

3.0 Summary of Watershed Conditions

Section 3.0 is a summary of the watershed conditions found in the Sugarland Run and Horsepen Creek watersheds. Detailed information regarding watershed conditions in the Sugarland Run watershed and the Horsepen Creek watershed can be found in the Draft Sugarland Run and Horsepen Creek Watershed Workbook, dated October 2008, located in Appendix A.

The Sugarland Run and Horsepen Creek watersheds are located in the northwestern portion of Fairfax County. Fairfax County is broken into 30 watersheds. Each watershed is defined by the topography of the area and does not follow county, state or national boundaries. The watersheds within Fairfax County are part of the larger Potomac River Basin. The Potomac River, in turn, is part of the even larger Chesapeake Bay Watershed, which drains 64,000 square miles and extends from New York through Pennsylvania, Delaware, West Virginia, Maryland, Virginia, and the District of Columbia. For management and planning purposes, watersheds are broken down into watershed management areas (WMAs) and subwatersheds. A WMA is generally four square miles (2,560 acres) in size and is the contributing drainage area to a major tributary or a group of subwatersheds with similar characteristics. A subwatershed ranges in size from 100 to 300 acres.

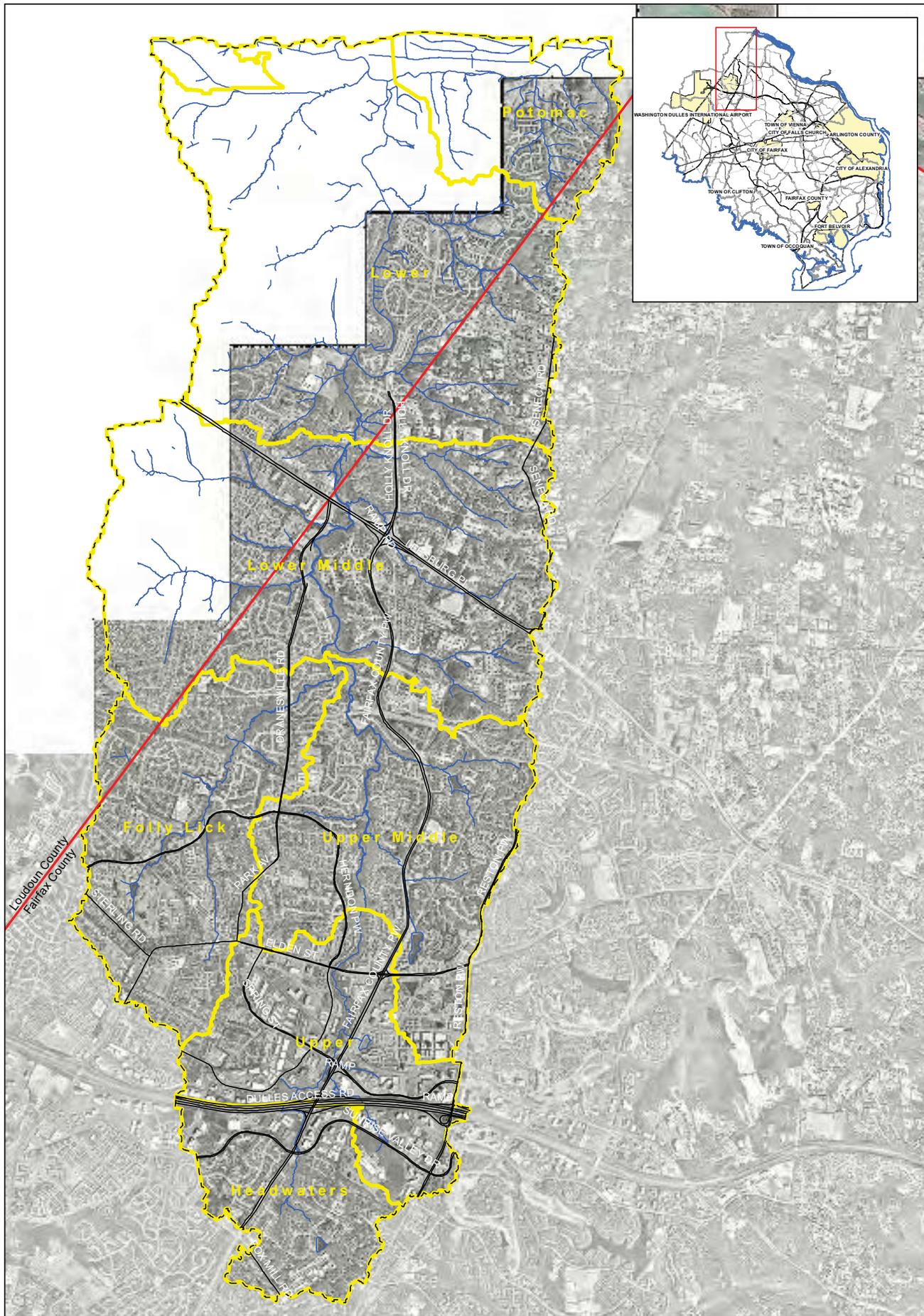
3.1 Sugarland Run Watershed

The Sugarland Run watershed is made up of Sugarland Run, Offuts Branch, Folly Lick Branch, and Rosiers Branch. The portion of the Sugarland Run watershed that lies within Fairfax County has a drainage area of approximately 15.3 square miles and has 31.1 miles of perennial streams. The Sugarland Run watershed consists of seven WMAs including Folly Lick, Headwaters, Lower Sugarland, Lower Middle Sugarland, Potomac, Upper Sugarland, and Upper Middle Sugarland as shown in Figure 3.1.

Assessments were made of each WMA based on information supplied by the County and from field reconnaissance. Each WMA was assessed for factors such as drainage complaints, proposed county projects, existing stormwater management facilities, on-site septic systems, Neighborhood Source Assessments (NSA), Hot Spot Investigations (HIS) and Stream Physical Assessments (SPA).

The water quality and quantity was modeled for each WMA by assessing land uses, impervious coverage, topography, vegetative cover, the health of streams, and stormwater management. Each WMA was evaluated using STEPL Modeling and HEC-RAS Modeling to determine the WMA subwatershed ranking of watershed impacts. Each WMA was also evaluated using source indicators to identify potential WMA stressors or pollutant sources. For more detailed information, see the Sugarland Run and Horsepen Creek Watersheds Draft Watershed Workbook, dated October 2008, located in Appendix A.

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0 0.25 0.5
Miles

-  Roads
-  Perennial Streams
-  WMA Boundary
-  Sugarland Run Watershed Boundary
-  County Boundary

Map 3.1
Sugarland Run
Watershed Management Area
Map

Overall, Sugarland Run watershed streams range in quality from poor to good. Poor reaches are concentrated around the upstream area and good reaches are generally located in the tributaries draining into the downstream area. The upstream area is located partly within the Town of Herndon and is characterized by urban residential, commercial, and industrial development. The northern tributaries drain lower density residential areas before crossing into Loudoun County and emptying into the main stem of Sugarland Run.

3.1.1 Folly Lick WMA

The Folly Lick WMA is located in the western portion of the Sugarland Run Watershed. The WMA is comprised of 1,813 acres (2.83 square miles). Approximately 5.3 miles of perennial streams are located within the Folly Lick WMA, and flow northeast toward the confluence with Sugarland Run. The streams range from poor to fair condition in the Herndon section to good condition in the northern section. The WMA consists primarily of medium density residential land use with a golf course and high density residential in the central portion, as shown in Figure 3.2. According to the HEC-RAS modeling, one bridge does not carry the 2, 10 or 100-year stormflow, and will overtop the roadway. Also, one culvert does not carry the 100-year stormflow and may increase flooding upstream.

