

### 3. Summary of Watershed Conditions

#### 3.1 Introduction

This section presents a summary of Little Rocky Run and Johnny Moore Creek watershed conditions. More detailed information can be found in the appendices of the Watershed Management Plan. Little Rocky Run and Johnny Moore Creek drain into Bull Run and eventually to Chesapeake Bay, and are located in the southwestern part of Fairfax County, Virginia, as shown in Figure 3-1.

The Little Rocky Run watershed encompasses 4,605 acres (7.2 square miles) and the Johnny Moore Creek watershed encompasses 3,374 acres (5.3 square miles). Both watersheds are located in the Piedmont physiographic province, a region characterized by gently rolling hills, deeply weathered bedrock and very little solid rock at the surface.

The Little Rocky Run and Johnny Moore Creek watersheds have been subdivided into watershed management areas (WMAs). The WMAs have been used to evaluate portions of the watershed with similar land use and development characteristics. The Little Rocky Run watershed is divided into three WMAs: Little Rocky Run-Upper, Little Rocky Run-Lower and Little Rocky Run-Bull Run. Johnny Moore Creek watershed is similarly divided into two WMAs, Johnny Moore Creek and Johnny Moore-Bull Run. Both Little Rocky Run-Bull Run and Johnny Moore-Bull Run are small areas that drain directly to Bull Run; these two WMAs have no significant development, and no projects are identified for these WMAs in this watershed management plan. Figure 3-2 shows the locations of the WMAs used for Little Rocky Run and Johnny Moore Creek.

#### 3.2 Land Use in the Watersheds

On July 26, 1982, the Fairfax County Board of Supervisors approved a rezoning of more than 41,000 acres in the Occoquan watershed, which includes the Johnny Moore Creek watershed and a portion of the Little Rocky Run watershed, in order to protect the Occoquan Reservoir, which supplies drinking water to the County. Land in the rezoned area is classified as a Residential-Conservation (R-C) District, designating a maximum density of one dwelling unit per 5 acres. The entire Johnny Moore Creek watershed is located in the R-C District. The portion of Little Rocky Run south of Compton Road, and the area south of Braddock Road and east of Union Mill Road, are in the R-C District. The Little Rocky Run watershed consists primarily of open space,

