3.0 Summary of Watershed Conditions

Section 3.0 is a summary of the watershed conditions found in the Nichol Run and Pond Branch watersheds. Detailed information regarding watershed conditions in the Nichol Run watershed and the Pond Branch watershed can be found in the Draft Nichol Run and Pond Branch Watershed Workbook, dated January 2009, located in Appendix A.

The Nichol Run and Pond Branch watersheds are located in the northern 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 Basin, 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 further 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.

Table 3.1 identifies the total area and perennial stream miles for each watershed and each watershed management area that comprise Nichol Run and Pond Branch watersheds.

Table 3.1
Summary of Watershed Management Areas

Watershed Management Area	Total Acres	Total Sq-mi	Total Perennial Stream Miles
Jefferson	1,185	1.85	6.7
Lower Nichol	821	1.28	7.6
Potomac (Nichol)	697	1.09	4.6
Upper Nichol	2,548	3.98	12.9
Nichol Run Watershed Total	**5,250**	**8.2**	**31.8**
Clark	1,759	2.75	8.4
Mine Run	1,633	2.55	6.9
Pond	742	1.16	4.1
Potomac	1,270	1.98	4.4
Pond Branch Watershed Total	**5,404**	**8.4**	**23.8**
Nichol Run and Pond Branch Watersheds Total	**10,654**	**16.6**	**55.6**

The Fairfax County Stormwater Planning Division has created standard land use categories to unify watershed management planning throughout the county. The categories are assigned a code for easy identification. The Fairfax County land use categories are presented in Table 3.2.

Table 3.2
Generalized Land Use Categories

Land Use	Code	Description
Open Space	OS	Open space, parkland, or vacant land
Estate Residential	ESR	Single-family detached greater than 2 acres per residence
Low Density Residential	LDR	Single-family detached 0.5-2 acres per residence
Medium Density Residential	MDR	Single-family detached less than 0.5 acres per residence and multifamily residential less than 8 dwelling units per acre
High Density Residential	HDR	All residential less than 0.125 acre per residence (8 or greater dwelling units per acre)
Institutional	INT	School or institutions, originally considered LIC
Low Intensity Commercial	LIC	Commercial uses including low rise and limited offices and neighborhood retail
High Intensity Commercial	HIC	Commercial uses including high density offices and highway retail
Industrial	IND	Industrial uses
Golf Course	GC	Golf courses, originally considered open space
Water	WATER	Perennial streams buffered 10’
Transportation	TRANS	Transportation, areas not represented by parcels

3.1 Nichol Run Watershed

The Nichol Run watershed includes Nichol Run, Harkney Branch, Jefferson Branch, and the Potomac Headwaters. It has a drainage area of approximately 8.2 square miles and contains 31.8 miles of perennial streams. The Nichol Run watershed consists of four watershed management areas (WMAs) including Jefferson, Lower Nichol, Potomac, and Upper Nichol as shown in Map 3.1.

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 Assessments (NSA), Hot Spot Investigations (HIS) and Stream Physical Assessments (SPA).

The water quality and quantity was modeled for each WMA by assessing land use, impervious coverage, topography, vegetative cover, stream health, 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 Nichol Run and Pond Branch Watersheds Draft Watershed Workbook, dated January 2009, located in Appendix A.

Overall, Nichol Run watershed streams displayed a wide range in quality, from poor to excellent. Poor quality reaches are concentrated in the upstream area and good quality reaches are generally located in the tributaries draining into the downstream area. The upstream area is characterized mainly by low density residential development.

