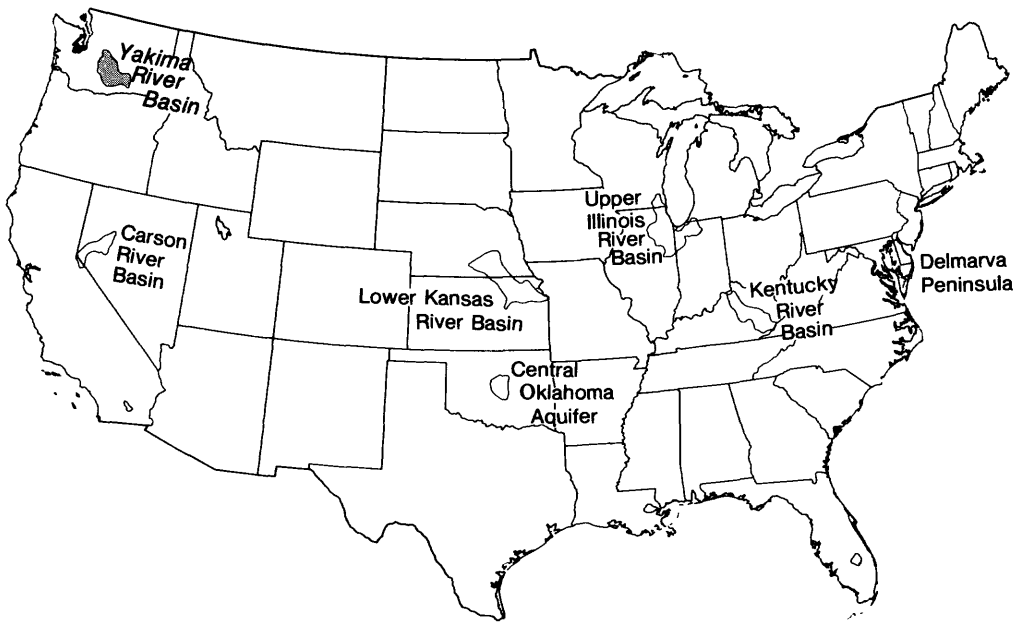
SURFACE-WATER-QUALITY ASSESSMENT OF THE YAKIMA RIVER BASIN, WASHINGTON: PESTICIDE AND OTHER TRACE-ORGANIC-COMPOUND DATA FOR WATER, SEDIMENT, SOIL, AND AQUATIC BIOTA, 1987-91

By J.F. Rinella, S.W. McKenzie, J.K. Crawford, W.T. Foreman, P.M. Gates, G.J. Fuhrer, and M.L. Janet



U.S. GEOLOGICAL SURVEY
Open-File Report 92—644

Portland, Oregon
1992

DEPARTMENT OF THE INTERIOR
MANUEL LUJAN, JR., Secretary

U.S. GEOLOGICAL SURVEY
Dallas L. Peck, Director

For additional information write to:

District Chief
U.S. Geological Survey
Water Resources Division
10615 S.E. Cherry Blossom Drive
Portland, Oregon 97216

Copies of this report can be purchased from:

Books and Open-File Reports
Box 25425
U.S. Geological Survey
Federal Center, Building 810
Denver, Colorado 80225

CONTENTS

ILLUSTRATIONS

TABLES

TABLES--Continued
Analytical Data--Continued
Water Column--Continued

TABLES--Continued
Analytical Data--Continued
Aquatic Biota

TABLES--Continued
Quality Assurance Data--Continued
Water Column--Continued

TABLES--Continued
Quality Assurance Data--Continued
Water Column--Continued

TABLES--Continued
Quality Assurance Data--Continued
Filtered Water--Continued

Suspended Sediment

Bed Sediment

TABLES--Continued
Quality Assurance Data--Continued

Page

Aquatic Biota

CONVERSION FACTORS

[SI = International System of units, a modernized metric system of measurement]

A. Factors for converting SI metric units to inch/pound units

Multiply	By	To obtain
	LENGTH	
centimeter (cm)	0.3937	inch (in)
millimeter (mm)	0.03937	inch
meter (m)	3.281	foot (foot)
	1.094	yard (yd)
	VOLUME	
milliliter (mL)	0.001057	quart (qt)
liter (L)	1.057	quart
liter	0.2642	gallon (gal)
	MASS	
gram (g)	0.03527	ounce (oz avoirdupois)
kilogram (kg)	2.205	pound (lb avoirdupois)
	TEMPERATURE	
degree Celsius (°C)	1/	degree Fahrenheit (°F)

B. Factor for converting inch/pound units to SI metric units

Multiply	By	To obtain
	VOLUME PER UNIT TIME (FLOW)	
cubic foot per second (ft^3/s)	0.02832	cubic meter per second (m^3/s)

1/ Temp degree F = 1.8 (Temp degree C) + 32

C. Factors for converting SI metric units to other miscellaneous units

Multiply	By	To obtain
CONCENTRATION, IN WATER		
milligrams per liter (mg/L)	1	parts per million (ppm)
nanograms per liter (ng/L)	1	parts per trillion (ppt)
nanograms per liter	0.000001	parts per million
CONCENTRATION, IN BED SEDIMENT		
micrograms per kilogram (μg/kg)	1	parts per billion (ppb)
micrograms per kilogram (μg/kg)	0.001	parts per million
CONCENTRATION, IN TISSUE		
micrograms per gram (μg/g)	1	parts per million
micrograms per kilogram (μg/kg)	1	parts per billion

Electrical conductivity is measured as specific electrical conductance, in units of microsiemens per centimeter (μS/cm) at 25 degrees Celsius.

Any use of trade, product, or firm names in this publication is for descriptive purposes only and does not imply endorsement by U.S. Government.

SURFACE-WATER-QUALITY ASSESSMENT OF THE YAKIMA RIVER BASIN, WASHINGTON: PESTICIDE AND OTHER TRACE-ORGANIC-COMPOUND DATA FOR WATER, SEDIMENT, SOIL, AND AQUATIC BIOTA, 1987-91

By J.F. Rinella, S.W. McKenzie, J.K. Crawford, W.T. Foreman, P.M. Gates, G.J. Fuhrer, and M.L. Janet

ABSTRACT

Chemical data are presented from an assessment of pesticides and other trace-organic compounds in stream-water, suspended-sediment, bed-sediment, soil, and aquatic-biota samples from the Yakima River basin in south-central Washington during 1987-91. The assessment is a component of the U.S. Geological Survey's National Water-Quality Assessment (NAWQA) Program. The program is designed to describe the status and trends in the quality of the Nation's ground- and surface-water resources, and to determine factors that affect water quality. This report includes the sampling plan, field-collection techniques, laboratory methods, and a compilation of concentration and quality-assurance data. The data may be used by scientists and water managers to assess: (1) spatial distribution of concentrations of trace-organic compounds, (2) temporal (including seasonal) variability in concentrations, (3) suitability of streams for beneficial uses, and (4) major natural and human factors that affect water quality.

Samples were collected upstream and downstream from human activities throughout the basin. Stream-water samples were collected from 32 stations; in addition, five samples were collected from wells in agricultural areas. Large volumes of stream and well water (up to 224 liters) were sampled, filtered, extracted, and analyzed in order to detect small concentrations of trace-organic compounds. Bed-sediment samples were collected from 58 stations (samples from 26 stations were individually analyzed and samples from the other 32 stations were composited into 7 samples for analysis by crop type). Soil samples were collected from three fields in the Moxee subbasin, an area with large concentrations of pesticides in agricultural runoff. Samples of fish, mollusks, crayfish, and aquatic plants were collected from 32 stations in the basin. Analyses for water, sediment, soils, and biota include chlorophenoxy-acid and triazine herbicides; carbamate, organochlorine, and organophosphorus pesticides; and (or) volatile and semi-volatile trace (polycyclic-aromatic hydrocarbons) organic compounds.

INTRODUCTION

The production and use of organic compounds has increased dramatically over the last 50 years and has resulted in a gradual increase in concentrations of these compounds in our Nation's streams (Smith and others, 1988). Thousands of different organic compounds are used annually in commerce and agriculture; moreover, an unknown number of by-products and degradation products result from the production and use of these compounds. Many organic compounds are directly or indirectly released into streams by way of industrial and domestic point-source discharges (specific discharge outlets, such as effluent from pipes), nonpoint-source runoff (such as runoff from agricultural

fields), ground-water discharges, and atmospheric deposition. Even in small concentrations in streams and streambed sediment, many of these compounds are harmful and even toxic to aquatic organisms. Our ability to accurately monitor organic compounds throughout the environment is essential for assessing their influence on aquatic biota, humans, and wildlife.

Background

The U.S. Geological Survey (USGS) was established in 1879 to provide scientific information on the Nation's water, energy, and mineral resources. A major part of the mission of the USGS is to assess the quantity and quality of the Nation's water resources and to provide information to assist resource managers and policy makers at Federal, State, Tribal, and local levels in making sound management decisions. To a significant extent, these responsibilities are being carried out in the USGS's National Water-Quality Assessment (NAWQA) Program (Leahy and others, 1990), whose goals include providing a sound understanding of the natural and human factors that affect water quality.

A major national concern is the degradation of water quality that results from pesticides and other trace-organic compounds in agricultural, industrial, and urban runoff. Crop yields are improved greatly by applying pesticides, and our lives are enhanced through the usage of organic compounds (including fossil fuels for energy, household cleaners, and many others); however, increased production and use of organic compounds often results in an increase in environmental effects. One of the first surface-water studies in the NAWQA Program to collect data on trace-organic compounds was conducted in the Yakima River basin, Washington, from 1987-91 (project described by McKenzie and Rinella [1987]). The Yakima River basin is one of the most intensively irrigated areas in the United States with Yakima County leading the Nation in the production of apples, mint, and hops (basin characteristics described by Rinella and others, 1992). Pesticide use in the basin is extensive.

Purpose and Scope

The purpose of this report is to document the sampling plan, field-collection techniques, and laboratory methods; and to provide a compilation of concentrations of trace-organic compounds collected during the Yakima NAWQA study (1987-91). The scope of this report includes a presentation of the sampling plan, field-collection techniques, laboratory methods, and a compilation of data including quality-control and quality-assurance data. In this study, water, stream-sediment, aquatic-biota, and a few soil samples were collected and analyzed for a variety of pesticides and other trace-organic compounds that have been, and (or) continue to be, used in the basin. These data may be used by scientists and resource managers to quantitatively describe the:

(1) spatial distribution of pesticides and other trace-organic compounds in surface water, stream sediment, and aquatic biota (fish, mollusks, crayfish, and plants) in the Yakima River basin;

(2) temporal (hourly, daily, and seasonal) variability in concentrations of trace-organic compounds in streams;

(3) suitability of streams for designated beneficial uses including aquatic-life and domestic uses; and,

(4) major natural and human factors that affect the distribution of trace-organic-compound concentrations.

Acknowledgments

The authors wish to acknowledge the aid and advice provided by members of the Yakima NAWQA Liaison Committee. During 1992, this committee included:

David W. Zimmer, U.S. Bureau of Reclamation
Richard Albright, U.S. Environmental Protection Agency
Bill Garrigues, U.S. Forest Service
Terry W. Berkompas, U.S. Bureau of Indian Affairs
Kate Benkert, U.S. Fish and Wildlife Service
Jannine Jennings, Yakima Indian Nation
Bob Barwin, Washington State Department of Ecology
Perry Harvester, Washington State Department of Fisheries
Brent Renfrow, Washington State Department of Wildlife
Glen Patrick, Washington State Department of Health
Dr. L. Clint Duncan, Washington Water Research Center, Central Washington State University
Skip Steinmetz, Yakima County Health Department
Ronald L. Van Gundy, Yakima River Basin Association of Irrigation Districts
Ray L. Wondercheck, U.S. Soil Conservation Service, District Conservationist
Elaine Taylor, Yakima Valley Conference of Governments
Mike Tobin, North Yakima Conservation District

Special thanks to: (1) the Yakima Indian Nation for their cooperation in providing staff time and equipment for electrofishing, reviewing reports, and giving USGS permission to collect water-quality and biological samples in the Yakima Indian Nation; (2) U.S. Fish and Wildlife Service, Washington State Department of Fisheries, Washington State Department of Game, and Jean-Pierre Wilson (Heritage College, Toppenish, Washington) for assistance and cooperation in electrofishing; (3) U.S. Bureau of Reclamation and the Prosser Experiment Station (Washington State University and U.S. Department of Agriculture) for providing laboratory facilities in the basin; (4) Gregory D. Foster and Frank A. Rinella (U.S. Geological Survey) for developmental work on the Goulden large-sample extractor used to lower minimum analytical reporting levels; (5) Washington State Department of Wildlife for providing refrigeration and freezer space at the Naches Fish Hatchery; and (6) Shen Xianchen (Institute of Water Conservancy and Hydroelectric Power Research, Chinese Academy of Sciences, Ministry of Water Resources and Electric Power, Beijing, China) for assistance in sampling and developing quality-assurance procedures for spiking bed-sediment samples.

DATA COLLECTION AND ANALYSIS

The focus of the NAWQA study in the Yakima River basin is to assess water-quality conditions at a regional scale which involves water-quality characterizations of persistent conditions in stream reaches that extend 20 or more river miles. A local-scale study, which is beyond the scope of this study, would attempt to describe the water-quality patterns within smaller reaches, of perhaps, several hundreds of yards or less. Although the local scale is not the focus of this assessment, data from this study may reveal several, previously unknown, local-scale concerns to human health and ecosystems.

Sampling Plan

The general sampling plan (sampling purpose and scope) and types of analyses for water, bed-sediment, soil, and aquatic-biota samples from the Yakima River basin are outlined in table 1. Locations of the water, bed-sediment, soil, and aquatic-biota stations are given in table 2 and are shown in figure 1.

Whole-water and most filtered-water samples were analyzed for carbamate, chlorophenoxy-acid, organochlorine, organophosphorus, triazine, and other pesticides (see table 3 for listing of pesticide compounds that were analyzed); in addition, a few samples were analyzed for phenol, cresol, and volatile compounds (see table 2 for listing of chemical families that were analyzed at each station). Bed-sediment samples were analyzed for organochlorine and semi-volatile (phthalate esters, ethers, phenols, cresols, and monocyclic- and polycyclic-aromatic hydrocarbons) organic compounds; most of these compounds are hydrophobic and tend to sorb to organic carbon associated with sediment. Soil samples were analyzed for organochlorine and organophosphorus compounds. Aquatic biota samples (fish, mollusks, crayfish, and plants) were analyzed for organochlorine compounds; in addition, mollusks and plant samples were analyzed for selected semi-volatile organic compounds (polycyclic-aromatic hydrocarbons).

Sample Collection, Processing, and Preservation

The selection of sampling media (whole water, dissolved phase, suspended sediment, bed sediment, soil, or aquatic biota) for analysis was based on physical and chemical characteristics of the trace-organic compounds. For example, hydrophobic compounds that strongly associate with organic matter generally were analyzed in bed-sediment, suspended-sediment, soil, and aquatic-biota samples; hydrophilic compounds that are readily soluble in water were analyzed in filtered-water samples and (or) whole-water samples.

To minimize sample contamination from extraneous sources of trace-organic compounds during collection, processing, and shipment, all samples (water, sediment, soil, and aquatic-biota samples) only came in contact with glass, ceramic, stainless steel, Teflon, bronze, cadmium-plated, or aluminum containers, funnels, sieves, pumps, and (or) sampling equipment; however, fish were caught in nylon nets and were measured on a plexiglass measuring board. Prior to sampling, all sampling equipment and containers were washed with non-phosphate detergent and rinsed with tap water and (or) distilled water. Sample

Table 1. Sampling plan for collecting trace-organic-compound samples, Yakima River basin, Washington, 1987-91

[See table 2 for listing of chemical families analyzed at each site and see table 3 for listing of compounds in in esch chemical family; DDT = dichlorodiphenyltrichloroethane; DDE = dichlorodiphenyldichloroethylene; DDD = dichlorodiphenyldichloroethane]

Sampling medium	Sampling period	Number of sites	Chemical family analyzed	Purpose of sampling	Analytical data shown in following tables:
Bed sediment	August-November 1987	36	Organochlorines Semi-volatiles	Two main-stem samples, one urban-runoff sample, and seven composited samples (4 to 5 sites per composite) representing seven different crop types were collected to examine land-use effects on bed-sediment chemistry.	24 and 26
Bed sediment	August-September 1988	8	Organochlorines Semi-volatiles	One main-stem site, one pristine site, one urban site, and five agricultural return flows were sampled to compare trace-organic-compound concentrations in bed sediment and in the water column.	24 and 26
Bed sediment	September 1988	4	Organochlorines Sami-volatiles	Sites were re-sampled and individually analyzed to examine variability in agricultural-return flows that drain apple orchards. Preliminary results from the 1987 sampling showed that dreins from apple orchards (one composited sample of five orchards) had larger concentrations of trace-organic compounds in bed sediment than those concentretions in drains from six other crop types.	24 and 26
Bed sediment	1989-90	16	Organochlorines Semi-volatiles	Sites were sampled to compare trace-organic-compound concentrations in bed sediment and aquatic biota.	24 and 26
Soil	July 1989	3	Organochlorines Organophosphorus	Soil samples were collected from the A and B horizons at several locations in Moxee subbasin. Moxee subbasin was selected because relatively large concentrations of p,p'-DDT, p,p'-DDE, and p,p'-DDD were observed in Moxee Drain in 1988. Hop fields were selected because surface-weter drainage from these fields are ladened with sediment and may be transporting trace-organic compounds that are sorbed to the sediment. An apple orchard was selected, because preliminary results from the 1987 sampling showed that dreins from apple orchards (one composited sample of five orchards) had larger concentrations of trace-organic compounds in bed sediment than those concentrations in drains from six other crop types.	24 and 25
Whole water	May, June, July, August, and November 1988, and March 1989	8	Organochlorines Organophosphorus Triazines Carbamates Chlorophenoxy acids Volatiles Phenols and cresols	One main-stem site, one pristine site, one urban site, and five agricultural-return flows were sampled to exemine seesonal variability in concentrations of trece organic compounds in whole-water samples. Three storm samples also were collected from the main-stem site, Yakima River at Kiona, in December, 1989.	5, 6, 8, 10, 15, 20, 21, and 23
Whole water	July 1988	18	Organochlorines Organophosphorus Triazines Carbemates Chlorophenoxy acids Phenols and cresols	Five main-stem sites, one pristine site, one urban site, the Naches River, and ten major agricultural-return flows were sampled synoptically (within a four-day period) during peak irrigation to determine the spatial distribution of concentrations and major sources of trace organic compounds in whole-water samples.	5, 6, 8, 10, 15, 20, and 21
Filtered and suspended phases (separate analyses of each phase)	June 1989	29	Organochlorines Organophosphorus Triazines Carbamates Chlorophenoxy acids	The main stem, major tributaries, and major agriculturel-return flows were sampled synoptically (within a 5-dey period) to determine transport characteristics of trece organic compounds in the basin during peak irrigation. In addition, two drinking-weter wells were sampled in the vicinity of intense agricultural activity to explore surface- and ground-weter relations.	5, 7, 9, 11, 13, 16, 18, and 22

Table 1. Sampling plan for collecting trace-organic-compound samples, Yakima River basin, Washington, 1987-91--Continued

Sampling medium	Sampling period	Number of sites	Chemical family analyzed	Purpose of sampling	Analytical data shown in following tables:
Filtered and suspended phases (separate analyses of each phase)	May, June, July, and September 1991	4	Organochlorines Organophosphorus	One mein-stam site and three major agriculturel-return flows were sampled to exemine the variability of dissolved- and suspended-phase transport of trece organic compounds during irrigation season.	5, 12, 14, 17, and 19
Ground water	January 1989	3	Organochlorines Organophosphorus	Three shellow wells were sampled neer the mouth of Moxee Drain to examine surfece- and ground-water relations.	10 and 15
Aquatic biota	May 1989	4	Organochlorines Polycyclic-aromatic hydrocarbons	A preliminary field test was conducted to provide estimates of time and resources required for collection and analysis of contaminants in tissues.	27, 28, and 29
Aquatic biota	October-November 1989	19	Organochlorines Polycyclic-aromatic hydrocarbons	Biota from sites where contamination was suspected and from reference sites were sampled to determine the occurrence of contaminants in tissues.	27, 28, and 29
Aqustic biota	October-November 1990	25	Organochlorines Polycyclic-aromatic hydrocarbons	Biota from widely dispersed sites in the basin were sampled to provide a spetial distribution of contaminants in tissues.	27, 28, and 29
Aquatic biota	October-November 1991	3	Organochlorines	Fish from three sites were sampled to examine contaminants in edible portions of fish, variability among fish, and conteminants in whole fish versus fish muscle tissue.	Data not shown in this report and will be evailable in 1993.

Table 2. Sampling locations for pesticide and other trace-organic compounds in water, bed sediment, soil, and aquatic biota, Yakima River basin, Washington, 1987-91

["WATSTORE" indicates U.S. Geological Survey's National WATer Data STOrage and REtrieval Computer System; see figure 1 for location of sampling sites in basin; Carb = carbamates and other compounds; Chlor = chlorophenoxy acid herbicides; OC = organochlorine compounds; OP = organophosphorus compounds; TR = triazine herbicides; V = volatile organic compounds; PC = phenols and cresols; SV = semi-volatile organic compounds; PAH = polycyclic-aromatic hydrocarbons; abbreviations in site names are as follows: ab = above, abv = above, Blvd = Boulevard, blw = below, Br = Bridge, Campgrnd = Campground, Cr = Creek, E = East, Fk = Fork, M.S. = Middle School, mi = miles, N.F. = North Fork, No = North, nr = near, R = River, Rd = Road, Rds = Roads, RM = River Mile, Rnch = Ranch, S.F. = South Fork, STP = sewage treatment plant, and W = West; latitude and longitude are listed in degrees, minutes, and seconds]

Map reference number	Station number	Station name from WATSTORE	Latitude	Longitude	Chemical families analyzed at each station
		Water samples			
2	12478200	Cooper River at Salmon LaSac nr Roslyn	47 24 29	121 06 11	Carb, Chlor, OC, OP, TR
3	12478300	Cle Elum R above Cle Elum Lake nr Roslyn	47 21 19	121 06 22	Carb, Chlor, OC, OP, TR
4	12479500	Yakima River at Cle Elum	47 11 35	120 56 55	Carb, Chlor, OC, OP, TR
11	12484100	Wilson Cr abv. Cherry Creek at Thrall	46 55 35	120 30 01	Carb, Chlor, OC, OP, TR
13	12484480	Cherry Creek at Thrall	46 55 34	120 29 51	Carb, Chlor, OC, OP, TR
14	12484500	Yakima River at Umtanum	46 51 46	120 28 44	Carb, Chlor, OC, OP, TR
15	12484550	Umtanum Creek nr mouth at Umtanum	46 51 27	120 29 46	Carb, Chlor, OC, OP, TR
19	12496510	Pacific Power & Light Company Wasteway	46 41 44	120 39 11	Carb, Chlor, OC, OP, TR, V
20	12496511	City of Yakima-Finish Water	46 41 43	120 39 10	Carb, Chlor, OC, OP, TR, V
21	12496550	Buckskin Slough blw Gleed Ditch nr Gleed	46 38 01	120 34 50	Carb, Chlor, OC, OP
22	12499000	Naches River nr North Yakima	46 37 42	120 31 10	Carb, Chlor, OC, OP, TR
23	12500420	Moxee Drain at Birchfield road nr Union Gap	46 32 46	120 26 13	OC, OP
24	12500430	Moxee Drain at Thorp Rd nr Union Gap	46 32 18	120 27 19	Carb, Chlor, OC, OP, PC, TR,
27	12500445	Wide Hollow Creek near mouth at Union Gap	46 32 19	120 28 17	Carb, Chlor, OC, OP, PC, TR,
28	12500450	Yakima R abv Ahtanum Cr at Union Gap	46 32 04	120 27 58	Carb, Chlor, OC, OP, PC, TR
30	12502500	Ahtanum Creek at Union Gap	46 32 10	120 28 20	Carb, OC, OP, TR
33	12505350	E Toppenish Drain at Wilson Rd nr Toppenish	46 22 04	120 15 00	Carb, Chlor, OC, OP, TR
34	12505410	Sub 35 Drain at Parton Road near Granger	46 20 11	120 13 48	Carb, Chlor, OC, OP, TR
35	12505450	Granger Drain at Granger	46 20 37	120 11 09	OC, OP
36	12505460	Granger Drain at mouth nr Granger	46 20 10	120 11 38	Carb, Chlor, OC, OP, PC, TR,
37	12505510	Marion Drain at Indian Church Rd at Granger	46 19 52	120 11 54	Carb, Chlor, OC, OP, TR
38	12507508	Toppenish Cr at Indian Church Rd nr Granger	46 18 52	120 11 53	Carb, Chlor, OC, OP, TR
40	12507585	Yakima River at RM 72 ab Satus Cr nr Sunnyside	46 16 11	120 05 30	Carb, Chlor, OC, OP, TR
41	12507594	Sstus Cr abv Wilson-Charley Canyon nr Toppenish	46 01 00	120 40 54	Carb, Chlor, OC, OP, TR
43	12508620	Satus Creek at gage at Satus	46 16 26	120 08 32	Carb, Chlor, OC, OP, TR
45	12508630	South Drain nr Satus	46 15 35	120 07 57	Carb, Chlor, OC, OP, TR
46	12508850	Sulphur Cr Wasteway nr Sunnyside	46 15 03	120 01 07	Carb, Chlor, OC, OP, PC, TR,
47	12509050	Yakima R at Euclid Br at RM 55 nr Grandview	46 13 01	119 55 00	Carb, Chlor, OC, OP, TR
48	12509489	Chandler Canal at Bunn Rd at Prosser	46 13 27	119 44 08	Carb, Chlor, OC, OP
49	12509710	Spring Creek at mouth at Whitstran	46 14 00	119 40 38	Carb, Chlor, OC, OP, TR
50	12509829	Snipes Creek at mouth at Whitstran	46 14 02	119 40 37	Carb, Chlor, OC, OP, TR
51	12510500	Yakima River at Kiona	46 15 13	119 28 37	Carb, Chlor, OC, OP, PC, TR,
53	461720120043201	Well 1, Sunnyside, 09N/22E-04P01	46 17 20	120 04 32	Carb, Chlor, OC, OP, TR
55	462510120323901	Well 2, Harrah, 11N/18E-22R02	46 25 10	120 32 39	Carb, Chlor, OC, OP, TR
58	463233120262101	Well 12N/19E-09H02	46 32 33	120 26 21	OC, OP
59	463234120261601	Well 12N/19E-09H01	46 32 34	120 26 16	OC, OP
61	463257120260801	Well 12N/19E-10D02	46 32 57	120 26 08	OC, OP
		Bed sediment			
1	12478100	Waptus River at mouth nr Roslyn	47 25 13	121 05 15	SV
3	12478300	Cle Elum R above Cle Elum Lake nr Roslynum	47 21 19	121 06 22	OC, SV
5	12479720	Jungle Creek nr mouth nr Cle Elum	47 20 30	120 51 59	OC, SV
6	12479750	No Fk Teanaway R blw bridge at Dickey Creek Campgrnd	47 17 21	120 51 30	OC
7	12480000	Teanaway River below forks near Cle Elum	47 14 48	120 51 36	OC, SV
8	12481900	Taneum Cr at Taneum Meadow nr Thorp	47 06 47	120 52 01	OC
9	12483190	South Fork Manastash Cr nr Ellensburg	46 58 18	120 48 32	OC
10	12483750	Naneum Cr blw High Cr nr Ellensburg	47 10 55	120 26 44	OC
13	12484480	Cherry Creek at Thrall	46 55 34	120 29 51	OC, SV
14	12484500	Yakima River at Umtanum	46 51 46	120 28 44	OC, SV
15	12484550	Umtanum Creek nr mouth at Umtanum	46 51 27	120 29 46	OC, SV
16	12487200	Little Naches River at mouth nr Cliffdell	46 59 20	121 05 55	OC
17	12488250	American River at Hells Crossing nr Nile	46 58 04	121 15 45	OC, SV
18	12489100	Rattlesnake Cr abv N.F. Rattlesnake Cr nr Nile	46 48 34	121 04 08	OC, SV
24	12500430	Moxee Drain at Thorp Rd nr Union Gap	46 32 18	120 27 19	OC, SV

Table 2. Sampling locations for pesticide and other trace-organic compounds in water, bed sediment, soil, and aquatic biota, Yakima River basin, Washington, 1987-91--Continued

Map reference number	Station number	Station name from WATSTORE	Latitude	Longitude	Chemical families analyzed at each station
		Bed sediment--Continued			
25	12500437	Wide Hollow Cr at W Valley M.S. nr Ahtanum	46 34 56	120 36 34	OC, SV
27	12500445	Wide Hollow Cr near mouth at Union Gap	46 32 19	120 28 17	OC, SV
28	12500450	Yakima R abv Ahtanum Cr at Union Gap	46 32 04	120 27 58	OC, SV
29	12500900	S.F. Ahtanum Cr abv Conrad Rnch nr Tampico	46 29 32	120 57 23	OC
31	12503640	Unnamed drain at Lateral & Riggs Rds nr Wapato	46 28 40	120 31 59	OC, SV
36	12505460	Granger Drain at mouth nr Granger	46 20 10	120 11 38	OC, SV
38	12507508	Toppenish Cr at Indian Church Rd nr Granger	46 18 52	120 11 53	OC, SV
42	12508500	Satus Cr below Dry Cr near Toppenish	46 15 00	120 22 40	OC
44	12508625	Yakima R blw Setus Cr at RM 68 nr Setus	46 15 06	120 05 45	OC, SV
46	12508850	Sulphur Cr Wastewey nr Sunnyside	46 15 03	120 01 07	OC, SV
49	12509710	Spring Creek at mouth at Whitstran	46 14 00	119 40 38	SV
51	12510500	Yakima River at Kione	46 15 13	119 28 37	OC, SV
52	461652119522000	Unnamed drain at County Line Rd nr Grandview	46 16 52	119 52 20	OC, SV
54	461744119522400	Unnamed drain to E Turbine Laterel nr Grandview	46 17 44	119 52 24	OC, SV
62	463359120281400	Unnamed urban runoff at Union Gap	46 33 59	120 28 14	OC, SV
63	463501120353300	Wide Hollow Creek at Ahtanum Blvd nr Ahtanum	46 35 01	120 35 33	OC, SV
		Composited bed-sediment samples by crop type (stations not shown in figure 1)			
--	--	Composited samples neer pear orchards			OC, SV
		Wide Hollow Cr at Ahtanum Blvd nr Ahtanum	46 35 01	120 35 33	
		Waste ditch south of Old Naches Road nr Naches	46 43 02	120 39 49	
		Road ditch at Houghton Rd above Roza Canal	46 25 34	120 11 33	
		Waste ditch, 0.2 mi south of East Zillah Drive	46 24 06	120 13 08	
--	--	Composited samples near apple orchards			OC, SV
		Wide Hollow Cr at Ahtanum Blvd nr Ahtanum	46 35 01	120 35 33	
		Road ditch north of Old Naches Road nr Gleed	46 40 56	120 38 01	
		Waste ditch at intersection of Lateral Rd and Riggs Rd	46 28 40	120 32 00	
		Unnamed drain to E Turbine Lateral nr Grandview	46 17 44	119 52 24	
		Unnamed drain at County Line Rd nr Grandview	46 16 52	119 52 20	
--	--	Composited samples near hops fields			OC, SV
		Waste ditch near Faucher Rd near Moxee Drain	46 32 47	120 22 24	
		Weste ditch near intersection of Fort Rd and Bench Rd	46 22 37	120 36 19	
		Waste ditch at McDoneld Rd, 0.6 mi north of Hanks Rd	46 16 52	119 43 24	
		Waste ditch at intersection of Hanks Rd and Hinzerling Rd	46 16 23	119 46 03	
		Waste ditch northeast of intersection of Bonnieview Rd and Olmstead Rd	46 15 41	119 52 53	
--	--	Composited samples near corn fields			OC, SV
		Waste ditch near intersection of Fort Rd and Island Rd	46 22 32	120 35 00	
		Waste ditch at Fort Rd, 0.4 mi east of Becker Rd	46 22 32	120 20 49	
		Waste ditch at Cemetary Rd, 0.3 mi north of Gap Rd	46 19 28	120 04 53	
		Waste ditch at Indian Church Rd near Granger	46 20 01	120 11 58	
		Waste ditch at Sorensen Rd, 0.5 mi east of Denmark Hall	46 56 30	120 25 22	
--	--	Composited samples near asparagus fields			OC, SV
		Waste ditch at Yost Rd, 0.5 west of South Wapato Rd	46 20 48	120 25 45	
		Waste ditch at Cemetary Rd, 0.3 mi north of Gap Rd	46 19 28	120 04 53	
		Waste ditch at intersection of Factory Rd and Bethany Rd	46 19 02	119 55 28	
		Waste ditch at intersection of Lemley Rd and Wilgus Rd	46 15 06	119 49 46	
		Waste ditch near intersection of Colwesh Rd and Winnier Rd	46 13 02	120 05 51	

Table 2. Sampling locations for pesticide and other trace-organic compounds in water, bed sediment, soil, and aquatic biota, Yakima River basin, Washington, 1987-91--Continued

Map reference number	Station number	Station name from WATSTORE	Latitude	Longitude	Chemicel families analyzed at each station
		Composited bed-sediment samples by crop type (stations not shown in figure 1)--Continued			
--	--	Composited samples near poteto fields			OC, SV
		Waste ditch at Orchard Rd, 0.1 mi south of Thrall Rd	46 55 44	120 28 28	
		Waste ditch at Dodge Rd, 0.4 mi south of Orchard Rd	46 55 03	120 27 15	
		Waste ditch at Sorensen Rd, 0.4 mi west of Denmark Hall	46 56 30	120 26 31	
		Waste ditch near intersection of Hanks Rd and Missimer Rd	46 16 26	119 48 55	
		Waste ditch at intersection of Olden Way Rd and Jensen Rd	46 19 57	120 22 28	
--	--	Composited samples near grape orchards			OC, SV
		Waste ditch, intersection--McCreadie and Griffin Rds	46 15 33	119 51 02	
		Waste ditch, intersection--McCreadie and Missimer Rds	46 15 32	119 48 31	
		Waste ditch, intersection--Snipes and Hinzerling Rds	46 18 11	119 46 15	
		Waste ditch, intersection--Phipps and Scoon Rds	46 22 38	120 00 51	
		Soils			
56	463202120223600	Apple orchard nr Moxee City	46 32 02	120 22 36	OC, OP
57	463232120234900	Hop field near Moxee City	46 32 32	120 23 49	OC, OP
60	463247120222300	Hop field nr Moxee City	46 32 47	120 22 23	OC, OP
		Aquatic biota			
1	12478100	Waptus River at mouth nr Roslyn	47 25 13	121 05 15	OC
4	12479500	Yakima River at Cle Elum	47 11 35	120 56 55	OC
5	12479720	Jungle Creek nr mouth nr Cle Elum	47 20 30	120 51 59	OC
6	12479750	No Fk Teanaway R blw bridge et Dickey Cr Campgrnd	47 17 21	120 51 30	OC
7	12480000	Teanaway River below forks near Cle Elum	47 14 48	120 51 36	OC
8	12481900	Taneum Cr at Taneum Meadow nr Thorp	47 06 47	120 52 01	OC
9	12483190	South Fork Manastash Cr nr Ellensburg	46 58 18	120 48 32	OC
10	12483750	Naneum Cr blw High Cr nr Ellensburg	47 10 55	120 26 44	OC
12	12484440	Cherry Creek abv Wipple Wasteway at Thrall	46 55 44	120 29 48	OC
13	12484480	Cherry Creek at Thrall	46 55 34	120 29 51	OC, PAH
14	12484500	Yakima River at Umtanum	46 51 46	120 28 44	OC, PAH
15	12484550	Umtanum Creek nr mouth at Umtanum	46 51 27	120 29 46	OC
16	12487200	Little Naches River at mouth nr Cliffdell	46 59 20	121 05 55	OC
17	12488250	American River at Hells Crossing nr Nile	46 58 04	121 15 45	OC
18	12489100	Rattlesnake Cr abv N.F. Rattlesnake Cr nr Nile	46 48 34	121 04 08	OC
22	12499000	Naches River nr North Yakima	46 37 42	120 31 10	OC
24	12500430	Moxee Drain at Thorp Rd nr Union Gap	46 32 18	120 27 19	OC, PAH
25	12500437	Wide Hollow Cr at W Valley M.S. nr Ahtanum	46 34 56	120 36 34	OC
26	12500442	Wide Hollow Cr at Old STP at Union Gap	46 32 35	120 28 26	OC, PAH
29	12500900	S.F. Ahtanum Cr abv Conrad Rnch nr Tampico	46 29 32	120 57 23	OC
30	12502500	Ahtanum Creek at Union Gep	46 32 10	120 28 20	OC
32	12503950	Yakime R at Parker	46 30 22	120 27 07	OC, PAH
36	12505460	Granger Drein et mouth nr Granger	46 20 10	120 11 38	OC
38	12507508	Toppenish Cr at Indian Church Rd nr Granger	46 18 52	120 11 53	OC, PAH
39	12507525	Yakima R blw Toppenish Cr at RM 79.6 nr Granger	46 18 58	120 09 13	OC
40	12507585	Yakima River at RM 72 eb Satus Cr nr Sunnyside	46 16 11	120 05 30	OC, PAH
41	12507594	Satus Cr abv Wilson-Cherley Canyon nr Toppenish	46 01 00	120 40 54	OC
42	12508500	Satus Cr below Dry Cr near Toppenish	46 15 00	120 22 40	OC
43	12508620	Satus Creek at gage et Satus	46 16 26	120 08 32	OC, PAH
46	12508850	Sulphur Cr Wasteway nr Sunnyside	46 15 03	120 01 07	OC
47	12509050	Yakime R at Euclid Br at RM 55 nr Grandview	46 13 01	119 55 00	OC, PAH
49	12509710	Spring Creek at mouth at Whitstran	46 14 00	119 40 38	OC, PAH
51	12510500	Yakima River at Kiona	46 15 13	119 28 37	OC, PAH

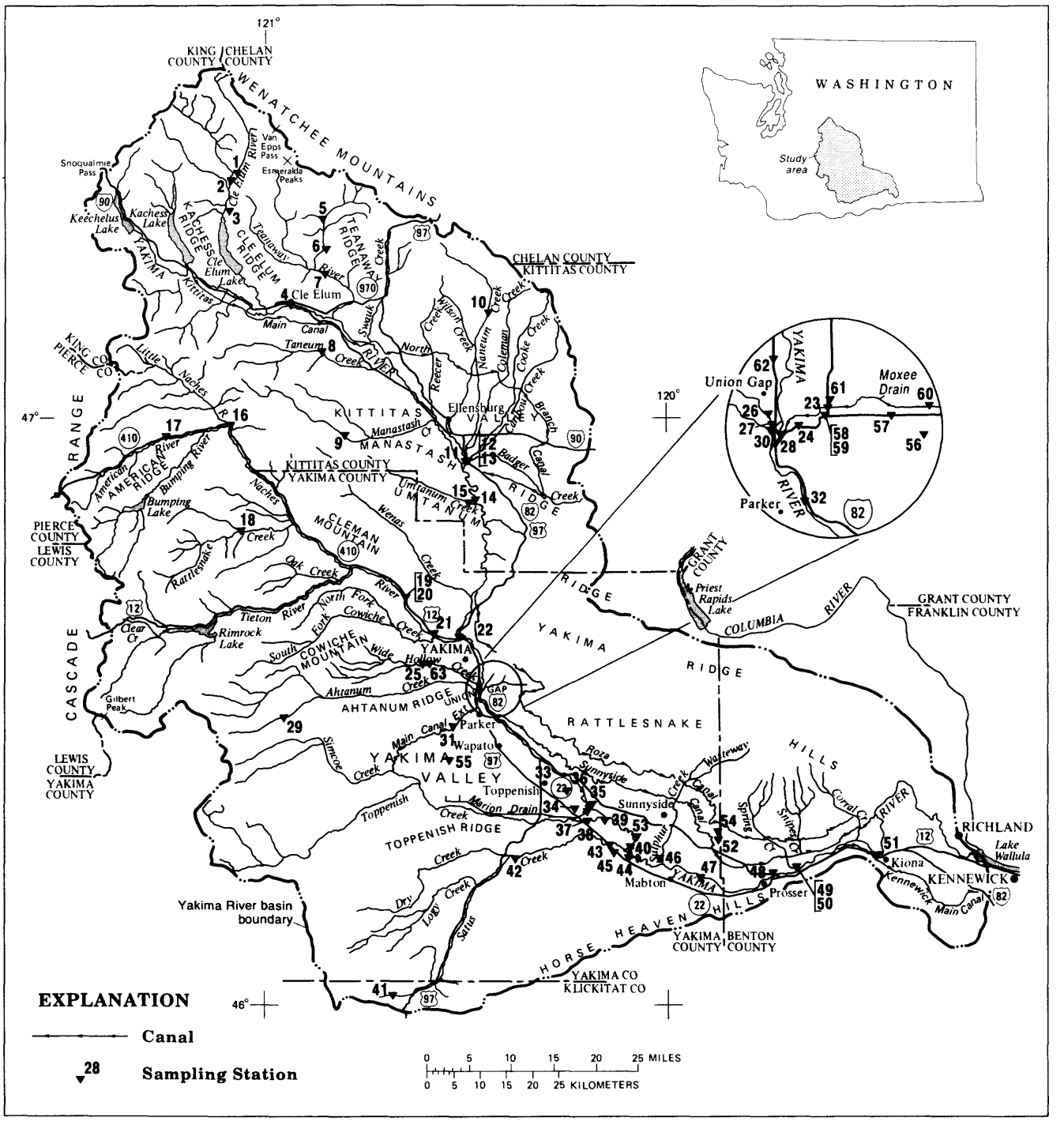


Figure 1.--Sampling stations for trace organic compounds in water, suspended sediment, bed sediment, soil, and aquatic biota, Yakima River basin,Washington, 1987-91. Reference numbers are shown on map and listed in Table 2.

Table 3. Common technical name and biological activity of pesticides analyzed in water, sediment, soil, and aquatic biota, Yakima River basin, Washington, 1987-91

[DDD = dichlorodiphenyldichloroethane; DDE = dichlorodiphenyldichloroethylene; DDT = dichlorodiphenyltrichloroethane; HCB = hexachlorobenzene; HCH = hexachlorocyclohexane; DEF = S,S,S-tributyl phosphorotrithioate; 2,4-D = (2,4-dichloro phenoxy)acetic acid; 2,4-DP = 2-(2,4-dichlorophenoxy)propionic acid; 2,4,5-T = (2,4,5-trichlorophenoxy)acetic acid; EPTC = S-ethyl dipropylthiocarbamate]

Common technical name	Biological activity
Organochlorine compounds	
Aldrin	Insecticide
cis-Chlordane	Insecticide--component of technical chlordane
trans-Chlordane	Insecticide--component of technical chlordane
Chlorothalonil	Fungicide
p,p'-DDD and o,p'-DDD	Insecticide and degradation product of DDT
p,p'-DDE and o,p'-DDE	Degradation products of DDT
p,p'-DDT and o,p'-DDT	Insecticides
Dacthal	Herbicide
1,3-Dichloropropene	Nematicide
Dieldrin	Insecticide and degradation product of aldrin
Dicofol	Acaricide
Endosulfan I	Insecticide and acaricide
Endosulfan II	Insecticide and acaricide
Endosulfan sulfate	Degradation product of endosulfan I and II
Endrin	Insecticide
Endrin aldehyde	Transformation product of endrin
Endrin ketone	Metabolite of endrin
HCB	Fungicide and industrial intermediate
alpha-HCH	Insecticide
beta-HCH	Insecticide
delta-HCH	Insecticide
Heptachlor	Insecticide--component of technical chlordane
Heptachlor epoxide	Degradation product of heptachlor
Kepone	Insecticide
Lindane (gamma-HCH)	Insecticide and rodenticide
o,p'-Methoxychlor and p,p'-Methoxychlor	Insecticides
Mirex	Insecticide and fire retardant
cis-Nonachlor	Insecticide--component of technical chlordane
trans-Nonachlor	Insecticide--component of technical chlordane
Oxychlordane	Degradation product of cis- and trans-chlordane
Perthane	Insecticide
Toxaphene	Insecticide, nematicide, herbicide, and fish poison
Organophosphorus compounds	
Azinphos-methyl	Insecticide and acaricide
Chlorpyrifos	Insecticide
DEF	Plant-growth regulator
Demeton-S	Insecticide and acaricide
Diazinon	Insecticide and acaricide
Dimethoate	Insecticide and acaricide
Disulfoton	Insecticide and acaricide
Ethion	Acaricide and insecticide
Fonofos	Insecticide
Isofenphos	Insecticide
Malathion	Insecticide and acaricide
Methidathion	Insecticide and acaricide
Methyl-parathion	Insecticide and acaricide
Methyl-trithion (methyl-carbophenothion)	Insecticide and acaricide
Mevinphos	Insecticide and acaricide
Parathion	Insecticide and acaricide
Phorate	Insecticide, acaricide, and nematicide
Phosphamidon	Insecticide and acaricide
Terbufos	Insecticide and nematicide
Trithion (carbophenothion)	Insecticide and acaricide

Table 3. Common technical name and biological activity of pesticides analyzed in water, sediment, soil, and aquatic biota, Yakima River basin, Washington, 1987-91--Continued

Common technical name	Biological activity
Chlorophenoxy acid herbicides	
2,4-D	Herbicide
2,4-DP (dichlorprop)	Herbicide and plant-growth regulator
Fenoprop (Silvex)	Herbicide
2,4,5-T	Herbicide
Triazine compounds	
Ametryn	Herbicide
Atrazine	Herbicide
Cyanazine	Herbicide
Deethyl-atrazine	Degradation product of atrazine and propazine
Deisopropyl-atrazine	Degradation product of atrazine and simazine
Hexazinone	Herbicide
Metribuzin	Herbicide
Prometon	Herbicide
Prometryn	Herbicide
Propazine	Herbicide
Simazine	Herbicide
Simetryn	Herbicide
Carbamate compounds	
Aldicarb	Insecticide, acaricide, and nematicide
Aldicarb sulfone	Nematicide and insecticide; degradation product of aldicarb
Aldicarb sulfoxide	Degradation product of aldicarb
Carbaryl	Insecticide and plant-growth regulator
Carbofuran	Insecticide, acaricide, and nematicide
3-Hydroxycarbofuran	Hydrolysis product of carbofuran
Methiocarb	Molluscicide, insecticide, acaricide, and repellent
Methomyl	Insecticide and acaricide
1-Naphthol	Insecticide; hydrolysis product of carbaryl
Oxamyl	Insecticide, acaricide, and nematicide
Propham	Herbicide and plant-growth regulator
Propoxur	Insecticide
Thiocarbamate compounds	
Butylate	Herbicide
Cycloate	Herbicide
EPTC (also listed in carbamate family)	Herbicide
Vernolate	Herbicide
Acetamide compounds	
Alachlor (also listed in chloroacetanilide family)	Herbicide
Diphenamid	Herbicide
Metolachlor	Herbicide
Anilide compounds	
Carboxin	Fungicide
Benzoic compounds	
Dicamba	Herbicide

Table 3. Common technical name and biological activity of pesticides analyzed in water, sediment, soil, and aquatic biota, Yakima River basin, Washington, 1987-91--Continued

Common technical name	Biological activity
	Chloroacetanilide compounds (chloroacetamide compounds)
Butachlor	Herbicide
Propachlor	Herbicide
	Conazole compounds
Triadimefon	Fungicide
	Pyrethoid compounds
Flucythrinate	Insecticide
cis-Permethrin	Insecticide
trans-Permethrin	Insecticide
	Pyridine compounds
Picloram	Herbicide
	Sulfite compounds
Propargite	Acaricide
	Trifluoromethyl compounds
Trifluralin	Herbicide
	Uracil compounds
Bromacil	Herbicide
Terbacil	Herbicide
	Urea compounds
Linuron	Herbicide

bottles and filters were oven-baked at 300-450°C [degrees Celsius] (preferably 450°C) for 8 or more hours. Lid liners were made of Teflon or oven-baked aluminum-foil inserts. Sampling equipment was rinsed with high-purity methanol or methylene chloride (especially manufactured for pesticide-residue analysis) followed by copious rinsings with stream water from the sampling location.

Whole Water

Water samples for analyses of trace-organic-compounds in whole-water, dissolved, and suspended-sediment phases were collected using the equal-width increment method. This method provides samples with (1) chemical concentrations that are discharge-weighted vertically and laterally, and (2) a sample volume at each sampling point in the transect that is proportional to the water discharge in the sampled zone (Ward and Harr, 1990).

A DH-75H sampler (a 1.5 pound sampler on a hand-held rod; Ward and Harr, 1990) was used for collecting water samples in wadeable streams; a DH-76 sampler (a 22 pound sampler on a hand line; Ward and Harr, 1990) was used for collecting samples from bridges and cableways. These samplers were fitted with Teflon nozzles and gaskets, and were designed to use 1-quart glass bottles.

Whole-water samples were chilled with ice within 30-40 minutes after collection, and were shipped within 2 to 5 days after collection to the USGS National Water-Quality Laboratory (NWQL) in Arvada, Colorado, where the samples were analyzed.

The following ancillary data were collected during most water-column samplings: streamflow, suspended-sediment concentrations and (or) turbidity, particle size of suspended sediment (percent sand), pH, specific conductance, stream temperature, suspended organic carbon, and dissolved organic carbon.

Filtered Water and Suspended Sediment

Selected whole-water samples for trace-organic compounds (up to 224 liters) were filtered through a 293-mL (millimeter) diameter, stainless-steel, filtration unit containing a glass-fiber filter (1-μm [micrometer] nominal pore diameter, binder-free filter). Except for samples collected in June 1989, filtered water was placed into glass bottles (conventional analysis for a chemical family--such as, triazines--requires one liter of sample), chilled with ice, and shipped for analysis to the USGS National Water-Quality Laboratory in Arvada, Colorado. To obtain lower minimum reporting levels for the samples collected in June 1989, large volumes of filtered water (4.4 to 112 liters) were extracted at a field laboratory with methylene chloride using the Goulden large-sample extractor [GLSE] (Goulden and Anthony, 1985; Foster and others, 1991). The GLSE extracts were placed in amber-colored glass bottles and sealed with Teflon-lined caps; the iced samples were shipped to the USGS Methods Research and Development Program Laboratory in Arvada, Colorado, for analysis.

The suspended sediment trapped on the filters also was analyzed. Prior to removing a filter for analysis from the filtration unit, excess water was removed by applying a gentle vacuum to the outlet port. The filter, which contained suspended sediment for chemical analysis, was folded in half and then into quarters, wrapped in cleaned, baked aluminum foil, and placed in

polyethylene storage bags. The samples were preserved by freezing in dry ice and were shipped frozen to the USGS National Water-Quality Laboratory, except for 13 samples collected in June, 1989, and shipped to the USGS Methods Research and Development Program Laboratory. In this report, concentrations of trace-organic compounds associated with suspended sediment are reported in nanograms per liter (calculated by dividing the mass of the trace-organic compound by the volume of water that passed through the filter).

Bed Sediment and Soil

Most bed-sediment samples were collected in late summer and early fall, near or at the end of irrigation season. Bed-sediment samples were collected to provide (1) a historical integration of water-quality conditions, (2) the amount and distribution of trace-organic compounds that are sorbed onto sediment particles, and (3) additional evidence concerning the occurrence of trace-organic compounds in the aquatic environment.

Bed-sediment samples were collected and processed using Teflon, stainless-steel, or glass sampling equipment, sieves, trays, and containers. Hand-held scoops were used for sampling shallow wadeable streams, and a Teflon-lined Ekman grab sampler was used for sampling deep streams. During sample collection, samples were isolated from the stream current in order to minimize loss of fine-grained sediment. The surficial layer (upper 0.5 inch) of bed sediment was sampled and analyzed to provide an estimate of concentrations of trace-organic compounds that were sorbed to the most recently deposited sediment. When possible, the samples were stream-width integrated by collecting and compositing a minimum of 5 samples in a transect; however, most samples were collected in low velocity zones in the reach (usually near the shoreline) in order to obtain fine-grained sediment. The bed-sediment samples were separated into size classes using stainless-steel sieves with 2-mm, 180 μm, and 62-μm openings. Samples were wet sieved using stream water from the sampling location. Immediately after sieving, size classes of samples were chilled with ice.

Soil samples were collected from the A- and B-soil horizons (as designated by the U.S. Soil Conservation Service) using a stainless-steel scoop. The soil samples were not sieved, and were placed in glass containers and chilled to less than 4°C. Bed-sediment and soil samples were packed in ice and shipped to the USGS National Water-Quality Laboratory, generally within 2 to 5 days after sample collection.

Aquatic Biota

Four different types of biological organisms were collected for analysis of organic compounds: mollusks, fish, crayfish, and aquatic plants. Using an underwater viewer to locate organisms, mollusks were collected from the stream bottom by hand or by using a kick net. The kick-net-collection method involved placing a net downstream from an area likely to contain mollusks. The target area then was disturbed by kicking or raking the stream bottom, so that mollusks would drift downstream into the net. Fish were collected by electrofishing, using both backpack and boat-mounted electrofishers. Electrofishing involves stunning the fish using an electrical current and then netting the immobilized fish. Crayfish were collected using kick nets. Vascular aquatic plants were collected by hand, and samples were stored in native water until they were processed. Processing occurred as quickly as could be accomplished following sampling, and always within 6 hours of collection.

All biological samples collected in 1989 and 1990 were composites of multiple organisms. Typically, samples were composited by species, and each composite consisted of about 20 mollusks, 10 fish, or 20 crayfish. At least 20 grams (wet weight) of plant material were collected for each sample of rooted aquatic plants. At some sampling sites, the number of organisms needed for a composite sample could not be collected; therefore, composite samples from these sites contained fewer than the desired number of individuals.

During 1991, additional samples were collected to assess contaminants in edible portions of fish, to compare the sensitivity of using whole fish versus fish muscle for detecting selected trace-organic compounds, and to compare the variability of concentrations of selected trace-organic compounds in whole fish and fish muscle. For this comparison, the study required sampling and analyzing several individual fish, not composited.

Sample-processing procedures varied, depending on the organism collected. For mollusks, organisms were washed in native water using a brush to remove attached sediment, algae, bacteria, and other debris. Mollusks were then placed in deionized water and held at 10°C for 3 days. Holding water was changed every 24 hours. The holding period allows an organism to purge ingested materials from its gut. Sediment and food in the gut is not part of the tissue of the organism and including this material would bias the analytical results. Following the gut-purging period, the maximum length of each individual in the composite sample was measured to the nearest millimeter. The shell was opened by cutting the adductor muscle with a stainless-steel scalpel, and the soft tissue was scraped into a precleaned, tared glass jar having a Teflon lid liner. The jar containing all the individuals in the composite was sealed, weighed, and labeled. Samples were packed in dry ice and frozen for shipment to the laboratory for analysis.

For fish, two different sample-preparation techniques were used, one for whole fish and another for fish muscle tissue. Sample preparation for whole fish involved rinsing the fish in native water, weighing and measuring each individual, collecting a scale sample to use for aging the fish, and examining each fish for external abnormalities. Each fish was wrapped in aluminum foil and all fish in a composite were placed in a labeled plastic bag and packed in dry ice for shipment to the laboratory for analysis. Small fish, comprising a composite sample, were wrapped together in one aluminum-foil packet.

For fish muscle tissue, sample preparation involved rinsing, weighing, measuring, scale-sample collection, an external examination, and the additional step of opening the body cavity to determine the sex of the fish. Then, a rectangular cut approximately 2 mm wide and 5 mm long was made through the skin of the fish on its left side, between the dorsal fin and the lateral line. This cut was made using a stainless-steel scalpel and forceps; each had been rinsed in methanol. This skin was peeled away exposing the muscle tissue underneath. Using a second set of pre-cleaned dissecting instruments, a rectangular block of muscle tissue was extracted, weighed, and placed in aluminum foil or in a precleaned glass jar. These samples were packed in dry ice for shipment to the laboratory for analysis.

Crayfish were triple rinsed using native water, then rinsed in deionized water, placed in a precleaned glass jar, weighed, and frozen. Frozen samples were shipped to the laboratory.

Only the apical 5 cm (centimeters) of rooted aquatic plants were collected. These plants were placed in a stainless-steel beaker and rinsed copiously using native water followed by distilled water. The sample was allowed to soak in distilled water for two hours, with a change of water after 1 hour. The soaking water was then drained, and the sample was placed in a precleaned, tared jar, weighed, and frozen.

All biological samples collected prior to 1991 were analyzed by the Mississippi State Chemical Laboratory at Mississippi State University. Fish-tissue samples collected in 1991 were analyzed at the USGS National Water-Quality Laboratory in Arvada, Colorado.

Laboratory Methods

Whole-water, filtered-water, and suspended-sediment samples were analyzed for carbamate, chlorophenoxy-acid (except suspended sediment), organochlorine, organophosphorus, triazine, and other pesticides; in addition, a few samples were analyzed for phenol, cresol, and volatile compounds (see table 2 for listing of chemical families that were analyzed at each station). Bed-sediment samples were analyzed for organochlorine and semi-volatile (phthalate esters, ethers, phenols, cresols, and monocyclic- and polycyclic-aromatic hydrocarbons) organic compounds. Soil samples were analyzed for organochlorine and organophosphorus compounds. Aquatic-biota samples (fish, mollusks, crayfish, and plants) were analyzed for organochlorine compounds; in addition, mollusks and plant samples were analyzed for selected semi-volatile organic compounds, namely polycyclic-aromatic hydrocarbons. The analytical laboratories and the methods of analysis for the water, suspended-sediment, bed-sediment, soils, and aquatic-biota samples are referenced in table 4. Three types of water-column samples were analyzed: whole water (water and suspended-sediment mixture), filtered water (water passing through a 1-μm-pore-size glass-fiber filter), and suspended sediment (direct analysis of sediment retained on a 1-μm-pore-size glass-fiber filter). Several different size classes of bed sediment were analyzed to provide data for examining associations among sediment particle size, concentrations of trace-organic compounds, and organic carbon.

Quality Assurance

Quality-assurance data for replicates, spikes, and blanks are shown in tables 30 through 55 at back of this report. The accuracy of water, sediment, and aquatic-biota analyses may be assessed by analyzing blanks (water, filters, and biological tissue) and by spiking the samples with (1) one or more of the target compounds (referred to as a spiked sample in this report--also known as a matrix spike), and [or] (2) surrogate compounds. A surrogate compound is similar in physical and chemical properties to the compounds of interest; however, they usually do not occur in natural or polluted water (Wershaw and others, 1987). Surrogate-spike recoveries may be used to estimate sample-processing errors and may be related to matrix effects; however, spike recoveries may not reflect the performance for analyzing other organic compounds in the matrix. Matrix spikes provide an estimate of method performance for extracting compounds from the water matrix; however, the analytical recoveries do not necessarily reflect extraction efficiencies of compounds from sediment/water mixtures (whole-water samples), bed-sediment, and biological samples.

Table 4. Laboratories where whole-water, filtered-water, suspended-sediment, bed-sediment, soil, and aquatic-biota samples were analyzed, Yakima River basin, Washington, 1987-91

[USGS = U.S. Geological Survey; EPA = U.S. Environmental Protection Agency; DDD = dichlorodiphenyldichloroethane]

Sample type	Period of sampling	Analyzing laboratory or group	Reference for analytical method	Table in this report where data are listed
Whole water	1988-91	USGS National Water-Quality Laboratory in Arvada, Colorado	Wershaw and others (1987); EPA Method 524.2 for volatiles USGS Method O-3116-86 for phenols and cresols (written communications, June, 1992, Michael P. Schroeder, USGS, Arvada, Colorado)	6, 8, 10, 15, 20, 21, and 23
Filtered water	June 1989 (except chlorophenoxy-acid herbicides)	USGS Methods Research and Development Program in Arvada, Colorado	Method listed in Appendix A	7, 11, 16, and 22
	June 1989 (chlorophenoxy-acid herbicides)	USGS National Water-Quality Laboratory in Arvada, Colorado	Wershaw and others (1987)	9
	May-September 1991	USGS National Water-Quality Laboratory in Arvada, Colorado	Wershaw and others (1987)	12 and 17
Suspended sediment	June 1989 (all samples with determinations for o,p'-DDD in table 13)	USGS Methods Research and Development Program in Arvada, Colorado	Method listed in Appendix B	13 and 18
	June 1989 (all samples with missing determinations for o,p'-DDD in table 13)	USGS National Water-Quality Laboratory in Arvada, Colorado	Wershaw and others (1987)	13 and 18
	May-September 1991	USGS National Water-Quality Laboratory in Arvada, Colorado	Wershaw and others (1987)	14 and 19
Bed sediment	August-November 1987 (organochlorine compounds)	Tennessee Valley Authority Laboratory Branch in Chattanooga, Tennessee	EPA Method 8080 for solid waste (U.S. Environmental Protection Agency, 1986)	24
Bed sediment and soils	1987 (semi-volatile compounds) 1988-90 (all compounds)	USGS National Water-Quality Laboratory in Arvada, Colorado	Wershaw and others (1987); Wershaw and others (1983) for semi-volatiles except soxhlet extraction with methylene chloride and methanol was used, and biobead cleanup was not performed	24, 25, and 26
Aquatic biota	May 1989 October-November 1989 October-November 1990	Mississippi State University--The Mississippi State Chemical Laboratory	Cromartie and others (1975)	27, 28, and 29
Aquatic biota	October-November 1991	USGS National Water-Quality Laboratory in Arvada, Colorado	--	Data not shown in this report and will be available in 1993

Except for whole-water samples in this study, precision may be assessed by evaluating results of duplicate analyses (samples that were thought to be essentially identical in composition); these results reflect sample-processing and laboratory precision. Duplicate whole-water samples were collected within 60 minutes of one another in this study; consequently, the results also reflect short-term changes in stream quality.

Blank solutions consisted of distilled water that presumably was free of target analytes. These solutions were analyzed concurrently with the filtered-water samples that were extracted using the GLSE. Blank filters (clean, oven-baked filters without suspended sediment) also were analyzed. Except for beta-hexachlorocyclohexane (beta-HCH), which exhibited quantifiable concentrations in most of the blank filters, target compound concentrations generally were below the minimum reporting levels in the blank solutions and blank filters. As a result of contamination from the filter, concentrations of beta-HCH are not reported for the suspended-sediment phase.

REFERENCES

Cromartie, Eugene, Reichel, W.L., Locke, L.N., Belisle, A.A., Kaiser, T.E., Lamont, T.G., Mulhern, B.M., Prouty, R.M., Swineford, D.M., 1975, Residues of organochlorine pesticides and polychlorinated biphenyls and autopsy data for bald eagles, 1971-72: Pesticides Monitoring Journal, v. 9, p. 11-14.

Foster, G.D., Foreman, W.T., and Gates, P.M., 1991, Performance of the Goulden large-sample extractor in multiclass pesticide isolation and preconcentration from stream water: Journal of Agricultural and Food Chemistry, v. 39, p. 1618-1622.

Goulden, P.D., and Anthony, D.H.J., 1985, Design of a large-scale extractor for the determination of organics in water: Environment Canada, National Water Research Institute, Report 85-121, Burlington, Ontario, Canada.

Leahy, P.P., Rosenshein, J.S., and Knopman, D.S., 1990, Implementation plan for the National Water-Quality Assessment Program: U.S. Geological Survey Open-File Report 90-174, 10 p.

Lee, M.L., Vassilaros, D.L., White, C.M., and Novotny, M., 1979, Retention Indicies for programmed-temperature capillary-column gas chromatography of polycyclic aromatic hydrocarbons: Analytical Chemistry, v. 51, no. 6, p. 768-773.

McKenzie, S.W., and Rinella, J.F., 1987, Surface-water-quality assessment of the Yakima River basin, Washington: Project description: U.S. Geological Survey Open-File Report 87-238, 35 p.

Miller, J.C., and Miller, J.N., 1986, Statistics for analytical chemistry: John Wiley & Sons, New York, p. 82-118.

Rinella, J.F., McKenzie, S.W., and Fuhrer, G.J., 1992, Surface-water-quality assessment of the Yakima River basin, Washington: Analysis of available water-quality data through 1985 water year: U.S. Geological Survey Open-File Report 91-453, 261 p. (pending publication as a U.S. Geological Survey Water Supply Paper 2354-B).

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

U.S. Environmental Protection Agency, 1986 (November), Test methods for evaluating solid waste (3rd ed.): Washington, D.C., Office of Solid Waste and Emergency Response.

Ward, J.R., and Harr, A., eds., 1990, Methods for collection and processing of surface-water and bed-material samples for physical and chemical analyses: U.S. Geological Survey Open-File Report 90-140, 71 p.

Wershaw, R.L., Fishman, M.J., Grabbe, R.R., and Lowe, L.E., eds, 1983, Methods for the determination of organic substances in water and fluvial sediments: U.S. Geological Survey Open-File Report 82-1004, 173 p.

_____ 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.

ANALYTICAL DATA

Data tables have been grouped and presented by sampling media: water-column data are listed in tables 5-23, bed-sediment and soil data in tables 24-26, and aquatic-biota data in tables 27-29. For each sampling medium, data are arranged alphabetically by chemical family. For each chemical family, water-column data are arranged by sampling phase (whole-water, filtered-water, and then suspended-sediment phase).

