WATER-QUALITY ASSESSMENT OF THE RIO GRANDE VALLEY, COLORADO, NEW MEXICO, AND TEXAS--Occurrence and distribution of selected pesticides and nutrients at selected surface-water sites in the Mesilla Valley, 1994-95

By Denis F. Healy

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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 a specific contamination problem; 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 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 60 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 60 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.

Robert M. Hirsch
Chief Hydrologist

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CONVERSION FACTORS AND VERTICAL DATUM

Multiply	By	To obtain
inch	25.4	millimeter
foot	0.3048	meter
mile	1.609	kilometer
acre	4,047	square meter
square mile	2.590	square kilometer
gallon	3.785	liter
gallon	0.003785	cubic meter
gallon per minute	0.06309	liter per second
ounce (avoirdupois)	28.36	gram
pound	0.4536	kilogram
cubic foot	0.02832	cubic meter
cubic foot per second	28.32	liter per second

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

$$°C = 5/9\ (°F-32)$$

Sea level: In this report "sea level" refers to the National Geodetic Vertical Datum of 1929--a geodetic datum derived from a general adjustment of the first-order level nets of the United States and Canada, formerly called Sea Level Datum of 1929.

WATER-QUALITY ASSESSMENT OF THE RIO GRANDE VALLEY, COLORADO, NEW MEXICO, AND TEXAS--Occurrence and distribution of selected pesticides and nutrients at selected surface-water sites in the Mesilla Valley, 1994-95

By Denis F. Healy

ABSTRACT

The Rio Grande Valley study unit of the U.S. Geological Survey National Water-Quality Assessment Program conducted a two-phase synoptic study of the occurrence and distribution of pesticides and nutrients in the surface water of the Mesilla Valley, New Mexico and Texas. Phase one, conducted in April-May 1994 during the high-flow irrigation season, consisted of a 6-week time-series sampling event during which 17 water-column samples were collected at 3 main-stem sites on the Rio Grande and a synoptic irrigation-run sampling event during which 19 water-column samples were collected at 7 main-stem sites, 10 drain sites, and 2 sites at the discharges of wastewater-treatment plants. Three samples are included in both the time-series and irrigation-run events. Phase two, conducted in January 1995 during the low-flow non-irrigation season, consisted of a non-irrigation synoptic sampling event during which 18 water-column samples were collected at seven main-stem sites, nine drain sites, and two sites at the discharges of wastewater-treatment plants and a bed-material sampling event during which 6 bed-material samples were collected at six sites near the mouths of drains that discharge to the Rio Grande.

The 51 water-column samples were analyzed for 78 pesticides and metabolites and 8 nutrients along with other constituents. The six bed-material samples were analyzed for 21 pesticides and metabolites, gross polychlorinated biphenyls, and gross polychlorinated naphthalenes.

The presence of dissolved pesticides in the surface water of the Mesilla Valley is erratic. A total of 100 detections of 17 different pesticides were detected in 44 of the water-column samples. As many as 38 percent of these detections may be attributed to pesticide use upstream from the valley or to nonagricultural pesticide use within the valley. There were 29 detections of 10 different pesticides in 17 samples during the irrigation run and 41 detections of 13 pesticides in 16 samples during the non-irrigation run. Nine pesticides were detected during both phases of the study.

The most commonly detected pesticides in the water-column samples were DCPA, which was detected in 29 samples, and metolachlor, which was detected in 17 of the samples. DCPA was detected throughout the Mesilla Valley, whereas metolachlor was detected mainly in the northern and central parts of the valley. The maximum pesticide concentration found during the study was 0.75 microgram per liter of carbofuran, which was detected at the East Side Drain site during the irrigation run. No water-column pesticide concentration exceeded U.S. Environmental Protection Agency's drinking-water standards or any applicable Federal or State criteria or guidelines.

A total of 21 occurrences of six pesticides and metabolites were found in the bed-material samples. Chlordane, diazinon, and methyl parathion were detected once each, whereas DDD, DDE, and DDT were detected at all six bed-material sites.

Water-column samples for the analysis of nutrient concentrations were collected at all sampling sites during both phases of the study. The concentrations of each nutrient ranged from at or below the individual minimum reporting level to as much as two or three orders of magnitude larger than the minimum reporting level. The concentration of each nutrient was left skewed with most of the values toward the lower end of the range. The larger concentrations of each nutrient, except dissolved nitrite plus nitrate, were associated with wastewater-treatment-plant sites 4 and 16. The larger concentrations of dissolved nitrite plus nitrate were generally associated with the non-irrigation run; however, the largest concentration was at site 4 during the irrigation run.

During this study, the Mesilla Valley as a unit was a source of nutrients to the Rio Grande. Within the valley, the amount of nutrients discharged to the Rio Grande from nonagricultural sources probably equaled or exceeded that from agricultural sources.

No nutrient concentration or constituent concentration related to nutrients failed to meet an applicable Federal or State criterion or standard. The maximum nitrite concentration at an ambient site was 0.12 milligram per liter as nitrogen and the maximum nitrite plus nitrate concentration at an ambient site was 2.3 milligrams per liter as nitrogen. The minimum dissolved-oxygen concentration at an ambient site was 6.2 milligrams per liter. The maximum calculated un-ionized ammonia concentration at an ambient site was 0.042 milligram per liter as nitrogen.

The median concentration values of dissolved nitrogen and total phosphorus at main-stem sites for the irrigation and non-irrigation runs are in the eutrophic range of most trophic classification systems. In particular, total phosphorus concentrations in 12 ambient-site samples exceeded the U.S. Environmental Protection Agency recommended concentration to control eutrophication in streams and other flowing waters not discharging directly to lakes or impoundments.

INTRODUCTION

The Rio Grande Valley study unit (RIOG) assessment program began in 1991 as one of 20 study units of the National Water-Quality Assessment (NAWQA) Program of the U.S. Geological Survey (USGS) (Gilliom and others, 1995). The study unit contains approximately 45,900 square miles in Colorado, New Mexico, and Texas encompassing the surface-water drainage for the Rio Grande upstream from the USGS streamflow-monitoring station Rio Grande at El Paso, Texas; the closed surface-water basins between the Rio Grande and Continental Divide; and the closed basin part of the San Luis Basin (Ellis and others, 1993). The RIOG assessment program conducted a high intensity sampling phase from September 1992 through September 1995. This phase included water-column and biological data collection at a network of fixed surface-water sampling stations and surface-water, ground-water, and biological synoptic studies that ranged in size from single land-use studies to study-area assessments. The Mesilla Valley synoptic study concentrated on the occurrence and distribution of pesticides and plant nutrients in the surface waters of the Mesilla Valley, New Mexico and Texas (see location map, fig. 1). This study area was chosen to address the lack of pesticide and nutrient data for surface water from a predominantly agricultural land-use setting in the Rio Grande Valley study unit.

The Mesilla Valley synoptic study was conducted in two phases: a high-flow irrigation season phase and a low-flow non-irrigation season phase. The irrigation phase consisted of two sampling events: a time-series sampling event, referred to as the time series, during which water-column samples were collected weekly at three sites from the first week of April through the second week of May 1994, and a synoptic sampling event, referred to as the irrigation run, from April 25 through April 28, 1994, during which water-column samples were collected at 19 sites. The fourth week of the time series coincided with the irrigation run. The non-irrigation phase also consisted of two sampling events: a synoptic sampling event, referred to as the non-

irrigation run, from January 4 through January 7, 1995, during which water-column samples were collected at 18 sites, and a bed-material sampling event, referred to as the bed-material run, over the same time period during which bed-material samples were collected at 6 of the 18 sites.

The 19 sites sampled during the study and the sampling events during which each was sampled are listed in table 1 and their locations are shown in figure 1. The 19 sites consist of 7 sites on the main stem of the Rio Grande (sites 1, 3, 5, 8, 13, 15, and 19); 7 sites near the mouths of drains that discharge to the Rio Grande, referred to as end-drain sites (sites 2, 6, 7, 10, 12, 14, and 18); 3 other sites on drains, referred to as mid-drain sites (sites 9, 11, and 17); and 2 sites at the outflows of wastewater-treatment plants (WWTP's) (sites 4 and 16). The end-drain and mid-drain sites as a group are referred to as drain sites.

Table 1.--Mesilla Valley synoptic sampling sites and sampling events during which samples were collected

[Site numbers refer to figure 1. Column A, sites sampled during the irrigation run; column B, sites sampled during the non-irrigation run; column C, sites sampled during the time series; column D, sites sampled during the bed-material run. WWTP, wastewater-treatment plant; Rt., route]

Site number	Site type	Station number	U.S. Geological Survey station name	Sampling event A	B	C	D
1	Main stem	08363500	Rio Grande below Leasburg Dam near Las Cruces, N. Mex.	X	X	X	
2	End drain	322541106525110	Selden Drain at levee road near Leasburg, N. Mex.	X	X		X
3	Main stem	322234106511710	Rio Grande at Shalem Bridge near Doña Ana, N. Mex.	X	X		
4	WWTP	321739106495110	Las Cruces WWTP at levee road near Las Cruces, N. Mex.	X	X		
5	Main stem	321601106494110	Rio Grande above N. Mex. 359 Bridge at Mesilla, N. Mex.	X	X		
6	End drain	321457106492110	Picacho Drain near San Pablo, N. Mex.	X	X		X
7	End drain	321014106431410	Santo Tomas River Drain at levee road near San Miguel, N. Mex.	X			
8	Main stem	320943106425810	Rio Grande at Rt. 192 Bridge near San Miguel, N. Mex.	X	X		
9	Mid-drain	321210106443210	Del Rio Drain at Piano Road near Santo Tomas, N. Mex.	X	X		
10	End drain	320610106393110	Del Rio Drain at levee road near Vado, N. Mex.	X	X		X
11	Mid-drain	320936106431710	La Mesa Drain at Rt. 192 near San Miguel, N. Mex.	X	X		
12	End drain	320214106392510	La Mesa Drain at levee road near Chamberino, N. Mex.	X	X		X
13	Main stem	320122106385510	Rio Grande at Rt. 404 Bridge near Chamberino, N. Mex.	X	X		
14	End drain	315807106361910	East Side Drain at levee road near Anthony, Tex.	X	X		X
15	Main stem	08363840	Rio Grande at Vinton Bridge near Anthony, Tex.	X	X	X	
16	WWTP	314754106332110	Sunland Park WWTP at Sunland Park, N. Mex.	X	X		
17	Mid-drain	315007106355410	Nemexas Drain at Meadowlark Drive near El Paso, Tex.	X	X		
18	End drain	314810106324610	Montoya Drain at levee road near Sunland Park, N. Mex.	X	X		X
19	Main stem	08364000	Rio Grande at El Paso, Tex.	X	X	X	

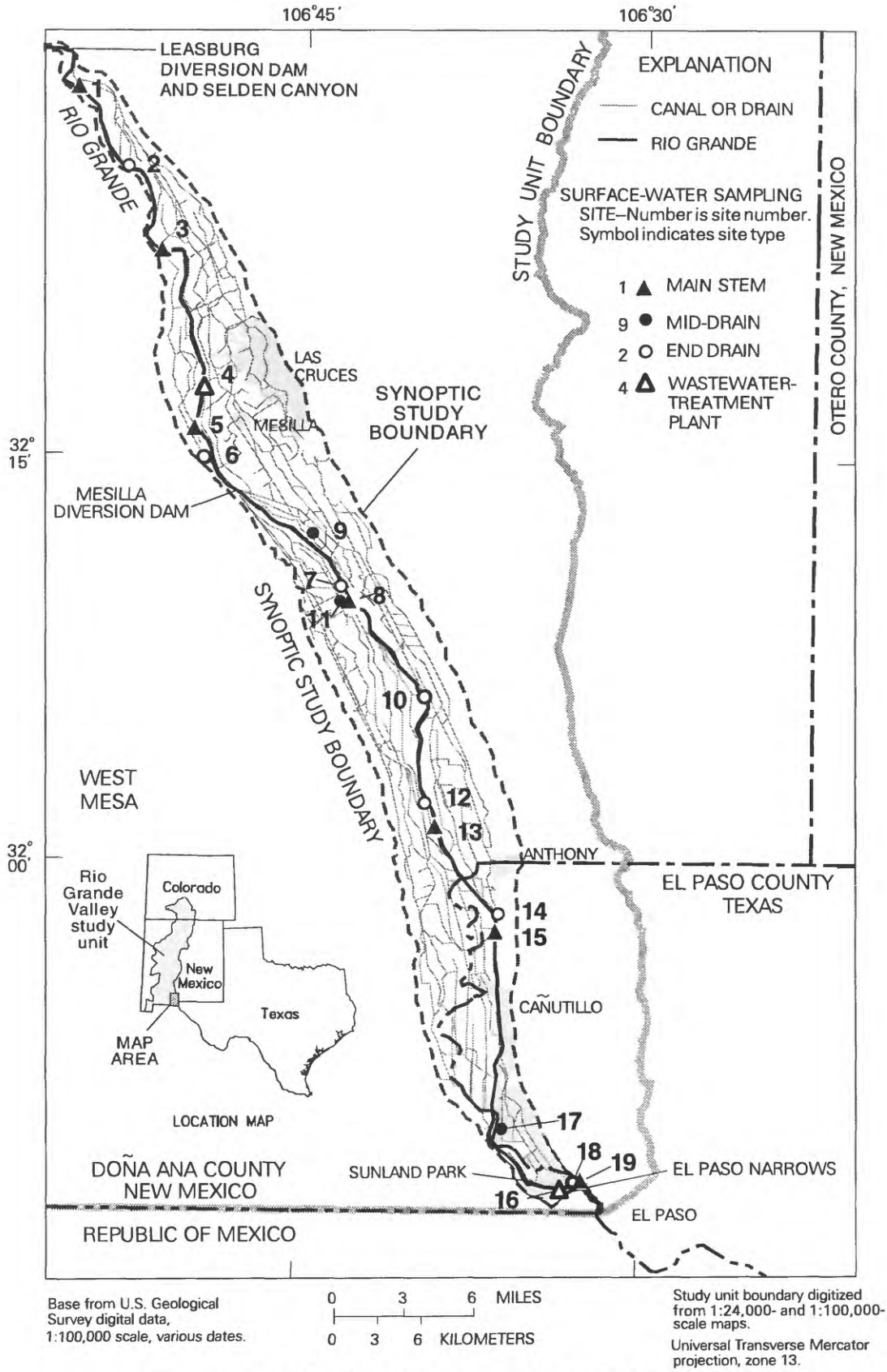

Figure 1.--Mesilla Valley synoptic study area.

Purpose and Scope

This report presents the pesticide and plant nutrient data and discusses the occurrence and distribution of these pesticides and plant nutrients collected at surface-water sites during the Mesilla Valley synoptic study, April-May 1994 and January 1995. The pesticides and metabolites (degradation products) selected for analysis in the Mesilla Valley were prescribed by the National NAWQA Program on the basis of national usage and the development and cost effectiveness of analytical procedures. As a result, not all of the pesticides used in the Mesilla Valley are included in the analyses and not all pesticides included in the analyses are used in the Mesilla Valley. Plant nutrients, for the purpose of this report and hereafter referred to as nutrients, are the compounds of nitrogen and phosphorus that are normally found in the aquatic environment. Water-column samples for major ions, trace elements, organic carbon, and suspended sediment were collected and discharge was measured during the study, but these data are discussed only as they relate to the interpretation of pesticide and nutrient data. Water-column analytes and field-measured properties are listed in table 2. Bed-material analytes are listed in table 3. Quality-control samples were collected as part of this study, but the data are not presented in this report. However, results of the quality-control sampling are discussed where necessary for the interpretation of pesticide and nutrient data. Water-column and bed-material data from this study are presented in the appendix.

Table 2.–Water-column analytes and field-measured properties

Pesticides and metabolites		
Acetochlor	Dichlorprop	Norflurazon
Acifluorfen	Dieldrin	Oryzalin
Alachlor	2,6-Diethylaniline	Oxamyl
Aldicarb	Dinoseb	Parathion
Aldicarb sulfone	Disulfoton	Pebulate
Aldicarb sulfoxide	Diuron	Pendimethalin
Alpha BHC	EPTC	Permethrin
Atrazine	Ethalfluralin	Phorate
Benfluralin	Ethoprop	Picloram
Bentazon	Fenuron	Prometon
Bromacil	Fluometuron	Pronamide
Bromoxynil	Fonofos	Propachlor
Butylate	3 Hydrxycarbofuran	Propanil
Carbaryl	Lindane	Propargite
Carbofuran	Linuron	Propham
Chloramben	Malathion	Propoxur
Chlorpyrifos	MCPA	Silvex
Clopyralid	Methiocarb	Simazine
Cyanazine	Methomyl	2,4,5-T
2,4-D	Methyl azinphos	Tebuthiuron
Dacthal mono-acid	Methyl parathion	Terbacil
DCPA	Metolachlor	Terbufos
p,p' DDE	Metribuzin	Thiobencarb
Deethyl atrazine	Molinate	Triallate
Diazinon	Napropamide	Triclopyr
Dicamba	Neburon	Trifluralin

Table 2.--Water-column analytes and field-measured properties--Concluded

Nutrients and organic carbon	
Nitrogen, ammonia, dissolved	Phosphorus, dissolved
Nitrogen, ammonia + organic, dissolved	Phosphorus, orthophosphate, dissolved
Nitrogen, ammonia + organic, total	Carbon, organic, total
Nitrogen, nitrite, dissolved	Carbon, organic, dissolved
Nitrogen, nitrite + nitrate, dissolved	Carbon, organic, suspended
Phosphorus, total	

Major ions and dissolved solids		
Calcium	Magnesium	Sodium
Chloride	Potassium	Solids, residue at 180 Celsius
Fluoride	Silica	Sulfate

Dissolved trace elements		
Aluminum	Chromium	Molybdenum
Antimony	Cobalt	Nickel
Arsenic	Copper	Selenium
Barium	Iron	Silver
Beryllium	Lead	Uranium
Boron	Manganese	Zinc
Cadmium		

Field-measured properties		
Air temperature	Bicarbonate	Oxygen, dissolved
Alkalinity	Carbonate	Specific conductance
Barometric pressure	Hydrogen ion activity (pH)	Water temperature

Table 3.--Bed material analytes

Constituent	Minimum reporting level (micrograms per kilogram)
Aldrin	0.1
Chlordane	1
DDD	0.1
DDE	0.1
DDT	0.1
Diazinon	0.1
Dieldrin	0.1
Endosulfan	0.1
Endrin	0.1
Ethion	0.1
Heptachlor	0.1
Heptachlor epoxide	0.1
Lindane	0.1
Malathion	0.1
Methoxychlor	0.1
Methyl parathion	0.1
Mirex	0.1
Parathion	0.1
Perthane	1
Polychlorinated biphenyls, PCB's, gross	1
Polychlorinated naphthalenes, PCN's, gross	1
Toxaphene	10
Trithion	0.1

Methods

The field methods used during this study were based on published NAWQA protocols presented in Shelton (1994) and Shelton and Capel (1994). The field methods differed in two ways from the published protocols. First, because the irrigation phase of the study preceded the change in laboratory policy discussed in Shelton (1994), mercuric chloride was added as a preservative to nutrient samples during this phase. Second, because samples for trace-element analysis were collected during the non-irrigation run, additional quality-assurance procedures specific to trace-element sampling were used during this run.

During the irrigation run, a Lagrangian sampling schedule was followed for 16 of the sites. This type of sampling schedule is designed to follow a specific volume of water as it travels downstream. For this study, the average velocity at a main-stem site being sampled was used to determine the sampling time for the next downstream main-stem site and for the end drain and WWTP sites between them. The mid-drain sites 9, 11, and 17 were not included in the Lagrangian sampling schedule.

Field quality-control samples included blanks, spikes, and replicates. Quality-control samples collected in the field were used to monitor for contamination, determine the extent of matrix interference, measure analyte degradation during field processing and shipping, and monitor the reproducibility of analytical results. In this report, the analyte concentration reported for sites at which replicate samples were collected is the concentration of the regular environmental sample that would have been collected if no quality-control samples were collected and not an average of the regular sample and the replicates. This approach was used for consistency between sites. The regular environmental sample is hereafter referred to as the regular sample.

Pesticides in the water column were analyzed by the C-18 solid phase extraction (SPE) method or by the Carbopak-B SPE method (Timme, 1995). Laboratory procedures used for the analyses of pesticides in bed material and nutrients, major ions, organic and inorganic carbons, and trace elements in the water column are described in Wershaw and others (1987), Fishman and Friedman (1989), and Faires (1993). Water-column and bed-material samples were chemically analyzed at the USGS National Water Quality Laboratory (NWQL) in Arvada, Colorado. Suspended-sediment concentrations were determined using procedures described by Guy (1969) at the New Mexico District Sediment Laboratory in Albuquerque, New Mexico.

Quality-control samples were used at the NWQL to determine default method detection limits (MDL's) and to establish performance records for each pesticide compound (Zaugg and others (1995) and R.J. Gilliom, U.S. Geological Survey, written commun., 1995). An MDL, as reported by the NWQL, is the minimum concentration at which a compound can be identified, measured, and reported with 99-percent confidence that the compound concentration is greater than zero (Timme, 1995). The probability of reporting a false positive (the analyte present when it is not) at the MDL concentration is one percent (by definition), whereas the probability of reporting a false negative (the analyte not present when it is) may be much higher and varies with the analyte (J.W. Pritt, U.S. Geological Survey, written commun., 1994). Default MDL's for specific pesticides were changed during the course of this study because of additional quality-control work that coincided with the period of this study. In addition, the MDL's for specific samples were superseded because of quality-control testing of instrument performance at the time of analysis.

As a result of the laboratory quality-control sampling, specific analytes were dropped from both SPE methods either completely or during specific time periods. Because of a poor performance record, dimethoate was dropped from the C-18 SPE method (Zaugg and others, 1995). The dimethoate data reported in Borland and Ong (1995) was deleted from USGS data bases (S.D. Zaugg, U.S. Geological Survey, written commun., 1996). Because of poor percent recovery of laboratory spike samples during the time period of this synoptic study, 1-napthol, chlorothalonil, 2,4-DB, dichlobenil, DNOC, esfenvalerate, and MCPB data from the Carbopak-B analyses are not included in this report.

In this report, pesticide concentrations are reported as uncensored, censored, or estimated data. Uncensored data are data for which an unqualified numerical value is given. Censored data are data reported as less than a value, generally the default MDL. A value other than the MDL was used if a problem occurred with the sample matrix or instrumentation at the time of analysis. Data reported as censored can result from the compound not being present or, if present, the compound cannot be conclusively identified. Estimated data are data for which a qualified numerical value is given. Estimated values less than the MDL are data for which the compound can be identified and measured, but with less than 99-percent confidence that it is actually present. Estimated values at or above the MDL can result from a poor performance record of the analyte with the analytical method (Zaugg and others, 1995), matrix interference, or small sample volume (J.W. Pritt, U.S. Geological Survey, written commun., 1994). Estimated concentrations in this report are marked by an E before the value.

Precision is a measure of the reproducibility of the chemical analysis and is reported as the percent relative standard deviation, which is the ratio of the standard deviation to the mean times 100 (Fishman and Friedman, 1989). A precision reported near the MDL as 20 percent means that if a sample with an actual concentration of the MDL value were analyzed thousands of times, approximately 68 percent of the results would be within plus or minus 20 percent of the MDL value. The precision of the reported values varies with the concentration and the compound. For pesticides, the precision declines as the concentration decreases below the MDL.

A minimum reporting level (MRL) instead of an MDL is used as the break between censored and uncensored data for pesticide concentrations in bed material and for nutrient, major ion, trace-element, and organic carbon concentrations in the water column. The NWQL defines an MRL as the smallest concentration of an analyte that may be reliably reported using a given analytical method (Timme, 1995). The MRL is not as well defined statistically and is generally greater than an MDL for a given analytical method.

Two-tailed non-parametric statistical tests were used to examine the data because most data sets did not fit the requirements for parametric tests. Non-parametric tests use the ranking of the data rather than the data values themselves. Two-tailed tests assume that the difference can be either greater or less, whereas a one-tailed test assumes a direction. Descriptions of statistical tests can be found in Helsel and Hirsch (1992) and Ott (1993). If the result of the statistical test was equal to or greater than the 90-percent confidence level, then the sets were accepted as being significantly different. If the result was less than the 90-percent confidence level, the difference between the data sets was assumed to be due to chance and not significant.

Statistical significance does not always mean numerical significance. A non-parametric test of paired data, where the second member of the pair is always greater than the first, will find the difference to be statistically significant even though the difference between the pairs may be as little as 0.001. This report notes where such situations occur.

Acknowledgments

The cooperation of many Federal, State, and local agencies and their employees are gratefully acknowledged. These agencies include the International Boundary and Water Commission; Elephant Butte Irrigation District; County of Doña Ana, New Mexico; County of El Paso, Texas; City of Las Cruces, New Mexico; Town of Sunland Park, New Mexico; Rio Grande Gas Company; and New Mexico Water Resources Research Institute. I would also like to thank Dr. Richard Lee of the New Mexico State University Cooperative Extension Program for pesticide-use data.

Many USGS employees participated in the collection and analyses of samples for this study and in the preparation and review of this report. I thank all of them for their contributions.

DESCRIPTION OF THE STUDY AREA

The Mesilla Valley is that section of the Rio Grande Valley situated in the Mesilla Basin in Doña Ana County, New Mexico, and El Paso County, Texas (fig. 2). The Mesilla Valley is at the downstream end of the RIOG study unit.

Physical Setting

The Mesilla Basin is one of a series of structural basins that formed along the tectonically active area known as the Rio Grande Rift (Ellis and others, 1993). The basin is approximately 60 miles long, as much as 30 miles wide, and is enclosed by a ring of mountains and bedrock highs that separate it from adjoining structural basins. The unconsolidated basin-fill sediments of the Santa Fe Group extend throughout the basin and can reach a thickness of approximately 3,000 feet (Hawley and Lozinsky, 1992).

The Mesilla Valley is entrenched along the east side of the Mesilla Basin. The Rio Grande flood-plain alluvium is beneath the Mesilla Valley and generally ranges in thickness from 50 to 125 feet (Wilson and others, 1981). The flood-plain alluvium consists of sand and gravel with lenses of silt and clay. The Mesilla Valley is as much as 5 miles wide and covers an area of approximately 110,000 acres. Bluffs on both sides of the valley are usually steep and generally range from 50 to 100 feet high (Conover, 1954). The present surface of the valley ranges from 300 to 350 feet below the Mesilla Basin surface of the West Mesa or La Mesa to the west (Nickerson and Myers, 1993). East of the Mesilla Valley, the basin surface rises toward the nearby mountains. A review of the geology of the Mesilla Basin can be found in King and others (1971).

The Mesilla Valley is located in the northern part of the Chihuahuan Desert and its climate is arid. Average annual precipitation near Las Cruces is about 8.5 inches, and about one-half of this amount results from summer thunderstorms (Frenzel and Kaehler, 1992). The mean daily temperature ranges from 41.7 °F in January to 80.0 °F in July. Daily temperature variations of more than 30 °F are common. Pan evaporation averages about 94 inches per year.

Land Use

Land use refers to a method of classifying human influence on the land. Figure 2 shows mid-1970's level I land use, the most generalized classification, for the Mesilla Valley. These data are from the USGS Geographic Information Retrieval and Analysis System (GIRAS) (U.S. Geological Survey, 1986) and the classification system is described in Anderson and others (1976). The two predominant land uses are agricultural and urban. Anderson and others (1976) described agricultural land as land used for the production of food and fiber, including cropland, pasture, orchards, nurseries, vineyards, confined feeding operations, and lands used in association with the above. Urban lands are described as those areas of intensive use with much of the land covered by structures, including cities, towns, and villages; strip development along highways; transportation, power, and communications facilities; and commercial and industrial complexes.

Approximately 75 percent of the Mesilla Valley is designated as agricultural land. Nearly 77,000 acres of irrigated cropland and pecan orchards are in the Mesilla Valley (Frenzel, 1992), and some fields produce three crops per year. The main crops in the valley are alfalfa, cotton, pecans, lettuce, onions, and chiles. The Mesilla Valley is also part of the "dairy belt" of southern New Mexico. Dairy farms located in the valley or on the adjacent river terraces use the dry lot method in which cows are confined to pens except when in the milking barn (Dye and others, 1984). In 1990, approximately 24,500 dairy cows were in Doña Ana County (Wilson, 1992).

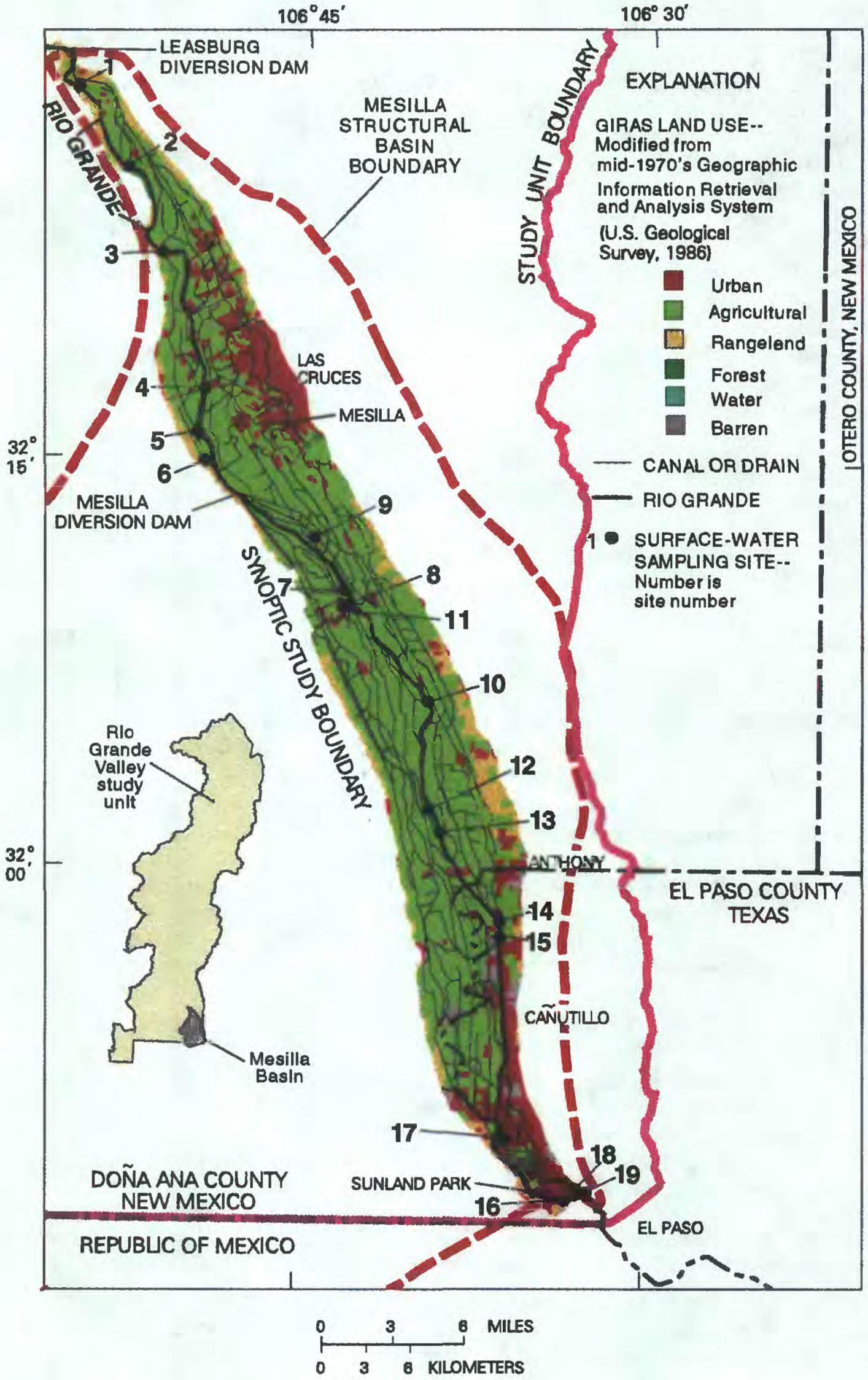

Figure 2.--Land use in the Mesilla Valley and location of the Mesilla Basin.

Urban lands covered approximately 14 percent of the valley in the late 1970's, though this percentage has probably increased in recent years. The major urban center in the northern part of the Mesilla Valley includes the city of Las Cruces and the town of Mesilla. The northern area is a major agricultural produce center and transportation hub and had a population in 1990 of more than 62,000 (U.S. Department of Commerce, 1991). The Las Cruces/Mesilla area includes a large university complex and a WWTP that discharges to the Rio Grande. The major urban area in the southern part of the valley includes Sunland Park and Anthony in New Mexico and Anthony, Cañutillo, and parts of El Paso in Texas. Major facilities in the southern area include a Federal correctional institute, race track complex, and power plant. A WWTP at Sunland Park discharges to the Rio Grande, and WWTP's at Anthony and the Federal correctional institute discharge to the East Side Drain. Seven active or inactive landfills are on Bureau of Land Management land associated with urban and non-urban areas in the Mesilla Valley or on the terraces and mesas near the valley.

Other land uses in the Mesilla Valley include rangeland, forest, open water, and barren land. These land uses covered approximately 11 percent of the valley in the late 1970's; however, with the increase in population in the 1980's and 1990's, the total percentage of these land uses has probably decreased.

Surface-Water System

The surface-water system in the Mesilla Valley is part of the intricate interaction of surface and ground water in the Mesilla Basin. A detailed discussion of the hydrologic systems of the Mesilla Valley and Mesilla Basin, and the interaction between the two systems, can be found in Wilson and others (1981), Peterson and others (1984), Frenzel (1992), and Nickerson and Myers (1993).

The surface-water system of the Mesilla Valley includes the Rio Grande and its tributaries and the anthropogenic (human related or made) system that delivers and drains irrigation water. Main sources of inflow to the Mesilla Valley surface-water system are the Rio Grande as it enters the valley, ground-water discharges, anthropogenic discharges, and precipitation runoff. Major ways in which water is lost from this system include the Rio Grande as it leaves the basin, seepage to the ground-water table, and evapotranspiration.

The Rio Grande enters the Mesilla Valley through Selden Canyon, flows southeastward through a leveed channel, then exits the valley through El Paso Narrows (fig. 1). Streamflow in the Rio Grande is almost completely controlled by releases from upstream reservoirs. Typically, irrigation releases start in January or February and continue until September or October. Streamflow during the remainder of the year is due mostly to seepage of ground water to the drain system, which then flows to the river; anthropogenic discharges; and precipitation runoff. The Rio Grande is a losing stream throughout most of its 62-mile reach in the Mesilla Valley. This means that water is generally moving from the river into the flood-plain alluvium. The length of the losing reaches and the rate of loss are dependent on annual and seasonal variation in streamflow (Nickerson and Myers, 1993).

The Rio Grande tributaries consist of arroyos that drain the uplands on both sides of the valley. Arroyos are ephemeral streams with flat bottoms and steep walls that flow only in response to precipitation. Most of the flow in the Mesilla Valley arroyos comes from the mountains and mesas to the east and west of the Mesilla Valley. Flow to the valley in some of the large arroyos near Las Cruces and El Paso is restricted by retention dams, and flow in smaller arroyos that does reach the valley probably does not significantly contribute to the Rio Grande (Frenzel, 1992). Arroyos are probably more important as mechanisms for recharge to the ground-water system (Frenzel, 1992).

During the irrigation season, March through September (Wilson and others, 1981), water is diverted from the Rio Grande to a system of canals, laterals, and ditches that delivers the water to agricultural fields. Water diverted at Leasburg Dam is used to irrigate fields north of and in

the Las Cruces area; water diverted at Mesilla Dam is used to irrigate the middle and southern parts of the valley. Only about 40 to 50 percent of the water diverted for irrigation actually reaches the fields (Wilson and others, 1981). The remainder is channel loss due to seepage through the unlined beds of the canals, laterals, and ditches; evaporation from the water surface; and transpiration from plants along the canals and laterals; or is canal-return flow, which is water flowing directly from the canal to a drain or to the river. Water that reaches the fields is mainly consumed by plants. Ground water from more than 900 irrigation wells is used to supplement the surface-water supply (Wilson and others, 1981). The amount of ground water used depends on available surface water and precipitation.