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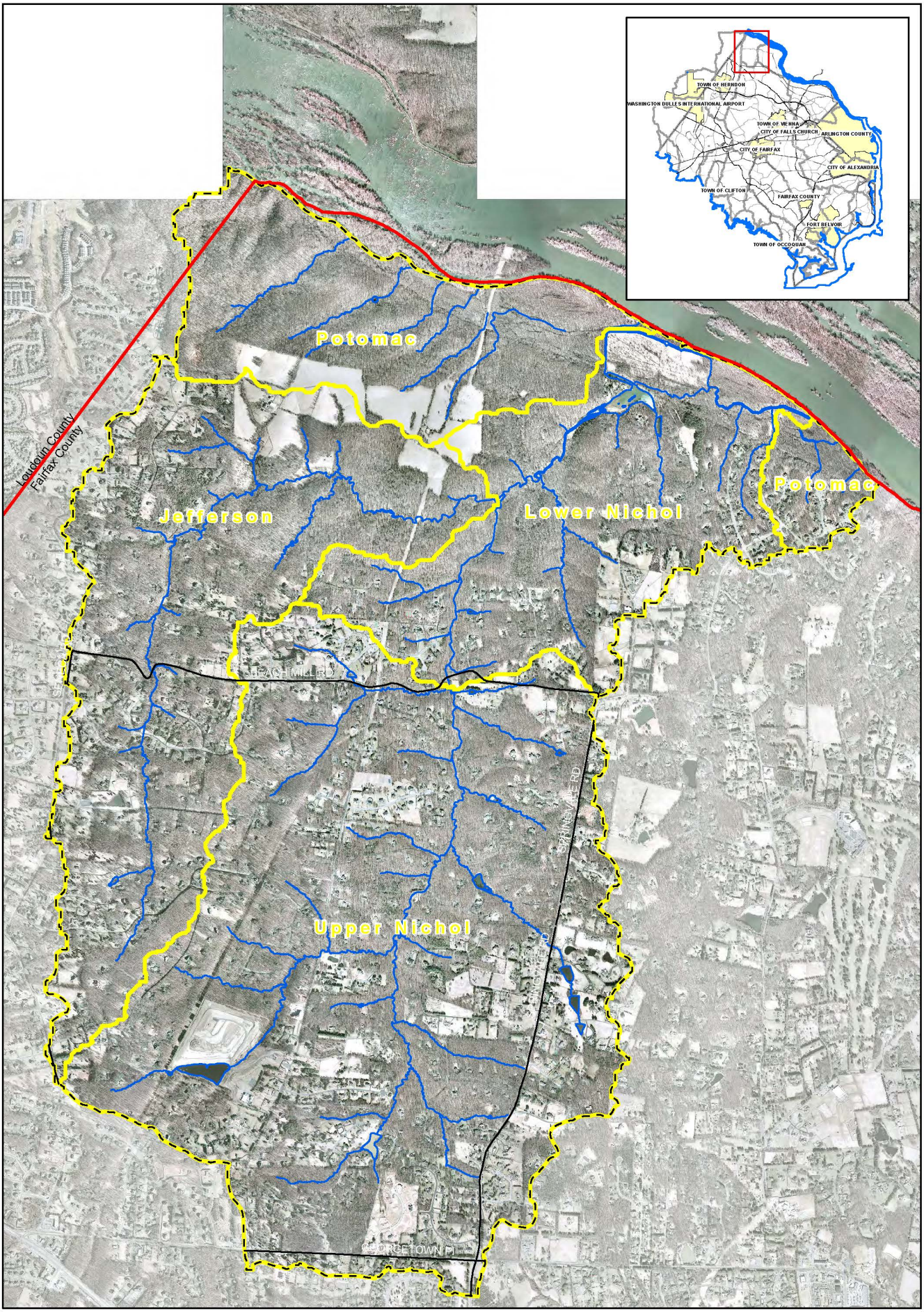


N

0 0.15 0.3 Miles

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

Map 3.1
Nichol Run
Watershed Management Area
Map

3.1.1 Jefferson WMA

The Jefferson WMA is located in the Western portion of the Nichol Run Watershed. The WMA is 1,185 acres in size (1.5 square miles). Approximately 6.7 miles of perennial streams are located within the Jefferson WMA. The majority of the streams are in good to excellent condition, with a few small portions in fair condition. The WMA consists primarily of estate and low density residential land uses with a section of open space in the northeast, as shown in Map 3.2. According to the HEC-RAS modeling, two of the culverts in the WMA do not carry the 100-year stormflow, and will pond upstream.

