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The 1999 Stream Water Quality Report is produced by the Division of Environmental Health of the Fairfax County Health Department. Staff support is provided by the Division's Monitoring and Environmental Services staff who collected, compiled and interpreted the stream sampling results for the year.

This and prior years reports are available on Fairfax County's Internet site at:

http://www.co.fairfax.va.us/service/hd/strannualrpt.htm

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1999 Stream Water Quality Report
Fairfax County Health Department

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Fairfax County Health Department
Stream Water Quality Report

1999 Stream Water Quality Report

Abstract

The 1999 Stream Water Quality Report includes data collected from 72 sampling sites throughout 25 of 30 watersheds in Fairfax County. A total of 1,486 stream samples were collected for analyses in 1999. These sampling sites are representative of all the streams monitored within these watersheds. The data in this report shows fluctuations in the stream water quality for individual sampling sites. The overall water quality of the watershed is considered fair for fecal coliforms and good for chemical and physical parameters.

A total of 90 individuals and groups are participating in the Adopt-A-Stream program.

A total of 15 stream complaints were investigated by the Health Department in 1999.

Sampling Result Highlights

- 1,486 stream samples collected from 72 Sites.
- The stream samples in the **good water quality range** (<200 f.c./100 ml) for fecal coliform is 13% for 1999.
- Total phosphates, nitrate nitrogen, dissolved oxygen and pH levels remain consistent with the 5 year averages.

FIVE YEAR COMPARISON SUMMARY (1995 - 1999)*

FECAL COLIFORM (F.C./100ML)	1995	1996	1997	1998	1999
% Fecal Coliform <200 f.c./100ml	22	17	18	9	13
Fecal Coliform Mean**	743	915	829	689	758
PHYSICAL PARAMETERS	**1995**	**1996**	**1997**	**1998**	**1999**
Rainfall (Sum in inches)	40	54	36	39	41
Sample Temperature (°F)***	54	54	54	57	55
CHEMICAL PARAMETERS	**1995**	**1996**	**1997**	**1998**	**1999**
Total Phosphorous (mg/l)**	0.10	0.10	0.10	.11	.10
Nitrate Nitrogen (mg/l)**	0.69	0.87	0.74	.61	.65
Dissolved Oxygen (mg/l)**	8.5	8.9	9.2	8.9	11.3
pH**	7.4	7.1	7.3	7.2	7.3

***Calculations based on all samples collected for each year**

****Results for five year comparisons are calculated as a Geometric Mean.**

*****Arithmetic Mean**

SECTION 1

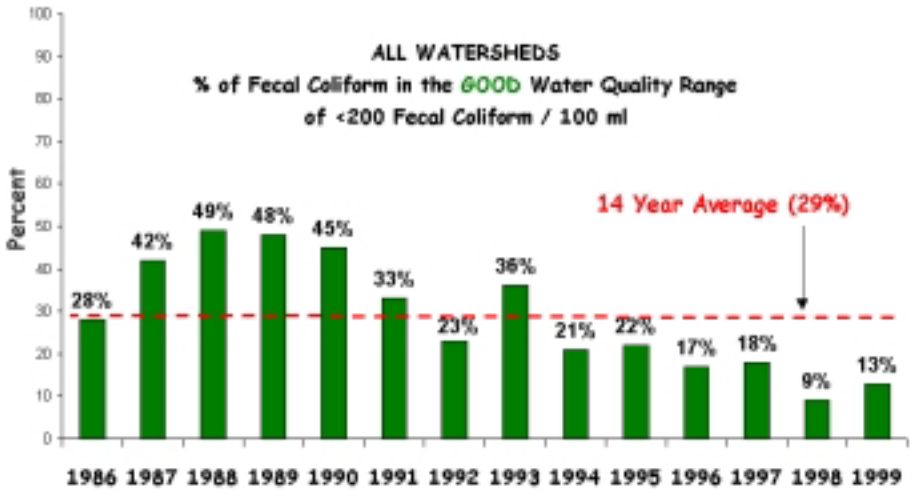
1999 SURVEY RESULTS

I. Fecal Coliform

Criteria: ***Water quality standards include fecal coliform bacteria standards. These "indicator organisms", while not necessarily harmful in themselves, are found in the intestinal tracts of warm-blooded animals, including humans, and therefore, can be indicative of fecal contamination and the possible presence of a pathogenic organism. In surface waters, the fecal coliform bacteria should not exceed 200 fecal coliform bacteria per 100 ml of water.***

Grab samples are collected by Health Department personnel and transported to the Fairfax County Laboratory where the samples are evaluated by the membrane filter method.

The fecal coliform bacteria standard is used to evaluate waters for all types of recreation. Prior to 1977, the coliform bacteria standards identified waters used for " secondary contact recreation ", e.g. ,- boating or fishing (200 - 1000/ 100 ml). In the 1977 amendments to Virginia's Water Quality Standards, the Department of Environmental Quality-Water (DEQW) adopted the more stringent bacteria standard for primary contact recreation to apply to all surface waters of the State. This action was taken as part of Virginia's commitment to attain the national goal of water quality suitable for all types of recreation.

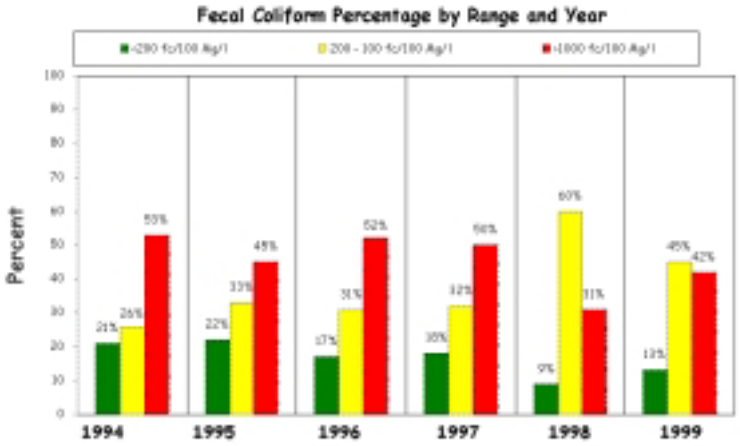


GRAPH # 1 Fecal Coliform 1986-1999

The Department of Environmental Quality-Water (DEQW) has established a criteria for all surface waters, except shellfish waters, as follows "...the fecal coliform bacteria shall not exceed a geometric mean[1] of 200 fecal coliform bacteria per 100 ml of water for two or more samples over a 30 day period, or a fecal coliform (f.c.) bacteria level of 1,000 per 100 ml at any time."[2] In 1999 the percentage of samples in the good water quality range (<200 f.c./100ml) increased to 13%, see graph # 1. The decrease in the number of samples in the greater than 1,000 f.c./100 ml noted

[1]The Geometric Mean is defined as the antilog of the average of the logarithms of the data values.

[2] "Water Quality Standards "Commonwealth of Virginia State Water Control Board Regulations July 1, 1988 page 19.



GRAPH # 2 - Fecal Coliform Range

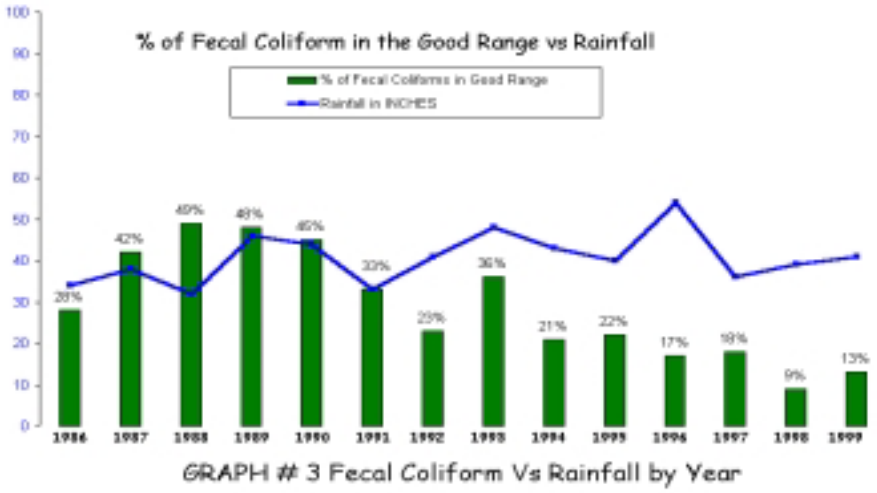
in 1998 was reversed in 1999. In 1999 the number of samples in the > 1,000 f.c./100 ml range increased to 42% from a five year low of 31% in 1998, graph # 2. The results for the 1998 and 1999 samples are an improvement over prior years. The movement of the number of samples within the > 1,000 f.c./100 ml range may reflect a seasonal variation and may not be a significant indicator of improvement.

Factors affecting the increase or decrease in the amount of fecal coliform in stream waters include rainfall amounts and the sample water temperature. Both of these factors are noted in past years' reports as environmental conditions affecting the fecal coliform results.

The first, increased rainfall, may affect fecal coliforms through dilution, allowing the streams to be more efficient in their self-cleansing action resulting in a decrease in the amount of fecal coliforms in the stream water. The normal action of the streams kills the majority of fecal coliform organisms introduced into them by oxidation and the lack of ideal habitat for the organisms. The fecal coliform organism is present in the fecal material of all warm-blooded animals and generally is deposited in the stream from rainfall events which flush streets, lawns, gardens and woodlands. The average number of fecal coliform organisms discharged from the human body is about 400 billion per day. It is estimated that levels of 250,000 f.c./100 ml of water in streams is indicative of direct sewage discharge. However, none of the samples collected approached such numbers.

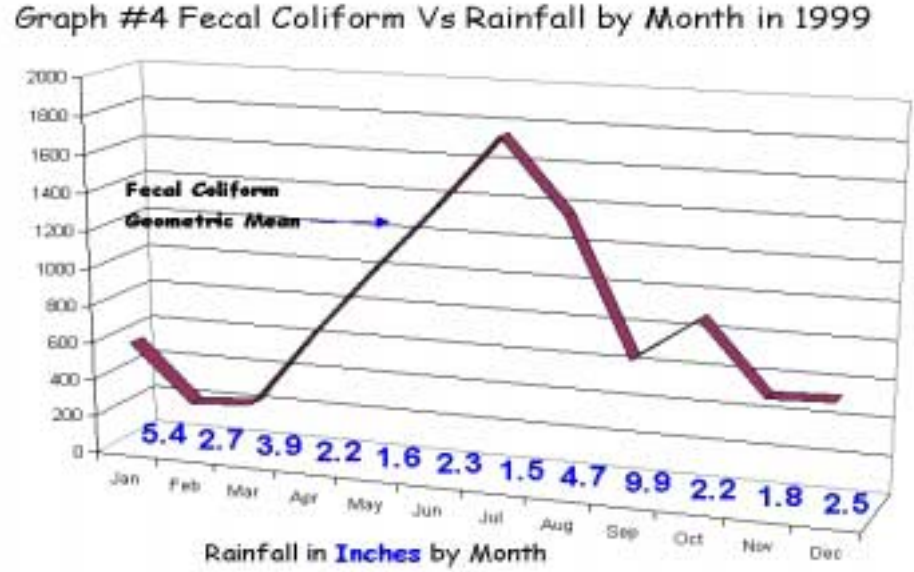
The assumption that an increase in rainfall would improve the water quality through self-cleansing of the streams by increased flow during the rainfall incidences has not been proven. A comparison of the percentage of fecal coliforms and the annual rainfall has not indicated a better water quality trend in this or past annual samplings. Several factors including sampling time (i.e. before or after significant rainfall), location of samples collected within the watershed (upper, middle or lower) and the general urbanization of the county make it difficult to see any self-cleansing action in the streams .