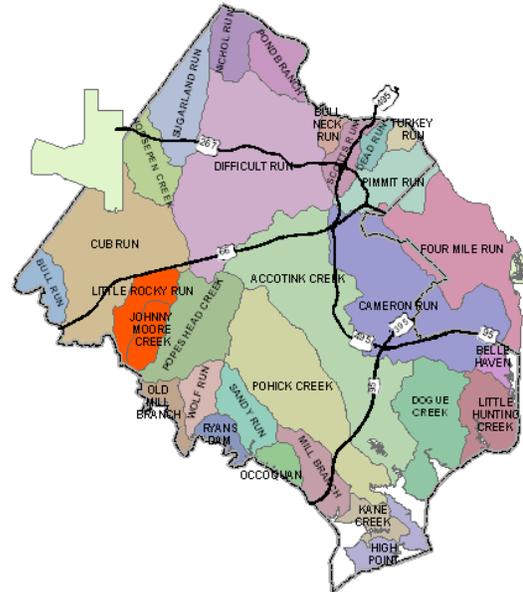
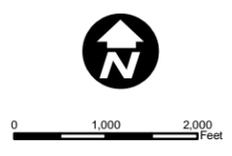
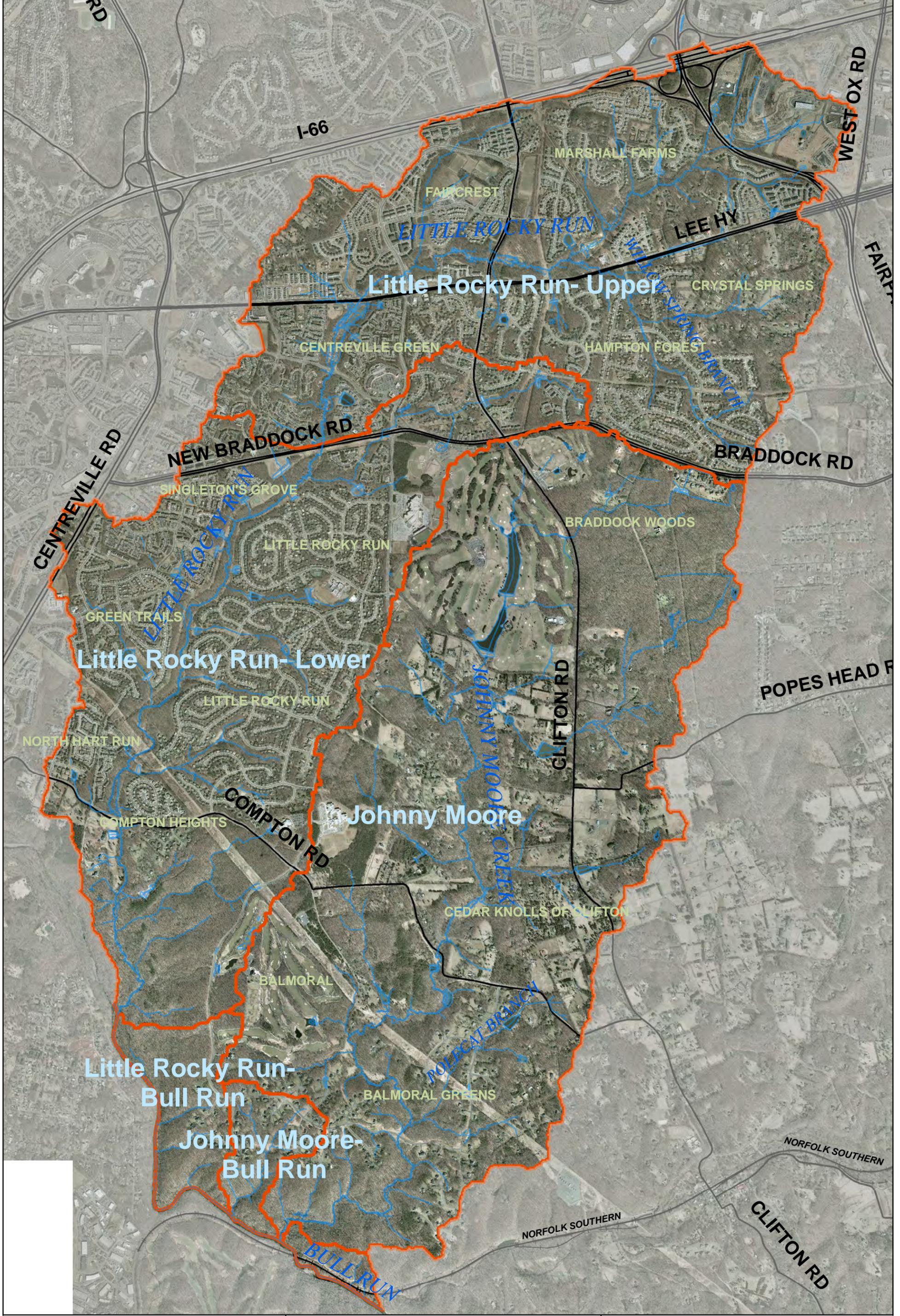


Figure 3-1: Location of the Little Rocky Run and Johnny Moore Creek watersheds shown in orange



- Streams
- Watershed Management Areas
- Major Roads
- Railroad

Map 3-2  
 Watershed Management Areas  
 Little Rocky Run / Johnny Moore Creek

residential development and roadways. Existing and Future Land Use Maps for both watersheds are shown in Figure 3-3.