None of the subwatersheds within the Jefferson WMA have been identified as potential problem areas in the subwatershed ranking of watershed impacts. Based upon existing conditions, the southern portion of the WMA is in good condition but conditions deteriorate slightly when traveling north toward the confluence with Nichol Run.

None of the subwatersheds within the Jefferson 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 shows moderate levels of stressors and pollutant sources.

3.1.2 Lower Nichol WMA

The Lower Nichol WMA is located in the northeastern portion of the Nichol Run watershed. The WMA is 821 acres in size (1.28 square miles). Approximately 7.6 miles of perennial streams are located within the Lower Nichol WMA. The majority of streams range from good to excellent condition. The WMA consists primarily of open space and estate residential land uses with some low density residential land uses to the east and south, as shown in Map 3.2. According to the HEC-RAS modeling, one of the bridges in the WMA does not carry the 100-year stormflow, and will overtop the roadway. Also, one of the culverts in the WMA does not carry the 100-year stormflow and may increase flooding upstream.

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

None of the subwatersheds within the Lower Nichol 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 to moderate levels of stressors and pollutant sources.

3.1.3 Potomac (Nichol) WMA

The Potomac WMA is broken into two subwatersheds, both of which lie along the northern border of the Nichol Run watershed. The WMA is 697 acres in size (1.09 square miles), of which 27.6 acres (0.04 square miles) lie within Loudoun County. Approximately 4.6 miles of perennial

streams are located within the Potomac WMA. The WMA consists primarily of open space with some estate and low density residential land uses in the south, as shown in Map 3.2. The WMA is composed of small tributaries that drain directly to the Potomac River where stream segments and drainage areas are small and development is minimal, therefore HEC-RAS modeling was not completed for the Potomac WMA.

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

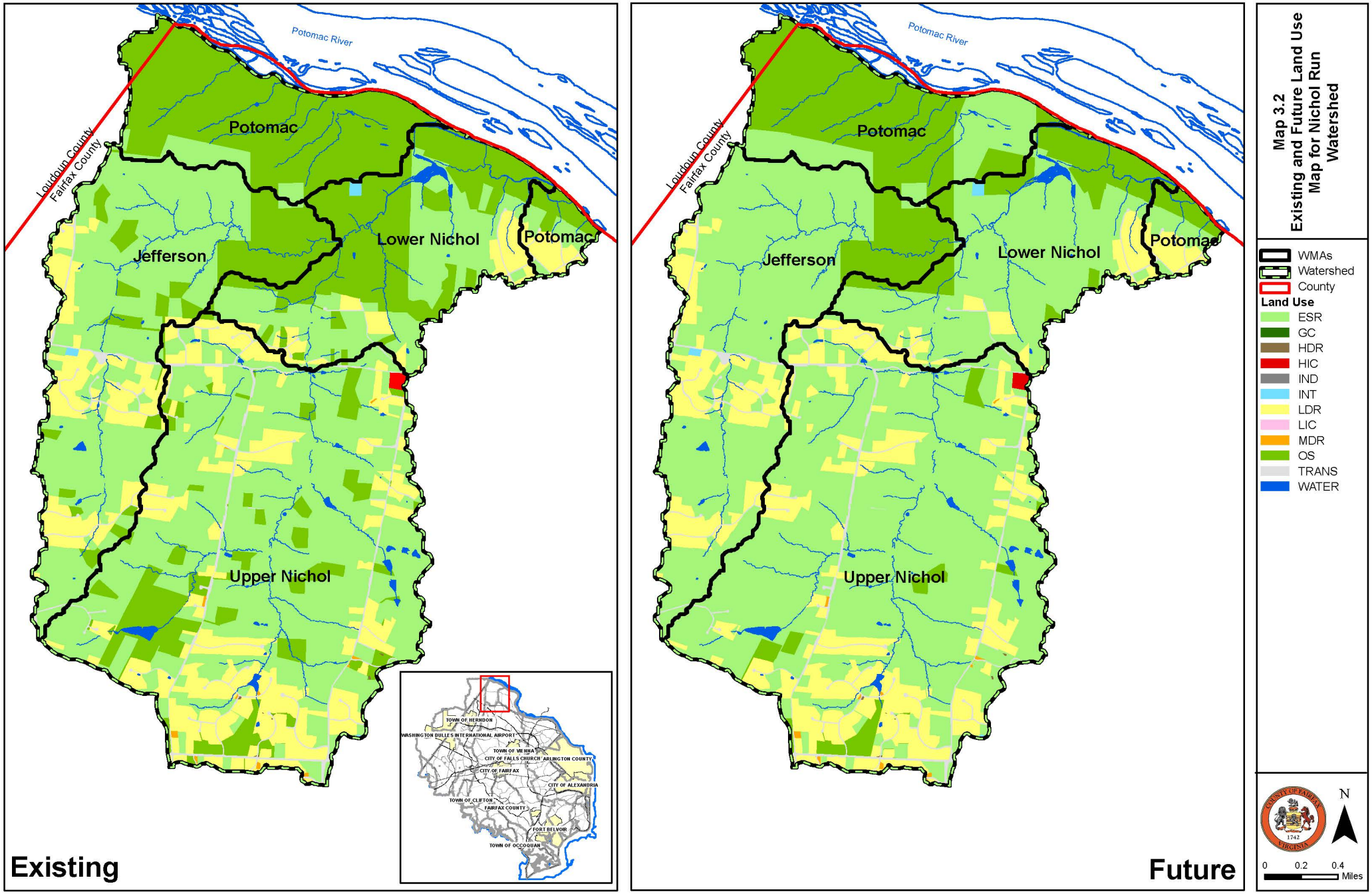
None of the subwatersheds within the Lower Nichol WMA have been identified as potential problem areas in the subwatershed ranking of source indicators to identify potential stressors or pollutant sources. All of the WMA shows low levels of stressors and pollutant sources.

