

FAIRFAX COUNTY DRAINAGE BASINS

The drainage basin map of Fairfax County is intended for use by planners, engineers, hydrologists, and other citizens concerned with the effect of land use on water resources.

Fairfax County, lying within the Potomac River basin, has an area of about 400 square miles (1,036 sq km). About three quarters of this area is in the Piedmont physiographic province and the remainder is in the Coastal Plain. Streams in the northern part of the Piedmont drain about 30 percent of the total county area and flow into the non-tidal Potomac River. The remaining area drains to the Potomac estuary, either directly, or into Occoquan Creek and thence to the estuary.

A drainage basin is a catchment area bounded by a topographic divide from which direct surface runoff normally drains by gravity into a stream. The area is measured in a horizontal plane on a topographic map, and is expressed in square miles, or square kilometers. Underlying the catchment area is a groundwater basin with a ground-water divide which usually coincides with the topographic divide. The significance of the distinction between the topographic divide and the ground-water divide is considered later.

Precipitation falling on a defined drainage basin may add to streamflow, infiltrate into the ground, or be re-pirated. Hydrologists study the occurrence and movement of water by measuring stream flow and evaluating ground-water aquifer systems in selected drainage basins.

The relationship between the physical characteristics of the drainage basins and the variations in streamflow are of particular interest to the hydrologist. Studies have been made which relate streamflow to factors such as climate, drainage area, channel geometry, forest cover, and surface storage (lakes and swamps). These studies relate the magnitude of a flow parameter in mathematical terms to indices of the basin characteristics. For example, average annual flood peaks for Fairfax County streams are related to drainage area size and to an index of main channel length and slope (Anderson, 1970). The relevant indices can be computed from topographic maps and weather records. Use of the defined relations permit the transfer of streamflow data from gaged sites to ungaged sites or more broadly, from gaged basins to ungaged basins.

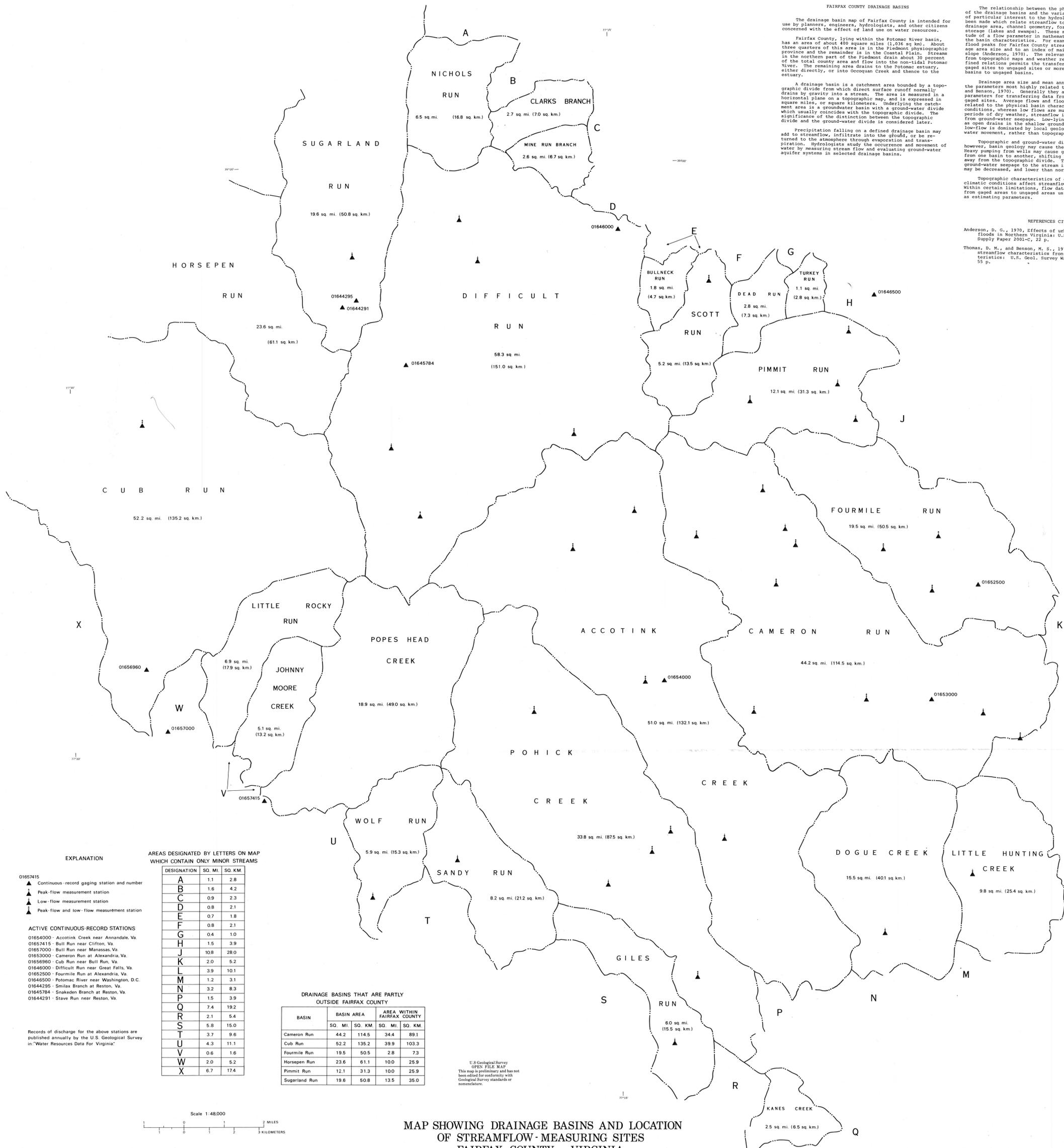
Drainage area size and mean annual precipitation are the parameters most highly related to streamflow (Thomas and Benson, 1970). Generally they are the best parameters for transferring data from gaged sites to ungaged sites. Average flows and flood flows are strongly related to the physical basin characteristics and climatic conditions, whereas low flows are much less so. During periods of dry weather, streamflow is essentially derived from ground-water seepage. Low-lying stream channels act as open drains in the shallow ground-water reservoir. Thus low-flow is dominated by local geologic controls on ground-water movement, rather than topographic factors.