In 1999 the amount of rainfall increased to 41", up from 36" in 1997 (graph #3). This did not reflect an appreciable increase or decrease in the good water quality levels for the year .



GRAPH # 3 Fecal Coliform Vs Rainfall by Year

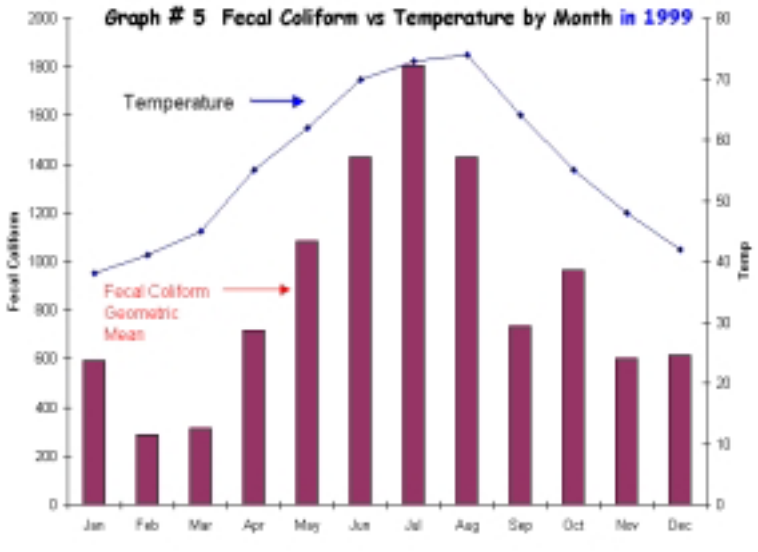
A further analysis of the rainfall by month in 1999 indicates a drop in rainfall during the summer months June - August. July was the highest monthly average for fecal coliforms of 1,805 fc/100ml and had the lowest rainfall of the year ,1.5 inches (graph # 4).



	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Fecal Coliform	592	287	314	717	1082	1431	1805	1431	734	983	600	614
Rainfall	5.4	2.7	3.9	2.2	1.6	2.3	1.5	4.7	9.9	2.2	1.8	2.5

The monthly fecal coliform levels did not appear to follow any **direct** relationship to the amount of rainfall. However, there were higher fecal coliform numbers in samples collected during the summer months when the rainfall was the lowest (graph # 4).The increase in fecal coliforms may be related more to temperature than rainfall.

The second factor, water temperature, may be contributing to an increase in the fecal coliform Geometric Mean by providing optimum temperatures for coliform growth. The number of samples in the equal to or greater than (>=) 200 fecal coliform range for 1999 did not follow the seasonal trend noted in prior Stream Water Quality Reports. (graph #5)



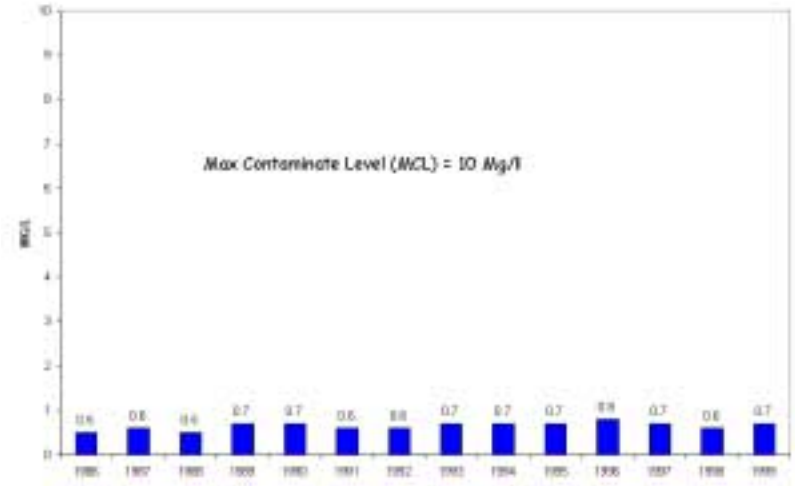
II. Dissolved Oxygen

Criteria: ***The presence of dissolved oxygen (D.O.) in water is essential for aquatic life, and the type of aquatic community is dependent to a large extent on the concentration of dissolved oxygen present. Dissolved oxygen standards are established to ensure the growth and propagation of aquatic ecosystems. The minimum standard for dissolved oxygen is 4.0 mg/l.***

Ninety-seven percent (97%) of the samples collected for determination of dissolved oxygen (D.O.) were above 4.0 mg/l. Sample results for 1999 were higher than in past years. The Mill Branch sampling station (20-03) improved during 1999 with only 24% of the samples for Dissolved Oxygen less than 4 mg/l. In 1998, 83% of the samples collected were below the minimum of 4.0 mg/l. The sampling site is located downstream from a debris landfill and may have been effected in prior sampling. The debris landfill is monitored by the Commonwealth of Virginia's Department of Environmental Quality- Waste.

III. Nitrate Nitrogen

Criteria: ***Nitrate Nitrogen is usually the most prevalent form of nitrogen in water because it is the end product of the aerobic decomposition of organic nitrogen. Nitrate from natural sources is attributed to the oxidation of nitrogen in the air by bacteria and to the decomposition of organic material in the soil. Fertilizers may add nitrate directly to water resources. Nitrate concentrations can range from a few tenths to several hundred milligrams per liter. In nonpolluted water, they seldom exceed 10 mg/l. Nitrate is a major component of human and animal wastes, and abnormally high concentrations suggest pollution from these sources.***



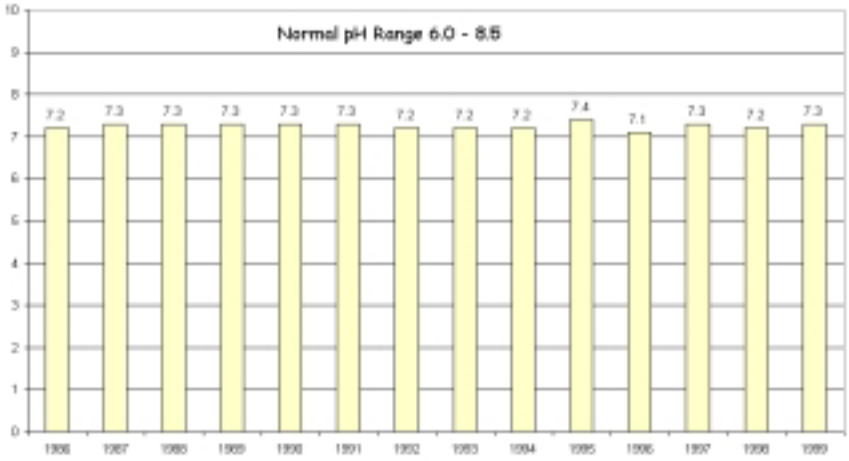
Graph # 7 NITRATE NITROGEN

The samples for nitrate nitrogen ranged from a low reading of 0.09 mg/l to a high of 10.6 mg/l. The overall nitrate nitrogen Geometric Mean was 0.65 mg/l. This is well below the maximum limit of 10 mg/l (graph # 7). Two samples were above the maximum contamination level of 10 mg/l. Both were from Station 25-04 in the Old Mill Branch Watershed.

IV. pH

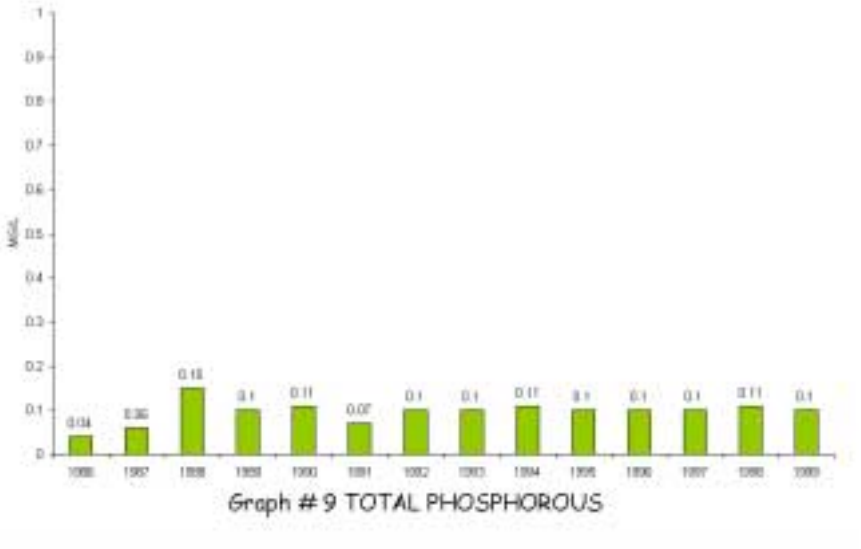
Criteria: ***Stream pH is an important factor in aquatic systems. Biological productivity, stream diversity, metal solubility, and toxicity of certain chemicals, as well as important chemical and biological activity, are strongly related to pH. The pH range of 6.0 - 8.5 generally provides adequate protection for aquatic life and for recreational use of streams.***

The pH ranged from a low reading of 4.0 to a high of 9.4. eight samples were above the 8.5 limits. One sample was below the 6.0 limit. Follow up testing indicated normal pH.



Graph # 8 pH

V. Phosphorous (Total)



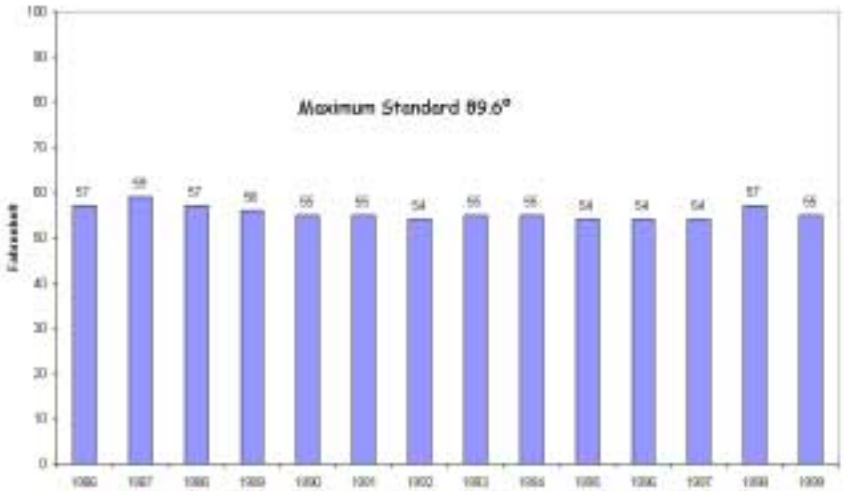
Criteria: ***Phosphorous is found in natural water in the form of various types of phosphates. Organic phosphates are formed in the natural biological processes. Therefore, they are contributed to sewage in body wastes and food residues. They may also be formed in the biological treatment process or by life existing in the receiving water.***

Condensed phosphates and orthophosphates are found in treated wastewater, laundry detergents, commercial cleansing compounds and fertilizers. Phosphorous is essential to the growth of organisms and can be the nutrient that limits the growth which a body of water can support. When phosphorous is a growth limiting nutrient, the discharge of raw or treated sewage, agricultural drainage or certain industrial wastes to a receiving water may stimulate the growth, in nuisance quantities, of photosynthetic aquatic microorganisms and macroorganisms.

