monitoring, targeted restoration projects, public outreach and education, enhanced stormwater controls, and improved communication with the development community.

The recommendations generated by the baseline study were as follows:

- Promote use of innovative BMPs and reduction of imperviousness for infill and redevelopment.
- Conduct public education in stream stewardship.
- Promote programs like Adopt-A-Stream to increase public involvement.

Additional recommendations are discussed in the Executive Summary and Chapter 5 of the *SPS report* which can be found on the Fairfax County website at: http://www. fairfaxcounty. gov/dpwes/environmental/sps_main.htm.

The SPS report provides data on a number of factors affecting the quality of Little Rocky Run and Johnny Moore Creek. The watershed characterization level from the SPS will guide the types of improvements recommended for the watershed management areas.

Fairfax County Stream Physical Assessment, 2005

The County initiated a stream physical assessment for all of its watersheds in August 2002, resulting in the final *Stream Physical Assessment Report* dated August 2005. The report included a habitat assessment, infrastructure inventory, stream characterization, and stream geomorphologic assessment. The assessment data are described for each of the subwatersheds in the following sections.

Habitat Assessment

As part of the assessment, the following characteristics were evaluated to determine the stream habitat quality for each stream reach:

- In-stream cover (fish)
- Epifaunal substrate (benthic)
- Embeddedness
- Channel/bank alteration
- Frequency of riffles
- Channel flow status (drought & normal flow)
- Bank vegetative protection
- Bank stability
- Vegetated buffer zone width

The scores assessed for the various physical parameters representing the stream habitat conditions were combined for each stream segment to obtain a total habitat score. The majority of the stream habitat was assessed as “fair” for both watersheds. The score of 102 for Little Rocky Run watershed is considered in the lower middle range of quality as compared with the rest of the County, and the score of 104 for Johnny Moore Creek watershed is considered in the middle range of quality as compared with the rest of the County. Tables 1-5 and 1-6 describe the percentage of length for each habitat quality rating for the streams according to the total score.

Table 1-5 Summary of Stream Habitat Quality for Little Rocky Run Watershed

Stream	Percent of Stream Length				
	Very Poor	**Poor**	**Fair**	**Good**	**Excellent**
Little Rocky Run	0%	11%	60%	21%	8%
Tributary to Bull Run	0%	0%	100%	0%	0%
Tributary to Little Rocky Run	0%	76%	24%	0%	0%
Willow Springs Branch	0%	0%	100%	0%	0%
Total Watershed	**0%**	**19%**	**62%**	**14%**	**5%**

Table 1-6 Summary of Stream Habitat Quality for Johnny Moore Creek Watershed

Stream	Percent of Stream Length				
	Very Poor	**Poor**	**Fair**	**Good**	**Excellent**
Johnny Moore Creek	0%	0%	53%	47%	0%
Polecat Branch	0%	35%	65%	0%	0%
Tributary to Bull Run	0%	0%	0%	100%	0%
Tributary to Johnny Moore Creek	2%	28%	66%	4%	0%
Tributary to Polecat Branch	0%	0%	100%	0%	0%
Total Watershed	**1%**	**15%**	**60%**	**24%**	**0%**

Vegetative Buffer Zone Width

Vegetative buffers filter pollutants entering a stream from runoff and minimize erosion along the stream. Approximately 37 percent of stream buffers in the Little Rocky Run watershed have a severe impact score, while 21 percent have a moderate to severe impact score, and 42 percent have a minor to moderate impact score. Approximately 5 percent of stream buffers in the Johnny Moore Creek watershed have a severe impact score, while 36 percent have a moderate to severe impact score, and 59 percent have a minor to moderate impact score.

Bank Stability

Stable stream banks have minimal erosion and gently sloping banks while unstable banks have steep slopes with evident erosion and bank failure. In the Little Rocky Run watershed, 46 percent of the banks were classified as moderately unstable and 54 percent were classified as moderately stable. In the Johnny Moore Creek watershed, 89 percent of the banks were classified as moderately unstable and 11 percent were classified as moderately stable.

Embeddedness

The assessment documented the degree of streambed embeddedness. Embeddedness, the degree to which cobbles and gravel on the streambed are covered with or sunken into sediment, is a measure used to quantify the impact of sedimentation on stream habitat. As the streambed becomes more embedded, the habitat of bottom dwelling organisms is

increasingly impaired. In the Little Rocky Run watershed, embeddedness rankings were: 4 percent poor, 61 percent marginal, 32 percent suboptimal and 3 percent optimal. In the Johnny Moore Creek watershed, embeddedness rankings were: 8 percent poor, 65 percent marginal, and 27 percent suboptimal.

Infrastructure Inventory

The assessment identified and characterized the following significant characteristics and features within the watersheds:

- Deficient buffer vegetation
- Dumpsites
- Erosion locations
- Head cuts
- Obstructions
- Pipe and ditch outfalls
- Public utility lines
- Roads and other crossings

An impact score was assigned to those inventory items causing a negative impact to the stream. Based on the impact score, the degrees of impact were classified into four groups: minor, moderate, severe, and extreme. Table 1-7 describes the classifications for each of the stream inventory items. These impacts are further categorized by watershed management area in Chapter 2.

