percentile not calculated; nd, pesticide not detected]

Study Unit	Number of field blanks	Number of detections	Percent detections	Study-Unit detections as a percent of national detections	Percentiles		Maximum (µg/L)	Minimum concentration detected (µg/L)
					75th (µg/L)	90th (µg/L)		
acfb	14	0	0.0	0.0	nd	nd	nd	nd
albe	19	0	.0	.0	nd	nd	nd	nd
ccpt	10	0	.0	.0	nd	--	nd	nd
cnbr	3	0	.0	.0	--	--	nd	nd
conn	5	0	.0	.0	nd	--	nd	nd
gafl	9	0	.0	.0	nd	--	nd	nd
hdsn	9	0	.0	.0	nd	--	nd	nd
lsus	10	0	.0	.0	nd	--	nd	nd
ozrk	7	0	.0	.0	nd	--	nd	nd
poto	14	0	.0	.0	nd	nd	nd	nd
redn	3	0	.0	.0	--	--	nd	nd
riog	3	0	.0	.0	--	--	nd	nd
sanj	10	0	.0	.0	nd	--	nd	nd
splt	8	0	.0	.0	nd	--	nd	nd
trin	7	0	.0	.0	nd	--	nd	nd
usnk	12	0	.0	.0	nd	nd	nd	nd
whit	17	1	5.9	100.0	nd	nd	.005	.005
will	6	0	.0	.0	nd	--	nd	nd
wmic	5	0	.0	.0	nd	--	nd	nd

Table C30. Detections of pebulate in field blanks analyzed by gas chromatography/mass spectrometry from surface-water sites of the National Water-Quality Assessment Program, by Study Unit, 1992-95

[The method detection limit is 0.004 µg/L and the parameter code is 82669. Study-Unit abbreviations are explained in figure 1; µg/L, micrograms per liter]

Study Unit	Site number	Date	Time	Concentration (µg/L)
whit	03374100	20SEP93	1408	0.005

Table C31. Statistical summary of concentrations of cis-permethrin in field blanks analyzed by gas chromatography/mass spectrometry from surface-water sites of the National Water-Quality Assessment Program, by Study Unit, 1992-95

[The method detection limit is 0.005 µg/L and the parameter code is 82687. Study-Unit abbreviations are explained in figure 1; µg/L, micrograms per liter; --, percentile not calculated; nd, pesticide not detected; E, pesticide detected and concentration estimated]

Study Unit	Number of field blanks	Number of detections	Percent detections	Study-Unit detections as a percent of national detections	Percentiles		Maximum (µg/L)	Minimum concentration detected (µg/L)
					75th (µg/L)	90th (µg/L)		
acfb	14	0	0.0	0.0	nd	nd	nd	nd
albe	19	0	.0	.0	nd	nd	nd	nd
ccpt	10	0	.0	.0	nd	--	nd	nd
cnbr	3	0	.0	.0	--	--	nd	nd
conn	5	0	.0	.0	nd	--	nd	nd
gafl	9	0	.0	.0	nd	--	nd	nd
hdsn	9	0	.0	.0	nd	--	nd	nd
lsus	10	0	.0	.0	nd	--	nd	nd
ozrk	7	0	.0	.0	nd	--	nd	nd
poto	14	0	.0	.0	nd	nd	nd	nd
redn	3	0	.0	.0	--	--	nd	nd
riog	3	0	.0	.0	--	--	nd	nd
sanj	10	1	10.0	100.0	nd	--	E .003	E .003
splt	8	0	.0	.0	nd	--	nd	nd
trin	7	0	.0	.0	nd	--	nd	nd
usnk	12	0	.0	.0	nd	nd	nd	nd
whit	17	0	.0	.0	nd	nd	nd	nd
will	6	0	.0	.0	nd	--	nd	nd
wmic	5	0	.0	.0	nd	--	nd	nd

Table C32. Detections of cis-permethrin in field blanks analyzed by gas chromatography/mass spectrometry from surface-water sites of the National Water-Quality Assessment Program, by Study Unit, 1992-95

[The method detection limit is 0.005 µg/L and the parameter code is 82687. Study-Unit abbreviations are explained in figure 1; µg/L, micrograms per liter; E, pesticide detected and concentration estimated]

Study Unit	Site number	Date	Time	Concentration (µg/L)
sanj	11274538	06AUG92	2000	E0.003

Table C33. Statistical summary of concentrations of prometon in field blanks analyzed by gas chromatography/mass spectrometry from surface-water sites of the National Water-Quality Assessment Program, by Study Unit, 1992-95

[The method detection limit is 0.018 µg/L and the parameter code is 04037. Study-Unit abbreviations are explained in figure 1; µg/L, micrograms per liter; --, percentile not calculated; nd, pesticide not detected; E, pesticide detected and concentration estimated]

Study Unit	Number of field blanks	Number of detections	Percent detections	Study-Unit detections as a percent of national detections	Percentiles		Maximum (µg/L)	Minimum concentration detected (µg/L)
					75th (µg/L)	90th (µg/L)		
acfb	14	0	0.0	0.0	nd	nd	nd	nd
albe	19	1	5.3	33.3	nd	nd	E .004	E .004
ccpt	10	0	.0	.0	nd	--	nd	nd
cnbr	7	0	.0	.0	nd	--	nd	nd
conn	5	0	.0	.0	nd	--	nd	nd
gafl	9	0	.0	.0	nd	--	nd	nd
hdsn	9	0	.0	.0	nd	--	nd	nd
lsus	10	0	.0	.0	nd	--	nd	nd
ozrk	7	0	.0	.0	nd	--	nd	nd
poto	14	0	.0	.0	nd	nd	nd	nd
redn	3	0	.0	.0	--	--	nd	nd
riog	3	0	.0	.0	--	--	nd	nd
sanj	10	0	.0	.0	nd	--	nd	nd
splt	8	1	12.5	33.3	nd	--	E .004	E .004
trin	7	0	.0	.0	nd	--	nd	nd
usnk	12	0	.0	.0	nd	nd	nd	nd
whit	17	0	.0	.0	nd	nd	nd	nd
will	6	0	.0	.0	nd	--	nd	nd
wmic	5	1	20.0	33.3	nd	--	E .004	E .004

Table C34. Detections of prometon in field blanks analyzed by gas chromatography/mass spectrometry from surface-water sites of the National Water-Quality Assessment Program, by Study Unit, 1992-95

[The method detection limit is 0.018 µg/L and the parameter code is 04037. Study-Unit abbreviations are explained in figure 1; µg/L, micrograms per liter; E, pesticide detected and concentration estimated]

Study Unit	Site number	Date	Time	Concentration (µg/L)
albe	02083833	07JUL93	2100	E0.004
splt	06713500	15JUL93	1138	E .004
wmic	04087000	29JUN93	945	E .004

Table C35. Statistical summary of concentrations of pronamide in field blanks analyzed by gas chromatography/mass spectrometry from surface-water sites of the National Water-Quality Assessment Program, by Study Unit, 1992-95

[The method detection limit is 0.003 µg/L and the parameter code is 82676. Study-Unit abbreviations are explained in figure 1; µg/L, micrograms per liter; --, percentile not calculated; nd, pesticide not detected]

Study Unit	Number of field blanks	Number of detections	Percent detections	Study-Unit detections as a percent of national detections	Percentiles		Maximum (µg/L)	Minimum concentration detected (µg/L)
					75th (µg/L)	90th (µg/L)		
acfb	14	0	0.0	0.0	nd	nd	nd	nd
albe	19	1	5.3	50.0	nd	nd	.120	.120
ccpt	10	0	.0	.0	nd	--	nd	nd
cnbr	3	0	.0	.0	--	--	nd	nd
conn	5	0	.0	.0	nd	--	nd	nd
gafl	9	0	.0	.0	nd	--	nd	nd
hdsn	9	1	11.1	50.0	nd	--	.066	.066
lsus	10	0	.0	.0	nd	--	nd	nd
ozrk	7	0	.0	.0	nd	--	nd	nd
poto	14	0	.0	.0	nd	nd	nd	nd
redn	3	0	.0	.0	--	--	nd	nd
riog	3	0	.0	.0	--	--	nd	nd
sanj	10	0	.0	.0	nd	--	nd	nd
splt	8	0	.0	.0	nd	--	nd	nd
trin	7	0	.0	.0	nd	--	nd	nd
usnk	12	0	.0	.0	nd	nd	nd	nd
whit	17	0	.0	.0	nd	nd	nd	nd
will	6	0	.0	.0	nd	--	nd	nd
wmic	5	0	.0	.0	nd	--	nd	nd

