POTOMAC RIVER BASIN WATER QUALITY
1986 - 1987

Prepared by

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August 1990

89-1

Interstate Commission on the Potomac River Basin
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INTERSTATE COMMISSION ON THE POTOMAC RIVER BASIN

This publication has been prepared by the Interstate Commission on the Potomac River Basin. Funds for this publication are provided by the United States Government, the U.S. Environmental Protection Agency, and the signatory bodies to the Interstate Commission on the Potomac River Basin: Maryland, Pennsylvania, Virginia, West Virginia, and the District of Columbia. The opinions expressed are those of the authors and should not be construed as representing the opinions of policies of the United States or any of its agencies, the several states, or the Commissioners of the Interstate Commission on the Potomac River Basin.

ACKNOWLEDGMENTS

The authors gratefully acknowledge the assistance of Rolland Fulton in providing interpretations of benthic macroinvertebrate data. Various individuals at the Virginia Water Control Board, the Maryland Department of the Environment, the Pennsylvania Department of Environmental Resources, the West Virginia Department of Natural Resources, and the District of Columbia Department of Consumer and Regulatory Affairs assisted by answering questions and providing information about water quality and benthic macroinvertebrate data.

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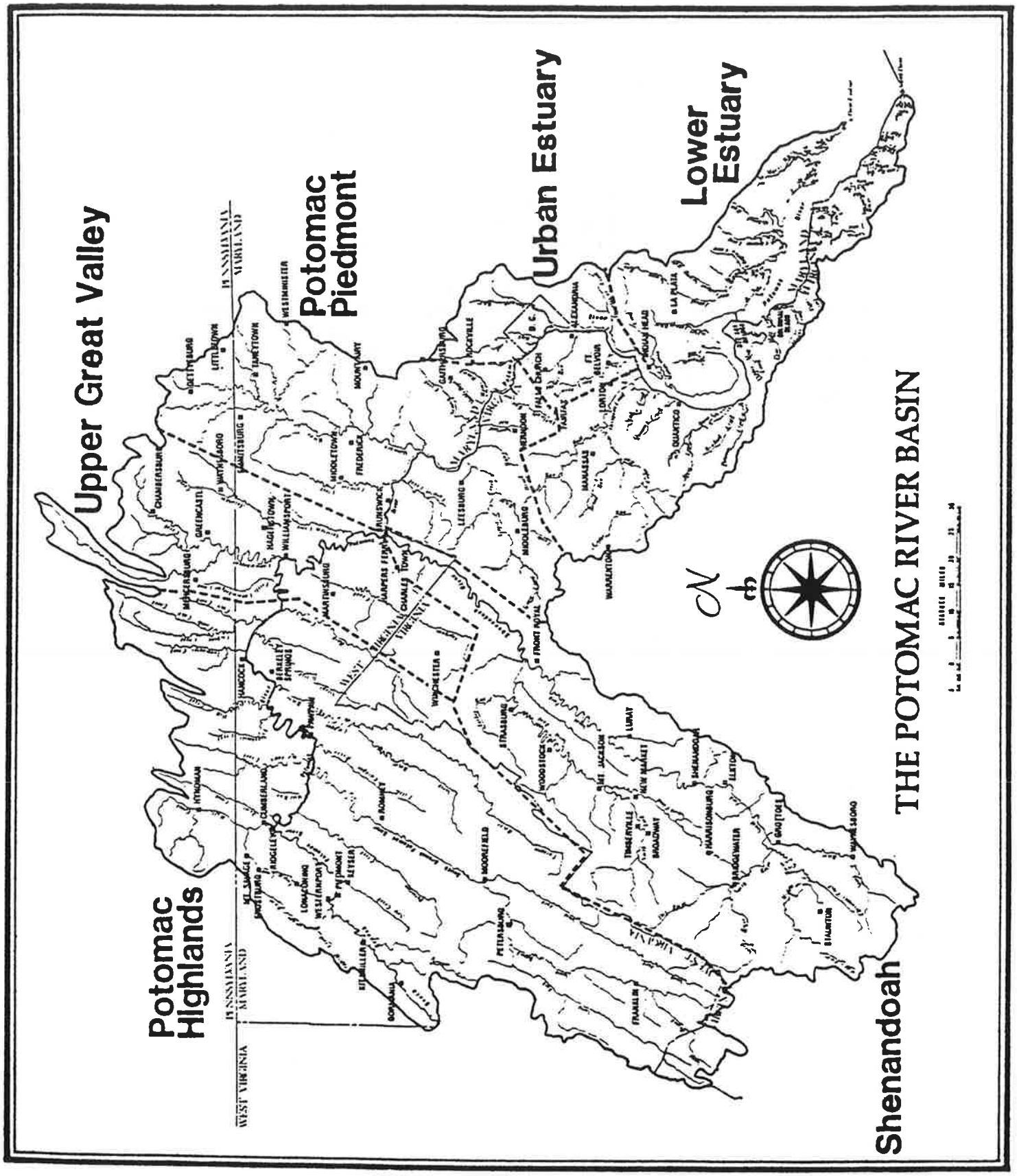
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Introduction

This report is intended to provide a regional assessment of trends in water quality in the Potomac River Basin in the period 1986 through 1987. This assessment includes a comparison of water quality data collected at selected stations during this period with data collected during 1984-85, and a compilation for the Potomac basin of the river miles meeting classified use support as indentified in state 305(b) reports for 1988. The purpose of this assessment is to provide information on status and trends in water quality throughout the Potomac basin, with a watershed perspective, rather than a state perspective. The network of stations, and parameters reviewed, is roughly consistent with those found in previous ICPRB reports on basin wide water quality (see References) to provide some comparability over time of these assessments.

Basin Description

The Potomac River Basin is located in the middle Atlantic coastal zone of the United States. The Potomac River is the second largest tributary to the Chesapeake Bay. It begins as a small spring at Fairfax Stone, WV, and for the first 100 miles of its length it is called the North Branch Potomac River. When it is joined by the South Branch Potomac River near Green Spring, WV, it forms the Potomac River proper and flows another 283 miles until it meets the Chesapeake Bay at Point Lookout, MD and Smith Point, VA. The Potomac River Basin drains 14,670 miles^2 (37,981 km^2) of which 5,723 miles^2 (14,817 km^2) are in Virginia, 3,818 miles^2 (9,885 km^2) in Maryland, 3,490 miles^2 (9,036 km^2) in West Virginia, 1,570 miles^2 (4,064 km^2) in Pennsylvania, and 69 miles^2 (179 km^2) in the District of Columbia.

In this report, the Basin is divided into six regions, which approximately correspond to physiographic provinces. Map 1 shows the Potomac Basin divided into these regions, and includes major towns and tributary streams.

Water Quality Data Sources

Water quality data summarized in this report were collected by the State agencies responsible for water quality monitoring: District of Columbia, Department of Consumer and Regulatory Affairs, Environmental Control Division; Maryland, Department of the Environment; Pennsylvania, Department of Environmental Resources; Virginia, State Water Control Board, Division of Surveillance and Field Studies, Northern and Valley Regional Offices; and West Virginia, Department of Natural Resources, Division of Water Resources.

Water quality data were obtained from the US EPA's STORET database. Forty five water quality parameters were selected for review, including those most commonly sampled by the states. Sampling frequency is generally once per month. Occasional missed values may be due to field or lab problems, and some stations may not be visited during every winter month. Clearly unreasonable data values, for example water temperatures less than -1 ^{o}C, were discarded before analysis. Some parameters may be sampled more than once in a monthly visit. Table 1 lists, by EPA STORET numerical code and description, water quality parameters used in this report. For brevity, raw data are not published here, but can be obtained from ICPRB, from STORET, or from the state agencies. More detailed information on field and laboratory methods for these parameters is also available from the same sources. Table 3 lists the location of monitoring stations. This table also lists, for each station, the state identification code, state agency, and the ICPRB BWQMN number (for continuity with previous ICPRB reports).

To provide some indication of the biological quality of water at these stations, each of the state water quality monitoring agencies was asked to provide data from benthic macroinvertebrate monitoring, if available, at these stations or on nearby reaches of the same streams. Qualitative assessments based on species diversity and the professional opinion of field sampling crews is provided in the station by station descriptions of status and trends.

Each of the states computed in their 305(b) reports for 1986-87 the number of stream miles meeting designated uses. To provide an overall indication of the degree to which Potomac streams are meeting designated uses, the Potomac basin mileage was abstracted from these reports and is presented in Table 3.

Water quality data are presented in separate tables for each station, which show summary statistics for all parameters by station. The statistics include; the median, maximum, minimum, mean, standard deviation, and number of observations for the 1986-87 monitoring period. Also, for comparison, the median and number of observations for the 1984-85 monitoring period are included in these tables. If a parameter was not monitored for an entire time period, the median column is flagged with an "NA" (not available). If a parameter was not monitored for both periods it is not listed at all in the table. Along with the summary of water quality data for the 1984-5 and 1986-87 periods, each table also includes notes on significant trends in water quality during 1973-84 (from Haywood et al, 1987) and an assessment of the benthic macroinvertebrate community if that information was available.

Stations are grouped by region within the basin. Following the tables for individual stations in a region, is one table which summarizes four year trends in water quality for all the stations in the region. In this table the median value for 1984-85 is compared to that for 1986-87. These comparisons are presented as a simple method to detect a current trend in a parameter, and consist of the difference in median values between the the two monitoring periods normalized by the standard deviation of the present monitoring period:

$$(MED8687-MED8485) / SD8687$$

where MED8687 is the median value 1986-87,
MED8485 is the median value 1984-85,
SD8687 is the standard deviation for 1986-87.

Thus, for example, if this statistic is 1.0, the median value of the water quality parameter has increased by one standard deviation from the previous monitoring period. Likewise, a -1.0 would indicate that the median value has decreased by one standard deviation. If the standard deviation was equal to 0 that parameter was flagged by a "*". If the number of observations was less than 3 the statistic was not computer and was also flagged with a "*". A blank entry indicates that a parameter did not have median values in both monitoring periods.

Summary of Regional Trends

Following are brief regional summaries of trends observed in water quality parameters. Regional trends 1984-5 to 1986-87 are noted and compared to trends previously determined for the 1973-84 period (see Haywood, et al, 1987). A "decreasing trend" refers to median value 1986-87 lower than 1984-5 and an "increasing trend" refers to median value 1986-87 higher than 1984-85.

Region 1: Potomac Highlands

North Branch Potomac: From 1973 to 1984, Phosphorous was increasing, pH was increasing except at Oldtown, D.O. showed upward trends in both the upper and lower North Branch. In contrast, the present report shows that the median value of Phosphorous (Total) was lower in 1986-87 data than 1984-85 data for three stations. pH was increasing at only one station and was downward at three. The D.O. medians were up in all stations except at Cumberland.

Savage River: Phosphorus and Nitrate were increasing 1973 - 84, while pH was decreasing. The present report showed equal medians for Phosphorous and decreasing trend for pH.

Georges Creek: D.O. and pH were both increasing during 1973-84. The present report found that D.O. was on the increase and pH had no change. The median value for Fecal Coliform (MFM-FCBR/100 ml) was the highest for all stations analyzed for the 1986-87 period. However, alkalinity was upward, and TKN, Conductivity and Phosphorous were all downward.

Wills Creek: No trends were reported in the 1985 report. Conductivity was down and TKN was up by the highest percentage in the Potomac Highlands region from 1984 to 1987.

South Branch: Upward trends in Fecal Coliform, Lead and Chromium were found from 1973-84, along with decreasing pH. The present report showed that Fecal Coliform was upward again, but pH was downward slightly (with the minimum value in 1986-87 still above the neutral value). There was insufficient data for Lead and Chromium, but Iron was upward, and Diss. Residue was also upward.

Town Creek: Conductivity and Sulfate were decreasing along with pH, and D.O., Nitrate and Phosphorous were increasing during 1973-84. For 1984 - 87 conductivity was up slightly, D.O. was downward, pH was up, Alkalinity was upward, TKN showed no change and Phosphorous was increasing again in the present report.

Potomac Main Stem: The major regional trend during 1973-84 was an increase in Phosphorous. In the present report, Phosphorous was exhibiting a decreasing trend in most cases or it showed no change. D.O. was upward.

Upper Potomac Highlands Region Summary: Alkalinity was upward in all stations, D.O. was up in most stations, Phosphorous was decreasing or remaining steady in most stations. pH was down only slightly or remained unchanged for many stations.

Region 2. Upper Great Valley.

Conococheague: An increase in Nitrate, Phosphorous, and Conductivity was detected in 1973-84. Nitrate was upward but Phosphorous was decreasing in the present report. Aluminum increased susbstantially at Worleytown, PA.

Opequeon : Toxic metal trend problems were detected in 1973-84. There were not sufficient data to assess continuing trends for those parameters in 1986-87. BOD, COD, Fecal Coliform, Nitrite, TKN, and Phosphorous were all increasing, while Nitrate Diss. Residue were decreasing.

Potomac Main Stem: Increases in Potomac main stem nutrient levels were strongly indicated in 197-84. This report showed that D.O. is upward, TKN is decreasing, pH is upward, and Phosphorous is still increasing.

Antietam Creek: Increases in Nitrate and TKN during 1973-84. During 1986-87, Nitrate and TKN continu increasing trends, but Phosphorous is down. Aluminum has a large pecentage increase in the East Branch.

Region 3: Shenandoah River Basin

North Fork: No decreasing trends for any of the Nitrogen parameters were detected for 197-84. Decrease in Orth-Phosphate for all stations and an increasing trend in Total Phosphorous. TKN was downward for two stations, and Nitrate was down for all stations in the present study. Phosphorous data were insufficient.

Cedar Creek: No significant trends were detected in 1973-84. In the present study, TKN, COD, conductivity and Nitrate were all upward.

South River: Decreases were detected in 1973-84 for TOC, while Ammonia and Nitrite were increasing. TOC was increasing but TKN and Nitrate were decreasing in the present study.

South Fork: Some Nitrite increasing trends and ammonia increases occurred 1973-84. No decreasing trends for any nitrogen parameters were found. Mercury showed decreases at Front Royal. Nitrite showed no change in two and a decreasing trend in another station for the 1986-87 period. However, Nitrate and residue were largely decreasing.

Main Stem: Increasing in one or more Nitrogen parameters for all stations, and no decreasing trends for Phosphorous during 1973-84. Phosphorous was decreasing in the present report, and Nitrogen was similar to 1985.

Shenandoah River Basin Summary: Alkalinity, COD, Conductivity, and Hardness showed higher median levels at most stations in this region for the 1986-87 period as compared to 1984-85.

Region 4: Potomac Piedmont

Potomac River: Increasing trends in some Nitrogen parameters and total Phosphorous during 1973-84. No decreasing trends for any Nitrogen or Phosphorous parameters were detected. TKN was downward, and total Phosphorous was decreasing in the present study.

Rock Creek: Increases in Total and Fecal Coliform occurred 1973-84. Decreases in Fecal Coliform were seen in the present study. However, large increases in Aluminum, Nitrate and Lead were also found.

Monocacy River: Increases in one or more Nitrogen parameters and total Phosphorous increases occurred at two stations during 1973-84. TKN was decreasing at one station and total Phosphorous was down at two stations in this study.

Goose Creek: Increases in Ammonia, Nitrite, TKN, and Phosphorous occurred during 1973-84. From 1984 to 1987 increases were found in Ammonia, Nitrite, TKN, and BOD, and COD. There was insufficient data on Phosphorous.

Seneca Creek: Increases in Nitrogen parameters, total Phosphorous and decreases in pH occurred 1973-84. Decreases in TKN, increases in pH and decreases in total Phosphorous were detected for 1984 - 87.

Cabin John Creek: Total Phosphorous was declining, Nitrate and TKN was increasing and total Coliform was decreasing during 1973-84. TKN was decreasing, and total Phosphorous was increasing 1984 - 87.

Potomac Piedmont Region Summary: D.O. was up at all stations, and Conductivity was up at most stations.

Region 5: Potomac Urban Estuary

Little Falls: Nitrogen was increasing 1973-84 and Phosphorous levels were decreasing. The present study showed the same trends continuing. Fecal Coliform, TKN were way up in Haines Point.

Rock Creek: Nitrogen parameters and salinity were increasing 1973-84. TKN and Phosphorous are upward and salinity data were insufficient in the present study.

Anacostia: Nitrogen and Phosphorous parameters were generally declining during 1973-84. The same trends continued 1984-87.

Four Mile Run: Improving trends were indicated in nearly all parameters for the period 1973-84. BOD, COD, Conductivity, Nitrate, TKN, and Residue were all increasing during 1984-87.

Hunting Creek: Improving trends in all except Fecal Coliform occurred 1973-84. BOD, Conductivity, Nitrate, Nitrite, TKN, were all increasing and Residue was decreasing 1984-87.

Piscataway Creek: Total Coliform, Nitrite, and Residue increased during 1973-84.. Phosphorous was downward and others had scarce data for the 1984 - 1987 period.

Little Hunting Creek: The only significant trend detected in 1973-84 was a decrease in Phosphorous. Phosphourous showed no change in the median value for 1984-87.

Pohick Creek: Deterioration in water quality was detected for nutrients, Fecal Coliform, and Residue during 1973-84. BOD, COD, Nitrate, TKN, and Residue were downward, and Cadmium and Fecal Coliform were upward in the present analysis.

Potomac Urban Estuary Region Summary: Phosphorous mostly downward, Conductivity upward, BOD mostly upward.

Region 6: Lower Potomac Estuary

Estuary stations: Increasing trends occurred for Nitrate and D.O. during 1973-84, while Phosphorous showed no trends, and total Coliform was decreasing. During 1984-87, D.O. levels were increasing, but Nitrogen and Coliform data were insufficient to assess trends.

South Run: Decreases were detected in pH, Ortho Phosphate, TOC and increases in Residue for 1973-84. pH was upward slightly during 1984-87 and Nitrate, Nitrite, and D.O. were increasing.

Occoquan: Nitrogen and Phosphorous increased during 1973-84. Nitrate was downward, TKN was upward and Phosphorous was steady from 1984 to 1987.

Mattawoman Creek: Decreasing trend in Total Coliform and increases in TKN occurred 1973-84. From 1984 to 1987 only TKN decreased, other data were insufficient for comparison.

Lower Potomac Estuary Region Summary: DO was up in most stations.

Designated Use Support

Each state, in preparing is biennial water quality assessment for the EPA, the 305(b) report, is required to classify its waters as to the number of miles meeting, partially meeting, or failing to meet, designated uses. Because the Potomac basin lies in parts of four states plus the District of Columbia no single agency makes a designated use assessment of the Potomac basin as a watershed. Use support information for the Potomac was abstracted from the states' 1988 305(b) reports and presented in Table 3 to provide at lease a first cut at determining the level of designated use support throughout the Potomac watershed. Because each state used different methods for determining miles of streams to be assessed, as well as different classification criteria, use support numbers cannot be compared between states. For further information on the states determined the level of use support see the 305(b) reports listed in the References.

Table 1. Water Quality Parameters Used to Determine Water Quality Status and Trend

STORET CODE	STORET ABBREVIATION	STORET PARAMETER DESCRIPTION
00010	Water Temp Cent	Temperature, Degrees Centigrade
00076	Turb Trbidmtr Hach FTU	Turbidity, Hach Turbidimeter (Formazin Turb Unit)
00094	Cnductvy Field	Specific Conductance, Field uMhos/cm @ 25C
00095	Cnductvy At	Specific Conductance, uMhos/cm @ 25C
00299	DO Probe	Oxygen Dissolved Analysis by Probe mg/l
00300	DO mg/l	Oxygen, Dissolved, mg/l
00301	DO Satur Percent	Oxygen, Dissolved, Percent Saturation)
00310	BOD 5 Day mg/l	Biochemical Oxygen Demand (mg/l, 5 Day 20Deg C)
00340	COD Hi Level	Chemical Oxygen Demand, .25N K2Cr2O7 mg/l
00400	pH	pH (Standard Units)
00403	Lab pH SU	pH (Standard Units) Lab
00410	T Alkalinity	Alkalinity, Total, mg/l As CaCO3
00435	T Acidity	Acidity, Total, mg/l As CaCO3
00480	Salinity	Salinity - Parts Per Thousand
00500	Residue Total	Residue, Total, mg/l
00515	Residue Diss-105C	Residue, Total Filtrable, Dried At 105C mg/l
00530	Residue Tot Nflt	Residue, Total Nonfiltrable, mg/l
00535	Residue Vol Nflt	Residue, Volatile Nonfiltrable, mg/l
00540	Residue Fix Nflt	Residue, Fixed Nonfiltrable, mg/l
00610	NH3+NH4-	Nitrogen, Ammonia, Total, mg/l N
00615	NO2-N Total	Nitrite Nitrogen, Total, mg/l As N
00620	NO3-N Total	Nitrate Nitrogen, Total, mg/l As N
00625	Tot Kjel N	Nitrogen, Kjeldahl, Total, mg/l As N
00630	NO2&NO3	Nitrite Plus Nitrate, Total, 1 Det., mg/l As N
00650	T PO4	Phosphate, Total, mg/l As PO4
00665	Phos-Tot	Phosphorus, Total, mg/l As P
00666	Phos-Dis	Phosphorus, Dissolved, mg/l As P
00671	Phos-Dis Ortho	Phosphorus, Dissolved Orthophosphate, mg/l As P
00680	T Org C	Carbon, Total Organic, mg/l As C
00900	Tot Hard CaCO3	Hardness, Total, mg/l As CaCO3
00927	Mgnsium Mg, Tot	Magnesium, Total, mg/l As Mg
00929	Sodium Na,Tot	Sodium, Total, mg/l As Na
00940	Chloride Total	Chloride, Total In Water, mg/l
00945	Sulfate SO4-tot	Sulfate, Total, mg/l As SO4
00951	Fluoride	Fluoride, Total, mg/l As F
01027	Cadmium Cd, Tot	Cadmium, Total, ug/l As Cd
01032	Chromium Hex-val	Chromium, Hexavalent, ug/l As Cr
01034	Chromium Cr, Tot	Chromium, Total, ug/l As Cr
01042	Copper Cu, Tot	Copper, Total, ug/l As Cu
01045	Iron Fe, Tot	Iron, Total, ug/l As Fe

Table 1. Water Quality Parameters Used to Determine Water Quality Status and Trend (continued)

STORET CODE	STORET ABBREVIATION	STORET PARAMETER DESCRIPTION
01051	Lead Pb, Tot	Lead, Total, ug/l As Pb
01105	Aluminum Al	Aluminum, Total, ug/l As Al
31505	Tot Coli MPN Conf /100 Ml	Coliform, Tot, MPN, Confirmed Test,35C (Tube 31506)
31615	Fec Coli	Fecal Coliform,MPNECMED per 100ml at 44.5C (Tube 31614)
31616	Fec Coli MFM-FCBR /100 Ml	Fecal Coliform, Membrane Filter M-FC Broth,44.5c
70507	Phos-T	Phosphorus, Tot. Orthophosphate, mg/l P
71900	Mercury Hg,	Mercury, Total ug/l As Hg

TABLE 2
Water Quality Monitoring Stations

Stream	Location	Station	Agency	BWQMN
SECTION 1: POTOMAC HIGHLANDS				
North Branch Potomac R.	Kitzmiller, MD, below Md Rt 38	NBP0689	MDOEP	1
	Bloomington, MD, Md Rt 135 Br.	NBP0534	MDOEP	2
Savage River	Bloomington, MD, at Md Rt 135	SAV000	MDOEP	3
Georges Creek	Franklin, MD, Md Rt 36 Bridge	GE00009	MDOEP	4
North Branch Potomac R.	Pinto, MD, West Md RR Bridge	NBP0326	MDOEP	5
Wills Creek	Cumberland, MD, below Braddock Run	WIL0013	MDOEP	6
North Branch Potomac R.	Cumberland, MD, at Md Rt 51	NBP0103	MDOEP	7
	Oldtown, MD, Md Rt 51 Toll Br.	NBP0023	MDOEP	8
South Branch Potomac R.	Moorefield, WV, US Rt 220 Br.	550843	WVDNR	9
	Springfield, WV, WV Rt 3 Br.	550468	WVDNR	10
Town Creek	Oldtown, MD, Oldtown Rd Bridge	TOW0030	MDOEP	11
Potomac River	Paw Paw, WV. Md Rt 51 Bridge	POT2766	MDOEP	12
	Hancock, MD, below US Rt 522	POT2386	MDOEP	13
SECTION 2: UPPER GREAT VALLEY				
Conococheague Creek	Worleytown, PA, Franklin City	WQN0501	PADER	14
	Fairview, MD, Md Rt 58	CON0180	MDOEP	15
	Williamsport, MD, Md Rt 68	CON0005	MDOEP	16
Abrams Creek	Winchester, VA, Va Rt 656 Br.	1AABR002.73	VASWCB	17
Opequon Creek	Va Rt 7 Br. below Winchester, VA	1AOPE025.10	VASWCB	18
	Bedington, WV, Sec Rt 12	550462 (P-4-7)	WVDNR	19

TABLE 3 (continued)
Water Quality Monitoring Stations

Stream	Location	Station	Agency	BWQMN
Potomac River	Shepherdstown, WV, below Md Rt 24	POT1830	MDOEP	20
Antietam Creek E. Branch	Washington Township, PA	WQN0504	PADER	21
Antietam Creek	Rocky Forge, MD, Rt 60 Bridge	ANT0366	MDOEP	22
	Funkstown, MD, Poffenberger Rd	ANT0203	MDOEP	23
	Sharpsburg, MD, Rt 34 Bridge	ANT0044	MDOEP	24
SECTION 3: SHENANDOAH RIVER BASIN				
North Fork Shenandoah	Cootes Store, VA, Rt 259 Bridge	1BNFS093.53	VASWCB	25
	New Market, VA, Rt 617/953 Bridge	1BNFS081.42	VASWCB	26
	Mt. Jackson, VA, US Rt 11	1BNFS062.18	VASWCB	27
	Strasburg, VA, Rt 55 Crossing	1BNFS010.34	VASWCB	28
Cedar Creek	Winchester, VA, Rt 628 Bridge	1BCDR013.29	VASWCB	29
North Fork Shenandoah	Front Royal, VA, US 340 Bridge	1BNFS000.69	VASWCB	30
South River	Waynesboro, VA, Rt 664 Bridge	1BSTH027.10	VASWCB	31
	Crimora, VA, Rt 612 Bridge	1BSTH014.49	VASWCB	32
	Port Republic, VA, Rt 629 Bridge	1BSTH000.19	VASWCB	33
South Fork Shenandoah	Lynnwood, VA, Rt 708 Bridge	1BSSF092.69	VASWCB	34
	Luray, VA, US Rt 211 Bridge	1BSSF054.20	VASWCB	35
South Fork Shenandoah	Front Royal, VA, US Rt 340/522	1BSSF000.58	VASWCB	36
Shenandoah Main Stem	Berryville, VA, Rt 7 Bridge	IBSHN022.63	VASWCB	37
Shenandoah River	Bolivar, WV, US Rt 340 Bridge	550471	WVDNR	38

TABLE 3 (continued)
Water Quality Monitoring Stations

Stream	Location	Station	Agency	BWQMN
SECTION 4: POTOMAC PIEDMONT				
Potomac River	Point of Rocks, MD US Rt 15	POT1595	MDOEP	39
	Point of Rocks, VA	POT1596	MDOEP	40
Rock Creek (Monocacy Trib)	Gettysburg, PA, US Rt 140 Bridge	WQN0503	PADER	41
Monocacy River	Bridgeport, MD, Rt 97 Bridge	MON0528	MDOEP	42
Big Pipe Creek	Bruceville, MD	BPC0035	MDOEP	43
Monocacy River	Below Frederick, MD, Reich Ford Br	MON0155	MDOEP	45
	Dickerson, MD, Rt 28 Bridge	MON0020	MDOEP	46
Potomac River	White's Ferry, MD, Rt 107	POT1471	MDOEP	47
	White's Ferry, VA,	POT1472	MDOEP	48
Goose Creek	Leesburg, VA, Rt 7 Bridge	1AGO0002.38	VASWCB	49
Seneca Creek	Bethesda, MD, River Rd Bridge	SEN0008	MDOEP	50
Cabin John Creek	Washington, DC, MacArthur Blvd Br	CJB0005	MDOEP	51
SECTION 5: POTOMAC URBAN ESTUARY				
Potomac River	Bethesda, MD, Little Falls Dam	POT1184	MDOEP	52
	Washington, DC, Canal Rd.	PMS01 (101001)	MDOEP	53
Rock Creek	Bethesda MD, Rt 410 Bridge	RCM0111	MDOEP	54
	Washington, DC, Park Road	101023	DCRA	55
Potomac River	Washington DC, Haines Point	PMS29 (101007)	DCRA	56
Anacostia River	Bladensburg, MD, US Rt 50 Br.	ANA0082	MDOEP	57
	Washington, DC, S. Capitol St.	ANA21 (101018)	DCRA	58

TABLE 3 (continued)
Water Quality Monitoring Stations

Stream	Location	Station	Agency	BWQMN
Four Mile Run	Arlington, VA, GW Parkway Br.	1AFOU000.19	VASWCB	59
Potomac River	Washington, DC, at Wilson Bridge	PMS44 (101012)	DCRA	60
Hunting Creek	Alexandria, VA, GW Parkway	1AHUT000.01	VASCB	61
Piscataway Creek	Fort Washington, MD, Rt 210 Br.	PIS0033	MDOEP	62
Little Hunting Creek	Fairfax, VA, GW Parkway Bridge	1ALIF000.19	VASWCB	63
Potomac River	Marshall Hall, MD, Buoy 67	XFB1433	MDOEP	64
Pohick Creek	Ft. Belvoir, VA, below Rt 641	1APOH007.65	VASWCB	65
SECTION 6: LOWER POTOMAC ESTUARY				
Potomac River	Indian Head, MD, Buoy N54	XEA6596	MDOEP	66
Occoquan Creek	Woodbridge, VA, Rt 123 Bridge	1AOCC006.71	VASWCB	67
South Run	Vint Hill, VA, below Vint Hill Installation	1ASOT001.44	VASWCB	68
Mattawoman Creek	Mason Springs, MD, Rt 225	MAT0078	MDOEP	69
Potomac River	Possum Pt/Moss Pt, Buoy 44	XEA1840	MDOEP	70
	Maryland Point, MD	XDA1177	MDOEP	71
	Morgantown, MD, Rt 301 Bridge	XDC1706	MDOEP	72

Table 3: CLASSIFIED USE SUPPORT

This table lists the number of stream miles that meet, partially meet, or fail to meet, quality criteria for designated uses within each state's portion of the Potomac Basin in 1987.