None of the subwatersheds within the Folly Lick WMA have been identified as potential problem areas in the subwatershed ranking of watershed impacts. Based upon existing conditions, most of the northern portion of the WMA is in good condition, but the conditions deteriorate when traveling south toward the headwaters of Folly Lick Branch.

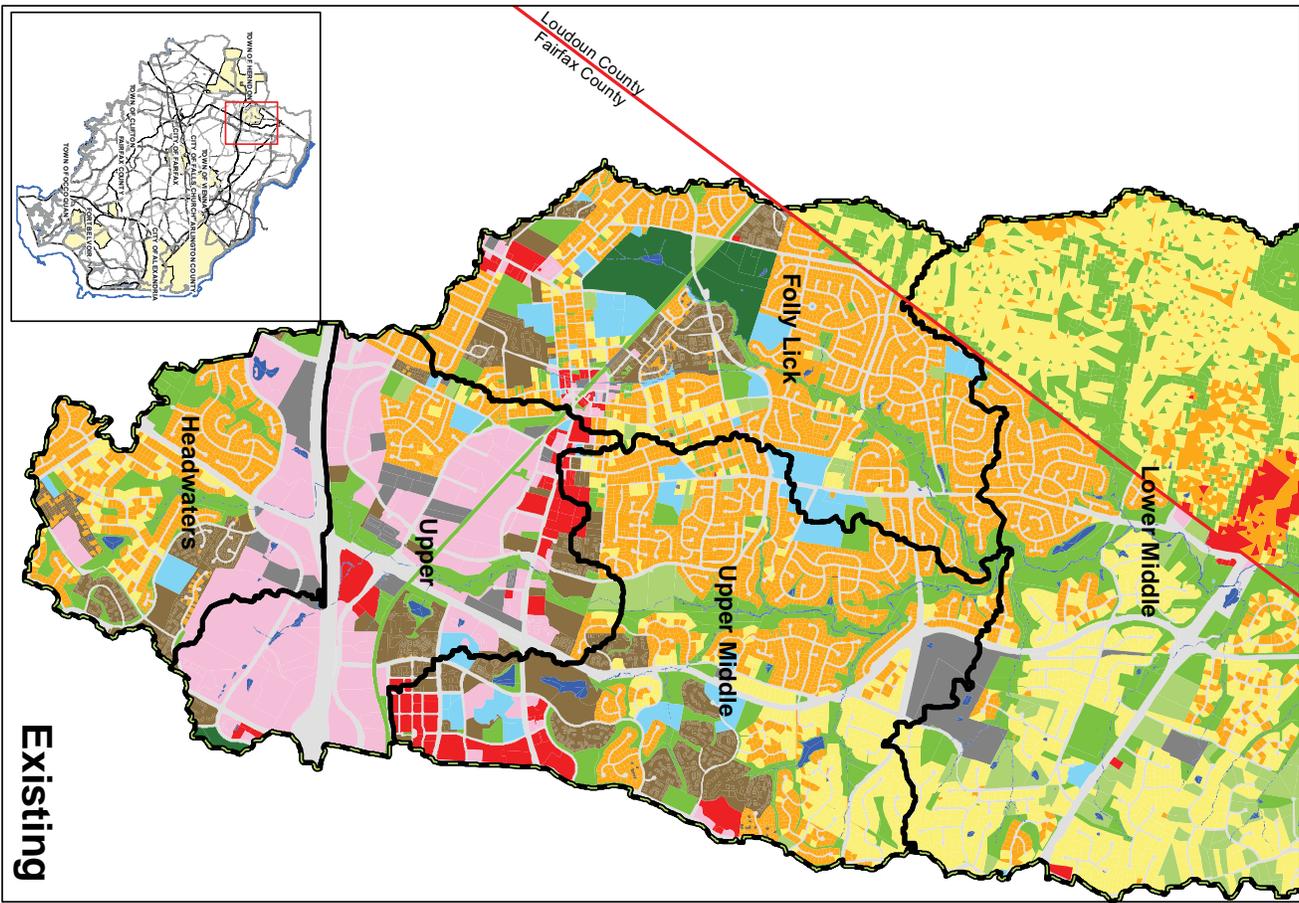
One of the subwatersheds within the Folly Lick WMA has been identified as a potential problem area in the subwatershed ranking of source indicators to identify potential stressors or pollutant sources. Most of the WMA shows high levels of stressors and pollutant sources.

3.1.2 Headwaters WMA

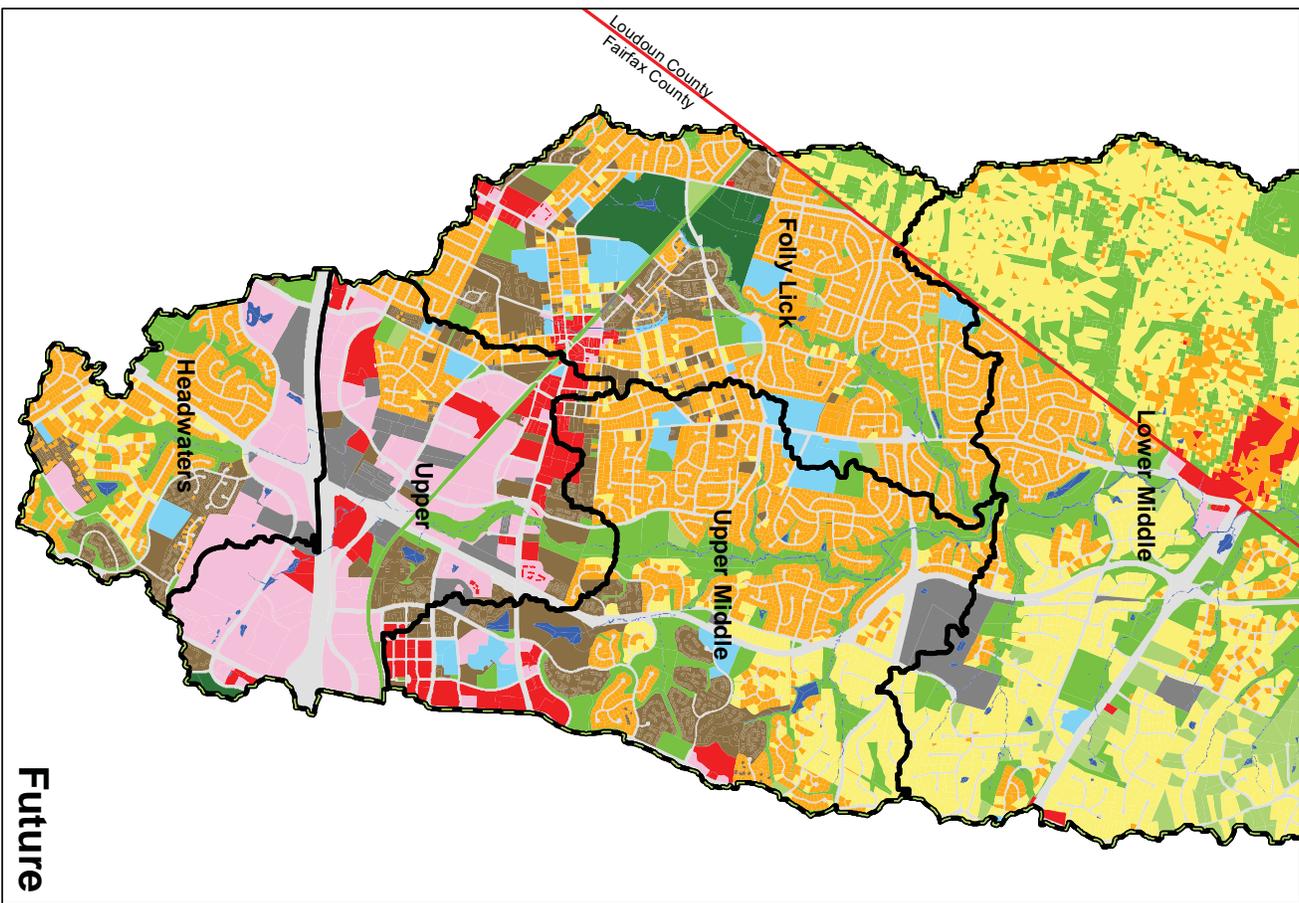
The Headwaters WMA is located in the southern portion of the Sugarland Run Watershed. The WMA is comprised of 929 acres (1.45 square miles). Approximately 1.4 miles of perennial streams exist within the Headwaters WMA, and flow north toward the confluence with the main stem of Sugarland Run. The majority of these streams range from poor to fair condition. The WMA consists primarily of medium density residential land use in the south and commercial and industrial land uses in the north, as shown in Figure 3.2. According to the HEC-RAS modeling, two culverts do not carry the 100-year stormflow, causing water to overtop the roadways and may increase flooding upstream.

