RESOLUTION NO. RS-2011-13

ADOPTING AN AMENDMENT TO THE TEXT OF THE 2002 COMPREHENSIVE PLAN FOR WASHINGTON COUNTY, MARYLAND (CP-11-001)

RECITALS

The Board of County Commissioners of Washington County, Maryland (the "Board"), adopted the 2002 Comprehensive Plan for Washington County, Maryland (hereinafter the "Plan") on August 27, 2002, effective August 27, 2002 in accordance with Md. Code, Article 66B, Section 3.07.

The Washington County Planning Commission (the "Planning Commission"), under the provisions of Md. Code, Article 66B, may recommend adoption of any amendment to the Plan.

An amendment to the Plan has been recommended by the Planning Commission. The amendment would add Chapter 8A, Water Resources Element, to the Plan and bring the Plan into compliance with Maryland law. It is the opinion of the Planning Commission and the Board that the amendment is consistent with the goals and objectives of the Plan.

The Planning Commission and the Board held a joint public hearing for the purpose of taking testimony on the proposed amendment on May 24, 2011 pursuant to public notice duly given as required by Md. Code, Article 66B, Section 3.07.

A copy of the recommended amendment was referred to all adjoining planning jurisdictions, and to all affected State and local jurisdictions that have responsibility for financing or constructing public improvements necessary to implement the Plan.

The Board has considered all recommendations of the Planning Commission, the Planning Staff, those comments received as part of the public hearing before the Planning Commission and the Board, and also reviewed any written communications which were submitted concerning the proposed amendment to the Plan, and the Board conducted this review process in public session(s).

NOW, THEREFORE, BE IT RESOLVED BY THE BOARD OF COUNTY COMMISSIONERS OF WASHINGTON COUNTY, MARYLAND, that the 2002 Comprehensive Plan for Washington County, Maryland is hereby amended as follows:

CP-11-001

Chapter 8A, WATER RESOURCES ELEMENT, is hereby ADDED as follows:

Water Resources Element

The Water Resources Element (WRE) for Washington County was prepared to comply with the Maryland State requirements established as State law in 2006 under House Bill 1141 – Land Use – Local Government Planning. This law provided new and modified elements to the local Comprehensive Plan. Article 66B of the Annotated Code of Maryland is the enabling Statute for these elements. The document was prepared in accordance with the Maryland Department of Planning's (MDP) Models and Guidelines No. 26 – The Water Resources Element: Planning Water Supply and Wastewater and Stormwater Management, dated June 2007.

The Guidelines provided by MDP outline the items that are to be addressed in the WRE for assessment of the water supplies, wastewater, and stormwater, and provides a model containing the components required in the complete WRE. The County utilized this document to prepare the WRE and has used its guidance to prepare a document specific to Washington County.

This document was a joint effort by the Divisions of Environmental Management, Public Works, Planning and Community Development, Office of the County Administrator, the Washington County Soil Conservation District, and the Washington County Health Department. The WRE is intended to be used by all the agencies in the development of land use policies,

water resources policies/plans, local trading initiatives, and Chesapeake Bay Initiatives. The WRE element will be incorporated into the County's Comprehensive Plan, development regulations, and Water and Sewer Plan.

The WRE was completed at the 8-digit watershed level and has looked at the overall County level as well. Strategies provided in the Plan are suggested mechanisms to achieve the goals both at the watershed level and at the County level to address not only the local water resource impairments and issues but also to address the Chesapeake Bay TMDL (Total Maximum Daily Load) and initiatives to clean up the Bay.

Sources of information used for this document included published documents by Maryland Department of Planning, Maryland Department of the Environment, Maryland Department of Natural Resources, and the United States Environmental Protection Agency. The plan references limitations of data discovered in development of the plan and identifies the data required to address these limitations for development of revisions of the WRE.

Water and wastewater service area boundaries utilized in this document reflect the information received from each Town during the Water and Sewer Plan Update which was adopted in November 2010. Where a Municipal Growth Element was available, this information was taken into consideration for the development of the buildout scenario. It is recognized that the WRE is dependent on changing information and will require modification as applicable to address municipal plans as they are adopted.

This plan is viewed as a living document that requires modifying and updating as new or more defined data becomes available. It should be recognized that the recommendations and initiatives will need to be refined and modified to reflect the ever changing technologies and data utilized in making these decisions. This document has been designed to address the requirements of the State Guidelines for inclusion in the Comprehensive Plan which requires a summary of the WRE analysis and findings, and the outline of this document follows the Guideline sections which identifies the key questions the WRE is to address to meet the HB 1141 standards.

The area used to prepare this report is within the established boundaries of Washington County, Maryland. Washington County is located in the west-central part of Maryland and includes the narrowest part of the State's panhandle. The northern boundary of the County is shared with Pennsylvania (Fulton and Franklin Counties) along the Mason-Dixon Line. Except for a two mile stretch that is shared with Virginia (Loudon County) at the southeastern edge of the County, the southern boundary of the County is the Potomac River and is mainly shared with West Virginia (Morgan, Berkeley and Jefferson Counties). Sideling Hill Creek forms the direct western boundary with Allegheny County, and the crest of South Mountain forms the eastern boundary with Frederick County.

Maps defining the areas within Washington County referenced in this Plan can be found in the Comprehensive Plan identified in the table of maps.

WATERSHEDS

A watershed is area of land, from ridge to ridge, catching precipitation which subsequently drains and seeps into marshes, streams, rivers, lakes, or groundwaters. Homes, farms, ranches, forests, small towns and big cities make up watersheds. Watersheds cross county, state and international borders. Watersheds come in all shapes and sizes. Small ones are nested in larger ones. The watersheds in Washington County are nested within the large Chesapeake Bay watershed. For the purpose of this report, the County has used the Maryland 8 digit watershed level. This is essentially the same as the Federal 12 digit watershed.

Washington County's ten major watersheds are listed and described below from west to east, and included as illustrated in the Comprehensive Plan of Washington County as Map 4. 208 acres of the Catoctin Watershed and 79 acres of the Upper Monocracy River watershed are located along the eastern County boundary with the remaining portion of these watersheds in Frederick County. For the purpose of this report, these watersheds have been excluded but will be incorporated in the next round of the WRE. Percentages describing makeup of watersheds has been rounded for demonstrative purposes.

Sideling Hill Creek

Sidling Hill is located in the western most section of the County. On the west, the watershed extends into Allegheny County, MD and to the north into Pennsylvania. The Little Tonoloway Creek watershed borders the northern section of eastern boundary and the Potomac River – Allegheny watershed borders the southern portion of the eastern boundary. The Washington County section of the watershed consists of 5,157 acres which is 87% deciduous forest area, 9% cropland, and the remaining 4% consisting of low density residential, open urban land, coniferous forest, brush, water, transportation, rural residential (agricultural), and rural residential (forest) agricultural buildings. Sidling Hill is designated by Maryland Department of the Environment as a Tier II Water. This classification is used to identify the States' high quality waters which have existing water quality conditions better than the defined level to meet the Clean Water Act's "fishable/swimmable goal". State regulations require that Tier II waters be protected.

Little Tonoloway Creek

Little Tonoloway is located in the western section of Washington County and is bordered on its west by Sidling Hill Creek watershed, on the south by the Potomac watershed – Allegheny County, and the Potomac River Watershed – Washington County. Tonoloway Creek watershed lies on its east side. The watershed extends to the north into Pennsylvania. The western portion of the Town of Hancock lies within this watershed. The watershed consists of 9,883 acres which is 61% deciduous forest, 9% cropland, 9% orchard, 5% brush, 3.5% low density residential, 2% transportation, 2% coniferous forest, and the remaining 8.5% consisting of medium density

residential, high density residential, commercial, industrial, institutional, extractive, open urban land, pasture, mixed forest, water, rural residential (agriculture), rural residential forest, and agricultural buildings.

Tonoloway Creek

The Tonoloway Creek watershed is located in the western section of Washington County and is surrounded by the Potomac River – Washington County watershed to the west, south and east. The watershed extends into Pennsylvania to the north. The eastern portion of the Town of Hancock lies within the watershed boundaries. The watershed consists of 1,334 acres which is 65% deciduous forest, 12% cropland, 6% low density residential, 4 % brush, 3% industrial, 2% bare ground, 2% rural residential forest, and the remaining 9% consisting of medium density residential, high density residential, commercial, open urban land, water; transportation, and rural residential (agricultural).

Licking Creek

The Licking Creek watershed is located in the western section of Washington County and is surrounded to the west and south by the Potomac River – Washington County watershed, and on the east by the Little Conococheague Creek watershed. The watershed extends into Pennsylvania to the north. The watershed consists of 17,691 acres which is 74% coniferous forest, 12% cropland, 3% deciduous forest, 2% low density residential, and the remaining 9% consisting of medium density residential, commercial, institutional, open urban land, pasture, orchard, mixed forest, brush, water, wetlands, bare ground, transportation, rural residential (agricultural), rural residential (forest), feeding operations, and agricultural buildings. Wetlands in this watershed total 1.89 acres.

Little Conococheague Creek

The Little Conococheague Creek watershed is located in the central part of Washington County and is bordered by the Licking Creek and Potomac River – Washington County watershed to the west, the Potomac River – Washington County watershed to the south wrapping around to the east, with the Conococheague Creek Watershed also bordering to the east. The watershed extends into Pennsylvania to the north. The Town of Clear Spring primarily resides in this watershed. The watershed consists of 10,720 acres which is comprised of 39% pasture, 34% coniferous forest, 8% cropland, 6% low density residential, 4% deciduous forest, and the remaining 91% consisting of medium density residential, high density residential, commercial, institutional, open urban land, orchard, mixed forest, brush, water; transportation, rural residential (agricultural), rural residential (forest), feeding operation, and agricultural buildings.

Conococheague Creek

The Conococheague Creek watershed is located in the central part of Washington County and is the third largest watershed in the County. The watershed is bordered to its west by the Little Conococheague Creek Watershed, the Potomac River – Washington County Watershed to the south with a portion wrapping to the lower western boundary, and to the east by the Marsh Run Watershed and Antietam Creek Watershed. A portion of the western section of the City of Hagerstown and the north section of the Town of Williamsport resides in the boundaries of this watershed. The Conococheague Creek watershed extends north into Pennsylvania. This watershed is 41,733 acres and consists of 25% cropland, 24% pasture, 11% deciduous forest, 10% low density residential, 5 % industrial, 4% commercial, 4% medium density residential, 3% coniferous forest, 3% rural residential (agricultural), and the remaining 11% consisting of high density residential, institutional, extractive, open urban land, orchard, ,mixed forest, brush, water, bare ground, transportation, rural residential (forest), feeding operation, and agricultural buildings.

Marsh Run

The Marsh Run watershed is located in the eastern section of Washington County and is the only watershed other than Israel Creek solely residing within the geographic boundaries of the County. The Conococheague Watershed and the Potomac River – Washington County border to the west with the Potomac River – Washington County Watershed wrapping round the southern section and part way up the eastern side. Antietam Creek Watershed borders to the east. A portion of the City of Hagerstown is located in the northern head water section of the watershed. The watershed is 13,460 acres and consists of 42% cropland, 15% deciduous forest, 12% pasture, 10% low density residential, 6% medium residential, 3% industrial, 3% institutional, 2 % commercial, with the remaining 7% consisting of high density residential, open urban land, orchard, brush, water, bare ground, transportation, rural residential (agricultural), rural residential (forest), feeding operations, and agricultural buildings.

Antietam Creek

The Antietam Creek Watershed is located on the eastern portion of Washington County and is the largest watershed in the County. The watershed is bordered to the west by the Conococheague Creek Watershed, Marsh Run Watershed, and the Potomac River - Washington County, which also borders the south with the Potomac River - Frederick County Watershed. This watershed is bordered to the east by the County boundary and since the South Mountain Range runs along this border the drainage area on this side is contained in the County. The watershed extends into Pennsylvania. The majority of the City of Hagerstown and all of the Town of Smithsburg, Town of Boonsboro, Town of Sharpsburg, and Town of Keedysville reside in this watershed. The watershed is 118,708 acres and consists of 36% cropland, 25% pasture, 11% low density residential, 5% medium density residential, 3% rural residential (forest), 2% rural residential (agricultural), 2% commercial, 2% institutional, and the remaining 14% consisting of high density residential, industrial, extractive, open urban land, orchard, coniferous

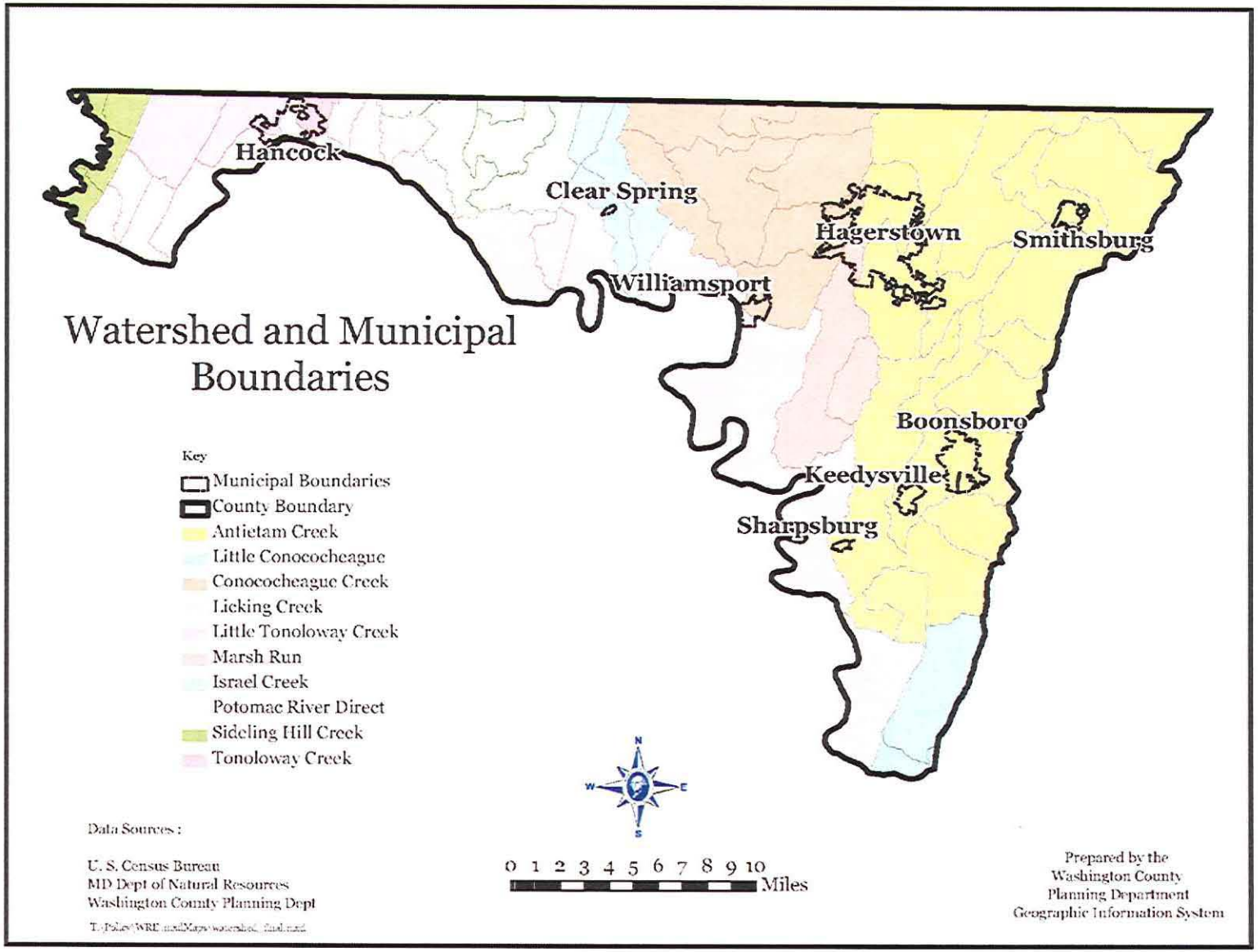
forest, mixed forest, brush, water, wetlands, bare ground, transportation, feeding operations, and agricultural buildings. Wetlands consist of 10.02 acres.