Table C36. Detections of pronamide in field blanks analyzed by gas chromatography/mass spectrometry from surface-water sites of the National Water-Quality Assessment Program, by Study Unit, 1992-95

[The method detection limit is 0.003 µg/L and the parameter code is 82676. Study-Unit abbreviations are explained in figure 1; µg/L, micrograms per liter]

Study Unit	Site number	Date	Time	Concentration (µg/L)
albe	02084160	31JUL92	2100	0.120
hdsn	01356190	22AUG94	1448	.066

Table C37. Statistical summary of concentrations of propargite in field blanks analyzed by gas chromatography/mass spectrometry from surface-water sites of the National Water-Quality Assessment Program, by Study Unit, 1992-95

[The method detection limit is 0.013 µg/L and the parameter code is 82685. Study-Unit abbreviations are explained in figure 1; µg/L, micrograms per liter; --, percentile not calculated; nd, pesticide not detected]

Study Unit	Number of field blanks	Number of detections	Percent detections	Study-Unit detections as a percent of national detections	Percentiles		Maximum (µg/L)	Minimum concentration detected (µg/L)
					75th (µg/L)	90th (µg/L)		
acfb	14	0	0.0	0.0	nd	nd	nd	nd
albe	19	0	.0	.0	nd	nd	nd	nd
ccpt	10	0	.0	.0	nd	--	nd	nd
cnbr	3	0	.0	.0	--	--	nd	nd
conn	5	0	.0	.0	nd	--	nd	nd
gafl	9	0	.0	.0	nd	--	nd	nd
hdsn	9	0	.0	.0	nd	--	nd	nd
lsus	10	0	.0	.0	nd	--	nd	nd
ozrk	7	0	.0	.0	nd	--	nd	nd
poto	14	0	.0	.0	nd	nd	nd	nd
redn	3	0	.0	.0	--	--	nd	nd
riog	3	0	.0	.0	--	--	nd	nd
sanj	10	2	20.0	100.0	nd	--	.074	.016
splt	8	0	.0	.0	nd	--	nd	nd
trin	7	0	.0	.0	nd	--	nd	nd
usnk	12	0	.0	.0	nd	nd	nd	nd
whit	17	0	.0	.0	nd	nd	nd	nd
will	6	0	.0	.0	nd	--	nd	nd
wmic	5	0	.0	.0	nd	--	nd	nd

Table C38. Detections of propargite in field blanks analyzed by gas chromatography/mass spectrometry from surface-water sites of the National Water-Quality Assessment Program, by Study Unit, 1992-95

[The method detection limit is 0.013 µg/L and the parameter code is 82685. Study-Unit abbreviations are explained in figure 1; µg/L, micrograms per liter]

Study Unit	Site number	Date	Time	Concentration (µg/L)
sanj	11274538	06AUG92	2000	0.074
sanj	11261100	25AUG93	1110	.016

Table C39. Statistical summary of concentrations of simazine in field blanks analyzed by gas chromatography/mass spectrometry from surface-water sites of the National Water-Quality Assessment Program, by Study Unit, 1992-95

[The method detection limit is 0.005 µg/L and the parameter code is 04035. Study-Unit abbreviations are explained in figure 1; µg/L, micrograms per liter; --, percentile not calculated; nd, pesticide not detected; E, pesticide detected and concentration estimated]

Study Unit	Number of field blanks	Number of detections	Percent detections	Study-Unit detections as a percent of national detections	Percentiles		Maximum (µg/L)	Minimum concentration detected (µg/L)
					75th (µg/L)	90th (µg/L)		
acfb	14	2	14.3	12.5	nd	E0.004	0.006	E0.004
albe	19	3	15.8	18.8	nd	.005	.005	E .003
ccpt	10	3	30.0	18.8	E .004	--	.006	E .004
cnbr	7	1	14.3	6.3	nd	--	E .002	E .002
conn	5	0	.0	.0	nd	--	nd	nd
gafl	9	0	.0	.0	nd	--	nd	nd
hdsn	9	0	.0	.0	nd	--	nd	nd
lsus	10	1	10.0	6.3	nd	--	E .004	E .004
ozrk	7	0	.0	.0	nd	--	nd	nd
poto	14	0	.0	.0	nd	nd	nd	nd
redn	3	1	33.3	6.3	--	--	.007	.007
riog	3	0	.0	.0	--	--	nd	nd
sanj	10	1	10.0	6.3	nd	--	E .003	E .003
splt	8	1	12.5	6.3	nd	--	E .004	E .004
trin	7	0	.0	.0	nd	--	nd	nd
usnk	12	0	.0	.0	nd	nd	nd	nd
whit	17	2	11.8	12.5	nd	E .003	.007	E .003
will	6	0	.0	.0	nd	--	nd	nd
wmic	5	1	20.0	6.3	nd	--	E .004	E .004

Table C40. Detections of simazine in field blanks analyzed by gas chromatography/mass spectrometry from surface-water sites of the National Water-Quality Assessment Program, by Study Unit, 1992-95

[The method detection limit is 0.005 µg/L and the parameter code is 04035. Study-Unit abbreviations are explained in figure 1; µg/L, micrograms per liter; E, pesticide detected and concentration estimated]

Study Unit	Site number	Date	Time	Concentration (µg/L)
acfb	02335870	17MAY93	915	0.006
acfb	02350080	13JUL93	1045	E .004
albe	02083500	18MAY93	2100	E .003
albe	02083833	07JUL93	2100	.005
albe	02083833	01SEP93	2100	.005
ccpt	12473740	18AUG93	1008	.006
ccpt	13351000	05OCT93	1208	E .004
ccpt	13351000	03MAR94	1308	E .004
cnbr	06800000	28SEP93	1309	E .002
lsus	401435076540910	08JUN93	1400	E .004
redn	473000097000010	30MAR93	1000	.007
sanj	11274538	06AUG92	2000	E .003
splt	06713500	15JUL93	1138	E .004
whit	03353637	05AUG92	1030	E .003
whit	03353637	14JUN93	1038	.007
wmic	04072050	07SEP93	1110	E .004

Table C41. Statistical summary of concentrations of tebuthiuron in field blanks analyzed by gas chromatography/mass spectrometry from surface-water sites of the National Water-Quality Assessment Program, by Study Unit, 1992-95

[The method detection limit is 0.010 µg/L and the parameter code is 82670. Study-Unit abbreviations are explained in figure 1; µg/L, micrograms per liter; --, percentile not calculated; nd, pesticide not detected]

Study Unit	Number of field blanks	Number of detections	Percent detections	Study-Unit detections as a percent of national detections	Percentiles		Maximum (µg/L)	Minimum concentration detected (µg/L)
					75th (µg/L)	90th (µg/L)		
acfb	14	0	0.0	0.0	nd	nd	nd	nd
albe	19	0	.0	.0	nd	nd	nd	nd
ccpt	10	0	.0	.0	nd	--	nd	nd
cnbr	3	0	.0	.0	--	--	nd	nd
conn	5	0	.0	.0	nd	--	nd	nd
gafl	9	0	.0	.0	nd	--	nd	nd
hdsn	9	0	.0	.0	nd	--	nd	nd
lsus	10	0	.0	.0	nd	--	nd	nd
ozrk	7	0	.0	.0	nd	--	nd	nd
poto	14	0	.0	.0	nd	nd	nd	nd
redn	3	0	.0	.0	--	--	nd	nd
riog	3	0	.0	.0	--	--	nd	nd
sanj	10	1	10.0	100.0	nd	--	.053	.053
splt	8	0	.0	.0	nd	--	nd	nd
trin	7	0	.0	.0	nd	--	nd	nd
usnk	12	0	.0	.0	nd	nd	nd	nd
whit	17	0	.0	.0	nd	nd	nd	nd
will	6	0	.0	.0	nd	--	nd	nd
wmic	5	0	.0	.0	nd	--	nd	nd

Table C42. Detections of tebuthiuron in field blanks analyzed by gas chromatography/mass spectrometry from surface-water sites of the National Water-Quality Assessment Program, by Study Unit, 1992-95

[The method detection limit is 0.010 µg/L and the parameter code is 82670. Study-Unit abbreviations are explained in figure 1; µg/L, micrograms per liter]

Study Unit	Site number	Date	Time	Concentration (µg/L)
sanj	11274538	06AUG92	2000	0.053