There is no established limit for total phosphorous content in stream water. Variations of the phosphorous content may help determine possible trends of water contamination. Significant increases in total phosphorous may indicate increasing amounts of contaminants entering the stream. This year's Geometric Mean of 0.10 mg/l does not indicate a significant increase over prior years' averages. Beginning in 1993, averages were a minimum of 0.10 mg/l due to a change in the Health Department Laboratory's testing procedure for total phosphorous. The new automated testing procedure uses 0.10 mg/l as the lowest detection level rather than the 0.02 mg/l limit used prior to 1992. Phosphorous results for the past 14 years are illustrated in graph # 9.

VI. Temperature

Criteria: ***The existence and composition of an aquatic community also depends greatly on the temperature characteristics of a body of water. Thus, temperature limits are included in water quality standards to protect and maintain a balanced aquatic community. The maximum standard for free flowing streams is 89.6°F (32°C).***



Graph #10 WATER SAMPLE TEMPERATURE

The temperature range for all stream water samples collected in 1999 was 32°F for the low in December and 86°F for the high in September. The average for all samples collected in 1999 was 55°F (graph # 10).

VII. Heavy Metals

Criteria: ***The presence of heavy metals in stream water indicates possible discharge of household and industrial waste into the stream. Sampling establishes baseline data for identifying point source pollution from areas where urbanization of the stream area is or will be occurring.***

The following metals have been selected for sampling based on their occurrence in industrial and household waste discharge, their potential health hazards, and as part of the Virginia Department of Environmental Quality-Water requirements for Surface Water Standards for Surface Public Water Supplies (VR680-21-02.3).

Nine years of results are available (1989 - 1997 Table 13). All results are within normal limits.

CONTAMINANT	PMCL : DETECTION LIMITS (MG/L)	SOURCE*	POTENTIAL HEALTH HAZARD*
ARSENIC	0.05 MG/L : 0.0010 MG/L	Industrial / Household	Carcinogenic
BARIUM	1.00 MG/L : 0.03 MG/L	Industrial	Circulatory
CADMIUM	0.05 MG/L : 0.001 MG/L	Industrial Deterioration of Galvanized Pipe	Urinary
CHROMIUM	0.05 MG/L : 0.001 MG/L	Industrial	Artherosclerosis
LEAD	0.05 MG/L : 0.002 MG/L	Industrial	Neurological
MERCURY	0.02 MG/L : 0.0002 MG/L	Industrial	Neurological
SELENIUM	0.01 MG/L : 0.003 MG/L	Industrial	Gastrointestinal
SILVER	0.05 MG/L : 0.001 MG/L	Industrial	Argyria

***Environmental Engineering & Sanitation 3rd Ed. by Joseph A. Salvato and Standard Methods for Examination of Water and Wastewater 16th Edition.**

VII. Lake Accotink

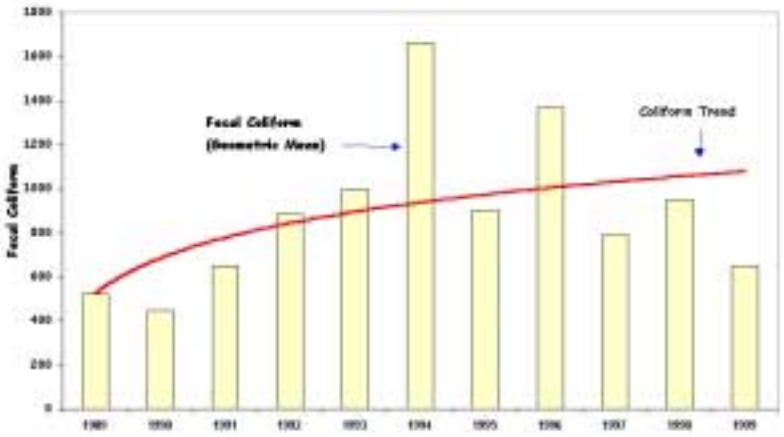
Background: ***Lake Accotink is sampled from four surface points on the lake from May through August. The four sample points are surface grab samples and are only accessible by boat. It is necessary to coordinate the sampling schedule with the availability of a boat and operator, which is provided by the Fairfax Park Authority. Results of all samples collected for testing are located in Table 11.***

A total of 20 samples were collected from May through August 1999. Fifteen percent (15%) of samples collected were in the good water quality range of less than 200 f.c./100 ml. The dissolved oxygen Geometric Mean for 1999 was 11.2 mg/l. All samples (100%) collected were greater than 4 mg/l for 1999. The overall Geometric Mean for nitrate nitrogen was 0.17 mg/l. The average pH was 7.3 and the average total phosphorous was 0.10 mg/l.

VIII. Fairfax City Stream Sites (Accotink Watershed)

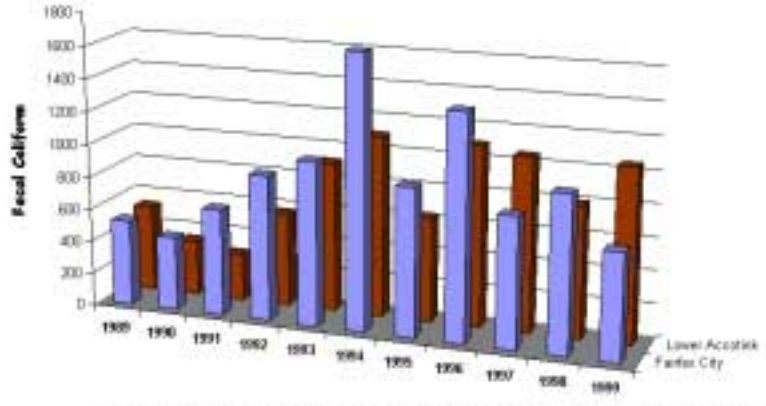
Background: ***Stream sites are within a highly urbanized area and are subject to run-off from shopping centers, garages, parking lots, and other potentially high pollution areas. Storm drains feed the majority of the streams passing through the city and have been implicated, since sampling of the streams began in 1988, as sources of pollution from improperly disposed petroleum products. The streams within this area are part of the head waters for the Accotink Watershed. Results of all samples collected for testing are located in TABLE 12.***

Seventy-six percent (76%) of the samples collected for fecal coliforms had results greater than or equal to 200 fecal coliforms/100 ml, while 24% of the samples collected are less than 200 fecal coliforms. The Geometric Mean for fecal coliforms from all Fairfax City stream sites decreased to 649 fc/100ml in 1999 (graph #11).



GRAPH # 11 Fairfax City - Fecal Coliform

The Fairfax City sample sites show the same general trend for fecal coliform as the other Accotink sampling sites. The samples for 1999 have a lower geometric mean than the lower Accotink sampling sites found outside of the Fairfax City limits (graph #12).



	1989	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999
Fairfax City	523	448	649	886	897	1682	903	1367	792	950	649
Lower Accotink	532	339	206	575	916	1103	636	1101	1069	902	1064

GRAPH #12 Fairfax City Vs Accotink Watershed

The pH ranged from a low of 6.7 to a high of 9.4. The Mean for pH for all city sites is 7.4 for 1999. Total phosphorous levels ranged from a low of 0.1 mg/l to a high of 0.45 mg/l. Nitrate nitrogen ranged from a low of 0.10 mg/l to a high of 2.5 mg/l. The overall nitrate nitrogen average for all stream sites within Fairfax City is 0.63 mg/l. The dissolved oxygen results ranged between 4.4 mg/l for the low to 17 mg/l for the high, with no sample results less than 4 mg/l.

X. Water Quality Summary Statement

The 1999 Stream Water Quality Report includes data collected from 72 sampling sites from 25 of the 30 watersheds in Fairfax County. A total of 1,486 stream samples were collected for analyses in 1999. These sampling sites are representative of all the streams monitored within these watersheds. The data in this report shows fluctuations in the stream water quality for individual sampling sites. The average geometric mean for fecal coliform at several of the stream sample sites is approaching and surpasses 1000 f.c./100ml (see table 4). The chemical and physical parameters have remained constant over the past five years (see tables 7 - 10). Therefore, the overall water quality of the watersheds in Fairfax County is considered fair for fecal coliform and good for the chemical and physical parameters of the streams.

In summary, any open, unprotected body of water is subject to pollution from indiscriminate dumping of litter and waste products, sewer line breaks and contamination from runoff pesticides, herbicides, and waste from domestic and wildlife animals. Therefore, the use of streams for contact recreational purposes, such as swimming, wading, etc., which could cause ingestion of stream water or possible contamination of an open wound by stream water, should be avoided.

SECTION 2
1999 WATER QUALITY PROGRAMS

I. Adopt-A-Stream Program

Background: The ***program was introduced at the Fairfax Fair in June 1989 in response to the Environmental Quality Advisory Council (EQAC) recommendations to promote citizen awareness to the potential hazards of recreational usage of streams and to provide the Health Department with citizen surveillance in the field of reporting possible pollution problems. An estimated 2000 people were provided information about the program through the display at the fair. Since 1989, the program has generated considerable interest in the private sector and citizens are responding on a regular basis. The program received national recognition when it was awarded the National Association of Counties 1991 Achievement Award and the Virginia Municipal League's 1991 award for Environmental Quality. A paper on the objectives and goals of the program was presented to the Virginia Water Resources Conference April 1992. Participants in the program range from individuals to Scout groups, civic organizations, public and private school science classes.***

1999 HIGHLIGHTS:

The Fairfax County, Department of Public Works, Utilities Planning and Design Division has incorporated the Adopt-A-Stream program and the Annual Stream Water Quality Report into Part I of their National Pollutant Discharge Elimination System Permit Application (NPDES). Both the Stream Water Quality Report and the Adopt-A-Stream program are identified by the Department of Public Works as programs used by the County to help identify potential pollution sources.

The Annual Stream Report is being utilized in the County's Stream Protection Strategy.

A two year study with the United States Geological Survey (USGS) was initiated to determine a method to "type" the fecal coliform found in streams.

At the present time 90 individuals and groups are participating in the program. These 90 participating members represent over five hundred people involved in stream awareness and individual programs.

One hundred (100) stream awareness programs have been presented by Environmental Health Specialists to 1,938 county residents since the program began. These programs alert residents to possible stream health hazards and provide information on reporting stream pollution problems.

II. Stream Complaints

Background: ***Procedures for investigation of stream complaints were standardized in 1989 to allow staff to respond in a minimum amount of time to potential point source pollution. The program was developed with the Adopt-A-Stream program as a central contact point for citizens to report stream problems. Since 1989 several of the complaints have resulted in court action, identification of underground spills and quicker departmental response to reported pollution problems.***

Thirty three(33) site visits were made to investigate 15 complaints in 1999. The 15 complaints were initially investigated by Health Department staff and referred to the proper agency or resolved utilizing Health Department procedures and local ordinances. Two complaints dealt with runoff, two were associated with dumping and trash in the streams, six were referred due to color and odor problems, two responses were made to a sewer line break and three miscellaneous complaints were received in 1999.