Potomac River Watershed – Allegheny, Washington and Frederick

The Potomac River Watershed is located along the Potomac River and is the second largest watershed in the County. The Potomac River Watershed runs the full length of the river through Maryland with the section in Washington County broken down into Allegheny, Washington, and Frederick designations. For the purpose of this report, the watershed is being evaluated as one unit and not broken down in the sections designated by the State. At this point on the Potomac, it is also receiving drainage from Garrett and Allegheny Counties in Maryland, Pennsylvania, and West Virginia which affects the quality of the water. As the WRE becomes more refined, this watershed will be looked at in smaller segments. The watershed is 64,470 acres and consists of 35% deciduous forest, 21% cropland, 17% coniferous forest, 8% low density residential, 8% pasture, 3% rural residential (forest), 2% rural residential (agricultural), with the remaining 6% consisting of medium density residential, high density residential, commercial, industrial, institutional, extractive, open urban land, orchard, mixed forest, brush, water, wetlands, bare ground, transportation, and agricultural buildings. Wetlands consist of 43.22 acres.

Israel Creek

Israel Creek Watershed is located on the southeastern section of the County along the eastern County boundary. It is bordered to the north by the Antietam Creek Watershed and to the west and south by the Potomac River Watershed – Frederick County. The watershed is 9,438 acres and consists of 51% deciduous forest, 19% cropland, 14% low density residential, 6% rural residential (forest), 6% rural residential (agricultural), with the remaining 4% consisting of medium density residential, high density residential, commercial, institutional, pasture, coniferous forest, water, feeding operations, and agricultural buildings.


Hancock
Clear Spring
Hagerstown
Smithsburg
Williamsport
Boonsboro
Keedysville
Sharpsburg
Watershed and Municipal Boundaries
Key
Municipal Boundaries
County Boundary
Antietam Creek
Little Conococheague
Conococheague Creek
Licking Creek
Little Tonoloway Creek
Marsh Run
Israel Creek
Potomac River Direct
Sideling Hill Creek
Tonoloway Creek
N
W
E
S
0 1 2 3 4 5 6 7 8 9 10
Miles
Data Sources :
U. S. Census Bureau
MD Dept of Natural Resources
Washington County Planning Dept
Prepared by the
Washington County
Planning Department
Geographic Information System

WATER

Maintaining a sustainable water supply to meet current demands and provide for future growth is vital to the future of Washington County. This means not only insuring that we have adequate water quantities, but that water quality is also of a standard to provide drinking water. Water quality is the critical component because it does not matter how much water we have available in the County if it is not of a useable/treatable quality.

Evaluation of the County's water resources took into account a variety of boundary areas generally including jurisdictional boundaries, water service areas, designated growth areas, watersheds, and hydrogeomorphic areas.

In completing this project, four main types of analysis were utilized in the water resource assessment. They included ground water supply capacity analysis, future demand/availability analysis, existing water system analysis, and source water assessment analysis. Details on the methodologies utilized in each of these analysis types are as follows:

Groundwater Supply Capacity Analysis: The Groundwater analysis was conducted utilizing Section II, Detailed Assessment Approaches and Methodologies located on page 61 of the Maryland Department of the Planning's Models and Guidelines No. 26. This section provides the formulas and data for each hydrogeomorphic rock type to calculate the recharge rate for each watershed within the County. This approach was used on the watershed boundary scale and looks at the summation of the individual hydrogeomorphic areas within each of these areas. The County recognizes that there are limitations to this approach and that more refined analysis will need to be completed in subsequent updates of the WRE. These limitations are recognized in the strategies discussion on water resources. This analysis accounted for all private and public/community groundwater sources in the County. Impervious surfaces at full buildout were accounted for when calculating total recharge available.

Future Capacity Demand Analysis: A current zoning analysis was conducted to determine how many residential and commercial equivalent dwelling units (EDUs) could be built in the County at full buildout. This analysis looked at each property in the County to determine if the property was vacant or under-developed based on current zoning, and then calculated how many additional EDUs this property will contribute to each water system or to the rural areas development. Because this property analysis treated properties that had planned but not yet developed usage as future growth, the treatment plant future capacity needs did not require that approved but not yet connected subdivisions be accounted for separately. This analysis therefore accounts for all development that could occur at full zoning build out in the County, which is not already served by a water system or a private well. Note that an EDU in the Washington County WRE is equal to 200 gallons per day which was established in County Policy in 1989 and has been verified as an acceptable level through routine usage analysis.

Future Capacity Availability Analysis: This analysis took the capacity availability figures from the Groundwater Availability Analysis and Existing Water System Capacity Analysis and subtracted the Future Capacity Demand Analysis figures to determine the excess or deficit in water supply for each Water System under County ownership and the rural areas served by private wells. This method allows for a margin of error in that the existing water system capacity still has some availability for future service.

Existing Water System Capacity Analysis: To determine the existing water systems capacity status for the systems owned by Washington County Government, each system was analyzed separately based on the number of EDUs already sold and the actual water used on a three-year average. The available capacity for each of the facilities was based on the analysis calculation showing the largest capacity need. This figure was then taken from the facilities' permitted capacity to determine available capacity for future development. Approved subdivisions were not accounted for in this Analysis because they were accounted for in the Future Capacity Availability Analysis.

Source Water Assessment: All Source Water Assessments, which are available to the County Government for water systems in the County, were reviewed and the findings of susceptible contaminants were listed in this document. A discussion on the meaning of this analysis and future needs is contained in this section.

Findings of the Above Described Analysis:

Groundwater Availability and Capacity Availability Analysis

Approximately 106,098 Equivalent Dwellings Units (residential / commercial / industrial) receive water in Washington County. 31,098 or 28.4% receive this water from a ground water supply. Groundwater availability was based on the number of acres within each hydrogeomorphic area by watershed (net of impervious surfaces), multiplied by the recharge rate per acre for the identified area to obtain the number of gallons available for total recharge in that watershed. Existing usage of groundwater resources was then calculated and subtracted from total available groundwater to obtain the net total availability. A land use analysis was then performed to determine total potential usage based on zoning and full buildout of the area. This was subtracted from the net total available resource.

The results shown below indicate that on a watershed basis, full buildout can occur and be served by the groundwater available. This includes the demand required from public water supplies identified in the study.

Note that the analysis in the City of Hagerstown WRE identified areas outside of their Medium Range Growth Area as served by groundwater. The County WRE also identified groundwater resources available to serve this area and included it in the total analysis. It is

believed that allocation from the Potomac River would be available long-term, even if participation in upstream storage was required, to serve the aforementioned area. Appropriate infrastructure upgrades would allow for transmission and use of the surfacewater appropriation.

Summary of Total Availability Based on Existing Use and Total Zoning Buildout

Groundwater Availability Analysis Accounting for Impervious Surface

Watershed	TOTAL RECHARGE AVAILABLE	TOTAL USAGE FROM EXISTING WELLS	AMOUNT REMAINING FOR ZONING BUILDOUT	DEMAND OF ZONING BUILDOUT	AMOUNT REMAINING FOR OTHER USES	EDU EQUIVALENT OF AMOUNT REMAINING	% OF TOTAL RECHARGE AVAILABLE AFTER EXISTING AND BUILDOUT DEMAND	% OF TOTAL RECHARGE USED BY EXISTING AND FUTURE DEMAND	% OF TOTAL RECHARGE BEING USED BY EXISTING DEMAND
Antietam Creek	37,023,911.71	3,455,800.00	33,568,111.71	12,088,200.00	21,479,911.71	107,399.56	58%	42%	9%
Catoctin Creek	85,141.78	1,600.00	83,541.78	-	83,541.78	417.71	98%	2%	2%
Conococheague Creek	12,566,493.29	570,400.00	11,996,093.29	3,911,000.00	8,085,093.29	40,425.47	64%	36%	5%
Israel Creek	3,457,234.11	518,400.00	2,938,834.11	349,200.00	2,589,634.11	12,948.17	75%	25%	15%
Licking Creek	6,378,324.01	66,000.00	6,312,324.01	362,800.00	5,949,524.01	29,747.62	93%	7%	1%
Little Conococheague	3,614,728.48	100,000.00	3,514,728.48	456,600.00	3,058,128.48	15,290.64	85%	15%	3%
Little Tonoloway Creek	3,535,547.07	50,000.00	3,485,547.07	405,400.00	3,080,147.07	15,400.74	87%	13%	1%
Marsh Run	3,782,635.26	221,400.00	3,561,235.26	1,667,200.00	1,894,035.26	9,470.18	50%	50%	6%
Potomac River	22,178,003.93	916,400.00	21,261,603.93	2,488,600.00	18,773,003.93	93,865.02	85%	15%	4%
Sideling Hill	1,089,563.90	9,600.00	1,079,963.90	67,000.00	1,012,963.90	5,064.82	93%	7%	1%
Tonoloway Creek	511,219.48	310,000.00	201,219.48	101,800.00	99,419.48	497.10	19%	81%	61%
Upper Monocacy	32,180.67	-	32,180.67	2,200.00	29,980.67	149.90	93%	7%	0%
Sum	94,254,983.69	6,219,600.00	88,035,383.69	21,900,000.00	66,135,383.69	330,676.92	70%	30%	7%

Future Groundwater Capacity Demand/Availability Analysis

To expand on groundwater availability and based on calculated demand per parcel using current zoning at full buildout, a total of 109,500 new EDU's will need served of which 64,333 will be served by the previously discussed community water systems. The remaining 45,167 EDU's will be served by private wells. The hydrogeomorphic and watershed analysis again indicates available resources to serve this demand.

Existing Water System Capacity Analysis

Community water systems evaluated in Washington County for purposes of this study are all owned and operated by Washington County, and include Highfield/Cascade/Penmar, Elk Ridge, Sandy Hook, Mt. Aetna, and Sharpsburg. Results of this analysis shown in the table below indicate that based on future buildout of the systems service areas, the recharge rate for the respective hydrogeomorphic area will support the needed supply. This of course cannot account for water that is un-extractable. In addition, the total groundwater analysis previously discussed also indicates available resources in the watershed to serve ultimate demand of these systems. In the future this will need further refined to insure that there are no isolated or localized issues.

Copies of the water service areas maps from the Washington County Water and Sewer Plan adopted November 2010 have been included at the end of this chapter as reference materials to aid in understanding the areas designated in the Water System Capacity Analysis.

Water System Analysis

System Name	Elk Ridge	Highfield *	Mt. Aetna	Sandy Hook	Sharpsburg **
Design Capacity (gpd)	7,500	215,000	87,200	15,000	133,000
Capacity Sold (EDU)	38	766	227	71	681
Zoning build-out plus planned capacity needs (EDU)	12	301	146	53	157
Remaining Capacity with current permit/increase (EDU)	12	309	209	54	157
Permit capacity increase needed from existing (gpd)	2,500	0	0	10,000	34,600
Remaining capacity for full buildout with proposed permit (EDU)	0	8	63	1	0
Anticipated permit capacity/total groundwater needed (gpd)	10,000	215,000	87,200	25,000	34,600
Estimated ground water available in water service area (gpd)	13,800	259,000	194,700	28,400	151,290
Permit increase need anticipated in	2023	N/A	N/A	2035	2022

* Plan incorporates the merger of the COPT water system unused capacity for the former Ft. Ritchie Army Base with the County system.

**167,600 is total water supply needed with 133,000 already appropriated from surface water supplies leaving a need of 34,600 gpd from available groundwater resources. It is anticipated that an increase in the surfacewater permit would prevent groundwater need.