### 3.3 Modeling Results

Table 3-1 provides a summary of runoff peak values and pollutant loadings at the outlet of each WMA. The bottom portion of the table contains values normalized by contributing drainage area.

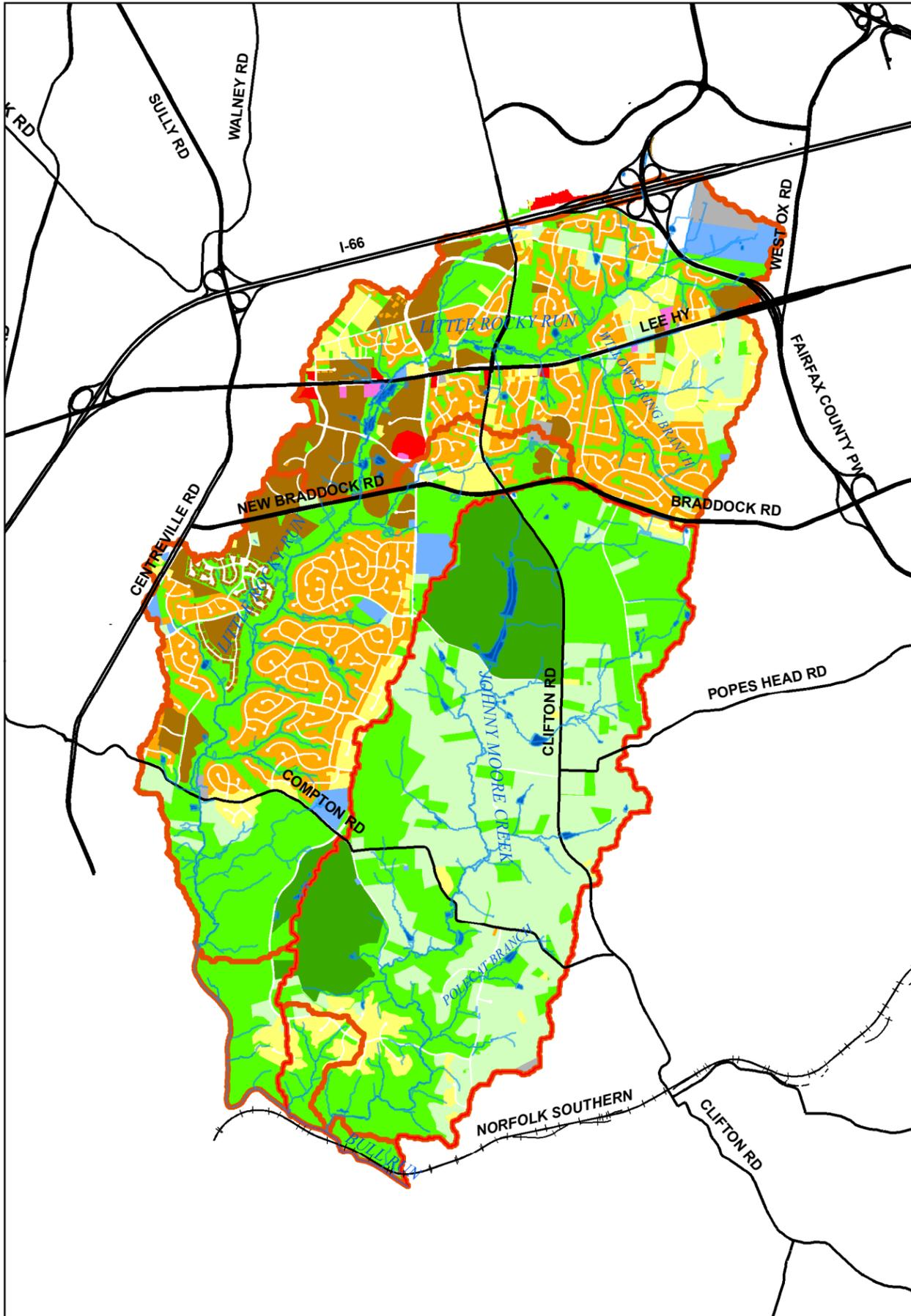
**Table 3-1 - WMA Stormwater Peak Values and Pollutant Loadings**