Water that infiltrates to the ground-water table may be intercepted and returned to the Rio Grande through a system of drains. The flow in drains is dependent on the level of the water table, which in turn is a function of the amount of irrigation, seepage from the Rio Grande and canals, and pumpage from irrigation and other wells (Peterson and others, 1984). There is, however, an annual and seasonal correlation between diversions and drain flow. Conover (1954) found that there may be a lag of a year or more between decreases in drain flow caused by decreases in diversion flow. Peterson and others (1984) reported a lag in both the increase and decrease in flow and attributed the lag, in part, to the distance between canals and drains.

OCCURRENCE AND DISTRIBUTION OF PESTICIDES

Possible sources of pesticides to the Mesilla Valley surface-water system include direct agricultural and nonagricultural application within the valley, atmospheric deposition that originates both within and outside the valley, the surface water and ground water entering the valley, and accidental spills. Other factors that affect the concentration of pesticides include their solubility, persistence, place and method of application, and amount applied. Possible pathways by which pesticides are lost from the Mesilla Valley surface-water system include surface water exiting the valley, seepage to the ground-water table, irrigation water applied to agricultural fields, sorbtion to organic and inorganic sediments, chemical and biological degradation, bioaccumulation, and volatilization.

New Mexico and Texas governmental agencies provide recommendations for the proper pesticides to use on each crop and the appropriate times and rates of application. However, details on the actual location and amount of each pesticide applied are not well documented. The pesticides used, locations of application, and amounts applied vary annually due to crop rotation, weather conditions, and possible pest outbreaks. Pesticide usage data were not available for the 1994 season when this study was conducted. The most recent data available for crop acreage and agricultural use of selected pesticides in Doña Ana County, New Mexico, and El Paso County, Texas, are for 1987 (table 4). Crop acreage data from the 1987 agricultural census are for total acres in each county and include acreage in these counties that are not in the study area (U.S. Department of Commerce, 1989). Pesticide usage was estimated by Resources for the Future (Gianessi and Puffer, 1991, 1992a, and 1992b). Because of annual changes in crop acreage and application rates and the phasing out of old pesticides and introduction of new pesticides, the estimates for 1987 can be used only as a general guide to pesticide use in the Mesilla Valley, and not for statistical analysis in conjunction with the data collected during this study.

The nonagricultural uses of pesticides are less documented than the agricultural uses. Nonagricultural uses of pesticides include application to home gardens, lawns, parks, and golf courses; pet dips; pest control around homes and commercial and industrial areas; and clearance of vegetation on driveways and patios and along canals, drains, fence lines, and transmission and railroad rights-of-way. Although estimating an amount for this category might be possible from commercial sales, the date, location, and rate of application would still be unknown.

The pesticide data are presented under the separate headings of surface water and bed material, but this does not exclude interaction between the different media. Pesticides in the water column can be sorbed on both inorganic and organic sediments, and pesticides in bed material can redissolve or leach into the water column.

Table 4.--Agricultural use of selected pesticides in Doña Ana County, N. Mex., and El Paso County, Tex., in 1987

[Type: H, herbicide; I, insecticide; F, fungicide. Crops: a, alfalfa; b, pecans; c, cotton; d, chiles (hot peppers); e, corn; f, onions; g,wheat; h, sorghum; i, lettuce; j, sweet peppers; k, barley; l, pasture; m, other hay; n, tomatoes; o, peaches; p, grapes; ai, active ingredient; --, not applicable. Source: Gianessi and Puffer, 1991, 1992a, 1992b]

		Doña Ana			El Paso		
Pesticide	Type	Crops	Acres treated	Pounds (ai)	Crops	Acres treated	Pounds (ai)
Alachlor	H	e,h	49	98	h	80	160
Aldicarb	I	b,c	4,994	7,045	b,c,h	2,480	4,360
Atrazine	H	e,h	698	1,744	h	160	239
Benfluralin	H	a,i	1,990	2,466	a	474	710
Bromoxynil	H	f,g,h	734	188	g,h	26	8
Carbaryl	I	--	0	0	a,b,g,h,m,n,o	2,217	7,492
Carbofuran	I	a,c,d,h	8,120	8,989	a,c,h	1,524	571
Chlorpyrifos	I	e,f,g,h	1,377	1,667	a,b,c,f,g,h,o	3,934	6,048
Cyanazine	H	c,e,h	6,209	8,473	h	56	84
2,4-D	H	e,g,h,k,l	1,759	997	g,h,l,m	399	294
DCPA	H	d,f	2,238	18,552	d,f	263	1,971
Diazinon	I	--	0	0	b,f,h	133	257
Dicamba	H	e,g,h,k,l	1,354	77	g,h,l,m	220	55
Disulfoton	I	c,e,g,h	533	251	c,g,h	1,326	279
Diuron	H	c	701	280	c,m	523	523
EPTC	H	a,e	512	1,664	a	237	710
Fonofos	I	e	97	97	h	8	8
Lindane	I	--	0	0	b	1,350	1,269
Malathion	I	--	0	0	a,b,c,h,o,p	1,457	3,394
MCPA	H	g,k	63	46	g	21	10
Methomyl	I	--	0	0	c,f,h,n,p	2,072	814
Methyl parathion	I	a,c,f	2,646	377	a,c,f,g	5,396	5,469
Methyl azinphos	I	--	0	0	b,c,o	2,005	876
Metolachlor	H	d,e	2,055	1,027	c,h	413	699
Metribuzin	H	a	747	373	a	237	142
Napropamide	H	j	429	429	d	236	353
Norflurazon	H	b	157	97	--	0	0
Oryzalin	H	b	157	196	b,o	412	79
Oxymyl	I	--	0	0	c,f	1,542	405
Parathion	I	h	72	36	a,c,g,h	1,668	905

Table 4.--Agricultural use of selected pesticides in Doña Ana County, N. Mex., and El Paso County, Tex., in 1987--Concluded

Pesticide	Type	Doña Ana			El Paso		
		Crops	Acres treated	Pounds (ai)	Crops	Acres treated	Pounds (ai)
Pendimethalin	H	c,h	4,224	4,224	c,h	4,081	4,162
Permethrin	I	f	707	354	c,f	406	74
Phorate	I	e,h	50	50	c,h	8	8
Picloram	H	l	25	12	l,m	109	73
Pronamide	H	i	278	417	--	0	0
Propargite	I	e	323	529	h,p	8	14
Simazine	H	--	0	0	a	237	355
Terbacil	H	a	299	478	--	0	0
Terbufos	I	e	290	290	h	40	29
Trifluralin	H	b,c,h,j	17,814	15,621	c,h,n	18,966	20,665

Surface Water

Each of the 51 water-column samples was analyzed for the 78 pesticides and metabolites listed in table 2. Because of various problems including, but not limited to, the time lag between sampling and analysis, the analytical results for specific pesticides in some samples were considered not valid and therefore were not reported. In addition, acetochlor results were reported for only the non-irrigation run. As a result, the total number of pesticide and metabolite analyses reported is 3,734, not 3,978 (table 2). One hundred of these analyses from 44 of the 51 water-column samples contained detectable concentrations of 17 different pesticides and metabolites (table 5). The largest number of detections of any one pesticide was 29 for DCPA. The highest concentration of any pesticide was 0.75 microgram per liter (µg/L) of carbofuran detected at site 14 during the irrigation run at the East Side Drain. Most pesticides that were included in the analytical procedures were not detected. Most of the pesticides that were detected were found in less than 10 percent of the samples. Some pesticides, such as prometon, were detected in regular samples during only one phase of the synoptic study, whereas others detected were associated with only one type of site: carbaryl, chlorpyrifos, and diazinon were found only in the effluents from the two WWTP's or in the first main-stem or drain site downstream from the discharge of a WWTP. Pesticide detections at main-stem site 1 are more likely the result of pesticide use upstream from the Mesilla Valley than of pesticide use within the valley. Pesticide detections associated with the WWTP sites are more likely the result of nonagricultural use than of agricultural use.

No temporal relations could be identified for most of the detected pesticides. Nine of the 11 pesticides with more than one detection in regular samples were detected during both the irrigation and non-irrigation phases of the study. Prometon and simazine were detected in regular samples only during the irrigation phase. DCPA concentrations show an apparent decreasing trend over the first 5 weeks of the time series.

Table 5.--Uncensored[1] and estimated[2] pesticide concentrations in water-column samples

[All concentrations are in micrograms per liter. ( ), method detection limit[3]; E, estimated[2] value; C, censored[1] data; --, no data]

Site number	U.S. Geological Survey station name	Date	Atrazine [6](0.004)	Bentazon (0.014)	Carbaryl[4] (0.003)	Carbofuran[4,5] (0.003)	Carbofuran[5] (0.028)	Chlorpyrifos (0.004)	DCPA (0.002)	p,p' DDE (0.006)	Diazinon (0.002)
1	Rio Grande below Leasburg Dam near Las Cruces, N. Mex.	4/13/94	C	C	C	E0.016	C	C	0.005	C	C
		4/18/94	C	C	C	C	C	C	.004	E0.002	C
		4/26/94	C	--	C	E.006	C	C	C	C	C
		5/4/94	C	C	C	C	C	C	.003	C	C
		5/10/94	C	C	C	C	C	C	C	C	C
		1/4/95	C	C	C	C	C	C	.003	C	C
2	Selden Drain at levee road near Leasburg, N. Mex.	4/26/94	C	--	C	C	C	C	C	C	C
		1/4/95	C	C	C	C	C	C	.005	C	C
3	Rio Grande at Shalem Bridge near Doña Ana, N. Mex.	4/26/94	C	--	C	C	C	C	C	C	C
		1/4/95	C	C	C	C	C	C	.002	C	C
4	Las Cruces WWTP at levee road near Las Cruces, N. Mex.	4/26/94	C	--	E0.044	C	C	0.19	C	C	0.099
		1/5/95	C	C	E.015	C	C	.030	C	C	.066
5	Rio Grande above N. Mex. 359 Bridge near Mesilla, N. Mex.	4/26/94	C	--	C	C	C	C	C	C	C
		1/6/95	C	C	C	C	C	C	C	C	C
6	Picacho Drain near San Pablo, N. Mex.	4/26/94	C	--	C	C	C	C	.004	C	C
		1/6/95	C	C	C	C	C	C	.002	E.002	C
7	Santo Tomas River Drain at levee road near San Miguel, N. Mex.	4/27/94	C	--	C	C	C	C	C	C	C
		[7]--	--	--	--	--	--	--	--	--	--
8	Rio Grande at Rt. 192 Bridge near San Miguel, N. Mex.	4/27/94	C	C	C	C	C	C	C	C	C
		1/5/95	C	C	C	C	C	C	.003	C	C
9	Del Rio Drain at Piano Road near Santo Tomas, N. Mex.	4/25/94	C	--	C	C	C	C	.004	C	C
		1/5/95	C	C	C	C	C	C	.002	C	C
10	Del Rio Drain at levee road near Vado, N. Mex.	4/27/94	C	C	C	C	C	C	C	C	C
		1/4/95	C	C	C	C	C	C	C	C	C
11	La Mesa Drain at Rt. 192 near San Miguel, N. Mex.	4/26/95	C	C	C	C	C	C	C	C	C
		1/5/95	C	C	C	C	C	C	.002	C	C
12	La Mesa Drain at levee road near Chamberino, N. Mex.	4/27/95	C	C	C	C	C	C	.006	C	C
		1/5/95	C	C	C	C	C	C	.002	C	C
13	Rio Grande at Rt. 404 Bridge near Chamberino, N. Mex.	4/27/94	C	C	C	C	C	C	C	C	C
		1/5/95	C	C	C	C	C	C	.003	C	C
14	East Side Drain at levee road near Anthony, Tex.	4/27/94	0.004	C	C	E.75	0.28	C	.019	C	.004
		1/6/95	.004	0.040	C	E.005	C	C	.014	C	C
15	Rio Grande at Vinton Bridge near Anthony, Tex.	4/7/94	.004	C	C	E.014	C	C	.008	C	C
		4/12/94	C	C	C	E.014	C	C	.006	C	C
		4/19/94	C	C	C	C	C	C	.005	C	C
		4/27/94	C	C	C	E.030	C	C	.004	C	C
		5/4/94	C	C	C	C	C	C	C	C	C
		5/11/94	C	C	C	C	C	C	.016	C	C
		1/4/95	C	C	C	C	C	C	.003	C	C

Table 5.--Uncensored[1] and estimated[2] pesticide concentrations in water-column samples--Continued

Site number	U.S. Geological Survey station name	Date	Atrazine [6](0.004)	Bentazon (0.014)	Carbaryl[4] (0.003)	Carbofuran[4,5] (0.003)	Carbofuran[5] (0.028)	Chlorpyrifos (0.004)	DCPA (0.002)	p,p' DDE (0.006)	Diazinon (0.002)
16	Sunland Park WWTP at Sunland Park, N. Mex.	4/28/94	C	C	C	C	C	0.042	C	C	0.16
		1/6/95	C	C	E0.013	C	C	.023	C	C	.067
17	Nemexas Drain at Meadowlark Drive near El Paso, Tex.	4/28/94	C	C	C	C	C	C	0.004	C	C
		1/6/95	0.004	C	C	E0.011	C	C	.006	C	C
18	Montoya Drain at levee road near Sunland Park, N. Mex.	4/28/94	C	C	C	C	C	C	C	C	C
		1/6/95	C	C	C	C	C	C	C	C	C
19	Rio Grande at El Paso, Tex.	4/6/94	.006	C	C	C	C	.008	.012	C	C
		4/12/94	C	C	C	E.013	0.030	C	.006	C	C
		4/19/94	.004	C	C	C	C	C	.005	C	C
		4/28/94	C	C	C	E.022	C	C	C	C	C
		5/3/94	C	C	C	C	C	C	C	C	C
		5/11/94	C	C	C	C	C	C	C	C	C
		1/7/95	C	C	C	C	C	C	.021	E0.002	C

Site number	U.S. Geological Survey station name	Date	Diuron (0.020)	EPTC (0.002)	Lindane (0.004)	Methyl[4] azinphos (0.001)	Metolachlor [6](0.005)	Metribuzin [6](0.011)	Prometon (0.018)	Simazine (0.005)	Tri-fluralin (0.002)
1	Rio Grande below Leasburg Dam near Las Cruces, N. Mex.	4/13/94	C	C	C	C	0.008	C	C	C	C
		4/18/94	C	C	C	C	C	C	E0.009	0.007	C
		4/26/94	C	C	C	C	C	C	E.008	C	C
		5/4/94	CC	C	C	C	C	C	E.009	C	C
		5/10/94	C	C	C	C	C	C	C	C	C
		1/4/95	E0.001	C	C	C	.008	C	C	C	C
2	Selden Drain at levee road near Leasburg, N. Mex.	4/26/94	C	C	C	C	.005	C	C	C	C
		1/4/95	C	C	C	C	E.004	C	C	C	C
3	Rio Grande at Shalem Bridge near Doña Ana, N. Mex.	4/26/94	C	C	C	C	C	C	E.007	C	C
		1/4/95	C	C	C	C	E.004	C	C	C	C
4	Las Cruces WWTP at levee road near Las Cruces, N. Mex.	4/26/94	C	C	C	C	C	C	C	C	C
		1/5/95	C	C	C	C	C	C	C	C	C
5	Rio Grande above N. Mex. 359 Bridge near Mesilla, N. Mex.	4/26/94	C	C	C	C	C	C	E.009	C	C
		1/6/95	C	C	C	C	.010	C	C	C	C
6	Picacho Drain near San Pablo, N. Mex.	4/26/94	C	C	C	C	.015	C	C	C	C
		1/6/95	C	C	C	C	.003	C	C	C	C
7	Santo Tomas River Drain at levee road near San Miguel, N. Mex.	4/27/94	C	C	C	C	C	C	C	C	C
		[7]--	--	--	--	--	--	--	--	--	--
8	Rio Grande at Rt. 192 Bridge near San Miguel, N. Mex.	4/27/94	C	C	C	C	C	C	E.007	C	C
		1/5/95	C	C	C	C	.010	C	C	C	C
9	Del Rio Drain at Piano Road near Santo Tomas, N. Mex.	4/25/94	C	C	C	C	.005	C	C	C	C
		1/5/95	C	C	C	C	.005	C	C	C	C
10	Del Rio Drain at levee road near Vado, N. Mex.	4/27/94	C	C	C	C	.005	C	C	C	C
		1/4/95	C	C	C	C	.006	C	C	C	C

Table 5.--Uncensored[1] and estimated[2] pesticide concentrations in water-column samples--Concluded

Site number	U.S. Geological Survey station name	Date	Diuron (0.020)	EPTC (0.002)	Lindane (0.004)	Methyl[4] azinphos (0.001)	Metolachlor [6](0.005)	Metribuzin [6](0.011)	Prometon (0.018)	Simazine (0.005)	Tri-fluralin (0.002)
11	La Mesa Drain at Rt. 192 near San Miguel, N. Mex.	4/26/95	C	C	C	C	C	C	C	C	C
		1/5/95	C	C	C	C	C	C	C	C	C
12	La Mesa Drain at levee road near Chamberino, N. Mex.	4/27/95	C	C	C	C	C	0.018	C	C	C
		1/5/95	C	C	C	C	0.005	C	C	C	C
13	Rio Grande at Rt. 404 Bridge near Chamberino, N. Mex.	4/27/94	C	C	C	C	C	C	E0.006	C	C
		1/5/95	C	C	C	C	E.004	C	C	C	C
14	East Side Drain at levee road near Anthony, Tex.	4/27/94	C	C	C	E0.048	C	C	C	C	C
		1/6/95	C	C	C	C	C	.011	C		C
15	Rio Grande at Vinton Bridge near Anthony, Tex.	4/7/94	C	C	C	C	C	C	C	C0.006	C
		4/12/94	C	C	C	C	C	C	C	C	C
		4/19/94	C	C	C	C	C	C	C	C	C
		4/27/94	C	C	C	C	C	C	C	C	C
		5/4/94	C	C	C	C	C	C	C	C	C
		5/11/94	C	0.005	C	C	C	C	C	C	C
		1/4/95	C	C	C	C	C	C	C	C	C
16	Sunland Park WWTP at Sunland Park, N. Mex.	4/28/94	C	C	C	C	C	C	C	C	C
		1/6/95	C	C	0.052	C	C	C	C	C	C
17	Nemexas Drain at Meadowlark Drive near El Paso, Tex.	4/28/94	C	C	C	C	C	C	C	C	C
		1/6/95	C	C	C	C	C	C	C	C	C
18	Montoya Drain at levee road near Sunland Park, N. Mex.	4/28/94	C	C	C	C	C	C	C	C	C
		1/6/95	C	C	C	C	C	C	C	C	C
19	Rio Grande at El Paso, Tex.	4/6/94	C	C	C	C	E.003	C	C	.008	C
		4/12/94	C	C	C	C	C	C	C	C	C
		4/19/94	C	C	C	C	C	C	E.007	.006	C
		4/28/94	C	C	C	C	C	C	E.009	C	C
		5/3/94	C	C	C	C	C	C	E.008	C	C
		5/11/94	C	C	C	C	C	C	C	C	C
		1/7/95	C	C	C	C	.007	C	C	C	0.010

[1] Uncensored data are data to which a value can be assigned. Censored data, expressed as less than values, result from the limits of analytical procedures and are interpreted to mean that the analyte may not be present or may be present in quantities that are too small for the analytical procedure to determine.

[2] Estimated concentrations in this report are of two types. Those less than the method detection limit lack the statistical confidence that they are not equal to zero. Those at or greater than the method detection limit result from matrix interference with the analytical procedure or from this analyte having a poor or variable performance record with the analytical procedure used.

[3] Method detection limits used in this table are the default reporting values from Zaugg and others (1995) and R.J. Gilliom, U.S. Geological Survey, written commun., 1995.

[4] Carbaryl. carbofuran, and methyl azinphos were among the five pesticides that had poor performance records with the C-18 solid phase extraction (SPE) method. All concentrations for these pesticides are considered estimated.

[5] Carbofuran was one of three pesticides included in both the C-18 and Carbopak-B SPE analytical methods. The first carbofuran column gives the results from the C-18 method. The second carbofuran column gives the results from the Carbopak-B method.

[6] As a result of the interpretation of quality-control data collected during this synoptic study, this study reporting level was used for this analyte in place of the method detection limit.

[7] The Santo Tomas River Drain was dry during the non-irrigation run. No sample was collected.

The spatial relations of the five pesticides that were found in more than 10 percent of the samples were not consistent. All six atrazine detections were in the southern part of the Mesilla Valley; however, they were spread out over the three water-column sampling events. All prometon detections in regular samples were at main-stem sites. Most carbofuran detections were in the southern part of the valley, and a direct cause-and-effect relation can be traced from the carbofuran load entering the main stem from the East Side Drain to the loads at the two main-stem sites downstream. Metolachlor and DCPA were similar in their spatial relations: for both, most detections during the irrigation run were at drain sites, whereas most detections during the non-irrigation run were at all site types except the WWTP sites. Metolachlor was detected mainly in the northern and central parts of the valley, whereas DCPA was detected throughout the valley.

Thirteen pesticides were detected in regular samples during the non-irrigation run, but only 10 were detected during the irrigation run. The number of detections, 41, during the non-irrigation run was also higher than the 29 detections during the irrigation run. However, 24 of the 41 detections during the non-irrigation run were of two pesticides, DCPA and metolachlor. Why more pesticides were found during the non-irrigation run cannot be determined from available data. Dilution by higher flows during the irrigation run, the timing and method of pesticide application, and the travel time lag may be major factors. Where a comparison could be made, loads of specific pesticides were much higher during the irrigation season.

Table 6 summarizes the number of detections, maximum concentration values, and MDL's for the 17 pesticides. The table also includes the U.S. Environmental Protection Agency (EPA) maximum contaminant level (MCL), health advisory level (HA), and acute freshwater ambient water-quality criteria (FAC) for the protection of aquatic organisms for each pesticide. The MCL and HA apply to drinking-water supplies only and are included in table 6 to provide a reference for comparison to the concentrations detected during this study. The FAC are nonenforceable guidelines to provide the basis for State standards (Nowell and Resek, 1994).

The following sections discuss the analytical results for each pesticide and metabolite. Included in these sections are major uses of the pesticides, agricultural use of the pesticides in Doña Ana and El Paso Counties in 1987, and discussions of quality-control data where appropriate.

Atrazine

Atrazine is a selective herbicide used for weed control in corn, sorghum, and certain other crops (Meister, 1995). In 1987, atrazine was used on corn and sorghum in Doña Ana and El Paso Counties (table 4). This compound also is used as a soil sterilant around driveways, patios, fence lines, and industrial sites. Atrazine was detected six times during the study and had a maximum concentration of 0.006 µg/L at main-stem site 19 during week 1 of the time series (table 5). Atrazine was detected at drain site 14 during both the irrigation and non-irrigation runs.

The MDL for atrazine in Zaugg and others (1995) is 0.001 µg/L. However, quality-control samples collected during this synoptic showed that there may be some interference in the atrazine analyses by the water matrixes found in the Mesilla Valley. As a result of the interpretation of this quality-control data, a study reporting level (SRL) of 0.004 µg/L was used to report censored atrazine concentrations in this report. SRL's are overrides of MDL's or MRL's and are specific to individual studies.

Table 6.--Summary of uncensored[1] and estimated[2] pesticide concentrations in water-column samples

[All concentrations are in micrograms per liter (µg/L). EPA, U.S. Environmental Protection Agency; MCL, maximum contaminant level; HA, health advisory; FAC, acute freshwater ambient water-quality criteria for the protection of aquatic organisms; E, estimated; --, not applicable. Source: Nowell and Resek, 1994]

Pesticide	Number of samples	Detections		Maximum concentration value	Method detection limit[3]	EPA		
		Uncensored[1]	Estimated[2]			Drinking water		Ambient water
						MCL	HA	FAC
Atrazine	51	6	0	0.006	[4]0.001	3	--	--
Bentazon	43	0	1	.040	.014	--	20	--
Carbaryl[5]	51	0	3	E .044	.003	--	700	--
Carbofuran[5,6]	51	0	10	E .75	.003	40	--	--
Chlorpyrifos	51	5	0	.19	.004	--	20	0.083
DCPA	51	29	0	.021	.002	--	4	--
p,p' DDE	51	0	3	E .002	.006	--	--	[7]1,050
Diazinon	51	5	0	.16	.002	--	.6	--
Diuron	51	0	1	E .001	.020	--	10	--
EPTC	51	1	0	.005	.002	--	--	--
Lindane	51	1	0	.052	.004	.2	--	2
Methyl azinphos[5]	51	0	1	E .048	.001	--	--	--
Metolachlor	51	17	0	.015	[8].002	--	100	--
Metribuzin	51	2	0	.018	[9].004	--	200	--
Prometon	51	0	10	E .009	.018	--	100	--
Simazine	51	4	0	.008	.005	4	--	--
Trifluralin	51	1	0	.010	.002	--	5	--

[1] Uncensored data are data to which a value can be assigned.

[2] Estimated concentrations in this report are of two types. Those less than the method detection limit lack the statistical confidence that they are not equal to zero. Those at or greater than the method detection limit result from matrix interference with the analytical procedure or from the analyte having a poor or variable performance record with the analytical procedure used.

[3] Method detection limits used in this table are the default reporting values from Zaugg and others (1995) and R.J. Gilliom, U.S. Geological Survey, written commun., 1995.

[4] As a result of the interpretation of quality-control data collected during this synoptic, a study reporting level of 0.004 µg/L was used to report censored atrazine concentrations in this report.

[5] Carbaryl, carbofuran, and methyl azinphos are among the five pesticides that had poor performance records with the C-18 solid phase extraction (SPE) analytical method. All concentrations for these pesticides are considered estimates.

[6] Carbofuran was one of three pesticides included in both the C-18 and Carbopak-B SPE analytical methods. The concentrations summarized in this table were derived from the C-18 method.

[7] Value shown is not a criterion, but rather the lowest observed adverse effect level.

[8] As a result of the interpretation of quality-control data collected during this synoptic study, a study reporting level of 0.005 µg/L was used to report censored metolachlor concentrations in this report.

[9] As a result of the interpretation of quality-control data collected during this synoptic study, a study reporting level of 0.011 µg/L was used to report censored metribuzen data in this report.

Bentazon

Bentazon is an herbicide used for selective postemergence control of many broadleaf weeds and sedges in alfalfa, corn, grasses, onions, sorghum, and many other crops and on lawns (Meister, 1995). Although no agricultural use of this pesticide was recorded in Doña Ana or El Paso Counties in 1987, bentazon is recommended for limited use on corn in New Mexico (Dr. Richard Lee, New Mexico State University Cooperative Extension Program, written commun., 1994). Bentazon was detected at drain site 14 during the non-irrigation run at an estimated concentration of 0.040 µg/L.

Carbaryl

Carbaryl is a broad spectrum insecticide used on many crops including vegetables, nuts, and forage crops (Meister, 1995). Carbaryl is not recommended for agricultural use in New Mexico (Dr. Richard Lee, written commun., 1994) and there was no recorded agricultural use of it in Doña Ana County during 1987. In El Paso County, however, carbaryl was used on many crops in 1987 (table 4). Nonagricultural uses of carbaryl include its use on lawns and rangeland and in flea collars.

Carbaryl was detected in the effluent at site 4 at estimated concentrations of 0.044 µg/L during the irrigation run and 0.015 µg/L during the non-irrigation run. An estimated concentration of 0.013 µg/L was detected in the effluent at site 16 during the non-irrigation run. The locations of the detections indicate that they are probably due to nonagricultural uses.

Quality-control tests as described in Zaugg and others (1995) found two problems with carbaryl analyses by the C-18 SPE method. The first problem was that carbaryl had a variable performance record with this method and as a result, all carbaryl concentrations are considered estimated data. The second problem was sample contamination during the analytical process that has since been eliminated. However, the problem was occurring during the same time period that the samples from the irrigation phase of this synoptic study were being analyzed. Although the detection during the irrigation run may be the result of contamination, the location of the detection and the magnitude of the estimated data indicate that the detection reflects environmental conditions.

Carbofuran

Carbofuran is a systemic broad spectrum insecticide and nematocide (Meister, 1995) that in 1987 was used on alfalfa, cotton, chiles, and sorghum in Doña Ana and El Paso Counties (table 4). Carbofuran was detected in 10 of the 51 samples collected during this synoptic study (table 5). The estimated concentration of 0.75 µg/L at drain site 14 during the irrigation run was the maximum concentration detected for any pesticide during this study. Carbofuran was also detected at estimated concentrations of 0.006 µg/L at site 1, 0.030 µg/L at site 15, and of 0.022 µg/L at site 19 during the same run. Sites 15 and 19 are the only main-stem sites downstream from the mouth of the East Side Drain. Instantaneous loads (concentration times discharge) of carbofuran were 584 micrograms per second (µg/sec) at site 14; 621 µg/sec at site 15; and 531 µg/sec at site 19. The load entering the main stem from the East Side Drain accounts for approximately 94 percent of the carbofuran load in the main stem at site 15. This was the only time during the study that an effect upon the main stem could be traced to a pesticide load entering from a drain or WWTP. Carbofuran was detected at site 15 during the first week of the time series and at all three time-series sites during the second week. Carbofuran was also detected at drain sites 14 and 17 during the non-irrigation run.

Carbofuran was one of three pesticides analyzed by both SPE methods during the study. The MDL for the C-18 method was 0.003 µg/L, whereas the MDL for the Carbopak-B method was 0.028 µg/L. The results of the two methods can be compared in table 5. Carbofuran was detected in 10 samples using the C-18 method and in only 2 samples using the Carbopak-B method. Two of the C-18 method detections were larger than the Carbopak-B MDL and the corresponding Carbopak-B method detections, whereas one C-18 method detection was less than the corresponding Carbopak-B detection. The estimated concentration of 0.75 µg/L of carbofuran reported at site 14 during the irrigation run using the C-18 method is about three times greater than the 0.28 µg/L reported using the Carbopak-B method. The C-18 method reported an estimated concentration of 0.030 µg/L at site 15 during the irrigation run, and the Carbopak-B method reported a censored value. The estimated carbofuran concentration of 0.013 µg/L reported at site 17 during the second week of the time series using the C-18 method was less than one-half the 0.030 µg/L reported using the Carbopak-B method. This discrepancy in analytical values is probably due to the performance of the pesticide with each method. Field quality-control samples collected during the irrigation run showed a higher recovery rate for the C-18 method than for the Carbopak-B method. The C-18 method laboratory performance evaluation reported in Zaugg and others (1995) specified carbofuran as one of the pesticides having a variable performance record and, as a result, all carbofuran concentrations reported using this method are considered estimated data. The larger C-18 method concentrations in the first two samples are probably the result of the higher recovery rate, whereas the smaller C-18 method concentration in the third sample is probably the result of the poor performance of this pesticide with the C-18 method.

Carbofuran was also subject to the same contamination problem as carbaryl. As with carbaryl, the location and magnitudes of the carbofuran detections during the irrigation phase of this synoptic study indicate that the carbofuran detections reflect environmental conditions rather than sample contamination.

Chlorpyrifos

Chlorpyrifos is an insecticide widely used for many agricultural pests (Meister, 1995). In 1987 in Doña Ana and El Paso Counties, it was used predominantly on alfalfa, pecans, cotton, corn, onions, wheat, sorghum, and peaches (table 4). Chlorpyrifos is also used extensively to control household and garden pests.

Chlorpyrifos was detected in the effluent from site 4 at concentrations of 0.19 and 0.030 µg/L during the irrigation and non-irrigation runs, respectively, and in the effluent from site 16 at concentrations of 0.042 and 0.023 µg/L during the irrigation and non-irrigation runs, respectively. Carbofuran was also detected at a concentration of 0.008 µg/L during the time series at main-stem site 19, which is approximately 1 1/2 miles downstream from the discharge at site 16. Although chlorpyrifos is used extensively for agriculture in the Mesilla Valley, the locations of the detections indicate that they are probably due to nonagricultural uses.

The chlorpyrifos concentration of 0.19 µg/L at site 4 was the only pesticide concentration during this synoptic study that exceeded any of the criteria in table 6. However, site 4 is on the discharge flume of a WWTP and the FAC are not applicable to effluent. The concentration of chlorpyrifos at main-stem site 5 downstream from site 4 was censored.

DCPA

DCPA is a selective herbicide for annual grasses and broadleaf weeds (Meister, 1995). In 1987, it was applied to chiles and onions in Doña Ana and El Paso Counties (table 4).

DCPA was detected in 29 of the 51 samples collected at concentrations that range from 0.002 to 0.021 µg/L (table 5). The mean for all 51 samples was estimated by log-probability regression to be 0.0039 µg/L and the standard deviation was estimated to be 0.0047 µg/L. The median value is 0.002 µg/L. An interquartile range of 0.0034 µg/L was estimated by the log-normal maximum likelihood procedure. Log-probability regression and log-normal maximum likelihood were used because of the percentage of censored data (Helsel and Hirsch, 1992).

During the time series, 11 detections of DCPA ranged from 0.003 to 0.016 µg/L. DCPA was entering the study area from upstream, and a comparison of the instantaneous loads at the three time-series sites shows a statistically significant increase in DCPA at the downstream sites. The time-series data also show an apparent decrease in DCPA concentrations over the first 5 weeks. During week 6, the concentration at site 15 increased again to 0.016 µg/L, whereas the concentrations at sites 1 and 19 were censored.

Five of the six detections during the irrigation run were in drains. Concentrations of DCPA at these five sites ranged from 0.004 to 0.019 µg/L; the maximum concentration was at site 14. The estimated mean of the 19 irrigation-run samples is 0.0027 µg/L and the estimated standard deviation is 0.0043 µg/L. The estimated median value is 0.0026 µg/L. DCPA was detected at two mid-drain sites, sites 9 and 17, but not at the associated end-drain sites, sites 10 and 18, respectively. DCPA was also detected at main-stem site 15 at a concentration of 0.004 µg/L. This site is downstream from the mouth of the East Side Drain, but the load entering the main stem from this drain would account for less than 0.001 µg/L in the main stem. The sum of measured loads entering from all upstream drains accounts for about one-third of the load at site 15.

DCPA was detected at 13 main-stem and drain sites during the non-irrigation run at concentrations that ranged from 0.002 to 0.021 µg/L (fig. 3). The estimated mean of the 18 samples from the non-irrigation run is 0.0031 µg/L and the estimated standard deviation is 0.0052 µg/L. The median is 0.002 µg/L. The increase in concentration of DCPA from 0.003 µg/L at site 15 to 0.021 µg/L at site 19 may be due to an influx of DCPA between sites 15 and 19 or may be an artifact of when the samples were collected. During the non-irrigation run, site 19 was sampled 3 days after site 15, and how the concentration at site 15 was changing during this time is unknown.

p,p' DDE

p,p' DDE is a metabolite of the insecticide DDT, which was banned in 1973 from all but emergency use. p,p' DDE was detected in three samples at an estimated concentration of 0.002 µg/L. The source of this compound may be residual DDT and its metabolites that are still in bed material and ground water.