Topographic and ground-water divides commonly coincide, however, basin geology may cause these divides to differ. Heavy pumping from wells may cause ground water to move from one basin to another, shifting the ground-water divide away from the topographic divide. The area contributing ground-water seepage to the stream in the ungaged basin may be decreased, and lower than normal base flows may occur.

Topographic characteristics of drainage basins and climatic conditions affect streamflow in measurable degrees. Within certain limitations, flow data can be transferred from gaged areas to ungaged areas using basin characteristics as estimating parameters.

REFERENCES CITED

- Anderson, D. G., 1970, Effects of urban development on floods in Northern Virginia: U.S. Geol. Survey Water-Supply Paper 2001-C, 22 p.  
Thomas, D. M., and Benson, M. S., 1970, Generalization of streamflow characteristics from drainage basin characteristics: U.S. Geol. Survey Water-Supply Paper 1975, 55 p.



EXPLANATION

- 01657415  
▲ Continuous-record gaging station and number  
▲ Peak-flow measurement station  
▲ Low-flow measurement station  
▲ Peak-flow and low-flow measurement station

ACTIVE CONTINUOUS-RECORD STATIONS

- 01654000 - Accotink Creek near Annandale, Va.  
01657415 - Bull Run near Clifton, Va.  
01657000 - Bull Run near Manassas, Va.  
01653000 - Cameron Run at Alexandria, Va.  
01656960 - Cub Run near Bull Run, Va.  
01646000 - Difficult Run near Great Falls, Va.  
01652500 - Fourmile Run at Alexandria, Va.  
01646500 - Potomac River near Washington, D.C.  
01644295 - Smitax Branch at Reston, Va.  
01645784 - Snakeden Branch at Reston, Va.  
01644291 - Stave Run near Reston, Va.

Records of discharge for the above stations are published annually by the U.S. Geological Survey in "Water Resources Data For Virginia".

AREAS DESIGNATED BY LETTERS ON MAP WHICH CONTAIN ONLY MINOR STREAMS

DESIGNATION	SQ. MI.	SQ. KM.
A	1.1	2.8
B	1.6	4.2
C	0.9	2.3
D	0.8	2.1
E	0.7	1.8
F	0.8	2.1
G	0.4	1.0
H	1.5	3.9
J	10.8	28.0
K	2.0	5.2
L	3.9	10.1
M	1.2	3.1
N	3.2	8.3
P	1.5	3.9
Q	7.4	19.2
R	2.1	5.4
S	5.8	15.0
T	3.7	9.6
U	4.3	11.1
V	0.6	1.6
W	2.0	5.2
X	6.7	17.4

DRAINAGE BASINS THAT ARE PARTLY OUTSIDE FAIRFAX COUNTY

BASIN	BASIN AREA		AREA WITHIN FAIRFAX COUNTY	
	SQ. MI.	SQ. KM.	SQ. MI.	SQ. KM.
Cameron Run	44.2	114.5	34.4	89.1
Cub Run	52.2	135.2	39.9	103.3
Fourmile Run	19.5	50.5	2.8	7.3
Horsepen Run	23.6	61.1	10.0	25.9
Pimmit Run	12.1	31.3	10.0	25.9
Sugarland Run	19.6	50.8	13.5	35.0

U.S. Geological Survey  
OPEN FILE MAP  
This map is preliminary and has not been edited for conformity with Geological Survey standards or nomenclature.

Scale 1:48,000



MAP SHOWING DRAINAGE BASINS AND LOCATION OF STREAMFLOW-MEASURING SITES  
FAIRFAX COUNTY, VIRGINIA

By  
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1977