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The 1998 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 year's reports are available on Fairfax County's Internet site at:

http://www.fairfaxcounty.gov/hd

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1998 Stream Water Quality Report
Fairfax County Health Department

Fairfax County Health Department
Stream Water Quality Report

1998 Stream Water Quality Report

Abstract

The 1998 Stream Water Quality Report includes data collected from 72 sampling sites throughout 25 of 30 watersheds in Fairfax County. A total of 1,520 stream samples were collected for analyses in 1998. 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 22 stream complaints were investigated by the Health Department in 1998.

Sampling Result Highlights

- 1,520 stream samples collected from 72 Sites.
- The stream samples in the **good water quality range** (<200 f.c./100 ml) for fecal coliform is 9% for 1998.
- Total phosphates, nitrate nitrogen, dissolved oxygen and pH levels remain consistent with the 5 year averages.

FIVE YEAR COMPARISON SUMMARY (1994 - 1998)*

FECAL COLIFORM (F.C./100ML)	1994	1995	1996	1997	1998
% Fecal Coliform <200 f.c./100ml	21	22	17	18	9
Fecal Coliform Mean**	946	743	915	829	689
PHYSICAL PARAMETERS	**1994**	**1995**	**1996**	**1997**	**1998**
Rainfall (Sum in inches)	43	40	54	36	39
Sample Temperature (°F)***	55	54	54	54	57
CHEMICAL PARAMETERS	**1994**	**1995**	**1996**	**1997**	**1998**
Total Phosphorous (mg/l)**	0.11	0.10	0.10	0.10	.11
Nitrate Nitrogen (mg/l)**	0.72	0.69	0.87	0.74	.61
Dissolved Oxygen (mg/l)***	8.5	8.5	8.9	9.2	8.9
pH***	7.3	7.4	7.1	7.3	7.2

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

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

*****Arithmetic Mean**

SECTION 1

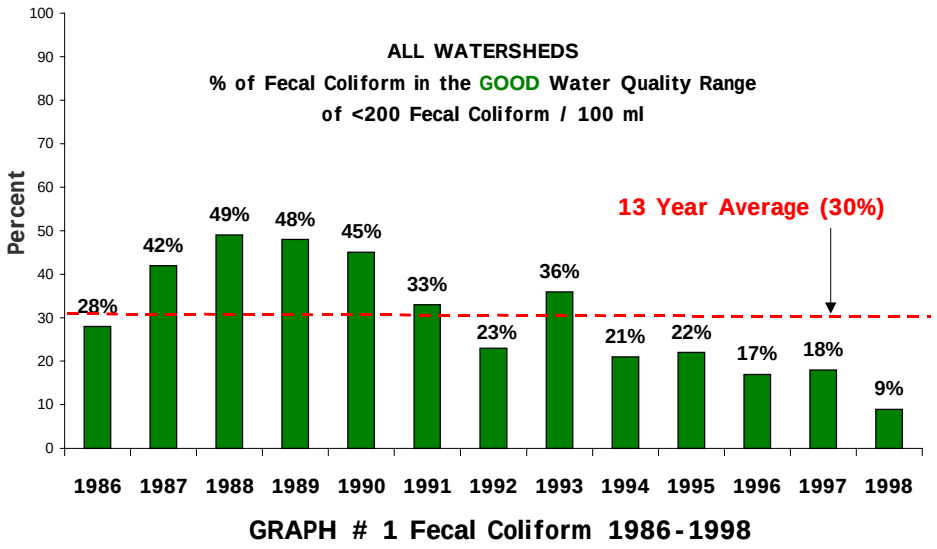
1998 SURVEY RESULTS

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.