Table C43. Statistical summary of concentrations of triallate in field blanks analyzed by gas chromatography/mass spectrometry from surface-water sites of the National Water-Quality Assessment Program, by Study Unit, 1992-95

[The method detection limit is 0.001 µg/L and the parameter code is 82678. Study-Unit abbreviations are explained in figure 1; µg/L, micrograms per liter; --, percentile not calculated; nd, pesticide not detected]

Study Unit	Number of field blanks	Number of detections	Percent detections	Study-Unit detections as a percent of national detections	Percentiles		Maximum (µg/L)	Minimum concentration detected (µg/L)
					75th (µg/L)	90th (µg/L)		
acfb	14	0	0.0	0.0	nd	nd	nd	nd
albe	19	0	.0	.0	nd	nd	nd	nd
ccpt	10	0	.0	.0	nd	--	nd	nd
cnbr	3	0	.0	.0	--	--	nd	nd
conn	5	0	.0	.0	nd	--	nd	nd
gafl	9	0	.0	.0	nd	--	nd	nd
hdsn	9	0	.0	.0	nd	--	nd	nd
lsus	10	0	.0	.0	nd	--	nd	nd
ozrk	7	0	.0	.0	nd	--	nd	nd
poto	14	0	.0	.0	nd	nd	nd	nd
redn	3	0	.0	.0	--	--	nd	nd
riog	3	0	.0	.0	--	--	nd	nd
sanj	10	0	.0	.0	nd	--	nd	nd
splt	8	0	.0	.0	nd	--	nd	nd
trin	7	0	.0	.0	nd	--	nd	nd
usnk	12	2	16.7	100.0	nd	.001	.004	.001
whit	17	0	.0	.0	nd	nd	nd	nd
will	6	0	.0	.0	nd	--	nd	nd
wmic	5	0	.0	.0	nd	--	nd	nd

Table C44. Detections of triallate in field blanks analyzed by gas chromatography/mass spectrometry from surface-water sites of the National Water-Quality Assessment Program, by Study Unit, 1992-95

[The method detection limit is 0.001 µg/L and the parameter code is 82678. Study-Unit abbreviations are explained in figure 1; µg/L, micrograms per liter]

Study Unit	Site number	Date	Time	Concentration (µg/L)
usnk	13055000	12MAY93	1323	0.004
usnk	13055000	29JUN94	1253	.001

Table C45. Statistical summary of concentrations of trifluralin in field blanks analyzed by gas chromatography/mass spectrometry from surface-water sites of the National Water-Quality Assessment Program, by Study Unit, 1992-95

[The method detection limit is 0.002 µg/L and the parameter code is 82661. Study-Unit abbreviations are explained in figure 1; µg/L, micrograms per liter; --, percentile not calculated; nd, pesticide not detected]

Study Unit	Number of field blanks	Number of detections	Percent detections	Study-Unit detections as a percent of national detections	Percentiles		Maximum (µg/L)	Minimum concentration detected (µg/L)
					75th (µg/L)	90th (µg/L)		
acfb	14	0	0.0	0.0	nd	nd	nd	nd
albe	19	0	.0	.0	nd	nd	nd	nd
ccpt	10	0	.0	.0	nd	--	nd	nd
cnbr	3	0	.0	.0	--	--	nd	nd
conn	5	0	.0	.0	nd	--	nd	nd
gafl	9	0	.0	.0	nd	--	nd	nd
hdsn	9	0	.0	.0	nd	--	nd	nd
lsus	10	0	.0	.0	nd	--	nd	nd
ozrk	7	0	.0	.0	nd	--	nd	nd
poto	14	0	.0	.0	nd	nd	nd	nd
redn	3	0	.0	.0	--	--	nd	nd
riog	3	0	.0	.0	--	--	nd	nd
sanj	10	1	10.0	100.0	nd	--	.006	.006
splt	8	0	.0	.0	nd	--	nd	nd
trin	7	0	.0	.0	nd	--	nd	nd
usnk	12	0	.0	.0	nd	nd	nd	nd
whit	17	0	.0	.0	nd	nd	nd	nd
will	6	0	.0	.0	nd	--	nd	nd
wmic	5	0	.0	.0	nd	--	nd	nd

Table C46. Detections of trifluralin in field blanks analyzed by gas chromatography/mass spectrometry from surface-water sites of the National Water-Quality Assessment Program, by Study Unit, 1992-95

[The method detection limit is 0.002 µg/L and the parameter code is 82661. Study-Unit abbreviations are explained in figure 1; µg/L, micrograms per liter]

Study Unit	Site number	Date	Time	Concentration (µg/L)
sanj	11274538	06AUG92	2000	0.006

APPENDIX D

Detections of Pesticides in Field Blanks Analyzed by Gas Chromatography/Mass Spectrometry from Ground-Water Sites of the National Water-Quality Assessment Program, by Pesticide and Study Unit

Tables D1–30

Table D1. Statistical summary of concentrations of atrazine in field blanks analyzed by gas chromatography/mass spectrometry from ground-water sites of the National Water-Quality Assessment Program, by Study Unit, 1992-95

[The method detection limit is 0.001 µg/L and the parameter code is 39632. Study-Unit abbreviations are explained in figure 1; µg/L, micrograms per liter; --, percentile not calculated; nd, pesticide not detected]

Study Unit	Number of field blanks	Number of detections	Percent detections	Study-Unit detections as a percent of national detections	Percentiles		Maximum (µg/L)	Minimum concentration detected (µg/L)
					75th (µg/L)	90th (µg/L)		
acfb	10	0	0.0	0.0	nd	--	nd	nd
albe	10	0	.0	.0	nd	--	nd	nd
ccpt	18	0	.0	.0	nd	nd	nd	nd
conn	9	0	.0	.0	nd	--	nd	nd
gafl	3	0	.0	.0	--	--	nd	nd
hdsn	7	1	14.3	25.0	nd	--	.004	.004
lsus	10	1	10.0	25.0	nd	--	.004	.004
ozrk	8	0	.0	.0	nd	--	nd	nd
poto	2	1	50.0	25.0	--	--	.004	.004
redn	10	1	10.0	25.0	nd	--	.012	.012
riog	8	0	.0	.0	nd	--	nd	nd
sanj	10	0	.0	.0	nd	--	nd	nd
splt	8	0	.0	.0	nd	--	nd	nd
trin	10	0	.0	.0	nd	--	nd	nd
usnk	9	0	.0	.0	nd	--	nd	nd
whit	3	0	.0	.0	--	--	nd	nd
will	5	0	.0	.0	nd	--	nd	nd
wmic	5	0	.0	.0	nd	--	nd	nd

Table D2. Detections of atrazine in field blanks analyzed by gas chromatography/mass spectrometry from ground-water sites of the National Water-Quality Assessment Program, by Study Unit, 1992-95

[The method detection limit is 0.001 µg/L and the parameter code is 39632. Study-Unit abbreviations are explained in figure 1; µg/L, micrograms per liter]

Study Unit	Site number	Date	Time	Concentration (µg/L)
hdsn	425612074252501	21JUL94	1138	0.004
lsus	401435076540910	21JUL94	1130	.004
poto	390151076561501	05NOV92	1600	.004
redn	473000097000020	27AUG93	1830	.012

Table D3. Statistical summary of concentrations of benfluralin in field blanks analyzed by gas chromatography/mass spectrometry from ground-water sites of the National Water-Quality Assessment Program, by Study Unit, 1992-95

[The method detection limit is 0.002 µg/L and the parameter code is 82673. Study-Unit abbreviations are explained in figure 1; µg/L, micrograms per liter; --, percentile not calculated; nd, pesticide not detected]

Study Unit	Number of field blanks	Number of detections	Percent detections	Study-Unit detections as a percent of national detections	Percentiles		Maximum (µg/L)	Minimum concentration detected (µg/L)
					75th (µg/L)	90th (µg/L)		
acfb	10	0	0.0	0.0	nd	--	nd	nd
albe	10	0	.0	.0	nd	--	nd	nd
ccpt	18	0	.0	.0	nd	nd	nd	nd
conn	9	0	.0	.0	nd	--	nd	nd
gafl	3	0	.0	.0	--	--	nd	nd
hdsn	7	0	.0	.0	nd	--	nd	nd
lsus	10	1	10.0	50.0	nd	--	.002	.002
ozrk	8	0	.0	.0	nd	--	nd	nd
poto	2	0	.0	.0	--	--	nd	nd
redn	10	0	.0	.0	nd	--	nd	nd
riog	8	1	12.5	50.0	nd	--	.003	.003
sanj	10	0	.0	.0	nd	--	nd	nd
splt	8	0	.0	.0	nd	--	nd	nd
trin	10	0	.0	.0	nd	--	nd	nd
usnk	9	0	.0	.0	nd	--	nd	nd
whit	3	0	.0	.0	--	--	nd	nd
will	5	0	.0	.0	nd	--	nd	nd
wmic	5	0	.0	.0	nd	--	nd	nd