One of the subwatersheds within the Headwaters WMA has been identified as a potential problem area in the subwatershed ranking of watershed impacts. Based upon existing conditions, all of the WMA is in very poor condition. One of the subwatersheds within the Headwaters WMA has been identified as an additional potential problem area in the subwatershed ranking of source indicators to identify potential stressors or pollutant sources. Most of the WMA shows high levels of stressors and pollutant sources.

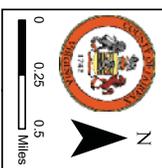
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Existing



Future



	WMAs
	County
	Watershed
	Land Use
	ESR
	GC
	HDR
	HIC
	IND
	INT
	LDR
	LIC
	OS
	MDR
	TRANS
	WATER

Map 3.2
Existing and Future Land Use
Map for Upper Sugarland Run
Watershed

3.1.3 Lower Middle Sugarland WMA

The Lower Middle Sugarland WMA is located in the northern portion of the Sugarland Run Watershed. The WMA is comprised of 3,590 acres (5.61 square miles). The portion that lies within Fairfax County is comprised of 2,012 acres (3.14 square miles). Approximately 14.8 miles of perennial streams exist within the Lower Middle Sugarland WMA, and flow west into Loudoun County. These streams range from fair to good condition. The WMA consists primarily of low and medium density residential land uses with open space along stream corridors, as shown in Figure 3.3. According to the HEC-RAS modeling, one bridge does not carry the 100-year stormflow, and will overtop the roadway. Also, one culvert does not carry the 100-year stormflow and may increase flooding upstream.

None of the subwatersheds within the Lower Middle Sugarland WMA have been identified as potential problem areas in the subwatershed ranking of watershed impacts. Based upon existing conditions, the majority of the WMA is in good condition. The exception was one subwatershed that scored fair.

One of the subwatersheds within the Lower Middle Sugarland WMA has been identified as an additional potential problem area in the subwatershed ranking of source indicators to identify potential stressors or pollutant sources. The rest of the WMA were ranked as low to moderate levels of stressors and pollutant sources.

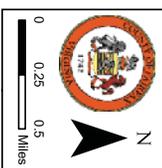
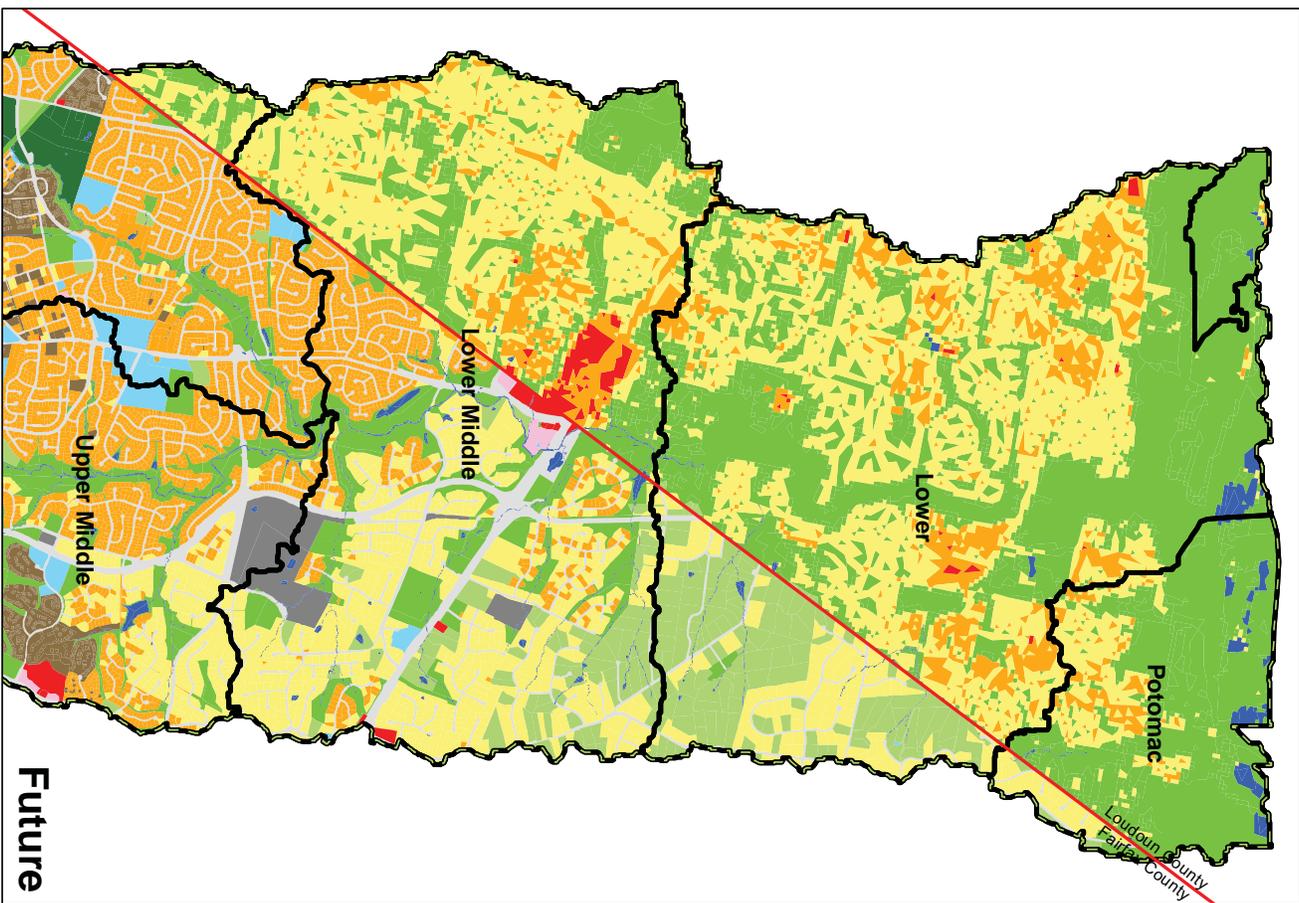
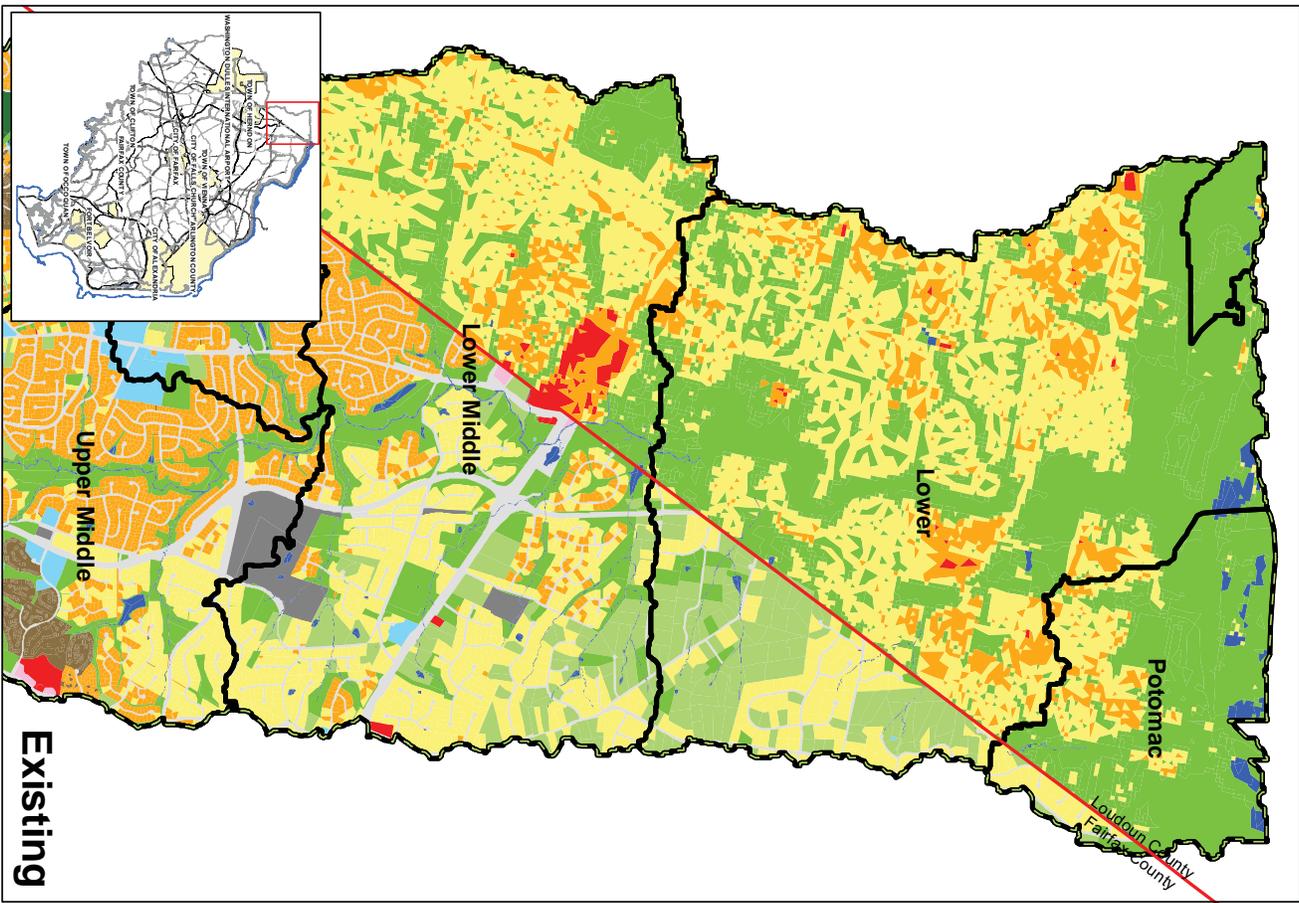
3.1.4 Lower Sugarland WMA