Source Water Assessment

In addition to water quantity evaluations, water quality of the ground water is an integral part of evaluating the drinking water supplies in the County. This area of analysis will require additional work to address the County's underground water supply serving private water systems, and a process for this analysis and assessment will need to be developed. With regard to the public water supplies, the State of Maryland and the Washington County Health Department have completed Source Water Assessments for all public drinking water systems. Details on each of these systems are included in the water section of the WRE. Source Water Assessments evaluate public drinking water systems to identify their vulnerabilities to contamination. They do not assess the treatment plant or the distribution system through which the water passes. These are assessed separately through other mechanisms. The following chart list the vulnerabilities currently identified:

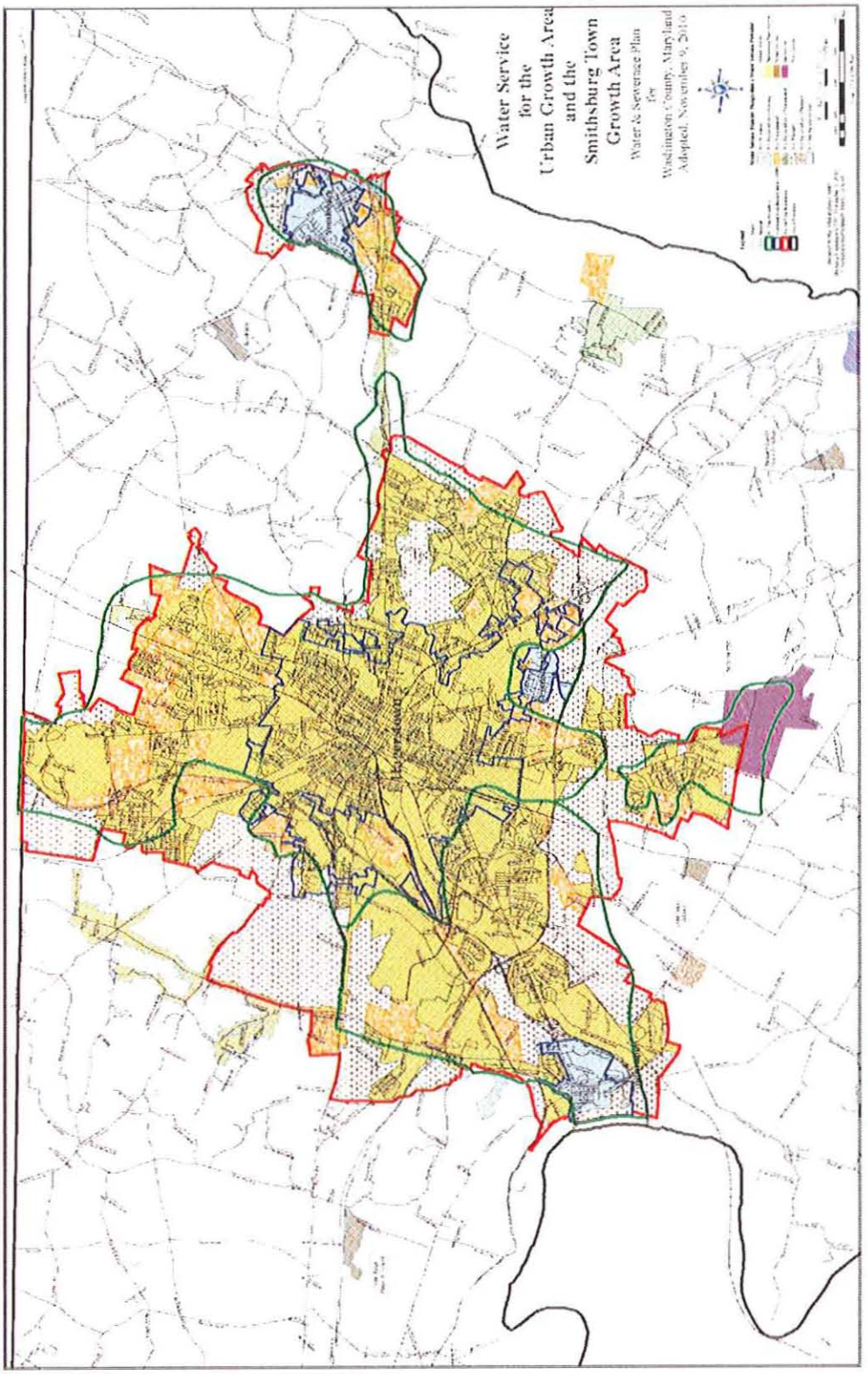
Water System	Susceptible Contaminates
Brook Lane Water System	Radon 222
Hancock Water System	VOC (Volatile Organic Carbon)
Clearview Nursing Home Water System	Nitrate Total Coliform Bacteria Radon 222
Woodlawn Trailer Park Water System	Nitrate Total Coliform Radon 222
Deer Lodge Mobile Home Park Water System	None listed at time of analysis
Brunswick Yourtee Springs (Brunswick Water System)	None listed at time of analysis
Fahrney Keedy Home and Village Water System	Radon
El Rancho Mobile Home Park Water System	Radon 222 Total Coliform Bacteria
Fort Ritchie Water System	Radionuclide Total Coliform Bacteria
Conococheague Apartments Water System	Nitrate Total Coliform Radon 222
San Mar Children's Home Water System	Microbiological Cryptosporidium Giardia
Seven Schools in Washington County	Nitrates Microbiological
Six Businesses in Washington County	Nitrates Microbiological

St. James School Water System	Nitrate Radionuclides Volatile Organic Carbons Synthetic Organic Carbons Microbiological Radon 222
Highfield Water System	Radon 222
Sandy Hook Water System	None identified
Mt. Aetna Water System	Total Coliform Bacteria Radon 222
Elk Ridge Lake Water System	Volatile Organic Compounds Radon 222
Town of Clear Spring Water System	Microbiological
Boonsboro/Keedysville Water System	Microbiological Nitrates Radon
Cedar Ridge Children's Home Water System	Nitrates Cryptosporidium Giardia Synthetic Organic Carbons (pending) Radon
Edgemont Reservoir	Total/Fecal Coliform Protozoa Viruses Turbidity
Potomac River Water Source	Organic Carbon Giardia Cryptosporidium Tastes and odors Sediment Algae Disinfection By-product Precursors

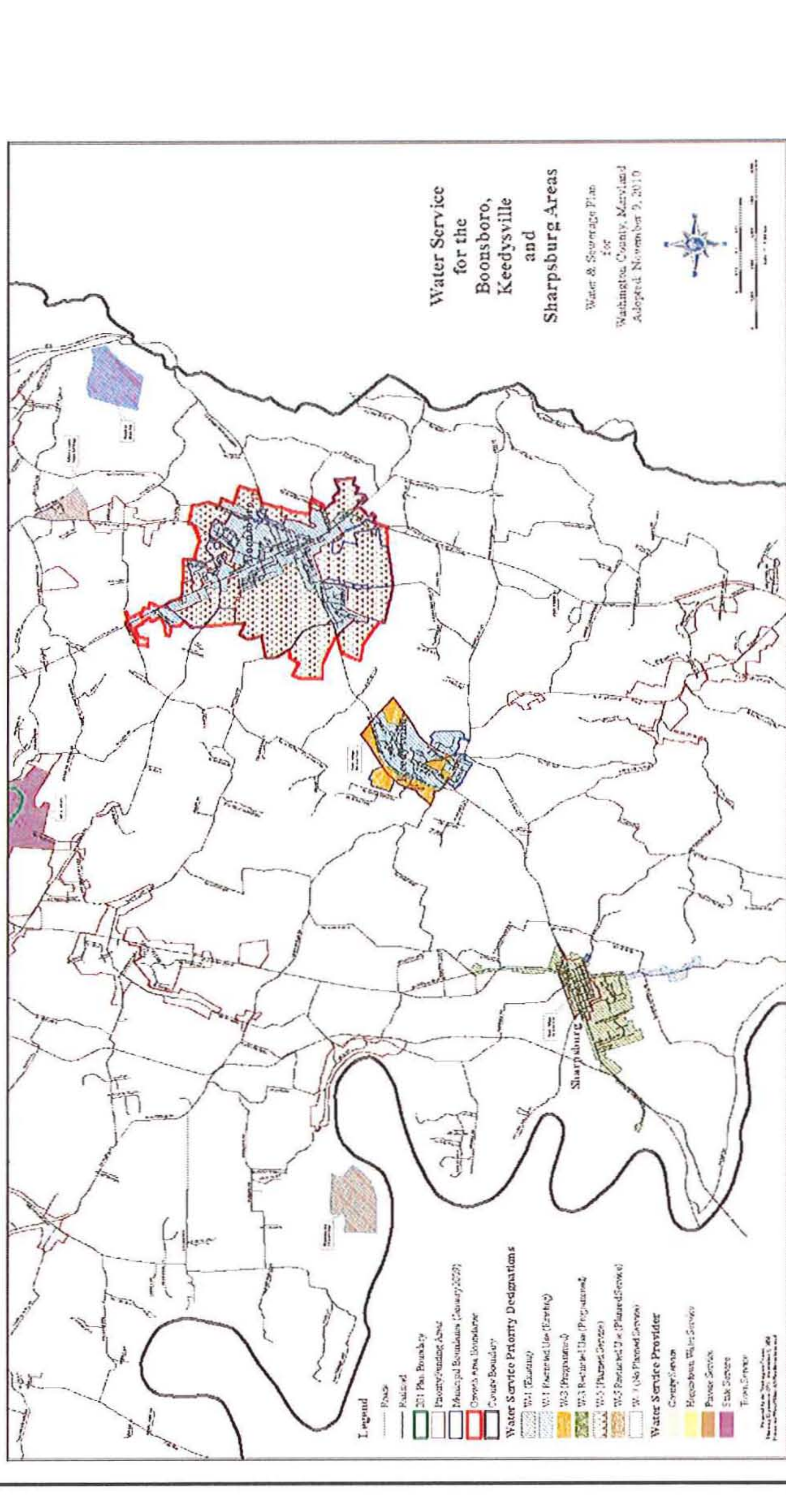
Action Items

Several items needing addressed for supply assessment are as follows:

- √ Methodology needs refined for accurate evaluation of critical areas;
- √ General groundwater quality assessment in rural areas with resulting action plan needs completed;
- √ At 90% permit vs. withdrawal rate on Community Water Systems, a detailed quantity assessment needs performed to confirm adequate supply and future potential at the withdrawal point;
- √ Update Water and Sewer Plan to reflect adopted WRE;
- √ Evaluate a mechanism to more completely identify residential and agricultural (rural area) wells, and incorporate this data into the County GIS system;
- √ Incorporate test data for groundwater quality into master database;
- √ Develop a more complete sourcewater/wellhead protection program;
- √ Continually evaluate regional solutions to water supply regional planning;
- √ Continue to promote water conservation initiatives;
- √ Continue to evaluate and maintain infrastructure at peak efficiency;
- √ Promote water reuse initiatives;
- √ Create and implement drought management procedures and requirements;
- √ Design and manage open space/land preservation initiatives to facilitate water protection requirements;
- √ Establish a common database accessible by multiple agencies to keep information current;
- √ Evaluate additional water supplies to supplement current systems.


Water Service
for the
Urban Growth Area
and the
Smithsburg Town
Growth Area
Water & Sewerage Plan
for
Washington County, Maryland
Adopted: November 9, 2010


Water Service
for
Southern Washington County,
Pen Mar
and
Cascade Areas
Water & Sewerage Plan
for
Washington County, Maryland
Adopted November 9, 2010
Pen Mar / Cascade
Southern Washington County
Legend
Water Service Priority Designations
Water Service Provider


Water Service
for the
Boonsboro,
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and
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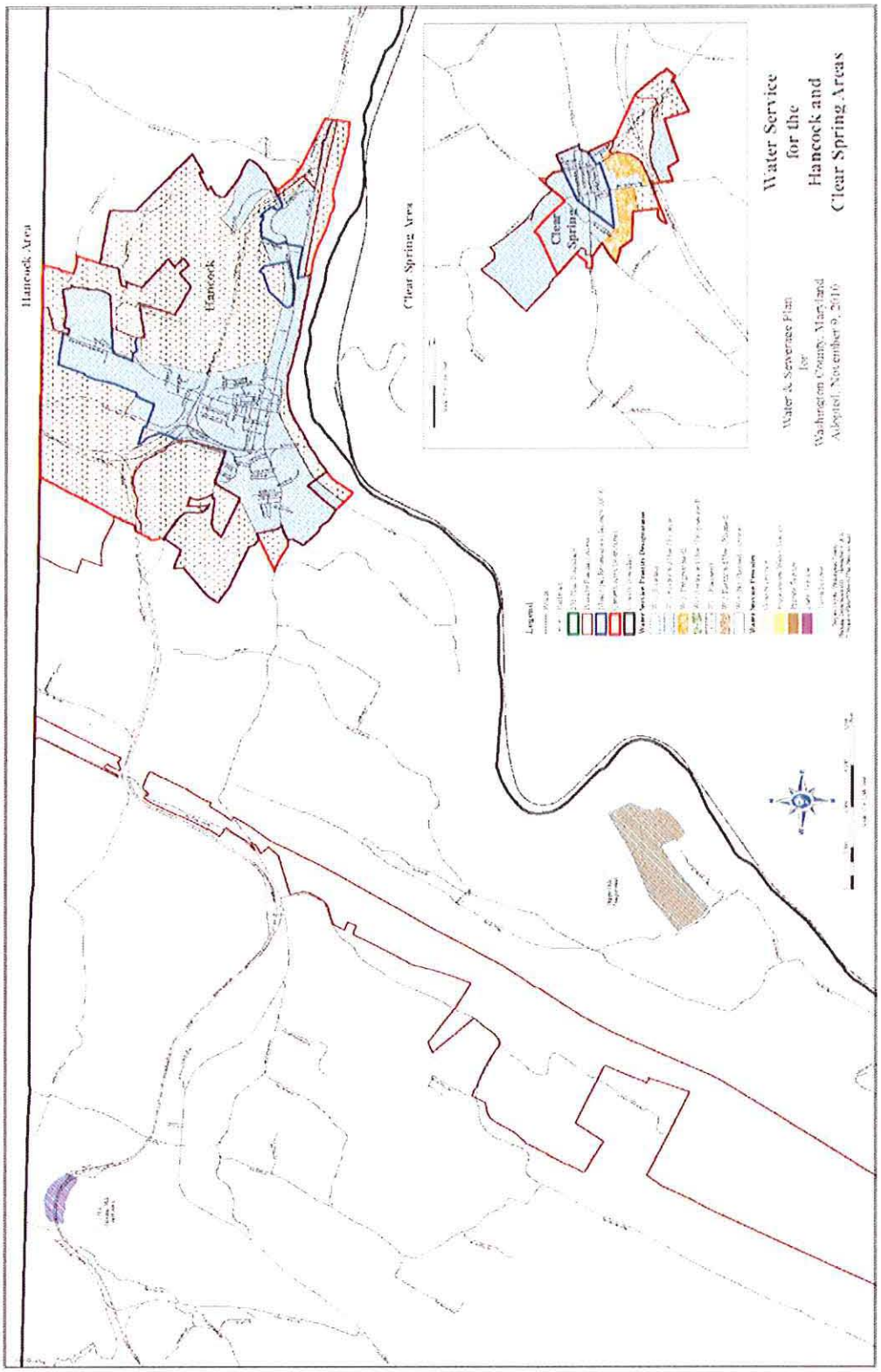

Hancock Area
Hancock
Clear Spring Area
Clear Spring
Water Service for the Hancock and Clear Spring Areas
Water & Sewerage Plan for Washington County, Maryland Adopted: November 9, 2010

WASTEWATER

The Chesapeake Bay has experienced a decline in water quality due to over enrichment of nutrients (mainly phosphorus and nitrogen). The Chesapeake Bay Agreement of 1983, signed by Maryland, Virginia, Pennsylvania, and the District of Columbia, specified a nutrient reduction goal of 40% by the year 2000. The Maryland Department of the Environment, in support of Maryland's commitment to reduce the amount of nutrients being discharged to the Bay, developed a strategy for achieving the desired reduction by the upgrade of the major 66 wastewater treatment plants to remove nitrogen through a process known as biological nutrient removal (BNR). Using the BNR process, more than 90% of pollutants are removed, while achieving nitrogen concentration below 8 mg/l total nitrogen.

Enhanced Nutrient Removal Program

Recognizing that more needs to be done, the Chesapeake Bay 2000 Agreement requires further reduction in nitrogen and phosphorus entering the Bay by about 20 million pounds and 1 million pounds per year respectively. The Maryland Department of the Environment is using the Bay Restoration Fund to upgrade the now 67 major wastewater treatment plants which discharge to the Chesapeake Bay with enhanced nutrient removal (ENR) technologies. Once upgraded, these plants are expected to reduce nitrogen and phosphorus in the wastewater down to 3 mg/l total nitrogen and 0.3 mg/l total phosphorus, achieving approximately one-third of the needed reduction under the Chesapeake Bay 2000 Agreement. Other pollutants will continue to be reduced by more than 90%.

