

PUBLIC HEARING DRAFT

NOVEMBER 2009

water resources

FUNCTIONAL PLAN



MONTGOMERY COUNTY PLANNING DEPARTMENT
THE MARYLAND-NATIONAL CAPITAL PARK AND PLANNING COMMISSION

MontgomeryPlanning.org

introduction

Montgomery County residents enjoy a plentiful, clean water supply fed by well-managed reservoirs, filtration plants, and groundwater. With water quality is afforded a significant level of protection by a significant large amount of undeveloped land—almost half of the County's land is preserved in parks and the Agricultural Reserve—and high-quality wastewater treatment, the County experiences few, if any concerns about water quality and quantity.

Yet, Montgomery County continues to attract new residents, and growth poses challenges for water quality. In the past few decades, low density suburban development and increasing impervious surfaces through large surface parking lots have affected our impacted water resources. Monitoring shows that water quality is degrading, especially in older, developed areas with little or no stormwater management increasing impervious cover. Moreover, Montgomery County continues to attract new residents, and growth poses additional challenges for water quality. And the County's water and sewer distribution and collection infrastructure is aging, and will continue to need proactive maintenance and replacement to minimize the impacts that pipe failures have on our water resources.

In response, we need to reconsider how the County grows. Planners and environmental regulators are defining new "greener" ways to develop and manage stormwater centering on retrofitting older developments encouraging infill and redevelopment, designing all new developments with new environmental standards, and stormwater retrofitting of older developments encouraging infill and redevelopment.

The challenge is to ensure that smarter growth helps us maintain and restore our streams and reservoirs as the County continues to grow.

This Water Resources Plan examines County land use, growth, and stormwater management in the context of adequate drinking water supplies, wastewater treatment capacity, water quality regulatory requirements, and inter-jurisdictional commitments.

In 2006, the State General Assembly adopted House Bill 1141 that requires a Water Resources Element to be incorporated into local governments' comprehensive plans to address:

- drinking water supply adequacy,
- wastewater treatment capacity, and
- meeting water quality standards to 2030.

This Water Resources Functional Master Plan fulfills the law's requirements and will be updated every six years to incorporate advances in meeting its goal—to ensure adequate water supply, wastewater treatment capacity, and sewer service and water quality that meets regulatory standards as the County continues to develop.

Water in Montgomery County

Water resources are a vital part of the County's environmental and economic health and sustainability. Our streams and reservoirs provide the water we drink, and a recreational resource. They are also the life blood of our natural areas, providing crucial habitats, accommodating runoff from a range of land uses, and supporting the great diversity of plants and animals found in the County. Our waters also feed a larger network of water resources that culminate in the Chesapeake Bay—the importance and value of which, as both a regional and national environmental resource—are well known.

The State of Maryland and Montgomery County have long considered protection of the Chesapeake Bay and its tributaries, including our local streams, to be a high priority. Protection of land and water resources and stewardship of the Chesapeake Bay are put forth in the Planning

throughout the State.

But past efforts have not been enough. Today we stand at a crossroad in the history of our County and the state of our water resources. The continued degradation of the Bay and many of our local streams will require increased funding and efforts to grow smarter and enhance and protect our natural resources, in order to meet water quality standards.

Continued threats to the County's water resources involve both effects from past practices as well as the consequences of existing and anticipated future trends. These include:

- the stormwater impacts from older development,
- impacts from development of remaining open space,
- increasing air pollution,
- competing priorities for limited funds,
- our aging water and sewer pipe infrastructure, and
- the loss and degradation of forest, wetland, and other natural areas.

These issues, especially as they relate to impaired water bodies identified by the State for specific pollutant limitations such as bacteria, trash, nutrients, and sediment, will be the highest priority issues to address as we move forward.

By addressing all aspects of water resources management, this Plan provides a basis for prioritizing and coordinating the shared responsibilities and efforts of County agencies, municipalities, and citizens to produce optimal environmental benefits. Comprehensive sustainability planning is important to address the interconnectedness of all that we do to and on the land.

The policies, programs, and plans that address water quality include:

- the County's stormwater (MS-4) permit and implementation plans
- watershed analyses and plans
- future Total Maximum Daily Load (TMDL) implementation plans for non-point source pollution
- master and sector plans
- County Growth Policy
- the County's *Ten-Year Comprehensive Water Supply and Sewerage Systems Plan*
- regulatory/code review and changes.