The Lower Sugarland WMA is located in the northern portion of the Sugarland Run Watershed. The WMA is comprised of 3,742 acres (5.85 square miles). The portion that lies within Fairfax County is comprised of 691 acres (1.08 square miles). Approximately 13.8 miles of perennial streams exist within the Lower Sugarland WMA, and flow west into Loudoun County. These streams range from fair to good condition. The WMA consists primarily of open space in the north and along stream corridors with low and medium density residential land uses throughout the east and west, as shown in Figure 3.3.

None of the subwatersheds within the Lower Sugarland WMA have been identified as potential problem areas in the subwatershed ranking of watershed impacts. The subwatershed areas of the Lower Sugarland WMA that lie outside of Fairfax County were not scored. Based upon existing conditions, all of the scored WMA is in good condition.

None of the subwatersheds within the Lower Sugarland WMA have been identified as potential problem areas in the subwatershed ranking of source indicators to identify potential stressors or pollutant sources. Most of the WMA shows low levels of stressors and pollutant sources.

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	WMAs
	Watershed
	County
	Land Use
	ESR
	GC
	HDR
	HIC
	IND
	INT
	LDR
	LIC
	MDR
	OS
	TRANS
	WATER

Map 3.3
Existing and Future Land Use
Map for Lower Sugarland Run
Watershed

3.1.5 Potomac WMA

The Potomac WMA is located at the northern tip of the Sugarland Run Watershed. The WMA is comprised of 1,053 acres (1.64 square miles). The portion that lies within Fairfax County is comprised of 70 acres (0.1 square miles). Approximately 3.0 miles of perennial streams exist within the Potomac WMA in Fairfax County, and flow west into Loudoun County. These streams range from fair to good condition. The WMA consists primarily of open space in the north and low and medium density residential land uses in the south, as shown in Figure 3.3.

None of the subwatersheds within the Potomac WMA have been identified as potential problem areas in the subwatershed ranking of watershed impacts. The subwatershed areas of the Potomac WMA that lie outside of Fairfax County were not scored. Based upon existing conditions, the majority of the scored WMA is in good condition.

None of the subwatersheds within the Potomac WMA have been identified as potential problem areas in the subwatershed ranking of source indicators to identify potential stressors or pollutant sources. The WMA was ranked as having low levels of stressors and pollutant sources.

3.1.6 Upper Middle Sugarland WMA

The Upper Middle Sugarland WMA is located in the middle of the Sugarland Run Watershed. The WMA is comprised of 1,975 acres (3.09 square miles). Approximately 6.8 miles of perennial streams exist within the Upper Middle Sugarland WMA, and flow north and northwest through the watershed. Most of these streams are in good condition, with only one small tributary in poor condition. The WMA consists primarily of medium density residential land use in the west, low density residential in the northeast, high density residential to the east, and high intensity commercial land uses to the southeast, as shown in Figure 3.2. According to the HEC-RAS modeling, two culverts do not carry the 100-year stormflow and may increase flooding upstream.

None of the subwatersheds within the Upper Middle Sugarland WMA have been identified as potential problem areas in the subwatershed ranking of watershed impacts. Based upon existing conditions, the WMA is in good condition.

One of the subwatersheds within the Upper Middle Sugarland WMA has been identified as a potential problem area in the subwatershed ranking of source indicators to identify potential stressors or pollutant sources. The remainder of the WMA was ranked as having moderate levels of stressors and pollutant sources.

3.1.7 Upper Sugarland WMA

The Upper Sugarland WMA is located in the southern portion of the Sugarland Run Watershed. The WMA is comprised of 1,391 acres (2.71 square miles). Approximately 3.5 miles of perennial streams exist within the Upper Sugarland WMA, and flow north through the watershed. These streams range from poor to good condition. The WMA consists primarily of low intensity commercial land uses and transportation networks, as shown in Figure 3.2.

According to the HEC-RAS modeling, five culverts do not carry the 100-year stormflow and may increase flooding upstream. Two of these culverts will overtop the roadway.

Three of the subwatersheds within the Upper Sugarland WMA have been identified as potential problem areas in the subwatershed ranking of watershed impacts. Based upon existing conditions, the entire WMA is in moderate condition.

Three of the subwatersheds within the Upper Sugarland WMA have been identified as additional potential problem areas in the subwatershed ranking of source indicators to identify potential stressors or pollutant sources. The WMA was ranked as having moderate to high levels of stressors and pollutant sources.