3.1.4 Upper Nichol WMA

The Upper Nichol WMA is located in the southern portion of the Nichol Run watershed. The WMA is 2,549 acres in size (3.98 square miles). Approximately 12.9 miles of perennial streams exist within the Upper Nichol WMA. The streams range from good to poor condition. The WMA consists primarily of estate residential land uses with low density land uses around the perimeter, as shown in Map 3.2. According to the HEC-RAS modeling, four culverts do not carry the 10-year stormflow and overtop the road and/or increase flooding upstream. Also, one culvert in the WMA does not carry the 100-year stormflow and will overtop the road.

None of the subwatersheds within the Upper Nichol 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.

Two of the subwatersheds within the Upper Nichol WMA have been identified as potential problem areas in the subwatershed ranking of source indicators to identify potential stressors or pollutant sources. The WMA has a range of stressors and pollutant sources, ranging from low to moderate levels.


Potomac River
Loudoun County
Fairfax County
Potomac
Jefferson
Lower Nichol
Potomac
Upper Nichol
Existing
TOWN OF HERNDON
WASHINGTON DULLES INTERNATIONAL AIRPORT
TOWN OF VIENNA
CITY OF FALLS CHURCH
ARLINGTON COUNTY
CITY OF FAIRFAX
CITY OF ALEXANDRIA
TOWN OF CLIFTON
FAIRFAX COUNTY
FORT BELVOIR
TOWN OF OCCOQUAN
Potomac River
Loudoun County
Fairfax County
Potomac
Jefferson
Lower Nichol
Potomac
Upper Nichol
Future
Map 3.2
Existing and Future Land Use
Map for Nichol Run
Watershed
WMAs
Watershed
County
Land Use
ESR
GC
HDR
HIC
IND
INT
LDR
LIC
MDR
OS
TRANS
WATER
N
0
0.2
0.4
Miles

3.2 Pond Branch Watershed

The Pond Branch watershed includes Pond Branch, Mine Run Branch, Clarks Branch, and Potomac Headwaters. It has a drainage area of approximately 8.5 square miles and contains 23.8 miles of perennial streams. The Pond Branch watershed consists of four WMAs including Clark, Mine Run, Pond, and Potomac as shown in Map 3.3.