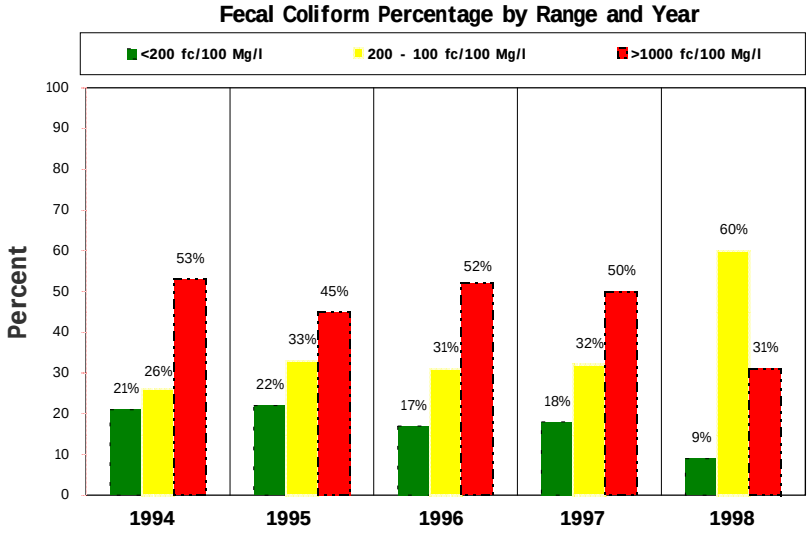
GRAPH # 1 Fecal Coliform 1986-1998

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 1998 the percentage of samples in the good water quality range (<200 f.c./100ml) was half (9%) of the 1997 percentage (18%), see graph # 1. However, there

[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.

was a corresponding decrease (19%) in the percentage of samples in the greater than 1,000 f.c./100 ml range, graph # 2. This resulted in a lower geometric mean for 1998 (689 f.c./100 ml) and the lowest year average since 1993's geometric mean of 498 f.c./100 ml.



GRAPH # 2 - Fecal Coliform Range

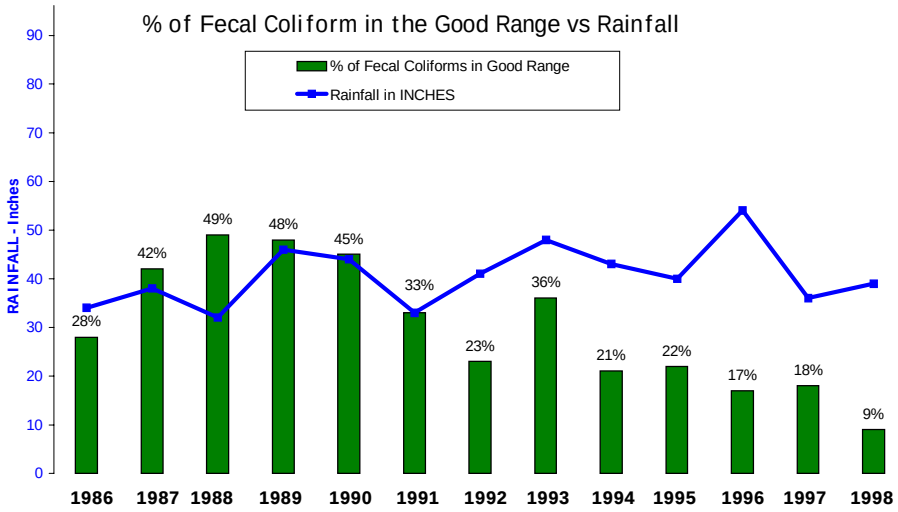
In 1998 the number of samples within the 200 - 1,000 f.c./100 ml range doubled (60%) the number of samples found in prior years (graph # 2). The increase in the number of samples for the 200 - 1,000 f.c./100 ml may indicate a slight improvement over prior years. The movement of the number of samples falling into this range from the <200 f.c./100ml and the >1,000 f.c./100 ml may prove to be a seasonal variation and not a significant indicator of improvement.

Early 1999 sample results are almost evenly grouped between the three sampling ranges. The percentage of samples falling into the higher fecal coliform range usually occurs during the summer months and is dependent on other factors as outlined in the following discussion.

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.