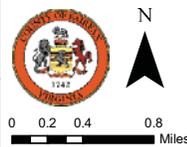
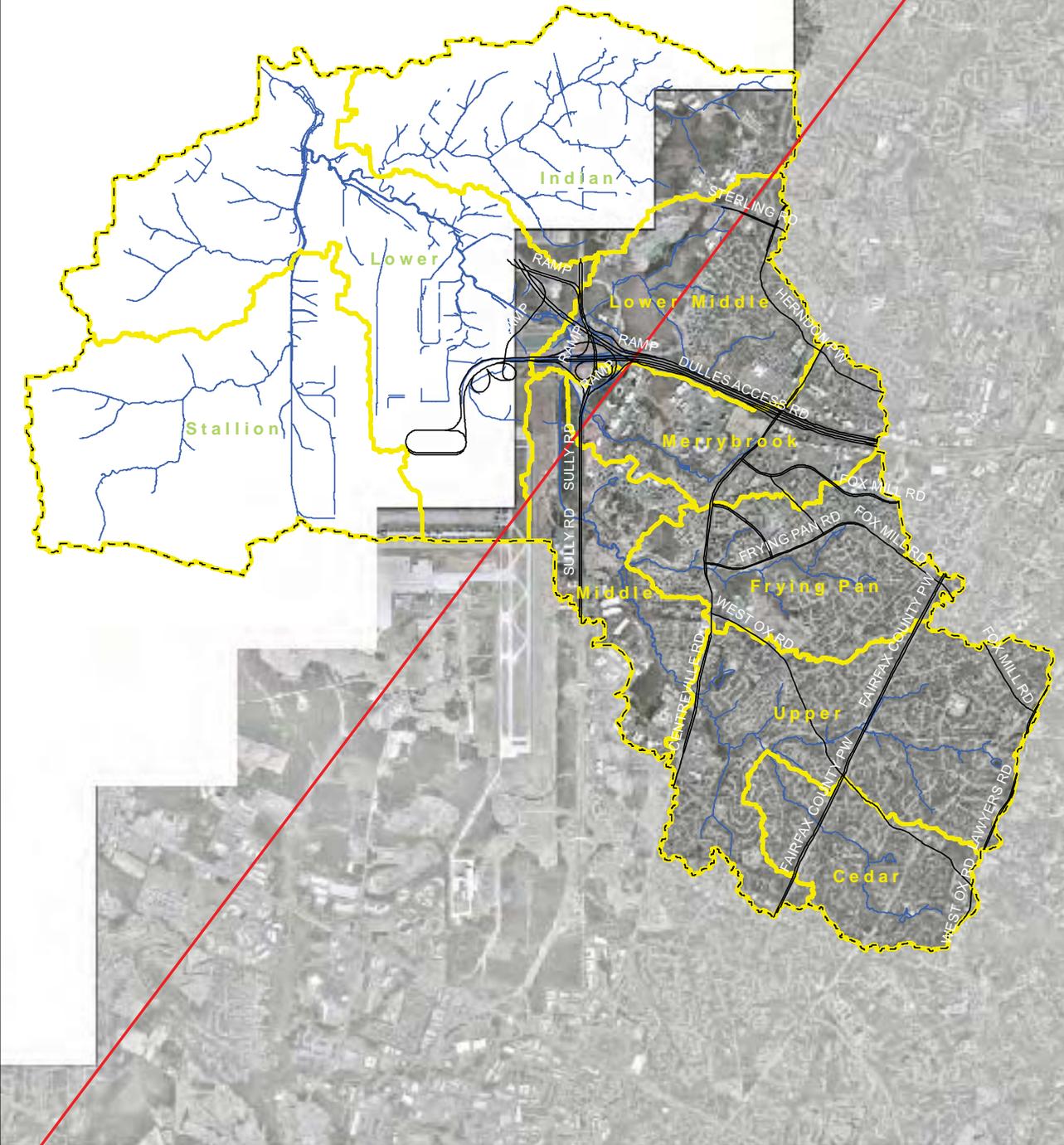
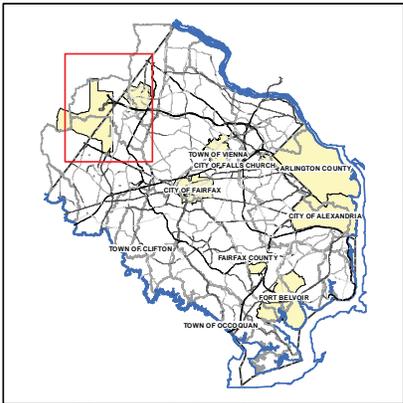
3.2 Horsepen Creek Watershed

The Horsepen Creek watershed is comprised of Horsepen Run, Frying Pan Branch, Cedar Run, and Merrybrook Run. The portion of Horsepen Creek Watershed that lies within Fairfax County has a drainage area of approximately 9.6 miles and 19.4 miles of perennial streams. The Horsepen Creek Watershed consists of nine watershed management areas (WMAs) including Cedar Run, Frying Pan, Indian, Lower Horsepen, Lower Middle Horsepen, Merrybrook, Middle Horsepen, Stallion, and Upper Horsepen as shown in Figure 3.4.

Assessments were made of each WMA based on information supplied by the County and field reconnaissance. Each WMA was assessed for factors such as drainage complaints, proposed county projects, existing stormwater management facilities, on-site septic systems, Neighborhood Source Assessment (NSA), Hot Spot Investigation (HIS) and Stream Physical Assessment (SPA).

The water quality and quantity was modeled for each WMA by assessing land uses, impervious coverage, topography, vegetative cover, the health of streams, and stormwater management. Each WMA was evaluated using STEPL Modeling and HEC-RAS Modeling to determine the WMA subwatershed ranking of watershed impacts. Each WMA was also evaluated using source indicators to identify potential WMA stressors or pollutant sources. For more detailed information, see the Sugarland Run and Horsepen Creek Watersheds Draft Watershed Workbook, dated October 2008, located in Appendix A.

Overall, Horsepen Creek watershed streams range in quality from very poor to good. Poor and very poor reaches are concentrated around the western, downstream area and good reaches are generally located in the eastern, upstream area. The downstream area borders Loudoun County and is located partly within the Town of Herndon. This area is characterized by urban residential, commercial, and industrial development. The eastern, upstream area drains primarily low and medium density residential areas.



-  Roads
-  Perennial Streams
-  WMA Boundary
-  Horsepen Creek Watershed Boundary
-  County Boundary

Map 3.4
Horsepen Creek
Watershed Management Area
Map

3.2.1 Cedar Run WMA

The Cedar Run WMA is located in the southern tip of the Horsepen Creek Watershed. The WMA is comprised of 783 acres (1.2 square miles). Approximately 2.4 miles of perennial streams exist within the Cedar Run WMA, and flow in a northwest direction toward the confluence with Horsepen Creek. Most of these streams are in good to fair condition. The WMA consists primarily of medium density residential land use with open space along stream corridors, as shown in Figure 3.5. According to the HEC-RAS modeling, one culvert does not carry the 100-year stormflow and may increase flooding upstream.

One of the subwatersheds within the Cedar Run WMA has been identified as a potential problem area in the subwatershed ranking of watershed impacts. Based upon existing conditions, the remainder of the WMA is in moderate condition.

Two of the subwatersheds within the Cedar Run WMA have been identified as additional potential problem areas in the subwatershed ranking of source indicators to identify potential stressors or pollutant sources. The remainder of the WMA was ranked as having moderate levels of stressors and pollutant sources.