Table D4. Detections of benfluralin in field blanks analyzed by gas chromatography/mass spectrometry from ground-water sites of the National Water-Quality Assessment Program, by Study Unit, 1992-95

[The method detection limit is 0.002 µg/L and the parameter code is 82673. Study-Unit abbreviations are explained in figure 1; µg/L, micrograms per liter]

Study Unit	Site number	Date	Time	Concentration (µg/L)
lsus	401435076540910	21JUL94	1130	0.002
riog	373849106124501	07SEP93	1008	.003

Table D5. Statistical summary of concentrations of chlorpyrifos in field blanks analyzed by gas chromatography/mass spectrometry from ground-water sites of the National Water-Quality Assessment Program, by Study Unit, 1992-95

[The method detection limit is 0.004 µg/L and the parameter code is 38933. Study-Unit abbreviations are explained in figure 1; µg/L, micrograms per liter; --, percentile not calculated; nd, pesticide not detected]

Study Unit	Number of field blanks	Number of detections	Percent detections	Study-Unit detections as a percent of national detections	Percentiles		Maximum (µg/L)	Minimum concentration detected (µg/L)
					75th (µg/L)	90th (µg/L)		
acfb	10	0	0.0	0.0	nd	--	nd	nd
albe	10	0	.0	.0	nd	--	nd	nd
ccpt	18	1	5.6	50.0	nd	nd	.013	.013
conn	9	0	.0	.0	nd	--	nd	nd
gafl	3	0	.0	.0	--	--	nd	nd
hdsn	7	0	.0	.0	nd	--	nd	nd
lsus	10	0	.0	.0	nd	--	nd	nd
ozrk	8	0	.0	.0	nd	--	nd	nd
poto	2	0	.0	.0	--	--	nd	nd
redn	10	0	.0	.0	nd	--	nd	nd
riog	8	0	.0	.0	nd	--	nd	nd
sanj	10	0	.0	.0	nd	--	nd	nd
splt	8	0	.0	.0	nd	--	nd	nd
trin	10	1	10.0	50.0	nd	--	.008	.008
usnk	9	0	.0	.0	nd	--	nd	nd
whit	3	0	.0	.0	--	--	nd	nd
will	5	0	.0	.0	nd	--	nd	nd
wmic	5	0	.0	.0	nd	--	nd	nd

Table D6. Detections of chlorpyrifos in field blanks analyzed by gas chromatography/mass spectrometry from ground-water sites of the National Water-Quality Assessment Program, by Study Unit, 1992-95

[The method detection limit is 0.004 µg/L and the parameter code is 38933. Study-Unit abbreviations are explained in figure 1; µg/L, micrograms per liter]

Study Unit	Site number	Date	Time	Concentration (µg/L)
ccpt	463824119120301	29MAR94	1208	0.013
trin	324234097082301	30AUG93	838	.008

Table D7. Statistical summary of concentrations of dacthal in field blanks analyzed by gas chromatography/mass spectrometry from ground-water sites of the National Water-Quality Assessment Program, by Study Unit, 1992-95

[The method detection limit is 0.002 µg/L and the parameter code is 82682. Study-Unit abbreviations are explained in figure 1; µg/L, micrograms per liter; --, percentile not calculated; nd, pesticide not detected; E, pesticide detected and concentration estimated]

Study Unit	Number of field blanks	Number of detections	Percent detections	Study-Unit detections as a percent of national detections	Percentiles		Maximum (µg/L)	Minimum concentration detected (µg/L)
					75th (µg/L)	90th (µg/L)		
acfb	10	0	0.0	0.0	nd	--	nd	nd
albe	10	0	.0	.0	nd	--	nd	nd
ccpt	18	0	.0	.0	nd	nd	nd	nd
conn	9	0	.0	.0	nd	--	nd	nd
gafl	3	0	.0	.0	--	--	nd	nd
hdsn	7	0	.0	.0	nd	--	nd	nd
lsus	10	1	10.0	100.0	nd	--	E .001	E .001
ozrk	8	0	.0	.0	nd	--	nd	nd
poto	2	0	.0	.0	--	--	nd	nd
redn	10	0	.0	.0	nd	--	nd	nd
riog	8	0	.0	.0	nd	--	nd	nd
sanj	10	0	.0	.0	nd	--	nd	nd
splt	8	0	.0	.0	nd	--	nd	nd
trin	10	0	.0	.0	nd	--	nd	nd
usnk	9	0	.0	.0	nd	--	nd	nd
whit	3	0	.0	.0	--	--	nd	nd
will	5	0	.0	.0	nd	--	nd	nd
wmic	5	0	.0	.0	nd	--	nd	nd

Table D8. Detections of dacthal in field blanks analyzed by gas chromatography/mass spectrometry from ground-water sites of the National Water-Quality Assessment Program, by Study Unit, 1992-95

[The method detection limit is 0.002 µg/L and the parameter code is 82682. Study-Unit abbreviations are explained in figure 1; µg/L, micrograms per liter; E, pesticide detected and concentration estimated]

Study Unit	Site number	Date	Time	Concentration (µg/L)
lsus	401435076540910	21JUL94	1130	E0.001

Table D9. Statistical summary of concentrations of p,p'-DDE in field blanks analyzed by gas chromatography/mass spectrometry from ground-water sites of the National Water-Quality Assessment Program, by Study Unit, 1992-95

[The method detection limit is 0.006 µg/L and the parameter code is 34653. Study-Unit abbreviations are explained in figure 1; µg/L, micrograms per liter; --, percentile not calculated; nd, pesticide not detected; E, pesticide detected and concentration estimated]

Study Unit	Number of field blanks	Number of detections	Percent detections	Study-Unit detections as a percent of national detections	Percentiles		Maximum (µg/L)	Minimum concentration detected (µg/L)
					75th (µg/L)	90th (µg/L)		
acfb	10	0	0.0	0.0	nd	--	nd	nd
albe	10	0	.0	.0	nd	--	nd	nd
ccpt	18	1	5.6	16.7	nd	nd	E .002	E .002
conn	9	0	.0	.0	nd	--	nd	nd
gafl	3	0	.0	.0	--	--	nd	nd
hdsn	7	0	.0	.0	nd	--	nd	nd
lsus	10	0	.0	.0	nd	--	nd	nd
ozrk	8	0	.0	.0	nd	--	nd	nd
poto	2	0	.0	.0	--	--	nd	nd
redn	10	0	.0	.0	nd	--	nd	nd
riog	8	1	12.5	16.7	nd	--	E .001	E .001
sanj	10	0	.0	.0	nd	--	nd	nd
splt	8	1	12.5	16.7	nd	--	E .001	E .001
trin	10	0	.0	.0	nd	--	nd	nd
usnk	9	2	22.2	33.3	nd	--	E .002	E .001
whit	3	0	.0	.0	--	--	nd	nd
will	5	1	20.0	16.7	nd	--	E .001	E .001
wmic	5	0	.0	.0	nd	--	nd	nd

Table D10. Detections of p,p'-DDE in field blanks analyzed by gas chromatography/mass spectrometry from ground-water sites of the National Water-Quality Assessment Program, by Study Unit, 1992-95

[The method detection limit is 0.006 µg/L and the parameter code is 34653. Study-Unit abbreviations are explained in figure 1; µg/L, micrograms per liter; E, pesticide detected and concentration estimated]

Study Unit	Site number	Date	Time	Concentration (µg/L)
ccpt	470947119392901	08JUL93	1008	E0.002
riog	373849106124501	07SEP93	1008	E .001
splt	401750104143101	28JUL94	915	E .001
usnk	424227113381301	15JUN93	1238	E .002
usnk	424609113312001	30JUN93	1208	E .001
will	444128122520901	07JUL93	1008	E .001

Table D11. Statistical summary of concentrations of desethylatrazine in field blanks analyzed by gas chromatography/mass spectrometry from ground-water sites of the National Water-Quality Assessment Program, by Study Unit, 1992-95

[The method detection limit is 0.002 µg/L and the parameter code is 04040. Study-Unit abbreviations are explained in figure 1; µg/L, micrograms per liter; --, percentile not calculated; nd, pesticide not detected; E, pesticide detected and concentration estimated]