Table 5. Field measurements, suspended sediment, turbidity, organic carbon, and selected nutrient data for surface-water and ground-water sites where water samples were collected, Yakima River basin, Washington, 1988-91

[°C = degress Celsius; µS/cm = microsiemens per centimeter at 25 degrees Celsius; mg/L = micrograms per liter; NTU = nephelometric turbidity units; C = Carbon; N = Nitrogen; P = Phosphorus; NO2 = Nitrite; NO3 = Nitrate; "E" = estimated value; "*" = data collected at 0920 hour; "+" = data collected at 0915 hour; "^" = data collected at 1400 hour; "--" = not analyzed or measured; "<" = less than; ">" = greater than; see figure 1 for site locations]

Map reference number	Station number	Station name	Date	Time	Discharge, instantaneous (ft^3/s)	Temperature water (°C)	Specific conductance (µS/cm)
2	12478200	Cooper River at Salmon LaSac nr Roslyn	06-28-89	1900	229	11.0	24
3	12478300	Cle Elum R above Cle Elum Lake nr Roslyn	05-05-88	1100	885	5.5	47
3	12478300	Cle Elum R above Cle Elum Lake nr Roslyn	06-02-88	0930	1,000	5.5	37
3	12478300	Cle Elum R above Cle Elum Lake nr Roslyn	07-26-88	1000	607	14.5	31
3	12478300	Cle Elum R above Cle Elum Lake nr Roslyn	08-31-88	1030	199	15.0	45
3	12478300	Cle Elum R above Cle Elum Lake nr Roslyn	11-16-88	1030	539	4.5	50
3	12478300	Cle Elum R above Cle Elum Lake nr Roslyn	03-09-89	1015	166	2.0	118
4	12479500	Yakima River at Cle Elum	07-26-88	1500	3,780	16.5	49
4	12479500	Yakima River at Cle Elum	06-29-89	1200	3,780	10.5	47
11	12484100	Wilson Creek abv. Cherry Creek at Thrall	07-26-88	1615	83	22.0	213
11	12484100	Wilson Creek abv. Cherry Creek at Thrall	06-29-89	1600	144	15.0	210
13	12484480	Cherry Creek at Thrall	05-05-88	1530	266	13.0	262
13	12484480	Cherry Creek at Thrall	06-02-88	1400	305	12.0	363
13	12484480	Cherry Creek at Thrall	06-02-88	1405	--	--	--
13	12484480	Cherry Creek at Thrall	07-26-88	1030	127	16.0	412
13	12484480	Cherry Creek at Thrall	08-31-88	1630	225	--	334
13	12484480	Cherry Creek at Thrall	11-18-88	1000	76	7.5	460
13	12484480	Cherry Creek at Thrall	03-09-89	1400	250	4.0	359
13	12484480	Cherry Creek at Thrall	06-29-89	1830	126	16.0	245
14	12484500	Yakima River at Umtanum	07-27-88	1045	3,830*	15.5*	77*
14	12484500	Yakima River at Umtanum	06-28-89	1700	3,630	13.0	88
14	12484500	Yakima River at Umtanum	06-28-89	1705	--	--	--
15	12484550	Umtanum Creek nr mouth at Umtanum	06-28-89	1400	1.0	16.5	205
19	12496510	Pacific Power & Light Company Wasteway	06-25-89	1700	501	16.5	51
20	12496511	City of Yakima-Finish Water	06-25-89	1630	21	14.0	54
21	12496550	Buckskin Slough blw Gleed Ditch nr Gleed	05-22-91	1100	17	--	--
21	12496550	Buckskin Slough blw Gleed Ditch nr Gleed	06-12-91	1345	19	14.0	270
22	12499000	Naches River nr North Yakima	07-26-88	1330	328	21.0	82
22	12499000	Naches River nr North Yakima	06-27-89	1015	1,190	13.0	67
23	12500420	Moxee Drain at Birchfield Road nr Union Gap	05-23-91	1000	68	12.0	242
23	12500420	Moxee Drain at Birchfield Road nr Union Gap	06-17-91	1100	77	14.0	247
23	12500420	Moxee Drain at Birchfield Road nr Union Gap	06-20-91	1645	146	14.5	249
23	12500420	Moxee Drain at Birchfield Road nr Union Gap	07-10-91	1240	51	20.0	313
23	12500420	Moxee Drain at Birchfield Road nr Union Gap	09-04-91	1115	63	15.0	300
24	12500430	Moxee Drain at Thorp Rd nr Union Gap	05-06-88	0930	87	11.5	279
24	12500430	Moxee Drain at Thorp Rd nr Union Gap	05-06-88	0940	--	--	--
24	12500430	Moxee Drain at Thorp Rd nr Union Gap	06-01-88	1600	79	17.0	275
24	12500430	Moxee Drain at Thorp Rd nr Union Gap	07-26-88	1100	76	--	296
24	12500430	Moxee Drain at Thorp Rd nr Union Gap	07-27-88	1310	76	23.0	309
24	12500430	Moxee Drain at Thorp Rd nr Union Gap	07-28-88	1605	70	23.0	320
24	12500430	Moxee Drain at Thorp Rd nr Union Gap	07-29-88	0800	91	17.5	266
24	12500430	Moxee Drain at Thorp Rd nr Union Gap	08-30-88	1730	77	20.5	280
24	12500430	Moxee Drain at Thorp Rd nr Union Gap	11-15-88	1015	26	9.5	649
24	12500430	Moxee Drain at Thorp Rd nr Union Gap	03-10-89	1200	24	7.0	606
24	12500430	Moxee Drain at Thorp Rd nr Union Gap	06-28-89	1030	65	14.5	295
24	12500430	Moxee Drain at Thorp Rd nr Union Gap	06-28-89	1035	--	--	--
27	12500445	Wide Hollow Creek near mouth at Union Gap	05-05-88	1845	44	12.5	247
27	12500445	Wide Hollow Creek near mouth at Union Gap	06-03-88	0730	61	12.5	202
27	12500445	Wide Hollow Creek near mouth at Union Gap	07-27-88	1025	26	18.5	322
27	12500445	Wide Hollow Creek near mouth at Union Gap	08-30-88	1430	22	17.5	324
27	12500445	Wide Hollow Creek near mouth at Union Gap	11-15-88	1330	23	12.0	446
27	12500445	Wide Hollow Creek near mouth at Union Gap	11-15-88	1430	--	--	--
27	12500445	Wide Hollow Creek near mouth at Union Gap	03-10-89	1400	82	7.0	253
27	12500445	Wide Hollow Creek near mouth at Union Gap	06-30-89	1000	33	15.0	260
28	12500450	Yakima R abv Ahtanum Cr at Union Gap	07-27-88	1600	2,890	21.0	86
28	12500450	Yakima R abv Ahtanum Cr at Union Gap	06-27-89	1630	3,630	17.0	92

Table 5. Field measurements, suspended sediment, turbidity, organic carbon, and selected nutrient data for surface-water and ground-water sites where water samples were collected, Yakima River basin, Washington, 1988-91--Continued

Station number	Date	Oxygen, dissolved (mg/L)	pH (standard units)	Turbidity (NTU)	Sediment, suspended (mg/L)	Carbon, organic suspended total (mg/L as C)	Carbon, organic dissolved (mg/L as C)	Nitrogen, ammonia + organic total (mg/L as N)	Nitrogen, NO2+NO3 dissolved (mg/L as N)	Phosphorus total (mg/L as P)	Phosphorus ortho, dissolved (mg/L as P)
12478200	06-28-89	10.2	8.2	--	2	0.1	1.1	--	0.036	--	<0.001
12478300	05-05-88	--	7.6	--	<1	.1	3.4	--	--	--	--
12478300	06-02-88	--	7.7	--	3	.1	1.6	--	--	--	--
12478300	07-26-88	--	7.6	2.8	<1	.1	1.6	--	--	--	--
12478300	08-31-88	--	8.0	--	1	.1	.7	--	--	--	--
12478300	11-16-88	--	7.7	--	2	.3	.8	--	--	--	--
12478300	03-09-89	--	8.0	--	1	.1	.8	--	--	--	--
12479500	07-26-88	--	7.9	1.7	5	.1	1.8	--	--	--	--
12479500	06-29-89	11.0	7.7	--	6	.1	2.8	--	.047	--	<.001
12484100	07-26-88	--	8.4	7.6	10	.5	4.8	.50	.63	.16	.10
12484100	06-29-89	10.4	8.1	--	13	.2	5.1	--	.59	--	.08
12484480	05-05-88	--	8.2	--	91	2.3	4.4	--	--	--	--
12484480	06-02-88	--	8.1	--	64	.9	4.9	--	--	--	--
12484480	06-02-88	--	8.1	--	68	.8	--	--	--	--	--
12484480	07-26-88	--	8.2	37	82	1.6	5.2	.70	3.1	.25	.21
12484480	08-31-88	--	8.1	--	45	.8	3.9	--	--	--	--
12484480	11-18-88	--	8.3	--	25	.4	2.6	--	--	--	--
12484480	03-09-89	--	8.1	--	1,020	>4.2	12	--	--	--	--
12484480	06-29-89	9.2	8.1	--	121	2.1	9.1	--	.87	--	.11
12484500	07-27-88	--	7.6*	6.0	19	.5	2.6	<.20	.15	.04	.017
12484500	06-28-89	10.8	8.1	--	25	.3	5.8	--	.46	--	.04
12484500	06-28-89	--	--	--	25	.3	2.4	--	--	--	--
12484550	06-28-89	9.4	8.1	--	1	.1	2.1	--	.016	--	.082
12496510	06-25-89	--	7.8	--	4	.2	1.2	--	<.010	--	.015
12496511	06-25-89	--	7.0	--	.2	<.1	.8	--	<.010	--	<.001
12496550	05-22-91	--	--	--	14	.4	1.8	--	--	--	--
12496550	06-12-91	--	--	1.5	8	.3	2.2	--	--	--	--
12499000	07-26-88	--	9.1	2.9	3	.2	2.6	1.2	2.7	.25	.13
12499000	06-27-89	10.5	8.1	--	6	.2	1.4	--	.045	--	.005
12500420	05-23-91	--	--	40	252	1.6	2.4	.40	.81	.23	.08
12500420	06-17-91	--	--	56	373	3.5	2.4	.50	.86	.15	.10
12500420	06-20-91	--	--	190	1,450	E10	6.6	2.1	2.3	.70	.26
12500420	07-10-91	--	--	150	903	1.4	3.5	.90	2.3	.43	.09
12500420	09-04-91	--	--	42	337	2.2	2.9	.40	1.1	.37	.10
12500430	05-06-88	--	8.2	--	134	1.0	3.3	--	--	--	--
12500430	05-06-88	--	--	--	143	1.0	3.2	--	--	--	--
12500430	06-01-88	--	8.3	--	296	1.9	3.3	--	--	--	--
12500430	07-26-88	--	7.9	--	597	3.4	4.0	1.0	1.2	.45	.15
12500430	07-27-88	--	8.1	>100	443	3.2	4.7	.40	1.2	.39	.15
12500430	07-28-88	--	8.2	--	565	4.9	3.1	.40	1.2	.28	.17
12500430	07-29-88	--	8.0	--	607	>3.2	3.9	.40	.98	.15	.18
12500430	08-30-88	--	8.1	--	157	1.5	3.2	--	--	--	--
12500430	11-15-88	--	8.5	--	58	1.2	6.5	--	--	--	--
12500430	03-10-89	--	8.5	--	47	--	5.1	--	--	--	--
12500430	06-28-89	9.2	6.2	--	436	>4.3	2.9	--	1.3	--	.11
12500430	06-28-89	--	--	--	432	>4.6	2.8	--	--	--	--
12500445	05-05-88	--	7.9	--	17	1.0	2.0	--	--	--	--
12500445	06-03-88	--	7.4	--	28	.7	5.4	--	--	--	--
12500445	07-27-88	--	7.8	2.8	8	.3	2.6	<.20	1.4	.13	.12
12500445	08-30-88	--	7.8	--	5	.2	1.8	--	--	--	--
12500445	11-15-88	--	8.1	--	5	.2	1.3	--	--	--	--
12500445	11-15-88	--	8.1	--	5	.4	22	--	--	--	--
12500445	03-10-89	--	7.9	--	211	>4.1	8.4	--	--	--	--
12500445	06-30-89	10.0	7.8	--	8	<.1	1.6	--	1.3	--	.07
12500450	07-27-88	--	8.4	13	22	.6	3.1	<.20	.16	.09	.04
12500450	06-27-89	10.0	8.5	--	24	.7	1.6	--	.16	--	.03

Table 5. Field measurements, suspended sediment, turbidity, organic carbon, and selected nutrient data for surface-water and ground-water sites where water samples were collected, Yakima River basin, Washington, 1988-91--Continued

Map reference number	Station number	Station name	Date	Time	Discharge, instantaneous (ft^3/s)	Temperature water (°C)	Specific conductance ($\mu S/cm$)
30	12502500	Ahtanum Creek at Union Gap	06-30-89	1230	23	17.0	320
33	12505350	E Toppenish Drain at Wilson Rd nr Toppenish	06-29-89	1700	53	16.0	149
34	12505410	Sub 35 Drain at Parton Road near Granger	06-29-89	1500	56	16.0	241
35	12505450	Granger Drain at Granger	05-23-91	1230	51	15.0	330
35	12505450	Granger Drain at Granger	06-17-91	1420	55	17.5	358
35	12505450	Granger Drain at Granger	06-20-91	1400	93	15.5	757
35	12505450	Granger Drain at Granger	07-10-91	1500	61	22.0	353
35	12505450	Granger Drain at Granger	09-04-91	1420	86	18.5	326
36	12505460	Granger Drain at mouth nr Granger	05-06-88	1230	37	13.0	418
36	12505460	Granger Drain at mouth nr Granger	06-01-88	1300	56	15.5	357
36	12505460	Granger Drain at mouth nr Granger	07-28-88	0730	49	17.0	350
36	12505460	Granger Drain at mouth nr Granger	07-28-88	0930	49	17.0	328
36	12505460	Granger Drain at mouth nr Granger	09-02-88	1000	63	16.5	304
36	12505460	Granger Drain at mouth nr Granger	11-15-88	1645	29	12.0	652
36	12505460	Granger Drain at mouth nr Granger	03-09-89	1730	30	10.5	689
36	12505460	Granger Drain at mouth nr Granger	06-27-89	1700	37	18.5	360
36	12505460	Granger Drain at mouth nr Granger	06-27-89	1705	--	--	--
37	12505510	Marion Drain at Indian Church Rd at Granger	07-28-88	1145	39	19.5	257
37	12505510	Marion Drain at Indian Church Rd at Granger	06-29-89	1130	71	16.0	242
38	12507508	Toppenish Cr at Indian Church Rd nr Granger	05-06-88	1345	322	13.0	217
38	12507508	Toppenish Cr at Indian Church Rd nr Granger	06-03-88	1000	105	13.5	207
38	12507508	Toppenish Cr at Indian Church Rd nr Granger	07-28-88	1445	54	21.5	262
38	12507508	Toppenish Cr at Indian Church Rd nr Granger	09-01-88	0930	58	--	267
38	12507508	Toppenish Cr at Indian Church Rd nr Granger	11-16-88	1615	27	8.5	451
38	12507508	Toppenish Cr at Indian Church Rd nr Granger	03-08-89	1600	90	8.5	402
38	12507508	Toppenish Cr at Indian Church Rd nr Granger	06-26-89	1445	39	21.5	262
40	12507585	Yakima River at RM 72 ab Satus Cr nr Sunnyside	06-30-89	1030	1,070	16.5	194
41	12507594	Satus Cr abv Wilson-Charley Canyon nr Toppenish	06-26-89	0940	12	12.5	54
43	12508620	Satus Creek at gage at Satus	07-29-88	1145	83	20.0	334
43	12508620	Satus Creek at gage at Satus	06-29-89	1945	124	17.5	279
45	12508630	South Drain nr Satus	06-27-89	1300	82	18.0	314
46	12508850	Sulphur Cr Wasteway nr Sunnyside	05-06-88	1630	302	15.5	264
46	12508850	Sulphur Cr Wasteway nr Sunnyside	06-03-88	1300	370	14.0	239
46	12508850	Sulphur Cr Wasteway nr Sunnyside	07-28-88	1200	151	18.0	333
46	12508850	Sulphur Cr Wasteway nr Sunnyside	07-28-88	1700	144	21.5	381
46	12508850	Sulphur Cr Wasteway nr Sunnyside	08-31-88	1530	235	20.0	290
46	12508850	Sulphur Cr Wasteway nr Sunnyside	08-31-88	1630	227	20.0	290
46	12508850	Sulphur Cr Wasteway nr Sunnyside	11-17-88	0900	75	11.0	669
46	12508850	Sulphur Cr Wasteway nr Sunnyside	03-08-89	1200	63	9.0	693
46	12508850	Sulphur Cr Wasteway nr Sunnyside	06-26-89	2000	265	20.0	259
46	12508850	Sulphur Cr Wasteway nr Sunnyside	06-26-89	2005	--	--	--
46	12508850	Sulphur Cr Wasteway nr Sunnyside	05-24-91	1000	380	14.0	224
46	12508850	Sulphur Cr Wasteway nr Sunnyside	06-19-91	1145	246	15.5	292
46	12508850	Sulphur Cr Wasteway nr Sunnyside	06-20-91	1200	800	15.5	465
46	12508850	Sulphur Cr Wasteway nr Sunnyside	07-11-91	1155	137	18.5	317
46	12508850	Sulphur Cr Wasteway nr Sunnyside	09-05-91	1130	341	17.0	273
47	12509050	Yakima R at Euclid Br at RM 55 nr Grandview	07-28-88	1010	963	23.0+	267
47	12509050	Yakima R at Euclid Br at RM 55 nr Grandview	06-28-89	1020	1,560	19.5	250
48	12509499	Chandler Canal at Bunn Rd at Prosser	05-22-91	1500	1,480	--	--
48	12509499	Chandler Canal at Bunn Rd at Prosser	06-13-91	1240	1,430	15.5	141
49	12509710	Spring Creek at mouth at Whitstran	07-29-88	1300	24^	23.0	290
49	12509710	Spring Creek at mouth at Whitstran	06-30-89	1800	47	19.0	192
50	12509829	Snipes Creek at mouth at Whitstran	07-29-88	1500	33	24.0	168
50	12509829	Snipes Creek at mouth at Whitstran	06-30-89	1430	50	18.0	167

Table 5. Field measurements, suspended sediment, turbidity, organic carbon, and selected nutrient data for surface-water and ground-water sites where water samples were collected, Yakima River basin, Washington, 1988-91--Continued

Station number	Date	Oxygen, dissolved (mg/L)	pH (standard units)	Turbidity (NTU)	Sediment, suspended (mg/L)	Carbon, organic suspended total (mg/L as C)	Carbon, organic dissolved (mg/L as C)	Nitrogen, ammonia + organic total (mg/L as N)	Nitrogen, NO2+NO3 dissolved (mg/L as N)	Phosphorus total (mg/L as P)	Phosphorus ortho, dissolved (mg/L as P)
12502500	06-30-89	9.8	8.1	--	9	0.1	2.3	--	--	--	--
12505350	06-29-89	8.6	7.7	--	52	.9	1.6	--	1.8	--	0.13
12505410	06-29-89	8.3	7.8	--	28	.7	1.6	--	2.0	--	.05
12505450	05-23-91	--	--	75	557	2.8	--	.80	1.6	.42	.28
12505450	06-17-91	--	--	87	576	E5.4	3.6	1.2	1.8	.49	.33
12505450	06-20-91	--	--	230	963	E10	22	5.7	6.8	1.6	.80
12505450	07-10-91	--	--	180	1,020	E9	5.8	1.6	1.9	.34	.22
12505450	09-04-91	--	--	50	396	2.4	3.5	.60	1.2	.49	.09
12505460	05-06-88	--	8.2	--	205	2.0	3.0	--	--	--	--
12505460	06-01-88	--	8.2	--	526	3.1	6.7	--	--	--	--
12505460	07-28-88	--	8.0	>100	421	3.0	4.1	1.8	2.0	.71	.16
12505460	07-28-88	--	7.8	>100	432	1.7	4.1	.90	2.0	.32	.16
12505460	09-02-88	--	7.7	--	282	1.6	2.8	--	--	--	--
12505460	11-15-88	--	8.4	--	62	1.0	2.4	--	--	--	--
12505460	03-09-89	--	8.5	--	92	2.3	11	2.8	3.2	.67	.34
12505460	06-27-89	7.9	8.2	--	643	>4.7	3.3	--	1.9	--	.19
12505460	06-27-89	--	--	--	643	>4.5	35	--	--	--	--
12505510	07-28-88	--	8.7	--	7	.3	2.8	.50	2.4	.08	.08
12505510	06-29-89	10.7	8.2	--	29	.8	1.8	--	2.1	--	.07
12507508	05-06-88	--	8.2	--	32	.9	2.5	--	--	--	--
12507508	06-03-88	--	7.9	--	--	--	3.0	--	--	--	--
12507508	07-28-88	--	8.3	>10	13	.1	2.3	.50	2.4	.11	.08
12507508	09-01-88	--	7.7	--	11	.3	2.8	--	--	--	--
12507508	11-16-88	--	8.6	--	337	>5.2	27	--	--	--	--
12507508	03-08-89	--	8.7	--	30	.9	5.4	--	--	--	--
12507508	06-26-89	10.5	8.5	--	32	.4	2.1	--	1.80	--	.07
12507585	06-30-89	8.9	7.5	--	44	1.4	1.7	--	.84	--	.05
12507594	06-26-89	9.6	7.8	--	2	.2	1.2	--	.01	--	.006
12508620	07-29-88	--	8.0	14	21	.6	2.7	.40	2.2	.13	.08
12508620	06-29-89	8.5	7.8	--	38	.8	2.0	--	1.7	--	.08
12508630	06-27-89	8.5	8.3	--	145	1.8	2.7	1.2	--	.11	--
12508850	05-06-88	--	8.8	--	70	1.0	3.0	--	--	--	--
12508850	06-03-88	--	8.1	--	204	1.3	3.6	--	--	--	--
12508850	07-28-88	--	8.1	--	128	--	3.0	<.20	.48	.03	.10
12508850	07-28-88	--	8.1	--	99	1.4	3.2	.60	3.1	.26	.14
12508850	08-31-88	--	8.0	--	83	1.2	60	--	--	--	--
12508850	08-31-88	--	8.2	--	67	1.1	3.6	--	--	--	--
12508850	11-17-88	--	8.4	--	19	1.0	1.9	--	--	--	--
12508850	03-08-89	--	8.4	--	108	1.6	3.7	--	--	--	--
12508850	06-26-89	8.5	8.1	--	245	2.3	2.3	--	1.8	--	.09
12508850	06-26-89	--	--	--	217	2.4	2.3	--	--	--	--
12508850	05-24-91	--	--	18	130	.6	2.3	.80	1.2	.16	.04
12508850	06-19-91	--	--	33	180	1.8	2.7	.90	2.0	.16	.07
12508850	06-20-91	--	--	250	909	E11	15	3.6	4.6	.87	.32
12508850	07-11-91	--	--	47	272	E3.4	3.0	2.2	2.0	1.2	.22
12508850	09-05-91	--	--	30	316	1.7	2.4	.70	1.8	.31	.05
12509050	07-28-88	--	8.3+	24	26	--	4.1	.30	1.2	.13	.09
12509050	06-28-89	8.6	8.2	--	47	.7	12	--	1.1	--	.06
12509499	05-22-91	--	--	--	38	.7	2.2	--	--	--	--
12509499	06-13-91	--	--	20	115	2.1	1.9	--	--	--	--
12509710	07-29-88	--	8.2	33	140	1.5	2.5	.20	1.1	.13	.06
12509710	06-30-89	9.0	7.8	--	196	--	2.3	--	.64	--	.06
12509829	07-29-88	--	7.8	>100	53	.8	2.0	<.20	.38	.09	.03
12509829	06-30-89	9.2	7.8	--	65	1.3	1.8	--	.39	--	.03

Table 5. Field measurements, suspended sediment, turbidity, organic carbon, and selected nutrient data for surface-water and ground-water sites where water samples were collected, Yakima River basin, Washington, 1988-91--Continued

Map reference number	Station number	Station name	Date	Time	Discharge, instantaneous (ft^3/s)	Temperature water (°C)	Specific conductance ($\mu S/cm$)
51	12510500	Yakima River at Kiona	05-07-88	0800	1,960	14.0	242
51	12510500	Yakima River at Kiona	06-01-88	0900	1,870	14.5	222
51	12510500	Yakima River at Kiona	07-29-88	1030	854	24.0	306
51	12510500	Yakima River at Kiona	08-31-88	1000	1,610	20.0	320
51	12510500	Yakima River at Kiona	11-17-88	1400	2,410	8.0	251
51	12510500	Yakima River at Kiona	03-08-89	0900	2,370	7.0	277
51	12510500	Yakima River at Kiona	06-26-89	1430	1,500	25.0	267
51	12510500	Yakima River at Kiona	06-26-89	1435	--	--	--
51	12510500	Yakima River at Kiona	12-06-89	1615	5,200	6.5	251
51	12510500	Yakima River at Kiona	12-06-89	2357	5,210	6.0	185
51	12510500	Yakima River at Kiona	12-07-89	1852	4,780	5.5	152
51	12510500	Yakima River at Kiona	05-21-91	1200	3,850	15.5	184
51	12510500	Yakima River at Kiona	07-09-91	1155	1,850	22.5	227
51	12510500	Yakima River at Kiona	08-06-91	1150	1,480	25.0	279
51	12510500	Yakima River at Kiona	08-06-91	1151	--	--	--
51	12510500	Yakima River at Kiona	09-25-91	1120	1,590	17.0	292
53	461720120043201	Well 1, Sunnyside, 09N/22E-04P01	06-27-89	1900	--	14.5	380
55	462510120323901	Well 2, Harrah, 11N/18E-22R02	06-29-89	0915	--	14.0	329
58	463233120262101	Well 12N/19E-09H02	01-20-89	0750	--	--	582
59	463234120261601	Well 12N/19E-09H01	01-20-89	0730	--	--	872
59	463234120261601	Well 12N/19E-09H01	01-20-89	0737	--	--	864
61	463257120260801	Well 12N/19E-10D02	01-20-89	0715	--	--	921

Table 5. Field measurements, suspended sediment, turbidity, organic carbon, and selected nutrient data for surface-water and ground-water sites where water samples were collected, Yakima River basin, Washington, 1988-91--Continued

Station number	Date	Oxygen, dissolved (mg/L)	pH (standard units)	Turbidity (NTU)	Sediment, suspended (mg/L)	Carbon, organic suspended total (mg/L as C)	Carbon, organic dissolved (mg/L as C)	Nitrogen, ammonia + organic total (mg/L as N)	Nitrogen, NO2+NO3 dissolved (mg/L as N)	Phosphorus total (mg/L as P)	Phosphorus ortho, dissolved (mg/L as P)
12510500	05-07-88	--	8.4	--	28	.8	2.7	--	--	--	--
12510500	06-01-88	--	8.1	--	35	.2	2.8	--	--	--	--
12510500	07-29-88	--	8.5	19	22	.7	5.8	.40	1.1	.14	.08
12510500	08-31-88	--	7.6	--	35	1.3	7.3	--	--	--	--
12510500	11-17-88	--	8.4	--	10	.4	1.1	--	--	--	--
12510500	03-08-89	--	8.3	--	103	1.8	2.1	--	--	--	--
12510500	06-26-89	10.5	8.6	--	30	1.0	2.1	--	1.1	--	.05
12510500	06-26-89	--	--	--	30	1.2	2.2	--	--	--	--
12510500	12-06-89	--	8.0	12	71	1.8	1.6	.65	1.2	.20	.08
12510500	12-06-89	--	8.0	14	71	2.3	1.8	.61	.76	.10	.04
12510500	12-07-89	--	7.9	14	57	2.0	2.7	.59	.62	.16	.05
12510500	05-21-91	10.0	8.0	14	51	.7	2.4	.60	.68	.13	.02
12510500	07-09-91	10.7	8.4	4.5	18	.6	2.4	.30	.86	.08	.04
12510500	08-06-91	--	--	10	32	1.1	2.7	.30	1.2	.12	.10
12510500	08-06-91	--	--	10	30	1.2	2.9	--	--	--	--
12510500	09-25-91	--	8.5	.20	7	.5	2.1	.40	1.2	.09	.07
461720120043201	06-27-89	2.4	7.6	--	--	<.1	1.4	--	1.0	--	.14
462510120323901	06-29-89	7.1	7.6	--	--	<.1	1.2	--	4.9	--	.078
463233120262101	01-20-89	--	--	--	--	--	--	--	3.0	--	--
463234120261601	01-20-89	--	--	--	--	--	--	--	9.0	--	--
463234120261601	01-20-89	--	--	--	--	--	--	--	8.9	--	--
463257120260801	01-20-89	--	--	--	--	--	--	--	6.0	--	--

Table 6. Concentrations of carbamate compounds in whole-water samples, Yakima River basin, Washington, 1988-91

[Concentrations in nanograms per liter; "--" = not analyzed; "<" = less than; see figure 1 for site locations]

Map reference number	Station number	Station name	Date	Time	Aldicarb	Aldicarb sulfone	Aldicarb sulfoxide
3	12478300	Cle Elum R above Cle Elum Lake nr Roslyn	05-05-88	1100	<500	<500	<500
3	12478300	Cle Elum R above Cle Elum Lake nr Roslyn	06-02-88	0930	<500	<500	<500
3	12478300	Cle Elum R above Cle Elum Lake nr Roslyn	07-26-88	1000	<500	<500	<500
3	12478300	Cle Elum R above Cle Elum Lake nr Roslyn	07-26-88	1015	<500	<500	<500
3	12478300	Cle Elum R above Cle Elum Lake nr Roslyn	08-31-88	1030	<500	<500	<500
3	12478300	Cle Elum R above Cle Elum Lake nr Roslyn	11-16-88	1030	<500	<500	<500
3	12478300	Cle Elum R above Cle Elum Lake nr Roslyn	03-09-89	1015	<500	<500	<500
4	12479500	Yakima River at Cle Elum	07-26-88	1500	<500	<500	<500
11	12484100	Wilson Creek abv. Cherry Creek at Thrall	07-26-88	1615	<500	<500	<500
13	12484480	Cherry Creek at Thrall	05-05-88	1530	<500	<500	<500
13	12484480	Cherry Creek at Thrall	06-02-88	1400	<500	<500	<500
13	12484480	Cherry Creek at Thrall	06-02-88	1405	<500	<500	<500
13	12484480	Cherry Creek at Thrall	07-26-88	1030	<500	<500	<500
13	12484480	Cherry Creek at Thrall	08-31-88	1630	<500	<500	<500
13	12484480	Cherry Creek at Thrall	11-18-88	1000	<500	<500	<500
13	12484480	Cherry Creek at Thrall	03-09-89	1400	<500	<500	<500
14	12484500	Yakima River at Umtanum	07-27-88	1045	<500	<500	<500
14	12484500	Yakima River at Umtanum	06-28-89	1705	<500	<500	<500
21	12496550	Buckskin Slough blw Gleed Ditch nr Gleed	05-22-91	1100	<500	<500	<500
21	12496550	Buckskin Slough blw Gleed Ditch nr Gleed	06-12-91	1345	<500	<500	<500
21	12496550	Buckskin Slough blw Gleed Ditch nr Gleed	08-07-91	1000	--	<500	<500
22	12499000	Naches River nr North Yakima	07-26-88	1330	<500	<500	<500
24	12500430	Moxee Drain at Thorp Rd nr Union Gap	05-06-88	0930	<500	<500	<500
24	12500430	Moxee Drain at Thorp Rd nr Union Gap	05-06-88	0940	<500	<500	<500
24	12500430	Moxee Drain at Thorp Rd nr Union Gap	06-01-88	1600	<500	<500	<500
24	12500430	Moxee Drain at Thorp Rd nr Union Gap	07-26-88	1100	<500	<500	<500
24	12500430	Moxee Drain at Thorp Rd nr Union Gap	07-27-88	1310	<500	<500	<500
24	12500430	Moxee Drain at Thorp Rd nr Union Gap	07-28-88	1605	<500	<500	<500
24	12500430	Moxee Drain at Thorp Rd nr Union Gap	07-29-88	0800	<500	<500	<500
24	12500430	Moxee Drain at Thorp Rd nr Union Gap	08-30-88	1730	<500	<500	<500
24	12500430	Moxee Drain at Thorp Rd nr Union Gap	11-15-88	1015	<500	<500	<500
24	12500430	Moxee Drain at Thorp Rd nr Union Gap	03-10-89	1200	<500	<500	<500
24	12500430	Moxee Drain at Thorp Rd nr Union Gap	06-28-89	1035	<500	<500	<500
27	12500445	Wide Hollow Creek near mouth at Union Gap	05-05-88	1845	<500	<500	<500
27	12500445	Wide Hollow Creek near mouth at Union Gap	06-03-88	0730	<500	<500	<500
27	12500445	Wide Hollow Creek near mouth at Union Gap	07-27-88	1025	<500	<500	<500
27	12500445	Wide Hollow Creek near mouth at Union Gap	08-30-88	1430	<500	<500	<500
27	12500445	Wide Hollow Creek near mouth at Union Gap	11-15-88	1330	<500	<500	<500
27	12500445	Wide Hollow Creek near mouth at Union Gap	11-15-88	1430	<500	<500	<500
27	12500445	Wide Hollow Creek near mouth at Union Gap	03-10-89	1400	<500	<500	<500
28	12500450	Yakima R abv Ahtanum Cr at Union Gap	07-27-88	1600	<500	<500	<500
36	12505460	Granger Drain at mouth nr Granger	05-06-88	1230	<500	<500	<500
36	12505460	Granger Drain at mouth nr Granger	06-01-88	1300	<500	<500	<500
36	12505460	Granger Drain at mouth nr Granger	07-28-88	0730	<500	<500	<500
36	12505460	Granger Drain at mouth nr Granger	07-28-88	0930	<500	<500	<500
36	12505460	Granger Drain at mouth nr Granger	07-28-88	1015	<500	<500	<500
36	12505460	Granger Drain at mouth nr Granger	09-02-88	1000	<500	<500	<500
36	12505460	Granger Drain at mouth nr Granger	11-15-88	1645	<500	<500	<500
36	12505460	Granger Drain at mouth nr Granger	03-09-89	1730	<500	<500	<500
36	12505460	Granger Drain at mouth nr Granger	06-27-89	1705	<500	<500	<500
37	12505510	Marion Drain et Indian Church Rd at Granger	07-28-88	1145	<500	<500	<500
38	12507508	Toppenish Cr at Indian Church Rd nr Granger	05-06-88	1345	<500	<500	<500
38	12507508	Toppenish Cr at Indian Church Rd nr Granger	06-03-88	1000	<500	<500	<500
38	12507508	Toppenish Cr at Indian Church Rd nr Granger	07-28-88	1445	<500	<500	<500
38	12507508	Toppenish Cr at Indian Church Rd nr Granger	09-01-88	0930	<500	<500	<500
38	12507508	Toppenish Cr at Indian Church Rd nr Granger	11-16-88	1615	<500	<500	<500
38	12507508	Toppenish Cr at Indian Church Rd nr Granger	03-08-89	1600	<500	<500	<500
43	12508620	Satus Creek st gage at Satus	07-29-88	1145	<500	<500	<500
46	12508850	Sulphur Cr Wasteway nr Sunnyside	05-06-88	1630	<500	<500	<500
46	12508850	Sulphur Cr Wasteway nr Sunnyside	06-03-88	1300	<500	<500	<500
46	12508850	Sulphur Cr Wasteway nr Sunnyside	07-28-88	1200	<500	<500	<500
46	12508850	Sulphur Cr Wasteway nr Sunnyside	07-28-88	1700	<500	<500	<500
46	12508850	Sulphur Cr Wasteway nr Sunnyside	08-31-88	1530	<500	<500	<500

Table 6. Concentrations of carbamate compounds in whole-water samples, Yakima River basin, Washington, 1988-91--Continued

Station number	Date	Carbaryl	Carbofuran	3-Hydroxycarbofuran	Methiocarb	Methomyl	1-Naphthol	Oxamyl	Propham	Propoxur
12478300	05-05-88	<500	<500	<500	--	<500	<500	<500	<500	--
12478300	06-02-88	<500	<500	<500	<500	<500	<500	<500	<500	<500
12478300	07-26-88	<500	<500	<500	<500	<500	<500	<500	<500	<500
12478300	07-26-88	<500	<500	<500	<500	<500	<500	<500	<500	<500
12478300	08-31-88	<500	<500	<500	<500	<500	<500	<500	<500	<500
12478300	11-16-88	<500	<500	<500	<500	<500	<500	<500	<500	<500
12478300	03-09-89	<500	<500	<500	<500	<500	<500	<500	<500	<500
12479500	07-26-88	<500	<500	<500	<500	<500	<500	<500	<500	<500
12484100	07-26-88	<500	<500	<500	<500	<500	<500	<500	<500	<500
12484480	05-05-88	<500	<500	<500	--	<500	<500	<500	<500	--
12484480	06-02-88	<500	<500	<500	<500	<500	<500	<500	<500	<500
12484480	06-02-88	<500	<500	<500	<500	<500	<500	<500	<500	<500
12484480	07-26-88	<500	<500	<500	<500	<500	<500	<500	<500	<500
12484480	08-31-88	14	<500	<500	<500	<500	<500	<500	<500	<500
12484480	11-18-88	<500	<500	<500	<500	<500	<500	<500	<500	<500
12484480	03-09-89	<500	<500	<500	<500	<500	<500	<500	<500	<500
12484500	07-27-88	<500	<500	<500	<500	<500	<500	<500	<500	<500
12484500	06-28-89	<500	<500	<500	<500	<500	<500	<500	<500	<500
12496550	05-22-91	<500	<500	<500	<500	<500	<500	<500	<500	<500
12496550	06-12-91	<500	<500	<500	<500	<500	<500	<500	--	<500
12496550	08-07-91	<500	<500	<500	<500	<500	<500	<500	<500	<500
12499000	07-26-88	<500	<500	<500	<500	<500	<500	<500	<500	<500
12500430	05-06-88	<500	<500	<500	--	<500	<500	<500	<500	--
12500430	05-06-88	<500	<500	<500	--	<500	<500	<500	<500	--
12500430	06-01-88	<500	<500	<500	<500	<500	<500	<500	<500	<500
12500430	07-26-88	<500	<500	<500	<500	<500	<500	<500	<500	<500
12500430	07-27-88	<500	<500	<500	<500	<500	<500	<500	<500	<500
12500430	07-28-88	<500	<500	<500	<500	<500	<500	<500	<500	<500
12500430	07-29-88	<500	<500	<500	<500	<500	<500	<500	<500	<500
12500430	08-30-88	<500	<500	<500	<500	<500	<500	<500	<500	<500
12500430	11-15-88	<500	<500	<500	<500	<500	<500	<500	<500	<500
12500430	03-10-89	<500	<500	<500	<500	<500	<500	<500	<500	<500
12500430	06-28-89	2	<500	<500	<500	<500	<500	<500	<500	<500
12500445	05-05-88	<500	<500	<500	--	<500	<500	<500	<500	--
12500445	06-03-88	<500	<500	<500	<500	<500	<500	<500	<500	<500
12500445	07-27-88	<500	<500	<500	<500	<500	<500	<500	<500	<500
12500445	08-30-88	<500	<500	<500	<500	<500	<500	<500	<500	<500
12500445	11-15-88	<500	<500	<500	<500	<500	<500	<500	<500	<500
12500445	11-15-88	<500	<500	<500	<500	<500	<500	<500	<500	<500
12500445	03-10-89	<500	<500	<500	<500	<500	<500	<500	<500	<500
12500450	07-27-88	<500	<500	<500	<500	<500	<500	<500	<500	<500
12505460	05-06-88	<500	<500	<500	--	<500	<500	<500	<500	--
12505460	06-01-88	<500	<500	<500	<500	<500	<500	<500	<500	<500
12505460	07-28-88	<500	<500	<500	<500	<500	<500	<500	<500	<500
12505460	07-28-88	<500	<500	<500	<500	<500	<500	<500	<500	<500
12505460	07-28-88	<500	<500	<500	<500	<500	<500	<500	<500	<500
12505460	09-02-86	4	<500	<500	<500	<500	<500	<500	<500	<500
12505460	11-15-68	<500	<500	<500	<500	<500	<500	<500	<500	<500
12505460	03-09-89	<500	<500	<500	<500	<500	<500	<500	<500	<500
12505460	06-27-89	<500	<500	<500	<500	<500	<500	<500	<500	<500
12505510	07-28-88	<500	<500	<500	<500	140	<500	<500	<500	<500
12507508	05-06-88	<500	<500	<500	--	<500	<500	<500	<500	--
12507508	06-03-88	<500	<500	<500	<500	<500	<500	<500	<500	<500
12507508	07-28-88	<500	<500	<500	<500	51	<500	<500	<500	<500
12507508	09-01-88	<500	<500	<500	<500	<500	<500	<500	<500	<500
12507508	11-16-88	<500	<500	<500	<500	<500	<500	<500	<500	<500
12507508	03-08-89	<500	<500	<500	<500	<500	<500	<500	<500	<500
12508620	07-29-88	<500	<500	<500	<500	110	<500	<500	<500	<500
12508850	05-06-68	<500	<500	<500	--	<500	<500	<500	<500	--
12508850	06-03-88	<500	<500	<500	<500	<500	<500	<500	<500	<500
12508850	07-28-88	<500	<500	<500	<500	<500	<500	<500	<500	<500
12508850	07-28-88	<500	<500	<500	<500	<500	<500	<500	<500	<500
12508850	08-31-88	<500	<500	<500	<500	<500	<500	<500	<500	<500

Table 6. Concentrations of carbamate compounds in whole-water samples, Yakima River basin, Washington, 1988-91

Map reference number	Station number	Station name	Date	Time	Aldicarb	Aldicarb sulfone	Aldicarb sulfoxide
46	12508850	Sulphur Cr Wasteway nr Sunnyside	08-31-88	1630	<500	<500	<500
46	12508850	Sulphur Cr Wasteway nr Sunnyside	11-17-88	0900	<500	<500	<500
46	12508850	Sulphur Cr Wasteway nr Sunnyside	03-08-89	1200	<500	<500	<500
46	12508850	Sulphur Cr Wasteway nr Sunnyside	06-26-89	2005	<500	<500	<500
47	12509050	Yakima R at Euclid Br at RM 55 nr Grandview	07-28-88	1010	<500	<500	<500
48	12509499	Chandler Canal at Bunn Rd nr Prosser	05-22-91	1500	--	<500	<500
48	12509499	Chandler Canal at Bunn Rd nr Prosser	06-13-91	1240	<500	<500	<500
49	12509710	Spring Creek at mouth at Whitstran	07-29-88	1300	<500	<500	<500
50	12509829	Snipes Creek at mouth at Whitstran	07-29-88	1500	<500	<500	<500
51	12510500	Yakima River at Kiona	05-07-88	0800	<500	<500	<500
51	12510500	Yakima River at Kiona	06-01-88	0900	<500	<500	<500
51	12510500	Yakima River at Kiona	07-29-88	1030	<500	<500	<500
51	12510500	Yakima River at Kiona	08-31-88	1000	<500	<500	<500
51	12510500	Yakima River at Kiona	11-17-88	1400	<500	<500	<500
51	12510500	Yakima River at Kiona	03-08-89	0900	<500	<500	<500
51	12510500	Yakima River at Kiona	06-26-89	1435	<500	<500	<500

Station number	Date	Carbaryl	Carbofuran	3-Hydroxycarbofuran	Methiocarb	Methomyl	1-Naphthol	Oxamyl	Propham	Propoxur
12508850	08-31-88	<500	<500	<500	<500	<500	<500	<500	<500	<500
12508850	11-17-88	<500	<500	<500	<500	<500	<500	<500	<500	<500
12508850	03-08-89	<500	<500	<500	<500	<500	<500	<500	<500	<500
12508850	06-26-89	6	<500	<500	<500	<500	<500	<500	<500	<500
12509050	07-28-88	<500	<500	<500	<500	<500	<500	<500	<500	<500
12509499	05-22-91	<500	<500	<500	<500	<500	<500	<500	<500	<500
12509499	06-13-91	<500	<500	<500	<500	<500	<500	<500	--	<500
12509710	07-29-88	<500	<500	<500	<500	<500	<500	<500	<500	<500
12509829	07-29-88	<500	<500	<500	<500	<500	<500	<500	<500	<500
12510500	05-07-88	<500	<500	<500	--	<500	<500	<500	<500	--
12510500	06-01-88	<500	<500	<500	<500	<500	<500	<500	<500	<500
12510500	07-29-88	<500	<500	<500	<500	<500	<500	<500	<500	<500
12510500	08-31-88	<500	<500	<500	<500	30	<500	<500	<500	<500
12510500	11-17-88	<500	<500	<500	<500	<500	<500	<500	<500	<500
12510500	03-08-89	<500	<500	<500	<500	<500	<500	<500	<500	<500
12510500	06-26-89	<500	<500	<500	<500	<500	<500	<500	<500	<500

Table 7. Concentrations of carbamate, thiocarbamate, pyrethoid, and other pesticides in filtered-water samples, Yakima River basin, Washington, June 25-30, 1989

[Concentrations in nanograms per liter; "<" = less than; "T" = present, but below quantifiable concentration; "--" = not analyzed; EPTC = S-ethyl dipropylthiocarbamate; butylate was not detected; trace concentrations of flucythrinate were detected below quantifiable concentrations in Yakima River at Cle Elum and Yakima River at Umtanum; linuron was analyzed in 3 samples--1.9 ng/L in the Yakima River at Kions and not detected at Cherry Creek and Yakima River at RM 72; see figure 1 for site locations]

Map reference number	Station number	Station name	Bromacil	Carbaryl	Carbofuran	EPTC	cis-Permethrin	trans-Permethrin	Propargite	Triadimefon	Vernolate
2	12478200	Cooper River at Salmon LaSac	<1.4	<1.6	<0.56	<0.31	T<1.2	T<1.3	<1.8	<0.66	<0.33
4	12479500	Yakima River at Cle Elum	<.83	<.50	<.26	<.35	<.76	T<.85	T<.68	<.30	T<.41
11	12484100	Wilson Cr abv. Cherry Creek	T<3.0	T<3.4	T<1.2	1.6	<2.5	<2.8	<3.8	<1.4	<.69
13	12484480	Cherry Creek at Thrall	<1.5	T<1.0	<.83	37	<4.4	<5.5	T<4.6	<.41	<1.3
14	12484500	Yakima River at Umtanum	<2.6	<1.6	T<.80	1.6	<2.4	<2.7	T<2.1	<.92	T<1.3
15	12484550	Umtanum Creek nr mouth	T<.97	<.72	<.54	<.22	<.79	<.79	<.61	--	<.25
19	12496510	Pacific Power & Light Company Wasteway	<.80	<.49	<.25	<.34	<.74	<.83	<.66	<.29	<.40
20	12496511	City of Yakima-Finish Water	<.94	<1.0	<.36	<.20	<.78	<.87	<1.2	<.43	<.21
22	12499000	Naches River nr North Yakima	T<.45	--	<.18	<.26	<.48	<.54	.57	<.28	<.34
24	12500430	Moxee Drain at Thorp Rd	<4.6	--	<1.9	T<2.7	<4.9	<5.6	210	<2.8	<3.5
27	12500445	Wide Hollow Creek near mouth	T<2.9	T<3.2	<1.1	<.60	<2.4	<2.6	<3.6	T<1.3	<.65
28	12500450	Yakima R abv Ahtanum Cr	T<2.4	<1.5	T<.76	1.1	<2.2	T<2.5	3.0	<.88	<1.2
30	12502500	Ahtanum Creek at Union Gap	<1.5	--	<.61	<.87	<1.6	<1.8	<2.1	<.91	<1.1
33	12505350	E Toppenish Drain at Wilson Rd	27	13	<1.1	1.8	<2.4	<2.7	19	<1.3	<.66
34	12505410	Sub 35 Drain at Parton Road	T<2.9	T<3.2	3.7	6.3	<2.4	<2.6	11	T<1.3	.94
36	12505460	Granger Drain at mouth	13	--	<1.7	3.1	<4.4	<5.0	40	<2.6	T<3.1
55	462510-120323901	Well 2, Harrah, 11N/18E-22R02	<.94	<1.0	<.36	1.0	<.78	<.87	<1.2	<.43	<.21
37	12505510	Marion Drain, Indian Church Rd	<2.9	T<3.2	<1.1	3.2	<2.4	<2.6	30	<1.3	<.65
38	12507508	Toppenish Cr, Indian Church Rd	<1.4	--	<.58	2.8	T<1.5	<1.7	27	<.87	<1.1
40	12507585	Yakima River at RM 72	<1.5	1.5	1.5	7.3	<4.4	<5.5	17	<.61	<1.3
41	12507594	Satus Cr abv Wilson-Charley Canyon nr Toppenish	<.46	--	<.19	<.27	<.49	<.56	<.64	<.28	<.35
53	461720-120043201	Well 1, Sunnyside, 09/22E-04P01	<.93	<1.0	<.36	<.20	<.77	<.86	<1.2	T<.42	<.21
43	12508620	Satus Cr at gage at Satus	<2.9	T<3.2	<1.1	2.9	<2.4	<2.7	14	<1.3	<.65
45	12508630	South Drain nr Satus	T<4.7	--	<1.9	3.4	<5.0	<5.6	160	<2.9	T<3.5
46	12508850	Sulphur Creek Wasteway	T<24	T<26	<9.1	T<5.0	<20	<22	260	T<11	<5.4
47	12509050	Yakima R at Euclid Br at RM 55	1.7	--	.96	3.8	<1.6	<1.8	44	<.92	T<1.1
49	12509710	Spring Creek at mouth	<2.9	T<3.3	T<1.1	3.3	<2.4	<2.7	3.0	<1.3	T<.67
50	12509829	Snipes Creek at mouth	T<2.9	T<3.2	<1.1	1.5	<2.4	<2.6	45	T<1.3	T<.65
51	12510500	Yakima River at Kiona	<2.6	<1.6	<.80	3.3	<2.4	<2.7	7.2	<.92	<1.3

Table 8. Concentrations of chlorophenoxy-acid herbicides, dicamba, and picloram in whole-water samples, Yakima River basin, Washington, 1988-91

[Concentrations in nanograms per liter; "<" = less than; 2,4-D = (2,4-dichlorophenoxy)acetic acid; 2,4-DP = dichlorprop; 2,4,5-T = (2,4,5-trichlorophenoxy)acetic acid; see figure 1 for site locations]

Map reference number	Station number	Station name	Date	Time	Dicamba	2,4-D	2,4-DP	Fenoprop	Picloram	2,4,5-T
3	12478300	Cle Elum R above Cle Elum Lake nr Roslyn	05-05-88	1100	<10	<10	<10	<10	<10	<10
3	12478300	Cle Elum R above Cle Elum Lake nr Roslyn	06-02-88	0930	<10	<10	<10	<10	<10	<10
3	12478300	Cle Elum R above Cle Elum Lake nr Roslyn	07-26-88	1000	<10	<10	<10	<10	<10	<10
3	12478300	Cle Elum R above Cle Elum Lake nr Roslyn	07-26-88	1015	<10	<10	<10	<10	<10	<10
3	12478300	Cle Elum R above Cle Elum Lake nr Roslyn	08-31-88	1030	<10	<10	<10	<10	<10	<10
3	12478300	Cle Elum R above Cle Elum Lake nr Roslyn	11-16-88	1030	<10	220	110	<10	<10	<10
3	12478300	Cle Elum R above Cle Elum Lake nr Roslyn	03-09-89	1015	<10	<10	<10	<10	70	<10
4	12479500	Yakima River at Cle Elum	07-26-88	1500	<10	<10	<10	<10	<10	<10
11	12484100	Wilson Creek abv. Cherry Creek at Thrall	07-26-88	1615	70	80	<10	<10	<10	<10
13	12484480	Cherry Creek at Thrall	05-05-88	1530	2,600	7,500	<10	<10	<10	<10
13	12484480	Cherry Creek at Thrall	06-02-88	1400	140	150	<10	<10	10	<10
13	12484480	Cherry Creek at Thrall	06-02-88	1405	140	140	<10	<10	<10	<10
13	12484480	Cherry Creek at Thrall	07-26-88	1030	520	480	<10	<10	<10	<10
13	12484480	Cherry Creek at Thrall	08-31-88	1630	50	60	<10	<10	<10	<10
13	12484480	Cherry Creek at Thrall	11-18-88	1000	<10	<10	<10	<10	<10	<10
13	12484480	Cherry Creek at Thrall	03-09-89	1400	240	200	140	<10	<10	<10
14	12484500	Yakima River at Umtanum	07-27-88	1045	20	20	<10	<10	<10	<10
14	12484500	Yakima River at Umtanum	06-28-89	1705	<10	<10	<10	<10	<10	<10
21	12496550	Buckskin Slough blw Gleed Ditch nr Gleed	05-22-91	1100	<10	<10	<10	<10	<10	<10
21	12496550	Buckskin Slough blw Gleed Ditch nr Gleed	06-12-91	1345	<10	<10	<10	<10	<10	<10
22	12499000	Naches River nr North Yakima	07-26-88	1330	<10	<10	<10	<10	<10	<10
24	12500430	Moxee Drain at Thorp Rd nr Union Gap	05-06-88	0930	30	20	<10	<10	10	<10
24	12500430	Moxee Drain at Thorp Rd nr Union Gap	05-06-88	0940	30	120	<10	<10	<10	<10
24	12500430	Moxee Drain at Thorp Rd nr Union Gap	06-01-88	1600	10	150	<10	<10	10	<10
24	12500430	Moxee Drain at Thorp Rd nr Union Gap	07-26-88	1100	20	200	<10	<10	<10	<10
24	12500430	Moxee Drain at Thorp Rd nr Union Gap	07-27-88	1310	20	290	<10	<10	<10	<10
24	12500430	Moxee Drain at Thorp Rd nr Union Gap	07-28-88	1605	10	1,900	<10	<10	<10	<10
24	12500430	Moxee Drain at Thorp Rd nr Union Gap	07-29-88	0800	10	260	<10	<10	<10	<10
24	12500430	Moxee Drain at Thorp Rd nr Union Gap	08-30-88	1730	10	50	<10	<10	<10	<10
24	12500430	Moxee Drain at Thorp Rd nr Union Gap	11-15-88	1015	<10	<10	<10	<10	<10	<10
24	12500430	Moxee Drain at Thorp Rd nr Union Gap	03-10-89	1200	<10	270	<10	<10	<10	<10
24	12500430	Moxee Drain at Thorp Rd nr Union Gap	06-28-89	1035	10	<10	<10	<10	<10	<10
27	12500445	Wide Hollow Creek near mouth at Union Gap	05-05-88	1845	<10	<10	<10	<10	<10	<10
27	12500445	Wide Hollow Creek near mouth at Union Gap	06-03-88	0730	20	250	<10	<10	<10	<10
27	12500445	Wide Hollow Creek near mouth at Union Gap	07-27-88	1025	<10	20	<10	<10	10	<10
27	12500445	Wide Hollow Creek near mouth at Union Gap	08-30-88	1430	<10	<10	<10	<10	<10	<10
27	12500445	Wide Hollow Creek near mouth at Union Gap	11-15-88	1330	<10	<10	<10	<10	<10	<10
27	12500445	Wide Hollow Creek near mouth at Union Gap	11-15-88	1430	<10	<10	<10	<10	<10	<10
27	12500445	Wide Hollow Creek near mouth at Union Gap	03-10-89	1400	10	<10	200	<10	<10	<10
28	12500450	Yakima R abv Ahtanum Cr at Union Gap	07-27-88	1600	20	40	<10	<10	<10	<10
36	12505460	Granger Drain at mouth nr Granger	05-06-88	1230	<10	<10	<10	<10	10	<10
36	12505460	Granger Drain at mouth nr Granger	06-01-88	1300	130	430	<10	<10	<10	<10
36	12505460	Granger Drain at mouth nr Granger	07-28-88	0730	40	330	<10	<10	<10	<10
36	12505460	Granger Drain at mouth nr Granger	07-28-88	0930	40	390	<10	<10	<10	<10
36	12505460	Granger Drain at mouth nr Granger	07-28-88	1015	40	410	<10	<10	<10	<10
36	12505460	Granger Drain at mouth nr Granger	09-02-88	1000	<10	<10	<10	<10	<10	<10
36	12505460	Granger Drain at mouth nr Granger	11-15-88	1645	<10	<10	<10	<10	<10	<10
36	12505460	Granger Drain at mouth nr Granger	03-09-89	1730	20	<10	<10	<10	<10	<10
36	12505460	Granger Drain at mouth nr Granger	06-27-89	1705	70	<10	<10	<10	<10	<10
37	12505510	Marion Drain at Indian Church Rd at Granger	07-28-88	1145	50	<10	<10	<10	<10	<10
38	12507508	Toppenish Cr at Indian Church Rd nr Granger	05-06-88	1345	10	<10	<10	<10	<10	<10
38	12507508	Toppenish Cr at Indian Church Rd nr Granger	06-03-88	1000	70	160	<10	<10	<10	<10
38	12507508	Toppenish Cr at Indian Church Rd nr Granger	07-28-88	1445	10	30	<10	<10	<10	<10
38	12507508	Toppenish Cr at Indian Church Rd nr Granger	09-01-88	0930	10	40	<10	<10	<10	<10
38	12507508	Toppenish Cr at Indian Church Rd nr Granger	11-16-88	1615	<10	40	<10	<10	<10	<10
38	12507508	Toppenish Cr at Indian Church Rd nr Granger	03-08-89	1600	<10	<10	<10	<10	<10	<10
43	12508620	Satus Creek at gage at Satus	07-29-88	1145	30	70	<10	<10	<10	<10

Table 8. Concentrations of chlorophenoxy-acid herbicides, dicamba, and picloram in whole-water samples, Yakima River basin, Washington, 1988-91--Continued

Map reference number	Station number	Station name	Date	Time	Dicamba	2,4-D	2,4-DP	Fenoprop	Picloram	2,4,5-T
46	12508850	Sulphur Cr Wasteway nr Sunnyside	05-06-88	1630	20	10	<10	<10	10	<10
46	12508850	Sulphur Cr Wasteway nr Sunnyside	06-03-88	1300	10	100	<10	<10	<10	<10
46	12508850	Sulphur Cr Wasteway nr Sunnyside	07-28-88	1200	20	90	<10	<10	<10	<10
46	12508850	Sulphur Cr Wasteway nr Sunnyside	07-28-88	1700	<10	<10	<10	<10	<10	<10
46	12508850	Sulphur Cr Wasteway nr Sunnyside	08-31-88	1530	10	50	<10	<10	<10	<10
46	12508850	Sulphur Cr Wasteway nr Sunnyside	08-31-88	1630	10	60	<10	<10	<10	<10
46	12508850	Sulphur Cr Wasteway nr Sunnyside	11-17-88	0900	<10	100	<10	<10	<10	<10
46	12508850	Sulphur Cr Wasteway nr Sunnyside	03-08-89	1200	<10	<10	<10	<10	<10	<10
46	12508850	Sulphur Cr Wasteway nr Sunnyside	06-26-89	2005	20	<10	<10	<10	<10	<10
47	12509050	Yakima R at Euclid Br at RM 55 nr Grandview	07-28-88	1010	10	60	<10	<10	<10	<10
48	12509499	Chandler Canal at Bunn Rd at Prosser	05-22-91	1500	<10	30	<10	<10	<10	<10
		Chandler Canal at Bunn Rd at Prosser	06-13-91	1240	20	70	<10	<10	<10	<10
49	12509710	Spring Creek at mouth at Whitstran	07-29-88	1300	10	50	<10	<10	<10	<10
50	12509829	Snipes Creek at mouth at Whitstran	07-29-88	1500	10	60	<10	<10	<10	<10
51	12510500	Yakima River at Kiona	05-07-88	0800	10	10	<10	<10	10	<10
51	12510500	Yakima River at Kiona	06-01-88	0900	10	110	<10	<10	<10	<10
51	12510500	Yakima River at Kiona	07-29-88	1030	10	70	<10	<10	<10	<10
51	12510500	Yakima River at Kiona	08-31-88	1000	20	40	<10	<10	<10	<10
51	12510500	Yakima River at Kiona	11-17-88	1400	<10	<10	<10	<10	<10	<10
51	12510500	Yakima River at Kiona	03-08-89	0900	<10	<10	<10	<10	<10	<10
51	12510500	Yakima River at Kiona	06-26-89	1435	20	70	<10	<10	<10	<10

Table 9. Concentrations of chlorophenoxy-acid herbicides, dicamba, and picloram in filtered-water samples, Yakima River basin, Washington, June 25-30, 1989

[Concentrations in nanograms per liter; "<" = less than; 2,4-D = (2,4-dichlorophenoxy)acetic acid; 2,4-DP = dichlorprop; 2,4,5-T = (2,4,5-trichlorophenoxy)acetic acid; see figure 1 for site locations]

Map reference number	Station number	Station name	Date	Time	Dicamba	2,4-D	2,4-DP	Fenoprop	Picloram	2,4,5-T
2	12478200	Cooper River at Salmon LaSac nr Roslyn	06-28-89	1900	<10	<10	<10	<10	<10	<10
4	12479500	Yakima River at Cle Elum	06-29-89	1200	<10	<10	<10	<10	<10	<10
11	12484100	Wilson Creek abv. Cherry Creek at Thrall	06-29-89	1600	50	<10	<10	<10	<10	<10
13	12484480	Cherry Creek at Thrall	06-29-89	1830	100	290	<10	<10	<10	<10
14	12484500	Yakima River at Umtanum	06-28-89	1700	10	<10	<10	<10	<10	<10
15	12484550	Umtanum Creek nr mouth at Umtanum	06-28-89	1400	<10	<10	<10	<10	<10	<10
19	12496510	Pacific Power & Light Company Wasteway	06-25-89	1700	<10	<10	<10	<10	30	<10
20	12496511	City of Yakima-Finish Water	06-25-89	1630	<10	<10	<10	<10	<10	<10
22	12499000	Naches River nr North Yakima	06-27-89	1015	<10	<10	<10	<10	<10	<10
24	12500430	Moxee Drain at Thorp Rd nr Union Gap	06-28-89	1030	<10	120	<10	<10	<10	<10
27	12500445	Wide Hollow Creek near mouth at Union Gap	06-30-89	1000	<10	<10	<10	<10	<10	<10
28	12500450	Yakima R abv Ahtanum Cr at Union Gap	06-27-89	1630	<10	70	<10	<10	<10	<10
33	12505350	E Toppenish Drain at Wilson Rd nr Toppenish	06-29-89	1700	<10	<10	<10	<10	<10	<10
34	12505410	Sub 35 Drain at Parton Road near Granger	06-29-89	1500	<10	30	<10	<10	<10	<10
36	12505460	Granger Drain at mouth nr Granger	06-27-89	1700	50	140	<10	<10	<10	<10
37	12505510	Marion Drain at Indian Church Rd at Granger	06-29-89	1130	<10	140	<10	<10	<10	<10
38	12507508	Toppenish Cr at Indian Church Rd nr Granger	06-26-89	1445	<10	<10	<10	<10	<10	<10
40	12507585	Yakima River at RM 72 ab Satus Cr	06-30-89	1030	<10	<10	<10	<10	<10	<10
41	12507594	Satus Cr abv Wilson-Charley Canyon	06-26-89	0940	<10	<10	<10	<10	<10	<10
43	12508620	Satus Creek at gage at Satus	06-29-89	1945	<10	10	<10	<10	<10	<10
45	12508630	South Drain nr Satus	06-27-89	1300	<10	20	<10	<10	<10	<10
46	12508850	Sulphur Cr Wasteway nr Sunnyside	06-26-89	2000	10	80	<10	<10	<10	<10
47	12509050	Yakima R at Euclid Br at RM 55 nr Grandview	06-28-89	1020	<10	70	<10	<10	<10	<10
49	12509710	Spring Creek at mouth at Whitstran	06-30-89	1800	10	60	<10	<10	<10	<10
50	12509829	Snipes Creek at mouth at Whitstran	06-30-89	1430	10	<10	<10	<10	<10	<10
51	12510500	Yakima River at Kiona	06-26-89	1430	<10	90	<10	<10	<10	<10
53	461720-120043201	Well 1, Sunnyside, 09N/22E-04P01	06-27-89	1900	<10	<10	<10	<10	<10	<10
55	462510-120323901	Well 2, Harrah, 11N/18E-22R02	06-29-89	0915	<10	<10	<10	<10	<10	<10

Table 10. Concentrations of organochlorine compounds in whole-water samples, Yakima River basin, Washington, 1988-89

[Concentrations in nanograms per liter; "<" = less than; DDD = dichlorodiphenyldichloroethane; DDE = dichlorodiphenyldichloroethylene; DDT = dichlorodiphenyltrichloroethane; PCB = gross polychlorinated biphenyls; PCN = gross polychlorinated naphthalenes; see figure 1 for site locations]

Map reference number	Station number	Station name	Date	Time	Aldrin
3	12478300	Cle Elum R above Cle Elum Lake nr Roslyn	05-05-88	1100	<1
3	12478300	Cle Elum R above Cle Elum Lake nr Roslyn	06-02-88	0930	<1
3	12478300	Cle Elum R above Cle Elum Lake nr Roslyn	07-26-88	1000	<1
3	12478300	Cle Elum R above Cle Elum Lake nr Roslyn	07-26-88	1015	<1
3	12478300	Cle Elum R above Cle Elum Lake nr Roslyn	08-31-88	1030	<1
3	12478300	Cle Elum R above Cle Elum Lake nr Roslyn	11-16-88	1030	<1
3	12478300	Cle Elum R above Cle Elum Lake nr Roslyn	03-09-89	1015	<1
4	12479500	Yakima River at Cle Elum	07-26-88	1500	<1
11	12484100	Wilson Creek abv. Cherry Creek at Thrall	07-26-88	1615	<1
13	12484480	Cherry Creek at Thrall	05-05-88	1530	<1
13	12484480	Cherry Creek at Thrall	06-02-88	1400	<1
13	12484480	Cherry Creek at Thrall	08-02-88	1405	<1
13	12484480	Cherry Creek at Thrall	07-26-88	1030	<1
13	12484480	Cherry Creek at Thrall	08-31-88	1630	<1
13	12484480	Cherry Creek at Thrall	11-18-88	1000	<1
13	12484480	Cherry Creek at Thrall	03-09-89	1400	<1
14	12484500	Yakima River at Umtanum	07-27-88	1045	<1
14	12484500	Yakima River at Umtanum	06-28-89	1705	<1
22	12499000	Naches River nr North Yakima	07-26-88	1330	<1
24	12500430	Moxee Drain at Thorp Rd nr Union Gap	05-06-88	0930	<1
24	12500430	Moxee Drain at Thorp Rd nr Union Gap	05-06-88	0940	<1
24	12500430	Moxee Drain at Thorp Rd nr Union Gap	06-01-88	1600	<1
24	12500430	Moxee Drain at Thorp Rd nr Union Gap	07-26-88	1100	<1
24	12500430	Moxee Drain at Thorp Rd nr Union Gap	07-27-88	1310	<1
24	12500430	Moxee Drain at Thorp Rd nr Union Gap	07-28-88	1605	<1
24	12500430	Moxee Drain at Thorp Rd nr Union Gap	07-29-88	0800	<1
24	12500430	Moxee Drain at Thorp Rd nr Union Gap	08-30-88	1730	<1
24	12500430	Moxee Drain at Thorp Rd nr Union Gap	11-15-88	1015	<1
24	12500430	Moxee Drain at Thorp Rd nr Union Gap	03-10-89	1200	<1
24	12500430	Moxee Drain at Thorp Rd nr Union Gap	06-28-89	1035	<1
27	12500445	Wide Hollow Creek near mouth at Union Gap	05-05-88	1845	<1
27	12500445	Wide Hollow Creek near mouth at Union Gap	06-03-88	0730	<1
27	12500445	Wide Hollow Creek near mouth at Union Gap	07-27-88	1025	<1
27	12500445	Wide Hollow Creek near mouth at Union Gap	08-30-88	1430	<1
27	12500445	Wide Hollow Creek near mouth at Union Gap	11-15-88	1330	<1
27	12500445	Wide Hollow Creek near mouth at Union Gap	11-15-88	1430	<1
27	12500445	Wide Hollow Creek near mouth at Union Gap	03-10-89	1400	<1
28	12500450	Yakima R abv Ahtanum Cr at Union Gap	07-27-88	1600	<1
36	12505460	Granger Drain at mouth nr Granger	05-06-88	1230	<1
36	12505460	Granger Drain at mouth nr Granger	06-01-88	1300	<1
36	12505460	Granger Drain at mouth nr Granger	07-28-88	0730	<1
36	12505460	Granger Drain at mouth nr Granger	07-28-88	0930	<1
36	12505460	Granger Drain at mouth nr Granger	07-28-88	1015	<1
36	12505460	Granger Drain at mouth nr Granger	09-02-88	1000	<1
36	12505460	Granger Drain at mouth nr Granger	11-15-88	1645	<1
36	12505460	Granger Drain at mouth nr Granger	03-09-89	1730	<1
		Granger Drain at mouth nr Granger	06-27-89	1705	<1
37	12505510	Marion Drain at Indian Church Rd at Granger	07-28-88	1145	<1
38	12507508	Toppenish Cr at Indian Church Rd nr Granger	05-06-88	1345	<1
38	12507508	Toppenish Cr at Indian Church Rd nr Granger	06-03-88	1000	<1
38	12507508	Toppenish Cr at Indian Church Rd nr Granger	07-28-88	1445	<1
38	12507508	Toppenish Cr at Indian Church Rd nr Granger	09-01-88	0930	<1
38	12507508	Toppenish Cr at Indian Church Rd nr Granger	11-16-88	1615	<1
38	12507508	Toppenish Cr at Indian Church Rd nr Granger	03-08-89	1600	<1
43	12508620	Satus Creek at gege at Satus	07-29-88	1145	<1
46	12508850	Sulphur Cr Wasteway nr Sunnyside	05-06-88	1630	<1
46	12508850	Sulphur Cr Wasteway nr Sunnyside	06-03-88	1300	<1
46	12508850	Sulphur Cr Wasteway nr Sunnyside	07-28-88	1200	<1
46	12508850	Sulphur Cr Wasteway nr Sunnyside	07-28-88	1700	<1
46	12508850	Sulphur Cr Wasteway nr Sunnyside	08-31-88	1530	<1

Table 10. Concentrations of organochlorine compounds in whole-water samples, Yakima River basin, Washington, 1988-89--Continued

Station number	Date	Gross chlor-dane	p,p'-DDD	p,p'-DDE	p,p'-DDT	Di-eldrin	Endo-sulfan I	Endrin	Hepta-chlor
12478300	05-05-88	<100	<1	<1	<1	<1	<1	<1	<1
12478300	06-02-88	<100	<1	<1	<1	<1	<1	<1	<1
12478300	07-26-88	<100	<1	<1	<1	<1	<1	<1	<1
12478300	07-26-88	<100	<1	<1	<1	<1	<1	<1	<1
12478300	08-31-88	<100	<1	<1	<1	<1	<1	<1	<1
12478300	11-16-88	<100	<1	<1	<1	<1	<1	<1	<1
12478300	03-09-89	<100	<1	<1	<1	<1	<1	<1	<1
12479500	07-26-88	<100	<1	<1	<1	<1	<1	<1	<1
12484100	07-26-88	<100	<1	<1	<1	1	<1	<1	<1
12484480	05-05-88	<100	<1	1	1	3	<1	<1	<1
12484480	06-02-88	<100	<1	1	<1	3	<1	<1	<1
12484480	06-02-88	<100	<1	1	<1	3	<1	<1	<1
12484480	07-26-88	<100	<1	4	<1	12	<1	<1	<1
12484480	08-31-88	<100	<1	2	2	5	2	<1	<1
12484480	11-18-88	<100	<1	1	1	1	<1	<1	<1
12484480	03-09-89	<100	<1	15	24	41	<1	<1	<1
12484500	07-27-88	<100	<1	<1	<1	1	<1	<1	<1
12484500	06-28-89	<100	<1	<1	<1	<1	<1	<1	<1
12499000	07-26-88	<100	<1	<1	<1	<1	<1	<1	<1
12500430	05-06-88	<100	1	4	4	1	16	<1	<1
12500430	05-06-88	<100	<1	4	4	1	30	<1	<1
12500430	06-01-88	<100	<1	10	11	4	18	<1	<1
12500430	07-26-88	<100	2	31	28	6	31	<1	<1
12500430	07-27-88	<100	1	16	14	6	24	<1	<1
12500430	07-28-88	<100	2	29	26	7	190	1	<1
12500430	07-29-88	<100	2	40	34	8	93	<1	<1
12500430	08-30-88	<100	1	7	6	2	14	<1	<1
12500430	11-15-88	<100	1	2	<1	<1	<1	<1	<1
12500430	03-10-89	<100	<1	5	<1	<1	<1	<1	<1
12500430	06-28-89	<100	<1	21	21	<1	<1	<1	<1
12500445	05-05-88	<100	1	3	<1	2	10	<1	<1
12500445	06-03-88	<100	1	5	4	2	70	<1	<1
12500445	07-27-88	<100	1	2	1	3	66	<1	<1
12500445	08-30-88	<100	<1	2	<1	<1	<1	<1	<1
12500445	11-15-88	<100	<1	1	<1	2	11	<1	<1
12500445	11-15-88	<100	<1	1	<1	2	13	<1	<1
12500445	03-10-89	<100	3	43	45	<1	87	<1	<1
12500450	07-27-88	<100	<1	2	2	1	4	<1	<1
12505460	05-06-88	<100	7	21	13	6	<1	<1	<1
12505460	06-01-88	<100	2	21	17	9	21	<1	<1
12505460	07-28-88	<100	11	61	50	24	100	<1	<1
12505460	07-28-88	<100	7	53	43	30	76	<1	<1
12505460	07-28-88	<100	10	47	39	17	83	<1	<1
12505460	09-02-88	<100	<1	21	15	8	<1	<1	<1
12505460	11-15-88	<100	2	12	5	5	<1	<1	<1
12505460	03-09-89	<100	<1	28	<1	<1	<1	<1	<1
	06-27-89	<100	<1	50	60	<1	<1	<1	<1
12505510	07-28-88	<100	<1	1	<1	1	3	<1	<1
12507508	05-06-88	<100	<1	1	<1	1	<1	<1	<1
12507508	06-03-88	<100	<1	1	<1	7	<1	<1	<1
12507508	07-28-88	<100	<1	2	<1	3	4	<1	<1
12507508	09-01-88	<100	<1	1	<1	1	1	<1	<1
12507508	11-16-88	<100	1	3	1	<1	<1	<1	<1
12507508	03-08-89	<100	<1	<1	<1	<1	<1	<1	<1
12508620	07-29-88	<100	<1	1	<1	2	8	<1	<1
12508850	05-06-88	<100	1	6	5	2	<1	<1	<1
12508850	06-03-88	<100	1	11	15	5	17	<1	<1
12508850	07-28-88	<100	<1	19	16	15	17	<1	<1
12508850	07-28-88	<100	3	15	17	14	26	<1	<1
12508850	08-31-88	<100	1	7	6	6	11	<1	<1

Table 10. Concentrations of organochlorine compounds in whole-water samples, Yakima River basin, Washington, 1988-89--Continued

Station number	Date	Hepta-chlor epoxide	Lindane	p,p'-Meth-oxy-chlor	Mirex	PCB	PCN	Per-thane	Tox-aphene
12478300	05-05-88	<1	<1	<10	<10	<100	<100	<100	<1,000
12478300	06-02-88	<1	<1	<10	<10	<100	<100	<100	<1,000
12478300	07-26-88	<1	<1	<10	<10	<100	<100	<100	<1,000
12478300	07-26-88	<1	<1	<10	<10	<100	<100	<100	<1,000
12478300	08-31-88	<1	<1	<10	<10	<100	<100	<100	<1,000
12478300	11-16-88	<1	<1	<10	<10	<100	<100	<100	<1,000
12478300	03-09-89	<1	<1	<10	<10	<100	<100	<100	<1,000
12479500	07-26-88	<1	<1	<10	<10	<100	<100	<100	<1,000
12484100	07-26-88	<1	<1	<10	<10	<100	<100	<100	<1,000
12484480	05-05-88	<1	<1	<10	<10	<100	<100	<100	<1,000
12484480	06-02-88	<1	<1	<10	<10	<100	<100	<100	<1,000
12484480	06-02-88	<1	<1	<10	<10	<100	<100	<100	<1,000
12484480	07-26-88	<1	<1	<10	<10	<100	<100	<100	<1,000
12484480	08-31-88	<1	<1	<10	<10	<100	<100	<100	<1,000
12484480	11-18-88	<1	<1	<10	<10	<100	<100	<100	<1,000
12484480	03-09-89	<1	<1	<10	<10	<100	<100	<100	<1,000
12484500	07-27-88	<1	<1	<10	<10	<100	<100	<100	<1,000
12484500	06-28-89	<1	<1	<10	<10	<100	<100	<100	<1,000
12499000	07-26-88	<1	<1	<10	<10	<100	<100	<100	<1,000
12500430	05-06-88	<1	<1	<10	<10	<100	<100	<100	<1,000
12500430	05-06-88	<1	<1	<10	<10	<100	<100	<100	<1,000
12500430	06-01-88	<1	<1	<10	<10	<100	<100	<100	<1,000
12500430	07-26-88	<1	<1	<10	<10	<100	<100	<100	<1,000
12500430	07-27-88	<1	<1	<10	<10	<100	<100	<100	<1,000
12500430	07-28-88	<1	<1	<10	<10	<100	<100	<100	<1,000
12500430	07-29-88	<1	<1	<10	<10	<100	<100	<100	<1,000
12500430	08-30-88	<1	<1	<10	<10	<100	<100	<100	<1,000
12500430	11-15-88	<1	<1	<10	<10	<100	<100	<100	<1,000
12500430	03-10-89	<1	<1	<10	<10	<100	<100	<100	<1,000
12500430	06-28-89	<1	<1	<10	<10	<100	<100	<100	<1,000
12500445	05-05-88	<1	<1	<10	<10	<100	<100	<100	<1,000
12500445	06-03-88	<1	<1	<10	<10	<100	<100	<100	<1,000
12500445	07-27-88	<1	<1	<10	<10	<100	<100	<100	<1,000
12500445	08-30-88	<1	<1	<10	<10	<100	<100	<100	<1,000
12500445	11-15-88	<1	<1	<10	<10	<100	<100	<100	<1,000
12500445	11-15-88	<1	<1	<10	<10	<100	<100	<100	<1,000
12500445	03-10-89	<1	<1	<10	<10	<100	<100	<100	<1,000
12500450	07-27-88	<1	<1	<10	<10	<100	<100	<100	<1,000
12505460	05-06-88	<1	<1	<10	<10	<100	<100	<100	<1,000
12505460	06-01-88	<1	1	<10	<10	<100	<100	<100	<1,000
12505460	07-28-88	<1	<1	<10	<10	<100	<100	<100	<1,000
12505460	07-28-88	<1	<1	<10	<10	<100	<100	<100	<1,000
12505460	07-28-88	<1	<1	<10	<10	<100	<100	<100	<1,000
12505460	09-02-88	<1	<1	<10	<10	<100	<100	<100	<1,000
12505460	11-15-88	<1	<1	<10	<10	<100	<100	<100	<1,000
12505460	03-09-89	<1	<1	<10	<10	<100	<100	<100	<1,000
	06-27-89	<1	<1	<10	<10	<100	<100	<100	<1,000
12505510	07-28-88	<1	<1	<10	<10	<100	<100	<100	<1,000
12507508	05-06-88	<1	<1	<10	<10	<100	<100	<100	<1,000
12507508	06-03-88	<1	<1	<10	<10	<100	<100	<100	<1,000
12507508	07-28-88	<1	<1	<10	<10	<100	<100	<100	<1,000
12507508	09-01-88	<1	<1	<10	<10	<100	<100	<100	<1,000
12507508	11-16-88	<1	<1	<10	<10	<100	<100	<100	<1,000
12507508	03-08-89	<1	<1	<10	<10	<100	<100	<100	<1,000
12508620	07-29-88	<1	1	<10	<10	<100	<100	<100	<1,000
12508850	05-06-88	<1	<1	<10	<10	<100	<100	<100	<1,000
12508850	06-03-88	<1	1	<10	<10	<100	<100	<100	<1,000
12508850	07-28-88	<1	<1	<10	<10	<100	<100	<100	<1,000
12508850	07-28-88	<1	<1	<10	<10	<100	<100	<100	<1,000
12508850	08-31-88	<1	<1	<10	<10	<100	<100	<100	<1,000