Regulatory requirements are evolving as we move forward to minimize total loads discharged from Publically Owned Treatment Works (POTW) and privately owned facilities. The Chesapeake Bay initiatives and TMDL's have limited discharges from these facilities and required major facilities to upgrade treatment capabilities to the limit of technology (LOT). The flexibility that is currently available and necessary to manage the required load reductions while facilitating long-term growth management initiatives is continually decreasing. Therefore, it is imperative that the methods identified in the wastewater capacity analysis be available and adhered to in order to sustain the long-term viability of our County.

The treatment of wastewater generated in Washington County is handled by either a wastewater treatment plant (WwTP) or by an on-site disposal system (OSDS). WwTPs in the County are either publically or privately owned. In order for the plant to be privately owned, it must provide service to a single property or adjoining property owned by one individual or entity. An OSDS typically serves only one property which can include residential, commercial, agricultural or institutional. These systems are sized based on usage and are approved/regulated by the Washington County Health Department or MDE depending on size. OSDS are classified as non-point sources because they do not have a designated discharge point into a water body, and they are further discussed in the non-point source section of this document.

Wastewater treatment plants are classified as point sources because they have a designated discharge point into waters of the State of Maryland and are regulated by Federal and

State regulations, more specifically the Clean Water Act. The Clean Water Act requires that these facilities be permitted through the National Pollutant Discharge Elimination System (NPDES) program, which is administered by the Maryland Department of the Environment through primacy with EPA. The NPDES permit designates the amount of a constituent that can be discharged into the receiving water for each facility. This is also referred to as the treatment plant's allocation. Allocation amounts are primarily based on the assimilative capacity of the receiving water, the amount being discharged, and State water quality standards including TMDLs. Permits are designed to protect the water body from degradation. Permit allocations are also based on downstream conditions to which they can contribute. The best known example of this is the Chesapeake Bay initiatives and TMDL. Since the Bay TMDL is completed, each County (geographical boundary not political) will be assigned a loading allocation for nitrogen and phosphorus. MDE has already placed allocation limits for nitrogen and phosphorus in the NPDES permits for major WwTPs and will continue to limit these allocations as necessary. Minor WwTPs also have a load allocation which is regulated, and many have specific limits also contained in their NPDES permits based on ammonia limits or TMDL limitations.

Capacity Analysis Methodology

Evaluation of the County's WwTP's capacity took into account a variety of boundary areas generally including jurisdictional boundaries, sewer service areas, and designated growth areas that could be served by one or more POTW.

In completing this analysis, three main types of analysis were utilized to identify wastewater capacity. They included identification of existing wastewater system usage, future demand for available load, and the total load available to a specific facility to calculate ultimate capacity. Ultimate capacity is based on the current limit of technology and approved initiatives, knowing that in the future enhanced technologies may develop that allow much greater load reduction and associated flexibility in overall County options. Details on the methodologies utilized in each of these analysis types are as follows:

Existing Capacity Demand Analysis: To determine the existing wastewater systems capacity status for the systems owned by Washington County Government, each system was analyzed separately based on the number of EDUs already sold and the actual wastewater treated based on a three-year average. The available capacity for each of the facilities was based on the analysis calculation showing the largest capacity need. This figure was then taken from the facilities' permitted capacity to determine available capacity for future development. Approved, but not constructed, subdivisions were not accounted for in this Analysis because they were accounted for in the Future Capacity Availability Analysis.

Future Demand Analysis: A current zoning analysis was conducted to determine how many residential and commercial equivalent dwelling units could be built in the County at full buildout. This analysis looked at each property to determine if the property was vacant or under-developed based on current zoning, and then calculated how many additional EDUs this property

will contribute to the wastewater system or to rural areas development on OSDS. Because this property analysis treated properties that had planned but not yet developed usage as future growth, the treatment plant future capacity needs did not require that approved but not yet connected subdivisions be accounted for separately. This analysis therefore accounts for all development that could occur at full zoning buildout in the County which is not already served by WwTPs or OSDS. Note that an EDU in the Washington County WRE is equal to 200 gallons per day which was established in County Policy in 1989 and has been verified as an acceptable level through routine usage analysis.

Total Available Load Analysis: This analysis was conducted utilizing load allocations to each facility as identified in the Enhanced Nutrient Removal (ENR) strategy. Total load availability coupled with future demand allowed calculation of ultimate load needed per facility. The ability to revise total available facility load can then be calculated by using (1) a "bubble" concept where excess load from one facility can be shared with another facility, and (2) tradable loads where identified loads can be traded to a WwTP after an appropriate amount of load is retired toward State initiatives. The combination of these initiatives, coupled with base available load allows calculation of ultimate available load per facility.

Findings of the Above Described Analysis:

Existing Capacity Demand Analysis / Future Demand Analysis / Total Available Load Analysis

POTWs evaluated in Washington County for purposes of this study include the Conococheague, Antietam, Winebrenner, Smithsburg, and Sandy Hook WwTPs. The results of these analyses must be evaluated and explained together, as the resulting conclusions are based on the combined data for each facility.

Copies of the wastewater service areas maps from the Washington County Water and Sewer Plan adopted November 2010 have been included at the end of this chapter as reference materials to aid in understanding the areas designated in the Wastewater System Capacity Analysis,

Conococheague POTW

The results for this facility are especially pertinent since it serves the largest urban growth area in the County (UGA) along with the City of Hagerstown POTW. There is concern that the City POTW is unable to serve this UGA given capacity limitations. The City WRE indicates that only their identified Medium Range Growth Area (MRGA) can be served by the City POTW, and only then fully served through cooperative efforts using the Conococheague POTW.

Analysis through this WRE indicates that through upgrade to ENR standards, the utilization of bubble and trading initiatives previously discussed, and through careful operation of both facilities which is required to meet NPDES permit limits, the full UGA can be served given current zoning and future demand. This is significant in that cooperative efforts must not be overlooked that allow both jurisdictions to accomplish their growth management goals. Only through these cooperative efforts can long-term growth management policies and future long-term sustainability in this UGA be guaranteed.

Antietam POTW

The results for this facility indicate that buildout for this service area can occur given current loading availability. In order for this to occur, the facility would be upgraded to achieve ENR levels to accommodate buildout. Flow calculations are different at this POTW given that it is a completely closed system consisting of grinder pumps serving each property. It is therefore not subject to levels of inflow and infiltration seen at other facilities. Using existing flows and projected buildout at the same gallon per day rate per unit as other facilities to be conservative, this POTW can still handle the ultimate buildout of the area it serves.

Winebrenner POTW

The results for this facility indicate that buildout for this service area can occur given current loading availability. This facility will be upgraded to achieve ENR levels with a portion of the ENR strategy load transferred to the Conococheague WwTP. The resulting upgrade will allow service to the ultimate buildout of the area it serves, including the former Fort Ritchie Army Base.

Smithsburg POTW

The results for this facility indicate that buildout for this service area can occur given current loading availability along with minor trading initiatives. This facility will be upgraded to achieve ENR levels with a portion of the ENR strategy load transferred to the Conococheague WwTP. The area this facility is proposed to serve includes an existing high-density area using OSDS. The resulting trade from the OSDS loading will complete the loading requirement for ultimate buildout of the area it serves.

Sandy Hook POTW

The results for this facility indicate that buildout for this service area can occur given current loading availability and facility operation.

POTW Facility Summary

System Name	Conococheague	Antietam	Sandy Hook	Smithsburg*	Winebrenner
Watershed	Conococheague	Antietam	Potomac	Antietam	Antietam
Current Design Capacity (MGD)	4.1	.163	.030	.333	.600
Anticipated Permitted Capacity (MGD)	8.4	.275	.030	.600	.600
ENR Strategy Allocation TN (lbs)	49,947	6,263	372	13,408	12,182
Forecasted Nutrient Load TN (lbs)	87,188	3,349	372	6100	7,306
ENR Strategy Allocation TP (lbs)	3,746	1,044	62	2,235	914
Forecasted Nutrient Load TP (lbs)	5,714	251	62	457	547
Capacity Sold (EDU)	12,422		71	1,356	985
Remaining Capacity (EDU)	29,578	830	79	1,644	2,015
Zoning Build out plus planned Capacity needs (EDU)	28,860	293	55	2,030	1,999
Remaining capacity (EDU)	318	537	24	-386	16
Permitted Capacity Increase needed for Build out Scenario (MGD)	4.3	.112	0	.267	0
Permit increase need anticipated in	2021	2023	N/A	2014	N/A

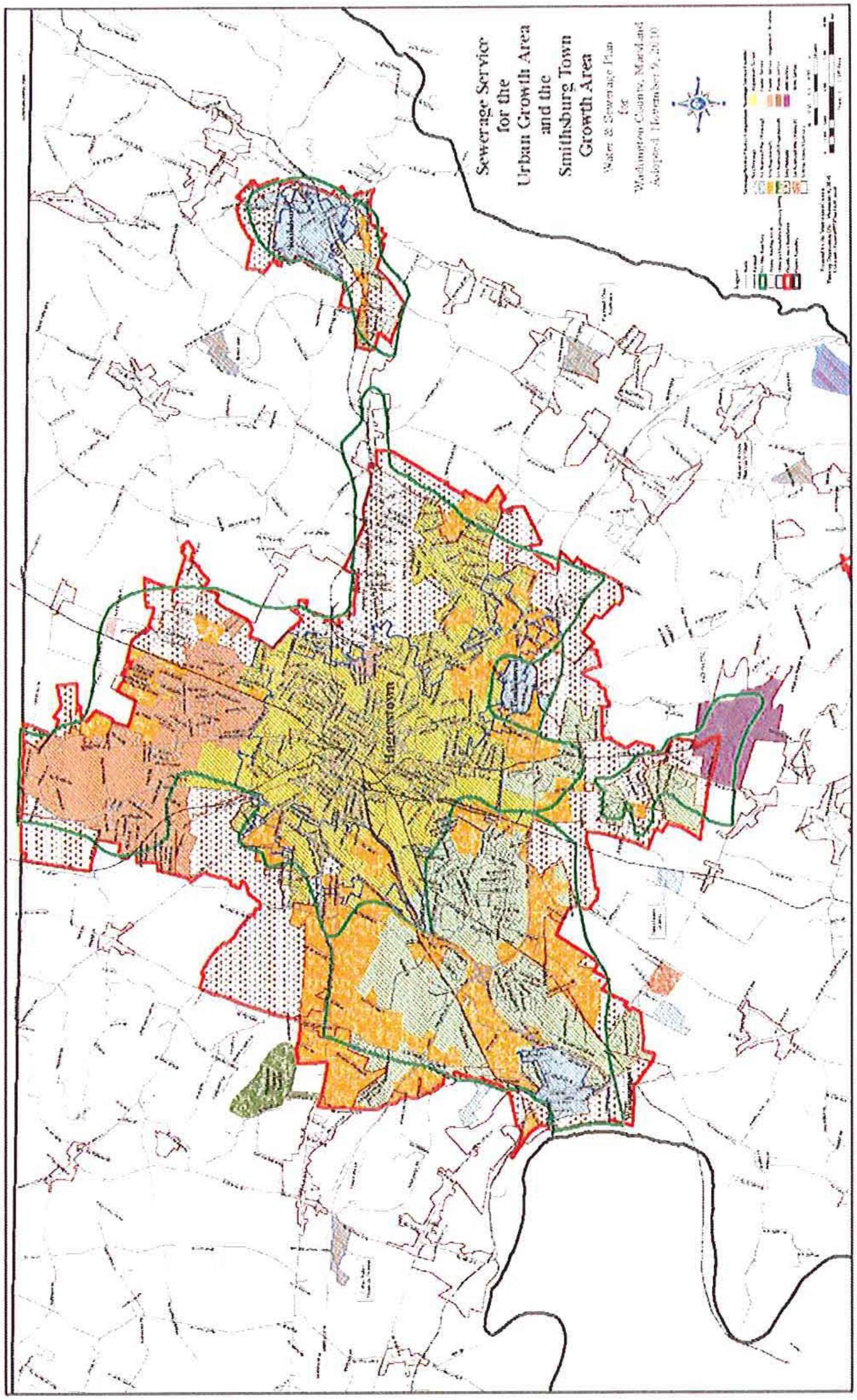
* Approved strategies will be utilized to achieve the total load.

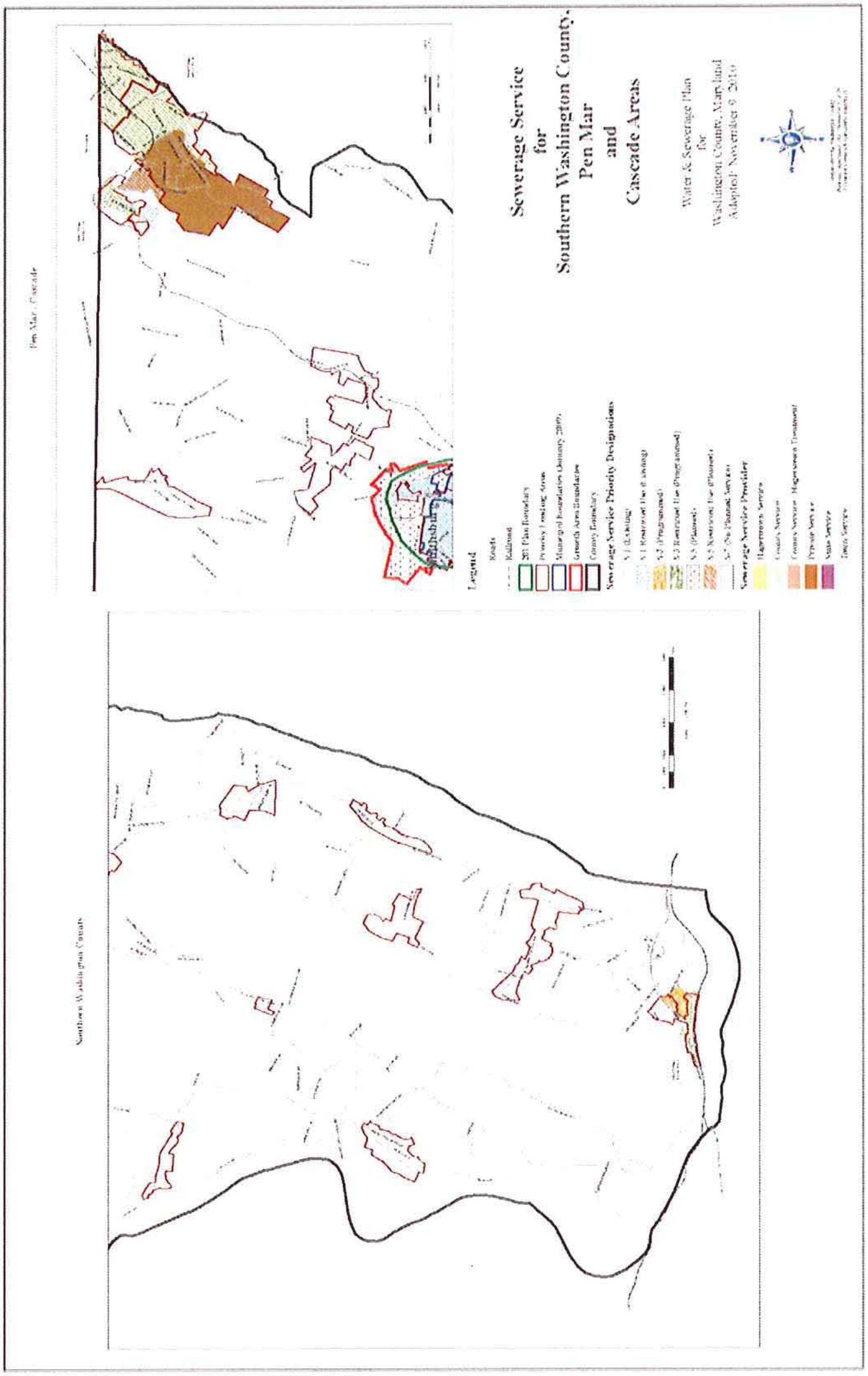
** Anticipated OSDS trade will increase available EDUs by 479 allowing service for ultimate buildout.