Three of the 1999 complaints required action to be taken by the Fairfax County Health Department and two required action by the Department of Public Works and Environmental Services .

Section 3

Appendix A-Laboratory Procedures

All laboratory procedures used in this report are defined in “Standard Methods for the Analysis of Water and Wastewater, 18th Edition”, 1992. The fecal coliform procedure utilizes the millipore filter and gives a direct count per 100 ml of sample. The dissolved oxygen (D.O.) determination is made by the azide modification of the “Winkler Method.” The pH is read directly by meter. The nitrate nitrogen is determined by the automated cadmium reduction method and phosphates are determined by persulfate digestion followed by the ascorbic acid colorimetry. Heavy metal determination is madeby electrothermal atomic ab-

sorption method using a graphite furnace . Mercury was analyzed by Cold Vapor Technique. Detection limits for heavy metals are located in a table found in Section I -VII (page 10) of this report.

Appendix B-Watersheds and Sampling Sites

There are 30 watersheds within the County encompassing approximately 400 square miles. Sampling sites are established on 25 of these watersheds. Five watersheds are small and do not contain any well defined streams; therefore, these are excluded from the program. The number of sampling sites in 1999 is 72, the data which is represented in this report. These stations are located on the major streams and their main tributaries. The sample station identification number is a two part number identifying the watershed and the sample site. There are gaps in the sequential numbering system due to additions and eliminations of sample sites over several years. Eight sites within the Accotink Creek watershed were added in 1988 at the request of Fairfax City. The reports for the Accotink Creek watershed include the stream sample results from these sites as well as the Accotink Creek sites in the County. All samples are random grab samples collected twice a month. The stream sample site locations have been evaluated for run-off potential and possible sources of pollution. The sites are located on tax maps and diagrams of the sites are available for reference. Directions to the sites were developed to standardize the sampling sites and for use in the field by Environmental Health Specialists. Maps of sampling sites were developed using Fairfax County's Geographic Information System (GIS) . The maps are part of Section 5 of this report.

Appendix C-Data Tables And Calculations

Comparison and trends of the data are based on a five and ten year period. Data may be obtained for previous years from earlier reports. Data for years prior to 1973 are not comparable due to differentiation in laboratory methods and reporting techniques. The terms Geometric Mean and Average are defined as follows:

The geometric mean is defined as the antilog of the average of the logarithms of the data values.

The term average is used as the Arithmetical Average of data values.

Fecal coliform results for each station are presented in Table 2. The data provides for a year comparison of sample stations to assist in recognizing trends in water quality. The percentage of samples based on their fecal coliform classification (<200 F.C./100 ml and equal to or >200 F.C./100 ml) for each of the watersheds is shown with comparison to previous years in Table 3. Table 4 gives the geometric mean value for each sampling station for fecal coliform organisms. The annual data for dissolved oxygen is presented in Table 5. The data for nitrate nitrogen, pH, and total phosphorous is provided in Table 6. Tables 7 (nitrate nitrogen), 8 (pH) and 9 (total phosphorous) compare a five year period for each watershed. The average temperature, with the high and low temperature for each month, is found in Table 10. The Lake Accotink

Data is presented in Table 11. A separate report for the Fairfax City stream sites is included in Table 12 and the sampling data for heavy metal screening is included in Table 13.

The calculations for this report are generated using dBase IV programming to provide the database and mathematical computations. Development of the computer database began in 1986 with the data stored by calendar year (January 1 to December 31) for report generation. Graphs were generated using Microsoft Office 97, Excel.

The Fairfax County Stream Sampling Sites maps were created as a GIS project using ArcView for Windows. As physical overlays of the County are developed , the GIS program will be developing more detailed maps of sampling sites as well as complaint sites for future reports.

D-Stream Water Quality Report Background

The Stream Water Quality Program was initiated by the Department of Health's Division of Environmental Health in the Fall of 1969. The primary objective of the program is to monitor the water quality of the streams in Fairfax County and obtain data for use in stream water quality surveillance. This enables the Environmental Services staff to locate pollution sources and to initiate corrective action or refer to the appropriate agency for corrective action. The data for this report was collected by the staff of the Environmental Services Section with supplemental information from the Environmental Monitoring Section "**1999 Annual Summary Report**" for the Fairfax County Board of Supervisors.

The parameters originally selected as criteria for stream water quality were fecal coliform and dissolved oxygen. The parameters were expanded in 1979 to include pH, nitrate nitrogen and total phosphorous and in 1982, to include temperature criteria. A screening for heavy metals was collected from 1989 to 1997 to establish a background database for future evaluations. The criteria of each parameter used in this report are based on the Department of Environmental Quality-Water (DEQW)* standards.

The 1994 report contained several enhancements to the programming and presentation formats. The format for Tables 1,3,4,10 and 11 was changed for better understanding and readability. All tables are now generated by dBase IV programming and do not require time to enter additional information for five year comparison reports. The graphs are embedded files in the report, resulting in sharper graphic images.

The 1995 and 1996 reports contain enhancements using Fairfax County's GIS Pilot program and downloaded information and material from the Internet. Future enhancements will include a menu of utility programs for monthly, quarterly or semiannual review of statistics.

Annual Stream reports from 1997 to the present are available for downloading from the Health Department's web site (http://www.co.fairfax.va.us/service/strannualrpt.htm). The reports are available in Acrobat PDF file format and the chemical and fecal coliform results from 1986 to the present are available in dB IV format .

We welcome comments, suggestions and clarifications. However, the **Stream Water Quality Report** is a **trend** analysis report and general findings should not be applied to specific sampling sites. Samples are grab samples collected twice a month, when possible, with many factors influencing any particular sample. Results should be viewed in perspective to all sampling sites within the watershed as well as all sampling sites within the county.

The **Stream Water Quality Report** is provided to the Fairfax County Board of Supervisors, the Metropolitan Washington Council of Governments, Northern Virginia Soil and Water Conservation District, Northern Virginia Planning District Commission, Fairfax County Park Authority, Fairfax City Office of City Planning, Prince William Water and Conservation Division and any Fairfax County citizens group or individual requesting the report. Request for additional copies of the **Stream Water Quality Report** may be directed to the mailing address found in the Table of Contents.

*DEQW is the new designation for the State Water Control Board (SWCB)

SECTION - 4
DATA TABLES

TABLE 1
Number of Stream Samples Collected by Year

	1995	1996	1997	1998	1999
Number of Samples collected for Fecal Coliforms	1574	1536	1686	1528	1486
Number of Samples collected for Dissolved Oxygen	1574	1536	1686	1528	1486
Number of Samples collected for Total Phosphorous	1574	1536	1686	1528	1486
Number of Samples collected for pH	1574	1536	1686	1528	1486
Number of Samples collected for Nitrate Nitrogen	1574	1536	1686	1528	1486

TABLE 2

NUMBER OF FECAL COLIFORM SAMPLES

FOR EACH SAMPLING SITE

REPORT FROM 01/01/99 TO 12/31/99

SAMPLE STATION	TOTAL SAMPLES COLLECTED	<200 per 100 ml	200-1000 per 100 ml	>1000 per 100 ml
SUGARLAND RUN				
02-02	21	4	10	7
02-03	21	2	15	4
NICHOL RUN				
03-03	6	0	4	2
POND BRANCH				
04-01	21	1	10	10
04-02	21	4	9	8
04-03	20	1	14	5
DIFFICULT RUN				
05-01	21	1	8	12
05-05	20	1	8	11
05-09	19	2	8	9
05-11	20	2	10	8
05-12	19	0	6	13
05-13	19	2	7	10
05-15	21	2	10	9
05-18	20	0	6	14
05-19	19	1	9	9
BULLNECK RUN				
06-02	21	5	8	8
SCOTTS RUN				
07-01	21	3	9	9
DEAD RUN				
08-02	21	1	8	12
TURKEY RUN				
09-01	21	6	10	5

TABLE 2

NUMBER OF FECAL COLIFORM SAMPLES
FOR EACH SAMPLING SITE
REPORT FROM 01/01/99 TO: 12/31/99

SAMPLE STATION	TOTAL SAMPLES COLLECTED	<200 per 100 ml	200-1000 per 100 ml	>1000 per 100 ml
PIMMIT RUN				
10-02	21	3	9	9
10-03	21	0	8	13
10-04	21	3	11	7
10-05	21	2	11	8
FOUR MILE RUN				
11-03	20	1	6	13
CAMERON RUN				
12-04	20	4	5	11
12-05	20	1	11	8
12-07	20	3	7	10
12-12	20	3	10	7
12-13	21	4	5	12
12-14	21	3	9	9
LITTLE HUNTING CREEK				
14-02	21	6	6	9
14-03	20	1	11	8
DOGUE CREEK				
15-06	21	1	8	12
ACCOTINK CREEK				
16-03	20	1	8	11
16-07	20	0	6	14
16-08	20	1	10	9
16-09	20	1	8	11
16-12	21	3	7	11
POHICK CREEK				
17-04	21	2	11	8
17-05	21	4	6	11
17-06	21	3	12	6
17-08	21	2	7	12
17-13	20	1	5	14

TABLE 2

NUMBER OF FECAL COLIFORM SAMPLES

FOR EACH SAMPLING SITE

REPORT FROM: 01/01/99 TO 12/31/99

SAMPLE STATION	TOTAL SAMPLES COLLECTED	<200 per 100 ml	200-1000 per 100 ml	>1000 per 100 ml
MILL BRANCH				
20-01	21	4	8	9
20-02	21	5	10	6
20-03	21	10	3	8
SANDY RUN				
22-03	21	4	9	8
22-04	21	4	6	11
WOLF RUN				
24-01	19	3	9	7
24-02	20	2	12	6
OLD MILL BRANCH				
25-04	18	3	7	8
POPES HEAD CREEK				
26-02	18	2	11	5
26-03	19	3	11	5
26-05	19	2	8	9
JOHNNY MOORE CREEK				
27-01	19	3	11	5
LITTLE ROCKY RUN				
28-01	19	1	10	8
28-02	19	2	9	8
CUB RUN				
29-02	22	5	11	6
29-03	22	2	12	8
29-04	21	3	15	3
29-05	22	1	14	7
29-06	22	2	11	9
29-08	21	4	12	5
BULL RUN				
30-01	22	2	12	8
LAKE ACCOTINK				
LA-01	6	2	3	1
LA-02	6	0	3	3
LA-03	6	0	2	4
LA-04	3	1	0	2

TABLE 3

Five Year Comparison of Stream Water Quality Data by
Percentage of Samples in the Good Range For Fecal Coliforms
(Less than 200 f.c. per 100 mg/1)