Table 10. Concentrations of organochlorine compounds in whole-water samples, Yakima River basin, Washington, 1988-89

Map reference number	Station number	Station name	Date	Time	Aldrin
46	12508850	Sulphur Cr Wasteway nr Sunnyside	08-31-88	1630	<1
46	12508850	Sulphur Cr Wasteway nr Sunnyside	11-17-88	0900	<1
46	12508850	Sulphur Cr Wasteway nr Sunnyside	03-08-89	1200	<1
46	12508850	Sulphur Cr Wasteway nr Sunnyside	06-26-89	2005	<1
47	12509050	Yakime R at Euclid Br at RM 55 nr Grendview	07-28-88	1010	<1
49	12509710	Spring Creek at mouth at Whitstran	07-29-88	1300	<1
50	12509829	Snipes Creek at mouth at Whitstran	07-29-88	1500	<1
51	12510500	Yakima River at Kiona	05-07-88	0800	<1
51	12510500	Yakima River at Kiona	06-01-88	0900	<1
51	12510500	Yakima River at Kiona	07-29-88	1030	<1
51	12510500	Yakima River at Kiona	08-31-88	1000	<1
51	12510500	Yakima River at Kiona	11-17-88	1400	<1
51	12510500	Yakima River at Kiona	03-08-89	0900	<1
51	12510500	Yakima River at Kiona	06-26-89	1435	<1
51	12510500	Yakima River at Kiona	12-06-89	1615	<1
51	12510500	Yakima River at Kiona	12-06-89	2357	<1
51	12510500	Yakima River at Kiona	12-07-89	1852	<1
58	463233120282101	Well 12N/19E-09H02	01-20-89	0750	<1
59	463234120261601	Well 12N/19E-09H01	01-20-89	0730	<1
59	463234120261601	Well 12N/19E-09H01	01-20-89	0737	<1
61	463257120260801	Well 12N/19E-10D02	01-20-89	0715	<1

Station number	Date	Gross chlordane	p,p'-DDD	p,p'-DDE	p,p'-DDT	Dieldrin	Endosulfan I	Endrin	Heptachlor
12508850	08-31-88	<100	1	7	5	6	5	<1	<1
12508850	11-17-88	<100	1	7	2	4	<1	<1	<1
12508850	03-08-89	<100	<1	6	<1	3	<1	<1	<1
12508850	06-26-89	<100	<1	21	30	<1	<1	<1	<1
12509050	07-28-88	<100	1	4	<1	5	1	<1	<1
12509710	07-29-88	<100	1	12	5	7	13	2	<1
12509829	07-29-88	<100	1	8	4	5	<1	<1	<1
12510500	05-07-88	<100	1	3	1	1	<1	<1	<1
12510500	06-01-88	<100	<1	3	<1	2	11	<1	<1
12510500	07-29-88	<100	<1	1	<1	3	8	<1	<1
12510500	08-31-88	<100	<1	2	<1	2	<1	<1	<1
12510500	11-17-88	<100	<1	1	<1	<1	<1	<1	<1
12510500	03-08-89	<100	<1	5	9	<1	<1	<1	<1
12510500	06-26-89	<100	<1	<1	<1	<1	<1	<1	<1
12510500	12-06-89	<100	<1	1	<1	<1	<1	<1	<1
12510500	12-06-89	<100	<1	1	<1	<1	<1	<1	<1
12510500	12-07-89	<100	<1	1	<1	<1	<1	<1	<1
463233120262101	01-20-89	<100	<1	<1	<1	<1	<1	<1	<1
463234120261601	01-20-89	<100	<1	<1	<1	<1	<1	<1	<1
463234120261601	01-20-89	<100	<1	<1	<1	<1	<1	<1	<1
463257120260801	01-20-89	<100	<1	<1	<1	<1	<1	<1	<1

Station number	Date	Heptachlor epoxide	Lindane	p,p'-Methoxychlor	Mirex	PCB	PCN	Perthane	Toxaphene
12508850	08-31-88	<1	<1	<10	<10	<100	<100	<100	<1,000
12508850	11-17-88	<1	1	<10	<10	<100	<100	<100	<1,000
12508850	03-08-89	<1	<1	<10	<10	<100	<100	<100	<1,000
12508850	06-26-89	<1	<1	<10	<10	<100	<100	<100	<1,000
12509050	07-28-88	<1	<1	<10	<10	<100	<100	<100	<1,000
12509710	07-29-88	<1	<1	<10	<10	<100	<100	<100	<1,000
12509829	07-29-88	<1	<1	<10	<10	<100	<100	<100	<1,000
12510500	05-07-88	<1	<1	<10	<10	<100	<100	<100	<1,000
12510500	06-01-88	<1	1	<10	<10	<100	<100	<100	<1,000
12510500	07-29-88	<1	<1	<10	<10	<100	<100	<100	<1,000
12510500	08-31-88	<1	<1	<10	<10	<100	<100	<100	<1,000
12510500	11-17-88	<1	<1	<10	<10	<100	<100	<100	<1,000
12510500	03-08-89	<1	<1	<10	<10	<100	<100	<100	<1,000
12510500	06-26-89	<1	<1	<10	<10	<100	<100	<100	<1,000
12510500	12-06-89	<1	<1	<10	<10	<100	<100	<100	<1,000
12510500	12-06-89	<1	<1	<10	<10	<100	<100	<100	<1,000
12510500	12-07-89	<1	<1	<10	<10	<100	<100	<100	<1,000
463233120262101	01-20-89	<1	<1	<10	<10	<100	<100	<100	<1,000
463234120261601	01-20-89	<1	<1	<10	<10	<100	<100	<100	<1,000
463234120261601	01-20-89	<1	<1	<10	<10	<100	<100	<100	<1,000
463257120260801	01-20-89	<1	<1	<10	<10	<100	<100	<100	<1,000

Table 11. Concentrations of organochlorine compounds in filtered-water samples, Yakima River basin, Washington, June 25-30, 1989

[Concentrations in nanograms per liter; "T" = present, but below quantifiable concentration; "nd" = not detected and minimum reporting level not quantified; "--" = not analyzed; "<" = less than; "*" = sum was estimated using a regression analysis of 12 dissolved concentrations of p,p'-DDE and p,p'-DDT plus p,p'-DDE plus p,p'-DDD--coefficient of determination is 0.99--regression data collected in June, 1989; DDD = dichlorodiphenyldichloroethane; DDE = dichlorodiphenyldichloroethylene; DDT = dichlorodiphenyltrichloroethane; HCB = hexachlorobenzene; HCH = hexachlorocyclohexane; heptachlor, beta-HCH, and delta-HCH were not detected; see figure 1 for site locations]

Map reference number	Station number	Station name	Aldrin	cis-Chlordane	trans-Chlordane	Chloro thalonil	p,p'-DDE		p,p'-DDT+ p,p'-DDE+ p,p'-DDD	Dieldrin	Endosul-fan I	Endosul-fan II
2	12478200	Cooper River at Salmon LaSac	<0.94	<0.25	<0.23	--	<0.16		0.6	<0.28	<0.25	<0.47
4	12479500	Yakima River at Cle Elum	T<.22	<.20	<.22	--	.14		.5	T<.21	T<.15	<.26
11	12484100	Wilson Cr abv. Cherry Creek	<2.0	<.53	<.48	--	<.33	*	<1.0	T<.58	<.53	<.98
13	12484480	Cherry Creek at Thrall	<.84	T<1.1	T<1.2	T	T<.77	*	T<2.1	3.7	--	<1.6
14	12484500	Yakima River at Umtanum	T<.69	T<.63	T<.70	--	T<.41	*	T<1.2	.93	.82	<.81
15	12484550	Umtanum Creek nr mouth	<.74	<.23	<.15	--	.13	*	.5	<.10	--	<.24
19	12496510	Pacific Power & Light Company Wasteway	<.21	<.20	<.22	--	.39		1.3	<.20	8.0	2.0
20	12496511	City of Yakima-Finish Water	<.61	<.16	<.15	--	<.10	*	<.4	<.18	1.3	<.30
22	12499000	Naches River nr North Yakima	<.34	<.18	<.16	--	.20	*	.7	<.33	.73	<.32
24	12500430	Moxee Drain at Thorp Rd	<3.5	<1.8	<1.6	--	5.6		15	T<3.4	11	5.2
27	12500445	Wide Hollow Creek near mouth	<1.8	<.50	<.45	--	.47	*	1.4	1.0	2.6	1.0
28	12500450	Yakima R abv Ahtanum Cr	<.65	<.60	<.67	--	.74		2.8	.77	.92	<.77
30	12502500	Ahtanum Creek at Union Gap	<1.1	<.58	<.53	--	.34	*	1.1	<1.1	2.3	<1.1
33	12505350	E Toppenish Drain at Wilson Rd	<1.9	T<.51	.31	--	1.2	*	3.2	<.56	3.5	<.94
34	12505410	Sub 35 Drain at Parton Road	<1.8	<.50	<.45	--	.61	*	1.7	1.1	<.50	T<.92
36	12505460	Granger Drain at mouth	<3.2	<1.6	<1.5	--	.96	*	2.6	T<3.1	T<1.4	<3.0
55	462510-120323901	Well 2, Harrah, 11N/18E-22R02	<.61	<.16	<.15	--	<.10	*	<.4	<.18	<.16	<.30
37	12505510	Marion Drain, Indian Church Rd	T<1.8	<.50	<.45	--	.47	*	1.4	1.3	1.8	<.92
38	12507508	Toppenish Cr, Indian Church Rd	T<1.1	<.55	<.50	--	.59	*	1.7	T<1.0	1.2	<1.0
40	12507585	Yakima River at RM 72	<.84	<1.1	<1.2	nd	1.4	*	3.7	.98	--	1.6
41	12507594	Satus Cr abv Wilson-Charley Canyon nr Toppenish	<.35	<.18	<.16	--	.17		.6	<.34	<.16	<.33
53	461720-120043201	Well 1, Sunnyside, 09N/22E-04P01	T<.60	<.16	<.15	--	.17		.5	T<.18	<.16	<.30
43	12508620	Satus Cr at gage at Satus	T<1.9	<.50	<.46	--	.28	*	.9	1.6	<.50	<.93
45	12508630	South Drain nr Satus	<3.5	<1.8	<1.6	--	3.7		11	T<3.4	<1.6	<3.4
46	12508850	Sulphur Creek Wasteway	<15	<4.1	<3.8	--	15		38	35	6.8	<7.6
47	12509050	Yakima R at Euclid Br at RM 55	<1.1	<.59	<.53	--	2.4	*	6.2	5.7	<.50	<1.1
49	12509710	Spring Creek at mouth	<1.9	<.51	<.46	--	4.8		9.0	7.2	<.51	<.95
50	12509829	Snipes Creek at mouth	<1.8	<.50	<.45	--	2.9		6.3	5.9	<.50	<.92
51	12510500	Yakima River at Kiona	T<.69	<.63	<.70	--	1.2		4.2	3.6	1.2	<.81

Table 11. Concentrations of organochlorine compounds in filtered-water samples, Yakima River basin, Washington, June 1989--Continued

Station number	Station name	Endrin	HCB	alpha-HCH	Lindane (gamma-HCH)	Heptachlor epoxide	o,p'-Methoxychlor	p,p'-Methoxychlor	Mirex	Perthane
12478200	Cooper River at Salmon LaSac	<2.1	T<0.15	T<1.1	<1.0	<0.54	<2.5	nd	<1.1	<1.2
12479500	Yakima River at Cle Elum	<.18	<.18	T<.62	<.83	<.38	T<1.5	nd	T<.45	<.44
12484100	Wilson Cr abv. Cherry Creek	<4.4	<.31	<2.2	<2.1	<1.1	<5.2	nd	<2.3	<2.6
12484480	Cherry Creek at Thrall	<2.4	T<.52	T<1.4	<3.0	<1.5	T<.91	<1.2	<2.9	<1.2
12484500	Yakima River at Umtanum	1.5	<.56	<1.9	<2.6	T<1.2	<4.8	nd	T<1.4	<1.4
12484550	Umtanum Creek nr mouth	<.50	T<.07	<.31	<.84	<.82	<1.2	<1.4	<.51	<.17
12496510	Pacific Power & Light Company Wasteway	<.18	<.17	<.60	<.81	<.37	<1.5	nd	<.44	<.43
12496511	City of Yakima-Finish Water	<1.4	<.10	<.70	<.65	<.35	<1.6	nd	<.71	<.81
12499000	Naches River nr North Yakima	T<.66	<.11	T<.38	<.25	T<.25	<.98	<1.1	<.20	<.31
12500430	Moxee Drain at Thorp Rd	<6.8	<1.1	T<3.9	<2.6	<2.5	<10	<12	<2.1	<3.2
12500445	Wide Hollow Cr near mouth	<4.2	T<.30	<2.1	<2.0	<1.1	<4.9	nd	<2.1	<2.4
12500450	Yakima R abv Ahtanum Cr	2.8	<.53	T<1.8	<2.5	<1.1	<4.5	nd	T<1.3	<1.3
12502500	Ahtanum Creek at Union Gap	<2.2	<.35	<1.2	<.82	<.81	<3.2	<3.7	<.66	<1.0
12505350	E Toppenish Drain at Wilson Rd	<4.3	T<.30	<2.2	<2.0	<1.1	<5.0	nd	<2.2	<2.5
12505410	Sub 35 Drain at Parton Road	<4.2	T<.30	<2.1	<2.0	<1.1	<4.9	nd	<2.1	<2.4
12505460	Granger Drain at mouth	<6.1	T<.99	<3.5	T<2.3	<2.3	<9.0	<10	<1.9	T<2.8
462510-120323901	Well 2, Harrah, 11N/18E-22R02	<1.4	T<.10	<.70	<.65	<.35	<1.6	nd	<.71	T<.81
12505510	Marion Drain, Indian Church Rd	<4.2	T<.30	T<2.1	<2.0	<1.1	<4.9	nd	<2.2	<2.5
12507508	Toppenish Cr, Indian Church Rd	<2.1	T<.34	<1.2	<.78	< .77	<3.0	<3.5	<.63	<.96
12507585	Yakima River at RM 72	<2.4	T<.52	T<1.4	<3.0	T<1.5	<.91	<1.2	<2.9	<1.2
12507594	Satus Cr abv Wilson-Charley Canyon	<.68	T<.11	<.39	<.26	<.25	<1.0	<1.2	<.21	<.32
461720-120043201	Well 1, Sunnyside, 09N/22E-04P01	<1.4	T<.10	<.69	<.65	<.35	<1.6	nd	<.70	<.80
12508620	Satus Cr at gage at Satus	<4.2	T<.30	<2.1	<2.0	<1.1	<4.9	nd	<2.2	<2.5
12508630	South Drain nr Satus	<6.8	<1.1	<3.9	<2.6	<2.6	<10	<12	<2.1	<3.2
12508850	Sulphur Creek Wasteway	<35	<2.4	<18	<16	<8.9	<41	nd	<18	<20
12509050	Yakima R at Euclid Br at RM 55	9.1	<.36	<1.2	<.83	<.82	<3.2	<3.7	<.67	<1.0
12509710	Spring Creek at mouth	<4.3	T<.30	<2.2	<2.0	<1.1	<5.0	nd	<2.2	<2.5
12509829	Snipes Creek at mouth	<4.2	<.30	T<2.1	<2.0	<1.1	<4.9	nd	<2.2	<2.5
12510500	Yakima River at Kiona	<.56	T<.56	<1.9	<2.6	<1.2	<4.8	nd	<1.4	<1.4

Table 12. Concentrations of organochlorine compounds in filtered-water samples, Yakima River basin, Washington, May-September 1991

[Concentretions in nanograms per liter; "<" = less than; DDD = dichlorodiphenyldichloroethane; DDE = dichlorodiphenyldichloroethylene; DDT = dichlorodiphenyltrichloroethane; PCB = gross polychlorinated biphenyls; PCN = gross polychlorinated naphthalenes; see figure 1 for site locations]

Map reference number	Station number	Station name	Date	Time	Aldrin
21	12496550	Buckskin Slough blw Gleed Ditch nr Gleed	05-22-91	1100	<1
21	12496550	Buckskin Slough blw Gleed Ditch nr Gleed	06-12-91	1345	<1
23	12500420	Moxee Drain at Birchfield Road nr Union Gap	05-23-91	1000	<1
23	12500420	Moxee Drain at Birchfield Road nr Union Gap	06-17-91	1100	<1
23	12500420	Moxee Drain at Birchfield Road nr Union Gap	06-20-91	1645	<1
23	12500420	Moxee Drain at Birchfield Road nr Union Gap	07-10-91	1240	<1
23	12500420	Moxee Drain at Birchfield Road nr Union Gap	09-04-91	1115	<1
35	12505450	Grenger Drain at Granger	05-23-91	1230	<1
35	12505450	Granger Drain at Granger	06-17-91	1420	<1
35	12505450	Granger Drain at Granger	06-20-91	1400	<1
35	12505450	Granger Drain at Granger	07-10-91	1500	<1
35	12505450	Granger Drein at Granger	09-04-91	1420	<1
46	12508850	Sulphur Cr Wasteway nr Sunnyside	05-24-91	1000	<1
46	12508850	Sulphur Cr Wasteway nr Sunnyside	06-19-91	1145	<1
46	12508850	Sulphur Cr Wasteway nr Sunnyside	06-20-91	1200	<1
46	12508850	Sulphur Cr Wasteway nr Sunnyside	07-11-91	1155	<1
46	12508850	Sulphur Cr Wasteway nr Sunnyside	09-05-91	1130	<1
48	12509499	Chandler Canal at Bunn Rd at Prosser	05-22-91	1500	<1
48	12509499	Chandler Canal at Bunn Rd at Prosser	06-13-91	1240	<1
51	12510500	Yakima River at Kiona	05-21-91	1200	<1
51	12510500	Yakima River at Kione	07-09-91	1155	<1
51	12510500	Yakima River at Kione	08-06-91	1150	<1
51	12510500	Yakima River at Kiona	08-06-91	1151	<1
51	12510500	Yakima River at Kiona	09-25-91	1120	<1

Station number	Date	Gross chlordane	p,p'-DDD	p,p'-DDE	p,p'-DDT	Dieldrin	Endosulfan I	Endrin	Heptachlor
12496550	05-22-91	<100	<1	5	<1	<1	<1	<1	<1
12496550	06-12-91	<100	5	6	2	4	3	<1	<1
12500420	05-23-91	<100	<1	6	<1	<1	<1	<1	<1
12500420	06-17-91	<100	1	3	2	2	2	<1	<1
12500420	06-20-91	<100	<1	2	<1	1	<1	<1	<1
12500420	07-10-91	<100	<1	5	4	2	<1	<1	<1
12500420	09-04-91	<100	<1	4	1	4	<1	<1	<1
12505450	05-23-91	<100	<1	9	<1	3	<1	<1	<1
12505450	06-17-91	<100	2	12	5	8	2	<1	<1
12505450	06-20-91	<100	2	34	25	9	<1	<1	<1
12505450	07-10-91	<100	1	6	5	6	<1	<1	<1
12505450	09-04-91	<100	<1	8	4	6	<1	<1	<1
12508850	05-24-91	<100	<1	6	<1	2	<1	<1	<1
12508850	06-19-91	<100	1	4	20	6	<1	<1	<1
12508850	06-20-91	<100	4	19	15	16	<1	<1	<1
12508850	07-11-91	<100	1	5	3	7	<1	<1	<1
12508850	09-05-91	<100	<1	4	2	5	<1	<1	<1
12509499	05-22-91	<100	<1	4	<1	1	<1	<1	<1
12509499	06-13-91	<100	<1	1	<1	1	2	<1	<1
12510500	05-21-91	<100	<1	4	<1	3	<1	<1	<1
12510500	07-09-91	<100	<1	1	<1	3	<1	<1	<1
12510500	08-06-91	<100	<1	4	<1	<1	5	<1	<1
12510500	08-06-91	<100	2	2	<1	1	1	<1	<1
12510500	09-25-91	<100	<1	2	<1	5	<1	<1	<1

Table 12. Concentrations of organochlorine compounds in filtered-water samples, Yakima River basin, Washington, May-September 1991--Continued

Station number	Date	Heptachlor epoxide	Lindane	p,p'-Methoxychlor	Mirex	PCB	PCN	Perthane	Toxaphene
12496550	05-22-91	<1	<1	<10	<10	<100	<100	<100	<1,000
12496550	06-12-91	<1	1	<10	<10	100	<100	<100	<1,000
12500420	05-23-91	<1	<1	<10	<10	<100	<100	<100	<1,000
12500420	06-17-91	<1	<1	<10	<10	<100	<100	<100	<1,000
12500420	06-20-91	<1	<1	<10	<10	<100	<100	<100	<1,000
12500420	07-10-91	<1	<1	<10	<10	<100	<100	<100	<1,000
12500420	09-04-91	1	<1	<10	<10	<100	<100	<100	<1,000
12505450	05-23-91	<1	<1	<10	<10	<100	<100	<100	<1,000
12505450	06-17-91	<1	<1	<10	<10	<100	<100	<100	<1,000
12505450	06-20-91	<1	4	<10	<10	<100	<100	<100	<1,000
12505450	07-10-91	<1	<1	<10	<10	<100	<100	<100	<1,000
12505450	09-04-91	<1	<1	<10	<10	<100	<100	<100	<1,000
12508850	05-24-91	<1	<1	<10	<10	<100	<100	<100	<1,000
12508850	06-19-91	<1	<1	<10	<10	<100	<100	<100	<1,000
12508850	06-20-91	<1	7	<10	<10	<100	<100	<100	<1,000
12508850	07-11-91	<1	<1	<10	<10	<100	<100	<100	<1,000
12508850	09-05-91	<1	<1	<10	<10	<100	<100	<100	<1,000
12509499	05-22-91	<1	<1	<10	<10	<100	<100	<100	<1,000
12509499	06-13-91	<1	<1	<10	<10	<100	<100	<100	<1,000
12510500	05-21-91	<1	<1	<10	<10	<100	<100	<100	<1,000
12510500	07-09-91	<1	<1	<10	<10	100	<100	<100	<1,000
12510500	08-06-91	<1	.3	<10	<10	200	<100	<100	<1,000
12510500	08-06-91	<1	<1	<10	<10	100	<100	<100	<1,000
12510500	09-25-91	<1	<1	<10	<10	100	<100	<100	<1,000

Table 13. Concentrations of organochlorine compounds associated with suspended sediment, Yakima River basin, Washington, June 25-30, 1989

[Concentrations in nanograms per liter; all determinations made using GC/ECD (gas chromatograph/electron-capture detector) except values in parentheses are determinations made using GC/MS (gas chromatograph/mass spectrometer detector); nd = concentration is below quantifiable concentration using GC/MS; "<" = less than; DDD = dichlorodiphenyldichloroethane; DDE = dichlorodiphenyldichloroethylene; DDT = dichlorodiphenyltrichloroethane; HCB = hexachlorobenzene; HCH = hexachlorocyclohexane; "T" = present, but below quantifiable concentration; "--" = not analyzed; "*" = a portion of sample was lost during analysis, and reported concentrations may be biased low; "**" = compound detected and may be less than reported value; I = interference at peak; g = gross chlordane (cis-chlordane + trans-chlordane); Endosulfan sulfate, endrin aldehyde, endrin ketone, heptachlor, delta-HCH, cis- and trans-permethrin, perthane, gross polychlorinated napthalenes (PCN) were not detected. PCB = polychlorinated biphenyl: PCB (8.8 ng/L) and toxaphene (160 ng/L) were detected at Granger Drain; PCB also was detected at 1.2 ng/L at Sulphur Creek. Chlorthalonil (0.08 ng/L) was detected at South Drain. trans-Nonachlor was detected at Granger Drain (0.21 ng/L), Moxee Drain (trace concentration <0.03 ng/L), and Sulphur Creek (trace concentration <0.3 ng/L); see figure 1 for site locations]

Map reference number	Station number	Station name	Aldrin	o,p'-DDD	p,p'-DDD	p,p'-DDE	o,p'-DDT	p,p'-DDT	Dieldrin	Endosulfan I	Endosulfan II	cis-Chlordane	trans-Chlordane
2	12478200	Cooper River at Salmon LaSac	<0.09	--	0.001	0.01	--	<0.09	<0.09	<0.09	--	g 0.15	--
4	12479500	Yakima River at Cle Elum	<.09	<0.02	<.02	<.05	<0.02	<.02	<.02	<.02	<0.05	<.02	<0.02
11	12484100	Wilson Cr abv. Cherry Creek	<.3	--	.11	.18	--	<.3	.009	<.3	--	g<3.0	--
13	12484480	Cherry Creek at Thrall	<.3	--	.46	3.3	--	4.2	.96	<.3	--	g 4.0	--
14	12484500	Yakima River at Umtanum	<.6	<.04	.05	.12	<.2	.26	.04	<.04	<.07	<.04	<.04
15	12484550	Umtanum Creek nr mouth	<.4	<.02	<.02	<.1	<.1	<.02	<.02	<.02	<.05	<.02	<.02
19	12496510	Pacific Power & Light Company Wasteway	<.01	<.01	<.01	.25	T<.01	.24	<.01	.04	<.02	<.01	<.01
20	12496511	City of Yakima-Finish Water	<.2	<.02	<.02	.36	<.02	<.02	<.02	<.02	<.05	<.02	<.02
22	12499000	Naches River nr North Yakima	<.02	<.02	<.02	<.02	<.02	.05	<.02	<.02	<.04	<.02	<.02
22	12499000	Naches River nr North Yakima	nd	nd	(T)	(.28)	nd	(T)	(.44)	nd	(T)	nd	nd
24	12500430	Moxee Drain at Thorp Rd	<.01	.23	1.6	7.1	2.4	9.6	.86	.69	<.06	T<.03	T<.03
27	12500445	Wide Hollow Creek near mouth	<.3	--	.21	.69	--	.40	.019	<.3	--	g .76	--
28	12500450	Yakima R abv Ahtanum Cr	<.02	<.07	T<.2	.27	<.07	.11	T<.2	<.07	<.2	<.07	<.07
28	12500450	Yakima R abv Ahtanum Cr	nd	nd	(T)	(.95)	nd	(T)	nd	nd	nd	nd	nd
30	12502500	Ahtanum Creek at Union Gap	<.3	--	.067	.24	--	<.3	.003	<.3	--	g .41	--
33	12505350	E Toppenish Drain at Wilson Rd	<.3	--	.74	3.6	--	4.5	.052	<.3	--	g 2.3	--
34	12505410	Sub 35 Drain at Parton Road	<.3	--	.54	1.6	--	6.5	.061	<.3	--	g .45	--
36	12505460	Granger Drain at mouth	.09	1.9	6.4	28	5.7	38	3.6	<.02	I<2.0	.05	.09
55	462510-120323901	Well 2, Harrah, 11N/18E-22R02	<.02	<.02	<.02	<.02	<.02	<.02	T<.02	<.02	<.05	<.02	<.02
37	12505510	Marion Drain, Indian Church Rd	<.3	--	.16	1.1	--	1.9	.06	<.3	--	g .38	--
38	12507508	Toppenish Cr, Indian Church Rd	<.3	--	.23	1.1	--	1.3	.055	<.3	--	g 3.0	--
40	12507585	Yakima River at RM 72	<1	T<.1	.50	2.5	.22	3.4	.12	<.1	<.1	<.1	<.1
40	12507585	Yakmia River at RM 72	nd	nd	nd	(4.5)	nd	nd	nd	nd	nd	nd	nd
41	12507594	Satus Cr abv Wilson-Charley Canyon nr Toppenish	<.05	--	<.05	.008	--	<.05	<.05	<.05	--	g<.5	--
53	461720-120043201	Well 1, Sunnyside, 09N/22E-04P01	<.01	<.02	<.04	<.02	<.02	<.02	<.02	<.02	<.04	<.02	<.02
43	12508620	Satus Cr at gage at Satus	<.3	--	.16	.60	--	.86	.13	<.3	--	g<3.0	--
45	12508630	South Drain nr Satus	<.01	.03	.53	4.0	.31	4.0	.02	<.05	<.1	<.05	<.05
46	12508850	Sulphur Creek Wasteway	<.5	.34	1.7	6.4	2.8	7.8	2.1	<.06	<.1	T<.3	T <.3
47	12509050	Yakima R at Euclid Br at RM 55	<.07*	<.07*	<.07*	T<.07*	<.07*	T<.2*	T<.07*	<.07*	<.2*	<.07*	<.07*
47	12509050	Yakima R at Euclid Br at RM 55	nd		(1.3)	(4.6)							
49	12509710	Spring Creek at mouth	<.3	--	1.9	19	--	20	.70	<.3	--	g 1.4	--
50	12509829	Snipes Creek at mouth	<.3	--	.86	6.7	--	7.8	.23	<.3	--	g .37	--
51	12510500	Yakima River at Kiona	<.01	<.04	.17	9.6	.92	.20	.08	<.04	<.08	<.04	<.04
51	12510500	Yakima River at Kiona	nd	nd	(T)	nd	nd	(T)	nd	nd	nd	nd	nd

Table 13. Concentrations of organochlorine compounds associated with suspended sediment, Yakima River basin, Washington, June 25-30, 1989--Continued

Station number	Station name	Dacthal	Endrin	HCB	alpha-HCH	Lindane (gamma-HCH)	Heptachlor epoxide	o,p'-Methoxychlor	p,p'-Methoxychlor	Mirex	Heptachlor	delta-HCH
12478200	Cooper River at Salmon LaSac	--	<0.09	--	--	<0.09	<0.09	--	<0.09	0.008	<0.09	--
12479500	Yakima River at Cle Elum	<0.02	<.02	<0.05	<0.02	<.02	<.02	<0.02	<.02	<.09	<.05	<0.02
12484100	Wilson Cr abv. Cherry Creek	--	<.3	--	--	<.3	<.3	--	<.3	<.3	<.3	--
12484480	Cherry Creek at Thrall	--	<.3	--	--	<.3	<.3	--	<.3	.004	<.3	--
12484500	Yakima River at Umtanum	<.04	<.04	<.07	<.04	<.04	<.04	<.04	<.04	<.2	<.07	<.04
12484500	Yakima River at Umtanum	nd	nd	nd	nd	(4.0)	nd	nd	nd	nd	nd	nd
12484550	Umtanum Creek nr mouth	<.02	<.02	<.07	<.02	<.02	<.02	<.02	<.02	<.2	<.4	<.02
12496510	Pacific Power & Light Company Wasteway	<.01	<.01	T<.01	<.01	<.01	<.01	<.01	<.01	<.01	<.01	<.01
12496511	City of Yakima-Finish Water	<.02	<.02	<.02	<.02	<.02	<.02	<.02	<.02	<.2	<.02	<.02
12499000	Naches River nr North Yakima	<.02	<.02	<.01	<.02	<.02	<.02	<.04	<.04	<.02	<.02	<.02
12499000	Naches River nr North Yakima	nd	nd	nd	nd	nd	nd	(T)	nd	nd	nd	nd
12500430	Moxee Drain at Thorp Rd	<.03	<.03	<.01	T<.03	<.03	T<.03	<.03	<.03	<.03	<.01	<.03
12500445	Wide Hollow Creek near mouth	--	<.3	--	--	<.3	<.3	--	<.3	<.3	<.3	--
12500450	Yakima R abv Ahtanum Cr	<.07	<.07	<.02	<.07	<.07	<.07	<.07	<.07	<.07	<.02	<.07
12500450	Yakima R abv Ahtanum Cr	nd	nd	nd	nd	nd	nd	(T)	nd	nd	nd	nd
12502500	Ahtanum Creek at Union Gap	--	<.3	--	--	<.3	<.3	--	<.3	<.3	<.3	--
12505350	E Toppenish Drain at Wilson Rd	--	<.3	--	--	<.3	<.3	--	<.3	<.3	<.3	--
12505410	Sub 35 Drain at Parton Road	--	<.3	--	--	<.3	<.3	--	<.3	<.3	<.3	--
12505460	Granger Drain at mouth	.23	.31	.33	.02	.06	.15	3.4**	.32**	<.04	<.02	<.04
462510-120323901	Well 2, Harrah, 11N/18E-22R02	<.02	<.02	<.01	<.02	<.02	<.02	<.02	<.02	<.09	<.01	<.02
12505510	Marion Drain, Indian Church Rd	--	<.3	--	--	<.3	<.3	--	<.3	<.3	<.3	--
12507508	Toppenish Cr, Indian Church Rd	--	<.3	--	--	<.3	<.3	--	<.3	<.3	<.3	--
12507585	Yakima River at RM 72	.31	<.1	T<.1	<.1	T<.1	<.1	<.1	<.1	<.5	<.1	<.1
12507585	Yakima River at RM 72	nd	nd	(T)	nd	nd	nd	(T)	nd	nd	nd	nd
12507594	Satus Cr abv Wilson-Charley Canyon nr Toppenish	--	<.05	--	--	<.05	<.05	--	<.05	<.05	<.05	--
461720-120043201	Well 1,Sunnyside, 09N/22E-04P01	<.02	<.02	<.01	<.02	<.02	<.02	<.02	<.02	<.02	<.01	<.02
12508620	Satus Cr at gage at Satus	--	<.3	--	--	<.3	<.3	--	<.3	<.3	<.3	--
12508630	South Drain nr Satus	.15	<.05	<.01	<.05	<.05	<.05	<.05	<.05	<.05	<.01	<.05
12508850	Sulphur Creek Wasteway	T<.06	<.06	.08	<.06	<.06	<.06	<.06	<.06	<.06	<.2	<.06
12509050	Yakima R at Euclid Br at RM 55	<.07	<.07	<.03	<.07	<.07	<.07	<.07	<.07	<.2	<.07	<.07
12509710	Spring Creek at mouth	--	<.3	--	--	<.3	<.3	--	<.3	<.3	<.3	--
12509829	Snipes Creek at mouth	--	<.3	--	--	<.3	<.3	--	<.3	<.3	<.3	--
12510500	Yakima River at Kiona	<.04	<.04	.16	<.04	<.04	<.04	<.04	<.04	<.04	<.01	<.04
12510500	Yakima River at Kiona	nd	nd	(T)	nd	nd	nd	nd	nd	nd	nd	nd

Table 14. Concentrations of organochlorine compounds associated with suspended sediment, Yakima River basin, Washington, May-September 1991

[Concentrations in nanograms per liter; "<" = less than; DDD = dichlorodiphenyldichloroethane; DDE = dichlorodiphenyldichloroethylene; DDT = dichlorodiphenyltrichloroethane; PCB = gross polychlorinated biphenyls; PCN = gross polychlorinated naphthalenes; "T" = compound present, but less than reported value; "nq" = not quantified because of interference; see figure 1 for site locations]

Map reference number	Station number	Station name	Date	Time	Aldrin
21	12496550	Buckskin Slough blw Gleed Ditch nr Gleed	05-22-91	1100	<1
21	12496550	Buckskin Slough blw Gleed Ditch nr Gleed	06-12-91	1345	<1
23	12500420	Moxee Drain at Birchfield Road nr Union Gap	05-23-91	1000	<1
23	12500420	Moxee Drain at Birchfield Road nr Union Gap	06-17-91	1100	<1
23	12500420	Moxee Drain at Birchfield Road nr Union Gap	06-20-91	1645	<1
23	12500420	Moxee Drain at Birchfield Road nr Union Gap	07-10-91	1240	<1
23	12500420	Moxee Drain at Birchfield Road nr Union Gap	09-04-91	1115	<1
35	12505450	Granger Drain at Granger	05-23-91	1230	<1
35	12505450	Granger Drain at Granger	06-17-91	1420	<1
35	12505450	Granger Drain at Granger	06-20-91	1400	<1
35	12505450	Granger Drain at Granger	07-10-91	1500	<1
35	12505450	Granger Drain at Granger	09-04-91	1420	<1
46	12508850	Sulphur Cr Wasteway nr Sunnyside	05-24-91	1000	<1
46	12508850	Sulphur Cr Wasteway nr Sunnyside	06-19-91	1145	<1
46	12508850	Sulphur Cr Wasteway nr Sunnyside	06-20-91	1200	<1
46	12508850	Sulphur Cr Wasteway nr Sunnyside	07-11-91	1155	<1
46	12508850	Sulphur Cr Wasteway nr Sunnyside	09-05-91	1130	<1
48	12509499	Chandler Canal at Bunn Rd at Prosser	05-22-91	1500	<1
48	12509499	Chandler Canal at Bunn Rd at Prosser	06-13-91	1240	<1
48	12509499	Chandler Canal at Bunn Rd at Prosser	06-13-91	1241	<1
51	12510500	Yakima River at Kiona	05-21-91	1200	<1
51	12510500	Yakima River at Kiona	05-21-91	1201	<1
51	12510500	Yakima River at Kiona	07-09-91	1155	<1
51	12510500	Yakima River at Kiona	08-06-91	1150	<1
51	12510500	Yakima River at Kiona	08-06-91	1151	<1
51	12510500	Yakima River at Kiona	09-25-91	1120	<1

Station number	Date	Gross chlordane	p,p'-DDD	p,p'-DDE	p,p'-DDT	Dieldrin	Endosulfan I	Endrin	Heptachlor
12496550	05-22-91	<100	1	2	1	<1	1	<1	<1
12496550	06-12-91	<100	<1	2	1	<1	<1	<1	<1
12500420	05-23-91	<100	<1	3	3	<1	1	<1	<1
12500420	06-17-91	<100	1	6	5	1	<1	<1	<1
12500420	06-20-91	<100	.1	1	1	.2	.8	<1	<1
12500420	07-10-91	<100	<1	2	2	.1	<1	<1	<1
12500420	09-04-91	<100	1	1	1	1	<1	<1	<1
12505450	05-23-91	<100	1	5	4	<1	1	<1	<1
12505450	06-17-91	1	3	16	13	2	<1	<1	<1
12505450	06-20-91	<100	3	18	18	2	<1	<1	<1
12505450	07-10-91	<100	1	29	37	5	<1	<1	<1
12505450	09-04-91	<100	4	19	15	1	<1	<1	<1
12508850	05-24-91	<100	2	10	7	1	2	<1	<1
12508850	06-19-91	<100	1	3	7	1	<1	<1	<1
12508850	06-20-91	<100	.3	<1	2	2	.1	<1	<1
12508850	07-11-91	<100	2	9	10	2	<1	<1	<1
12508850	09-05-91	<100	2	15	12	2	<1	<1	<1
12509499	05-22-91	<100	<1	1	<1	<1	1	<1	<1
12509499	06-13-91	<100	<1	1	<1	<1	<1	<1	<1
12509499	06-13-91	<100	<1	2	<1	<1	<1	<1	<1
12510500	05-21-91	<100	<1	1	1	1	1	<1	<1
12510500	05-21-91	<100	<1	1	1	<1	1	<1	<1
12510500	07-09-91	<100	<1	1	.2	.4	1	<1	<1
12510500	08-06-91	<100	<1	1	<1	<1	<1	<1	<1
12510500	08-06-91	<100	1	1	<1	1	<1	<1	<1
12510500	09-25-91	<100	T<1	1	<1	1	<1	<1	<1

Table 14. Concentrations of organochlorine compounds associated with suspended sediment, Yakima River basin, Washington, May-September 1991--Continued

Station number	Date	Heptachlor epoxide	Lindane	p,p'-Methoxychlor	Mirex	PCB	PCN	Perthane	Toxaphene
12496550	05-22-91	<1	<1	<10	<10	<10	<100	<100	<1,000
12496550	06-12-91	nq	<1	<10	<10	<100	<100	<100	<1,000
12500420	05-23-91	<1	<1	<10	<10	<10	<100	<100	<1,000
12500420	06-17-91	<1	<1	<10	<10	26	<100	<100	<1,000
12500420	06-20-91	<1	.1	<10	<10	<100	<100	<100	<1,000
12500420	07-10-91	<1	<1	<10	<10	60	<100	<100	<1,000
12500420	09-04-91	<1	<1	<10	<10	70	<100	<100	<1,000
12505450	05-23-91	<1	<1	<10	<10	<10	<100	<100	<1,000
12505450	06-17-91	.1	.1	<10	<10	<100	<100	<100	<1,000
12505450	06-20-91	<1	.3	<10	<10	<100	<100	<100	<1,000
12505450	07-10-91	<1	<1	<10	<10	20	<100	<100	<1,000
12505450	09-04-91	<1	<1	<10	<10	40	<100	<100	<1,000
12508850	05-24-91	<1	<1	<10	<10	10	<100	<100	<1,000
12508850	06-19-91	<1	<.1	<10	<10	<100	<100	<100	<1,000
12508850	06-20-91	<1	.5	<10	<10	<100	<100	<100	<1,000
12508850	07-11-91	<1	<1	<10	<10	<100	<100	<100	<1,000
12508850	09-05-91	<1	<1	<10	<10	10	<100	<100	<1,000
12509499	05-22-91	<1	<1	<10	<10	<10	<100	<100	<1,000
12509499	06-13-91	nq	<1	<10	<10	<100	<100	<100	<1,000
12509499	06-13-91	nq	<1	<10	<10	<100	<100	<100	<1,000
12510500	05-21-91	<1	<1	<10	<10	<10	<100	<100	<1,000
12510500	05-21-91	<1	<1	<10	<10	<10	<100	<100	<1,000
12510500	07-09-91	<1	<1	<10	<10	10	<100	<100	<1,000
12510500	08-06-91	<1	<1	<10	<10	20	<100	<100	<1,000
12510500	08-06-91	<1	<1	<10	<10	50	<100	<100	<1,000
12510500	09-25-91	<1	<1	<10	<10	20	<100	<100	<1,000

Table 15. Concentrations of organophosphorus pesticides in whole-water samples, Yakima River basin, Washington, 1988-89

[Concentrations in nanograms per liter; "--" = not analyzed; "<" = less than; see figure 1 for site locations]

Map reference number	Station number	Station name	Date	Time	Chlor-pyrifos	Diaz-inon
3	12478300	Cle Elum R above Cle Elum Lake nr Roslyn	05-05-88	1100	--	<10
3	12478300	Cle Elum R above Cle Elum Lake nr Roslyn	06-02-88	0930	--	<10
3	12478300	Cle Elum R above Cle Elum Lake nr Roslyn	07-26-88	1000	--	<10
3	12478300	Cle Elum R above Cle Elum Lake nr Roslyn	07-26-88	1015	--	<10
3	12478300	Cle Elum R above Cle Elum Lake nr Roslyn	08-31-88	1030	--	<10
3	12478300	Cle Elum R above Cle Elum Lake nr Roslyn	11-16-88	1030	--	<10
3	12478300	Cle Elum R above Cle Elum Lake nr Roslyn	03-09-89	1015	--	<10
4	12479500	Yakima River at Cle Elum	07-26-88	1500	--	<10
11	12484100	Wilson Creek abv. Cherry Creek at Thrall	07-26-88	1615	--	<10
13	12484480	Cherry Creek at Thrall	05-05-88	1530	--	<10
13	12484480	Cherry Creek at Thrall	06-02-88	1400	--	<10
13	12484480	Cherry Creek at Thrall	06-02-88	1405	--	<10
13	12484480	Cherry Creek at Thrall	07-26-88	1030	--	<10
13	12484480	Cherry Creek at Thrall	08-31-88	1630	--	<10
13	12484480	Cherry Creek at Thrall	11-18-88	1000	--	<10
13	12484480	Cherry Creek at Thrall	03-09-89	1400	--	<10
14	12484500	Yakima River at Umtanum	07-27-88	1045	--	<10
14	12484500	Yakima River at Umtanum	06-28-89	1705	--	<10
22	12499000	Naches River nr North Yakima	07-26-88	1330	--	<10
24	12500430	Moxee Drain at Thorp Rd nr Union Gap	05-06-88	0930	10	<10
24	12500430	Moxee Drain at Thorp Rd nr Union Gap	05-06-88	0940	10	<10
24	12500430	Moxee Drain at Thorp Rd nr Union Gap	06-01-88	1600	--	10
24	12500430	Moxee Drain at Thorp Rd nr Union Gap	07-26-88	1100	--	360
24	12500430	Moxee Drain at Thorp Rd nr Union Gap	07-27-88	1310	--	630
24	12500430	Moxee Drain at Thorp Rd nr Union Gap	07-28-88	1605	--	130
24	12500430	Moxee Drain at Thorp Rd nr Union Gap	07-29-88	0800	--	530
24	12500430	Moxee Drain at Thorp Rd nr Union Gap	08-30-88	1730	--	30
24	12500430	Moxee Drain at Thorp Rd nr Union Gap	11-15-88	1015	--	<10
24	12500430	Moxee Drain at Thorp Rd nr Union Gap	03-10-89	1200	--	<10
24	12500430	Moxee Drain at Thorp Rd nr Union Gap	06-28-89	1035	--	370
27	12500445	Wide Hollow Creek near mouth at Union Gap	05-05-88	1845	<10	<10
27	12500445	Wide Hollow Creek near mouth at Union Gap	06-03-88	0730	--	120
27	12500445	Wide Hollow Creek near mouth at Union Gap	07-27-88	1025	--	10
27	12500445	Wide Hollow Creek near mouth at Union Gap	08-30-88	1430	--	<10
27	12500445	Wide Hollow Creek near mouth at Union Gap	11-15-88	1330	--	<10
27	12500445	Wide Hollow Creek near mouth at Union Gap	11-15-88	1430	--	<10
27	12500445	Wide Hollow Creek near mouth at Union Gap	03-10-89	1400	--	<10
28	12500450	Yakima R abv Ahtanum Cr at Union Gap	07-27-88	1600	--	20
36	12505460	Granger Drain at mouth nr Granger	05-06-88	1230	--	<10
36	12505460	Granger Drain at mouth nr Granger	06-01-88	1300	--	<10
36	12505460	Granger Drain at mouth nr Granger	07-28-88	0730	--	30
36	12505460	Granger Drain at mouth nr Granger	07-28-88	0930	--	20
36	12505460	Granger Drain at mouth nr Granger	07-28-88	1015	--	10
36	12505460	Granger Drain at mouth nr Granger	09-02-88	1000	--	10
36	12505460	Granger Drain at mouth nr Granger	11-15-88	1645	--	<10
36	12505460	Granger Drain at mouth nr Granger	03-09-89	1730	--	<10
36	12505460	Granger Drain at mouth nr Granger	06-27-89	1705	--	10
37	12505510	Marion Drain at Indian Church Rd at Granger	07-28-88	1145	--	230
38	12507508	Toppenish Cr at Indian Church Rd nr Granger	05-06-88	1345	--	<10
38	12507508	Toppenish Cr at Indian Church Rd nr Granger	06-03-88	1000	--	<10
38	12507508	Toppenish Cr at Indian Church Rd nr Granger	07-28-88	1445	--	150
38	12507508	Toppenish Cr at Indian Church Rd nr Granger	09-01-88	0930	--	10
38	12507508	Toppenish Cr at Indian Church Rd nr Granger	11-16-88	1615	--	<10
38	12507508	Toppenish Cr at Indian Church Rd nr Granger	03-08-89	1600	--	<10
43	12508620	Satus Creek at gage at Satus	07-29-88	1145	--	50
46	12508850	Sulphur Cr Wasteway nr Sunnyside	05-06-88	1630	--	<10
46	12508850	Sulphur Cr Wasteway nr Sunnyside	06-03-88	1300	--	<10
46	12508850	Sulphur Cr Wasteway nr Sunnyside	07-28-88	1200	--	20
46	12508850	Sulphur Cr Wasteway nr Sunnyside	07-28-88	1700	--	10
46	12508850	Sulphur Cr Wasteway nr Sunnyside	08-31-88	1530	--	10

Table 15. Concentrations of organophosphorus pesticides in whole-water samples, Yakima River basin, Washington, 1988-1989--Continued

Station number	Date	Disulfoton	Ethion	Malathion	Methyl parathion	Methyl trithion	Parathion	Phorate	Trithion
12478300	05-05-88	--	<10	<10	<10	<10	<10	--	<10
12478300	06-02-88	--	<10	<10	<10	<10	<10	--	<10
12478300	07-26-88	--	<10	<10	<10	<10	<10	--	<10
12478300	07-26-88	--	<10	<10	<10	<10	<10	--	<10
12478300	08-31-88	--	<10	<10	<10	<10	<10	--	<10
12478300	11-16-88	--	<10	<10	<10	<10	<10	--	<10
12478300	03-09-89	--	<10	<10	<10	<10	<10	--	<10
12479500	07-26-88	--	<10	<10	<10	<10	<10	--	<10
12484100	07-26-88	--	<10	<10	<10	<10	<10	--	<10
12484480	05-05-88	--	<10	<10	<10	<10	<10	--	<10
12484480	06-02-88	--	<10	<10	<10	<10	<10	--	<10
12484480	06-02-88	--	<10	<10	<10	<10	<10	--	<10
12484480	07-26-88	--	<10	<10	<10	<10	<10	--	<10
12484480	08-31-88	--	<10	<10	<10	<10	<10	--	<10
12484480	11-18-88	--	<10	<10	<10	<10	<10	--	<10
12484480	03-09-89	--	<10	<10	<10	<10	<10	--	<10
12484500	07-27-88	--	<10	<10	<10	<10	<10	--	<10
12484500	06-28-89	--	<10	<10	<10	<10	<10	--	<10
12499000	07-26-88	--	<10	<10	<10	<10	<10	--	<10
12500430	05-06-88	--	<10	<10	<10	<10	<10	--	<10
12500430	05-06-88	--	<10	<10	<10	<10	<10	--	<10
12500430	06-01-88	--	<10	<10	<10	<10	<10	20	<10
12500430	07-26-88	--	410	<10	<10	<10	80	240	<10
12500430	07-27-88	--	140	<10	<10	<10	10	100	<10
12500430	07-28-88	--	50	<10	<10	<10	100	140	<10
12500430	07-29-88	--	40	<10	<10	<10	10	90	<10
12500430	08-30-88	--	100	<10	<10	<10	<10	10	<10
12500430	11-15-88	--	<10	<10	<10	<10	<10	--	<10
12500430	03-10-89	--	<10	<10	<10	<10	<10	--	<10
12500430	06-28-89	--	<10	<10	<10	<10	<10	90	<10
12500445	05-05-88	--	<10	<10	<10	<10	<10	--	<10
12500445	06-03-88	--	<10	60	<10	<10	10	--	<10
12500445	07-27-88	--	<10	<10	<10	<10	<10	--	<10
12500445	08-30-88	--	<10	<10	<10	<10	<10	--	<10
12500445	11-15-88	--	<10	<10	<10	<10	<10	--	<10
12500445	11-15-88	--	<10	<10	<10	<10	<10	--	<10
12500445	03-10-89	--	<10	<10	<10	<10	<10	--	<10
12500450	07-27-88	--	<10	<10	<10	<10	<10	--	<10
12505460	05-06-88	--	<10	<10	<10	<10	<10	--	<10
12505460	06-01-88	--	<10	10	<10	<10	<10	--	<10
12505460	07-28-88	--	<10	<10	<10	<10	<10	--	<10
12505460	07-28-88	--	<10	<10	<10	<10	<10	--	<10
12505460	07-28-88	--	<10	<10	<10	<10	<10	--	<10
12505460	09-02-88	--	<10	<10	<10	<10	<10	--	<10
12505460	11-15-88	--	<10	<10	<10	<10	<10	--	<10
12505460	03-09-89	--	<10	<10	<10	<10	<10	--	<10
12505460	06-27-89	--	<10	<10	<10	<10	<10	--	<10
12505510	07-28-88	--	<10	<10	<10	<10	20	--	<10
12507508	05-06-88	--	<10	<10	<10	<10	<10	--	<10
12507508	06-03-88	--	<10	10	<10	<10	<10	--	<10
12507508	07-28-88	--	<10	<10	<10	<10	20	--	<10
12507508	09-01-88	--	<10	<10	<10	<10	<10	--	<10
12507508	11-16-88	--	<10	<10	<10	<10	<10	--	<10
12507508	03-08-89	--	<10	<10	<10	<10	<10	--	<10
12508620	07-29-88	--	<10	<10	<10	<10	10	--	<10
12508850	05-06-88	--	<10	<10	<10	<10	<10	--	<10
12508850	06-03-88	--	<10	<10	<10	<10	10	--	<10
12508850	07-28-88	70	<10	<10	<10	<10	<10	10	<10
12508850	07-28-88	60	<10	<10	<10	<10	<10	10	<10
12508850	08-31-88	--	<10	<10	<10	<10	<10	--	<10

Table 15. Concentrations of organophosphorus pesticides in whole-water samples, Yakima River basin, Washington, 1988-1989--Continued

Map reference number	Station number	Station name	Date	Time	Chlor-pyrifos	Diaz-inon
46	12508850	Sulphur Cr Wasteway nr Sunnyside	08-31-88	1630	--	<10
46	12508850	Sulphur Cr Wasteway nr Sunnyside	11-17-88	0900	--	<10
46	12508850	Sulphur Cr Wasteway nr Sunnyside	03-08-89	1200	--	<10
46	12508850	Sulphur Cr Wasteway nr Sunnyside	06-26-89	2005	--	20
47	12509050	Yakima R at Euclid Br at RM 55 nr Grandview	07-28-88	1010	--	70
49	12509710	Spring Creek at mouth at Whitstran	07-29-88	1300	--	70
50	12509829	Snipes Creek at mouth st Whitstran	07-29-88	1500	--	10
51	12510500	Yakima River at Kiona	05-07-88	0800	--	<10
51	12510500	Yakima River at Kiona	06-01-88	0900	--	<10
51	12510500	Yakima River at Kiona	07-29-88	1030	--	250
51	12510500	Yakima River at Kiona	08-31-88	1000	--	10
51	12510500	Yakima River at Kiona	11-17-88	1400	--	10
51	12510500	Yakima River at Kiona	03-08-89	0900	--	<10
51	12510500	Yakima River at Kiona	06-26-89	1435	--	30
51	12510500	Yakima River at Kiona	12-06-89	1615	--	<10
51	12510500	Yakima River at Kiona	12-06-89	2357	--	<10
51	12510500	Yakima River at Kiona	12-07-89	1852	--	<10
58	463233120262101	Well 12N/19E-09H02	01-20-89	0750	--	<10
59	463234120261601	Well 12N/19E-09H01	01-20-89	0730	--	<10
59	463234120261601	Well 12N/19E-09H01	01-20-89	0737	--	<10
61	463257120260801	Well 12N/19E-10D02	01-20-89	0715	--	<10

Station number	Date	Disulfo-ton	Ethion	Mala-thion	Methyl para-thion	Methyl tri-thion	Para-thion	Phorate	Tri-thion
12508850	08-31-88	--	<10	<10	<10	<10	<10	--	<10
12508850	11-17-88	--	<10	<10	<10	<10	<10	--	<10
12508850	03-08-89	--	<10	<10	<10	<10	<10	--	<10
12508850	06-26-89	--	<10	10	<10	<10	<10	--	<10
12509050	07-28-88	--	<10	<10	<10	<10	30	10	<10
12509710	07-29-88	--	<10	10	<10	<10	10	--	<10
12509829	07-29-88	--	<10	<10	<10	<10	<10	--	<10
12510500	05-07-88	--	<10	<10	<10	<10	<10	--	<10
12510500	06-01-88	--	<10	<10	<10	<10	<10	--	<10
12510500	07-29-88	--	<10	<10	<10	<10	60	--	<10
12510500	08-31-88	--	<10	<10	<10	<10	<10	--	<10
12510500	11-17-88	--	<10	<10	<10	<10	<10	--	<10
12510500	03-08-89	--	<10	<10	<10	<10	<10	--	<10
12510500	06-26-89	--	<10	<10	<10	<10	10	--	<10
12510500	12-06-89	<10	<10	<10	<10	<10	<10	<10	<10
12510500	12-06-89	<10	<10	<10	<10	<10	<10	<10	<10
12510500	12-07-89	<10	<10	<10	<10	<10	<10	<10	<10
463233120262101	01-20-89	--	<10	<10	<10	<10	<10	--	<10
463234120261601	01-20-89	--	<10	<10	<10	<10	<10	--	<10
463234120261601	01-20-89	--	<10	<10	<10	<10	<10	--	<10
463257120260801	01-20-89	--	<10	<10	<10	<10	<10	--	<10

Table 16. Concentrations of organophosphorus pesticides in filtered-water samples, Yakima River basin, Washington, June 25-30, 1989

[Concentrations in nanograms per liter; "D" = detected and not quantified; nd = not detected and minimum reporting level not quantified; "--" = not analyzed; "T" = present, but below quantifiable concentration; "<" = less than; DEF = (S,S,S-tributyl phosphorotrithioate), methamidophos, and terbufos were not detected; for quality assurance, three additional replicate samples from the Yakima River at Kiona were analyzed for azinphos-methyl, and the concentrations were 6.5, 6.7, and 9.0 ng/L; see figure 1 for site locations]

Map reference number	Station number	Station name	Azinphos-methyl	Chlor-pyrifos	Demeton-S	Diazinon	Dimetho-ate	Disulfo-ton	Ethion	Fonofos	Isofen-phos
2	12478200	Cooper River at Salmon LaSac	--	<1.6	<2.1	<1.3	<2.2	<1.7	<2.6	<1.0	<1.8
4	12479500	Yakima River at Cle Elum	nd	<.75	<.76	.67	<1.2	<.78	T<1.2	<.66	<.84
11	12484100	Wilson Cr abv. Cherry Creek	--	<3.3	<4.4	<2.7	<4.7	<3.5	<5.4	<2.1	<3.9
13	12484480	Cherry Creek at Thrall	<4.6	T<3.1	<4.0	T<2.7	<3.5	<2.2	<2.6	<2.4	<2.6
14	12484500	Yakima River at Umtanum	nd	T<2.4	<2.4	T<2.0	<3.7	<2.4	T<3.9	<2.0	T<2.6
15	12484550	Umtanum Creek nr mouth	nd	1.0	<1.2	<1.2	<1.1	<1.3	<1.2	<1.2	<.90
19	12496510	Pacific Power & Light Company Wasteway	nd	<.73	<.74	<.64	<1.1	<.76	<1.2	<.64	<.82
20	12496511	City of Yakima-Finish Water	--	<1.0	<1.4	<.83	<1.4	<1.1	<1.7	<.66	<1.2
22	12499000	Naches River nr North Yakima	D	<.65	<.77	T<.64	<1.3	<.74	<1.1	<.68	<.80
24	12500430	Moxee Drain at Thorp Rd	D	T<6.7	T<7.9	410	<13	<7.6	T<11	<7.0	<8.2
27	12500445	Wide Hollow Creek near mouth	--	<3.1	<4.1	5.9	5.7	<3.3	T<5.1	<2.0	<3.6
28	12500450	Yakima R abv Ahtanum Cr	D	<2.2	<2.3	7.9	<3.5	<2.3	T<3.7	<2.0	T<2.5
30	12502500	Ahtanum Creek at Union Gap	D	T<2.1	T<2.5	3.3	<4.2	<2.4	<3.6	<2.2	<2.6
33	12505350	E Toppenish Drain at Wilson Rd	--	3.3	<4.2	28	T<4.5	<3.4	<5.2	<2.0	<3.7
34	12505410	Sub 35 Drain at Parton Road	--	T<3.1	<4.1	25	T<4.4	T<3.3	<5.1	<2.0	<3.6
36	12505460	Granger Drain at mouth	nd	T<6.0	<7.1	11	T<12	T<6.9	<10	<6.3	<7.4
55	462510-120323901	Well 2, Harrah, 11N/18E-22R02	--	<1.0	<1.4	T<.83	<1.4	<1.1	<1.7	<.66	<1.2
37	12505510	Marion Drain, Indian Church Rd	--	<3.1	<4.1	55	4.6	T<3.3	T<5.1	T<2.0	<3.7
38	12507508	Toppenish Cr, Indian Church Rd	D	T<2.0	<2.4	31	T<4.0	T<2.3	<3.5	<2.1	<2.5
40	12507585	Yakima River at RM 72	T<4.6	T<3.1	<4.0	35	<3.5	T<2.2	<2.6	T<2.4	<2.6
41	12507594	Satus Cr abv Wilson-Charley Canyon nr Toppenish	D	<.66	<.79	<.65	<1.3	<.76	<1.1	<.70	<.82
53	461720-120043201	Well 1, Sunnyside, 09N/22E-04P01	--	<1.0	<1.3	<.82	T<1.4	<1.1	<1.7	<.65	<1.2
43	12508620	Satus Cr at gage at Satus	--	T<3.1	<4.2	22	7.7	T<3.3	<5.1	<2.0	<3.7
45	12508630	South Drain nr Satus	nd	<6.7	<8.0	150	<13	T<7.7	<12	<7.1	<8.3
46	12508850	Sulphur Creek Wasteway	--	<26	T<34	66	330	T<27	<42	<17	<30
47	12509050	Yakima R at Euclid Br at RM 55	D	T<2.2	<2.6	120	7.3	<2.5	<3.7	<2.3	<2.7
49	12509710	Spring Creek at mouth	--	2.8	<4.2	71	<4.6	T<3.4	T<5.2	<2.0	<3.8
50	12509829	Snipes Creek at mouth	--	<3.1	<4.1	32	T<4.4	<3.3	T<5.1	<2.0	<3.7
51	12510500	Yakima River at Kiona	nd	9.6	<2.4	39	<3.7	<2.4	T<3.9	<2.0	<2.6

Table 16. Concentrations of organophosphorus pesticides in filtered-water samples, Yakima River basin, Washington, June 25-30, 1989--Continued

Station number	Station name	Malathion	Methida-thion	Methyl parathion	Methyl trithion	Mevinphos	Parathion	Phorate	Phospham-idon	Trithion
12478200	Cooper River at Salmon LaSac	T<2.7	<2.4	<0.69	<2.4	<2.1	<2.6	<2.4	<2.2	<2.6
12479500	Yakima River at Cle Elum	1.5	<.96	<1.3	<1.2	<1.0	<1.0	<.88	T<2.1	<1.1
12484100	Wilson Cr abv. Cherry Creek	T<5.7	140	<1.4	<5.1	<4.4	<5.4	<5.1	T<4.7	<5.3
12484480	Cherry Creek at Thrall	T<2.7	<2.6	<3.1	<2.5	<3.5	<3.0	5.2	<2.4	<2.5
12484500	Yakima River at Umtanum	T<3.9	4.9	T<4.1	T<3.8	<3.2	T<3.2	<2.8	T<6.5	<3.6
12484550	Umtanum Creek nr mouth	<1.1	<.99	<1.4	<1.5	<.93	--	<.92	<.86	<.99
12496510	Pacific Power & Light Company Wasteway	5.6	<.93	<1.3	<1.2	<1.0	T<1.0	<.86	<2.0	<1.1
12496511	City of Yakima-Finish Water	T<1.8	<1.6	<.45	<1.6	<1.3	<1.7	<1.6	<1.5	<1.6
12499000	Naches River nr North Yakima	1.6	<1.0	T<1.4	T<1.2	<.93	T<1.3	<.87	T<1.0	<.92
12500430	Moxee Drain at Thorp Rd	T<11	<10	<14	<12	<9.5	<14	130	43	<9.4
12500445	Wide Hollow Creek near mouth	13	<4.8	<1.4	<4.8	<4.1	<5.1	<4.8	8.1	<5.0
12500450	Yakima R abv Ahtanum Cr	25	<2.8	<3.9	<3.6	<3.0	T<3.1	3.6	T<6.1	<3.4
12502500	Ahtanum Creek at Union Gap	6.3	<3.4	<4.5	<3.9	<3.0	<4.4	<2.8	5.3	<3.0
12505350	E Toppenish Drain at Wilson Rd	12	<4.9	<1.4	<4.9	<4.2	10	10	52	<5.1
12505410	Sub 35 Drain at Parton Road	19	<4.8	16	<4.8	<4.1	<5.1	<4.8	16	<5.0
12505460	Granger Drain at mouth	T<9.9	<9.5	<13	<11	T<8.6	<12	<8.0	56	<8.5
462510-120323901	Well 2, Harrah, 11N/18E-22R02	2.1	<1.6	5.6	<1.6	<1.3	<1.7	<1.6	T<1.5	<1.6
12505510	Marion Drain, Indian Church Rd	31	<4.8	<1.4	<4.8	<4.1	7.4	19	10	<5.0
12507508	Toppenish Cr, Indian Church Rd	12	<3.2	<4.3	<3.7	<2.9	16	<2.7	<3.2	<2.9
12507585	Yakima River at RM 72	14	<2.6	T<3.1	<2.5	<3.5	11	T<3.4	T<2.4	<2.5
12507594	Satus Cr abv Wilson-Charley Canyon nr Toppenish	<1.1	<1.0	<1.4	<1.2	<.95	<1.4	<.89	<1.0	<.94
461720-120043201	Well 1, Sunnyside, 09N/22E-04P01	T<1.7	<1.6	<.44	<1.6	<1.3	<1.7	<1.6	T<1.4	<1.6
12508620	Satus Cr at gage at Satus	14	T<4.8	<1.4	<4.8	<4.1	180	<4.8	<4.5	<5.1
12508630	South Drain nr Satus	T<11	<11	<14	<12	<9.6	23	<9.0	<11	<9.5
12508850	Sulphur Creek Wasteway	T<44	<40	<11	<40	<34	<42	T<40	T<37	<42
12509050	Yakima R at Euclid Br at RM 55	8.6	<3.4	<4.6	<4.0	<3.1	30	T<2.9	22	<3.1
12509710	Spring Creek at mouth	48	<4.9	13	<4.9	<4.2	12	<4.9	6.7	T<5.2
12509829	Snipes Creek at mouth	27	<4.8	<1.4	<4.8	<4.1	T<5.1	<4.8	28	<5.0
12510500	Yakima River at Kiona	70	<3.0	<4.1	<3.8	<3.2	T<3.2	T<2.8	5.3	<3.6

Table 17. Concentrations of organophosphorus pesticides in filtered-water samples, Yakima River basin, Washington, May-September 1991

[Concentrations in nanograms per liter; "<" = less than; DEF = S,S,S-tributyl phosphorotrithioate; see figure 1 for site locations]

Map reference number	Station number	Station name	Date	Time	Chlor-pyrifos	DEF	Diaz-inon
21	12496550	Buckskin Slough blw Gleed Ditch nr Gleed	05-22-91	1100	<10	<10	<10
21	12496550	Buckskin Slough blw Gleed Ditch nr Gleed	06-12-91	1345	<10	<10	<10
23	12500420	Moxee Drain at Birchfield Road nr Union Gap	05-23-91	1000	10	<10	<10
23	12500420	Moxee Drain at Birchfield Road nr Union Gap	06-17-91	1100	10	<10	340
23	12500420	Moxee Drain at Birchfield Road nr Union Gap	06-20-91	1645	10	<10	1,300
23	12500420	Moxee Drain at Birchfield Road nr Union Gap	07-10-91	1240	<10	<10	30
23	12500420	Moxee Drain at Birchfield Road nr Union Gap	09-04-91	1115	<10	<10	10
35	12505450	Granger Drain at Granger	05-23-91	1230	<10	<10	<10
35	12505450	Granger Drain at Granger	06-17-91	1420	<10	<10	10
35	12505450	Granger Drain at Granger	06-20-91	1400	<10	<10	30
35	12505450	Granger Drain at Granger	07-10-91	1500	<10	<10	<10
35	12505450	Granger Drain at Granger	09-04-91	1420	<10	<10	<10
46	12508850	Sulphur Cr Wasteway nr Sunnyside	05-24-91	1000	<10	<10	<10
46	12508850	Sulphur Cr Wasteway nr Sunnyside	06-19-91	1145	<10	<10	20
46	12508850	Sulphur Cr Wasteway nr Sunnyside	06-20-91	1200	10	<10	50
46	12508850	Sulphur Cr Wasteway nr Sunnyside	07-11-91	1155	<10	<10	20
46	12508850	Sulphur Cr Wasteway nr Sunnyside	09-05-91	1130	<10	<10	<10
48	12509499	Chandler Canal at Bunn Rd at Prosser	05-22-91	1500	<10	<10	<10
48	12509499	Chandler Canal at Bunn Rd at Prosser	06-13-91	1240	<10	<10	<10
51	12510500	Yakima River at Kiona	05-21-91	1200	<10	<10	<10
51	12510500	Yakima River at Kiona	07-09-91	1155	<10	<10	10
51	12510500	Yakima River at Kiona	08-06-91	1150	<10	<10	10
51	12510500	Yakima River at Kiona	08-06-91	1151	<10	<10	10
51	12510500	Yakima River at Kiona	09-25-91	1120	<10	<10	<10