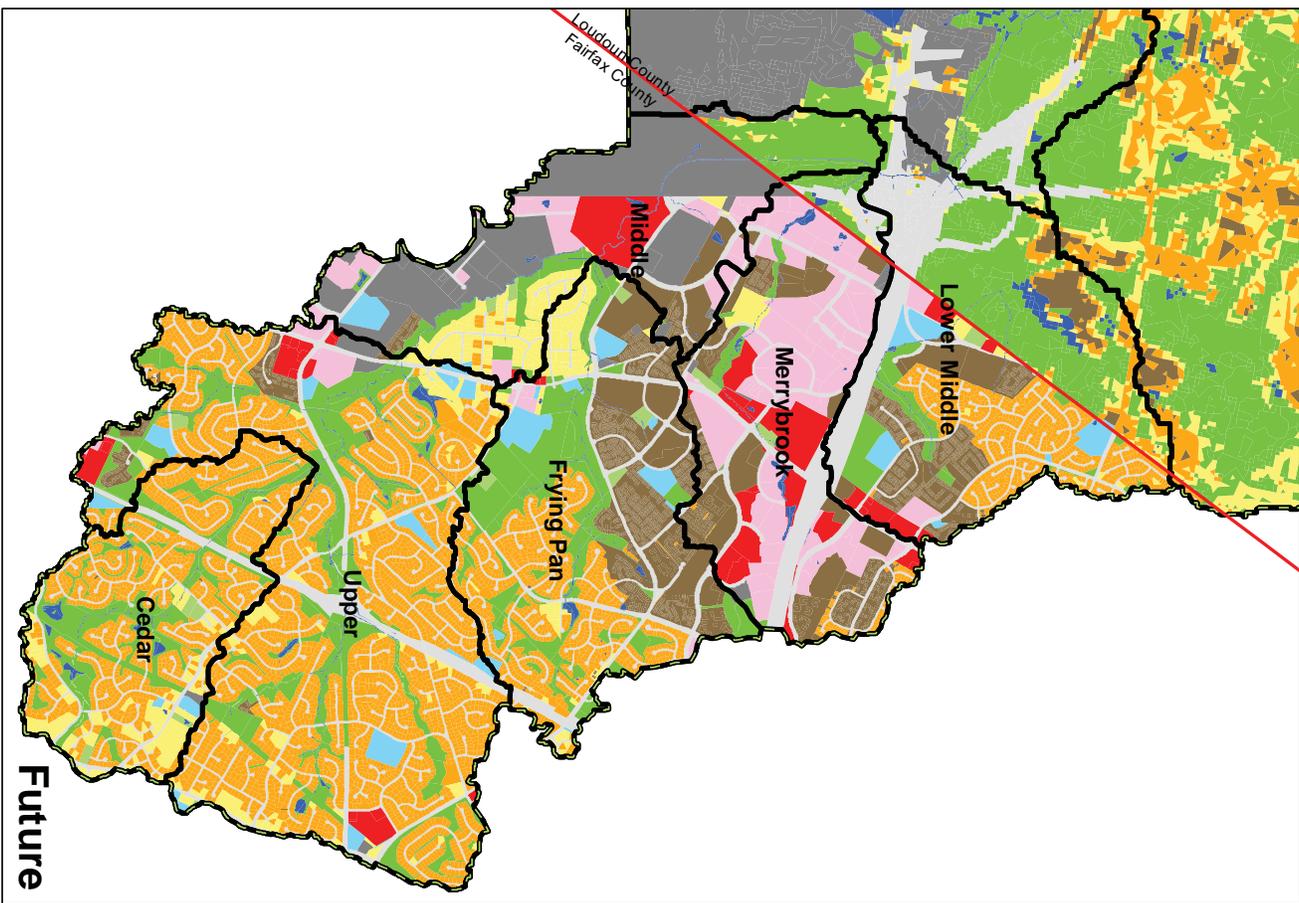
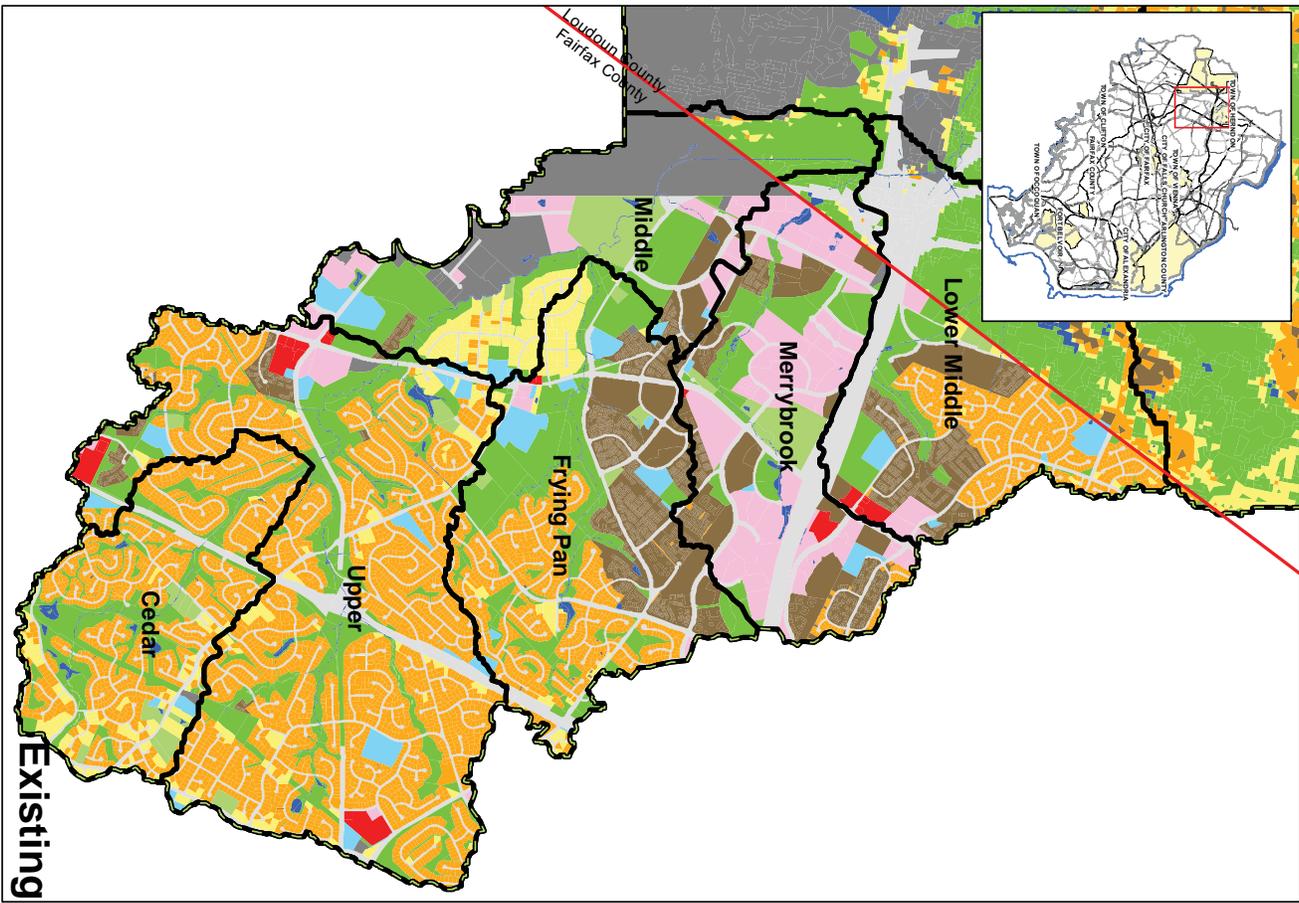
3.2.2 Frying Pan WMA

The Frying Pan WMA is located in the central portion of the Horsepen Creek Watershed, and is bordered on the east by the Sugarland Run Watershed. The WMA is comprised of 1,131 acres (1.8 square miles). Approximately 3.6 miles of perennial streams exist within the Frying Pan WMA, and flow in a western direction toward the confluence with Horsepen Creek. Most of these streams are in poor condition. The WMA consists primarily of high density residential land use in the northwest, medium density residential in the northeast and open space along stream corridors, as shown in Figure 3.5. According to the HEC-RAS modeling, one culvert does not carry the 100-year stormflow and may increase flooding upstream.