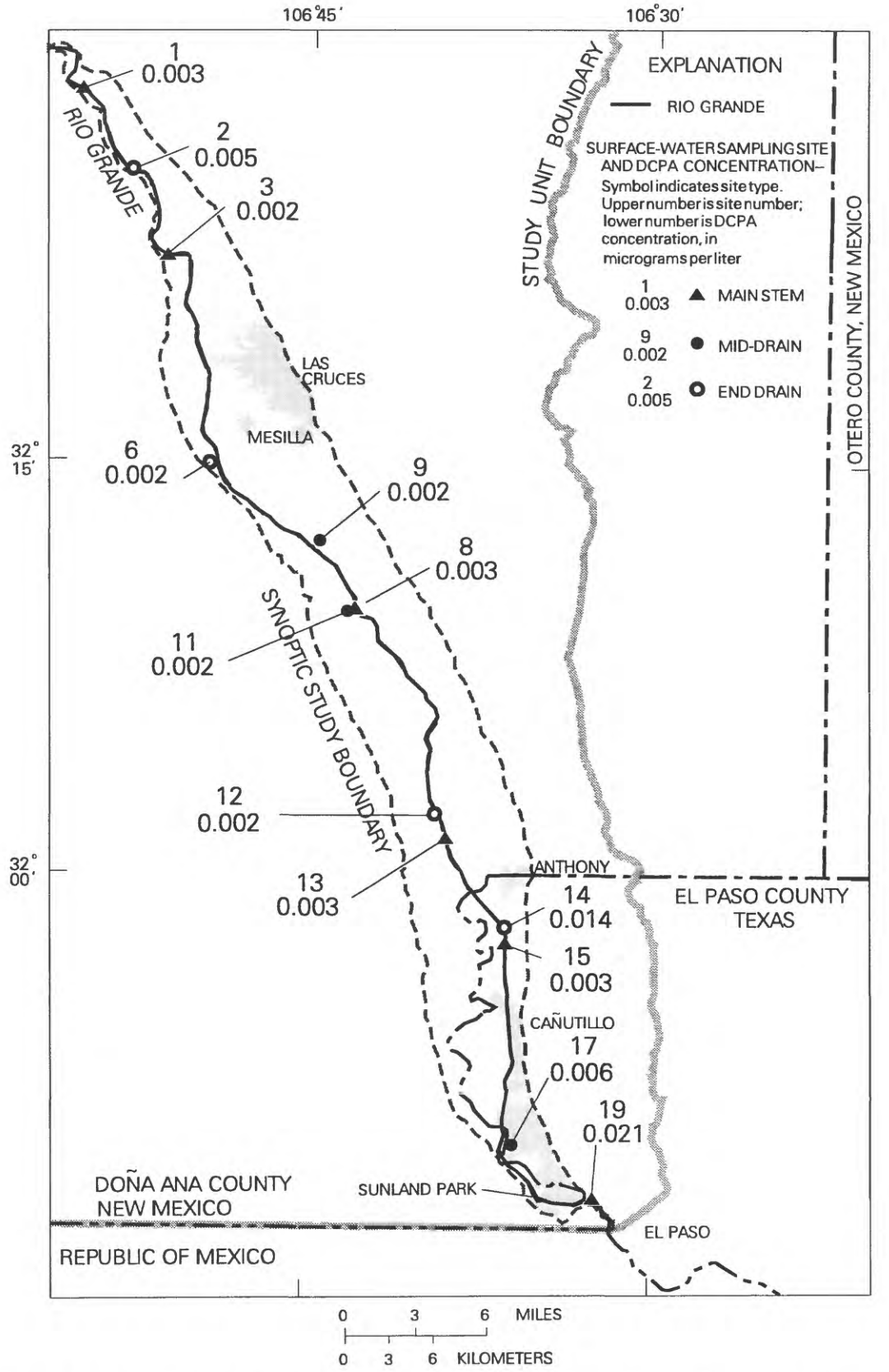

Figure 3.--Location and concentration of DCPA detections during the non-irrigation run.

Diazinon

Diazinon is a widely used insecticide for the control of many types of pests (Meister, 1995). Its main agricultural use in Doña Ana and El Paso Counties in 1987 was on pecans, onions, and sorghum (table 4). Nonagricultural uses include pest control in homes, gardens, and commercial and industrial nonfood preparation areas. Diazinon was detected in the effluent at site 4 at concentrations of 0.099 and 0.066 µg/L during the irrigation and non-irrigation runs, respectively, and in the effluent at site 16 at concentrations of 0.16 and 0.067 µg/L during the irrigation and non-irrigation runs, respectively (table 5). Diazinon was also detected at a concentration of 0.004 µg/L during the irrigation run at site 14 in the East Side Drain, which receives effluent from two WWTP's. The location of the detections indicates that the source of diazinon was probably from nonagricultural use.

Diuron

Diuron is an herbicide for emerging and young broadleaf weeds, grasses, and mosses (Meister, 1995). It was used mainly on cotton and hay crops in 1987 in Doña Ana and El Paso Counties (table 4). It is, however, acceptable for use on alfalfa, field corn, pecans, winter wheat, and oats in New Mexico (Dr. Richard Lee, New Mexico State University Cooperative Extension Program, written commun., 1994). Diuron was detected at an estimated concentration of 0.001 µg/L at main-stem site 1 during the non-irrigation phase.

EPTC

EPTC is a selective herbicide used to control annual grassy weeds and perennial weeds in beans, forage legumes, and potatoes (Meister, 1995). In Doña Ana and El Paso Counties, it was used on alfalfa and corn in 1987 (table 4). EPTC was detected at a concentration of 0.005 µg/L at main-stem site 15 during the time series.

Lindane

Lindane is a chlorinated insecticide used to control wireworms and seed maggots (Meister, 1995) and as a dip for livestock. It is used nonagriculturally as a dip for pets and as a spray to control pests in domestic and commercial non-food areas. In 1987, it was used on pecans in El Paso County (table 4). A concentration of 0.052 µg/L was detected in the effluent at site 16 during the non-irrigation run. The location of the detection indicates that the source of the lindane was probably from nonagricultural use.

Methyl Azinphos

Methyl azinphos is an insecticide used on various fruits, nuts, vegetables, field crops, ornamentals, and shade trees (Meister, 1995). In 1987, methyl azinphos was used on pecans, cotton, and peaches in El Paso County, but was not used for agricultural purposes in Doña Ana County (table 4). Methyl azinphos was detected once at an estimated concentration of 0.048 µg/L at drain site 14 during the irrigation run. Methyl azinphos was one of the pesticides that had a variable performance record with the C-18 SPE analysis and, as a result, all methyl azinphos concentrations are considered estimated data.

Metolachlor

Metolachlor is a selective herbicide used for preemergence and preplant weed control in corn, soybeans, sorghum, cotton, and other crops (Meister, 1995). It was used mainly on cotton, chile, corn, and sorghum in Doña Ana and El Paso Counties during 1987 (table 4).

Metolachlor was detected in 17 of the 51 samples collected during this synoptic study at concentrations that range from an estimated 0.003 to 0.015 µg/L (table 5). Eleven of these 17 detections were in main-stem and drain sites during the non-irrigation run. The concentrations of these non-irrigation-run detections ranged from an estimated 0.003 to 0.010 µg/L; most of the detections were located in the northern two-thirds of the valley (fig. 4). The estimated mean concentration of metolachlor in the 18 non-irrigation samples was 0.0045 µg/L, and the estimated standard deviation was 0.0027 µg/L. The median concentration was an estimated 0.004 µg/L. Of the remaining six detections, four were in samples collected from drains in the northern half of the Mesilla Valley during the irrigation run and two were in samples collected at main-stem sites 1 and 19 during different weeks of the time series.

The MDL for metolachlor in Zaugg and others (1995) is 0.002 µg/L. However, quality-control samples collected during this synoptic study showed that there may have been some interference in the metolachlor analyses by the water matrixes found in the Mesilla Valley. As a result of the interpretation of quality-control data, an SRL of 0.005 µg/L was used to report censored metolachlor concentrations in this report. Metolachlor concentrations below 0.005 µg/L are considered estimated data for this report.

The metolachlor concentration in the regular sample at drain site 9 during the irrigation run was 0.005 µg/L, whereas those in the quality-control replicates were 0.005 µg/L and a censored concentration. The metolachlor concentration in the regular sample at drain site 14 during the non-irrigation run was a censored concentration, whereas the metolachlor concentration in both quality-control replicates was an estimated 0.004 µg/L. The reason why metolachlor was detected in two analyses but not the third may be due to variability in concentrations that resulted from field and laboratory processing, to changes in the calibration and sensitivity of the analytical equipment, and/or to matrix interference with the analyses.

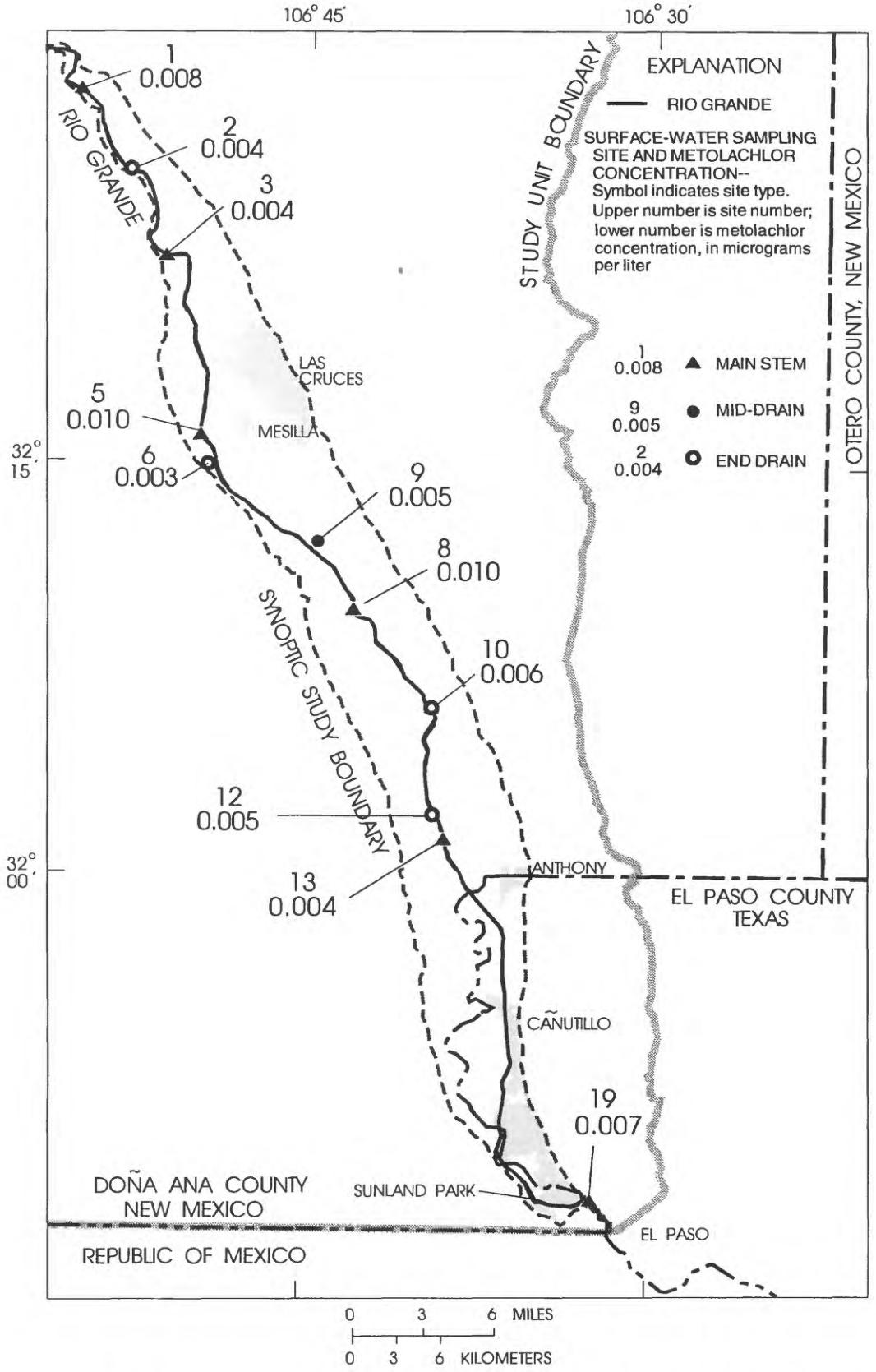

Figure 4.--Location and concentration of metolachlor detections during the non-irrigation run.

Metribuzen

Metribuzen is an herbicide used to control a large number of grasses and broadleaf weeds (Meister, 1995). In Doña Ana and El Paso Counties in 1987, it was used mainly on alfalfa (table 4). Metribuzen was detected at concentrations of 0.018 µg/L at drain site 12 during the irrigation run and 0.011 µg/L at drain site 14 during the non-irrigation run.

The MDL for metribuzen in Zaugg and others (1995) is 0.004 µg/L. However, quality-control samples collected during this synoptic study showed that there may be some interference in the metribuzen analyses by the water matrixes found in the Mesilla Valley. As a result of the interpretation of quality-control data, an SRL of 0.011 µg/L for metribuzen was used to report censored metribuzen concentrations in this report.

Prometon

Prometon is a non-selective herbicide that controls most annual and many perennial broadleaf weeds and grasses (Meister, 1995). In 1987, it was not used for agricultural purposes in Doña Ana or El Paso Counties. Nonagricultural uses include its addition to asphalt, and domestic and commercial use on patios, driveways, and fence lines.

All prometon detections in regular samples were in those collected during the irrigation phase of the study at main-stem sites. Prometon was detected at two of the three main-stem sites sampled during the time series and at six of the seven main-stem sites sampled during the irrigation run (table 5). Site 15 was the only main-stem site at which no prometon was detected.

The prometon concentration in the regular sample at drain site 14 during the non-irrigation run was a censored concentration, whereas the prometon concentrations in the quality-control replicates were an estimated 0.007 µg/L and an estimated 0.006 µg/L. The reason why prometon was detected in two analyses but not the third may be due to variability in concentrations that resulted from field and laboratory processing, to changes in the calibration and sensitivity of the analytical equipment, and/or to matrix interference with the analyses.

Prometon was detected at sites 1 and 19 during weeks 3, 4, and 5 of the time series. Estimated concentrations ranged from 0.007 to 0.009 µg/L. No temporal pattern could be distinguished from these detections. Prometon appeared in week 3 and disappeared after week 5.

The concentrations and instantaneous loads of prometon at the main-stem sites during the irrigation run are shown in figure 5. Prometon concentrations ranged from censored at site 15 to an estimated 0.009 µg/L at sites 5 and 19. The instantaneous loads ranged from censored at site 15 to an estimated 262 µg/sec at site 5.

The analytical precision of the estimated concentrations at which prometon was detected during the irrigation run is low. As a result, the precision of the instantaneous loads calculated from these concentrations also is low. The precision of the discharge measurements, though high, also decrease the precision of the instantaneous loads.

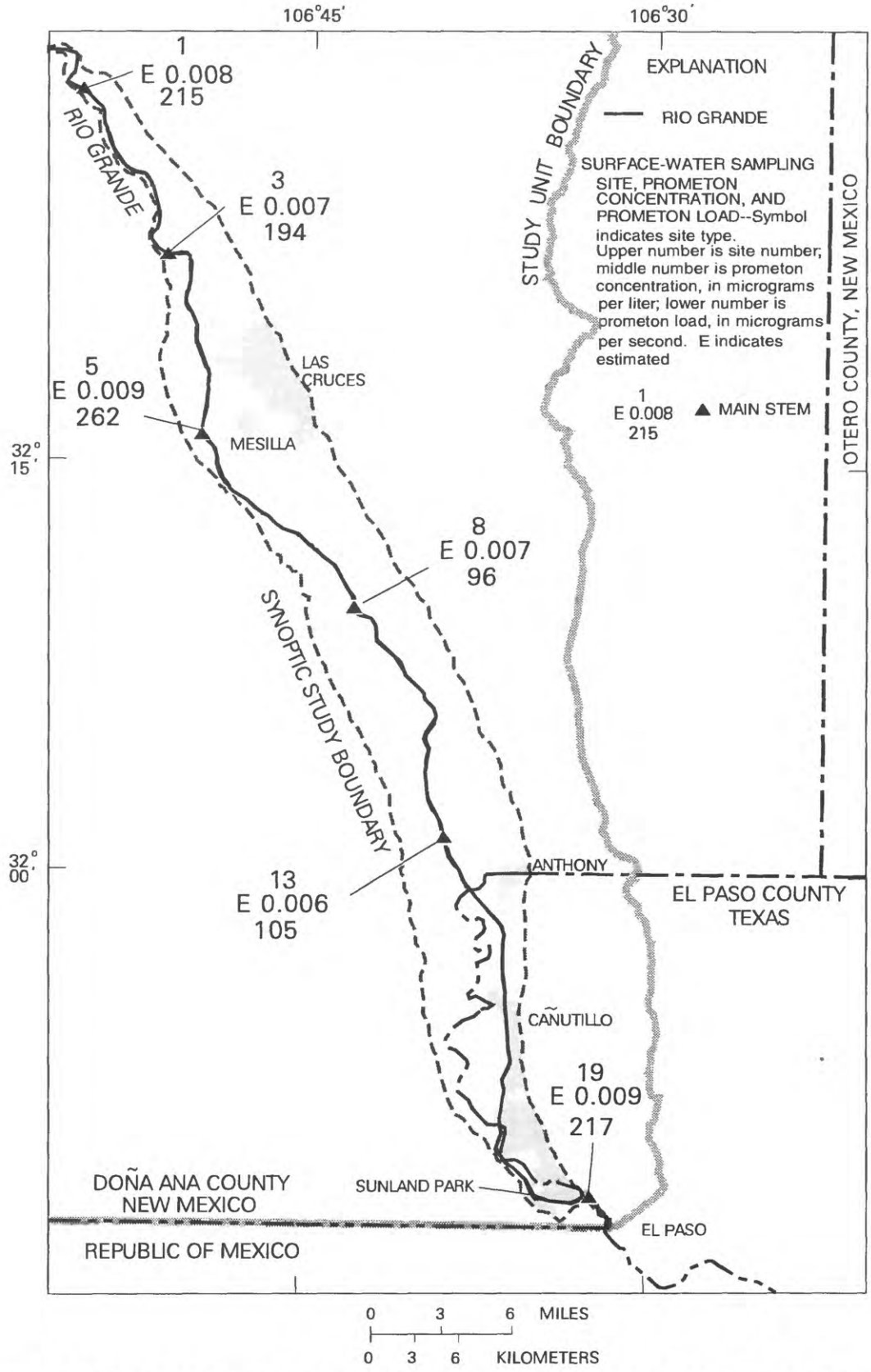

Figure 5.--Location and concentration of prometon detections and loads during the irrigation run.

The instantaneous prometon load entering the Mesilla Valley at site 1 was about the same as that leaving the valley at site 19: 215 to 217 µg/sec, respectively. The prometon load appears to decrease between sites 1 and 3 and then to increase as the Rio Grande flowed by the northern urban area. This apparent increase may reflect an actual increase in the prometon load, but may also be an artifact of analytical precision. Downstream from this urban area, more than half the discharge of the Rio Grande is diverted at the Mesilla Dam, and the load of prometon carried by the river at site 8 was about 37 percent of that at site 5. The load at site 13 increased slightly from that at site 8 even though the estimated concentration decreased. At site 15, the prometon concentration is censored. Whether this is a result of dilution or matrix interference in the analytical process is unknown. Between sites 15 and 19, the river flows near the southern urban area (fig. 2). The prometon load at site 19 was more than 100 percent greater than that at site 13. As with the increase near the northern urban area, this apparent increase may reflect an environmental increase in the prometon load or may be an artifact of the analytical precision.

During the irrigation run, the primary source of prometon to the surface-water system of the Mesilla Valley was probably the Rio Grande; additional sources may include the two urban areas within the valley. However, the apparent increases in loads near the urban areas may be due to the precision of the analytical procedures. Whether there is an environmental increase in prometon near the northern urban area cannot be determined from the data. The size of the apparent increase near the southern urban area indicates some environmental increase, but its actual magnitude cannot be determined. The pathway by which prometon is entering the river cannot be determined by analysis of these data.

Simazine

Simazine is a selective herbicide used to control most annual grasses and broadleaf weeds in orchards, corn, alfalfa, and other crops and in industrial areas, fairways, lawns, and ornamentals (Meister, 1995). In 1987, simazine was used agriculturally only on alfalfa in El Paso County. Simazine was detected in four samples during the time series. The concentrations ranged from 0.006 µg/L at main-stem sites 15 and 19 during weeks 1 and 3, respectively, to 0.008 µg/L at site 19 during week 1. The fourth detection was a concentration of 0.007 µg/L at main-stem site 1 during week 3.

Trifluralin

Trifluralin is a selective preemergence herbicide used on many crops including alfalfa, corn, cotton, sweet peppers, and pecans (Meister, 1995). In 1987, trifluralin was used on pecans, cotton, sorghum, sweet peppers, and tomatoes in Doña Ana and El Paso Counties (table 4). Trifluralin was detected at a concentration of 0.010 µg/L at site 19 during the non-irrigation run.

Bed Material

Bed-material samples were collected at six end-drain sites during the bed-material run for analysis of 21 pesticides and metabolites, gross polychlorinated biphenyls (PCB's), and gross polychlorinated naphthalenes (PCN's) (table 3). There were 21 detections of six different compounds out of 138 analyses; three compounds were detected at one site each and three compounds were detected at all six sites (table 7).

Table 7.--Uncensored[1] pesticide concentrations in bed-material samples

[All concentrations are in micrograms per kilogram. C, censored[1] data. Numbers in parentheses are minimum reporting levels]

Site number	U.S. Geological Survey station name	Date	Chlordane (1.0)	DDD (0.2)	DDE (0.2)	Diazinon (0.2)	DDT (0.2)	Methyl parathion (0.2)
2	Selden Drain at levee road near Leasburg, N. Mex.	1/4/95	C	1.5	1.2	C	6.1	C
6	Picacho Drain near San Pablo, N. Mex.	1/6/95	C	1.5	5.9	C	1.4	C
10	Del Rio Drain at levee road near Vado, N. Mex.	1/4/95	C	0.6	2.8	C	1.1	C
12	La Mesa Drain at levee road near Chamberino, N. Mex.	1/5/95	C	0.6	3.0	C	0.2	0.2
14	East Side Drain at levee road near Anthony, Tex.	1/6/95	2.0	2.7	4.6	0.3	0.6	C
18	Montoya Drain at levee road near Sunland Park, N. Mex.	1/6/95	C	0.7	3.2	C	0.7	C

[1] Uncensored data are data to which a value can be assigned. Censored data, expressed as less than values, result from the limits of analytical procedures and are interpreted to mean that the analyte may not be present or may be present in quantities that are too small for the analytical procedure to determine.

Chlordane and diazinon were detected in bed material at site 14 at concentrations of 2.0 and 0.3 micrograms per kilogram (µg/kg), respectively. Chlordane is a stomach and contact organochlorine insecticide that has had limited use since 1974. Its main uses are in termite control and wood treatment (Meister, 1995). It is considered insoluble in water and can accumulate in the organic matter in bed material (Smith and others, 1988). Chlordane is 75 to 100 percent degraded in soils in 3 to 5 years (Verschueren, 1983). Diazinon is a widely used organophosphate insecticide for the control of many types of pests (Meister, 1995). It has a relatively high solubility and does not tend to sorb to sediments; when it does accumulate, the bed-material residues are likely to be short lived (Smith and others, 1988). Diazinon is 75 to 100 percent degraded in soils in 12 weeks (Verschueren, 1983). The diazinon concentration detected at site 14 was probably of recent deposition.

Methyl parathion was detected at a concentration of 0.2 µg/kg at site 12. Methyl parathion is an insecticide used against boll weevils and other sucking insects (Meister, 1995). In 1987, it was used in Doña Ana and El Paso Counties on alfalfa, cotton, onions, and wheat (table 4). Methyl parathion is from the same family of pesticides as diazinon, but is less persistent in the environment (Smith and others, 1988). The concentration detected at site 12 was probably of recent deposition.

DDD, DDE, and DDT were detected in the bed material at all six sites. DDD and DDT were widely used stomach and contact insecticides until banned in 1973 for all but emergency use (Meister, 1995). DDE is a metabolite of both DDD and DDT and, under certain circumstances, DDD is a metabolite of DDT. DDD concentrations ranged from 0.6 µg/kg at sites 10 and 12 to 2.7 µg/kg at site 14. DDE concentrations ranged from 1.2 µg/kg at site 2 to 5.9 µg/kg at site 6. DDT was detected in concentrations ranging from 0.2 µg/kg at site 12 to 6.1 µg/kg at site 2. DDD and DDT are from the same family of pesticides as chlordane, but have a higher tendency to accumulate in sediments (Smith and others, 1988). DDT is 75 to 100 percent degraded in soils in 4 to 30 years (Verschueren, 1983).

OCCURRENCE AND DISTRIBUTION OF NUTRIENTS

Water-column samples for the analysis of nutrient concentrations were collected at all sampling sites during both phases of the study. Table 8 presents these data for dissolved ammonia, dissolved ammonia plus organic nitrogen, total ammonia plus organic nitrogen, dissolved nitrite, dissolved nitrite plus nitrate, total phosphorus, dissolved phosphorus, and dissolved orthophosphate. Dissolved organic nitrogen and dissolved nitrate concentrations were not calculated because censored concentrations in the dissolved ammonia, dissolved ammonia plus organic nitrogen, dissolved nitrite, and dissolved nitrite plus nitrate data interfered with the calculations for some samples.

Concentrations of each of the above nutrients ranged from at or below the individual MRL to as much as two or three orders of magnitude larger than the MRL. The distribution of concentrations for each nutrient was left skewed with most of the values toward the lower end of the range. The larger concentrations for each nutrient, except dissolved nitrite plus nitrate, were associated with sites 4 and 16. Samples at these two sites were of the effluent from the Las Cruces and Sunland Park WWTP's and were expected to be high in nutrients. The larger concentrations for dissolved nitrite plus nitrate were generally associated with the non-irrigation run; however, the largest concentration of this nutrient was at site 4 during the irrigation run. Summary statistics of all samples for each nutrient are presented in table 9.

The main environmental problem associated with excessive nutrient concentrations is eutrophication, which is defined as the process by which a water body becomes enriched in dissolved nutrients. Eutrophication is usually discussed in regard to ponds, lakes, and other large bodies of water, but it can also be a problem in the slow moving and backwater areas of rivers and streams. Eutrophication leads to the rapid production of aquatic vegetation whose respiration may cause large, diurnal dissolved oxygen fluctuations. In extreme cases, the water body can become supersaturated with dissolved oxygen during the day and depleted of dissolved oxygen during the night. The decay of large amounts of dead vegetation also puts a demand upon available dissolved oxygen concentrations. The EPA has recommended that 5 milligrams per liter (mg/L) of dissolved oxygen be a minimum ambient criterion for the health of an aquatic ecosystem, although this may vary with the ecosystem. The New Mexico limited warm-water fisheries standard is 4 mg/L (New Mexico Water Quality Control Commission, 1991). The minimum dissolved oxygen concentration for an ambient site was 6.2 mg/L at drain site 7 during the irrigation run. The term ambient sites includes all main-stem and drain sites and excludes sites 4 and 16. The minimum concentration for a main-stem site was 7.4 mg/L at site 19 during week 3 of the time series. Dissolved oxygen concentrations at all ambient sites were above the minimum dissolved oxygen criterion; however, most of these measurements were made during the day. Data from this study do not provide the information needed to discuss diurnal dissolved oxygen fluctuations in the surface water of the Mesilla Valley.

Trophic classification criteria usually include more than total dissolved nitrogen (dissolved ammonia plus organic nitrogen plus dissolved nitrite plus nitrate) and total phosphorus concentrations; chlorophyll-a concentrations, transparency, and allowances for the extent of aquatic plant growth are usually included as parts of a trophic classification criterion. In addition, water bodies with moving water, such as rivers and estuaries, are usually more productive for a given amount of nutrients than lakes or ponds. Not enough data are available from this study to classify the surface waters of the Mesilla Valley as to their trophic conditions. However, the median values of total dissolved nitrogen and total phosphorus at the main-stem sites for both the irrigation and non-irrigation runs are in the eutrophic range under most classification systems.

Table 8.--Nutrient concentrations in water-column samples

[mg/L as N, milligrams per liter as nitrogen; mg/L as P, milligrams per liter as phosphorus; <, less than; WWTP, wastewater-treatment plant; Rt., route; -- , no data]

Site number	U.S. Geological Survey station name	Date	Ammonia, dissolved (mg/L as N)	Ammonia plus organic nitrogen, dissolved (mg/L as N)	Ammonia plus organic nitrogen, total (mg/L as N)	Nitrite, dissolved (mg/L as N)	Nitrite plus nitrate, dissolved (mg/L as N)	Phosphorus, total (mg/L as P)	Phosphorus, dissolved (mg/L as P)	Ortho-phosphate, dissolved (mg/L as P)
1	Rio Grande below Leasburg Dam	4/13/94	0.02	0.3	0.4	0.02	0.08	0.05	<0.01	<0.01
	near Las Cruces, N. Mex.	4/18/94	.03	<.2	.3	<.01	<.05	.02	.02	.02
		4/26/94	.03	.2	.3	.01	.05	.03	.02	<.01
		5/04/94	.02	.2	.5	<.01	<.05	.05	<.01	<.01
		5/10/94	.02	.2	.5	<.01	<.05	.04	.04	.01
		1/04/95	.02	<.2	<.2	<.01	.14	.02	<.01	<.01
2	Selden Drain at levee road	4/26/94	.05	.3	.4	.03	.43	.02	.02	<.01
	near Leasburg, N. Mex.	1/04/95	.05	.4	.4	.01	.11	.03	.02	.02
3	Rio Grande at Shalem Bridge	4/26/94	.02	.2	.4	.01	<.05	.04	<.01	<.01
	near Doña Ana, N. Mex.	1/04/95	.02	<.2	.2	<.01	.14	.01	<.01	<.01
4	Las Cruces WWTP at levee road	4/26/94	3.4	4.6	5.4	1.2	15	2.3	2.0	1.8
	near Las Cruces, N. Mex.	1/05/95	20	21	22	.26	.42	.33	.18	.13
5	Rio Grande above N. Mex. 359	4/26/94	.05	.3	.4	.03	.19	.09	.03	.03
	Bridge at Mesilla, N. Mex.	1/06/95	.90	1.2	1.1	.04	.24	.05	<.01	.01
6	Picacho Drain near San	4/26/94	.08	.5	.5	.02	.24	.08	.11	.01
	Pablo, N. Mex.	1/06/95	.15	.3	.4	.03	.62	.02	<.01	.01
7	Santo Tomas River Drain at levee	4/27/94	.03	.3	.5	<.01	<.05	.13	.10	.10
	road near San Miguel, N. Mex.[1]	--	--	--	--	--	--	--	--	--
8	Rio Grande at Rt. 192 Bridge	4/27/94	.02	.2	.4	.02	.26	.11	.03	.02
	near San Miguel, N. Mex.	1/05/95	1.5	2.0	2.1	.12	.89	.06	.02	<.01
9	Del Rio Drain at Piano Road	4/25/94	.02	<.2	.3	.02	.42	.07	.04	.04
	near Santo Tomas, N. Mex.	1/05/95	.17	.4	.5	.03	.34	.12	.08	.07
10	Del Rio Drain at levee road	4/27/94	.03	<.2	.3	.02	.64	.09	.02	.02
	near Vado, N. Mex.	1/04/95	.11	.3	.2	.03	.69	.07	.05	.06
11	La Mesa Drain at Rt. 192	4/26/95	.10	.3	.5	.02	.21	.08	.03	.04
	near San Miguel, N. Mex.	1/05/95	.20	.5	.5	.02	.60	.06	.03	.03
12	La Mesa Drain at levee road	4/27/95	.04	.2	.4	.02	.41	.05	.02	.02
	near Chamberino, N. Mex.	1/05/95	.12	.4	.4	.03	.60	.05	.05	.02
13	Rio Grande at Rt. 404 Bridge	4/27/94	.02	<.2	.3	.01	.27	.10	.02	.02
	near Chamberino, N. Mex.	1/05/95	.56	.8	1.1	.10	.87	.06	.01	.01
14	East Side Drain at levee road	4/27/94	.14	.5	1.0	.08	.64	.34	.16	.12
	near Anthony, Tex.	1/06/95	.68	1.1	1.8	.11	2.3	.49	.28	.29
15	Rio Grande at Vinton Bridge	4/07/94	.02	.3	.4	.02	.37	.06	.01	.02
	near Anthony, Tex.	4/12/94	.01	.2	.5	.02	.37	.12	.02	.02
		4/19/94	<.01	.2	.6	<.01	.24	.11	.01	<.01
		4/27/94	.03	.2	.5	.01	.28	.17	.02	.02
		5/04/94	.03	.2	.5	.01	.16	.06	<.01	.02
		5/11/94	.02	.2	.5	.02	.25	.09	.03	.03
		1/04/95	.36	.7	.8	.12	1.1	.08	.07	.03

Table 8.--Nutrient concentrations in water-column samples--Concluded

Site number	U.S. Geological Survey station name	Date	Ammonia, dissolved (mg/L as N)	Ammonia plus organic nitrogen, dissolved (mg/L as N)	Ammonia plus organic nitrogen, total (mg/L as N)	Nitrite, dissolved (mg/L as N)	Nitrite plus nitrate, dissolved (mg/L as N)	Phosphorus, total (mg/L as P)	Phosphorus, dissolved (mg/L as P)	Ortho-phosphate, dissolved (mg/L as P)
16	Sunland Park WWTP at Sunland Park, N. Mex.	4/28/94	17	22	21	0.12	0.15	3.8	3.9	3.4
		1/06/95	27	29	28	.18	.21	1.6	1.5	1.4
17	Nemexas Drain at Meadowlark Drive near El Paso, Tex.	4/28/94	.05	.3	.3	.02	.38	.02	.02	.02
		1/06/95	.14	.4	.4	.02	.33	.08	.05	.03
18	Montoya Drain at levee road near Sunland Park, N. Mex.	4/28/94	.04	.2	.3	.02	.36	.09	.01	.01
		1/06/95	.12	.2	.3	.02	.27	.06	.02	.03
19	Rio Grande at El Paso, Tex.	4/06/94	.06	.3	.6	.03	.39	.10	.02	.02
		4/12/94	.02	.3	.5	.02	.39	.14	.02	.02
		4/19/94	<.01	<.2	.5	<.01	.24	.09	.02	.02
		4/28/94	.05	.2	.3	<.01	.30	.05	.04	.03
		5/03/94	.03	--	.5	<.01	.21	.11	.01	.01
		5/11/94	.05	.4	.5	.01	.35	.12	.03	.04
		1/07/95	.19	.4	.8	.08	.95	.12	<.01	<.01

[1] The Santo Tomas River Drain was dry during the non-irrigation run. No sample was collected.

Table 9.--Summary statistics of nutrient concentrations in water-column samples

[Concentrations of nitrogen nutrients are in milligrams per liter as nitrogen. Concentrations of phosphorus nutrients are in milligrams per liter as phosphorus. MRL, minimum reporting level; <, less than]

Nutrient	Number of samples	MRL	Number of samples below MRL[1]	Mean	Standard deviation	Maximum	Minimum	Percentiles 10	25	50 (Median)	75	90
Ammonia, dissolved	51	0.01	2	1.45	5.15	27	<0.01	0.02	0.02	0.05	0.15	1.38
Ammonia plus organic nitrogen, dissolved	50	.2	7	[2] 1.85	[2] 5.76	29	<.2	<.2	.2	.3	.425	1.92
Ammonia plus organic nitrogen, total	51	.2	1	1.99	5.58	28	<.2	.3	.4	.5	.6	2.04
Nitrite, dissolved	51	.01	10	[2] .06	[2] .17	1.2	<.01	<.01	.01	.02	.03	.12
Nitrite plus nitrate, dissolved	51	.05	5	.671	2.08	15	<.05	<.05	.19	.30	.43	.886
Phosphorus, total	51	.01	0	.238	.635	3.8	.01	.02	.05	.08	.12	.338
Phosphorus, dissolved	51	.01	9	[2] .180	[2] .632	3.9	<.01	<.01	.01	.02	.05	.176
Orthophosphate	51	.01	10	[2] .159	[2] .559	3.4	<.01	<.01	.01	.02	.03	.128

[1] Concentrations below the MRL are censored data. For nutrients, censored data are reported as less than the MRL value. Censored data result from the limits of analytical procedures and are interpreted to mean that the analyte may not be present or may be present in quantities that are too small for the analytical procedure to determine.

[2] Mean and standard deviation for data sets with 10 percent or more censored data are estimated by log-probability regression.