	USE SUPPORT	MONITORED	EVALUATED	TOTAL
VA	Attained	302.00	NA	302.00
	Partially Attained	325.70	NA	325.70
	Not Attained	242.50	NA	242.50
		870.20	NA	870.20
PA	Attained	67.40	22.40	89.80
	Partially Attained	9.20	20.80	30.00
	Not Attained	19.80	4.00	23.80
		96.40	47.20	143.60
WV	Attained	631.34	303.41	934.75
	Partially Attained	265.88	251.34	517.22
	Not Attained	52.15	50.66	102.81
		949.37	605.41	1554.78
MD	Attained	360.00	289.00	649.00
	Partially Attained	231.00	24.00	255.00
	Not Attained	48.00	4.00	52.00
		639.00	317.00	956.00
DC	Attained	0.00	NA	0.00
	Partially Attained	0.00	NA	0.00
	Not Attained	26.40	NA	26.40
		26.40	NA	26.40
Totals in Potomac Basin		2581.17	969.61	3550.98

POTOMAC WATER QUALITY STATUS AND TRENDS (1986-87)
Region 1: Potomac Highlands

River North Branch Potomac River
Station NBP0689 Agency MDOEP
Location Kitzmiller, MD below MD Rt. 38.
River Mile: 354

	(1986-1987)						(1984-1985)	
PARAMETER	MED	MAX	MIN	MEAN	S.D.	N	MED	N
Acidity	NA	NA	NA	NA	NA	0	8.500	20
Alkalinity	4.000	7.000	2.000	3.611	1.539	18	2.000	41
Aluminum	NA	NA	NA	NA	NA	0	1.100	21
BOD	NA	NA	NA	NA	NA	0	2.000	1
Coliform, Total	NA	NA	NA	NA	NA	0	0.000	44
Coliform Fecal b	310.000	1500.000	9.000	432.188	449.124	16	NA	0
Conductivity Field	280.000	720.000	130.000	343.706	184.457	17	375.500	44
DO	10.900	13.100	7.790	10.881	1.609	16	10.400	39
DO%Sat	NA	NA	NA	NA	NA	0	92.400	39
Iron Fe	NA	NA	NA	NA	NA	0	0.530	41
Nitrate NO3	NA	NA	NA	NA	NA	0	0.600	37
Nitrite NO2	NA	NA	NA	NA	NA	0	0.003	26
NO2 + NO3	0.730	1.200	0.590	0.772	0.157	17	NA	0
TKN	0.500	0.850	0.250	0.501	0.158	17	0.450	40
pH	6.200	6.600	5.000	5.961	0.495	18	6.000	44
pH Lab	NA	NA	NA	NA	NA	0	5.200	21
Phosphorus, Tot	0.040	0.140	0.020	0.044	0.028	17	0.040	40
Residue	NA	NA	NA	NA	NA	0	272.000	41
Residue, Diss.	10.000	170.000	2.000	22.294	39.642	17	NA	0
Residue, Fix.Nonflt	NA	NA	NA	NA	NA	0	6.000	41
Salinity	0.000	0.030	0.000	0.002	0.007	17	NA	0
Sulfate	NA	NA	NA	NA	NA	0	141.000	41
Temperature	8.500	20.000	1.500	9.250	6.293	14	9.500	44
Turbidity	5.750	67.000	0.200	10.161	15.278	18	NA	0

In the ten year trend analysis (ICPRB, 1987), Total Coliform, Iron, Temperature and Turbidity showed significant decreasing trends. Increasing trends were detected in Nitrate, pH, and Total Phosphorus. The present analysis shows pH and Temperature increasing also, however Total Phosphorus shows no change.

There were no significant temporal trends in benthic macroinvertebrate data. The condition of the benthic community at this station was rated Poor to Very Poor in 1986 and 1987.

POTOMAC WATER QUALITY STATUS AND TRENDS (1986-87)
Region 1: Potomac Highlands

River North Branch Potomac River
Station NBP0534 Agency MDOEP
Location Bloomington, Md. at MD Rt. 135 Bridge.
River Mile: 338

	(1986-1987)						(1984-1985)	
PARAMETER	MED	MAX	MIN	MEAN	S.D.	N	MED	N
Acidity	NA	NA	NA	NA	NA	0	4.000	21
Alkalinity	3.000	4.000	0.600	2.417	1.030	18	3.000	42
Aluminum	NA	NA	NA	NA	NA	0	0.400	21
Coliform, Total	NA	NA	NA	NA	NA	0	1.500	46
Coliform Fecal b	3.000	73.000	3.000	12.353	18.778	17	NA	0
Conductivity Field	278.000	394.000	160.000	275.118	61.536	17	265.000	46
DO	11.100	13.000	8.090	11.128	1.426	16	10.800	41
DO%Sat	NA	NA	NA	NA	NA	0	92.600	41
Iron Fe	NA	NA	NA	NA	NA	0	0.480	42
Nitrate NO3	NA	NA	NA	NA	NA	0	0.650	40
Nitrite NO2	NA	NA	NA	NA	NA	0	0.004	32
NO2 + NO3	0.790	0.900	0.680	0.792	0.066	17	NA	0
TKN	0.400	0.700	0.250	0.439	0.123	17	0.395	42
pH	6.000	6.600	4.600	5.894	0.458	18	6.300	46
pH Lab	NA	NA	NA	NA	NA	0	5.700	23
Phosphorus, Tot	0.030	0.070	0.020	0.034	0.014	17	0.040	42
Residue	NA	NA	NA	NA	NA	0	220.000	22
Residue, Diss.	10.000	208.000	2.000	24.153	50.514	17	NA	0
Residue, Fix.Nonflt	NA	NA	NA	NA	NA	0	12.000	22
Salinity	0.000	0.000	0.000	0.000	0.000	17	NA	0
Sulfate	NA	NA	NA	NA	NA	0	129.000	44
Temperature	7.750	19.000	1.000	9.121	6.088	14	11.150	46
Turbidity	3.100	45.000	0.500	5.811	10.351	18	NA	0

The ten year trend report (ICPRB, 1987) showed significant decreasing trends in Aluminum, Total Coliform, Iron, Residue, Sulfate, Temperature, and Turbidity, with increasing trends detected in DO, Nitrate, Nitrite, pH, Total Phosphorus, and Nonfilt. Residue. The present analysis shows increases in DO and decreases in Temperature. In contrast Total Phosphorus and pH decreased.

There were no significant temporal trends in benthic macroinvertebrate data. The condition of the benthic community was rated Poor in 1986 and Poor-Fair in 1987.

POTOMAC WATER QUALITY STATUS AND TRENDS (1986-87)
Region 1: Potomac Highlands

River Savage River
Station SAV0000 Agency MDOEP
Location Bloomington, MD at MD Rt. 135.
River Mile: 338

	(1986-1987)						(1984-1985)	
PARAMETER	MED	MAX	MIN	MEAN	S.D.	N	MED	N
Acidity	NA	NA	NA	NA	NA	0	2.000	7
Alkalinity	12.000	27.000	7.000	14.533	5.848	18	10.000	21
Aluminum	NA	NA	NA	NA	NA	0	1.000	9
Coliform, Total	NA	NA	NA	NA	NA	0	43.000	21
Coliform Fecal b	23.000	93.000	3.000	31.765	29.740	17	NA	0
Conductivity Field	113.000	183.000	50.000	111.235	31.465	17	99.000	21
DO	11.600	12.700	9.600	11.460	0.988	15	11.250	20
DO%Sat	NA	NA	NA	NA	NA	0	95.550	20
Iron Fe	NA	NA	NA	NA	NA	0	0.400	20
Nitrate NO3	NA	NA	NA	NA	NA	0	0.790	19
Nitrite NO2	NA	NA	NA	NA	NA	0	0.006	15
NO2 + NO3	0.810	1.100	0.400	0.769	0.177	17	NA	0
TKN	0.350	2.630	0.100	0.488	0.579	17	0.300	19
pH	6.500	7.400	6.100	6.544	0.307	18	7.100	21
pH Lab	NA	NA	NA	NA	NA	0	6.550	12
Phosphorus, Tot	0.030	0.260	0.010	0.057	0.067	17	0.030	19
Residue	NA	NA	NA	NA	NA	0	80.000	11
Residue, Diss.	5.000	170.000	2.000	19.706	43.142	17	NA	0
Residue, Fix.Nonflt	NA	NA	NA	NA	NA	0	4.000	11
Salinity	0.000	0.000	0.000	0.000	0.000	17	NA	0
Sulfate	NA	NA	NA	NA	NA	0	23.500	21
Temperature	7.250	16.000	1.000	8.286	5.094	14	9.000	21
Turbidity	2.650	76.000	0.700	8.761	17.711	18	NA	0

The ten year trend report (ICPRB, 1987), showed decreasing trends for Total Coliform, pH, Temperature, and Turbidity, with increasing trends in Nitrate and Total Phosphorus. The present analysis shows decreases in pH and Temperature.

Benthic data were not available for this station.

POTOMAC WATER QUALITY STATUS AND TRENDS (1986-87)
Region 1: Potomac Highlands

River Georges Creek
Station GE00009 Agency MDOEP
Location Franklin, MD at MD Rt. 36 Bridge
River Mile: 335-1

	(1986-1987)						(1984-1985)	
PARAMETER	MED	MAX	MIN	MEAN	S.D.	N	MED	N
Acidity	NA	NA	NA	NA	NA	0	4.000	20
Alkalinity	21.000	33.000	7.000	20.765	8.541	17	9.000	42
Aluminum	NA	NA	NA	NA	NA	0	3.180	19
Cadmium Cd	NA	NA	NA	NA	NA	0	2.600	1
Coliform, Total	NA	NA	NA	NA	NA	0	580.000	46
Coliform Fecal b	2300.000	43000.000	3.000	5653.530	10840.100	15	NA	0
Conductivity Field	673.000	1230.000	220.000	678.706	294.814	17	746.000	44
DO	11.100	13.500	9.160	11.175	1.229	15	11.000	41
DO%Sat	NA	NA	NA	NA	NA	0	95.300	41
Iron Fe	NA	NA	NA	NA	NA	0	2.670	43
Nitrate NO3	NA	NA	NA	NA	NA	0	0.960	41
Nitrite NO2	NA	NA	NA	NA	NA	0	0.008	34
NO2 + NO3	1.135	1.500	0.800	1.117	0.219	16	NA	0
TKN	0.575	1.030	0.280	0.593	0.229	16	0.690	42
pH	6.500	7.100	5.800	6.512	0.322	17	6.500	46
pH Lab	NA	NA	NA	NA	NA	0	6.350	24
Phosphorus, Tot	0.090	0.260	0.040	0.105	0.056	16	0.120	40
Residue	NA	NA	NA	NA	NA	0	654.000	23
Residue, Diss.	19.000	170.000	10.000	31.688	38.860	16	NA	0
Residue, Fix.Nonflt	NA	NA	NA	NA	NA	0	24.000	23
Salinity	0.000	0.310	0.000	0.070	0.101	17	NA	0
Sulfate	NA	NA	NA	NA	NA	0	376.000	44
Temperature	8.000	19.000	3.000	9.729	5.593	14	10.250	46
Turbidity	12.000	80.000	4.100	17.488	17.710	17	NA	0

The ten year trend report (ICPRB, 1987) showed significant decreasing trends in Residue, Temperature, and Turbidity, and increasing trends in DO, Manganese, Nitrate, pH, and Phosphorus. The present analysis also showed increases in DO, and pH, and a decrease in Temperature. In contrast, Total Phosphorus shows a decrease.

There were no benthic data available for this station.

POTOMAC WATER QUALITY STATUS AND TRENDS (1986-87)
Region 1: Potomac Highlands

River North Branch Potomac River
Station NBP0326 Agency MDOEP
Location Pinto, MD west MD RR Bridge.
River Mile: 318

	(1986-1987)						(1984-1985)	
PARAMETER	MED	MAX	MIN	MEAN	S.D.	N	MED	N
Acidity	NA	NA	NA	NA	NA	0	3.000	21
Alkalinity	28.000	52.000	11.000	29.118	11.028	17	19.500	44
Aluminum	NA	NA	NA	NA	NA	0	0.800	21
BOD	NA	NA	NA	NA	NA	0	0.500	1
Coliform, Total	NA	NA	NA	NA	NA	0	0.000	47
Coliform Fecal b	1500.000	9300.000	210.000	2088.820	2185.820	17	NA	0
Conductivity Field	435.000	635.000	170.000	421.059	139.919	17	378.000	47
DO	10.750	12.000	6.790	10.261	1.656	16	9.350	42
DO%Sat	NA	NA	NA	NA	NA	0	91.250	42
Iron Fe	NA	NA	NA	NA	NA	0	0.625	44
Nitrate NO3	NA	NA	NA	NA	NA	0	0.670	41
Nitrite NO2	NA	NA	NA	NA	NA	0	0.012	35
NO2 + NO3	0.765	1.100	0.510	0.777	0.181	16	NA	0
TKN	0.625	0.800	0.330	0.599	0.133	16	0.580	43
pH	6.800	7.500	6.000	6.812	0.434	17	7.100	47
pH Lab	NA	NA	NA	NA	NA	0	6.750	24
Phosphorus, Tot	0.080	0.270	0.050	0.097	0.056	16	0.080	42
Residue	NA	NA	NA	NA	NA	0	323.000	24
Residue, Diss.	11.500	64.000	2.000	16.688	15.426	16	NA	0
Residue, Fix.Nonflt	NA	NA	NA	NA	NA	0	14.000	24
Salinity	0.000	0.000	0.000	0.000	0.000	17	NA	0
Sulfate	NA	NA	NA	NA	NA	0	131.000	45
Temperature	9.000	24.500	4.500	11.714	7.038	14	12.000	47
Turbidity	9.600	33.000	1.300	10.841	7.882	17	NA	0

The ten year trend report (ICPRB, 1987) showed significant decreasing trends in Conductivity, Residue, Sulfate, Temperature, and Turbidity, with increasing trends in Acidity, Do, Nitrate, pH (Lab), and Total Phosphorus. The present analysis shows decreases in Temperature and increases in DO. In contrast, Conductivity shows increases.

There were no significant temporal trends in benthic macroinvertebrate data. The condition of the benthic community was rated Poor-Fair in 1986 and 1987.

POTOMAC WATER QUALITY STATUS AND TRENDS (1986-87)
Region 1: Potomac Highlands

River Wills Creek
Station WIL0013 Agency MDOEP
Location Cumberland, MD below Braddock Run.
River Mile: 307-1

	(1986-1987)						(1984-1985)	
PARAMETER	MED	MAX	MIN	MEAN	S.D.	N	MED	N
Acidity	NA	NA	NA	NA	NA	0	2.000	9
Alkalinity	31.000	92.000	2.000	38.211	26.989	19	29.000	21
Aluminum	NA	NA	NA	NA	NA	0	1.000	9
Coliform, Total	NA	NA	NA	NA	NA	0	430.000	21
Coliform Fecal b	930.000	93000.000	93.000	6693.290	22282.300	17	NA	0
Conductivity Field	168.000	801.000	65.000	236.294	197.443	17	282.000	21
DO	11.700	14.000	8.490	11.471	1.630	16	10.450	20
DO%Sat	NA	NA	NA	NA	NA	0	97.900	20
Iron Fe	NA	NA	NA	NA	NA	0	0.510	20
Nitrate NO3	NA	NA	NA	NA	NA	0	1.060	18
Nitrite NO2	NA	NA	NA	NA	NA	0	0.008	19
NO2 + NO3	1.050	1.900	0.210	1.047	0.602	18	NA	0
TKN	0.350	0.900	0.100	0.397	0.231	17	0.300	20
pH	6.800	7.900	6.400	6.950	0.462	18	7.500	21
pH Lab	NA	NA	NA	NA	NA	0	7.000	12
Phosphorus, Tot	0.040	0.100	0.010	0.044	0.025	17	0.040	20
Residue	NA	NA	NA	NA	NA	0	196.000	12
Residue, Diss.	6.000	46.000	2.000	10.000	11.314	17	NA	0
Residue, Fix.Nonflt	NA	NA	NA	NA	NA	0	14.000	12
Salinity	0.000	0.070	0.000	0.004	0.017	17	NA	0
Sulfate	NA	NA	NA	NA	NA	0	47.000	21
Temperature	10.000	21.000	NA	10.367	6.911	15	11.000	21
TOC	1.900	1.910	1.910	1.910	NA	1	NA	0
Turbidity	1.200	26.000	0.600	3.047	5.788	19	NA	0

The ten year trend report (ICPRB, 1987) showed significant decreasing trends in Temperature and Turbidity, with increasing trends in Nitrate and Total Phosphorus. The present analysis also showed Temperature decreasing, but Phosphorus showed no change.

There were no benthic data available for this station.

River North Branch Potomac River
Station NBP0103 Agency MDOEP
Location Cumberland, MD at MD Rt. 51.
River Mile: 295

	(1986-1987)						(1984-1985)	
PARAMETER	MED	MAX	MIN	MEAN	S.D.	N	MED	N
Alkalinity	46.000	81.000	4.600	44.035	19.207	17	34.000	23
Coliform, Total	NA	NA	NA	NA	NA	0	9300.000	23
Coliform Fecal b	930.000	9300.000	230.000	1848.670	2441.870	15	NA	0
Conductivity Field	328.000	587.000	135.000	362.529	138.672	17	322.000	23
DO	10.500	12.700	7.180	10.282	1.935	16	11.000	23
DO%Sat	NA	NA	NA	NA	NA	0	90.700	23
Iron Fe	NA	NA	NA	NA	NA	0	0.750	22
Nitrate NO3	NA	NA	NA	NA	NA	0	0.875	22
Nitrite NO2	NA	NA	NA	NA	NA	0	0.013	21
NO2 + NO3	0.990	1.600	0.680	1.046	0.292	16	NA	0
TKN	0.475	1.250	0.280	0.580	0.256	16	0.450	22
pH	6.600	7.400	6.000	6.667	0.391	18	6.600	23
pH Lab	NA	NA	NA	NA	NA	0	7.050	22
Phosphorus, Tot	0.090	0.260	0.050	0.102	0.059	16	0.100	21
Residue	NA	NA	NA	NA	NA	0	279.000	22
Residue, Diss.	7.000	84.000	2.000	13.375	20.601	16	NA	0
Residue, Fix.Nonflt	NA	NA	NA	NA	NA	0	14.000	22
Salinity	0.000	0.000	0.000	0.000	0.000	17	NA	0
Sulfate	NA	NA	NA	NA	NA	0	110.000	23
Temperature	8.000	24.000	0.000	11.013	7.681	15	6.000	23
TOC	3.400	3.370	3.370	3.370	0.000	1	NA	0
Turbidity	5.500	46.000	0.600	7.600	10.455	17	NA	0

The ten year trend report (ICPRB, 1987) showed significant decreasing trends for Nitrite, pH, Temperature, and Turbidity, with increasing trends in DO, Nitrate, pH (Lab), and Total Phosphorus. In contrast, the present analysis showed decreases in DO, and Total Phosphorus, with increases in Temperature.

There were no significant temporal trends in benthic macroinvertebrate data. The condition of the benthic community was rated Good-Excellent in 1986; no data were reported for 1987.

POTOMAC WATER QUALITY STATUS AND TRENDS (1986-87)
Region 1: Potomac Highlands

River North Branch Potomac River
Station NBP0023 Agency MDOEP
Location Oldtown, MD, MD Rt. 51 Toll Bridge.
River Mile: 287

	(1986-1987)						(1984-1985)	
PARAMETER	MED	MAX	MIN	MEAN	S.D.	N	MED	N
Acidity	NA	NA	NA	NA	NA	0	2.000	8
Alkalinity	38.500	64.000	19.000	40.056	13.649	18	27.000	19
Aluminum	NA	NA	NA	NA	NA	0	1.000	9
Coliform, Total	NA	NA	NA	NA	NA	0	0.000	21
Coliform Fecal b	430.000	4300.000	93.000	839.563	1087.760	16	NA	0
Conductivity Field	328.000	582.000	125.000	349.294	144.297	17	362.000	20
DO	10.300	13.100	6.990	10.144	1.981	16	8.700	20
DO%Sat	NA	NA	NA	NA	NA	0	91.950	20
Iron Fe	NA	NA	NA	NA	NA	0	0.860	17
Nitrate NO3	NA	NA	NA	NA	NA	0	0.850	18
Nitrite NO2	NA	NA	NA	NA	NA	0	0.014	17
NO2 + NO3	0.955	1.400	0.620	0.976	0.264	16	NA	0
TKN	0.500	1.000	0.300	0.551	0.187	16	0.475	18
pH	6.700	7.500	6.300	6.800	0.326	17	7.100	21
pH Lab	NA	NA	NA	NA	NA	0	6.800	11
Phosphorus, Tot	0.080	0.190	0.050	0.095	0.043	16	0.090	18
Residue	NA	NA	NA	NA	NA	0	259.000	18
Residue, Diss.	12.000	74.000	2.000	18.706	22.326	17	NA	0
Residue, Fix.Nonflt	NA	NA	NA	NA	NA	0	13.000	18
Salinity	0.000	0.000	0.000	0.000	0.000	17	NA	0
Sulfate	NA	NA	NA	NA	NA	0	102.000	19
Temperature	8.500	25.000	0.000	11.333	7.986	15	15.000	21
TOC	3.600	3.570	3.570	3.570	NA	1	NA	0
Turbidity	6.200	37.000	1.100	8.906	9.105	18	NA	0

The ten year trend report (ICPRB, 1987) showed significant decreasing trends in pH and Salinity, with increasing trends in Total Coliform and Total Phosphorus. The present analysis shows decreases in pH, but in contrast, it shows decreases in Total Phosphorus.

There was a significant increasing trend in diversity index at this station (K-tau value = 2.52, slope = 0.08, $p<0.05$) (see Figure 2.2). The condition of the benthic community was rated Good-Excellent in 1986 and 1987.