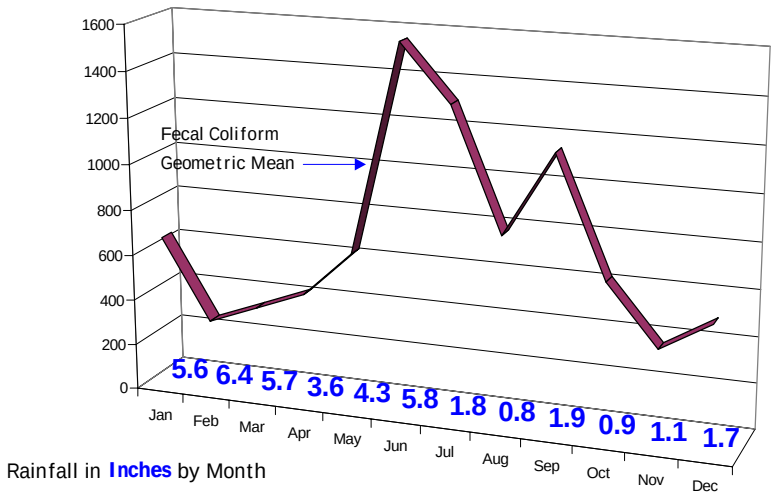


GRAPH # 3 Fecal Coliform Vs Rainfall by Year

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 1998 the amount of rainfall increased slightly to 39", 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 #4 Fecal Coliform Vs Rainfall by Month in 1998



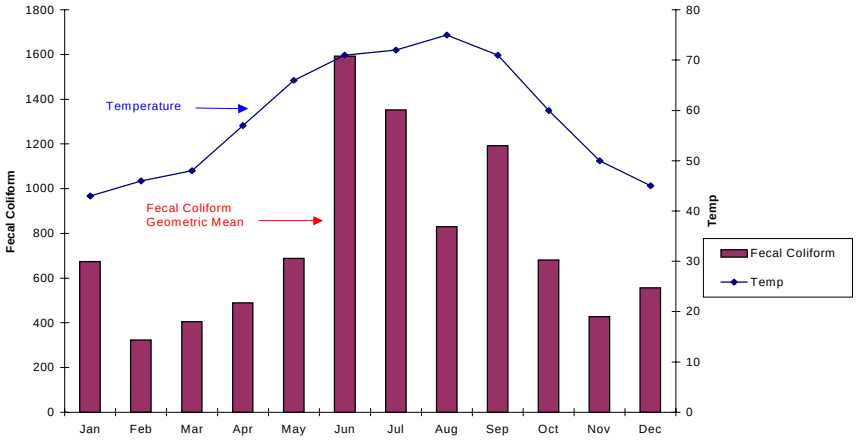
	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Fecal Coliform	673	323	404	489	688	1593	1352	831	1191	681	427	556
Rainfall	5.6	6.4	5.7	3.6	4.3	5.8	1.8	0.8	1.9	0.9	1.1	1.7

A further analysis of the rainfall by month in 1998 indicates a drastic drop in rainfall after the highest monthly total (5.8") of the year in June. June was also the highest monthly average for fecal coliforms in 1998 with an average of 1,593 f.c./100 ml for the month.

The monthly rainfall totals from July through December 1998 were never above 2" per month and the monthly geometric mean for the fecal coliforms did decrease but did not follow any direct relationship to the rainfall (graph # 4).

The decrease in fecal coliforms may be related more to temperature than rainfall.

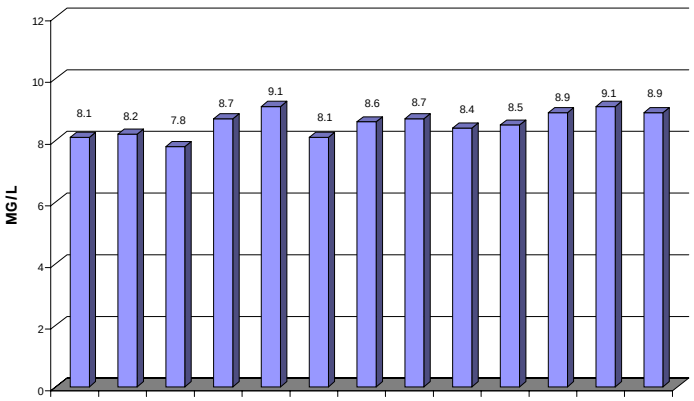
The second factor, water temperature, may be contributing to an increase in the fecal coliform Geometric Mean by providing optimum temperatures for coliform growth. The number of samples in the equal to or greater than (>=) 200 fecal coliform range for 1998 did not follow the seasonal trend noted in prior Stream Water Quality Reports. (graph #5)