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 Assessments Hot Spot Investigations and Stream Physical Assessments.

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 Nichol Run and Pond Branch Watersheds Draft Watershed Workbook, dated January 2009, located in Appendix A.

Pond Branch watershed streams range from good to very poor. Poor and very 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 characterized mainly by low density residential development and the downstream area is characterized mainly by estate residential development and open space.

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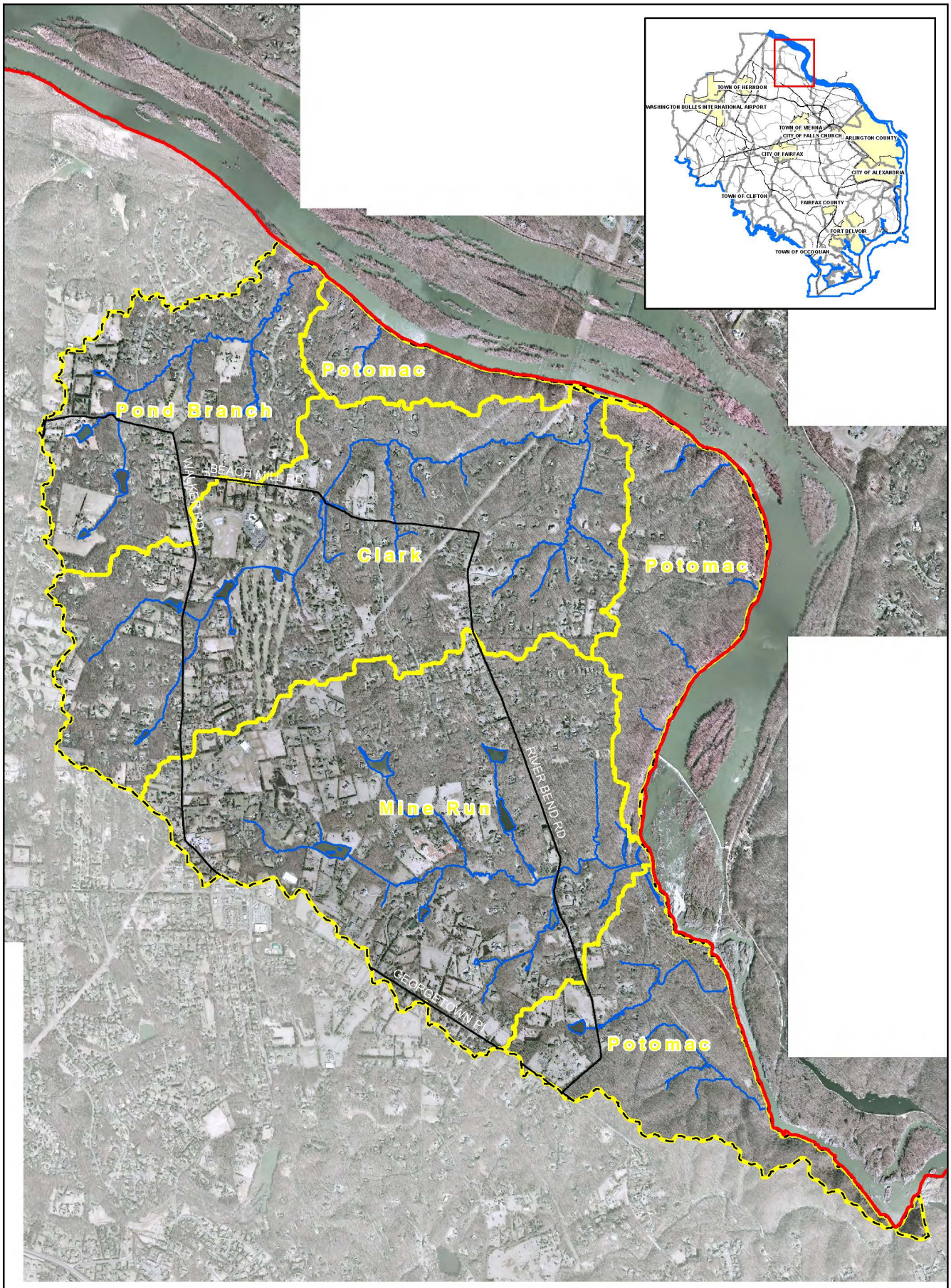