WATERSHED	1995	1996	1997	1998	1999
SUGARLAND RUN-02	12	11	14	12	14
NICHOL RUN-03	39	28	23	8	0
POND BRANCH-04	13	24	24	13	10
DIFFICULT RUN-05	21	16	15	8	6
BULLNECK RUN-06	36	4	21	8	24
SCOTTS RUN-07	39	32	30	4	14
DEAD RUN-08	17	9	4	4	5
TURKEY RUN-09	32	22	35	8	29
PIMMIT RUN-10	14	10	8	3	10
FOUR MILE RUN-11	10	14	13	4	5
CAMERON RUN-12	19	17	22	5	15
LITTLE HUNTING-14	10	13	10	5	17
DOGUE CREEK-15	33	22	13	18	5
ACCOTINK CREEk-16	17	12	13	7	13
POHICK CREEK-17	25	12	21	7	12
MILL BRANCH-20	36	24	21	4	30
SANDY RUN-22	41	17	27	9	19
WOLF RUN-24	30	31	24	10	13
OLD MILL-25	37	26	35	11	17
POPES HEAD-26	23	28	26	13	13
JOHNNY MOORE-27	25	17	13	21	16
LITTLE ROCKY-28	14	13	17	17	8
CUB RUN-29	25	16	19	15	13
BULL RUN-30	42	14	29	27	9

Table 4
Geometric Mean of Fecal Coliforms
Per 100/ml by Supervisor Districts
Five Year Survey

District/Stream Station Number	Collection Point	Year Collected				
		1995	1996	1997	1998	1999
BRADDOCK						
16-07 Long Branch	Braddock Rd	1240	854	811	695	1472
16-08 Accotink Ck	Braddock Rd	772	969	962	1006	991
DRANESVILLE						
02-02 Folly Lick Br	Hiddenbrook	976	969	861	665	642
02-03 Sugarland Run	Rt 7	1483	899	949	804	545
03-03 Jefferson Br	Springvale Rd	471	455	522	629	725
04-01 Mine Run Br	River Bend Rd	1038	648	560	478	833
04-02 Clarks Branch	Beach Mill Rd	1039	739	511	662	562
04-03 Pond Branch	Blackberry La	483	488	665	501	580
05-15 Capt Hickory Br	Fringe Tree Rd	964	696	812	563	808
05-19 Wolf Trap Run	Trap Rd	687	914	766	795	1032
06-02 Bull Neck Run	Georgetown Pk	422	946	470	487	616
07-01 Scott Run	Georgetown Pk	466	734	742	605	807
08-02 Dead Run	Whann St	928	1617	1299	949	1146
09-01 Turkey Run	George Wash Pk	500	1001	444	529	491
10-02 Pimmit Run	Old Dominion	1318	1967	1814	741	817
10-03 Pimmit Run	Kirby Rd	794	1393	1106	826	1295
10-04 Little Pimmit	Kirby Rd	912	1027	996	835	739
10-05 Pimmit Run	Westmoreland	1342	1834	1792	768	730
HUNTER MILL						
05-09 Difficult Run	Hunter Mill Rd	451	387	684	821	935
05-11 Wolf Trap Run	Browns Mill Rd	846	3968	2236	724	779
05-12 Difficult Run	Browns Mill Rd	759	644	1269	871	1433
05-13 Colvin Mill Run	Rt 7	651	615	495	733	914
05-18 Wolf Trap Cr	Lois Ave	889	804	977	639	1400
LEE						
12-14 Pikes Branch	Telegraph Rd	1251	1610	1059	552	742
16-09 Accotink Ck	Old Keene Mill	694	756	1337	677	941
MASON						
11-03 Long Branch	Glen Carlyn Rd	1607	1476	1380	846	1605
12-04 Tripps Run	Sleepy Hollow	1649	1040	919	790	918
12-05 Holmes Run	Sleepy Hollow	1164	550	689	930	998
12-07 Holmes Run	Glen Hills Pk	682	478	692	661	790
12-12 Turkey Cock	Edsall Rd	501	798	782	496	623
MT VERNON						
12-13 Cameron Run	Fenwick Drive	958	916	950	671	784
14-02 Lit Hunting Ck	Richmond Hwy	1319	1077	1121	947	724
14-03 North Branch	Colligwood Rd	1502	1506	1568	874	944
15-06 Dogue Creek	Mt Vernon Hwy	509	859	977	786	979
16-12 Long Branch	Backlick Rd	1367	1936	1243	702	905
17-06 Pohick Creek	Pohick Rd	518	1101	588	702	529

Table 4
Geometric Mean of Fecal Coliforms
Per 100/ml by Supervisor Districts
Five Year Survey

District/Stream Station Number		Collection Point	Year Collected				
			1995	1996	1997	1998	1999
MT VERNON							
17-08	Pohick Creek	Old Colchester	464	1391	854	582	897
20-01	Giles Run	Lorton Rd	947	1577	1226	782	687
20-02	Giles Run	Old Colchester	468	1434	884	755	440
20-03	South Branch	Old Colchester	232	260	334	448	392
PROVIDENCE							
16-03	Accotink Creek	Barclay Dr	1008	1267	1042	990	1055
SPRINGFIELD							
17-04	Pohick Creek	Old Keene Mill	600	928	917	601	853
17-05	South Run	Lee Chapel Rd	499	479	684	484	763
17-13	Pohick Creek	Burke Lake Rd	798	853	1498	890	1325
22-03	Sandy Run	Henderson Rd	636	874	861	861	735
22-04	Sandy Run	Cathedral Forest	381	659	744	***	***
24-01	Wolf Run	Clifton Rd	627	434	661	566	579
24-02	Wolf Run	Henderson Rd	530	445	795	602	586
25-04	Bull Run	Old Yates Ford	562	659	531	565	591
26-02	Popes Head Ck	Popes Head Rd	650	668	688	562	600
26-03	Piney Branch	Popes Head Rd	708	471	370	554	534
26-05	Popes Head Ck	Clifton Creek	535	515	840	699	919
27-01	Johnny MooreCk	Compton Rd	524	539	831	514	507
28-02	Little Rocky Run	Compton Rd	657	580	773	627	832
SULLY							
05-01	Difficult Run	Waples Mill	947	1128	555	466	981
05-05	Difficult Run	Vale Rd	430	411	993	766	1111
28-01	Little Rocky Run	Lee Hwy	1043	982	1130	506	869
29-02	Big Rocky Run	Braddock Rd	694	849	754	511	421
29-03	Cub Run	Braddock Rd	793	1424	760	600	646
29-04	Cub Run	Compton Rd	441	1490	662	484	458
29-05	Flatlick Branch	Lee Jackson Rd	928	830	840	981	670
29-06	Flatlick Branch	Braddock Rd	828	1007	641	606	692
29-08	Cub Run	Braddock Rd	366	777	527	500	446
30-01	Bull Run	Lee Hwy	373	1020	527	447	698

TABLE 5
DISSOLVED OXYGEN (mg/1)
REPORT FROM: 01/01/99 TO: 12/31/99

SAMPLE STATION	TOTAL SAMPLES COLLECTED	AVERAGE DISSOLVED OXYGEN	PERCENTAGE OF SAMPLES LESS THAN 4.0 mg/1
SUGARLAND RUN			
02-02	21	11.6	0
02-03	21	11.0	0
NICHOL RUN			
03-03	7	11.3	0
POND BRANCH			
04-01	21	11.0	0
04-02	21	10.5	0
04-03	20	11.2	0
DIFFICULT RUN			
05-01	22	12.0	0
05-05	20	10.7	0
05-09	19	10.9	0
05-11	20	11.7	0
05-12	19	10.6	0
05-13	19	11.7	0
05-15	21	11.4	0
05-18	20	11.3	0
05-19	19	11.6	0
BULLNECK RUN			
06-02	20	12.0	0
SCOTTS RUN			
07-01	21	12.7	0
DEAD RUN			
08-02	21	11.6	0
TURKEY RUN			
09-01	21	12.8	0

TABLE 5
DISSOLVED OXYGEN (mg/1)
REPORT FROM: 01/01/99 TO: 12/31/99

SAMPLE STATION	TOTAL SAMPLES COLLECTED	AVERAGE DISSOLVED OXYGEN	PERCENTAGE OF SAMPLES LESS THAN 4.0 mg/1
PIMMIT RUN			
10-02	20	12.3	0
10-03	21	12.6	0
10-04	21	12.7	0
10-05	21	13.0	0
FOUR MILE RUN			
11-03	20	12.8	0
CAMERON RUN			
12-04	20	12.4	0
12-05	20	12.5	0
12-07	20	12.8	0
12-12	20	11.5	0
12-13	20	11.4	0
12-14	20	11.4	0
LITTLE HUNTING CREEK			
14-02	20	10.8	0
14-03	20	9.9	0
DOGUE CREEK			
15-06	20	10.4	0
ACCOTINK CREEK			
16-03	20	11.2	0
16-07	20	12.4	0
16-08	20	11.7	0
16-09	19	11.9	0
16-12	20	12.2	0
POHICK CREEK			
17-04	21	11.9	0
17-05	21	12.1	0
17-06	21	11.8	0
17-08	21	11.9	0
17-13	20	11.2	0

TABLE 6
AVERAGES FOR NITRATE NITROGEN (mg/1)
PH VALUES AND TOTAL PHOSPHOROUS (mg/1)
REPORT FROM: 01/01/99 TO: 12/31/99

SAMPLE STATION	TOTAL SAMPLES COLLECTED	AVERAGE NITRATE NITROGEN	AVERAGE PH	AVERAGE TOTAL PHOSPHOROUS
SUGARLAND RUN				
02-02	21	1.8	7.5	0.1
02-03	21	1.1	7.5	0.1
NICHOL RUN				
03-03	7	0.5	7.2	0.1
POND BRANCH				
04-01	21	1.0	7.2	0.1
04-02	21	1.8	7.0	0.1
04-03	20	1.7	7.2	0.1
DIFFICULT RUN				
05-01	22	0.8	7.2	0.1
05-05	20	1.0	7.2	0.1
05-09	19	0.9	7.1	0.1
05-11	20	1.3	7.2	0.1
05-12	19	0.9	6.9	0.1
05-13	19	1.2	7.1	0.1
05-15	21	1.8	7.2	0.1
05-18	20	0.9	7.2	0.1
05-19	19	1.0	7.2	0.1
BULLNECK RUN				
06-02	20	2.4	7.3	0.1
SCOTTS RUN				
07-01	21	1.1	7.7	0.1
DEAD RUN				
08-02	21	2.0	7.2	0.1
TURKEY RUN				
09-01	21	1.2	7.7	0.1

TABLE 6

AVERAGES FOR NITRATE NITROGEN (mg/1)
PH VALUES AND TOTAL PHOSPHOROUS (mg/1)

REPORT FROM: 01/01/99 TO 12/31/99

SAMPLE STATION	TOTAL SAMPLES COLLECTED	AVERAGE NITRATE NITROGEN	AVERAGE PH	AVERAGE TOTAL PHOSPHOROUS
PIMMIT RUN				
10-02	20	1.2	7.4	0.1
10-03	21	1.4	7.5	0.1
10-04	21	1.5	7.6	0.1
10-05	21	1.3	7.7	0.1
FOUR MILE RUN				
11-03	20	1.3	7.4	0.1
CAMERON RUN				
12-04	20	2.0	7.4	0.1
12-05	20	0.7	7.4	0.1
12-07	20	0.7	7.4	0.1
12-12	20	0.9	7.2	0.1
12-13	20	0.6	7.1	0.1
12-14	20	1.0	7.4	0.1
LITTLE HUNTING CREEK				
14-02	20	1.0	7.0	0.2
14-03	20	0.7	6.9	0.2
DOGUE CREEK				
15-06	20	0.4	6.9	0.1
ACCOTINK CREEK				
16-03	20	0.7	7.1	0.1
16-07	20	0.7	7.2	0.1
16-08	20	0.8	7.1	0.1
16-09	19	0.6	7.2	0.1
16-12	20	0.5	7.0	0.1
POHICK CREEK				
17-04	21	0.4	7.4	0.1
17-05	21	0.2	6.9	0.2
17-06	21	0.3	7.4	0.1
17-08	21	0.3	7.2	0.1
17-13	20	0.4	7.1	0.1