Station number	Date	Disulfo-ton	Ethion	Fonofos	Mala-thion	Methyl para-thion	Methyl tri-thion	Para-thion	Phorate	Tri-thion
12496550	05-22-91	<10	<10	<10	<10	<10	<10	<10	<10	<10
12496550	06-12-91	<10	<10	<10	<10	<10	<10	<10	<10	<10
12500420	05-23-91	<10	<10	<10	<10	<10	<10	<10	10	<10
12500420	06-17-91	<10	<10	<10	10	<10	<10	10	<10	<10
12500420	06-20-91	<10	<10	<10	10	60	<10	<10	10	<10
12500420	07-10-91	<10	20	<10	<10	20	<10	<10	<10	<10
12500420	09-04-91	<10	20	<10	<10	<10	<10	<10	<10	<10
12505450	05-23-91	<10	<10	<10	<10	<10	<10	<10	<10	<10
12505450	06-17-91	<10	<10	<10	20	10	<10	10	<10	<10
12505450	06-20-91	<10	<10	10	20	30	<10	10	<10	<10
12505450	07-10-91	<10	<10	<10	<10	<10	<10	<10	<10	<10
12505450	09-04-91	<10	<10	<10	<10	<10	<10	<10	<10	<10
12508850	05-24-91	<10	<10	<10	<10	<10	<10	<10	10	<10
12508850	06-19-91	<10	<10	<10	20	10	<10	10	<10	<10
12508850	06-20-91	<10	<10	<10	50	40	<10	20	10	<10
12508850	07-11-91	<10	<10	<10	50	<10	<10	10	<10	<10
12508850	09-05-91	<10	<10	<10	<10	<10	<10	<10	<10	<10
12509499	05-22-91	<10	<10	<10	<10	<10	<10	<10	<10	<10
12509499	06-13-91	<10	<10	<10	30	<10	<10	<10	<10	<10
12510500	05-21-91	<10	<10	<10	<10	<10	<10	<10	<10	<10
12510500	07-09-91	<10	<10	<10	290	<10	<10	10	<10	<10
12510500	08-06-91	<10	<10	<10	<10	<10	<10	10	<10	<10
12510500	08-06-91	<10	<10	<10	<10	<10	<10	<10	<10	<10
12510500	09-25-91	<10	<10	<10	<10	<10	<10	10	<10	<10

Table 18. Concentrations of organophosphorus pesticides associated with suspended sediment, Yakima River basin, Washington, June 25-30, 1989

[Concentrations in nanograms per liter; "--" = not analyzed; "T" = present, but below quantifiable concentration; "<" = less than; DEF = S,S,S-tributyl phosphorotrithioate; see figure 1 for site locations]

Map reference number	Station number	Station name	Chlor-pyrifos	DEF	Diazinon	Disulfo-ton	Ethion	Fonofos	Isofen-phos
2	12478200	Cooper River at Sslmon LaSac	<0.05	--	<0.05	<0.05	<0.05	--	--
4	12479500	Yakima River at Cle Elum	<.04	<.04	<.04	<.04	<.04	<0.04	<0.04
11	12484100	Wilson Cr abv. Cherry Creek	<.2	--	<.2	<.2	<.2	--	--
13	12484480	Cherry Creek at Thrall	.3	--	<.1	.6	<.1	--	--
14	12484500	Yakima River at Umtanum	<.06	<.06	<.06	<.06	<.06	<.06	<.06
15	12484550	Umtanum Creek nr mouth	<.04	<.04	<.04	<.04	<.04	<.04	<.04
19	12496510	Pacific Power & Light Company Wasteway	<.02	<.02	<.02	<.02	<.02	<.02	<.02
20	12496511	City of Yakima-Finish Water	<.04	<.04	.06	<.04	<.04	<.04	<.04
22	12499000	Naches River nr North Yakima	T<.04	<.04	<.04	<.04	T<.04	<.04	<.04
24	12500430	Moxee Drain at Thorp Rd	.48	<.05	3.3	<.05	.52	<.05	<.05
27	12500445	Wide Hollow Creek near mouth	<.1	--	<.1	<.1	<.1	--	--
28	12500450	Yakima R abv Ahtanum Cr	<.1	<.1	T<.1	<.1	<.1	<.1	<.1
30	12502500	Ahtanum Creek at Union Gap	<.2	--	<.2	<.2	<.2	--	--
33	12505350	E Toppenish Drain at Wilson Rd	.4	--	.3	<.1	<.1	--	--
34	12505410	Sub 35 Drain at Parton Road	<.1	--	.3	<.1	<.1	--	--
36	12505460	Granger Drain at mouth	<.08	<.08	1.9	<.08	T<.08	<.08	<.08
55	462510-120323901	Well 2, Harrah, 11N/18E-22R02	<.04	<.04	<.04	<.04	<.04	<.04	<.04
37	12505510	Marion Drain, Indian Church Rd	<.1	--	.3	<.1	<.1	--	--
38	12507508	Toppenish Cr, Indian Church Rd	.1	--	.2	<.1	<.1	--	--
40	12507585	Yakima River at RM 72	T<.1	<.1	.16	<.1	T<.1	<.1	<.1
41	12507594	Satus Cr abv Wilson-Charley Canyon nr Toppenish	<.03	--	<.03	<.03	<.03	--	--
53	461720-120042301	Well 1, Sunnyside, 09N/22E-04P01	<.04	<.04	<.04	<.04	<.04	<.04	<.04
43	12508620	Satus Cr at gage at Satus	.2	--	.2	<.1	<.1	--	--
45	12508630	South Drain nr Satus	T<.09	<.09	.29	<.09	<.09	<.09	<.09
46	12508850	Sulphur Creek Wasteway	.16	<.1	.18	<.1	T<.1	<.1	<.1
47	12509050	Yakima R at Euclid Br at RM 55	<.1	<.1	T<.1	<.1	<.1	<.1	T<.1
49	12509710	Spring Creek at mouth	.2	--	.9	<.1	.5	--	--
50	12509829	Snipes Creek at mouth	.2	--	.3	<.1	<.1	--	--
51	12510500	Yakima River at Kiona	T<.06	<.06	.07	<.06	<.06	<.06	<.06

Station Number	Station name	Malathion	Methyl parathion	Methyl trithion	Parathion	Phorate	Trithion
12478200	Cooper River at Salmon LaSac	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
12479500	Yakima River at Cle Elum	<.04	<.04	<.04	<.04	<.04	<.04
12484100	Wilson Cr abv. Cherry Creek	<.2	<.2	<.2	<.2	<.2	<.2
12484480	Cherry Creek at Thrall	<.1	<.1	<.1	<.1	.3	<.1
12484500	Yakima River at Umtanum	<.06	<.06	<.06	<.06	<.06	<.06
12484550	Umtanum Creek nr mouth	<.04	<.04	<.04	<.04	<.04	<.04
12496510	Pacific Power & Light Company Wasteway	<.02	T<.02	<.02	<.02	<.02	<.02
12496511	City of Yakima-Finish Water	<.04	<.04	<.04	<.04	<.04	<.04
12499000	Naches River nr North Yakima	<.04	<.04	<.04	<.04	<.04	<.04
12500430	Moxee Drain at Thorp Rd	<.05	<.05	<.05	.14	1.4	<.05
12500445	Wide Hollow Creek near mouth	<.1	<.1	<.1	<.1	<.1	<.1
12500450	Yakima R abv Ahtanum Cr	<.1	<.1	<.1	<.1	<.1	<.1
12502500	Ahtanum Creek at Union Gap	<.2	<.2	<.2	<.2	<.2	<.2
12505350	E Toppenish Drain at Wilson Rd	<.1	<.1	<.1	.5	<.1	<.1
12505410	Sub 35 Drain at Parton Road	<.1	<.1	<.1	<.1	<.1	<.1
12505460	Granger Drain at mouth	<.08	<.08	<.08	<.08	<.08	<.08
462510-120323901	Well 2, Harrah, 11N/18E-22R02	<.04	<.04	<.04	<.04	<.04	<.04
12505510	Marion Drain, Indian Church Rd	<.1	<.1	<.1	<.1	<.1	<.1
12507508	Toppenish Cr, Indian Church Rd	<.1	<.1	<.1	.1	<.1	<.1
12507585	Yakima River at RM 72	<.1	<.1	<.1	.10	<.1	<.1
12507594	Satus Cr abv Wilson-Charley Canyon nr Toppenish	<.03	<.03	<.03	<.03	<.03	<.03
461720-120043201	Well 1,Sunnyside, 09N/22E-04P01	<.04	<.04	<.04	<.04	<.04	<.04
12508620	Satus Cr at gage at Satus	<.1	.6	<.1	.3	<.1	<.1
12508630	South Drain nr Satus	<.09	<.09	<.09	.17	<.09	<.09
12508850	Sulphur Creek Wasteway	<.1	<.1	<.1	.10	T<.1	<.1
12509050	Yakima R at Euclid Br at RM 55	<.1	<.1	<.1	<.1	<.1	<.1
12509710	Spring Creek at mouth	<.1	<.1	<.1	.5	<.1	<.1
12509829	Snipes Creek at mouth	<.1	.3	<.1	.2	<.1	<.1
12510500	Yakima River at Kiona	<.06	<.06	<.06	T<.06	<.06	<.06

Table 19. Concentrations of organophosphorus pesticides associated with suspended sediment, Yakima River basin, Washington, May-September 1991

[Concentrations in nanograms per liter; "<" = less than; DEF = S,S,S-tributyl phosphorotrithioate; see figure 1 for site locations]

Map reference number	Station number	Station name	Date	Time	Chlor-pyrifos	DEF	Diaz-inon
21	12496550	Buckskin Slough blw Gleed Ditch nr Gleed	05-22-91	1100	<0.5	<0.5	<0.5
21	12496550	Buckskin Slough blw Gleed Ditch nr Gleed	06-12-91	1345	<.3	<.3	<.3
23	12500420	Moxee Drain at Birchfield Road nr Union Gap	05-23-91	1000	<.4	<.4	<.4
23	12500420	Moxee Drain at Birchfield Road nr Union Gap	06-17-91	1100	<.5	<.5	1
23	12500420	Moxee Drain at Birchfield Road nr Union Gap	06-20-91	1645	.8	<.4	30
23	12500420	Moxee Drain at Birchfield Road nr Union Gap	07-10-91	1240	<.6	<.6	1
23	12500420	Moxee Drain at Birchfield Road nr Union Gap	09-04-91	1115	<.4	<.4	<.4
35	12505450	Granger Drain at Granger	05-23-91	1230	<.3	<.3	<.3
35	12505450	Granger Drain at Granger	06-17-91	1420	<.5	<.5	<.5
35	12505450	Granger Drain at Granger	06-20-91	1400	<.7	<.7	1
35	12505450	Granger Drain at Granger	07-10-91	1500	<.5	<.5	<.5
35	12505450	Granger Drain at Granger	09-04-91	1420	<.4	<.4	<.4
46	12508850	Sulphur Cr Wasteway nr Sunnyside	05-24-91	1000	<.4	<.4	<.4
46	12508850	Sulphur Cr Wasteway nr Sunnyside	06-19-91	1145	<.6	<.6	<.6
46	12508850	Sulphur Cr Wasteway nr Sunnyside	06-20-91	1200	<.7	<.7	1
46	12508850	Sulphur Cr Wasteway nr Sunnyside	07-11-91	1155	<.4	<.4	<.4
46	12508850	Sulphur Cr Wasteway nr Sunnyside	09-05-91	1130	<.4	<.4	<.4
48	12509499	Chandler Canal at Bunn Rd at Prosser	05-22-91	1500	<.7	<.7	<.7
48	12509499	Chandler Canal at Bunn Rd at Prosser	06-13-91	1240	<.6	<.6	<.6
48	12509499	Chandler Canal at Bunn Rd at Prosser	06-13-91	1241	<.6	<.6	<.6
51	12510500	Yakima River at Kiona	05-21-91	1200	<.4	<.4	<.4
51	12510500	Yakima River at Kiona	05-21-91	1201	<.4	<.4	<.4
51	12510500	Yakima River at Kiona	07-09-91	1155	<.4	<.4	<.4
51	12510500	Yakima River at Kiona	08-06-91	1150	<10	<10	<10
51	12510500	Yakima River at Kiona	08-06-91	1151	<10	<10	<10
51	12510500	Yakima River at Kiona	09-25-91	1120	<.5	<.5	<.5

Station number	Date	Disulf-oton	Ethion	Fonofos	Mala-thion	Methyl para-thion	Methyl tri-thion	Para-thion	Phorate	Tri-thion
12496550	05-22-91	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
12496550	06-12-91	<.3	<.3	<.3	<.3	<.3	<.3	<.3	<.3	<.3
12500420	05-23-91	<.4	<.4	<.4	<.4	<.4	<.4	<.4	<.4	<.4
12500420	06-17-91	<.5	<.5	<.5	<.5	<.5	<.5	<.5	<.5	<.5
12500420	06-20-91	<.4	<.4	<.4	<.4	4	<.4	<.4	<.4	<.4
12500420	07-10-91	<.6	1	<.6	<.6	1	<.6	<.6	.6	<.6
12500420	09-04-91	<.4	1	<.4	<.4	.5	<.4	<.4	<.4	<.4
12505450	05-23-91	<.3	<.3	<.3	<.3	<.3	<.3	<.3	<.3	<.3
12505450	06-17-91	<.5	<.5	<.5	<.5	1	<.5	<.5	<.5	<.5
12505450	06-20-91	<.7	<.7	<.7	<.7	2	<.7	<.7	<.7	<.7
12505450	07-10-91	<.5	<.5	<.5	<.5	1	<.5	<.5	<.5	<.5
12505450	09-04-91	<.4	<.4	<.4	<.4	.6	<.4	<.4	<.4	<.4
12508850	05-24-91	<.4	<.4	<.4	<.4	<.4	<.4	<.4	<.4	<.4
12508850	06-19-91	<.6	<.6	<.6	<.6	3	<.6	<.6	<.6	<.6
12508850	06-20-91	<.7	<.7	<.7	<.7	7	<.7	1	<.7	<.7
12508850	07-11-91	<.4	<.4	<.4	<.4	1	<.4	<.4	<.4	<.4
12508850	09-05-91	<.4	<.4	<.4	<.4	.4	<.4	<.4	<.4	<.4
12509499	05-22-91	<.7	<.7	<.7	<.7	<.7	<.7	<.7	<.7	<.7
12509499	06-13-91	<.6	<.6	<.6	<.6	<.6	<.6	<.6	<.6	<.6
12509499	06-13-91	<.6	<.6	<.6	<.6	<.6	<.6	<.6	<.6	<.6
12510500	05-21-91	<.4	<.4	<.4	<.4	<.4	<.4	<.4	<.4	<.4
12510500	05-21-91	<.4	<.4	<.4	<.4	<.4	<.4	<.4	<.4	<.4
12510500	07-09-91	<.4	<.4	<.4	.4	<.4	<.4	<.4	<.4	<.4
12510500	08-06-91	<10	<10	<10	<10	<10	<10	<10	<10	<10
12510500	08-06-91	<10	<10	<10	<10	<10	<10	<10	<10	<10
12510500	09-25-91	<.5	<.5	<.5	<.5	<.5	<.5	<.5	<.5	<.5

Table 20. Concentrations of phenol and cresol compounds (acid-extractable compounds) in whole-water samples, Yakima River basin, Washington, 1988-89

[Concentrations in nanograms per liter; "<" = less than; see figure 1 for site locations]

Map reference number	Station number	Station name	Date	Time	2-Chloro-phenol	2,4-Di-chloro-phenol
24	12500430	Moxee Drain at Thorp Rd nr Union Gap	08-30-88	1730	<5,000	<5,000
27	12500445	Wide Hollow Creek near mouth at Union Gap	05-05-88	1845	<5,000	<5,000
27	12500445	Wide Hollow Creek near mouth at Union Gap	07-27-88	1025	<5,000	<5,000
27	12500445	Wide Hollow Creek near mouth at Union Gap	08-30-88	1430	<5,000	<5,000
27	12500445	Wide Hollow Creek near mouth at Union Gap	11-15-88	1330	<5,000	<5,000
27	12500445	Wide Hollow Creek near mouth at Union Gap	11-15-88	1430	<5,000	<5,000
27	12500445	Wide Hollow Creek near mouth at Union Gap	03-10-89	1400	<5,000	<5,000
28	12500450	Yakima R abv Ahtanum Cr at Union Gap	07-27-88	1600	<5,000	<5,000
36	12505460	Granger Drain at mouth nr Granger	09-02-88	1000	<5,000	<5,000
46	12508850	Sulphur Cr Wasteway nr Sunnyside	07-28-88	1200	<5,000	<5,000
46	12508850	Sulphur Cr Wasteway nr Sunnyside	07-28-88	1700	<5,000	<5,000
46	12508850	Sulphur Cr Wasteway nr Sunnyside	08-31-88	1530	<5,000	<5,000
46	12508850	Sulphur Cr Wasteway nr Sunnyside	08-31-88	1630	<5,000	<5,000
51	12510500	Yakima River at Kiona	08-31-88	1000	<5,000	<5,000

Station number	Date	2,4-Di-methyl-phenol	4,6-Dinitro-o-cresol	2,4,-Di-nitro-phenol	2-Nitro-phenol	4-Nitro-phenol	P-chloro-m-cresol	Penta-chloro-phenol	Phenol	2,4,6-Tri-chloro-phenol
12500430	08-30-88	<5,000	<30,000	<20,000	<5,000	<30,000	<30,000	<30,000	<5,000	<20,000
12500445	05-05-88	<5,000	<30,000	<20,000	<5,000	<30,000	<30,000	<30,000	<5,000	<20,000
12500445	07-27-88	<5,000	<30,000	<20,000	<5,000	<30,000	<30,000	<30,000	<5,000	<20,000
12500445	08-30-88	<5,000	<30,000	<20,000	<5,000	<30,000	<30,000	<30,000	<5,000	<20,000
12500445	11-15-88	<5,000	<30,000	<20,000	<5,000	<30,000	<30,000	<30,000	<5,000	<20,000
12500445	11-15-88	<5,000	<30,000	<20,000	<5,000	<30,000	<30,000	<30,000	<5,000	<20,000
12500445	03-10-89	<5,000	<30,000	<20,000	<5,000	<30,000	<30,000	<30,000	<5,000	<20,000
12500450	07-27-88	<5,000	<30,000	<20,000	<5,000	<30,000	<30,000	<30,000	<5,000	<20,000
12505460	09-02-88	<5,000	<30,000	<20,000	<5,000	<30,000	<30,000	<30,000	<5,000	<20,000
12508850	07-28-88	<5,000	<30,000	<20,000	<5,000	<30,000	<30,000	<30,000	<5,000	<20,000
12508850	07-28-88	<5,000	<30,000	<20,000	<5,000	<30,000	<30,000	<30,000	<5,000	<20,000
12508850	08-31-88	<5,000	<30,000	<20,000	<5,000	<30,000	<30,000	<30,000	<5,000	<20,000
12508850	08-31-88	<5,000	<30,000	<20,000	<5,000	<30,000	<30,000	<30,000	<5,000	<20,000
12510500	08-31-88	<5,000	<30,000	<20,000	<5,000	<30,000	<30,000	<30,000	<5,000	<20,000

Table 21. Concentrations of triazine, acetamide, chloroacetanilide, and other pesticides in whole-water samples, Yakima River basin, Washington, 1988-89

[Concentrations in nanograms per liter; "<" = less than; see figure 1 for site locations]

Map reference number	Station number	Station name	Date	Time	Ala-chlor	Ame-tryn	Atra-zine
3	12478300	Cle Elum R above Cle Elum Lake nr Roslyn	05-05-88	1100	<100	<100	<100
3	12478300	Cle Elum R above Cle Elum Lake nr Roslyn	06-02-88	0930	<100	<100	<100
3	12478300	Cle Elum R above Cle Elum Lake nr Roslyn	07-26-88	1000	<100	<100	<100
3	12478300	Cle Elum R above Cle Elum Lake nr Roslyn	08-31-88	1030	<100	<100	<100
3	12478300	Cle Elum R above Cle Elum Lake nr Roslyn	11-16-88	1030	<100	<100	<100
3	12478300	Cle Elum R above Cle Elum Lake nr Roslyn	03-09-89	1015	<100	<100	<100
4	12479500	Yakima River at Cle Elum	07-26-88	1500	<100	<100	<100
11	12484100	Wilson Creek abv. Cherry Creek at Thrall	07-26-88	1615	<100	<100	59
13	12484480	Cherry Creek at Thrall	05-05-88	1530	<100	<100	70
13	12484480	Cherry Creek at Thrall	06-02-88	1400	<100	<100	20
13	12484480	Cherry Creek at Thrall	06-02-88	1405	<100	<100	60
13	12484480	Cherry Creek at Thrall	07-26-88	1030	<100	<100	78
13	12484480	Cherry Creek at Thrall	08-31-88	1630	<100	<100	61
13	12484480	Cherry Creek at Thrall	11-18-88	1000	<100	<100	48
13	12484480	Cherry Creek at Thrall	03-09-89	1400	<100	<100	600
14	12484500	Yakima River at Umtanum	07-27-88	1045	<100	<100	16
14	12484500	Yakima River at Umtanum	06-28-89	1705	<100	<100	<100
22	12499000	Naches River nr North Yakima	07-26-88	1330	<100	<100	<100
24	12500430	Moxee Drain at Thorp Rd nr Union Gap	05-06-88	0930	<100	<100	30
24	12500430	Moxee Drain at Thorp Rd nr Union Gap	05-06-88	0940	<100	<100	30
24	12500430	Moxee Drain at Thorp Rd nr Union Gap	06-01-88	1600	<100	<100	10
24	12500430	Moxee Drain at Thorp Rd nr Union Gap	07-26-88	1100	<100	<100	14
24	12500430	Moxee Drain at Thorp Rd nr Union Gap	07-27-88	1310	<100	<100	<100
24	12500430	Moxee Drain at Thorp Rd nr Union Gap	07-28-88	1605	<100	<100	17
24	12500430	Moxee Drain at Thorp Rd nr Union Gap	07-29-88	0800	<100	<100	9
24	12500430	Moxee Drain at Thorp Rd nr Union Gap	08-30-88	1730	<100	<100	16
24	12500430	Moxee Drain at Thorp Rd nr Union Gap	11-15-88	1015	<100	<100	<100
24	12500430	Moxee Drain at Thorp Rd nr Union Gap	03-10-89	1200	<100	<100	<100
24	12500430	Moxee Drain at Thorp Rd nr Union Gap	06-28-89	1035	<100	<100	10
27	12500445	Wide Hollow Creek near mouth at Union Gap	05-05-88	1845	<100	<100	<100
27	12500445	Wide Hollow Creek near mouth at Union Gap	06-03-88	0730	<100	<100	40
27	12500445	Wide Hollow Creek near mouth at Union Gap	07-27-88	1025	<100	<100	<100
27	12500445	Wide Hollow Creek near mouth at Union Gap	08-30-88	1430	<100	<100	<100
27	12500445	Wide Hollow Creek near mouth at Union Gap	11-15-88	1330	<100	<100	<100
27	12500445	Wide Hollow Creek near mouth at Union Gap	11-15-88	1430	<100	<100	<100
27	12500445	Wide Hollow Creek near mouth at Union Gap	03-10-89	1400	<100	<100	11
28	12500450	Yakima R abv Ahtanum Cr at Union Gap	07-27-88	1600	<100	<100	25
36	12505460	Granger Drain at mouth nr Granger	05-06-88	1230	<100	<100	90
36	12505460	Granger Drain at mouth nr Granger	06-01-88	1300	30	<100	90
36	12505460	Granger Drain at mouth nr Granger	07-28-88	0730	<100	<100	40
36	12505460	Granger Drain at mouth nr Granger	07-28-88	0930	<100	<100	47
36	12505460	Granger Drain at mouth nr Granger	09-02-88	1000	<100	<100	120
36	12505460	Granger Drain at mouth nr Granger	11-15-88	1645	<100	<100	<100
36	12505460	Granger Drain at mouth nr Granger	03-09-89	1730	<100	<100	280
36	12505460	Granger Drain at mouth nr Granger	06-27-89	1705	<100	<100	90
37	12505510	Marion Drain at Indian Church Rd at Granger	07-28-88	1145	<100	<100	120
38	12507508	Toppenish Cr at Indian Church Rd nr Granger	05-06-88	1345	<100	<100	50
38	12507508	Toppenish Cr at Indian Church Rd nr Granger	06-03-88	1000	<100	<100	60
38	12507508	Toppenish Cr at Indian Church Rd nr Granger	07-28-88	1445	<100	<100	54
38	12507508	Toppenish Cr at Indian Church Rd nr Granger	09-01-88	0930	<100	<100	43
38	12507508	Toppenish Cr at Indian Church Rd nr Granger	11-16-88	1615	<100	<100	23
38	12507508	Toppenish Cr at Indian Church Rd nr Granger	03-08-89	1600	<100	<100	<100
43	12508620	Satus Creek at gage at Satus	07-29-88	1145	<100	<100	52
46	12508850	Sulphur Cr Wasteway nr Sunnyside	05-06-88	1630	<100	<100	60
46	12508850	Sulphur Cr Wasteway nr Sunnyside	06-03-88	1300	<100	<100	20
46	12508850	Sulphur Cr Wasteway nr Sunnyside	07-28-88	1200	<100	<100	25
46	12508850	Sulphur Cr Wasteway nr Sunnyside	07-28-88	1700	<100	<100	31
46	12508850	Sulphur Cr Wasteway nr Sunnyside	08-31-88	1530	<100	<100	34
46	12508850	Sulphur Cr Wasteway nr Sunnyside	08-31-88	1630	<100	<100	34
46	12508850	Sulphur Cr Wasteway nr Sunnyside	11-17-88	0900	<100	<100	<100
46	12508850	Sulphur Cr Wasteway nr Sunnyside	03-08-89	1200	<100	<100	44
46	12508850	Sulphur Cr Wasteway nr Sunnyside	06-26-89	2005	<100	<100	22
47	12509050	Yakima R at Euclid Br at RM 55 nr Grandview	07-28-88	1010	<100	<100	48
49	12509710	Spring Creek at mouth at Whitstran	07-29-88	1300	<100	<100	<100
50	12509829	Snipes Creek at mouth at Whitstran	07-29-88	1500	<100	<100	11
51	12510500	Yakima River at Kiona	05-07-88	0800	<100	<100	50
51	12510500	Yakima River at Kiona	06-01-88	0900	<100	<100	30
51	12510500	Yakima River at Kiona	07-29-88	1030	<100	<100	49
51	12510500	Yakima River at Kiona	08-31-88	1000	<100	<100	30
51	12510500	Yakima River at Kiona	11-17-88	1400	<100	<100	<100
51	12510500	Yakima River at Kiona	03-08-89	0900	<100	<100	<100
51	12510500	Yakima River at Kiona	06-26-89	1435	<100	<100	<100

Table 21. Concentrations of triazine, acetamide, chloroacetanilide, and other pesticides in whole-water samples, Yakima River basin, Washington, 1988-89--Continued

Station number	Date	Brom-acil	Buta-chlor	Butyl-ate	Car-boxin	Cyan-azine	Cyclo-ate	Diphen-amid	Hexazi-none	Metola-chlor	Metri-buzin
12478300	05-05-88	<100	<100	<100	<100	<100	<100	<100	<100	<100	<100
12478300	06-02-88	<100	<100	<100	<100	<100	<100	<100	<100	<100	<100
12478300	07-26-88	<100	<100	<100	<100	<100	<100	<100	<100	<100	<100
12478300	08-31-88	<100	<100	<100	<100	<100	<100	<100	<100	<100	<100
12478300	11-16-88	<100	<100	<100	<100	<100	<100	<100	<100	<100	<100
12478300	03-09-89	<100	<100	<100	<100	<100	<100	<100	<100	<100	<100
12479500	07-26-88	<100	<100	<100	<100	<100	<100	<100	<100	<100	<100
12484100	07-26-88	<100	<100	<100	<100	<100	<100	<100	<100	<100	<100
12484480	05-05-88	<100	<100	<100	<100	<100	<100	<100	<100	<100	<100
12484480	06-02-88	<100	<100	<100	<100	<100	<100	<100	<100	<100	<100
12484480	06-02-88	<100	<100	<100	<100	<100	<100	<100	<100	<100	<100
12484480	07-26-88	<100	<100	<100	<100	<100	<100	<100	<100	<100	<100
12484480	08-31-88	<100	<100	<100	<100	<100	<100	<100	<100	<100	<100
12484480	11-18-88	<100	<100	<100	<100	<100	<100	<100	<100	<100	<100
12484480	03-09-89	67	<100	<100	<100	<100	<100	<100	15	<100	<100
12484500	07-27-88	<100	<100	<100	<100	<100	<100	<100	<100	<100	<100
12484500	06-28-89	<100	<100	<100	<100	<100	<100	<100	<100	<100	<100
12499000	07-26-88	<100	<100	<100	<100	67	<100	<100	<100	<100	<100
12500430	05-06-88	<100	<100	<100	<100	<100	<100	<100	<100	<100	<100
12500430	05-06-88	<100	<100	<100	<100	<100	<100	<100	<100	<100	<100
12500430	06-01-88	<100	<100	<100	<100	<100	<100	<100	<100	<100	<100
12500430	07-26-88	<100	<100	<100	<100	<100	<100	<100	<100	<100	<100
12500430	07-27-88	<100	<100	<100	<100	<100	<100	<100	<100	<100	<100
12500430	07-28-88	<100	<100	<100	<100	<100	<100	<100	<100	<100	<100
12500430	07-29-88	<100	<100	<100	<100	<100	<100	<100	<100	<100	<100
12500430	08-30-88	<100	<100	<100	<100	<100	<100	<100	<100	<100	<100
12500430	11-15-88	<100	<100	<100	<100	<100	<100	<100	<100	<100	<100
12500430	03-10-89	<100	<100	<100	<100	14	<100	<100	<100	<100	<100
12500430	06-28-89	<100	<100	<100	<100	<100	<100	<100	<100	<100	<100
12500445	05-05-88	<100	<100	<100	<100	30	<100	<100	<100	<100	<100
12500445	06-03-88	200	<100	<100	<100	<100	<100	<100	<100	<100	<100
12500445	07-27-88	<100	<100	<100	<100	<100	<100	<100	<100	<100	<100
12500445	08-30-88	<100	<100	<100	<100	<100	<100	<100	<100	<100	<100
12500445	11-15-88	<100	<100	<100	<100	<100	<100	<100	<100	<100	<100
12500445	11-15-88	<100	<100	<100	<100	<100	<100	<100	<100	<100	<100
12500445	03-10-89	<100	<100	<100	<100	15	<100	<100	<100	<100	<100
12500450	07-27-88	<100	<100	<100	<100	<100	<100	<100	<100	<100	<100
12505460	05-06-88	<100	<100	<100	<100	<100	<100	<100	<100	<100	<100
12505460	06-01-88	<100	<100	<100	<100	60	<100	<100	30	<100	<100
12505460	07-28-88	<100	<100	<100	<100	<100	<100	<100	<100	<100	<100
12505460	07-28-88	<100	<100	<100	<100	<100	<100	<100	<100	<100	<100
12505460	09-02-88	<100	<100	<100	<100	<100	<100	<100	<100	<100	<100
12505460	11-15-88	<100	<100	<100	<100	<100	<100	<100	<100	<100	<100
12505460	03-09-89	110	<100	<100	<100	<100	<100	<100	90	<100	<100
12505460	06-27-89	<100	<100	<100	<100	<100	<100	<100	<100	<100	<100
12505510	07-28-88	<100	<100	<100	<100	145	<100	<100	<100	<100	<100
12507508	05-06-88	<100	<100	<100	<100	<100	<100	<100	<100	<100	<100
12507508	06-03-88	<100	<100	<100	<100	<100	<100	<100	<100	<100	<100
12507508	07-28-88	<100	<100	<100	<100	<100	<100	<100	<100	<100	<100
12507508	09-01-88	<100	<100	<100	<100	<100	<100	<100	<100	<100	<100
12507508	11-16-88	<100	<100	<100	<100	<100	<100	<100	<100	<100	<100
12507508	03-08-89	<100	<100	<100	<100	<100	<100	<100	<100	<100	<100
12508620	07-29-88	<100	<100	<100	<100	121	<100	<100	<100	<100	<100
12508850	05-06-88	<100	<100	<100	<100	<100	<100	<100	<100	<100	<100
12508850	06-03-88	<100	<100	<100	<100	<100	<100	<100	<100	<100	<100
12508850	07-28-88	<100	<100	<100	<100	<100	<100	<100	<100	<100	<100
12508850	07-28-88	<100	<100	<100	<100	<100	<100	<100	<100	<100	<100
12508850	08-31-88	<100	<100	<100	<100	<100	<100	<100	<100	<100	<100
12508850	08-31-88	<100	<100	<100	<100	<100	<100	<100	<100	<100	<100
12508850	11-17-88	<100	<100	<100	<100	<100	<100	<100	<100	<100	<100
12508850	03-08-89	<100	<100	<100	<100	12	<100	<100	<100	<100	<100
12508850	06-26-89	<100	<100	<100	<100	<100	<100	<100	<100	<100	<100
12509050	07-28-88	<100	<100	<100	<100	<100	<100	<100	<100	<100	42
12509710	07-29-88	<100	<100	<100	<100	100	<100	<100	<100	<100	<100
12509829	07-29-88	<100	<100	<100	<100	<100	<100	<100	<100	<100	<100
12510500	05-07-88	<100	<100	<100	<100	<100	<100	<100	<100	<100	<100
12510500	06-01-88	<100	<100	<100	<100	<100	<100	<100	<100	<100	<100
12510500	07-29-88	<100	<100	<100	<100	72	<100	<100	<100	<100	<100
12510500	08-31-88	<100	<100	<100	<100	<100	<100	<100	<100	<100	<100
12510500	11-17-88	<100	<100	<100	<100	<100	<100	<100	<100	<100	<100
12510500	03-08-89	<100	<100	<100	<100	<100	<100	<100	<100	<100	<100
12510500	06-26-89	<100	<100	<100	<100	<100	<100	<100	<100	<100	<100

Table 21. Concentrations of triazine, acetamide, chloroacetanilide, and other pesticides in whole-water samples, Yakima River basin, Washington, 1988-89--Continued

Station number	Date	Prometon	Prometryn	Propachlor	Propazine	Simazine	Simetryn	Terbacil	Trifluralin	Vernolate
12478300	05-05-88	<100	<100	<100	<100	<100	<100	<100	<100	<100
12478300	06-02-88	<100	<100	<100	<100	<100	<100	<100	<100	<100
12478300	07-26-88	<100	<100	<100	<100	<100	<100	<100	<100	<100
12478300	08-31-88	<100	<100	<100	<100	<100	<100	<100	<100	<100
12478300	11-16-88	<100	<100	<100	<100	<100	<100	<100	<100	<100
12478300	03-09-89	<100	<100	<100	<100	<100	<100	<100	<100	<100
12479500	07-26-88	<100	<100	<100	<100	<100	<100	<100	<100	<100
12484100	07-26-88	<100	<100	<100	<100	41	<100	<100	<100	<100
12484480	05-05-88	<100	100	<100	<100	90	<100	<100	<100	<100
12484480	06-02-88	<100	<100	<100	<100	<100	<100	<100	<100	<100
12484480	06-02-88	<100	<100	<100	<100	40	<100	<100	<100	<100
12484480	07-26-88	<100	<100	<100	<100	220	<100	<100	<100	<100
12484480	08-31-88	<100	<100	<100	<100	23	<100	<100	<100	<100
12484480	11-18-88	<100	<100	<100	<100	<100	<100	<100	<100	<100
12484480	03-09-89	<100	<100	<100	<100	6,600	<100	<100	<100	<100
12484500	07-27-88	<100	<100	<100	<100	57	<100	<100	<100	<100
12484500	06-28-89	<100	<100	<100	<100	<100	<100	<100	<100	<100
12499000	07-26-88	<100	<100	<100	<100	27	<100	<100	<100	<100
12500430	05-06-68	<100	<100	<100	<100	20	<100	<100	<100	<100
12500430	05-06-88	<100	<100	<100	<100	20	<100	<100	<100	<100
12500430	06-01-88	30	<100	<100	<100	10	<100	<100	<100	<100
12500430	07-26-88	<100	<100	<100	<100	15	<100	<100	<100	<100
12500430	07-27-88	<100	<100	<100	<100	19	<100	<100	<100	<100
12500430	07-28-88	<100	<100	<100	<100	24	<100	<100	<100	<100
12500430	07-29-88	<100	<100	<100	<100	<100	<100	<100	19	<100
12500430	08-30-88	<100	<100	<100	<100	<100	<100	<100	<100	<100
12500430	11-15-88	<100	<100	<100	<100	<100	<100	<100	<100	<100
12500430	03-10-89	<100	<100	<100	<100	18	<100	<100	<100	<100
12500430	06-28-89	<100	<100	<100	<100	<100	<100	<100	<100	<100
12500445	05-05-88	<100	<100	<100	<100	26	<100	<100	<100	<100
12500445	06-03-88	210	<100	<100	<100	40	<100	<100	<100	<100
12500445	07-27-88	64	<100	<100	<100	33	<100	<100	<100	<100
12500445	08-30-88	58	<100	<100	<100	22	<100	<100	<100	<100
12500445	11-15-88	<100	<100	<100	<100	<100	<100	<100	<100	<100
12500445	11-15-88	<100	<100	<100	<100	<100	<100	<100	<100	<100
12500445	03-10-89	20	<100	<100	<100	43	<100	<100	<100	<100
12500450	07-27-88	<100	<100	<100	<100	38	<100	<100	<100	<100
12505460	05-06-88	<100	<100	<100	<100	80	<100	<100	<100	<100
12505460	06-01-88	70	<100	<100	<100	460	<100	<100	70	<100
12505460	07-28-88	<100	<100	<100	<100	91	<100	<100	55	<100
12505460	07-28-88	<100	<100	<100	<100	100	<100	<100	42	<100
12505460	09-02-88	<100	<100	<100	<100	24	<100	<100	<100	<100
12505460	11-15-88	<100	<100	<100	<100	<100	<100	<100	<100	<100
12505460	03-09-89	<100	<100	<100	<100	100	<100	<100	<100	<100
12505460	06-27-89	50	<100	<100	<100	170	<100	<100	100	<100
12505510	07-28-88	<100	<100	<100	<100	40	<100	<100	<100	<100
12507508	05-06-88	<100	<100	<100	<100	<100	<100	<100	<100	<100
12507508	06-03-88	<100	<100	<100	<100	40	<100	<100	<100	<100
12507508	07-28-88	<100	<100	<100	<100	45	<100	<100	<100	<100
12507508	09-01-88	<100	<100	<100	<100	16	<100	<100	<100	<100
12507508	11-16-88	<100	<100	<100	<100	<100	<100	<100	<100	<100
12507508	03-08-89	<100	<100	<100	<100	11	<100	<100	<100	<100
12508620	07-29-88	<100	<100	<100	<100	29	<100	<100	<100	<100
12508850	05-06-88	<100	<100	<100	<100	120	<100	<100	<100	<100
12508850	06-03-88	<100	<100	<100	<100	60	<100	<100	<100	<100
12508850	07-28-88	<100	<100	<100	<100	74	<100	<100	<100	<100
12508850	07-28-88	<100	<100	<100	<100	68	<100	<100	<100	<100
12508850	08-31-88	<100	<100	<100	<100	29	<100	<100	<100	<100
12508850	08-31-88	<100	<100	<100	<100	24	<100	<100	<100	<100
12508850	11-17-88	<100	<100	<100	<100	<100	<100	<100	<100	<100
12508850	03-08-89	44	<100	<100	<100	34	<100	<100	<100	<100
12508850	06-26-89	<100	<100	<100	<100	77	<100	<100	<100	<100
12509050	07-28-88	<100	<100	<100	<100	56	<100	<100	<100	<100
12509710	07-29-88	<100	<100	<100	<100	<100	<100	<100	<100	<100
12509829	07-29-88	<100	<100	<100	<100	22	<100	<100	<100	<100
12510500	05-07-88	<100	<100	<100	<100	40	<100	<100	<100	<100
12510500	06-01-88	50	<100	<100	<100	20	<100	<100	<100	<100
12510500	07-29-88	<100	<100	<100	<100	49	<100	<100	<100	<100
12510500	08-31-88	<100	<100	<100	<100	17	<100	<100	<100	<100
12510500	11-17-88	<100	<100	<100	<100	<100	<100	<100	<100	<100
12510500	03-08-89	<100	<100	<100	<100	28	<100	<100	<100	<100
12510500	06-26-89	<100	<100	<100	<100	44	<100	<100	<100	<100

Table 22. Concentrations of triazine, acetamide, chloroacetanilide, and trifluromethyl compounds in filtered-water samples, Yakima River basin, Washington, June 25-30, 1989

[Concentrations in nanograms per liter; "T" = present, but below quantifiable concentration; "D" = detected and not quantified; "nd" = not detected and minimum reporting level not quantified; "<" = less than; ametryn, propachlor, simetryn were not detected; deisopropylatrazine was detected and not quantified at Granger Drain and Yakima River at Kiona; trace concentrations of prometryn were detected at Satus Creek at Satus, Sub 35 Drain, and Marion Drain; trace concentrations of metribuzin were detected at Toppenish and Sulphur Creeks, and in three additional replicate samples collected from Yakima River at Kiona; for quality assurance, three additional replicate samples from Yakima River at Kiona were analyzed for cyanazine, and concentrations were 2.4, 3.7, and 3.7 ng/L; see figure 1 for site locations]

Map reference number	Station number	Station name	Alachlor	Atrazine	Deethyl-atrazine	Butachlor	Cyanazine	Metola-chlor	Prometon	Propazine	Simazine	Triflur-alin
2	12478200	Cooper River at Salmon LaSac	<0.99	T<1.4	nd	<1.4	<1.9	<0.91	<1.2	<1.1	<1.4	<2.0
4	12479500	Yakima River at Cle Elum	<.52	.27	nd	T<.81	<.55	<.42	<.27	<.12	.25	<1.2
11	12484100	Wilson Cr abv. Cherry Creek	<2.1	27	D	<3.0	<4.0	<1.9	7.8	<2.3	4.2	<4.1
13	12484480	Cherry Creek at Thrall	<1.2	71	4.0	<1.1	<1.9	<.7	1.4	<.8	11	T<3.0
14	12484500	Yakima River at Umtanum	<1.6	10	D	<2.5	<1.7	T<1.3	1.1	T<.39	2.2	T<3.8
15	12484550	Umtanum Creek nr mouth	<.42	<.77	nd	<.89	<.94	<.25	<.58	<.56	<.67	<1.3
19	12496510	Pacific Power & Light Company Wasteway	<.50	<.17	nd	<.79	<.54	<.41	<.26	<.12	<.19	<1.2
20	12496511	City of Yakima-Finish Water	<.64	<.88	nd	<.93	<1.2	<.59	<.81	<.72	<.88	<1.3
22	12499000	Naches River nr North Yakima	<.39	.26	nd	<.69	<.36	T<.30	T<.26	<.35	.24	<1.3
24	12500430	Moxee Drain at Thorp Rd	<4.0	8.5	D	<7.1	<3.7	<3.1	3.8	<3.6	<3.6	T<14
27	12500445	Wide Hollow Creek near mouth	<2.0	6.8	D	<2.8	<3.8	<1.8	22	<2.2	7.1	<3.9
28	12500450	Yakima R abv Ahtanum Cr	<1.5	5.6	D	T<2.4	<1.6	T<1.2	1.4	<.37	3.9	T<3.6
30	12502500	Ahtanum Creek at Union Gap	<1.3	T<1.8	D	<2.3	<1.2	<1.0	3.0	<1.1	6.7	<4.4
33	12505350	E Toppenish Drain at Wilson Rd	4.5	130	D	<2.9	<3.8	<1.8	T<2.5	<2.2	14	T<4.0
34	12505410	Sub 35 Drain at Parton Road	98	88	D	T<2.8	<3.8	<1.8	T<2.5	<2.2	17	T<3.9
36	12505460	Granger Drain at mouth	33	48	D	<6.4	8.6	T<2.8	32	<3.2	130	28
55	462510-120323901	Well 2, Harrah, 11N/18E-22R02	T<.64	57	D	<.93	<1.2	<.59	T<.81	<.72	6.4	<1.3
37	12505510	Marion Drain, Indian Church Rd	20	34	D	<2.8	<3.8	3.6	T<2.5	<2.2	21	7.1
38	12507508	Toppenish Cr, Indian Church Rd	16	54	D	<2.2	<1.1	2.2	2.7	T<1.1	43	T<4.2
40	12507585	Yakima River at RM 72	11	26	1.6	<1.1	<1.8	.93	2.4	<.78	16	3.1
41	12507594	Satus Cr abv Wilson-Charley Canyon nr Toppenish	<.40	T<.56	nd	<.71	<.37	<.31	<.27	<.36	<.36	<1.4
53	461720-120043201	Well 1, Sunnyside, 09N/22E-04P01	<.64	18	D	<.92	<1.2	<.59	<.80	<.71	1.9	<1.3
43	12508620	Satus Cr at gage at Satus	13	46	D	<2.9	<3.8	4.1	<2.5	<2.2	27	7.3
45	12508630	South Drain nr Satus	17	130	D	<7.2	<3.7	6.0	T<2.7	T<3.6	<3.6	T<14
46	12508850	Sulphur Creek Wasteway	33	49	D	<24	T<31	T<15	26	<18	81	T<32
47	12509050	Yakima R at Euclid Br at RM 55	19	61	D	<2.3	T<1.2	1.3	5.2	<1.2	33	T<4.5
49	12509710	Spring Creek at mouth	<2.0	13	D	<2.9	<3.9	<1.8	<2.5	<2.2	10	T<4.0
50	12509829	Snipes Creek at mouth	T<2.0	12	D	<2.8	<3.8	T<1.8	T<2.5	<2.2	6.4	T<3.9
51	12510500	Yakima River at Kiona	12	32	D	<2.5	<6.5	1.9	3.0	.47	18	T<3.8

Table 23. Concentrations of volatile organic compounds (halogenated aliphatic and monocyclic aromatic hydrocarbons) in whole-water samples, Yakima River basin, Washington, 1988-89

[Concentrations in nanograms per liter; "--" = not analyzed; "<" = less than; see figure 1 for site locations]

Map reference number	Station number	Station name	Date	Time	Benzene	Bromo-benzene
19	12496510	Pacific Power & Light Company Wasteway	07-01-89	1400	<3,000	--
20	12496511	City of Yakima-Finish Water	07-01-89	1405	<3,000	--
24	12500430	Moxee Drain at Thorp Rd nr Union Gap	08-30-88	1730	<200	<200
27	12500445	Wide Hollow Creek near mouth at Union Gap	08-30-88	1430	<200	<200
27	12500445	Wide Hollow Creek near mouth at Union Gap	11-15-88	1330	<200	<200
27	12500445	Wide Hollow Creek near mouth at Union Gap	11-15-88	1430	<200	<200
27	12500445	Wide Hollow Creek near mouth at Union Gap	03-10-89	1400	<200	<200
36	12505460	Granger Drain at mouth nr Granger	09-02-88	1000	<200	<200
46	12508850	Sulphur Cr Wasteway nr Sunnyside	08-31-88	1530	<200	<200
		Sulphur Cr Wasteway nr Sunnyside	08-31-88	1630	<200	<200
51	12510500	Yakima River at Kiona	08-31-88	1000	<200	<200

Station number	Date	Bromodi-chloro-methane	Bromo-form	Bromo-methane	Carbon tetra-chlo-ride	Chloro-benzene	Chloro-ethane	2-Chloro-ethyl-vinyl ether	Chloro-form	Chloro-methane
12496510	07-01-89	<3,000	<3,000	<3,000	<3,000	<3,000	<3,000	<3,000	<3,000	<3,000
12496511	07-01-89	<3,000	<3,000	<3,000	<3,000	<3,000	<3,000	<3,000	22,000	<3,000
12500430	08-30-88	<200	<200	<200	<200	<200	<200	--	<200	<200
12500445	08-30-88	<200	<200	<200	<200	<200	<200	--	<200	<200
12500445	11-15-88	<200	<200	<200	<200	<200	<200	--	<200	<200
12500445	11-15-88	<200	<200	<200	<200	<200	<200	--	<200	<200
12500445	03-10-89	<200	<200	<200	<200	<200	<200	--	<200	<200
12505460	09-02-88	<200	<200	<200	<200	<200	<200	--	<200	<200
12508850	08-31-88	<200	<200	<200	<200	<200	<200	--	<200	<200
12508850	08-31-88	<200	<200	<200	<200	<200	<200	--	<200	<200
12510500	08-31-88	<200	<200	<200	<200	<200	<200	--	<200	<200

Station number	Date	1,2-Chloro-toluene	1,4-Chloro-toluene	cis-1,3-Di-chloro-propene	Dibromo-chloro-methane	1,2-Dibromo-ethane	Dibromo-methane	1,2-Di-chloro-benzene	1,3-Di-chloro-benzene	1,4-Di-chloro-benzene
12496510	07-01-89	--	--	<3,000	<3,000	<3,000	--	<3,000	<3,000	<3,000
12496511	07-01-89	--	--	<3,000	<3,000	<3,000	--	<3,000	<3,000	<3,000
12500430	08-30-88	<200	<200	<200	<200	<200	<200	<200	<200	<200
12500445	08-30-88	<200	<200	<200	<200	<200	<200	<200	<200	<200
12500445	11-15-88	<200	<200	<200	<200	<200	<200	<200	<200	<200
12500445	11-15-88	<200	<200	<200	<200	<200	<200	<200	<200	<200
12500445	03-10-89	<200	<200	<200	<200	<200	<200	<200	<200	<200
12505460	09-02-88	<200	<200	<200	<200	<200	<200	<200	<200	<200
12508850	08-31-88	<200	<200	<200	<200	<200	<200	<200	<200	<200
12508850	08-31-88	<200	<200	<200	<200	<200	<200	<200	<200	<200
12510500	08-31-88	<200	<200	<200	<200	<200	<200	<200	<200	<200

Table 23. Concentrations of volatile organic compounds (halogenated aliphatic and monocyclic aromatic hydrocarbons) in whole-water samples, Yakima River basin, Washington, 1988-89--Continued

Station number	Date	Dichlorodifluoromethane	1,1-Dichloroethane	1,2-Dichloroethane	1,1-Dichloroethene	1,2-Dichloroethene	1,2-Dichloropropane	1,3-Dichloropropane	2,2-Dichloropropane	1,1-Dichloropropene
12496510	07-01-89	<3,000	<3,000	<3,000	<3,000	--	<3,000	--	--	--
12496511	07-01-89	<3,000	<3,000	<3,000	<3,000	--	<3,000	--	--	--
12500430	08-30-88	<200	<200	<200	<200	<200	<200	<200	<200	<200
12500445	08-30-88	<200	<200	<200	<200	<200	<200	<200	<200	<200
12500445	11-15-88	<200	<200	<200	<200	<200	<200	<200	<200	<200
12500445	11-15-88	<200	<200	<200	<200	<200	<200	<200	<200	<200
12500445	03-10-89	<200	<200	<200	<200	<200	<200	<200	<200	<200
12505460	09-02-88	<200	<200	<200	<200	<200	<200	<200	<200	<200
12508850	08-31-88	<200	<200	<200	<200	<200	<200	<200	<200	<200
12508850	08-31-88	<200	<200	<200	<200	<200	<200	<200	<200	<200
12510500	08-31-88	<200	<200	<200	<200	<200	<200	<200	<200	<200

Station number	Date	1,3-Dichloropropene	Ethylbenzene	Methylene chloride	Styrene	1,1,1,2-Tetrachloroethane	1,1,2,2-Tetrachloroethane	Tetrachloroethene	Toluene	trans-1,2-Dichloroethene
12496510	07-01-89	<3,000	<3,000	<3,000	<3,000	--	<3,000	<3,000	<3,000	<3,000
12496511	07-01-89	<3,000	<3,000	<3,000	<3,000	--	<3,000	<3,000	<3,000	<3,000
12500430	08-30-88	--	<200	<200	<200	<200	<200	<200	<200	--
12500445	08-30-88	--	<200	<200	<200	<200	<200	200	<200	--
12500445	11-15-88	--	<200	<200	<200	<200	<200	300	<200	--
12500445	11-15-88	--	<200	<200	<200	<200	<200	300	<200	--
12500445	03-10-89	--	<200	<200	<200	<200	<200	200	<200	--
12505460	09-02-88	--	<200	<200	<200	<200	<200	<200	<200	--
12508850	08-31-88	--	<200	<200	<200	<200	<200	<200	<200	--
12508850	08-31-88	--	<200	<200	<200	<200	<200	<200	<200	--
12510500	08-31-88	--	<200	<200	<200	<200	<200	<200	<200	--

Station number	Date	trans-1,3-Dichloropropene	1,2,4-Trichlorobenzene	1,1,1-Trichloroethane	1,1,2-Trichloroethane	Trichloroethene	Trichlorofluoromethane	1,2,3-Trichloropropane	Vinyl chloride	Xylene
12496510	07-01-89	<3,000	--	<3,000	<3,000	<3,000	<3,000	--	<1,000	<3,000
12496511	07-01-89	<3,000	--	<3,000	<3,000	<3,000	<3,000	--	<1,000	<3,000
12500430	08-30-88	<200	--	<200	<200	<200	<200	<200	<200	<200
12500445	08-30-88	<200	--	<200	<200	<200	<200	<200	<200	<200
12500445	11-15-88	<200	--	<200	<200	<200	<200	<200	<200	<200
12500445	11-15-88	<200	--	<200	<200	<200	<200	<200	<200	<200
12500445	03-10-89	<200	<5,000	<200	<200	<200	<200	<200	<200	<200
12505460	09-02-88	<200	--	<200	<200	<200	<200	<200	<200	<200
12508850	08-31-88	<200	--	<200	<200	<200	900	<200	<200	<200
12508850	08-31-88	<200	--	<200	<200	<200	<200	<200	<200	<200
12510500	08-31-88	<200	--	<200	<200	<200	<200	<200	<200	<200

Table 24. Concentrations of organochlorine compounds, total carbon, and inorganic carbon in bed-sediment and soil samples, Yakima River basin, Washington, 1987-90

[gm = gram; kg = kilogram; µm = microgram; "n" = soil sample was not sieved; "--" = not analyzed; "#" = <62 micrometer data collected during trace element study on a different sample and day; "@" site receives drainage from apple orchard(s); "<" = less than; DDD = dichlorodiphenyldichloroethane; DDE = dichlorodiphenyldichloroethylene; DDT = dichlorodiphenyltrichloroethane; PCB = gross polychlorinated biphenyls; PCN = gross polychlorinated naphthalenes; C = Carbon; see figure 1 for site locations]

Map reference number	Station number	Station name	Date	Time	Particle size finer than, micrometers	Carbon, inorganic + organic (gm/kg as C)	Carbon, inorganic, (gm/kg as C)	Aldrin (µg/kg)
		Bed sediment						
3	12478300	Cle Elum R above Cle Elum Lake nr Roslyn	08-31-88	1030	2,000	2.2	0.4	<0.1
5	12479720	Jungle Creek nr mouth nr Cle Elum	05-02-89	1230	2,000	4	.1	<.1
6	12479750	No Fk Teanaway R blw bridge at Dickey Cr Campgrnd	11-03-90	1415	62	--	--	<.5
7	12480000	Teanaway River below forks near Cle Elum	11-06-89	0910	2,000	2.6 #	<.1 #	<.1
8	12481900	Taneum Cr at Taneum Meadow nr Thorp	11-03-90	0815	62	4.7 #	<.1 #	<.5
9	12483190	South Fork Manastash Cr nr Ellensburg	11-02-90	0815	62	3.0 #	<.1 #	<.5
10	12483750	Naneum Cr blw High Cr nr Ellensburg	11-02-90	1330	62	9.2 #	<.1 #	<.5
13	12484480	Cherry Creek at Thrall	08-31-88	1630	2,000	10	.3	<.1
13	12484480	Cherry Creek at Thrall	08-31-88	1635	62	10	.4	<.1
14	12484500	Yakima River at Umtanum	05-04-89	1100	2,000	16	<.1	<.1
15	12484550	Umtanum Creek nr mouth at Umtanum	05-03-89	0945	2,000	10	.1	<.1
16	12487200	Little Naches River at mouth nr Cliffdell	10-30-90	0905	62	4.1 #	<.1 #	<.5
17	12488250	American River at Hells Crossing nr Nile	11-07-89	1200	2,000	3.8 #	<.1 #	<.1
18	12489100	Rattlesnake Cr abv N.F. Rattlesnake Cr nr Nile	11-07-89	1200	2,000	3.3 #	<.1 #	<.1
24	12500430	Moxee Drain at Thorp Rd nr Union Gap	08-30-88	1730	2,000	12	.1	<.1
24	12500430	Moxee Drain at Thorp Rd nr Union Gap	08-30-88	1735	62	11	.2	<.1
25	12500437	Wide Hollow Cr at W. Valley School nr Ahtanum	05-01-89	1430	2,000	24	<.1	<.1
27	12500445	Wide Hollow Creek near mouth at Union Gap	08-30-88	1430	2,000	27	<.1	<.1
27	12500445	Wide Hollow Creek near mouth at Union Gap	08-30-88	1435	62	29	.1	.4
28	12500450	Yakima R abv Ahtanum Cr at Union Gap	09-16-87	1631	180	2.1 #	<.1 #	<10
29	12500900	S. F. Ahtanum Cr abv Conrad Rnch nr Tampico	11-06-90	0810	62	5.2 #	<.1 #	<.5
31	12503640	@ Unnamed drain at Lateral & Riggs Rds nr Wapato	09-01-88	0800	2,000	9.9	1.2	.4
31	12503640	Unnamed drain at Lateral & Riggs Rds nr Wapato	09-01-88	0805	62	9.1	1.4	.2
36	12505460	Granger Drain at mouth nr Granger	09-02-88	1000	2,000	4.9	.8	<.1
36	12505460	Granger Drain at mouth nr Granger	09-02-88	1005	62	8.6	1.3	<.1
38	12507508	Toppenish Cr at Indian Church Rd nr Granger	09-01-88	0930	2,000	17	<.1	<.1
38	12507508	Toppenish Cr at Indian Church Rd nr Granger	09-01-88	0935	62	27	<.1	<.1
42	12508500	Satus Cr below Dry Cr near Toppenish	11-07-90	0920	62	1.2 #	<.1 #	<.5
44	12508625	Yakima R blw Satus Cr at RM 68 nr Satus	09-15-87	1201	180	1.6 #	<.1 #	<10
46	12508850	Sulphur Cr Wasteway nr Sunnyside	08-31-88	1530	2,000	9.5	1	<.1
46	12508850	Sulphur Cr Wasteway nr Sunnyside	08-31-88	1535	62	9.3	1.1	<.1
46	12508850	Sulphur Cr Wasteway nr Sunnyside	08-31-88	1630	2,000	5.1	.8	<.1
46	12508850	Sulphur Cr Wasteway nr Sunnyside	08-31-88	1635	62	6	1.5	<.1
51	12510500	Yakima River at Kiona	08-31-88	1000	2,000	2.4	.1	<.1
51	12510500	Yakima River at Kiona	08-31-88	1005	62	18	<.1	<.1
52	61652119522000	@ Unnamed drain at County Line Rd nr Grandview	09-01-88	1100	2,000	4.9	< .1	<.1
52	61652119522000	Unnamed drain at County Line Rd nr Grandview	09-01-88	1105	62	14	.1	<.1
54	61744119522400	@ Unnamed drain to E Turbine Lateral nr Grandview	09-01-88	0900	2,000	18	<.1	<.1
54	61744119522400	Unnamed drain to E Turbine Lateral nr Grandview	09-01-88	0905	62	34	<.1	<.1
62	63359120281400	Unnamed urban runoff at Union Gap	08-28-87	1001	180	--	--	<10
63	63501120353300	@ Wide Hollow Cr at Ahtanum Blvd nr Ahtanum	09-01-88	1000	2,000	22	.1	<.1
63	63501120353300	Wide Hollow Cr at Ahtanum Blvd nr Ahtanum	09-01-88	1005	62	22	.1	<.1
		Apple--composite from 5 ditches	08-27-87	2245	180	--	--	<10
		Asparagus--composite from 5 ditches	09-16-87	1600	180	--	--	<10
		Corn--composite from 5 ditches	08-27-87	2115	180	--	--	<10
		Grape--composite from 4 ditches	11-30-87	1200	180	--	--	<10
		Hops--composite from 5 ditches	09-16-87	1630	180	--	--	<10
		Pear--composite from 4 ditches	11-30-87	1300	180	--	--	<10
		Potato--composite from 5 ditches	09-18-87	1015	180	--	--	<10
56	463202120223600	Apple orchard nr Moxee City, A Horizon, 0-6 in.	07-01-89	1000	n	14	<.1	<.1
56	463202120223600	Apple orchard nr Moxee City, B Horizon, 6-9 in.	07-01-89	1005	n	5.2	<.1	<.1
57	463232120234900	Hop field near Moxee City, A Horizon, 0-9 in.	07-01-89	0900	n	16	<.1	<.1
57	463232120234900	Hop field near Moxee City, B Horizon, 9-12 in.	07-01-89	0905	n	6.2	<.1	<.1
60	463247120222300	Hop field nr Moxee City, A Horizon, 1-10 in.	07-01-89	1100	n	14	<.1	<.1

Table 24. Concentrations of organochlorine compounds, total carbon, and inorganic carbon in bed-sediment and soil samples, Yakima River basin, Washington, 1987-90--Continued

Station number	Date	Gross chlordane (µg/kg)	Dieldrin (µg/kg)	p,p'-DDD (µg/kg)	p,p'-DDE (µg/kg)	p,p'-DDT (µg/kg)	Endosulfan I (µg/kg)	Endrin (µg/kg)	Heptachlor (µg/kg)	Heptachlor epoxide (µg/kg)
					Bed sediment					
12478300	08-31-88	<1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
12479720	05-02-89	<1	<.1	<.1	<.1	<.1	<.1	<.1	<.1	<.1
12479750	11-03-90	<5	<.5	.1	.3	.1	<.5	<.5	.1	<.5
12480000	11-06-89	<1	<.1	<.1	<.1	<.1	<.1	<.1	<.1	<.1
12481900	11-03-90	<5	<.5	.1	.3	<.5	<.5	<.5	.1	<.5
12483190	11-02-90	<5	<.5	.2	.4	<.5	<.5	<.5	.1	<.5
12483750	11-02-90	<5	<.5	.2	.5	.1	<.5	<.5	.1	<.5
12484480	08-31-88	9	35	9.3	30	15	<.1	.2	<.1	.1
12484480	08-31-88	10	39	13	28	28	<.1	.2	<.1	.2
12484500	05-04-89	<1	1	1	3	1	<.1	<.1	<.1	<.1
12484550	05-03-89	<1	<.1	<.1	.4	<.1	<.1	<.1	<.1	<.1
12487200	10-30-90	<5	<.5	.2	.2	.1	<.5	<.5	.1	<.5
12488250	11-07-89	<1	<.1	.1	.1	<.1	<.1	<.1	<.1	<.1
12489100	11-07-89	<1	<.1	<.1	.1	<.1	<.1	<.1	<.1	<.1
12500430	08-30-88	<1	1.7	23	91	15	11	.4	<.1	.2
12500430	08-30-88	3	1.2	18	65	8.5	7.4	.1	<.1	.1
12500437	05-01-89	<10	1	38	160	11	<.1	.5	<.1	<.1
12500445	08-30-88	<1	3.2	28	44	8.9	21	.6	<.1	<.1
12500445	08-30-88	15	3	<.1	16	<.1	3.3	<.1	<.1	<.1
12500450	09-16-87	<10	<10	<10	<10	<10	<10	<10	<10	<10
12500900	11-06-90	<5	<.5	.7	.5	.2	<.5	<.5	.1	<.5
12503640	09-01-88	<1	34	43	470	29	<.1	<.1	<.1	1.3
12503640	09-01-88	<1	47	51	180	160	9.2	<.1	<.1	2.5
12505460	09-02-88	<1	1.8	23	47	27	2.5	<.1	<.1	<.1
12505460	09-02-88	<1	3.5	16	60	7.6	<.1	<.1	<.1	<.1
12507508	09-01-88	1	.5	2.8	16	<.1	<.1	<.1	<.1	<.1
12507508	09-01-88	<1	.5	9.5	23	2.6	2.6	<.1	<.1	<.1
12508500	11-07-90	<5	<.5	.1	.8	<.5	<.5	<.5	<.5	<.5
12508625	09-15-87	<10	<10	<10	15	<10	<10	<10	<10	<10
12508850	08-31-88	<1	5.6	13	<.1	.8	<.1	<.1	<.1	<.1
12508850	08-31-88	<1	5	26	74	13	7.9	<.1	<.1	<.1
12508850	08-31-88	4	3.4	10	33	8	1.9	<.1	<.1	<.1
12508850	08-31-88	4	4.4	15	42	9.9	1.9	<.1	<.1	.1
12510500	08-31-88	<1	.2	1	3	.3	<.1	<.1	<.1	<.1
12510500	08-31-88	5	1.3	2.7	10	<.1	<.1	<.1	<.1	<.1
461652119522000	09-01-88	<1	15	48	220	66	61	.1	<.1	.1
461652119522000	09-01-88	<1	31	80	160	14	67	<.1	<.1	<.1
461744119522400	09-01-88	<1	1	4.5	.9	6.1	19	5.3	<.1	<.1
461744119522400	09-01-88	<1	3.6	29	4.4	10	68	17	<.1	<.1
463359120281400	08-28-87	<10	<10	<10	<10	<10	<10	<10	<10	<10
463501120353300	09-01-88	<1	24	48	1700	370	<.1	<.1	<.1	<.1
463501120353300	09-01-88	<1	13	440	1400	180	71	3.5	<.1	<.1
Apple--composite from 5 ditches	08-27-87	<10	<10	130	480	72	17	<10	<10	<10
Asparagus--composite from 5 ditches	09-16-87	<10	<10	<10	<10	<10	<10	<10	<10	<10
Corn--composite from 5 ditches	08-27-87	33	<10	<10	<10	<10	<10	<10	<10	<10
Grape--composite from 4 ditches	11-30-87	<10	<10	11	70	<10	<10	<10	<10	<10
Hops--composite from 5 ditches	09-16-87	<10	<10	<10	<10	<10	<10	<10	<10	<10
Pear--composite from 4 ditches	11-30-87	<10	<10	89	180	<10	<10	<10	<10	<10
Potato--composite from 5 ditches	09-18-87	<10	38	18	64	<10	<10	<10	<10	<10
463202120223600	07-01-89	<1	<.1	56	680	650	<.1	<.1	<.1	<.1
463202120223600	07-01-89	<1	<.1	3.5	45	58	<.1	<.1	<.1	<.1
463232120234900	07-01-89	4	.8	17	160	140	<.1	.3	<.1	<.1
463232120234900	07-01-89	1	.1	1.4	29	22	<.1	<.1	<.1	<.1
463247120222300	07-01-89	2	.1	25	140	310	<.1	.2	<.1	<.1

Table 24. Concentrations of organochlorine compounds, total carbon, and inorganic carbon in bed-sediment and soil samples, Yakima River basin, Washington, 1987-90--Continued

Station number	Date	Lindane (µg/kg)	p,p'-Methoxychlor (µg/kg)	Mirex (µg/kg)	PCB (µg/kg)	PCN (µg/kg)	Perthane (µg/kg)	Toxaphene (µg/kg)
			Bed sediment					
12478300	08-31-88	<0.1	<0.1	<0.1	<1	<1	<1	<10
12479720	05-02-89	<.1	<.1	<.1	<1	<1	<1	<10
12479750	11-03-90	<.5	<.5	<.5	<5	<5	<5	<50
12480000	11-06-89	<.1	<.1	<.1	<1	<1	<1	<10
12481900	11-03-90	<.5	<.5	<.5	<5	<5	<5	<50
12483190	11-02-90	<.5	<.5	<.5	<5	<5	<5	<50
12483750	11-02-90	<.5	<.5	<.5	<5	<5	<5	<50
12484480	08-31-88	<.1	<.1	<.1	<1	<1	<1	<10
12484480	08-31-88	<.1	<.1	<.1	<1	<1	<1	<10
12484500	05-04-89	<.1	<.1	<.1	<1	<1	<1	<10
12484550	05-03-89	<.1	<.1	<.1	<1	<1	<1	<10
12487200	10-30-90	<.5	<.5	<.5	<5	<5	<5	<50
12488250	11-07-89	<.1	<1	<.1	<1	<1	<1	<10
12489100	11-07-89	<.1	<.1	<.1	<1	<1	<1	<10
12500430	08-30-88	<.1	<.1	<.1	<1	<1	<1	<10
	08-30-88	<.1	<.1	<.1	<1	<1	<1	<10
12500437	05-01-89	<.1	<.1	<.1	<1	<1	2	<10
12500445	08-30-88	<.1	<.1	<.1	<1	<1	<1	<10
12500445	08-30-88	<.1	.6	<.1	<1	<1	<1	<10
12500450	09-16-87	<10	<10	<10	<700	<100	<10	<500
12500900	11-06-90	<.5	<.5	<.5	<5	<5	<5	<50
12503640	09-01-88	<.1	<.1	<.1	<1	<1	<1	<10
12503640	09-01-88	<.1	2.1	<.1	<1	<1	<1	<10
12505460	09-02-88	<.1	<.1	<.1	<1	<1	<1	<10
12505460	09-02-88	<.1	.8	<.1	<1	<1	<1	<10
12507508	09-01-88	<.1	<.1	<.1	<1	<1	<1	<10
12507508	09-01-88	<.1	<.1	<.1	<1	<1	<1	<10
12508500	11-07-90	<.5	<.5	<.5	<5	<5	<5	<50
12508625	09-15-87	<10	<10	<10	<700	<100	<10	<500
12508850	08-31-88	<.1	<.1	<.1	<1	<1	<1	<10
12508850	08-31-88	<.1	<.1	<.1	<1	<1	<1	<10
12508850	08-31-88	<.1	<.1	<.1	<1	<1	<1	<10
12508850	08-31-88	<.1	<.1	<.1	<1	<1	<1	<10
12510500	08-31-88	<.1	<.1	<.1	<1	<1	<1	<10
12510500	08-31-88	<.1	<.1	<.1	<1	<1	<1	<10
461652119522000	09-01-88	<.1	<.1	<.1	<1	<1	<1	<10
461652119522000	09-01-88	<.1	3.2	<.1	<1	<1	<1	<10
461744119522400	09-01-88	.3	<.1	<.1	<1	<1	<1	<10
461744119522400	09-01-88	.8	<.1	<.1	<1	<1	<1	<10
463359120281400	08-27-87	<10	<10	<10	<700	--	<10	<500
463501120353300	09-01-88	<.1	<.1	<.1	<1	<1	<1	<10
463501120353300	09-01-88	<.1	<.1	<.1	<1	<1	<1	<10
Apple--composite from 5 ditches	08-27-87	<10	<10	<10	<700	<100	<10	<500
Asparagus--composite from 5 ditches	09-16-87	<10	<10	<10	<700	<100	<10	<500
Corn--composite from 5 ditches	08-27-87	<10	<10	<10	<700	<100	<10	<500
Grape--composite from 4 ditches	11-30-87	<10	<10	<10	<700	<100	<10	<500
Hops--composite from 5 ditches	09-16-87	<10	<10	<10	<700	<100	<10	<500
Pear--composite from 4 ditches	11-30-87	<10	<10	<10	<700	<100	<10	<500
Potato--composite from 5 ditches	09-18-87	<10	<10	<10	<700	<100	<10	<500
463202120223600	07-01-89	<.1	<.1	<.1	<1	<1	<1	<10
463202120223600	07-01-89	<.1	<.1	<.1	<1	<1	<1	<10
463232120234900	07-01-89	<.1	<.1	<.1	<1	<1	<1	<10
463232120234900	07-01-89	<.1	<.1	<.1	<1	<1	<1	<10
463247120222300	07-01-89	<.1	<.1	<.1	<1	<1	<1	<10

Table 25. Concentrations of organophosphorus pesticides in soil samples, Yakima River basin, Washington, 1989

[Concentrations in micrograms per kilogram; "<" = less than; see figure 1 for site locations]