WMA	Stormwater Runoff Peak Values		Pollutant Loadings		
	2-yr storm (cfs)	10-yr storm (cfs)	TSS (tons/yr)	TN (lbs/yr)	TP (lbs/yr)
Johnny Moore Creek	542	1591	249.6	7102.5	1255.7
Little Rocky Run - Lower	998	2538	650.4	27796.6	4093.8
Little Rocky Run - Upper	515	1312	352.9	15196.7	2250.2
NORMALIZED BY DRAINAGE AREA					
WMA	Stormwater Runoff Peak Values		Pollutant Loadings		
	2-yr storm (cfs/acre)	10-yr storm (cfs/acre)	TSS (tons/acre/yr)	TN (lbs/acre/yr)	TP (lbs/acre/yr)
Johnny Moore Creek	0.169	0.495	0.078	2.211	0.391
Little Rocky Run - Lower	0.429	1.090	0.128	5.412	0.792
Little Rocky Run - Upper	0.233	0.594	0.160	6.871	1.017

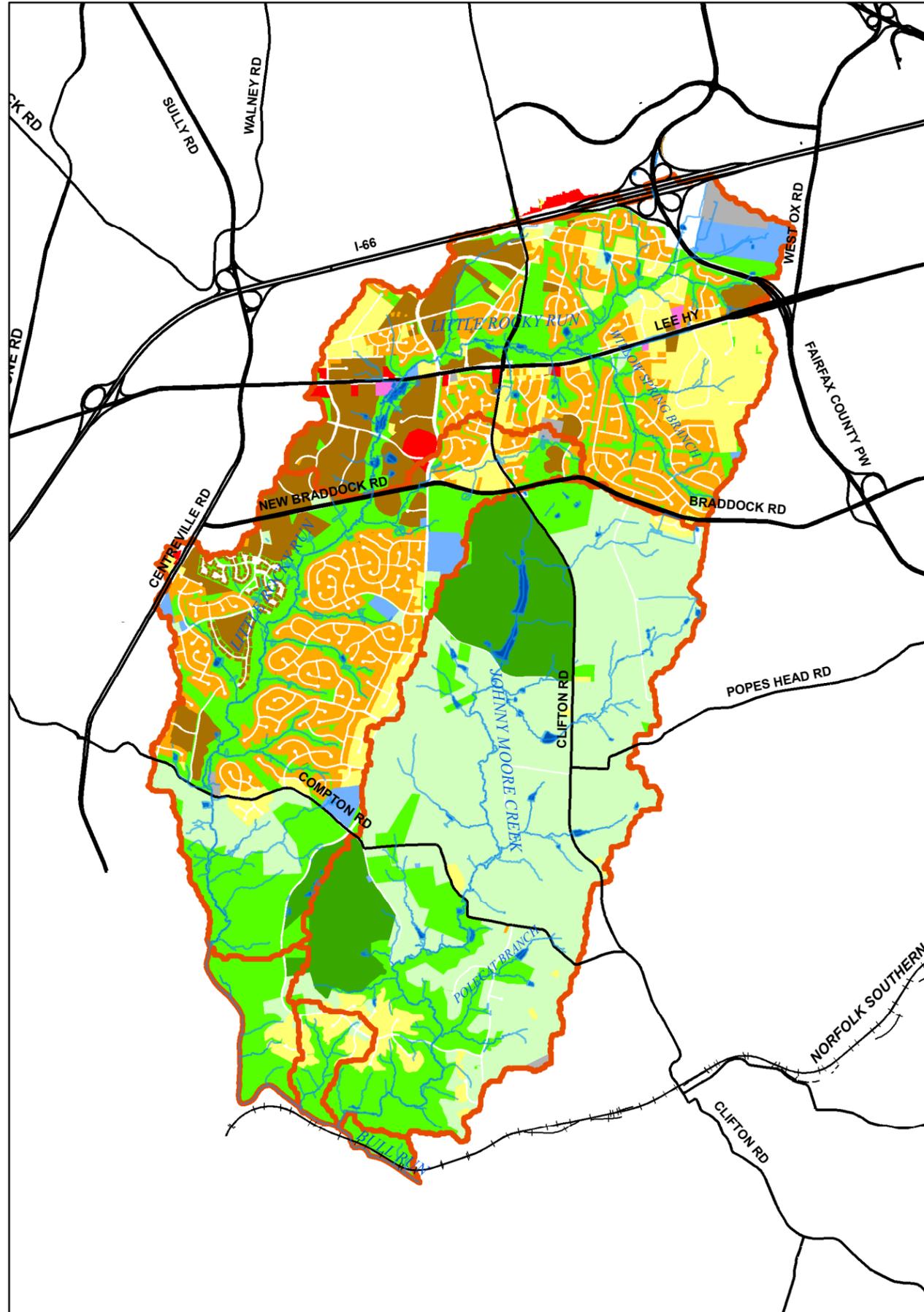
The water-quality analysis is driven by land use and the results reflect the different levels of development and stormwater controls in place in the three WMAs. Johnny Moore Creek, with less impervious areas and more natural cover, contributes fewer pounds per year of the selected nutrients than the WMAs in the Little Rocky Run watershed. There are a number of private facilities such as the ponds at the Twin Lakes Golf Course that enhance water quality treatment in the Johnny Moore Creek watershed, though not by design. Stormwater controls are sparsely located throughout the watershed because much of the single lot development that occurred was constructed without stormwater controls. Based on the requirements in place at the time of development, stormwater management may not have been required or stormwater management requirements may have been waived. This watershed is in relatively healthy condition and needs to be protected; even modest changes in land use should be addressed using stormwater controls.