TABLE 6

AVERAGES FOR NITRATE NITROGEN (mg/1)
PH VALUES AND TOTAL PHOSPHOROUS (mg/1)
REPORT FROM: 01/01/99 TO 12/31/99

SAMPLE STATION	TOTAL SAMPLES COLLECTED	AVERAGE NITRATE NITROGEN	AVERAGE PH	AVERAGE TOTAL PHOSPHOROUS
MILL BRANCH				
20-01	21	0.8	7.6	0.1
20-02	21	0.7	7.2	0.1
20-03	21	0.3	7.2	0.2
SANDY RUN				
22-03	21	0.3	7.2	0.1
22-04	21	0.3	7.2	0.1
WOLFRUN				
24-01	18	0.1	7.2	0.1
24-02	20	0.2	7.3	0.1
OLD MILL BRANCH				
25-04	18	4.8	7.5	0.1
POPES HEAD CREEK				
26-02	18	1.1	7.4	0.1
26-03	19	0.7	7.5	0.1
26-05	19	0.5	7.4	0.1
JOHNNY MOORE CREEK				
27-01	19	0.6	7.2	0.1
LITTLE ROCKY RUN				
28-01	20	0.3	7.3	0.1
28-02	19	0.7	7.7	0.1
CUB RUN				
29-02	22	0.6	7.5	0.1
29-03	22	0.7	7.6	0.1
29-04	22	0.7	7.8	0.1
29-05	20	1.5	7.4	0.1
29-06	22	1.1	7.5	0.1
29-08	22	0.6	7.7	0.1
BULL RUN				
30-01	21	0.4	7.4	0.1
LAKE ACCOTINK				
LA-01	6	0.2	7.2	0.1
LA-02	6	0.2	7.4	0.1
LA-03	6	0.2	7.3	0.1
LA-04	3	0.2	7.3	0.1

Table 7
Geometric Mean of Nitrate Nitrogen
by Watershed
Five Year Survey

Watershed	Year Collected 1995	1996	1997	1998	1999
02-Sugarland Run	1.3	1.7	1.2	0.9	1.1
04-Pond Branch	1.3	1.2	1.4	1.5	1.4
05-Difficult Run	1.0	1.2	1.2	1.1	0.9
06-Bullneck Run	2.0	2.2	2.1	1.7	2.2
07-Scotts Run	1.0	1.4	1.3	1.1	1.0
08-Dead Run	2.0	2.5	2.1	1.6	1.8
09-Turkey Run	1.2	1.2	1.2	1.1	1.1
10-Pimmit Run	1.4	1.5	1.5	1.2	1.1
11-Four Mile Run	1.1	1.6	1.4	1.3	0.9
12-Cameron Run	0.8	0.9	0.9	0.7	0.8
14-Little Hunting Creek	0.7	1.0	0.7	0.7	0.7
15-Douge Creek	0.2	0.2	0.2	0.2	0.2
16-Accotink Creek	0.6	0.9	0.7	0.5	0.6
17-Pohick Creek	0.3	0.4	0.3	0.3	0.3
20-Mill Branch	0.6	0.4	0.5	0.3	0.4
22-Sandy Run	0.3	0.4	0.3	0.2	0.3
24-Wolf Run	0.2	0.3	0.2	0.2	0.2
25-Old Mill Branch	3.0	1.9	3.0	3.5	3.7
26-Popes Head Creek	0.8	0.9	0.8	0.8	0.7
27-Johnny Moore Creek	0.6	0.9	0.7	0.4	0.5
28-Little Rocky Run	0.4	0.6	0.5	0.3	0.3
29-Cub Run	0.6	0.8	0.6	0.4	0.7
30-Bull Run	0.2	0.4	0.3	0.2	0.3

Table 8
Geometric Mean of pH
by Watershed
Five Year Survey

Watershed	Year Collected 1995	1996	1997	1998	1999
02-Sugarland Run	7.5	7.2	7.4	7.5	7.5
03-Nichol Run	7.3	6.9	7.2	7.1	7.2
04-Pond Branch	7.2	6.8	7.0	7.1	7.1
05-Difficult Run	7.3	7.0	7.1	7.1	7.1
06-Bullneck Run	7.3	7.1	7.2	7.3	7.3
07-Scotts Run	7.6	7.3	7.5	7.5	7.7
08-Dead Run	7.3	7.1	7.2	7.0	7.2
09-Turkey Run	7.6	7.4	7.7	7.7	7.7
10-Pimmit Run	7.6	7.3	7.5	7.6	7.6
11-Four Mile Run	7.6	7.0	7.2	7.1	7.4
12-Cameron Run	7.4	7.1	7.3	7.2	7.3
14-Little Hunting Cree	7.1	6.7	6.9	6.8	6.9
15-Douge Creek	7.0	6.8	6.8	6.9	6.9
16-Accotink Creek	7.3	7.1	7.2	7.2	7.3
17-Pohick Creek	7.2	7.0	7.1	7.1	7.2
20-Mill Branch	7.5	7.1	7.2	7.2	7.3
22-Sandy Run	7.4	7.1	7.5	7.1	7.2
24-Wolf Run	7.3	7.0	7.6	7.2	7.2
25-Old Mill Branch	7.7	7.2	7.5	7.6	7.5
26-Popes Head Creek	7.4	7.1	7.4	7.4	7.4
27-Johnny Moore Creek	7.4	7.0	7.1	7.3	7.2
28-Little Rocky Run	7.5	7.2	7.4	7.5	7.5
29-Cub Run	7.5	7.2	7.5	7.5	7.6
30-Bull Run	7.4	7.1	7.4	7.3	7.4

Table 9
Geometric Mean of Total Phosphorous (mg/1)
by Watershed
Five Year Survey

Watershed	Year Collected 1995	1996	1997	1998	1999
02-Sugarland Run	0.11	0.10	0.10	0.11	0.10
03-Nichol Run	0.11	0.10	0.09	0.10	0.10
04-Pond Branch	0.10	0.10	0.10	0.10	0.10
05-Difficult Run	0.10	0.10	0.10	0.10	0.10
06-Bullneck Run	0.11	0.11	0.10	0.10	0.10
07-Scotts Run	0.11	0.10	0.09	0.10	0.10
08-Dead Run	0.10	0.11	0.10	0.10	0.11
09-Turkey Run	0.11	0.11	0.09	0.10	0.10
10-Pimmit Run	0.11	0.11	0.09	0.10	0.10
11-Four Mile Run	0.10	0.10	0.10	0.10	0.10
12-Cameron Run	0.10	0.11	0.10	0.11	0.10
14-Little Hunting Creek	0.11	0.12	0.11	0.12	0.16
15-Douge Creek	0.11	0.11	0.12	0.11	0.11
16-Accotink Creek	0.11	0.10	0.10	0.10	0.10
17-Pohick Creek	0.10	0.10	0.10	0.10	0.11
20-Mill Branch	0.11	0.11	0.13	0.14	0.12
22-Sandy Run	0.10	0.10	0.09	0.10	0.10
24-Wolf Run	0.11	0.10	0.10	0.10	0.10
25-Old Mill Branch	0.11	0.11	0.10	0.12	0.10
26-Popes Head Creek	0.11	0.10	0.10	0.10	0.10
27-Johnny Moore Creek	0.11	0.11	0.10	0.11	0.10
28-Little Rocky Run	0.11	0.11	0.10	0.10	0.10
29-Cub Run	0.10	0.11	0.10	0.11	0.10
30-Bull Run	0.10	0.11	0.10	0.10	0.10

Table 10
Stream Water Sample Temperature Ranges
(Degrees in Fahrenheit)

Temperature Averages (Geometric Mean)

	1995	1996	1997	1998	1999
January	39	37	38	43	38
February	38	42	45	46	41
March	51	44	48	48	45
April	53	52	55	57	55
May	61	61	59	66	62
June	70	72	66	71	70
July	76	74	72	72	73
August	76	72	72	75	74
September	66	67	66	71	64
October	58	59	58	60	55
November	45	46	45	50	48
December	37	44	40	45	42

High & Low Temperature

	1995	1996	1997	1998	1999
January					
High	56	60	60	59	59
Low	32	30	9	34	32
February					
High	55	63	62	60	60
Low	31	32	32	38	34
March					
High	62	58	61	72	65
Low	37	32	42	42	35
April					
High	66	68	68	66	68
Low	41	39	0	49	34
May					
High	72	86	74	80	73
Low	44	50	50	55	48
June					
High	88	88	82	81	83
Low	62	60	56	59	61
July					
High	86	90	82	84	83
Low	67	66	66	64	63
August					
High	88	78	80	84	82
Low	65	67	65	65	62
September					
High	82	83	75	83	76
Low	56	54	58	61	47
October					
High	72	68	80	67	64
Low	50	48	44	51	41
November					
High	59	65	60	62	62
Low	38	38	36	36	38
December					
High	50	60	55	60	58
Low	27	38	35	32	35

Table 11
Lake Accotink Park
Results
(All averages are Geometric Mean)

Percentage of Fecal Coliforms in the Good Range
(Less than 200 Fecal Coliform/ 100 ml)

Station	1995	1996	1997	1998	1999
LA-01	20	33	25	13	33
LA-02	20	33	13	0	0
LA-03	40	17	13	0	0
LA-04	20	17	13	0	33

Average Dissolved Oxygen (mg/1) By Station

Station	1995	1996	1997	1998	1999
LA-01	7.5	6.8	7.3	8.8	10.8
LA-02	7.7	7.3	7.1	8.2	11.5
LA-03	7.5	6.1	7.4	8.2	10.7
LA-04	7.5	6.1	7.4	8.2	10.7

Percent of Samples Less than 4 mg/1 of Dissolved Oxygen

Station	1995	1996	1997	1998	1999
LA-01	0	0	0	0	0
LA-02	0	0	0	0	0
LA-03	0	0	0	0	0
LA-04	0	17	0	0	0

Average Nitrate Nitrogen (mg/1)

Station	1995	1996	1997	1998	1999
LA-01	0.27	0.54	0.25	0.34	0.19
LA-02	0.28	0.67	0.32	0.34	0.17
LA-03	0.21	0.70	0.27	0.38	0.18
LA-04	0.31	0.68	0.25	0.37	0.14

Average pH

Station	1995	1996	1997	1998	1999
LA-01	7.4	7.0	7.0	7.2	7.2
LA-02	7.4	7.0	7.0	7.3	7.4
LA-03	7.4	6.9	7.1	7.2	7.3
LA-04	7.5	7.0	7.1	7.2	7.3

Average Total Phosphorous (mg/1)