Many of these are currently being prepared or revised. This Plan is just one component of an interagency approach to dealing with water resources and water quality issues.

map 1 water service areas and facilities

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Treatment facilities and service areas in Montgomery County

In Montgomery County, water supply is plentiful and generally well-managed. Public water and sewer is provided to most of the County's population within the Priority Funding Areas (Map 3). Drinking water comes from three sources: the Patuxent reservoirs, the Potomac River, and well water. These resources are afforded significant protection by the large amount of low-density zoned land in the Agricultural Reserve, as well as the natural areas throughout the County. Wastewater is collected and treated primarily at the Blue Plains treatment plant in the District of Columbia and at four smaller treatment facilities in Germantown, Damascus, Hyattstown, and Poolesville. These facilities operate at very high standards, applying advanced treatment before discharging to streams and rivers.

Stormwater management is a much more difficult issue, especially in the built-up areas of the County. Many down-County communities developed before stormwater management policies were in place and stream conditions are generally fair or poor. Even the streams in areas with newer, higher density development in the Priority Funding Area often show impairments, although new stormwater regulations promise better results. Providing treatment sufficient to prevent *any* degradation of stream conditions in areas of high imperviousness remains a challenge.

map 3 priority funding areas

map 4 county watersheds and the chesapeake bay

This Plan explains the planning process for maintaining the capacity to provide drinking water, wastewater treatment, and absorption of stormwater to accommodate growth to 2030 and the challenges we face in achieving the goals of federal, State, and local governments.

The Water Resources Functional Plan was developed in coordination with the local government agencies that share responsibility for water resources. Their staffs' expertise was instrumental in providing technical information and support in drafting the Plan's policies and recommendations. The Plan's purpose and scope was presented to stakeholder groups, which were also provided updates on the Plan's progress and proposed policies and recommendations (Appendix 9).

Agencies

DED	Department of Economic Development
DEP	Department of Environmental Protection
DGS	Department of General Services
DOT	Department of Transportation
DPS	Department of Permitting Services
EPA	Environmental Protection Agency
ICPRB	Interstate Commission on the Potomac River Basin
MDE	Maryland Department of Planning the Environment
MDP	Maryland Department of Planning
MGS	Maryland Geological Survey
MWCOG	Metropolitan Washington Council of Governments
WSSC	Washington Suburban Sanitary Commission

Regulatory

APFO	Adequate Public Facilities Ordinance
BLT	Building Lot Termination
BMP	Best Management Practice
BNR	Biological Nutrient Removal
ENR	Enhanced Nutrient Removal
ESD	Environmental Site Design

state agencies

Maryland Department of Environment (MDE)

- Water and Sewer Plan approval
- Comprehensive Plan Guidance and [Approval/Review](#)
- Impaired Water Listing
- TMDL Program
- Tier II Waters Anti-degradation Program
- Stormwater Manual
- NPDES Program

Maryland Department of Planning (MDP)

- Planning and Zoning Oversight
- Comprehensive Plan [Guidance and Review](#)
- Smart Growth Program
- Land Use Forecasts

Montgomery Soil Conservation District (MSCD)

- Agricultural Management and Conservation Support
 - Soil Conservation
 - Water Quality
 - Nutrient Management
 - Agricultural BMPs

Maryland Department of Natural Resource (DNR)

- State Forestry Program
- Bay Program Support
- Park and Natural Resource Management

regional agencies

D.C. Water and Sewer Authority (DCWASA)

- Blue Plains Wastewater Treatment Plant
 - Bi-County Agreement
 - Inter-Municipal Agreement

Interstate Commission on the Potomac River Basin (ICPRB)

- Pollution Control and Prevention
- Source Water Protection Partnership
- Water Quality Technical Studies and Modeling
- Drought Management Support
- Water Supply Planning Analyses

Metropolitan Washington Council of Governments (MWCOCG)