# Map 3-3: Existing and Future Land Use

Existing Conditions Land Use Map



Future Conditions Land Use Map



## Map 1-3 Existing and Future Land Use Maps

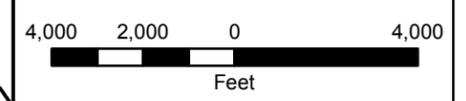
### Little Rocky Run / Johnny Moore Creek Watersheds

#### Legend

-  Streams
-  Major Roads
-  Railroad
-  JMwatershed
-  Watershed Management Areas
- Land Use**
-  Estate Residential
-  Low Density Residential
-  Medium Density Residential
-  High Density Residential
-  Low Intensity Commercial
-  High Intensity Commercial
-  Industrial
-  Institutional
-  Golf Course
-  Open Space
-  Water
-  Transportation



Scale



Little Rocky Run – Lower is a non-homogenous management area. The lower portion of the watershed is primarily open space or part of the R-C District and therefore produces low levels of pollutants. The rest of the WMA contains significant medium- and high-density residential areas and therefore pollutant loading estimates increase. Areas with more impervious areas and small or non-existent buffer areas will generate more pollutants than undisturbed areas, which is consistent with results. It should be noted that there are few expected changes in land use during future conditions for this WMA.

The subwatersheds located in Little Rocky Run – Upper WMA are producing relatively high pollutant loadings. The WMA is predominantly medium- to high-density residential and contains commercially zoned parcels as well. With more impervious areas and small or non-existent buffer areas, the results are consistent with expectations. The I-66 Transfer Station Complex is located in the headwaters of this WMA and is the only recognized Virginia Pollutant Discharge Elimination System (VPDES) identified point source in the Little Rocky Run watershed. This WMA has undergone the most significant development over the past 10 years, owing to medium/high-density residential and commercial areas replacing open space and low-density residential areas. The field reconnaissance revealed that this system is still responding to these recent changes.