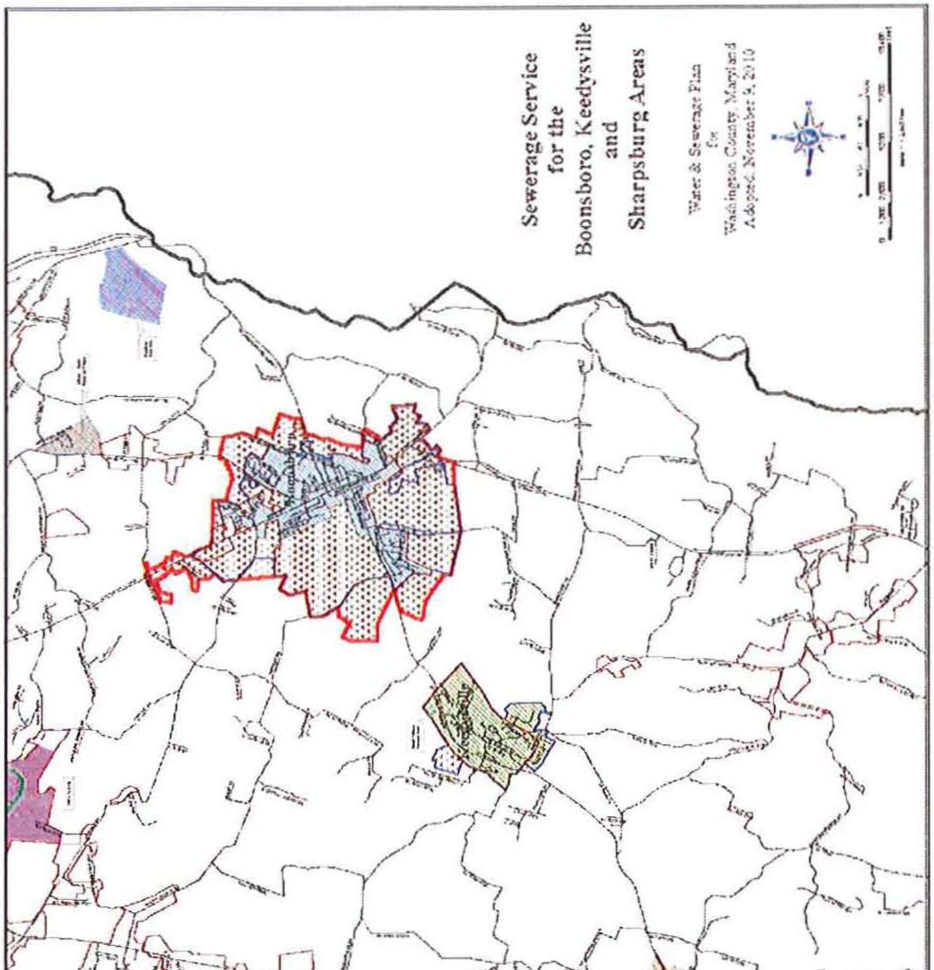
Action Items

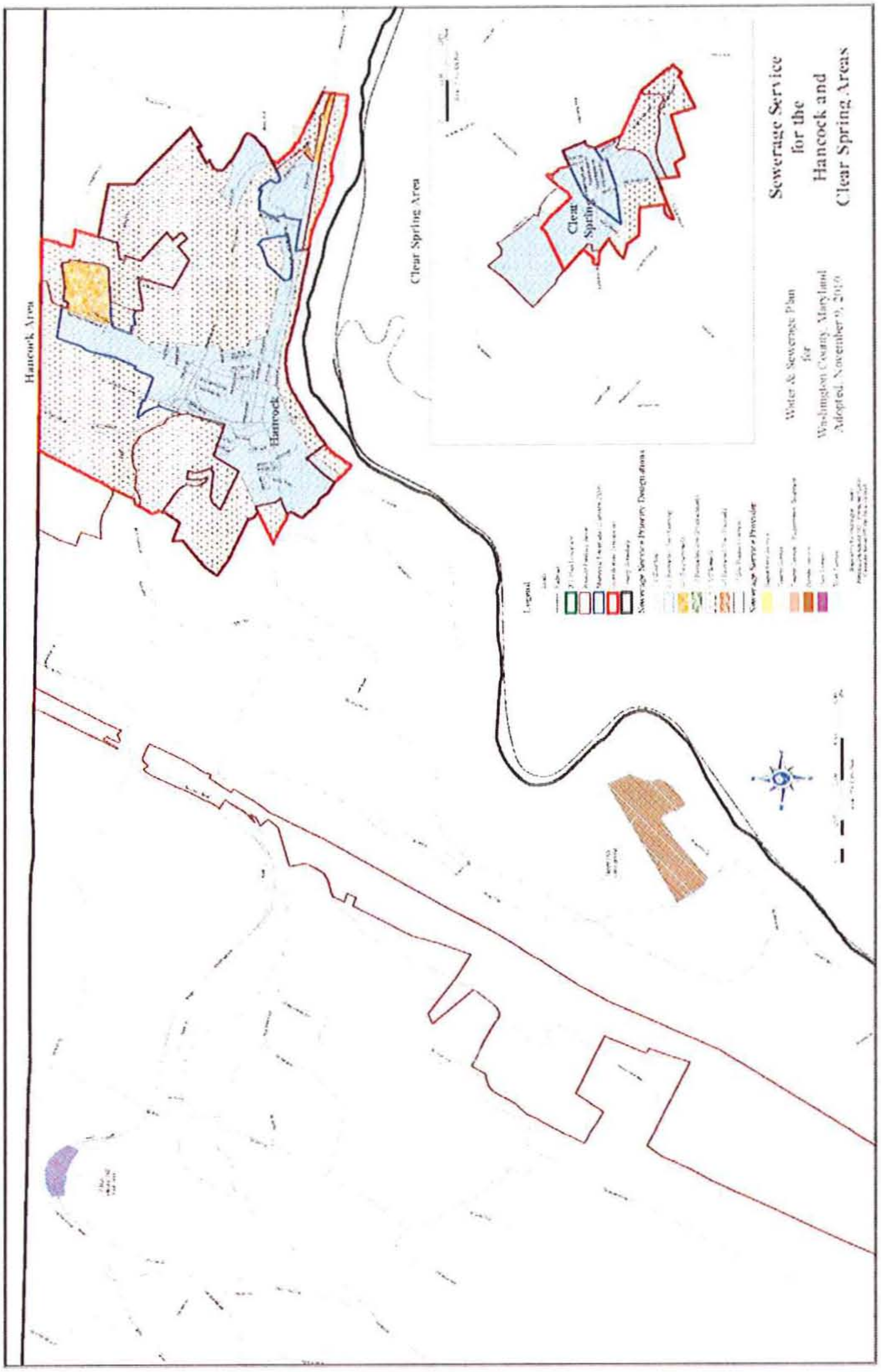
Several items needing addressed for capacity management are as follows:

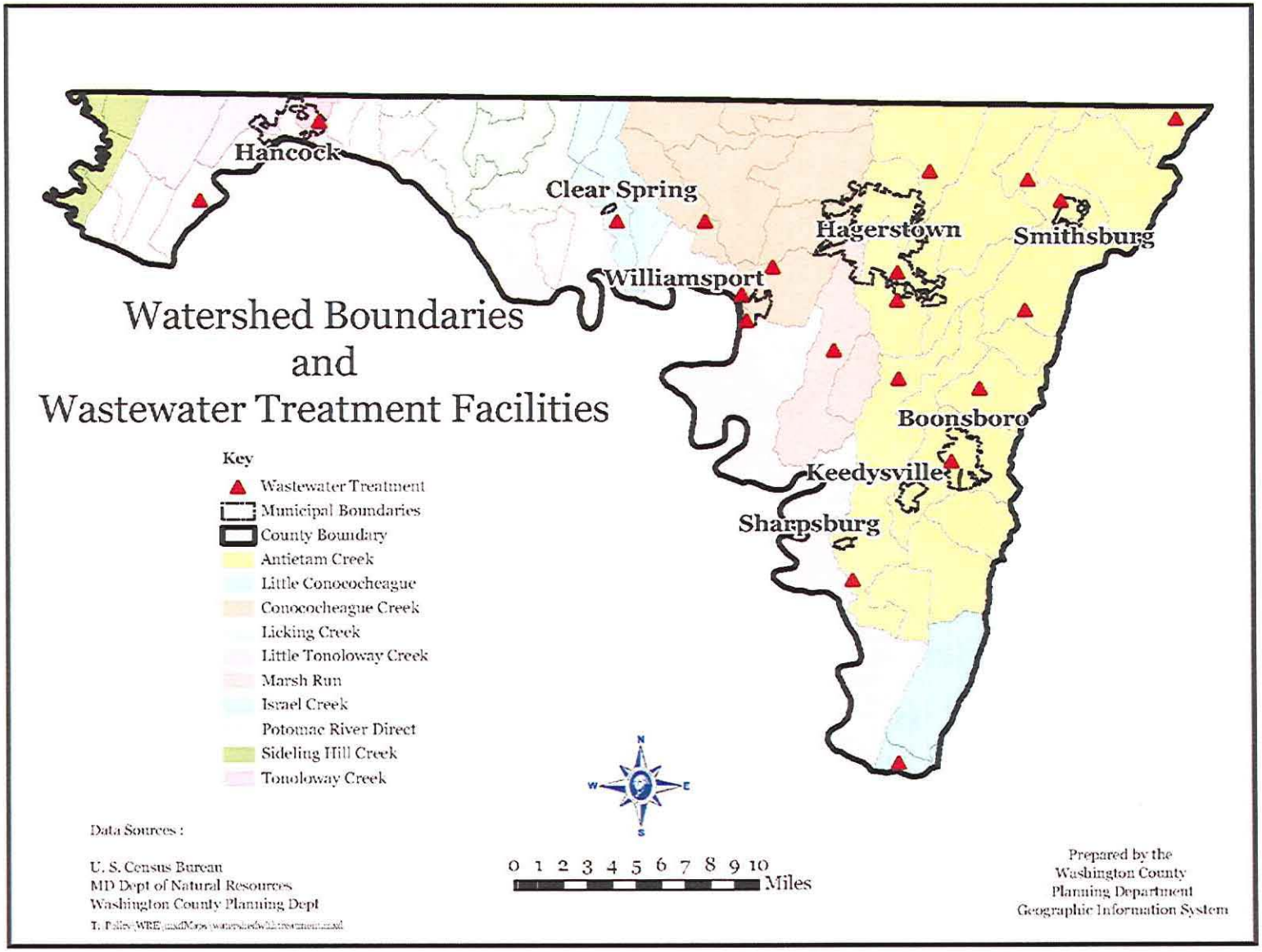
- √ Methodology needs refined for accurate evaluation of critical areas;
- √ Continuous monitoring and update based on plant performance;
- √ Establish a bubble permit;
- √ Finalize trading and bubble allocations in NPDES renewals;
- √ Update Water and Sewer Plan to reflect adopted WRE;
- √ Monitor and reduce inflow and infiltration;
- √ Continually evaluate regional solutions for capacity management to facilitate regional planning;
- √ Promote wastewater reuse initiatives;
- √ Develop policies that address offsets for any zoning modification allowing higher densities;
- √ Evaluate alternative methods for wastewater disposal;
- √ Update WRE as new TMDLs become available.


Sewerage Service
for the
Urban Growth Area
and the
Smithsburg Town
Growth Area
Water & Sewerage Plan
for
Washington County, Maryland


Southern Washington County
Pen Mar - Cascade
Legend
Roads
Railroad
201 Plan Boundary
Priority Funding Areas
Municipal Boundaries (January 2009)
Growth Area Boundaries
County Boundary
Sewerage Service Priority Designations
S-1 (Existing)
S-1 Restricted Use (Existing)
S-3 (Programmed)
S-3 Restricted Use (Programmed)
S-5 (Planned)
S-5 Restricted Use (Planned)
S-7 (No Planned Service)
Sewerage Service Provider
Hagerstown Service
County Service
County Service - Hagerstown Treatment
Private Service
State Service
Town Service
Sewerage Service
for
Southern Washington County,
Pen Mar
and
Cascade Areas
Water & Sewerage Plan
for
Washington County, Maryland
Adopted: November 9, 2010


Sewerage Service
for the
Boonsboro, Keedysville
and
Sharpsburg Areas
Water & Sewerage Plan
for
Washington County, Maryland
Adopted: November 9, 2010
Sharpsburg
Legend
Roads
Railroad
201 Plan Boundary
Priority Funding Areas
Growth Area Boundaries
County Boundary
Sewerage Service Priority Designations
S-1 (Existing)
S-1 Restricted Use (Existing)
S-3 (Programmed)
S-3 Restricted Use (Programmed)
S-5 (Planned)
S-5 Restricted Use (Planned)
S-7 (No Planned Service)
Sewerage Service Provider
Hagerstown Service
County Service
Private Service
State Service
Town Service


Hancock Area
Hancock
Clear Spring Area
Clear Spring
Legend
Sewerage Service Priority Designations
Sewerage Service Provider
Sewerage Service for the Hancock and Clear Spring Areas
Water & Sewerage Plan for Washington County, Maryland Adopted November 9, 2010


Hancock
Clear Spring
Hagerstown
Smithsburg
Williamsport
Boonsboro
Keedysville
Sharpsburg
Watershed Boundaries
and
Wastewater Treatment Facilities
Key
Wastewater Treatment
Municipal Boundaries
County Boundary
Antietam Creek
Little Conococheague
Conococheague Creek
Licking Creek
Little Tonoloway Creek
Marsh Run
Israel Creek
Potomac River Direct
Sideling Hill Creek
Tonoloway Creek
N
W
E
S
0 1 2 3 4 5 6 7 8 9 10
Miles
Data Sources :
U. S. Census Bureau
MD Dept of Natural Resources
Washington County Planning Dept
Prepared by the
Washington County
Planning Department
Geographic Information System

NON-POINT SOURCE

This category is one of the most critical in the WRE analysis. While other categories are more finite and can be evaluated and quantified, results of non-point source loadings require analysis of land use practices and loadings given certain data and assumptions for a variety of scenarios, and drive substantial future costs for implementation. Additionally, the correlation between calculated and regulatory load limits cannot be made at this juncture due to *the lack of data on load per parameter allocated to the County.* The non-point source section of the WRE document looks at sources of pollution which characteristically come from the land use/practice or an OSDS. This includes but is not limited to stormwater, agricultural practices, lawn care practices, OSDS, etc. This section will evaluate the pollutant loads coming from these sources using current land use data, septic tank data, and agricultural practices data for both existing and future planned land use.