POTOMAC WATER QUALITY STATUS AND TRENDS (1986-87)
Region 1: Potomac Highlands

River South Branch Potomac River
Station 550843 Agency WVDNR
Location Moorefield, WV, US Rt. 220 Bridge.
River Mile: 285-45

	(1986-1987)						(1984-1985)	
PARAMETER	MED	MAX	MIN	MEAN	S.D.	N	MED	N
Alkalinity	NA	NA	NA	NA	NA	0	80.000	10
Aluminum	NA	NA	NA	NA	NA	0	148.000	1
Ammonia NH3+NH4	NA	NA	NA	NA	NA	0	0.030	4
BOD	NA	NA	NA	NA	NA	0	2.400	10
Cadmium Cd	NA	NA	NA	NA	NA	0	4.000	4
Chloride	NA	NA	NA	NA	NA	0	4.500	10
Chromium, Total	NA	NA	NA	NA	NA	0	4.000	1
Chromium, Hexavalent	NA	NA	NA	NA	NA	0	1.000	9
Coliform Fecal b	NA	NA	NA	NA	NA	0	385.000	10
Conductivity Field	NA	NA	NA	NA	NA	0	182.500	6
Conductivity At	NA	NA	NA	NA	NA	0	195.000	10
Copper Cu	NA	NA	NA	NA	NA	0	4.000	1
DO%Sat	NA	NA	NA	NA	NA	0	95.500	6
Flouride	NA	NA	NA	NA	NA	0	0.100	10
Hardness	NA	NA	NA	NA	NA	0	75.000	10
Iron Fe	NA	NA	NA	NA	NA	0	84.000	1
Lead Pb	NA	NA	NA	NA	NA	0	40.000	4
Mercury Hg	NA	NA	NA	NA	NA	0	0.200	1
NO2 + NO3	NA	NA	NA	NA	NA	0	0.420	4
TKN	NA	NA	NA	NA	NA	0	0.175	4
pH	NA	NA	NA	NA	NA	0	7.750	6
pH Lab	NA	NA	NA	NA	NA	0	7.500	10
Phosphorus, Tot	NA	NA	NA	NA	NA	0	0.025	4
Residue, Diss.	NA	NA	NA	NA	NA	0	4.500	10
Sodium Na	NA	NA	NA	NA	NA	0	2.700	1
Sulfate	NA	NA	NA	NA	NA	0	18.500	4
Temperature	NA	NA	NA	NA	NA	0	10.700	7
TOC	NA	NA	NA	NA	NA	0	3.000	3

The ten year trend report (ICPRB, 1987) showed significant decreasing trends in DO%Sat, pH, pH (lab), Total Phosphorus, Residue, Sulfate, and TOC, with increasing trends in Hexavalent Chromium, and Lead. The corresponding data were not available for this report.

There were no significant temporal trends in benthic macroinvertebrate data. The condition of the benthic community was rated Good in 1986 and 1987.

POTOMAC WATER QUALITY STATUS AND TRENDS (1986-87)
Region 1: Potomac Highlands

River South Branch Potomac River
Station 550468 Agency WVDNR
Location Springfield, WV, WV Rt. 3 Bridge.
River Mile: 285-17

	(1986-1987)						(1984-1985)	
PARAMETER	MED	MAX	MIN	MEAN	S.D.	N	MED	N
Alkalinity	81.500	134.000	28.000	78.458	22.529	24	80.000	22
Aluminum	160.000	736.000	40.000	220.783	175.609	23	146.000	14
Ammonia NH3+NH4	NA	NA	NA	NA	NA	0	0.040	9
BOD	NA	NA	NA	NA	NA	0	1.900	10
COD	4.000	12.000	2.000	5.909	3.115	22	6.000	12
Cadmium Cd	NA	NA	NA	NA	NA	0	4.000	10
Chloride	NA	NA	NA	NA	NA	0	5.000	11
Chromium, Total	NA	NA	NA	NA	NA	0	4.000	2
Chromium, Hexavalent	NA	NA	NA	NA	NA	0	1.000	9
Coliform Fecal b	55.000	1890.000	10.000	154.167	383.507	24	40.000	21
Conductivity Field	229.000	278.000	141.000	223.895	37.272	19	185.000	13
Conductivity At	215.000	470.000	110.000	210.292	67.503	24	200.000	21
Copper Cu	NA	NA	NA	NA	NA	0	4.000	3
DO%Sat	88.500	97.000	79.000	88.722	5.131	18	93.000	12
Flouride	NA	NA	NA	NA	NA	0	0.080	10
Hardness	NA	NA	NA	NA	NA	0	72.000	10
Iron Fe	240.000	1580.000	82.000	413.652	401.979	23	118.000	16
Lead Pb	NA	NA	NA	NA	NA	0	40.000	10
Magnesium Mg	NA	NA	NA	NA	NA	0	17.000	1
Mercury Hg	NA	NA	NA	NA	NA	0	0.200	2
Nitrate NO3	NA	NA	NA	NA	NA	0	1.000	1
NO2 + NO3	0.680	1.110	0.030	0.618	0.324	22	0.640	21
TKN	0.200	0.430	0.080	0.209	0.099	21	0.220	21
pH	7.900	8.700	7.600	7.969	0.244	16	7.750	12
pH Lab	7.965	8.140	7.400	7.907	0.209	24	7.800	21
Phosphorus, Tot	0.025	0.100	0.001	0.036	0.027	21	0.025	21
Residue, Diss.	8.000	52.000	1.000	14.304	14.474	23	3.500	20
Sodium Na	NA	NA	NA	NA	NA	0	2.490	2
Sulfate	24.000	36.000	18.000	24.652	5.228	23	23.500	22
Temperature	10.900	27.100	2.500	13.938	8.422	21	12.000	13
TOC	NA	NA	NA	NA	NA	0	3.000	9

The ten year trend report (ICPRB, 1987) showed significant decreasing trends in Hardness, pH, Total Phosporous, and TOC, with increasing trends in BOD, Hexavalent Chromium, Fecal Coliform, Lead, Nitrite + Nitrate, Temperature, and TOC. The present analysis also showed increases in Nitrite + Nitrate and Fecal Coliform. In contrast, decreases in Temperature and increases in pH are shown now.

There were no significant temporal trends in the benthic macroinvertebrate data at this station. The condition of the benthic community was rated Good in 1986 and 1987.

POTOMAC WATER QUALITY STATUS AND TRENDS (1986-87)
Region 1: Potomac Highlands

River Town Creek
Station TOW0030 Agency MDOEP
Location Oldtown, MD, Oldtown Rd. Bridge.
River Mile: 282-3

	(1986-1987)						(1984-1985)	
PARAMETER	MED	MAX	MIN	MEAN	S.D.	N	MED	N
Alkalinity	57.500	127.000	21.000	64.938	34.916	16	43.000	22
Aluminum	NA	NA	NA	NA	NA	0	0.200	1
BOD	NA	NA	NA	NA	NA	0	0.300	1
Coliform, Total	NA	NA	NA	NA	NA	0	430.000	22
Coliform Fecal b	93.000	930.000	23.000	214.000	242.471	16	NA	0
Conductivity Field	130.000	263.000	29.000	139.000	65.492	17	124.500	22
DO	10.750	14.000	7.590	10.816	1.973	16	11.850	22
DO%Sat	NA	NA	NA	NA	NA	0	95.700	22
Iron Fe	NA	NA	NA	NA	NA	0	0.300	20
Nitrate NO3	NA	NA	NA	NA	NA	0	0.510	21
Nitrite NO2	NA	NA	NA	NA	NA	0	0.005	20
NO2 + NO3	0.540	0.910	0.020	0.489	0.342	16	NA	0
TKN	0.350	0.800	0.100	0.372	0.168	15	0.350	21
pH	7.100	8.000	6.300	7.141	0.449	17	7.000	22
pH Lab	NA	NA	NA	NA	NA	0	7.400	22
Phosphorus, Tot	0.040	0.120	0.010	0.044	0.029	15	0.030	21
Residue	NA	NA	NA	NA	NA	0	107.000	20
Residue, Diss.	6.000	122.000	2.000	23.867	39.093	15	NA	0
Residue, Fix.Nonflt	NA	NA	NA	NA	NA	0	8.000	22
Salinity	0.000	0.000	0.000	0.000	0.000	17	NA	0
Sulfate	NA	NA	NA	NA	NA	0	26.000	21
Temperature	10.750	23.000	1.500	11.821	7.536	14	8.500	22
TOC	2.500	2.480	2.480	2.480	0.000	1	NA	0
Turbidity	1.350	60.000	0.600	8.381	16.995	16	NA	0

The ten year trend report (ICPRB, 1987) showed significant decreasing trends in Conductivity, pH, Sulfate, and Temperature, with increasing trends in DO, Nitrate, and Total Phosphorus. The present analysis shows increases for Total Phosphorus. In contrast, decreases in DO, and increases in Conductivity, pH, and Temperature are shown now.

Benthic data were not available for this station.

River Potomac River
Station POT2766 Agency MDOEP
Location Paw Paw, WV, MD Rt. 51 Bridge.
River Mile: 277

	(1986-1987)						(1984-1985)	
PARAMETER	MED	MAX	MIN	MEAN	S.D.	N	MED	N
Acidity	NA	NA	NA	NA	NA	0	2.000	9
Alkalinity	58.000	102.000	30.000	59.118	21.020	17	39.000	18
Aluminum	NA	NA	NA	NA	NA	0	1.000	9
Coliform, Total	NA	NA	NA	NA	NA	0	0.000	21
Coliform Fecal b	430.000	4300.000	23.000	961.063	1221.890	16	NA	0
Conductivity Field	256.000	489.000	100.000	265.588	115.715	17	249.000	21
DO	11.600	13.500	6.590	10.409	2.224	15	8.400	20
DO%Sat	NA	NA	NA	NA	NA	0	91.150	20
Iron Fe	NA	NA	NA	NA	NA	0	0.600	19
Nitrate NO3	NA	NA	NA	NA	NA	0	0.705	18
Nitrite NO2	NA	NA	NA	NA	NA	0	0.009	17
NO2 + NO3	0.845	1.300	0.050	0.752	0.335	16	NA	0
TKN	0.465	0.830	0.230	0.492	0.167	16	0.465	18
pH	7.100	8.200	6.500	7.194	0.365	18	7.200	21
pH Lab	NA	NA	NA	NA	NA	0	7.200	9
Phosphorus, Tot	0.060	0.180	0.030	0.076	0.046	16	0.060	18
Residue	NA	NA	NA	NA	NA	0	198.000	10
Residue, Diss.	16.000	52.000	2.000	17.647	14.530	17	NA	0
Residue, Fix.Nonflt	NA	NA	NA	NA	NA	0	14.000	10
Salinity	0.000	0.000	0.000	0.000	0.000	17	NA	0
Sulfate	NA	NA	NA	NA	NA	0	59.000	18
Temperature	10.000	25.000	0.000	11.693	7.799	15	16.500	21
TOC	3.500	3.550	3.550	3.550	0.000	1	NA	0
Turbidity	5.600	30.000	1.000	8.844	8.515	18	NA	0

The ten year trend report (ICPRB, 1987) showed significant decreasing trends in Nitrite ad Turbidity, with increasing trends in Nitrate. The corresponding data were not available for this report.

There were significant increasing trends in both number of organisms (K-tau value = 1.91, slope = 14.4, $p<0.05$) and number of taxa (K-tau value = 2.65, slope = 1.07, $p<0.005$) (see Figures 2.3 and 2.4). The condition of the benthic community was rated Excellent in 1986 and 1987.

POTOMAC WATER QUALITY STATUS AND TRENDS (1986-87)
Region 1: Potomac Highlands

River Potomac River
Station POT2386 Agency MDOEP
Location Hancock, MD, Below US Rt. 522.
River Mile: 239

	(1986-1987)						(1984-1985)	
PARAMETER	MED	MAX	MIN	MEAN	S.D.	N	MED	N
Alkalinity	50.000	149.000	32.000	59.500	27.045	18	43.200	20
Coliform, Total	NA	NA	NA	NA	NA	0	430.000	26
Coliform Fecal b	93.000	430.000	23.000	137.500	137.140	16	NA	0
Conductivity Field	268.000	500.000	145.000	301.889	113.320	18	246.000	25
DO	10.750	15.200	7.490	10.874	2.366	18	9.400	25
DO%Sat	NA	NA	NA	NA	NA	0	93.600	25
Hardness	NA	NA	NA	NA	NA	0	97.000	1
Nitrate NO3	NA	NA	NA	NA	NA	0	0.670	22
Nitrite NO2	NA	NA	NA	NA	NA	0	0.008	22
NO2 + NO3	0.730	1.100	0.070	0.669	0.328	18	NA	0
TKN	0.500	1.100	0.150	0.507	0.250	18	0.440	22
pH	7.650	8.400	6.800	7.672	0.428	18	7.600	24
Phosphorus, Tot	0.065	0.320	0.020	0.090	0.085	18	0.075	22
Residue, Diss.	7.500	141.000	1.000	16.333	32.333	18	NA	0
Residue, Fix.Nonflt	NA	NA	NA	NA	NA	0	6.000	22
Salinity	0.000	0.000	0.000	0.000	0.000	18	NA	0
Temperature	10.750	28.700	0.100	12.778	9.510	18	4.440	25
TOC	3.355	13.400	2.590	4.592	3.183	18	NA	0
Turbidity	13.500	49.000	6.100	17.778	12.375	18	NA	0

The ten year trend report (ICPRB, 1987) showed significant decreasing trends in Total Coliform, and Temperature, with increasing trends in Total Phosphorus and Residue. The present analysis showed decreases in Total Phosphorus and increases in Temperature.

There were significant increasing trends in both number of organisms (K-tau value = 2.18, slope = 18.9, $p<0.05$) and number of taxa (K-tau value = 1.65, slope = 1.06, $p<0.05$) at this station (see Figures 2.5 and 2.6). The condition of the benthic community was rated Excellent in 1987; no data were reported for 1986.

Table 4. Upper Potomac Highlands Subdivision Median Comparison.

Number indicates difference in median values for the 1986-87 monitoring period from the 1984-85 period normalized by the standard deviation. A blank entry indicates that a parameter was not measured for either or both periods. See "Summary Tables" for specific data and "Methods" for further discussion.

	NBP0689	NBP0534	SAV0000	GEO0009	NBP0326	WIL0013	NBP0103	NBP0023	550843	550468	TOW0030	POT2766	POT2386
Acidity													
Alkalinity	1.3	0.0	0.3	1.4	0.8	0.1	0.6	0.8	0.1	0.4	0.9	0.3	
Aluminum									0.1				
Ammonia NH3+NH4													
BOD													
COD									-0.6				
Cadmium Cd													
Chloride													
Chromium, Total													
Chromium, Hexavalent													
Coliform, Total													
Coliform Fecal a													
Coliform Fecal b									0.0				
Conductivity Field	-0.5	0.2	0.4	-0.2	0.4	-0.6	0.0	-0.2	1.2	0.1	0.1	0.2	
Conductivity At									0.2				
Copper Cu													
DO	0.3	0.2	0.4	0.1	0.8	0.8	-0.3	0.8		-0.6	1.4	0.6	
DOZSat									-0.9				
Flouride													
Hardness													
Iron Fe									0.3				
Lead Pb													
Magnesium Mg													
Mercury Hg													
Nitrate NO3													
Nitrite NO2													
NO2 + NO3									0.1				
TKN	0.3	0.0	0.1	-0.5	0.3	0.2	0.1	0.1	-0.2	0.0	0.0	0.2	
pH	0.4	-0.7	-2.0	0.0	-0.7	-1.5	0.0	-1.2	0.6	0.2	-0.3	0.1	
pH Lab									0.8				
Phosphate, Tot													
Phosphorus, Diss.Ortho													
Phosphorus, Tot	0.0	-0.7	0.0	-0.5	0.0	0.0	-0.2	-0.2	0.0	0.3	0.0	-0.1	
Phosphorus, Tot.Ortho													
Residue													
Residue, Diss.									0.3				
Residue, Nonflt													
Residue, Vol.Nonflt													
Residue, Fix.Nonflt													
Salinity													
Sodium Na													
Sulfate									0.1				
Temperature	-0.2	-0.6	-0.3	-0.4	-0.4	-0.1	0.3	-0.8	-0.1	0.3	-0.8	0.7	
TOC													
Turbidity													

POTOMAC WATER QUALITY STATUS AND TRENDS (1986-87)
Region 2: Upper Great Valley

River Conococheague Creek
Station WQN0501 Agency PADER
Location Worleytown, PA, Franklin County.
River Mile: 211-25

	(1986-1987)						(1984-1985)	
PARAMETER	MED	MAX	MIN	MEAN	S.D.	N	MED	N
Alkalinity	140.000	188.000	88.000	137.083	29.927	24	128.000	24
Aluminum	640.000	760.000	520.000	640.000	169.706	2	125.000	2
Ammonia NH3+NH4	0.070	0.150	0.020	0.073	0.030	24	0.050	24
Cadmium Cd	0.275	0.350	0.200	0.275	0.106	2	0.600	2
Chloride	12.500	21.000	8.000	13.542	3.671	24	13.000	24
Chromium, Total	4.000	4.000	4.000	4.000	0.000	2	37.000	2
Coliform Fecal b	250.000	6400.000	20.000	807.083	1344.380	24	220.000	23
Conductivity At	351.000	455.000	275.000	359.125	59.739	24	327.500	24
Copper Cu	50.000	50.000	50.000	50.000	0.000	2	65.000	2
DO	11.100	16.200	7.400	11.429	2.618	24	11.350	20
Hardness	156.000	201.000	111.000	157.792	27.022	24	155.500	24
Iron Fe	380.000	1770.000	150.000	550.833	424.304	24	180.000	25
Lead Pb	4.000	4.000	4.000	4.000	0.000	2	4.000	2
Magnesium Mg	11.635	15.290	7.760	11.672	2.018	24	11.490	25
Mercury Hg	1.000	1.000	1.000	1.000	0.000	2	2.000	1
Nitrate NO3	4.370	9.890	2.830	4.613	1.341	24	3.750	24
Nitrite NO2	0.026	0.050	0.014	0.027	0.010	24	0.028	24
pH	8.000	8.950	7.400	8.046	0.339	24	7.950	12
pH Lab	7.400	8.300	6.400	7.362	0.584	24	7.900	24
Phosphorus, Tot	0.170	0.510	0.070	0.227	0.153	24	0.170	24
Residue, Fix.Nonflt	260.000	1582.000	162.000	315.333	275.799	24	253.000	24
Sulfate	25.000	33.000	13.000	24.500	5.649	24	22.000	24
Temperature	12.750	24.500	1.000	13.438	7.660	24	13.200	23

The ten year trend report (ICPRB, 1987) showed significant decreasing trends in Iron, Nitrite, and Water Appearance, with increasing trends in Chloride, Conductivity, Magnesium, Nitrate, pH, Total Phosphate, and Residue. The present analysis also showed decreases in Nitrite, and increases in Conductivity, Magnesium, Nitrate, and pH. However, Iron shows increases in the present analysis.

There was no significant temporal trend in number of benthic taxa at this station. The condition of the benthic community was rated Good in 1986 and 1987.

River Conococheague Creek
Station CON0180 Agency MDOEP
Location Fairview, MD, MD Rt. 58.
River Mile: 211-18

	(1986-1987)						(1984-1985)	
PARAMETER	MED	MAX	MIN	MEAN	S.D.	N	MED	N
Alkalinity	125.000	200.000	74.000	132.833	37.960	18	138.100	10
Coliform, Total	NA	NA	NA	NA	NA	0	1500.000	11
Coliform Fecal b	230.000	4300.000	23.000	695.125	1113.370	16	NA	0
Conductivity Field	341.500	474.000	240.000	357.944	68.958	18	388.000	10
DO	11.950	16.500	7.790	11.712	2.431	18	10.800	10
DO%Sat	NA	NA	NA	NA	NA	0	100.550	10
Nitrate NO3	NA	NA	NA	NA	NA	0	3.550	10
Nitrite NO2	NA	NA	NA	NA	NA	0	0.023	10
NO2 + NO3	4.250	5.100	2.750	4.100	0.619	17	NA	0
TKN	0.600	0.950	0.300	0.577	0.181	18	0.575	10
pH	7.900	8.600	7.200	7.906	0.390	18	7.800	10
Phosphorus, Tot	0.130	0.550	0.090	0.196	0.131	18	0.275	10
Residue, Diss.	8.000	62.000	1.000	15.000	18.774	18	NA	0
Residue, Fix.Nonflt	NA	NA	NA	NA	NA	0	5.000	10
Salinity	0.000	0.000	0.000	0.000	0.000	18	NA	0
Temperature	10.100	25.000	0.200	12.228	8.450	18	2.645	10
TOC	2.900	4.860	1.990	3.169	0.917	18	NA	0
Turbidity	12.500	68.100	3.400	20.317	19.931	18	NA	0

The ten year trend report (ICPRB, 1987) showed significant decreasing trends in Salinity and Turbidity, with increasing trend in Nitrate. The data were not comparable in the present analysis

Benthic data were not available for this station.

POTOMAC WATER QUALITY STATUS AND TRENDS (1986-87)
Region 2: Upper Great Valley

River Conococheague Creek
Station CON0005 Agency MDOEP
Location Williamsport, MD, MD Rt. 68.
River Mile: 211-1

	(1986-1987)						(1984-1985)	
PARAMETER	MED	MAX	MIN	MEAN	S.D.	N	MED	N
Alkalinity	126.000	200.000	66.000	131.941	39.322	17	125.000	23
Coliform, Total	NA	NA	NA	NA	NA	0	930.000	24
Coliform Fecal b	180.000	2300.000	23.000	441.938	594.120	16	NA	0
Conductivity Field	365.000	470.000	246.000	371.059	59.287	17	363.000	23
DO	11.200	14.300	7.690	10.914	2.334	17	9.500	23
DO%Sat	NA	NA	NA	NA	NA	0	94.100	23
Hardness	NA	NA	NA	NA	NA	0	160.000	1
Nitrate NO3	NA	NA	NA	NA	NA	0	4.110	23
Nitrite NO2	NA	NA	NA	NA	NA	0	0.019	23
NO2 + NO3	4.200	5.300	2.100	3.979	0.889	17	NA	0
TKN	0.600	0.900	0.330	0.600	0.174	17	0.520	21
pH	8.000	8.600	6.900	7.918	0.454	17	7.950	22
Phosphorus, Tot	0.140	0.300	0.080	0.155	0.068	17	0.160	21
Residue, Diss.	8.000	80.000	1.000	15.000	18.851	17	NA	0
Residue, Fix.Nonflt	NA	NA	NA	NA	NA	0	8.000	23
Salinity	0.000	0.000	0.000	0.000	0.000	17	NA	0
Temperature	11.200	26.100	1.900	12.812	8.874	17	3.050	23
TOC	2.910	5.140	2.130	3.191	0.896	17	NA	0
Turbidity	16.000	102.000	3.700	21.541	23.462	17	NA	0

The ten year trend report (ICPRB, 1987) showed significant decreasing trends in pH, Residue, Salinity, Temperature, and Turbidity, with increasing trends in Conductivity, Nitrate, and Total Phosphorus. The present analysis showed decreases in Total Phosphorus, and increases in pH and Temperature.

Benthic data were not available for this station.

River Opequon Creek
Station 1AOPE025.10 Agency VASWCB
Location VA Rt. 7 Bridge below Winchester, Va.
River Mile: 202-25

	(1986-1987)						(1984-1985)	
PARAMETER	MED	MAX	MIN	MEAN	S.D.	N	MED	N
Alkalinity	199.500	232.000	83.000	189.318	44.116	22	202.000	15
Ammonia NH3+NH4	0.150	1.000	0.100	0.309	0.294	22	0.100	18
BOD	2.000	5.000	1.000	2.136	1.167	22	1.500	20
COD	11.500	44.000	1.000	12.046	8.465	22	9.000	20
Coliform Fecal b	200.000	2600.000	100.000	365.000	551.815	20	100.000	20
Conductivity Field	524.000	617.000	246.000	497.143	104.456	21	519.000	20
DO	9.450	13.700	7.500	9.909	1.777	22	10.800	20
Hardness	248.000	269.000	122.000	231.864	42.269	22	241.000	9
Nitrate NO3	2.075	3.400	1.200	2.146	0.535	22	2.350	18
Nitrite NO2	0.060	0.200	0.020	0.075	0.054	22	0.040	18
TKN	0.650	1.500	0.300	0.718	0.316	22	0.400	17
pH	7.900	8.900	6.700	7.842	0.484	22	8.000	20
pH Lab	8.000	8.300	7.500	7.964	0.246	22	8.000	15
Phosphorus, Tot	0.350	0.900	0.100	0.391	0.190	22	0.300	17
Residue	NA	NA	NA	NA	NA	0	304.000	1
Residue, Diss.	5.000	51.000	5.000	10.409	12.022	22	6.500	20
Residue, Nonflt	5.000	44.000	2.000	8.227	10.351	22	5.000	20
Residue, Vol.Nonflt	4.500	14.000	NA	4.091	2.910	22	5.000	20
Temperature	16.850	27.000	1.000	14.532	8.257	22	12.500	20
TOC	5.000	7.000	2.000	4.600	1.142	20	5.000	20

The ten year trend report (ICPRB, 1987) showed significant decreasing trends in Ammonia, BOD, Nitrite, pH, and Temperature, with an increasing trend in DO. The present analysis showed a decrease in DO and pH, with increases in Ammonia, BOD, Nitrite, and Temperature.

Virginia monitors benthic data at two stations, Station 1AOPE025.1 - above the confluence with Abrams Creek, and a second station downstream of the confluence. The condition of the benthic community above the confluence in 1986 through 1988 was rated Fair-Good or Good, while the downstream station was rated Fair in Spring 1986, but downgraded to Poor in fall 1987 and Spring 1988. This degradation of benthic community condition is probably due to discharges into Abrams Creek from the overloaded and antiquated Winchester STP. Benthic community condition at a station below the discharge point was also rated Poor in 1986 through 1988. This discharge is expected to cease in Fall of 1988 when the new Frederick-Winchester Service Authority STP is scheduled to begin operations.

POTOMAC WATER QUALITY STATUS AND TRENDS (1986-87)
Region 2: Upper Great Valley

River Opequon Creek
Station 550462 (P-4-7) Agency WVDNR
Location Bedington, WV, Secondary Rt. 12
River Mile: 200-9

	(1986-1987)						(1984-1985)	
PARAMETER	MED	MAX	MIN	MEAN	S.D.	N	MED	N
Alkalinity	NA	NA	NA	NA	NA	0	227.000	9
Aluminum	NA	NA	NA	NA	NA	0	282.000	2
Ammonia NH3+NH4	NA	NA	NA	NA	NA	0	0.080	9
BOD	NA	NA	NA	NA	NA	0	1.700	9
Cadmium Cd	NA	NA	NA	NA	NA	0	4.000	9
Chloride	NA	NA	NA	NA	NA	0	20.000	9
Chromium, Total	NA	NA	NA	NA	NA	0	4.000	2
Chromium, Hexavalent	NA	NA	NA	NA	NA	0	3.000	9
Coliform Fecal b	NA	NA	NA	NA	NA	0	350.000	4
Conductivity Field	NA	NA	NA	NA	NA	0	413.500	6
Conductivity At	NA	NA	NA	NA	NA	0	500.000	9
Copper Cu	NA	NA	NA	NA	NA	0	4.000	3
DO%Sat	NA	NA	NA	NA	NA	0	92.000	6
Flouride	NA	NA	NA	NA	NA	0	0.280	9
Hardness	NA	NA	NA	NA	NA	0	196.000	9
Iron Fe	NA	NA	NA	NA	NA	0	540.000	3
Lead Pb	NA	NA	NA	NA	NA	0	40.000	9
Mercury Hg	NA	NA	NA	NA	NA	0	1.100	2
NO2 + NO3	NA	NA	NA	NA	NA	0	1.800	9
TKN	NA	NA	NA	NA	NA	0	0.340	9
pH	NA	NA	NA	NA	NA	0	7.850	6
pH Lab	NA	NA	NA	NA	NA	0	7.800	9
Phosphorus, Tot	NA	NA	NA	NA	NA	0	0.215	9
Residue, Diss.	NA	NA	NA	NA	NA	0	14.000	9
Sodium Na	NA	NA	NA	NA	NA	0	10.800	2
Sulfate	NA	NA	NA	NA	NA	0	32.000	9
Temperature	NA	NA	NA	NA	NA	0	12.150	6
TOC	NA	NA	NA	NA	NA	0	8.000	5

There were several significant trends found in the ten year trend report (ICPRB, 1987) but there were no data available for the present analysis.