Map reference number	Station number	Stetion name	Date	Time	Diazinon	Ethion	Malathion	Methyl parathion	Methyl trithion	Parathion	Trithion
56	463202120223600	Apple orchard nr Moxee City, A Horizon, 0-6 inches	07-01-89	1000	1.5	<0.1	<0.1	<0.1	<0.1	2.0	<0.1
		Apple orchard nr Moxee City, B Horizon, 6-9 inches	07-01-89	1005	.2	<.1	<.1	<.1	<.1	.3	<.1
57	463232120234900	Hop field near Moxee City, A Horizon, 0-9 inches	07-01-89	0900	4.1	<.1	<.1	<.1	<.1	.4	<.1
		Hop field near Moxee City, B Horizon, 9-12 inches	07-01-89	0905	.2	<.1	<.1	<.1	<.1	<.1	<.1
60	463247120222300	Hop field nr Moxee City A Horizon, 1-10 inches	07-01-89	1100	530	.1	<.1	<.1	<.1	.6	<.1

Table 26. Concentrations of semi-volatile organic compounds (phthalate esters, ethers, phenols, cresols, and monocyclic- and polycyclic-aromatic compounds) in bed-sediment samples, Yakima River basin, Washington, 1987-90

[Concentrations in micrograms per kilogram; "E" = estimated value; "<" = less than; see figure 1 for site locations; the typical minimum reporting level for these compounds is 200, 400, or 600 micrograms per kiliogram--however, the analyst is able to quantify smaller concentrations when the background analytical noise is small]

Map reference number	Station number	Station name	Date	Time	Particle size finer than, micrometers	Isophorone	2-Chloronaphthalene
1	12478100	Waptus River at mouth nr Roslyn	11-06-89	1215	2,000	<400	<400
3	12478300	Cle Elum R above Cle Elum Lake nr Roslyn	08-31-88	1030	2,000	<200	<200
5	12479720	Jungle Creek nr mouth nr Cle Elum	05-02-89	1230	2,000	<200	<200
7	12480000	Teaneway River below forks near Cle Elum	11-06-89	0910	2,000	<200	<200
13	12484480	Cherry Creek et Thrall	08-31-88	1630	2,000	<200	<200
13	12484480	Cherry Creek at Thrall	08-31-88	1635	62	<200	<200
14	12484500	Yakima River at Umtanum	05-04-89	1100	2,000	<200	<200
14	12484500	Yakima River at Umtanum	11-05-90	1330	62	<200	<200
15	12484550	Umtanum Creek nr mouth at Umtanum	05-03-89	0945	2,000	<200	<200
17	12488250	American River at Hells Crossing nr Nile	11-07-89	1200	2,000	<200	<200
18	12489100	Rattlesnake Cr abv N.F. Rattlesnake Cr nr Nile	11-07-89	1200	2,000	<200	<200
24	12500430	Moxee Drain at Thorp Rd nr Union Gap	08-30-88	1730	2,000	<200	<200
24	12500430	Moxee Drain at Thorp Rd nr Union Gap	08-30-88	1735	62	<200	<200
25	12500437	Wide Hollow Cr at W. Valley School nr Ahtanum	05-01-89	1430	2,000	<200	<200
27	12500445	Wide Hollow Creek near mouth at Union Gap	08-30-88	1430	2,000	<200	<200
27	12500445	Wide Hollow Creek near mouth at Union Gap	08-30-88	1435	62	<200	<200
28	12500450	Yakima R abv Ahtanum Cr at Union Gap	09-16-87	1630	180	<200	<200
31	12503640	Unnamed drain at Lateral & Riggs Rds nr Wapato	09-01-88	0800	2,000	<200	<200
31	12503640	Unnamed drain at Lateral & Riggs Rds nr Wapato	09-01-88	0805	62	<200	<200
36	12505460	Granger Drain at mouth nr Granger	09-02-88	1000	2,000	<200	<200
36	12505460	Granger Drain at mouth nr Granger	09-02-88	1005	62	<200	<200
38	12507508	Toppenish Cr at Indian Church Rd nr Granger	09-01-88	0930	2,000	<200	<200
38	12507508	Toppenish Cr at Indian Church Rd nr Granger	09-01-88	0935	62	<200	<200
44	12508625	Yakima R blw Satus Cr at RM 68 nr Satus	09-15-87	1200	180	<200	<200
46	12508850	Sulphur Cr Wasteway nr Sunnyside	08-31-88	1530	2,000	<200	<200
46	12508850	Sulphur Cr Wasteway nr Sunnyaide	08-31-88	1535	62	<200	<200
46	12508850	Sulphur Cr Wasteway nr Sunnyside	08-31-88	1630	2,000	<200	<200
46	12508850	Sulphur Cr Wasteway nr Sunnyside	08-31-88	1635	62	<200	<200
49	12509710	Spring Creek at mouth at Whitstran	11-08-90	1330	62	<200	<200
51	12510500	Yakima River at Kiona	08-31-88	1000	2,000	<200	<200
51	12510500	Yakima River et Kiona	08-31-88	1005	62	<200	<200
51	12510500	Yakima River at Kiona	11-10-90	0940	62	<200	<200
52	461652119522000	Unnamed drain et County Line Rd nr Grandview	09-01-88	1100	2,000	<200	<200
52	461652119522000	Unnamed drain at County Line Rd nr Grandview	09-01-88	1105	62	<200	<200
54	461744119522400	Unnamed drain to E Turbine Laterel nr Grandview	09-01-88	0900	2,000	<200	<200
54	461744119522400	Unnamed drain to E Turbine Lateral nr Grandview	09-01-88	0905	62	<200	<200
62	463359120281400	Unnamed urban runoff at Union Gap	08-28-87	1000	180	<200	<200
63	463501120353300	Wide Hollow Cr at Ahtanum Blvd nr Ahtanum	09-01-88	1000	2,000	110	<200
63	463501120353300	Wide Hollow Cr at Ahtanum Blvd nr Ahtanum	09-01-88	1005	62	<200	<200
		Apple--composite from 5 ditches	08-27-87	2245	180	<200	<200
		Asparagus--composite from 5 ditches	09-16-87	1600	180	<200	<200
		Corn--composite from 5 ditches	08-27-87	2115	180	<200	<200
		Grape--composite from 4 ditches	11-30-87	1200	180	<200	<200
		Hops--composite from 5 ditches	09-16-87	1630	180	<200	<200
		Pear--composite from 4 ditches	11-30-87	1300	180	<200	<200
		Potato--composite from 5 ditches	09-18-87	1015	180	<200	<200

Table 26. Concentrations of semi-volatile organic compounds (phthalate esters, etheres, phenols, cresols, and monocyclic- and polycyclic-aromatic compounds) in bed-sediment samples, Yakima River basin, Washington, 1987-90--Continued

Station number	Date	Hexa-chloro-but-adiene	Hexa-chloro-cyclo-pent-adiene	Hexa-chloro-ethane	bis(2-Chloro-ethoxy) methane	bis(2-Chloro-ethyl) ether	bis(2-Chloro-iso-propyl) ether	4-Bromo-phenyl phenyl ether	4-Chloro-phenyl phenyl ether	1,2-Di-chloro-benzene
12478100	11-06-89	<400	<400	<400	<400	<400	<400	<400	<400	<400
12478300	08-31-88	<200	<200	<200	<200	<200	<200	<200	<200	<200
12479720	05-02-89	<200	<200	<200	<200	<200	<200	<200	<200	<200
12480000	11-06-89	<200	<200	<200	<200	<200	<200	<200	<200	<200
12484480	08-31-88	<200	<200	<200	<200	<200	<200	<200	<200	<200
12484480	08-31-88	<200	<200	<200	<200	<200	<200	<200	<200	<200
12484500	05-04-89	<200	<200	<200	<200	<200	<200	<200	<200	<200
12484500	11-05-90	<200	<200	<200	<200	<200	<200	<200	<200	<200
12484550	05-03-89	<200	<200	<200	<200	<200	<200	<200	<200	<200
12488250	11-07-89	<200	<200	<200	<200	<200	<200	<200	<200	<200
12489100	11-07-89	<200	<200	<200	<200	<200	<200	<200	<200	<200
12500430	08-30-88	<200	<200	<200	<200	<200	<200	<200	<200	<200
12500430	08-30-88	<200	<200	<200	<200	<200	<200	<200	<200	<200
12500437	05-01-89	<200	<200	<200	<200	<200	<200	<200	<200	<200
12500445	08-30-88	<200	<200	<200	<200	<200	<200	<200	<200	<200
12500445	08-30-88	<200	<200	<200	<200	<200	<200	<200	<200	<200
12500450	09-16-87	<200	<200	<200	<200	<200	<200	<200	<200	<200
12503640	09-01-88	<200	<200	<200	<200	<200	<200	<200	<200	<200
12503640	09-01-88	<200	<200	<200	<200	<200	<200	<200	<200	<200
12505460	09-02-88	<200	<200	<200	<200	<200	<200	<200	<200	<200
12505460	09-02-88	<200	<200	<200	<200	<200	<200	<200	<200	<200
12507508	09-01-88	<200	<200	<200	<200	<200	<200	<200	<200	<200
12507508	09-01-88	<200	<200	<200	<200	<200	<200	<200	<200	<200
12508625	09-15-87	<200	<200	<200	<200	<200	<200	<200	<200	<200
12508850	08-31-88	<200	<200	<200	<200	<200	<200	<200	<200	<200
12508850	08-31-88	<200	<200	<200	<200	<200	<200	<200	<200	<200
12508850	08-31-88	<200	<200	<200	<200	<200	<200	<200	<200	<200
12508850	08-31-88	<200	<200	<200	<200	<200	<200	<200	<200	<200
12509710	11-08-90	<200	<200	<200	<200	<200	<200	<200	<200	<200
12510500	08-31-88	<200	<200	<200	<200	<200	<200	<200	<200	<200
12510500	08-31-88	<200	<200	<200	<200	<200	<200	<200	<200	<200
12510500	11-10-90	<200	<200	<200	<200	<200	<200	<200	<200	<200
461652119522000	09-01-88	<200	<200	<200	<200	<200	<200	<200	<200	<200
461652119522000	09-01-88	<200	<200	<200	<200	<200	<200	<200	<200	<200
461744119522400	09-01-88	<200	<200	<200	<200	<200	<200	<200	<200	<200
461744119522400	09-01-88	<200	<200	<200	<200	<200	<200	<200	<200	<200
463359120281400	08-28-87	<200	<200	<200	<200	<200	<200	<200	<200	<200
463501120353300	09-01-88	<200	<200	<200	<200	160	120	<200	<200	<200
463501120353300	09-01-88	<200	<200	<200	<200	<200	<200	<200	<200	<200
Apple--composite from 5 ditches	08-27-87	<200	<200	<200	<200	<200	<200	<200	<200	<200
Asparagus--composite from 5 ditches	09-16-87	<200	<200	<200	<200	<200	<200	<200	<200	<200
Corn--composite from 5 ditches	08-27-87	<200	<200	<200	<200	<200	<200	<200	<200	<200
Grape--composite from 4 ditches	11-30-87	<200	<200	<200	<200	<200	<200	<200	<200	<200
Hops--composite from 5 ditches	09-16-87	<200	<200	<200	<200	<200	<200	<200	<200	<200
Pear--composite from 4 ditches	11-30-87	<200	<200	<200	<200	<200	<200	<200	<200	<200
Potato--composite from 5 ditches	09-18-87	<200	<200	<200	<200	<200	<200	<200	<200	<200

Table 26. Concentrations of semi-volatile organic compounds (phthalate esters, ethers, phenols, cresols, and monocyclic- and polycyclic-aromatic compounds) in bed-sediment samples, Yakima River basin, Washington, 1987-90--Continued

Station number	Date	1,3-Di-chloro-benzene	1,4-Di-chloro-benzene	2,4-Di-nitro-toluene	2,6-Di-nitro-toluene	Hexa-chloro-benzene	Nitro-benzene	1,2,4-Tri-chloro-benzene	2-Chloro-phenol	2,4-Di-chloro-phenol
12478100	11-06-89	<400	<400	<400	<400	<400	<400	<400	<400	<400
12478300	08-31-88	<200	<200	<200	<200	<200	<200	<200	<200	<200
12479720	05-02-89	<200	<200	<200	<200	<200	<200	<200	<200	<200
12480000	11-06-89	<200	<200	<200	<200	<200	<200	<200	<200	<200
12484480	08-31-88	<200	<200	<200	<200	<200	<200	<200	<200	<200
12484480	08-31-88	<200	<200	<200	<200	<200	<200	<200	<200	<200
12484500	05-04-89	<200	<200	<200	<200	<200	<200	<200	<200	<200
12484500	11-05-90	<200	<200	<200	<200	<200	<200	<200	<200	<200
12484550	05-03-89	<200	<200	<200	<200	<200	<200	<200	<200	<200
12488250	11-07-89	<200	<200	<200	<200	<200	<200	<200	<200	<200
12489100	11-07-89	<200	<200	<200	<200	<200	<200	<200	<200	<200
12500430	08-30-88	<200	<200	<200	<200	<200	<200	<200	<200	<200
12500430	08-30-88	<200	<200	<200	<200	<200	<200	<200	<200	<200
12500437	05-01-89	<200	<200	<200	<200	<200	<200	<200	<200	<200
12500445	08-30-88	<200	<200	<200	<200	<200	<200	<200	<200	<200
12500445	08-30-88	<200	<200	<200	<200	<200	<200	<200	<200	<200
12500450	09-16-87	<200	<200	<200	<200	<200	<200	<200	<200	<200
12503640	09-01-88	<200	<200	<200	<200	<200	<200	<200	<200	<200
12503640	09-01-88	<200	<200	<200	<200	<200	<200	<200	<200	<200
12505460	09-02-88	<200	<200	<200	<200	<200	<200	<200	<200	<200
12507508	09-02-88	<200	<200	<200	<200	<200	<200	<200	<200	<200
12507508	09-01-88	<200	<200	<200	<200	<200	<200	<200	<200	<200
12507508	09-01-88	<200	<200	<200	<200	<200	<200	<200	<200	<200
12508625	09-15-87	<200	<200	<200	<200	<200	<200	<200	<200	<200
12508850	08-31-88	<200	<200	<200	<200	<200	<200	<200	<200	<200
12508850	08-31-88	<200	<200	<200	<200	<200	<200	<200	<200	<200
12508850	08-31-88	<200	<200	<200	<200	<200	<200	<200	<200	<200
12509710	11-08-90	<200	<200	<200	<200	<200	<200	<200	<200	<200
12510500	08-31-88	<200	<200	<200	<200	<200	<200	<200	<200	<200
12510500	08-31-88	<200	<200	<200	<200	<200	<200	<200	<200	<200
12510500	11-10-90	<200	<200	<200	<200	<200	<200	<200	<200	<200
461652119522000	09-01-88	<200	<200	<200	<200	<200	<200	<200	<200	<200
461652119522000	09-01-88	<200	<200	<200	<200	<200	<200	<200	<200	<200
461744119522400	09-01-88	<200	<200	<200	<200	<200	<200	<200	<200	<200
461744119522400	09-01-88	<200	<200	<200	<200	<200	<200	<200	<200	<200
463359120281400	08-28-87	<200	<200	<200	<200	<200	<200	<200	<200	<200
463501120353300	09-01-88	<200	<200	<200	160	<200	120	<200	<200	<200
463501120353300	09-01-88	<200	<200	<200	<200	<200	<200	<200	<200	<200
Apple--composite from 5 ditches	08-27-87	<200	<200	<200	<200	<200	<200	<200	<200	<200
Asparagus--composite from 5 ditches	09-16-87	<200	<200	<200	<200	<200	<200	<200	<200	<200
Corn--composite from 5 ditches	08-27-87	<200	<200	<200	<200	<200	<200	<200	<200	<200
Grape--composite from 4 ditches	11-30-87	<200	<200	<200	<200	<200	<200	<200	<200	<200
Hops--composite from 5 ditches	09-16-87	<200	<200	<200	<200	<200	<200	<200	<200	<200
Pear--composite from 4 ditches	11-30-87	<200	<200	<200	<200	<200	<200	<200	<200	<200
Potato--composite from 5 ditches	09-18-87	<200	<200	<200	<200	<200	<200	<200	<200	<200

Table 26. Concentrations of semi-volatile organic compounds (phthalate esters, ethers, phenols, cresols, and monocyclic- and polycyclic-aromatic compounds) in bed-sediment samples, Yakima River basin, Washington, 1987-90--Continued

Station number	Date	2,4-Dimethylphenol	4,6-Dinitro-ortho-cresol	2,4-Dinitrophenol	2-Nitrophenol	4-Nitrophenol	p-Chloro-m-cresol	Pentachlorophenol	Phenol (C6H5OH)	2,4,6-Trichlorophenol
12478100	11-06-89	<400	<1,200	<1,200	<400	<1,200	<1,200	<1,200	<400	<1,200
12478300	08-31-88	<200	<600	<600	<200	<600	<600	<600	<200	<600
12479720	05-02-89	<200	<600	<600	<200	<600	<600	<600	<200	<600
12480000	11-06-89	<200	<600	<600	<200	<600	<600	<600	<200	<600
12484480	08-31-88	<200	<600	<600	<200	<600	<600	<600	110	<600
12484480	08-31-88	<200	<600	<600	<200	<600	<600	<600	110	<600
12484500	05-04-89	<200	<600	<600	<200	<600	<600	<600	870	<600
12484500	11-05-90	<200	<600	<600	<200	<600	<600	<600	<200	<600
12484550	05-03-89	<200	<600	<600	<200	<600	<600	<600	230	<600
12488250	11-07-89	<200	<600	<600	<200	<600	<600	<600	<200	<600
12489100	11-07-89	<200	<600	<600	<200	<600	<600	<600	<200	<600
12500430	08-30-88	<200	<600	<600	<200	<600	<600	<600	110	<600
12500430	08-30-88	<200	<600	<600	<200	<600	<600	<600	<200	<600
12500437	05-01-89	<200	<600	<600	<200	<600	<600	<600	<200	<600
12500445	08-30-88	<200	<600	<600	<200	<600	<600	<600	<200	<600
12500445	08-30-88	<200	<600	<600	<200	<600	<600	<600	<200	<600
12500450	09-16-87	<200	<600	<600	<200	<600	<600	<600	<200	<600
12503640	09-01-88	<200	<600	<600	<200	<600	<600	<600	3	<600
12503640	09-01-88	<200	<600	<600	<200	<600	<600	<600	<200	<600
12505460	09-02-88	<200	<600	<600	<200	<600	<600	<600	<200	<600
12505460	09-02-88	<200	<600	<600	<200	<600	<600	<600	<200	<600
12507508	09-01-88	<200	<600	<600	<200	<600	<600	<600	<200	<600
12507508	09-01-88	<200	<600	<600	<200	<600	<600	<600	<200	<600
12508625	09-15-87	<200	<600	<600	<200	<600	<600	<600	<200	<600
12508850	08-31-88	<200	<600	<600	<200	<600	<600	<600	<200	<600
12508850	08-31-88	<200	<600	<600	<200	<600	<600	<600	<200	<600
12508850	08-31-88	<200	<600	<600	<200	<600	<600	<600	110	<600
12508850	08-31-88	<200	<600	<600	<200	<600	<600	<600	110	<600
12509710	11-08-90	<200	<600	<600	<200	<600	<600	<600	<200	<600
12510500	08-31-88	<200	<600	<600	<200	<600	<600	<600	<200	<600
12510500	08-31-88	<200	<600	<600	<200	<600	<600	<600	63	<600
12510500	11-10-90	<200	<600	<600	<200	<600	<600	<600	35	<600
461652119522000	09-01-88	<200	<600	<600	<200	<600	<600	<600	<200	<600
461652119522000	09-01-88	<200	<600	<600	<200	<600	<600	<600	<200	<600
461744119522400	09-01-88	<200	<600	<600	<200	<600	<600	<600	110	<600
461744119522400	09-01-88	<200	<600	<600	<200	<600	<600	<600	110	<600
463359120281400	08-28-87	<200	<600	<600	<200	<600	<600	<600	<200	<600
463501120353300	09-01-88	<200	<600	<600	<200	250	<600	<600	130	<600
463501120353300	09-01-88	<200	<600	<600	<200	<600	<600	<600	310	<600
Apple--composite from 5 ditches	08-27-87	<200	<600	<600	<200	<600	<600	<600	120	<600
Asparagus--composites from 5 ditches	09-16-87	<200	<600	<600	<200	<600	<600	<600	<200	<600
Corn--composite from 5 ditches	08-27-87	<200	<600	<600	<200	<600	<600	<600	170	<600
Grape--composite from 4 ditches	11-30-87	<200	<600	<600	<200	<600	<600	<600	<200	<600
Hops--composite from 5 ditches	09-16-87	<200	<600	<600	<200	<600	<600	<600	<200	<600
Pear--composite from 4 ditches	11-30-87	<200	<600	<600	<200	<600	<600	<600	<200	<600
Potato--composite from 5 ditches	09-18-87	<200	<600	<600	<200	<600	<600	<600	<200	<600

Table 26. Concentrations of semi-volatile organic compounds (phthalate esters, ethers, phenols, cresols, and monocyclic- and polycyclic-aromatic compounds) in bed-sediment samples, Yakima River basin, Washington, 1987-90--Continued

Station number	Date	bis (2-Ethyl-hexyl) phthal-ate	Diethyl phthal-ate	Di-methyl phthal-ate	Di-n-butyl phthal-ate	Di-n-octyl phthal-ate	n-Butyl benzyl phthal-ate	Ace-naph-thene	Ace-naph-thylene	Anthra-cene
12478100	11-06-89	E800	<400	<400	<400	<800	<400	<400	<400	<400
12478300	08-31-88	<200	<200	<200	<200	<400	<200	<200	<200	<200
12479720	05-02-89	240	<200	<200	<200	<400	<200	<200	<200	<200
12480000	11-06-89	<200	<200	<200	<200	<400	<200	<200	<200	<200
12484480	08-31-88	2500	79	<200	120	190	120	<200	<200	<200
12484480	08-31-88	550	81	<200	120	<400	<200	<200	<200	<200
12484500	05-04-89	310	<200	<200	<200	<400	<200	<200	<200	<200
12484500	11-05-90	<200	<200	<200	<200	<400	<200	<200	<200	<200
12484550	05-03-89	5200	<200	<200	<200	<400	<200	<200	<200	<200
12488250	11-07-89	<200	<200	<200	<200	<400	<200	<200	<200	<200
12489100	11-07-89	<200	<200	<200	<200	<400	<200	<200	<200	<200
12500430	08-30-88	330	90	<200	160	150	150	<200	81	86
12500430	08-30-88	180	<200	<200	100	<400	<200	<200	<200	<200
12500437	05-01-89	250	<200	<200	<200	<400	<200	<200	<200	<200
12500445	08-30-88	440	<200	<200	<200	<400	<200	<200	<200	<200
12500445	08-30-88	580	<200	<200	<200	<400	<200	<200	<200	<200
12500450	09-16-87	<200	<200	<200	<200	<400	<200	<200	<200	<200
12503640	09-01-88	4	<200	<200	3	<400	<200	<200	<200	<200
12503640	09-01-88	<200	<200	<200	<200	<400	<200	<200	<200	<200
12505460	09-02-88	<200	<200	<200	<200	<400	<200	<200	<200	<200
12507508	09-02-88	<200	<200	<200	<200	<400	<200	<200	<200	<200
12507508	09-01-88	340	<200	<200	<200	<400	<200	<200	<200	<200
12507508	09-01-88	790	<200	<200	<200	<400	<200	<200	<200	<200
12508625	09-15-87	<200	<200	<200	<200	<400	<200	<200	<200	<200
12508850	08-31-88	<200	<200	<200	<200	<400	<200	<200	<200	<200
12508850	08-31-88	350	<200	<200	<200	<400	<200	<200	<200	<200
12508850	08-31-88	520	80	<200	120	<400	150	<200	<200	<200
12508850	08-31-88	430	80	<200	120	<400	<200	<200	<200	<200
12509710	11-08-90	<200	<200	<200	<200	<400	<200	<200	<200	<200
12510500	08-31-88	<200	<200	<200	<200	<400	<200	<200	<200	<200
12510500	08-31-88	610	<200	<200	<200	<400	<200	<200	<200	<200
12510500	11-10-90	<200	<200	<200	<200	<400	<200	<200	<200	<200
461652119522000	09-01-88	<200	<200	<200	<200	<400	<200	<200	<200	<200
461652119522000	09-01-88	330	<200	<200	<200	<400	<200	<200	<200	<200
461744119522400	09-01-88	260	81	<200	110	190	360	<200	<200	<200
461744119522400	09-01-88	200	83	99	110	170	160	<200	<200	<200
463359120281400	08-28-87	<200	<200	<200	<200	<400	<200	<200	<200	40
463501120353300	09-01-88	390	88	<200	150	150	150	<200	87	99
463501120353300	09-01-88	520	<200	<200	<200	<400	<200	<200	<200	<200
Apple--composite from 5 ditches	08-27-87	<200	<200	<200	<200	<400	<200	<200	<200	280
Asparagus--composite from 5 ditches	09-16-87	<200	<200	<200	<200	<400	<200	<200	<200	<200
Corn--composite from 5 ditches	08-27-87	<200	<200	<200	<200	<400	<200	<200	<200	<200
Grape--composite from 4 ditches	11-30-87	<200	<200	<200	<200	<400	<200	<200	<200	<200
Hops--composite from 5 ditches	09-16-87	<200	<200	<200	<200	<400	<200	<200	<200	<200
Pear--composite from 4 ditches	11-30-87	<200	<200	<200	<200	<400	<200	<200	<200	<200
Potato--composite from 5 ditches	09-18-87	<200	<200	<200	<200	<400	<200	<200	<200	<200

Table 26. Concentrations of semi-volatile organic compounds (phthalate esters, ethers, phenols, cresols, and monocyclic- and polycyclic-aromatic compounds) in bed-sediment samples, Yakima River basin, Washington, 1987-90--Continued

Station number	Date	Benzo(a) anthra-cene	Benzo(a) pyrene	Benzo(b) fluor-anthene	Benzo(k) fluor-anthene	Benzo (ghi) pery-lene	Chry-sene	Dibenzo (a,h) anthra-cene	Fluor-anthene
12478100	11-06-89	<800	<800	<800	<800	<800	<800	<800	<400
12478300	08-31-88	<400	<400	<400	<400	<400	<400	<400	<200
12479720	05-02-89	<400	<400	<400	<400	<400	<400	<400	<200
12480000	11-06-89	<400	<400	<400	<400	<400	<400	<400	<200
12484480	08-31-88	<400	<400	<400	<400	<400	<400	<400	120
12484480	08-31-88	<400	<400	<400	<400	<400	<400	<400	<200
12484500	05-04-89	<400	<400	<400	<400	<400	<400	<400	<200
12484500	11-05-90	<400	<400	<400	<400	<400	<400	<400	<200
12484550	05-03-89	<400	<400	<400	<400	<400	<400	<400	<200
12488250	11-07-89	<400	<400	<400	<400	<400	<400	<400	<200
12489100	11-07-89	<400	<400	<400	<400	<400	<400	<400	<200
12500430	08-30-88	<400	<400	<400	<400	<400	81	<400	120
12500430	08-30-88	<400	<400	<400	<400	<400	<400	<400	<200
12500437	05-01-89	<400	<400	<400	<400	<400	<400	<400	<200
12500445	08-30-88	<400	<400	<400	<400	<400	<400	<400	<200
12500445	08-30-88	<400	<400	<400	<400	<400	<400	<400	120
12500450	09-16-87	<400	<400	<400	<400	<400	<400	<400	<200
12503640	09-01-88	<400	<400	<400	<400	<400	<400	<400	<200
12503640	09-01-88	<400	<400	<400	<400	<400	<400	<400	<200
12505460	09-02-88	<400	<400	<400	<400	<400	<400	<400	<200
12505460	09-02-88	<400	<400	<400	<400	<400	<400	<400	<200
12507508	09-01-88	<400	<400	<400	<400	<400	<400	<400	<200
12507508	09-01-88	<400	<400	<400	<400	<400	<400	<400	<200
12508625	09-15-87	<400	<400	<400	<400	<400	<400	<400	<200
12508850	08-31-88	<400	<400	<400	<400	<400	<400	<400	<200
12508850	08-31-88	<400	<400	<400	<400	<400	<400	<400	<200
12508850	08-31-88	<400	<400	<400	<400	<400	<400	<400	<200
12508850	08-31-88	<400	<400	<400	<400	<400	<400	<400	<200
12509710	11-08-90	<400	<400	<400	<400	<400	<400	<400	5
12510500	08-31-88	<400	<400	<400	<400	<400	<400	<400	<200
12510500	08-31-88	<400	<400	<400	<400	<400	<400	<400	<200
12510500	11-10-90	<400	<400	<400	<400	<400	<400	<400	4
461652119522000	09-01-88	<400	<400	<400	<400	<400	<400	<400	<200
461652119522000	09-01-88	<400	<400	<400	<400	<400	<400	<400	<200
461744119522400	09-01-88	<400	<400	<400	<400	<400	<400	<400	<200
461744119522400	09-01-88	<400	<400	<400	<400	<400	<400	<400	<200
463359120281400	08-28-87	<400	<400	<400	<400	<400	<400	<400	56
463501120353300	09-01-88	130	160	200	140	160	160	<400	200
463501120353300	09-01-88	<400	<400	<400	<400	<400	<400	<400	<200
Apple--composite from 5 ditches	08-27-87	<400	<400	<400	<400	<400	<400	<400	130
Asparagus--composite from 5 ditches	09-16-87	<400	<400	<400	<400	<400	<400	<400	<200
Corn--composite from 5 ditches	08-27-87	<400	<400	<400	<400	<400	<400	<400	<200
Grape--composite from 4 ditches	11-30-87	<400	<400	<400	<400	<400	<400	<400	<200
Hops--compoosite from 5 ditches	09-16-87	<400	<400	<400	<400	<400	<400	<400	<200
Pear--composite from 4 ditches	11-30-87	<400	<400	<400	<400	<400	<400	<400	<200
Potato--composite from 5 ditches	09-18-87	<400	<400	<400	<400	<400	<400	<400	<200

Table 26. Concentrations of semi-volatile organic compounds (phthalate esters, ethers, phenols, cresols, and monocyclic- and polycyclic-aromatic compounds) in bed-sediment samples, Yakima River basin, Washington, 1987-90--Continued

Station number	Date	Fluor-ene	Indeno (1,2,3-cd) pyrene	Naphth-alene	Phenan-threne	Pyrene	n-Nitro-sodi-methyl-amine	n-Nitro-sodi-n-propyl-amine	n-Nitro-sodi-phenyl-amine
12478100	11-06-89	<400	<800	<400	<400	<400	<400	<400	<400
12478300	08-31-88	<200	<400	<200	<200	<200	<200	<200	<200
12479720	05-02-89	<200	<400	<200	<200	<200	<200	<200	<200
12480000	11-06-89	<200	<400	<200	<200	<200	<200	<200	<200
12484480	08-31-88	<200	<400	<200	96	120	<200	<200	<200
12484480	08-31-88	<200	<400	95	83	<200	<200	<200	<200
12484500	05-04-89	<200	<400	<200	<200	<200	<200	<200	<200
12484500	11-05-90	<200	<400	<200	<200	<200	<200	<200	<200
12484550	05-03-89	<200	<400	<200	<200	<200	<200	<200	<200
12488250	11-07-89	<200	<400	<200	<200	<200	<200	<200	<200
12489100	11-07-89	<200	<400	<200	<200	<200	<200	<200	<200
12500430	08-30-88	<200	<400	96	90	120	<200	<200	<200
12500430	08-30-88	<200	<400	<200	<200	<200	<200	<200	<200
12500437	05-01-89	<200	<400	<200	<200	<200	<200	<200	<200
12500445	08-30-88	<200	<400	30	90	<200	<200	<200	220
12500445	08-30-88	<200	<400	20	70	70	<200	<200	160
12500450	09-16-87	<200	<400	<200	<200	<200	<200	<200	<200
12503640	09-01-88	<200	<400	<200	<200	<200	<200	<200	<200
12503640	09-01-88	<200	<400	<200	<200	<200	<200	<200	<200
12505460	09-02-88	<200	<400	<200	<200	<200	<200	<200	<200
12505460	09-02-88	<200	<400	<200	<200	<200	<200	<200	<200
12507508	09-01-88	<200	<400	<200	<200	<200	<200	<200	<200
12507508	09-01-88	<200	<400	<200	20	<200	<200	<200	<200
12508625	09-15-87	<200	<400	<200	<200	<200	<200	<200	<200
12508850	08-31-88	<200	<400	<200	<200	<200	<200	<200	<200
12508850	08-31-88	<200	<400	<200	<200	<200	<200	<200	<200
12508850	08-31-88	<200	<400	<200	<200	<200	<200	<200	<200
12508850	08-31-88	<200	<400	94	82	110	<200	<200	<200
12509710	11-08-90	<200	<400	3	9	4	<200	<200	<200
12510500	08-31-88	<200	<400	<200	<200	<200	<200	<200	<200
12510500	08-31-88	<200	<400	8	<200	<200	<200	<200	<200
12510500	11-10-90	<200	<400	2	4	3	<200	<200	<200
461652119522000	09-01-88	<200	<400	<200	<200	<200	<200	<200	<200
461652119522000	09-01-88	<200	<400	<200	38	<200	<200	<200	<200
461744119522400	09-01-88	<200	<400	<200	<200	<200	<200	<200	<200
461744119522400	09-01-88	<200	<400	<200	<200	<200	<200	<200	<200
463359120281400	08-28-87	<200	<400	25	35	58	<200	<200	<200
463501120353300	09-01-88	<200	<400	100	140	190	120	<200	43
463501120353300	09-01-88	<200	<400	<200	28	<200	<200	<200	<200
Apple--composite from 5 ditches	08-27-87	<200	<400	<200	240	160	<200	<200	<200
Asparagus--composite from 5 ditches	09-16-87	<200	<400	<200	<200	<200	<200	<200	<200
Corn--composite from 5 ditches	08-27-87	<200	<400	<200	<200	<200	<200	<200	<200
Grape--composite from 4 ditches	11-30-87	<200	<400	<200	<200	<200	<200	<200	<200
Hops--composite from 5 ditches	09-16-87	<200	<400	<200	<200	<200	<200	<200	<200
Pear--composite from 4 ditches	11-30-87	<200	<400	<200	<200	<200	<200	<200	<200
Potato--composite from 5 ditches	09-18-87	<200	<400	<200	<200	<200	<200	<200	<200

Table 27. Ancillary data, for composite biological samplas, collected for analysis of trace-organic compounds, Yakima River basin, Washington, 1989-90

[D = did not determine, NA = not applicable; see figure 1 for site locations; age of biological samples are expressed in years as measured from scale samples, for example, 0 = less than 1 year, 1 = greater than 1 year and less than 2 years]

Map reference number	Station number	Station name	Sampling date	Field number	Organism				Number external abnormalities
					Number	Length (mm)	Weight (grams)	Age (years)	
				Rainbow Trout					
1	12478100	Waptus River at mouth nr Roslyn	11-02-89	YK0065SF	1	93	7	0	D
					2	122	14	0	D
					3	107	11	0	D
					4	112	11	0	D
					5	120	14	0	D
					6	125	16	0	D
					7	120	14	0	D
					Ave.	114	12		
5	12479720	Jungle Creek nr mouth nr Cle Elum	05-02-89	YK0005SF	1	108	17	D	D
					2	105	12	D	D
					3	106	11	D	D
					4	74	5	D	D
					5	67	4	D	D
					6	108	13	D	D
					7	69	3	D	D
					8	79	4	D	D
					9	82	5	D	D
					10	62	3	D	D
					Ave.	86	8		
7	12480000	Teanaway River blw forks nr Cle Elum	11-06-89	YK0124SF	1	147	25	1	D
					2	159	33	1	D
					3	166	36	1	D
					4	148	28	1	D
					5	145	24	1	D
					6	171	42	1	D
					7	167	45	1	D
					8	135	21	1	D
					9	154	35	1	D
					10	153	36	1	D
					Ave.	155	33		
14	12484500	Yakima River at Umtanum	11-07-89	YK0145SF	1	132	23	0	D
					2	235	133	1	D
					3	131	26	1	D
					4	125	24	1	D
					5	118	16	1	D
					6	198	83	1	D
					7	195	70	1	D
					8	220	110	1	D
					9	200	84	1	D
					10	210	96	1	D
					Ave.	176	67		
15	12484550	Umtanum Creek nr mouth at Umtanum	05-03-89	YK0011SF	1	137	29	D	D
					2	127	23	D	D
					3	137	29	D	D
					4	122	21	D	D
					5	146	32	D	D
					6	109	16	D	D
					7	113	17	D	D
					8	110	15	D	D
					9	115	18	D	D
					10	96	10	D	D
					Ava.	122	21		
16	12487200	Little Naches River at mouth nr Cliffdell	10-30-90	YK0201SF	1	210	88	2	0
					2	237	115	2	0
					3	157	35	1	0
					4	157	36	1	0
					5	130	18	1	0
					6	133	19	1	0
					Ava.	171	51		
18	12489100	Rattlesnake Cr abv N.F. Rattlesnake Cr nr Nile	11-06-89	YK0126SF	1	94	8	D	D
					2	88	7	D	D
					3	70	4	D	D
					4	81	6	D	D
					5	78	4	D	D
					6	80	5	D	D
					7	82	6	D	D
					8	89	5	D	D
					9	96	7	D	D
					10	85	6	D	D
					Ave.	84	6		
41	12507594	Satus Cr abv Wilson-Charley Canyon nr Toppenish	11-09-89	YK0161SF	1	192	64	1	D
					2	200	70	1	D
					3	140	26	1	D
					4	135	22	1	D
					5	130	19	0	D
					6	149	27	0	D
					7	170	42	2	D
					8	180	50	2	D
					9	127	17	1	D
					10	115	13	1	D
					Ave.	154	35		

Table 27. Ancillary data, for composite biological samples, collected for analysis of trace-organic compounds, Yakima River basin, Washington, 1989-90--Continued

Map reference number	Station number	Station name	Sampling date	Field number	Organism				Number external abnormalities
					Number	Length (mm)	Weight (grams)	Age (years)	
			Mountain Whitefish						
4	12479500	Yakima River at Cle Elum	11-02-89	YK0067SF	1	313	245	4	D
					2	299	222	2	D
					3	312	208	3	D
					4	299	236	2	D
					5	301	271	3	D
					6	290	205	2	D
					7	313	285	2	D
					8	294	209	2	D
					9	320	304	2	D
					10	315	303	3	D
					Ave.	306	259		
4	12479500	Yakima River at Cle Elum	11-05-90	YK0303SF	1	295	268	4	0
					2	293	214	4	0
					3	339	301	4	0
					4	313	296	4	0
					5	312	244	4	0
					6	357	415	5	1
					7	287	224	4	0
					8	349	391	5	0
					9	310	272	4	0
					10	291	217	5	0
					Ave.	315	284		
14	12484500	Yakima River at Umtanum	11-07-89	YK0143SF	1	399	512	5	D
					2	349	346	2	D
					3	380	466	3	D
					4	356	393	3	D
					5	278	198	2	D
					6	260	170	2	D
					7	245	138	2	D
					8	187	52	1	D
					9	170	37	0	D
					10	184	51	0	D
					Ave.	281	236		
22	12499000	Naches River nr North Yakima	11-06-90	YK0332SF	1	406	658	4	0
					2	361	389	5	1
					3	384	303	4	0
					4	319	289	5	0
					5	338	405	5	2
					6	320	286	4	0
					7	290	238	5	0
					8	320	346	4	6
					9	321	338	5	2
					10	292	223	3	0
					Ave.	335	348		
24	12500430	Moxee Drain at Thorp Rd nr Union Gap	11-08-89	YK0154SF	1	132	16	1	D
					2	145	24	1	D
					3	135	19	1	D
					4	149	24	1	D
					5	148	25	1	D
					6	139	20	1	D
					7	159	34	1	D
					8	154	27	1	D
					9	131	19	1	D
					10	124	16	1	D
					Ave.	142	22		
40	12507585	Yakima River at RM 72 ab Satus Cr nr Sunnyside	11-01-89	YK0058SF	1	277	189	D	D
					2	274	189	D	D
					3	187	48	D	D
					4	268	162	D	D
					5	296	244	D	D
					6	269	168	D	D
					7	190	55	D	D
					8	174	43	D	D
					9	183	49	D	D
					10	176	40	D	D
					Ave.	229	119		
43	12508620	Satus Creek at gage at Satus	11-03-89	YK0076SF	1	184	51	1	D
					2	179	49	1	D
					3	184	48	1	D
					4	176	42	0	D
					5	161	33	1	D
					6	187	50	1	D
					7	180	50	0	D
					8	166	37	0	D
					9	172	44	0	D
					10	181	55	0	D
					Ave.	177	46		

Table 27. Ancillary data, for composite biological samples, collected for analysis of trace-organic compounds, Yakima River basin, Washington, 1989-90--Continued

Map reference number	Station number	Station name	Sampling date	Field number	Organism				Number external abnormalities
					Number	Length (mm)	Weight (grams)	Age (years)	
				Mountain Whitefish--Continued					
51	12510500	Yakima River at Kiona	10-31-89	YK0040SF	1	354	424	D	D
					2	425	626	D	D
					3	402	698	D	D
					4	343	420	D	D
					5	357	433	D	D
					6	366	489	D	D
					7	379	576	D	D
					8	359	446	D	D
					9	368	452	D	D
					10	350	425	D	D
					Ave.	370	499		
51	12510500	Yakima River at Kiona	11-10-90	YK0404SF	1	374	496	5	0
					2	388	667	6	1
					3	364	469	5	3
					4	345	367	4	0
					5	334	397	5	1
					6	382	535	5	1
					7	354	462	5	1
					8	371	491	5	1
					9	338	397	3	0
					10	370	378	4	1
					Ave.	362	466		
				Smallmouth Bass					
51	12510500	Yakima River at Kiona	10-31-89	YK0039SF	1	265	219	D	D
					2	202	108	D	D
					3	181	76	D	D
					4	253	207	D	D
					5	289	299	D	D
					6	299	311	D	D
					7	180	76	D	D
					8	233	152	D	D
					9	220	116	D	D
					10	307	346	D	D
					Ave.	243	191		
				Sculpin					
4	Yakima River at Cle Elum		11-05-90	YK0304SF	1	79	5	D	0
					2	76	6	D	0
					3	42	1	D	0
					4	41	1	D	0
					5	82	6	D	0
					6	89	10	D	0
					7	57	3	D	0
					8	87	8	D	0
					9	39	1	D	0
					10	68	4	D	0
					Ave.	66	5		
5	12479720	Jungle Creek nr mouth nr Cle Elum	05-02-89	YK0007OF	1	68	4	D	D
					2	78	6	D	D
					3	73	5	D	D
					4	80	6	D	D
					5	76	5	D	D
					6	71	4	D	D
					7	85	8	D	D
					8	67	3	D	D
					9	68	3	D	D
					10	67	3	D	D
					Ave.	73	5		
6	12479750	No Fk Teanaway R blw bridge at Dickey Creek Campgrnd	11-03-90	YK0268SF	1	110	17	D	0
					2	80	6	D	0
					3	66	3	D	0
					4	108	15	D	0
					5	72	4	D	0
					6	76	5	D	0
					7	78	6	D	0
					8	105	15	D	0
					9	54	2	D	0
					10	80	6	D	0
					Ave.	83	8		
8	12481900	Taneum Cr at Taneum Meadow nr Thorp	11-03-90	YK0265SF	1	121	24	D	0
					2	103	14	D	0
					3	92	11	D	0
					4	104	15	D	0
					5	115	21	D	0
					6	95	12	D	0
					7	92	11	D	0
					8	96	12	D	0
					9	85	9	D	0
					10	93	9	D	0
					Ave.	100	14		

Table 27. Ancillary data, for composite biological samples, collected for analysis of trace-organic compounds, Yakima River basin, Washington, 1989-90--Continued

Map reference number	Station number	Station name	Sampling date	Field number	Organism				Number external abnormalities
					Number	Length (mm)	Weight (grams)	Age (years)	
		Sculpin--Continued							
9	12483190	South Fork Manastash Cr nr Ellensburg	11-02-90	YK0240SF	1	98	9	D	0
					2	89	8	D	0
					3	93	10	D	0
					4	113	23	D	0
					5	76	6	D	0
					6	86	9	D	0
					7	82	6	D	0
					8	76	5	D	0
					9	71	5	D	0
					10	69	4	D	0
					Ave.	85	9		
10	12483750	Naneum Cr blw High Cr nr Ellensburg	11-02-90	YK0242SF	1	121	24	D	0
					2	103	15	D	0
					3	135	38	D	0
					4	78	5	D	0
					5	77	8	D	0
					6	94	10	D	0
					7	75	5	D	0
					8	80	7	D	0
					9	75	5	D	0
					10	74	5	D	0
					Ave.	91	12		
15	12484550	Umatanum Creek nr mouth at Umtanum	11-05-90	YK0297SF	1	71	4	D	0
					2	59	2	D	0
					3	55	2	D	0
					4	67	4	D	0
					5	82	7	D	0
					6	67	4	D	0
					7	58	2	D	0
					8	59	3	D	0
					9	61	2	D	0
					10	72	3	D	0
					Ave.	65	3		
17	12488250	American River at Hells Crossing nr Nile	11-01-90	YK0221SF	1	89	7	D	0
					2	72	5	D	0
					3	79	6	D	0
					4	74	5	D	0
					5	82	7	D	0
					6	94	12	D	0
					7	84	6	D	0
					8	79	5	D	0
					9	80	5	D	0
					10	74	5	D	0
					Ave.	81	6		
18	12489100	Rattlesnake Cr abv N.F. Rattlesnake Cr nr Nile	11-01-90	YK0225SF	1	110	18	D	0
					2	117	19	D	0
					3	79	5	D	0
					4	112	17	D	0
					5	103	10	D	0
					6	98	13	D	0
					7	74	5	D	0
					8	70	4	D	0
					9	75	6	D	0
					10	76	5	D	0
					Ave.	91	10		
29	12500900	S.F. Ahtanum Cr abv Conrad Rnch nr Tampico	11-06-90	YK0337SF	1	109	15	D	D
					2	110	21	D	D
					3	116	20	D	D
					4	108	14	D	D
					5	103	16	D	D
					6	96	11	D	D
					7	86	7	D	D
					8	110	14	D	D
					9	95	10	D	D
					10	118	22	D	D
					Ave.	105	15		
30	12502500	Ahtanum Creek at Union Gap	11-06-90	YK0348SF	1	93	10	D	0
					2	95	10	D	0
					3	126	28	D	0
					4	122	25	D	0
					5	109	15	D	0
					6	92	12	D	0
					7	99	14	D	0
					8	102	16	D	0
					9	96	10	D	0
					10	105	17	D	0
					Ave.	104	16		
41	12507594	Satus Cr abv Wilson-Charley Canyon nr Toppenish	11-07-90	YK0368SF	1	87	8	D	0
					2	90	10	D	0
					3	88	11	D	0
					4	83	7	D	0
					5	100	13	D	0
					6	112	20	D	0
					7	94	11	D	0
					8	92	11	D	0
					9	118	18	D	0
					10	90	9	D	0
					Ave.	95	12		

Table 27. Ancillary data, for composite biological samples, collected for analysis of trace-organic compounds, Yakima River basin, Washington, 1989-90--Continued

Map reference number	Station number	Station name	Sampling date	Field number	Organism				Number external abnormalities
					Number	Length (mm)	Weight (grams)	Age (years)	
				Sculpin--Continued					
43	12508500	Satus Cr below Dry Cr nr Toppenish	11-07-90	YK0355SF	1	77	6	D	0
					2	60	3	D	0
					3	55	2	D	0
					4	72	5	D	0
					5	79	6	D	0
					6	61	3	D	0
					7	62	3	D	0
					8	77	6	D	0
					9	64	4	D	0
					10	58	2	D	0
					Ave.	67	4		
43	12508620	Satus Creek at gage at Satus	11-07-90	YK0353SF	1	101	17	D	0
					2	78	7	D	0
					3	68	5	D	0
					4	84	9	D	0
					5	73	5	D	0
					6	75	6	D	0
					7	62	3	D	0
					8	82	8	D	0
					9	71	6	D	0
					10	82	8	D	0
					Ave.	78	7		
				Chisalmouth					
24	12500430	Moxee Drain at Thorp Rd nr Union Gap	10-31-90	YK0218SF	1	207	83	1	0
					2	202	73	2	0
					3	178	58	1	0
					4	199	68	2	0
					5	195	67	2	0
					6	192	63	1	0
					7	140	24	1	0
					Ave.	188	62		
46	12508850	Sulphur Cr Waateway nr Sunnyside	11-09-90	YK0401SF	1	142	25	1	0
					2	126	21	1	0
					3	149	27	1	0
					4	129	18	1	0
					5	129	18	1	0
					6	137	22	1	0
					7	141	23	1	0
					Ave.	136	22		
49	12509710	Spring Creek at mouth at Whitstran	10-30-89	YK0020SF	1	196	80	D	D
					2	196	72	D	D
					3	94	8	D	D
					4	110	13	D	D
					5	120	16	D	D
					6	109	14	D	D
					Ave.	138	34		
				Largescale Sucker					
13	12484480	Cherry Creek at Thrall	11-06-89	YK0122SF	1	269	193	1	D
					2	245	139	1	D
					3	229	131	1	D
					4	208	86	1	D
					5	203	92	1	D
					6	187	63	1	D
					7	151	29	0	D
					8	109	14	0	D
					9	176	53	1	D
					10	236	143	1	D
					Ave.	201	94		
14	12484500	Yakima River at Umtanum	11-05-90	YK0302SF	1	430	934	5	0
					2	468	1,108	5	0
					3	576	2,083	6	0
					4	563	1,865	6	0
					5	500	1,263	6	0
					6	528	1,386	6	0
					7	481	1,281	5	0
					8	539	1,500	5	0
					9	455	906	6	0
					10	477	1,240	5	0
					Ave.	502	1,357		

Table 27. Ancillary data, for composite biological samples, collected for analysis of trace-organic compounds, Yakima River basin, Washington, 1989-90--Continued

Map reference number	Station number	Station name	Sampling date	Field number	Organism				Number external abnormalities
					Number	Length (mm)	Weight (grams)	Age (years)	
				Largescale Sucker--Continued					
22	12499000	Naches River nr North Yakima	11-06-90	YK0331SF	1	347	801	5	0
					2	422	730	4	0
					3	436	762	4	0
					4	341	465	4	0
					5	509	1,076	7	0
					6	446	840	5	1
					7	449	833	5	0
					8	418	729	6	0
					9	449	923	5	1
					10	497	1,367	7	0
					Ave.	431	853		
24	12500430	Moxee Drain at Thorp Rd nr Union Gap	11-08-89	YK0157SF	1	222	105	2	D
					2	244	150	2	D
					3	226	117	2	D
					4	246	140	2	D
					5	222	106	1	D
					6	169	48	1	D
					7	129	24	0	D
					8	132	23	0	D
					Ave.	199	89		
26	12500442	Wide Hollow Cr at Old STP at Union Gap	11-05-90	YK0309SF	1	213	108	1	0
					2	219	94	1	0
					3	173	58	1	0
					4	169	40	D	0
					Ave.	194	75		
32	12503950	Yakima R at Parker	11-07-89	YK0141SF	1	456	912	2	1
					2	420	669	3	0
					3	399	613	3	0
					4	458	761	3	0
					5	454	777	5	0
					6	456	865	3	0
					7	404	479	3	0
					8	451	810	4	0
					9	422	609	4	0
					10	432	741	4	0
					Ave.	435	723		
32	12503950	Yakima R at Parker	11-06-90	YK0324SF	1	462	927	5	0
					2	529	1,097	6	0
					3	392	585	3	0
					4	435	790	5	0
					5	427	760	4	0
					6	430	635	4	4
					7	450	904	6	0
					8	426	711	5	0
					9	434	742	5	0
					10	447	781	6	4
					Ave.	443	793		
36	12505460	Granger Drain at mouth at Granger	11-03-89	YK0071SF	1	196	64	1	D
					2	196	62	1	D
					3	199	62	1	D
					4	190	54	1	D
					5	187	51	1	D
					6	186	58	1	D
					7	164	32	1	D
					8	163	31	1	D
					9	216	88	1	D
					Ave.	188	56		
38	12507508	Toppenish Cr at Indian Church Rd nr Granger	11-03-89	YK0073SF	1	396	604	3	D
					2	469	891	4	D
					3	424	768	6	D
					4	465	1,042	5	D
					5	376	525	3	D
					6	441	878	5	D
					7	480	1,072	5	D
					8	443	944	D	D
					9	453	957	D	D
					10	443	842	D	D
					Ave.	439	852		

Table 27. Ancillary data, for composite biological samples, collected for analysis of trace-organic compounds, Yakima River basin, Washington, 1989-90--Continued

Map reference number	Station number	Station name	Sampling date	Field number	Organism				Number external abnormalities
					Number	Length (mm)	Weight (grams)	Age (years)	
				Largescale Sucker--Continued					
39	12507525	Yakima R blw Toppenish Cr at RM 79.6 nr Granger	11-07-90	YK0372SF	1	397	708	4	0
					2	485	985	5	0
					3	508	1,137	5	0
					4	445	958	5	0
					5	395	653	6	0
					6	441	758	4	0
					7	445	858	4	0
					8	461	872	4	3
					9	444	884	4	0
					10	423	749	5	3
					Ave.	444	856		
40	12507585	Yakima River at RM 72 ab Satus Cr nr Sunnyside	11-01-89	YK0055SF	1	429	762	3	D
					2	432	776	2	D
					3	431	750	2	D
					4	375	537	1	D
					5	437	668	4	D
					6	339	351	1	D
					7	430	787	3	D
					8	435	808	2	D
					9	440	833	2	D
					10	434	773	2	D
					Ave.	418	704		
46	12508850	Sulphur Cr Wasteway nr Sunnyside	11-01-89	YK0052SF	1	473	951	3	D
					2	462	1,015	4	D
					3	515	1,238	4	D
					4	484	998	4	D
					5	431	817	3	D
					6	501	1,288	3	D
					7	203	94	1	D
					8	462	943	3	D
					9	491	1,113	4	D
					10	465	895	4	D
					Ave.	449	935		
47	12509050	Yakima R at Euclid Br at RM 55 nr Grandview	10-31-89	YK0047SF	1	475	1,287	4	D
					2	456	888	4	D
					3	453	753	3	D
					4	451	757	3	D
					5	520	1,421	2	D
					6	478	980	3	D
					7	461	854	2	D
					8	434	826	2	D
					9	536	1,454	4	D
					10	491	1,048	4	D
					Ave.	476	1,027		
47	12509050	Yakima R at Euclid Br at RM 55 nr Grandview	11-09-90	YK0400SF	1	513	1,199	5	1
					2	449	870	6	0
					3	494	1,010	6	0
					4	424	710	5	0
					5	394	623	5	2
					6	480	989	4	0
					7	440	773	5	1
					8	471	940	6	2
					9	473	1,051	4	0
					10	422	742	5	0
					Ave.	456	891		
51	12510500	Yakima River at Kiona	10-31-89	YK0041SF	1	396	597	D	0
					2	453	1,130	D	0
					3	453	1,011	D	0
					4	475	1,333	D	0
					5	484	1,293	D	0
					6	474	1,112	D	1
					7	400	706	D	0
					8	408	761	D	0
					9	508	1,292	D	0
					10	436	930	D	0
					Ave.	449	102		

Table 27. Ancillary data, for composite biological samples, collected for analysis of trace-organic compounds, Yakima River basin, Washington, 1989-90--Continued

Map reference number	Station number	Station name	Sampling date	Field number	Organism				Number external abnormalities
					Number	Length (mm)	Weight (grams)	Age (years)	
				Largescale Sucker--Continued					
51	12510500	Yakima River at Kiona	11-10-90	YK0402SF	1	471	1,049	4	0
					2	435	908	3	0
					3	493	1,051	4	0
					4	531	1,386	4	0
					5	532	1,525	6	2
					6	492	1,157	4	0
					7	556	1,771	8	0
					8	537	1,688	6	1
					9	461	908	5	0
					10	500	1,240	6	0
					Ave.	501	1,268		
51	12510500	Yakima River at Kiona	11-10-90	YK0403SF	1	471	1,051	5	2
					2	565	1,727	7	0
					3	510	1,244	6	0
					4	495	1,224	6	0
					5	560	1,984	7	0
					6	530	1,127	6	0
					7	460	950	5	2
					8	445	1,113	4	0
					9	520	1,609	5	1
					10	560	1,814	5	1
					Ave.	512	1,384		
				Bridgelip Sucker					
12	12484440	Cherry Creek abv. Wipple Wasteway at Thrall	10-31-90	YK0211SF	1	190	72	1	0
					2	174	65	1	0
					3	153	47	1	0
					4	166	66	1	0
					5	130	26	2	0
					6	138	31	1	0
					Ave.	159	51		
14	12484500	Yakima River at Umtanum	05-03-89	YK0015SF	1	374	595	D	D
					2	355	475	D	D
					3	392	610	D	D
					4	373	550	D	D
					5	268	535	D	D
					Ave.	352	553		
25	12500437	Wide Hollow Cr at W. Valley School nr Ahtanum	05-01-89	YK0001SF	1	240	180	D	D
					2	174	70	D	D
					3	186	100	D	D
					4	181	75	D	D
					5	160	60	D	D
					6	155	45	D	D
					7	179	70	D	D
					8	172	70	D	D
					9	168	70	D	D
					10	155	50	D	D
					Ave.	177	79		
26	12500442	Wide Hollow Creek at Old STP at Union Gap	11-08-89	YK0155SF	1	111	13	0	D
					2	155	38	0	D
					3	108	11	0	D
					4	102	11	0	D
					5	106	11	0	D
					6	119	16	0	D
					7	125	21	0	D
					8	156	34	0	D
					9	141	28	0	D
					Ave.	125	20		
36	12505460	Granger Drain at mouth nr Granger	11-08-90	YK0386SF	1	227	129	3	0
					2	220	117	2	0
					3	212	118	2	0
					4	223	120	3	0
					5	229	131	4	0
					6	216	106	6	0
					7	198	67	2	0
					8	211	95	3	0
					9	253	191	4	0
					10	201	85	3	0
					Ave.	219	116		
				Common Carp					
40	12507585	Yakima River at RM 72 ab Satus Cr nr Sunnyside	11-01-89	YK0056SF	1	552	2,126	D	D
					2	410	892	D	D
					3	463	1,486	D	D
					4	510	2,160	D	D
					5	438	1,197	D	D
					6	410	951	D	D
					7	393	750	D	D
					8	435	1,093	D	D
					9	458	1,376	D	D
					10	447	1,241	D	D
					Ave.	452	1,327		

Table 27. Ancillary data, for composite biological samples, collected for analysis of trace-organic compounds, Yakima River basin, Washington, 1989-90--Continued

Map reference number	Station number	Station name	Sampling date	Field number	Organism				Number external abnormalities
					Number	Langth (mm)	Weight (grams)	Age (years)	
				Asiatic Clam					
40	12507585	Yakima River at RM 72 ab Satus Cr nr Sunnyside	11-01-89	YK0100SM	1	30	D	D	NA
					2	33	D	D	NA
					3	30	D	D	NA
					4	31	D	D	NA
					5	19	D	D	NA
					6	27	D	D	NA
					7	37	D	D	NA
					8	25	D	D	NA
					9	30	D	D	NA
					10	24	D	D	NA
					11	30	D	D	NA
					12	39	D	D	NA
					13	25	D	D	NA
					14	24	D	D	NA
					15	30	D	D	NA
					16	24	D	D	NA
					17	28	D	D	NA
					18	25	D	D	NA
					19	36	D	D	NA
					20	22	D	D	NA
					21	23	D	D	NA
					22	23	D	D	NA
					23	31	D	D	NA
					24	23	D	D	NA
					25	27	D	D	NA
					26	26	D	D	NA
					27	24	D	D	NA
					28	24	D	D	NA
					29	30	D	D	NA
					30	28	D	D	NA
					31	28	D	D	NA
					32	24	D	D	NA
					33	26	D	D	NA
					34	23	D	D	NA
					35	29	D	D	NA
					36	28	D	D	NA
					37	24	D	D	NA
					38	18	D	D	NA
					39	24	D	D	NA
					40	25	D	D	NA
					41	33	D	D	NA
					42	23	D	D	NA
					43	25	D	D	NA
					44	23	D	D	NA
					45	24	D	D	NA
					Ave.	27			
40	12507585	Yakima River at RM 72 ab Satus Cr nr Sunnyside	11-01-89	YK0101SM	1	24	D	D	NA
					2	20	D	D	NA
					3	22	D	D	NA
					4	22	D	D	NA
					5	25	D	D	NA
					6	18	D	D	NA
					7	33	D	D	NA
					8	22	D	D	NA
					9	24	D	D	NA
					10	18	D	D	NA
					11	30	D	D	NA
					12	26	D	D	NA
					13	23	D	D	NA
					14	27	D	D	NA
					15	22	D	D	NA
					16	23	D	D	NA
					17	29	D	D	NA
					18	26	D	D	NA
					19	23	D	D	NA
					20	26	D	D	NA
					21	26	D	D	NA
					22	28	D	D	NA
					23	22	D	D	NA
					24	29	D	D	NA
					25	22	D	D	NA
					26	28	D	D	NA
					27	23	D	D	NA
					28	22	D	D	NA
					29	32	D	D	NA
					30	24	D	D	NA
					31	33	D	D	NA
					32	24	D	D	NA
					33	24	D	D	NA
					34	22	D	D	NA
					35	24	D	D	NA
					36	23	D	D	NA
					37	25	D	D	NA
					38	28	D	D	NA
					39	32	D	D	NA
					40	28	D	D	NA
					41	24	D	D	NA
					42	23	D	D	NA
					43	23	D	D	NA
					44	24	D	D	NA
					45	31	D	D	NA
					Ave.	25			
40	12507585	Yakima River at RM 72 ab Satus Cr nr Sunnyside	11-01-89	YK0102SM	1-?	-	D	D	NA
40	12507585	Yakima River at RM 72 ab Satus Cr nr Sunnyside	11-01-89	YK0103SM	1-?	-	D	D	NA

Table 27. Ancillary data, for composite biological samples, collected for anelysis of trace-organic compounds, Yakima River basin, Washington, 1989-90--Continued

Map reference number	Station number	Station name	Sampling date	Field number	Organism				Number external abnormalities
					Number	Length (mm)	Weight (grams)	Age (years)	
				Asiatic Clam--Continued					
47	12509050	Yakima R at Euclid Br at RM 55 nr Grandview	10-31-89	YK0082SM	1	14	D	D	NA
					2	27	D	D	NA
					3	20	D	D	NA
					4	17	D	D	NA
					5	15	D	D	NA
					6	17	D	D	NA
					7	20	D	D	NA
					8	20	D	D	NA
					9	16	D	D	NA
					10	17	D	D	NA
					11	36	D	D	NA
					12	28	D	D	NA
					13	34	D	D	NA
					14	27	D	D	NA
					15	33	D	D	NA
					16	40	D	D	NA
					17	30	D	D	NA
					18	27	D	D	NA
					19	26	D	D	NA
					20	26	D	D	NA
					21	21	D	D	NA
					22	27	D	D	NA
					23	21	D	D	NA
					24	20	D	D	NA
					25	19	D	D	NA
					26	26	D	D	NA
					27	27	D	D	NA
					26	23	D	D	NA
					29	27	D	D	NA
					30	26	D	D	NA
					31	20	D	D	NA
					32	24	D	D	NA
					33	14	D	D	NA
					34	24	D	D	NA
					35	22	D	D	NA
					36	18	D	D	NA
					37	19	D	D	NA
					38	21	D	D	NA
					39	18	D	D	NA
					40	20	D	D	NA
					41	15	D	D	NA
					42	14	D	D	NA
					43	16	D	D	NA
					44	15	D	D	NA
					45	16	D	D	NA
					Ave.	22			
47	12509050	Yakima R at Euclid Br at RM 55 nr Grandview	10-31-89	YK0085SM	1	15	D	D	NA
					2	18	D	D	NA
					3	15	D	D	NA
					4	17	D	D	NA
					5	17	D	D	NA
					6	15	D	D	NA
					7	17	D	D	NA
					8	16	D	D	NA
					9	18	D	D	NA
					10	17	D	D	NA
					11	28	D	D	NA
					12	28	D	D	NA
					13	33	D	D	NA
					14	25	D	D	NA
					15	24	D	D	NA
					16	31	D	D	NA
					17	29	D	D	NA
					18	35	D	D	NA
					19	22	D	D	NA
					20	26	D	D	NA
					21	25	D	D	NA
					22	27	D	D	NA
					23	25	D	D	NA
					24	27	D	D	NA
					25	25	D	D	NA
					26	23	D	D	NA
					27	21	D	D	NA
					28	23	D	D	NA
					29	21	D	D	NA
					30	22	D	D	NA
					31	21	D	D	NA
					32	19	D	D	NA
					33	23	D	D	NA
					34	18	D	D	NA
					35	18	D	D	NA
					36	23	D	D	NA
					37	18	D	D	NA
					38	18	D	D	NA
					39	18	D	D	NA
					40	17	D	D	NA
					41	16	D	D	NA
					42	16	D	D	NA
					43	13	D	D	NA
					44	15	D	D	NA
					45	14	D	D	NA
					Ave.	22			

Table 27. Ancillary data, for composite biological samples, collected for analysis of trace-organic compounds, Yakima River basin, Washington, 1989-90--Continued

Map reference number	Station number	Station name	Sampling date	Field number	Organism				Number external abnormalities
					Number	Length (mm)	Weight (grams)	Age (years)	
				Asiatic Clam--Continued					
47	12509050	Yakima R at Euclid Br at RM 55 nr Grandview	11-04-90	YK0375SM	1	29	D	D	NA
					2	26	D	D	NA
					3	22	D	D	NA
					4	25	D	D	NA
					5	21	D	D	NA
					6	27	D	D	NA
					7	27	D	D	NA
					8	25	D	D	NA
					9	25	D	D	NA
					10	21	D	D	NA
					11	22	D	D	NA
					12	19	D	D	NA
					13	23	D	D	NA
					14	21	D	D	NA
					15	22	D	D	NA
					16	24	D	D	NA
					17	24	D	D	NA
					18	23	D	D	NA
					19	22	D	D	NA
					20	21	D	D	NA
					21	21	D	D	NA
					22	20	D	D	NA
					23	21	D	D	NA
					24	21	D	D	NA
					25	20	D	D	NA
					26	19	D	D	NA
					27	25	D	D	NA
					28	25	D	D	NA
					29	22	D	D	NA
					30	26	D	D	NA
					31	20	D	D	NA
					32	22	D	D	NA
					33	23	D	D	NA
					34	22	D	D	NA
					35	22	D	D	NA
					36	21	D	D	NA
					37	23	D	D	NA
					38	16	D	D	NA
					39	16	D	D	NA
					40	20	D	D	NA
					41	18	D	D	NA
					42	17	D	D	NA
					43	24	D	D	NA
					44	22	D	D	NA
					45	26	D	D	NA
					Ave.	22	D		
49	12509710	Spring Creek at mouth at Whitstran	10-31-89	YK0080SM	1	18	D	D	NA
					2	17	D	D	NA
					3	17	D	D	NA
					4	16	D	D	NA
					5	16	D	D	NA
					6	17	D	D	NA
					7	16	D	D	NA
					8	18	D	D	NA
					9	17	D	D	NA
					10	16	D	D	NA
					11	26	D	D	NA
					12	22	D	D	NA
					13	25	D	D	NA
					14	24	D	D	NA
					15	22	D	D	NA
					16	26	D	D	NA
					17	22	D	D	NA
					18	21	D	D	NA
					19	23	D	D	NA
					20	21	D	D	NA
					21	22	D	D	NA
					22	23	D	D	NA
					23	22	D	D	NA
					24	23	D	D	NA
					25	22	D	D	NA
					26	20	D	D	NA
					27	22	D	D	NA
					28	20	D	D	NA
					29	18	D	D	NA
					30	20	D	D	NA
					31	19	D	D	NA
					32	18	D	D	NA
					33	18	D	D	NA
					34	18	D	D	NA
					35	17	D	D	NA
					36	18	D	D	NA
					37	17	D	D	NA
					38	19	D	D	NA
					39	16	D	D	NA
					40	16	D	D	NA
					41	15	D	D	NA
					42	17	D	D	NA
					43	13	D	D	NA
					44	16	D	D	NA
					45	13	D	D	NA
					Ave.	19			

Table 27. Ancillary data, for composite biological samples, collected for analysis of trace-organic compounds, Yakima River basin, Washington, 1989-90--Continued

Map reference number	Station number	Station name	Sampling date	Field number	Organism				Number external abnormalities
					Number	Length (mm)	Weight (grams)	Age (years)	
				Asiatic Clam--Continued					
49	12509710	Spring Creek at mouth at Whitstran	11-08-90	YK0408SM	1	23	D	D	NA
					2	23	D	D	NA
					3	21	D	D	NA
					4	21	D	D	NA
					5	26	D	D	NA
					6	18	D	D	NA
					7	20	D	D	NA
					8	18	D	D	NA
					9	17	D	D	NA
					10	18	D	D	NA
					11	22	D	D	NA
					12	23	D	D	NA
					13	21	D	D	NA
					14	19	D	D	NA
					15	23	D	D	NA
					16	20	D	D	NA
					17	21	D	D	NA
					18	30	D	D	NA
					19	22	D	D	NA
					20	16	D	D	NA
					21	28	D	D	NA
					22	26	D	D	NA
					23	22	D	D	NA
					24	19	D	D	NA
					25	21	D	D	NA
					26	18	D	D	NA
					27	19	D	D	NA
					28	17	D	D	NA
					29	23	D	D	NA
					30	25	D	D	NA
					31	12	D	D	NA
					32	13	D	D	NA
					33	23	D	D	NA
					34	21	D	D	NA
					35	20	D	D	NA
					36	19	D	D	NA
					37	24	D	D	NA
					38	26	D	D	NA
					39	18	D	D	NA
					40	20	D	D	NA
					41	21	D	D	NA
					42	22	D	D	NA
					43	26	D	D	NA
					44	23	D	D	NA
					45	21	D	D	NA
					46	20	D	D	NA
					47	27	D	D	NA
					Ave.	21	D		
51	12510500	Yakima River at Kiona	10-30-89	YK0115SM	1	21	D	D	NA
					2	19	D	D	NA
					3	17	D	D	NA
					4	16	D	D	NA
					5	17	D	D	NA
					6	16	D	D	NA
					7	16	D	D	NA
					8	22	D	D	NA
					9	22	D	D	NA
					10	25	D	D	NA
					11	22	D	D	NA
					12	20	D	D	NA
					13	19	D	D	NA
					14	20	D	D	NA
					15	17	D	D	NA
					16	17	D	D	NA
					17	19	D	D	NA
					18	18	D	D	NA
					19	17	D	D	NA
					20	15	D	D	NA
					21	17	D	D	NA
					22	20	D	D	NA
					23	19	D	D	NA
					24	19	D	D	NA
					25	20	D	D	NA
					26	24	D	D	NA
					27	18	D	D	NA
					28	18	D	D	NA
					29	17	D	D	NA
					30	16	D	D	NA
					31	19	D	D	NA
					32	17	D	D	NA
					33	18	D	D	NA
					34	16	D	D	NA
					35	16	D	D	NA
					36	16	D	D	NA
					37	16	D	D	NA
					38	16	D	D	NA
					39	18	D	D	NA
					40	16	D	D	NA
					41	16	D	D	NA
					42	17	D	D	NA
					43	14	D	D	NA
					44	14	D	D	NA
					45	12	D	D	NA
					Ave.	18			

Table 27. Ancillary data, for composite biological samples, collected for analysis of trace-organic compounds, Yakima River basin, Washington, 1989-90--Continued