N

0 0.1 0.2 0.3 0.4 Miles

Roads
Perennial Streams
WMA Boundary
Pond Branch Watershed Boundary
County Boundary

Map 3.3
Pond Branch Watershed Management Area Map

3.2.1 Clark WMA

The Clark WMA is located in the central portion of the Pond Branch watershed. The WMA is 1,759 acres in size (2.7 square miles). Approximately 8.4 miles of perennial streams exist within the Clark WMA. Most of these streams are in fair condition, with portions of the headwaters in poor and very poor condition. The WMA consists primarily of estate and low density residential land uses with a golf course near the center, as shown in Map 3.4. According to the HEC-RAS modeling, two of the culverts in the WMA do not carry the 100-year stormflow and may increase flooding upstream.

Two of the subwatersheds within the Clark WMA have been identified as potential problem areas in the subwatershed ranking of watershed impacts. Based upon existing conditions, the upper portion of the WMA is in fair condition, while the lower portion is in good condition.

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

3.2.2 Mine Run WMA

The Mine Run WMA is located along the southern border of the Pond Branch watershed, and is bordered by the Difficult Run watershed. The WMA is 1,634 acres in size (2.6 square miles). Approximately 6.9 miles of perennial streams exist within the Mine Run WMA. Habitat conditions range from good to very poor. The WMA consists primarily of estate residential land use with open space and low density residential land uses to the north, as shown in Map 3.4 According to the HEC-RAS modeling, three of the culverts in the WMA do not carry the 100-year stormflow and may increase flooding upstream.

Three of the subwatersheds within the Mine Run WMA have been identified as potential problem areas in the subwatershed ranking of watershed impacts. Based upon existing conditions, the WMA has fair conditions.

None of the subwatersheds within the Mine Run WMA have been identified as potential problem areas in the subwatershed ranking of source indicators to identify potential stressors or pollutant sources. The WMA has low to moderate levels of stressors and pollutant sources.

3.2.3 Pond WMA

The Pond WMA is located in the northwestern corner of the Pond Branch watershed and is bordered on the west by the Nichol Run watershed. The WMA is 741 acres in size (1.2 square miles). Approximately 4.1 miles of perennial steams exist within the Pond WMA. The WMA consists primarily of estate and low density residential land uses, as shown in Map 3.4. According

to the HEC-RAS modeling, one of the culverts in the WMA does not carry the 100-year stormflow and may increase flooding upstream.