In this report, nutrient concentrations are statistically compared in four ways. The first comparison is between the nutrient concentrations during the irrigation and non-irrigation runs at the ambient, main-stem, and drain sites. The results of this comparison show if there are significant differences in nutrient concentrations between the two runs. The second comparison is between the nutrient concentrations at the main-stem and end-drain sites for the irrigation run, non-irrigation run, and for both runs combined together. The results of this comparison show if there are significant differences in nutrient concentrations between the main-stem and end-drain sites and give information as to how drain discharges are affecting main-stem nutrient concentrations. The third and fourth comparisons are between the nutrient concentrations and loads at site 1 with those at site 19 for the time-series data. These comparisons show if the Mesilla Valley, as a unit, is affecting nutrient concentrations or loads in the Rio Grande.

A fifth comparison between the total nutrient load entering the main stem from agricultural land-use areas and from urban land-use areas is made in this report. However, there was no available breakdown of the percentage of the drain or WWTP nutrient load that can be attributed to agricultural land use or urban land use. The drains may receive some urban runoff where they run through urban areas, and the East Side Drain receives the discharge from two WWTP's. The WWTP load entering the main stem is probably mostly due to urban land use. Because of this uncertainty, assumptions were made about the contribution of each land use to the nutrient loads discharging from the drains and WWTP's. The drain load was assumed to represent the load from agricultural land-use areas and is referred to as the load from agricultural sources. The WWTP load was assumed to represent the load from urban land-use areas and is referred to as the load from nonagricultural sources. This comparison is used to give a reference as to how the magnitudes of the nutrient loads from the two land uses compare and not numerical ratios.

All comparisons of nutrient concentrations and loads in the Mesilla Valley represent conditions as they existed at the time of this synoptic study and cannot be extrapolated to represent long-term concentrations or loads. Furthermore, the conditions in the Mesilla Valley during this synoptic study may or may not represent typical nutrient concentrations and loads in the Mesilla Valley. Additional data collected over several years would be necessary to determine what would be considered typical conditions.

Nitrogen

Anderholm and others (1995) identified the major sources of nitrogen compounds to the RIOG study unit as animal manure, fertilizers, atmospheric deposition, and sewage treatment effluent. These are probably also the main sources of nitrogen compounds to the surface waters of the Mesilla Valley, although not necessarily in the same order.

Once in the environment, nitrogen compounds enter into a complex biogeochemical process known as the nitrogen cycle. In the well-oxygenated surface waters sampled during this study, the major process of this cycle is nitrification, which is defined as the oxidation of the reduced forms of nitrogen (nitrite, ammonia, and organic nitrogen) to the oxidized form of nitrate. This process is an important sink for the reduced forms and can also be an important source of nitrate. Uptake by plants and denitrification, which is the biodegradation of nitrate to nitrogen gas, can be important sinks for nitrate. Adsorption onto mineral surfaces and volatilization can be important sinks for ammonia.

Nitrogen is a common chemical component of most natural surface-water systems. However, excessive nitrogen concentrations may cause problems concerning human health and toxicity to aquatic life in addition to those problems associated with eutrophication. The risk of human health problems, such as methemoglobinemia (blue baby syndrome) in small children and infants increases with excessive nitrates and nitrites in drinking-water supplies. The EPA has set an MCL of 1 mg/L as nitrogen (N) for nitrite and 10 mg/L as N for nitrate in drinking-water supplies. Although the waters sampled as part of this study were not drinking-water supplies, the above MCL's can be used for comparison of the nitrite and nitrite plus nitrate concentrations derived from the study. The maximum dissolved nitrite concentration at an ambient site was 0.12 mg/L as N at main-stem sites 8 and 15 during the non-irrigation run. The maximum dissolved nitrite plus nitrate concentration at an ambient site was 2.3 mg/L as N at drain site 14 during the non-irrigation run.

Nitrogen nutrients can be toxic to aquatic life either directly through the effects of un-ionized ammonia or indirectly through oxygen deprivation. Un-ionized ammonia is that part of dissolved ammonia that has not split into ions. The percentage of dissolved ammonia that is in the un-ionized form depends mainly on water temperature and hydrogen ion activity (pH). The toxicity of un-ionized ammonia varies with the species of aquatic life, and the criterion for un-ionized ammonia is usually set by the type of designated fisheries that a segment of surface water supports. Most of the Rio Grande in the Mesilla Valley is designated as a limited warm-water fishery by the New Mexico Water Quality Control Commission with an un-ionized ammonia criterion of 0.06 mg/L as N (New Mexico Water Quality Control Commission, 1991). The maximum un-ionized ammonia concentration for a main-stem site was 0.042 mg/L as N at site 8 during the non-irrigation run. This was also the maximum concentration for an ambient site.

If excessive nutrients are responsible for low dissolved oxygen concentrations, they are usually a by-product of eutrophication. However, nitrification of large quantities of the reduced nitrogen forms will add to the oxygen demand in a surface-water system. As mentioned above, dissolved oxygen concentrations at all ambient sites were above the EPA minimum dissolved oxygen criterion.

The nitrogen nutrients were statistically compared in the four ways mentioned earlier. The first comparison was nitrogen concentrations at ambient, main-stem, and drain sites during the irrigation run to concentrations during the non-irrigation run. The first comparison found 12 of a possible 15 statistically significant differences between concentrations during the non-irrigation and irrigation runs. The concentrations of all five nitrogen nutrients were statistically larger during the irrigation run for the ambient sites and for the main-stem sites. These higher concentrations were due mainly to a large load of dissolved ammonia that was being discharged at site 4 during the non-irrigation run. The concentrations of dissolved ammonia and dissolved ammonia plus organic nitrogen at the drain sites were also statistically larger during the non-irrigation run.

The second comparison was nitrogen concentrations at the main-stem sites to those at the end-drain sites for the irrigation run, non-irrigation run, and for both runs combined. For the second comparison, only 2 of 15 showed a statistically significant difference between concentrations at the main-stem sites and at the end-drain sites. Dissolved ammonia and dissolved nitrite plus nitrate concentrations were significantly larger at the end-drain sites during the irrigation run. Because of the large dissolved ammonia load being discharged at site 4 during the non-irrigation run, an additional set of comparisons of nitrogen concentrations at main-stem and end-drain sites downstream from site 4 for this run was made. The concentrations of all nitrogen nutrients, except dissolved nitrite plus nitrate, were found to be significantly larger at the main-stem sites for this comparison.

The third and fourth comparisons were time-series data for site 1 to those for site 19. Both the dissolved nitrite plus nitrate concentrations and loads at site 19 were significantly larger than those at site 1. Concentrations and loads of the other nitrogen nutrients showed no difference between the two sites. These two statistical comparisons indicate that during the period of the time series, the Mesilla Valley was a source of dissolved nitrite plus nitrate to the Rio Grande.

The third and fourth comparisons were also made for the total dissolved nitrogen nutrient load. This load was found to be significantly larger at site 19. During the time series, the Mesilla Valley was a source of nitrogen nutrients to the Rio Grande.

The total dissolved nitrogen load entering the main stem from agricultural sources was calculated and compared with the load entering the main stem from nonagricultural sources. During the irrigation run, the total dissolved nitrogen nutrient load from agricultural sources was approximately 62 percent of the load from nonagricultural sources. During the non-irrigation run, the total dissolved nitrogen nutrient load from agricultural sources was approximately 28 percent of the load from nonagricultural sources. During this study, the total nitrogen load entering the main stem from nonagricultural sources equaled or exceeded the load entering the main stem from agricultural sources.

Phosphorus

Natural sources of phosphorus compounds are erosion of phosphorus-bearing rocks, animal waste, and decay of organic matter. Waste discharges from WWTP's and application of commercial fertilizer are important anthropogenic sources. Low solubility, adsorption, coprecipitation, and uptake by biota are major reasons for low phosphorus concentrations in most natural waters.

Most forms of phosphorus are insoluble, and Meybeck (1982) estimated that approximately 95 percent of the phosphorus load in rivers is in the particulate form. The orthophosphate form is the most stable of the dissolved phosphorus forms in the aerated waters sampled during this study. The dissolved phosphorus forms are the most available for uptake by biota, whereas the total phosphorus form can be looked at as a potentially available supply.

The main problem of excessive phosphorus concentrations in natural surface waters is eutrophication. To control eutrophication, the EPA has recommended that the total phosphorus concentration in streams or other flowing waters not discharging directly to lakes or impoundments be 0.100 mg/L as P or less. This recommended concentration was exceeded in 12 of the 47 ambient- site samples (table 8). The maximum total phosphorus concentration at an ambient site was 0.49 mg/L as P at drain site 14 during the non-irrigation run. The second highest concentration of 0.34 mg/L as P was at the same site during the irrigation run. Total phosphorus concentrations in three of the seven samples from main-stem site 15 and four of the seven samples from main-stem site 19 exceeded the recommended concentration.

The phosphorus concentrations and loads were compared in the same manner as the nitrogen concentrations and loads. For the first comparison, no difference was found in the total phosphorus and dissolved phosphorus concentrations between the irrigation and non-irrigation runs. Dissolved orthophosphate concentrations were statistically significantly larger in the drains during the non-irrigation run; however, the median value during the non-irrigation run was 0.03 mg/L as phosphorus (as P) and during the irrigation run was 0.02 mg/L as P.

For the second comparison, no difference was found in total phosphorus concentrations between the end-drain sites and the main-stem sites. Dissolved phosphorus concentrations were larger at the end-drain sites for the combined irrigation and non-irrigation runs, but when the data for the two runs are examined separately, the concentrations show no difference. Dissolved orthophosphate concentrations were significantly larger at the end-drain sites than at the main-stem sites for the combined irrigation and non-irrigation runs and for the non-irrigation run. There was no statistically significant difference between the concentrations at these sites during the irrigation run.

For the third and fourth comparisons, total phosphorus and dissolved orthophosphate concentrations and loads were significantly larger at site 19 than at site 1 during the time series. Dissolved phosphorus concentrations and loads at the two sites showed no difference.

The total phosphorus load entering the main stem from agricultural sources was calculated and compared to the total phosphorus load entering the main stem from nonagricultural sources. During the irrigation run, the total phosphorus load from agricultural sources was approximately 82 percent of that from nonagricultural sources. During the non-irrigation run, the total phosphorus load from agricultural sources was approximately 139 percent of that from nonagricultural sources. During this study, the total phosphorus load entering the main stem from nonagricultural sources probably equaled or exceeded that from agricultural sources.

SUMMARY AND CONCLUSIONS

A two-phase synoptic study of pesticides and nutrients in the surface water of the Mesilla Valley, New Mexico and Texas, was conducted as part of the RIOG assessment program. The first phase was conducted during the high-flow irrigation season (April-May 1994) and consisted of a 6-week time-series sampling event of the water column at 3 water-quality sites and an irrigation-run sampling event of the water column at 19 water-quality sites. The second phase (January 1995) was conducted during the low-flow non-irrigation season and consisted of a non-irrigation-run sampling event of the water column at 18 water-quality sites and a bed-material sampling event at 6 end-drain sites. Major findings and conclusions of the Mesilla Valley surface-water synoptic study are:

PESTICIDES IN THE WATER COLUMN

- The presence of pesticides in the surface water of the Mesilla Valley is erratic. There was a total of 100 detections of 17 different pesticides and metabolites out of 3,734 analyses of 78 pesticides and metabolites. Forty-four of the 51 water-column samples had detections of pesticides and metabolites.

- No pesticide concentration exceeded the EPA's drinking-water standards or any applicable Federal or State ambient criteria or guidelines.

- As many as 38 percent of the pesticide detections may be attributed to sources upstream from the Mesilla Valley or to non-agricultural use within the Mesilla Valley.

- There were more detections of more different pesticides and metabolites during the non-irrigation run (41 detections of 13 pesticides and metabolites) than during the irrigation run (29 detections of 10 pesticides and metabolites). However 24 of the 41 non-irrigation-run detections were of two pesticides, DCPA and metolachlor.

- Of the 11 pesticides and metabolites detected more than once in regular samples, 9 were detected during both the irrigation and non-irrigation phases of the study. Where a comparison can be made, the loads of specific pesticides were much higher during the irrigation phase.

- DCPA was detected in 29 of the 51 water-column samples and metolachlor in 17 of the samples. DCPA was detected throughout the Mesilla Valley, whereas metolachlor was detected mainly in the northern and central parts of the valley.

- The highest pesticide concentration detected was 0.75 µg/L of carbofuran at site 14, the East Side Drain, during the irrigation run. The increase in main-stem carbofuran concentrations that resulted from the discharge of the carbofuran load associated with this concentration was the only time during this synoptic study that an effect upon main-stem pesticide concentrations could be directly attributed to a pesticide load discharged from a particular drain or WWTP.

PESTICIDES IN BED MATERIAL

- A total of 21 detections of 6 different pesticides and metabolites were found in bed-material samples out of 138 analyses of 21 pesticides and metabolites, gross PCB's, and gross PCN's.

- DDD, DDE, and DDT were detected in all six bed-material samples even though the use of DDD and DDT was banned in 1973 for all but emergency use.

NUTRIENTS IN THE WATER COLUMN

- The Mesilla Valley as a unit was a source of nutrients to the Rio Grande.

- The inflow of nutrients to the Rio Grande from non-agricultural sources within the Mesilla Valley may equal or exceed the inflow from agricultural sources.

- No nutrient concentration or constituent concentration related to nutrients failed to meet any applicable Federal or State criterion or standard. The maximum nitrite concentration at an ambient site was 0.12 mg/L as N, and the maximum nitrite plus nitrate concentration at an ambient site was 2.3 mg/L as N. The minimum dissolved oxygen concentration at an ambient site was 6.2 mg/L. The maximum calculated un-ionized ammonia concentration at an ambient site was 0.042 mg/L as N.

- Median concentrations of dissolved nitrogen and total phosphorus at main-stem sites for the irrigation and non-irrigation runs are in the eutrophic range of most trophic classification systems.

- The total phosphorus concentration in 12 ambient-site samples exceeded the EPA recommended concentration of 0.100 mg/L as P to control eutrophication in streams or other flowing waters not discharging directly to lakes or impoundments. Nine of these 12 samples are from the southern part of the valley.

REFERENCES

Anderholm, S.K., Radell, M.J., and Richey, S.F., 1995, Water-quality assessment of the Rio Grande Valley study unit, Colorado, New Mexico, and Texas--Analysis of selected nutrient, suspended-sediment, and pesticide data: U.S. Geological Survey Water-Resources Investigations Report 94-4061, 203 p.

Anderson, J.R., Hardy, E.E., Roach, J.T., and Witmer, R.E., 1976, A land use and land cover classification system for use with remote sensor data: U.S. Geological Survey Professional Paper 964, 28 p.

Borland, J.P., and Ong, Kim, 1995, Water resources data--New Mexico, water year 1994: U.S. Geological Survey Water-Data Report NM-94-1, 581 p.

Conover, C.S., 1954, Ground-water conditions in the Rincon and Mesilla Valleys and adjacent areas in New Mexico: U.S. Geological Survey Water-Supply Paper 1230, 200 p.

Dye, Albert, Raymondi, Richard, Bostick, Kent, Clement, Paul, Cary, Steven, and Conrad, Ron, 1984, Seepage rates and ground-water-quality impacts from manure-lined dairy waste lagoons: New Mexico Health and Environment Department, 117 p.

Ellis, S.R., Levings, G.W., Carter, L.F., Richey, S.F., and Radell, M.J., 1993, Rio Grande Valley, Colorado, New Mexico, and Texas: Water Resources Bulletin, v. 29, no. 4, p. 617-646.

Faires, L.M., 1993, Methods of analysis by the U.S. Geological Survey National Water Quality Laboratory--Determination of metals in water by inductively coupled plasma-mass spectrometry: U.S. Geological Survey Open-File Report 92-634, 28 p.

Fishman, M.J., and Friedman, L.C., eds., 1989, Methods for the determination of inorganic substances in water and fluvial sediments: U.S. Geological Survey Techniques of Water-Resources Investigations, book 5, chap. A1, 545 p.

Frenzel, P.F., 1992, Simulation of ground-water flow in the Mesilla Basin, Doña Ana County, New Mexico, and El Paso County, Texas--Supplement to Open-File Report 88-305: U.S. Geological Survey Water-Resources Investigations Report 91-4155, 152 p.

Frenzel, P.F., and Kaehler, C.A., 1992, Geohydrology and simulation of ground-water flow in the Mesilla Basin, Doña Ana County, New Mexico, and El Paso County, Texas, *with a section on* Water quality and geochemistry, by S.K. Anderholm: U.S. Geological Survey Professional Paper 1407-C, 105 p.

Friedman, L.C., and Erdmann, D.E., 1982, Quality assurance practices for the chemical and biological analyses of water and fluvial sediments: U.S. Geological Survey Techniques of Water-Resources Investigations, book 5, chap. A6, 181 p.

Gianessi, L.P., and Puffer, C.A., 1991, Herbicide use in the United States--National summary report (rev. ed.): Washington, D.C., Resources for the Future, 128 p.

_____1992a, Fungicide use in the U.S. crop production--National summary report: Washington, D.C., Resources for the Future, 102 p.

_____1992b, Insecticide use in the U.S. crop production--National summary report: Washington, D.C., Resources for the Future, 212 p.

REFERENCES--Continued

Gilliom, R.J., Alley, W.M., and Gurtz, M.E., 1995, Design of the National Water-Quality Assessment program--Occurrence and distribution of water-quality conditions: U.S. Geological Survey Circular 1112, 33 p.

Guy, H.P., 1969, Laboratory theory and methods for sediment analysis: U.S. Geological Survey Techniques of Water-Resources Investigations, book 5, chap. C1, 58 p.

Hawley, J.W., and Lozinsky, R.P., 1992, Hydrogeologic section of the Mesilla Bolson, New Mexico and Texas, II: Socorro, New Mexico Bureau of Mines and Mineral Resources Open-File Report 323.

Helsel, D.R., and Hirsch, R.M., 1992, Statistical methods in water resources: Amsterdam, The Netherlands, Elsvier Science Publishers, 449 p., 4 app.

Hem, J.D., 1985, Study and interpretation of the chemical characteristics of natural water (3d ed.): U.S. Geological Survey Water-Supply Paper 2254, 263 p.

King, W.E., Hawley, J.W., Taylor, A.M., and Wilson, R.P., 1971, Geology and ground-water resources of central and western Doña Ana County, New Mexico: Socorro, New Mexico Institute of Mining and Mineral Resources Hydrologic Report 1, 64 p.

Meister, R.T., ed., 1995, Farm chemical handbook '95: Willoughby, Ohio, Meister Publishing Co., 7 sections, 922 p.

Meybeck, Michael, 1982, Carbon, nitrogen, and phosphorus transport by world rivers: American Journal of Science, v. 282, p. 401-450.

New Mexico Water Quality Control Commission, 1991, Water-quality standards for interstate and intrastate streams in New Mexico: Santa Fe, 49 p.

Nickerson, E.L., and Myers, R.G., 1993, Geohydrology of the Mesilla ground-water basin, Doña Ana County, New Mexico, and El Paso County, Texas: U.S. Geological Survey Water-Resources Investigations Report 92-4156, 89 p.

Nowell, L.H., and Resek, E.A., 1994, National standards and guidelines for pesticides in water, sediment, and aquatic organisms--Application to water-quality assessments, *in* Ware, G.W., ed., Reviews of environmental contamination and toxicology, v. 140: New York, Springer-Verlag, p. 1-164.

Ott, Lyman, 1993, An introduction to statistical methods and data analysis (4th ed.): Belmont, Calif., Duxbury Press, 1051 p., 2 app.

Peterson, D.M., Khaleel, Raz, and Hawley, J.W., 1984, Quasi three-dimensional modeling of ground-water flow in the Mesilla Bolson, New Mexico and Texas: Las Cruces, New Mexico Water Resources Research Institute Report 178, 185 p.

Shelton, L.R., 1994, Field guide for collecting and processing stream-water samples for the National Water-Quality Assessment Program: U.S. Geological Survey Open-File Report 94-455, 42 p.

REFERENCES--Concluded

Shelton, L.R., and Capel, P.D., 1994, Guidelines for collecting and processing samples of streambed sediment for analysis of trace elements and organic contaminants for the National Water-Quality Assessment Program: U.S. Geological Survey Open-File Report 94-458, 20 p.

Smith, J.A., Witkowski, P.J., and Fusillo, T.V., 1988, Man-made organic compounds in the surface waters of the United States--A review of current understanding: U.S. Geological Survey Circular 1007, 92 p.

Timme, P.J., 1995, National Water Quality Laboratory 1995 services catalog: U.S. Geological Survey Open-File Report 95-352, 120 p.

U.S. Department of Commerce, 1989, 1987 census of agriculture. V. 1, Geographic area series, part 51, United States summary and State data: Bureau of the Census, Washington, D.C., 199 p.

_____1991, 1990 census of population and housing--Summary population and housing characteristics, New Mexico, CPH-1-33: Bureau of the Census, Washington, D.C., 63 p.

U.S. Geological Survey, 1986, Land use and land cover data from 1:250,000- and 1:100,000-scale maps: National Mapping Program, technical instructions, data user's guide 4, 36 p.

Verschueren, Karl, 1983, Handbook of environmental data on organic chemicals (2d ed.): New York, Van Nostrand Reinhold, 1310 p.

Wershaw, R.L., Fishman, M.J., Grabbe, R.R., and Lowe, L.E., eds., 1987, Methods for the determination of organic substances in water and fluvial sediments: U.S. Geological Survey Techniques of Water-Resources Investigations, book 5, chap. A3, 80 p.

Wilson, B.C., 1992, Water use by categories in New Mexico counties and river basins, and irrigated acreage in 1990: New Mexico State Engineer Technical Report 47, 141 p.

Wilson, C.A., White, R.R., Orr, B.R., and Roybal, R.G., 1981, Water resources of the Rincon and Mesilla Valleys and adjacent areas, New Mexico: New Mexico State Engineer Technical Report 43, 514 p.

Zaugg, S.D., Sandstrom, M.W., Smith, S.G., and Fehlberg, K.M., 1995, Methods of analysis by the United States Geological Survey National Water Quality Laboratory--Determination of pesticides in water by C-18 solid-phase extraction and capillary-column gas chromatography/mass spectrometry with selected ion monitoring: U.S. Geological Survey Open-File Report 95-181, 54 p.

Appendix--Field measurements and analytical results for samples collected during the Mesilla Valley synoptic study

[inst., instantaneous; { }, U.S. Geological Survey (USGS) Water-Data Storage and Retrieval System (WATSTORE) parameter code; µS/cm, microsiemens per centimeter at 25 degrees Celsius; deg C, degrees Celsius; mm, millimeters; mg/L, milligrams per liter; IT, incremental titration; diss, dissolved; --, no data; WWTP, wastewater treatment plant; NO_2+NO_3, nitrite plus nitrate; <, less than; µg/L, micrograms per liter; rec, recoverable; µg/kg, micrograms per kilogram]

Date	Time	Discharge, inst. (cubic feet per second) {00061}	Specific conductance (µS/cm) {00095}	pH water, whole field (standard units) {00400}	Temperature air (deg C) {00020}	Temperature water (deg C) {00010}	Barometric pressure (mm of Hg) {00025}	Oxygen, dissolved (mg/L) {00300}	Oxygen, dissolved (percent saturation) {00301}	Hardness, total (mg/L as $CaCO_3$) {00900}	Hardness, noncarb (mg/L as $CaCO_3$) {00904}	Alkalinity, diss, total IT field (mg/L as $CaCO_3$) {39086}
SITE 1 USGS 08363500 RIO GRANDE BELOW LEASBURG DAM NEAR LAS CRUCES, N. MEX.												
APR 1994												
13...	1000	E965	820	8.3	18.5	15.0	664	8.4	96	200	72	127
18...	1330	E1,030	785	8.1	29.5	18.5	663	8.4	103	190	44	146
26...	0740	E950	787	8.2	11.5	13.0	654	8.3	92	200	47	157
MAY												
04...	1015	E865	759	8.4	--	17.5	668	8.1	97	190	45	146
10...	1145	E865	743	8.3	26.0	16.5	661	8.2	97	190	42	146
JAN 1995												
04...	1145	127	1,420	8.3	9.0	6.5	666	11.0	102	340	140	202
SITE 2 USGS 322541106525110 SELDEN DRAIN AT LEVEE ROAD NEAR LEASBURG, N. MEX.												
APR 1994												
26...	1020	3.25	1,180	8.1	16.0	14.0	655	8.2	93	320	77	242
JAN 1995												
04...	1430	0.03	1,340	8.6	8.0	9.0	666	15.2	151	330	100	230
SITE 3 USGS 322234106511710 RIO GRANDE AT SHALEM BRIDGE NEAR DOÑA ANA, N. MEX.												
APR 1994												
26...	1330	981	802	8.4	24.5	17.0	657	8.4	102	200	43	159
JAN 1995												
04...	1530	65	1,580	8.2	7.5	8.5	661	10.3	103	370	130	237
SITE 4 USGS 321739106495110 LAS CRUCES WWTP AT LEVEE ROAD NEAR LAS CRUCES, N. MEX.												
APR 1994												
26...	1855	11	1,280	7.5	22.0	21.0	656	6.2	82	240	100	137
JAN 1995												
05...	1500	16	1,410	7.8	--	17.5	653	6.9	85	230	4	230
SITE 5 USGS 321601106494110 RIO GRANDE ABOVE N. MEX. 359 BRIDGE AT MESILLA, N. MEX.												
APR 1994												
26...	2030	1,030	822	7.8	20.0	17.5	653	7.7	95	210	49	156
JAN 1995												
06...	0800	74	1,500	8.5	4.5	3.0	659	11.3	98	340	120	218
SITE 6 USGS 321457106492110 PICACHO DRAIN NEAR SAN PABLO, N. MEX.												
APR 1994												
26...	2210	8.2	1,250	8.0	18.0	19.0	657	6.9	87	320	100	212
JAN 1995												
06...	1050	1.6	1,420	8.1	10.0	6.5	660	9.3	88	360	120	234
SITE 7 USGS 321014106431410 SANTO TOMAS RIVER DRAIN AT LEVEE ROAD NEAR SAN MIGUEL, N. MEX.												
APR 1994												
27...	0530	0.06	1,200	8.1	13.5	15.5	657	6.2	72	360	150	212

Appendix--Field measurements and analytical results for samples collected during the Mesilla Valley synoptic study--Continued

Date	Solids, sum of constituents, dissolved (mg/L) {70301}	Solids, residue at 180 deg. C, dissolved (mg/L) {70300}	Calcium, dissolved (mg/L as Ca) {00915}	Magnesium, dissolved (mg/L as Mg) {00925}	Sodium, dissolved (mg/L as Na) {00930}	Sodium percent {00932}	Sodium adsorption ratio {00931}	Potassium, dissolved (mg/L as K) {00935}	Bicarbonate, diss IT field (mg/L as HCO_3) {00453}	Carbonate, diss IT field (mg/L as CO_3) {00452}	Sulfate, dissolved (mg/L as SO_4) {00945}	Chloride, dissolved (mg/L as Cl) {00940}
SITE 1 USGS 08363500 RIO GRANDE BELOW LEASBURG DAM NEAR LAS CRUCES, N. MEX.												
APR 1994												
13...	461	487	57	14	91	49	3	6.6	152	2	140	73
18...	452	469	55	13	84	48	3	6.2	179	0	140	64
26...	450	448	57	13	86	48	3	6.1	182	0	130	65
MAY												
04...	432	437	55	13	80	47	3	6.0	172	3	130	57
10...	430	456	54	13	78	46	2	5.8	178	0	130	56
JAN 1995												
04...	876	922	100	22	150	48	4	7.7	226	10	320	140
SITE 2 USGS 322541106525110 SELDEN DRAIN AT LEVEE ROAD NEAR LEASBURG, N. MEX.												
APR 1994												
26...	733	738	98	18	130	46	3	8.1	295	0	220	89
JAN 1995												
04...	860	908	100	20	150	48	4	14	252	14	310	110
SITE 3 USGS 322234106511710 RIO GRANDE AT SHALEM BRIDGE NEAR DOÑA ANA, N. MEX.												
APR 1994												
26...	472	485	58	14	87	47	3	6.4	193	1	140	68
JAN 1995												
04...	994	1,030	110	23	180	51	4	11	289	0	340	170
SITE 4 USGS 321739106495110 LAS CRUCES WWTP AT LEVEE ROAD NEAR LAS CRUCES, N. MEX.												
APR 1994												
26...	754	770	70	16	140	54	4	18	167	0	120	200
JAN 1995												
05...	794	778	67	16	140	53	4	25	280	0	130	220
SITE 5 USGS 321601106494110 RIO GRANDE ABOVE N. MEX. 359 BRIDGE AT MESILLA, N. MEX.												
APR 1994												
26...	473	489	59	14	89	48	3	6.7	190	0	140	67
JAN 1995												
06...	900	960	100	21	160	50	4	10	238	14	300	160
SITE 6 USGS 321457106492110 PICACHO DRAIN NEAR SAN PABLO, N. MEX.												
APR 1994												
26...	780	812	97	18	140	48	3	6.9	259	0	270	100
JAN 1995												
06...	885	932	110	20	150	47	3	6.6	285	0	300	130
SITE 7 USGS 321014106431410 SANTO TOMAS RIVER DRAIN AT LEVEE ROAD NEAR SAN MIGUEL, N. MEX.												
APR 1994												
27...	750	774	110	20	120	41	3	8.8	258	0	250	98

Appendix--Field measurements and analytical results for samples collected during the Mesilla Valley synoptic study--Continued

Date	Fluoride, dissolved (mg/L as F) (00950)	Silica, dissolved (mg/L as SiO2) (00955)	Nitrogen, nitrite, dissolved (mg/L as N) (00613)	Nitrogen, NO_2+NO_3, dissolved (mg/L as N) (00631)	Nitrogen, ammonia, dissolved (mg/L as N) (00608)	Nitrogen, ammonia + organic, diss (mg/L as N) (00623)	Nitrogen, ammonia + organic, total (mg/L as N) (00625)	Phosphorus, total (mg/L as P) (00665)	Phosphorus, dissolved (mg/L as P) (00666)	Phosphorus, ortho, dissolved (mg/L as P) (00671)	Aluminum, dissolved (mg/L as Al) (01106)	Antimony, dissolved (mg/L as Sb) (01095)
SITE 1 USGS 08363500 RIO GRANDE BELOW LEASBURG DAM NEAR LAS CRUCES, N. MEX.												
APR 1994												
13...	0.60	1.4	0.02	0.08	0.02	0.30	0.40	0.05	<0.01	<0.01	--	--
18...	0.60	1.5	<0.01	<0.05	0.03	<0.20	0.30	0.02	0.02	0.02	--	--
26...	0.60	2.2	0.01	0.05	0.03	0.20	0.30	0.03	0.02	<0.01	--	--
MAY												
04...	0.60	3.2	<0.01	<0.05	0.02	0.20	0.50	0.05	<0.01	<0.01	--	--
10...	0.60	4.8	<0.01	<0.05	0.02	0.20	0.50	0.04	0.04	0.01	--	--
JAN 1995												
04...	0.60	14	<0.01	0.14	0.02	<0.20	<0.20	0.02	<0.01	<0.01	2	<1
SITE 2 USGS 322541106525110 SELDEN DRAIN AT LEVEE ROAD NEAR LEASBURG, N. MEX.												
APR 1994												
26...	0.80	22	0.03	0.43	0.05	0.30	0.40	0.02	0.02	<0.01	--	--
JAN 1995												
04...	0.70	16	0.01	0.11	0.05	0.40	0.40	0.03	0.02	0.02	4	<1
SITE 3 USGS 322234106511710 RIO GRANDE AT SHALEM BRIDGE NEAR DOÑA ANA, N. MEX.												
APR 1994												
26...	0.60	2.3	0.01	<0.05	0.02	0.20	0.40	0.04	<0.01	<0.01	--	--
JAN 1995												
04...	0.70	16	<0.01	0.14	0.02	<0.20	0.20	0.01	<0.01	<0.01	4	<1
SITE 4 USGS 321739106495110 LAS CRUCES WWTP AT LEVEE ROAD NEAR LAS CRUCES, N. MEX.												
APR 1994												
26...	0.80	31	1.20	15.0	3.40	4.6	5.4	2.30	2.00	1.80	--	--
JAN 1995												
05...	0.70	29	0.26	0.42	20.0	21	22	0.33	0.18	0.13	10	<1
SITE 5 USGS 321601106494110 RIO GRANDE ABOVE N. MEX. 359 BRIDGE AT MESILLA, N. MEX.												
APR 1994												
26...	0.70	2.5	0.03	0.19	0.05	0.30	0.40	0.09	0.03	0.03	--	--
JAN 1995												
06...	0.60	15	0.04	0.24	0.90	1.2	1.1	0.05	<0.01	0.01	4	<1
SITE 6 USGS 321457106492110 PICACHO DRAIN NEAR SAN PABLO, N. MEX.												
APR 1994												
26...	0.70	19	0.02	0.24	0.08	0.50	0.50	0.08	0.11	0.01	--	--
JAN 1995												
06...	0.70	24	0.03	0.62	0.15	0.30	0.40	0.02	<0.01	0.01	5	<1
SITE 7 USGS 321014106431410 SANTO TOMAS RIVER DRAIN AT LEVEE ROAD NEAR SAN MIGUEL, N. MEX.												
APR 1994												
27...	0.50	15	<0.01	<0.05	0.03	0.30	0.50	0.13	0.10	0.10	--	--

Appendix--Field measurements and analytical results for samples collected during the Mesilla Valley synoptic study--Continued

Date	Arsenic, dissolved (mg/L as As) (01000)	Barium, dissolved (mg/L as Ba) (01005)	Beryllium, dissolved (mg/L as Be) (01010)	Boron, dissolved (mg/L as B) (01020)	Cadmium, dissolved (mg/L as Cd) (01025)	Chromium, dissolved (mg/L as Cr) (01030)	Cobalt, dissolved (mg/L as Co) (01035)	Copper, dissolved (mg/L as Cu) (01040)	Iron, dissolved (mg/L as Fe) (01046)	Lead, dissolved (mg/L as Pb) (01049)	Manganese, dissolved (mg/L as Mn) (01056)	Molybdenum, dissolved (mg/L as Mo) (01060)
SITE 1 USGS 08363500 RIO GRANDE BELOW LEASBURG DAM NEAR LAS CRUCES, N. MEX.												
APR 1994												
13...	--	--	--	--	--	--	--	--	<3	--	3	--
18...	--	--	--	--	--	--	--	--	<3	--	3	--
26...	--	--	--	--	--	--	--	--	10	--	5	--
MAY												
04...	--	--	--	--	--	--	--	--	6	--	4	--
10...	--	--	--	--	--	--	--	--	3	--	3	--
JAN 1995												
04...	1	100	<1	220	<1.0	3	<1	1	<3	<1	32	6
SITE 2 USGS 322541106525110 SELDEN DRAIN AT LEVEE ROAD NEAR LEASBURG, N. MEX.												
APR 1994												
26...	--	--	--	--	--	--	--	--	19	--	310	--
JAN 1995												
04...	1	59	<1	220	<1.0	3	<1	2	19	<1	180	7
SITE 3 USGS 322234106511710 RIO GRANDE AT SHALEM BRIDGE NEAR DOÑA ANA, N. MEX.												
APR 1994												
26...	--	--	--	--	--	--	--	--	<3	--	6	--
JAN 1995												
04...	1	110	<1	250	<1.0	1	<1	2	7	<1	41	7
SITE 4 USGS 321739106495110 LAS CRUCES WWTP AT LEVEE ROAD NEAR LAS CRUCES, N. MEX.												
APR 1994												
26...	--	--	--	--	--	--	--	--	94	--	49	--
JAN 1995												
05...	<1	6	<1	290	<1.0	2	<1	2	130	<1	57	19
SITE 5 USGS 321601106494110 RIO GRANDE ABOVE N. MEX. 359 BRIDGE AT MESILLA, N. MEX.												
APR 1994												
26...	--	--	--	--	--	--	--	--	<3	--	2	--
JAN 1995												
06...	2	99	<1	230	<1.0	1	<1	3	<3	<1	7	7
SITE 6 USGS 321457106492110 PICACHO DRAIN NEAR SAN PABLO, N. MEX.												
APR 1994												
26...	--	--	--	--	--	--	--	--	4	--	10	--
JAN 1995												
06...	2	78	<1	210	<1.0	2	<1	2	6	<1	140	10
SITE 7 USGS 321014106431410 SANTO TOMAS RIVER DRAIN AT LEVEE ROAD NEAR SAN MIGUEL, N. MEX.												
APR 1994												
27...	--	--	--	--	--	--	--	--	11	--	5	--