- Forum for Coordination of Regional Actions
 - Water Supply
 - Watershed Protection
 - Anacostia Restoration
 - Water Conservation
 - Drought Management Plans
 - Water Emergency Response Plan
 - Regional Water-Related Databases
 - Urban Forestry
 - Regional Air Quality

local agencies

Maryland-National Capital Park and Planning Commission (M-NCPPC)

- General Plan
- Master, Sector, and Functional Plans
- Growth policy
- Park Planning and Development
 - Natural Resource Management
 - Recreation
 - Stream Monitoring in Parks
 - [Zoning Code](#)
- [Zoning Code](#)
- SPA Imperviousness Requirements
- Forest Conservation Program
 - Law, Regulations, Enforcement
- Development Review
 - Environmental Guidelines
 - Environmental Inventory Approval

Washington Suburban Sanitary Commission (WSSC)

- Water Supply and Sewerage Systems
 - Planning
 - CIP Program
 - Design
 - Construction
 - Operation
 - Maintenance

Master plans, sector plans, and functional plans will be guided by this Plan. This guidance will continue the coordination of the General Plan's land use element with water and wastewater planning, and ensure long-term water and sewer adequacy as the County grows. Other plans that deal with the County's natural resource issues, such as the Green Infrastructure Plan, will be coordinated with this Plan to help optimize water quality benefits associated with natural resource stewardship. Likewise, master and sector plans will also be revised periodically and implemented to maximize the water quality improvement and protection benefits in their particular geography. Specific decisions about the pattern, density, and zoning of development are established in master and sector plans and are updated periodically.

The Montgomery County Ten-Year Comprehensive Water Supply and Sewerage Systems Plan

The *Ten-Year Comprehensive Water Supply and Sewerage Systems Plan* (Water and Sewer Plan) prepared by DEP documents the policies, needs, issues, and planned infrastructure related to public water and sewer systems, private systems (groundwater and septic systems), and related public health, environmental protection, and land use issues in Montgomery County. It gives both background information and a planning basis for the evaluation of water supply and sewerage system needs in the County, and coordination of these capacities and related infrastructure with planned development. The continued close coordination of the Water and Sewer Plan with the County's General Plan and master plans is vital in ensuring ongoing adequacy of water supplies and wastewater treatment capacity as the County continues to grow.

The Water and Sewer Plan also details the inter-agency coordination of planning and implementing the County's water and sewer service. It is closely coordinated with WSSC, reviewed by various local and State agencies, and approved by the County Council.

The current Water and Sewer Plan covers 2003-2012 and is being revised, with approval expected in 2010. The current plan is online at: montgomerycountymd.gov/waterworks

Water and Sewer Plan Goals and Objectives

The overall goal of the Water and Sewer Plan is to ensure that the existing and future water supply and sewerage system needs of Montgomery County are satisfied in a manner consistent with:

- emphasizing service to urban areas
- adopted land use recommendations
- provision of other services
- Smart Growth initiatives
- protection of surface and groundwater resources
- identifying water and sewer and public health needs and solutions.

Supporting information from the Water and Sewer Plan is provided in Appendices 1 through 4 of this Plan. Appendix 1 has information on objectives, policies, and inter-agency responsibilities. Appendix 2 contains general information on characteristics of the natural environment, as well as the cultural background that includes demographics, land use, and development. Appendices 3 and 4 pertain to water supply and wastewater systems, respectively.

Technical information on WSSC's water supply and sewerage systems-wastewater flow projections is provided in Appendices 5 and 6. The complete Water and Sewer Plan provides full details on all these aspects of water and sewer planning in Montgomery County.

Coordination with Land Use Element of the General Plan

The Water and Sewer Plan is closely coordinated with the land use element of the General Plan. The County's growth projections based on master plan recommendations and zoning capacity are provided to MWCOC for their regional forecasts. The forecasts are based on master and sector plan land use, and the forecasts must be within the capacities allowed by existing or proposed zoning. This information is used in conjunction with County wide trends. The projected growth is placed geographically in relation to

Traffic Analysis Zones (TAZs). Through this process, County forecasts are developed for households, jobs, and population. (Municipalities with independent planning and zoning authority do their own forecasts, which are incorporated into the County totals.) These projections are used by DEP and WSSC in planning for existing and future adequacy of water supply and sewerage systems in the County. (See Appendix 1, and Chapter 1 of the *Ten-Year Comprehensive Water Supply and Sewerage Systems Plan*.)