Graph # 5 Fecal Coliform vs Temperature by

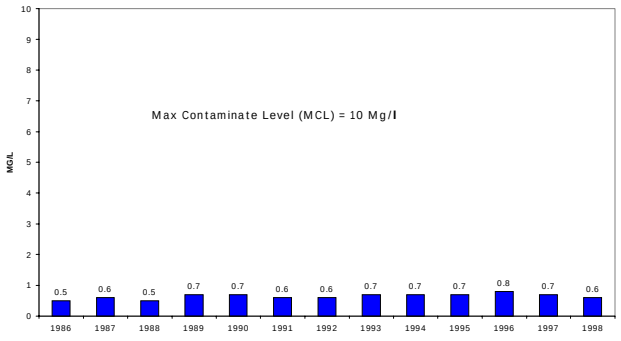
II. Dissolved Oxygen

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.***



Graph #6 DISSOLVED OXYGEN

Ninety-seven percent (97%) of the samples collected for determination of dissolved oxygen (D.O.) were above 4.0 mg/l. Sample results for 1998 remained consistent with results from prior sampling years with only one sampling station showing uniformly low results (graph #6). Mill Branch sampling station (20-03) where the annual geometric mean was 1.9 mg/l and 83% of the samples collected were below the minimum of 4.0 mg/l. This sampling site is located downstream from a debris landfill and could indicate that organic contaminants are entering the stream. The introduction of organic contaminants decreases the oxygen content of the stream. The debris landfill operation is regularly monitored by the Commonwealth of Virginia's Department of Environmental Quality-Waste.



Graph # 7 NITRATE NITROGEN

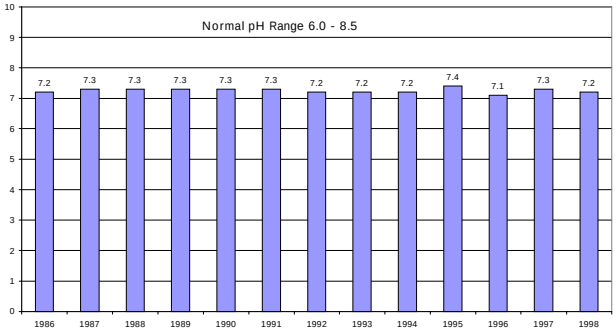
III. Nitrate Nitrogen

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.***

The samples for nitrate nitrogen ranged from a low reading of 0.09 mg/l to a high of 10.4 mg/l. The overall nitrate nitrogen Geometric Mean was 0.61 mg/l. This is well below the maximum limit of 10 mg/l (graph # 7). Three samples were above the maximum contamination level of 10 mg/l. All 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.***



Graph # 8 pH

The pH ranged from a low reading of 6.2 to a high of 10.0. Ten samples were above the 8.5 limits.

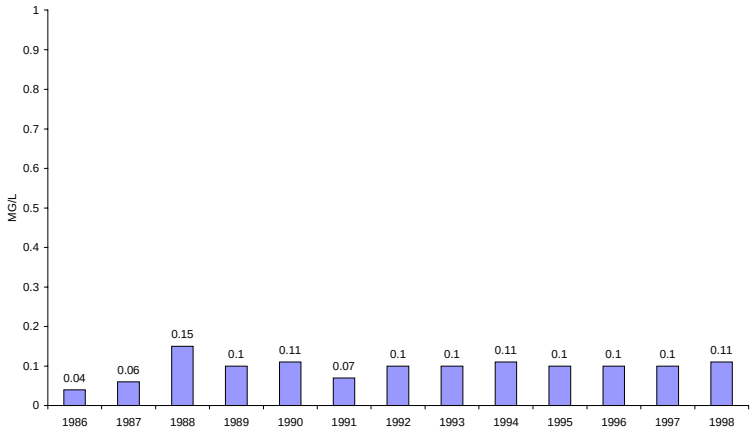
V. Phosphorous (Total)

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 phos-

phorous 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 0.11 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 13 years are illustrated in graph # 9.