Station	1995	1996	1997	1998	1999
LA-01	0.10	0.11	0.10	0.12	0.10
LA-02	0.11	0.11	0.10	0.11	0.10
LA-03	0.10	0.10	0.10	0.11	0.10
LA-04	0.11	0.10	0.09	0.12	0.10

TABLE 12
CITY OF FAIRFAX STREAM SAMPLE RESULTS
FOR EACH SAMPLING STATION

NUMBER OF FECAL COLIFORM SAMPLES

STATION	TOTAL SAMPLES COLLECTED	<200 per 100 ml	200-1000 per 100 ml	>1000 per 100 ml
16-20	21	1	9	11
16-21	21	4	9	8
16-22	21	2	9	10
16-23	20	3	10	7
16-24	20	3	11	6
16-25	20	5	7	8
16-26	20	4	9	6

STATION	# SAMPLES COLLECTED	AVERAGE DISSOLVED OXYGEN	PERCENTAGE OF SAMPLES LESS THAN 4 MG/L
16-20	20	10.8	0
16-21	20	12.0	0
16-22	20	12.9	0
16-23	20	12.6	0
16-24	20	12.5	0
16-25	20	12.2	0
16-26	20	12.8	0
16-27	20	11.7	0

STATION	# SAMPLES COLLECTED	AVERAGE NITRATE NITROGEN	AVERAGE pH	AVERAGE TOTAL PHOSPHOROUS
16-20	20	0.8	7.5	0.1
16-21	20	0.8	7.5	0.1
16-22	20	0.9	7.6	0.1
16-23	20	1.0	7.4	0.1
16-24	20	0.9	7.5	0.1
16-25	20	1.2	7.4	0.1
16-26	20	0.6	7.4	0.1
16-27	20	0.4	7.3	0.1

Table 13

Log Average of Heavy Metals by Watershed

From 1989 - 1997

NOTE: PMCL = Primary Maximum Contaminate Level

	METAL (PMCL)	**RESULTS(mg/1)**
01- HORSEPEN CREEK:		
	Arsenic(0.05mg/1)	0.002
	Barium (1.00mg/1)	0.066
	Cadmium (0.01mg/1)	0.001
	Chromium (0.05mg/1)	0.001
	Lead (0.05mg/1)	0.001
	Mercury (0.02 mg/1)	Below Detection Limits
	Selenium (0.01 mg/1)	0.002
	Silver (0.05 mg/1)	0.001
02- SUGARLAND RUN:		
	Arsenic (0.05mg/1)	0.001
	Barium (1.00mg/1)	0.046
	Cadmium (0.01mg/1)	0.001
	Chromium (0.05mg/1)	0.001
	Lead (0.05mg/1)	0.001
	Mercury (0.02 mg/1)	Below Detection Limits
	Selenium (0.01 mg/1)	0.002
	Silver (0.05 mg/1)	0.001
03- NICHOL RUN:		
	Arsenic (0.05mg/1)	0.001
	Barium (1.00mg/1)	0.015
	Cadmium (0.01mg/1)	0.001
	Chromium (0.05mg/1)	0.001
	Lead (0.05mg/1)	0.001
	Mercury (0.02 mg/1)	Below Detection Limits
	Selenium (0.01 mg/1)	0.002
	Silver (0.05 mg/1)	0.002
04- POND BRANCH:		
	Arsenic (0.05mg/1)	0.001
	Barium (1.00mg/1)	0.020
	Cadmium (0.01mg/1)	0.001
	Chromium (0.05mg/1)	0.001
	Lead (0.05mg/1)	0.001
	Mercury (0.02 mg/1)	Below Detection Limits
	Selenium (0.01 mg/1)	0.002
	Silver (0.05 mg/1)	0.001

Table 13

Log Average of Heavy Metals by Watershed

From 1989 - 1997

NOTE: PMCL =Primary Maximum Contaminate Level

	METAL (PMCL)	**RESULTS(mg/1)**
05- DIFFICULT RUN:		
	Arsenic (0.05mg/1)	0.001
	Barium (1.00mg/1)	0.021
	Cadmium (0.01mg/1)	0.001
	Chromium (0.05mg/1)	0.001
	Lead (0.05mg/1)	0.001
	Mercury (0.02mg/1)	Below Detection Limits
	Selenium (0.01 mg/1)	0.002
	Silver (0.05 mg/1)	0.001
06- BULLNECK RUN:		
	Arsenic (0.05 mg/1)	0.001
	Barium (1.00 mg/1)	0.014
	Cadmium (0.01mg/1)	Below Detection Limits
	Chromium (0.05mg/1)	0.001
	Lead (0.05mg/1)	0.001
	Mercury (0.02mg/1)	Below Detection Limits
	Selenium (0.01mg/1)	0.001
	Silver (0.05mg/1)	Below Detection Limits
07- SCOTTS RUN:		
	Arsenic (0.05mg/1)	0.001
	Barium (1.00mg/1)	0.018
	Cadmium (0.01mg/1)	0.001
	Chromium (0.05mg/1)	0.001
	Lead (0.05mg/1)	0.002
	Mercury (0.02 mg/1)	Below Detection Limits
	Selenium (0.01 mg/1)	0.001
	Silver (0.05 mg/1)	0.001
08- DEAD RUN:		
	Arsenic (0.05mg/1)	0.001
	Barium (1.00mg/1)	0.017
	Cadmium (0.01mg/1)	0.001
	Chromium (0.05mg/1)	0.001
	Lead (0.05mg/1)	0.002
	Mercury (0.02mg/1)	Below Detection Limits
	Selenium (0.01 mg/1)	0.002
	Silver (0.05 mg/1)	0.001

Table 13

Log Average of Heavy Metals by Watershed

From 1989 TO 1997

NOTE: PMCL = Primary Maximum Contaminate Level

	METAL (PMCL)	**RESULTS(mg/1)**
09- TURKEY RUN:		
	Arsenic (0.05mg/1)	0.001
	Barium (1.00mg/1)	0.021
	Cadmium (0.01mg/1)	0.001
	Chromium (0.05mg/1)	0.001
	Lead (0.05mg/1)	0.001
	Mercury (0.02mg/1)	Below Detection Limits
	Selenium (0.01 mg/1)	0.002
	Silver (0.05 mg/1)	0.001
10- PIMMIT RUN:		
	Arsenic (0.05mg/1)	0.001
	Barium (1.00mg/1)	0.023
	Cadmium (0.01mg/1)	0.001
	Chromium (0.05mg/1)	0.001
	Lead (0.05mg/1)	0.001
	Mercury (0.02 mg/1)	Below Detection Limits
	Selenium (0.01 mg/1)	0.002
	Silver (0.05 mg/1)	0.001
11- FOUR MILE RUN:		
	Arsenic (0.05mg/1)	Below Detection Limits
	Barium (1.00mg/1)	0.020
	Cadmium (0.01mg/1)	0.001
	Chromium (0.05mg/1)	0.001
	Lead (0.05mg/1)	0.002
	Mercury (0.02mg/1)	Below Detection Limits
	Selenium (0.01mg/1)	0.002
	Silver (0.05mg/1)	0.001
12- CAMERON RUN:		
	Arsenic (0.05mg/1)	0.001
	Barium (1.00mg/1)	0.035
	Cadmium (0.01mg/1)	0.001
	Chromium (0.05mg/1)	0.001
	Lead (0.05mg/1)	0.002
	Mercury (0.02mg/1)	Below Detection Limits
	Selenium (0.01 mg/1)	0.002
	Silver (0.05mg/1)	0.001

Table 13

Log Average of Heavy Metals by Watershed

From 1989 TO 1997

NOTE: PMCL = Primary Maximum Contaminate Level

	METAL (PMCL)	**RESULTS (mg/1)**
14- LITTLE HUNTING:		
	Arsenic (0.05mg/1)	0.001
	Barium (1.00mg/1)	0.035
	Cadmium (0.01mg/1)	0.001
	Chromium (0.05mg/1)	0.001
	Lead (0.05mg/1)	0.002
	Mercury (0.02mg/1)	Below Detection Limits
	Selenium (0.01mg/1)	0.002
	Silver (0.05mg/1)	0.001
15- DOGUE CREEK:		
	Arsenic (0.05mg/1)	0.002
	Barium (1.00mg/1)	0.031
	Cadmium (0.01mg/1)	0.001
	Chromium (0.05mg/1)	Below Detection Limits
	Lead (0.05mg/1)	0.002
	Mercury (0.02mg/1)	Below Detection Limits
	Selenium (0.01 mg/1)	0.001
	Silver (0.05 mg/1)	0.001
16- ACCOTINK CREEK:		
	Arsenic (0.05 mg/1)	0.001
	Barium (1.00 mg/1)	0.020
	Cadmium (0.01mg/1)	0.001
	Chromium (0.05mg/1)	0.001
	Lead (0.05mg/1)	0.002
	Mercury (0.02 mg/1)	Below Detection Limits
	Selenium (0.01mg/1)	0.002
	Silver (0.05mg/1)	0.001
17- POHICK CREEK:		
	Arsenic (0.05mg/1)	0.001
	Barium (1.00mg/1)	0.022
	Cadmium (0.01mg/1)	0.001
	Chromium (0.05mg/1)	0.001
	Lead (0.05mg/1)	0.001
	Mercury (0.02mg/1)	Below Detection Limits
	Selenium (0.01mg/1)	0.002
	Silver (0.05mg/1)	0.001

Table 13

Log Average of Heavy Metals by Watershed

From 1989 TO 1997

NOTE: PMCL = Primary Maximum Contaminate Level

	METAL (PMCL)	**RESULTS (mg/1)**
20- MILL BRANCH:		
	Arsenic (0.05mg/1)	0.001
	Barium (1.00mg/1)	0.043
	Cadmium (0.01mg/1)	0.001
	Chromium (0.05mg/1)	0.001
	Lead (0.05mg/1)	0.003
	Mercury (0.02 mg/1)	Below Detection Limits
	Selenium (0.01 mg/1)	0.002
	Silver (0.05 mg/1)	0.001
22- SANDY RUN:		
	Arsenic (0.05mg/1)	0.001
	Barium (1.00mg/1)	0.029
	Cadmium (0.01mg/1)	0.001
	Chromium (0.05mg/1)	0.001
	Lead (0.05mg/1)	0.001
	Mercury (0.02 mg/1)	Below Detection Limits
	Selenium (0.01 mg/1)	0.002
	Silver (0.05 mg/1)	0.001
24- WOLF RUN:		
	Arsenic (0.05mg/1)	Below Detection Limits
	Barium (1.00mg/1)	0.018
	Cadmium (0.01mg/1)	0.001
	Chromium (0.05mg/1)	0.001
	Lead (0.05mg/1)	0.001
	Mercury (0.02mg/1)	Below Detection Limits
	Selenium (0.01mg/1)	0.002
	Silver (0.05mg/1)	0.001
25- OLD MILL:		
	Arsenic (0.05mg/1)	0.002
	Barium (1.00mg/1)	0.036
	Cadmium (0.01mg/1)	Below Detection Limits
	Chromium (0.05mg/1)	0.001
	Lead (0.05mg/1)	0.002
	Mercury (0.02mg/1)	Below Detection Limits
	Selenium (0.01mg/1)	0.001
	Silver (0.05mg/1)	Below Detection Limits