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

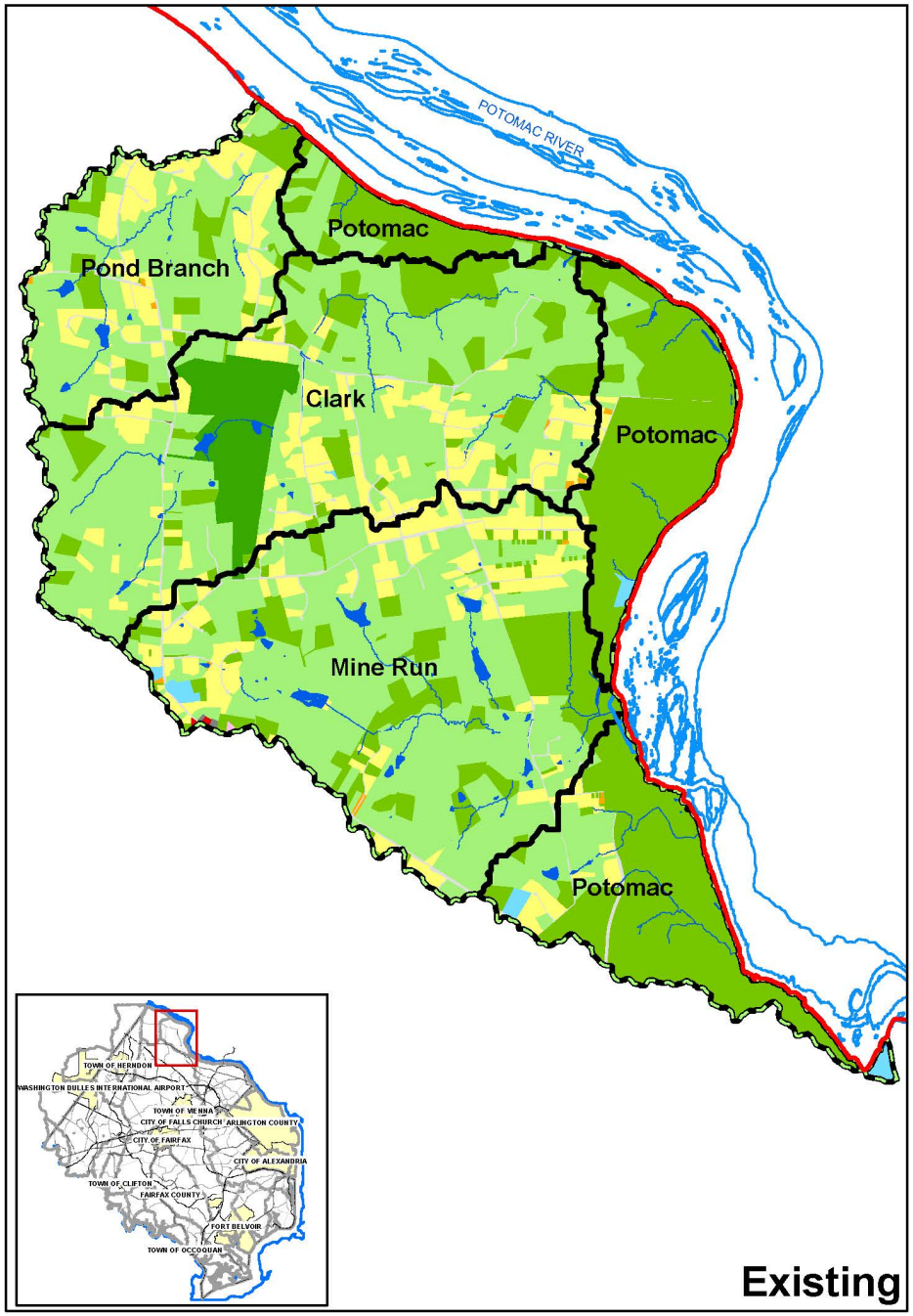
None of the subwatersheds within the Pond WMA have been identified as potential problem areas in the subwatershed ranking of source indicators to identify potential stressors or pollutant sources. The WMA was ranked as having low to moderate levels of stressors and pollutant sources.