Map reference number	Station number	Station name	Sampling date	Field number	Organism				Number external abnormalities
					Number	Length (mm)	Weight (grams)	Age (years)	
				Asiatic Clam--Continued					
51	12510500	Yakima River at Kiona	10-30-89	YK0116SM	1	16	D	D	NA
					2	16	D	D	NA
					3	19	D	D	NA
					4	19	D	D	NA
					5	16	D	D	NA
					6	20	D	D	NA
					7	14	D	D	NA
					8	16	D	D	NA
					9	16	D	D	NA
					10	19	D	D	NA
					11	28	D	D	NA
					12	19	D	D	NA
					13	19	D	D	NA
					14	17	D	D	NA
					15	17	D	D	NA
					16	19	D	D	NA
					17	16	D	D	NA
					18	17	D	D	NA
					19	16	D	D	NA
					20	20	D	D	NA
					21	20	D	D	NA
					22	27	D	D	NA
					23	18	D	D	NA
					24	19	D	D	NA
					25	17	D	D	NA
					26	21	D	D	NA
					27	17	D	D	NA
					28	23	D	D	NA
					29	18	D	D	NA
					30	16	D	D	NA
					31	19	D	D	NA
					32	19	D	D	NA
					33	18	D	D	NA
					34	16	D	D	NA
					35	15	D	D	NA
					36	15	D	D	NA
					37	15	D	D	NA
					38	20	D	D	NA
					39	16	D	D	NA
					40	20	D	D	NA
					41	18	D	D	NA
					42	18	D	D	NA
					43	20	D	D	NA
					44	16	D	D	NA
					45	19	D	D	NA
					Ave.	18			
51	12510500	Yakima River at Kiona	11-04-90	YK0367SM	1	23	D	D	NA
					2	24	D	D	NA
					3	24	D	D	NA
					4	19	D	D	NA
					5	20	D	D	NA
					6	18	D	D	NA
					7	28	D	D	NA
					8	22	D	D	NA
					9	22	D	D	NA
					10	22	D	D	NA
					11	23	D	D	NA
					12	20	D	D	NA
					13	22	D	D	NA
					14	19	D	D	NA
					15	26	D	D	NA
					16	24	D	D	NA
					17	21	D	D	NA
					18	22	D	D	NA
					19	19	D	D	NA
					20	19	D	D	NA
					21	19	D	D	NA
					22	18	D	D	NA
					23	19	D	D	NA
					24	18	D	D	NA
					25	16	D	D	NA
					26	18	D	D	NA
					27	20	D	D	NA
					28	23	D	D	NA
					29	20	D	D	NA
					30	19	D	D	NA
					31	19	D	D	NA
					32	23	D	D	NA
					33	17	D	D	NA
					34	17	D	D	NA
					35	18	D	D	NA
					36	18	D	D	NA
					37	18	D	D	NA
					38	21	D	D	NA
					39	18	D	D	NA
					40	18	D	D	NA
					41	17	D	D	NA
					42	16	D	D	NA
					43	16	D	D	NA
					44	17	D	D	NA
					45	16	D	D	NA
					46	14	D	D	NA

Table 27. Ancillary data, for composite biological samples, collected for analysis of trace-organic compounds, Yakima River basin, Washington, 1989-90--Continued

Map reference number	Station number	Station name	Sampling date	Field number	Organism				Number external abnormalities
					Number	Length (mm)	Weight (grams)	Age (years)	
				Asiatic Clam--Continued					
					47	15	D	D	NA
					48	17	D	D	NA
					49	18	D	D	NA
					50	18	D	D	NA
					51	17	D	D	NA
					52	14	D	D	NA
					53	16	D	D	NA
					54	16	D	D	NA
					55	16	D	D	NA
					56	15	D	D	NA
					57	14	D	D	NA
					58	19	D	D	NA
					59	16	D	D	NA
					Ave.	19	D		
				Western Pearlshell					
14	12484500	Yakima River at Umtanum	11-01-89	YK0111SM	1	127	D	D	NA
					2	124	D	D	NA
					3	111	D	D	NA
					4	117	D	D	NA
					5	113	D	D	NA
					6	111	D	D	NA
					7	119	D	D	NA
					8	123	D	D	NA
					9	118	D	D	NA
					10	117	D	D	NA
					Ave.	117			
14	12484500	Yakima River at Umtanum	11-05-90	YK0393SM	1	134	D	D	NA
					2	128	D	D	NA
					3	125	D	D	NA
					4	118	D	D	NA
					5	126	D	D	NA
					Ave.	126	D		
				Crayfish					
15	12484550	Umtanum Creek nr mouth at Umtanum	05-03-89	YK0013SD	1-20	D	D	D	NA
25	12500437	Wide Hollow Cr at W. Valley School nr Ahtanum	05-01-89	YK0003SD	1-20	D	D	D	NA
49	12509710	Spring Creek at mouth at Whitstran	10-30-89	YK0022SD	1-?	D	D	D	NA
				Coontail					
38	12507508	Toppenish Creek at Indian Church Rd nr Granger	11-03-89	YK0079SP	1-?	D	D	NA	NA
51	12510500	Yakima River at Kiona	10-30-89	YK0034SP	1-?	D	D	NA	NA
				Curlyleaf Pondweed					
13	12484480	Cherry Creak at Thrall	11-06-89	YK0139SP	1-?	D	D	NA	NA
14	12484500	Yakima River at Umtanum	11-05-89	YK0118SP	1-?	D	D	NA	NA
24	12500430	Moxee Drain at Thorp Rd nr Union Gap	11-04-89	YK0093SP	1-?	D	D	NA	NA
26	12500442	Wide Hollow Creek at Old STP at Union Gap	11-04-89	YK0096SP	1-?	D	D	NA	NA
32	12503950	Yakima R at Parker	11-04-89	YK0094SP	1-?	D	D	NA	NA
40	12507585	Yakima River at RM 72 ab Satus Cr nr Sunnyside	11-01-89	YK0060SP	1-?	D	D	NA	NA
43	12508620	Satus Creek at gage at Satus	11-03-89	YK0091SP	1-?	D	D	NA	NA
47	12509050	Yakima River at Euclid Br at RM 55 nr Grandview	10-31-89	YK0045SP	1-?	D	D	NA	NA
				Waterweed					
26	12500430	Wide Hollow Creek at Old STP at Union Gap	11-04-89	YK0098SP	1-?	-	-	NA	NA
38	12507508	Toppenish Creek at Indian Church Rd nr Granger	11-03-89	YK0088SP	1-?	-	-	NA	NA
43	12508620	Satus Creek at gage at Satus	11-03-89	YK0092SP	1-?	-	-	NA	NA
49	12509710	Spring Creek at mouth at Whitstran	10-30-89	YK0036SP	1-?	-	-	NA	NA

Table 28. Concentrations of organochlorine compounds in aquatic biota, Yakima River basin, Washington, 1989-90

[Concentrations in micrograms per kilogram; wet weight; whole fish were analyzed; DDD = dichlorodiphenyldichloroethane; DDE = dichlorodiphenyldichloroethylene; DDT = dichlorodiphenyltrichloroethane; PCBs = polychlorinated biphenyls; "--" = not analyzed; see figure 1 for site locations]

Map reference number	Station number	Station name	Date	Field number	Moisture, in percent	Lipid, in percent
		Rainbow Trout				
1	12478100	Waptus River at mouth nr Roslyn	11-02-89	YK0065SF	76.0	3.48
5	12479720	Jungle Creek nr mouth nr Cle Elum	05-02-89	YK0005SF	78.0	1.80
7	12480000	Teanaway River below forks near Cle Elum	11-06-89	YK0124SF	78.0	2.22
15	12484550	Umtanum Creek nr mouth at Umtanum	05-03-89	YK0011SF	79.0	1.68
15	12484550	Umtanum Creek nr mouth at Umtanum	11-07-89	YK0145SF	76.0	4.10
16	12487200	Little Naches River at mouth nr Cliffdell	10-30-90	YK0201SF	76.4	4.56
18	12489100	Rattlesnake Cr abv N.F. Rattlesnake Cr nr Nile	11-06-89	YK0126SF	75.0	4.58
41	12507594	Satus Cr abv Wilson-Charley Canyon nr Toppenish	11-09-89	YK0161SF	75.5	3.68
		Mountain Whitefish				
4	12479500	Yakima River at Cle Elum	11-02-89	YK0067SF	74.0	6.64
		Yakima River at Cle Elum	11-05-90	YK0303SF	72.2	5.84
14	12484500	Yakima River at Umtanum	11-07-89	YK0143SF	72.2	5.92
22	12499000	Naches River nr North Yakima	11-06-90	YK0332SF	73.0	5.56
24	12500430	Moxee Drain at Thorp Rd nr Union Gap	11-08-89	YK0154SF	73.0	6.80
40	12507585	Yakima River at RM 72 ab Satus Cr nr Sunnyside	11-01-89	YK0058SF	71.5	7.54
43	12508620	Satus Creek at gage at Satus	11-03-89	YK0076SF	72.4	6.64
51	12510500	Yakima River at Kiona	10-31-89	YK0040SF	71.0	6.90
51	12510500	Yakima River at Kiona	11-10-90	YK0404SF	70.0	7.91
		Smallmouth Bass				
51	12510500	Yakima River at Kiona	10-31-89	YK0039SF	76.0	2.88
		Sculpin				
4	12479500	Yakima River at Cle Elum	11-05-90	YK0304SF	78.2	2.08
5	12479720	Jungle Creek nr mouth nr Cle Elum	05-02-89	YK0007SF	75.5	1.76
6	12479750	No Fk Teanaway R blw bridge at Dickey Creek Campgrnd	11-03-90	YK0268SF	81.8	1.49
8	12481900	Taneum Cr at Taneum Meadow nr Thorp	11-03-90	YK0265SF	83.4	1.40
9	12483190	South Fork Manastash Cr nr Ellensburg	11-02-90	YK0240SF	84.8	1.95
10	12483750	Naneum Cr blw High Cr nr Ellensburg	11-02-90	YK0242SF	80.4	1.54
15	12484550	Umtanum Creek nr mouth at Umtanum	11-05-90	YK0297SF	76.6	1.19
17	12488250	American River at Hells Crossing nr Nile	11-01-90	YK0221SF	78.0	1.67
18	12489100	Rattlesnake Cr abv N.F. Rattlesnake Cr nr Nile	11-01-90	YK0225SF	80.2	1.28
29	12500900	S. F. Ahtanum Cr abv Conrad Rnch nr Tampico	11-06-90	YK0337SF	80.8	1.43
30	12502500	Ahtanum Creek at Union Gap	11-06-90	YK0348SF	80.8	1.83
41	12507594	Satus Cr abv Wilson-Charley Canyon nr Toppenish	11-07-90	YK0368SF	80.0	1.63
42	12508500	Satus Creek below Dry Cr nr Toppenish	11-07-90	YK0355SF	77.6	2.30
43	12508620	Satus Creek at gage at Satus	11-07-90	YK0353SF	78.0	4.65
		Chiselmouth				
24	12500430	Moxee Drain at Thorp Rd nr Union Gap	10-31-90	YK0218SF	72.6	6.69
46	12508850	Sulphur Cr Wasteway nr Sunnyside	11-09-90	YK0401SF	76.0	6.71
49	12509710	Spring Creek at mouth at Whitstran	10-30-89	YK0020SF	73.5	7.90
		Largescale Sucker				
13	12484480	Cherry Creek at Thrall	11-06-89	YK0122SF	75.5	5.94
14	12484500	Yakima River at Umtanum	11-05-90	YK0302SF	72.6	6.64
22	12499000	Naches River nr North Yakima	11-06-90	YK0331SF	75.4	4.71
24	12500430	Moxee Drain at Thorp Rd nr Union Gap	11-08-89	YK0157SF	77.4	3.90
26	12500442	Wide Hollow Cr at Old STP at Union Gap	11-05-90	YK0309SF	76.8	2.79
32	12503950	Yakima R at Parker	11-07-89	YK0141SF	75.2	3.60
32	12503950	Yakima R at Parker	11-06-90	YK0324SF	77.8	3.10
36	12505460	Granger Drain at mouth nr Granger	11-03-89	YK0071SF	75.0	3.66
38	12507508	Toppenish Cr at Indian Church Rd nr Granger	11-03-89	YK0073SF	76.0	5.06
39	12507525	Yakima R blw Toppenish Cr at RM 79.6 nr Granger	11-07-90	YK0372SF	76.2	8.15
40	12507585	Yakima River at RM 72 ab Satus Cr nr Sunnyside	11-01-89	YK0055SF	74.5	7.12
46	12508850	Sulphur Cr Wasteway nr Sunnyside	11-01-89	YK0052SF	72.0	8.96
47	12509050	Yakima R at Euclid Br at RM 55 nr Grandview	10-31-89	YK0047SF	73.5	7.56
47	12509050	Yakima R at Euclid Br at RM 55 nr Grandview	11-09-90	YK0400SF	75.0	5.30
51	12510500	Yakima River at Kiona	10-31-89	YK0041SF	70.0	11.6
51	12510500	Yakima River at Kiona	11-10-90	YK0402SF	70.6	7.99
51	12510500	Yakima River at Kiona	11-10-90	YK0403SF	67.6	11.6

Table 28. Concentrations of organochlorine compounds in aquatic biota, Yakima River basin, Washington, 1989-90--Continued

Map reference number	Station number	Field number	cis-Chlordane	trans-Chlordane	Oxy-chlordane	Hepta-chlor epoxide	cis-Nonachlor	trans-Nonachlor
				Rainbow Trout				
1	12478100	YK0065SF	<10	<10	<10	<10	<10	<10
5	12479720	YK0005SF	<10	<10	<10	<10	<10	<10
7	12480000	YK0124SF	<10	<10	<10	<10	<10	<10
15	12484550	YK0011SF	<10	<10	<10	<10	<10	<10
15	12484550	YK0145SF	<10	<10	<10	<10	<10	<10
16	12487200	YK0201SF	<10	<10	<10	<10	<10	<10
18	12489100	YK0126SF	<10	<10	<10	<10	<10	<10
41	12507594	YK0161SF	<10	<10	<10	<10	<10	<10
				Mountain Whitefish				
4	12479500	YK0067SF	<10	<10	<10	<10	<10	<10
4	12479500	YK0303SF	10	<10	<10	<10	<10	10
14	12484500	YK0143SF	<10	<10	<10	<10	<10	<10
22	12499000	YK0332SF	<10	<10	10	10	<10	10
24	12500430	YK0154SF	10	<10	<10	<10	<10	10
40	12507585	YK0058SF	10	<10	<10	<10	<10	10
43	12508620	YK0076SF	<10	<10	<10	<10	<10	<10
51	12510500	YK0040SF	30	<10	<10	<10	<10	20
51	12510500	YK0404SF	10	10	10	10	<10	20
				Smallmouth Bass				
51	12510500	YK0039SF	<10	<10	<10	<10	<10	<10
				Sculpin				
4	12479500	YK0304SF	<10	<10	<10	<10	<10	<10
5	12479720	YK0007SF	<10	<10	<10	<10	<10	<10
6	12479750	YK0268SF	<10	<10	<10	<10	<10	<10
8	12481900	YK0265SF	<10	<10	<10	<10	<10	<10
9	12483190	YK0240SF	<10	<10	<10	<10	<10	<10
10	12483750	YK0242SF	<10	<10	<10	<10	<10	<10
15	12484550	YK0297SF	<10	<10	<10	<10	<10	<10
17	12488250	YK0221SF	<10	<10	<10	<10	<10	<10
18	12489100	YK0225SF	<10	<10	<10	<10	<10	<10
29	12500900	YK0337SF	<10	<10	<10	<10	<10	<10
30	12502500	YK0348SF	<10	<10	<10	<10	<10	<10
41	12507594	YK0368SF	<10	<10	<10	<10	<10	<10
42	12508500	YK0355SF	<10	<10	<10	<10	<10	<10
43	12508620	YK0353SF	<10	<10	<10	10	<10	<10
				Chiselmouth				
24	12500430	YK0218SF	20	<10	<10	10	<10	10
46	12508850	YK0401SF	10	<10	<10	<10	<10	10
49	12509710	YK0020SF	<10	<10	<10	<10	<10	<10
				Largescale Sucker				
13	12484480	YK0122SF	<10	<10	<10	<10	<10	<10
14	12484500	YK0302SF	10	<10	10	10	<10	10
22	12499000	YK0331SF	10	<10	<10	<10	<10	<10
24	12500430	YK0157SF	<10	<10	<10	<10	<10	<10
26	12500442	YK0309SF	10	<10	<10	<10	<10	10
32	12503950	YK0141SF	<10	<10	<10	<10	<10	<10
		YK0324SF	10	<10	<10	<10	<10	10
36	12505460	YK0071SF	<10	<10	<10	<10	<10	<10
38	12507508	YK0073SF	<10	<10	<10	<10	<10	<10
39	12507525	YK0372SF	10	<10	<10	<10	<10	10
40	12507585	YK0055SF	10	<10	<10	<10	<10	10
46	12508850	YK0052SF	40	<10	<10	<10	<10	30
47	12509050	YK0047SF	20	<10	<10	<10	<10	20
47	12509050	YK0400SF	20	10	10	10	<10	20
51	12510500	YK0041SF	20	<10	<10	<10	<10	20
51	12510500	YK0402SF	20	10	10	10	<10	30
51	12510500	YK0403SF	30	10	20	20	<10	40

Table 28. Concentrations of organochlorine compounds in aquatic biota, Yakima River basin, Washington, 1989-90--Continued

Map reference number	Station number	Field number	o,p'-DDD	p,p'-DDD	o,p'-DDE	p,p'-DDE	o,p'-DDT	p,p'-DDT
				Rainbow Trout				
1	12478100	YK0065SF	<10	<10	<10	10	<10	<10
5	12479720	YK0005SF	<10	<10	<10	10	<10	<10
7	12480000	YK0124SF	<10	<10	<10	10	<10	<10
15	12484550	YK0011SF	<10	<10	<10	30	<10	<10
15	12484550	YK0145SF	<10	<10	<10	50	<10	<10
16	12487200	YK0201SF	<10	<10	<10	20	<10	<10
16	12489100	YK0126SF	<10	<10	<10	10	<10	<10
41	12507594	YK0161SF	<10	<10	<10	10	<10	<10
				Mountain Whitefish				
4	12479500	YK0067SF	<10	10	<10	70	<10	30
4	12479500	YK0303SF	70	10	<10	70	<10	10
14	12484500	YK0143SF	<10	10	<10	160	<10	40
22	12499000	YK0332SF	10	60	10	590	<10	80
24	12500430	YK0154SF	20	70	<10	830	40	110
40	12507585	YK0058SF	20	90	<10	1,000	<10	110
43	12508620	YK0076SF	<10	10	<10	90	<10	30
51	12510500	YK0040SF	<10	170	<10	1,500	<10	<10
51	12510500	YK0404SF	40	230	30	1,600	<10	70
				Smallmouth Bass				
51	12510500	YK0039SF	<10	90	<10	560	<10	<10
				Sculpin				
4	12479500	YK0304SF	<10	<10	<10	<10	<10	<10
5	12479720	YK0007SF	<10	<10	<10	<10	<10	<10
6	12479750	YK0268SF	<10	<10	<10	<10	<10	<10
8	12481900	YK0265SF	<10	<10	<10	<10	<10	<10
9	12483190	YK0240SF	<10	<10	<10	<10	<10	<10
10	12483750	YK0242SF	<10	<10	<10	<10	<10	<10
15	12484550	YK0297SF	<10	<10	<10	10	<10	<10
17	12488250	YK0221SF	<10	<10	<10	<10	<10	<10
18	12489100	YK0225SF	<10	<10	<10	<10	<10	<10
29	12500900	YK0337SF	<10	<10	<10	<10	<10	<10
30	12502500	YK0348SF	<10	20	<10	90	<10	<10
41	12507594	YK0368SF	<10	<10	<10	<10	<10	<10
42	12508500	YK0355SF	<10	<10	<10	10	<10	<10
43	12508620	YK0353SF	<10	10	<10	60	<10	10
				Chiselmouth				
24	12500430	YK0218SF	10	50	20	360	<10	10
46	12508850	YK0401SF	30	130	20	1,200	<10	30
49	12509710	YK0020SF	<10	<10	<10	480	<10	<10
				Largescale Sucker				
13	12484480	YK0122SF	<10	<10	<10	50	<10	<10
14	12484500	YK0302SF	<10	30	10	210	10	50
22	12499000	YK0331SF	10	50	<10	410	<10	70
24	12500430	YK0157SF	<10	70	<10	530	<10	160
26	12500442	YK0309SF	20	80	10	270	<10	20
32	12503950	YK0141SF	10	60	<10	420	<10	80
32	12503950	YK0324SF	10	70	<10	620	<10	110
36	12505460	YK0071SF	30	150	<10	1,500	<10	260
38	12507508	YK0073SF	20	110	<10	1,000	<10	150
39	12507525	YK0372SF	20	140	20	1,400	<10	210
40	12507585	YK0055SF	40	210	<10	1,800	<10	270
46	12508850	YK0052SF	70	410	<10	3,400	<10	960
47	12509050	YK0047SF	50	290	<10	2,500	<10	370
47	12509050	YK0400SF	60	420	30	2.500	<10	460
51	12510500	YK0041SF	40	190	<10	1,800	<10	240
51	12510500	YK0402SF	40	300	30	2,000	<10	190
51	12510500	YK0403SF	50	390	30	2,200	<10	220

Table 28. Concentrations of organochlorine compounds in aquatic biota, Yakima River basin, Washington, 1989-90--Continued

Map reference number	Station number	Field number	Hexachloro-benzene	a-Hexachloro-cyclohexane	b-Hexachloro-cyclohexane	g-Hexachloro-cyclohexane (lindane)	d-Hexachloro-cyclohexane	Toxaphene
				Rainbow Trout				
1	12478100	YK0065SF	<10	<10	<10	<10	<10	<50
5	12479720	YK0005SF	<10	<10	<10	<10	<10	<50
7	12480000	YK0124SF	<10	<10	<10	<10	<10	<50
15	12484550	YK0011SF	<10	<10	<10	<10	<10	<50
15	12484550	YK0145SF	<10	<10	<10	<10	<10	<50
16	12487200	YK0201SF	<10	<10	<10	<10	<10	<50
18	12489100	YK0126SF	<10	<10	<10	<10	<10	<50
41	12507594	YK0161SF	<10	<10	<10	<10	<10	<50
				Mountain Whitefish				
4	12479500	YK0067SF	<10	<10	<10	<10	<10	<50
4	12479500	YK0303SF	<10	<10	<10	<10	<10	<50
14	12484500	YK0143SF	<10	<10	<10	<10	<10	<50
22	12499000	YK0332SF	<10	<10	<10	<10	<10	<50
24	12500430	YK0154SF	<10	<10	<10	<10	<10	<50
40	12507585	YK0058SF	<10	<10	<10	<10	<10	<50
43	12508620	YK0076SF	<10	<10	<10	<10	<10	<50
51	12510500	YK0040SF	<10	<10	<10	<10	<10	<50
51	12510500	YK0404SF	<10	<10	<10	<10	<10	360
				Smallmouth Bass				
51	12510500	YK0039SF	<10	<10	<10	<10	<10	<50
				Sculpin				
4	12479500	YK0304SF	<10	<10	<10	<10	<10	<50
5	12479720	YK0007SF	<10	<10	<10	<10	<10	<50
6	12479750	YK0268SF	<10	<10	<10	<10	<10	<50
8	12481900	YK0265SF	<10	<10	<10	<10	<10	<50
9	12483190	YK0240SF	<10	<10	<10	<10	<10	<50
10	12483750	YK0242SF	<10	<10	<10	<10	<10	<50
15	12484550	YK0297SF	<10	<10	<10	<10	<10	<50
17	12488250	YK0221SF	<10	<10	<10	<10	<10	<50
18	12489100	YK0225SF	<10	<10	<10	<10	<10	<50
29	12500900	YK0337SF	<10	<10	<10	<10	<10	<50
30	12502500	YK0348SF	<10	<10	<10	<10	<10	<50
41	12507594	YK0368SF	<10	<10	<10	<10	<10	<50
42	12508500	YK0355SF	<10	<10	<10	<10	<10	<50
43	12508620	YK0353SF	<10	<10	<10	<10	<10	<50
				Chiselmouth				
24	12500430	YK0218SF	<10	<10	<10	<10	<10	<50
46	12508850	YK0401SF	<10	<10	<10	<10	<10	690
49	12509710	YK0020SF	<10	<10	<10	<10	<10	<50
				Largescale Sucker				
13	12484480	YK0122SF	<10	<10	<10	<10	<10	<50
14	12484500	YK0302SF	<10	<10	<10	<10	<10	<50
22	12499000	YK0331SF	<10	<10	<10	<10	<10	<50
24	12500430	YK0157SF	<10	<10	<10	<10	<10	<50
26	12500442	YK0309SF	10	<10	<10	<10	<10	<50
32	12503950	YK0141SF	<10	<10	<10	<10	<10	<50
		YK0324SF	<10	<10	<10	<10	<10	<50
36	12505460	YK0071SF	<10	<10	<10	<10	<10	<50
38	12507508	YK0073SF	<10	<10	<10	<10	<10	<50
39	12507525	YK0372SF	<10	<10	<10	<10	<10	300
40	12507585	YK0055SF	<10	<10	<10	<10	<10	350
46	12508850	YK0052SF	<10	<10	<10	<10	<10	1,200
47	12509050	YK0047SF	<10	<10	<10	<10	<10	520
47	12509050	YK0400SF	<10	<10	<10	<10	<10	930
51	12510500	YK0041SF	<10	<10	<10	<10	<10	310
51	12510500	YK0402SF	<10	<10	<10	<10	<10	710
51	12510500	YK0403SF	<10	<10	<10	<10	<10	720

Table 28. Concentrations of organochlorine compounds in aquatic biota, Yakima River basin, Washington, 1989-90--Continued

Map reference number	Station number	Field number	Total PCBS	Dieldrin	Endrin	Mirex	Kepone	Octochloro-styrene	Dicofol
				Rainbow Trout					
1	12478100	YK0065SF	<50	<10	<10	<10	<10	<10	<10
5	12479720	YK0005SF	<50	<10	<10	<10	<10	<10	<10
7	12480000	YK0124SF	<50	<10	<10	<10	<10	<10	<10
15	12484550	YK0011SF	<50	<10	<10	<10	<10	<10	<10
15	12484550	YK0145SF	<50	10	<10	<10	<10	<10	<10
16	12487200	YK0201SF	<50	<10	<10	<10	--	--	<10
18	12489100	YK0126SF	<50	<10	<10	<10	<10	<10	<10
41	12507594	YK0161SF	<50	<10	<10	<10	<10	<10	<10
				Mountain Whitefish					
4	12479500	YK0067SF	<50	10	<10	<10	<10	<10	<10
4	12479500	YK0303SF	<50	10	<10	<10	--	--	--
14	12484500	YK0143SF	<50	20	<10	<10	<10	<10	<10
22	12499000	YK0332SF	<50	10	<10	<10	--	--	--
24	12500430	YK0154SF	<50	20	<10	<10	<10	<10	40
40	12507585	YK0058SF	<50	40	<10	<10	<10	<10	40
43	12508620	YK0076SF	<50	10	<10	<10	<10	<10	30
51	12510500	YK0040SF	<50	60	<10	<10	<10	<10	<10
51	12510500	YK0404SF	620	50	<10	<10	--	--	<10
				Smallmouth Bass					
51	12510500	YK0039SF	<50	50	<10	<10	<10	<10	<10
				Sculpin					
4	12479500	YK0304SF	<50	<10	<10	<10	--	--	--
5	12479720	YK0007SF	<50	<10	<10	<10	<10	<10	<10
6	12479750	YK0268SF	<50	<10	<10	<10	--	--	--
8	12481900	YK0265SF	<50	<10	<10	<10	--	--	<10
9	12483190	YK0240SF	<50	<10	<10	<10	--	--	<10
10	12483750	YK0242SF	<50	<10	<10	<10	--	--	<10
15	12484550	YK0297SF	<50	<10	<10	<10	--	--	--
17	12488250	YK0221SF	<50	<10	<10	<10	--	--	<10
18	12489100	YK0225SF	<50	<10	<10	<10	--	--	<10
29	12500900	YK0337SF	<50	<10	<10	<10	--	--	--
30	12502500	YK0348SF	<50	<10	<10	<10	--	--	--
41	12507594	YK0368SF	<50	<10	<10	<10	--	--	<10
42	12508500	YK0355SF	<50	<10	<10	<10	--	--	--
43	12508620	YK0353SF	<50	10	<10	<10	--	--	--
				Chiselmouth					
24	12500430	YK0218SF	<50	<10	<10	<10	--	--	300
46	12508850	YK0401SF	250	80	<10	<10	--	--	60
49	12509710	YK0020SF	<50	100	<10	<10	<10	<10	30
				Largescale Sucker					
13	12484480	YK0122SF	<50	20	<10	<10	<10	<10	<10
14	12484500	YK0302SF	<50	10	<10	<10	--	--	--
22	12499000	YK0331SF	<50	<10	<10	<10	--	--	--
24	12500430	YK0157SF	<50	10	<10	<10	<10	<10	30
26	12500442	YK0309SF	<50	10	<10	<10	--	--	--
32	12503950	YK0141SF	<50	10	<10	<10	<10	<10	<10
32	12503950	YK0324SF	170	<10	<10	<10	--	--	--
36	12505460	YK0071SF	<50	70	<10	<10	<10	<10	30
38	12507508	YK0073SF	<50	20	<10	<10	<10	<10	30
39	12507525	YK0372SF	370	20	<10	<10	--	--	60
40	12507585	YK0055SF	100	40	<10	<10	<10	<10	20
46	12508850	YK0052SF	610	170	<10	<10	<10	<10	60
47	12509050	YK0047SF	290	80	<10	<10	<10	<10	20
47	12509050	YK0400SF	780	50	<10	<10	--	--	50
51	12510500	YK0041SF	<50	100	<10	<10	<10	<10	<10
51	12510500	YK0402SF	790	60	<10	<10	--	--	<10
51	12510500	YK0403SF	900	90	<10	<10	--	--	<10

Table 28. Concentrations of organochlorine compounds in aquatic biota, Yakima River basin, Washington, 1989-90--Continued

Map reference number	Station number	Station name	Date	Field number	Moisture, in percent	Lipid, in percent
		Bridgelip Sucker				
12	12484440	Cherry Creek abv. Wipple Westeway at Thrall	10-31-90	YK0211SF	72.2	7.93
14	12484500	Yakima River at Umtanum	05-03-89	YK0015SF	71.8	7.03
25	12500437	Wide Hollow Cr at W. Valley School nr Ahtanum	05-01-89	YK0001SF	73.6	6.75
26	12500442	Wide Hollow Cr at Old STP at Union Gap	11-08-89	YK0155SF	74.5	5.02
36	12505460	Granger Drain at mouth nr Granger	11-08-90	YK0386SF	71.2	8.98
		Carp				
40	12507585	Yakima River at RM 72 ab Satus Cr nr Sunnyside	11-01-89	YK0056SF	72.5	5.30
		Asiatic Clam				
40	12507585	Yakima River at RM 72 ab Satus Cr nr Sunnyside	11-01-89	YK0100SM	76.0	2.40
40	12507585	Yakima River at RM 72 ab Satus Cr nr Sunnyside	11-01-89	YK0101SM	78.0	2.32
40	12507585	Yakima River at RM 72 ab Satus Cr nr Sunnyside	11-01-89	YK0102SM	79.0	2.62
40	12507585	Yakima River at RM 72 ab Satus Cr nr Sunnyside	11-01-89	YK0103SM	82.0	1.96
47	12509050	Yakima R at Euclid Br at RM 55 nr Grandview	10-31-89	YK0085SM	82.0	2.20
47	12509050	Yakima R at Euclid Br at RM 55 nr Grandview	10-31-89	YK0082SM	95.5	1.64
47	12509050	Yakima R at Euclid Br at RM 55 nr Grandview	11-04-90	YK0375SM	82.8	1.74
49	12509710	Spring Creek at mouth at Whitstran	10-31-89	YK0080SM	83.0	2.00
49	12509710	Spring Creek at mouth at Whitstran	11-08-90	YK0408SM	82.8	1.98
51	12510500	Yakima River at Kiona	10-30-89	YK0115SM	83.0	2.20
51	12510500	Yakima River at Kiona	10-30-89	YK0116SM	84.0	1.95
51	12510500	Yakima River at Kiona	11-04-90	YK0367SM	82.4	2.04
		Western Peerlshell				
14	12484500	Yakima River at Umtanum	11-01-89	YK0111SM	86.0	.92
14	12484500	Yakima River at Umtanum	11-05-90	YK0393SM	90.2	.42
		Crayfish				
15	12484550	Umtanum Creek nr mouth et Umtanum	05-03-89	YK0013SD	67.5	2.64
25	12500437	Wide Hollow Cr at W. Valley School nr Ahtanum	05-01-89	YK0003SD	76.5	2.16
49	12509710	Spring Creek at mouth at Whitstran	10-30-89	YK0022SD	75.0	1.10
		Coontail				
38	12507508	Toppenish Cr at Indian Church Rd nr Granger	11-03-89	YK0079SP	94.0	0.10
51	12510500	Yakima River at Kiona	10-30-89	YK0034SP	93.0	.20
		Curlyleaf Pondweed				
13	12484480	Cherry Creek at Thrall	11-06-89	YK0139SP	93.0	.20
14	12484500	Yakima River at Umtanum	11-05-89	YK0118SP	99.0	.10
24	12500430	Moxee Drain at Thorp Rd nr Union Gap	11-04-89	YK0093SP	95.0	.20
26	12500442	Wide Hollow Cr at Old STP at Union Gap	11-04-89	YK0096SP	93.0	.20
32	12503950	Yakima R at Parker	11-04-89	YK0094SP	94.0	.30
40	12507585	Yakima River at RM 72 ab Satus Cr nr Sunnyside	11-01-89	YK0060SP	93.0	.30
43	12508620	Satus Creek at gage at Satus	11-03-89	YK0091SP	91.0	.30
47	12509050	Yakima R at Euclid Br at RM 55 nr Grendview	10-31-89	YK0045SP	91.0	.30
		Waterweed				
26	12500442	Wide Hollow Cr at Old STP at Union Gap	11-04-89	YK0098SP	94.0	.10
38	12507508	Toppenish Cr et Indian Church Rd nr Granger	11-03-89	YK0088SP	93.0	.20
43	12508620	Satus Creek at gage at Satus	11-03-89	YK0092SP	94.0	.30
49	12509710	Spring Creek at mouth at Whitstran	10-30-89	YK0036SP	93.0	.20

Table 28. Concentrations of organochlorine compounds in aquatic biota, Yakima River basin, Washington, 1989-90--Continued

Map reference number	Station number	Field number	cis-Chlordane	trans-Chlordane	Oxy-chlordane	Hepta-chlor epoxide	cis-Nonachlor	trans-Nonachlor
				Bridgelip Sucker				
12	12484440	YK0211SF	10	10	10	20	<10	10
14	12484500	YK0015SF	10	<10	<10	<10	<10	<10
25	12500437	YK0001SF	30	<10	<10	<10	<10	<10
26	12500442	YK0155SF	10	<10	<10	<10	<10	10
36	12505460	YK0386SF	20	10	10	20	<10	20
				Carp				
40	12507585	YK0056SF	10	<10	<10	<10	<10	10
				Asiatic Clam				
40	12507585	YK0100SM	<10	<10	<10	<10	<10	<10
40	12507585	YK0101SM	<10	<10	<10	<10	<10	<10
40	12507585	YK0102SM	<10	<10	<10	<10	<10	<10
40	12507585	YK0103SM	<10	<10	<10	<10	<10	<10
47	12509050	YK0085SM	<10	<10	<10	<10	<10	<10
47	12509050	YK0082SM	<10	<10	<10	<10	<10	<10
47	12509050	YK0375SM	<10	<10	<10	<10	<10	<10
49	12509710	YK0080SM	<10	<10	<10	<10	<10	<10
49	12509710	YK0408SM	10	<10	<10	<10	<10	10
51	12510500	YK0115SM	<10	<10	<10	<10	<10	<10
51	12510500	YK0116SM	<10	<10	<10	<10	<10	<10
51	12510500	YK0367SM	10	<10	<10	<10	<10	10
				Western Pearlshell				
14	12484500	YK0111SM	<10	<10	<10	<10	<10	<10
14	12484500	YK0393SM	<10	<10	<10	<10	<10	<10
				Crayfish				
15	12484550	YK0013SD	<10	<10	<10	<10	<10	<10
25	12500437	YK0003SD	<10	<10	<10	<10	<10	<10
49	12509710	YK0022SD	<10	<10	<10	<10	<10	<10
				Coontail				
38	12507508	YK0079SP	<10	<10	<10	<10	<10	<10
51	12510500	YK0034SP	<10	<10	<10	<10	<10	<10
				Curlyleaf Pondweed				
13	12484480	YK0139SP	<10	<10	<10	<10	<10	<10
14	12484500	YK0118SP	<10	<10	<10	<10	<10	<10
24	12500430	YK0093SP	<10	<10	<10	<10	<10	<10
26	12500442	YK0096SP	<10	<10	<10	<10	<10	<10
32	12503950	YK0094SP	<10	<10	<10	<10	<10	<10
40	12507585	YK0060SP	<10	<10	<10	<10	<10	<10
43	12508620	YK0091SP	<10	<10	<10	<10	<10	<10
47	12509050	YK0045SP	<10	<10	<10	<10	<10	<10
				Waterweed				
26	12500442	YK0098SP	<10	<10	<10	<10	<10	<10
38	12507508	YK0088SP	<10	<10	<10	<10	<10	<10
43	12508620	YK0092SP	<10	<10	<10	<10	<10	<10
49	12509710	YK0036SP	<10	<10	<10	<10	<10	<10

Table 28. Concentrations of organochlorine compounds in aquatic biota, Yakima River basin, Washington, 1989-90--Continued

Map reference number	Station number	Field number	o,p'-DDD	p,p'-DDD	o,p'-DDE	p,p'-DDE	o,p'-DDT	p,p'-DDT
				Bridgelip Sucker				
12	12484440	YK0211SF	20	20	10	60	10	30
14	12484500	YK0015SF	10	50	<10	220	<10	70
25	12500437	YK0001SF	20	150	10	750	10	110
26	12500442	YK0155SF	30	80	<10	180	20	50
36	12505460	YK0386SF	20	190	20	730	<10	200
				Carp				
40	12507585	YK0056SF	20	140	<10	1,700	<10	40
				Asiatic Clam				
40	12507585	YK0100SM	10	60	<10	310	<10	80
40	12507585	YK0101SM	10	50	<10	280	<10	70
40	12507585	YK0102SM	10	60	<10	330	<10	80
40	12507585	YK0103SM	10	40	<10	230	<10	60
47	12509050	YK0085SM	30	100	10	530	<10	60
47	12509050	YK0082SM	20	80	<10	390	<10	40
47	12509050	YK0375SM	20	100	10	660	<10	70
49	12509710	YK0080SM	40	180	20	1,300	30	320
49	12509710	YK0408SM	20	120	20	1,300	70	380
51	12510500	YK0115SM	20	80	10	410	<10	50
51	12510500	YK0116SM	20	60	<10	360	<10	30
51	12510500	YK0367SM	10	70	10	430	<10	40
				Western Pearlshell				
14	12484500	YK0111SM	<10	<10	<10	<10	<10	<10
14	12484500	YK0393SM	<10	<10	<10	<10	<10	<10
				Crayfish				
15	12484550	YK0013SD	<10	<10	<10	<10	<10	<10
25	12500437	YK0003SD	<10	60	<10	50	<10	10
49	12509710	YK0022SD	<10	<10	<10	40	<10	<10
				Coontail				
38	12507508	YK0079SP	<10	<10	<10	<10	<10	<10
51	12510500	YK0034SP	<10	<10	<10	20	<10	<10
				Curlyleaf Pondweed				
13	12484480	YK0139SP	<10	<10	<10	<10	<10	<10
14	12484500	YK0118SP	<10	<10	<10	<10	<10	<10
24	12500430	YK0093SP	<10	<10	<10	20	<10	<10
26	12500442	YK0096SP	<10	<10	<10	10	<10	<10
32	12503950	YK0094SP	<10	<10	<10	<10	<10	<10
40	12507585	YK0060SP	<10	<10	<10	10	<10	<10
43	12508620	YK0091SP	<10	<10	<10	10	<10	<10
47	12509050	YK0045SP	<10	<10	<10	30	<10	<10
				Waterweed				
26	12500442	YK0098SP	<10	<10	<10	10	<10	<10
38	12507508	YK0088SP	<10	<10	<10	<10	<10	<10
43	12508620	YK0092SP	<10	<10	<10	<10	<10	<10
49	12509710	YK0036SP	<10	<10	<10	40	<10	<10

Table 28. Concentrations of organochlorine compounds in aquatic biota, Yakima River basin, Washington, 1989-90--Continued

Map reference number	Station number	Field number	Hexachloro-benzene	a-Hexachloro-cyclohexane	b-Hexachloro-cyclohexane	g-Hexachloro-cyclohexane (lindane)	d-Hexachloro-cyclohexane	Toxaphene
				Bridgelip Sucker				
12	12484440	YK0211SF	<10	<10	<10	<10	<10	<50
14	12484500	YK0015SF	<10	<10	<10	<10	<10	<50
25	12500437	YK0001SF	<10	<10	<10	<10	<10	<50
26	12500442	YK0155SF	<10	<10	<10	<10	<10	<50
36	12505460	YK0386SF	<10	<10	<10	<10	<10	410
				Carp				
40	12507585	YK0056SF	<10	<10	<10	<10	<10	220
				Asiatic Clam				
40	12507585	YK0100SM	<10	<10	<10	<10	<10	<50
40	12507585	YK0101SM	<10	<10	<10	<10	<10	<50
40	12507585	YK0102SM	<10	<10	<10	<10	<10	<50
40	12507585	YK0103SM	<10	<10	<10	<10	<10	<50
47	12509050	YK0085SM	<10	<10	<10	<10	<10	<50
47	12509050	YK0082SM	<10	<10	<10	<10	<10	<50
47	12509050	YK0375SM	<10	<10	<10	<10	<10	<50
49	12509710	YK0080SM	<10	<10	<10	<10	<10	<50
49	12509710	YK0408SM	<10	<10	<10	<10	<10	<50
51	12510500	YK0115SM	<10	<10	<10	<10	<10	<50
51	12510500	YK0116SM	<10	<10	<10	<10	<10	<50
51	12510500	YK0367SM	<10	<10	<10	<10	<10	<50
				Western Pearlshell				
14	12484500	YK0111SM	<10	<10	<10	<10	<10	<50
14	12484500	YK0393SM	<10	<10	<10	<10	<10	<50
				Crayfish				
15	12484550	YK0013SD	<10	<10	<10	<10	<10	<50
25	12500437	YK0003SD	<10	<10	<10	<10	<10	<50
49	12509710	YK0022SD	<10	<10	<10	<10	<10	<50
				Coontail				
38	12507508	YK0079SP	<10	<10	<10	<10	<10	<50
51	12510500	YK0034SP	<10	<10	<10	<10	<10	<50
				Curlyleaf Pondweed				
13	12484480	YK0139SP	<10	<10	<10	<10	<10	<50
14	12484500	YK0118SP	<10	<10	<10	<10	<10	<50
24	12500430	YK0093SP	<10	<10	<10	<10	<10	<50
26	12500442	YK0096SP	<10	<10	<10	<10	<10	<50
32	12503950	YK0094SP	<10	<10	<10	<10	<10	<50
40	12507585	YK0060SP	<10	<10	<10	<10	<10	<50
43	12508620	YK0091SP	<10	<10	<10	<10	<10	<50
47	12509050	YK0045SP	<10	<10	<10	<10	<10	<50
				Waterweed				
26	12500442	YK0098SP	<10	<10	<10	<10	<10	<50
38	12507508	YK0088SP	<10	<10	<10	<10	<10	<50
43	12508620	YK0092SP	<10	<10	<10	<10	<10	<50
49	12509710	YK0036SP	<10	<10	<10	<10	<10	<50

Table 28. Concentrations of organochlorine compounds in aquatic biota, Yakima River basin, Washington, 1989-90--Continued

Map reference number	Station number	Field number	Total PCBS	Dieldrin	Endrin	Mirex	Kepone	Octochloro-styrene	Dicofol
				Bridgelip Sucker					
12	12484440	YK0211SF	<50	30	<10	<10	--	--	<10
14	12484500	YK0015SF	<50	10	<10	<10	<10	<10	<10
25	12500437	YK0001SF	<50	30	<10	<10	<10	<10	<10
26	12500442	YK0155SF	<50	40	<10	<10	<10	<10	<10
36	12505460	YK0386SF	220	80	<10	<10	--	--	<10
				Carp					
40	12507585	YK0056SF	<50	20	<10	<10	<10	<10	20
				Asiatic Clam					
40	12507585	YK0100SM	<50	10	<10	<10	<10	<10	<10
40	12507585	YK0101SM	<50	10	<10	<10	<10	<10	<10
40	12507585	YK0102SM	<50	10	<10	<10	<10	<10	<10
40	12507585	YK0103SM	<50	10	<10	<10	<10	<10	<10
47	12509050	YK0085SM	<50	20	<10	<10	<10	<10	<10
47	12509050	YK0082SM	<50	20	<10	<10	<10	<10	<10
47	12509050	YK0375SM	<50	10	<10	<10	--	--	<10
49	12509710	YK0080SM	<50	40	<10	<10	<10	<10	<10
49	12509710	YK0408SM	<50	30	<10	<10	--	--	70
51	12510500	YK0115SM	<50	10	<10	<10	<10	<10	<10
51	12510500	YK0116SM	<50	10	<10	<10	<10	<10	<10
51	12510500	YK0367SM	<50	10	<10	<10	--	--	<10
				Western Pearlshell					
14	12484500	YK0111SM	<50	<10	<10	<10	<10	<10	<10
14	12484500	YK0393SM	<50	<10	<10	<10	--	--	<10
				Crayfish					
15	12484550	YK0013SD	<50	<10	<10	<10	<10	<10	<10
25	12500437	YK0003SD	<50	<10	<10	<10	<10	<10	<10
49	12509710	YK0022SD	<50	<10	<10	<10	<10	<10	<10
				Coontail					
38	12507508	YK0079SP	<50	<10	<10	<10	<10	<10	<10
51	12510500	YK0034SP	<50	<10	<10	<10	<10	<10	<10
				Curlyleaf Pondweed					
13	12484480	YK0139SP	<50	<10	<10	<10	<10	<10	<10
14	12484500	YK0118SP	<50	<10	<10	<10	<10	<10	<10
24	12500430	YK0093SP	<50	<10	<10	<10	<10	<10	<10
26	12500442	YK0096SP	<50	<10	<10	<10	<10	<10	<10
32	12503950	YK0094SP	<50	<10	<10	<10	<10	<10	<10
40	12507585	YK0060SP	<50	<10	<10	<10	<10	<10	<10
43	12508620	YK0091SP	<50	<10	<10	<10	<10	<10	<10
47	12509050	YK0045SP	<50	<10	<10	<10	<10	<10	<10
				Waterweed					
26	12500442	YK0098SP	<50	<10	<10	<10	<10	<10	<10
38	12507508	YK0088SP	<50	<10	<10	<10	<10	<10	<10
43	12508620	YK0092SP	<50	<10	<10	<10	<10	<10	<10
49	12509710	YK0036SP	<50	<10	<10	<10	<10	<10	<10

Table 29. Concentrations of semi-volatile organic compounds (polycyclic-aromatic hydrocarbons) in aquatic biota, Yakima River basin, Washington, 1989-90

[Concentrations in micrograms per kilogram, wet weight; whole fish were analyzed; see figure 1 for site locations]

Map reference number	Station number	Station name	Date	Field number	Moisture, in percent	Lipid, in percent
		Rainbow Trout				
16	12487200	Little Naches River at mouth nr Cliffdell	10-30-90	YK0201SF	76.4	4.56
		Asiatic Clam				
40	12507585	Yakima River at RM 72 ab Satus Cr nr Sunnyside	11-01-89	YK0100SM	76.0	2.40
40	12507585	Yakima River at RM 72 ab Satus Cr nr Sunnyside	11-01-89	YK0101SM	78.0	2.32
40	12507585	Yakima River at RM 72 ab Satus Cr nr Sunnyside	11-01-89	YK0102SM	79.0	2.62
40	12507585	Yakima River at RM 72 ab Satus Cr nr Sunnyside	11-01-89	YK0103SM	82.0	1.96
47	12509050	Yakima R at Euclid Br at RM 55 nr Grandview	10-31-89	YK0082SM	95.5	1.64
47	12509050	Yakima R at Euclid Br at RM 55 nr Grandview	10-31-89	YK0085SM	82.0	2.20
49	12509710	Spring Creek at mouth at Whitstran	10-31-89	YK0080SM	83.0	2.00
49	12509710	Spring Creek at mouth at Whitstran	11-08-90	YK0408SM	82.8	1.98
51	12510500	Yakima River at Kiona	10-30-89	YK0115SM	83.0	2.20
51	12510500	Yakima River at Kiona	10-30-89	YK0116SM	84.0	1.95
51	12510500	Yakima River at Kiona	11-04-90	YK0367SM	82.4	2.04
		Western Pearlshell				
14	12484500	Yakima River at Umtanum	11-01-89	YK0111SM	86.0	.92
14	12484500	Yakima River at Umtanum	11-05-90	YK0393SM	90.2	.42
		Crayfish				
15	12484550	Umtanum Creek nr mouth at Umtanum	05-03-89	YK0013SD	67.5	2.64
25	12500437	Wide Hollow Cr at W. Valley School nr Ahtanum	05-01-89	YK0003SD	76.5	2.16
49	12509710	Spring Creek at mouth at Whitstran	10-30-89	YK0022SD	75.0	1.10
		Coontail				
38	12507508	Toppenish Cr at Indian Church Rd nr Granger	11-03-89	YK0079SP	94.0	.10
51	12510500	Yakima River at Kiona	10-30-89	YK0034SP	93.0	.20
		Curlyleaf Pondweed				
13	12484480	Cherry Creek at Thrall	11-06-89	YK0139SP	93.0	.20
14	12484500	Yakima River at Umtanum	11-05-89	YK0118SP	99.0	.10
24	12500430	Moxee Drain at Thorp Rd nr Union Gap	11-04-89	YK0093SP	95.0	.20
26	12500442	Wide Hollow Cr at Old STP at Union Gap	11-04-89	YK0096SP	93.0	.20
32	12503950	Yakima R at Parker	11-04-89	YK0094SP	94.0	.30
40	12507585	Yakima River at RM 72 ab Satus Cr nr Sunnyside	11-01-89	YK0060SP	93.0	.20
43	12508620	Satus Creek at gage at Satus	11-03-89	YK0091SP	91.0	.30
47	12509050	Yakima R at Euclid Br at RM 55 nr Grandview	10-31-89	YK0045SP	91.0	.30
		Waterweed				
26	12500442	Wide Hollow Cr at Old STP at Union Gap	11-04-89	YK0098SP	94.0	.20
38	12507508	Toppenish Cr at Indian Church Rd nr Granger	11-03-89	YK0088SP	93.0	.20
43	12508620	Satus Creek at gage at Satus	11-03-89	YK0092SP	94.0	.30
49	12509710	Spring Creek at mouth at Whitstran	10-30-89	YK0036SP	93.0	.20

Table 29. Concentrations of semi-volatile organic compounds (polycyclic-aromatic hydrocarbons) in aquatic biota, Yakima River basin, Washington, 1989-90--Continued

Map reference number	Station number	Field number	Napthalene	Fluorene	Phenanthrene	Anthracene	Fluoranthrene	Pyrene	1,2-Benzanthracene
					Rainbow Trout				
16	12487200	YK0201SF	50	<10	<10	<10	<10	<10	<10
					Asiatic Clem				
40	12507585	YK0100SM	10	<10	30	<10	10	<10	<10
40	12507585	YK0101SM	<10	<10	30	<10	10	<10	<10
40	12507585	YK0102SM	<10	10	30	<10	10	<10	10
40	12507585	YK0103SM	10	<10	40	<10	10	<10	<10
47	12509050	YK0082SM	10	<10	40	<10	<10	<10	<10
47	12509050	YK0085SM	20	<10	30	<10	10	10	<10
49	12509710	YK0080SM	10	<10	30	<10	10	10	<10
49	12509710	YK0408SM	40	<10	20	<10	<10	<10	<10
51	12510500	YK0115SM	<10	10	90	<10	20	<10	<10
51	12510500	YK0116SM	10	<10	40	<10	50	<10	<10
51	12510500	YK0367SM	40	<10	20	<10	10	<10	<10
					Western Pearlshell				
14	12484500	YK0111SM	<10	<10	<10	<10	<10	<10	<10
14	12484500	YK0393SM	10	<10	<10	<10	10	<10	<10
					Crayfish				
15	12484550	YK0013SD	<10	<10	<10	<10	<10	<10	<10
25	12500437	YK0003SD	<10	<10	<10	<10	<10	<10	<10
49	12509710	YK0022SD	<10	<10	<10	<10	<10	<10	<10
					Coontail				
38	12507508	YK0079SP	<10	<10	<10	<10	<10	<10	<10
51	12510500	YK0034SP	<10	<10	<10	<10	<10	<10	<10
					Curlyleaf Pondweed				
13	12484480	YK0139SP	<10	<10	<10	<10	<10	<10	<10
14	12484500	YK0118SP	<10	<10	<10	<10	<10	<10	<10
24	12500430	YK0093SP	<10	<10	<10	<10	<10	<10	<10
26	12500442	YK0096SP	<10	<10	<10	<10	10	<10	<10
32	12503950	YK0094SP	<10	<10	<10	<10	<10	<10	<10
40	12507585	YK0060SP	<10	<10	<10	<10	<10	<10	<10
43	12508620	YK0091SP	<10	<10	<10	<10	<10	<10	<10
47	12509050	YK0045SP	<10	<10	<10	<10	10	<10	<10
					Waterweed				
26	12500442	YK0098SP	<10	<10	<10	<10	<10	<10	<10
38	12507508	YK0088SP	<10	<10	<10	<10	<10	<10	<10
43	12508620	YK0092SP	<10	<10	<10	<10	<10	<10	<10
49	12509710	YK0036SP	20	10	40	<10	10	<10	<10

Table 29. Concentrations of semi-volatile organic compounds (polycyclic-aromatic hydrocarbons) in aquatic biota, Yakima River basin, Washington, 1989-90--Continued

Map reference number	Station number	Field number	Chrysene	Benzo(b)-fluoranthrene	Benzo(k)-fluoranthrene	Benzo(e)-pyrene	Benzo(a)-pyrene	1,2,5,6-Dibenz-anthracene	Benz pery
					Rainbow Trout				
16	12487200	YK0201SF	<10	<10	<10	<10	<10	<10	<10
					Asiatic Clam				
40	12507585	YK0100SM	<10	<10	<10	<10	<10	<10	<10
40	12507585	YK0101SM	<10	<10	<10	<10	<10	<10	<10
40	12507585	YK0102SM	<10	<10	<10	<10	<10	<10	<10
40	12507585	YK0103SM	<10	<10	<10	<10	<10	<10	<10
47	12509050	YK0082SM	<10	<10	<10	<10	<10	<10	<10
47	12509050	YK0085SM	<10	<10	<10	<10	<10	<10	<10
49	12509710	YK0080SM	<10	<10	<10	<10	<10	<10	<10
49	12509710	YK0408SM	<10	<10	<10	<10	<10	<10	<10
51	12510500	YK0115SM	<10	<10	<10	<10	<10	<10	<10
51	12510500	YK0116SM	<10	<10	<10	<10	<10	<10	<10
51	12510500	YK0367SM	<10	<10	<10	<10	<10	<10	<10
					Western Pearlshell				
14	12484500	YK0111SM	<10	<10	<10	<10	<10	<10	<10
14	12484500	YK0393SM	<10	<10	<10	<10	<10	<10	<10
					Crayfish				
15	12484550	YK0013SD	<10	<10	<10	<10	<10	<10	<10
25	12500437	YK0003SD	<10	<10	<10	<10	<10	<10	<10
49	12509710	YK0022SD	<10	<10	<10	10	<10	<10	<10
					Coontail				
38	12507508	YK0079SP	<10	<10	<10	10	<10	<10	<10
51	12510500	YK0034SP	<10	<10	<10	<10	<10	<10	<10
					Curlyleaf Pondweed				
13	12484480	YK0139SP	<10	<10	<10	<10	<10	<10	<10
14	12484500	YK0118SP	<10	<10	<10	<10	<10	<10	<10
24	12500430	YK0093SP	<10	<10	<10	10	<10	<10	<10
26	12500442	YK0096SP	<10	<10	<10	10	<10	<10	<10
32	12503950	YK0094SP	<10	<10	<10	<10	<10	<10	<10
40	12507585	YK0060SP	<10	<10	<10	<10	<10	<10	<10
43	12508620	YK0091SP	<10	<10	<10	<10	<10	<10	<10
47	12509050	YK0045SP	<10	<10	<10	10	<10	<10	<10
					Waterweed				
26	12500442	YK0098SP	<10	<10	<10	10	<10	<10	<10
38	12507508	YK0088SP	<10	<10	<10	10	<10	<10	<10
43	12508620	YK0092SP	10	<10	<10	<10	<10	<10	<10
49	12509710	YK0036SP	<10	<10	<10	<10	<10	<10	<10

QUALITY-ASSURANCE DATA

Tables showing quality-assurance data have been grouped and presented by sampling media: whole-water data are listed in tables 30-38, filtered-water data in tables 39-44, suspended-sediment data in tables 45-50, bed-sediment data in tables 51-53, and aquatic-biota data in tables 54-57. For whole-water analyses, data are arranged alphabetically by chemical family.

Table 30A. Concentrations of carbamate compounds in replicate whole-water samples from Cle Elum River above Cle Elum Lake near Roslyn, Washington, July 26, 1988, at 1000 hour and 1015 hour

[Station number 12478300; map reference number 3--figure 1; in addition to analytical variability, the results include temporal variability, because the samples were collected 15 minutes apart; "<" = less than; less-than values were set equal to zero for calculations]

Parameter code	Constituent	Concentration, in nanograms per liter Replicate 1 (not spiked) A	Replicate 2 (not spiked) B	Difference |A - B|
39053	Aldicarb	<500	<500	0
82587	Aldicarb sulfone	<500	<500	0
82586	Aldicarb sulfoxide	<500	<500	0
39750	Carbaryl	<500	<500	0
82615	Carbofuran	<500	<500	0
82584	3-Hydroxycarbofuran	<500	<500	0
30282	Methiocarb	<500	<500	0
39051	Methomyl	<500	<500	0
77441	1-Naphthol	<500	<500	0
82613	Oxamyl	<500	<500	0
39052	Propham	<500	<500	0
30296	Propoxur	<500	<500	0

Table 30B. Concentrations of carbamate compounds in replicate whole-water samples from Cherry Creek at Thrall, Washington, June 2, 1988, at 1400 hour and 1405 hour

[Station number 12484480; map reference number 13--figure 1; in addition to analytical variability, the results include temporal variability, because the samples were collected 5 minutes apart"<" = less than; less-than values were set equal to zero for calculations]

Parameter code	Constituent	Concentrstion, in nanograms per liter Replicate 1 (not spiked) A	Replicate 2 (not spiked) B	Difference |A - B|
39053	Aldicarb	<500	<500	0
82587	Aldicarb sulfone	<500	<500	0
82586	Aldicarb sulfoxide	<500	<500	0
39750	Carbaryl	<500	<500	0
82615	Carbofuran	<500	<500	0
82584	3-Hydroxycarbofuran	<500	<500	0
30282	Methiocarb	<500	<500	0
39051	Methomyl	<500	<500	0
77441	1-Naphthol	<500	<500	0
82613	Oxamyl	<500	<500	0
39052	Propham	<500	<500	0
30296	Propoxur	<500	<500	0

Table 30C. Concentrations of carbamate compounds in replicate whole-water samples from Wide Hollow Creek near mouth at Union Gap, Washington, November 15, 1988, at 1330 hour and 1430 hour

[Station number 12500445; map reference number 27--figure 1; in addition to analytical variability, the results include temporal variability, because the samples were collected 1 hour apart; "<" = less than; less-than values were set equal to zero for calculations]

Parameter code	Constituent	Concentration, in nanograms per liter Replicate 1 (not spiked) A	Replicate 2 (not spiked) B	Difference |A - B|
39053	Aldicarb	<500	<500	0
82587	Aldicarb sulfone	<500	<500	0
82586	Aldicarb sulfoxide	<500	<500	0
39750	Carbaryl	<500	<500	0
82615	Carbofuran	<500	<500	0
82584	3-Hydroxycarbofuran	<500	<500	0
30282	Methiocarb	<500	<500	0
39051	Methomyl	<500	<500	0
77441	1-Naphthol	<500	<500	0
82613	Oxamyl	<500	<500	0
39052	Propham	<500	<500	0
30296	Propoxur	<500	<500	0

Table 30D. Concentrations of carbamate compounds in replicate whole-water samples from Moxee Drain at Thorp Road near Union Gap, Washington, May 6, 1988, at 0930 hour and 0940 hour

[Station number 12500430; map reference number 24--figure 1; in addition to analytical variability, the results include temporal variability, because the samples were collected 10 minutes apart; "<" = less than; less-than valuea were set equal to zero for calculations]

Parameter code	Constituent	Concentration, in nanograms per liter: Replicate 1 (not spiked) A	Replicate 2 (not spiked) B	Difference |A - B|
39053	Aldicarb	<500	<500	0
82587	Aldicarb sulfone	<500	<500	0
82586	Aldicarb sulfoxide	<500	<500	0
39750	Carbaryl	<500	<500	0
82615	Carbofuran	<500	<500	0
82584	3-Hydroxycarbofuran	<500	<500	0
39051	Methomyl	<500	<500	0
77441	1-Naphthol	<500	<500	0
82613	Oxamyl	<500	<500	0
39052	Propham	<500	<500	0

Table 30E. Concentrations of carbamate compounds in replicate whole-water samples from Granger Drain at mouth near Granger, Washington, July 28, 1988, at 0930 hour and 1015 hour

[Station number 12505460; map reference number 36--figure 1; in addition to analytical variability, the results include temporal variebility, because the samples were collected 45 minutes apart; "<" = less than; less-than values were set equel to zero for calculations]

Parameter code	Constituent	Concentration, in nanograms per liter: Replicate 1 (not spiked) A	Replicate 2 (not spiked) B	Difference |A - B|
39053	Aldicarb	<500	<500	0
82587	Aldicarb sulfone	<500	<500	0
82586	Aldicarb sulfoxide	<500	<500	0
39750	Carbaryl	<500	<500	0
82615	Carbofuran	<500	<500	0
82584	3-Hydroxycarbofuran	<500	<500	0
30282	Methiocarb	<500	<500	0
39051	Methomyl	<500	<500	0
77441	1-Naphthol	<500	<500	0
82613	Oxamyl	<500	<500	0
39052	Propham	<500	<500	0
30296	Propoxur	<500	<500	0

Table 30F. Concentrations of carbamate compounds in replicate and spiked whole-water samples from Sulphur Creek Wasteway near Sunnyside, Washington, August 31, 1988, at 1530 hour and 1630 hour

[Station number 12508850; map reference number 46--figure 1; in addition to analytical variebility, the results include temporal variability, because the samples were collected 1 hour apart; "ns" = not spiked; "<" = less than; less-than values were set equal to zero for calculations]

Parameter code	Constituent	Concentration, in nanograms per liter: Laboratory results: Replicate 1 (not spiked) A	Replicate 2 (not spiked) B	Difference |A - B|	Replicate 3 (spiked) C	Calculated concentration in replicate 3 (spiked) D	Analytical recovery, in percent C x 100 / D
39053	Aldicarb	<500	<500	0	310	430	72
82587	Aldicarb sulfone	<500	<500	0	ns	ns	ns
82586	Aldicarb sulfoxide	<500	<500	0	ns	ns	ns
39750	Carberyl	<500	<500	0	350	470	74
82615	Carbofuran	<500	<500	0	510	460	110
82584	3-Hydroxycarbofuran	<500	<500	0	ns	ns	ns
30282	Methiocarb	<500	<500	0	ns	ns	ns
39051	Methomyl	<500	<500	0	400	510	78
77441	1-Naphthol	<500	<500	0	ns	ns	ns
82613	Oxamyl	<500	<500	0	ns	ns	ns
39052	Propham	<500	<500	0	ns	ns	ns
30296	Propoxur	<500	<500	0	ns	ns	ns

Table 30G. Concentrations of carbamate compounds in spiked whole-water samples from Buckskin Slough below Gleed Ditch near Gleed, Washington, May 22, 1991, at 1100 hour and 1107 hour

[Station number 12496550; map reference number 21--figure 1; "<" = less than; less-than values were set equal to zero for calculations]

Parameter code	Constituent	Concentration, in nanograms per liter: Laboratory results: Replicate 1 (not spiked) A	Replicate 2 (spiked) B	Calculated concentration in replicate 2 C	Recovery, in percent B x 100 /C
39750	Carbaryl	<500	<500	1,100	0
82615	Carbofuran	<500	<500	1,100	0
39051	Methomyl	<500	<500	1,100	0
82613	Oxamyl	<500	<500	1,100	0

Table 30H. Concentrations of carbamate compounds in spiked whole-water samples from Buckskin Slough below Gleed Ditch near Gleed, Washington, August 7, 1991, at 1000 hour and 1007 hour

[Station number 12496550; map reference number 21--figure 1; "<" = less than; less-than values were set equal to zero for calculations]

Parameter code	Constituent	Concentration, in nanograms per liter: Laboratory results: Replicate 1 (not spiked) A	Replicate 2 (spiked) B	Calculated concentration in replicate 2 C	Recovery, in percent B x 100 / C
39750	Carbaryl	<500	900	1,100	82
82615	Carbofuran	<500	1,000	1,100	91
39051	Methomyl	<500	900	1,100	82
82613	Oxamyl	<500	600	1,100	54

Table 31A. Concentrations of chlorophenoxy-acid herbicides, dicamba, and picloram in replicate whole-water samples from Cle Elum River above Cle Elum Lake near Roslyn, Washington, July 26, 1988, at 1000 hour and 1015 hour

[Station number 12478300; map raference number 3--figure 1; in addition to analytical variability, the results include temporal variability, because the samples were collected 15 minutes apart; 2,4-D = (2,4-dichlorophenoxy)acetic acid; 2,4-DP = dichlorprop; 2,4,5-T = (2,4,5-trichlorophenoxy)acetic acid; "<" = less than; less-than values were set equal to zero for calculations]

Parameter code	Constituent	Concentration, in nanograms per liter Replicate 1 (not spiked) A	Replicate 2 (not spiked) B	Difference |A - B|
82052	Dicamba	<10	<10	0
39730	2,4-D	<10	<10	0
82183	2,4-DP	<10	<10	0
39760	Fenoprop	<10	<10	0
39720	Picloram	<10	<10	0
39740	2,4,5-T	<10	<10	0

Table 31B. Concentrations of chlorophenoxy-acid herbicides, dicamba, and picloram in replicete whole-water samples from Cherry Creek at Thrall, Washington, June 2, 1988, at 1400 hour and 1405 hour

[Station number 12484480; map reference number 13--figure 1; in addition to analytical variability, the results include temporal variability, because the samples were collected 5 minutes apart; 2,4-D = (2,4-dichlorophenoxy)acetic acid; 2,4-DP = dichlorprop; 2,4,5-T = (2,4,5-trichlorophenoxy)acetic acid; "<" = less than; less-than values were set equal to zero for calculations]

Parameter code	Constituent	Concentration, in nanograms per liter Replicate 1 (not spiked) A	Replicate 2 (not spiked) B	Difference |A - B|
82052	Dicamba	140	140	0
39730	2,4-D	150	140	10
82183	2,4-DP	<10	<10	0
39760	Fenoprop	<10	<10	0
39720	Picloram	<10	<10	0
39740	2,4,5-T	<10	<10	0

Table 31C. Concentrations of chlorophenoxy-acid herbicides, dicamba, and picloram in replicate whole-water samples from Wide Hollow Creek near mouth at Union Gap, Washington, November 15, 1988, at 1330 hour and 1430 hour

[Station number 12500445; map reference number 27--figure 1; in addition to analytical variability, the results include temporal variability, because the samples were collected 1 hour apart; 2,4-D = (2,4-dichlorophenoxy acetic acid; 2,4-DP = dichlorprop; 2,4,5-T = (2,4,5-trichlorophenoxy)acetic acid; "<"= less than; less-than values were set equal to zero for calculations]

Parameter code	Constituent	Concentration, in nanograms per liter Replicate 1 (not spiked) A	Replicate 2 (not spiked) B	Difference |A - B|
82052	Dicamba	<10	<10	0
39730	2,4-D	<10	<10	0
82183	2,4-DP	<10	<10	0
39760	Fenoprop	<10	<10	0
39720	Picloram	<10	<10	0
39740	2,4,5-T	<10	<10	0

Table 31D. Concentrations of chlorophenoxy-acid herbicides, dicamba, and picloram in replicate whole-water samples from Moxee Drain at Thorp Road near Union Gap, Washington, May 6, 1988, at 0930 hour and 0940 hour

[Station number 12500430; map reference number 24--figure 1; in addition to analytical variability, the results include temporal variability, because the samples were collected 10 minutes apart; 2,4-D = (2,4-dichlorophenoxy)acetic acid; 2,4-DP = dichlorprop; 2,4,5-T = (2,4,5-trichlorophenoxy)acetic acid; "<" = less than; less-than values were set equal to zero for calculations]

Parameter code	Constituent	Concentration, in nanograms per liter		
		Replicate 1 (not spiked) A	Replicate 2 (not spiked) B	Difference |A - B|
82052	Dicamba	30	30	0
39730	2,4-D	20	120	100
82183	2,4-DP	<10	<10	0
39760	Fenoprop	<10	<10	0
39720	Picloram	<10	<10	0
39740	2,4,5-T	<10	<10	0

Table 31E. Concentrations of chlorophenoxy-acid herbicides, dicamba, and picloram in replicate whole-water samples from Granger Drain at mouth near Granger, Washington, July 28, 1988, at 0930 hour and 1015 hour

[Station number 12505460; map reference number 36--figure 1; in addition to analytical variability, the results include temporal variability, because the samples were collected 45 minutes apart; 2,4-D = (2,4-dichlorophenoxy)acetic acid; 2,4-DP = dichlorprop; 2,4,5-T = (2,4,5-trichlorophenoxy)acetic acid; "<" = less than; less-than values were set equal to zero for calculations]

Parameter code	Constituent	Concentration, in nanograms per liter		
		Replicate 1 (not spiked) A	Replicate 2 (not spiked) B	Difference |A - B|
82052	Dicamba	40	40	0
39730	2,4-D	390	410	20
82183	2,4-DP	<10	<10	0
39760	Fenoprop	<10	<10	0
39720	Picloram	<10	<10	0
39740	2,4,5-T	<10	<10	0

Table 31F. Concentrations of chlorophenoxy-acid herbicides, dicamba, and picloram in replicate and spiked whole-water samples from Sulphur Creek Wasteway near Sunnyside, Washington, August 31, 1988, at 1530 hour and 1630 hour

[Station number 12508850; map reference number 46--figure 1; in eddition to analytical variability, the results include temporel variability, beceuse the samples were collected 1 hour apart; "ns" = not spiked; 2,4-D = (2,4-dichlorophenoxy)acetic acid; 2,4-DP = dichlorprop; 2,4,5-T = (2,4,5-trichlorophenoxy)acetic acid; "<" = less than; less-than velues were set equal to zero for calculations]

Para-meter code	Constituent	Concentrstion, in nanograma per liter: Laboratory results: Replicate 1 (not spiked) A	Replicate 2 (not spiked) B	Difference |A - B|	Replicate 3 (spiked) C	Calculated concentration in replicate 3 (spiked) D	Recovery, in percent C x 100 / D
82052	Dicamba	10	10	0	20	ns	ns
39730	2,4-D	50	60	10	360	680	53
82183	2,4-DP	<10	<10	0	<10	ns	ns
39760	Fenoprop	<10	<10	0	280	510	55
39720	Picloram	<10	<10	0	<10	ns	ns
39740	2,4,5-T	<10	<10	0	220	450	49