None of the subwatersheds within the Frying Pan WMA have been identified as potential problem areas in the subwatershed ranking of watershed impacts. Based upon existing conditions, the WMA is in fair to moderate condition.

One of the subwatersheds within the Frying Pan WMA has been identified as an additional potential problem area in the subwatershed ranking of source indicators to identify potential stressors or pollutant sources. The remainder of the WMA was ranked as having moderate levels of stressors and pollutant sources.

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**Map 3.5
Existing and Future Land Use
for Upper Horsepen Creek
Watershed**

			<ul style="list-style-type: none"> WMAs Watersheds County 	<ul style="list-style-type: none"> ESR ESR HDR HIC IND INT LDR LIC MDR OS TRANS WATER
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3.2.3 Indian WMA

The Indian WMA is located on the northern border of the Horsepen Creek Watershed, and is located almost entirely within Loudoun County. The WMA is comprised of 2,066 acres (3.2 square miles). The portion that lies within Fairfax County is comprised of 5.3 acres (0.01 square miles). Approximately 4.5 miles of perennial streams exist within the Indian WMA, and flow in a western direction toward the confluence with Horsepen Creek. The WMA primarily consists of open space and low and medium density residential land uses, as shown in Figure 3.6.

None of the subwatersheds within the Indian WMA have been identified as potential problem areas in the subwatershed ranking of watershed impacts. Only two subwatersheds within the Fairfax County portion of the Indian WMA were scored. Based upon existing conditions, the WMA is in fair condition.

None of the subwatersheds within the Indian WMA have been identified as potential problem areas in the subwatershed ranking of source indicators to identify potential stressors or pollutant sources. The WMA was ranked as having low levels of stressors and pollutant sources.

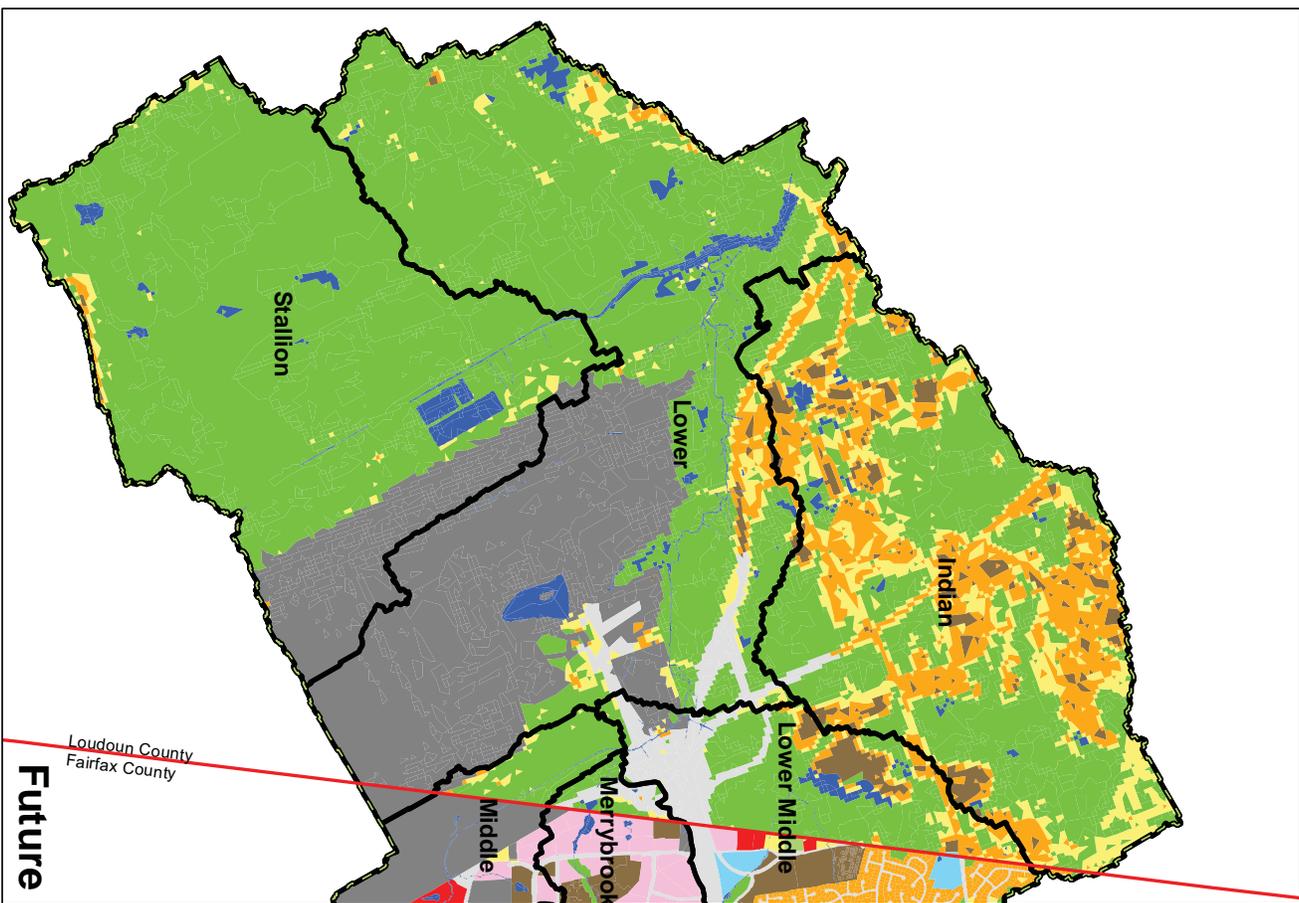
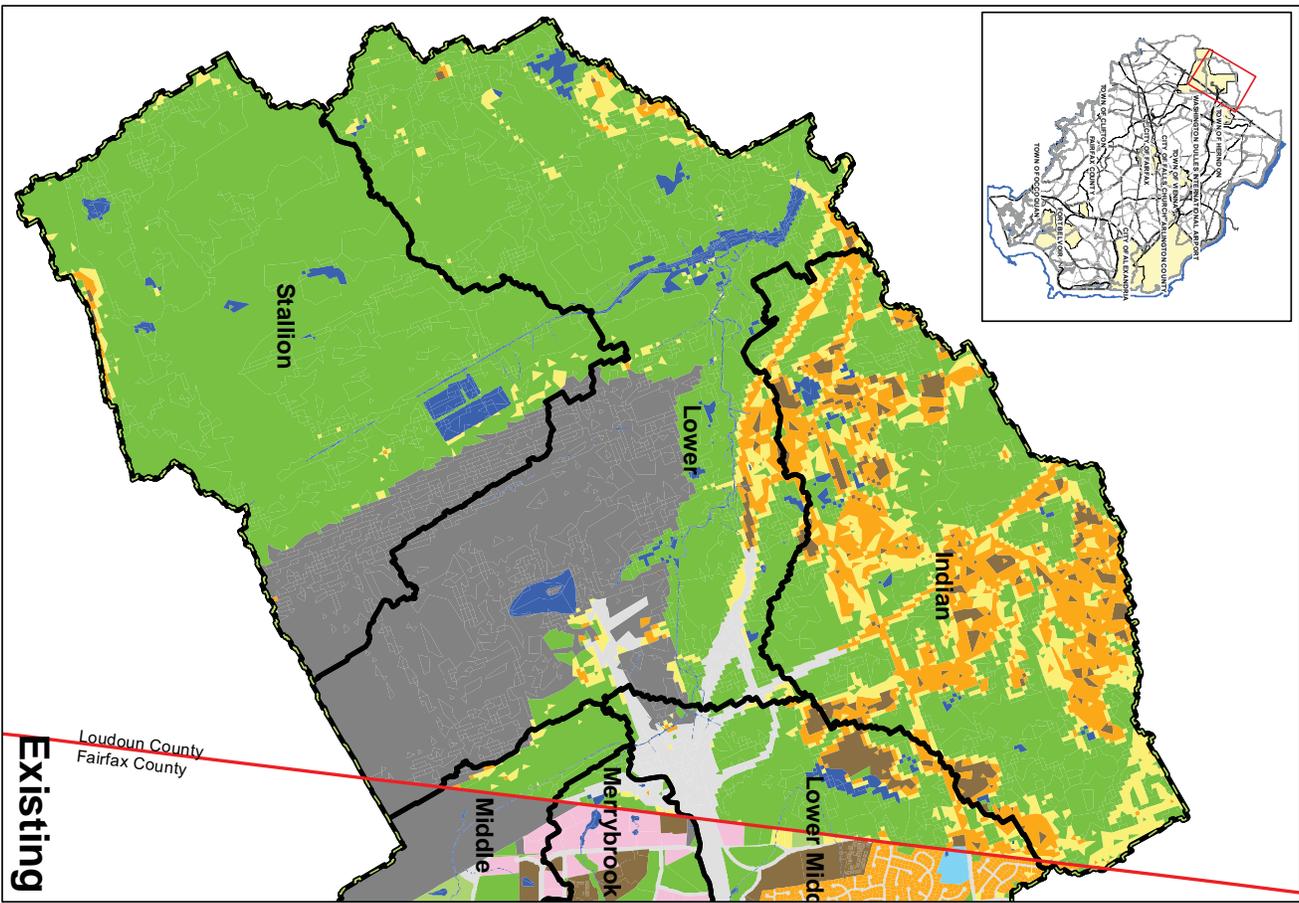
3.2.4 Lower Horsepen WMA