Study Unit	Number of field blanks	Number of detections	Percent detections	Study-Unit detections as a percent of national detections	Percentiles		Maximum (µg/L)	Minimum concentration detected (µg/L)
					75th (µg/L)	90th (µg/L)		
acfb	10	0	0.0	0.0	nd	--	nd	nd
albe	10	0	.0	.0	nd	--	nd	nd
ccpt	18	0	.0	.0	nd	nd	nd	nd
conn	9	0	.0	.0	nd	--	nd	nd
gafl	3	0	.0	.0	--	--	nd	nd
hdsn	7	0	.0	.0	nd	--	nd	nd
lsus	10	1	10.0	100.0	nd	--	E .005	E .005
ozrk	8	0	.0	.0	nd	--	nd	nd
poto	2	0	.0	.0	--	--	nd	nd
redn	10	0	.0	.0	nd	--	nd	nd
riog	8	0	.0	.0	nd	--	nd	nd
sanj	10	0	.0	.0	nd	--	nd	nd
splt	8	0	.0	.0	nd	--	nd	nd
trin	10	0	.0	.0	nd	--	nd	nd
usnk	9	0	.0	.0	nd	--	nd	nd
whit	3	0	.0	.0	--	--	nd	nd
will	5	0	.0	.0	nd	--	nd	nd
wmic	5	0	.0	.0	nd	--	nd	nd

Table D12. Detections of desethylatrazine in field blanks analyzed by gas chromatography/mass spectrometry from ground-water sites of the National Water-Quality Assessment Program, by Study Unit, 1992-95

[The method detection limit is 0.002 µg/L and the parameter code is 04040. Study-Unit abbreviations are explained in figure 1; µg/L, micrograms per liter; E, pesticide detected and concentration estimated]

Study Unit	Site number	Date	Time	Concentration (µg/L)
lsus	401435076540910	21JUL94	1130	E0.005

Table D13. Statistical summary of concentrations of diazinon in field blanks analyzed by gas chromatography/mass spectrometry from ground-water sites of the National Water-Quality Assessment Program, by Study Unit, 1992-95

[The method detection limit is 0.002 µg/L and the parameter code is 39572. Study-Unit abbreviations are explained in figure 1; µg/L, micrograms per liter; --, percentile not calculated; nd, pesticide not detected]

Study Unit	Number of field blanks	Number of detections	Percent detections	Study-Unit detections as a percent of national detections	Percentiles		Maximum (µg/L)	Minimum concentration detected (µg/L)
					75th (µg/L)	90th (µg/L)		
acfb	10	0	0.0	0.0	nd	--	nd	nd
albe	10	0	.0	.0	nd	--	nd	nd
ccpt	18	0	.0	.0	nd	nd	nd	nd
conn	9	0	.0	.0	nd	--	nd	nd
gafl	3	0	.0	.0	--	--	nd	nd
hdsn	7	0	.0	.0	nd	--	nd	nd
lsus	10	0	.0	.0	nd	--	nd	nd
ozrk	8	0	.0	.0	nd	--	nd	nd
poto	2	0	.0	.0	--	--	nd	nd
redn	10	0	.0	.0	nd	--	nd	nd
riog	8	0	.0	.0	nd	--	nd	nd
sanj	10	0	.0	.0	nd	--	nd	nd
splt	8	0	.0	.0	nd	--	nd	nd
trin	10	1	10.0	100.0	nd	--	.011	.011
usnk	9	0	.0	.0	nd	--	nd	nd
whit	3	0	.0	.0	--	--	nd	nd
will	5	0	.0	.0	nd	--	nd	nd
wmic	5	0	.0	.0	nd	--	nd	nd

Table D14. Detections of diazinon in field blanks analyzed by gas chromatography/mass spectrometry from ground-water sites of the National Water-Quality Assessment Program, by Study Unit, 1992-95

[The method detection limit is 0.002 µg/L and the parameter code is 39572. Study-Unit abbreviations are explained in figure 1; µg/L, micrograms per liter]

Study Unit	Site number	Date	Time	Concentration (µg/L)
trin	330245097344201	01MAR94	1108	0.011

Table D15. Statistical summary of concentrations of metolachlor in field blanks analyzed by gas chromatography/mass spectrometry from ground-water sites of the National Water-Quality Assessment Program, by Study Unit, 1992-95

[The method detection limit is 0.002 µg/L and the parameter code is 39415. Study-Unit abbreviations are explained in figure 1; µg/L, micrograms per liter; --, percentile not calculated; nd, pesticide not detected]

Study Unit	Number of field blanks	Number of detections	Percent detections	Study-Unit detections as a percent of national detections	Percentiles		Maximum (µg/L)	Minimum concentration detected (µg/L)
					75th (µg/L)	90th (µg/L)		
acfb	10	0	0.0	0.0	nd	--	nd	nd
albe	10	0	.0	.0	nd	--	nd	nd
ccpt	18	0	.0	.0	nd	nd	nd	nd
conn	9	0	.0	.0	nd	--	nd	nd
gafl	3	0	.0	.0	--	--	nd	nd
hdsn	7	1	14.3	50.0	nd	--	.002	.002
lsus	10	1	10.0	50.0	nd	--	.006	.006
ozrk	8	0	.0	.0	nd	--	nd	nd
poto	2	0	.0	.0	--	--	nd	nd
redn	10	0	.0	.0	nd	--	nd	nd
riog	8	0	.0	.0	nd	--	nd	nd
sanj	10	0	.0	.0	nd	--	nd	nd
splt	8	0	.0	.0	nd	--	nd	nd
trin	10	0	.0	.0	nd	--	nd	nd
usnk	9	0	.0	.0	nd	--	nd	nd
whit	3	0	.0	.0	--	--	nd	nd
will	5	0	.0	.0	nd	--	nd	nd
wmic	5	0	.0	.0	nd	--	nd	nd

Table D16. Detections of metolachlor in field blanks analyzed by gas chromatography/mass spectrometry from ground-water sites of the National Water-Quality Assessment Program, by Study Unit, 1992-95

[The method detection limit is 0.002 µg/L and the parameter code is 39415. Study-Unit abbreviations are explained in figure 1; µg/L, micrograms per liter]

Study Unit	Site number	Date	Time	Concentration (µg/L)
hdsn	425612074252501	21JUL94	1138	0.002
lsus	401435076540910	21JUL94	1130	.006

Table D17. Statistical summary of concentrations of cis-permethrin in field blanks analyzed by gas chromatography/mass spectrometry from ground-water sites of the National Water-Quality Assessment Program, by Study Unit, 1992-95

[The method detection limit is 0.005 µg/L and the parameter code is 82687. Study-Unit abbreviations are explained in figure 1; µg/L, micrograms per liter; --, percentile not calculated; nd, pesticide not detected; E, pesticide detected and concentration estimated]

Study Unit	Number of field blanks	Number of detections	Percent detections	Study-Unit detections as a percent of national detections	Percentiles		Maximum (µg/L)	Minimum concentration detected (µg/L)
					75th (µg/L)	90th (µg/L)		
acfb	10	0	0.0	0.0	nd	--	nd	nd
albe	10	0	.0	.0	nd	--	nd	nd
ccpt	18	0	.0	.0	nd	nd	nd	nd
conn	9	0	.0	.0	nd	--	nd	nd
gafl	3	0	.0	.0	--	--	nd	nd
hdsn	7	0	.0	.0	nd	--	nd	nd
lsus	10	0	.0	.0	nd	--	nd	nd
ozrk	8	0	.0	.0	nd	--	nd	nd
poto	2	0	.0	.0	--	--	nd	nd
redn	10	0	.0	.0	nd	--	nd	nd
riog	8	1	12.5	100.0	nd	--	E .003	E .003
sanj	10	0	.0	.0	nd	--	nd	nd
splt	8	0	.0	.0	nd	--	nd	nd
trin	10	0	.0	.0	nd	--	nd	nd
usnk	9	0	.0	.0	nd	--	nd	nd
whit	3	0	.0	.0	--	--	nd	nd
will	5	0	.0	.0	nd	--	nd	nd
wmic	5	0	.0	.0	nd	--	nd	nd

Table D18. Detections of cis-permethrin in field blanks analyzed by gas chromatography/mass spectrometry from ground-water sites of the National Water-Quality Assessment Program, by Study Unit, 1992-95