There were no significant temporal trends in the benthic macroinvertebrate data at this station. The condition of the benthic community was rated Fair in 1986 and Good in 1987.

POTOMAC WATER QUALITY STATUS AND TRENDS (1986-87)
Region 2: Upper Great Valley

River Potomac River
Station POT1830 Agency MDOEP
Location Shepherdstonw, WV, Below MD Rt. 24.
River Mile: 183

	(1986-1987)						(1984-1985)	
PARAMETER	MED	MAX	MIN	MEAN	S.D.	N	MED	N
Alkalinity	80.000	610.000	40.000	111.722	127.728	18	75.000	23
Coliform, Total	NA	NA	NA	NA	NA	0	840.000	26
Coliform Fecal b	93.000	4300.000	9.000	386.412	1019.200	17	NA	0
Conductivity Field	297.000	505.000	154.000	317.500	105.927	18	280.500	26
DO	11.450	14.300	6.790	10.996	2.533	18	9.200	26
DO%Sat	NA	NA	NA	NA	NA	0	94.550	26
Hardness	NA	NA	NA	NA	NA	0	150.000	1
Nitrate NO3	NA	NA	NA	NA	NA	0	1.245	24
Nitrite NO2	NA	NA	NA	NA	NA	0	0.015	24
NO2 + NO3	1.300	1.900	0.270	1.232	0.410	18	NA	0
TKN	0.475	1.480	0.100	0.531	0.347	18	0.500	24
pH	7.650	8.400	7.000	7.650	0.352	18	7.500	25
Phosphorus, Tot	0.070	0.600	0.050	0.133	0.151	18	0.100	23
Residue, Diss.	6.000	456.000	1.000	41.611	107.584	18	NA	0
Residue, Fix.Nonflt	NA	NA	NA	NA	NA	0	5.000	23
Salinity	0.000	0.000	0.000	0.000	0.000	18	NA	0
Temperature	10.800	27.500	2.000	13.182	9.150	17	3.300	26
TOC	3.115	8.900	2.100	3.698	1.677	18	NA	0
Turbidity	10.700	578.000	6.200	50.200	134.417	18	NA	0

The ten year trend report (ICPRB, 1987) showed significant decreasing trends in Total Coliform, DO%Sat, pH, Temperature, and Turbidity, with increasing trends in Nitrate, Nitrite, Total Phosphorus, and TKN. However, the present analysis showed increased in pH and Temperature, and decreases in Total Phosphorus.

There were significant increasing trends in both number of taxa (K-tau value = 2.99, slope = 1.00, $p<0.005$) and diversity index (K-tau value = 2.06, slope = 0.06, $p<0.05$) at this station (see Figures 2.7 and 2.8). The condition of the benthic community was rated Excellent in 1986 and Good-Excellent in 1987.

POTOMAC WATER QUALITY STATUS AND TRENDS (1986-87)
Region 2: Upper Great Valley

River East Branch Antietam Creek
Station WQN0504 Agency PADER
Location Washington Township, PA
River Mile: 180-39

	(1986-1987)						(1984-1985)	
PARAMETER	MED	MAX	MIN	MEAN	S.D.	N	MED	N
Alkalinity	111.000	156.000	70.000	109.833	25.869	24	100.000	24
Aluminum	1045.000	1870.000	220.000	1045.000	1166.730	2	125.000	2
Ammonia NH3+NH4	1.060	2.640	0.400	1.227	0.600	24	0.690	24
BOD	2.400	4.800	1.000	2.527	0.975	22	1.400	23
Cadmium Cd	0.520	0.590	0.450	0.520	0.099	2	0.640	2
Chloride	11.500	20.000	7.000	11.792	2.654	24	10.500	24
Chromium, Total	4.000	4.000	4.000	4.000	0.000	2	37.000	2
Coliform Fecal b	1600.000	24000.000	100.000	4022.500	6234.270	24	1100.000	24
Conductivity At	288.000	535.000	187.000	291.250	76.348	24	262.500	24
Copper Cu	50.000	50.000	50.000	50.000	0.000	2	65.000	2
DO	10.800	16.500	7.400	10.750	2.526	24	9.900	21
Hardness	118.500	159.000	73.000	115.000	25.444	24	109.500	24
Iron Fe	330.000	3120.000	100.000	475.833	637.665	24	140.000	25
Lead Pb	16.250	28.500	4.000	16.250	17.324	2	4.000	2
Magnesium Mg	10.680	14.600	6.660	10.451	2.250	24	10.070	25
Mercury Hg	1.000	1.000	1.000	1.000	0.000	2	2.000	2
Nitrate NO3	2.840	4.550	1.190	2.777	0.877	24	2.065	24
Nitrite NO2	0.069	0.168	0.010	0.066	0.045	24	0.072	24
pH	7.700	8.400	6.500	7.648	0.407	24	7.700	11
pH Lab	7.200	8.000	6.400	7.171	0.550	24	7.600	24
Phosphorus, Tot	0.440	1.200	0.160	0.490	0.300	24	0.425	24
Residue, Fix.Nonflt	193.000	270.000	132.000	194.250	39.727	24	190.000	24
Sulfate	20.500	27.000	10.000	20.750	5.302	24	19.500	24
Temperature	12.250	20.000	2.000	11.492	5.910	24	12.500	24

The ten year trend report (ICPRB, 1987) showed significant decreasing trends in Lab pH and Water Appearance, with increasing trends in Fecal Coliform, Magnesium, pH, Residue, and Sulfate. The present analysis also showed increases in Fecal Coliform, Magnesium, and Sulfate.

There was no significant temporal trend in number of benthic taxa at this station. The condition of the benthic community was rated Poor-Fair in 1986 and Fair-Good in 1987. Damage from organic materials and chlorine, apparently resulting from discharges by the Washington Township STP, was reported in both years but not noted previously.

POTOMAC WATER QUALITY STATUS AND TRENDS (1986-87)
Region 2: Upper Great Valley

River Antietam Creek
Station ANT0366 Agency MDOEP
Location Rocky Forge, MD, Rt. 60 Bridge.
River Mile: 180-37

	(1986-1987)						(1984-1985)	
PARAMETER	MED	MAX	MIN	MEAN	S.D.	N	MED	N
Alkalinity	151.000	193.000	44.000	141.692	41.325	13	129.000	9
Coliform, Total	NA	NA	NA	NA	NA	0	5700.000	12
Coliform Fecal b	930.000	9300.000	150.000	1932.500	2616.770	12	NA	0
Conductivity Field	388.500	445.000	290.000	377.857	53.059	14	326.000	9
DO	12.250	14.500	7.890	11.576	2.232	14	12.900	9
DO%Sat	NA	NA	NA	NA	NA	0	98.900	9
Nitrate NO3	NA	NA	NA	NA	NA	0	3.200	9
Nitrite NO2	NA	NA	NA	NA	NA	0	0.068	9
NO2 + NO3	4.200	5.000	2.400	4.027	0.670	13	NA	0
TKN	0.950	1.500	0.730	0.992	0.196	13	0.930	9
pH	7.850	8.400	7.500	7.900	0.263	14	7.700	9
Phosphorus, Tot	0.250	0.300	0.160	0.239	0.052	13	0.280	9
Residue, Diss.	9.000	36.000	1.000	13.231	9.257	13	NA	0
Residue, Fix.Nonflt	NA	NA	NA	NA	NA	0	13.000	9
Salinity	0.000	0.000	0.000	0.000	0.000	14	NA	0
Temperature	9.000	21.000	0.200	10.836	6.869	14	2.690	9
TOC	2.740	6.480	2.100	3.211	1.198	13	NA	0
Turbidity	17.000	74.000	4.800	19.962	17.614	13	NA	0

The ten year trend report (ICPRB, 1987) showed significant decreasing trends in Salinity and Turbidity, with increasing trends in Nitrate and TKN. The present analysis also showed increases in TKN.

Benthic data were not available for this station.

POTOMAC WATER QUALITY STATUS AND TRENDS (1986-87)
Region 2: Upper Great Valley

River Antietam Creek
Station ANT0203 Agency MDOEP
Location Funkstown, MD, Poffenberger Rd. Bridge.
River Mile: 180-20

	(1986-1987)						(1984-1985)	
PARAMETER	MED	MAX	MIN	MEAN	S.D.	N	MED	N
Alkalinity	178.500	219.000	20.000	168.500	54.365	18	176.000	23
Coliform, Total	NA	NA	NA	NA	NA	0	9300.000	23
Coliform Fecal b	930.000	93000.000	93.000	9415.470	23852.000	17	NA	0
Conductivity Field	536.000	646.000	386.000	523.944	67.200	18	503.000	23
DO	10.300	13.700	7.380	10.137	1.975	18	9.500	23
DO%Sat	NA	NA	NA	NA	NA	0	88.500	23
Hardness	NA	NA	NA	NA	NA	0	217.000	1
Nitrate NO3	NA	NA	NA	NA	NA	0	4.680	23
Nitrite NO2	NA	NA	NA	NA	NA	0	0.044	23
NO2 + NO3	5.300	6.800	4.000	5.253	0.751	18	NA	0
TKN	0.875	2.250	0.550	0.938	0.369	18	0.700	22
pH	7.400	7.700	7.000	7.400	0.230	18	7.500	22
Phosphorus, Tot	0.260	0.800	0.140	0.337	0.203	18	0.370	20
Residue, Diss.	11.000	28.000	1.000	13.722	9.112	18	NA	0
Residue, Fix.Nonflt	NA	NA	NA	NA	NA	0	10.000	21
Salinity	0.000	0.000	0.000	0.000	0.000	18	NA	0
Temperature	10.550	22.200	0.500	11.694	7.133	18	3.600	23
TOC	2.955	6.940	2.400	3.403	1.119	18	NA	0
Turbidity	17.500	60.900	6.800	21.239	13.374	18	NA	0

The ten year trend report (ICPRB, 1987) showed significant decreasing trends in Nitrite, pH, Residue, Salinity, Temperature, and Turbidity, with increasing trends in Conductivity and Nitrate. The present analysis showed decreases in pH, and increases in Conductivity. In contrast, Temperature shows increases.

Benthic data were not available for this station.

POTOMAC WATER QUALITY STATUS AND TRENDS (1986-87)
Region 2: Upper Great Valley

River Antietam Creek
Station ANT0044 Agency MDOEP
Location Sharpsburg, MD, Rt. 34 Bridge.
River Mile: 180-4

	(1986-1987)						(1984-1985)	
PARAMETER	MED	MAX	MIN	MEAN	S.D.	N	MED	N
Alkalinity	183.500	225.000	105.000	181.500	32.010	18	174.000	12
Coliform, Total	NA	NA	NA	NA	NA	0	2200.000	12
Coliform Fecal b	230.000	9300.000	75.000	1438.690	3080.750	16	NA	0
Conductivity Field	514.500	590.000	384.000	505.778	57.060	18	503.500	12
DO	10.190	14.000	7.390	10.216	2.163	18	8.500	11
DO%Sat	NA	NA	NA	NA	NA	0	86.800	11
Nitrate NO3	NA	NA	NA	NA	NA	0	4.250	12
Nitrite NO2	NA	NA	NA	NA	NA	0	0.036	12
NO2 + NO3	4.725	5.500	3.700	4.761	0.533	18	NA	0
TKN	0.600	1.770	0.400	0.711	0.334	18	0.550	11
pH	7.800	8.200	7.500	7.822	0.213	18	7.750	12
pH Lab	NA	NA	NA	NA	NA	0	7.900	1
Phosphorus, Tot	0.205	0.370	0.130	0.213	0.070	18	0.350	11
Residue, Diss.	11.000	71.000	1.000	15.500	17.020	18	NA	0
Residue, Fix.Nonflt	NA	NA	NA	NA	NA	0	10.500	12
Salinity	0.000	0.000	0.000	0.000	0.000	18	NA	0
Temperature	9.900	23.500	0.000	11.389	7.502	18	2.600	12
TOC	2.730	4.980	1.920	3.089	0.975	18	NA	0
Turbidity	14.600	66.800	3.600	18.167	15.054	18	NA	0

The ten year trend report (ICPRB, 1987) showed significant decreasing trends in Salinity and Turbidity, with increasing trends in Nitrate, pH (lab), and TKN. No data from the present analysis were comparable.

Benthic data were not available for this station.

Table 5. Upper Great Valley Subdivision Median Comparison.

Number indicates difference in median values for the 1986-87 monitoring period from the 1984-85 period normalized by the standard deviation. A blank entry indicates that a parameter was not measured for either or both periods. See "Summary Tables" for specific data and "Methods" for further discussion.

	WQN0501		CON0180	CON0005	1AOPE025.10	550462	POT1830	WQN0504		ANT0366	ANT0203	ANT0044
Acidity												
Alkalinity	0.4	-0.3	0.0	-0.1		0.0	0.4		0.5	0.0	0.3	
Aluminum	*						*					
Ammonia NH3+NH4	0.7			0.2			0.6					
BOD				0.4			1.0					
COD				0.3								
Cadmium Cd	*						*					
Chloride	-0.1						0.4					
Chromium, Total	*						*					
Chromium, Hexavalent												
Coliform, Total												
Coliform Fecal a												
Coliform Fecal b	0.0			0.2			0.1					
Conductivity Field		-0.7	0.0	0.0		0.2			1.2	0.5	0.2	
Conductivity At	0.4						0.3					
Copper Cu	*						*					
DO	-0.1	0.5	0.7	-0.8		0.9	0.4	-0.3		0.4	0.8	
DO%Sat												
Flouride												
Hardness	0.0			0.2			0.4					
Iron Fe	0.5						0.3					
Lead Pb	*						*					
Magnesium Mg	0.1						0.3					
Mercury Hg	*						*					
Nitrate NO3	0.5			-0.5			0.9					
Nitrite NO2	-0.2			0.4			-0.1					
NO2 + NO3												
TKN		0.1	0.5	0.8		-0.1			0.1	0.5	0.1	
pH	0.1	0.3	0.1	-0.2		0.4	0.0		0.6	-0.4	0.2	
pH Lab	-0.9			0.0			-0.7					
Phosphate, Tot												
Phosphorus, Diss.Ortho												
Phosphorus, Tot	0.0	-1.1	-0.3	0.3		-0.2	0.0		-0.6	-0.5	-2.1	
Phosphorus, Tot.Ortho												
Residue												
Residue, Diss.				-0.1								
Residue, Nonflt				0.0								
Residue, Vol.Nonflt				-0.2								
Residue, Fix.Nonflt	0.0						0.1					
Salinity												
Sodium Na												
Sulfate	0.5						0.2					
Temperature	-0.1	0.9	0.9	0.5		0.8	-0.0		0.9	1.0	1.0	
TOC				0.0								
Turbidity												

POTOMAC WATER QUALITY STATUS AND TRENDS (1986-87)
Region 3: Shenandoah River Basin

River North Fork Shenandoah River
Station 1BNFS093.53 Agency VASWCB
Location Cootes Store, VA. Rt. 259 Bridge.
River Mile: 171-55-94

	(1986-1987)						(1984-1985)	
PARAMETER	MED	MAX	MIN	MEAN	S.D.	N	MED	N
Alkalinity	43.000	203.000	11.000	53.879	47.291	24	29.000	13
Ammonia NH3+NH4	0.100	0.100	0.100	0.100	0.000	24	0.100	19
BOD	1.000	3.000	1.000	1.125	0.448	24	1.000	20
COD	4.000	28.000	1.000	5.833	6.302	24	2.000	20
Coliform Fecal b	100.000	8000.000	100.000	583.333	1694.920	24	100.000	19
Conductivity Field	123.000	413.000	63.900	138.035	70.110	23	93.000	19
DO	9.750	13.300	6.800	10.054	1.956	24	9.850	20
Hardness	50.000	120.000	28.000	55.083	22.035	24	36.000	9
Nitrate NO3	1.000	3.100	0.100	1.038	0.870	24	0.660	19
Nitrite NO2	0.010	0.020	0.010	0.011	0.003	24	0.010	19
TKN	0.150	1.300	0.100	0.233	0.258	24	0.200	17
pH	7.400	8.530	6.600	7.542	0.591	23	7.350	20
pH Lab	7.100	8.200	6.400	7.146	0.510	24	6.800	13
Phosphorus, Tot	0.100	0.300	0.100	0.117	0.048	24	0.100	18
Residue	NA	NA	NA	NA	NA	0	60.000	1
Residue, Diss.	5.000	35.000	5.000	7.417	7.558	24	5.000	20
Residue, Nonflt	5.000	29.000	5.000	6.917	5.755	24	5.000	20
Residue, Vol.Nonflt	5.000	8.000	5.000	5.167	0.637	24	5.000	20
Temperature	15.400	27.600	0.000	14.258	8.726	24	13.750	20
TOC	3.000	6.000	1.000	3.227	1.066	22	3.000	20

The ten year trend report (ICPRB, 1987) showed significant decreasing trends in Tot. Ortho Phosphorus, and TOC, with increasing trends in Ammonia, Nitrite, Total Phosphorus, Residue (Nonfilt. and Vol. Nonfilt.), and TKN. The present analysis shows no change in Nitrite, Total Phosphorus, and both forms of Residue.

Virginia has 4 monitoring stations on the upper North Fork Shenandoah river, 2 upstream, and 2 downstream of the Broadway-Timberville cluster of discharges. The upstream stations are located about one mile upstream and five miles downstream of BWQMN Station 1BNFS093.53. These two stations have exhibited Good or Fair-Good benthic community condition over the last two years.

POTOMAC WATER QUALITY STATUS AND TRENDS (1986-87)
Region 3: Shenandoah River Basin

River North Fork Shenandoah River
Station 1BNFS081.42 Agency VASWCB
Location New Market, VA, Rt. 617/953 Bridge.
River Mile: 171-55-82

	(1986-1987)						(1984-1985)	
PARAMETER	MED	MAX	MIN	MEAN	S.D.	N	MED	N
Alkalinity	160.000	225.000	23.000	143.875	60.031	24	104.000	13
Ammonia NH3+NH4	0.100	0.500	0.100	0.133	0.092	24	0.100	19
BOD	1.000	7.000	1.000	1.542	1.250	24	1.000	20
COD	4.000	40.000	1.000	6.708	8.057	24	5.000	20
Coliform Fecal b	100.000	8000.000	100.000	562.500	1614.290	24	200.000	20
Conductivity Field	351.000	722.000	124.900	355.078	128.872	23	282.000	19
DO	11.200	14.300	7.500	10.921	2.269	24	11.200	19
Hardness	168.000	248.000	54.000	165.000	57.034	24	124.000	9
Nitrate NO3	2.580	4.000	1.340	2.482	0.708	24	2.400	19
Nitrite NO2	0.030	0.070	0.010	0.031	0.017	24	0.020	19
TKN	0.350	2.900	0.100	0.450	0.536	24	0.300	18
pH	8.095	8.700	7.040	8.076	0.416	24	7.850	20
pH Lab	7.900	8.400	6.400	7.858	0.439	24	7.900	13
Phosphorus, Tot	0.100	0.700	0.100	0.154	0.132	24	0.100	18
Residue	NA	NA	NA	NA	NA	0	136.000	1
Residue, Diss.	5.000	275.000	5.000	17.167	55.010	24	5.000	20
Residue, Nonflt	5.000	240.000	1.000	15.167	47.947	24	5.000	20
Residue, Vol.Nonflt	5.000	34.000	2.000	6.250	5.980	24	5.000	20
Temperature	16.400	25.400	1.000	14.325	7.922	24	14.000	19
TOC	4.000	5.000	1.000	3.455	0.858	22	4.000	20

The ten year trend report (ICPRB, 1987) showed significant decreasing trends in Tot. Ortho Phosphorus, and TOC, with increasing trends in Ammonia, and Nitrate. The present analysis also showed increases in Nitrate but no change in Ammonia.

One Virginia benthic station is located about 5 miles upstream of this BWQMN monitoring station at New Market. This benthic station is in an area that was extensively channelized in Spring 1986, is just upstream of the Timberville STP discharge, and downstream of one municipal and two industrial discharge points.The condition of the benthic community was rated Fair in 1986 to 1988. A second benthic monitoring is located at the New Market BWQMN site. The condition of the benthic community was previously rated Fair-Good, but has degraded to Fair in the two most recent surveys in Fall 1987 and Spring 1988.

POTOMAC WATER QUALITY STATUS AND TRENDS (1986-87)
Region 3: Shenandoah River Basin

River North Fork Shenandoah River
Station 1BNFS010.34 Agency VASWCB
Location Strasburg, VA, Rt. 55 Crossing.
River Mile: 171-55-10

	(1986-1987)						(1984-1985)	
PARAMETER	MED	MAX	MIN	MEAN	S.D.	N	MED	N
Alkalinity	118.500	187.000	56.000	124.909	33.379	22	116.500	16
Ammonia NH3+NH4	0.100	0.200	0.100	0.105	0.021	22	0.100	18
BOD	1.000	4.000	1.000	1.409	0.796	22	1.000	20
COD	9.000	29.000	1.000	9.727	6.017	22	6.000	20
Coliform Fecal b	100.000	4300.000	100.000	572.500	1168.840	20	100.000	20
Conductivity Field	304.000	482.000	160.100	321.555	80.386	22	298.500	20
DO	10.500	12.800	3.300	9.873	2.539	22	10.650	20
Hardness	142.000	208.000	70.000	146.864	36.022	22	129.000	9
Nitrate NO3	1.145	2.490	0.050	1.085	0.845	22	1.325	18
Nitrite NO2	0.010	0.040	0.010	0.015	0.007	22	0.010	18
TKN	0.300	1.400	0.100	0.405	0.268	22	0.350	16
pH	8.350	9.000	7.000	8.172	0.640	22	8.075	20
pH Lab	8.050	9.300	7.100	8.023	0.581	22	8.000	16
Phosphorus, Tot	0.100	0.300	0.100	0.123	0.053	22	0.100	16
Residue	NA	NA	NA	NA	NA	0	111.000	1
Residue, Diss.	5.000	125.000	5.000	16.727	34.527	22	5.000	20
Residue, Nonflt	5.000	107.000	5.000	14.500	29.805	22	5.000	20
Residue, Vol.Nonflt	5.000	19.000	4.000	6.818	4.584	22	5.000	20
Temperature	17.750	28.400	0.000	15.227	9.568	22	14.250	20
TOC	4.000	7.000	3.000	4.200	1.005	20	4.500	20

The ten year report (ICPRB, 1987) showed significant decreasing trends in Tot. Ortho Phosphorus with increasing trends in Ammonia, Nitrite, Total Phosphorus, and TKN. The present analysis showed no changes in Ammonia, Nitrite, and Total Phosphorus.

Benthic data were not available at this station.

POTOMAC WATER QUALITY STATUS AND TRENDS (1986-87)
Region 3: Shenandoah River Basin

River Cedar Creek
Station 1BCDR013.29 Agency VASWCB
Location Winchester, Va, Rt. 628 Bridge.
River Mile: 171-55-7-13

	(1986-1987)						(1984-1985)	
PARAMETER	MED	MAX	MIN	MEAN	S.D.	N	MED	N
Alkalinity	100.500	175.000	38.000	101.600	41.719	26	110.500	16
Ammonia NH3+NH4	0.100	0.100	0.100	0.100	0.000	26	0.100	19
BOD	1.000	2.000	1.000	1.154	0.368	26	1.000	21
COD	5.500	17.000	1.000	6.192	4.691	26	4.000	22
Cadmium Cd	NA	NA	NA	NA	NA	0	1.000	1
Chromium, Total	NA	NA	NA	NA	NA	0	3.000	1
Coliform Fecal b	100.000	1900.000	100.000	223.077	360.342	26	100.000	21
Conductivity Field	264.500	626.000	110.000	253.181	106.294	26	207.000	21
Copper Cu	NA	NA	NA	NA	NA	0	10.000	1
DO	10.600	13.800	7.900	10.612	1.668	25	10.200	22
Hardness	114.000	190.000	50.000	114.720	39.337	25	107.000	10
Lead Pb	NA	NA	NA	NA	NA	0	1.000	1
Mercury Hg	NA	NA	NA	NA	NA	0	0.300	1
Nitrate NO3	0.540	60.000	0.080	2.820	11.667	26	0.450	19
Nitrite NO2	0.010	0.020	0.010	0.010	0.002	26	0.010	19
TKN	0.200	0.400	0.100	0.165	0.075	26	0.100	16
pH	7.700	8.400	7.000	7.690	0.412	23	7.600	22
pH Lab	7.700	8.500	6.200	7.612	0.538	26	7.650	16
Phosphorus, Tot	0.100	0.100	0.100	0.100	0.000	26	0.100	16
Residue	NA	NA	NA	NA	NA	0	133.000	1
Residue, Diss.	5.000	11.000	5.000	5.423	1.391	26	5.000	22
Residue, Nonflt	5.000	7.000	1.000	4.962	0.999	26	5.000	22
Residue, Vol.Nonflt	5.000	5.000	2.000	4.692	0.838	26	5.000	22
Sulfate	21.600	21.600	21.600	21.600	0.000	1	NA	0
Temperature	11.500	23.500	2.000	12.108	7.106	25	14.000	22
TOC	4.000	7.000	3.000	3.909	0.921	22	3.000	22

The ten year trend report (ICPRB, 1987) showed no significant trends.

The two Virginia benthic monitoring stations are about 5 and 11 miles downstream of the Winchester BWQMN monitoring station, and bracket a discharge point from a limestone quarry. The condition of the benthic community at both stations has been rated Good through the reporting period.