Appendix--Field measurements and analytical results for samples collected during the Mesilla Valley synoptic study--Continued

Date	Nickel, dissolved (mg/L as Ni) (01065)	Selenium, dissolved (mg/L as Se) (01145)	Silver, dissolved (mg/L as Ag) (01075)	Zinc, dissolved (mg/L as Zn) (01090)	Uranium, natural, dissolved (mg/L as U) (22703)	Carbon, organic, total (mg/L as C) (00680)	Carbon, organic, suspended, total (mg/L as C) (00689)	Carbon, organic, dissolved (mg/L as C) (00681)	Acetochlor, dissolved, rec (mg/L) (49260)	Acifluorfen, dissolved, rec (mg/L) (49315)	Alachlor, dissolved, rec (mg/L) (46342)	Aldicarb, dissolved, rec (mg/L) (49312)
SITE 1 USGS 08363500 RIO GRANDE BELOW LEASBURG DAM NEAR LAS CRUCES, N. MEX.												
APR 1994												
13...	--	--	--	--	--	--	0.4	7.5	--	<0.035	<0.002	<0.016
18...	--	--	--	--	--	--	1.1	5.3	--	<0.035	<0.002	<0.016
26...	--	--	--	--	--	--	0.5	5.3	--	<0.035	<0.002	<0.016
MAY												
04...	--	--	--	--	--	--	0.8	6.5	--	<0.035	<0.002	<0.016
10...	--	--	--	--	--	--	0.2	5.7	--	<0.035	<0.002	<0.016
JAN 1995												
04...	6	<1	<1.0	1	4.0	7.4	--	3.1	<0.009	<0.035	<0.002	<0.016
SITE 2 USGS 322541106525110 SELDEN DRAIN AT LEVEE ROAD NEAR LEASBURG, N. MEX.												
APR 1994												
26...	--	--	--	--	--	--	--	3.4	--	<0.035	<0.002	<0.016
JAN 1995												
04...	7	<1	<1.0	3	4.0	9.1	--	5.2	<0.009	<0.035	<0.002	<0.016
SITE 3 USGS 322234106511710 RIO GRANDE AT SHALEM BRIDGE NEAR DOÑA ANA, N. MEX.												
APR 1994												
26...	--	--	--	--	--	--	0.7	3.9	--	<0.035	<0.002	<0.016
JAN 1995												
04...	6	<1	<1.0	<1	4.0	3.0	--	2.8	<0.009	<0.060	<0.002	<0.060
SITE 4 USGS 321739106495110 LAS CRUCES WWTP AT LEVEE ROAD NEAR LAS CRUCES, N. MEX.												
APR 1994												
26...	--	--	--	--	--	--	0.5	6.8	--	<0.035	<0.002	<0.016
JAN 1995												
05...	5	<1	<1.0	8	12	18	--	8.6	<0.009	<0.035	<0.002	<0.016
SITE 5 USGS 321601106494110 RIO GRANDE ABOVE N. MEX. 359 BRIDGE AT MESILLA, N. MEX.												
APR 1994												
26...	--	--	--	--	--	--	0.7	--	--	<0.035	<0.002	<0.016
JAN 1995												
06...	6	<1	<1.0	2	4.0	14	--	3.1	<0.009	<0.035	<0.002	<0.016
SITE 6 USGS 321457106492110 PICACHO DRAIN NEAR SAN PABLO, N. MEX.												
APR 1994												
26...	--	--	--	--	--	--	0.5	4.4	--	<0.035	<0.002	<0.016
JAN 1995												
06...	6	<1	<1.0	1	3.0	6.7	--	3.9	<0.009	<0.035	<0.002	<0.016
SITE 7 USGS 321014106431410 SANTO TOMAS RIVER DRAIN AT LEVEE ROAD NEAR SAN MIGUEL, N. MEX.												
APR 1994												
27...	--	--	--	--	--	--	0.3	--	--	<0.035	<0.002	<0.016

Appendix--Field measurements and analytical results for samples collected during the Mesilla Valley synoptic study--Continued

Date	Aldicarb sulfone, dissolved, rec (mg/L) (49313)	Aldicarb sulfoxide, dissolved, rec (mg/L) (49314)	Alpha BHC, dissolved (mg/L) (34253)	Atrazine, dissolved, rec (mg/L) (39632)	Benfluralin, dissolved, rec (mg/L) (82673)	Bentazon, dissolved, rec (mg/L) (38711)	Bromacil, dissolved, rec (mg/L) (04029)	Bromoxynil, dissolved, rec (mg/L) (49311)	Butylate, dissolved, rec (mg/L) (04028)	Carbaryl, dissolved, rec (mg/L) (49310)	Carbaryl, dissolved, rec (mg/L) (82680)	Carbofuran, dissolved rec (mg/L) (49309)
SITE 1 USGS 08363500 RIO GRANDE BELOW LEASBURG DAM NEAR LAS CRUCES, N. MEX.												
APR 1994												
13...	<0.016	<0.021	<0.002	<0.004	<0.002	--	<0.035	--	<0.002	<0.008	<0.003	<0.028
18...	<0.016	<0.021	<0.002	<0.004	<0.002	<0.014	<0.035	<0.035	<0.002	<0.008	<0.003	<0.028
26...	<0.016	<0.021	<0.002	<0.004	<0.002	<0.014	<0.035	<0.035	<0.002	<0.008	<0.003	<0.028
MAY												
04...	<0.016	<0.021	<0.002	<0.004	<0.002	<0.014	<0.035	<0.035	<0.002	<0.008	<0.003	<0.028
10...	<0.016	<0.021	<0.002	<0.004	<0.002	<0.014	<0.035	<0.035	<0.002	<0.008	<0.003	<0.028
JAN 1995												
04...	<0.016	<0.021	<0.002	<0.004	<0.002	<0.014	<0.035	<0.035	<0.002	<0.008	<0.003	<0.028
SITE 2 USGS 322541106525110 SELDEN DRAIN AT LEVEE ROAD NEAR LEASBURG, N. MEX.												
APR 1994												
26...	<0.016	<0.021	<0.002	<0.004	<0.002	--	<0.035	--	<0.002	<0.008	<0.003	<0.028
JAN 1995												
04...	<0.016	<0.021	<0.002	<0.004	<0.002	<0.014	<0.035	<0.035	<0.002	<0.008	<0.003	<0.028
SITE 3 USGS 322234106511710 RIO GRANDE AT SHALEM BRIDGE NEAR DOÑA ANA, N. MEX.												
APR 1994												
26...	<0.016	<0.021	<0.002	<0.004	<0.002	--	<0.035	--	<0.002	<0.008	<0.003	<0.028
JAN 1995												
04...	<0.060	<0.060	<0.002	<0.004	<0.002	<0.060	<0.060	<0.060	<0.002	<0.060	<0.003	<0.060
SITE 4 USGS 321739106495110 LAS CRUCES WWTP AT LEVEE ROAD NEAR LAS CRUCES, N. MEX.												
APR 1994												
26...	<0.016	<0.021	<0.002	<0.004	<0.002	--	<0.035	--	<0.002	<0.008	E0.044	<0.028
JAN 1995												
05...	<0.016	<0.021	<0.002	<0.004	<0.002	<0.014	<0.035	<0.035	<0.002	<0.008	E0.015	<0.028
SITE 5 USGS 321601106494110 RIO GRANDE ABOVE N. MEX. 359 BRIDGE AT MESILLA, N. MEX.												
APR 1994												
26...	<0.016	<0.021	<0.002	<0.004	<0.002	--	<0.035	--	<0.002	<0.008	<0.003	<0.028
JAN 1995												
06...	<0.016	<0.021	<0.002	<0.004	<0.002	<0.014	<0.035	<0.035	<0.002	<0.008	<0.003	<0.028
SITE 6 USGS 321457106492110 PICACHO DRAIN NEAR SAN PABLO, N. MEX.												
APR 1994												
26...	<0.016	<0.021	<0.002	<0.004	<0.002	--	<0.035	--	<0.002	<0.008	<0.003	<0.028
JAN 1995												
06...	<0.016	<0.021	<0.002	<0.004	<0.002	<0.014	<0.035	<0.035	<0.002	<0.008	<0.003	<0.028
SITE 7 USGS 321014106431410 SANTO TOMAS RIVER DRAIN AT LEVEE ROAD NEAR SAN MIGUEL, N. MEX.												
APR 1994												
27...	<0.016	<0.021	<0.002	<0.004	<0.002	--	<0.035	--	<0.002	<0.008	<0.003	<0.028

Appendix--Field measurements and analytical results for samples collected during the Mesilla Valley synoptic study--Continued

Date	Carbofuran, dissolved, rec (mg/L) {82674}	Chloramben, dissolved, rec (mg/L) {49307}	Chlorpyrifos, dissolved (mg/L) {38933}	Clopyralid, dissolved, rec (mg/L) {49305}	Cyanazine, dissolved, rec (mg/L) {04041}	2,4-D, dissolved (mg/L) {39732}	Dacthal monoacid, dissolved, rec (mg/L) {49304}	DCPA, dissolved, rec (mg/L) {82682}	Deethylatrazine, dissolved, rec (mg/L) {04040}	Diazinon, dissolved (mg/L) {39572}	Dicamba, dissolved, rec (mg/L) {38442}	Dichlorprop, dissolved, rec (mg/L) {49302}
SITE 1 USGS 08363500 RIO GRANDE BELOW LEASBURG DAM NEAR LAS CRUCES, N. MEX.												
APR 1994												
13...	E0.016	<0.011	<0.004	<0.050	<0.004	<0.035	<0.017	0.005	<0.002	<0.002	<0.035	<0.032
18...	<0.003	<0.011	<0.004	<0.050	<0.004	<0.035	<0.017	0.004	<0.002	<0.002	<0.035	<0.032
26...	E0.006	<0.011	<0.004	--	<0.004	--	--	<0.002	<0.002	<0.002	--	<0.032
MAY												
04...	<0.003	<0.011	<0.004	<0.050	<0.004	<0.035	<0.017	0.003	<0.002	<0.002	<0.035	<0.032
10...	<0.003	<0.011	<0.004	<0.050	<0.004	<0.035	<0.017	<0.002	<0.002	<0.002	<0.035	<0.032
JAN 1995												
04...	<0.003	<0.011	<0.005	<0.050	<0.004	<0.035	<0.017	0.003	<0.003	<0.002	<0.035	<0.032
SITE 2 USGS 322541106525110 SELDEN DRAIN AT LEVEE ROAD NEAR LEASBURG, N. MEX.												
APR 1994												
26...	<0.003	<0.011	<0.004	--	<0.004	--	--	<0.002	<0.002	<0.002	--	<0.032
JAN 1995												
04...	<0.003	<0.011	<0.005	<0.050	<0.004	<0.035	<0.017	0.005	<0.003	<0.002	<0.035	<0.032
SITE 3 USGS 322234106511710 RIO GRANDE AT SHALEM BRIDGE NEAR DOÑA ANA, N. MEX.												
APR 1994												
26...	<0.003	<0.011	<0.004	--	<0.004	--	--	<0.002	<0.002	<0.002	--	<0.032
JAN 1995												
04...	<0.003	<0.060	<0.005	<0.060	<0.004	<0.060	<0.060	0.002	<0.003	<0.002	<0.060	<0.060
SITE 4 USGS 321739106495110 LAS CRUCES WWTP AT LEVEE ROAD NEAR LAS CRUCES, N. MEX.												
APR 1994												
26...	<0.003	<0.011	0.19	--	<0.004	--	--	<0.002	<0.002	0.099	--	<0.032
JAN 1995												
05...	<0.003	<0.011	0.030	<0.050	<0.004	<0.017	<0.035	<0.002	<0.003	0.066	<0.035	<0.032
SITE 5 USGS 321601106494110 RIO GRANDE ABOVE N. MEX. 359 BRIDGE AT MESILLA, N. MEX.												
APR 1994												
26...	<0.003	<0.011	<0.004	--	<0.004	--	--	<0.002	<0.002	<0.002	--	<0.032
JAN 1995												
06...	<0.003	<0.011	<0.005	<0.050	<0.004	<0.017	<0.035	<0.002	<0.003	<0.002	<0.035	<0.032
SITE 6 USGS 321457106492110 PICACHO DRAIN NEAR SAN PABLO, N. MEX.												
APR 1994												
26...	<0.003	<0.011	<0.004	--	<0.004	--	--	0.004	<0.002	<0.002	--	<0.032
JAN 1995												
06...	<0.003	<0.011	<0.005	<0.050	<0.004	<0.017	<0.035	0.002	<0.003	<0.002	<0.035	<0.032
SITE 7 USGS 321014106431410 SANTO TOMAS RIVER DRAIN AT LEVEE ROAD NEAR SAN MIGUEL, N. MEX.												
APR 1994												
27...	<0.003	<0.011	<0.004	--	<0.004	--	--	<0.002	<0.002	<0.002	--	<0.032

Appendix--Field measurements and analytical results for samples collected during the Mesilla Valley synoptic study--Continued

Date	Dieldrin, dissolved (mg/L) {39381}	2,6-Diethylaniline, dissolved, rec (mg/L) {82660}	Dinoseb, dissolved, rec (mg/L) {49301}	Disulfoton, dissolved, rec (mg/L) {82677}	Diuron, dissolved, rec (mg/L) {49300}	EPTC, dissolved, rec (mg/L) {82668}	Ethalfluralin, dissolved, rec (mg/L) {82663}	Ethoprop, dissolved, rec (mg/L) {82672}	Fenuron, dissolved, rec (mg/L) {49297}	Fluometuron, dissolved, rec (mg/L) {38811}	Fonofos, dissolved, rec (mg/L) {04095}	3 Hydroxycarbofuran, dissolved, rec (mg/L) {49308}
SITE 1 USGS 08363500 RIO GRANDE BELOW LEASBURG DAM NEAR LAS CRUCES, N. MEX.												
APR 1994												
13...	<0.001	<0.003	<0.035	<0.010	<0.020	<0.002	<0.004	<0.003	<0.013	<0.035	<0.003	<0.014
18...	<0.001	<0.003	<0.035	<0.010	<0.020	<0.002	<0.004	<0.003	<0.013	<0.035	<0.003	<0.014
26...	<0.001	<0.003	<0.035	<0.017	<0.020	<0.002	<0.004	<0.003	<0.013	<0.035	<0.003	<0.014
MAY												
04...	<0.001	<0.003	<0.035	<0.017	<0.020	<0.002	<0.004	<0.003	<0.013	<0.035	<0.003	<0.014
10...	<0.001	<0.003	<0.035	<0.017	<0.020	<0.002	<0.004	<0.003	<0.013	<0.035	<0.003	<0.014
JAN 1995												
04...	<0.001	<0.003	<0.035	<0.017	E0.001	<0.002	<0.004	<0.003	<0.013	<0.035	<0.003	<0.014
SITE 2 USGS 322541106525110 SELDEN DRAIN AT LEVEE ROAD NEAR LEASBURG, N. MEX.												
APR 1994												
26...	<0.001	<0.003	<0.035	<0.017	<0.020	<0.002	<0.004	<0.003	<0.013	<0.035	<0.003	<0.014
JAN 1995												
04...	<0.001	<0.003	<0.035	<0.017	<0.020	<0.002	<0.004	<0.003	<0.013	<0.035	<0.003	<0.014
SITE 3 USGS 322234106511710 RIO GRANDE AT SHALEM BRIDGE NEAR DOÑA ANA, N. MEX.												
APR 1994												
26...	<0.001	<0.003	<0.035	<0.017	<0.020	<0.002	<0.004	<0.003	<0.013	<0.035	<0.003	<0.014
JAN 1995												
04...	<0.001	<0.003	<0.060	<0.017	<0.060	<0.002	<0.004	<0.003	<0.060	<0.060	<0.003	<0.060
SITE 4 USGS 321739106495110 LAS CRUCES WWTP AT LEVEE ROAD NEAR LAS CRUCES, N. MEX.												
APR 1994												
26...	<0.001	<0.003	<0.035	<0.017	<0.020	<0.002	<0.004	<0.003	<0.013	<0.035	<0.003	<0.014
JAN 1995												
05...	<0.001	<0.003	<0.035	<0.017	<0.020	<0.002	<0.004	<0.003	<0.013	<0.035	<0.003	<0.014
SITE 5 USGS 321601106494110 RIO GRANDE ABOVE N. MEX. 359 BRIDGE AT MESILLA, N. MEX.												
APR 1994												
26...	<0.001	<0.003	<0.035	<0.017	<0.020	<0.002	<0.004	<0.003	<0.013	<0.035	<0.003	<0.014
JAN 1995												
06...	<0.001	<0.003	<0.035	<0.017	<0.020	<0.002	<0.004	<0.003	<0.013	<0.035	<0.003	<0.014
SITE 6 USGS 321457106492110 PICACHO DRAIN NEAR SAN PABLO, N. MEX.												
APR 1994												
26...	<0.001	<0.003	<0.035	<0.017	<0.020	<0.002	<0.004	<0.003	<0.013	<0.035	<0.003	<0.014
JAN 1995												
06...	<0.001	<0.003	<0.035	<0.017	<0.020	<0.002	<0.004	<0.003	<0.013	<0.035	<0.003	<0.014
SITE 7 USGS 321014106431410 SANTO TOMAS RIVER DRAIN AT LEVEE ROAD NEAR SAN MIGUEL, N. MEX.												
APR 1994												
27...	<0.001	<0.003	<0.035	<0.017	<0.020	<0.002	<0.004	<0.003	<0.013	<0.035	<0.003	<0.014

Appendix--Field measurements and analytical results for samples collected during the Mesilla Valley synoptic study--Continued

Date	Lindane, dissolved (mg/L) (39341)	Linuron, dissolved, rec (mg/L) (38478)	Linuron, dissolved, rec (mg/L) (82666)	Malathion, dissolved (mg/L) (39532)	MCPA, dissolved, rec (mg/L) (38482)	Methiocarb, dissolved, rec (mg/L) (38501)	Methomyl, dissolved, rec (mg/L) (49296)	Methyl azinphos, dissolved, rec (mg/L) (82686)	Methyl parathion, dissolved, rec (mg/L) (82667)	Metolachlor, dissolved (mg/L) (39415)	Metribuzin sencor, dissolved (mg/L) (82630)
SITE 1 USGS 08363500 RIO GRANDE BELOW LEASBURG DAM NEAR LAS CRUCES, N. MEX.											
APR 1994											
13...	<0.004	<0.018	<0.002	<0.005	<0.050	<0.026	<0.017	<0.001	<0.006	0.008	<0.011
18...	<0.004	<0.018	<0.002	<0.005	<0.050	<0.026	<0.017	<0.001	<0.006	<0.005	<0.011
26...	<0.004	<0.018	<0.002	<0.005	--	<0.026	<0.017	<0.001	<0.006	<0.005	<0.011
MAY											
04...	<0.004	<0.018	<0.002	<0.005	<0.050	<0.026	<0.017	<0.001	<0.006	<0.005	<0.011
10...	<0.004	<0.018	<0.002	<0.005	<0.050	<0.026	<0.017	<0.001	<0.006	<0.005	<0.011
JAN 1995											
04...	<0.004	<0.018	<0.002	<0.005	<0.050	<0.026	<0.017	<0.038	<0.006	0.008	<0.011
SITE 2 USGS 322541106525110 SELDEN DRAIN AT LEVEE ROAD NEAR LEASBURG, N. MEX.											
APR 1994											
26...	<0.004	<0.018	<0.002	<0.005	--	<0.026	<0.017	<0.001	<0.006	0.005	<0.011
JAN 1995											
04...	<0.004	<0.018	<0.002	<0.005	<0.050	<0.026	<0.017	<0.038	<0.006	E0.004	<0.011
SITE 3 USGS 322234106511710 RIO GRANDE AT SHALEM BRIDGE NEAR DOÑA ANA, N. MEX.											
APR 1994											
26...	<0.004	<0.018	<0.002	<0.005	--	<0.026	<0.017	<0.001	<0.006	<0.005	<0.011
JAN 1995											
04...	<0.004	<0.060	<0.002	<0.005	<0.060	<0.060	<0.060	<0.038	<0.006	E0.004	<0.011
SITE 4 USGS 321739106495110 LAS CRUCES WWTP AT LEVEE ROAD NEAR LAS CRUCES, N. MEX.											
APR 1994											
26...	<0.004	<0.018	<0.002	<0.005	--	<0.026	<0.017	<0.001	<0.006	<0.005	<0.011
JAN 1995											
05...	<0.004	<0.018	<0.002	<0.005	<0.050	<0.026	<0.017	<0.038	<0.006	<0.005	<0.011
SITE 5 USGS 321601106494110 RIO GRANDE ABOVE N. MEX. 359 BRIDGE AT MESILLA, N. MEX.											
APR 1994											
26...	<0.004	<0.018	<0.002	<0.005	--	<0.026	<0.017	<0.001	<0.006	<0.005	<0.011
JAN 1995											
06...	<0.004	<0.018	<0.002	<0.005	<0.050	<0.026	<0.017	<0.038	<0.006	0.010	<0.011
SITE 6 USGS 321457106492110 PICACHO DRAIN NEAR SAN PABLO, N. MEX.											
APR 1994											
26...	<0.004	<0.018	<0.002	<0.005	--	<0.026	<0.017	<0.001	<0.006	0.015	<0.011
JAN 1995											
06...	<0.004	<0.018	<0.002	<0.005	<0.050	<0.026	<0.017	<0.038	<0.006	E0.003	<0.011
SITE 7 USGS 321014106431410 SANTO TOMAS RIVER DRAIN AT LEVEE ROAD NEAR SAN MIGUEL, N. MEX.											
APR 1994											
27...	<0.004	<0.018	<0.002	<0.005	--	<0.026	<0.017	<0.001	<0.006	<0.005	<0.011

Appendix--Field measurements and analytical results for samples collected during the Mesilla Valley synoptic study--Continued

Date	Molinate, dissolved, rec (mg/L) {82671}	Napropamide, dissolved, rec (mg/L) {82684}	Neburon, dissolved, rec (mg/L) {49294}	Norflurazon, dissolved, rec (mg/L) {49293}	Oryzalin, dissolved, rec (mg/L) {49292}	Oxamyl, dissolved, rec (mg/L) {38866}	p,p' DDE, dissolved (mg/L) {34653}	Parathion, dissolved (mg/L) {39542}	Pebulate, dissolved, rec (mg/L) {82669}	Pendimethalin, dissolved, rec (mg/L) {82683}	Permethrin, cis, dissolved, rec (mg/L) {82687}
SITE 1 USGS 08363500 RIO GRANDE BELOW LEASBURG DAM NEAR LAS CRUCES, N. MEX.											
APR 1994											
13...	<0.004	<0.003	<0.015	<0.024	<0.019	<0.018	<0.006	<0.004	<0.004	<0.004	<0.005
18...	<0.004	<0.003	<0.015	<0.024	<0.019	<0.018	E0.002	<0.004	<0.004	<0.004	<0.005
26...	<0.004	<0.003	<0.015	<0.024	<0.019	<0.018	<0.006	<0.004	<0.004	<0.004	<0.005
MAY											
04...	<0.004	<0.003	<0.015	<0.024	<0.019	<0.018	<0.006	<0.004	<0.004	<0.004	<0.005
10...	<0.004	<0.003	<0.015	<0.024	<0.019	<0.018	<0.006	<0.004	<0.004	<0.004	<0.005
JAN 1995											
04...	<0.004	<0.003	<0.015	<0.024	<0.019	<0.018	<0.006	<0.004	<0.004	<0.004	<0.005
SITE 2 USGS 322541106525110 SELDEN DRAIN AT LEVEE ROAD NEAR LEASBURG, N. MEX.											
APR 1994											
26...	<0.004	<0.003	<0.015	<0.024	<0.019	<0.018	<0.006	<0.004	<0.004	<0.004	<0.005
JAN 1995											
04...	<0.004	<0.003	<0.015	<0.024	<0.019	<0.018	<0.006	<0.004	<0.004	<0.004	<0.005
SITE 3 USGS 322234106511710 RIO GRANDE AT SHALEM BRIDGE NEAR DOÑA ANA, N. MEX.											
APR 1994											
26...	<0.004	<0.003	<0.015	<0.024	<0.019	<0.018	<0.006	<0.004	<0.004	<0.004	<0.005
JAN 1995											
04...	<0.004	<0.003	<0.060	<0.060	<0.060	<0.060	<0.006	<0.004	<0.004	<0.004	<0.005
SITE 4 USGS 321739106495110 LAS CRUCES WWTP AT LEVEE ROAD NEAR LAS CRUCES, N. MEX.											
APR 1994											
26...	<0.004	<0.003	<0.015	<0.024	<0.019	<0.018	<0.006	<0.004	<0.004	<0.004	<0.005
JAN 1995											
05...	<0.004	<0.003	<0.015	<0.024	<0.019	<0.018	<0.006	<0.004	<0.004	<0.004	<0.005
SITE 5 USGS 321601106494110 RIO GRANDE ABOVE N. MEX. 359 BRIDGE AT MESILLA, N. MEX.											
APR 1994											
26...	<0.004	<0.003	<0.015	<0.024	<0.019	<0.018	<0.006	<0.004	<0.004	<0.004	<0.005
JAN 1995											
06...	<0.004	<0.003	<0.015	<0.024	<0.019	<0.018	<0.006	<0.004	<0.004	<0.004	<0.005
SITE 6 USGS 321457106492110 PICACHO DRAIN NEAR SAN PABLO, N. MEX.											
APR 1994											
26...	<0.004	<0.003	<0.015	<0.024	<0.019	<0.018	<0.006	<0.004	<0.004	<0.004	<0.005
JAN 1995											
06...	<0.004	<0.003	<0.015	<0.024	<0.019	<0.018	E0.002	<0.004	<0.004	<0.004	<0.005
SITE 7 USGS 321014106431410 SANTO TOMAS RIVER DRAIN AT LEVEE ROAD NEAR SAN MIGUEL, N. MEX.											
APR 1994											
27...	<0.004	<0.003	<0.015	<0.024	<0.019	<0.018	<0.006	<0.004	<0.004	<0.004	<0.005

Appendix--Field measurements and analytical results for samples collected during the Mesilla Valley synoptic study--Continued

Date	Phorate, dissolved, rec (mg/L) (82664)	Picloram, dissolved, rec (mg/L) (49291)	Prometon, dissolved, rec (mg/L) (04037)	Pronamide, dissolved, rec (mg/L) (82676)	Propachlor, dissolved, rec (mg/L) (04024)	Propanil, dissolved, rec (mg/L) (82679)	Propargite, dissolved, rec (mg/L) (82685)	Propham, dissolved, rec (mg/L) (49236)	Propoxur, dissolved, rec (mg/L) (38538)	Silvex, dissolved (mg/L) (39762)	Simazine, dissolved, rec (mg/L) (04035)
SITE 1 USGS 08363500 RIO GRANDE BELOW LEASBURG DAM NEAR LAS CRUCES, N. MEX.											
APR 1994											
13...	<0.002	<0.050	<0.018	<0.003	<0.007	<0.004	<0.013	<0.035	<0.035	<0.021	<0.005
18...	<0.002	<0.050	E0.009	<0.003	<0.007	<0.004	<0.013	<0.035	<0.035	<0.021	0.007
26...	<0.002	--	E0.008	<0.003	<0.007	<0.004	<0.013	<0.035	<0.035	<0.021	<0.005
MAY											
04...	<0.002	<0.050	E0.009	<0.003	<0.007	<0.004	<0.013	<0.035	<0.035	<0.021	<0.005
10...	<0.002	<0.050	<0.018	<0.003	<0.007	<0.004	<0.013	<0.035	<0.035	<0.021	<0.005
JAN 1995											
04...	<0.002	<0.050	<0.018	<0.003	<0.007	<0.004	<0.013	<0.035	<0.035	<0.021	<0.005
SITE 2 USGS 322541106525110 SELDEN DRAIN AT LEVEE ROAD NEAR LEASBURG, N. MEX.											
APR 1994											
26...	<0.002	--	<0.018	<0.003	<0.007	<0.004	<0.013	<0.035	<0.035	<0.021	<0.005
JAN 1995											
04...	<0.002	<0.050	<0.018	<0.003	<0.007	<0.004	<0.013	<0.035	<0.035	<0.021	<0.005
SITE 3 USGS 322234106511710 RIO GRANDE AT SHALEM BRIDGE NEAR DOÑA ANA, N. MEX.											
APR 1994											
26...	<0.002	--	E0.007	<0.003	<0.007	<0.004	<0.013	<0.035	<0.035	<0.021	<0.005
JAN 1995											
04...	<0.002	<0.060	<0.018	<0.003	<0.007	<0.004	<0.013	<0.060	<0.060	<0.060	<0.005
SITE 4 USGS 321739106495110 LAS CRUCES WWTP AT LEVEE ROAD NEAR LAS CRUCES, N. MEX.											
APR 1994											
26...	<0.002	--	<0.018	<0.003	<0.007	<0.004	<0.013	<0.035	<0.035	<0.021	<0.005
JAN 1995											
05...	<0.002	<0.050	<0.018	<0.003	<0.007	<0.004	<0.013	<0.035	<0.035	<0.021	<0.005
SITE 5 USGS 321601106494110 RIO GRANDE ABOVE N. MEX. 359 BRIDGE AT MESILLA, N. MEX.											
APR 1994											
26...	<0.002	--	E0.009	<0.003	<0.007	<0.004	<0.013	<0.035	<0.035	<0.021	<0.005
JAN 1995											
06...	<0.002	<0.050	<0.018	<0.003	<0.007	<0.004	<0.013	<0.035	<0.035	<0.021	<0.005
SITE 6 USGS 321457106492110 PICACHO DRAIN NEAR SAN PABLO, N. MEX.											
APR 1994											
26...	<0.002	--	<0.018	<0.003	<0.007	<0.004	<0.013	<0.035	<0.035	<0.021	<0.005
JAN 1995											
06...	<0.002	<0.050	<0.018	<0.003	<0.007	<0.004	<0.013	<0.035	<0.035	<0.021	<0.005
SITE 7 USGS 321014106431410 SANTO TOMAS RIVER DRAIN AT LEVEE ROAD NEAR SAN MIGUEL, N. MEX.											
APR 1994											
27...	<0.002	--	<0.018	<0.003	<0.007	<0.004	<0.013	<0.035	<0.035	<0.021	<0.005

Appendix--Field measurements and analytical results for samples collected during the Mesilla Valley synoptic study--Continued

Date	2,4,5-T, dissolved (mg/L) {39742}	Tebuthiuron, dissolved, rec (mg/L) {82670}	Terbacil, dissolved, rec (mg/L) {82665}	Terbufos, dissolved, rec (mg/L) {82675}	Thiobencarb, dissolved, rec (mg/L) {82681}	Trialate, dissolved, rec (mg/L) {82678}	Triclopyr, dissolved, rec (mg/L) {49235}	Trifluralin, dissolved, rec (mg/L) {82661}	Aldrin, total in bottom material (µg/kg) {39333}	Chlordane, total in bottom material (µg/kg) {39351}	DDD, total in bottom material (µg/kg) {39363}
SITE 1 USGS 08363500 RIO GRANDE BELOW LEASBURG DAM NEAR LAS CRUCES, N. MEX.											
APR 1994											
13...	<0.035	<0.010	<0.007	<0.013	<0.002	<0.001	<0.050	<0.002	--	--	--
18...	<0.035	<0.010	<0.007	<0.013	<0.002	<0.001	<0.050	<0.002	--	--	--
26...	<0.035	<0.010	<0.007	<0.013	<0.002	<0.001	<0.050	<0.002	--	--	--
MAY											
04...	<0.035	<0.010	<0.007	<0.013	<0.002	<0.001	--	<0.002	--	--	--
10...	<0.035	<0.010	<0.007	<0.013	<0.002	<0.001	--	<0.002	--	--	--
JAN 1995											
04...	<0.035	<0.010	<0.007	<0.013	<0.002	<0.001	<0.050	<0.002	--	--	--
SITE 2 USGS 322541106525110 SELDEN DRAIN AT LEVEE ROAD NEAR LEASBURG, N. MEX.											
APR 1994											
26...	<0.035	<0.010	<0.007	<0.013	<0.002	<0.001	<0.050	<0.002	--	--	--
JAN 1995											
04...	<0.035	<0.010	<0.007	<0.013	<0.002	<0.001	<0.050	<0.002	<0.1	<1.0	1.5
SITE 3 USGS 322234106511710 RIO GRANDE AT SHALEM BRIDGE NEAR DOÑA ANA, N. MEX.											
APR 1994											
26...	<0.035	<0.010	<0.007	<0.013	<0.002	<0.001	<0.050	<0.002	--	--	--
JAN 1995											
04...	<0.060	<0.010	<0.007	<0.013	<0.002	<0.001	<0.060	<0.002	--	--	--
SITE 4 USGS 321739106495110 LAS CRUCES WWTP AT LEVEE ROAD NEAR LAS CRUCES, N. MEX.											
APR 1994											
26...	<0.035	<0.010	<0.007	<0.013	<0.002	<0.001	<0.050	<0.002	--	--	--
JAN 1995											
05...	<0.035	<0.010	<0.007	<0.013	<0.002	<0.001	<0.050	<0.002	--	--	--
SITE 5 USGS 321601106494110 RIO GRANDE ABOVE N. MEX. 359 BRIDGE AT MESILLA, N. MEX.											
APR 1994											
26...	<0.035	<0.010	<0.007	<0.013	<0.002	<0.001	<0.050	<0.002	--	--	--
JAN 1995											
06...	<0.035	<0.010	<0.007	<0.013	<0.002	<0.001	<0.050	<0.002	--	--	--
SITE 6 USGS 321457106492110 PICACHO DRAIN NEAR SAN PABLO, N. MEX.											
APR 1994											
26...	<0.035	<0.010	<0.007	<0.013	<0.002	<0.001	<0.050	<0.002	--	--	--
JAN 1995											
06...	<0.035	<0.010	<0.007	<0.013	<0.002	<0.001	<0.050	<0.002	<0.1	<1.0	1.5
SITE 7 USGS 321014106431410 SANTO TOMAS RIVER DRAIN AT LEVEE ROAD NEAR SAN MIGUEL, N. MEX.											
APR 1994											
27...	<0.035	<0.010	<0.007	<0.013	<0.002	<0.001	<0.050	<0.002	--	--	--

Appendix--Field measurements and analytical results for samples collected during the Mesilla Valley synoptic study--Continued