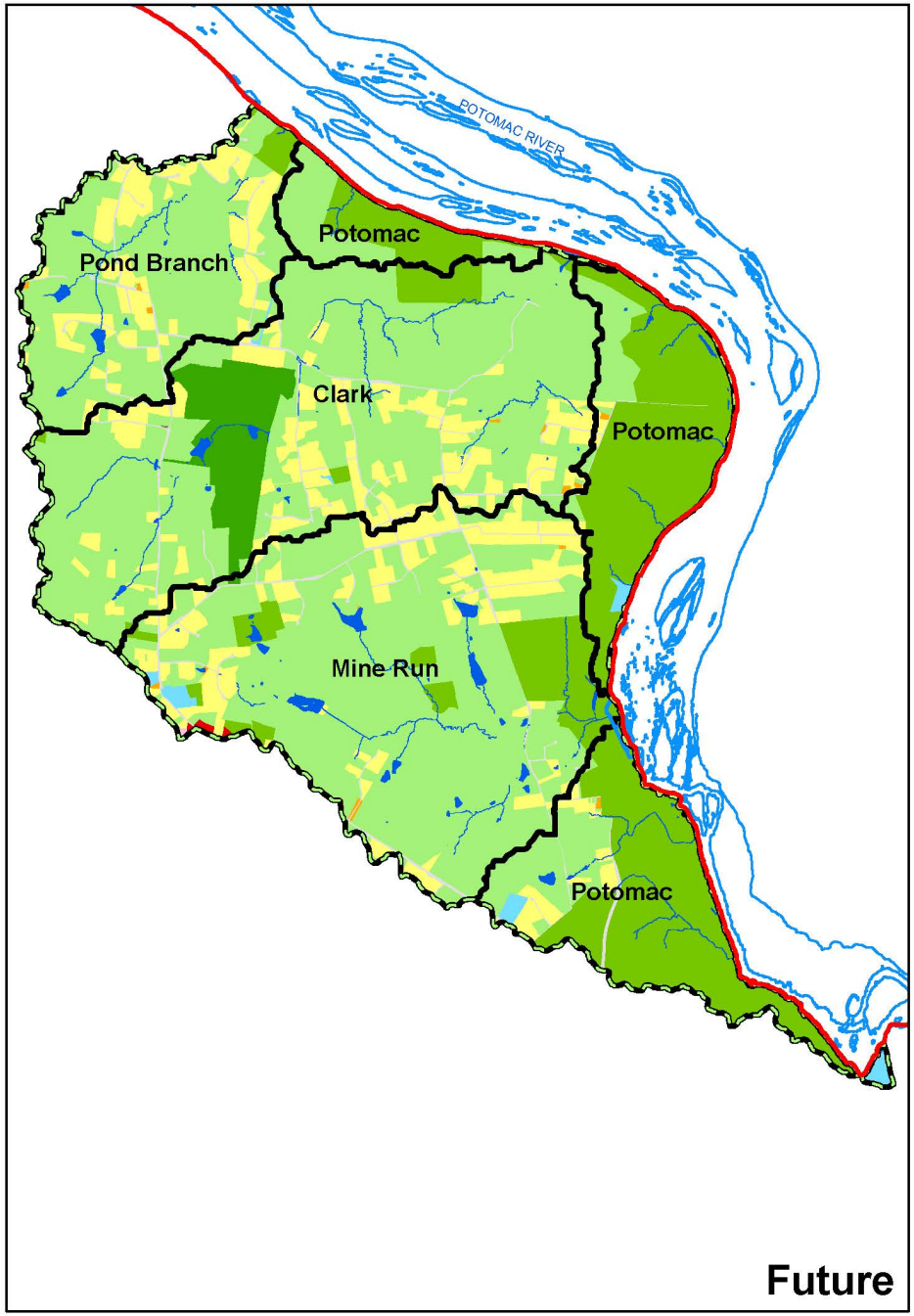
3.2.4 Potomac (Pond) WMA

The Potomac WMA is broken into three subwatersheds, all of which lie along the Potomac River. Two subwatersheds are located along the northern border of the WMA and the third encompasses the southeastern tip. Approximately 4.4 miles of perennial streams exits within the Potomac WMA. The WMA consists primarily of open space with some estate and low density residential land uses closest to the center of the Pond Branch watershed, as shown in Map 3.4. The WMA is composed of small tributaries that drain directly to the Potomac River where stream segments and drainage areas are small and development is minimal, therefore HEC-RAS modeling was not completed for the Potomac WMA.

None of the subwatersheds within the Potomac WMA have been identified as potential problem areas in the subwatershed ranking of watershed impacts. Based upon existing conditions, the WMA ranges from a poor to 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.





Map 3.4
Existing and Future Land Use for Pond Branch Watershed

WMAs
Watersheds
County

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

N

0 0.25 0.5 Miles