

Fairfax County 2023 MS4 Program Plan and Annual Report

# Appendix R12

Summary of The Biological Monitoring Results and Analyses

VSMP Permit Number VA0088587  
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During the 2023 permit cycle, the five selected bioassessment sites within Fairfax County were monitored twice for benthic macroinvertebrates and habitat. Fairfax County uses the EPA rapid bioassessment protocol (RBP) multi-habitat benthic survey (20-jab method) and subsamples to approximately 200 individuals, which are identified to the lowest practicable level (usually genus). In order to calculate the Virginia Stream Condition Index (VSCI), the sample is rarified to 110 individuals and then aggregated to family (and some higher-level taxa) for analysis.

Although the benthic macroinvertebrate assemblage scored consistently higher on the Virginia Stream Condition Index (VSCI) in the fall monitoring period compared to the spring (except for a minor increase at flatlick branch), scores ranged from Slightly Impaired (1) to Severely Impaired (3). While the spring samples were dominated by Chironomidae and oligochaetes, most of the fall samples continue to be dominated by tolerant Trichoptera (Philopotamidae and Hydropsychidae) with a distinct lack of Chironomidae and oligochaetes. Additionally, the fall samples held an average of four more taxa than the spring samples.

Fairfax County utilizes stream habitat assessments modified from EPA’s RBP. Certain environmental factors can influence habitat scores such as differing water levels, vegetative growth depending on the season the assessment was done, or antecedent weather conditions. Habitat scores indicate that spring scores (mean=119.8) are slightly better than fall scores (mean=114.0) and the difference among paired habitat scores is significant (p=0.036). Two-way analyses of variance indicated there were no temporal [annual] trends in habitat in the spring (p=0.955) or fall (p=0.626).

There is a distinct increase in the fall VSCI scores (mean=43.0) over the spring samples (mean=23.8). The mean annual increase by site scores is 19.1 on the VSCI, which is significant (p<0.001). Because this trend is consistent at most of the sites over this permit and extensions, the benthic assemblage varies seasonally among Piedmont MS4 sites. Two-way analyses of variance indicated there were no temporal [annual] trends in VSCI scores in the spring (p=0.911) or fall (p=0.718).

Sufficient data has been collected to establish a “baseline” biological condition and seasonal trend for these sites.

Site ID	Latitude	Longitude	Season	Virginia SCI (out of 100)	Rating	Habitat Scores (out of 200)
01645704 – Difficult Run	38°53'04.5"	77°19'57.8" NAD27	Fall	48.1	Impaired (1)	114
			Spring	17.9	Impaired (3)	107
01645762 – South Fork Little Difficult Run	38°54'35"	77°20'14.6" NAD27	Fall	53.1	Impaired (1)	112
			Spring	33.7	Impaired (2)	113
01646305 – Dead Run	38°57'34.8"	77°10'33.5" NAD27	Fall	49.1	Impaired (1)	133
			Spring	21.8	Impaired (2)	139
01654500 – Long Branch	38°48'39"	77°14'07" NAD27	Fall	36.4	Impaired (2)	131
			Spring	24.1	Impaired (2)	129
01656903 – Flatlick Branch	38°52'56.2"	77°25'55.9" NAD27	Fall	51	Impaired (1)	139
			Spring	29.7	Impaired (2)	120