POTOMAC WATER QUALITY STATUS AND TRENDS (1986-87)
Region 3: Shenandoah River Basin

River North Fork Shenandoah River
Station 1BNFS000.69 Agency VASWCB
Location Front Royal, VA, US 340 Bridge.
River Mile: 171-55-1

	(1986-1987)						(1984-1985)	
PARAMETER	MED	MAX	MIN	MEAN	S.D.	N	MED	N
Alkalinity	133.600	168.000	62.000	128.123	29.522	26	138.000	21
Ammonia NH3+NH4	0.100	0.100	0.100	0.100	0.000	26	0.100	19
BOD	1.000	7.000	1.000	1.462	1.208	26	1.000	22
COD	9.500	22.000	2.000	10.077	4.915	26	7.000	22
Cadmium Cd	NA	NA	NA	NA	NA	0	1.000	1
Chromium, Total	NA	NA	NA	NA	NA	0	1.000	1
Coliform Fecal b	100.000	4600.000	100.000	415.385	955.695	26	100.000	21
Conductivity Field	333.500	421.000	172.000	323.854	72.373	26	317.000	21
Copper Cu	NA	NA	NA	NA	NA	0	10.000	1
DO	10.200	13.800	4.200	9.768	2.662	25	9.800	22
Flouride	0.100	0.100	0.100	0.100	0.000	1	NA	0
Hardness	148.000	206.000	76.000	149.840	31.650	25	154.500	20
Lead Pb	NA	NA	NA	NA	NA	0	1.000	1
Mercury Hg	NA	NA	NA	NA	NA	0	0.300	1
Nitrate NO3	0.985	1.940	0.050	0.886	0.656	26	0.900	19
Nitrite NO2	0.010	0.040	0.010	0.013	0.008	26	0.010	19
TKN	0.400	0.700	0.100	0.377	0.139	26	0.300	16
pH	8.300	9.000	7.300	8.267	0.437	23	8.200	22
pH Lab	8.100	8.900	6.600	8.008	0.421	26	8.000	21
Phosphorus, Tot	0.100	0.200	0.100	0.108	0.027	26	0.100	16
Residue	NA	NA	NA	NA	NA	0	205.500	2
Residue, Diss.	5.000	39.000	5.000	8.346	7.833	26	5.000	21
Residue, Nonflt	5.000	32.000	3.000	6.846	6.208	26	5.000	21
Residue, Vol.Nonflt	5.000	8.000	2.000	4.962	1.183	26	5.000	21
Sulfate	19.200	22.600	14.500	18.767	2.498	11	17.855	16
Temperature	13.300	30.000	0.500	14.704	9.218	25	17.750	22
TOC	4.000	8.000	2.000	4.182	1.097	22	4.000	22

The ten year trend report (ICPRB, 1987) showed significant decreasing trends in Mercury, pH, Tot. Ortho Phosphorus, and TOC, with increasing trends in Ammonia, DO, Nitrite, Total Phosphorus, and TKN. The present analysis also showed increases in DO, but decreases in Total Phosphorus, and increases in pH.

The condition of the benthic community at a site located just downstream of this water quality monitoring station was generally rated as Good during the past two years.

POTOMAC WATER QUALITY STATUS AND TRENDS (1986-87)
Region 3: Shenandoah River Basin

River South River
Section 1BSTH027.10 Agency VASWCB
Location Waynesboro, VA, Rt. 664 Bridge.
River Mile: 171-55-100-27

	(1986-1987)						(1984-1985)	
PARAMETER	MED	MAX	MIN	MEAN	S.D.	N	MED	N
Alkalinity	79.000	111.000	45.000	79.739	23.089	23	82.000	12
Ammonia NH3+NH4	0.100	0.200	0.100	0.104	0.021	23	0.100	18
BOD	1.000	2.000	1.000	1.087	0.288	23	1.000	19
COD	3.000	13.000	1.000	4.261	3.441	23	2.000	19
Coliform Fecal b	100.000	1900.000	100.000	304.545	439.130	22	100.000	19
Conductivity Field	207.000	249.000	119.400	194.178	44.237	23	167.000	19
DO	10.700	13.900	7.800	10.568	1.845	22	10.500	19
Hardness	93.000	124.000	50.000	91.818	26.186	22	84.000	10
Nitrate NO3	0.600	0.960	0.400	0.662	0.153	23	0.675	18
Nitrite NO2	0.010	0.040	0.010	0.012	0.007	23	0.010	18
TKN	0.100	2.600	0.100	0.283	0.518	23	0.200	16
pH	8.100	8.800	6.800	8.058	0.440	22	7.950	18
pH Lab	7.700	8.100	6.600	7.600	0.402	23	7.600	12
Phosphorus, Tot	0.100	0.200	0.070	0.125	0.046	23	0.100	16
Residue	NA	NA	NA	NA	NA	0	136.000	1
Residue, Diss.	6.000	34.000	5.000	9.870	7.131	23	6.000	19
Residue, Nonflt	5.000	28.000	1.000	7.391	5.945	23	5.000	19
Residue, Vol.Nonflt	5.000	12.000	1.000	5.130	2.029	23	5.000	19
Temperature	14.000	21.900	2.200	12.659	6.489	22	11.500	19
TOC	3.000	4.000	2.000	2.905	0.768	21	2.000	19

The ten year trend report (ICPRB, 1987) showed significant decreasing trends in Conductivity, Total Ortho Phosphorus, Temperature and TOC, with increasing trends in Ammonia, DO, Nitrite, Diss. Ortho Phosphorus, Total Phosphorus, and TKN. The present analysis also showed increases in DO with increases in Conductivity, and Temperature. No changes were seen in Ammmonia, Nitrite, and Total Phosphorus.

Virginia maintains three benthic monitoring stations on the South River; a "control" station located at the Waynesboro BWQMN site, a second station located about 3 miles downstream, which is below the discharge points for two major industrial dischargers, and a third station located about 2.5 miles further downstream, which is downstream of the municipal STP discharge. The condition of the benthic community at the control site has improved from Fair-Good to Good. The benthic community condition at the middle station was rated Fair-Good in Spring 1988, an improvement from Fair ratings in previous surveys. However, the benthic community condition of the station downstream of the municipal discharge has deteriorated from Fair to Poor over the last two years.

River South Fork Shenandoah River
Station 1BSSF054.20 Agency VASWCB
Location Luray, VA, US Rt. 211 Bridge.
River Mile: 171-55-54

	(1986-1987)						(1984-1985)	
PARAMETER	MED	MAX	MIN	MEAN	S.D.	N	MED	N
Alkalinity	123.000	162.000	81.000	123.136	25.441	22	100.000	15
Ammonia NH3+NH4	0.100	0.100	0.100	0.100	0.000	22	0.100	18
BOD	1.000	3.000	1.000	1.318	0.568	22	1.000	21
COD	7.000	18.000	2.000	8.318	4.202	22	5.000	21
Coliform Fecal b	100.000	8000.000	100.000	463.636	1683.410	22	100.000	21
Conductivity Field	352.500	533.000	214.000	341.364	74.503	22	266.500	20
DO	8.100	13.900	6.500	9.267	2.443	21	10.850	20
Hardness	133.000	168.000	16.000	131.227	35.766	22	116.000	10
Nitrate NO3	1.485	2.300	0.970	1.491	0.353	22	1.545	18
Nitrite NO2	0.020	0.050	0.010	0.021	0.010	22	0.020	18
TKN	0.500	1.200	0.200	0.491	0.262	22	0.400	15
pH	8.105	9.100	7.000	8.100	0.529	22	7.800	19
pH Lab	7.950	8.500	7.000	7.926	0.369	22	7.800	15
Phosphorus, Tot	0.200	0.400	0.100	0.250	0.106	22	0.100	15
Residue, Diss.	5.000	24.000	2.000	7.545	5.722	22	10.000	21
Residue, Nonflt	5.000	22.000	2.000	6.952	5.371	21	7.000	21
Residue, Vol.Nonflt	5.000	23.000	3.000	5.500	3.973	22	5.000	21
Temperature	18.300	27.600	2.000	15.224	8.457	21	11.500	19
TOC	4.000	5.000	1.000	3.900	1.021	20	4.000	21

The ten year trend report (ICPRB, 1987) showed significant decreasing trends for pH, with increasing trends for Ammonia, Fecal Coliform, and Nitrite. These parameters showed no change in the present study.

Benthic data were not available from this station.

POTOMAC WATER QUALITY STATUS AND TRENDS (1986-87)
Region 3: Shenandoah River Basin

River South Fork Shenandoah River
Station 1BSSF000.58 Agency VASWCB
Location Front Royal, VA, US Rt. 340/522 Bridge.
River Mile: 171-55-1

	(1986-1987)						(1984-1985)	
PARAMETER	MED	MAX	MIN	MEAN	S.D.	N	MED	N
Alkalinity	123.000	146.000	11.100	114.938	29.872	26	106.000	21
Ammonia NH3+NH4	0.100	0.400	0.100	0.123	0.071	26	0.100	19
BOD	2.000	6.000	1.000	2.192	1.234	26	2.000	21
COD	13.500	33.000	4.000	14.808	7.521	26	10.000	22
Cadmium Cd	NA	NA	NA	NA	NA	0	1.000	1
Chromium, Total	NA	NA	NA	NA	NA	0	1.000	1
Coliform Fecal b	100.000	1400.000	100.000	216.000	361.340	25	100.000	21
Conductivity Field	699.000	1161.000	272.000	697.923	251.338	26	434.000	21
Copper Cu	NA	NA	NA	NA	NA	0	10.000	1
DO	10.050	13.700	5.500	10.096	2.078	24	9.650	22
Flouride	0.100	0.110	0.110	0.110	0.000	1	NA	0
Hardness	190.000	310.000	95.000	183.800	50.206	25	144.000	20
Lead Pb	NA	NA	NA	NA	NA	0	1.000	1
Mercury Hg	NA	NA	NA	NA	NA	0	0.300	1
Nitrate NO3	0.990	1.680	0.050	0.929	0.500	26	1.200	19
Nitrite NO2	0.010	0.040	0.010	0.017	0.009	26	0.020	19
TKN	0.650	2.000	0.400	0.750	0.346	26	0.500	16
pH	8.550	9.200	8.000	8.609	0.395	22	8.200	21
pH Lab	8.300	8.900	6.800	8.208	0.502	26	7.800	21
Phosphorus, Tot	0.200	0.300	0.100	0.177	0.059	26	0.100	16
Residue	NA	NA	NA	NA	NA	0	317.000	1
Residue, Diss.	5.000	37.000	5.000	8.462	7.606	26	9.000	22
Residue, Nonflt	5.000	29.000	NA	6.080	5.392	25	5.500	22
Residue, Vol.Nonflt	5.000	16.000	3.000	5.731	2.836	26	5.000	22
Sulfate	228.500	307.600	4.300	215.070	88.499	10	80.600	15
Temperature	15.100	32.000	0.000	15.658	9.367	24	19.000	22
TOC	5.000	8.000	3.000	5.286	1.586	21	5.000	22

The ten year trend report (ICPRB, 1987) showed significant decreasing trends in BOD, Mercury, pH, and TOC with an increasing trend in Nitrite. The present analysis showed decreases in Nitrite and increases in pH.

Virginia maintains three benthic monitoring stations on the lower South Fork Shenandoah River, stations on the right and left banks of the river at the same river mile as the Front Royal BWQMN station, and a third station 3 miles upstream, which is above the Avtex Fibers, Inc. discharge points. Benthic community condition at the upstream station was rated Fair-Good in Fall 1987, down from the previous year's Very Good rating. The right bank downstream station, which is primarily affected by the Avtex discharge, has deteriorated from Fair-Poor to Poor, while the left bank has also degraded from Fair-Good to Fair over the last two years. Contaminated groundwater from Avtex's lagoons are thought to be exacerbating the effects of the permitted discharges.

POTOMAC WATER QUALITY STATUS AND TRENDS (1986-87)
Region 3: Shenandoah River Basin

River Shenandoah River Main Stem
Station 1BSHN022.63 Agency VASWCB
Location Berryville, VA, Rt. 7 Bridge.
River Mile: 171-23

	(1986-1987)						(1984-1985)	
PARAMETER	MED	MAX	MIN	MEAN	S.D.	N	MED	N
Alkalinity	116.500	149.000	50.000	108.682	25.732	22	104.000	16
Ammonia NH3+NH4	0.100	0.150	0.100	0.102	0.011	22	0.100	19
BOD	1.000	3.000	1.000	1.591	0.734	22	1.000	21
COD	9.500	28.000	1.000	11.000	6.047	22	7.000	21
Coliform Fecal b	100.000	1300.000	100.000	223.810	316.077	21	100.000	21
Conductivity Field	383.000	644.000	4.900	386.841	161.378	22	311.000	21
DO	9.100	14.500	6.400	9.852	2.436	21	10.800	21
Hardness	138.000	192.000	66.000	133.955	35.784	22	124.000	10
Nitrate NO3	0.895	1.800	0.050	0.827	0.528	22	0.930	19
Nitrite NO2	0.010	0.050	0.010	0.013	0.009	22	0.010	18
TKN	0.400	1.100	0.200	0.500	0.241	22	0.400	17
pH	8.150	9.000	6.150	7.978	0.744	20	8.000	21
pH Lab	8.000	8.700	6.900	7.945	0.471	22	7.900	16
Phosphorus, Tot	0.100	0.200	0.100	0.132	0.048	22	0.100	17
Residue	NA	NA	NA	NA	NA	0	174.000	2
Residue, Diss.	7.000	55.000	5.000	12.954	13.545	22	7.000	21
Residue, Nonflt	5.000	47.000	2.000	10.091	11.148	22	5.000	21
Residue, Vol.Nonflt	5.000	10.000	2.000	5.091	2.022	22	5.000	20
Sulfate	63.850	96.500	22.900	63.567	30.863	6	33.200	13
Temperature	19.500	28.000	0.000	16.133	9.340	21	13.000	21
TOC	4.000	6.000	3.000	4.550	0.887	20	5.000	21

The ten year trend report (ICPRB, 1987) showed significant decreasing trends in BOD, pH, Residue, Temperature, and TOC, with increasing trends in Ammonia, and Nitrite. The present analysis shows no change in Ammonia, BOD, Nitrite, and Residue, Vol. Nonfilt., with a decrease in TOC and an increase in pH and TOC.

The condition of the benthic community at this station has been rated Good over the last two years.

POTOMAC WATER QUALITY STATUS AND TRENDS (1986-87)
Region 3: Shenandoah River Basin

River Shenandoah River
Station 550471 Agency WVDNR
Location Bolivar, WV, US Rt. 340 Bridge.
River Mile: 171-1

	(1986-1987)						(1984-1985)	
PARAMETER	MED	MAX	MIN	MEAN	S.D.	N	MED	N
Alkalinity	123.000	154.000	81.000	125.542	18.724	24	133.000	19
Aluminum	140.000	676.000	26.000	179.478	138.711	23	172.000	12
Ammonia NH3+NH4	NA	NA	NA	NA	NA	0	0.050	9
BOD	NA	NA	NA	NA	NA	0	1.600	9
COD	8.000	20.000	2.000	8.636	4.293	22	12.000	10
Cadmium Cd	NA	NA	NA	NA	NA	0	4.000	9
Chloride	NA	NA	NA	NA	NA	0	12.000	9
Chromium, Total	NA	NA	NA	NA	NA	0	4.000	2
Chromium, Hexavalent	NA	NA	NA	NA	NA	0	1.000	9
Coliform Fecal b	20.000	340.000	10.000	45.000	68.525	24	40.000	11
Conductivity Field	395.500	684.000	251.000	433.750	113.453	20	347.000	13
Conductivity At	350.000	650.000	240.000	386.875	103.060	24	350.000	19
Copper Cu	NA	NA	NA	NA	NA	0	4.000	3
DO%Sat	89.000	116.000	71.000	88.105	9.134	19	99.000	13
Flouride	NA	NA	NA	NA	NA	0	0.180	9
Hardness	NA	NA	NA	NA	NA	0	106.000	9
Iron Fe	236.000	1136.000	80.000	290.261	224.649	23	184.000	13
Lead Pb	NA	NA	NA	NA	NA	0	40.000	9
Mercury Hg	NA	NA	NA	NA	NA	0	1.100	2
NO2 + NO3	1.220	1.990	0.090	1.128	0.527	22	1.120	19
TKN	0.450	0.970	0.140	0.467	0.225	21	0.410	19
pH	8.300	8.700	7.600	8.258	0.295	19	8.200	13
pH Lab	8.185	8.600	7.900	8.180	0.175	24	8.100	19
Phosphorus, Tot	0.087	0.360	0.025	0.106	0.075	21	0.125	19
Residue, Diss.	10.000	47.000	1.000	11.174	10.569	23	9.500	18
Sodium Na	NA	NA	NA	NA	NA	0	19.250	2
Sulfate	52.000	135.000	23.000	59.522	29.225	23	46.000	19
Temperature	12.350	27.900	3.000	14.300	8.089	22	18.500	13
TOC	NA	NA	NA	NA	NA	0	4.000	9

The ten year trend report (ICPRB, 1987) showed significant decreasing trends in Chloride, Copper, Hardness, pH, pH (Lab), and TOC, with increasing trends in Hexavalent Chromium, Lead and Nitrite + Nitrate. The present analysis also shows increases in Nitrite + Nitrate. In contrast, increases in pH and pH (Lab) are shown now.

There were no significant temporal trends in the benthic macroinvertebrate data at this station. This station received an aberrant benthic community condition rating of Poor in 1986 due to an overwhelming abundance of one taxon, which severely depressed the diversity index. In 1987, as in most previous years, the condition of the benthic community was rated Good.

Table 6. Shenadoah River Basin Subdivision Median Comparison.

Number indicates difference in median values for the 1986-87 monitoring period from the 1984-85 period normalized by the standard deviation. A blank entry indicates that a parameter was not measured for either or both periods. See "Summary Tables" for specific data and "Methods" for further discussion.

	1BNFS093.53		1BNFS081.42		1BNFS010.34		1BCDR013.29		1BNFS000.69		1BSTH027.10		1BSSF054.20		1BSSF000.58		1BSHN022.63		550471
Acidity																			
Alkalinity	0.3	0.9	0.1	-0.2	-0.1	-0.1			0.9	0.6			0.5	-0.5					
Aluminum														-0.2					
Ammonia NH3+NH4	*	0.0	0.0	*	*	0.0			*	0.0			0.0						
BOD	0.0	0.0	0.0	0.0	0.0	0.0			0.0	0.0			0.0						
COD	0.3	-0.1	0.5	0.3	0.5	0.3			0.5	0.5			0.4	-0.9					
Cadmium Cd																			
Chloride																			
Chromium, Total																			
Chromium, Hexavalent																			
Coliform, Total																			
Coliform Fecal a																			
Coliform Fecal b	0.0	-0.1	0.0	0.0	0.0	0.0			0.0	0.0			0.0	-0.3					
Conductivity Field	0.4	0.5	0.1	0.5	0.2	0.9			1.2	1.1			0.4	0.4					
Conductivity At														0.0					
Copper Cu																			
DO	-0.1	0.0	-0.1	0.2	0.2	0.1			-1.1	0.2			-0.7						
DO%Sat													-1.1						
Flouride																			
Hardness	0.6	0.8	0.4	0.2	-0.2	0.3			0.5	0.9			0.4						
Iron Fe													0.2						
Lead Pb																			
Magnesium Mg																			
Mercury Hg																			
Nitrate NO3	0.4	0.3	-0.2	0.0	0.1	-0.5			-0.2	-0.4			-0.1						
Nitrite NO2	0.0	0.6	0.0	0.0	0.0	0.0			0.0	-1.1			0.0						
NO2 + NO3														0.2					
TKN	-0.2	0.1	-0.2	1.3	0.7	-0.2			0.4	0.4			0.0	0.2					
pH	0.1	0.6	0.4	0.2	0.2	0.3			0.6	0.9			0.2	0.3					
pH Lab	0.6	0.0	0.1	0.1	0.2	0.2			0.4	1.0			0.2	0.5					
Phosphate, Tot																			
Phosphorous, Diss.Ortho																			
Phosphorous, Tot	0.0	0.0	0.0	*	0.0	0.0			0.9	1.7			0.0	-0.5					
Phosphorous, Tot.Ortho																			
Residue																			
Residue, Diss.	0.0	0.0	0.0	0.0	0.0	0.0			-0.9	-0.5			0.0	0.0					
Residue, Nonflt	0.0	0.0	0.0	0.0	0.0	0.0			-0.4	-0.1			0.0						
Residue, Vol.Nonflt	0.0	0.0	0.0	0.0	0.0	0.0			0.0	0.0			0.0						
Residue, Fix.Nonflt																			
Salinity																			
Sodium Na																			
Sulfate					0.5					1.7			1.0	0.2					
Temperature	0.2	0.3	0.4	-0.4	-0.5	0.4			0.8	-0.4			0.7	-0.8					
TOC	0.0	0.0	-0.5	1.1	0.0	1.3			0.0	0.0			-1.1						
Turbidity																			

POTOMAC WATER QUALITY STATUS AND TRENDS (1986-87)
Region 4: Potomac Piedmont

River Potomac River
Station POT1595 Agency MDOEP
Location Point of Rocks, MD, US Rt. 15 Bridge.
River Mile: 160

	(1986-1987)						(1984-1985)	
PARAMETER	MED	MAX	MIN	MEAN	S.D.	N	MED	N
Alkalinity	84.000	118.000	39.000	86.471	21.249	17	66.000	13
BOD	3.000	8.800	0.100	3.187	1.952	18	2.200	13
Coliform, Total	NA	NA	NA	NA	NA	0	750.000	15
Coliform Fecal b	93.000	23000.000	23.000	2009.120	5537.430	17	NA	0
Conductivity Field	300.000	510.000	159.000	322.833	85.032	18	275.000	15
DO	11.800	14.400	5.990	11.136	2.640	18	9.400	15
DO%Sat	NA	NA	NA	NA	NA	0	96.000	15
Nitrate NO3	NA	NA	NA	NA	NA	0	1.250	13
Nitrite NO2	NA	NA	NA	NA	NA	0	0.015	13
NO2 + NO3	1.500	2.600	0.270	1.551	0.572	17	NA	0
TKN	0.475	1.330	0.150	0.570	0.323	18	0.730	13
pH	7.550	8.700	6.600	7.683	0.607	18	7.500	15
pH Lab	NA	NA	NA	NA	NA	0	7.900	13
Phosphorus, Tot	0.075	0.150	0.010	0.080	0.033	18	0.120	13
Residue, Diss.	8.000	104.000	1.000	13.889	23.557	18	NA	0
Residue, Fix.Nonflt	NA	NA	NA	NA	NA	0	8.000	13
Salinity	0.000	0.00	0.000	0.000	0.000	18	NA	0
Temperature	10.750	27.000	0.300	12.389	9.362	18	12.300	15
TOC	3.170	7.160	2.100	3.749	1.490	17	NA	0
Turbidity	12.000	103.000	5.400	18.382	22.922	17	NA	0

The ten year trend report (ICPRB, 1987) showed significant decreasing trends in pH and Residue, with increasing trends in Nitrite and TKN. The present analysis showed increases in pH.

There were significant increasing trends in both number of taxa (K-tau value = 1.85, slope = 0.73, $p<0.05$) and diversity index (K-tau value = 2.58, slope = 0.13, $p<0.05$) (see Figures 2.9 and 2.10). The condition of the benthic community was rated as Excellent in both 1986 and 1987.

POTOMAC WATER QUALITY STATUS AND TRENDS (1986-87)
Region 4: Potomac Piedmont

River Potomac River
Station POT1596 Agency MDOEP
Location Point of Rocks, Virginia

Station = POT1596

	(1986-1987)						(1984-1985)	
PARAMETER	MED	MAX	MIN	MEAN	S.D.	N	MED	N
Alkalinity	102.000	142.000	52.000	100.294	24.558	17	76.100	13
BOD	3.100	7.940	1.000	3.730	2.208	18	2.300	13
Coliform, Total	NA	NA	NA	NA	NA	0	430.000	13
Coliform Fecal b	43.000	460000.000	9.000	27359.400	111491.000	17	NA	0
Conductivity Field	333.000	601.000	133.000	350.111	113.807	18	272.000	13
DO	11.400	14.700	7.090	11.148	2.505	17	9.900	12
DO%Sat	NA	NA	NA	NA	NA	0	96.100	12
Nitrate NO3	NA	NA	NA	NA	NA	0	1.100	13
Nitrite NO2	NA	NA	NA	NA	NA	0	0.014	13
NO2 + NO3	1.600	2.600	0.020	1.240	0.757	17	NA	0
TKN	0.575	2.130	0.200	0.723	0.457	18	0.650	13
pH	7.950	8.900	6.500	7.883	0.614	18	7.500	13
pH Lab	NA	NA	NA	NA	NA	0	7.900	13
Phosphorus, Tot	0.105	0.230	0.040	0.111	0.052	18	0.110	13
Residue, Diss.	10.000	58.000	1.000	13.111	14.397	18	NA	0
Residue, Fix.Nonflt	NA	NA	NA	NA	NA	0	8.000	13
Salinity	0.000	0.000	0.000	0.000	0.000	18	NA	0
Temperature	12.200	27.900	0.200	12.950	9.472	18	3.820	13
TOC	3.900	6.900	2.060	3.966	1.467	18	NA	0
Turbidity	10.000	62.000	5.600	16.582	14.375	17	NA	0

This station was not analyzed in the ten year report (ICPRB, 1987).

Benthic data were not available for this station.

POTOMAC WATER QUALITY STATUS AND TRENDS (1986-87)
Region 4: Potomac Piedmont

River Rock Creek (Monocacy Tributary)
Station WQN0503 Agency PADER
Location Gettysburg, PA, US Rt. 140 Bridge.
River Mile: 154-64

	(1986-1987)						(1984-1985)	
PARAMETER	MED	MAX	MIN	MEAN	S.D.	N	MED	N
Alkalinity	92.000	142.000	54.000	93.043	31.731	23	119.000	24
Aluminum	945.000	1500.000	390.000	945.000	784.889	2	220.000	1
Ammonia NH3+NH4	0.120	6.090	0.040	0.941	1.827	23	5.265	24
BOD	2.400	10.400	0.500	2.862	2.166	21	5.600	23
Cadmium Cd	0.700	0.800	0.600	0.700	0.141	2	0.600	1
Chloride	62.000	126.000	18.000	59.000	28.885	23	43.500	24
Chromium, Total	4.000	4.000	4.000	4.000	0.000	2	4.600	1
Coliform Fecal b	600.000	12000.000	20.000	2085.420	2883.930	24	1400.000	23
Conductivity At	491.000	840.000	260.000	504.130	173.566	23	487.000	24
Copper Cu	50.000	50.000	50.000	50.000	0.000	2	50.000	1
DO	8.700	13.600	3.700	9.274	2.815	23	6.400	21
Hardness	137.000	208.000	86.000	141.478	34.262	23	146.000	24
Iron Fe	530.000	1840.000	210.000	630.435	392.943	23	465.000	24
Lead Pb	7.300	7.400	7.200	7.300	0.141	2	4.200	1
Magnesium Mg	11.770	18.090	7.410	12.062	2.585	23	12.100	25
Mercury Hg	1.000	1.000	1.000	1.000	0.000	2	2.000	1
Nitrate NO3	3.500	14.300	0.440	4.490	3.834	23	1.465	24
Nitrite NO2	0.022	0.360	0.004	0.055	0.082	23	0.113	24
pH	7.400	8.000	6.500	7.372	0.336	23	7.300	11
pH Lab	7.100	8.000	6.200	7.052	0.513	23	7.400	24
Phosphorus, Tot	0.500	1.650	0.210	0.591	0.393	23	1.500	24
Residue, Fix.Nonflt	362.000	1772.000	176.000	412.696	316.359	23	336.000	24
Sulfate	65.000	145.000	34.000	73.826	30.674	23	56.500	24
Temperature	13.000	25.000	1.000	12.870	7.809	23	14.000	23

The ten year trend report (ICPRB, 1987) showed significant decreasing trends in Total Phosphate, and Turbidity, with increasing trends in Chloride, Fecal Coliform, Total Coliform, and Conductivity. The present analysis shows increases in Chloride. In contrast, decreases in Fecal Coliform are shown now.