The hydraulic modeling results are summarized as follows:

*Johnny Moore Creek:*

- Three stream road crossings in the watershed do not have the capacity to pass the 10-year storm without the road being over topped.
- The 2-year storm exceeds the channel banks in several locations.
- There are seven structures located within the modeled 100-year flood inundation zone.

*Little Rocky Run – Lower:*

- One of three road crossings identified for analysis does not have the capacity to pass the 10-year discharge.
- The 2-year discharge exceeds the channel banks in several locations.
- There are seven structures located within the modeled 100-year flood inundation zone.

*Little Rocky Run – Upper:*

- Three of 10 road crossings identified for analysis in the watershed do not have the capacity to pass the 10-year discharge.
- The 2-year discharge exceeds the channel banks in several locations.
- There are 13 structures located within the modeled 100-year flood inundation zone.

### **3.4 Other Studies and Field Reconnaissance**

Fairfax County has collected data on its watersheds for over 20 years. This data was compiled and served as source data for the development of this Watershed Management Plan. The County Stream Physical Assessment (SPA) conducted in 2005 provided invaluable information about the habitat and problem areas in the watershed. Field reconnaissance was also conducted in June 2008 to gather more detailed information about existing stormwater infrastructure and previously identified problem areas. The reconnaissance effort included the identification of pollution sources, current stormwater management practices and potential restoration opportunities throughout the watersheds. Typical sites visited included problem areas identified in the SPA, existing stormwater ponds and other stormwater management facilities to identify their retrofit potential, and other sites identified through the public forum, WAG meetings and a review of drainage complaints. More detailed information about the SPA and field reconnaissance results in each WMA can be found in Appendix A.

### **3.5 Subwatershed Ranking**

A detailed subwatershed ranking was conducted using the process described in Section 2. More detailed scoring information is provided in Appendix B.

The Johnny Moore Creek WMA contains mostly high-quality subwatersheds. The main stressors in this WMA come from two golf courses, which tend to result in higher pollutant loadings while also having a negative impact on natural stream buffers. Also, as noted in the SPA and in the field reconnaissance, there are many gully formations and unstable banks throughout this watershed, which will increase sediment load, impacting aquatic life. Otherwise, this watershed is of higher quality than its Little Rocky Run counterparts because of significant land use differences. The predominantly low-density residential and open space land use in the watershed results in some protection of stream health.

Little Rocky Run - Lower is the one WMA where subwatershed ranking results are not homogenous. The northern portion of this WMA has similar characteristics to Little Rocky Run - Upper. A sizeable area located in the southern portion of the WMA is located on Fairfax County Park Authority land is therefore undisturbed or very nearly so. These subwatersheds are generally of high quality.

The northern portion of Little Rocky Run - Lower is predominantly comprised of medium and high density residential development. The stream corridor remains forested, but buffers have been impacted by the development. Unlike Little Rocky Run - Upper, most of the development occurred nearly two decades ago, allowing for the system to stabilize. This portion of Little Rocky Run - Lower is relatively built out and was fairly stable between the 2005 SPA and the 2008 field reconnaissance. This stability in land use, along with the fact that there is no VPDES point source or commercial/industrial landuse, explain why the quality of the subwatersheds in this WMA are on average rated slightly higher than those in the Little Rocky Run - Upper WMA.

Little Rocky Run - Upper contains the majority of 'low-quality' subwatersheds. The objective composite scores are based on measures of environmental condition. The indicator measurements are consistent with a nearly built-out watershed, showing that riparian, wetland and terrestrial forested habitat have been compromised and pollutant loads are relatively high.

Little Rocky Run - Upper contains the highest percentage of medium- and high-density residential, commercial/industrial and impervious surfaces, as well as the only VPDES-permitted point source. It contains all but two of the lowest quality subwatersheds.