[The method detection limit is 0.005 µg/L and the parameter code is 82687. Study-Unit abbreviations are explained in figure 1; µg/L, micrograms per liter; E, pesticide detected and concentration estimated]

Study Unit	Site number	Date	Time	Concentration (µg/L)
riog	350344106391201	11AUG93	1038	E0.003

Table D19. Statistical summary of concentrations of prometon in field blanks analyzed by gas chromatography/mass spectrometry from ground-water sites of the National Water-Quality Assessment Program, by Study Unit, 1992-95

[The method detection limit is 0.018 µg/L and the parameter code is 04037. Study-Unit abbreviations are explained in figure 1; µg/L, micrograms per liter; --, percentile not calculated; nd, pesticide not detected; E, pesticide detected and concentration estimated]

Study Unit	Number of field blanks	Number of detections	Percent detections	Study-Unit detections as a percent of national detections	Percentiles		Maximum (µg/L)	Minimum concentration detected (µg/L)
					75th (µg/L)	90th (µg/L)		
acfb	10	0	0.0	0.0	nd	--	nd	nd
albe	10	0	.0	.0	nd	--	nd	nd
ccpt	18	0	.0	.0	nd	nd	nd	nd
conn	9	0	.0	.0	nd	--	nd	nd
gafl	3	0	.0	.0	--	--	nd	nd
hdsn	7	0	.0	.0	nd	--	nd	nd
lsus	10	0	.0	.0	nd	--	nd	nd
ozrk	8	0	.0	.0	nd	--	nd	nd
poto	2	0	.0	.0	--	--	nd	nd
redn	10	0	.0	.0	nd	--	nd	nd
riog	8	0	.0	.0	nd	--	nd	nd
sanj	10	0	.0	.0	nd	--	nd	nd
splt	8	0	.0	.0	nd	--	nd	nd
trin	10	0	.0	.0	nd	--	nd	nd
usnk	9	0	.0	.0	nd	--	nd	nd
whit	3	0	.0	.0	--	--	nd	nd
will	5	0	.0	.0	nd	--	nd	nd
wmic	5	1	20.0	100.0	nd	--	E .013	E .013

Table D20. Detections of prometon in field blanks analyzed by gas chromatography/mass spectrometry from ground-water sites of the National Water-Quality Assessment Program, by Study Unit, 1992-95

[The method detection limit is 0.018 µg/L and the parameter code is 04037. Study-Unit abbreviations are explained in figure 1; µg/L, micrograms per liter; E, pesticide detected and concentration estimated]

Study Unit	Site number	Date	Time	Concentration (µg/L)
wmic	433715088015801	15JUN94	938	E0.013

Table D21. Statistical summary of concentrations of pronamide in field blanks analyzed by gas chromatography/mass spectrometry from ground-water sites of the National Water-Quality Assessment Program, by Study Unit, 1992-95

[The method detection limit is 0.003 µg/L and the parameter code is 82676. Study-Unit abbreviations are explained in figure 1; µg/L, micrograms per liter; --, percentile not calculated; nd, pesticide not detected; E, pesticide detected and concentration estimated]

Study Unit	Number of field blanks	Number of detections	Percent detections	Study-Unit detections as a percent of national detections	Percentiles		Maximum (µg/L)	Minimum concentration detected (µg/L)
					75th (µg/L)	90th (µg/L)		
acfb	10	0	0.0	0.0	nd	--	nd	nd
albe	10	0	.0	.0	nd	--	nd	nd
ccpt	18	0	.0	.0	nd	nd	nd	nd
conn	9	0	.0	.0	nd	--	nd	nd
gafl	3	0	.0	.0	--	--	nd	nd
hdsn	7	0	.0	.0	nd	--	nd	nd
lsus	10	1	10.0	100.0	nd	--	E .002	E .002
ozrk	8	0	.0	.0	nd	--	nd	nd
poto	2	0	.0	.0	--	--	nd	nd
redn	10	0	.0	.0	nd	--	nd	nd
riog	8	0	.0	.0	nd	--	nd	nd
sanj	10	0	.0	.0	nd	--	nd	nd
splt	8	0	.0	.0	nd	--	nd	nd
trin	10	0	.0	.0	nd	--	nd	nd
usnk	9	0	.0	.0	nd	--	nd	nd
whit	3	0	.0	.0	--	--	nd	nd
will	5	0	.0	.0	nd	--	nd	nd
wmic	5	0	.0	.0	nd	--	nd	nd

Table D22. Detections of pronamide in field blanks analyzed by gas chromatography/mass spectrometry from ground-water sites of the National Water-Quality Assessment Program, by Study Unit, 1992-95

[The method detection limit is 0.003 µg/L and the parameter code is 82676. Study-Unit abbreviations are explained in figure 1; µg/L, micrograms per liter; E, pesticide detected and concentration estimated]

Study Unit	Site number	Date	Time	Concentration (µg/L)
lsus	401435076540910	21JUL94	1130	E0.002

Table D23. Statistical summary of concentrations of propanil in field blanks analyzed by gas chromatography/mass spectrometry from ground-water sites of the National Water-Quality Assessment Program, by Study Unit, 1992-95

[The method detection limit is 0.004 µg/L and the parameter code is 82679. Study-Unit abbreviations are explained in figure 1; µg/L, micrograms per liter; --, percentile not calculated; nd, pesticide not detected; E, pesticide detected and concentration estimated]

Study Unit	Number of field blanks	Number of detections	Percent detections	Study-Unit detections as a percent of national detections	Percentiles		Maximum (µg/L)	Minimum concentration detected (µg/L)
					75th (µg/L)	90th (µg/L)		
acfb	10	0	0.0	0.0	nd	--	nd	nd
albe	10	0	.0	.0	nd	--	nd	nd
ccpt	18	0	.0	.0	nd	nd	nd	nd
conn	9	0	.0	.0	nd	--	nd	nd
gafl	3	0	.0	.0	--	--	nd	nd
hdsn	7	0	.0	.0	nd	--	nd	nd
lsus	10	1	10.0	100.0	nd	--	E .002	E .002
ozrk	8	0	.0	.0	nd	--	nd	nd
poto	2	0	.0	.0	--	--	nd	nd
redn	10	0	.0	.0	nd	--	nd	nd
riog	8	0	.0	.0	nd	--	nd	nd
sanj	10	0	.0	.0	nd	--	nd	nd
splt	8	0	.0	.0	nd	--	nd	nd
trin	10	0	.0	.0	nd	--	nd	nd
usnk	9	0	.0	.0	nd	--	nd	nd
whit	3	0	.0	.0	--	--	nd	nd
will	5	0	.0	.0	nd	--	nd	nd
wmic	5	0	.0	.0	nd	--	nd	nd

Table D24. Detections of propanil in field blanks analyzed by gas chromatography/mass spectrometry from ground-water sites of the National Water-Quality Assessment Program, by Study Unit, 1992-95

[The method detection limit is 0.004 µg/L and the parameter code is 82679. Study-Unit abbreviations are explained in figure 1; µg/L, micrograms per liter; E, pesticide detected and concentration estimated]

Study Unit	Site number	Date	Time	Concentration (µg/L)
lsus	401435076540910	21JUL94	1130	E0.002

Table D25. Statistical summary of concentrations of simazine in field blanks analyzed by gas chromatography/mass spectrometry from ground-water sites of the National Water-Quality Assessment Program, by Study Unit, 1992-95

[The method detection limit is 0.005 µg/L and the parameter code is 04035. Study-Unit abbreviations are explained in figure 1; µg/L, micrograms per liter; --, percentile not calculated; nd, pesticide not detected; E, pesticide detected and concentration estimated]

Study Unit	Number of field blanks	Number of detections	Percent detections	Study-Unit detections as a percent of national detections	Percentiles		Maximum (µg/L)	Minimum concentration detected (µg/L)
					75th (µg/L)	90th (µg/L)		
acfb	10	0	0.0	0.0	nd	--	nd	nd
albe	10	1	10.0	50.0	nd	--	E .001	E .001
ccpt	18	0	.0	.0	nd	nd	nd	nd
conn	9	0	.0	.0	nd	--	nd	nd
gafl	3	0	.0	.0	--	--	nd	nd
hdsn	7	0	.0	.0	nd	--	nd	nd
lsus	10	0	.0	.0	nd	--	nd	nd
ozrk	8	0	.0	.0	nd	--	nd	nd
poto	2	0	.0	.0	--	--	nd	nd
redn	10	0	.0	.0	nd	--	nd	nd
riog	8	1	12.5	50.0	nd	--	E .001	E .001
sanj	10	0	.0	.0	nd	--	nd	nd
splt	8	0	.0	.0	nd	--	nd	nd
trin	10	0	.0	.0	nd	--	nd	nd
usnk	9	0	.0	.0	nd	--	nd	nd
whit	3	0	.0	.0	--	--	nd	nd
will	5	0	.0	.0	nd	--	nd	nd
wmic	5	0	.0	.0	nd	--	nd	nd