Date	DDE, total in bottom material (µg/kg) {39368}	DDT, total in bottom material (µg/kg) {39373}	Diazinon, total in bottom material (µg/kg) {39571}	Dieldrin, total in bottom material (µg/kg) {39383}	Endosulfan, total in bottom material (µg/kg) {39389}	Endrin, total in bottom material (µg/kg) {39393}	Trithion, total in bottom material (µg/kg) {39787}	Ethion, total in bottom material (µg/kg) {39399}	Heptachlor, total in bottom material (µg/kg) {39413}	Heptachlor epoxide, total in bottom material (µg/kg) {39423}	Lindane, total in bottom material (µg/kg) {39343}
SITE 1 USGS 08363500 RIO GRANDE BELOW LEASBURG DAM NEAR LAS CRUCES, N. MEX.											
APR 1994											
13...	--	--	--	--	--	--	--	--	--	--	--
18...	--	--	--	--	--	--	--	--	--	--	--
26...	--	--	--	--	--	--	--	--	--	--	--
MAY											
04...	--	--	--	--	--	--	--	--	--	--	--
10...	--	--	--	--	--	--	--	--	--	--	--
JAN 1995											
04...	--	--	--	--	--	--	--	--	--	--	--
SITE 2 USGS 322541106525110 SELDEN DRAIN AT LEVEE ROAD NEAR LEASBURG, N. MEX.											
APR 1994											
26...	--	--	--	--	--	--	--	--	--	--	--
JAN 1995											
04...	1.2	6.1	<0.2	<0.1	<0.1	<0.1	<0.2	<0.2	<0.1	<0.1	<0.1
SITE 3 USGS 322234106511710 RIO GRANDE AT SHALEM BRIDGE NEAR DOÑA ANA, N. MEX.											
APR 1994											
26...	--	--	--	--	--	--	--	--	--	--	--
JAN 1995											
04...	--	--	--	--	--	--	--	--	--	--	--
SITE 4 USGS 321739106495110 LAS CRUCES WWTP AT LEVEE ROAD NEAR LAS CRUCES, N. MEX.											
APR 1994											
26...	--	--	--	--	--	--	--	--	--	--	--
JAN 1995											
05...	--	--	--	--	--	--	--	--	--	--	--
SITE 5 USGS 321601106494110 RIO GRANDE ABOVE N. MEX. 359 BRIDGE AT MESILLA, N. MEX.											
APR 1994											
26...	--	--	--	--	--	--	--	--	--	--	--
JAN 1995											
06...	--	--	--	--	--	--	--	--	--	--	--
SITE 6 USGS 321457106492110 PICACHO DRAIN NEAR SAN PABLO, N. MEX.											
APR 1994											
26...	--	--	--	--	--	--	--	--	--	--	--
JAN 1995											
06...	5.9	1.4	<0.2	<0.4	<0.1	<0.1	<0.2	<0.2	<0.1	<0.1	<0.1
SITE 7 USGS 321014106431410 SANTO TOMAS RIVER DRAIN AT LEVEE ROAD NEAR SAN MIGUEL, N. MEX.											
APR 1994											
27...	--	--	--	--	--	--	--	--	--	--	--

Appendix--Field measurements and analytical results for samples collected during the Mesilla Valley synoptic study--Continued

Date	Malathion, total in bottom material (µg/kg) {39531}	Methoxychlor, total in bottom material (µg/kg) {39481}	Methyl parathion, total in bottom material (µg/kg) {39601}	Mirex, total in bottom material (µg/kg) {39758}	Parathion, total in bottom material (µg/kg) {39541}	Perthane, in bottom material (µg/kg) {81886}	PCB, total in bottom material (µg/kg) {39519}	PCN, total in bottom material (µg/kg) {39251}	Toxaphene, total in bottom material (µg/kg) {39403}	Sediment, suspended (µg/L) {80154}	Sediment discharge, suspended (t/day) {80155}
SITE 1 USGS 08363500 RIO GRANDE BELOW LEASBURG DAM NEAR LAS CRUCES, N. MEX.											
APR 1994											
13...	--	--	--	--	--	--	--	--	--	134	E349
18...	--	--	--	--	--	--	--	--	--	148	E411
26...	--	--	--	--	--	--	--	--	--	111	E284
MAY											
04...	--	--	--	--	--	--	--	--	--	143	E334
10...	--	--	--	--	--	--	--	--	--	68	E159
JAN 1995											
04...	--	--	--	--	--	--	--	--	--	107	37
SITE 2 USGS 322541106525110 SELDEN DRAIN AT LEVEE ROAD NEAR LEASBURG, N. MEX.											
APR 1994											
26...	--	--	--	--	--	--	--	--	--	75	0.66
JAN 1995											
04...	<0.2	<0.1	<0.2	<0.1	<0.2	<1.00	<1	<1.0	<10	--	--
SITE 3 USGS 322234106511710 RIO GRANDE AT SHALEM BRIDGE NEAR DOÑA ANA, N. MEX.											
APR 1994											
26...	--	--	--	--	--	--	--	--	--	99	262
JAN 1995											
04...	--	--	--	--	--	--	--	--	--	93	16
SITE 4 USGS 321739106495110 LAS CRUCES WWTP AT LEVEE ROAD NEAR LAS CRUCES, N. MEX.											
APR 1994											
26...	--	--	--	--	--	--	--	--	--	24	0.70
JAN 1995											
05...	--	--	--	--	--	--	--	--	--	--	--
SITE 5 USGS 321601106494110 RIO GRANDE ABOVE N. MEX. 359 BRIDGE AT MESILLA, N. MEX.											
APR 1994											
26...	--	--	--	--	--	--	--	--	--	107	298
JAN 1995											
06...	--	--	--	--	--	--	--	--	--	132	26
SITE 6 USGS 321457106492110 PICACHO DRAIN NEAR SAN PABLO, N. MEX.											
APR 1994											
26...	--	--	--	--	--	--	--	--	--	106	2.3
JAN 1995											
06...	<0.2	<0.4	<0.2	<0.1	<0.2	<1.00	<1	<1.0	<10	--	--
SITE 7 USGS 321014106431410 SANTO TOMAS RIVER DRAIN AT LEVEE ROAD NEAR SAN MIGUEL, N. MEX.											
APR 1994											
27...	--	--	--	--	--	--	--	--	--	28	<0.01

Appendix--Field measurements and analytical results for samples collected during the Mesilla Valley synoptic study--Continued

Date	Time	Discharge, inst. (cubic feet per second) (00061)	Specific conductance (µS/cm) (00095)	pH water whole field (standard units) (00400)	Temperature air (deg C) (00020)	Temperature water (deg C) (00010)	Barometric pressure (mm of Hg) (00025)	Oxygen, dissolved (mg/L) (00300)	Oxygen, dissolved (percent saturation) (00301)	Hardness, total (mg/L as $CaCO_3$) (00900)	Hardness, noncarb (mg/L as $CaCO_3$) (00904)	Alkalinity, diss, total IT field (mg/L as $CaCO_3$) (39086)
SITE 8 USGS 320943106425810 RIO GRANDE AT RT. 192 BRIDGE NEAR SAN MIGUEL, N. MEX.												
APR 1994												
27...	0645	484	814	8.4	15.0	13.5	661	8.6	96	200	47	150
JAN 1995												
05...	0800	65	1,510	8.4	3.5	3.0	660	11.1	96	340	130	210
SITE 9 USGS 321210106443210 DEL RIO DRAIN AT PIANO ROAD NEAR SANTO TOMAS, N. MEX.												
APR 1994												
25...	1140	48	1,180	8.1	18.5	15.5	661	9.1	106	320	130	192
JAN 1995												
05...	1215	21	1,190	8.1	5.5	12.0	660	8.0	86	320	120	200
SITE 10 USGS 320610106393110 DEL RIO DRAIN AT LEVEE ROAD NEAR VADO, N. MEX.												
APR 1994												
27...	1215	59	1,300	8.2	23.0	17.5	658	8.1	98	350	140	208
JAN 1995												
04...	1515	30	1,320	8.0	--	8.0	664	9.4	92	330	95	233
SITE 11 USGS 320936106431710 LA MESA DRAIN AT RT. 192 NEAR SAN MIGUEL, N. MEX.												
APR 1994												
25...	1130	19	1,340	8.0	17.5	15.5	660	8.6	100	360	140	221
JAN 1995												
05...	1000	1.6	1,910	8.1	7.5	9.0	663	6.9	69	550	270	280
SITE 12 USGS 320214106392510 LA MESA DRAIN AT LEVEE ROAD NEAR CHAMBERINO, N. MEX.												
APR 1994												
27...	1730	37	1,570	8.3	21.5	19.5	659	8.8	100	420	180	244
JAN 1995												
05...	0830	14	1,840	8.2	5.0	8.5	659	9.2	91	520	230	286
SITE 13 USGS 320122106385510 RIO GRANDE AT RT. 404 BRIDGE NEAR CHAMBERINO, N. MEX.												
APR 1994												
27...	1830	616	922	7.8	--	18.0	659	7.8	96	230	77	158
JAN 1995												
05...	1130	111	1,590	8.5	10.0	8.5	665	11.0	108	370	130	236
SITE 14 USGS 315807106361910 EAST SIDE DRAIN AT LEVEE ROAD NEAR ANTHONY, TEX.												
APR 1994												
27...	2230	28	2,100	8.4	10.5	15.5	666	7.0	81	320	31	293
JAN 1995												
06...	0910	9.7	2,690	8.3	10.0	7.0	669	9.6	91	340	0	359

Appendix--Field measurements and analytical results for samples collected during the Mesilla Valley synoptic study--Continued

Date	Solids, sum of constituents, dissolved (mg/L) {70301}	Solids, residue at 180 deg. C, dissolved (mg/L) {70300}	Calcium, dissolved (mg/L as Ca) {00915}	Magnesium, dissolved (mg/L as Mg) {00925}	Sodium, dissolved (mg/L as Na) {00930}	Sodium percent {00932}	Sodium adsorption ratio {00931}	Potassium, dissolved (mg/L as K) {00935}	Bicarbonate, diss IT field (mg/L as HCO_3) {00453}	Carbonate, diss IT field (mg/L as CO_3) {00452}	Sulfate, dissolved (mg/L as SO_4) {00945}	Chloride, dissolved (mg/L as Cl) {00940}
SITE 8 USGS 320943106425810 RIO GRANDE AT RT. 192 BRIDGE NEAR SAN MIGUEL, N. MEX.												
APR 1994 27...	466	499	57	13	86	48	3	6.5	181	0	140	70
JAN 1995 05...	944	991	100	22	170	51	4	12	236	10	310	180
SITE 9 USGS 321210106443210 DEL RIO DRAIN AT PIANO ROAD NEAR SANTO TOMAS, N. MEX.												
APR 1994 25...	730	776	100	18	120	44	3	6.9	234	0	250	100
JAN 1995 05...	740	806	100	18	120	44	3	7.1	244	0	250	100
SITE 10 USGS 320610106393110 DEL RIO DRAIN AT LEVEE ROAD NEAR VADO, N. MEX.												
APR 1994 27...	812	814	110	19	140	46	3	7.8	254	0	280	110
JAN 1995 04...	845	880	100	19	140	47	3	8.1	284	0	290	120
SITE 11 USGS 320936106431710 LA MESA DRAIN AT RT. 192 NEAR SAN MIGUEL, N. MEX.												
APR 1994 25...	830	860	110	21	140	45	3	7.7	270	0	290	110
JAN 1995 05...	1,250	1,340	170	30	190	42	4	11	342	0	480	170
SITE 12 USGS 320214106392510 LA MESA DRAIN AT LEVEE ROAD NEAR CHAMBERINO, N. MEX.												
APR 1994 27...	1,000	1,050	130	24	170	46	4	7.9	297	0	360	140
JAN 1995 05...	1,230	1,320	160	29	200	45	4	8.6	349	0	450	180
SITE 13 USGS 320122106385510 RIO GRANDE AT RT. 404 BRIDGE NEAR CHAMBERINO, N. MEX.												
APR 1994 27...	541	589	69	15	100	47	3	7.0	192	0	170	78
JAN 1995 05...	970	1,040	110	23	170	49	4	10	264	12	330	160
SITE 14 USGS 315807106361910 EAST SIDE DRAIN AT LEVEE ROAD NEAR ANTHONY, TEX.												
APR 1994 27...	1,300	1,320	87	26	330	67	8	25	351	3	400	240
JAN 1995 06...	1,670	1,760	93	27	420	70	10	33	441	0	490	350

Appendix--Field measurements and analytical results for samples collected during the Mesilla Valley synoptic study--Continued

Date	Fluoride, dissolved (mg/L as F) (00950)	Silica, dissolved (mg/L as SiO2) (00955)	Nitrogen, nitrite, dissolved (mg/L as N) (00613)	Nitrogen, NO_2+NO_3, dissolved (mg/L as N) (00631)	Nitrogen, ammonia, dissolved (mg/L as N) (00608)	Nitrogen, ammonia + organic, diss. (mg/L as N) (00623)	Nitrogen, ammonia + organic, total (mg/L as N) (00625)	Phosphorus, total (mg/L as P) (00665)	Phosphorus, dissolved (mg/L as P) (00666)	Phosphorus, ortho, dissolved (mg/L as P) (00671)	Aluminum, dissolved (mg/L as Al) (01106)	Antimony, dissolved (mg/L as Sb) (01095)
SITE 8 USGS 320943106425810 RIO GRANDE AT RT. 192 BRIDGE NEAR SAN MIGUEL, N. MEX.												
APR 1994												
27...	0.60	2.3	0.02	0.26	0.02	0.20	0.40	0.11	0.03	0.02	--	--
JAN 1995												
05...	0.70	17	0.12	0.89	1.50	2.0	2.1	0.06	0.02	<0.01	2	<1
SITE 9 USGS 321210106443210 DEL RIO DRAIN AT PIANO ROAD NEAR SANTO TOMAS, N. MEX.												
APR 1994												
25...	0.60	17	0.02	0.42	0.02	<0.20	0.30	0.07	0.04	0.04	--	--
JAN 1995												
05...	0.60	22	0.03	0.34	0.17	0.40	0.50	0.12	0.08	0.07	2	<1
SITE 10 USGS 320610106393110 DEL RIO DRAIN AT LEVEE ROAD NEAR VADO, N. MEX.												
APR 1994												
27...	0.70	17	0.02	0.64	0.03	<0.20	0.30	0.09	0.02	0.02	--	--
JAN 1995												
04...	0.70	24	0.03	0.69	0.11	0.30	0.20	0.07	0.05	0.06	2	<1
SITE 11 USGS 320936106431710 LA MESA DRAIN AT RT. 192 NEAR SAN MIGUEL, N. MEX.												
APR 1994												
25...	0.60	16	0.02	0.21	0.10	0.30	0.50	0.08	0.03	0.04	--	--
JAN 1995												
05...	0.50	25	0.02	0.60	0.20	0.50	0.50	0.06	0.03	0.03	7	<2
SITE 12 USGS 320214106392510 LA MESA DRAIN AT LEVEE ROAD NEAR CHAMBERINO, N. MEX.												
APR 1994												
27...	0.60	20	0.02	0.41	0.04	0.20	0.40	0.05	0.02	0.02	--	--
JAN 1995												
05...	0.60	26	0.03	0.60	0.12	0.40	0.40	0.05	0.05	0.02	3	<1
SITE 13 USGS 320122106385510 RIO GRANDE AT RT. 404 BRIDGE NEAR CHAMBERINO, N. MEX.												
APR 1994												
27...	0.70	5.1	0.01	0.27	0.02	<0.20	0.30	0.10	0.02	0.02	--	--
JAN 1995												
05...	0.60	20	0.10	0.87	0.56	0.80	1.1	0.06	0.01	0.01	3	<1
SITE 14 USGS 315807106361910 EAST SIDE DRAIN AT LEVEE ROAD NEAR ANTHONY, TEX.												
APR 1994												
27...	1.0	15	0.08	0.64	0.14	0.50	1.0	0.34	0.16	0.12	--	--
JAN 1995												
06...	1.3	30	0.11	2.30	0.68	1.1	1.8	0.49	0.28	0.29	10	<2

Appendix--Field measurements and analytical results for samples collected during the Mesilla Valley synoptic study--Continued

Date	Arsenic, dissolved (mg/L as As) {01000}	Barium, dissolved (mg/L as Ba) {01005}	Beryllium, dissolved (mg/L as Be) {01010}	Boron, dissolved (mg/L as B) {01020}	Cadmium, dissolved (mg/L as Cd) {01025}	Chromium, dissolved (mg/L as Cr) {01030}	Cobalt, dissolved (mg/L as Co) {01035}	Copper, dissolved (mg/L as Cu) {01040}	Iron, dissolved (mg/L as Fe) {01046}	Lead, dissolved (mg/L as Pb) {01049}	Manganese, dissolved (mg/L as Mn) {01056}	Molybdenum, dissolved (mg/L as Mo) {01060}
SITE 8 USGS 320943106425810 RIO GRANDE AT RT. 192 BRIDGE NEAR SAN MIGUEL, N. MEX.												
APR 1994 27...	--	--	--	--	--	--	--	--	<3	--	2	--
JAN 1995 05...	1	110	<1	270	<1.0	2	<1	3	5	<1	2	10
SITE 9 USGS 321210106443210 DEL RIO DRAIN AT PIANO ROAD NEAR SANTO TOMAS, N. MEX.												
APR 1994 25...	--	--	--	--	--	--	--	--	5	--	47	--
JAN 1995 05...	1	90	<1	190	<1.0	3	<1	1	<3	<1	380	8
SITE 10 USGS 320610106393110 DEL RIO DRAIN AT LEVEE ROAD NEAR VADO, N. MEX.												
APR 1994 27...	--	--	--	--	--	--	--	--	<3	--	10	--
JAN 1995 04...	2	78	<1	210	<1.0	2	<1	2	<3	<1	34	10
SITE 11 USGS 320936106431710 LA MESA DRAIN AT RT. 192 NEAR SAN MIGUEL, N. MEX.												
APR 1994 25...	--	--	--	--	--	--	--	--	13	--	450	--
JAN 1995 05...	<1	71	<2	230	<2.0	<2	<2	3	11	<2	1,200	8
SITE 12 USGS 320214106392510 LA MESA DRAIN AT LEVEE ROAD NEAR CHAMBERINO, N. MEX.												
APR 1994 27...	--	--	--	--	--	--	--	--	3	--	260	--
JAN 1995 05...	1	56	<1	260	<1.0	2	<1	2	<3	<1	310	8
SITE 13 USGS 320122106385510 RIO GRANDE AT RT. 404 BRIDGE NEAR CHAMBERINO, N. MEX.												
APR 1994 27...	--	--	--	--	--	--	--	--	<3	--	12	--
JAN 1995 05...	2	98	<1	240	<1.0	<1	<1	2	<3	<1	45	8
SITE 14 USGS 315807106361910 EAST SIDE DRAIN AT LEVEE ROAD NEAR ANTHONY, TEX.												
APR 1994 27...	--	--	--	--	--	--	--	--	49	--	21	--
JAN 1995 06...	3	55	<2	510	<2.0	2	<2	9	<9	<2	140	22

Appendix--Field measurements and analytical results for samples collected during the Mesilla Valley synoptic study--Continued

Date	Nickel, dissolved (mg/L as Ni) (01065)	Selenium, dissolved (mg/L as Se) (01145)	Silver, dissolved (mg/L as Ag) (01075)	Zinc, dissolved (mg/L as Zn) (01090)	Uranium, natural, dissolved (mg/L as U) (22703)	Carbon, organic, total (mg/L as C) (00680)	Carbon, organic, suspended, total (mg/L as C) (00689)	Carbon, organic, dissolved (mg/L as C) (00681)	Acetochlor, dissolved, rec (mg/L) (49260)	Acifluorfen, dissolved, rec (mg/L) (49315)	Alachlor, dissolved, rec (mg/L) (46342)	Aldicarb, dissolved, rec (mg/L) (49312)
SITE 8 USGS 320943106425810 RIO GRANDE AT RT. 192 BRIDGE NEAR SAN MIGUEL, N. MEX.												
APR 1994												
27...	--	--	--	--	--	--	1.0	3.8	--	<0.035	<0.002	<0.016
JAN 1995												
05...	6	<1	<1.0	3	5.0	5.8	--	4.1	<0.009	<0.035	<0.002	<0.016
SITE 9 USGS 321210106443210 DEL RIO DRAIN AT PIANO ROAD NEAR SANTO TOMAS, N. MEX.												
APR 1994												
25...	--	--	--	--	--	--	0.1	3.3	--	<0.035	<0.002	<0.016
JAN 1995												
05...	7	<1	<1.0	3	2.0	3.4	--	3.1	<0.009	<0.035	<0.002	<0.016
SITE 10 USGS 320610106393110 DEL RIO DRAIN AT LEVEE ROAD NEAR VADO, N. MEX.												
APR 1994												
27...	--	--	--	--	--	--	0.7	--	--	<0.035	<0.002	<0.016
JAN 1995												
04...	6	<1	<1.0	1	3.0	14	--	3.0	<0.009	<0.035	<0.002	<0.016
SITE 11 USGS 320936106431710 LA MESA DRAIN AT RT. 192 NEAR SAN MIGUEL, N. MEX.												
APR 1994												
25...	--	--	--	--	--	--	0.3	4.3	--	<0.035	<0.002	<0.016
JAN 1995												
05...	11	<1	<2.0	7	4.0	4.8	--	4.1	<0.009	<0.035	<0.002	<0.016
SITE 12 USGS 320214106392510 LA MESA DRAIN AT LEVEE ROAD NEAR CHAMBERINO, N. MEX.												
APR 1994												
27...	--	--	--	--	--	--	0.3	3.7	--	<0.035	<0.002	<0.016
JAN 1995												
05...	7	<1	<1.0	2	3.0	4.6	--	2.8	<0.009	<0.035	<0.002	<0.016
SITE 13 USGS 320122106385510 RIO GRANDE AT RT. 404 BRIDGE NEAR CHAMBERINO, N. MEX.												
APR 1994												
27...	--	--	--	--	--	--	0.9	--	--	<0.035	<0.002	<0.016
JAN 1995												
05...	6	<1	<1.0	3	4.0	11	--	3.3	<0.009	<0.035	<0.002	<0.016
SITE 14 USGS 315807106361910 EAST SIDE DRAIN AT LEVEE ROAD NEAR ANTHONY, TEX.												
APR 1994												
27...	--	--	--	--	--	--	0.1	5.1	--	<0.035	<0.002	<0.016
JAN 1995												
06...	5	<1	<2.0	6	17	8.0	--	5.8	<0.009	<0.035	<0.002	<0.016

Appendix--Field measurements and analytical results for samples collected during the Mesilla Valley synoptic study--Continued

Date	Aldicarb sulfone, dissolved, rec (mg/L) {49313}	Aldicarb-sulfoxide, dissolved, rec (mg/L) {49314}	Alpha BHC, dissolved (mg/L) {34253}	Atrazine, dissolved, rec (mg/L) {39632}	Benfluralin, dissolved, rec (mg/L) {82673}	Bentazon, dissolved, rec (mg/L) {38711}	Bromacil, dissolved, rec (mg/L) {04029}	Bromoxynil, dissolved, rec (mg/L) {49311}	Butylate, dissolved, rec (mg/L) {04028}	Carbaryl, dissolved, rec (mg/L) {49310}	Carbaryl, dissolved, rec (mg/L) {82680}	Carbofuran, dissolved, rec (mg/L) {49309}
SITE 8 USGS 320943106425810 RIO GRANDE AT RT. 192 BRIDGE NEAR SAN MIGUEL, N. MEX.												
APR 1994												
27...	<0.016	<0.021	<0.002	<0.004	<0.002	<0.014	<0.035	<0.035	<0.002	<0.008	<0.003	<0.028
JAN 1995												
05...	<0.016	<0.021	<0.002	<0.004	<0.002	<0.014	<0.035	<0.035	<0.002	<0.008	<0.003	<0.028
SITE 9 USGS 321210106443210 DEL RIO DRAIN AT PIANO ROAD NEAR SANTO TOMAS, N. MEX.												
APR 1994												
25...	<0.016	<0.021	<0.002	<0.004	<0.002	--	<0.035	--	<0.002	<0.008	<0.003	<0.028
JAN 1995												
05...	<0.016	<0.021	<0.002	<0.004	<0.002	<0.014	<0.035	<0.035	<0.002	<0.008	<0.003	<0.028
SITE 10 USGS 320610106393110 DEL RIO DRAIN AT LEVEE ROAD NEAR VADO, N. MEX.												
APR 1994												
27...	<0.016	<0.021	<0.002	<0.004	<0.002	<0.014	<0.035	<0.035	<0.002	<0.008	<0.003	<0.028
JAN 1995												
04...	<0.016	<0.021	<0.002	<0.004	<0.002	<0.014	<0.035	<0.035	<0.002	<0.008	<0.003	<0.028
SITE 11 USGS 320936106431710 LA MESA DRAIN AT RT. 192 NEAR SAN MIGUEL, N. MEX.												
APR 1994												
25...	<0.016	<0.021	<0.002	<0.004	<0.002	<0.014	<0.035	<0.035	<0.002	<0.008	<0.003	<0.028
JAN 1995												
05...	<0.016	<0.021	<0.002	<0.004	<0.002	<0.014	<0.035	<0.035	<0.002	<0.008	<0.003	<0.028
SITE 12 USGS 320214106392510 LA MESA DRAIN AT LEVEE ROAD NEAR CHAMBERINO, N. MEX.												
APR 1994												
27...	<0.016	<0.021	<0.002	<0.004	<0.002	<0.014	<0.035	<0.035	<0.002	<0.008	<0.003	<0.028
JAN 1995												
05...	<0.016	<0.021	<0.002	<0.004	<0.002	<0.014	<0.035	<0.035	<0.002	<0.008	<0.003	<0.028
SITE 13 USGS 320122106385510 RIO GRANDE AT RT. 404 BRIDGE NEAR CHAMBERINO, N. MEX.												
APR 1994												
27...	<0.016	<0.021	<0.002	<0.004	<0.002	<0.014	<0.035	<0.035	<0.002	<0.008	<0.003	<0.028
JAN 1995												
05...	<0.016	<0.021	<0.002	<0.004	<0.002	<0.014	<0.035	<0.035	<0.002	<0.008	<0.003	<0.028
SITE 14 USGS 315807106361910 EAST SIDE DRAIN AT LEVEE ROAD NEAR ANTHONY, TEX.												
APR 1994												
27...	<0.016	<0.021	<0.002	0.004	<0.002	<0.014	<0.035	<0.035	<0.002	<0.008	<0.003	0.28
JAN 1995												
06...	<0.016	<0.021	<0.002	0.004	<0.002	0.040	<0.035	<0.035	<0.002	<0.008	<0.003	<0.028

Appendix--Field measurements and analytical results for samples collected during the Mesilla Valley synoptic study--Continued

Date	Carbofuran, dissolved, rec (mg/L) {82674}	Chloramben, dissolved, rec (mg/L) {49307}	Chlorpyrifos, dissolved (mg/L) {38933}	Clopyralid, dissolved, rec (mg/L) {49305}	Cyanazine, dissolved, rec (mg/L) {04041}	2,4-D, dissolved (mg/L) {39732}	Dacthal monoacid, dissolved, rec (mg/L) {49304}	DCPA, dissolved, rec (mg/L) {82682}	Deethyl atrazine, dissolved, rec (mg/L) {04040}	Diazinon, dissolved (mg/L) {39572}	Dicamba, dissolved, rec (mg/L) {38442}	Dichlorprop, dissolved, rec (mg/L) {49302}
SITE 8 USGS 320943106425810 RIO GRANDE AT RT. 192 BRIDGE NEAR SAN MIGUEL, N. MEX.												
APR 1994												
27...	<0.003	<0.011	<0.004	<0.050	<0.004	<0.035	<0.017	<0.002	<0.002	<0.002	<0.035	<0.032
JAN 1995												
05...	<0.003	<0.011	<0.005	<0.050	<0.004	<0.035	<0.017	0.003	<0.003	<0.002	<0.035	<0.032
SITE 9 USGS 321210106443210 DEL RIO DRAIN AT PIANO ROAD NEAR SANTO TOMAS, N. MEX.												
APR 1994												
25...	<0.003	<0.011	<0.004	--	<0.004	--	--	0.004	<0.002	<0.002	--	<0.032
JAN 1995												
05...	<0.003	<0.011	<0.005	<0.050	<0.004	<0.035	<0.017	0.002	<0.003	<0.002	<0.035	<0.032
SITE 10 USGS 320610106393110 DEL RIO DRAIN AT LEVEE ROAD NEAR VADO, N. MEX.												
APR 1994												
27...	<0.003	<0.011	<0.004	<0.050	<0.004	<0.035	<0.017	<0.002	<0.002	<0.002	<0.035	<0.032
JAN 1995												
04...	<0.003	<0.011	<0.005	<0.050	<0.004	<0.035	<0.017	<0.002	<0.003	<0.002	<0.035	<0.032
SITE 11 USGS 320936106431710 LA MESA DRAIN AT RT. 192 NEAR SAN MIGUEL, N. MEX.												
APR 1994												
25...	<0.003	<0.011	<0.004	<0.050	<0.004	<0.035	<0.017	<0.002	<0.002	<0.002	<0.035	<0.032
JAN 1995												
05...	<0.003	<0.011	<0.005	<0.050	<0.004	<0.035	<0.017	0.002	<0.003	<0.002	<0.035	<0.032
SITE 12 USGS 320214106392510 LA MESA DRAIN AT LEVEE ROAD NEAR CHAMBERINO, N. MEX.												
APR 1994												
27...	<0.003	<0.011	<0.004	<0.050	<0.004	<0.035	<0.017	0.006	<0.002	<0.002	<0.035	<0.032
JAN 1995												
05...	<0.003	<0.011	<0.005	<0.050	<0.004	<0.035	<0.017	0.002	<0.003	<0.002	<0.035	<0.032
SITE 13 USGS 320122106385510 RIO GRANDE AT RT. 404 BRIDGE NEAR CHAMBERINO, N. MEX.												
APR 1994												
27...	<0.003	<0.011	<0.004	<0.050	<0.004	<0.035	<0.017	<0.002	<0.002	<0.002	<0.035	<0.032
JAN 1995												
05...	<0.003	<0.011	<0.005	<0.050	<0.004	<0.035	<0.017	0.003	<0.003	<0.002	<0.035	<0.032
SITE 14 USGS 315807106361910 EAST SIDE DRAIN AT LEVEE ROAD NEAR ANTHONY, TEX.												
APR 1994												
27...	E0.750	<0.011	<0.004	<0.050	<0.004	<0.035	<0.017	0.019	<0.002	0.004	<0.035	<0.032
JAN 1995												
06...	E0.005	<0.011	<0.005	<0.050	<0.004	<0.035	<0.017	0.014	<0.003	<0.002	<0.035	<0.032

Appendix--Field measurements and analytical results for samples collected during the Mesilla Valley synoptic study--Continued

Date	Dieldrin, dissolved (mg/L) (39381)	2,6-Diethylaniline, dissolved, rec (mg/L) (82660)	Dinoseb, dissolved, rec (mg/L) (49301)	Disulfoton, dissolved, rec (mg/L) (82677)	Diuron, dissolved, rec (mg/L) (49300)	EPTC, dissolved, rec (mg/L) (82668)	Ethalfluralin, dissolved, rec (mg/L) (82663)	Ethoprop, dissolved, rec (mg/L) (82672)	Fenuron, dissolved, rec (mg/L) (49297)	Fluometuron, dissolved, rec (mg/L) (38811)	Fonofos, dissolved, rec (mg/L) (04095)
SITE 8 USGS 320943106425810 RIO GRANDE AT RT. 192 BRIDGE NEAR SAN MIGUEL, N. MEX.											
APR 1994											
27...	<0.001	<0.003	<0.035	<0.017	<0.020	<0.002	<0.004	<0.003	<0.013	<0.035	<0.003
JAN 1995											
05...	<0.001	<0.003	<0.035	<0.017	<0.020	<0.002	<0.004	<0.003	<0.013	<0.035	<0.003
SITE 9 USGS 321210106443210 DEL RIO DRAIN AT PIANO ROAD NEAR SANTO TOMAS, N. MEX.											
APR 1994											
25...	<0.001	<0.003	<0.035	<0.017	<0.020	<0.002	<0.004	<0.003	<0.013	<0.035	<0.003
JAN 1995											
05...	<0.001	<0.003	<0.035	<0.017	<0.020	<0.002	<0.004	<0.003	<0.013	<0.035	<0.003
SITE 10 USGS 320610106393110 DEL RIO DRAIN AT LEVEE ROAD NEAR VADO, N. MEX.											
APR 1994											
27...	<0.001	<0.003	<0.035	<0.017	<0.020	<0.002	<0.004	<0.003	<0.013	<0.035	<0.003
JAN 1995											
04...	<0.001	<0.003	<0.035	<0.017	<0.020	<0.002	<0.004	<0.003	<0.013	<0.035	<0.003
SITE 11 USGS 320936106431710 LA MESA DRAIN AT RT. 192 NEAR SAN MIGUEL, N. MEX.											
APR 1994											
25...	<0.001	<0.003	<0.035	<0.017	<0.020	<0.002	<0.004	<0.003	<0.013	<0.035	<0.003
JAN 1995											
05...	<0.001	<0.003	<0.035	<0.017	<0.020	<0.002	<0.004	<0.003	<0.013	<0.035	<0.003
SITE 12 USGS 320214106392510 LA MESA DRAIN AT LEVEE ROAD NEAR CHAMBERINO, N. MEX.											
APR 1994											
27...	<0.001	<0.003	<0.035	<0.017	<0.020	<0.002	<0.004	<0.003	<0.013	<0.035	<0.003
JAN 1995											
05...	<0.001	<0.003	<0.035	<0.017	<0.020	<0.002	<0.004	<0.003	<0.013	<0.035	<0.003
SITE 13 USGS 320122106385510 RIO GRANDE AT RT. 404 BRIDGE NEAR CHAMBERINO, N. MEX.											
APR 1994											
27...	<0.001	<0.003	<0.035	<0.017	<0.020	<0.002	<0.004	<0.003	<0.013	<0.035	<0.003
JAN 1995											
05...	<0.001	<0.003	<0.035	<0.017	<0.020	<0.002	<0.004	<0.003	<0.013	<0.035	<0.003
SITE 14 USGS 315807106361910 EAST SIDE DRAIN AT LEVEE ROAD NEAR ANTHONY, TEX.											
APR 1994											
27...	<0.001	<0.003	<0.035	<0.017	<0.020	<0.002	<0.004	<0.003	<0.013	<0.035	<0.003
JAN 1995											
06...	<0.001	<0.003	<0.035	<0.017	<0.020	<0.002	<0.004	<0.003	<0.013	<0.035	<0.003

Appendix--Field measurements and analytical results for samples collected during the Mesilla Valley synoptic study--Continued

Date	3 Hydrxy-carbo-furan, dis-solved, rec (mg/L) {49308}	Lindane, dis-solved (mg/L) {39341}	Linuron, dis-solved, rec (mg/L) {38478}	Lin-uron, dis-solved, rec (mg/L) {82666}	Mala-thion, dis-solved (mg/L) {39532}	MCPA, dis-solved, rec (mg/L) {38482}	Methio-carb, dis-solved, rec (mg/L) {38501}	Meth-omyl, dis-solved, rec (mg/L) {49296}	Methyl azin-phos, dis-solved, rec (mg/L) {82686}	Methyl para-thion, dis-solved, rec (mg/L) {82667}	Meto-lachlor, dis-solved (mg/L) {39415}
SITE 8 USGS 320943106425810 RIO GRANDE AT RT. 192 BRIDGE NEAR SAN MIGUEL, N. MEX.											
APR 1994											
27...	<0.014	<0.004	<0.018	<0.002	<0.005	<0.050	<0.026	<0.017	<0.001	<0.006	<0.005
JAN 1995											
05...	<0.014	<0.004	<0.018	<0.002	<0.005	<0.050	<0.026	<0.017	<0.038	<0.006	0.010
SITE 9 USGS 321210106443210 DEL RIO DRAIN AT PIANO ROAD NEAR SANTO TOMAS, N. MEX.											
APR 1994											
25...	<0.014	<0.004	<0.018	<0.002	<0.005	--	<0.026	<0.017	<0.001	<0.006	0.005
JAN 1995											
05...	<0.014	<0.004	<0.018	<0.002	<0.005	<0.050	<0.026	<0.017	<0.038	<0.006	0.005
SITE 10 USGS 320610106393110 DEL RIO DRAIN AT LEVEE ROAD NEAR VADO, N. MEX.											
APR 1994											
27...	<0.014	<0.004	<0.018	<0.002	<0.005	<0.050	<0.026	<0.017	<0.001	<0.006	0.005
JAN 1995											
04...	<0.014	<0.004	<0.018	<0.002	<0.005	<0.050	<0.026	<0.017	<0.038	<0.006	0.006
SITE 11 USGS 320936106431710 LA MESA DRAIN AT RT. 192 NEAR SAN MIGUEL, N. MEX.											
APR 1994											
25...	<0.014	<0.004	<0.018	<0.002	<0.005	<0.050	<0.026	<0.017	<0.001	<0.006	<0.005
JAN 1995											
05...	<0.014	<0.004	<0.018	<0.002	<0.005	<0.050	<0.026	<0.017	<0.038	<0.006	<0.005
SITE 12 USGS 320214106392510 LA MESA DRAIN AT LEVEE ROAD NEAR CHAMBERINO, N. MEX.											
APR 1994											
27...	<0.014	<0.004	<0.018	<0.002	<0.005	<0.050	<0.026	<0.017	<0.001	<0.006	<0.005
JAN 1995											
05...	<0.014	<0.004	<0.018	<0.002	<0.005	<0.050	<0.026	<0.017	<0.038	<0.006	0.005
SITE 13 USGS 320122106385510 RIO GRANDE AT RT. 404 BRIDGE NEAR CHAMBERINO, N. MEX.											
APR 1994											
27...	<0.014	<0.004	<0.018	<0.002	<0.005	<0.050	<0.026	<0.017	<0.001	<0.006	<0.005
JAN 1995											
05...	<0.014	<0.004	<0.018	<0.002	<0.005	<0.050	<0.026	<0.017	<0.038	<0.006	E0.004
SITE 14 USGS 315807106361910 EAST SIDE DRAIN AT LEVEE ROAD NEAR ANTHONY, TEX.											
APR 1994											
27...	<0.014	<0.004	<0.018	<0.002	<0.005	<0.050	<0.026	<0.017	E0.048	<0.006	<0.005
JAN 1995											
06...	<0.014	<0.004	<0.018	<0.002	<0.005	<0.050	<0.026	<0.017	<0.038	<0.006	<0.005