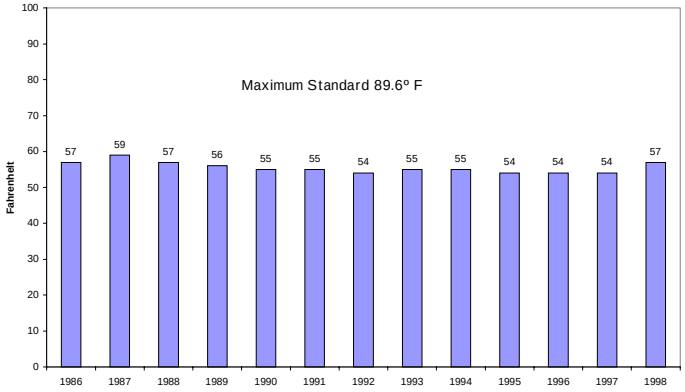


Graph # 9 TOTAL PHOSPHOROUS

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).***

The temperature range for all stream water samples collected in 1998 was 32°F for the low in December and 84°F for the high in September. The average for all samples collected in 1998 was 57°F (graph # 10).



Graph #10 WATER SAMPLE TEMPERATURE

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).

Sampling for heavy metals began in 1989 for all stream sites. 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

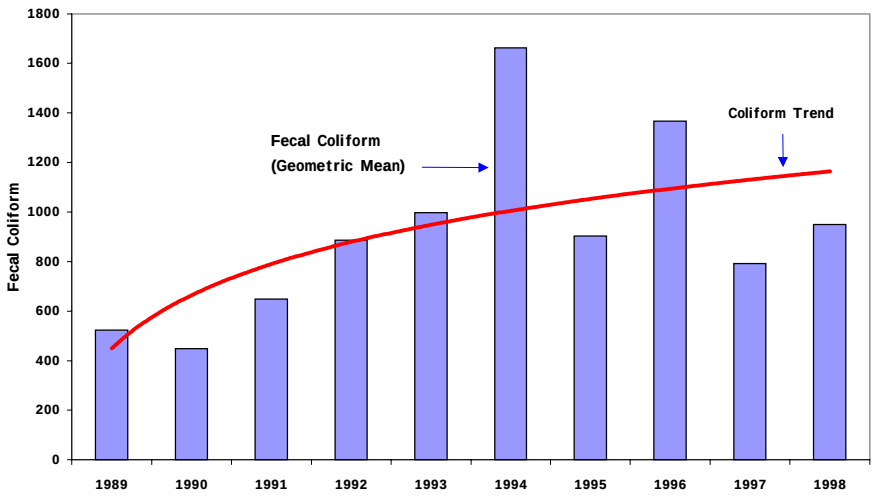
Background: ***Lake Accotink is sampled from four surface points on the lake from May through August. The four sample points are surface grab samples and are only accessible by boat. It is necessary to coordinate the sampling schedule with the availability of a boat and operator, which is provided by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

A total of 28 samples were collected from May through August 1998. Five percent (5%) of samples collected were in the good water quality range of less than 200 f.c./100 ml. The dissolved oxygen Geometric Mean for 1998 was 8.4 mg/l. All samples (100%) collected were greater than 4 mg/l for 1998. The overall Geometric Mean for nitrate nitrogen was 0.35 mg/l. The average pH was 7.2 and the average total phosphorous was 0.11 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.***