Table D26. Detections of simazine in field blanks analyzed by gas chromatography/mass spectrometry from ground-water sites of the National Water-Quality Assessment Program, by Study Unit, 1992-95

[The method detection limit is 0.005 µg/L and the parameter code is 04035. Study-Unit abbreviations are explained in figure 1; µg/L, micrograms per liter; E, pesticide detected and concentration estimated]

Study Unit	Site number	Date	Time	Concentration (µg/L)
albe	354649077294202	03SEP93	1008	E0.001
riog	373849106124501	07SEP93	1008	E .001

Table D27. Statistical summary of concentrations of triallate in field blanks analyzed by gas chromatography/mass spectrometry from ground-water sites of the National Water-Quality Assessment Program, by Study Unit, 1992-95

[The method detection limit is 0.001 µg/L and the parameter code is 82678. Study-Unit abbreviations are explained in figure 1; µg/L, micrograms per liter; --, percentile not calculated; nd, pesticide not detected]

Study Unit	Number of field blanks	Number of detections	Percent detections	Study-Unit detections as a percent of national detections	Percentiles		Maximum (µg/L)	Minimum concentration detected (µg/L)
					75th (µg/L)	90th (µg/L)		
acfb	10	0	0.0	0.0	nd	--	nd	nd
albe	10	0	.0	.0	nd	--	nd	nd
ccpt	18	0	.0	.0	nd	nd	nd	nd
conn	9	0	.0	.0	nd	--	nd	nd
gafl	3	0	.0	.0	--	--	nd	nd
hdsn	7	0	.0	.0	nd	--	nd	nd
lsus	10	1	10.0	50.0	nd	--	.001	.001
ozrk	8	0	.0	.0	nd	--	nd	nd
poto	2	0	.0	.0	--	--	nd	nd
redn	10	0	.0	.0	nd	--	nd	nd
riog	8	1	12.5	50.0	nd	--	.001	.001
sanj	10	0	.0	.0	nd	--	nd	nd
splt	8	0	.0	.0	nd	--	nd	nd
trin	10	0	.0	.0	nd	--	nd	nd
usnk	9	0	.0	.0	nd	--	nd	nd
whit	3	0	.0	.0	--	--	nd	nd
will	5	0	.0	.0	nd	--	nd	nd
wmic	5	0	.0	.0	nd	--	nd	nd

Table D28. Detections of triallate in field blanks analyzed by gas chromatography/mass spectrometry from ground-water sites of the National Water-Quality Assessment Program, by Study Unit, 1992-95

[The method detection limit is 0.001 µg/L and the parameter code is 82678. Study-Unit abbreviations are explained in figure 1; µg/L, micrograms per liter]

Study Unit	Site number	Date	Time	Concentration (µg/L)
lsus	401435076540910	21JUL94	1130	0.001
riog	373849106124501	07SEP93	1008	.001

Table D29. Statistical summary of concentrations of trifluralin in field blanks analyzed by gas chromatography/mass spectrometry from ground-water sites of the National Water-Quality Assessment Program, by Study Unit, 1992-95

[The method detection limit is 0.002 µg/L and the parameter code is 82661. Study-Unit abbreviations are explained in figure 1; µg/L, micrograms per liter; --, percentile not calculated; nd, pesticide not detected]

Study Unit	Number of field blanks	Number of detections	Percent detections	Study-Unit detections as a percent of national detections	Percentiles		Maximum (µg/L)	Minimum concentration detected (µg/L)
					75th (µg/L)	90th (µg/L)		
acfb	10	0	0.0	0.0	nd	--	nd	nd
albe	10	0	.0	.0	nd	--	nd	nd
ccpt	18	0	.0	.0	nd	nd	nd	nd
conn	9	0	.0	.0	nd	--	nd	nd
gafl	3	0	.0	.0	--	--	nd	nd
hdsn	7	0	.0	.0	nd	--	nd	nd
lsus	10	1	10.0	100.0	nd	--	.002	.002
ozrk	8	0	.0	.0	nd	--	nd	nd
poto	2	0	.0	.0	--	--	nd	nd
redn	10	0	.0	.0	nd	--	nd	nd
riog	8	0	.0	.0	nd	--	nd	nd
sanj	10	0	.0	.0	nd	--	nd	nd
splt	8	0	.0	.0	nd	--	nd	nd
trin	10	0	.0	.0	nd	--	nd	nd
usnk	9	0	.0	.0	nd	--	nd	nd
whit	3	0	.0	.0	--	--	nd	nd
will	5	0	.0	.0	nd	--	nd	nd
wmic	5	0	.0	.0	nd	--	nd	nd

Table D30. Detections of trifluralin in field blanks analyzed by gas chromatography/mass spectrometry from ground-water sites of the National Water-Quality Assessment Program, by Study Unit, 1992-95

[The method detection limit is 0.002 µg/L and the parameter code is 82661. Study-Unit abbreviations are explained in figure 1; µg/L, micrograms per liter]

Study Unit	Site number	Date	Time	Concentration (µg/L)
lsus	401435076540910	21JUL94	1130	0.002

APPENDIX E

Detections of Pesticides in Field Blanks Analyzed by High-Performance Liquid Chromatography from Surface-Water Sites of the National Water-Quality Assessment Program, by Pesticide and Study Unit

Tables E1–4

Table E1. Statistical summary of concentrations of 2,4-D in field blanks analyzed by high-performance liquid chromatography from surface-water sites of the National Water-Quality Assessment Program, by Study Unit, 1992–95

[The method detection limit is 0.035 µg/L and the parameter code is 39732. Study-Unit abbreviations are explained in figure 1; µg/L, micrograms per liter; --, percentile not calculated; nd, pesticide not detected]

Study Unit	Number of field blanks	Number of detections	Percent detections	Study-Unit detections as a percent of national detections	Percentiles		Maximum (µg/L)	Minimum concentration detected (µg/L)
					75th (µg/L)	90th (µg/L)		
acfb	14	1	7.1	100.0	nd	nd	0.230	0.230
albe	7	0	.0	.0	nd	--	nd	nd
ccpt	8	0	.0	.0	nd	--	nd	nd
cnbr	3	0	.0	.0	--	--	nd	nd
conn	3	0	.0	.0	--	--	nd	nd
gafl	7	0	.0	.0	nd	--	nd	nd
hdsn	4	0	.0	.0	--	--	nd	nd
lsus	6	0	.0	.0	nd	--	nd	nd
ozrk	5	0	.0	.0	nd	--	nd	nd
poto	8	0	.0	.0	nd	--	nd	nd
redn	4	0	.0	.0	--	--	nd	nd
riog	1	0	.0	.0	--	--	nd	nd
sanj	8	0	.0	.0	nd	--	nd	nd
splt	3	0	.0	.0	--	--	nd	nd
trin	5	0	.0	.0	nd	--	nd	nd
usnk	7	0	.0	.0	nd	--	nd	nd
whit	8	0	.0	.0	nd	--	nd	nd
will	6	0	.0	.0	nd	--	nd	nd
wmic	1	0	.0	.0	--	--	nd	nd

Table E2. Detections of 2,4-D in field blanks analyzed by high-performance liquid chromatography from surface-water sites of the National Water-Quality Assessment Program, by Study Unit, 1992-95

[The method detection limit is 0.035 µg/L and the parameter code is 39732. Study-Unit abbreviations are explained in figure 1; µg/L, micrograms per liter]

Study Unit	Site number	Date	Time	Concentration (µg/L)
acfb	02335870	17MAY93	915	0.230

Table E3. Statistical summary of concentrations of diuron in field blanks analyzed by high-performance liquid chromatography from surface-water sites of the National Water-Quality Assessment Program, by Study Unit, 1992-95

[The method detection limit is 0.020 µg/L and the parameter code is 49300. Study-Unit abbreviations are explained in figure 1; µg/L, micrograms per liter; --, percentile not calculated; nd, pesticide not detected; E, pesticide detected and concentration estimated]