Countywide Land Use and Impervious Cover

A breakdown of existing and future county-wide land use is described in Table 1 below. Two growth scenarios were analyzed. Scenario 1 analyzed existing conditions based on 2009 land use and population. Scenario 2 analyzed land use conditions under full build out of the existing County zoning. Under the full build out scenario, an increase in development acres of 42,165 acres or 75% is projected while a decrease in agriculture acres of 30,064 acres or 27% is projected. County-wide development acres will increase from 21% to 36% of the total County land area and agriculture acres will decrease from 39% to 28%.

Table 1. Total County Land Use

	Existing Conditions (Acres)	**Full Build Out Conditions (Acres)**
Development	56,553	98,718
Agriculture	111,367	81,303
Forest	104,721	92,652
Water	881	881
Other	7,697	7,666
Total Area	281,219	281,219

Land development and its associated conversion of open space and agricultural land to impervious surface, has a direct impact on the quality of stormwater runoff. An increase in impervious cover can lead to an increase in the amount and intensity of stormwater runoff from the land during rainfall events. In addition, impervious surfaces accumulate pollutants deposited during dry weather from the atmosphere, leaked from vehicles or other storage containers, dumped or discharged directly onto the ground, or applied to the surface due to activities such as

deicing. During storm events, these non-point source pollutants wash off the land along with pollutants applied from fertilizers and pesticides, from animal waste, and natural biological material degradation and reach the watershed stream system. While the land and the receiving stream system has a natural ability to absorb and transport these non-point source pollutants, both have an inherent maximum capacity to do so. Once this capacity is reached, aquatic impairment of the stream system can result.

A breakdown of existing and future countywide open space and impervious cover is described in Table 2 below. Under the existing conditions scenario, the Antietam Creek watershed contains the most impervious acres at 49% followed by the Conococheague Creek watershed at 27%. Under the full build out conditions scenario, there is little change in the contribution of impervious land area from the Antietam Creek watershed (48%) and the Conococheague Creek watershed (26%). Under the full build out scenario, an overall County-wide increase of 3,521 acres (22%) of impervious land area will occur. Under this same scenario, County wide total open space will decrease by 42,134 acres or 20%.

Table 2. Total County Impervious Cover and Open Space

	Existing Conditions (Acres)	**Full Build Out Conditions (Acres)**
Total Impervious Cover	16,167	19,668
Agriculture	111,369	81,304
Forest	104,666	92,597

Watershed Land Use and Impervious Cover

Analyzing open space and impervious cover on a watershed basis can assist in describing the level of aquatic impairment a watershed may be expected to experience. Figures 1 and 2 provide a watershed comparison of existing and future open space acres and percent impervious area for the ten (10) major watersheds in the County. Under the existing conditions scenario, the Antietam Creek watershed has the highest level of open space of the ten (10) watersheds in the County. However, under the full build out scenario, the Upper Potomac River watershed contains the highest level of open space among the ten (10) watersheds in the County. The highest percent reduction of forested open space acres between the existing condition scenario and the full build out scenario occurs in the Marsh Run watershed with a reduction of 18.6%.

Watershed impervious level has long been shown to be a relatively good indicator of the level of impairment of the aquatic surface waters. Research has shown that sensitive streams of high quality, stable channels, excellent habitat structure and diverse aquatic biota exist when watershed impervious cover is at or below 10%. Streams with watershed impervious cover ranging from 11 to 25% show clear signs of degradation including channel erosion declining stream habitat and declining stream biodiversity, with most sensitive fish and aquatic insects disappearing from the stream. Once watershed impervious cover exceeds 25%, stream quality is so degraded that it can no longer support a diverse aquatic biological community.

Figure 2 illustrates the watershed impervious levels for each of watersheds analyzed under both the existing conditions and full build-out conditions scenarios. Of the 10 major watersheds in the County, only the Conococheague Creek has a watershed impervious level greater than 10%, with a value of 10.55% under existing conditions and 12.22% under full build out conditions. This watershed would be expected to be exhibiting aquatic impairment under both scenarios, with watershed condition moving from mildly impaired to fully impaired. Under the full build out conditions scenario, the Marsh Run watershed is approaching the 10% watershed impervious limit, with a value of 9.6%. While most likely not exhibiting aquatic impairment under existing conditions, it is expected that this watershed will be exhibiting some level of aquatic impairment at full build out conditions.

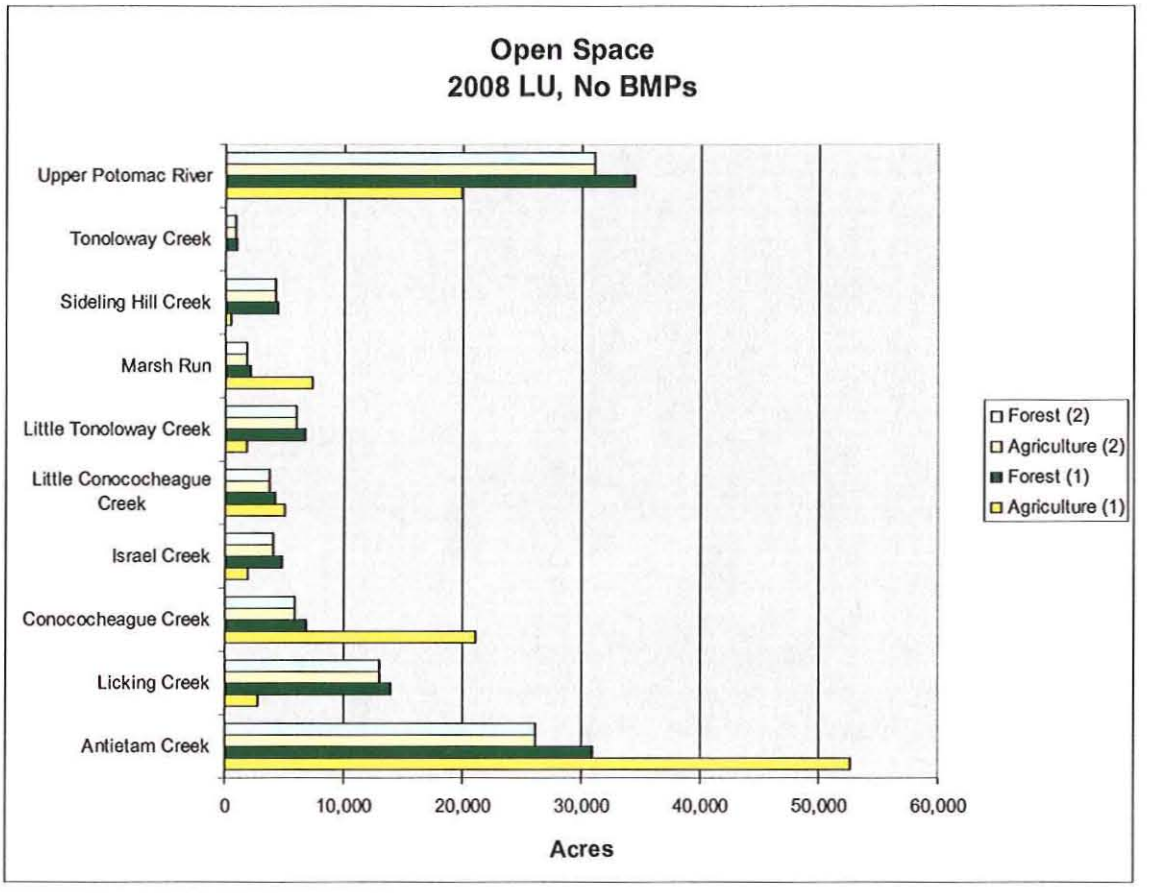


Figure 1.

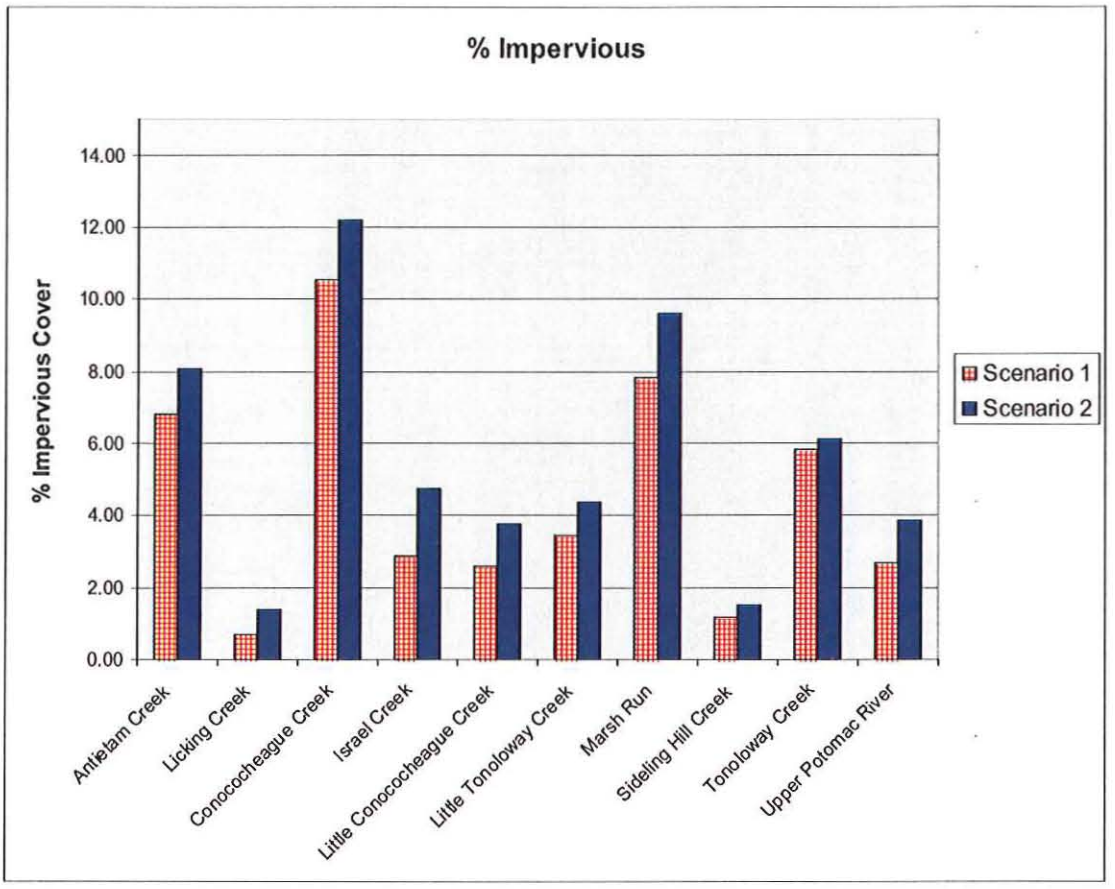


Figure 2.

Agricultural Non-point Source Management Program

While a vital part of the County's food supply and heritage, agriculture operations also contribute to the quality of the County's water resources. More specifically, they contribute nitrogen, phosphorus and sediment. Over the past 15 years, the agricultural sector has reduced their contribution of these constituents through reduction mechanisms called Best Management Practices, (BMPs). In Washington County, these BMPs include the following:

Waste Storage Structures
Conservation Cover
No-Till Farming
Critical Area Planting
Fencing of Streams
Riparian Forest Buffer
Filter Strip
Grassed Waterways
Waste Storage Pond
Shallow Water Development and Management
Roof Runoff Structure

Spring Development
Tree/Shrub Establishment
Watering Facilities
Upland Wildlife Habitat Management
Riparian Herbaceous Cover
Nutrient Management Programs

While improvements have been made, it is recognized that agricultural land use practices are still contributing a sizable portion of the nitrogen, phosphorus and sediment to the waters of the County. Agriculture pasture and crop land have been specifically identified in the sediment TMDLs for the Antietam Creek and the Conococheague Creek as needing to be reduced by the amounts indicated in this section. It should be noted that any additional sediment which has been added to the baseline load since the development of the respective TMDL would increase the amount of sediment required to be removed. Therefore, the BMP programs indicated above will need to expand to incorporate more acreage under management, and work with the State Department of Agriculture to explore other options is needed. These initiatives will be further explored and developed with the Maryland Department of Agriculture (MDA) in the County's Watershed Implementation Plan. Accurate data for these BMPs from MDA will be a key component in the accurate accounting and plan development of this nonpoint load.

Transferable Development Rights (TDRs) are another issue frequently discussed with respect to agricultural properties and rural areas. TDRs allow non-UGA properties to sell development rights for a property to an UGA property which requires a greater density than allowed by zoning, or that must be bought to allow density at current zoning to occur. TDRs generally rely on the principle that excess or un-needed development rights in a specific area have an inherent value for transfer to a receiving area that can use/needs those "rights". Since the original proposal for TDRs and the completion of the consultant's report on TDRs in Washington County, the State of Maryland passed legislation requiring the local jurisdictions to develop a Water Resources Element. "The purpose of the Water Resources Element is to ensure that future county and municipal comprehensive plans reflect the opportunities and limitations presented by local and regional water resources. WREs are intended to improve local jurisdictions contribution to the protection of State land and water resources; to the protection of public health, safety and welfare; and to meeting local and State smart growth policies." (State Models and Resource Guideline for the WRE). This requirement forced evaluation of the loads associated with each type of land use, and limited the loads that can be generated by specific categories. This limiting requirement in essence negated the value of TDRs in the traditional sense of the word, and replaced them with a calculation that defines total land use allowable loads and available Tradable Load Allocations (TLAs). These load allocations in essence show what load a current type of land has, what type of load a receiving piece of land needs, and whether a load trade is practical/possible given the total load requirement for that category of land use.