There was no significant temporal trend in the number of taxa identified at this station. However, there was an apparent improvement in the benthic community in the last two years, following upgrading of the Gettysburg STP. In 1986 and 1987 the condition of the benthic community was rated Fair-Good, as opposed to Poor in previous years.

POTOMAC WATER QUALITY STATUS AND TRENDS (1986-87)
Region 4: Potomac Piedmont

River Monocacy River
Station MON0528 Agency MDOEP
Location Bridgeport, MD, LRt. 97 Bridge.
River Mile: 154-53

	(1986-1987)						(1984-1985)	
PARAMETER	MED	MAX	MIN	MEAN	S.D.	N	MED	N
Alkalinity	55.500	111.000	28.000	61.278	25.258	18	52.200	23
Coliform, Total	NA	NA	NA	NA	NA	0	1500.000	23
Coliform Fecal b	430.000	23000.000	9.000	2253.240	5466.640	17	NA	0
Conductivity Field	253.000	403.000	160.000	262.222	69.272	18	230.500	22
DO	11.000	17.800	5.400	10.853	3.560	18	9.100	23
DO%Sat	NA	NA	NA	NA	NA	0	85.700	23
Nitrate NO3	NA	NA	NA	NA	NA	0	1.680	23
Nitrite NO2	NA	NA	NA	NA	NA	0	0.018	23
NO2 + NO3	1.400	3.400	0.020	1.468	1.235	17	NA	0
TKN	0.790	1.800	0.450	0.890	0.372	18	0.700	23
pH	7.300	8.400	6.600	7.361	0.519	18	7.200	19
Phosphorus, Tot	0.170	0.650	0.090	0.197	0.133	18	0.170	23
Residue, Diss.	6.500	152.000	1.000	21.444	36.725	18	NA	0
Residue, Fix.Nonflt	NA	NA	NA	NA	NA	0	8.000	23
Salinity	0.000	0.000	0.000	0.000	0.000	18	NA	0
Temperature	10.200	26.200	0.600	11.959	8.867	17	5.000	23
TOC	5.170	10.650	3.640	5.615	1.921	17	NA	0
Turbidity	14.000	257.000	2.100	38.053	62.090	17	NA	0

The ten year trend report (ICPRB, 1987) showed significant decreasing trends in pH, Residue, and Salinity, with increasing trends in Conductivity, Nitrate, Nitrite, pH (Lab), Total Phosphorus, and TKN.
The present analysis shows Conductivity and pH increased.

Benthic data were not available for this station.

POTOMAC WATER QUALITY STATUS AND TRENDS (1986-87)
Region 4: Potomac Piedmont

River Big Pipe Creek
Station BPC0035 Agency MDOEP
Location At USGS Gage, Bruceville, Maryland

	(1986-1987)						(1984-1985)	
PARAMETER	MED	MAX	MIN	MEAN	S.D.	N	MED	N
Alkalinity	52.000	84.000	29.000	55.611	17.068	18	48.800	11
Coliform, Total	NA	NA	NA	NA	NA	0	2300.000	11
Coliform Fecal b	430.000	43000.000	NA	3437.060	10277.300	17	NA	0
Conductivity Field	218.500	302.000	169.000	218.222	30.267	18	195.000	11
DO	11.300	17.100	7.000	11.319	2.921	18	8.700	11
DO%Sat	NA	NA	NA	NA	NA	0	91.000	11
Nitrate NO3	NA	NA	NA	NA	NA	0	2.500	11
Nitrite NO2	NA	NA	NA	NA	NA	0	0.013	11
NO2 + NO3	3.100	5.000	1.500	3.117	0.996	18	NA	0
TKN	0.550	1.750	0.350	0.718	0.433	18	0.440	11
pH	7.200	7.900	6.400	7.244	0.453	18	7.300	10
Phosphorus, Tot	0.070	0.400	0.040	0.117	0.103	18	0.060	11
Residue, Diss.	6.000	127.000	1.000	27.722	39.716	18	NA	0
Residue, Fix.Nonflt	NA	NA	NA	NA	NA	0	5.500	10
Salinity	0.000	0.000	0.000	0.000	0.000	18	NA	0
Temperature	9.800	24.600	1.300	10.956	7.910	18	2.490	11
TOC	2.820	7.970	1.870	3.551	1.842	17	NA	0
Turbidity	15.300	150.000	4.600	32.835	41.948	17	NA	0

This station was not available in the ten year trend report (ICPRB, 1987) and was also not available for Benthic data.

POTOMAC WATER QUALITY STATUS AND TRENDS (1986-87)
Region 4: Potomac Piedmont

River Monocacy River
Station MON0155 Agency MDOEP
Location Below Frederick, MD, Reichs Ford Bridge.
River Mile: 154-16

	(1986-1987)						(1984-1985)	
PARAMETER	MED	MAX	MIN	MEAN	S.D.	N	MED	N
Alkalinity	63.500	140.000	29.000	76.722	33.276	18	68.000	23
Coliform, Total	NA	NA	NA	NA	NA	0	9300.000	23
Coliform Fecal b	930.000	23000.000	43.000	4981.350	7389.640	17	NA	0
Conductivity Field	267.000	425.000	102.000	274.111	85.626	18	245.000	22
DO	9.895	13.800	3.800	10.030	3.048	18	8.400	22
DO%Sat	NA	NA	NA	NA	NA	0	81.400	22
Hardness	NA	NA	NA	NA	NA	0	95.000	1
Nitrate NO3	NA	NA	NA	NA	NA	0	2.150	23
Nitrite NO2	NA	NA	NA	NA	NA	0	0.039	23
NO2 + NO3	2.150	4.100	0.270	2.082	1.105	16	NA	0
TKN	0.935	2.900	0.500	1.300	0.768	18	0.900	23
pH	7.350	8.100	6.500	7.361	0.366	18	7.300	20
pH Lab	NA	NA	NA	NA	NA	0	12.300	1
Phosphorus, Tot	0.170	0.550	0.110	0.219	0.126	17	0.200	23
Residue, Diss.	8.000	212.000	1.000	24.556	52.259	18	NA	0
Residue, Fix.Nonflt	NA	NA	NA	NA	NA	0	9.000	23
Salinity	0.000	0.000	0.000	0.000	0.000	18	NA	0
Temperature	11.700	26.400	1.500	12.411	8.751	18	4.400	23
TOC	4.400	11.330	3.020	4.864	2.082	17	NA	0
Turbidity	14.000	162.000	7.200	24.381	37.359	16	NA	0

The ten year trend report (ICPRB, 1987) showed a significant decreasing trend for Temperature, and an increasing trend for Total Coliform. The present analysis shows increases in Temperature.

Benthic data were not available at this station.

POTOMAC WATER QUALITY STATUS AND TRENDS (1986-87)
Region 4: Potomac Piedmont

River Monocacy River
Station MON0020 Agency MDOEP
Location Dickerson, MD, LRt. 28 Bridge.
River Mile: 154-2

	(1986-1987)						(1984-1985)	
PARAMETER	MED	MAX	MIN	MEAN	S.D.	N	MED	N
Alkalinity	77.000	121.000	45.000	81.000	22.071	19	67.950	24
BOD	3.200	5.200	0.900	3.193	1.237	19	2.600	24
Coliform, Total	NA	NA	NA	NA	NA	0	2300.000	24
Coliform Fecal b	230.000	93000.000	23.000	6404.440	23115.700	16	NA	0
Conductivity Field	274.000	399.000	182.000	287.667	54.245	18	258.500	24
DO	11.650	14.500	5.990	10.440	2.756	18	8.650	24
DO%Sat	NA	NA	NA	NA	NA	0	87.000	24
Hardness	NA	NA	NA	NA	NA	0	96.000	1
Nitrate NO3	NA	NA	NA	NA	NA	0	2.420	24
Nitrite NO2	NA	NA	NA	NA	NA	0	0.039	24
NO2 + NO3	2.750	4.300	1.400	2.669	0.858	18	NA	0
TKN	0.650	1.200	0.500	0.752	0.201	19	0.835	24
pH	7.300	8.600	6.400	7.350	0.494	18	7.200	22
pH Lab	NA	NA	NA	NA	NA	0	7.700	24
Phosphorus, Tot	0.170	0.340	0.090	0.183	0.067	19	0.250	24
Residue, Diss.	7.000	60.000	1.000	11.210	15.820	19	NA	0
Residue, Fix.Nonflt	NA	NA	NA	NA	NA	0	11.000	24
Salinity	0.000	0.000	0.000	0.000	0.000	18	NA	0
Temperature	11.150	27.500	0.100	12.461	9.380	18	3.965	24
TOC	3.690	7.000	2.110	3.753	1.172	19	NA	0
Turbidity	11.000	43.000	4.400	13.089	8.526	19	NA	0

The ten year trend report (ICPRB, 1987) showed significant decreasing trends for pH, Salinity and Temperature, with increasing trends in Conductivity, Nitrate, Nitrite, Total Phosphorus, and TKN. The present analysis shows increases in Conductivity. In contrast, increases in pH and Temperature and decreases in Total Phosphorus and TKN are shown now.

Benthic data were not available for this station.

River Potomac River
Station POT1471 Agency MDOEP
Location White's Ferry, Md, Rt. 107.
River Mile: 147

	(1986-1987)						(1984-1985)	
PARAMETER	MED	MAX	MIN	MEAN	S.D.	N	MED	N
Alkalinity	82.000	121.000	67.000	88.177	17.238	17	69.200	21
BOD	3.250	5.200	0.800	3.255	1.459	16	2.100	23
Coliform, Total	NA	NA	NA	NA	NA	0	4300.000	25
Coliform Fecal b	93.000	4300.000	23.000	612.267	1178.090	15	NA	0
Conductivity Field	291.000	506.000	260.000	324.941	76.010	17	265.000	25
DO	11.000	13.200	6.390	10.336	2.260	17	8.000	25
DO%Sat	NA	NA	NA	NA	NA	0	85.500	25
Hardness	NA	NA	NA	NA	NA	0	99.000	1
Nitrate NO3	NA	NA	NA	NA	NA	0	2.000	23
Nitrite NO2	NA	NA	NA	NA	NA	0	0.025	23
NO2 + NO3	1.600	3.700	0.050	1.868	1.060	17	NA	0
TKN	0.630	1.350	0.280	0.698	0.301	17	0.700	23
pH	7.900	8.600	6.100	7.706	0.697	17	7.400	23
pH Lab	NA	NA	NA	NA	NA	0	7.700	23
Phosphorus, Tot	0.090	0.170	0.050	0.097	0.035	16	0.170	23
Residue, Diss.	11.000	37.000	2.000	12.235	9.045	17	NA	0
Residue, Fix.Nonflt	NA	NA	NA	NA	NA	0	22.000	23
Salinity	0.000	0.000	0.000	0.000	0.000	17	NA	0
Temperature	14.300	29.200	2.600	15.165	9.518	17	5.450	25
TOC	3.150	4.970	1.710	3.298	0.997	17	NA	0
Turbidity	14.000	47.000	6.300	17.776	10.507	17	NA	0

The ten year trend report (ICPRB, 1987) showed significant decreasing trends in BOD, pH and Salinity with increasing trends in Nitrate, Nitrite, Total Phosphorus, and TKN. The present analysis, in contrast, showed increases in BOD, pH, and decreases in Total Phosphorus and TKN.

There were significant increasing trends in both number of taxa (K-tau value = 2.84, slope = 1.04, $p<0.005$) and diversity index (K-tau value = 3.12, slope = 0.10, $p<0.005$) at this station (see Figures 2.11 and 2.12). The condition of the benthic community was rated Good-Excellent in 1986. This station was not sampled in 1987, but a station one mile upstream (POT1472) received only a Fair-Good rating. The number of taxa identified at POT1472 in 1987 was in the Good-Excellent range, but diversity was low and the total number of organisms was in the Enriched range. Further sampling will be required to determine if this is an indicator of a deteriorating trend, or a transient occurrence, such as occurred at Station 550471 in 1986.

POTOMAC WATER QUALITY STATUS AND TRENDS (1986-87)
Region 4: Potomac Piedmont

River Goose Creek
Station 1AG00002.38 Agency VASWCB
Location Leesburg, VA, Rt. 7 Bridge.
River Mile: 142-2

	(1986-1987)						(1984-1985)	
PARAMETER	MED	MAX	MIN	MEAN	S.D.	N	MED	N
Alkalinity	44.500	135.000	7.600	56.223	36.693	22	35.500	8
Ammonia NH3+NH4	0.300	5.500	0.050	0.985	1.546	24	0.100	19
BOD	3.000	14.000	1.000	3.958	3.263	24	2.000	20
COD	13.000	22.000	2.000	12.583	5.563	24	9.000	20
Cadmium Cd	1.000	1.000	1.000	1.000	0.000	1	1.000	2
Chloride	57.000	57.000	57.000	57.000	0.000	1	NA	0
Chromium, Total	1.000	1.000	1.000	1.000	0.000	1	1.000	2
Coliform Fecal b	100.000	5900.000	9.000	870.450	1565.520	20	100.000	4
Conductivity Field	186.000	641.000	115.700	266.904	170.576	24	167.350	20
Copper Cu	10.000	10.000	10.000	10.000	0.000	1	10.000	2
DO	10.200	13.700	5.200	9.770	2.524	23	9.650	20
Hardness	75.500	168.000	56.000	97.167	48.251	6	NA	0
Iron Fe	NA	NA	NA	NA	NA	0	310.000	1
Lead Pb	1.000	1.000	1.000	1.000	0.000	1	2.500	2
Mercury Hg	0.300	0.300	0.300	0.300	0.000	1	0.300	2
Nitrate NO3	1.345	3.600	0.420	1.573	0.771	24	1.340	19
Nitrite NO2	0.080	28.000	0.010	1.283	5.693	24	0.030	19
TKN	0.700	10.000	0.200	1.804	2.500	24	0.500	19
pH	7.500	8.000	6.700	7.426	0.408	23	7.200	20
pH Lab	7.150	7.600	6.600	7.095	0.355	22	6.700	8
Phosphorus, Tot	0.100	0.300	0.030	0.121	0.062	24	0.100	19
Residue, Diss.	8.500	29.000	5.000	11.042	7.445	24	8.000	20
Residue, Nonflt	5.000	25.000	3.000	8.125	5.826	24	5.000	20
Residue, Vol.Nonflt	5.000	14.000	1.000	5.125	2.849	24	6.000	20
Temperature	13.700	27.800	0.500	14.471	8.981	21	13.500	20
TOC	5.000	8.000	3.000	5.550	1.432	20	5.000	20

The ten year trend report (ICPRB, 1987) showed significant decreasing trends in Conductivity, pH, Tot. Ortho Phosphorus, and TOC, with increasing trends in Ammonia, Nitrite, Diss. Ortho Phosphorus, Total Phosphate, and TKN. The present analysis also showed increases in Ammonia and TKN. In contrast, increases in Conductivity, and pH are shown now.

Benthic data were not available for this station.

POTOMAC WATER QUALITY STATUS AND TRENDS (1986-87)
Region 4: Potomac Piedmont

River Seneca Creek
Station SEN0008 Agency MDOEP
Location Bethesda, MD, River Rd. Bridge.
River Mile: 135-1

	(1986-1987)						(1984-1985)	
PARAMETER	MED	MAX	MIN	MEAN	S.D.	N	MED	N
Alkalinity	41.000	106.000	29.000	46.333	18.049	18	42.000	11
BOD	2.650	4.100	1.000	2.651	0.905	18	2.000	11
Coliform, Total	NA	NA	NA	NA	NA	0	1215.000	12
Coliform Fecal b	230.000	23000.000	43.000	1757.650	5503.080	17	NA	0
Conductivity Field	230.000	350.000	167.000	250.412	54.360	17	231.000	11
DO	11.400	15.000	6.990	11.125	2.668	17	9.100	11
DO%Sat	NA	NA	NA	NA	NA	0	101.100	11
Nitrate NO3	NA	NA	NA	NA	NA	0	3.690	11
Nitrite NO2	NA	NA	NA	NA	NA	0	0.024	11
NO2 + NO3	3.800	4.900	2.000	3.653	0.819	17	NA	0
TKN	0.500	1.200	0.350	0.595	0.201	17	0.630	11
pH	7.200	8.800	5.900	7.183	0.636	18	7.100	11
pH Lab	NA	NA	NA	NA	NA	0	7.800	11
Phosphorus, Tot	0.160	0.310	0.050	0.183	0.083	17	0.230	11
Residue, Diss.	7.000	18.000	1.000	7.111	4.957	18	NA	0
Residue, Fix.Nonflt	NA	NA	NA	NA	NA	0	4.000	11
Salinity	0.000	0.000	0.000	0.000	0.000	17	NA	0
Temperature	10.950	24.000	0.700	11.728	7.920	18	3.520	11
TOC	3.150	5.500	1.970	3.423	1.057	18	NA	0
Turbidity	11.050	33.000	4.700	12.739	7.558	18	NA	0

The ten year trend report (ICPRB, 1987) showed significant decreasing trends in pH, with increasing trends in Nitrate, pH (Lab), total Phosphorus, and TKN. The present analysis, in contrast, shows decreases in Total Phosphorus, and TKN, and increases in pH.

Benthic data were not available for this station.

POTOMAC WATER QUALITY STATUS AND TRENDS (1986-87)
Region 4: Potomac Piedmont

River Cabin John Creek
Station CJB0005 Agency MDOEP
Location MacArthur Boulevard Bridge, Montgomery County, MD.
River Mile: 119-1

	(1986-1987)						(1984-1985)	
PARAMETER	MED	MAX	MIN	MEAN	S.D.	N	MED	N
Alkalinity	65.000	101.000	44.000	66.750	16.338	12	60.100	10
BOD	2.500	5.700	1.500	2.820	1.197	13	2.600	11
Coliform, Total	NA	NA	NA	NA	NA	0	840.000	12
Coliform Fecal b	230.000	9300.000	15.000	1355.180	2737.590	11	NA	0
Conductivity Field	308.000	751.000	154.000	344.692	144.848	13	272.000	11
DO	12.000	15.300	8.200	11.828	2.943	13	10.300	11
DO%Sat	NA	NA	NA	NA	NA	0	107.800	11
Nitrate NO3	NA	NA	NA	NA	NA	0	0.900	11
Nitrite NO2	NA	NA	NA	NA	NA	0	0.009	11
NO2 + NO3	1.250	1.900	0.360	1.106	0.514	13	NA	0
TKN	0.400	0.950	0.200	0.448	0.233	13	0.550	11
pH	7.600	8.300	6.400	7.500	0.644	13	7.700	11
pH Lab	NA	NA	NA	NA	NA	0	8.100	11
Phosphorus, Tot	0.050	0.120	0.020	0.052	0.027	13	0.040	11
Residue, Diss.	2.000	27.000	1.000	5.333	7.475	12	NA	0
Residue, Fix.Nonflt	NA	NA	NA	NA	NA	0	4.000	11
Salinity	0.000	0.050	0.000	0.004	0.014	13	NA	0
Temperature	7.100	24.600	1.100	11.077	8.590	13	3.410	11
TOC	2.590	7.200	2.010	3.388	1.684	12	NA	0
Turbidity	5.450	107.000	2.600	18.642	30.897	12	NA	0

The ten year trend report (ICPRB, 1987) showed significant decreasing trends in Total Coliform, Total Phosphorus, and Salinity, with increasing trends in DO, Nitrate, and TKN. The present analysis shows increases in DO. In contrast decreases in TKN and increases in Total Phosphorus are shown now.

Benthic data were not available for this station.

Table 7. Potomac Piedmont Subdivision Median Comparison.

Number indicates difference in median values for the 1986-87 monitoring period from the 1984-85 period normalized by the standard deviation. A blank entry indicates that a parameter was not measured for either or both periods. See "Summary Tables" for specific data and "Methods" for further discussion.

	POT1595	POT1596	WQN0503	MON0528	BPC0035	MON0155	MON0020	POT1471	1AG00002.38	SEN0008	CJB0005
Acidity											
Alkalinity	0.8	1.1	-0.9	0.1	0.2	-0.1	0.4	0.7	0.2	-0.1	0.3
Aluminum			*								
Ammonia NH3+NH4			-2.8						0.1		
BOD	0.4	0.4	-1.5				0.5	0.8	0.3	0.7	-0.1
COD									0.7		
Cadmium Cd			*						*		
Chloride			0.6								
Chromium, Total			*						*		
Chromium, Hexavalent											
Coliform, Total											
Coliform Fecal a											
Coliform Fecal b			-0.3						0.0		
Conductivity Field	0.3	0.5		0.3	0.8	0.3	0.3	0.3	0.1	-0.0	0.2
Conductivity At			0.0								
Copper Cu			*						*		
DO	0.9	0.6	0.8	0.5	0.9	0.5	1.1	1.3	0.2	0.9	0.6
DO%Sat											
Flouride											
Hardness			-0.3								
Iron Fe			0.2								
Lead Pb			*						*		
Magnesium Mg			-0.1								
Mercury Hg			*						*		
Nitrate NO3			0.5						0.0		
Nitrite NO2			-1.1						0.0		
NO2 + NO3											
TKN	-0.8	-0.2		0.2	0.3	0.0	-0.9	-0.2	0.1	-0.6	-0.6
pH	0.1	0.7	0.3	0.2	-0.2	0.1	0.2	0.7	0.7	0.2	-0.2
pH Lab			-0.6						1.3		
Phosphate, Tot											
Phosphorus, Diss.Ortho											
Phosphorus, Tot	-1.3	-0.1	-2.5	0.0	0.1	-0.2	-1.2	-2.3	0.0	-0.8	0.4
Phosphorus, Tot.Ortho											
Residue											
Residue, Diss.									0.1		
Residue, Nonflt									0.0		
Residue, Vol.Nonflt									-0.4		
Residue, Fix.Nonflt			0.1								
Salinity											
Sodium Na											
Sulfate			0.3								
Temperature	-0.2	0.9	-0.1	0.6	0.9	0.8	0.8	0.9	0.0	0.9	0.4
TOC									0.0		
Turbidity											

POTOMAC WATER QUALITY STATUS AND TRENDS (1986-87)
Region 5: Potomac Urban Estuary

River Potomac River
Station POT1184 Agency MDOEP
Location Bethesda, MD, Little Falls Dam.
River Mile: 118

	(1986-1987)						(1984-1985)	
PARAMETER	MED	MAX	MIN	MEAN	S.D.	N	MED	N
Alkalinity	79.000	111.000	41.000	77.294	17.197	17	73.100	21
BOD	3.200	6.100	1.000	3.265	1.539	17	2.600	22
Coliform, Total	NA	NA	NA	NA	NA	0	930.000	23
Coliform Fecal b	43.000	4300.000	4.000	661.688	1383.790	16	NA	0
Conductivity Field	293.000	510.000	90.000	300.059	98.262	17	280.000	22
DO	10.750	14.700	7.390	10.745	2.550	16	8.900	22
DO%Sat	NA	NA	NA	NA	NA	0	92.650	22
Hardness	NA	NA	NA	NA	NA	0	119.000	1
Nitrate NO3	NA	NA	NA	NA	NA	0	1.120	22
Nitrite NO2	NA	NA	NA	NA	NA	0	0.014	22
NO2 + NO3	1.400	2.100	0.030	1.262	0.657	17	NA	0
TKN	0.700	1.060	0.250	0.628	0.288	17	0.630	22
pH	7.400	8.900	6.300	7.494	0.655	17	7.450	20
pH Lab	NA	NA	NA	NA	NA	0	7.900	22
Phosphorus, Tot	0.080	0.200	0.030	0.084	0.040	17	0.105	22
Residue, Diss.	8.000	22.000	3.000	8.647	5.656	17	NA	0
Residue, Fix.Nonflt	NA	NA	NA	NA	NA	0	12.500	22
Salinity	0.000	0.000	0.000	0.000	0.000	17	NA	0
Temperature	10.800	28.600	1.900	13.129	9.181	17	6.050	22
TOC	3.780	7.290	1.890	3.742	1.340	17	NA	0
Turbidity	12.400	168.000	5.500	22.400	38.005	17	NA	0

The ten year trend report (ICPRB, 1987) showed significant decreasing trends in pH, Salinity, Temperature and Turbidity, with increasing trends in Nitrate, Nitrite, Total Phosphorus, and TKN. The present analysis shows decreases in pH. In contrast, increases in Temperature and decreases in Total Phosphorus are shown now.

Maryland has monitored macrobenthos at both POT1184 and POT1183, but only at POT1183 in recent years. There were no significant temporal trends in the benthic macroinvertebrate data at either station. In 1986 the condition of the benthic community was rated Fair, with abundances indicative of an enriched habitat. In 1987 the benthic condition was Good-Excellent, as have been most years since 1983. Prior to 1983, benthic community composition was generally in the Fair range, so there does seem to be an indication of improved conditions at this station in recent years.