Appendix--Field measurements and analytical results for samples collected during the Mesilla Valley synoptic study--Continued

Date	Metribuzin sencor, dissolved (mg/L) (82630)	Molinate, dissolved, rec (mg/L) (82671)	Napropamide, dissolved, rec (mg/L) (82684)	Neburon, dissolved, rec (mg/L) (49294)	Norflurazon, dissolved, rec (mg/L) (49293)	Oryzalin, dissolved, rec (mg/L) (49292)	Oxamyl, dissolved, rec (mg/L) (38866)	p,p' DDE, dissolved (mg/L) (34653)	Parathion, dissolved (mg/L) (39542)	Pebulate, dissolved, rec (mg/L) (82669)	Pendimethalin, dissolved, rec (mg/L) (82683)
SITE 8 USGS 320943106425810 RIO GRANDE AT RT. 192 BRIDGE NEAR SAN MIGUEL, N. MEX.											
APR 1994											
27...	<0.011	<0.004	<0.003	<0.015	<0.024	<0.019	<0.018	<0.006	<0.004	<0.004	<0.004
JAN 1995											
05...	<0.011	<0.004	<0.003	<0.015	<0.024	<0.019	<0.018	<0.006	<0.004	<0.004	<0.004
SITE 9 USGS 321210106443210 DEL RIO DRAIN AT PIANO ROAD NEAR SANTO TOMAS, N. MEX.											
APR 1994											
25...	<0.011	<0.004	<0.003	<0.015	<0.024	<0.019	<0.018	<0.006	<0.004	<0.004	<0.004
JAN 1995											
05...	<0.011	<0.004	<0.003	<0.015	<0.024	<0.019	<0.018	<0.006	<0.004	<0.004	<0.004
SITE 10 USGS 320610106393110 DEL RIO DRAIN AT LEVEE ROAD NEAR VADO, N. MEX.											
APR 1994											
27...	<0.011	<0.004	<0.003	<0.015	<0.024	<0.019	<0.018	<0.006	<0.004	<0.004	<0.004
JAN 1995											
04...	<0.011	<0.004	<0.003	<0.015	<0.024	<0.019	<0.018	<0.006	<0.004	<0.004	<0.004
SITE 11 USGS 320936106431710 LA MESA DRAIN AT RT. 192 NEAR SAN MIGUEL, N. MEX.											
APR 1994											
25...	<0.011	<0.004	<0.003	<0.015	<0.024	<0.019	<0.018	<0.006	<0.004	<0.004	<0.004
JAN 1995											
05...	<0.011	<0.004	<0.003	<0.015	<0.024	<0.019	<0.018	<0.006	<0.004	<0.004	<0.004
SITE 12 USGS 320214106392510 LA MESA DRAIN AT LEVEE ROAD NEAR CHAMBERINO, N. MEX.											
APR 1994											
27...	0.018	<0.004	<0.003	<0.015	<0.024	<0.019	<0.018	<0.006	<0.004	<0.004	<0.004
JAN 1995											
05...	<0.011	<0.004	<0.003	<0.015	<0.024	<0.019	<0.018	<0.006	<0.004	<0.004	<0.004
SITE 13 USGS 320122106385510 RIO GRANDE AT RT. 404 BRIDGE NEAR CHAMBERINO, N. MEX.											
APR 1994											
27...	<0.011	<0.004	<0.003	<0.015	<0.024	<0.019	<0.018	<0.006	<0.004	<0.004	<0.004
JAN 1995											
05...	<0.011	<0.004	<0.003	<0.015	<0.024	<0.019	<0.018	<0.006	<0.004	<0.004	<0.004
SITE 14 USGS 315807106361910 EAST SIDE DRAIN AT LEVEE ROAD NEAR ANTHONY, TEX.											
APR 1994											
27...	<0.011	<0.004	<0.003	<0.015	<0.024	<0.019	<0.018	<0.006	<0.004	<0.004	<0.004
JAN 1995											
06...	0.011	<0.004	<0.003	<0.015	<0.024	<0.019	<0.018	<0.006	<0.004	<0.004	<0.004

Appendix--Field measurements and analytical results for samples collected during the Mesilla Valley synoptic study--Continued

Date	Permethrin, cis, dissolved, rec (mg/L) {82687}	Phorate, dissolved, rec (mg/L) {82664}	Picloram, dissolved, rec (mg/L) {49291}	Prometon, dissolved, rec (mg/L) {04037}	Pronamide, dissolved, rec (mg/L) {82676}	Propachlor, dissolved, rec (mg/L) {04024}	Propanil, dissolved, rec (mg/L) {82679}	Propargite, dissolved, rec (mg/L) {82685}	Propham, dissolved, rec (mg/L) {49236}	Propoxur, dissolved, rec (mg/L) {38538}	Silvex, dissolved (mg/L) {39762}
SITE 8 USGS 320943106425810 RIO GRANDE AT RT. 192 BRIDGE NEAR SAN MIGUEL, N. MEX.											
APR 1994											
27...	<0.005	<0.002	<0.050	E0.007	<0.003	<0.007	<0.004	<0.013	<0.035	<0.035	<0.021
JAN 1995											
05...	<0.005	<0.002	<0.050	<0.018	<0.003	<0.007	<0.004	<0.013	<0.035	<0.035	<0.021
SITE 9 USGS 321210106443210 DEL RIO DRAIN AT PIANO ROAD NEAR SANTO TOMAS, N. MEX.											
APR 1994											
25...	<0.005	<0.002	--	<0.018	<0.003	<0.007	<0.004	<0.013	<0.035	<0.035	<0.021
JAN 1995											
05...	<0.005	<0.002	<0.050	<0.018	<0.003	<0.007	<0.004	<0.013	<0.035	<0.035	<0.021
SITE 10 USGS 320610106393110 DEL RIO DRAIN AT LEVEE ROAD NEAR VADO, N. MEX.											
APR 1994											
27...	<0.005	<0.002	<0.050	<0.018	<0.003	<0.007	<0.004	<0.013	<0.035	--	<0.021
JAN 1995											
04...	<0.005	<0.002	<0.050	<0.018	<0.003	<0.007	<0.004	<0.013	<0.035	<0.035	<0.021
SITE 11 USGS 320936106431710 LA MESA DRAIN AT RT. 192 NEAR SAN MIGUEL, N. MEX.											
APR 1994											
25...	<0.005	<0.002	<0.050	<0.018	<0.003	<0.007	<0.004	<0.013	<0.035	<0.035	<0.021
JAN 1995											
05...	<0.005	<0.002	<0.050	<0.018	<0.003	<0.007	<0.004	<0.013	<0.035	<0.035	<0.021
SITE 12 USGS 320214106392510 LA MESA DRAIN AT LEVEE ROAD NEAR CHAMBERINO, N. MEX.											
APR 1994											
27...	<0.005	<0.002	<0.050	<0.018	<0.003	<0.007	<0.004	<0.013	<0.035	<0.035	<0.021
JAN 1995											
05...	<0.005	<0.002	<0.050	<0.018	<0.003	<0.007	<0.004	<0.013	<0.035	<0.035	<0.021
SITE 13 USGS 320122106385510 RIO GRANDE AT RT. 404 BRIDGE NEAR CHAMBERINO, N. MEX.											
APR 1994											
27...	<0.005	<0.002	<0.050	E0.006	<0.003	<0.007	<0.004	<0.013	<0.035	--	<0.021
JAN 1995											
05...	<0.005	<0.002	<0.050	<0.018	<0.003	<0.007	<0.004	<0.013	<0.035	<0.035	<0.021
SITE 14 USGS 315807106361910 EAST SIDE DRAIN AT LEVEE ROAD NEAR ANTHONY, TEX.											
APR 1994											
27...	<0.005	<0.002	<0.050	<0.018	<0.003	<0.007	<0.004	<0.013	<0.035	<0.035	<0.021
JAN 1995											
06...	<0.005	<0.002	<0.050	<0.018	<0.003	<0.007	<0.004	<0.013	<0.035	<0.035	<0.021

Appendix--Field measurements and analytical results for samples collected during the Mesilla Valley synoptic study--Continued

Date	Simazine, dissolved, rec (mg/L) (04035)	Tebuthiuron, dissolved, rec (mg/L) (82670)	Terbacil, dissolved, rec (mg/L) (82665)	Terbufos, dissolved, rec (mg/L) (82675)	Thiobencarb, dissolved, rec (mg/L) (82681)	Trialate, dissolved, rec (mg/L) (82678)	Triclopyr, dissolved, rec (mg/L) (49235)	Trifluralin, dissolved, rec (mg/L) (82661)	Aldrin, total in bottom material (µg/kg) (39333)	Chlordane, total in bottom material (µg/kg) (39351)	DDD, total in bottom material (µg/kg) (39363)
SITE 8 USGS 320943106425810 RIO GRANDE AT RT. 192 BRIDGE NEAR SAN MIGUEL, N. MEX.											
APR 1994											
27...	<0.005	<0.010	<0.007	<0.013	<0.002	<0.001	<0.050	<0.002	--	--	--
JAN 1995											
05...	<0.005	<0.010	<0.007	<0.013	<0.002	<0.001	<0.050	<0.002	--	--	--
SITE 9 USGS 321210106443210 DEL RIO DRAIN AT PIANO ROAD NEAR SANTO TOMAS, N. MEX.											
APR 1994											
25...	<0.005	<0.010	<0.007	<0.013	<0.002	<0.001	<0.050	<0.002	--	--	--
JAN 1995											
05...	<0.005	<0.010	<0.007	<0.013	<0.002	<0.001	<0.050	<0.002	--	--	--
SITE 10 USGS 320610106393110 DEL RIO DRAIN AT LEVEE ROAD NEAR VADO, N. MEX.											
APR 1994											
27...	<0.005	<0.010	<0.007	<0.013	<0.002	<0.001	<0.050	<0.002	--	--	--
JAN 1995											
04...	<0.005	<0.010	<0.007	<0.013	<0.002	<0.001	<0.050	<0.002	<0.1	<1.0	0.6
SITE 11 USGS 320936106431710 LA MESA DRAIN AT RT. 192 NEAR SAN MIGUEL, N. MEX.											
APR 1994											
25...	<0.005	<0.010	<0.007	<0.013	<0.002	<0.001	<0.050	<0.002	--	--	--
JAN 1995											
05...	<0.005	<0.010	<0.007	<0.013	<0.002	<0.001	<0.050	<0.002	--	--	--
SITE 12 USGS 320214106392510 LA MESA DRAIN AT LEVEE ROAD NEAR CHAMBERINO, N. MEX.											
APR 1994											
27...	<0.005	<0.010	<0.007	<0.013	<0.002	<0.001	<0.050	<0.002	--	--	--
JAN 1995											
05...	<0.005	<0.010	<0.007	<0.013	<0.002	<0.001	<0.050	<0.002	<0.1	<1.0	0.6
SITE 13 USGS 320122106385510 RIO GRANDE AT RT. 404 BRIDGE NEAR CHAMBERINO, N. MEX.											
APR 1994											
27...	<0.005	<0.010	<0.007	<0.013	<0.002	<0.001	<0.050	<0.002	--	--	--
JAN 1995											
05...	<0.005	<0.010	<0.007	<0.013	<0.002	<0.001	<0.050	<0.002	--	--	--
SITE 14 USGS 315807106361910 EAST SIDE DRAIN AT LEVEE ROAD NEAR ANTHONY, TEX.											
APR 1994											
27...	<0.005	<0.010	<0.007	<0.013	<0.002	<0.001	<0.050	<0.002	--	--	--
JAN 1995											
06...	<0.005	<0.010	<0.007	<0.013	<0.002	<0.001	<0.050	<0.002	<0.1	2.0	2.7

Appendix--Field measurements and analytical results for samples collected during the Mesilla Valley synoptic study--Continued

Date	DDE, total in bottom material (µg/kg) {39368}	DDT, total in bottom material (µg/kg) {39373}	Diazinon, total in bottom material (µg/kg) {39571}	Dieldrin, total in bottom material (µg/kg) {39383}	Endosulfan, total in bottom material (µg/kg) {39389}	Endrin, total in bottom material (µg/kg) {39393}	Trithion, total in bottom material (µg/kg) {39787}	Ethion, total in bottom material (µg/kg) {39399}	Heptachlor, total in bottom material (µg/kg) {39413}	Heptachlor epoxide, total in bottom material (µg/kg) {39423}	Lindane, total in bottom material (µg/kg) {39343}
SITE 8 USGS 320943106425810 RIO GRANDE AT RT. 192 BRIDGE NEAR SAN MIGUEL, N. MEX.											
APR 1994											
27...	--	--	--	--	--	--	--	--	--	--	--
JAN 1995											
05...	--	--	--	--	--	--	--	--	--	--	--
SITE 9 USGS 321210106443210 DEL RIO DRAIN AT PIANO ROAD NEAR SANTO TOMAS, N. MEX.											
APR 1994											
25...	--	--	--	--	--	--	--	--	--	--	--
JAN 1995											
05...	--	--	--	--	--	--	--	--	--	--	--
SITE 10 USGS 320610106393110 DEL RIO DRAIN AT LEVEE ROAD NEAR VADO, N. MEX.											
APR 1994											
27...	--	--	--	--	--	--	--	--	--	--	--
JAN 1995											
04...	2.8	1.1	<0.2	<0.1	<0.1	<0.1	<0.2	<0.2	<0.1	<0.1	<0.1
SITE 11 USGS 320936106431710 LA MESA DRAIN AT RT. 192 NEAR SAN MIGUEL, N. MEX.											
APR 1994											
25...	--	--	--	--	--	--	--	--	--	--	--
JAN 1995											
05...	--	--	--	--	--	--	--	--	--	--	--
SITE 12 USGS 320214106392510 LA MESA DRAIN AT LEVEE ROAD NEAR CHAMBERINO, N. MEX.											
APR 1994											
27...	--	--	--	--	--	--	--	--	--	--	--
JAN 1995											
05...	3.0	0.2	<0.2	<0.1	<0.1	<0.1	<0.2	<0.2	<0.1	<0.1	<0.1
SITE 13 USGS 320122106385510 RIO GRANDE AT RT. 404 BRIDGE NEAR CHAMBERINO, N. MEX.											
APR 1994											
27...	--	--	--	--	--	--	--	--	--	--	--
JAN 1995											
05...	--	--	--	--	--	--	--	--	--	--	--
SITE 14 USGS 315807106361910 EAST SIDE DRAIN AT LEVEE ROAD NEAR ANTHONY, TEX.											
APR 1994											
27...	--	--	--	--	--	--	--	--	--	--	--
JAN 1995											
06...	4.6	0.6	0.3	<0.4	<0.1	<0.1	<0.2	<0.2	<0.1	<0.1	<0.1

Appendix--Field measurements and analytical results for samples collected during the Mesilla Valley synoptic study--Continued

Date	Malathion, total in bottom material (µg/kg) {39531}	Methoxychlor, total in bottom material (µg/kg) {39481}	Methyl parathion, total in bottom material (µg/kg) {39601}	Mirex, total in bottom material (µg/kg) {39758}	Parathion, total in bottom material (µg/kg) {39541}	Perthane, in bottom material (µg/kg) {81886}	PCB, total in bottom material (µg/kg) {39519}	PCN, total in bottom material (µg/kg) {39251}	Toxaphene, total in bottom material (µg/kg) {39403}	Sediment, suspended (µg/L) {80154}	Sediment discharge, suspended (t/day) {80155}
SITE 8 USGS 320943106425810 RIO GRANDE AT RT. 192 BRIDGE NEAR SAN MIGUEL, N. MEX.											
APR 1994											
27...	--	--	--	--	--	--	--	--	--	166	217
JAN 1995											
05...	--	--	--	--	--	--	--	--	--	100	18
SITE 9 USGS 321210106443210 DEL RIO DRAIN AT PIANO ROAD NEAR SANTO TOMAS, N. MEX.											
APR 1994											
25...	--	--	--	--	--	--	--	--	--	82	11
JAN 1995											
05...	--	--	--	--	--	--	--	--	--	--	--
SITE 10 USGS 320610106393110 DEL RIO DRAIN AT LEVEE ROAD NEAR VADO, N. MEX.											
APR 1994											
27...	--	--	--	--	--	--	--	--	--	136	22
JAN 1995											
04...	<0.2	<0.1	<0.2	<0.1	<0.2	<1.00	<1	<1.0	<10	--	--
SITE 11 USGS 320936106431710 LA MESA DRAIN AT RT. 192 NEAR SAN MIGUEL, N. MEX.											
APR 1994											
25...	--	--	--	--	--	--	--	--	--	79	4.1
JAN 1995											
05...	--	--	--	--	--	--	--	--	--	--	--
SITE 12 USGS 320214106392510 LA MESA DRAIN AT LEVEE ROAD NEAR CHAMBERINO, N. MEX.											
APR 1994											
27...	--	--	--	--	--	--	--	--	--	107	11
JAN 1995											
05...	<0.2	<0.1	0.2	<0.1	<0.2	<1.00	<1	<1.0	<10	--	--
SITE 13 USGS 320122106385510 RIO GRANDE AT RT. 404 BRIDGE NEAR CHAMBERINO, N. MEX.											
APR 1994											
27...	--	--	--	--	--	--	--	--	--	177	294
JAN 1995											
05...	--	--	--	--	--	--	--	--	--	117	35
SITE 14 USGS 315807106361910 EAST SIDE DRAIN AT LEVEE ROAD NEAR ANTHONY, TEX.											
APR 1994											
27...	--	--	--	--	--	--	--	--	--	157	12
JAN 1995											
06...	<0.2	<0.4	<0.2	<0.1	<0.2	<1.00	<1	<1.0	<10	--	--

Appendix--Field measurements and analytical results for samples collected during the Mesilla Valley synoptic study--Continued

Date	Time	Discharge, inst. (cubic feet per second) {00061}	Specific conductance (µS/cm) {00095}	pH water whole field (standard units) {00400}	Temperature air (deg C) {00020}	Temperature water (deg C) {00010}	Barometric pressure (mm of Hg) {00025}	Oxygen, dissolved (mg/L) {00300}	Oxygen, dissolved (percent saturation) {00301}	Hardness, total (mg/L as $CaCO_3$) {00900}	Hardness, noncarb (mg/L as $CaCO_3$) {00904}	Alkalinity, diss, total IT field (mg/L as $CaCO_3$) {39086}
		SITE 15	USGS 08363840 RIO GRANDE AT VINTON BRIDGE NEAR ANTHONY, TEX.									
APR 1994												
07...	1240	696	973	8.4	--	17.0	664	8.8	105	220	51	168
12...	1430	640	956	8.4	22.5	18.0	670	9.1	110	230	66	164
19...	1100	590	946	8.4	27.0	18.0	667	8.3	101	230	56	171
27...	2330	731	831	8.3	11.5	15.0	663	7.9	90	230	73	158
MAY												
04...	0700	630	1,000	8.3	9.0	17.5	667	7.5	90	230	58	176
11...	0745	560	984	8.2	15.0	16.5	666	7.7	91	240	67	173
JAN 1995												
04...	0930	105	1,680	8.2	--	8.5	666	11.0	108	370	130	244
		SITE 16	USGS 314754106332110 SUNLAND PARK WWTP AT SUNLAND PARK, N. MEX.									
APR 1994												
28...	0920	1.3	1,400	7.6	13.5	23.5	668	7.2	97	110	0	179
JAN 1995												
06...	0930	1.1	1,440	7.6	--	17.5	--	8.7	--	120	0	191
		SITE 17	USGS 315007106355410 NEMEXAS DRAIN AT MEADOWLARK DRIVE NEAR EL PASO, TEX.									
APR 1994												
28...	1200	75	1,770	8.2	20.0	17.0	665	8.4	100	380	120	262
JAN 1995												
06...	1230	33	2,100	8.0	--	12.5	664	9.5	103	420	100	310
		SITE 18	USGS 314810106324610 MONTOYA DRAIN AT LEVEE ROAD NEAR SUNLAND PARK, N. MEX.									
APR 1994												
28...	0815	81	1,900	8.2	16.5	14.5	666	6.8	77	370	130	248
JAN 1995												
06...	0745	37	2,420	8.0	--	9.0	664	10.1	101	420	120	303
		SITE 19	USGS 08364000 RIO GRANDE AT EL PASO, TEX.									
APR 1994												
06...	0940	E690	1,073	8.4	--	12.0	670	8.4	90	230	50	177
12...	0815	720	1,090	8.4	10.0	14.5	675	8.0	89	250	64	185
19...	0730	E650	1,050	8.4	12.0	17.5	669	7.4	88	240	58	182
28...	0830	852	1,070	8.2	11.0	13.0	667	8.7	95	250	67	179
MAY												
03...	1320	745	1,020	8.4	--	20.0	665	8.5	108	240	69	173
11...	1130	E670	1,050	8.3	25.0	20.0	667	8.0	101	250	65	187
JAN 1995												
07...	0900	178	1,780	8.4	5.5	6.0	676	10.9	100	370	140	233

Appendix--Field measurements and analytical results for samples collected during the Mesilla Valley synoptic study--Continued

Date	Solids, sum of constituents, dissolved (mg/L) {70301}	Solids, residue at 180 deg. C, dissolved (mg/L) {70300}	Calcium, dissolved (mg/L as Ca) {00915}	Magnesium, dissolved (mg/L as Mg) {00925}	Sodium, dissolved (mg/L as Na) {00930}	Sodium percent {00932}	Sodium adsorption ratio {00931}	Potassium, dissolved (mg/L as K) {00935}	Bicarbonate, diss IT field (mg/L as HCO_3) {00453}	Carbonate, diss IT field (mg/L as CO_3) {00452}	Sulfate, dissolved (mg/L as SO_4) {00945}	Chloride, dissolved (mg/L as Cl) {00940}
SITE 15 USGS 08363840 RIO GRANDE AT VINTON BRIDGE NEAR ANTHONY, TEX.												
APR 1994												
07...	578	617	61	16	110	51	3	7.8	190	7	180	96
12...	560	583	67	15	110	50	3	7.6	195	2	170	86
19...	553	560	66	15	110	50	3	7.4	208	0	170	77
27...	566	586	68	15	110	50	3	7.4	187	3	180	84
MAY												
04...	588	620	69	15	110	50	3	7.9	203	6	190	84
11...	586	616	70	16	110	49	3	7.2	212	0	190	80
JAN 1995												
04...	1,040	1,120	110	24	200	53	5	12	298	0	350	170
SITE 16 USGS 314754106332110 SUNLAND PARK WWTP AT SUNLAND PARK, N. MEX.												
APR 1994												
28...	844	806	39	4.1	210	78	9	14	218	0	230	170
JAN 1995												
06...	882	810	43	3.6	210	77	8	13	233	0	240	180
SITE 17 USGS 315007106355410 NEMEXAS DRAIN AT MEADOWLARK DRIVE NEAR EL PASO, TEX.												
APR 1994												
28...	1,150	1,170	110	25	250	58	6	6.8	319	0	400	170
JAN 1995												
06...	1,380	1,460	120	28	300	61	6	7.2	378	0	490	210
SITE 18 USGS 314810106324610 MONTOYA DRAIN AT LEVEE ROAD NEAR SUNLAND PARK, N. MEX.												
APR 1994												
28...	1,210	1,270	110	24	270	61	6	6.9	302	0	430	200
JAN 1995												
06...	1,550	1,640	120	29	360	65	8	7.4	370	0	530	280
SITE 19 USGS 08364000 RIO GRANDE AT EL PASO, TEX.												
APR 1994												
06...	652	686	63	17	130	54	4	7.7	216	0	210	110
12...	667	660	72	17	130	52	4	7.7	222	2	210	110
19...	635	648	70	16	130	53	4	7.6	212	5	200	95
28...	639	690	72	16	120	51	3	7.2	218	0	210	98
MAY												
03...	633	672	70	16	120	51	3	7.6	211	0	210	96
11...	669	684	73	17	130	52	4	7.6	228	0	220	98
JAN 1995												
07...	1,110	1,190	110	24	230	57	5	6.3	251	16	380	190

Appendix--Field measurements and analytical results for samples collected during the Mesilla Valley synoptic study--Continued

Date	Fluoride, dissolved (mg/L as F) (00950)	Silica, dissolved (mg/L as SiO2) (00955)	Nitrogen, nitrite, dissolved (mg/L as N) (00613)	Nitrogen, NO_2+NO_3, dissolved (mg/L as N) (00631)	Nitrogen, ammonia, dissolved (mg/L as N) (00608)	Nitrogen, ammonia + organic, diss. (mg/L as N) (00623)	Nitrogen, ammonia + organic, total (mg/L as N) (00625)	Phosphorus, total (mg/L as P) (00665)	Phosphorus, dissolved (mg/L as P) (00666)	Phosphorus, ortho, dissolved (mg/L as P) (00671)	Aluminum, dissolved (mg/L as Al) (01106)	Antimony, dissolved (mg/L as Sb) (01095)
	SITE 15	USGS 08363840 RIO GRANDE AT VINTON BRIDGE NEAR ANTHONY, TEX.										
APR 1994												
07...	0.60	4.2	0.02	0.37	0.02	0.30	0.40	0.06	0.01	0.02	--	--
12...	0.60	3.8	0.02	0.37	0.01	0.20	0.50	0.12	0.02	0.02	--	--
19...	0.60	3.8	<0.01	0.24	<0.01	0.20	0.60	0.11	0.01	<0.01	--	--
27...	0.70	4.9	0.01	0.28	0.03	0.20	0.50	0.17	0.02	0.02	--	--
MAY												
04...	0.70	5.2	0.01	0.16	0.03	0.20	0.50	0.06	<0.01	0.02	--	--
11...	0.70	7.0	0.02	0.25	0.02	0.20	0.50	0.09	0.03	0.03	--	--
JAN 1995												
04...	0.70	20	0.12	1.10	0.36	0.70	0.80	0.08	0.07	0.03	2	<1
	SITE 16	USGS 3147541063321l0 SUNLAND PARK WWTP AT SUNLAND PARK, N. MEX.										
APR 1994												
28...	0.90	36	0.12	0.15	17.0	22	21	3.80	3.90	3.40	--	--
JAN 1995												
06...	0.90	36	0.18	0.21	27.0	29	28	1.60	1.50	1.40	20	<1
	SITE 17	USGS 315007106355410 NEMEXAS DRAIN AT MEADOWLARK DRIVE NEAR EL PASO, TEX.										
APR 1994												
28...	0.80	24	0.02	0.38	0.05	0.30	0.30	0.02	0.02	0.02	--	--
JAN 1995												
06...	0.80	34	0.02	0.33	0.14	0.40	0.40	0.08	0.05	0.03	2	<1
	SITE 18	USGS 314810106324610 MONTOYA DRAIN AT LEVEE ROAD NEAR SUNLAND PARK, N. MEX.										
APR 1994												
28...	0.90	23	0.02	0.36	0.04	0.20	0.30	0.09	0.01	0.01	--	--
JAN 1995												
06...	0.80	34	0.02	0.27	0.12	0.20	0.30	0.06	0.02	0.03	2	<1
	SITE 19	USGS 08364000 RIO GRANDE AT EL PASO, TEX.										
APR 1994												
06...	0.70	6.0	0.03	0.39	0.06	0.30	0.60	0.10	0.02	0.02	--	--
12...	0.70	6.3	0.02	0.39	0.02	0.30	0.50	0.14	0.02	0.02	--	--
19...	0.60	5.5	<0.01	0.24	<0.01	<0.20	0.50	0.09	0.02	0.02	--	--
28...	0.70	6.5	<0.01	0.30	0.05	0.20	0.30	0.05	0.04	0.03	--	--
MAY												
03...	0.70	6.6	<0.01	0.21	0.03	--	0.50	0.11	0.01	0.01	<10	--
11...	0.70	8.4	0.01	0.35	0.05	0.40	0.50	0.12	0.03	0.04	--	--
JAN 1995												
07...	0.70	22	0.08	0.95	0.19	0.40	0.80	0.12	<0.01	<0.01	<1	<1

Appendix--Field measurements and analytical results for samples collected during the Mesilla Valley synoptic study--Continued

Date	Arsenic, dissolved (mg/L as As) (01000)	Barium, dissolved (mg/L as Ba) (01005)	Beryllium, dissolved (mg/L as Be) (01010)	Boron, dissolved (mg/L as B) (01020)	Cadmium, dissolved (mg/L as Cd) (01025)	Chromium, dissolved (mg/L as Cr) (01030)	Cobalt, dissolved (mg/L as Co) (01035)	Copper, dissolved (mg/L as Cu) (01040)	Iron, dissolved (mg/L as Fe) (01046)	Lead, dissolved (mg/L as Pb) (01049)	Manganese, dissolved (mg/L as Mn) (01056)	Molybdenum, dissolved (mg/L as Mo) (01060)
SITE 15 USGS 08363840 RIO GRANDE AT VINTON BRIDGE NEAR ANTHONY, TEX.												
APR 1994												
07...	--	--	--	--	--	--	--	--	<3	--	1	--
12...	--	--	--	--	--	--	--	--	<3	--	5	--
19...	--	--	--	--	--	--	--	--	4	--	4	--
27...	--	--	--	--	--	--	--	--	<3	--	4	--
MAY												
04...	--	--	--	--	--	--	--	--	<3	--	2	--
11...	--	--	--	--	--	--	--	--	<3	--	2	--
JAN 1995												
04...	1	93	<1	270	<1.0	2	<1	5	<3	<1	16	11
SITE 16 USGS 314754106332110 SUNLAND PARK WWTP AT SUNLAND PARK, N. MEX.												
APR 1994												
28...	--	--	--	--	--	--	--	--	39	--	15	--
JAN 1995												
06...	11	18	<1	350	<1.0	2	<1	1	31	<1	14	11
SITE 17 USGS 315007106355410 NEMEXAS DRAIN AT MEADOWLARK DRIVE NEAR EL PASO, TEX.												
APR 1994												
28...	--	--	--	--	--	--	--	--	<3	--	36	--
JAN 1995												
06...	6	62	<1	450	<1.0	3	<1	3	9	<1	190	14
SITE 18 USGS 314810106324610 MONTOYA DRAIN AT LEVEE ROAD NEAR SUNLAND PARK, N. MEX.												
APR 1994												
28...	--	--	--	--	--	--	--	--	<3	--	11	--
JAN 1995												
06...	4	61	<1	470	<1.0	4	<1	3	27	<1	120	14
SITE 19 USGS 08364000 RIO GRANDE AT EL PASO, TEX.												
APR 1994												
06...	--	--	--	--	--	--	--	--	4	--	1	--
12...	--	--	--	--	--	--	--	--	<3	--	2	--
19...	--	--	--	--	--	--	--	--	<3	--	1	--
28...	--	--	--	--	--	--	--	--	<3	--	2	--
MAY												
03...	--	64	--	--	--	--	<3	--	<3	--	4	10
11...	--	--	--	--	--	--	--	--	<3	--	4	--
JAN 1995												
07...	2	75	<1	300	<1.0	7	<1	3	<3	<1	27	11

Appendix--Field measurements and analytical results for samples collected during the Mesilla Valley synoptic study--Continued

Date	Nickel, dissolved (mg/L as Ni) (01065)	Selenium, dissolved (mg/L as Se) (01145)	Silver, dissolved (mg/L as Ag) (01075)	Zinc, dissolved (mg/L as Zn) (01090)	Uranium, natural, dissolved (mg/L as U) (22703)	Carbon, organic, total (mg/L as C) (00680)	Carbon, organic, suspended, total (mg/L as C) (00689)	Carbon, organic, dissolved (mg/L as C) (00681)	Acetochlor, dissolved, rec (mg/L) (49260)	Acifluorfen, dissolved, rec (mg/L) (49315)	Alachlor, dissolved, rec (mg/L) (46342)	Aldicarb, dissolved, rec (mg/L) (49312)
SITE 15 USGS 08363840 RIO GRANDE AT VINTON BRIDGE NEAR ANTHONY, TEX.												
APR 1994												
07...	--	--	--	--	--	--	--	--	--	<0.035	<0.002	<0.016
12...	--	--	--	--	--	--	0.4	4.4	--	<0.035	<0.002	<0.016
19...	--	--	--	--	--	--	1.2	8.3	--	<0.035	<0.002	<0.016
27...	--	--	--	--	--	--	1.0	4.9	--	<0.035	<0.002	<0.016
MAY												
04...	--	--	--	--	--	--	1.2	--	--	<0.035	<0.002	<0.016
11...	--	--	--	--	--	--	0.8	4.7	--	<0.035	<0.002	<0.016
JAN 1995												
04...	7	<1	<1.0	2	5.0	4.8	--	4.1	<0.009	<0.070	<0.002	<0.070
SITE 16 USGS 314754106332110 SUNLAND PARK WWTP AT SUNLAND PARK, N. MEX.												
APR 1994												
28...	--	--	--	--	--	--	0.1	8.8	--	<0.035	<0.002	<0.016
JAN 1995												
06...	3	<1	<1.0	19	<1.0	20	--	7.6	<0.009	<0.035	<0.002	<0.016
SITE 17 USGS 315007106355410 NEMEXAS DRAIN AT MEADOWLARK DRIVE NEAR EL PASO, TEX.												
APR 1994												
28...	--	--	--	--	--	--	0.5	4.4	--	<0.035	<0.002	<0.016
JAN 1995												
06...	6	<1	<1.0	<1	5.0	12	--	3.9	<0.009	<0.070	<0.002	<0.070
SITE 18 USGS 314810106324610 MONTOYA DRAIN AT LEVEE ROAD NEAR SUNLAND PARK, N. MEX.												
APR 1994												
28...	--	--	--	--	--	--	0.7	6.1	--	<0.035	<0.002	<0.016
JAN 1995												
06...	6	<1	<1.0	1	4.0	7.2	--	3.9	<0.009	<0.035	<0.002	<0.016
SITE 19 USGS 08364000 RIO GRANDE AT EL PASO, TEX.												
APR 1994												
06...	--	--	--	--	--	--	--	--	--	<0.035	<0.002	<0.016
12...	--	--	--	--	--	--	1.0	4.0	--	<0.035	<0.002	<0.016
19...	--	--	--	--	--	--	0.7	5.7	--	<0.035	<0.002	<0.016
28...	--	--	--	--	--	--	0.7	3.8	--	<0.035	<0.002	<0.016
MAY												
03...	<1	<1	<1.0	--	--	--	1.0	--	--	<0.035	<0.002	<0.016
11...	--	--	--	--	--	--	1.1	5.7	--	<0.035	<0.002	<0.016
JAN 1995												
07...	6	<1	<1.0	<1	5.0	7.3	--	4.1	<0.009	<0.035	<0.002	<0.016

Appendix--Field measurements and analytical results for samples collected during the Mesilla Valley synoptic study--Continued