Table 13

Log Average of Heavy Metals by Watershed

From 1989 TO 1997

NOTE: PMCL = Primary Maximum Contaminate Level

	METAL (PMCL)	**RESULTS (mg/1)**
26- POPES READ:		
	Arsenic (0.05mg/1)	0.001
	Barium (1.00mg/1)	0.019
	Cadmium (0.01mg/1)	0.001
	Chromium (0.05mg/1)	0.001
	Lead (0.05mg/1)	0.001
	Mercury (0.02 mg/1)	Below Detection Limits
	Selenium (0.01 mg/1)	0.002
	Silver (0.05 mg/1)	0.001
27- JOHNNY MOORE RUN:		
	Arsenic (0.05 mg/1)	Below Detection Limits
	Barium (1.00 mg/1)	0.017
	Cadmium (0.01mg/1)	0.001
	Chromium (0.05mg/1)	0.001
	Lead (0.05mg/1)	0.001
	Mercury (0.02mg/1)	Below Detection Limits
	Selenium (0.01mg/1)	0.002
	Silver (0.05mg/1)	0.001
28- LITTLE ROCKY RUN:		
	Arsenic (0.05mg/1)	0.001
	Barium (1.00mg/1)	0.033
	Cadmium (0.01mg/1)	0.001
	Chromium (0.05mg/1)	0.001
	Lead (0.05mg/1)	0.002
	Mercury (0.02 mg/1)	Below Detection Limits
	Selenium (0.01 mg/1)	0.002
	Silver (0.05 mg/1)	0.001
29- CUB RUN:		
	Arsenic (0.05mg/1)	0.001
	Barium (1.00mg/1)	0.046
	Cadmium (0.01mg/1)	0.001
	Chromium (0.05mg/1)	0.001
	Lead (0.05mg/1)	0.002
	Mercury (0.02mg/1)	Below Detection Limits
	Selenium (0.01 mg/1)	0.002
	Silver (0.05 mg/1)	0.001

Table 13

Log Average of Heavy Metals by Watershed

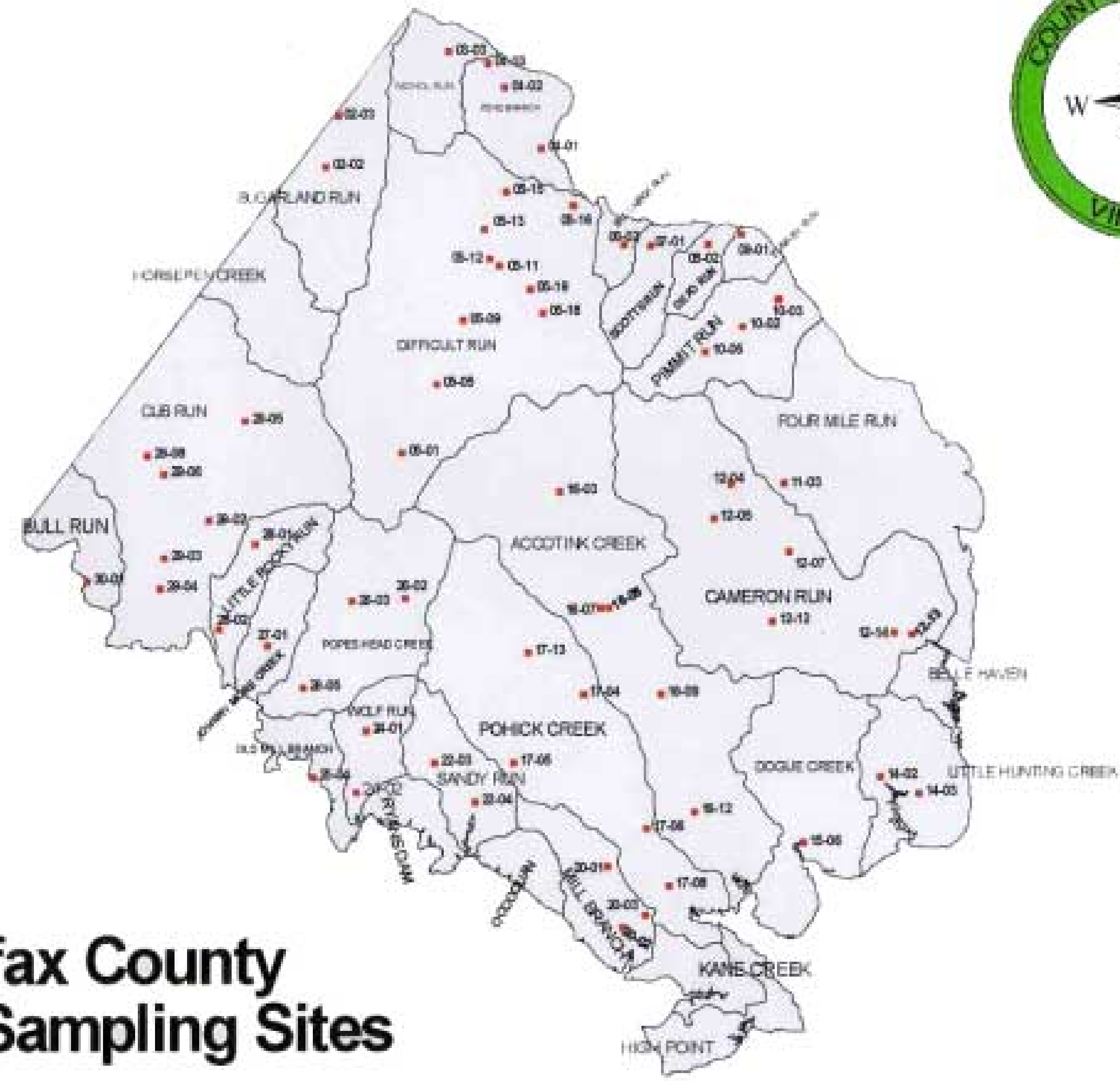
From 1989 TO 1997

NOTE: PMCL = Primary Maximum Contaminate Level

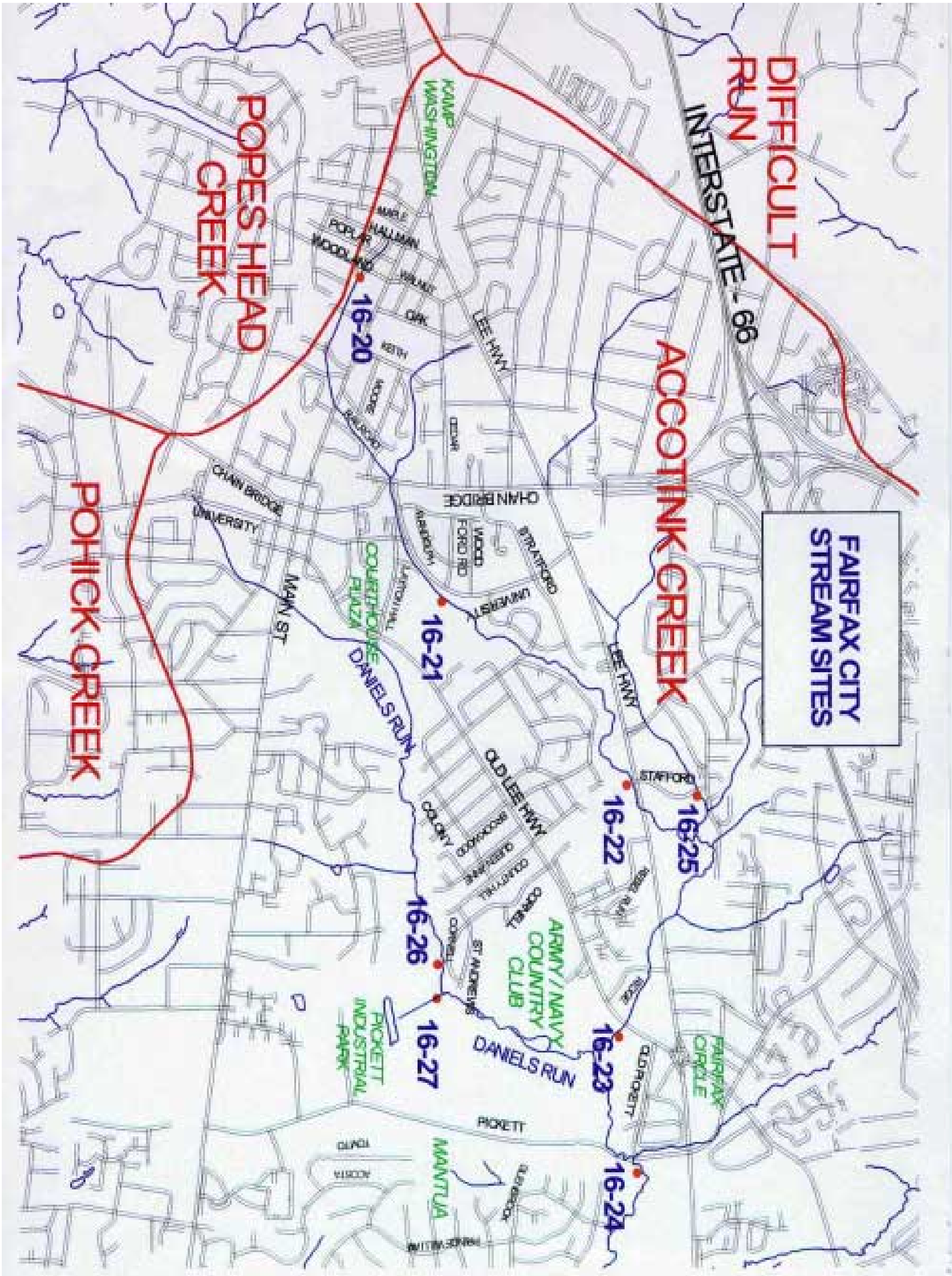
	METAL (PMCL)	**RESULTS (mg/1)**
30- BULL RUN:		
	Arsenic (0.05mg/1)	0.001
	Barium (1.00mg/1)	0.027
	Cadmium (0.01mg/1)	0.001
	Chromium (0.05mg/1)	0.001
	Lead (0.05mg/1)	0.001
	Mercury (0.02mg/1)	Below Detection Limits
	Selenium (0.01mg/1)	0.002
	Silver (0.05 mg/1)	0.001

SECTION 5

STREAM
SAMPLING SITES



Fairfax County Stream Sampling Sites


FAIRFAX CITY STREAM SITES
DIFFICULT RUN
POPES HEAD CREEK
POHICK CREEK
ACCOTINK CREEK
INTERSTATE - 66
KAMP WASHINGTON
COURTHOUSE PLAZA
ARMY / NAVY COUNTRY CLUB
PICKETT INDUSTRIAL PARK
FAIRFAX CIRCLE
MANTUA
DANIELS RUN
DANIELS RUN
16-20
16-21
16-22
16-23
16-24
16-25
16-26
16-27
LEE HWY
LEE HWY
CHAIN BRIDGE
CHAIN BRIDGE
UNIVERSITY
UNIVERSITY
MAIN ST
OLD LEE HWY
STAFFORD
STRATFORD
OLD PICKETT
PICKETT
FORD RD
WOOD
CEDAR
KEITH
OAK
WOODLAND
POPLAR
HALLMAN
MAPLE
COLONY
ST ANDREWS