In development of the WRE, County staff reviewed the Total Maximum Daily Loads Documents (TMDLs) prepared by MDE for the water bodies in Washington County and developed land use loading numbers for nitrogen, phosphorus and sediment. A table of the TMDLs developed or under development and their status as of the date of this document is

shown in exhibit 1. Please note that additional impairments for our water bodies have been listed which require the State to review and develop additional TMDLs or Water Quality Analysis for our County water bodies. These documents once developed will need to be analyzed and addressed accordingly. Therefore, it is important to note that this is an ever-changing process. This analysis is being completed to determine the opportunities our local water resources allow, limitations they cause to opportunities for development, possibilities for load trading to facilitate these goals, and to prepare for the challenges we will be facing with the Chesapeake Bay TMDL once we receive our loading numbers.

The results of this analysis have shown that sediment appears to be the greatest limiting factor impacting growth in Washington County. Currently, three sediment TMDLs have been prepared for Washington County water bodies of which two have been finalized with the third under EPA review for approval. The two approved TMDLs are for the Antietam Creek and Conococheague Creek and the third under review is for the Potomac River. The conclusion of each of these TMDLs is that our sediment loading exceeds the amount the stream can receive and meet its water quality standards as shown in the non-point source section of the document. Exhibit 2 shows a summary of the results of the TMDLs for each watershed reflecting the sediment loading at the time the TMDL calculations were completed and which is the base for calculation of total load reduction that will be mandated, load availability and use for existing categories and watersheds, future needed loads, and calculations that demonstrate the practicality of considering load trades from parcel to parcel. The presence of the TMDL is a sign that pollution control efforts must outweigh additional pollution impacts from future land use change, septic tanks, and WwTP flows to prevent further degradation of the water body. Washington County recognizes that Antietam Creek and the Conococheague Creek, because of the presence of a sediment TMDL, can only be considered suitable receiving waters if future sediment impacts are offset (e.g. as described in the Maryland Phase I Watershed Implementation Plan, Section 3). This WRE includes recommendations for pollution control efforts to help achieve this goal.

Unknowns that currently prevent trading:

- No Total Nitrogen (TN and Total Phosphorous TP allocations
- EOS (Edge of Stream) actual reduction amount (reduction from field to the stream)
- Actual location of future agricultural BMPs
- Don't know future local TMDLs
- Any excess load that maybe required for NPDES or loading allocation offsets
- Effect of cropland loss
- Is trading possible when total load reduction per source has not been met
- CO$T – long term sustainable funds and short term capital costs

EXHIBIT 1

TMDL - TMDLs (Total Maximum Daily Load) are completed when a water body continues to violate water quality standards. A TMDL establishes the amount of pollution, plus a margin of

safety, that a water body can assimilate and still attain water quality standards. MDE prepares the TMDL in accordance with the 303d list. Listed below are the TMDLS either or under EPA review at this time of this publication. For a current up to date listing of completed TMDLs for water bodies in Washington County and the current schedule for development of future TMDLs reference should be made to the MDE website at:
http://www.mde.state.md.us/Programs/WaterPrograms/TMDL/index.asp.

TMDL Status –

Impairment	Date Approved	Basin Code	Basin Name	Water Type	Cause
Bacteria Impairment					
	October 8, 2009	02140502	Antietam Creek	River	Fecal Coliform
	May 7, 2009	02140504	Conococheague Creek	River	Fecal Coliform
Sediments Impairment					
	December 18, 2008	02140502	Antietam Creek	River	Total Suspended Solids
	November 24, 2008	O214504	Conococheague Creek	River	Total Suspended Solids

Water Quality Analysis with EPA Concurrence

Impairment	Date Approved	Basin Code	Basin Name	Water Type	Cause
Eutrophication					
	September 27, 2005		Greenbrier Lake	Impoundment	

TMDLs accepted by EPA as Information for De-listing

Impairment	Date Approved	Basin Code	Basin Name	Water Type	Cause
Biochemical Oxygen Demand					
	September 16, 2002	02140502	Antietam Creek	River	
	February 2, 2002	02140504	Conococheague Creek	River	

TMDLs/Water Quality Analysis Development by MDE and Under EPA review

Impairment	Notification Date	Basin Code	Basin Name	Water Type	Cause
Sediments Impairment – TMDL					
	March 19, 2010	02410501	Potomac River – Washington County	River	Total Suspended Solids
Total Phosphorous - Water Quality Analysis					
	March 19, 2010	02410501	Potomac River – Washington County	River	Total Phosphorous

These TMDL's are used in determining local limitations for the corresponding watershed in the WRE that are not a limiting factor for other watersheds in the County.

Exhibit 2

Antietam Creek Sediment TMDL

MD 8 Digit Antietam Creek TMDL Reductions by Source Category

	Baseline Load Source Categories		Baseline Load (ton/yr)	TMDL Components	TMDL (ton/yr)	Reduction (%)
MD 8 Digit Antietam Creek Watershed Contribution	Non-point Source	Crop	18,610.8	LA	8,035.8	56.8
		Extractive	172.4		172.4	0.0
		Forest	1,629.6		1,629.6	0.0
		Pasture	3,972.9		2,081.6	47.6
	Point Source	Urban	8,490.4	WLA	3,556.8	58.1
		Permits	703.2		703.2	0.0
Sub-total			33,579.3		16,179.4	51.8
Upstream	Pennsylvania		15,218.4	Upstream LA	13,362.1	12.2
Total			48,797.70		29,541.5	39.5

Conococheague Creek Sediment TMDL

MD 8-digit Conococheague Creek TMDL Reductions by Source Category						
	Baseline Load Source Categories		Baseline Load (ton/yr)	TMDL Components	TMDL (tons/yr)	Reduction (%)
MD 8-digit Conococheague Creek Watershed Contributions	Non-point Sources	Crop	8,430.4	LA	4,944.1	41.3
		Extractive	248.3		248.3	0.0
		Forest	506.6		506.6	0.0
		Pasture	1,413.9		868.4	38.6
	Point Source	Urban	3,670.2		2,008.1	45.3
		Permits	188.3	WLA	188.3	0.0
Subtotal			14,457.8		8,763.8	39.4
Upstream	Pennsylvania		86,152.5	Upstream L A	85,870.9	0.3
Total			100,610.30		94,634.70	5.9

Potomac River Sediment TMDL Potomac River Washington County

TMDL Reduction by Source Category

	Baseline Load Source Categories		Baseline Load (ton/yr)	TMDL Components	TMDL (ton/yr)	Reduction (%)
MD 8 Digit Potomac River Watershed Contribution	Non-point Source		14,889.0	LA	13,060.0	12.3
	Point Source	Urban	1,250.0	WLA	1,060.0	15.0
		Permits	76.0		76.0	0.0
Total			16,215.0		14,196.0	12.5

Based on these numbers, staff calculated the sediment loadings for each watershed based on 2008 land use to analyze more current conditions. The results of this analysis and its correlation to the TMDL loading allocations for the major watersheds in the County are as follows:

Total Sediment Loading - Scenario 1 - Existing 2008 Conditions (Tons/Yr)

	Antietam Creek	Licking Creek	Conoco-cheague Creek	Israel Creek	Little Conoco-cheague Creek	Little Tonol-oway Creek	Marsh Run	Sideling Hill Creek	Tonol-oway Creek	Upper Potomac River
Development NPS	37,473	1,142	17,043	2,799	1,332	1,654	4,286	264	380	11,127
Agriculture NPS	178,994	9,280	54,195	7,151	8,775	4,912	23,971	1,811	605	61,099
Forest NPS	9,280	4,194	2,038	1,444	1,254	2,024	643	1,348	274	10,342
Other Terrestrial NPS	11,429	137	8,472	-577	349	174	1,103	21	742	1,136
Total Initial Terrestrial Load	237,175	14,753	81,747	10,817	11,710	8,764	30,004	3,443	2,002	83,704
Ag BMP Load Reduction	2,398	0	713	10	0	0	169	0	0	301
Total Terrestrial Load	**234,777**	**14,753**	**81,034**	**10,807**	**11,710**	**8,764**	**29,834**	**3,443**	**2,002**	**83,403**

Total Sediment Loading Scenario 2 – Full Build out Conditions (Tons/Yr)

	Antietam Creek	Licking Creek	Conoco-cheague Creek	Israel Creek	Little Conoco-cheague Creek	Little Tonol-oway Creek	Marsh Run	Sideling Hill Creek	Tonol-oway Creek	Upper Potomac River
Development NPS	65,582	2,900	27,951	3,723	3,517	3,117	8,149	684	497	19,864
Agriculture NPS	129,432	8,079	32,388	5,900	6,772	3,593	15,813	1,537	501	50,164
Forest NPS	7,831	3,886	1,761	1,242	1,123	1,809	523	1,273	257	9,312
Other Terrestrial NPS	11,429	137	7,732	-577	349	174	1,103	21	742	1,136
Total Initial Terrestrial Load	214,274	15,003	69,832	10,288	11,761	8,692	25,588	3,515	1,997	80,476
Ag BMP Load Reduction	2,398	0	713	10	0	0	169	0	0	301
Total Terrestrial Load	**211,875**	**15,003**	**69,119**	**10,278**	**11,761**	**8,692**	**25,419**	**3,515**	**1,997**	**80,175**

	Antietam Creek	Licking Creek	Conoco-cheague Creek	Israel Creek	Little Conoco-cheague Creek	Little Tono-loway Creek	Marsh Run	Sideling Hill Creek	Tonol-oway Creek	Upper Potomac River
TMDL Load Limit (tons/yr)	**16,186.10**	**NA**	**8,763.80**	**NA**	**NA**	**NA**	**NA**	**NA**	**NA**	**14,196.00**
TMDL EOF Load (tons/yr)**		NA		NA	NA	NA	NA	NA	NA	71,974.00
TMDL LL/EOF Load***	0.20	NA	0.20	NA	NA	NA	NA	NA	NA	0.20
Existing Projected Load (tons/yr)*	46,955.42	NA	16,206.78	NA	NA	NA	NA	NA	NA	16,450.22
Future Projected Load (tons/yr)*	42,375.08	NA	13,823.85	NA	NA	NA	NA	NA	NA	15,813.54

* Assumes Load Reduction from EOF (Edge of Field) to EOS (Edge of Stream) for all watersheds is same as Upper Potomac at 80%.
** From Anna Kosko, MDE
*** Assumes loss in sediment for all watersheds from EOF to EOS is the same

Stormwater Management Programs

Management of stormwater runoff is necessary to reduce potential property and road flooding that may occur due to changes in land cover that result with new development. In addition, the management of stormwater runoff provides a mechanism to reduce the nutrient, sediment and toxic pollution delivered to the County's water bodies. In Washington County, stormwater management is provided through enforcement of local and state laws, new development design review and approval, construction inspection maintenance inspection, and floodplain management.

Washington County is also required to implement a comprehensive stormwater management program under its federally mandated MS4 Stormwater NPDES Permit. This permit requires the County to development and implement programs in: 1) Public Education and Outreach; 2) Public Participation; 3) Illicit Discharge Detection and Elimination; and, 4) Construction Site Runoff Control. Currently no requirements are included in this permit for watershed study development, stormwater retrofitting, impervious surface reduction or other stormwater management capital projects. However, it is anticipated that future permits issued by MDE will include requirements for such capital improvements and studies with the goal of meeting the Bay TMDL or local watershed TMDL nutrient and sediment load requirements.

Stormwater Management Facilities

There are a total of 997 known stormwater management structures in Washington County that have either been constructed, are currently under construction or have been approved but are waiting permits for construction. Of the 997 approved structures, 475 have been completed and 117 of these are currently owned and maintained by Washington County. New design regulations from MDE as part of the 2007 Stormwater Act will likely result in a greater number of smaller scale treatment facilities to be constructed for future development. Washington County spends approximately $245,000 annually in SWM facility maintenance. This is expected to increase to $334,000 after all approved and permitted stormwater facilities have been constructed.

Washington County conducts maintenance inspections on all completed stormwater facilities once every three years. Approximately 100 triennial inspections are performed annually at a cost of $10,400. As these stormwater facilities age, inspection and long term maintenance will become more critical to ensuring that they function for water quality treatment as originally intended. The addition of the greater number of smaller scale treatment facilities constructed under the new MDE 2007 Stormwater Act requirements will only add to the financial burden of the County for construction and maintenance inspection.

Watershed Management

Washington County currently does not have a proactive comprehensive watershed management program in place to conduct watershed studies, identify problem areas and areas needing protection, and develop management strategies. The County is currently in partnership with the Washington County Soil Conservation District and the Canaan Valley Institute to develop a watershed based management plan for the Antietam Creek watershed under a Section 319 Grant from MDE. This will be the first County watershed management plan developed. Antietam Creek was chosen because it is currently under an EPA approved TMDL for sediment and bacteria.

Stormwater Treatment Capacity

The effectiveness of the County's stormwater program rests with its ability to adequately treat stormwater runoff from new development, while maintaining or improving management of existing development areas. To assess the County's future treatment capacity for managing stormwater runoff quality from new development based on land use plans, the County performed a non-point source loading assessment using a spreadsheet model developed by the Maryland Department of the Environment. The spreadsheet model was modified to better reflect the current state of urban stormwater management and agricultural non-point source BMP implementation in Washington County. The spreadsheet analysis provided important planning information on the non-point source loads for Total Nitrogen (TN), Total Phosphorous (TP) and Total Suspended Solids (TSS) generated from urban and agricultural land cover due to stormwater runoff. In addition to addressing nutrient loads from runoff, the spreadsheet analysis also predicted the TN and TP loading impacts of standard and enhanced septic systems. Two

growth scenarios were analyzed. Scenario 1 analyzed existing conditions based on 2009 land use and population, with existing urban stormwater BMPs and agricultural BMPs in place. Scenario 2 analyzed land use conditions under full build out of the existing County zoning. This scenario included maintaining all existing urban stormwater and agricultural BMPs included under Scenario 1, and also included application of new stormwater BMPs for new development in accordance with the State 2007 Stormwater Act. For each scenario, analyses were performed both on a County-wide scale and watershed scale. Ten major watersheds were included in the analyses: Antietam Creek, Licking Creek, Conococheague Creek, Israel Creek, Little Conococheague Creek, Little Tonoloway Creek, Marsh Run, Sideling Hill Creek, Tonoloway Creek, and the Upper Potomac River.