POTOMAC WATER QUALITY STATUS AND TRENDS (1986-87)
Region 5: Potomac Urban Estuary

River Potomac River
Station PMS01 Agency DCRA
Location Washington, DC, Fletcher's Boat House.
River Mile: 99.5

	(1986-1987)						(1984-1985)	
PARAMETER	MED	MAX	MIN	MEAN	S.D.	N	MED	N
Alkalinity	75.000	112.000	58.000	79.200	16.876	20	67.000	10
BOD	1.100	4.400	1.000	1.672	1.053	18	1.850	10
Cadmium Cd	5.000	5.000	2.000	4.250	1.500	4	5.000	4
Chromium, Total	10.000	20.000	5.000	11.250	6.292	4	10.000	4
Coliform, Total	620.000	35000.000	32.000	3845.730	10368.500	11	7950.000	14
Coliform Fecal a	40.000	4900.000	20.000	492.909	1462.300	11	455.000	16
Conductivity Field	287.500	525.000	199.000	331.817	107.256	82	257.000	18
Copper Cu	10.000	10.000	10.000	10.000	0.000	2	10.000	4
DO	8.500	16.300	6.300	9.229	2.370	56	10.600	12
Hardness	121.000	186.000	86.000	126.300	27.317	20	104.000	11
Iron Fe	251.500	421.000	168.000	273.000	111.753	4	329.000	4
Lead Pb	50.000	50.000	5.000	38.750	22.500	4	50.000	4
Mercury Hg	0.200	0.200	0.200	0.200	0.000	4	0.200	4
Nitrate NO3	1.340	1.740	0.323	1.221	0.430	12	NA	0
Nitrite NO2	0.010	0.045	0.010	0.014	0.010	12	NA	0
TKN	0.390	2.330	0.200	0.618	0.576	16	0.613	11
pH	7.550	8.800	6.400	7.565	0.557	82	7.700	13
Phosphorus, Tot	0.059	0.466	0.028	0.083	0.104	16	0.114	11
Residue, Diss.	9.500	20.000	4.000	10.250	5.523	8	25.500	10
Temperature	24.400	29.100	2.300	20.706	7.798	82	13.100	20
TOC	4.100	11.600	1.900	4.882	2.689	17	3.450	8
Turbidity	11.000	66.000	5.000	18.636	17.620	11	NA	0

The ten year trend report (ICPRB, 1987) showed significant decreasing trends in Ammonia, Fecal Coliform, Diss. Phosphorus, and TKN. The present analysis, in contrast, shows increases in Fecal Coliform, and TKN.

In the 1987 survey, the benthic condition at this station was rated Poor and Fair in separate samples.

POTOMAC WATER QUALITY STATUS AND TRENDS (1986-87)
Region 5: Potomac Urban Estuary

River Rock Creek
Station RCM0111 Agency MDOEP
Location Bethesda, MD, Rt. 410 Bridge.
River Mile: 101-11

	(1986-1987)						(1984-1985)	
PARAMETER	MED	MAX	MIN	MEAN	S.D.	N	MED	N
Alkalinity	50.000	90.000	40.000	57.438	15.253	16	51.400	12
BOD	2.580	6.300	1.000	3.091	1.537	16	3.350	12
Coliform, Total	NA	NA	NA	NA	NA	0	3300.000	12
Coliform Fecal b	750.000	23000.000	150.000	4585.330	7767.560	15	NA	0
Conductivity Field	305.000	636.000	162.000	314.313	125.419	16	257.500	12
DO	10.450	13.700	5.790	10.053	2.677	16	9.150	12
DO%Sat	NA	NA	NA	NA	NA	0	94.650	12
Nitrate NO3	NA	NA	NA	NA	NA	0	0.675	12
Nitrite NO2	NA	NA	NA	NA	NA	0	0.024	12
NO2 + NO3	1.075	2.000	0.360	1.044	0.500	16	NA	0
TKN	0.750	1.600	0.400	0.752	0.296	15	0.640	12
pH	7.200	8.300	6.100	7.200	0.507	16	7.150	12
pH Lab	NA	NA	NA	NA	NA	0	7.500	12
Phosphorus, Tot	0.080	0.180	0.040	0.087	0.038	15	0.070	12
Residue, Diss.	7.500	78.000	2.000	13.375	18.341	16	NA	0
Residue, Fix.Nonflt	NA	NA	NA	NA	NA	0	5.500	12
Salinity	0.000	0.000	0.000	0.000	0.000	16	NA	0
Temperature	12.200	24.200	2.800	12.656	7.823	16	4.770	12
TOC	4.420	8.850	2.750	4.709	1.737	16	NA	0
Turbidity	13.400	47.000	5.500	21.337	14.156	16	NA	0

The ten year trend report (ICPRB, 1987) showed significant decreasing trend in Salinity, with increasing trends in Nitrate, Nitrite, and TKN. The present analysis also showed increases in TKN.

Benthic data were not available for this station.

POTOMAC WATER QUALITY STATUS AND TRENDS (1986-87)
Region 5: Potomac Urban Estuary

River Potomac River
Station PMS29 Agency DCRA
Location Washington, D.C., Haines Point
River Mile: 92.5

	(1986-1987)						(1984-1985)	
PARAMETER	MED	MAX	MIN	MEAN	S.D.	N	MED	N
Alkalinity	76.000	98.000	40.000	74.686	13.141	35	70.000	10
BOD	1.700	3.800	1.000	1.958	0.808	19	1.100	11
Cadmium Cd	5.000	5.000	2.000	4.400	1.342	5	5.000	5
Chromium, Total	10.000	20.000	5.000	11.000	5.477	5	10.000	5
Coliform, Total	490.000	2300.000	20.000	795.455	751.497	11	3850.000	12
Coliform Fecal a	80.000	790.000	20.000	225.455	244.023	11	80.000	13
Conductivity Field	309.500	523.000	148.000	320.460	105.935	150	262.000	33
Copper Cu	10.000	10.000	10.000	10.000	0.000	3	10.000	5
DO	8.900	14.700	5.700	9.443	2.252	89	8.650	12
Hardness	128.000	180.000	70.000	127.257	26.046	35	106.000	12
Iron Fe	190.000	295.000	144.000	211.800	73.377	5	372.000	5
Lead Pb	50.000	50.000	5.000	41.000	20.125	5	50.000	5
Mercury Hg	0.200	0.300	0.200	0.220	0.045	5	0.200	5
Nitrate NO3	1.405	2.160	0.040	1.283	0.469	20	NA	0
Nitrite NO2	0.021	0.160	0.010	0.044	0.049	20	NA	0
TKN	0.668	2.470	0.200	0.741	0.548	25	0.449	13
pH	7.500	8.900	7.000	7.650	0.485	146	7.500	32
Phosphorus, Tot	0.053	0.395	0.024	0.073	0.074	24	0.078	13
Residue, Diss.	12.000	19.000	4.000	11.571	4.815	14	8.000	12
Temperature	23.600	29.600	0.800	20.731	7.851	150	19.000	53
TOC	2.700	7.200	1.400	3.476	1.645	17	3.100	8
Turbidity	13.500	522.000	4.000	46.500	115.038	20	NA	0

The ten year trend report (ICPRB, 1987) showed significant decreasing trends in Ammonia, Fecal Coliform, Diss. Phosphorus and TKN, with an increasing trend in Nitrate. The present analysis shows, in contrast, increases in Fecal Coliform and TKN.

In the 1987 survey, the condition of the benthic macroinvertebrate community was rated Poor at this station.

POTOMAC WATER QUALITY STATUS AND TRENDS (1986-87)
Region 5: Potomac Urban Estuary

River Anacostia River
Station ANA0082 Agency MDOEP
Location Blandensburg, MD, US Rt. 50 Bridge.
River Mile: 95-8

	(1986-1987)						(1984-1985)	
PARAMETER	MED	MAX	MIN	MEAN	S.D.	N	MED	N
Alkalinity	47.000	70.000	31.000	46.941	11.054	17	45.100	22
BOD	2.700	5.890	0.700	3.170	1.674	17	3.350	22
Coliform, Total	NA	NA	NA	NA	NA	0	4300.000	23
Coliform Fecal b	2300.000	43000.000	23.000	5400.180	10224.500	17	NA	0
Conductivity Field	291.500	718.000	187.000	315.000	116.560	18	246.000	23
DO	10.900	14.400	4.990	10.529	2.750	18	9.700	23
DO%Sat	NA	NA	NA	NA	NA	0	94.600	23
Hardness	NA	NA	NA	NA	NA	0	67.000	1
Nitrate NO3	NA	NA	NA	NA	NA	0	0.890	23
Nitrite NO2	NA	NA	NA	NA	NA	0	0.021	23
NO2 + NO3	1.200	5.900	0.110	1.363	1.329	15	NA	0
TKN	0.650	1.500	0.380	0.750	0.329	17	0.800	23
pH	7.050	8.200	6.100	7.094	0.507	18	7.100	21
pH Lab	NA	NA	NA	NA	NA	0	7.600	22
Phosphorus, Tot	0.080	0.170	0.040	0.094	0.046	17	0.090	23
Residue, Diss.	8.000	42.000	1.000	13.235	11.372	17	NA	0
Residue, Fix.Nonflt	NA	NA	NA	NA	NA	0	12.000	23
Salinity	0.000	0.030	0.000	0.002	0.007	18	NA	0
Temperature	12.700	28.300	2.000	13.461	9.037	18	13.700	23
TOC	4.780	9.610	2.270	5.046	2.125	17	NA	0
Turbidity	15.000	127.000	7.200	27.371	28.787	17	NA	0

The ten year trend report (ICPRB, 1987) showed significant decreasing trends in pH, Residue, salinity, and Turbidity, with increasing trends in pH, and TKN. The present analysis shows decreases in pH.

Benthic data were not available.

POTOMAC WATER QUALITY STATUS AND TRENDS (1986-87)
Region 5: Potomac Urban Estuary

River Anacostia River
Station ANA21 Agency DCRA
Location Washington, D.C., S. Capital Street.
River Mile: 92.5-1.75

	(1986-1987)						(1984-1985)	
PARAMETER	MED	MAX	MIN	MEAN	S.D.	N	MED	N
Alkalinity	68.000	114.000	38.000	69.306	17.133	36	60.000	25
BOD	2.400	7.600	1.100	2.781	1.560	21	2.500	18
Cadmium Cd	5.000	5.000	2.000	4.400	1.342	5	5.000	5
Chromium, Total	10.000	10.000	5.000	9.000	2.236	5	10.000	5
Coliform Fecal a	790.000	3300.000	50.000	1487.780	1441.840	9	595.000	14
Conductivity Field	301.000	524.000	168.000	315.853	75.907	177	292.000	105
Copper Cu	10.000	10.000	10.000	10.000	0.000	3	10.000	5
DO	5.800	12.700	1.100	5.992	2.427	97	5.050	27
Hardness	77.000	170.000	4.000	70.972	53.394	36	92.000	26
Iron Fe	260.000	1800.000	194.000	607.000	679.298	5	740.000	5
Lead Pb	50.000	50.000	5.000	41.000	20.125	5	50.000	5
Mercury Hg	0.200	0.200	0.200	0.200	0.000	5	0.200	5
Nitrate NO3	0.901	1.320	0.107	0.837	0.319	20	NA	0
Nitrite NO2	0.052	0.460	0.019	0.076	0.097	20	NA	0
TKN	0.878	1.390	NA	0.900	0.347	26	0.988	25
pH	7.000	7.900	6.200	6.993	0.366	178	7.100	85
Phosphorus, Tot	0.073	0.740	NA	0.100	0.134	26	0.088	25
Residue, Diss.	11.000	35.000	5.000	13.188	7.268	16	10.000	23
Temperature	23.600	29.900	1.900	20.899	7.185	177	25.600	125
TOC	4.800	7.100	2.000	4.665	1.464	17	5.100	15
Turbidity	22.000	234.000	10.000	38.526	50.366	19	NA	0

The ten year trend report (ICPRB, 1987) showed significant decreasing trends in Ammonia, Fecal and Total Coliform, Do, pH, Diss Phosphorus, Residue, Temperature, and TKN. The present analysis shows decreases in Temperature and TKN but increases in pH.

The condition of the benthic macroinvertebrate community was rated Poor at this station in 1987.

POTOMAC WATER QUALITY STATUS AND TRENDS (1986-87)
Region 5: Potomac Urban Estuary

River Four Mile Run
Station 1AFOU000.19 Agency VASWCB
Location Arlington, VA, GW Parkway Bridge.
River Mile: 93-(.2)

	(1986-1987)						(1984-1985)	
PARAMETER	MED	MAX	MIN	MEAN	S.D.	N	MED	N
Alkalinity	93.000	136.000	28.000	87.667	30.805	18	74.500	20
Ammonia NH3+NH4	4.800	10.500	0.100	4.397	2.926	18	4.600	19
BOD	8.500	17.000	3.000	9.611	4.258	18	3.000	20
COD	18.000	24.000	10.000	18.056	4.304	18	15.500	20
Cadmium Cd	4.000	4.000	4.000	4.000	0.000	1	NA	0
Chloride	64.000	114.000	9.800	61.378	30.687	18	62.500	20
Chromium, Total	1.000	1.000	1.000	1.000	0.000	1	NA	0
Coliform Fecal b	100.000	8000.000	100.000	1412.500	2436.360	16	100.000	5
Conductivity Field	512.000	653.000	146.700	486.928	134.587	18	436.000	20
Copper Cu	10.000	10.000	10.000	10.000	0.000	1	NA	0
DO	8.000	11.700	5.700	8.324	1.647	17	8.300	18
Hardness	146.000	176.000	140.000	155.000	16.309	5	NA	0
Lead Pb	2.000	2.000	2.000	2.000	0.000	1	NA	0
Mercury Hg	0.300	0.300	0.300	0.300	0.000	1	NA	0
Nitrate NO3	1.560	8.900	0.690	2.084	1.857	18	1.185	20
Nitrite NO2	0.150	0.340	0.060	0.166	0.083	18	0.180	20
TKN	6.500	12.000	1.700	6.278	3.348	18	5.100	19
pH	7.300	8.230	6.300	7.324	0.470	19	7.100	20
pH Lab	7.550	7.900	6.700	7.428	0.351	18	7.300	20
Phosphorus, Tot	0.200	0.500	0.100	0.183	0.110	18	0.205	20
Residue, Diss.	14.000	39.000	5.000	16.167	8.726	18	12.000	20
Residue, Nonflt	10.500	29.000	3.000	11.500	7.778	18	6.000	20
Residue, Vol.Nonflt	5.000	10.000	2.000	5.222	2.157	18	5.500	20
Temperature	20.000	30.500	5.000	19.195	7.437	19	17.000	20
TOC	6.000	9.000	5.000	6.667	1.291	15	7.000	20

The ten year trend report (ICPRB, 1987) showed significant decreasing trends in Ammonia, BOD, COD, Conductivity, Diss. Ortho Phosphorus, Total Phosphate, Tot. Ortho Phosphorus, Fix. Nonflt. Residue, Nonflt. Residue, Vol. Nonflt. Residue, TKN and TOC, with increasing trends in Nitrite and DO. The present analysis shows decreases in Vol. Nonflt Residue and TOC. However, increases in Ammonia, BOD, COD, Conductivity, Nonfilt. Residue, and TKN are shown now.

Benthic data were not available for this station.

POTOMAC WATER QUALITY STATUS AND TRENDS (1986-87)
Region 5: Potomac Urban Estuary

River Potomac River
Station PMS44 Agency DCRA
Location Washington, D.C. at Woodrow Wilson Bridge.
River Mile: 88.75

	(1986-1987)						(1984-1985)	
PARAMETER	MED	MAX	MIN	MEAN	S.D.	N	MED	N
Alkalinity	70.000	94.000	40.000	70.381	13.426	21	68.000	12
BOD	1.800	3.300	1.000	1.826	0.808	19	1.300	11
Cadmium Cd	5.000	5.000	2.000	4.400	1.342	5	5.000	5
Chromium, Total	10.000	20.000	5.000	11.000	5.477	5	10.000	5
Coliform, Total	330.000	7900.000	20.000	1173.640	2277.430	11	3300.000	14
Coliform Fecal a	110.000	230.000	20.000	105.455	81.408	11	170.000	16
Conductivity Field	317.000	547.000	159.000	330.541	114.967	109	266.000	31
Copper Cu	10.000	10.000	10.000	10.000	0.000	3	10.000	5
DO	8.650	13.100	5.400	8.813	2.379	72	9.650	12
Hardness	126.000	172.000	78.000	125.714	25.544	21	108.000	12
Iron Fe	221.000	500.000	186.000	307.400	145.732	5	487.000	5
Lead Pb	50.000	50.000	5.000	41.000	20.125	5	50.000	5
Mercury Hg	0.200	0.200	0.200	0.200	0.000	5	0.200	5
Nitrate NO3	1.770	3.030	1.080	1.889	0.651	12	NA	0
Nitrite NO2	0.018	0.223	0.010	0.054	0.069	12	NA	0
TKN	0.601	1.170	0.320	0.696	0.276	16	0.458	12
pH	7.200	8.600	6.700	7.342	0.403	106	7.700	33
Phosphorus, Tot	0.054	0.175	0.033	0.063	0.036	16	0.080	12
Residue, Diss.	10.500	22.000	4.000	11.500	7.521	8	11.000	11
Temperature	24.800	29.400	1.900	20.452	8.383	110	19.900	53
TOC	3.800	5.900	1.100	3.629	1.454	17	2.600	8
Turbidity	19.000	174.000	10.000	34.750	48.280	12	NA	0

The ten year trend report (ICPRB, 1987) showed significant decreasing trends in Ammonia, BOD, Fecal Coliform, Nitrite, Diss Phosphorus, TKN, and Turbidity with an increasing trend in Nitrate. The present analysis shows decreases in Fecal Coliform but increases in BOD and TKN.

A benthic sample was taken in the Hydrilla beds near this station in the 1987 survey. The condition of the benthic macroinvertebrate was rated Fair.

POTOMAC WATER QUALITY STATUS AND TRENDS (1986-87)
Region 5: Potomac Urban Estuary

River Hunting Creek
Station 1AHUT000.01 Agency VASWCB
Location Alexandria, VA, George Washington Parkway.
River Mile: 90-(.01)

	(1986-1987)						(1984-1985)	
PARAMETER	MED	MAX	MIN	MEAN	S.D.	N	MED	N
Alkalinity	57.000	84.000	22.000	55.105	16.835	19	33.000	20
Ammonia NH3+NH4	9.000	15.000	0.100	7.222	5.206	19	8.250	20
BOD	11.000	19.000	2.000	10.053	4.576	19	6.500	20
COD	27.000	52.000	11.000	26.421	10.035	19	26.500	20
Cadmium Cd	1.000	1.000	1.000	1.000	0.000	1	NA	0
Chloride	91.300	126.000	5.920	81.433	34.540	19	81.500	20
Chromium, Total	1.000	1.000	1.000	1.000	0.000	1	NA	0
Coliform Fecal b	100.000	8000.000	100.000	868.750	2065.500	16	100.000	6
Conductivity Field	519.000	651.000	163.700	487.774	139.208	19	447.000	20
Copper Cu	10.000	10.000	10.000	10.000	0.000	1	NA	0
DO	9.300	36.500	3.500	9.668	7.005	19	7.800	17
Hardness	94.000	116.000	64.000	94.000	19.677	6	NA	0
Lead Pb	2.000	2.000	2.000	2.000	0.000	1	NA	0
Mercury Hg	0.300	0.300	0.300	0.300	0.000	1	NA	0
Nitrate NO3	0.440	2.060	0.040	0.553	0.527	19	0.260	20
Nitrite NO2	0.030	1.200	0.010	0.096	0.268	19	0.025	20
TKN	12.000	22.500	0.900	10.926	6.657	19	9.300	20
pH	6.800	7.600	6.100	6.762	0.361	19	6.300	19
pH Lab	7.000	7.600	6.600	6.984	0.283	19	6.600	20
Phosphorus, Tot	0.100	0.200	0.030	0.086	0.040	19	0.100	20
Residue, Diss.	10.000	48.000	5.000	16.737	14.491	19	20.500	20
Residue, Nonflt	7.000	40.000	3.000	13.053	11.702	19	13.000	20
Residue, Vol.Nonflt	5.000	12.000	2.000	5.158	2.363	19	7.000	20
Temperature	20.000	29.400	3.000	19.205	7.826	19	15.000	19
TOC	9.000	11.000	5.000	8.625	1.962	16	10.000	20

The ten year tren report (ICPRB, 1987) showed significant decreasing trends for BOD, Nitrite, pH, Total Phosphorus, Ortho Phosphorus, Total Phosphate, Fix. Nonflt. Residue, Nonfilt. Residue, Vol. Nonflt. Residue, and TOC, with increasing trends in Fecal Coliform, and DO. The present analysis shows decreases in NONflt. Residue, Vol. Nonfilt Residue, TOC, but increases in BOD and pH. Increases in DO were continuing.

Benthic data were not available for this station.

POTOMAC WATER QUALITY STATUS AND TRENDS (1986-87)
Region 5: Potomac Urban Estuary

River Piscataway Creek
Station PIS0033 Agency MDOEP
Location Fort Washington, MD, Rt. 210 Bridge
River Mile: 85-2

	(1986-1987)						(1984-1985)	
PARAMETER	MED	MAX	MIN	MEAN	S.D.	N	MED	N
Alkalinity	21.000	67.000	12.000	28.000	14.444	26	25.900	17
BOD	2.650	7.830	0.290	3.120	1.989	26	2.200	17
Coliform, Total	NA	NA	NA	NA	NA	0	0.000	20
Coliform Fecal b	430.000	4300.000	23.000	758.688	1052.080	16	NA	0
Conductivity Field	191.500	288.000	153.000	200.308	35.292	26	189.000	17
DO	9.490	14.700	5.300	9.936	2.667	25	8.900	17
DO%Sat	NA	NA	NA	NA	NA	0	91.300	17
Nitrate NO3	NA	NA	NA	NA	NA	0	0.530	16
Nitrite NO2	NA	NA	NA	NA	NA	0	0.011	16
NO2 + NO3	0.580	1.300	0.110	0.613	0.389	26	NA	0
TKN	0.690	1.450	0.350	0.700	0.276	26	0.800	17
pH	7.000	7.600	5.600	6.912	0.511	26	7.000	17
pH Lab	NA	NA	NA	NA	NA	0	7.300	17
Phosphorus, Tot	0.090	0.370	0.050	0.120	0.080	26	0.120	17
Residue, Diss.	6.500	31.000	1.000	7.723	6.832	26	NA	0
Residue, Fix.Nonflt	NA	NA	NA	NA	NA	0	7.000	17
Salinity	0.000	0.000	0.000	0.000	0.000	26	NA	0
Temperature	15.550	29.100	2.600	14.815	8.436	26	5.990	17
TOC	4.880	8.690	2.680	4.970	1.516	26	NA	0
Turbidity	11.100	57.000	4.900	13.865	10.109	26	NA	0

The ten year trend report (ICPRB, 1987) showed significant decreasing trends in Total Coliform, Nitrite, and Residue, however the present data were not comparable.

Benthic data were not available for this station.

POTOMAC WATER QUALITY STATUS AND TRENDS (1986-87)
Region 5: Potomac Urban Estuary

River Little Hunting Creek
Station 1ALIF000.19 Agency VASWCB
Location Fairfax, VA, GW Parkway Bridge.
River Mile: 83-.2

	(1986-1987)						(1984-1985)	
PARAMETER	MED	MAX	MIN	MEAN	S.D.	N	MED	N
Alkalinity	58.000	89.000	6.800	56.367	17.763	24	50.500	20
Ammonia NH3+NH4	1.000	8.250	0.100	1.904	2.397	24	1.950	20
BOD	3.500	12.000	1.000	4.750	3.040	24	3.000	20
COD	14.000	25.000	6.000	14.417	5.073	24	15.000	20
Cadmium Cd	8.000	8.000	8.000	8.000	0.000	1	NA	0
Chloride	46.000	125.000	6.240	45.239	28.955	24	35.500	20
Chromium, Total	1.000	1.000	1.000	1.000	0.000	1	NA	0
Coliform Fecal b	100.000	4600.000	100.000	355.909	964.813	22	100.000	5
Conductivity Field	352.500	656.000	159.400	360.308	109.671	24	300.500	20
Copper Cu	10.000	10.000	10.000	10.000	0.000	1	NA	0
DO	9.100	12.600	2.800	8.179	3.084	24	8.050	18
Hardness	115.000	144.000	93.000	113.500	18.950	6	NA	0
Lead Pb	4.000	4.000	4.000	4.000	0.000	1	NA	0
Mercury Hg	0.300	0.300	0.300	0.300	0.000	1	NA	0
Nitrate NO3	1.535	2.560	0.450	1.559	0.530	24	1.305	20
Nitrite NO2	0.045	0.340	0.020	0.096	0.103	24	0.055	20
TKN	1.600	11.000	0.500	2.846	2.894	24	2.700	20
pH	6.850	8.290	6.100	7.002	0.540	26	6.750	20
pH Lab	7.100	7.700	6.600	7.088	0.272	24	6.900	20
Phosphorus, Tot	0.100	0.200	0.030	0.122	0.055	24	0.100	20
Residue, Diss.	16.500	98.000	5.000	20.792	21.191	24	20.000	20
Residue, Nonflt	13.000	88.000	5.000	17.667	19.135	24	14.500	20
Residue, Vol.Nonflt	5.000	10.000	1.000	4.583	2.083	24	5.500	20
Temperature	16.000	30.200	0.500	15.011	10.065	26	16.500	20
TOC	6.000	12.000	4.000	6.571	1.568	21	7.000	20

The ten year trend report (ICPRB, 1987) ashowed significant decreasing trends in BOD, pH, Nonflt. Residue, and TOC, with increasing trends in Ammonia, Chloride, Fecal Coliform, Total Phosphate, and TKN. The present analysis also shows increases in Chloride and decreases in Nonflt. Residue, but in contrast, it shows increases in BOD and pH and decreases in Ammonia and TKN.

Benthic data were not available for this station.

POTOMAC WATER QUALITY STATUS AND TRENDS (1986-87)
Region 5: Potomac Urban Estuary

River Potomac River
Station XFB1433 Agency MDOEP
Location Marshall Hall, MD, Buoy 67.
River Mile: 82

	(1986-1987)						(1984-1985)	
PARAMETER	MED	MAX	MIN	MEAN	S.D.	N	MED	N
Alkalinity	69.000	98.000	49.000	70.519	11.479	81	60.200	51
BOD	2.100	6.100	0.500	2.369	1.438	79	1.950	48
Coliform, Total	NA	NA	NA	NA	NA	0	0.000	54
Coliform Fecal b	23.000	930.000	3.000	144.313	254.127	16	NA	0
Conductivity Field	302.000	2500.000	177.000	414.679	323.648	81	301.000	51
DO	7.600	14.000	5.000	8.796	2.663	81	7.800	51
DO%Sat	NA	NA	NA	NA	NA	0	86.400	51
Nitrate NO3	NA	NA	NA	NA	NA	0	1.665	50
Nitrite NO2	NA	NA	NA	NA	NA	0	0.047	48
NO2 + NO3	1.800	3.900	1.200	1.917	0.593	81	NA	0
TKN	0.850	1.700	0.550	0.863	0.221	80	0.765	50
pH	7.500	8.000	6.700	7.433	0.357	81	7.400	48
pH Lab	NA	NA	NA	NA	NA	0	7.700	51
Phosphorus, Tot	0.100	0.320	0.020	0.117	0.055	81	0.120	51
Residue, Diss.	27.000	133.000	1.000	32.648	22.507	81	NA	0
Residue, Fix.Nonflt	NA	NA	NA	NA	NA	0	21.000	51
Salinity	0.000	1.010	0.000	0.026	0.126	81	NA	0
Temperature	16.200	29.700	1.900	16.389	8.940	81	22.800	51
TOC	3.700	5.500	1.880	3.848	0.958	81	NA	0
Turbidity	35.000	135.000	11.000	43.890	28.480	81	NA	0

The ten year trend report (ICPRB, 1987) showed significant decreasing trends in pH and Total Phosphorus. The present analysis shows a decrease in Total Phosphorus but increases in pH.