Study Unit	Number of field blanks	Number of detections	Percent detections	Study-Unit detections as a percent of national detections	Percentiles		Maximum (µg/L)	Minimum concentration detected (µg/L)
					75th (µg/L)	90th (µg/L)		
acfb	14	0	0.0	0.0	nd	nd	nd	nd
albe	3	0	.0	.0	--	--	nd	nd
ccpt	8	0	.0	.0	nd	--	nd	nd
cnbr	3	0	.0	.0	--	--	nd	nd
conn	3	0	.0	.0	--	--	nd	nd
gafl	7	0	.0	.0	nd	--	nd	nd
hdsn	4	0	.0	.0	--	--	nd	nd
lsus	5	0	.0	.0	nd	--	nd	nd
ozrk	5	0	.0	.0	nd	--	nd	nd
poto	7	0	.0	.0	nd	--	nd	nd
redn	4	0	.0	.0	--	--	nd	nd
riog	1	0	.0	.0	--	--	nd	nd
sanj	5	0	.0	.0	nd	--	nd	nd
splt	1	0	.0	.0	--	--	nd	nd
trin	5	0	.0	.0	nd	--	nd	nd
usnk	6	0	.0	.0	nd	--	nd	nd
whit	6	1	16.7	100.0	nd	--	E .010	E .010
will	5	0	.0	.0	nd	--	nd	nd

Table E4. Detections of diuron in field blanks analyzed by high-performance liquid chromatography from surface-water sites of the National Water-Quality Assessment Program, by Study Unit, 1992-95

[The method detection limit is 0.020 µg/L and the parameter code is 49300. Study-Unit abbreviations are explained in figure 1; µg/L, micrograms per liter; E, pesticide detected and concentration estimated]

Study Unit	Site number	Date	Time	Concentration (µg/L)
whit	394340085524601	21JUL93	1308	E0.010

APPENDIX F

Detections of Pesticides in Field Blanks Analyzed by High-Performance Liquid Chromatography from Ground-Water Sites of the National Water-Quality Assessment Program, by Pesticide and Study Unit

Tables F1–6

Table F1. Statistical summary of concentrations of bromacil in field blanks analyzed by high-performance liquid chromatography from ground-water sites of the National Water-Quality Assessment Program, by Study Unit, 1992-95

[The method detection limit is 0.035 µg/L and the parameter code is 04029. Study-Unit abbreviations are explained in figure 1; µg/L, micrograms per liter; --, percentile not calculated; nd, pesticide not detected; E, pesticide detected and concentration estimated]

Study Unit	Number of field blanks	Number of detections	Percent detections	Study-Unit detections as a percent of national detections	Percentiles		Maximum (µg/L)	Minimum concentration detected (µg/L)
					75th (µg/L)	90th (µg/L)		
acfb	8	0	0.0	0.0	nd	--	nd	nd
albe	4	0	.0	.0	--	--	nd	nd
ccpt	16	1	6.3	100.0	nd	nd	E .010	E .010
conn	6	0	.0	.0	nd	--	nd	nd
gafl	3	0	.0	.0	--	--	nd	nd
lsus	9	0	.0	.0	nd	--	nd	nd
ozrk	5	0	.0	.0	nd	--	nd	nd
poto	2	0	.0	.0	--	--	nd	nd
redn	11	0	.0	.0	nd	nd	nd	nd
riog	8	0	.0	.0	nd	--	nd	nd
sanj	1	0	.0	.0	--	--	nd	nd
splt	6	0	.0	.0	nd	--	nd	nd
trin	10	0	.0	.0	nd	--	nd	nd
usnk	7	0	.0	.0	nd	--	nd	nd
whit	2	0	.0	.0	--	--	nd	nd
will	5	0	.0	.0	nd	--	nd	nd
wmic	1	0	.0	.0	--	--	nd	nd

Table F2. Detections of bromacil in field blanks analyzed by high-performance liquid chromatography from ground-water sites of the National Water-Quality Assessment Program, by Study Unit, 1992-95

[The method detection limit is 0.035 µg/L and the parameter code is 04029. Study-Unit abbreviations are explained in figure 1; µg/L, micrograms per liter; E, pesticide detected and concentration estimated]

Study Unit	Site number	Date	Time	Concentration (µg/L)
ccpt	462330119115001	05OCT94	1008	E0.010

Table F3. Statistical summary of concentrations of diuron in field blanks analyzed by high-performance liquid chromatography from ground-water sites of the National Water-Quality Assessment Program, by Study Unit, 1992-95

[The method detection limit is 0.020 µg/L and the parameter code is 49300. Study-Unit abbreviations are explained in figure 1; µg/L, micrograms per liter; --, percentile not calculated; nd, pesticide not detected; E, pesticide detected and concentration estimated]

Study Unit	Number of field blanks	Number of detections	Percent detections	Study-Unit detections as a percent of national detections	Percentiles		Maximum (µg/L)	Minimum concentration detected (µg/L)
					75th (µg/L)	90th (µg/L)		
acfb	8	0	0.0	0.0	nd	--	nd	nd
albe	4	0	.0	.0	--	--	nd	nd
ccpt	16	1	6.3	100.0	nd	nd	.020	.020
conn	6	0	.0	.0	nd	--	nd	nd
gafl	3	0	.0	.0	--	--	nd	nd
lsus	9	0	.0	.0	nd	--	nd	nd
ozrk	5	0	.0	.0	nd	--	nd	nd
poto	1	0	.0	.0	--	--	nd	nd
redn	11	0	.0	.0	nd	nd	nd	nd
riog	8	0	.0	.0	nd	--	nd	nd
sanj	1	0	.0	.0	--	--	nd	nd
splt	5	0	.0	.0	nd	--	nd	nd
trin	10	0	.0	.0	nd	--	nd	nd
usnk	3	0	.0	.0	--	--	nd	nd
whit	2	0	.0	.0	--	--	nd	nd
will	5	0	.0	.0	nd	--	nd	nd
wmic	1	0	.0	.0	--	--	nd	nd

Table F4. Detections of diuron in field blanks analyzed by high-performance liquid chromatography from ground-water sites of the National Water-Quality Assessment Program, by Study Unit, 1992-95

[The method detection limit is 0.020 µg/L and the parameter code is 49300. Study-Unit abbreviations are explained in figure 1; µg/L, micrograms per liter; E, pesticide detected and concentration estimated]

Study Unit	Site number	Date	Time	Concentration (µg/L)
ccpt	462330119115001	05OCT94	1008	E0.020

Table F5. Statistical summary of concentrations of fenuron in field blanks analyzed by high-performance liquid chromatography from ground-water sites of the National Water-Quality Assessment Program, by Study Unit, 1992-95

[The method detection limit is 0.013 µg/L and the parameter code is 49297. Study-Unit abbreviations are explained in figure 1; µg/L, micrograms per liter; --, percentile not calculated; nd, pesticide not detected; E, pesticide detected and concentration estimated]

Study Unit	Number of field blanks	Number of detections	Percent detections	Study-Unit detections as a percent of national detections	Percentiles		Maximum (µg/L)	Minimum concentration detected (µg/L)
					75th (µg/L)	90th (µg/L)		
acfb	8	0	0.0	0.0	nd	--	nd	nd
albe	4	0	.0	.0	--	--	nd	nd
ccpt	16	0	.0	.0	nd	nd	nd	nd
conn	6	0	.0	.0	nd	--	nd	nd
gafl	3	0	.0	.0	--	--	nd	nd
lsus	9	0	.0	.0	nd	--	nd	nd
ozrk	5	0	.0	.0	nd	--	nd	nd
poto	1	0	.0	.0	--	--	nd	nd
redn	11	0	.0	.0	nd	nd	nd	nd
riog	8	0	.0	.0	nd	--	nd	nd
sanj	1	0	.0	.0	--	--	nd	nd
splt	5	0	.0	.0	nd	--	nd	nd
trin	10	1	10.0	100.0	nd	--	E .010	E .010
usnk	3	0	.0	.0	--	--	nd	nd
whit	2	0	.0	.0	--	--	nd	nd
will	5	0	.0	.0	nd	--	nd	nd
wmic	1	0	.0	.0	--	--	nd	nd

Table F6. Detections of fenuron in field blanks analyzed by high-performance liquid chromatography from ground-water sites of the National Water-Quality Assessment Program, by Study Unit, 1992-95

[The method detection limit is 0.013 µg/L and the parameter code is 49297. Study-Unit abbreviations are explained in figure 1; µg/L, micrograms per liter; E, pesticide detected and concentration estimated]

Study Unit	Site number	Date	Time	Concentration (µg/L)
trin	300240094551401	25JUL94	1218	E0.010

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