Table 3. Acres of Land Area Managed by Stormwater BMPs

BMP TYPE	Antietam Creek	Licking Creek	Conococheague Creek	Israel Creek	Little Conococheague Creek	Little Tonoloway Creek	Marsh Run	Sideling Hill Creek	Tonoloway Creek	Upper Potomac River	Total County
Wet Pond	209.70		22.62				43.00				275.32
Wet Ext. Detention Pond	405.11		294.38		17.62		56.70			42.40	816.21
Retention Pond											
Pond/Wetland System											
Shallow Wetland											
Constructed Wetlands											
Wetlands											
Dry Detention Ponds	4,036.23	1.50	1,583.83		166.00		213.48		4.30	166.85	6,172.19
Hydrodynamic Structures											
Dry Ext. Detention Ponds	1,056.71		1,667.37	73.38			580.63			113.64	3,491.73
Ext. Detention Ponds										12.00	12.00
Infiltration Trench	1.93		10.70				4.00				16.63
Infiltration Basin	77.59		76.91			3.50	118.91			19.60	296.51
Porous Pavement											
Infiltration Practices	17.90		60.40								78.30
Dry Swale											
Wet Swale											
Infiltration Swale											
Water Quality Swale											
Open Channel Practices											
Bioretention	7.05		2.03		1.50		1.22			2.05	13.85
Filtering Practices	8.17		8.56							0.90	17.63
Total	**5,820.39**	**1.50**	**3,726.80**	**73.38**	**185.12**	**3.50**	**1,017.94**	**0.00**	**4.30**	**357.44**	**11,190.37**

Table 3 provides the number of acres of each watershed currently managed for stormwater runoff by in place stormwater BMPs. There are approximately 11,190 acres Countywide currently draining to a stormwater management BMP. The majority of these managed acres are within the Antietam Creek and Conococheague watersheds, where most of the development has occurred since stormwater management requirements have been in effect. Countywide, the majority of managed acres are draining to dry detention ponds. Dry detention ponds offer very little benefit to nutrient removal as their TN, TP, and TSS removal efficiencies are estimated at 5%, 10% and 10% respectively. Dry extended detention ponds manage the second largest number of acres in the County. The TN, TP, and TSS removal efficiencies for dry extended detention ponds are estimated at 30%, 20% and 60% respectively. These stormwater management facilities provide more benefit in stormwater treatment.

Non-point Source Pollutant Loading Estimation

A non-point source pollutant loading analysis was performed to estimate the current Total Nitrogen (TN), Total Phosphorous (TP) and Total Suspended Solids (TSS) load contributions to the County and its watersheds under current land use conditions and full build out conditions. The assessment considered loads from urban stormwater and agriculture stormwater. In addition, the assessment also included a nitrogen loading estimate for standard septic systems. Table 4 provides the estimated annual non-point source pollutant loads for each watershed and the County for TN, TP and TSS. These estimates become an important tool for land use planning, justification, and decision making. In addition, Table 4 provides the current Total Maximum Daily Load (TMDL) requirements for TSS for the Upper Potomac River watershed, the Conococheague Creek watershed and the Antietam Creek watershed. Table 5 provides a comparison of non-point source TN loadings from septic systems and urban and agriculture stormwater.

Total County TN non-point source loads from urban and agricultural stormwater and septic systems are projected to increase by over 299,500 lbs/year or 9.5% if the current land use plan is implemented along with the stormwater management for all new development under the 2007 State Manual requirements. Total County loads for TP and TSS will decrease by 7.8% and 8.8%, respectively. For all watersheds, non-point source TN loads from urban and agricultural stormwater and septic systems are projected to increase if the current land use plan is implemented along with the stormwater management for all new development under the 2007 State Manual requirements. The largest watershed increase in total TN loads occurs in the Little Conococheague Creek, Licking Creek and Upper Potomac River watersheds, with an increase of 17.6%, 15.7% and 15.4%, respectively. Levels of total TP loading are projected to decrease for some watersheds and increase for others. Increasing TP load watersheds include the Upper Potomac River, Little Tonoloway Creek, Israel Creek, Sideling Hill Creek and Conococheague Creek watersheds. The Sideling Hill Creek watershed, a Tier II watershed, will see a projected increase in total TP loading of 68.89 lbs/year or 7.7%. However, for the total county, levels of TP loading are projected to decrease from the existing conditions scenario to the full build out scenario by 7,800 lbs/year. Levels of

total TSS loading are projected to decrease for some watersheds and increase for others. Increasing TSS load watersheds include the Licking Creek, Little Conococheague Creek, Little Tonoloway Creek, and Sideling Hill Creek. The Sideling Hill Creek watershed, a Tier II watershed, will see a projected increase in total TSS loading of 72.35 lbs/year or 2.2%. However, Total County TSS loading is projected to decrease from the existing conditions scenario to the full build out scenario by a projected 42,693 lbs/year, or 8.8%.

As illustrated in Table 5, between existing conditions and full build out conditions, all total annual TN loads decrease for non-point sources attributed to urban and agriculture stormwater, only.

Excluding septic systems, under the existing conditions scenario, the largest contribution of TN load is agriculture land area (68%). Development land area contributes 21% of the TN load. Under full build out conditions, agriculture land area is still the largest contributor of TN load. However, the contribution has reduced to 59% with contribution from development land area increasing to 32%.

Excluding septic systems, under the existing conditions scenario, the largest contribution of TP load is agriculture land area (65%). Development land area contributes 30% of the TP load. Under full build out conditions, agriculture land area is still the largest contributor of TP load. However, the contribution has reduced to 51% with contribution from development land area increasing to 46%.

Excluding septic systems, under the existing conditions scenario, the largest contribution of TSS load is agriculture land area (72%). Development land area contributes 16% of the TSS load. Under full build out conditions, agriculture land area is still the largest contributor of TSS load. However the contribution has reduced to 57% with contribution from development land area increasing to 31%.

Without load limits, it is difficult to determine where non-point source pollution problems exist currently or are projected to exist in the future. Although increases in many non-point source pollutant loads are evident under full build out conditions, it is not known whether these increases will result in negative impacts to the receiving stream aquatic biological system. It is also not feasible to determine the level of nutrient load reduction required to meet the load limits, and therefore testing alternative land use scenarios or stormwater retrofit strategies is premature. In addition, *prioritizing watersheds cannot be done at this time when watershed load limits are not known.*

The TMDLs for TSS for the Antietam Creek watershed and the Conococheague Creek watershed provide load limits and require TSS load reductions for urban stormwater, and agriculture and septic system non-point source loads. Currently, however, the WRE assessment tool lacks a critical analysis of overland pollutant uptake needed to be able to compare the results of the WRE analysis with the TMDL load limits.

The Chesapeake Bay TMDL will provide TN, TP and TSS for some watersheds in the County. In addition, the TP TMDL for the Conococheague Creek watershed is

currently under development by MDE. Once load limits are determined from these TMDLs, the County could begin to be able to prioritize where high nutrient load problem watersheds are and target resources to address these problems. However, more robust analysis tools that include the overland pollutant uptake model must be added to the WRE assessment. It is anticipated that MDE will develop this addition to the WRE non-point source assessment spreadsheet.

Table 4. Urban Stormwater, Agricultural Stormwater and Septic System Non-point Source Loadings By Watershed

Total Sediment

	Antietam Creek	Licking Creek	Conococheague Creek	Israel Creek	Little Conococheague Creek	Little Tonoloway Creek	Marsh Run	Sideling Hill Creek	Tonoloway Creek	Upper Potomac River	Total County
Scenario 1 (tons/yr)	234,777	14,753	81,034	10,807	11,710	8,764	29,834	3,443	2,002	83,403	480,527
Scenario 2 (tons/yr)	211,875	15,003	69,119	10,278	11,761	8,692	25,419	3,515	1,997	80,175	437,835
TMDL Load (tons/yr)	16,186	NA	8,764	NA	NA	NA	NA	NA	NA	14,196	NA

Total Phosphorous

	Antietam Creek	Licking Creek	Conococheague Creek	Israel Creek	Little Conococheague Creek	Little Tonoloway Creek	Marsh Run	Sideling Hill Creek	Tonoloway Creek	Upper Potomac River	Total County
Scenario 1 (lbs/yr)	87,252	4,017	34,009	4,540	7,446	3,550	12,741	891	445	33,062	182,625
Scenario 2 (lbs/yr)	85,066	1,100	33,347	4,817	7,473	3,660	9,301	960	442	33,985	126,981

Total Nitrogen

	Antietam Creek	Licking Creek	Conococheague Creek	Israel Creek	Little Conococheague Creek	Little Tonoloway Creek	Marsh Run	Sideling Hill Creek	Tonoloway Creek	Upper Potomac River	Total County
Scenario 1 (lbs/yr)	1,513,597	89,302	496,126	83,071	90,300	59,146	196,212	22,572	8,303	591,153	3,061,498
Scenario 2 (lbs/yr)	1,622,680	103,358	530,551	94,898	106,190	66,360	209,168	25,043	8,755	682,334	3,349,226

Table 5.

Total Nitrogen

Scenario 1 (lbs/yr)	Antietam Creek	Licking Creek	Conococheague Creek	Israel Creek	Little Conococheague Creek	Little Tonoloway Creek	Marsh Run	Sideling Hill Creek	Tonoloway Creek	Upper Potomac River	Total County
Without Septic Systems	1,406,792	89,302	496,126	83,071	90,300	59,146	196,212	22,572	8,303	591,153	3,149,782
With Septic Systems	1,513,597	86,485	464,763	76,446	85,743	56,921	184,692	22,129	7,841	529,848	2,921,661
Load increase	106,805	2,816	31,363	6,625	4,557	2,225	11,519	443	462	61,305	228,121
% Change	7.59	3.26	6.75	8.67	5.31	3.91	6.24	2.00	5.89	11.57	7.81
Scenario 2 (lbs/yr)	Antietam Creek	Licking Creek	Conococheague Creek	Israel Creek	Little Conococheague Creek	Little Tonoloway Creek	Marsh Run	Sideling Hill Creek	Tonoloway Creek	Upper Potomac River	Total County
Without Septic Systems	1,354,920	87,978	450,689	76,547	87,533	56,545	178,271	22,280	7,711	529,234	2,851,707
With Septic Systems	1,622,680	103,358	530,551	94,898	106,190	66,360	209,168	25,043	8,755	682,334	3,449,337
Load increase	267,761	15,379	79,863	18,350	18,657	9,816	30,897	2,763	1,043	153,100	597,629
% Change	17	15	15	19	18	15	15	11	12	22	17

Table 6. Nonpoint Load Per Capita (1,2)

	Scenario 1	Scenario 2
Total Nitrogen Load	14.06	31.33
Total Phosphorous Load	1.71	0.58
Total Suspended Solids Load	4.17	2.01

Note 1. Load from wastewater treatment plants and NPDES point source loads are not included
Note 2. Scenario 1 population based on 2009 data is 106,902. Scenario 2 population based on full build out no. of houses is 217,804.

Table 6 provides the TN, TP and TS loads for the County under each scenario on a per capita basis. As the County implements the current land use plan, the per capita load for TP and TSS is projected to decrease. However, the per capita load for TN is projected to increase.

Action Items

Several items needing addressed for urban stormwater and load identification are as follows:

- √ Continue the County's strong support and implementation of erosion and sediment control and stormwater management regulations
- √ Develop a policy to require watershed based loading limits and/or impervious limits on all new development, specifically focused on watershed loading limits identified in TMDLs and considering protection of Tier II watersheds;
- √ Evaluate and adopt, where needed, amendments to parking requirements, imposing limits on the surface area of a site devoted to parking;
- √ Implement measures to adopt a Streambank Buffer Zone Policy;
- √ Increase the urban tree canopy, thereby increasing the interception of rainfall;
- √ Require an increase in forested buffer size for sensitive areas and require that these buffers be placed in a perpetual conservation easement;
- √ Adopt zoning and land use changes specific to minimizing development impacts to ground water in areas underlain by carbonate rock;
- √ Perform detailed comprehensive watershed studies on all 10 watersheds. Watershed studies should include water quality and quantity modeling, use of GIS tools and databases, collection of additional characterization data to assist in identifying problem areas, targeting stormwater retrofit projects, and, identifying sensitive sub-basins;
- √ Collect/monitor water quality data on pollutant loads in local stream basins. Implement a long term stream monitoring program to measure progress and identify additional problem areas and/or retrofit or restoration opportunities;

- √ Implement a stormwater retrofit program to reduce existing impervious area or pollutant loading on a watershed basis;
- √ Expand on and continue efforts to develop a geo-referenced relational database of existing stormwater BMPs, which describes their age, condition, function, and ownership;
- √ Discuss ability to receive critical data from MDA on agricultural BMPs;
- √ Determine the level of financial resources required to implement management programs necessary to meet our watershed loading goals;
- √ Investigate the creation of a countywide watershed protection (NPDES) utility fee.

FUNDING ISSUES

The Chesapeake Bay TMDL process will require Washington County to develop an action plan or Watershed Implementation Plan (WIP) that outlines proposed regulations and capital projects to meet load reduction requirements for Total Nitrogen (TN), Total Phosphorous (TP) and Total Suspended Solids (TSS). *It is currently unknown what the County's load reduction requirements will be for urban stormwater management.* However, one Maryland local government has estimated their potential costs for stormwater retrofits required by the Bay TMDL could be as much as $800 million. Securing the necessary funding to implement these retrofits is a challenge facing Washington County.

Currently watershed management and urban stormwater management programs compete for funding resources with other programs funded from the General Fund. In addition, there is no funding source, other than development review fees, that is generated for the sole purpose of watershed management or urban stormwater management.

A detailed and technically robust analysis of where these retrofit dollars should be spent to be most cost efficient is critical. The County currently lacks the tools and personnel resources to address the Bay TMDL requirements. A technically proficient analysis will require new tools currently not available such as watershed modeling software, GIS data layers, and a complete detailed mapping and assessment of all County-wide stormwater management and stormwater conveyance infrastructure.

SUMMARY

While calculated resources for public utility systems appear to be sufficient to accomplish the goals set forth in long term growth management plans currently espoused in County policies and procedures, it is only through cooperative efforts of local governments and careful planning and tracking that the Watershed Implementation Plan goals will be achieved. Non-point source analysis indicates that difficulty exists in meeting current TMDLs at full zoning buildout, and the lack of sufficient data on load allocation to the County prevents conclusions on overall viability of goal implementation.

Funding of these initiatives will be key to the success of the required programs, and may be in the hundreds of millions of dollars.

Through careful and detailed programs for implementation, and given the necessary tools such as funding availability, trading initiatives, and cooperative local, State, and Federal initiatives, WIP goals can be achieved in Washington County.

Adopted this 14th day of June, 2011.

Effective the 14th day of June, 2011.

ATTEST:

Vicki C. Lumm
Vicki C. Lumm, Clerk

BOARD OF COUNTY COMMISSIONERS OF WASHINGTON COUNTY, MARYLAND

Terry L. Baker
Terry L. Baker, President

Approved as to form
and legal sufficiency:

Kirk C. Downey
Kirk C. Downey
Assistant County Attorney

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