The Lower Horsepen WMA is located in the northwestern portion of the Horsepen Creek Watershed. The WMA is comprised of 3,189 acres (5.0 square miles). The portion that lies within Fairfax County is comprised of 20.6 acres (0.03 square miles). Approximately 7.0 miles of perennial streams exist within the Lower Horsepen WMA, and flow north and northwest toward the confluence with Horsepen Creek. The WMA consists primarily of open space to the west and industrial land uses containing the Dulles International Airport to the east, as shown in Figure 3.6.

None of the subwatersheds within the Lower Horsepen WMA have been identified as potential problem areas in the subwatershed ranking of watershed impacts. Only one subwatershed within the Fairfax County portion of the Lower Horsepen WMA was scored. Based upon existing conditions, the WMA is in moderate condition.

None of the subwatersheds within the Lower Horsepen WMA have been identified as potential problem areas in the subwatershed ranking of source indicators to identify potential stressors or pollutant sources. Only one subwatershed within the Fairfax County portion of the Lower Horsepen WMA was scored.

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Map 3.6
Existing and Future Land Use
for Lower Horsepen Creek
Watershed

3.2.5 Lower Middle Horsepen WMA

The Lower Middle Horsepen WMA is located in the central portion of the Horsepen Creek Watershed, and is bordered on the east by the Sugarland Run Watershed. The WMA is comprised of 1,188 acres (1.9 square miles). Approximately one half of this WMA is located in Fairfax County and the other half is located in Loudoun County. Approximately 3.4 miles of perennial streams exist within the Frying Pan WMA, and flow in a western direction toward the confluence with Horsepen Creek. The WMA consists primarily of open space to the west and medium and high density residential land uses to the east, as shown in Figure 3.5.

None of the subwatersheds within the Lower Middle Horsepen WMA have been identified as potential problem areas in the subwatershed ranking of watershed impacts. Based upon existing conditions, the WMA is in moderate condition.

None of the subwatersheds within the Lower Middle Horsepen WMA have been identified as potential problem areas in the subwatershed ranking of source indicators to identify potential stressors or pollutant sources. The WMA was ranked as having low to moderate levels of stressors and pollutant sources.

3.2.6 Merrybrook WMA

The Merrybrook WMA is located in the central portion of the Horsepen Creek Watershed, and is bordered on the east by the Sugarland Run Watershed. The WMA is comprised of 967 acres (1.5 square miles). A small portion on the western side of the WMA lies within Loudoun County. Approximately 2.0 miles of perennial streams exist within the Merrybrook WMA, and flow in a western direction into Loudoun County before flowing into the main stem of Horsepen Creek. The WMA consists primarily of commercial and high density residential land uses with open space along stream corridors, as shown in Figure 3.5.

None of the subwatersheds within the Merrybrook WMA have been identified as potential problem areas in the subwatershed ranking of watershed impacts. Based upon existing conditions, the WMA is in fair condition.

None of the subwatersheds within the Merrybrook WMA have been identified as potential problem area in the subwatershed ranking of source indicators to identify potential stressors or pollutant sources. The WMA was ranked as having moderate levels of stressors and pollutant sources.

3.2.7 Middle Horsepen WMA

The Middle Horsepen WMA is located in the central portion of the Horsepen Creek Watershed. The WMA is comprised of 953 acres (1.5 square miles). A small portion of the northern tip lies within Loudoun County. Approximately 2.9 miles of perennial streams exist within the Middle Horsepen WMA, and flow in a northern direction into Loudoun County. The streams in the upper portion of the WMA are in good to fair condition, and streams in the lower portion of the WMA are in poor to very poor condition. The WMA consists primarily of commercial and

industrial land uses to the west with open space and low density residential land uses to the east, as shown in Figure 3.5. According to the HEC-RAS modeling, one bridge and one culvert do not carry the 100-year stormflow, and will overtop the roadways.

Two of the subwatersheds within the Middle Horsepen WMA have been identified as potential problem areas in the subwatershed ranking of watershed impacts. Based upon existing conditions, the WMA is in poor to very poor condition.

None of the subwatersheds within the Middle Horsepen WMA have been identified as potential problem areas in the subwatershed ranking of source indicators to identify potential stressors or pollutant sources. The southern portion of the WMA was ranked as having moderate levels of stressors and pollutant sources. The northern portion of the WMA was ranked as having low to moderate levels of stressors and pollutant sources.

3.2.8 Stallion WMA

The Stallion WMA is located in the western portion of the Horsepen Creek Watershed. The WMA lies entirely within Loudoun County. The WMA is comprised of 2,394 acres (3.7 square miles). Approximately 3.2 miles of perennial streams exist within the Stallion WMA, and flow in a northern direction into the Lower Horsepen WMA. The WMA consists primarily of open space with industrial land uses to the northeast, as shown in Figure 3.6.

No subwatershed ranking was completed for the Stallion WMA since it is located completely in Loudoun County.

3.2.9 Upper Horsepen WMA

The Upper Horsepen WMA is located in the southern tip of the Horsepen Creek Watershed. The WMA is comprised of 1,929 acres (3.0 square miles). Approximately 7.3 miles of perennial streams exist within the Upper Horsepen WMA, and flow in a northwest direction into the Middle Horsepen WMA. The majority of streams are in good to fair condition, although there are some small portions in poor to very poor condition. The WMA consists primarily of medium density residential land uses with open space along stream corridors, as shown in Figure 3.5.

Two of the subwatersheds within the Upper Horsepen WMA have been identified as potential problem areas in the subwatershed ranking of watershed impacts. Based upon existing conditions, the WMA is in moderate condition.

Two additional subwatersheds within the Upper Horsepen WMA have been identified as additional potential problem areas in the subwatershed ranking of source indicators to identify potential stressors or pollutant sources. The remainder of the WMA was ranked as having moderate to high levels of stressors and pollutant sources.