Table 1-7 Description of Impacts

Impact	Description
Deficient Buffer Vegetation (within 100 feet of stream bank)	
Extreme	Impervious/commercial area in close proximity to a stream. The stream banks may be modified or engineered. The stream character (bank/bed stability, sediment deposition, and/or light penetration) is obviously degraded by adjacent use.
Severe	Some impervious areas and/or turf located up to the bank and water. Very little vegetation aside from the turf exists within the 25-foot zone. Home sites may be located very close to the stream. The stream character is probably degraded by adjacent use.
Moderate	Encroachment mostly from residential uses and yards. There is some vegetation within the 25-foot zone, but very little aside from turf exists within the remainder of the 100-foot zone. The stream character may be changed slightly by adjacent use.
Minor	Vegetated buffer primarily consists of native meadow (not grazed).
Dumpsites	
Severe to Extreme	Active and/or threatening sites. The materials may be considered toxic or threatening to the environment (concrete, petroleum, empty 55-

Impact	Description
	gallon drums, etc.) or the site is large (greater than 2,500 square feet) and appears active.
Moderate	Dumpsite less than 2,500 square feet with non-toxic material. It does not appear to be used often, but clean-up would definitely be a benefit.
Minor	Dumpsite appears small (less than 1,000 square feet) and the material stable (will not likely be transported downstream by high water). This site is not a high priority.
Erosion Locations	
Extreme	Impending threat to structures or infrastructure
Severe	Large area of erosion that is damaging property and causing obvious in-stream degradation. The eroding bank is generally five feet or greater in height.
Moderate	A moderate area of erosion that may be damaging property and causing in-stream degradation. The eroding bank is generally two feet or greater in height.
Minor	A minor area of erosion that is a low threat to property and causes no noticeable in-stream degradation.
Head Cuts	
Severe to Extreme	Greater than two-foot head cut height
Moderate	One- to two-foot head cut height
Minor	One-half to less than one-foot head cut height
Obstructions	
Severe to Extreme	The blockage is causing a significant erosion problem and/or the potential for flooding that can cause damage to infrastructure. The stream is usually almost totally blocked (more than 75% blocked).
Moderate to Severe	The blockage is causing moderate erosion and could cause flooding. The stream is partially blocked, but obstructions should probably be removed or the problem could worsen.
Minor to Moderate	The blockage is causing some erosion problems and has the potential to worsen. It should be looked at and/or monitored.
Pipes and Ditch Outfalls	
Severe to Extreme	Stormwater runoff from a ditch or pipe is causing a significant erosion problem to the stream bank or stream. Discharge that may not be stormwater is coming from the stormwater pipe.
Moderate	Stormwater runoff from a ditch or pipe is causing a moderate erosion problem and should be fixed; it may get worse if left unattended. Discharge is coming from the pipe. It is probably stormwater, but it will be uncertain without further investigation.
Minor	Stormwater runoff from a ditch or pipe is causing a minor erosion problem and some discharge is occurring.

Public Utility Lines	
Extreme	A utility line is leaking.
Severe	An exposed utility line is causing a significant erosion problem and/or obstruction (blockage). The potential for the sanitary line to burst or leak appears high.
Moderate	A partially exposed utility line is causing a moderate erosion problem. The line is partially visible (mostly buried in a stream bed with little if any erosion).
Minor	A utility line is exposed but stabilized with concrete lining and stable anchoring into the bank.
Road and other Crossings	
Extreme	The condition of debris, sediment, or erosion poses an immediate threat to the structural stability of the road crossing or other structure. Major repairs will be needed if the problem is not addressed.
Severe	The condition probably poses a threat to a road crossing or other structure. The problem should be addressed to avoid larger problems in the future
Moderate	The condition does not appear to pose a threat to a road crossing or other structure but should be addressed to enhance stream integrity and the future stability of the structures.
Minor	The condition is noticeable but may not warrant repair.

Source: *Fairfax County Stream Physical Assessment Protocols*, December 2002

Stream Geomorphologic Assessment

The geomorphologic assessment of the stream channels in the Little Rocky Run and Johnny Moore Creek watersheds was based on the conceptual incised channel evolution model (CEM) developed by Schumm, et al. (1984). Based on visual observation of the channel cross section and other morphological observations of the channel segment, the CEM type was assigned for the channel segment. The CEM types are summarized in Table 1-8. The CEM type for the stream segments is shown on maps in Chapter 2.

Table 1-8 Summary of CEM Types

CEM Type	Description
1	Stable stream banks and developed channel
2	Deep incised channel
3	Unstable stream banks and actively widening channel
4	Stream bank stabilizing and channel developing
5	Stable stream banks and widened channel

The data obtained from the stream physical assessment will be used as a starting point to determine problem areas in the watersheds. The assessment data will be field verified and projects to mitigate the problem areas will be recommended as part of the *Watershed Management Plan*.

Annual Report on Fairfax County's Streams, 2005 and 2006

In 2004, the County's biological sampling strategy was reevaluated and long-term goals were established. The Fairfax County Stormwater Planning Division developed the *2005*