Benthic data were not available for this station.

POTOMAC WATER QUALITY STATUS AND TRENDS (1986-87)
Region 5: Potomac Urban Estuary

River Pohick Creek
Station 1APOH007.65 Agency VASWCB
Location Ft. Belvoir, VA, Below Rt. 641
River Mile: 80-8

	(1986-1987)						(1984-1985)	
PARAMETER	MED	MAX	MIN	MEAN	S.D.	N	MED	N
Alkalinity	37.000	47.000	9.600	33.964	10.360	11	NA	0
Ammonia NH3+NH4	0.100	1.000	0.100	0.207	0.243	14	0.100	15
BOD	1.000	10.000	1.000	2.571	2.848	14	2.000	17
COD	11.500	25.000	2.000	12.714	7.043	14	13.000	17
Cadmium Cd	5.000	5.000	5.000	5.000	0.000	1	1.000	2
Chromium, Total	1.000	1.000	1.000	1.000	0.000	1	1.000	2
Coliform Fecal b	250.000	8000.000	100.000	1033.330	2230.910	12	100.000	16
Conductivity Field	156.550	306.000	94.100	168.329	54.646	14	113.000	17
Copper Cu	10.000	10.000	10.000	10.000	0.000	1	10.000	2
DO	9.850	13.500	7.800	10.021	1.659	14	10.000	16
Lead Pb	NA	NA	NA	NA	NA	0	2.000	2
Mercury Hg	0.300	0.300	0.300	0.300	0.000	1	0.300	2
Nitrate NO3	0.215	0.850	0.090	0.296	0.222	14	0.230	16
Nitrite NO2	0.010	0.050	0.010	0.019	0.015	14	0.010	16
TKN	0.350	2.200	0.100	0.607	0.580	14	0.400	15
pH	6.700	8.000	6.200	6.964	0.630	11	7.025	16
pH Lab	7.000	7.800	6.300	6.982	0.451	11	NA	0
Phosphorus, Tot	0.100	0.400	0.100	0.136	0.084	14	0.100	15
Residue, Diss.	9.000	268.000	5.000	50.538	77.527	13	10.000	17
Residue, Nonflt	5.000	238.000	NA	42.538	69.592	13	6.000	17
Residue, Vol.Nonflt	9.000	30.000	2.000	9.538	7.523	13	6.000	17
Temperature	16.250	27.000	3.000	15.693	7.826	14	14.000	17
TOC	5.500	9.000	3.000	5.643	1.598	14	6.000	17

The ten year trend report (ICPRB, 1987) showed significant decreasing trend in Total Ortho Phosphorus, with incareasing trends in Ammonia, Fecal Coliform, Nitrite, Total Phosphate, Fix. Nonflt. Residue, Nonflt. Residue, Vol.Nonflt. Residue, and TKN. The present analysis shows increases in Fecal Coliform and Vol. Nonflt. Residue, but decreases in Nonfilt. Residue. and TKN.

One station is monitored by Virginia above the Lower Potomac STP to gauge the impacts of urbanization. The condition of the macroinvertebrate community was rated Poor in 1986 through 1988.

Table 8. Potomac Urban Estuary Subdivision Median Comparison.

Number indicates difference in median values for the 1986-87 monitoring period from the 1984-85 period normalized by the standard deviation. A blank entry indicates that a parameter was not measured for either or both periods. See "Summary Tables" for specific data and "Methods" for further discussion.

	POT1184		PMS01		RCM0111		PMS29		ANA0082		ANA21		1AFOU000.19		PMS44		1AHUT000.01		PIS0033		1ALIF000.19		XFB1433		1APOH007.65
Acidity																									
Alkalinity	0.3		0.5		-0.1		0.5		0.2		0.5		0.6		0.1		1.4		-0.3		0.4		0.8		
Aluminum																									
Ammonia NH3+NH4													0.1				0.1				-0.4				0.0
BOD	0.4		-0.7		-0.5		0.7		-0.4		-0.1		1.3		0.6		1.0		0.2		0.2		0.1		-0.4
COD													0.6				0.0				-0.2				-0.2
Cadmium Cd			0.0				0.0				0.0				0.0										*
Chloride													0.0				0.3				0.4				
Chromium, Total			0.0				0.0				0.0				0.0										*
Chromium, Hexavalent																									
Coliform, Total			-0.7				-4.5								-1.3										
Coliform Fecal a			-0.3				0.0				0.1				-0.7										
Coliform Fecal b													0.0				0.0				0.0				0.1
Conductivity Field	0.1		0.3		0.4		0.4		0.4		0.1		0.6		0.4		0.5		0.1		0.5		0.0		0.8
Conductivity At																									
Copper Cu			*				*				*				*										*
DO	0.7		-0.9		0.5		0.1		0.4		0.3		-0.2		-0.4		0.2		0.2		0.3		-0.1		-0.1
DO%Sat																									
Flouride																									
Hardness			0.6				0.8				-0.3				0.7										
Iron Fe			-0.7				-2.5				-0.7				-1.8										
Lead Pb			0.0				0.0				0.0				0.0										
Magnesium Mg																									
Mercury Hg			0.0				0.0				0.0				0.0										*
Nitrate NO3													0.2				0.3				0.4				-0.1
Nitrite NO2													-0.4				0.0				-0.1				0.0
NO2 + NO3																									
TKN	0.2		-0.4		0.4		0.4		-0.5		-0.3		0.4		0.5		0.4		-0.4		-0.4		0.4		-0.1
pH	-0.1		-0.3		0.1		0.0		-0.1		-0.3		0.4		-1.2		1.4		0.0		0.2		0.3		-0.5
pH Lab													0.7				1.4				0.7				
Phosphate, Tot																									
Phosphorus, Diss.Ortho																									
Phosphorus, Tot	-0.6		-0.5		0.3		-0.3		-0.2		-0.1		-0.0		-0.7		0.0		-0.4		0.0		-0.4		0.0
Phosphorus, Tot.Ortho																									
Residue																									
Residue, Diss.			-2.9				0.8				0.1		0.2		-0.1		-0.7				-0.2				-0.0
Residue, Nonflt													0.6				-0.5				-0.1				-0.0
Residue, Vol.Nonflt													-0.2				-0.8				-0.2				0.4
Residue, Fix.Nonflt																									
Salinity																									
Sodium Na																									
Sulfate																									
Temperature	0.5		1.4		0.9		0.6		-0.1		-0.3		0.4		0.6		0.6		1.1		-0.0		-0.7		0.3
TOC			0.2				-0.2				-0.2		-0.8		0.8		-0.5				-0.6				-0.3
Turbidity																									

POTOMAC WATER QUALITY STATUS AND TRENDS (1986-87)
Region 6: Lower Potomac Estuary

River Potomac River
Station XEA6596 Agency MDOEP
Location Indian Head, MD, Buoy N54.
River Mile: 75

	(1986-1987)						(1984-1985)	
PARAMETER	MED	MAX	MIN	MEAN	S.D.	N	MED	N
Alkalinity	67.000	91.000	40.000	69.619	10.973	84	60.000	105
BOD	2.450	6.600	0.500	2.615	1.557	82	2.800	92
Coliform, Total	NA	NA	NA	NA	NA	0	0.000	160
Coliform_Fecal b	23.000	1500.000	3.000	135.118	359.339	17	NA	0
Conductivity Field	295.000	6760.000	172.000	846.378	1154.230	111	303.000	181
DO	8.900	15.100	5.200	9.014	2.654	111	8.500	183
DO%Sat	NA	NA	NA	NA	NA	0	92.100	154
Nitrate NO3	NA	NA	NA	NA	NA	0	1.300	103
Nitrite NO2	NA	NA	NA	NA	NA	0	0.041	102
NO2 + NO3	1.600	2.600	0.680	1.578	0.490	84	NA	0
TKN	0.800	1.430	0.100	0.820	0.207	84	0.900	105
pH	7.600	8.000	6.900	7.541	0.306	111	7.800	181
pH Lab	NA	NA	NA	NA	NA	0	8.000	92
Phosphorus, Tot	0.110	0.500	0.050	0.131	0.068	84	0.130	104
Residue, Diss.	28.500	138.000	7.000	35.316	24.275	84	NA	0
Residue, Fix.Nonflt	NA	NA	NA	NA	NA	0	26.000	105
Salinity	0.000	3.450	0.000	0.246	0.576	111	0.000	27
Temperature	16.200	29.500	1.500	15.790	9.008	111	22.900	185
TOC	3.700	5.930	2.050	3.934	0.897	84	NA	0
Turbidity	41.900	202.000	16.000	51.333	35.579	84	NA	0

The ten year trend report (ICPRB, 1987) showed significant decreasing trends in TOtal Coliform, Conductivity, and Salinity, with increasing trends in DO, DO%Sat, Nitrate, and Dissolved Residue. The present analysis shows Conductivity decreases and DO increases.

Benthic data were not available for this station.

River Occoquan Creek
Station 1AOCC006.71 Agency VASWCB
Location Woodbridge, VA, Rt. 123 Bridge.
River Mile: 83-4

	(1986-1987)						(1984-1985)	
PARAMETER	MED	MAX	MIN	MEAN	S.D.	N	MED	N
Alkalinity	36.500	63.000	23.000	37.667	12.220	12	37.000	17
Ammonia NH3+NH4	0.100	0.300	0.100	0.142	0.067	12	0.100	16
BOD	3.000	4.000	1.000	2.750	1.055	12	2.000	17
COD	17.500	31.000	10.000	18.333	5.297	12	17.000	17
Cadmium Cd	NA	NA	NA	NA	NA	0	2.000	2
Chloride	15.500	300.000	5.960	47.526	90.328	10	12.000	17
Chromium, Total	NA	NA	NA	NA	NA	0	1.500	2
Coliform Fecal b	100.000	6000.000	100.000	672.727	1769.230	11	100.000	4
Conductivity Field	173.900	1228.000	105.100	273.775	311.843	12	128.000	17
Copper Cu	NA	NA	NA	NA	NA	0	15.000	2
DO	10.050	13.500	7.600	10.000	1.909	12	11.350	16
Lead Pb	NA	NA	NA	NA	NA	0	2.500	2
Mercury Hg	NA	NA	NA	NA	NA	0	0.300	2
Nitrate NO3	0.510	1.550	0.050	0.682	0.447	12	0.570	17
Nitrite NO2	0.010	0.030	0.010	0.014	0.007	12	0.010	17
TKN	0.800	1.500	0.400	0.850	0.306	12	0.700	16
pH	6.500	8.700	5.500	6.782	0.923	11	6.900	17
pH Lab	6.900	7.800	6.500	7.008	0.394	12	7.200	17
Phosphorus, Tot	0.100	0.200	0.100	0.133	0.049	12	0.100	16
Residue	122.000	735.000	118.000	221.714	228.872	7	134.000	7
Residue, Diss.	9.000	30.000	5.000	12.417	8.607	12	10.000	17
Residue, Nonflt	5.000	24.000	2.000	8.000	6.688	12	5.000	17
Residue, Vol.Nonflt	5.000	14.000	3.000	5.750	3.415	12	5.000	17
Temperature	13.000	28.100	3.500	14.550	8.710	12	16.500	17
TOC	7.000	9.000	5.000	7.000	1.044	12	7.000	17

The ten year trend report (ICPRB, 1987) showed significant decreasing trend in TOC, with increasing trends in Nitrite, Diss. Ortho Phosphorus, Total Phosphate, Vol. Nonfilt. Residue and TKN. The present analysis showed increases in TKN.

Virginia monitors two stations on Bull Run upstream of the Occoquan Creek BWQMN station to assess effects from urban growth and the UOSA STP. The upstream station at Route 705 has improved from Fair to Good over the last two years. The downstream station at Route 28 has received a Fair rating i1986-1988.

POTOMAC WATER QUALITY STATUS AND TRENDS (1986-87)
Region 6: Lower Potomac Estuary

River South Run
Station 1ASOT001.44 Agency VASWCB
Location Vint Hill, VA, Below Vint Hill Installation
River Mile: 73-28-16-1

	(1986-1987)						(1984-1985)	
PARAMETER	MED	MAX	MIN	MEAN	S.D.	N	MED	N
Alkalinity	40.000	119.000	24.000	48.162	22.617	21	NA	0
Ammonia NH3+NH4	0.100	3.200	0.100	0.487	0.742	23	0.100	19
BOD	2.000	9.000	1.000	2.739	2.261	23	2.000	20
COD	13.000	28.000	4.000	14.609	5.417	23	12.000	20
Cadmium Cd	1.000	1.000	1.000	1.000	0.000	1	1.000	2
Chromium, Total	1.000	1.000	1.000	1.000	0.000	1	1.000	2
Coliform Fecal b	100.000	1900.000	100.000	259.091	406.681	22	100.000	18
Conductivity Field	216.000	645.000	107.800	296.948	176.518	23	154.500	20
Copper Cu	10.000	10.000	10.000	10.000	0.000	1	10.000	2
DO	10.300	14.300	6.600	10.330	2.242	23	9.250	20
Hardness	69.000	178.500	38.000	87.750	54.284	6	NA	0
Lead Pb	1.000	1.000	1.000	1.000	0.000	1	2.000	2
Mercury Hg	0.300	0.300	0.300	0.300	0.000	1	0.300	2
Nitrate NO3	1.120	8.500	0.290	1.797	1.967	23	1.400	19
Nitrite NO2	0.020	0.280	0.010	0.057	0.074	23	0.030	19
TKN	0.700	3.900	0.500	1.043	0.835	23	0.600	19
pH	7.000	8.230	5.900	7.117	0.591	23	6.800	20
pH Lab	7.000	7.700	6.500	6.981	0.344	21	NA	0
Phosphorus, Tot	0.200	0.400	0.100	0.213	0.097	23	0.200	19
Residue, Diss.	5.000	15.000	5.000	6.174	2.348	23	5.000	20
Residue, Nonflt	5.000	6.000	3.000	5.000	0.603	23	5.000	20
Residue, Vol.Nonflt	5.000	44.000	1.000	6.478	8.404	23	5.000	20
Temperature	11.000	27.900	NA	12.259	7.614	22	17.750	20
TOC	5.000	9.000	1.000	5.632	1.674	19	7.000	20

The ten year trend report (ICPRB, 1987) showed significant decreasing trends in pH, Diss Ortho Phosphorus and TOC, with an increasing trend in Vol. Nonflt. Residue. The present analysis also showed decreases in TOC but increases in pH.

Virginia monitors benthic macroinvertebrates at this station. The condition of the benthic community was rated Good in spring 1988, an improvement over Fair ratings in previous surveys.

POTOMAC WATER QUALITY STATUS AND TRENDS (1986-87)
Region 6: Lower Potomac Estuary

River Mattawoman Creek
Station MAT0078 Agency MDOEP
Location Mason Springs, MD, Rt. 225.
River Mile: 82-8

	(1986-1987)						(1984-1985)	
PARAMETER	MED	MAX	MIN	MEAN	S.D.	N	MED	N
Alkalinity	12.000	45.000	4.000	16.714	12.226	28	15.000	27
BOD	2.500	7.000	0.500	2.600	1.505	28	1.700	27
Coliform, Total	NA	NA	NA	NA	NA	0	0.000	29
Coliform Fecal b	230.000	1500.000	23.000	321.375	366.255	16	NA	0
Conductivity Field	112.000	1610.000	79.000	207.107	315.688	28	103.000	27
DO	8.100	14.600	3.700	8.640	3.534	27	7.600	27
DO%Sat	NA	NA	NA	NA	NA	0	80.100	27
Nitrate NO3	NA	NA	NA	NA	NA	0	0.050	27
Nitrite NO2	NA	NA	NA	NA	NA	0	0.005	26
NO2 + NO3	0.150	0.370	0.020	0.146	0.096	28	NA	0
TKN	0.740	1.200	0.330	0.733	0.244	28	0.825	26
pH	6.500	7.600	5.600	6.607	0.495	27	6.600	27
pH Lab	NA	NA	NA	NA	NA	0	7.100	27
Phosphorus, Tot	0.080	0.280	0.020	0.100	0.056	28	0.100	27
Residue, Diss.	5.500	16.000	1.000	6.464	4.623	28	NA	0
Residue, Fix.Nonflt	NA	NA	NA	NA	NA	0	5.000	27
Salinity	0.000	0.520	0.000	0.023	0.100	28	NA	0
Temperature	16.000	27.400	1.800	14.879	8.158	28	21.200	27
TOC	6.955	9.520	3.070	6.687	1.813	28	NA	0
Turbidity	13.800	25.000	5.200	14.093	4.836	28	NA	0

The ten year trend report (ICPRB, 1987) showed significant decreasing trends in Total Coliform, and Salinity, with increasing trends in pH (Lab), and TKN. The present analysis showed decreases in TKN.

Lower Mattawoman Creek, downstream of the water quality monitoring station, is characterized by recurrent summer algal blooms. During 1985 the creek had chlorophyll-a levels as high as 135 ug/l, with heavy dominance by Cyanobacteria throughout the summer (Panday and Haire, 1986).

POTOMAC WATER QUALITY STATUS AND TRENDS (1986-87)
Region 6: Lower Potomac Estuary

River Potomac River
Station XEA1840 Agency MDOEP
Location Possum Point/Moss Point, Buoy 44.
River Mile: 70

	(1986-1987)						(1984-1985)	
PARAMETER	MED	MAX	MIN	MEAN	S.D.	N	MED	N
Alkalinity	66.000	90.000	40.000	67.713	11.170	87	57.900	90
BOD	1.400	5.400	0.500	1.804	1.314	84	2.300	74
Coliform, Total	NA	NA	NA	NA	NA	0	0.000	96
Coliform Fecal b	7.000	930.000	3.000	88.706	227.785	17	NA	0
Conductivity Field	485.000	10200.000	172.000	1999.330	2392.650	84	1645.000	90
DO	8.550	14.000	4.800	8.864	2.495	84	8.000	92
DO%Sat	NA	NA	NA	NA	NA	0	87.200	90
Nitrate NO3	NA	NA	NA	NA	NA	0	0.770	92
Nitrite NO2	NA	NA	NA	NA	NA	0	0.032	88
NO2 + NO3	1.400	2.500	0.350	1.351	0.559	87	NA	0
TKN	0.700	1.330	0.350	0.749	0.210	87	0.900	91
pH	7.600	8.100	7.000	7.543	0.287	84	7.600	86
pH Lab	NA	NA	NA	NA	NA	0	7.900	77
Phosphorus, Tot	0.130	0.360	0.040	0.137	0.066	87	0.130	91
Residue, Diss.	30.000	160.000	4.000	41.328	32.992	87	NA	0
Residue, Fix.Nonflt	NA	NA	NA	NA	NA	0	25.500	92
Salinity	0.000	5.510	0.000	0.862	1.270	84	NA	0
Temperature	17.300	29.500	1.000	16.340	8.802	84	22.850	90
TOC	3.720	6.260	2.030	3.795	0.865	87	NA	0
Turbidity	41.000	190.000	11.600	56.767	44.091	87	NA	0

The ten year trend report (ICPRB, 1987) showed significant increasing trends in Nitrate and TKN. The present analysis shows that TKN decreased.

Benthic data were not available at this station.

POTOMAC WATER QUALITY STATUS AND TRENDS (1986-87)
Region 6: Lower Potomac Estuary

River Potomac River
Station XDA1177 Agency MDOEP
Location Midchannel off Maryland Point, Buoy #19

	(1986-1987)						(1984-1985)	
PARAMETER	MED	MAX	MIN	MEAN	S.D.	N	MED	N
Alkalinity	68.000	81.000	49.000	66.862	8.356	87	59.000	53
BOD	1.000	5.200	0.450	1.385	1.147	85	0.600	51
Coliform, Total	NA	NA	NA	NA	NA	0	0.000	65
Coliform Fecal b	4.000	75.000	3.000	11.647	17.614	17	NA	0
Conductivity Field	8980.000	17000.000	222.000	8630.880	4702.440	102	6800.000	91
DO	8.200	14.000	2.700	8.356	2.732	102	6.400	91
DO%Sat	NA	NA	NA	NA	NA	0	76.400	63
Nitrate NO3	NA	NA	NA	NA	NA	0	0.620	53
Nitrite NO2	NA	NA	NA	NA	NA	0	0.023	50
NO2 + NO3	0.900	2.000	0.150	1.021	0.506	87	NA	0
TKN	0.600	1.850	0.350	0.664	0.233	87	0.750	53
pH	7.400	8.200	6.800	7.502	0.293	102	7.400	87
pH Lab	NA	NA	NA	NA	NA	0	7.500	52
Phosphorus, Tot	0.120	0.500	0.040	0.144	0.078	87	0.140	53
Residue, Diss.	30.000	294.000	1.000	49.853	54.115	87	NA	0
Residue, Fix.Nonflt	NA	NA	NA	NA	NA	0	29.000	53
Salinity	4.770	9.780	0.000	4.647	2.774	102	2.525	28
Temperature	15.900	28.800	2.000	15.275	8.556	102	22.700	91
TOC	3.530	9.170	2.110	3.804	1.002	87	NA	0
Turbidity	40.000	352.000	5.100	65.436	65.085	87	NA	0

Data from this station were not available to the ten year trend report (ICPRB, 1987) and were not available for benthic data.

POTOMAC WATER QUALITY STATUS AND TRENDS (1986-87)
Region 6: Lower Potomac Estuary

River Potommac River
Station XDC1706 Agency MDOEP
Location Morgantown, MD, Rt. 301 Bridge.
River Mile: 44

	(1986-1987)						(1984-1985)	
PARAMETER	MED	MAX	MIN	MEAN	S.D.	N	MED	N
Alkalinity	75.000	91.000	50.000	73.684	8.955	57	68.000	76
BOD	0.600	11.000	0.020	2.209	2.750	55	1.500	73
Coliform, Total	NA	NA	NA	NA	NA	0	0.000	183
Coliform Fecal b	3.000	23.000	3.000	5.125	5.175	16	NA	0
Conductivity Field	16900.000	24100.000	1170.000	16061.600	4453.870	135	14750.000	179
DO	7.100	13.400	0.100	6.913	3.403	135	5.900	180
DO%Sat	NA	NA	NA	NA	NA	0	70.800	179
Hardness	NA	NA	NA	NA	NA	0	218.500	2
Nitrate NO3	NA	NA	NA	NA	NA	0	0.180	79
Nitrite NO2	NA	NA	NA	NA	NA	0	0.014	75
NO2 + NO3	0.440	1.600	0.020	0.556	0.397	57	NA	0
TKN	0.700	1.750	0.430	0.739	0.261	56	0.700	79
pH	7.500	8.600	6.800	7.564	0.403	135	7.400	173
pH Lab	NA	NA	NA	NA	NA	0	7.500	77
Phosphorus, Tot	0.110	0.350	0.060	0.123	0.053	56	0.130	77
Residue, Diss.	15.000	310.000	2.000	31.975	47.188	57	NA	0
Residue, Fix.Nonflt	NA	NA	NA	NA	NA	0	15.000	78
Salinity	9.720	14.500	0.270	9.229	2.808	135	NA	0
Sulfate	NA	NA	NA	NA	NA	0	55.500	1
Temperature	16.600	28.500	2.500	15.539	7.826	135	19.600	179
TOC	3.780	7.860	1.920	3.943	1.082	56	NA	0
Turbidity	22.000	289.000	6.000	38.307	45.781	57	NA	0

The ten year trend report (ICPRB, 1987) showed significant decreasing trends in Total Coliform, Conductivity, Nonflt. Residue, with increasing trends in Nitrate and Nitrite. The present analysis shows that Conductivity increased.

Benthic data were not available for this station.

Table 9. Lower Potomac Estuary Subdivision Median Comparison.

Number indicates difference in median values for the 1986-87 monitoring period from the 1984-85 period normalized by the standard deviation. A blank entry indicates that a parameter was not measured for either or both periods. See "Summary Tables" for specific data and "Methods" for further discussion.

	XEA6596		1AOCC006.71		1ASOT001.44		MAT0078		XEA1840		XDA1177		XDC1706
Acidity													
Alkalinity	0.6	-0.0				-0.2			0.7	1.1		0.8	
Aluminum													
Ammonia NH3+NH4		0.0		0.0									
BOD	-0.2	0.9		0.0		0.5			-0.7	0.3		-0.3	
COD		0.1		0.2									
Cadmium Cd				*									
Chloride		0.0											
Chromium, Total				*									
Chromium, Hexavalent													
Coliform, Total													
Coliform Fecal a													
Coliform Fecal b		0.0		0.0									
Conductivity Field	-0.0	0.1		0.3		0.0			-0.5	0.5		0.5	
Conductivity At													
Copper Cu				*									
DO	0.2	-0.7		0.5		0.1			0.2	0.7		0.4	
DO%Sat													
Flouride													
Hardness													
Iron Fe													
Lead Pb				*									
Magnesium Mg													
Mercury Hg				*									
Nitrate NO3		-0.1		-0.1									
Nitrite NO2		0.0		-0.1									
NO2 + NO3													
TKN	-0.5	0.3		0.1		-0.3			-1.0	-0.6		0.0	
pH	-0.7	-0.4		0.3		-0.2			0.0	0.0		0.2	
pH Lab		-0.8											
Phosphate, Tot													
Phosphorus, Diss.Ortho													
Phosphorus, Tot	-0.3	0.0		0.0		-0.4			0.0	-0.3		-0.4	
Phosphorus, Tot.Ortho													
Residue		-0.1											
Residue, Diss.		-0.1		0.0									
Residue, Nonflt		0.0		0.0									
Residue, Vol.Nonflt		0.0		0.0									
Residue, Fix.Nonflt													
Salinity	0.0									0.8			
Sodium Na													
Sulfate													
Temperature	-0.7	-0.4		-0.9		-0.6			-0.6	-0.8		-0.4	
TOC		0.0		-1.2									
Turbidity													

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