Date	Aldicarb sulfone, dissolved, rec (mg/L) {49313}	Aldicarb sulfoxide, dissolved, rec (mg/L) {49314}	Alpha BHC, dissolved (mg/L) {34253}	Atrazine, dissolved, rec (mg/L) {39632}	Benfluralin, dissolved, rec (mg/L) {82673}	Bentazon, dissolved, rec (mg/L) {38711}	Bromacil, dissolved, rec (mg/L) {04029}	Bromoxynil, dissolved, rec (mg/L) {49311}	Butylate, dissolved, rec (mg/L) {04028}	Carbaryl, dissolved, rec (mg/L) {49310}	Carbaryl, dissolved, rec (mg/L) {82680}	Carbofuran, dissolved, rec (mg/L) {49309}
SITE 15 USGS 08363840 RIO GRANDE AT VINTON BRIDGE NEAR ANTHONY, TEX.												
APR 1994												
07...	<0.016	<0.021	<0.002	0.004	<0.002	<0.014	<0.035	<0.035	<0.002	<0.008	<0.003	<0.028
12...	<0.016	<0.021	<0.002	<0.004	<0.002	<0.014	<0.035	<0.035	<0.002	<0.008	<0.003	<0.028
19...	<0.016	<0.021	<0.002	<0.004	<0.002	<0.014	<0.035	<0.035	<0.002	<0.008	<0.003	<0.028
27...	<0.016	<0.021	<0.002	<0.004	<0.002	<0.014	<0.035	<0.035	<0.002	<0.008	<0.003	<0.028
MAY												
04...	<0.016	<0.021	<0.002	<0.004	<0.002	<0.014	<0.035	<0.035	<0.002	<0.008	<0.003	<0.028
11...	<0.016	<0.021	<0.002	<0.004	<0.002	<0.014	<0.035	<0.035	<0.002	<0.008	<0.003	<0.028
JAN 1995												
04...	<0.070	<0.070	<0.002	<0.004	<0.002	<0.070	<0.070	<0.070	<0.002	<0.070	<0.003	<0.070
SITE 16 USGS 314754106332110 SUNLAND PARK WWTP AT SUNLAND PARK, N. MEX.												
APR 1994												
28...	<0.016	<0.021	<0.002	<0.004	<0.002	<0.014	<0.035	<0.035	<0.002	<0.008	<0.003	<0.028
JAN 1995												
06...	<0.016	<0.021	<0.002	<0.004	<0.002	<0.014	<0.035	<0.035	<0.002	<0.008	E0.013	<0.028
SITE 17 USGS 315007106355410 NEMEXAS DRAIN AT MEADOWLARK DRIVE NEAR EL PASO, TEX.												
APR 1994												
28...	<0.016	<0.021	<0.002	<0.004	<0.002	<0.014	<0.035	<0.035	<0.002	<0.008	<0.003	<0.028
JAN 1995												
06...	<0.070	<0.070	<0.002	0.004	<0.002	<0.070	<0.070	<0.070	<0.002	<0.070	<0.003	<0.070
SITE 18 USGS 314810106324610 MONTOYA DRAIN AT LEVEE ROAD NEAR SUNLAND PARK, N. MEX.												
APR 1994												
28...	<0.016	<0.021	<0.002	<0.004	<0.002	<0.014	<0.035	<0.035	<0.002	<0.008	<0.003	<0.028
JAN 1995												
06...	<0.016	<0.021	<0.002	<0.004	<0.002	<0.014	<0.035	<0.035	<0.002	<0.008	<0.003	<0.028
SITE 19 USGS 08364000 RIO GRANDE AT EL PASO, TEX.												
APR 1994												
06...	<0.016	<0.021	<0.002	0.006	<0.002	<0.014	<0.035	<0.035	<0.002	<0.008	<0.003	<0.028
12...	<0.016	<0.021	<0.002	<0.004	<0.002	<0.014	<0.035	<0.035	<0.002	<0.008	<0.003	0.030
19...	<0.016	<0.021	<0.002	0.004	<0.002	<0.014	<0.035	<0.035	<0.002	<0.008	<0.003	<0.028
28...	<0.016	<0.021	<0.002	<0.004	<0.002	<0.014	<0.035	<0.035	<0.002	<0.008	<0.003	<0.028
MAY												
03...	<0.016	<0.021	<0.002	<0.004	<0.002	<0.014	<0.035	<0.035	<0.002	<0.008	<0.003	<0.028
11...	<0.016	<0.021	<0.002	<0.004	<0.002	<0.014	<0.035	<0.035	<0.002	<0.008	<0.003	<0.028
JAN 1995												
07...	<0.016	<0.021	<0.002	<0.004	<0.002	<0.014	<0.035	<0.035	<0.002	<0.008	<0.003	<0.028

Appendix--Field measurements and analytical results for samples collected during the Mesilla Valley synoptic study--Continued

Date	Carbofuran, dissolved, rec (mg/L) (82674)	Chloramben, dissolved, rec (mg/L) (49307)	Chlorpyrifos, dissolved (mg/L) (38933)	Clopyralid, dissolved, rec (mg/L) (49305)	Cyanazine, dissolved, rec (mg/L) (04041)	2,4-D, dissolved (mg/L) (39732)	Dacthal monoacid, dissolved, rec (mg/L) (49304)	DCPA, dissolved, rec (mg/L) (82682)	Deethylatrazine, dissolved, rec (mg/L) (04040)	Diazinon, dissolved (mg/L) (39572)	Dicamba, dissolved, rec (mg/L) (38442)	Dichlorprop, dissolved, rec (mg/L) (49302)
SITE 15 USGS 08363840 RIO GRANDE AT VINTON BRIDGE NEAR ANTHONY, TEX.												
APR 1994												
07...	E0.014	<0.011	<0.005	<0.050	<0.004	<0.035	<0.017	0.008	<0.003	<0.002	<0.035	<0.032
12...	E0.014	<0.011	<0.004	<0.050	<0.004	<0.035	<0.017	0.006	<0.002	<0.002	<0.035	<0.032
19...	<0.003	<0.011	<0.004	<0.050	<0.004	<0.035	<0.017	0.005	<0.002	<0.002	<0.035	<0.032
27...	E0.030	<0.011	<0.004	<0.050	<0.004	<0.035	<0.017	0.004	<0.002	<0.002	<0.035	<0.032
MAY												
04...	<0.003	<0.011	<0.004	<0.050	<0.004	<0.035	<0.017	<0.002	<0.002	<0.002	<0.035	<0.032
11...	<0.003	<0.011	<0.004	<0.050	<0.004	<0.035	<0.017	0.016	<0.002	<0.002	<0.035	<0.032
JAN 1995												
04...	<0.003	<0.070	<0.005	<0.070	<0.004	<0.070	<0.070	0.003	<0.003	<0.002	<0.070	<0.070
SITE 16 USGS 314754106332110 SUNLAND PARK WWTP AT SUNLAND PARK, N. MEX.												
APR 1994												
28...	<0.003	<0.011	0.042	<0.050	<0.004	<0.035	<0.017	<0.002	<0.002	0.16	<0.035	<0.032
JAN 1995												
06...	<0.003	<0.011	0.023	<0.050	<0.004	<0.035	<0.017	<0.002	<0.003	0.067	<0.035	<0.032
SITE 17 USGS 315007106355410 NEMEXAS DRAIN AT MEADOWLARK DRIVE NEAR EL PASO, TEX.												
APR 1994												
28...	<0.003	<0.011	<0.004	<0.050	<0.004	<0.035	<0.017	0.004	<0.002	<0.002	<0.035	<0.032
JAN 1995												
06...	E0.011	<0.070	<0.005	<0.070	<0.004	<0.070	<0.070	0.006	<0.003	<0.002	<0.070	<0.070
SITE 18 USGS 314810106324610 MONTOYA DRAIN AT LEVEE ROAD NEAR SUNLAND PARK, N. MEX.												
APR 1994												
28...	<0.003	<0.011	<0.004	<0.050	<0.004	<0.035	<0.017	<0.002	<0.002	<0.002	<0.035	<0.032
JAN 1995												
06...	<0.003	<0.011	<0.005	<0.050	<0.004	<0.035	<0.017	<0.002	<0.003	<0.002	<0.035	<0.032
SITE 19 USGS 08364000 RIO GRANDE AT EL PASO, TEX.												
APR 1994												
06...	<0.003	<0.011	0.008	<0.050	<0.004	<0.035	<0.017	0.012	<0.003	<0.002	<0.035	<0.032
12...	E0.013	<0.011	<0.004	<0.050	<0.004	<0.035	<0.017	0.006	<0.002	<0.002	<0.035	<0.032
19...	<0.003	<0.011	<0.004	<0.050	<0.004	<0.035	<0.017	0.005	<0.002	<0.002	<0.035	<0.032
28...	E0.022	<0.011	<0.004	<0.050	<0.004	<0.035	<0.017	<0.002	<0.002	<0.002	<0.035	<0.032
MAY												
03...	<0.003	<0.011	<0.004	<0.050	<0.004	<0.035	<0.017	<0.002	<0.002	<0.002	<0.035	<0.032
11...	<0.003	<0.011	<0.004	<0.050	<0.004	<0.035	<0.017	<0.002	<0.002	<0.002	<0.035	<0.032
JAN 1995												
07...	<0.003	<0.011	<0.005	<0.050	<0.004	<0.035	<0.017	0.021	<0.003	<0.002	<0.035	<0.032

Appendix--Field measurements and analytical results for samples collected during the Mesilla Valley synoptic study--Continued

Date	Dieldrin, dissolved (mg/L) {39381}	2,6-Diethylaniline, dissolved, rec (mg/L) {82660}	Dinoseb, dissolved, rec (mg/L) {49301}	Disulfoton, dissolved, rec (mg/L) {82677}	Diuron, dissolved, rec (mg/L) {49300}	EPTC, dissolved, rec (mg/L) {82668}	Ethalfluralin, dissolved, rec (mg/L) {82663}	Ethoprop, dissolved, rec (mg/L) {82672}	Fenuron, dissolved, rec (mg/L) {49297}	Fluometuron, dissolved, rec (mg/L) {38811}	Fonofos, dissolved, rec (mg/L) {04095}
SITE 15 USGS 08363840 RIO GRANDE AT VINTON BRIDGE NEAR ANTHONY, TEX.											
APR 1994											
07...	<0.001	<0.003	<0.035	<0.008	<0.020	<0.002	<0.004	<0.003	<0.013	<0.035	<0.003
12...	<0.001	<0.003	<0.035	<0.010	<0.020	<0.002	<0.004	<0.003	<0.013	<0.035	<0.003
19...	<0.001	<0.003	<0.035	<0.010	<0.020	<0.002	<0.004	<0.003	<0.013	<0.035	<0.003
27...	<0.001	<0.003	<0.035	<0.017	<0.020	<0.002	<0.004	<0.003	<0.013	<0.035	<0.003
MAY											
04...	<0.001	<0.003	<0.035	<0.017	<0.020	<0.002	<0.004	<0.003	<0.013	<0.035	<0.003
11...	<0.001	<0.003	<0.035	<0.017	<0.020	0.005	<0.004	<0.003	<0.013	<0.035	<0.003
JAN 1995											
04...	<0.001	<0.003	<0.070	<0.017	<0.070	<0.002	<0.004	<0.003	<0.070	<0.070	<0.003
SITE 16 USGS 314754106332110 SUNLAND PARK WWTP AT SUNLAND PARK, N. MEX.											
APR 1994											
28...	<0.001	<0.003	<0.035	<0.017	<0.020	<0.002	<0.004	<0.003	<0.013	<0.035	<0.003
JAN 1995											
06...	<0.001	<0.003	<0.035	<0.017	<0.020	<0.002	<0.004	<0.003	<0.013	<0.035	<0.003
SITE 17 USGS 315007106355410 NEMEXAS DRAIN AT MEADOWLARK DRIVE NEAR EL PASO, TEX.											
APR 1994											
28...	<0.001	<0.003	<0.035	<0.017	<0.020	<0.002	<0.004	<0.003	<0.013	<0.035	<0.003
JAN 1995											
06...	<0.001	<0.003	<0.070	<0.017	<0.070	<0.002	<0.004	<0.003	<0.070	<0.070	<0.003
SITE 18 USGS 314810106324610 MONTOYA DRAIN AT LEVEE ROAD NEAR SUNLAND PARK, N. MEX.											
APR 1994											
28...	<0.001	<0.003	<0.035	<0.017	<0.020	<0.002	<0.004	<0.003	<0.013	<0.035	<0.003
JAN 1995											
06...	<0.001	<0.003	<0.035	<0.017	<0.020	<0.002	<0.004	<0.003	<0.013	<0.035	<0.003
SITE 19 USGS 08364000 RIO GRANDE AT EL PASO, TEX.											
APR 1994											
06...	<0.001	<0.003	<0.035	<0.008	<0.020	<0.002	<0.004	<0.003	<0.013	<0.035	<0.003
12...	<0.001	<0.003	<0.035	<0.010	<0.020	<0.002	<0.004	<0.003	<0.013	<0.035	<0.003
19...	<0.001	<0.003	<0.035	<0.010	<0.020	<0.002	<0.004	<0.003	<0.013	<0.035	<0.003
28...	<0.001	<0.003	<0.035	<0.017	<0.020	<0.002	<0.004	<0.003	<0.013	<0.035	<0.003
MAY											
03...	<0.001	<0.003	<0.035	<0.017	<0.020	<0.002	<0.004	<0.003	<0.013	<0.035	<0.003
11...	<0.001	<0.003	<0.035	<0.017	<0.020	<0.002	<0.004	<0.003	<0.013	<0.035	<0.003
JAN 1995											
07...	<0.001	<0.003	<0.035	<0.017	<0.020	<0.002	<0.004	<0.003	<0.013	<0.035	<0.003

Appendix--Field measurements and analytical results for samples collected during the Mesilla Valley synoptic study--Continued

Date	3 Hydrxy-carbo-furan, dis-solved, rec (mg/L) {49308}	Lindane, dis-solved (mg/L) {39341}	Linuron, dis-solved, rec (mg/L) {38478}	Lin-uron, dis-solved, rec (mg/L) {82666}	Mala-thion, dis-solved (mg/L) {39532}	MCPA, dis-solved, rec (mg/L) {38482}	Methio-carb, dis-solved, rec (mg/L) {38501}	Meth-omyl, dis-solved, rec (mg/L) {49296}	Methyl azin-phos, dis-solved, rec (mg/L) {82686}	Methyl para-thion, dis-solved, rec (mg/L) {82667}	Meto-lachlor, dis-solved (mg/L) {39415}
SITE 15 USGS 08363840 RIO GRANDE AT VINTON BRIDGE NEAR ANTHONY, TEX.											
APR 1994											
07...	<0.014	<0.004	<0.018	<0.002	<0.005	<0.050	<0.026	<0.017	<0.038	<0.006	<0.005
12...	<0.014	<0.004	<0.018	<0.002	<0.005	<0.050	<0.026	<0.017	<0.001	<0.006	<0.005
19...	<0.014	<0.004	<0.018	<0.002	<0.005	<0.050	<0.026	<0.017	<0.001	<0.006	<0.005
27...	<0.014	<0.004	<0.018	<0.002	<0.005	<0.050	<0.026	<0.017	<0.001	<0.006	<0.005
MAY											
04...	<0.014	<0.004	<0.018	<0.002	<0.005	<0.050	<0.026	<0.017	<0.001	<0.006	<0.005
11...	<0.014	<0.004	<0.018	<0.002	<0.005	<0.050	<0.026	<0.017	<0.001	<0.006	<0.005
JAN 1995											
04...	<0.070	<0.004	<0.070	<0.002	<0.005	<0.070	<0.070	<0.070	<0.038	<0.006	<0.005
SITE 16 USGS 314754106332110 SUNLAND PARK WWTP AT SUNLAND PARK, N. MEX.											
APR 1994											
28...	<0.014	<0.004	<0.018	<0.002	<0.005	<0.050	<0.026	<0.017	<0.001	<0.006	<0.005
JAN 1995											
06...	<0.014	0.052	<0.018	<0.002	<0.005	<0.050	<0.026	<0.017	<0.038	<0.006	<0.005
SITE 17 USGS 315007106355410 NEMEXAS DRAIN AT MEADOWLARK DRIVE NEAR EL PASO, TEX.											
APR 1994											
28...	<0.014	<0.004	<0.018	<0.002	<0.005	<0.050	<0.026	<0.017	<0.001	<0.006	<0.005
JAN 1995											
06...	<0.070	<0.004	<0.070	<0.002	<0.005	<0.070	<0.070	<0.070	<0.038	<0.006	<0.005
SITE 18 USGS 314810106324610 MONTOYA DRAIN AT LEVEE ROAD NEAR SUNLAND PARK, N. MEX.											
APR 1994											
28...	<0.014	<0.004	<0.018	<0.002	<0.005	<0.050	<0.026	<0.017	<0.001	<0.006	<0.005
JAN 1995											
06...	<0.014	<0.004	<0.018	<0.002	<0.005	<0.050	<0.026	<0.017	<0.038	<0.006	<0.005
SITE 19 USGS 08364000 RIO GRANDE AT EL PASO, TEX.											
APR 1994											
06...	<0.014	<0.004	<0.018	<0.002	<0.005	<0.050	<0.026	<0.017	<0.038	<0.006	E0.003
12...	<0.014	<0.004	<0.018	<0.002	<0.005	<0.050	<0.026	<0.017	<0.001	<0.006	<0.005
19...	<0.014	<0.004	<0.018	<0.002	<0.005	<0.050	<0.026	<0.017	<0.001	<0.006	<0.005
28...	<0.014	<0.004	<0.018	<0.002	<0.005	<0.050	<0.026	<0.017	<0.001	<0.006	<0.005
MAY											
03...	<0.014	<0.004	<0.018	<0.002	<0.005	<0.050	<0.026	<0.017	<0.001	<0.006	<0.005
11...	<0.014	<0.004	<0.018	<0.002	<0.005	<0.050	<0.026	<0.017	<0.001	<0.006	<0.005
JAN 1995											
07...	<0.014	<0.004	<0.018	<0.002	<0.005	<0.050	<0.026	<0.017	<0.038	<0.006	0.007

Appendix--Field measurements and analytical results for samples collected during the Mesilla Valley synoptic study--Continued

Date	Metribuzin sencor, dissolved (mg/L) (82630)	Molinate, dissolved, rec (mg/L) (82671)	Napropamide, dissolved, rec (mg/L) (82684)	Neburon, dissolved, rec (mg/L) (49294)	Norflurazon, dissolved, rec (mg/L) (49293)	Oryzalin, dissolved, rec (mg/L) (49292)	Oxamyl, dissolved, rec (mg/L) (38866)	p,p' DDE, dissolved (mg/L) (34653)	Parathion, dissolved (mg/L) (39542)	Pebulate, dissolved, rec (mg/L) (82669)	Pendimethalin, dissolved, rec (mg/L) (82683)
SITE 15 USGS 08363840 RIO GRANDE AT VINTON BRIDGE NEAR ANTHONY, TEX.											
APR 1994											
07...	<0.011	<0.004	<0.003	<0.015	<0.024	<0.019	<0.018	<0.006	<0.004	<0.004	<0.004
12...	<0.011	<0.004	<0.003	<0.015	<0.024	<0.019	<0.018	<0.006	<0.004	<0.004	<0.004
19...	<0.011	<0.004	<0.003	<0.015	<0.024	<0.019	<0.018	<0.006	<0.004	<0.004	<0.004
27...	<0.011	<0.004	<0.003	<0.015	<0.024	<0.019	<0.018	<0.006	<0.004	<0.004	<0.004
MAY											
04...	<0.011	<0.004	<0.003	<0.015	<0.024	<0.019	<0.018	<0.006	<0.004	<0.004	<0.004
11...	<0.011	<0.004	<0.003	<0.015	<0.024	<0.019	<0.018	<0.006	<0.004	<0.004	<0.004
JAN 1995											
04...	<0.011	<0.004	<0.003	<0.070	<0.070	<0.070	<0.070	<0.006	<0.004	<0.004	<0.004
SITE 16 USGS 314754106332110 SUNLAND PARK WWTP AT SUNLAND PARK, N. MEX.											
APR 1994											
28...	<0.011	<0.004	<0.003	<0.015	<0.024	<0.019	<0.018	<0.006	<0.004	<0.004	<0.004
JAN 1995											
06...	<0.011	<0.004	<0.003	<0.015	<0.024	<0.019	<0.018	<0.006	<0.004	<0.004	<0.004
SITE 17 USGS 315007106355410 NEMEXAS DRAIN AT MEADOWLARK DRIVE NEAR EL PASO, TEX.											
APR 1994											
28...	<0.011	<0.004	<0.003	<0.015	<0.024	<0.019	<0.018	<0.006	<0.004	<0.004	<0.004
JAN 1995											
06...	<0.011	<0.004	<0.003	<0.070	<0.070	<0.070	<0.070	<0.006	<0.004	<0.004	<0.004
SITE 18 USGS 314810106324610 MONTOYA DRAIN AT LEVEE ROAD NEAR SUNLAND PARK, N. MEX.											
APR 1994											
28...	<0.011	<0.004	<0.003	<0.015	<0.024	<0.019	<0.018	<0.006	<0.004	<0.004	<0.004
JAN 1995											
06...	<0.011	<0.004	<0.003	<0.015	<0.024	<0.019	<0.018	<0.006	<0.004	<0.004	<0.004
SITE 19 USGS 08364000 RIO GRANDE AT EL PASO, TEX.											
APR 1994											
06...	<0.011	<0.004	<0.003	<0.015	<0.024	<0.019	<0.018	<0.006	<0.004	<0.004	<0.004
12...	<0.011	<0.004	<0.003	<0.015	<0.024	<0.019	<0.018	<0.006	<0.004	<0.004	<0.004
19...	<0.011	<0.004	<0.003	<0.015	<0.024	<0.019	<0.018	<0.006	<0.004	<0.004	<0.004
28...	<0.011	<0.004	<0.003	<0.015	<0.024	<0.019	<0.018	<0.006	<0.004	<0.004	<0.004
MAY											
03...	<0.011	<0.004	<0.003	<0.015	<0.024	<0.019	<0.018	<0.006	<0.004	<0.004	<0.004
11...	<0.011	<0.004	<0.003	<0.015	<0.024	<0.019	<0.018	<0.006	<0.004	<0.004	<0.004
JAN 1995											
07...	<0.011	<0.004	<0.003	<0.015	<0.024	<0.019	<0.018	E0.002	<0.004	<0.004	<0.004

Appendix--Field measurements and analytical results for samples collected during the Mesilla Valley synoptic study--Continued

Date	Permethrin, cis, dissolved, rec (mg/L) (82687)	Phorate, dissolved, rec (mg/L) (82664)	Picloram, dissolved, rec (mg/L) (49291)	Prometon, dissolved, rec (mg/L) (04037)	Pronamide, dissolved, rec (mg/L) (82676)	Propachlor, dissolved, rec (mg/L) (04024)	Propanil, dissolved, rec (mg/L) (82679)	Propargite, dissolved, rec (mg/L) (82685)	Propham, dissolved, rec (mg/L) (49236)	Propoxur, dissolved, rec (mg/L) (38538)	Silvex, dissolved (mg/L) (39762)
SITE 15 USGS 08363840 RIO GRANDE AT VINTON BRIDGE NEAR ANTHONY, TEX.											
APR 1994											
07...	<0.005	<0.002	<0.050	<0.018	<0.003	<0.007	<0.004	<0.013	<0.035	--	<0.021
12...	<0.005	<0.002	<0.050	<0.018	<0.003	<0.007	<0.004	<0.013	<0.035	<0.035	<0.021
19...	<0.005	<0.002	<0.050	<0.018	<0.003	<0.007	<0.004	<0.013	<0.035	<0.035	<0.021
27...	<0.005	<0.002	<0.050	<0.018	<0.003	<0.007	<0.004	<0.013	<0.035	--	<0.021
MAY											
04...	<0.005	<0.002	<0.050	<0.018	<0.003	<0.007	<0.004	<0.013	<0.035	<0.035	<0.021
11...	<0.005	<0.002	<0.050	<0.018	<0.003	<0.007	<0.004	<0.013	<0.035	<0.035	<0.021
JAN 1995											
04...	<0.005	<0.002	<0.070	<0.018	<0.003	<0.007	<0.004	<0.013	<0.070	<0.070	<0.070
SITE 16 USGS 314754106332110 SUNLAND PARK WWTP AT SUNLAND PARK, N. MEX.											
APR 1994											
28...	<0.005	<0.002	<0.050	<0.018	<0.003	<0.007	<0.004	<0.013	<0.035	<0.035	<0.021
JAN 1995											
06...	<0.005	<0.002	<0.050	<0.018	<0.003	<0.007	<0.004	<0.013	<0.035	<0.035	<0.021
SITE 17 USGS 315007106355410 NEMEXAS DRAIN AT MEADOWLARK DRIVE NEAR EL PASO, TEX.											
APR 1994											
28...	<0.005	<0.002	<0.050	<0.018	<0.003	<0.007	<0.004	<0.013	<0.035	--	<0.021
JAN 1995											
06...	<0.005	<0.002	<0.070	<0.018	<0.003	<0.007	<0.004	<0.013	<0.070	<0.070	<0.070
SITE 18 USGS 314810106324610 MONTOYA DRAIN AT LEVEE ROAD NEAR SUNLAND PARK, N. MEX.											
APR 1994											
28...	<0.005	<0.002	<0.050	<0.018	<0.003	<0.007	<0.004	<0.013	<0.035	--	<0.021
JAN 1995											
06...	<0.005	<0.002	<0.050	<0.018	<0.003	<0.007	<0.004	<0.013	<0.035	<0.035	<0.021
SITE 19 USGS 08364000 RIO GRANDE AT EL PASO, TEX.											
APR 1994											
06...	<0.005	<0.002	<0.050	<0.018	<0.003	<0.007	<0.004	<0.013	<0.035	--	<0.021
12...	<0.005	<0.002	<0.050	<0.018	<0.003	<0.007	<0.004	<0.013	<0.035	<0.035	<0.021
19...	<0.005	<0.002	<0.050	E0.007	<0.003	<0.007	<0.004	<0.013	<0.035	<0.035	<0.021
28...	<0.005	<0.002	<0.050	E0.009	<0.003	<0.007	<0.004	<0.013	<0.035	<0.035	<0.021
MAY											
03...	<0.005	<0.002	<0.050	E0.008	<0.003	<0.007	<0.004	<0.013	<0.035	<0.035	<0.021
11...	<0.005	<0.002	<0.050	<0.018	<0.003	<0.007	<0.004	<0.013	<0.035	<0.035	<0.021
JAN 1995											
07...	<0.005	<0.002	<0.050	<0.018	<0.003	<0.007	<0.004	<0.013	<0.035	<0.035	<0.021

Appendix--Field measurements and analytical results for samples collected during the Mesilla Valley synoptic study--Continued

Date	Simazine, dissolved, rec (mg/L) (04035)	Tebuthiuron, dissolved, rec (mg/L) (82670)	Terbacil, dissolved, rec (mg/L) (82665)	Terbufos, dissolved, rec (mg/L) (82675)	Thiobencarb, dissolved, rec (mg/L) (82681)	Trialate, dissolved, rec (mg/L) (82678)	Triclopyr, dissolved, rec (mg/L) (49235)	Trifluralin, dissolved, rec (mg/L) (82661)	Aldrin, total in bottom material (µg/kg) (39333)	Chlordane, total in bottom material (µg/kg) (39351)	DDD, total in bottom material (µg/kg) (39363)
SITE 15 USGS 08363840 RIO GRANDE AT VINTON BRIDGE NEAR ANTHONY, TEX.											
APR 1994											
07...	0.006	<0.010	<0.007	<0.013	<0.002	<0.001	<0.050	<0.002	--	--	--
12...	<0.005	<0.010	<0.007	<0.013	<0.002	<0.001	<0.050	<0.002	--	--	--
19...	<0.005	<0.010	<0.007	<0.013	<0.002	<0.001	<0.050	<0.002	--	--	--
27...	<0.005	<0.010	<0.007	<0.013	<0.002	<0.001	<0.050	<0.002	--	--	--
MAY											
04...	<0.005	<0.010	<0.007	<0.013	<0.002	<0.001	--	<0.002	--	--	--
11...	<0.005	<0.010	<0.007	<0.013	<0.002	<0.001	--	<0.002	--	--	--
JAN 1995											
04...	<0.005	<0.010	<0.007	<0.013	<0.002	<0.001	<0.070	<0.002	--	--	--
SITE 16 USGS 314754106332110 SUNLAND PARK WWTP AT SUNLAND PARK, N. MEX.											
APR 1994											
28...	<0.005	<0.010	<0.007	<0.013	<0.002	<0.001	<0.050	<0.002	--	--	--
JAN 1995											
06...	<0.005	<0.010	<0.007	<0.013	<0.002	<0.001	<0.050	<0.002	--	--	--
SITE 17 USGS 315007106355410 NEMEXAS DRAIN AT MEADOWLARK DRIVE NEAR EL PASO, TEX.											
APR 1994											
28...	<0.005	<0.010	<0.007	<0.013	<0.002	<0.001	<0.050	<0.002	--	--	--
JAN 1995											
06...	<0.005	<0.010	<0.007	<0.013	<0.002	<0.001	<0.070	<0.002	--	--	--
SITE 18 USGS 314810106324610 MONTOYA DRAIN AT LEVEE ROAD NEAR SUNLAND PARK, N. MEX.											
APR 1994											
28...	<0.005	<0.010	<0.007	<0.013	<0.002	<0.001	<0.050	<0.002	--	--	--
JAN 1995											
06...	<0.005	<0.010	<0.007	<0.013	<0.002	<0.001	<0.050	<0.002	<0.1	<1.0	0.7
SITE 19 USGS 08364000 RIO GRANDE AT EL PASO, TEX.											
APR 1994											
06...	0.008	<0.010	<0.007	<0.013	<0.002	<0.001	<0.050	<0.002	--	--	--
12...	<0.005	<0.010	<0.007	<0.013	<0.002	<0.001	<0.050	<0.002	--	--	--
19...	0.006	<0.010	<0.007	<0.013	<0.002	<0.001	<0.050	<0.002	--	--	--
28...	<0.005	<0.010	<0.007	<0.013	<0.002	<0.001	<0.050	<0.002	--	--	--
MAY											
03...	<0.005	<0.010	<0.007	<0.013	<0.002	<0.001	--	<0.002	--	--	--
11...	<0.005	<0.010	<0.007	<0.013	<0.002	<0.001	--	<0.002	--	--	--
JAN 1995											
07...	<0.005	<0.010	<0.007	<0.013	<0.002	<0.001	<0.050	0.010	--	--	--

Appendix--Field measurements and analytical results for samples collected during the Mesilla Valley synoptic study--Continued

Date	DDE, total in bottom material (µg/kg) (39368)	DDT, total in bottom material (µg/kg) (39373)	Diazinon, total in bottom material (µg/kg) (39571)	Dieldrin, total in bottom material (µg/kg) (39383)	Endosulfan, total in bottom material (µg/kg) (39389)	Endrin, total in bottom material (µg/kg) (39393)	Trithion, total in bottom material (µg/kg) (39787)	Ethion, total in bottom material (µg/kg) (39399)	Heptachlor, total in bottom material (µg/kg) (39413)	Heptachlor epoxide, total in bottom material (µg/kg) (39423)	Lindane, total in bottom material (µg/kg) (39343)
SITE 15 USGS 08363840 RIO GRANDE AT VINTON BRIDGE NEAR ANTHONY, TEX.											
APR 1994											
07...	--	--	--	--	--	--	--	--	--	--	--
12...	--	--	--	--	--	--	--	--	--	--	--
19...	--	--	--	--	--	--	--	--	--	--	--
27...	--	--	--	--	--	--	--	--	--	--	--
MAY											
04...	--	--	--	--	--	--	--	--	--	--	--
11...	--	--	--	--	--	--	--	--	--	--	--
JAN 1995											
04...	--	--	--	--	--	--	--	--	--	--	--
SITE 16 USGS 314754106332110 SUNLAND PARK WWTP AT SUNLAND PARK, N. MEX.											
APR 1994											
28...	--	--	--	--	--	--	--	--	--	--	--
JAN 1995											
06...	--	--	--	--	--	--	--	--	--	--	--
SITE 17 USGS 315007106355410 NEMEXAS DRAIN AT MEADOWLARK DRIVE NEAR EL PASO, TEX.											
APR 1994											
28...	--	--	--	--	--	--	--	--	--	--	--
JAN 1995											
06...	--	--	--	--	--	--	--	--	--	--	--
SITE 18 USGS 314810106324610 MONTOYA DRAIN AT LEVEE ROAD NEAR SUNLAND PARK, N. MEX.											
APR 1994											
28...	--	--	--	--	--	--	--	--	--	--	--
JAN 1995											
06...	3.2	0.7	<0.2	<0.4	<0.1	<0.1	<0.2	<0.2	<0.1	<0.1	<0.1
SITE 19 USGS 08364000 RIO GRANDE AT EL PASO, TEX.											
APR 1994											
06...	--	--	--	--	--	--	--	--	--	--	--
12...	--	--	--	--	--	--	--	--	--	--	--
19...	--	--	--	--	--	--	--	--	--	--	--
28...	--	--	--	--	--	--	--	--	--	--	--
MAY											
03...	--	--	--	--	--	--	--	--	--	--	--
11...	--	--	--	--	--	--	--	--	--	--	--
JAN 1995											
07...	--	--	--	--	--	--	--	--	--	--	--

Appendix--Field measurements and analytical results for samples collected during the Mesilla Valley synoptic study--Concluded

Date	Malathion, total in bottom material (µg/kg) {39531}	Methoxychlor, total in bottom material (µg/kg) {39481}	Methyl parathion, total in bottom material (µg/kg) {39601}	Mirex, total in bottom material (µg/kg) {39758}	Parathion, total in bottom material (µg/kg) {39541}	Perthane, in bottom material (µg/kg) {81886}	PCB, total in bottom material (µg/kg) {39519}	PCN, total in bottom material (µg/kg) {39251}	Toxaphene, total in bottom material (µg/kg) {39403}	Sediment, suspended (µg/L) {80154}	Sediment discharge, suspended (t/day) {80155}
SITE 15 USGS 08363840 RIO GRANDE AT VINTON BRIDGE NEAR ANTHONY, TEX.											
APR 1994											
07...	--	--	--	--	--	--	--	--	--	717	1,350
12...	--	--	--	--	--	--	--	--	--	362	626
19...	--	--	--	--	--	--	--	--	--	309	492
27...	--	--	--	--	--	--	--	--	--	192	379
MAY											
04...	--	--	--	--	--	--	--	--	--	226	384
11...	--	--	--	--	--	--	--	--	--	147	222
JAN 1995											
04...	--	--	--	--	--	--	--	--	--	142	40
SITE 16 USGS 314754106332110 SUNLAND PARK WWTP AT SUNLAND PARK, N. MEX.											
APR 1994											
28...	--	--	--	--	--	--	--	--	--	30	0.11
JAN 1995											
06...	--	--	--	--	--	--	--	--	--	--	--
SITE 17 USGS 315007106355410 NEMEXAS DRAIN AT MEADOWLARK DRIVE NEAR EL PASO, TEX.											
APR 1994											
28...	--	--	--	--	--	--	--	--	--	138	28
JAN 1995											
06...	--	--	--	--	--	--	--	--	--	--	--
SITE 18 USGS 314810106324610 MONTOYA DRAIN AT LEVEE ROAD NEAR SUNLAND PARK, N. MEX.											
APR 1994											
28...	--	--	--	--	--	--	--	--	--	142	31
JAN 1995											
06...	<0.2	<0.4	<0.2	<0.1	<0.2	<1.00	<1	<1.0	<10	--	--
SITE 19 USGS 08364000 RIO GRANDE AT EL PASO, TEX.											
APR 1994											
06...	--	--	--	--	--	--	--	--	--	199	E370
12...	--	--	--	--	--	--	--	--	--	189	367
19...	--	--	--	--	--	--	--	--	--	216	E379
28...	--	--	--	--	--	--	--	--	--	222	511
MAY											
03...	--	--	--	--	--	--	--	--	--	167	336
11...	--	--	--	--	--	--	--	--	--	169	E305
JAN 1995											
07...	--	--	--	--	--	--	--	--	--	184	88