Table 31G. Concentrations of chlorophenoxy-ecid herbicides, dicambe, and picloram in replicate end spiked whole-water samples from Buckskin Slough below Gleed Ditch near Gleed, Washington, May 22, 1991, et 1100 hour and 1107 hour

[Station number 12496550; map reference number 21--figure 1; in addition to analytical variability, the results include temporal variability, because the samples were collected 7 minutes apart; 2,4-D = (2,4-dichlorophenoxy)acetic acid; 2,4,5-T = (2,4,5-trichlorophenoxy)acetic acid; "<" = less than; less-than values were set equal to zero for calculations]

Para-meter code	Constituent	Concentretion, in nanograms per liter: Laboratory results: Replicate 1 (not spiked) A	Replicate 2 (spiked) B	Calculated concentretion in replicate 2 C	Recovery, in percent B x 100 / C
82052	Dicamba	<10	60	110	54
39730	2,4-D	<10	90	110	82
39760	Fenoprop	<10	60	110	54
39720	Picloram	<10	60	110	54
39740	2,4,5-T	<10	60	110	54

Table 32A. Concentrations of organochlorine and organophosphorus compounds in replicate whole-water samples from Cle Elum River above Cle Elum Lake near Roslyn, Washington, July 26, 1988, at 1000 hour and 1015 hour

[Station number 12478300; map reference number 3--figure 1; in addition to analytical variability, the results include temporal variability, because the samples were collected 15 minutes apart; DDD = dichlorodiphenyldichloroethane; DDE = dichlorodiphenyldichloroethylene; DDT = dichlorodiphenyltrichloroethane; HCH = hexachlorocyclohexane; PCB = gross polychlorinated biphenyls; PCN = gross polychlorinated naphthalenes; "<" = less than; less-than values were set equal to zero for calculations]

Parameter code	Constituent	Concentration, in nanograms per liter: Replicate 1 (not spiked) A	Replicate 2 (not spiked) B	Difference |A - B|
	Organochlorine compounds			
39330	Aldrin	<1	<1	0
39350	gross Chlordane	<100	<100	0
39360	p,p'-DDD	<1	<1	0
39365	p,p'-DDE	<1	<1	0
39370	p,p'-DDT	<1	<1	0
39380	Dieldrin	<1	<1	0
39388	Endosulfan I	<1	<1	0
39390	Endrin	<1	<1	0
39410	Heptachlor	<1	<1	0
39420	Heptachlor epoxide	<1	<1	0
39340	Lindane (gamma-HCH)	<1	<1	0
39480	p,p'-Methoxychlor	<10	<10	0
39755	Mirex	<10	<10	0
39516	PCB	<100	<100	0
39250	PCN	<100	<100	0
39034	Perthane	<100	<100	0
39400	Toxaphene	<1,000	<1,000	0
	Organophosphorus compounds			
39570	Diazinon	<10	<10	0
39398	Ethion	<10	<10	0
39530	Malathion	<10	<10	0
39600	Methyl parathion	<10	<10	0
39790	Methyl trithion	<10	<10	0
39540	Parathion	<10	<10	0
39786	Trithion	<10	<10	0

Table 32B. Concentrations of organochlorine and organophosphorus compounds in replicate whole-water samples from Cherry Creek at Thrall, Washington, June 2, 1988, at 1400 hour and 1405 hour

[Station number 12484480; map reference number 13--figure 1; in addition to analytical variability, the results include temporal variability, because the samples were collected 5 minutes apart; DDD = dichlorodiphenyldichloroethane; DDE = dichlorodiphenyldichloroethylene; DDT = dichlorodiphenyltrichloroethane; HCH = hexachlorocyclohexane; PCB = gross polychlorinated biphenyls; PCN = gross polychlorinated naphthalenes; "<" = less than; less-than values were set equal to zero for calculations]

Parameter code	Constituent	Concentration, in nanograms per liter: Replicate 1 (not spiked) A	Replicate 2 (not spiked) B	Difference |A - B|
	Organochlorine compounds			
39330	Aldrin	<1	<1	0
39350	gross Chlordane	<100	<100	0
39360	p,p'-DDD	<1	<1	0
39365	p,p'-DDE	1	1	0
39370	p,p'-DDT	<1	<1	0
39380	Dieldrin	3	3	0
39388	Endosulfan I	<1	<1	0
39390	Endrin	<1	<1	0
39410	Heptachlor	<1	<1	0
39420	Heptachlor epoxide	<1	<1	0
39340	Lindane (gamma-HCH)	<1	<1	0
39480	p,p'-Methoxychlor	<10	<10	0
39755	Mirex	<10	<10	0
39516	PCB	<100	<100	0
39250	PCN	<100	<100	0
39034	Perthane	<100	<100	0
39400	Toxaphene	<1,000	<1,000	0
	Organophosphorus compounds			
39570	Diazinon	<10	<10	0
39398	Ethion	<10	<10	0
39530	Malathion	<10	<10	0
39600	Methyl parathion	<10	<10	0
39790	Methyl trithion	<10	<10	0
39540	Parathion	<10	<10	0
39786	Trithion	<10	<10	0

Table 32C. Concentrations of organochlorine and organophosphorus compounds in replicate whole-water samples from Wide Hollow Creek near mouth at Union Gap, Washington, November 15, 1988, at 1330 hour and 1430 hour

[Station number 12500445; map reference number 27--figure 1; in addition to analytical variability, the results include temporal variability, because the samples were collected 1 hour apart; DDD = dichlorodiphenyldichloroethane; DDE = dichlorodiphenyldichloroethylene; DDT = dichlorodiphenyltrichloroethane; HCH = hexachlorocyclohexane; PCB = gross polychlorinated biphenyls; PCN = gross polychlorinated naphthalenes; "<" = less than; less-than values were set equal to zero for calculations]

Parameter code	Constituent	Concentration, in nanograms per liter: Replicate 1 (not spiked) A	Replicate 2 (not spiked) B	Difference |A - B|
	Organochlorine compounds			
39330	Aldrin	<1	<1	0
39350	gross Chlordane	<100	<100	0
39360	p,p'-DDD	<1	<1	0
39365	p,p'-DDE	1	1	0
39370	p,p'-DDT	<1	<1	0
39380	Dieldrin	2	2	0
39388	Endosulfan I	11	13	2
39390	Endrin	<1	<1	0
39410	Heptachlor	<1	<1	0
39420	Heptachlor epoxide	<1	<1	0
39340	Lindane (gamma-HCH)	<1	<1	0
39480	p,p'-Methoxychlor	<10	<10	0
39755	Mirex	<10	<10	0
39516	PCB	<100	<100	0
39250	PCN	<100	<100	0
39034	Perthane	<100	<100	0
39400	Toxaphene	<1,000	<1,000	0
	Organophosphorus compounds			
39570	Diazinon	<10	<10	0
39398	Ethion	<10	<10	0
39530	Malathion	<10	<10	0
39600	Methyl parathion	<10	<10	0
39790	Methyl trithion	<10	<10	0
39540	Parathion	<10	<10	0
39786	Trithion	<10	<10	0

Table 32D. Concentrations of organochlorine and organophosphorus compounds in replicate whole-water samples from Moxee Drain at Thorp Road near Union Gap, Washington, May 6, 1988, at 0930 hour and 0940 hour

[Station number 12500430; map reference number 24--figure 1; in addition to analytical variability, the results include temporal variability, because the samples were collected 10 minutes apart; DDD = dichlorodiphenyldichloroethane; DDE = dichlorodiphenyldichloroethylene; DDT = dichlorodiphenyltrichloroethane; HCH = hexachlorocyclohexane; PCB = gross polychlorinated biphenyls; PCN = gross polychlorinated naphthalenes; "<" = less than; less-than values were set equal to zero for calculations]

Parameter code	Constituent	Concentration, in nanograms per liter: Replicate 1 (not spiked) A	Replicate 2 (not spiked) B	Difference |A - B|
	Organochlorine compounds			
39330	Aldrin	<1	<1	0
39350	gross Chlordane	<100	<100	0
39360	p,p'-DDD	1	<1	1
39365	p,p'-DDE	4	4	0
39370	p,p'-DDT	4	4	0
39380	Dieldrin	1	1	0
39388	Endosulfan I	16	30	14
39390	Endrin	<1	<1	0
39410	Heptachlor	<1	<1	0
39420	Heptachlor epoxide	<1	<1	0
39340	Lindane (gamma-HCH)	<1	<1	0
39480	p,p'-Methoxychlor	<10	<10	0
39755	Mirex	<10	<10	0
39516	PCB	<100	<100	0
39250	PCN	<100	<100	0
39034	Perthane	<100	<100	0
39400	Toxaphene	<1,000	<1,000	0
	Organophosphorus compounds			
38932	Chloryrifos	10	10	0
39570	Diazinon	<10	<10	0
39398	Ethion	<10	<10	0
39530	Malathion	<10	<10	0
39600	Methyl parathion	<10	<10	0
39790	Methyl trithion	<10	<10	0
39540	Parathion	<10	<10	0
39786	Trithion	<10	<10	0

Table 32E. Concentrations of organochlorine and organophosphorus compounds in replicate whole-water samples from Granger Drain at mouth near Granger, Washington, July 28, 1988, at 0930 hour and 1015 hour

[Station number 12505460; map reference number 36--figure 1; in addition to analytical variability, the results include temporal variability, because the samples were collected 45 minutes apart; DDD = dichlorodiphenyldichloroethane; DDE = dichlorodiphenyldichloroethylene; DDT = dichlorodiphenyltrichloroethane; HCH = hexachlorocyclohexane; PCB = gross polychlorinated biphenyls; PCN = gross polychlorinated naphthalenes; "<" = less than; less-than values were set equal to zero for calculations]

Parameter code	Constituent	Concentration, in nanograms per liter: Replicate 1 (not spiked) A	Replicate 2 (not spiked) B	Difference |A - B|
	Organochlorine compounds			
39330	Aldrin	<1	<1	0
39350	gross Chlordane	<100	<100	0
39360	p,p'-DDD	7	10	3
39365	p,p'-DDE	53	47	6
39370	p,p'-DDT	43	39	4
39380	Dieldrin	30	17	13
39388	Endosulfan I	76	83	7
39390	Endrin	<1	<1	0
39410	Heptachlor	<1	<1	0
39420	Heptachlor epoxide	<1	<1	0
39340	Lindane (gamma-HCH)	<1	<1	0
39480	p,p'-Methoxychlor	<10	<10	0
39755	Mirex	<10	<10	0
39516	PCB	<100	<100	0
39250	PCN	<100	<100	0
39034	Perthane	<100	<100	0
39400	Toxaphene	<1,000	<1,000	0
	Organophosphorus compounds			
39570	Diazinon	20	10	10
39398	Ethion	<10	<10	0
39530	Malathion	<10	<10	0
39600	Methyl parathion	<10	<10	0
39790	Methyl trithion	<10	<10	0
39540	Parathion	<10	<10	0
39786	Trithion	<10	<10	0

Table 32F. Concentrations of organochlorine and organophosphorus compounds in replicate and spiked whole-water samples from Sulphur Creek Wasteway near Sunnyside, Washington, August 31, 1988, at 1530 hour and 1630 hour 1/

[Station number 12508850; map reference number 46--figure 1; in addition to analytical variability, the results include temporal variability, because the samples were collected 1 hour apart; DDD = dichlorodiphenyl- dichloroethane; DDE = dichlorodiphenyldichloroethylene; DDT = dichlorodiphenyltrichloroethane; HCH = hexachlorocyclohexane; PCB = gross polychlorinated biphenyls; PCN = gross polychlorinated naphthalenes; "<" = less than; less-than values were set equal to zero for calculations]

Parameter code	Constituent	Concentration, in nanograms per liter: Replicate 1 (not spiked) A	Replicate 2 (not spiked) B	Difference |A - B|
	Organochlorine compounds			
39330	Aldrin	<1	<1	0
39350	gross Chlordane	<100	<100	0
39360	p,p'-DDD	1	1	0
39365	p,p'-DDE	7	7	0
39370	p,p'-DDT	6	5	1
39380	Dieldrin	6	6	0
39388	Endosulfan I	11	5	6
39390	Endrin	<1	<1	0
39410	Heptachlor	<1	<1	0
39420	Heptachlor epoxide	<1	<1	0
39340	Lindane (gamma-HCH)	<1	<1	0
39480	p,p'-Methoxychlor	<10	<10	0
39755	Mirex	<10	<10	0
39516	PCB	<100	<100	0
39250	PCN	<100	<100	0
39034	Perthane	<100	<100	0
39400	Toxaphene	<1,000	<1,000	0
	Organophosphorus compounds			
39570	Diazinon	10	<10	10
39398	Ethion	<10	<10	0
39530	Malathion	<10	<10	0
39600	Methyl parathion	<10	<10	0
39790	Methyl trithion	<10	<10	0
39540	Parathion	<10	<10	0
39786	Trithion	<10	<10	0

1/ A third replicate of this sample was collected at 1600 hour, and it was spiked with organochlorine compounds, including 4,600 nanograms per liter (ng/L) of toxaphene. The laboratory reported 4,000 ng/L. The other organochlorine compounds could not be quantified because of analytical interference, possibly associated with the relatively large toxaphene spike (Frank W. Wiebe, U.S. Geological Survey, Arvada, Colorado, written commun., December 1991).

Table 32G. Concentrations of organochlorine and organophosphorus compounds in replicate whole-water samples from a well (station identifier: 12N/19E-09H01), Washington, January 20, 1989, at 0730 hour and 0737 hour

[Station number 463234120261601; map reference number 59--figure 1; in addition to analytical variability, the results include temporal variability, because the samples were collected 7 minutes apart; DDD = dichlorodiphenyldichloroethane; DDE = dichlorodiphenyldichloroethylene; DDT = dichlorodiphenyltrichloroethane; HCH = hexachlorocyclohexane; PCB = gross polychlorinated biphenyls; PCN = gross polychlorinated naphthalenes; "<" = less than; less-than values were set equal to zero for calculations]

Parameter code	Constituent	Concentration, in nanograms per liter Replicate 1 (not spiked) A	Replicate 2 (not spiked) B	Difference |A - B|
	Organochlorine compounds			
39330	Aldrin	<1	<1	0
39350	gross Chlordane	<100	<100	0
39360	p,p'-DDD	<1	<1	0
39365	p,p'-DDE	<1	<1	0
39370	p,p'-DDT	<1	<1	0
39380	Dieldrin	<1	<1	0
39388	Endosulfan I	<1	<1	0
39390	Endrin	<1	<1	0
39410	Heptachlor	<1	<1	0
39420	Heptachlor epoxide	<1	<1	0
39340	Lindane (gamma-HCH)	<1	<1	0
39480	p,p'-Methoxychlor	<10	<10	0
39755	Mirex	<10	<10	0
39516	PCB	<100	<100	0
39250	PCN	<100	<100	0
39034	Perthane	<100	<100	0
39400	Toxaphene	<1,000	<1,000	0
	Organophosphorus compounds			
39570	Diazinon	<10	<10	0
39398	Ethion	<10	<10	0
39530	Malathion	<10	<10	0
39600	Methyl parathion	<10	<10	0
39790	Methyl trithion	<10	<10	0
39540	Parathion	<10	<10	0
39786	Trithion	<10	<10	0

Table 33A. Concentrations of phenols and cresols (acid-extractable compounds) in replicate whole-water samples from Wide Hollow Creek near mouth at Union Gap, Washington, November 15, 1988, at 1330 hour and 1430 hour

[Station number 12500445; map reference number 27--figure 1; in addition to analytical variability, the results include temporal variability, because the samples were collected 1 hour apart; "<" = less than; less-than values were set equal to zero for calculations]

Parameter code	Constituent	Concentration, in nanograms per liter: Replicate 1 (not spiked) A	Replicate 2 (not spiked) B	Difference |A - B|
34586	2-Chlorophenol	<5,000	<5,000	0
34601	2,4-Dichlorophenol	<5,000	<5,000	0
34606	2,4-Dimethylphenol	<5,000	<5,000	0
34657	4,6-Dinitro-o-cresol	<30,000	<30,000	0
34616	2,4-Dinitrophenol	<20,000	<20,000	0
34591	2-Nitrophenol	<5,000	<5,000	0
34646	4-Nitrophenol	<30,000	<30,000	0
34452	P-chloro-m-cresol	<30,000	<30,000	0
39032	Pentachlorophenol	<30,000	<30,000	0
34694	Phenol	<5,000	<5,000	0
34621	2,4,6-Trichlorophenol	<20,000	<20,000	0

Table 33B. Concentrations of phenols and cresols (acid-extractable compounds) in replicate and spiked whole-water samples from Sulphur Creek Wasteway near Sunnyside, Washington, August 31, 1988, at 1530 hour and 1630 hour

[Station number 12508850; map reference number 46--figure 1; in addition to analytical variability, the results include temporal variability, because the samples were collected 1 hour apart; "<" = less than; less-than values were set equal to zero for calculations]

Parameter code	Constituent	Concentrations, in nanograms per liter: Laboratory results: Replicate 1 (not spiked) A	Replicate 2 (not spiked) B	Difference |A - B|	Replicate 3 (spiked) C	Calculated concentration in replicate 3 (spiked) D	Recovery, in percent C x 100 / D
34586	2-Chlorophenol	<5,000	<5,000	0	21,000	29,000	72
34601	2,4-Dichlorophenol	<5,000	<5,000	0	27,000	29,000	93
34606	2,4-Dimethylphenol	<5,000	<5,000	0	22,000	29,000	76
34657	4,6-Dinitro-o-cresol	<30,000	<30,000	0	230,000	144,000	160
34616	2,4-Dinitrophenol	<20,000	<20,000	0	93,000	86,000	110
34591	2-Nitrophenol	<5,000	<5,000	0	30,000	29,000	100
34646	4-Nitrophenol	<30,000	<30,000	0	73,000	144,000	51
34452	P-chloro-m-cresol	<30,000	<30,000	0	130,000	144,000	90
39032	Pentachlorophenol	<30,000	<30,000	0	170,000	144,000	120
34694	Phenol	<5,000	<5,000	0	<5,000	29,000	<17
34621	2,4,6-Trichlorophenol	<20,000	<20,000	0	100,000	86,000	120

Table 34A. Concentrations of triazine, acetamide, chloroacetanilide, and other pesticides in spiked whole-water samples from Cle Elum River above Cle Elum Lake near Roslyn, Washington, July 26, 1988, at 0930 hour and 1000 hour

[Station number 12478300; map reference number 3--figure 1; in addition to analytical variability, the results include temporal variability, because the samples were collected 30 minutes apart; "<" = less than; less-than values were set equal to zero for calculations]

Parameter code	Constituent	Concentrations, in nanograms per liter: Laboratory results: Replicate 1 (not spiked) A	Laboratory results: Replicate 2 (spiked) B	Calculated concentration in replicate 2 C	Recovery, in percent B x 100 / C
77825	Alachlor	<100	520	480	110
39630	Atrazine	<100	330	340	97
82612	Metolachlor	<100	500	420	120
82611	Metribuzin	<100	470	420	110
39055	Simazine	<100	350	350	100
39030	Trifluralin	<100	430	490	88

Table 34B. Concentrations of triazine, acetamide, chloroacetanilide, and other pesticides in replicate whole-water samples from Cherry Creek at Thrall, Washington, June 2, 1988, at 1400 hour and 1405 hour

[Station number 12484480; map reference number 13--figure 1; in addition to analytical variability, the results include temporal variability, because the samples were collected 5 minutes apart; "<" = less than; less-than values were set equal to zero for calculations]

Parameter code	Constituent	Concentration, in nanograms per liter: Replicate 1 (not spiked) A	Replicate 2 (not spiked) B	Difference |A - B|
77825	Alachlor	<100	<100	0
82184	Ametryn	<100	<100	0
39630	Atrazine	20	60	40
30234	Bromacil	<100	<100	0
30235	Butachlor	<100	<100	0
30236	Butylate	<100	<100	0
30245	Carboxin	<100	<100	0
81757	Cyanazine	<100	<100	0
30254	Cycloate	<100	<100	0
30255	Diphenamid	<100	<100	0
30264	Hexazinone	<100	<100	0
82612	Metolachlor	<100	<100	0
82611	Metribuzin	<100	<100	0
39056	Prometone	<100	<100	0
39057	Prometryn	<100	<100	0
30295	Propachlor	<100	<100	0
39024	Propazine	<100	<100	0
39055	Simazine	<100	40	40
39054	Simetryn	<100	<100	0
30311	Terbacil	<100	<100	0
39030	Trifluralin	<100	<100	0
30324	Vernolate	<100	<100	0

Table 34C. Concentrations of triazine, acetamide, chloroacetanilide, and other pesticides in replicate whole-water samples from Wide Hollow Creek near mouth at Union Gap, Washington, November 15, 1988, at 1330 hour and 1430 hour

[Station number 12500445; map reference number 27--figure 1; in addition to analytical variability, the results include temporal variability, because the samples were collected 1 hour apart; "<" = less than; less-than values were set equal to zero for calculations]

Parameter code	Constituent	Concentration, in nanograms per liter: Replicate 1 (not spiked) A	Replicate 2 (not spiked) B	Difference |A - B|
77825	Alachlor	<100	<100	0
82184	Ametryn	<100	<100	0
39630	Atrazine	<100	<100	0
30234	Bromacil	<100	<100	0
30235	Butachlor	<100	<100	0
30236	Butylate	<100	<100	0
30245	Carboxin	<100	<100	0
81757	Cyanazine	<100	<100	0
30254	Cycloate	<100	<100	0
30255	Diphenamid	<100	<100	0
30264	Hexazinone	<100	<100	0
82612	Metolachlor	<100	<100	0
82611	Metribuzin	<100	<100	0
39056	Prometone	<100	<100	0
39057	Prometryn	<100	<100	0
30295	Propachlor	<100	<100	0
39024	Propazine	<100	<100	0
39055	Simazine	<100	<100	0
39054	Simetryn	<100	<100	0
30311	Terbacil	<100	<100	0
39030	Trifluralin	<100	<100	0
30324	Vernolate	<100	<100	0

Table 34D. Concentrations of triazine, acetamide, chloroacetanilide, and other pesticides in replicate whole-water samples from Moxee Drain at Thorp Road near Union Gap, Washington, May 6, 1988, at 0930 hour and 0940 hour

[Station number 12500430; map reference number 24--figure 1; in addition to analytical variability, the results include temporal variability, because the samples were collected 10 minutes apart; "<" = less than; less-than values were set equal to zero for calculations]

Parameter code	Constituent	Concentration, in nanograms per liter: Replicate 1 (not spiked) A	Replicate 2 (not spiked) B	Difference |A - B|
77825	Alachlor	<100	<100	0
82184	Ametryn	<100	<100	0
39630	Atrazine	30	30	0
30234	Bromacil	<100	<100	0
30235	Butachlor	<100	<100	0
30236	Butylate	<100	<100	0
30245	Carboxin	<100	<100	0
81757	Cyanazine	<100	<100	0
30254	Cycloate	<100	<100	0
30255	Diphenamid	<100	<100	0
30264	Hexazinone	<100	<100	0
82612	Metolachlor	<100	<100	0
82611	Metribuzin	<100	<100	0
39056	Prometone	<100	<100	0
39057	Prometryn	<100	<100	0
30295	Propachlor	<100	<100	0
39024	Propazine	<100	<100	0
39055	Simazine	20	20	0
39054	Simetryn	<100	<100	0
30311	Terbacil	<100	<100	0
39030	Trifluralin	<100	<100	0
30324	Vernolate	<100	<100	0

Table 34E. Concentrations of triazine, acetamide, chloroacetanilide, and other pesticides in spiked whole-water samples from Granger Drain at mouth near Granger, Washington, July 28, 1988, at 0930 hour and 1015 hour

[Station number 12505460; map reference number 36--figure 1; in addition to analytical variability, the results include temporal variability, because the samples were collected 45 minutes apart; "<" = less than; less-than values were set equal to zero for calculations]

Parameter code	Constituent	Concentrations, in nanograms per liter: Laboratory results: Replicate 1 (not spiked) A	Replicate 2 (spiked) B	Calculated concentration in replicate 2 C	Recovery, in percent B x 100 / C
77825	Alachlor	<100	570	570	100
39630	Atrazine	47	430	410	100
82612	Metolachlor	<100	570	510	110
82611	Metribuzin	<100	530	500	110
39055	Simazine	104	500	420	120
39030	Trifluralin	42	510	580	88

Table 34F. Concentrations of triazine, acetamide, chloroacetanilide, and other pesticides in replicate and spiked whole-water samples from Sulphur Creek Wasteway near Sunnyside, Washington, August 31, 1988, at 1530 hour and 1630 hour

[Station number 12508850; map reference number 46--figure 1; in addition to analytical variability, the results include temporal variability, because the samples were collected 1 hour apart; "ns" = not spiked; "<" = less than; less-than values were set equal to zero for calculations]

Parameter code	Constituent	Concentrations in nanograms per liter: Laboratory results: Replicate 1 (not spiked) A	Replicate 2 (not spiked) B	Difference |A - B|	Replicate 3 (spiked) C	Calculated concentration in replicate 3 (spiked) D	Recovery, in percent C x 100 / D
77825	Alachlor	<100	<100	0	530	670	79
82184	Ametryn	<100	<100	0	ns	ns	ns
39630	Atrazine	34	34	0	440	510	86
30234	Bromacil	<100	<100	0	ns	ns	ns
30235	Butachlor	<100	<100	0	ns	ns	ns
30236	Butylate	<100	<100	0	ns	ns	ns
30245	Carboxin	<100	<100	0	ns	ns	ns
81757	Cyanazine	<100	<100	0	ns	ns	ns
30254	Cycloate	<100	<100	0	ns	ns	ns
30255	Diphenamid	<100	<100	0	ns	ns	ns
30264	Hexazinone	<100	<100	0	ns	ns	ns
82612	Metolachlor	<100	<100	0	530	600	88
82611	Metribuzin	<100	<100	0	610	590	100
39056	Prometone	<100	<100	0	ns	ns	ns
39057	Prometryn	<100	<100	0	ns	ns	ns
30295	Propachlor	<100	<100	0	ns	ns	ns
39024	Propazine	<100	<100	0	ns	ns	ns
39055	Simazine	29	24	5	310	530	58
39054	Simetryn	<100	<100	0	ns	ns	ns
30311	Terbacil	<100	<100	0	ns	ns	ns
39030	Trifluralin	<100	<100	0	470	690	68
30324	Vernolate	<100	<100	0	ns	ns	ns

Table 35A. Concentrations of volatile organic compounds in replicate whole-water samples from Wide Hollow Creek near mouth at Union Gap, Washington, November 15, 1988, at 1330 hour and 1430 hour

[Station number 12500445; map reference number 27--figure 1; in addition to analytical variability, the results include temporal variability, because the samples were collected 1 hour apart; "<" = less than; less-than values were set equal to zero for calculations]

Parameter code	Constituent	Concentration, in nanograms per liter Replicate 1 (not spiked) A	Replicate 2 (not spiked) B	Difference |A - B|
34030	Benzene	<200	<200	0
81555	Bromobenzene	<200	<200	0
32101	Bromodichloromethane	<200	<200	0
32104	Bromoform	<200	<200	0
34413	Bromomethane	<200	<200	0
32102	Carbon tetrachloride	<200	<200	0
34301	Chlorobenzene	<200	<200	0
34311	Chloroethane	<200	<200	0
32106	Chloroform	<200	<200	0
34418	Chloromethane	<200	<200	0
77275	1,2-Chlorotoluene	<200	<200	0
77277	1,4-Chlorotoluene	<200	<200	0
34704	cis-1,3-Dichloropropene	<200	<200	0
32105	Dibromochloromethane	<200	<200	0
77651	1,2-Dibromoethane	<200	<200	0
30217	Dibromomethane	<200	<200	0
34536	1,2-Dichlorobenzene	<200	<200	0
34566	1,3-Dichlorobenzene	<200	<200	0
34571	1,4-Dichlorobenzene	<200	<200	0
34668	Dichlorodifluoromethane	<200	<200	0
34496	1,1-Dichloroethane	<200	<200	0
32103	1,2-Dichloroethane	<200	<200	0
34501	1,1-Dichloroethene	<200	<200	0
45617	1,2-Dichloroethene	<200	<200	0
34541	1,2-Dichloropropane	<200	<200	0
77173	1,3-Dichloropropane	<200	<200	0
77170	2,2-Dichloropropane	<200	<200	0
77168	1,1-Dichloropropene	<200	<200	0
34371	Ethylbenzene	<200	<200	0
34423	Methylene chloride	<200	<200	0
77128	Styrene	<200	<200	0
77562	1,1,1,2-Tetrachloroethane	<200	<200	0
34516	1,1,2,2-Tetrachloroethane	<200	<200	0
34475	Tetrachloroethene	<200	<200	0
34010	Toluene	<200	<200	0
34546	trans-1,2-Dichloroethene	<200	<200	0
34699	trans-1,3-Dichloropropene	<200	<200	0
34506	1,1,1-Trichloroethane	<200	<200	0
34511	1,1,2-Trichloroethane	<200	<200	0
39180	Trichloroethene	<200	<200	0
34488	Trichlorofluoromethane	<200	<200	0
77443	1,2,3-Trichloropropane	<200	<200	0
39175	Vinyl chloride	<200	<200	0
81551	Xylene	<200	<200	0

Table 35B. Concentrations of volatile organic compounds in replicate and spiked whole-water samples from Sulphur Creek Wasteway near Sunnyside, Washington, August 31, 1988, at 1530 hour and 1630 hour

[Station number 12508850; map reference number 46--figure 1; in addition to analytical variability, the results include temporal variability, because the samples were collected 1 hour apart; "ns" = not spiked; "<" = less than; less-than values were set equal to zero for calculations]

Parameter code	Constituent	Concentrations, in nanograms per liter					
		Laboratory results					
		Replicate 1 (not spiked) A	Replicate 2 (not spiked) B	Difference |A - B|	Replicate 3 (spiked) C	Calculated concentration in replicate 3 (spiked) D	Recovery, in percent C x 100 / D
34030	Benzene	<200	<200	0	3,200	5,000	64
81555	Bromobenzene	<200	<200	0	<200	ns	ns
32101	Bromodichloromethane	<200	<200	0	2,400	5,000	48
32104	Bromoform	<200	<200	0	2,600	5,000	52
34413	Bromomethane	<200	<200	0	1,300	5,000	26
32102	Carbon tetrachloride	<200	<200	0	3,600	5,000	72
34301	Chlorobenzene	<200	<200	0	3,400	5,000	68
34311	Chloroethane	<200	<200	0	1,400	5,000	28
32106	Chloroform	<200	<200	0	4,900	5,000	98
34418	Chloromethane	<200	<200	0	1,100	5,000	22
77275	1,2-Chlorotoluene	<200	<200	0	<200	ns	ns
77277	1,4-Chlorotoluene	<200	<200	0	<200	ns	ns
34704	cis-1,3-Dichloropropene	<200	<200	0	<200	ns	ns
32105	Dibromochloromethane	<200	<200	0	1,300	5,000	26
77651	1,2-Dibromoethane	<200	<200	0	<200	ns	ns
30217	Dibromomethane	<200	<200	0	<200	ns	ns
34536	1,2-Dichlorobenzene	<200	<200	0	<200	ns	ns
34566	1,3-Dichlorobenzene	<200	<200	0	<200	ns	ns
34571	1,4-Dichlorobenzene	<200	<200	0	<200	ns	ns
34668	Dichlorodifluoromethane	<200	<200	0	<200	ns	ns
34496	1,1-Dichloroethane	<200	<200	0	9,200	5,000	180
32103	1,2-Dichloroethane	<200	<200	0	3,900	5,000	78
34501	1,1-Dichloroethene	<200	<200	0	6,700	5,000	130
45617	1,2-Dichloroethene	<200	<200	0	<200	ns	ns
34541	1,2-Dichloropropane	<200	<200	0	2,400	5,000	48
77173	1,3-Dichloropropane	<200	<200	0	<200	ns	ns
77170	2,2-Dichloropropane	<200	<200	0	<200	ns	ns
77168	1,1-Dichloropropene	<200	<200	0	<200	ns	ns
34371	Ethylbenzene	<200	<200	0	3,600	5,000	72
34423	Methylene chloride	<200	<200	0	7,300	5,000	150
77128	Styrene	<200	<200	0	<200	ns	ns
77562	1,1,1,2-Tetrachloroethane	<200	<200	0	<200	ns	ns
34516	1,1,2,2-Tetrachloroethane	<200	<200	0	2,700	5,000	54
34475	Tetrachloroethene	<200	<200	0	2,500	5,000	50
34010	Toluene	<200	<200	0	2,600	5,000	52
34546	trans-1,2-Dichloroethene	<200	<200	0	<200	ns	ns
34699	trans-1,3-Dichloropropene	<200	<200	0	<200	ns	ns
34506	1,1,1-Trichloroethane	<200	<200	0	3,600	5,000	72
34511	1,1,2-Trichloroethane	<200	<200	0	2,700	5,000	54
39180	Trichloroethene	<200	<200	0	2,500	5,000	50
34488	Trichlorofluoromethane	<200	<200	0	4,600	5,000	92
77443	1,2,3-Trichloropropane	<200	<200	0	<200	ns	ns
39175	Vinyl chloride	<200	<200	0	1,300	5,000	26
81551	Xylene	<200	<200	0	<200	ns	ns

Table 36. Concentrations of pesticides in filtered water (using the Goulden large-sample extractor), associated with suspended sediment (analysis of a large sample of de-watered sediment on a glass-fiber filter), and in whole water (conventional analysis of a 1-liter sample of a sediment-water mixture), Yakima River basin, Washington, June 25-30, 1989

[Concentrations in nanograms per liter; see figure 1 for site locations; "F" = filtered water; "S" = suspended sediment; "W" = whole water; "T" = present, but below quantifiable concentration; '--' = not analyzed; "nd" = not detected; "D" = detected and not quantified; "g" = analysis of cis- plus trans-chlordane; "<" = less than; DDD = dichlorodiphenyldichloroethane; DDE = dichlorodiphenyldichloroethylene; DDT = dichlorodiphenyltrichloroethane; HCB = hexachlorobenzene; HCH = hexachlorocyclohexane; minimum reporting levels were smaller for filtered and suspended analyses, because analytical sample volumes were large ranging from 4.4 to 34.5 liters for dissolved samples and from 41.8 to 83.9 liters for suspended samples]

Map reference number	Station number	Station name	Sample media	Organochlorine compounds								
				Aldrin	cis-Chlordane	trans-Chlordane	p,p'-DDD	p,p'-DDE	p,p'-DDT	Dieldrin	Endosulfan I	Endosulfan II
14	12484500	Yakima River at Umtanum	F	T<0.69	T<0.63	T<0.70	T<1.6	T<0.41	--	0.93	0.82	<0.81
			S	<.6	<0.4	<.04	.05	.12	0.26	.04	<.04	<.07
			W	<1	g<100	--	<1	<1	<1	<1	<1	--
24	12500430	Moxee Drain at Thorp Rd	F	<3.5	<1.8	<1.6	3.0	5.6	6.3	T<3.4	11	5.2
			S	<.01	T<.03	T<.03	1.6	7.1	9.6	.86	.69	<.06
			W	<1	g<100	--	<1	21	21	<1	<1	--
36	12505460	Granger Drain at mouth	F	<3.2	<1.6	<1.5	T<2.7	.96	T<8.9	T<3.1	T<1.4	<3.0
			S	.09	.05	.09	6.4	28	38	3.6	<.02	<2.0
			W	<1	g<100	--	<1	50	60	<1	<1	--
46	12508850	Sulphur Creek Wasteway	F	<15	<4.1	<3.8	9.4	15	14	35	6.8	<7.6
			S	<.05	T<.3	T<.3	1.7	6.4	7.8	2.1	<.06	<.1
			W	<1	g<100	--	<1	21	30	<1	<1	--
51	12510500	Yakima River at Kiona	F	T<69	<.63	<.70	1.4	1.2	1.6	3.6	1.2	<.81
			S	<.01	<.04	<.04	.17	9.6	.2	.08	<.04	<.08
			W	<1	g<100	--	<1	<1	<1	<1	<1	--

Station number	Station name	Sample media	Organochlorine compounds								
			Endrin	HCB	alpha-HCH	gamma-HCH (lindane)	Heptachlor epoxide	o,p'methoxychlor	p,p'methoxychlor	Mirex	Perthane
12484500	Yakima River at Umtanum	F	1.5	<0.56	<1.9	<2.6	T<1.2	<4.8	--	T<1.4	<1.4
		S	<.04	<.07	<.04	<.04	<.04	<.04	<0.04	<.2	--
		W	<1	--	--	<1	<1	--	<10	<10	<100
12500430	Moxee Drain at Thorp Rd	F	<6.8	<1.1	<3.9	<2.6	<2.5	<10	<12	<2.1	<3.2
		S	<.03	<.01	T<.03	<.03	T<.03	<.03	<.03	<.03	--
		W	<1	--	--	<1	<1	--	<10	<10	<100
12505460	Granger Drain at mouth	F	<6.1	T<.99	<3.5	T<2.3	<2.3	<9.0	<10	<1.9	T<2.8
		S	.31	.33	.02	.06	.15	3.4	.32	<.04	--
		W	<1	--	--	<1	<1	--	<10	<10	<100
12508850	Sulphur Creek Wasteway	F	<35	<2.4	<18	<16	<8.9	<41	--	<18	<20
		S	<.06	.08	<.06	<.06	<.06	<.06	<.06	<.06	--
		W	<1	--	--	<1	<1	--	<10	<10	<100
12510500	Yakima River at Kiona	F	<.56	T<.56	<1.9	<2.6	<1.2	<4.8	--	<1.4	<1.4
		S	<.04	.16	<.04	<.04	<.04	<.04	<.04	<.04	--
		W	<1	--	--	<1	<1	--	<10	<10	<100

Table 36. Concentrations of pesticides in filtered water (using the Goulden large-sample extractor), associated with suspended sediment (analysis of a large sample of de-watered sediment on a glass-fiber filter), and in whole water (conventional analysis of a 1-liter sample of a sediment-water mixture), Yakima River basin, Washington, June 25-30, 1989--Continued

Station number	Station name	Sample media	Organophosphorus compounds							
			Azinphos-methyl	Chlor-pyrifos	Demeton-S	Diazinon	Dimetho-ate	Disulfo-ton	Ethion	Fonofos
12484500	Yakima River at Umtanum	F	nd	T<2.4	<2.4	T<2.0	<3.7	<2.4	T<3.9	<2.0
		S	--	<.06	--	<.06	--	<.06	<.06	<.06
		W	--	--	--	<10	--	--	<10	--
12500430	Moxee Drain at Thorp Rd	F	D	T<6.7	T<7.9	406	<13	<7.6	T<11	<7.0
		S	--	.48	--	3.3	--	<.05	.52	<.05
		W	--	--	--	370	--	--	<10	--
12505460	Granger Drain at mouth	F	nd	T<6.0	<7.1	11	T<12	T<6.9	<10	<6.3
		S	--	<.1	--	1.9	--	<.08	T<.08	< .08
		W	--	--	--	10	--	--	<10	--
12508850	Sulphur Creek Wasteway	F	--	<26	T<34	66	328	T<27	<42	<17
		S	--	.16	--	.18	--	<.1	T<.1	<.1
		W	--	--	--	20	--	--	<10	--
12510500	Yakima River at Kiona	F	nd	9.6	<2.4	39	<3.7	<2.4	T<3.9	<2.0
		S	--	T<.06	--	.07	--	<.06	<.06	<.06
		W	--	--	--	30	--	--	<10	--

Station number	Station name	Sample media	Organophosphorus compounds								
			Malathion	Methida-thion	Methyl parathion	Methyl trithion	Mevinphos	Parathion	Phorate	Phospham-idon	Trithion
12484500	Yakima River at Umtanum	F	T<3.9	4.9	T<4.1	T<3.8	<3.2	T<3.2	<2.8	T<6.5	<3.6
		S	<.06	--	<.06	<.06	--	<.06	<.06	--	<.06
		W	<10	--	<10	<10	--	<10	--	--	<10
12500430	Moxee Drain at Thorp Rd	F	T<11	<10	<14	<12	<9.5	<14	130	43	<9.4
		S	<.05	--	<.05	<.05	--	.14	1.4	--	<.05
		W	<10	--	<10	<10	--	<10	90	--	<10
12505460	Granger Drain at mouth	F	T<9.9	<9.5	<13	<11	T<8.6	<12	<8.0	56	<8.5
		S	<.08	--	<.08	<.08	--	<.08	<.08	--	<.08
		W	<10	--	<10	<10	--	<10	--	--	<10
12508850	Sulphur Creek Wasteway	F	T<44	<40	<11	<40	<34	<42	T<40	T<37	<42
		S	<.1	--	<.1	<.1	--	.10	T<.1	--	<.1
		W	10	--	<10	<10	--	<10	--	--	<10
12510500	Yakima River at Kiona	F	70	<3.0	<4.1	<3.8	<3.2	T<3.2	T<2.8	5.3	<3.6
		S	<.06	--	<.06	<.06	--	T<.06	<.06	--	<.06
		W	<10	--	<10	<10	--	10	--	--	<10

Table 36. Concentrations of pesticides in filtered water (using the Goulden large-sample extractor), associated with suspended sediment (analysis of a large sample of de-watered sediment on a glass-fiber filter), and in whole water (conventional analysis of a 1-liter sample of a sediment-water mixture), Yakima River basin, Washington, June 25-30, 1989--Continued

Station number	Station name	Sample media	Triazine, acetamide, uracil, chloroacetanilide, thiocarbamate, and anilide compounds [1]									
			Ala-chlor	Ametryn	Atra-zine	Broma-cil	Buta-chlor	Butylate	Car-boxin	Cyana-zine	Cyclo-ate	Diphen-amid
12484500	Yakima River at Umtanum	F	<1.6	nd	10	nd	nd	nd	--	<1.7	--	--
		W	<100	<100	<100	<100	<100	<100	<100	<100	<100	<100
12500430	Moxee Drain At Thorp Rd	F	<4.0	nd	8.5	nd	nd	nd	--	<3.7	--	--
		W	<100	<100	10	<100	<100	<100	<100	<100	<100	<100
12505460	Granger Drain at mouth	F	33	nd	48	13	nd	nd	--	8.6	--	--
		W	<100	<100	90	<100	<100	<100	<100	<100	<100	<100
12508850	Sulphur Creek Wasteway	F	33	nd	49	T	nd	nd	--	T<31	--	--
		W	<100	<100	22	<100	<100	<100	<100	<100	<100	<100
12510500	Yakima River at Kiona	F	12	nd	32	nd	nd	nd	--	<6.5	--	--
		W	<100	<100	<100	<100	<100	<100	<100	<100	<100	<100

Station number	Station name	Sample media	Triazine, acetamide, chloroacetanilide, uracil, trifluoromethyl, thiocarbamate compounds [1]										
			Hexazi-none	Metola-chlor	Metri-buzin	Prome-ton	Prome-tryn	Propa-chlor	Propa-zine	Sima-zine	Sime-tryn	Terba-cil	Triflur-alin	Verno-late
12484500	Yakima River at Umtanum	F	--	T<1.3	nd	1.1	nd	nd	T<0.39	2.2	nd	--	T<3.8	T
		W	<100	<100	<100	<100	<100	<100	<100	<100	<100	<100	<100	<100
12500430	Moxee Drain At Thorp Rd	F	--	<3.1	nd	<3.1	nd	nd	<3.6	<3.6	nd	--	T<14	nd
		W	<100	<100	<100	<100	<100	<100	<100	<100	<100	<100	<100	<100
12505460	Granger Drain at mouth	F	--	T<2.8	nd	32	nd	nd	<3.2	134	nd	--	28	T
		W	<100	<100	<100	50	<100	<100	<100	170	<100	<100	100	<100
12508850	Sulphur Creek Wasteway	F	--	T<15	T	26	nd	nd	<18	81	nd	--	T<32	nd
		W	<100	<100	<100	<100	<100	<100	<100	77	<100	<100	<100	<100
12510500	Yakima River at Kiona	F	--	1.9	T	3.0	nd	nd	.47	18	nd	--	T<3.8	nd
		W	<100	<100	<100	<100	<100	<100	<100	44	<100	<100	<100	<100

[1] Suspended sediment samples were not analyzed.

Table 37. Concentrations of organic carbon in replicate suspended-sediment samples and in spiked filtered-water samples from Chandler Canal at Bunn Road at Prosser, Washington, May 22, 1991, at 1500 hour and 1507 hour

[Station number 12509499; map reference number 48--figure 1]

Constituent	Concentration, in milligrams per liter: Laboratory results: Replicate 1 (not spiked) A	Replicate 2 (spiked) B	Calculated concentration in replicate 2 C	Recovery, in percent B x 100 / C
Dissolved organic carbon	2.2	3.7	3.1	120

Constituent	Concentration, in milligrams per liter: Laboratory results: Replicate 1 (not spiked) A	Replicate 2 (spiked) B	Difference |A - B|
Suspended organic carbon	0.7	0.6	0.1

Table 38. Concentration of organic carbon, suspended sediment, and turbidity in replicate water samples from Yakima River at Kiona, Washington, August 6, 1991, at 1150 hour and 1151 hour

[Station number 12510500; map reference number 51--figure 1; NTU = nephelometric turbidity units]

Parameter code	Constituent	Concentration: Replicate 1 (not spiked) A	Replicate 2 (not spiked) B	Difference | A - B |
00681	Dissolved organic carbon, in milligrams per liter	2.7	2.9	0.2
00689	Suspended organic carbon, in milligrams per liter	1.1	1.2	.1
80154	Suspended sediment, in milligrams per liter	32	30	2
70331	Sediment, percent finer than 0.062 millimeters	91	85	6
00076	Turbidity, in NTU	10	10	0

Table 39. Mean analytical recoveries using the Goulden large-sample extractor for extracting surrogate compounds from filtered-water samples, Yakima River basin, Washington, June 25-30, 1989

[One standard deviation of the mean is shown in parenthesis and is reported in percent; "$" includes field blanks]

Sample volume extracted, in liters	Number of samples	Mean analytical recoveries, in percent: Diazinon d-10	gamma-Hexachloro-cyclohexane d-6	Isodrin	Atrazine d-5	Terbuthylazine
5.0 - 7.7$	13	81 (16)	59 (43)	18 (19)	84 (14)	84 (15)
4.4 - 12	14	93 (14)	61 (26)	18 (16)	91 (18)	88 (23)
34 - 37	17	87 (10)	62 (21)	45 (14)	76 (11)	80 (9)
72 - 113	11	69 (26)	65 (20)	27 (17)	47 (19)	63 (20)
All samples	55	84 (18)	62 (28)	28 (20)	76 (22)	79 (19)

Table 40. Analytical recoveries using the Goulden large-sample extractor for extracting spiked compounds from filtered-water samples, Yakima River basin, Washington, June 25-30, 1989

[See table 2 for map reference numbers and figure 1 for site locations; natural occurring concentrations of pesticides have been substracted out of reported recoveries; DDD = dichlorodiphenyldichloroethane; DDE = dichlorodiphenyldichloroethylene; DDT = dichlorodiphenyltrichloroethane; HCB = hexachlorobenzene; HCH = hexachlorocyclohexane; DEF = S,S,S-tributyl phosphorotrithioate; EPTC = S-ethyl dipropylthiocarbamate; extracted sample volumes listed in parenthesis; L = liter; "--" = not analyzed; "nq" = not quantified, because of analytical problems; "*" = surrogate spike; negative recoveries indicate that concentration detected in native water sample exceeded concentration in spiked sample--negative recoveries occurred because actual concentrations in spiked samples were small and because laboratory precision at low concentrations is poor]

	Recovery of spiked compound, in percent						
	Station number						
	12508850	12505460	12508630	12500430	12510500		
	Station name						
Compounds	Sulphur Creek Wasteway (11.5 L)	Granger Drain (12.3 L)	South Drain (11.7 L)	Moxee Drain (11.4 L)	Yakima River at Kiona Replicate 1 (9.99 L)	Yakima River at Kiona Replicate 2 (9.51 L)	Yakima River at Kiona Replicate 3 (10.3 L)
Organochlorine							
Aldrin	46	30	30	48	29	22	53
cis-Chlordane	85	60	78	66	51	43	55
trans-Chlordane	79	55	73	62	47	39	51
p,p'-DDD	32	42	59	38	84	81	88
p,p'-DDE	48	61	56	44	52	45	55
p,p'-DDT	0	-5	3	1	8	10	10
p,p'-DDT d-8 *	13	0	3	4	7	9	9
Dieldrin	40	138	91	90	72	65	75
Endosulfan I	76	76	87	87	59	51	56
Endosulfan II	97	47	67	62	53	49	52
Endrin	58	145	92	94	--	--	--
HCB	45	23	32	59	41	31	35
alpha-HCH	60	56	69	71	76	64	72
beta-HCH	59	58	70	75	63	61	67
delta-HCH	86	--	--	--	75	70	79
gamma-HCH (lindane)	57	52	65	67	57	57	62
gamma-HCH d-6 *	56	50	52	65	74	73	83
Heptachlor	23	13	14	23	20	19	20
Heptachlor epoxide	107	64	115	135	51	59	75
Isodrin *	33	12	15	45	15	7	15
o,p'-Methoxychlor	14	12	16	13	18	23	23
p,p'-Methoxychlor	nq	nq	4	5	10	14	14
Mirex	11	11	16	15	18	17	23
Perthane	62	52	58	40	55	48	53
Organophosphorus							
Azinphos-methyl	--	--	--	--	63	52	44
Chlorpyrifos	116	71	92	89	86	81	85
DEF	65	76	73	69	72	66	69
Demeton-S	99	106	79	87	36	29	28
Diazinon	-36	74	50	-32	88	72	81
Diazinon d-10 *	92	78	82	81	97	91	92
Dimethoate	19	58	32	26	35	28	39
Disulfoton	83	80	69	76	37	29	27
Ethion	78	81	75	51	71	68	70
Fonofos	104	97	81	86	86	75	81
Isofenphos	61	97	78	71	93	89	93
Malathion	127	112	72	68	72	63	64
Methidathion	171	152	87	0	75	68	69
Methyl parathion	0	71	92	59	81	77	74
Methyl trithion	149	98	85	1	71	65	65
Mevinphos	122	90	87	86	91	72	80
Parathion	76	62	84	70	84	87	84
Phorate	168	121	87	82	70	63	52
Phosphamidon	22	420	110	43	104	77	107
Terbufos	116	95	68	79	60	50	49
Trithion	82	94	72	52	70	64	65

Table 40. Analytical recoveries using the Goulden large-sample extractor for extracting spiked compounds from filtered-water samples, Yakima River basin, Washington, June 25-30, 1989--Continued

Compounds	Recovery of spiked compound, in percent						
	Station number						
	12508850	12505460	12508630	12500430	12510500		
	Station name						
	Sulphur Creek Wasteway (11.5 L)	Granger Drain (12.3 L)	South Drain (11.7 L)	Moxee Drain (11.4 L)	Yakima River at Kiona Replicate 1 (9.99 L)	Yakima River at Kiona Replicate 2 (9.51 L)	Yakima River at Kiona Replicate 3 (10.3 L)
Triazine							
Ametryn	82	64	88	88	78	73	81
Atrazine	33	30	62	92	94	78	98
Atrazine d-5 *	85	73	101	82	83	75	86
Cyanazine	57	57	66	6	73	69	74
Metribuzin	92	70	72	77	76	72	77
Prometon	56	27	104	97	80	76	84
Prometryn	86	65	92	88	80	76	84
Propazine	90	72	107	92	88	80	90
Simazine	-39	-112	24	58	56	46	61
Simetryn	82	62	85	87	78	71	82
Terbuthylazine	76	73	106	85	82	74	84
Carbamate							
Carbaryl	52	nq	nq	nq	47	42	40
Carbofuran	30	38	38	28	29	30	32
EPTC	85	58	78	83	81	57	45
Thiocarbamate							
Butylate	62	37	61	79	53	38	32
Vernolate	84	78	77	85	79	60	51
Acetamide							
Alachlor	55	62	86	85	79	71	79
Metolachlor	84	77	84	83	75	69	76
Chloroacetanilide							
Butachlor	49	65	80	67	89	82	90
Propachlor	110	88	102	94	102	86	93
Conazole							
Triadimefon	71	78	92	92	84	78	86
Pyrethoid							
Flucythrinate	101	77	47	39	65	59	62
cis-Permethrin	33	35	34	23	49	40	47
trans-Permethrin	35	37	3	24	40	31	34
Sulfite							
Propargite	-439	114	89	-57	102	71	93
Trifluoromethyl							
Trifluralin	79	0	45	76	47	48	40
Uracil							
Bromacil	22	11	33	36	35	34	23
Urea							
Linuron	--	--	--	--	41	44	44

Table 40. Analytical recoveries using the Goulden large-sample extractor for extracting spiked compounds from filtered-water samples, Yakima River basin, Washington, June 25-30, 1989--Continued

Compounds	Recovery of spiked compound, in percent Station number 12510500 Station name Yakima River at Kiona (35.7 L)	Station number 12484500 Station name Yakima River at Umtanum (35.7 L)	Station number 12496510 Station name Pacific Power & Light Company Wasteway (113 L)	Station number 12507594 Station name Satus Creek above Wilson-Charley Canyon (111 L)
Organochlorine				
Aldrin	90	49	30	43
cis-Chlordane	156	101	83	78
trans-Chlordane	152	98	80	73
p,p'-DDD	51	53	42	51
p,p'-DDE	57	59	53	61
p,p'-DDT	29	29	23	8
p,p'-DDT d-8 *	5	44	24	9
Dieldrin	105	105	77	84
Endosulfan I	nq	99	85	81
Endosulfan II	59	63	47	58
Endrin	148	196	160	99
HCB	104	56	40	55
alpha-HCH	92	89	56	53
beta-HCH	101	85	68	56
delta-HCH	116	143	116	nq
gamma-HCH (lindane)	90	97	40	59
gamma-HCH d-6 *	57	103	74	56
Heptachlor	60	60	52	28
Heptachlor epoxide	130	117	72	78
Isodrin *	80	66	21	31
o,p'-Methoxychlor	25	39	28	19
p,p'-Methoxychlor	nq	nq	nq	9
Mirex	18	21	20	16
Perthane	86	60	54	57
Organophosphorus				
Chlorpyrifos	86	97	77	86
DEF	74	51	36	75
Demeton-S	102	101	75	58
Diazinon	77	88	68	59
Diazinon d-10 *	92	92	64	62
Dimethoate	23	34	18	9
Disulfoton	88	80	63	54
Ethion	77	81	65	68
Fonophos	87	82	65	61
Isofenphos	66	53	43	63
Malathion	-96	194	125	94
Methidathion	111	172	113	76
Methyl parathion	176	257	176	103
Methyl trithion	116	164	109	80
Mevinphos	94	64	40	27
Parathion	nq	73	66	79
Phorate	119	93	55	65
Phosphamidon	146	26	18	45
Terbufos	79	81	60	54
Trithion	75	68	59	69

Table 40. Analytical recoveries using the Goulden large-sample extractor for extracting spiked compounds from filtered-water samples, Yakima River basin, Washington, June 25-30, 1989--Continued

Compounds	Recovery of spiked compound, in percent Station number 12510500 Station name: Yakima River at Kiona (35.7 L)	Station number 12484500 Station name: Yakima River at Umtanum (35.7 L)	Station number 12496510 Station name: Pacific Power & Light Company Wasteway (113 L)	Station number 12507594 Station name: Satus Creek above Wilson-Charley Canyon (111 L)
Triazine				
Ametryn	104	77	58	64
Atrazine	114	68	56	56
Atrazine d-5 *	104	76	46	44
Cyanazine	75	47	26	24
Metribuzin	66	58	41	29
Prometon	113	72	60	51
Prometryn	110	83	63	72
Propazine	98	83	61	67
Simazine	77	25	24	18
Simetryn	103	67	52	41
Terbuthylazine	97	91	57	62
Carbamate				
Carbaryl	73	33	40	nq
Carbofuran	51	15	15	14
EPTC	126	81	44	61
Thiocarbamate				
Butylate	116	71	43	59
Vernolate	115	78	45	63
Acetamide				
Alachlor	117	103	74	74
Metolachlor	103	92	69	69
Chloroacetanilide				
Butachlor	98	83	56	60
Propachlor	118	114	59	64
Conazole				
Triadimefon	107	95	119	78
Pyrethoid				
Flucythrinate	--	124	60	64
cis-Permethrin	36	37	34	36
trans-Permethrin	47	41	36	38
Sulfite				
Propargite	86	99	59	82
Trifluoromethyl				
Trifluralin	108	84	51	63
Uracil				
Bromacil	-25	148	9	8

Table 41. Concentrations of pesticides extracted from replicate filtered-water samples using the Goulden large-sample extractor, Yakima River at Kiona, Washington, June 26, 1989

[Station number 12510500; map reference number 51--figure 1; "T" = trace concentration below minimum reporting level; "nd" = not detected; "ap" = analytical problems; "D" = detected, but not quantified; EPTC = S-ethyl dipropylthiocarbamate; DDD = dichlorodiphenyldichloroethane; DDE = dichlorodiphenyldichloroethylene; DDT = dichlorodiphenyltrichloroethane; HCB = hexachlorobenzene]

Compound	Concentration, in nanograms per liter			
	Sample number collected from 0800 to 1330 hour			Sample number 2 collected from 1350 to 1650 hour
	Replicate 1	Replicate 2	Replicate 3	
Acetamide compounds				
Alachlor	9.7	9.2	9.4	12
Metolachlor	1.7	T	1.5	1.9
Carbamate compounds				
EPTC	4.4	5.2	5.1	3.3
Organochlorine compounds				
Aldrin	nd	nd	nd	T
p,p'-DDD	T	T	T	1.4
p,p'-DDE	.93	T	.81	1.2
p,p'-DDT	ap	ap	ap	1.6
Dieldrin	2.9	T	2.5	3.6
Endosulfan I	nd	nd	nd	1.2
HCB	nd	nd	nd	T
Organophosphorus compounds				
Azinphos-methyl	9.0	6.5	6.7	nd
Chloropyrifos	T	T	T	9.6
Diazinon	40	40	40	39
Ethion	nd	nd	nd	T
Malathion	12	11	11	70
Parathion	T	T	T	T
Phorate	T	T	T	T
Phosphamidon	6.4	T	5.9	5.3
Pyrethoid compounds				
cis-Permethrin	T	T	T	nd
Sulfite compounds				
Propargite	11	11	11	7.2
Triazine				
Atrazine	37	36	36	32
Cyanazine	2.4	3.7	3.7	nd
Deethylatrazine	T	T	T	D
Deisopropylatrazine	T	T	T	D
Metribuzin	T	T	T	nd
Prometon	2.1	3.3	3.5	3.0
Propazine	nd	nd	nd	.47
Simazine	21	22	22	18
Trifluoromethyl compounds				
Trifluralin	T	T	T	T
Urea compounds				
Linuron	T	T	1.9	na

Table 42. Concentrations of organochlorine and organophosphorus compounds in spiked filtered-water samples from Yakima River at Kiona, Washington, May 21, 1991, at 1200 hour and 1207 hour

[Station number 12510500; map reference number 51--figure 1; "ns" = not spiked; DDD = dichlorodiphenyldichloroethane; DDE = dichlorodiphenyldichloroethylene; DDT = dichlorodiphenyltrichloroethane; PCB = gross polychlorinated biphenyls; PCN = gross polychlorinated naphthalenes; DEF = S,S,S-tributyl phosphorotrithioate; "<" = less than; less-than values were set equal to zero for calculations]

Parameter code	Compound	Concentration, in nanograms per liter: Laboratory results: Replicate 1 (not spiked) A	Laboratory results: Replicate 2 (spiked) B	Calculated concentration in replicate 2 C	Recovery, in percent B x 100 / C
Organochlorine compounds					
39331	Aldrin	<1	<1	ns	ns
39352	Gross chlordane	<100	<100	ns	ns
39361	p,p'-DDD	<1	<1	ns	ns
39366	p,p'-DDE	4	3	ns	ns
39371	p,p'-DDT	<1	<1	ns	ns
39381	Dieldrin	3	1	58	2
82354	Endosulfan I	<1	<1	ns	ns
39391	Endrin	<1	<1	ns	ns
39411	Heptachlor	<1	<1	ns	ns
39421	Heptachlor epoxide	<1	<1	ns	ns
39341	Lindane (gamma-HCH)	<1	<1	56	0
	p,p'-Methoxychlor	<10	<10	ns	ns
39756	Mirex	<10	<10	ns	ns
39517	PCB	<100	<100	ns	ns
82360	PCN	<100	<100	ns	ns
82348	Perthane	<100	<100	ns	ns
39401	Toxaphene	<1,000	<1,000	ns	ns
Organophosphate compounds					
	Chlorpyrifos	<10	<10	110	0
	DEF	<10	<10	ns	ns
39572	Diazinon	<10	<10	110	0
	Disulfoton	<10	<10	ns	ns
82346	Ethion	<10	<10	ns	ns
	Fonofos	<10	<10	ns	ns
39532	Malathion	<10	<10	110	0
39602	Methyl parathion	<10	<10	ns	ns
	Methyl trithion	<10	<10	ns	ns
39542	Parathion	<10	<10	110	0
	Phorate	<10	<10	ns	ns
82342	Trithion	<10	<10	ns	ns

Table 43. Concentrations of organochlorine and organophosphorus compounds in spiked filtered-water samples from Chandler Canal at Bunn Road at Prosser, Washington, June 13, 1991, at 1240 hour and 1247 hour

[Station number 12509499; map reference number 48--figure 1; "ns" = not spiked; DDD = dichlorodiphenyldichloroethane; DDE = dichlorodiphenyldichloroethylene; DDT = dichlorodiphenyltrichloroethane; PCB = gross polychlorinated biphenyls; PCN = gross polychlorinated naphthalenes; DEF = S,S,S-tributyl phosphorotrithioate; less-than values were set equal to zero for calculations]

Parameter code	Constituent	Concentration, in nanograms per liter: Laboratory results: Replicate 1 (not spiked) A	Laboratory results: Replicate 2 (spiked) B	Calculated concentration in replicate 2 C	Recovery, in percent: B x 100 / C
Organochlorine compounds					
39331	Aldrin	<1	<1	ns	ns
39352	gross Chlordane	<100	<100	ns	ns
39361	p,p'-DDD	<1	<1	ns	ns
39366	p,p'-DDE	1	1	ns	ns
39371	p,p'-DDT	<1	1	ns	ns
39381	Dieldrin	1	40	54	74
82354	Endosulfan I	2	2	ns	ns
39391	Endrin	<1	<1	ns	ns
39411	Heptachlor	<1	<1	ns	ns
39421	Heptachlor epoxide	<1	<1	ns	ns
39341	Lindane (gamma-HCH)	<1	40	53	75
	p,p'-Methoxychlor	<10	<10	ns	ns
39756	Mirex	<10	<10	ns	ns
39517	PCB	<100	<100	ns	ns
82360	PCN	<100	<100	ns	ns
82348	Perthane	<100	<100	ns	ns
39401	Toxaphene	<1,000	<1,000	ns	ns
Organophosphate compounds					
	Chlorpyrifos	<10	60	100	57
	DEF	<10	<10	ns	ns
39572	Diazinon	<10	130	100	120
	Disulfoton	<10	<10	ns	ns
82346	Ethion	<10	<10	ns	ns
	Fonofos	<10	<10	ns	ns
39532	Malathion	30	160	140	120
39602	Methyl parathion	<10	<10	ns	ns
	Methyl trithion	<10	<10	ns	ns
39542	Parathion	<10	160	100	150
	Phorate	<10	<10	ns	ns
82342	Trithion	<10	<10	ns	ns

Table 44. Concentrations of organochlorine and organophosphorus compounds in replicate filtered-water samples from Yakima River at Kiona, Washington, August 6, 1991, at 1150 hour and 1151 hour

[Station number 12510500; map reference number 51--figure 1; DDD = dichlorodiphenyldichloroethane; DDE = dichlorodiphenyldichloroethylene; DDT = dichlorodiphenyltrichloroethane; HCH = hexachlorocyclohexane; PCB = gross polychlorinated biphenyls; PCN = gross polychlorinated naphthalenes; DEF = S,S,S-tributyl phosphorotrithioate; "<" = less than; less-than values were set equal to zero for calculations]

Parameter code	Constituent	Concentration, in nanograms per liter: Replicate 1 (not spiked) A	Replicate 2 (not spiked) B	Difference | A - B |
Organochlorine compounds				
39331	Aldrin	<1	<1	0
39352	gross Chlordane	<100	<100	0
39361	p,p'-DDD	<1	2	2
39366	p,p'-DDE	4	2	2
39371	p,p'-DDT	<1	<1	0
39381	Dieldrin	<1	1	1
82354	Endosulfan I	5	1	4
39391	Endrin	<1	<1	0
39411	Heptachlor	<1	<1	0
39421	Heptachlor epoxide	<1	<1	0
39341	Lindane (gamma-HCH)	.3	<1	.3
	p,p'-Methoxychlor	<10	<10	0
39756	Mirex	<10	<10	0
39517	PCB	200	100	100
82360	PCN	<100	<100	0
82348	Perthane	<100	<100	0
39401	Toxaphene	<1,000	<1,000	0
Organophosphorus compounds				
	Chlorpyrifos	<10	<10	0
	DEF	<10	<10	0
39572	Diazinon	10	10	0
	Disulfoton	<10	<10	0
82346	Ethion	<10	<10	0
	Fonofos	<10	<10	0
39532	Malathion	<10	<10	0
39602	Methyl parathion	<10	<10	0
	Methyl trithion	<10	<10	0
39542	Parathion	10	<10	10
	Phorate	<10	<10	0
82342	Trithion	<10	<10	0

Table 45. Mean analytical recoveries for extracting surrogate compounds from suspended-sediment samples, Yakima River basin, Washington, June 25-30, 1989

["-" = not calculated; HCH = hexachlorocyclohexane; DDD = dichlorodiphenyldicloroethane; DDE = dichlorodiphenyldichloroethylene; DDT = dichlorodiphenyltrichloroethane]

Compound	Number of samples	Mean analytical recovery, in percent	One standard deviation of the mean, in percent
Isodrin	1	45	-
Lindane (gamma-HCH)	19	28	14
p,p'-DDT d-8	19	42	23
p,p'-DDE d-8 1/	6	5.9	5.6
p,p'-DDD d-8 1/	12	1.0	.6
(DDT+DDE+DDD) d-8 1/	19	45	23
Diazinon d-10	19	60	15
Isofenphos	1	110	-

1/ Samples were spiked with p,p'-DDT d-8 surrogate; during sample storage, processing, and (or) analysis, some of the DDT d-8 in several samples was converted to DDE d-8 and DDD d-8.