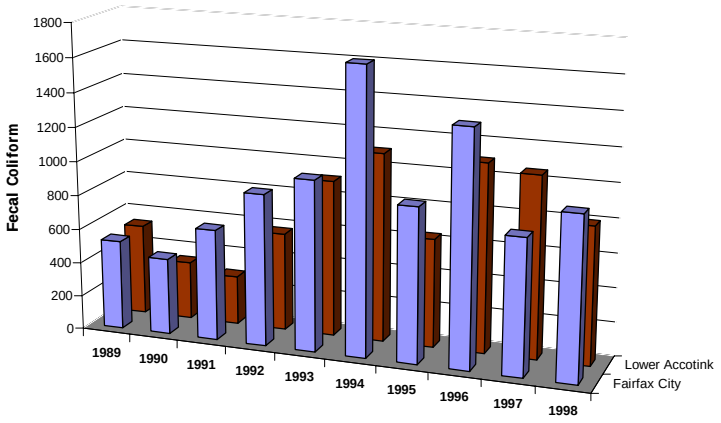
Eighty-two percent (82%) of the samples collected for fecal coliforms had results greater than or equal to 200 fecal coliforms/100 ml, while 18% of the samples collected are less than 200 fecal coliforms. The Geometric Mean for fecal coliforms from all Fairfax City stream sites increased to 950 fc/100ml (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 with sample results higher than the lower Accotink sampling sites (graph #12).

The pH ranged from a low of 6.5 to a high of 8.6. The Mean for pH for all city sites is 7.3 for 1998. Total phosphorous levels ranged from a low of 0.09 mg/l to a high of 0.22 mg/l. Nitrate nitrogen ranged from a low of 0.10 mg/l to a high of 2.0 mg/l. The overall nitrate nitrogen average for all stream sites within Fairfax City is 0.54 mg/l.



	1989	1990	1991	1992	1993	1994	1995	1996	1997	1998
Fairfax City	523	448	649	886	997	1662	903	1367	792	950
Lower Accotink	532	339	286	575	915	1103	636	1101	1059	802

GRAPH #12 Fairfax City Vs Accotink Watershed

The dissolved oxygen results ranged between 1.6 mg/l for the low to 14.4 mg/l for the high, with 5 sample results less than 4 mg/l.

X. Water Quality Summary Statement

The 1998 Stream Water Quality Report includes data collected from 72 sampling sites from 25 of the 30 watersheds in Fairfax County. A total of 1520 stream samples were collected for analyses in 1998. 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
1998 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.***

1998 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.

Eighty-eight (88) stream awareness programs have been presented by Environmental Health Specialists to 1,705 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.***

Seventy (70) site visits were made to investigate 22 complaints in 1998. The 22 complaints were initially investigated by Health Department staff and referred to the proper agency or resolved utilizing Health Department procedures and local ordinances. Two (2) complaints dealt with runoff, 6 were associated with dumping and trash in the streams, 4 were referred due to color and odor problems, 4 responses were made to possible sewer line breaks and 6 miscellaneous complaints were received in 1998.

Five (5) of the 1998 complaints required action to be taken by the Fairfax County Health Department , 3 required action by the Department of Public Works and Environmental Services and 1 by the Viriginia Department of Environmental Quality Water (DEQW).

Section 3

Appendix A-Laboratory Procedures

The laboratory procedures used to determine the number of fecal coliform organisms are defined in "Standard Methods (16th Edition)". The fecal coliform procedure utilizes the millipore filter and gives a direct count per 100 ml of sample. Procedures used to determine dissolved oxygen, nitrate nitrogen, pH and total phosphorous are defined in EPA's Manual, "Methods for Chemical Analysis of Water and Wastes," (EPA-600/4-9-020). The dissolved oxygen (D.O.) determination is 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 by electrothermal atomic absorption method using a graphite furnace as defined in "Standard Methods (16th Edition)". Mercury was analyzed by Cold Vapor Technique, EPA Method 245.1 Detection limits for heavy metals is located in a table found in Section I -VII (page 9) 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 1998 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 Pilot 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 Air Quality Chemical Hazards Section "**1998 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 initiated in 1989 and is collected once a year 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 were 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.

The 1997 report was placed on the Health Department's web site as an Acrobat PDF file for down loading. The chemical and fecal coliform results from 1986 to the present report are also available in dB4 format and are also located on the web site for down loading. Past annual reports, as well as the current report, will be available from the Health Department's web site for down loading.

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 one 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)