

1 Introduction

The *2006 Annual Report on Fairfax County's Streams* presents the results of monitoring efforts conducted throughout calendar year 2005 for biological, bacteriological, physical, and chemical stream characteristics, including:



A small stream cascading into the floodplain of Pohick Creek

- Bacteria levels (fecal-related)
- Benthic macroinvertebrates
- Fish communities
- Water chemistry

This data will be used to support watershed planning, project implementation, permit requirements, educational efforts, detection of pollution sources and more.

Previous years' data are used for comparison purposes and baseline information. Prior annual stream monitoring reports are available on Fairfax County's web site at:

<http://www.fairfax.va.us/dpwes/stormwater/streams/assessment.htm>

1.1 Report and Program Goals

The goal of the *Annual Report on Fairfax County's Streams* is to present the results of Fairfax County's annual stream water quality monitoring efforts. The results are used to determine the county's Stream Quality Index (SQI) - a numerical indicator ranging from 1 to 5 - of the overall health of Fairfax County's waterways. It is envisioned that future reports will serve as a central repository for information and data related to the biological, chemical and physical conditions of the county's waterways, collected through various county agencies and local organizations.

The long-term biological and bacteriological monitoring program supports the Board of Supervisor's *Environmental Excellence for Fairfax County; a 20-year Vision* (Environmental Agenda), by providing a comprehensive, ongoing analysis of stream conditions throughout the county, while simultaneously meeting or exceeding the requirements set forth in the Municipal Separate Storm Sewer System (MS4) Permit issued by the State under the Virginia Pollutant Discharge Elimination System (VPDES), pursuant to the goals and mandates of the Federal Clean Water Act.

While supporting these requirements and initiatives, the program will also develop a substantial dataset. Over time, this dataset will provide essential data to determine the overall rate of change or trends in the conditions of Fairfax County's streams, providing a basis for targeting and prioritizing implementation measures, as well as other opportunities to help restore and protect the county's streams and watersheds.

1.2 Study Area Overview

Fairfax County is located in the northeastern part of the state of Virginia, bordering the Potomac River (Figure 1). The county is bordered by Arlington County and the cities of Falls Church and Alexandria on the northeast. The Potomac River borders the county on the north and southeast. The border with Loudon County lies to the north and west, and the Bull Run/Occoquan Rivers form the southern border with Prince William County. Within the borders of Fairfax County are three incorporated towns, Vienna, Herndon and Clifton, and one city, Fairfax City. Two large federal reservations also lie within Fairfax County, Dulles International Airport, which straddles the western border with Loudon County, and Fort Belvoir, a large US Army base situated in the southeastern portion of Fairfax. Several smaller federal reservations also lie within the county's borders, CIA-Langley, a US Coast Guard Station, USGS Headquarters in Reston and Mason Neck National Wildlife Refuge. Waters on federal, state lands (including preserves and parks) are not under county authority or purview.



Figure 1: Location of Fairfax County in the State of Virginia.

Fairfax County today is highly urbanized and approaching ultimate build-out conditions, as envisioned in the county's Comprehensive Plan. The total land area of Fairfax County, including incorporated towns is 395 square miles. It is the most populous jurisdiction in Virginia as well the Washington D.C. metropolitan area, with the 2005 population estimated to be 1,047,500 with 387,700 households. Land use is primarily residential, with smaller areas in commercial, recreational, and open-land uses (industrial use areas are present in small pockets).

The county lies within the Chesapeake Bay Watershed. There are approximately 850 miles of stream channels with perennial streamflow draining 30 designated major watersheds (drainage basins), with 23 watersheds falling entirely within the county's borders (Figure 2). The 30 watersheds drain either to the north and east to the Potomac River, or to the south into the Bull Run/Occoquan river, which eventually outlets into the Potomac. The 30 major watersheds within the county range in size from the two square mile Turkey Run drainage to the 58 square mile Difficult Run basin. The mouths of the streams draining the far southeastern portion of the county are influenced by the tidal rhythm of the Lower Potomac.

The Watersheds and Physiographic Provinces of Fairfax County



Figure 2: The 30 watersheds and two physiographic provinces in Fairfax County, Virginia.

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Stormwater Planning Division, DPWES

The major lakes throughout the county are all man-made impoundments and were designed for municipal water supply, stormwater control, and/or recreational and aesthetic purposes.

The Occoquan River is impounded just upstream of where it passes under Route 123. The reservoir was created when the river was dammed in 1950, and then enlarged in 1957 by the county to provide a source of drinking water for residents within the region. In July 1982, the Fairfax County Board of Supervisors voted to restrict development on 41,000 of the 64,500 acres within Fairfax County draining to the reservoir. The resultant “down-zoning” limited the number of residences to one home per five acres in a successful effort to improve the quality of stream water draining into the drinking water reservoir.

Fairfax County at a Glance	
<i>Total area</i>	400 mi ² *
<i>Total land area</i>	395 mi ²
<i>Population in 2005 (estimated)</i>	1,047,500
<i>Number of households</i>	387,700
<i>Number of incorporated towns and cities</i>	4
<i>Towns of Vienna, Herndon, and Clifton Fairfax City</i>	
<i>Number of designated watersheds</i>	30
<i>Largest watershed Difficult Run, 58 mi² Smallest watershed Turkey Run, 2 mi²</i>	
<i>Length of perennial streams</i>	850 miles
<i>Physiographic Provinces (and sub-Provinces)</i>	
<i>Piedmont land area</i>	
<i>Triassic Basin land area</i>	
<i>Coastal Plain land area</i>	
	* mi ² = square miles

Fairfax County lies within two major physiographic provinces, the Coastal Plain and Piedmont (Figure 2). Physiographic provinces are areas that have common geology, surface processes, and landscape history having characteristic landforms and environments. Each province comprises areas with similar terrestrial and aquatic floral and faunal ecosystems, including certain communities which may be unique to those provinces. These provinces are the basic landscape units by which biological communities can be evaluated and compared.

The Piedmont province covers 60 percent of the county (243 mi²) and is typified by gently rolling landscapes, deeply weathered bedrock/soils and a relatively low occurrence of solid outcrop. The Triassic basin, which overlies the far western portion of Fairfax County, is a subset of the larger Piedmont province and covers 17 percent of the county (69 square miles). The Triassic basin is actually the remains of a huge prehistoric lake bottom that covered portions of western Northern Virginia and Maryland. It is typically much flatter and has unique lake sediment type soils as compared to the encompassing Piedmont province.

The Coastal Plain province spans the eastern portion of the county and bounds the Piedmont along the fall line. The fall line is a low east-facing cliff paralleling the Atlantic coastline from New Jersey to the Carolinas. It marks the boundary between the hard Paleozoic metamorphic rocks of the Piedmont (to the west) from the softer, flatter Mesozoic and Tertiary sedimentary rocks of the Coastal Plain. To the west of this line, the streams are typified by greater-sloping channel bottoms and the resultant higher velocity riffle-run habitats. East of this line, in the Coastal Plain, the landscape generally has much gentler slopes, and results in water bodies dominated by lower velocity pool-and-glide habitats. Historically, this fall line presented an obstacle to further upstream navigation to early European settlers in boats and thus is the location of many major mid-Atlantic cities such as Philadelphia, Baltimore, Washington D.C., and Richmond. Interstate 95 generally traverses this geologic feature through Northern Virginia.