Table 46. Analytical recoveries of pesticides that were spiked into a blank solvent extract and were analyzed in accordance with other extracts from suspended-sediment samples, Yakima River basin, Washington, June 25-30, 1989

[These recoveries do not include losses associated with the extraction and initial solvent-concentration procedures; "ns" = not spiked; "nq" = not quantified; DDD = dichlorodiphenyl dichloroethane; DDE = dichlorodiphenyldichloroethylene; DDT = dichlorodiphenyltrichloroethane; HCB = hexachlorobenzene; HCH = hexachlorocyclohexane; DEF = S,S,S- tributyl phosphorotrithioate]

Compound	Analytical recoveries, in percent
Organochlorine compounds	
Aldrin	44
trans-Chlordane	38
cis-Chlordane	39
Chlorthalonil	38
p,p'-DDD	53
p,p'-DDE	55
p,p'-DDT	48
p,p'-DDT d-8	84
Dacthal	ns
Dieldrin	55
Endosulfan I	18
Endosulfan II	nq
Endosulfan sulfate	ns
Endrin	52
Endrin aldehyde	ns
Endrin ketone	ns
HCB	26
alpha-HCH	29
beta-HCH	45
delta-HCH	39
Heptachlor	40
Heptachlor epoxide	40
Isodrin	28
Lindane (gamma-HCH)	34
Lindane d-6	65
o,p'-Methoxychlor	70
p,p'-Methoxychlor	55
Mirex	38
trans-Nonachlor	ns
Toxaphene	ns
Organophosphorus compounds	
Chlorpyrifos	48
DEF	53
Diazinon	42
Diazinon d-10	80
Disulfoton	10
Ethion	47
Fonofos	45
Isofenphos	52
Malathion	53
Methyl parathion	43
Methyl trithion	39
Parathion	50
Phorate	17
Trithion	49

Table 47. Concentrations of organochlorine and organophosphorus compounds in replicate suspended-sediment samples from Chandler Canal at Bunn Road at Prosser, Washington, June 13, 1991, at 1240 hour and 1241 hour

[Station number 12509499; map reference number 48--figure 1; DDD = dichlorodiphenyldichloroethane; DDE = dichlorodiphenyldichloroethylene; DDT = dichlorodiphenyltrichloroethane; HCH = hexachlorocyclohexane; PCB = gross polychlorinated biphenyls; PCN = gross polychlorinated naphthalenes; DEF = S,S,S-tributyl phosphorotrithioate; I = interference at peak; "<" = less than; less-than values were set equal to zero for calculations]

Parameter code	Constituent	Concentration, in nanograms per liter Replicate 1 (not spiked) A	Replicate 2 (not spiked) B	Difference | A - B |
	Organochlorine compounds			
39332	Aldrin	<1	<1	0
39353	gross Chlordane	<100	<100	0
39362	p,p'-DDD	<1	<1	0
39367	p,p'-DDE	1	2	1
39372	p,p'-DDT	<1	<1	0
39382	Dieldrin	<1	<1	0
82355	Endosulfan I	<1	<1	0
39392	Endrin	<1	<1	0
39412	Heptachlor	<1	<1	0
39422	Heptachlor epoxide	I	I	
39342	Lindane (gamma-HCH)	<1	<1	0
	p,p'-Methoxychlor	<10	<10	0
39757	Mirex	<10	<10	0
39518	PCB	<100	<100	0
82361	PCN	<100	<100	0
82349	Perthane	<100	<100	0
39402	Toxaphene	<1,000	<1,000	0
	Organophosphorus compounds			
	Chlorpyrifos	<.6	<.6	0
	DEF	<.6	<.6	0
39573	Diazinon	<.6	<.6	0
	Disulfoton	<.6	<.6	0
82347	Ethion	<.6	<.6	0
	Fonofos	<.6	<.6	0
39533	Malathion	<.6	<.6	0
39603	Methyl parathion	<.6	<.6	0
	Methyl trithion	<.6	<.6	0
39543	Parathion	<.6	<.6	0
	Phorate	<.6	<.6	0
82343	Trithion	<.6	<.6	0

Table 48. Concentrations of organochlorine and organophosphorus compounds in replicate suspended-sediment samples from Yakima River at Kiona, Washington, May 21, 1991, at 1200 hour and 1201 hour

[Station number 12510500; map reference number 51--figure 1; DDD = dichlorodiphenyldichloroethane; DDE = dichlorodiphenyldichloroethylene; DDT = dichlorodiphenyltrichloroethane; HCH = hexachlorocyclohexane; PCB = gross polychlorinated biphenyls; PCN = gross polychlorinated naphthalenes; DEF = S,S,S-tributyl phosphorotrithioate; "<" = less than; less-than values were set equal to zero for calculations]

Parameter code	Constituent	Concentration, in nanograms per liter: Replicate 1 (not spiked) A	Replicate 2 (not spiked) B	Difference | A - B |
	Organochlorine compounds			
39332	Aldrin	<1	<1	0
39353	gross Chlordane	<100	<100	0
39362	p,p'-DDD	<1	<1	0
39367	p,p'-DDE	1	1	0
39372	p,p'-DDT	1	1	0
39382	Dieldrin	1	<1	1
82355	Endosulfan I	1	1	0
39392	Endrin	<1	<1	0
39412	Heptachlor	<1	<1	0
39422	Heptachlor epoxide	<1	<1	0
39342	Lindane (gamma-HCH)	<1	<1	0
	p,p'-Methoxychlor	<10	<10	0
39757	Mirex	<10	<10	0
39518	PCB	<10	<10	0
82361	PCN	<100	<100	0
82349	Perthane	<100	<100	0
39402	Toxaphene	<1,000	<1,000	0
	Organophosphorus compounds			
	Chlorpyrifos	<.4	<.4	0
	DEF	<.4	<.4	0
39573	Diazinon	<.4	<.4	0
	Disulfoton	<.4	<.4	0
82347	Ethion	<.4	<.4	0
	Fonofos	<.4	<.4	0
39533	Malathion	<.4	<.4	0
39603	Methyl parathion	<.4	<.4	0
	Methyl trithion	<.4	<.4	0
39543	Parathion	<.4	<.4	0
	Phorate	<.4	<.4	0
82343	Trithion	<.4	<.4	0

Table 49. Concentrations of organochlorine and organophosphorus compounds in replicate suspended-sediment samples from Yakima River at Kiona, Washington, August 6, 1991, at 1150, hour and 1151 hour

[Station number 12510500; map reference number 51--figure 1; DDD = dichlorodiphenyldichloroethane; DDE = dichlorodiphenyldichloroethylene; DDT = dichlorodiphenyltrichloroethane; HCH = hexachlorocyclohexane; PCB = gross polychlorinated biphenyls; PCN = gross polychlorinated naphthalenes; DEF = S,S,S-tributyl phosphorotrithioate; "<" = less than; less-than values were set equal to zero for calculations]

Parameter code	Constituent	Concentration, in nanograms per liter Replicate 1 (not spiked) A	Replicate 2 (not spiked) B	Difference | A - B |
	Organochlorine compounds			
39332	Aldrin	<1	<1	0
39353	gross Chlordane	<100	<100	0
39362	p,p'-DDD	<1	1	1
39367	p,p'-DDE	1	1	0
39372	p,p'-DDT	<1	<1	0
39382	Dieldrin	<1	1	1
82355	Endosulfan I	<1	<1	0
39392	Endrin	<1	<1	0
39412	Heptachlor	<1	<1	0
39422	Heptachlor epoxide	<1	<1	0
39342	Lindane (gamma-HCH)	<1	<1	0
	p,p'-Methoxychlor	<10	<10	0
39757	Mirex	<10	<10	0
39518	PCB	20	50	30
82361	PCN	<100	<100	0
82349	Perthane	<100	<100	0
39402	Toxaphene	<1,000	<1,000	0
	Organophosphorus compounds			
	Chlorpyrifos	<10	<10	0
	DEF	<10	<10	0
39573	Diazinon	<10	<10	0
	Disulfoton	<10	<10	0
82347	Ethion	<10	<10	0
	Fonofos	<10	<10	0
39533	Malathion	<10	<10	0
39603	Methyl parathion	<10	<10	0
	Methyl trithion	<10	<10	0
39543	Parathion	<10	<10	0
	Phorate	<10	<10	0
82343	Trithion	<10	<10	0

Table 50. Concentrations of organochlorine and organophosphorus compounds associated with blank glass-fiber filters, Yakima River basin, Washington, July to September 1991

["<" = less than; DDD = dichlorodiphenyldichloroethane; DDE = dichlorodiphenyldichloroethylene; DDT = dichlorodiphenyltrichloroethane; HCH = hexachlorocyclohexane; PCB = gross polychlorinated biphenyls; PCN = gross polychlorinated naphthalenes; DEF = S,S,S-tributyl phosphorotrithioate]

Parameter code	Constituent	Concentration, in nanograms per liter Glass-fiber filter without suspended sediment July 1991 A	Sept. 5, 1991 B	Sept. 25, 1991 C
Organochlorine compounds				
39332	Aldrin	<1	<1	<1
39353	Chlordane	<100	<100	<100
39362	p,p'-DDD	<1	<1	<1
39367	p,p'-DDE	<1	<1	<1
39372	p,p'-DDT	<1	<1	<1
39382	Dieldrin	<1	<1	<1
82355	Endosulfan I	<1	<1	<1
39392	Endrin	<1	<1	<1
39412	Heptachlor	<1	<1	<1
39422	Heptachlor epoxide	<1	<1	<1
39342	Lindane (gamma-HCH)	<1	<1	<1
	p,p'-Methoxychlor	<10	<10	<10
39757	Mirex	<10	<10	<10
39518	PCB	<100	<100	<100
82361	PCN	<100	<100	<100
82349	Perthane	<100	<100	<100
39402	Toxaphene	<1,000	<1,000	<1,000
Organophosphorus compounds				
	Chlorpyrifos	<10	<10	<.5
	DEF	<10	<10	<.5
39573	Diazinon	<10	<10	<.5
	Disulfoton	<10	<10	<.5
82347	Ethion	<10	<10	<.5
	Fonofos	<10	<10	<.5
39533	Malathion	<10	<10	<.5
39603	Methyl parathion	<10	<10	<.5
	Methyl trithion	<10	<10	<.5
39543	Parathion	<10	<10	<.5
	Phorate	<10	<10	<.5
82343	Trithion	<10	<10	<.5

Table 51. Concentrations of organochlorine and semi-volatile organic compounds in replicate bed-sediment samples (sediment finer than 62 micrometers in diameter) from Sulphur Creek Wasteway near Sunnyside, Washington, August 31, 1988

[Station number 12508850; map reference number 46--figure 1; DDD = dichlorodiphenyldichloroethane; DDE = dichlorodiphenyldichloroethylene; DDT = dichlorodiphenyltrichloroethane; HCH = hexachlorocyclohexane; PCB = gross polychlorinated biphenyls; PCN = gross polychlorinated naphthalenes; "<" = less than; less-than values were set equal to zero for calculations]

Parameter code	Constituent	Replicate 1 A	Replicate 2 B	Difference | A - B |
	Carbon compounds [concentration, in grams per kilogram]			
00693	Carbon, inorganic + organic	9.3	6.0	3.3
00686	Carbon, inorganic	1.1	1.5	.4
	Organochlorine compounds [concentration, in micrograms per kilogram]			
39333	Aldrin	<.1	<.1	0
39351	gross Chlordane	<1	4	4
39383	Dieldrin	5	4.4	.6
39363	p,p'-DDD	26	15	11
39368	p,p'-DDE	74	42	32
39373	p,p'-DDT	13	9.9	3.1
39389	Endosulfan I	7.9	1.9	6
39393	Endrin	<.1	<.1	0
39413	Heptachlor	<.1	<.1	0
39423	Heptachlor epoxide	<.1	.1	.1
39343	Lindane (gamma-HCH)	<.1	<.1	0
39481	p,p'-Methoxychlor	<.1	<.1	0
39758	Mirex	<.1	<.1	0
39519	PCB	<1	<1	0
39251	PCN	<1	<1	0
81886	Perthane	<1	<1	0
39403	Toxaphene	<10	<10	0
	Semi-volatile compounds [concentration, in micrograms per kilogram]			
34411	Isophorone	<200	<200	0
34584	2-Chloronaphthalene	<200	<200	0
39705	Hexachlorobutadiene	<200	<200	0
34389	Hexachlorocyclopentadiene	<200	<200	0
34399	Hexachloroethane	<200	<200	0
34281	bis (2-Chloroethoxy) methane	<200	<200	0
34276	bis (2-Chloroethyl) ether	<200	<200	0
34286	bis (2-Chloroisopropyl) ether	<200	<200	0
34639	4-Bromophenyl phenyl ether	<200	<200	0
34641	4-Chlorophenyl phenyl ether	<200	<200	0
34539	1,2 Dichlorobenzene	<200	<200	0
34569	1,3 Dichlorobenzene	<200	<200	0
34574	1,4 Dichlorobenzene	<200	<200	0
34614	2,4 Dinitrotoluene	<200	<200	0
34629	2,6 Dinitrotoluene	<200	<200	0
39701	Hexachlorobenzene	<200	<200	0

Table 51. Concentrations of organochlorine and semi-volatile organic compounds in replicate bed-sediment samples (sediment finer than 62 micrometers in diameter) from Sulphur Creek Wasteway near Sunnyside, Washington, August 31, 1988--Continued

Parameter code	Constituent	Replicate 1 A	Replicate 2 B	Difference | A - B |
	Semi-volatile compounds--Continued [concentration, in micrograms per kilogram]			
34450	Nitrobenzene	<200	<200	0
34554	1,2,4 Trichlorobenzene	<200	<200	0
34589	2-Chlorophenol	<200	<200	0
34604	2,4 Dichlorophenol	<200	<200	0
34609	2,4-Dimethylphenol	<200	<200	0
34660	4,6-Dinitroortho cresol	<600	<600	0
34619	2,4-Dinitrophenol	<600	<600	0
34594	2-Nitrophenol	<200	<200	0
34649	4-Nitrophenol	<600	<600	0
34455	Parachloro meta cresol	<600	<600	0
39061	Pentachlorophenol	<600	<600	0
34695	Phenol	<200	110	110
34624	2,4,6 Trichlorophenol	<600	<600	0
39102	bis (2-Ethylhexyl) phthalate	350	430	80
34339	Diethyl phthalate	<200	80	80
34344	Dimethyl phthalate	<200	<200	0
39112	Di-n-butyl phthalate	<200	116	116
34599	Di-n-octyl phthalate	<400	<400	0
34295	N-butyl benzl phthalate	<200	<200	0
34208	Acenaphthene	<200	<200	0
34203	Acenaphthylene	<200	<200	0
34223	Anthracene	<200	<200	0
34529	Benzo (a) anthracene	<400	<400	0
34250	Benzo (a) pyrene	<400	<400	0
34233	Benzo (b) fluoranthene	<400	<400	0
34245	Benzo (k) fluoranthene	<400	<400	0
34524	Benzo (g,h,i) perylene	<400	<400	0
34323	Chrysene	<400	<400	0
34559	Dibenzo (a,h) anthracene	<400	<400	0
34379	Fluoranthene	<200	<200	0
34384	Fluorene	<200	<200	0
34406	Indeno (1,2,3-cd) pyrene	<400	<400	0
34445	Naphthalene	<200	94	94
34464	Phenanthrene	<200	82	82
34472	Pyrene	<200	110	110
34441	N-Nitrosodimethylamine	<200	<200	0
34431	N-Nitrosodi-n-propyl-amine	<200	<200	0
34436	N-Nitrosodiphenylamine	<200	<200	0

Table 52. Concentrations of organochlorine and semi-volatile organic compounds in replicate bed-sediment samples (sediment finer than 2,000 micrometers in diameter) from Sulphur Creek Wasteway near Sunnyside, Washington, August 31, 1988

[Station number 12508850; map reference number 46--figure 1; DDD = dichlorodiphenyldichloroethane; DDE = dichlorodiphenyl-dichloroethylene; DDT = dichlorodiphenyltrichloroethane; HCH = hexachlorocyclohexane; PCB = gross polychlorinated biphenyls; PCN = gross polychlorinated naphthalenes; "<" = less than; less-than values were set equal to zero for calculations]

Parameter code	Constituent	Replicate 1 A	Replicate 2 B	Difference | A - B |
	Carbon compounds [concentration, in grams per kilogram]			
00693	Carbon, inorganic + organic	9.5	5.1	4.4
00686	Carbon, inorganic	1.0	.8	.2
	Organochlorine compounds [concentration, in micrograms per kilogram]			
39333	Aldrin	<.1	<.1	0
39351	gross Chlordane	<1	4	4
39383	Dieldrin	5.6	3.4	2.2
39363	p,p'-DDD	13	10	3
39368	p,p'-DDE	<.1	33	33
39373	p,p'-DDT	.8	8	7.2
39389	Endosulfan I	<.1	1.9	1.9
39393	Endrin	<.1	<.1	0
39413	Heptachlor	<.1	<.1	0
39423	Heptachlor epoxide	<.1	<.1	0
39343	Lindane (gamma-HCH)	<.1	<.1	0
39481	p,p'-Methoxychlor	<.1	<.1	0
39758	Mirex	<.1	<.1	0
39519	PCB	<1	<1	0
39251	PCN	<1	<1	0
81886	Perthane	<1	<1	0
39403	Toxaphene	<10	<10	0
	Semi-volatile compounds [concentration, in micrograms per kilogram]			
34411	Isophorone	<200	<200	0
34584	2-Chloronaphthalene	<200	<200	0
39705	Hexachlorobutadiene	<200	<200	0
34389	Hexachlorocyclopenta-diene	<200	<200	0
34399	Hexachloroethane	<200	<200	0
34281	bis (2-Chloroethoxy) methane	<200	<200	0
34276	bis (2-Chloroethyl) ether	<200	<200	0
34286	bis (2-Chloroisopropyl) ether	<200	<200	0
34639	4-Bromophenyl phenyl ether	<200	<200	0
34641	4-Chlorophenyl phenyl ether	<200	<200	0
34539	1,2 Dichlorobenzene	<200	<200	0
34569	1,3 Dichlorobenzene	<200	<200	0
34574	1,4 Dichlorobenzene	<200	<200	0
34614	2,4 Dinitrotoluene	<200	<200	0
34629	2,6 Dinitrotoluene	<200	<200	0
39701	Hexachlorobenzene	<200	<200	0
34450	Nitrobenzene	<200	<200	0
34554	1,2,4 Trichlorobenzene	<200	<200	0
34589	2-Chlorophenol	<200	<200	0
34604	2,4 Dichlorophenol	<200	<200	0
34609	2,4-Dimethylphenol	<200	<200	0
34660	4,6-Dinitroortho cresol	<600	<600	0
34619	2,4-Dinitrophenol	<600	<600	0
34594	2-Nitrophenol	<200	<200	0
34649	4-Nitrophenol	<600	<600	0

Table 52. Concentrations of organochlorine and semi-volatile organic compounds in replicate bed-sediment samples (sediment finer than 2,000 micrometers in diameter) from Sulphur Creek Wasteway near Sunnyside, Washington, August 31, 1988--Continued

Parameter code	Constituent	Replicate 1 A	Replicate 2 B	Difference | A - B |
	Semi-volatile compounds--Continued [concentration, in micrograms per kilogram]			
34455	Parachloro meta cresol	<600	<600	0
39061	Pentachlorophenol	<600	<600	0
34695	Phenol	<200	110	110
34624	2,4,6 Trichlorophenol	<600	<600	0
39102	bis (2-Ethylhexyl) phthalate	<200	520	520
34339	Diethyl phthalate	<200	80	80
34344	Dimethyl phthalate	<200	<200	0
39112	Di-n-butyl phthalate	<200	120	120
34599	Di-n-octyl phthalate	<400	<400	0
34295	N-butyl benzl phthalate	<200	150	150
34208	Acenaphthene	<200	<200	0
34203	Acenaphthylene	<200	<200	0
34223	Anthracene	<200	<200	0
34529	Benzo (a) anthracene	<400	<400	0
34250	Benzo (a) pyrene	<400	<400	0
34233	Benzo (b) fluoranthene	<400	<400	0
34245	Benzo (k) fluoranthene	<400	<400	0
34524	Benzo (g,h,i) perylene	<400	<400	0
34323	Chrysene	<400	<400	0
34559	Dibenzo (a,h) anthracene	<400	<400	0
34379	Fluoranthene	<200	<200	0
34384	Fluorene	<200	<200	0
34406	Indeno (1,2,3-cd) pyrene	<400	<400	0
34445	Naphthalene	<200	<200	0
34464	Phenanthrene	<200	<200	0
34472	Pyrene	<200	<200	0
34441	N-Nitrosodimethylamine	<200	<200	0
34431	N-Nitrosodi-n-propyl-amine	<200	<200	0
34436	N-Nitrosodiphenylamine	<200	<200	0

Table 53. Analytical recovery of organochlorine and semi-volatile organic compounds spiked in bed-sediment samples from Sulphur Creek Wasteway, Washington, August 31, 1988

[Station number 12508850; map reference number 46--figure 1; three replicate sediment samples of each size class (less than 62-micrometer and less than 2,000-micrometer diameter) were analyzed; replicate 1 and replicate 2 in each size class were not spiked to determine precision (results of duplicate analyses shown in tables 51 and 52); replicate 3 in each size class was spiked; percent recoveries from replicate 3 samples are based on the mass of analyte that was spiked plus the mass of the analyte detected in replicates 1 or 2 for each size class; "ns" = not spiked; "-" = one or more of the percent recoveries were reported as "less than" values; "<" = less than; DDD = dichlorodiphenyldichloroethane; DDE = dichlorodiphenyldichloroethylene; DDT = dichlorodiphenyltrichloroethane; HCH = hexachlorocyclohexane; PCB = gross polychlorinated biphenyls; PCN = gross polychlorinated naphthalenes]

Parameter code	Constituent	Recovery of spike from Replicate 3, in percent <62 micrometer: Based on analysis of Replicate 1	<62 micrometer: Based on analysis of Replicate 2	<2,000 micrometer: Based on analysis of Replicate 1	<2,000 micrometer: Based on analysis of Replicate 2	Mean percent recovery	Percent relative standard deviation
	Organochlorine compounds						
39333	Aldrin	50	50	67	67	58	17
39351	gross Chlordane	100	71	230	33	110	79
39383	Dieldrin	86	86	98	100	92	8
39363	p,p'-DDD	71	76	89	92	82	12
39368	p,p'-DDE	82	110	250	131	143	51
39373	p,p'-DDT	90	92	110	102	98	9
39389	Endosulfan I	44	49	100	97	72	42
39393	Endrin	100	100	120	122	112	10
39413	Heptachlor	54	54	17	17	36	60
39423	Heptachlor epoxide	75	75	78	78	76	2
39343	Lindane (gamma-HCH)	58	58	61	61	60	3
39481	p,p'-Methoxychlor	ns	ns	ns	ns	ns	ns
39758	Mirex	ns	ns	ns	ns	ns	ns
39519	PCB	<.4	<.4	<.5	<.5	<.4	-
39251	PCN	ns	ns	ns	ns	ns	ns
81886	Perthane	ns	ns	ns	ns	ns	ns
39403	Toxaphene	<10	<10	<16	<16	<13	-
	Semi-volatile compounds						
34411	Isophorone	39	39	66	66	52	30
34584	2-Chloronaphthalene	38	38	92	92	65	48
39705	Hexachlorobutadiene	<21	<21	5	5	<13	-
34389	Hexachlorocyclopentadiene	<21	<21	<33	<33	<27	-
34399	Hexachloroethane	<21	<21	<33	<33	<27	-
34281	bis (2-Chloroethoxy) methane	64	64	110	110	87	30
34276	bis (2-Chloroethyl) ether	29	29	44	44	36	24
34286	bis (2-chloroisopropyl) ether	8	8	<33	<33	<20	-
34639	4-Bromophenyl phenyl ether	200	200	300	295	250	21
34641	4-Chlorophenyl phenyl ether	78	78	160	160	119	40
34539	1,2 Dichlorobenzene	<21	<21	2	2	<12	-
34569	1,3 Dichlorobenzene	<21	<21	2	2	<12	-
34574	1,4 Dichlorobenzene	<21	<21	3	3	<12	-
34614	2,4 Dinitrotoluene	52	52	10	10	31	78
34629	2,6 Dinitrotoluene	88	88	19	19	54	74
39701	Hexachlorobenzene	190	190	300	300	240	25
34450	Nitrobenzene	23	23	21	21	22	5
34554	1,2,4 Trichlorobenzene	1	1	14	14	8	100
34589	2-Chlorophenol	65	65	79	79	72	11
34604	2,4 Dichlorophenol	110	110	160	160	130	22

Table 53. Analytical recovery of organochlorine and semi-volatile organic compounds spiked in bed-sediment samples from Sulphur Creek Wasteway, Washington, August 31, 1988--Continued

Parameter code	Constituent	Recovery of spike from Replicate 3, in percent <62 micrometer: Based on analysis of Replicate 1	<62 micrometer: Based on analysis of Replicate 2	<2,000 micrometer: Based on analysis of Replicate 1	<2,000 micrometer: Based on analysis of Replicate 2	Mean percent recovery	Percent relative standard deviation
		Semi-volatile compounds--Continued					
34609	2,4-Dimethylphenol	2	2	21	21	12	95
34660	4,6-Dinitroortho cresol	3	3	<20	<20	<12	-
34619	2,4-Dinitrophenol	<21	<21	<33	<33	<27	-
34594	2-Nitrophenol	64	64	4	4	34	100
34649	4-Nitrophenol	7	7	2	2	4	64
34455	Parachloro meta cresol	87	87	170	170	130	38
39061	Pentachlorophenol	<13	<13	<20	<20	<16	-
34695	Phenol	130	130	150	120	130	8
34624	2,4,6 Trichlorophenol	97	97	110	110	100	8
39102	bis (2-Ethylhexyl) phthalate	110	100	200	110	130	36
34339	Diethyl phthalate	89	82	130	120	100	22
34344	Dimethyl phthalate	120	120	230	230	170	35
39112	Di-n-butyl phthalate	62	55	34	29	45	36
34599	Di-n-octyl phthalate	94	94	130	130	110	17
34295	N-butyl benzl phthalate	80	80	40	32	58	44
34208	Acenaphthene	52	52	110	110	79	40
34203	Acenaphthylene	30	30	73	73	52	48
34223	Anthracene	78	78	150	150	120	43
34529	Benzo (a) anthracene	120	120	190	190	150	24
34250	Benzo (a) pyrene	110	110	190	190	150	33
34233	Benzo (b) fluoranthene	120	120	210	210	170	31
34245	Benzo (k) fluoranthene	120	120	180	180	150	38
34524	Benzo (g,h,i) perylene	96	96	160	160	130	28
34323	Chrysene	120	120	180	180	150	23
34559	Dibenz (a,h) anthracene	140	140	130	130	140	6
34379	Fluoranthene	86	86	120	120	100	20
34384	Fluorene	62	62	130	130	96	40
34406	Indeno (1,2,3-cd) pyrene	91	91	150	150	120	30
34445	Naphthalene	4	4	16	16	10	69
34464	Phenanthrene	100	96	180	180	140	32
34472	Pyrene	120	110	150	150	140	15
34441	N-Nitrosodimethylamine	<21	<21	<33	<33	<27	-
34431	N-Nitrosodi-n-propyl-amine	62	62	120	120	89	35
34436	N-Nitrosodiphenylamine	89	89	210	210	150	47

Table 54. Laboratory quality-assurance data for organochlorine compounds analyzed in biological samples collected in 1989 and 1990, Yakima River basin, Washington

[Concentrations in micrograms per kilogram, wet weight; spike = 100 micrograms per kilogram, except 500 micrograms per kilogram for kepone; ; "<" = less than; DDD = dichlorodiphenyldichloroethane; DDE = dichlorodiphenyldichloroethylene; DDT = dichlorodiphenyltrichloroethane; NS = not spiked; "-" = not applicable; matrix blanks for fish consist of ocean-fish samples with very low to non-detectable concentrations of organochlorine compounds; matrix blanks for vegetation consist of grass samples collected in non-agricultural areas near Mississippi State University]

Compound analyzed	Reagent blank	Matrix blank for fish	Spike for fish	Percent recovery	Reagent blank	Reagent blank	Spike for fish	Percent recovery	Reagent blank
				May 1989					
Hexachlorobenzene	<10	<10	60	60					
a-Hexachlorocyclohexane	<10	<10	NS	-					
g-Hexachlorocyclohexane	<10	<10	89	89					
b-Hexachlorocyclohexane	<10	<10	89	89					
d-Hexachlorocyclohexane	<10	<10	NS	-					
Oxychlordane	<10	<10	88	88					
Heptachlor epoxide	<10	<10	99	99					
trans-Chlordane	<10	<10	NS	-					
trans-Nonachlor	<10	<10	93	93					
Toxaphene	<50	<50	NS	-					
Total PCBs	<50	<50	NS	-					
o,p'-DDE	<10	<10	97	97					
cis-Chlordane	<10	10	95	95					
p,p'-DDE	<10	20	100	100					
Dieldrin	<10	10	90	90					
o,p'-DDD	<10	<10	NS	-					
Endrin	<10	<10	100	100					
cis-Nonchlor	<10	<10	95	95					
o,p'-DDT	<10	<10	93	93					
p,p'-DDD	<10	10	100	100					
p,p'-DDT	<10	<10	100	100					
Mirex	<10	<10	93	93					
Dicofol	<10	<10	97	97					
Octochlorstyrene	<10	<10	71	71					
Kepone	<10	<10	310	62					
Percent moisture	-	71.0	70.0						
Percent lipid	-	8.53	8.74						
				October-November 1989					
Hexachlorobenzene	<10	<10	72	72	<10	<10	71	71	<10
a-Hexachlorocyclohexane	<10	<10	NS	-	<10	<10	NS	-	<10
g-Hexachlorocyclohexane	<10	<10	94	94	<10	<10	81	81	<10
b-Hexachlorocyclohexane	<10	<10	98	98	<10	<10	93	93	<10
d-Hexachlorocyclohexane	<10	<10	NS	-	<10	<10	NS	-	<10
Oxychlordane	<10	<10	100	100	<10	<10	88	88	<10
Heptachlor epoxide	<10	<10	100	100	<10	<10	92	92	<10
trans-hlordane	<10	<10	NS	-	<10	<10	NS	-	<10
trans-Nonachlor	<10	<10	95	95	<10	<10	85	85	<10
Toxaphene	<50	<50	NS	-	<50	<50	NS	-	<50
Total PCBs	<50	<50	NS	-	<50	<50	NS	-	<50
o,p'-DDE	<10	<10	110	110	<10	<10	94	94	<10
cis-Chlordane	<10	10	99	99	<10	<10	96	96	<10
p,p'-DDE	<10	20	99	99	<10	<10	99	99	<10
Dieldrin	<10	10	100	100	<10	<10	100	100	<10
o,p'-DDD	<10	<10	NS	-	<10	<10	NS	-	<10
Endrin	<10	<10	100	100	<10	<10	91	91	<10
cis-Nonchlor	<10	<10	100	100	<10	<10	97	97	<10
o,p'-DDT	<10	<10	99	99	<10	<10	95	95	<10
p,p'-DDD	<10	10	100	100	<10	<10	98	98	<10
p,p'-DDT	<10	<10	100	100	<10	<10	94	94	<10
Mirex	<10	<10	97	97	<10	<10	94	94	<10
Octochlorstyrene	<10	<10	85	85	<10	<10	77	77	<10
Dicofol	<10	<10	91	91	<10	<10	90	90	<10
Kepone	<10	<10	410	82	<10	<10	370	74	<10
Percent moisture	-	71.0	70.0	-	-	-	70.5	-	-
Percent lipid	-	8.53	9.28	-	-	-	8.96	-	-

Table 54. Laboratory quality-assurance data for organochlorine compounds analyzed in biological samples collected in 1989 and 1990, Yakima River basin, Washington--Continued

Compound analyzed	Reagent blank	Matrix blank for fish	Spike for fish	Percent recovery	Reagent blank	Reagent blank	Spike for fish	Percent recovery	Reagent blank
				October-November 1989					
Hexachlorobenzene	<10	<10	88	88	<10				
a-Hexachlorocyclohexane	<10	<10	NS	-	<10				
g-Hexachlorocyclohexane	<10	<10	120	120	<10				
b-Hexachlorocyclohexane	<10	<10	100	100	<10				
d-Hexachlorocyclohexane	<10	<10	NS	-	<10				
Oxychlordane	<10	<10	100	100	<10				
Heptachlor epoxide	<10	<10	110	110	<10				
trans-Chlordane	<10	<10	NS	-	<10				
trans-Nonachlor	<10	<10	100	100	<10				
Toxaphene	<50	<50	NS	-	<50				
Total PCBs	<50	<50	NS	-	<50				
o,p'-DDE	<10	<10	120	120	<10				
cis-Chlordane	<10	<10	110	110	<10				
p,p'-DDE	<10	<10	110	110	<10				
Dieldrin	<10	<10	100	100	<10				
o,p'-DDD	<10	<10	NS	-	<10				
Endrin	<10	<10	100	100	<10				
cis-Nonchlor	<10	<10	110	110	<10				
o,p'-DDT	<10	<10	120	120	<10				
p,p'-DDD	<10	<10	130	130	<10				
p,p'-DDT	<10	<10	100	100	<10				
Mirex	<10	<10	120	120	<10				
Octochlorstyrene	<10	<10	100	100	<10				
Dicofol	<10	<10	120	120	<10				
Kepone	<10	<10	390	78	<10				
Percent moisture	-	80.0	80.0	-	-				
Percent lipid	-	-	-	-	-				
				October-November 1990					
Hexachlorobenzene	<10	<10	57	57	<10	<10	57	57	<10
a-Hexachlorocyclohexane	<10	<10	NS	-	<10	<10	NS	-	<10
g-Hexachlorocyclohexane	<10	<10	100	100	<10	<10	100	100	<10
b-Hexachlorocyclohexane	<10	<10	98	98	<10	<10	97	97	<10
d-Hexachlorocyclohexane	<10	<10	NS	-	<10	<10	NS	-	<10
Oxychlordane	<10	<10	91	91	<10	<10	96	96	<10
Heptachlor epoxide	<10	<10	100	100	<10	<10	100	100	<10
trans-Chlordane	<10	<10	NS	-	<10	<10	NS	-	<10
trans-Nonachlor	<10	<10	89	89	<10	<10	91	91	<10
Toxaphene	<10	<10	NS	-	<10	<10	NS	-	<10
Total PCBs	<10	<10	NS	-	<10	<10	NS	-	<10
o,p'-DDE	<10	<10	100	100	<10	<10	100	100	<10
cis-Chlordane	<10	<10	94	94	<10	<10	94	94	<10
p,p'-DDE	<10	<10	93	93	<10	<10	95	95	<10
Dieldrin	<10	<10	93	93	<10	<10	90	90	<10
o,p'-DDD	<10	<10	NS	-	<10	<10	NS	-	<10
Endrin	<10	<10	100	100	<10	<10	100	100	<10
cis-Nonchlor	<10	<10	91	91	<10	<10	90	90	<10
o,p'-DDT	<10	<10	96	96	<10	<10	96	96	<10
p,p'-DDD	<10	<10	100	100	<10	<10	100	100	<10
p,p'-DDT	<10	<10	100	100	<10	<10	94	94	<10
Mirex	<10	<10	90	90	<10	<10	85	85	<10
Percent moisture	-	81.4	82.2	-	-	-	83.6		-
Percent lipid	-	1.14	1.07	-	-	-	1.06		-

Table 55. Laboratory quality-assurance data for semi-volatile organic compounds (polycyclic-aromatic hydrocarbons) analyzed in biological samples collected in 1989 and 1990, Yakima River basin, Washington

[Concentrations in micrograms per kilogram, wet weight; spike = 100 micrograms per kilogram; "-" not applicable; matrix blanks for fish consist of ocean-fish samples with very low to non-detectable concentrations of organochlorine compounds; matrix blanks for vegetation consist of grass samples collected in non-agricultural areas near Mississippi State University]

Compound analyzed	Reagent blank	Matrix blank for fish	Spike for fish	Percent recovery
		May 1989		
Napthalene	<10	<10	75	75
Fluorene	<10	<10	95	95
Phenanthrene	<10	<10	90	90
Anthracene	<10	<10	88	88
Fluoranthrene	<10	<10	80	80
Pyrene	<10	<10	96	96
1,2-Benzanthracene	<10	<10	91	91
Chrysene	<10	<10	94	94
Benzo(b)fluoranthrene	<10	<10	73	93
Benzo(k)fluoranthrene	<10	<10	66	66
Benzo(e)pyrene	<10	<10	84	84
Benzo(a)pyrene	<10	<10	89	89
1,2,5,6-Dibenzanthracene	<10	<10	82	82
Benzo(g,h,i)perylene	<10	<10	71	71
Percent moisture	-	81.4	84.5	-

Compound analyzed	Reagent blank	Matrix blank for fish	Spike for fish	Percent recovery	Reagent blank	Reagent blank	Matrix blank for vegetation	Spike for** vegetation	Percent recovery	Reagent blank
					October-November 1989					
Napthalene	<10	<10	70	70	<10	<10	<10	70	70	<10
Fluorene	<10	<10	84	84	<10	<10	<10	94	94	<10
Phenanthrene	<10	<10	94	94	<10	<10	<10	94	94	<10
Anthracene	<10	<10	71	71	<10	<10	<10	82	82	<10
Fluoranthrene	<10	<10	81	81	<10	<10	<10	68	68	<10
Pyrene	<10	<10	71	71	<10	<10	<10	75	75	<10
1,2-Benzanthracene	<10	<10	65	65	<10	<10	<10	75	75	<10
Chrysene	<10	<10	57	57	<10	<10	<10	97	97	<10
Benzo(b)fluoranthrene	<10	<10	75	75	<10	<10	<10	96	96	<10
Benzo(k)fluoranthrene	<10	<10	64	64	<10	<10	<10	64	64	<10
Benzo(e)pyrene	<10	<10	90	90	<10	<10	<10	70	70	<10
Benzo(a)pyrene	<10	<10	71	71	<10	<10	<10	68	68	<10
1,2,5,6-Dibenzanthracene	<10	<10	60	60	<10	<10	<10	50	50	<10
Benzo(g,h,i)perylene	<10	<10	92	92	<10	<10	<10	49	49	<10
Percent moisture	-	80.6	78.0	-	-	-	80.0	80.0	-	-

Compound analyzed	Reagent blank	Matrix blank for fish	Spike for fish	Percent recovery
		October-November 1990		
Napthalene	<10	<10	68	68
Fluorene	<10	<10	100	100
Phenanthrene	<10	<10	95	95
Anthracene	<10	<10	100	100
Fluoranthrene	<10	<10	83	83
Pyrene	<10	<10	87	87
1,2-Benzanthracene	<10	<10	85	85
Chrysene	<10	<10	77	77
Benzo(b)fluoranthrene	<10	<10	78	78
Benzo(k)fluoranthrene	<10	<10	78	78
Benzo(e)pyrene	<10	<10	94	94
Benzo(a)pyrene	<10	<10	66	66
1,2,5,6-Dibenzanthracene	<10	<10	79	79
Benzo(g,h,i)perylene	<10	<10	67	67
Percent moisture	-	81.4	83.6	-

Table 56. Concentretions of organochlorine compounds in field-replicate and laboratory-split samples of aquatic biota, Yakima River basin, Washington, 1989-90

[Concentrations in micrograms per kilogram; wet weight; whole fish were analyzed; DDD = dichlorodiphenyldichloroethane; DDE = dichlorodiphenyldichloroethylene; DDT = dichlorodiphenyltrichloroethane; PCBs = polychlorinated biphenyls; "--" = not analyzed; see figure 1 for site locations; "Replicate" = two or more composite samples were collected at a station on the same day and were analyzed individually; "Split" = a single composite sample was homogenized, split into two samples at the lab, and each split was analyzed]

Quality-assurance sample type	Map reference number	Station number	Station name	Date	Field number	Moisture, in percent	Lipid, in percent
			Largescale Sucker				
Split	22	12499000	Naches River nr North Yakima	11-06-90	YK0331SF	75.4	4.71
Split	22	12499000	Naches River nr North Yakima	11-06-90	YK0331SF	75.6	4.34
Split	47	12509050	Yakima R at Euclid Br at RM 55 nr Grandview	10-31-89	YK0047SF	73.5	7.56
Split	47	12509050	Yakima R at Euclid Br at RM 55 nr Grandview	10-31-89	YK0047SF	74.0	7.32
Split	51	12510500	Yakima River at Kiona	11-10-90	YK0402SF	70.6	7.99
Split	51	12510500	Yakima River at Kiona	11-10-90	YK0402SF	71.4	7.78
Replicate	51	12510500	Yakima River at Kiona	11-10-90	YK0403SF	67.6	11.6
			Asiatic Clam				
Replicate	40	12507585	Yakima River at RM 72 ab Satus Cr nr Sunnyside	11-01-89	YK0100SM	76.0	2.40
Replicate	40	12507585	Yakima River at RM 72 ab Satus Cr nr Sunnyside	11-01-89	YK0101SM	78.0	2.32
Replicate	40	12507585	Yakima River at RM 72 ab Setus Cr nr Sunnyside	11-01-89	YK0102SM	79.0	2.62
Replicate	40	12507585	Yakima River at RM 72 ab Setus Cr nr Sunnyside	11-01-89	YK0103SM	82.0	1.96
Replicate	47	12509050	Yakima R at Euclid Br at RM 55 nr Grandview	10-31-89	YK0082SM	95.5	1.64
Replicate	47	12509050	Yakima R at Euclid Br at RM 55 nr Grandview	10-31-89	YK0085SM	82.0	2.20
Replicate	51	12510500	Yakima River at Kiona	10-30-89	YK0115SM	83.0	2.20
Replicate	51	12510500	Yakima River at Kiona	10-30-89	YK0116SM	84.0	1.95
			Western Pearlshell				
Split	14	12484500	Yakima River at Umtanum	11-01-89	YK0111SM	86.0	.92
Split	14	12484500	Yakima River at Umtanum	11-01-89	YK0111SM	84.0	.86
			Waterweed				
Split	26	12500442	Wide Hollow Cr at Old STP at Union Gap	11-04-89	YK0098SP	94.0	.10
Split	26	12500442	Wide Hollow Cr at Old STP at Union Gap	11-04-89	YK0098SP	94.0	.20

Map reference number	Station number	Field number	cis-Chlordane	trans-Chlordane	Oxy-chlordane	Hepta-chlor epoxide	cis-Nonachlor	trans-Nonachlor
			Largescale Sucker					
22	12499000	YK0331SF	10	<10	<10	<10	<10	<10
22	12499000	YK0331SF	10	<10	<10	<10	<10	<10
47	12509050	YK0047SF	20	<10	<10	<10	<10	20
47	12509050	YK0047SF	20	<10	<10	<10	<10	20
51	12510500	YK0402SF	20	10	10	10	<10	30
51	12510500	YK0402SF	20	10	10	10	<10	40
51	12510500	YK0403SF	30	10	20	20	<10	40
			Asiatic Clam					
40	12507585	YK0100SM	<10	<10	<10	<10	<10	<10
40	12507585	YK0101SM	<10	<10	<10	<10	<10	<10
40	12507585	YK0102SM	<10	<10	<10	<10	<10	<10
40	12507585	YK0103SM	<10	<10	<10	<10	<10	<10
47	12509050	YK0082SM	<10	<10	<10	<10	<10	<10
47	12509050	YK0085SM	<10	<10	<10	<10	<10	<10
51	12510500	YK0115SM	<10	<10	<10	<10	<10	<10
51	12510500	YK0116SM	<10	<10	<10	<10	<10	<10
			Western Pearlshell					
14	12484500	YK0111SM	<10	<10	<10	<10	<10	<10
14	12484500	YK0111SM	<10	<10	<10	<10	<10	<10
			Waterweed					
26	12500442	YK0098SP	<10	<10	<10	<10	<10	<10
26	12500442	YK0098SP	<10	<10	<10	<10	<10	<10

Table 56. Concentrations of organochlorine compounds in field-replicate and laboratory-split samples of aquatic biota, Yakima River basin, Washington, 1989-90--Continued

Map reference number	Station number	Field number	o,p'-DDD	p,p'-DDD	o,p'-DDE	p,p'-DDE	o,p'-DDT	p,p'-DDT
				Largescale Sucker				
22	12499000	YK0331SF	10	50	<10	410	<10	70
22	12499000	YK0331SF	10	50	<10	380	<10	80
47	12509050	YK0047SF	50	290	<10	2,500	<10	370
47	12509050	YK0047SF	50	290	<10	2,400	<10	370
51	12510500	YK0402SF	40	300	30	2,000	<10	190
51	12510500	YK0402SF	40	300	30	2,100	<10	190
51	12510500	YK0403SF	50	390	30	2,200	<10	220
				Asiatic Clam				
40	12507585	YK0100SM	10	60	<10	310	<10	80
40	12507585	YK0101SM	10	50	<10	280	<10	70
40	12507585	YK0102SM	10	60	<10	330	<10	80
40	12507585	YK0103SM	10	40	<10	230	<10	60
47	12509050	YK0082SM	20	80	<10	390	<10	40
47	12509050	YK0085SM	30	100	10	530	<10	60
51	12510500	YK0115SM	20	80	10	410	<10	50
51	12510500	YK0116SM	20	60	<10	360	<10	30
				Western Pearlshell				
14	12484500	YK0111SM	<10	<10	<10	<10	<10	<10
14	12484500	YK0111SM	<10	<10	<10	<10	<10	<10
				Waterweed				
26	12500442	YK0098SP	<10	<10	<10	10	<10	<10
26	12500442	YK0098SP	<10	<10	<10	10	<10	<10

Map reference number	Station number	Field number	Hexachlorobenzene	a-Hexachlorocyclohexane	b-Hexachlorocyclohexane	g-Hexachlorocyclohexane (lindane)	d-Hexachlorocyclohexane	Toxaphene
				Largescale Sucker				
22	12499000	YK0331SF	<10	<10	<10	<10	<10	<50
22	12499000	YK0331SF	<10	<10	<10	<10	<10	<50
47	12509050	YK0047SF	<10	<10	<10	<10	<10	520
47	12509050	YK0047SF	<10	<10	<10	<10	<10	560
51	12510500	YK0402SF	<10	<10	<10	<10	<10	710
51	12510500	YK0402SF	<10	<10	<10	<10	<10	710
51	12510500	YK0403SF	<10	<10	<10	<10	<10	720
				Asiatic Clam				
40	12507585	YK0100SM	<10	<10	<10	<10	<10	<50
40	12507585	YK0101SM	<10	<10	<10	<10	<10	<50
40	12507585	YK0102SM	<10	<10	<10	<10	<10	<50
40	12507585	YK0103SM	<10	<10	<10	<10	<10	<50
47	12509050	YK0082SM	<10	<10	<10	<10	<10	<50
47	12509050	YK0085SM	<10	<10	<10	<10	<10	<50
51	12510500	YK0115SM	<10	<10	<10	<10	<10	<50
51	12510500	YK0116SM	<10	<10	<10	<10	<10	<50
				Western Pearlshell				
14	12484500	YK0111SM	<10	<10	<10	<10	<10	<50
14	12484500	YK0111SM	<10	<10	<10	<10	<10	<50
				Waterweed				
26	12500442	YK0098SP	<10	<10	<10	<10	<10	<50
26	12500442	YK0098SP	<10	<10	<10	<10	<10	<50

Table 56. Concentrations of organochlorine compounds in field-replicate and laboratory-split samples of aquatic biota, Yakima River basin, Washington, 1989-90--Continued

Map reference number	Station number	Field number	Total PCBs	Dieldrin	Endrin	Mirex	Kepone	Octochloro-styrene	Dicofol
				Largescale Sucker					
22	12499000	YK0331SF	<50	<10	<10	<10	--	--	--
22	12499000	YK0331SF	<50	<10	<10	<10	--	--	--
47	12509050	YK0047SF	290	80	<10	<10	<10	<10	20
47	12509050	YK0047SF	300	70	<10	<10	<10	<10	20
51	12510500	YK0402SF	790	60	<10	<10	--	--	<10
51	12510500	YK0402SF	790	60	<10	<10	--	--	<10
51	12510500	YK0403SF	900	90	<10	<10	--	--	<10
				Asiatic Clam					
40	12507585	YK0100SM	<50	10	<10	<10	<10	<10	<10
40	12507585	YK0101SM	<50	10	<10	<10	<10	<10	<10
40	12507585	YK0102SM	<50	10	<10	<10	<10	<10	<10
40	12507585	YK0103SM	<50	10	<10	<10	<10	<10	<10
47	12509050	YK0082SM	<50	20	<10	<10	<10	<10	<10
47	12509050	YK0085SM	<50	20	<10	<10	<10	<10	<10
51	12510500	YK0115SM	<50	10	<10	<10	<10	<10	<10
51	12510500	YK0116SM	<50	10	<10	<10	<10	<10	<10
				Western Pearlshell					
14	12484500	YK0111SM	<50	<10	<10	<10	<10	<10	<10
14	12484500	YK0111SM	<50	<10	<10	<10	<10	<10	<10
				Waterweed					
26	12500442	YK0098SP	<50	<10	<10	<10	<10	<10	<10
26	12500442	YK0098SP	<50	<10	<10	<10	<10	<10	<10

Table 57. Concentrations of semi-volatile organic compounds (polycyclic-aromatic hydrocarbons) in field-replicate and laboratory-split samples of aquatic biota, Yakima River basin, Washington, 1989-90

[Concentrations in micrograms per kilogram, wet weight; whole fish were analyzed; see figure 1 for site locations; "Replicate" = two or more composite samples were collected at a station on the same day and were analyzed individually; "Split" = a single composite sample was homogenized, split into 2 samples at the lab, and each split was analyzed]

Quality-assurance sample type	Map reference number	Station number	Station name	Date	Field number	Moisture, in percent	Lipid, in percent
			Asiatic Clam				
Replicate	40	12507585	Yakima River at RM 72 ab Satus Cr nr Sunnyside	11-01-89	YK0100SM	76.0	2.40
Replicate	40	12507585	Yakima River at RM 72 ab Satus Cr nr Sunnyside	11-01-89	YK0101SM	78.0	2.32
Replicate	40	12507585	Yakima River at RM 72 ab Satus Cr nr Sunnyside	11-01-89	YK0102SM	79.0	2.62
Replicate	40	12507585	Yakima River at RM 72 ab Satus Cr nr Sunnyside	11-01-89	YK0103SM	82.0	1.96
Replicate	47	12509050	Yakima R at Euclid Br at RM 55 nr Grandview	10-31-89	YK0082SM	95.5	1.64
Replicate	47	12509050	Yakima R at Euclid Br at RM 55 nr Grandview	10-31-89	YK0085SM	82.0	2.20
Replicate	51	12510500	Yakima River at Kiona	10-30-89	YK0115SM	83.0	2.20
Replicate	51	12510500	Yakima River at Kiona	10-30-89	YK0116SM	84.0	1.95
			Western Pearlshell				
Split	14	12484500	Yakima River at Umtanum	11-01-89	YK0111SM	86.0	.92
Split	14	12484500	Yakima River at Umtanum	11-01-89	YK0111SM	84.0	.86
			Waterweed				
Split	26	12500442	Wide Hollow Cr at Old STP at Union Gap	11-04-89	YK0098SP	94.0	.20
Split	26	12500442	Wide Hollow Cr at Old STP at Union Gap	11-04-89	YK0098SP	94.0	.10

Map reference number	Station number	Field number	Napthalene	Fluorene	Phenanthrene	Anthracene	Fluoranthrene	Pyrene	1,2-Benzanthracene
				Asiatic Clam					
40	12507585	YK0100SM	10	<10	30	<10	10	<10	<10
40	12507585	YK0101SM	<10	<10	30	<10	10	<10	<10
40	12507585	YK0102SM	<10	10	30	<10	10	<10	10
40	12507585	YK0103SM	10	<10	40	<10	10	<10	<10
47	12509050	YK0082SM	10	<10	40	<10	<10	<10	<10
47	12509050	YK0085SM	20	<10	30	<10	10	10	<10
51	12510500	YK0115SM	<10	10	90	<10	20	<10	<10
51	12510500	YK0116SM	10	<10	40	<10	50	<10	<10
				Western Pearlshell					
14	12484500	YK0111SM	<10	<10	<10	<10	<10	<10	<10
14	12484500	YK0111SM	10	<10	10	<10	<10	<10	<10
				Waterweed					
26	12500442	YK0098SP	<10	<10	<10	<10	<10	<10	<10
26	12500442	YK0098SP	<10	<10	<10	<10	<10	<10	<10

Table 57. Concentrations of semi-volatile organic compounds (polycyclic-aromatic hydrocarbons) in field-replicate and laboratory-split samples of aquatic biota, Yakima River basin, Washington, 1989-90--Continued

Map reference number	Station number	Field number	Chrysene	Benzo(b)-fluoranthrene	Benzo(k)-fluoranthrene	Benzo(e)-pyrene	Benzo(a)-pyrene	1,2,5,6-Dibenz-anthracene	Benzo(g,h,i)-perylene
					Asiatic Clam				
40	12507585	YK0100SM	<10	<10	<10	<10	<10	<10	<10
40	12507585	YK0101SM	<10	<10	<10	<10	<10	<10	<10
40	12507585	YK0102SM	<10	<10	<10	<10	<10	<10	<10
40	12507585	YK0103SM	<10	<10	<10	<10	<10	<10	<10
47	12509050	YK0082SM	<10	<10	<10	<10	<10	<10	<10
47	12509050	YK0085SM	<10	<10	<10	<10	<10	<10	<10
51	12510500	YK0115SM	<10	<10	<10	<10	<10	<10	<10
51	12510500	YK0116SM	<10	<10	<10	<10	<10	<10	<10
					Western Pearlshell				
14	12484500	YK0111SM	<10	<10	<10	<10	<10	<10	<10
14	12484500	YK0111SM	<10	<10	<10	<10	<10	<10	<10
					Waterweed				
26	12500442	YK0098SP	<10	<10	<10	10	<10	<10	<10
26	12500442	YK0098SP	<10	<10	<10	10	<10	<10	<10

APPENDIX A

METHOD FOR ANALYZING TRACE-ORGANIC COMPOUNDS IN FILTERED WATER

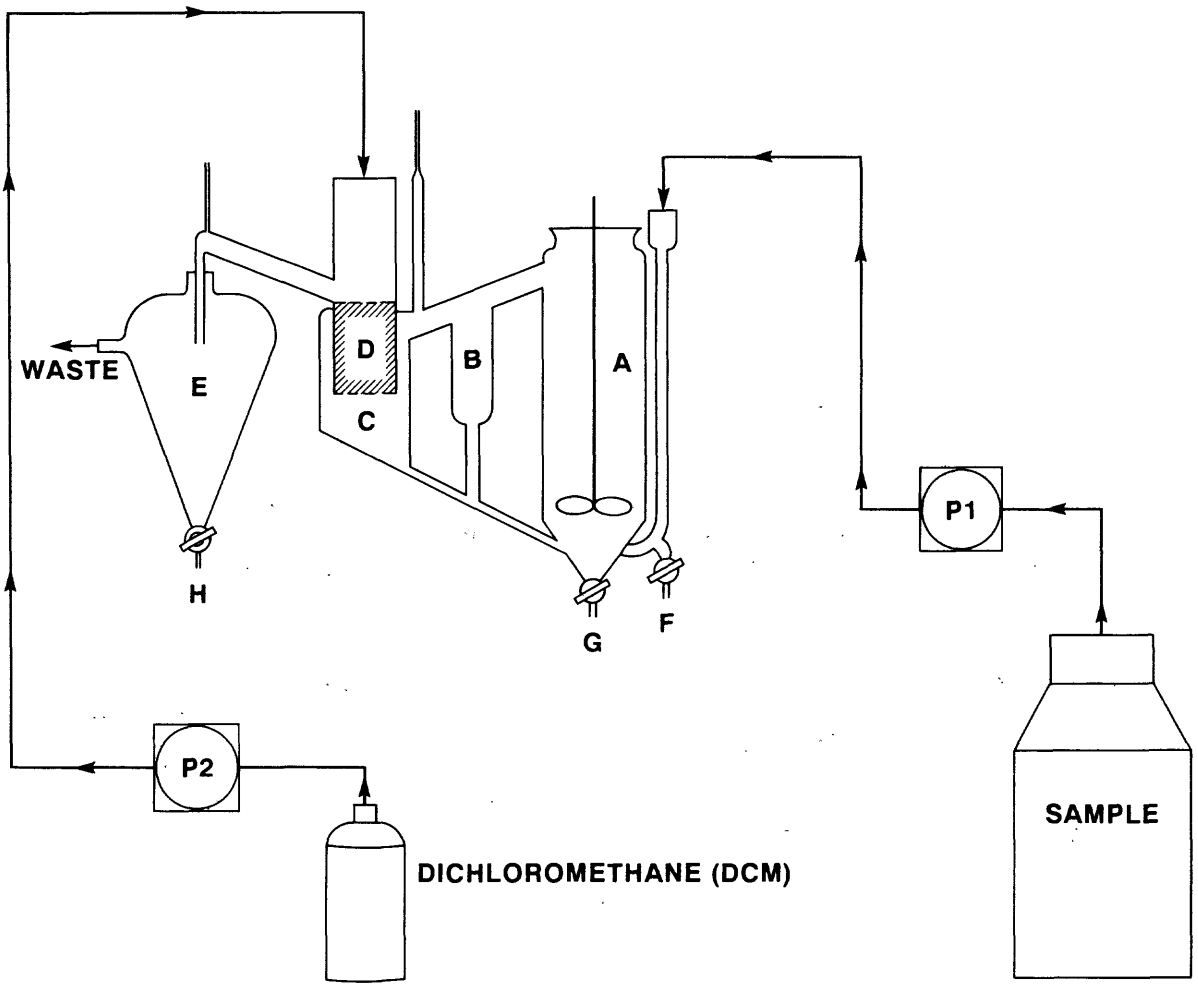
Dissolved-Phase Preconcentration

The Goulden Large Sample Extractor (GLSE), a continuous-flow liquid-liquid extractor (Goulden and Anthony, 1985), was used to extract small concentrations of organic compounds from large volumes of water. A schematic representation of the GLSE (Allen Scientific Glassware, Boulder, Colorado) is shown in figure A1. The dimensions of the mixer-settler portion of the GLSE were similar to that initially described by Goulden and Anthony, 1985.

The water sample was pumped at a flow rate of 350 mL/min (milliliters per minute) through Teflon tubing from a tared, stainless-steel, milk can into chamber A of the GLSE using a positive displacement pump [P1] (Model RP-D-2CSC, Fluid Metering Inc.) [fig. A1]. The sample was mixed with the dichloromethane (DCM) extraction solvent using a stirrer blade positioned in chamber A approximately 2 cm (centimeters) from the bottom. The stirrer motor (Fisher Dyna-Mix) was mounted just above the top opening of chamber A. The positioning, blade configuration, and rotation of the stirrer forced the incoming water upward in mixing chamber A and downward in the settling chamber B. This configuration provided efficient mixing, while minimizing the formation of emulsions (Goulden and Anthony, 1985). Column D consisted of a high-density polypropylene Buchner flat-bottom funnel that was packed with 4 mm (millimeters) x 4 mm Teflon Raschig rings. This column was placed over chamber C and was designed to minimize loss of DCM droplets and help break up emulsions (Goulden and Anthony, 1985). A final settling chamber [E] consisted of a Teflon separatory funnel and was positioned downstream of chamber C to collect any remaining DCM droplets. Additional air vents were positioned in the top of the GLSE between chambers A and C, and between C and E.

During the extraction process, a substantial volume of DCM was lost in the effluent water exiting chamber E, because DCM is appreciably soluble in water (about 1.6 percent by volume at 20°C [degrees Celsius]). In addition, some DCM is lost because of volatilization from the open-top design of the GLSE. To counter this loss, DCM was replenished by pumping solvent from a reservoir by another positive displacement pump [P2] (Model RP-SY-1CSC, Fluid Metering Inc.) through an opening at the top of chamber C directly into the packing in column D. Introduction of fresh solvent into column D also helped to extract remaining analytes from the water (Goulden and Anthony, 1985).

It should be noted that large volumes of DCM-saturated waste water, generated by the GLSE system used in this study, present a considerable disposal problem, especially for field applications. In addition, the vapor loss from its open-top design results in a significant vapor exposure potential. A newer version of the GLSE has recently been developed (oral commun., March 1992, D.H.J. Anthony, Environment Canada, National Water Research Institute, Burlington, Ontario) that reduces solvent vapor loss and incorporates a solvent-recovery system, although the latter necessitates much slower flow rates (about 2 L (liters) per hour).



EXPLANATION

P1	**Positive displacement pump 1**
A	**Mixing chamber A**
B	**Settling chamber B**
C	**Settling chamber C**
D	**Column D--Designed to minimize loss of solvent**
E	**Final Settling Chamber E**
P2	**Positive displacement pump 2**
F, G, H	**Stopcocks for draining system**

Figure A1.--Goulden Large-Sample Extractor.

Prior to processing every natural, spike, or blank sample, the GLSE and support hardware were cleaned by pumping 100 mL of acetone and 100 mL of methanol through the Teflon inlet tubing into chamber A using sample pump P1. The extractor also was rinsed thoroughly with acetone and methanol. For the final rinse, the extractor system was filled with 10 L of charcoal-filtered tap water via pump P1, and then drained.

The GLSE was operated by initially adding 250 mL of DCM to the extractor. The sample pump (P1) was started and, when the extractor was half-filled, the stirrer was started. As the sample finished filling the extractor, 50 mL of DCM were used to charge the Raschig rings in column D. The stirrer speed was adjusted so that a homogeneous mixture of sample and DCM was maintained and only a small number of droplets spilled over into chamber C. A solvent level midway between chambers A and C was maintained by continuously introducing fresh DCM at 9 mL/min into the packed column D with pump P2. Once started, a sample was extracted continuously without interruption. Sample volumes processed through the GLSE ranged from 4.4 to 112 L, depending on the expected target-analyte concentrations. After the sample was pumped through the extractor, 500 mL of distilled water was pumped into the extractor by pump P1 to ensure that all of the sample had reached the GLSE. The pumps and stirrer were then stopped and the DCM-water mixture was allowed to separate. The DCM fraction was drained through stopcock G into a 500-mL amber-glass bottle that was pre-cleaned by acid rinsing and heating to 450°C for 8 hours. The water in the GLSE was drained through stopcock F until the water level was below column D. Fifty milliliters of DCM were poured through column D, and following settling, the DCM was collected through stopcock G. Water in the extractor was carefully drained through stopcock F to avoid losing any solvent droplets still present. After all the water was removed from the GLSE, the extractor was meticulously rinsed with DCM, which was collected through stopcock G into the amber-glass bottle. Additionally, any DCM droplets in separatory funnel E were collected through stopcock H. Extracts were packed in ice for shipment to the U.S. Geological Survey Laboratory (Methods Research and Development Program in Arvada, Colorado). At the lab, the samples were stored in a refrigerator until volume reduction prior to analysis. During the filtration and extraction process, the solvents and samples only came into contact with Teflon, glass, or stainless steel, except for column D in the Goulden extractor which was made of high-density polypropylene.

GLSE Precleaning and Assembly

Before shipment to the field lab, all GLSE parts that would come in contact with sample or solvent were precleaned with Alconox soap solution, and rinsed with tap and distilled water and acetone. Non-glass components also were rinsed in methanol and DCM prior to being wrapped in clean (baked) aluminum foil. The glass components of the GLSE were then baked for 12 hours in a 450°C oven, and the openings were wrapped in clean aluminum foil. All components were then carefully packed for shipment to the field.

At the field lab, the GLSE was attached to a support-rack system contained within a wooden shipping box. The GLSE required electrical power for operation of the sample (P1) and solvent-metering (P2) pumps and the stirrer. The GLSE and filtration pumps were calibrated in the field to verify flows.

Laboratory Preparation of GLSE Extracts

Residual water was removed from extracts using a Teflon separatory funnel and by subsequently passing the extract through anhydrous sodium sulfate. Dried extracts were vacuum-rotary evaporated at 30°C to a volume of approximately 5 mL. Toluene was added as a keeper solvent to the 5-mL extracts, and volume was further reduced by evaporation with ultra-pure nitrogen to a final volume of 0.2 mL.

Instrumentation

All GLSE extracts were spiked with a perdeuterated-polycyclic-aromatic- hydrocarbon (PAH) internal-injection standard and analyzed by gas chromatography/mass spectrometry (GC/MS) using a Hewlett-Packard (HP) 5890A GC, equipped with a HP 5970 MSD (mass selective detector) and a HP 7673A autosampler. The GC/MSD was fitted with a 30-meters (m) long, 2.5-mm internal diameter, 0.25-micrometers-film-thickness-fused-silica, capillary column (Model DB-1701, J & W Scientific, Inc.). Compound separations were performed using the following temperature program: 80°C initial temperature for 2 minutes; followed by a 20°C per minute gradient to 120°C; followed by a 2.5°C per minute to 285°C with 18.5-minute hold time. The injector and transfer line were set at 250°C and 285°C, respectively. Two-microliter splitless injections were performed by the HP 7673A autosampler. The helium carrier gas had a linear velocity of 32 cm/s (centimeter per second) at 50°C. The split sweep and septum purge were set at 30 and 3 mL/min, respectively. The Grob split time was set at 2 minutes for all injections.

Electron-impact ionization mass spectrometric analysis was conducted at an energy of 70 electronvolts (eV). The ion source temperature was 200°C. The electron multiplier voltage ranged between 1,400 and 2,000 volts (V). Selected ion monitoring for the parent ion and two other characteristic ions was used.

Quantification

All integrations were performed by a HP 59970C 9000 Series Model 216 Chemstation. Response factors relative to perdeuterated PAH's were determined from 0.05, 0.10, 0.25, 0.50, 1.0, and 5.0 ng/μL (nanograms per microliter) standards, for sets of 10 to 16 samples. Modified Lee retention indices (Lee and other, 1979) were calculated using the internal-injection standard as the retention index markers on the DB-1701 column. Quantification levels were determined using the approach of Miller and Miller (1986). The presence of an analyte required: agreement with the relative retention indices, the presence of the parent peak, and the confirmation of the ion abundances of at least one of the characteristic ions relative to the parent peak. Additionally, concentrations needed to exceed analytical noise in order to be quantifiable.

Reagents

All solvents were pesticide-residue grade obtained from Burdick and Jackson, Muskegon, Michigan. Pesticide reference standards were obtained from the U.S. Environmental Protection Agency Pesticide Repository, Research Triangle Park, North Carolina. Perdeuterated naphthalene, phenanthrene, fluoranthene, chrysene, and perylene, atrazine ethylamine d-5 (atrazine d-5), gamma-hexachlorocyclohexane d-6 (gamma-HCH d-6), p,p'-DDT d-8, and diazinon diethyl d-10 were obtained from Cambridge Isotopes, Woburn, Massachusetts. Perdeuterated benzo(ghi)perylene was obtained from MSD Isotopes, Montreal, Ontario, Canada. Pesticide stock solutions were formulated from accurately weighed pure standards, at approximately 1,000 ng/μL concentrations in ethyl acetate. All deuterated stock solutions were made in toluene. All pesticides were combined into 50-ng/μL mixed-standard solutions. GC/MS calibration standards were prepared independently from the mixed standard solutions. Instrumental calibration standard solutions were formulated in toluene. A surrogate standard containing atrazine d-5, gamma-HCH d-6, diazinon diethyl d-10, p,p'-DDT d-8, isodrin, and terbuthylazine was formulated at 10 ng/μL in methanol. A separate, 50-ng/μL, mixed standard containing the perdeuterated PAH was prepared. The internal-injection standard solution contained the perdeuterated PAH, naphthalene d-8, phenanthrene d-10, fluoranthene d-10, chrysene d-12, and benzo(ghi)perylene d-12 diluted to 2.5 ng/μL in toluene.

Quality-Assurance Procedures

Quality-assurance samples represented a large percentage of the total samples processed in the GLSE, because this apparatus was in the evaluation stage. Of the 57 total GLSE extractions performed in the 1989 Yakima study, 32 were stream and well samples (including 4 replicate samples from one site), 12 were spiked samples, and 13 were system and extractor blanks.

Blanks were run for most phases of the procedure. Large volumes of distilled water were prepared in clean glass carboys and transported to the field lab. Field blanks were analyzed to determine extraneous sources of contamination during the filtration and extraction phases of the procedure. GLSE system blanks were prepared by pouring 10 to 20 L of distilled water into a clean milk can and processing it through the filtration unit using a clean glass-fiber filter. The system blank water was then extracted in the GLSE as described above for the stream and well samples.

Extractor blanks were run following every field-matrix spike sample to assess whether the GLSE cleaning procedure was adequate. Extractor blanks were not passed through the filtration apparatus, but were spiked with a surrogate solution and processed through the GLSE as with the system blanks and samples. Because of limitations in the volume of distilled water available to process blanks, extractor- and system-blank water volumes processed through the GLSE ranged from only 5 to 7.7 L for the 1989 trip, whereas stream and well-water sample volumes ranged from 4.4 to 112 L of water. Sampling-equipment blanks were not processed in the field because of an insufficient supply of distilled water. A

background site in the Wenatchee National Forest was sampled to assay environmental contributions not directly associated with agricultural pesticide applications in the Yakima River basin.

A surrogate solution was added to all GLSE samples prior to the extraction by spiking the filtered water during the filtration process to provide an estimate of the overall method performance. The surrogates were selected based on their physical and chemical similarity to the various target compound groups. The use of GC/MS also allowed for the selection of deuterated analogs of several target compounds (for example, diazinon d-10, atrazine d-5, gamma-HCH d-6, and p,p'-DDT d-8). However, because of differences in physical and chemical properties (like solubility and DCM-water partition coefficients), surrogate recoveries do not necessarily reflect recoveries for all of the other analytes within a particular pesticide class.

In June 1989, GLSE method performance for all target analytes was monitored by determining recoveries using field-matrix spikes. The spiking solution contained 68 pesticides in methanol and was added to the filtered water. Single-matrix spike samples were added at approximately 50 ng/L for the four 11- to 12- L samples, 25 ng/L for the two 36-L samples, and 11 ng/L for the two 110-L samples (table 40, Quality-assurance Data section). To assess precision, triplicate, 10-L samples from the Yakima River at Kiona were spiked at 50 ng/L (table 40, Quality-assurance Data section). Pesticide spikes were allowed to equilibrate with a sample for at least 30 minutes prior to extraction. Analytical recoveries in spiked samples were corrected for the amount of pesticides present in the duplicate samples of unspiked filtered stream water.

APPENDIX B

METHOD FOR ANALYZING TRACE-ORGANIC COMPOUNDS IN SUSPENDED SEDIMENT

Suspended-sediment samples collected in June 1989 were not all analyzed in the same laboratory, because the U.S. Geological Survey Methods and Research Development Laboratory was not prepared to analyze large numbers of suspended-sediment samples (29 stream samples plus quality-assurance samples). The samples were not analyzed using the same method, because procedural problems were recognized during sample-processing steps. The location of the laboratories where the samples were processed is listed in table B1 in this appendix for sample sets 1, 2, and 3. The method of analysis for sample set 3 is listed in Wershaw and others (1987); methods of analysis for sample sets 1 and 2 are described in this appendix.

Procedure for Analyzing Set-1 Samples

All suspended-sediment samples (sediment trapped on filters) were kept frozen until they were analyzed in October and November 1989. Prior to extraction, filters containing suspended sediment were thawed. Wet filters were placed into soxhlet extractors and spiked with a surrogate solution containing diazinon d-10 (10 hydrogens were deuterated), gamma-HCH d-6, p,p'-DDT d-8, and atrazine d-5. The filters were soxhlet extracted (using a solvent mix of 70 percent cyclohexane and 30 percent isopropanol) dried and concentrated to about 5 mL using vacuum-rotary evaporation, and further concentrated to 1 mL using nitrogen blowdown. The samples were then cleaned up and fractionated into two fractions using two rinses of a solvent mix (30 mL of a solvent mix containing 50 percent dichloromethane, 48.5 percent cyclohexane, and 1.5 percent acetonitrile) in a Florisil-sorbent-cartridge cleanup procedure. The first fraction contained most of the organochlorine compounds and some of the organophosphorus compounds. The first-fraction samples were (1) solvent exchanged to toluene and further reduced in volume to about 200 μL (microliters), (2) transferred to gas chromatograph vials, (3) spiked with a perdeuterated-polycyclic-aromatic-hydrocarbons (PAH), internal-injection-standard solution, and (4) analyzed by GC/MS at the USGS Methods and Research Development laboratory. The second-fraction samples from the Florisil-sorbent cleanup procedure were not analyzed by GC/MS.

To obtain minimum reporting levels, samples were processed further for analyses of (1) organophosphorus compounds using a gas chromatograph with a flame-photometric detector (GC/FPD) and (2) organochlorine compounds using a gas chromatograph with an electron-capture detector (GC/ECD). In preparation for analysis of organophosphorus compounds, Florisil fractions 1 and 2 were recombined, solvent exchanged to toluene, and reduced to a final volume of 500 μL. For the Yakima River at Euclid Bridge station, only the second-fraction extract was available for GC/FPD and GC/ECD analyses. The analysis was made using dual-column-capillary GC/FPD with DB-5 and DB-1701 columns. In preparation for analyses of organochlorine compounds, the set-1 samples were solvent exchanged to n-octane prior to alumina/silica column fractionation. The glass columns were dry packed with 3 g (grams) of alumina (heated to

Table B1. Analytical laboratories where suspended-sediment samples were processed for analysis of trace-organic compounds, Yakima River basin, Washington, June 1989

[Sample sets were analyzed at U.S. Geological Survey Methods and Research Development Laboratory in Arvada, Colorado. RM = River mile, see table 2 of main report for map reference numbers and figure 1 of main report for site locations]

Station number	Station name
	SAMPLE SET 1
12479500	Yakima River at Cle Elum
12484500	Yakima River at Umtanum
12484550	Umtanum Creek nr mouth
12496510	Pacific Power & Light Company Wasteway
12499000	Naches River nr North Yakima
12500450	Yakima R abv Ahtanum Creek
12507585	Yakima River at RM 72
12509050	Yakima R at Euclid Br at RM 55
12510500	Yakima River at Kiona
	SAMPLE SET 2
12496511	City of Yakima - Finish Water
12500430	Moxee Drain at Thorp Rd
12505460	Granger Drain at mouth
4617201200432	Well 1, Sunnyside (09N/22E-04P01)
4625101203239	Well 2, Harrah (11N/18E-22R02)
12508630	South Drain nr Satus
12508850	Sulphur Creek Wasteway
	SAMPLE SET 3
12478200	Cooper River at Salmon LaSac
12484100	Wilson Cr abv. Cherry Creek
12484480	Cherry Creek at Thrall
12500445	Wide Hollow Creek near mouth
12502500	Ahtanum Creek at Union Gap
12505350	E Toppenish Drain at Wilson Rd
12505410	Sub 35 Drain at Parton Road
12505510	Marion Drain, Indian Church Rd
12507508	Toppenish Cr, Indian Church Rd
12507594	Satus Cr abv Wilson-Charley Canyon nr Toppenish
12508620	Satus Cr at gage at Satus
12509710	Spring Creek at mouth
12509829	Snipes Creek at mouth

135°C and 1-percent water deactivated) over 6 g silica (heated to 135°C and 5-percent water deactivated). The column was topped with 1 cm (of column height) of sodium sulfate (cleaned by heating overnight at 450°C), and prerinsed with a 35-mL solution of 25-percent ethyl acetate and 75-percent hexane followed by hexane rinses of 35 mL and 25 mL. Samples ranged in volume from 0.5 to 1 mL; they were separately added to the column and eluted with 35 mL of hexane (fraction A), followed by a 25-mL solution of 25-percent ethyl acetate and 75-percent hexane (fraction B). Fractions (A and B) were reduced in volume to 0.5 mL using nitrogen gas and then analyzed by dual-capillary-column GC/ECD using Restek Rtx 5 and 1701 columns.

Procedure for Analyzing Set-2 Samples

Set-2 samples were processed and extracted in January 1990. The procedure was identical to the set-1 procedure up to the Florisil sorbent cleanup step. Set-2 samples were not fractionated on Florisil and were not analyzed by GC/MS. In preparation for organophosphorus (GC/FPD) analyses, set-2 samples were reduced in volume to 500 μL using cyclohexane as the final solvent. The GC/FPD analytical procedures for the set-2 samples were identical to the procedures used for the set-1 samples. In preparation for organochlorine (GC/ECD) analyses, the set-2 extracts in cyclohexane were cleaned up and fractionated on a combined alumina/silica column. The cleanup, fractionation, and GC/ECD analytical procedures for set-2 samples were identical to procedures used for the set-1 samples.