As master and sector plans are developed, DEP and WSSC are consulted regarding the adequacy of systems and the feasibility of any needed extensions. Once the County Council approves a new master plan and any related zoning changes, the Water and Sewer Plan is amended to implement the master plan's recommendations. These amendments are either comprehensive service area changes for large areas proposed by DEP, or individual service area change requests filed by property owners. These proposed changes are judged for consistency with the Water and Sewer Plan's service policies and with the master plan's land use and service recommendations. If the County Council approves, these areas are added as amendments to the Water and Sewer Plan.

Policies

Along with a coordinated framework of plans, the County has established development policies and zoning standards that contribute to preserving water quality.

Growth Policy

Reviewed biennially, this policy guides future development in Montgomery County, reinforcing smart growth principles and ensuring that development is coordinated with the provision of infrastructure. The current Growth Policy supports smart growth within the Priority Funding Area that focuses new development on areas already served by water and sewer infrastructure and minimizes expansion of development into greenfield areas. **Consequently, future growth to be served by public water and sewer will help achieve the Statewide goals of increasing the current percentage of growth in Priority Funding Areas (PFAs), and decreasing the current percentage of growth outside of PFAs.**

The County Council adopts the Growth Policy every **four** years based on Planning Board recommendations. The Policy sets the rules the Planning Board will use to consider subdivisions over the following two year period, in the context of the Adequate Public Facilities Ordinance (APFO). The APFO ensures that there is enough school and road capacity to accommodate development. Adequacy of water and sewer service is determined through the Water and Sewer Plan process.

By 2030, an additional 200,000 residents are expected in the County. Only four percent of the County, about 14,000 acres, remains undeveloped. And there is even less developable land when steep slopes, floodplains, and other regulated sensitive areas are considered. Because of this, new strategies and policies are needed to guide the County's growth in the future, and to be more consistent with Smart Growth.

The Growth Policy is shifting growth to redevelopment in Montgomery County's growth management tools, including master plans, zoning, and subdivision regulations, are being used to direct growth towards redevelopment in transit-served areas to reduce the vehicle miles traveled relative to the population and job growth. It will also limit adverse effects of growth on water quality by accommodating that growth with a significantly smaller increase in imperviousness. Redevelopment and infill, along with enhancing and revitalizing activity centers will become increasingly important strategies in growing smarter and will create opportunities for creative use of Environmental Site Design to increase water quality in urban areas. Finding ways to decrease our carbon footprint and become more sustainable will increasingly come to the fore as the County continues to grow. The 2009-2014 Growth Policy draft is available online at montgomeryplanning.org.

The Inter-County Connector (ICC)

From a master planning perspective, the ICC has been master planned along its current alignment since 1972 (with only minor changes in 1981 and 2009) so the project supports the land use plans already in place. No master planned land use changes are associated with the ICC.

From a development staging perspective, the additional accessibility provided by the ICC is expected to affect the timing of planned development to some extent. This effect was reflected in our adjustment of our cooperative forecasts for growth approved by the Metropolitan Washington Council of Governments as Round 6.4A when the ICC was added to the region's Constrained Long Range Plan in 2004. This reflected effect has been carried through in subsequent forecast rounds that have been used in recent planning. As a result, any potential impact of the ICC on water and sewer demand has already been factored into WSSC water and sewer demand projections.

Urban Design Guidelines

Recent master and sector plan revisions for urban areas have been accompanied by Urban Design Guidelines intended to implement the plan vision by providing design guidance for applicants seeking approval of private development or capital improvement projects. The guidelines are approved by the Planning Board for use in developing and evaluating building projects and other applications. They will be revised to reflect new technologies or field conditions and updated at least once every six years.

With the exception of street standards and other specific recommendations, the urban design guidelines are not regulations that mandate specific forms and locations of buildings and open space. They illustrate how plan recommendations and principles might be met, and they encourage applicants and public agencies to propose designs that create an attractive and successful public realm. They include guidance on a wide range of environmental issues including tree canopy, green open spaces, and stormwater management.

To date, draft urban design guidelines have been developed for the Twinbrook Sector Plan, the White Flint Sector Plan, and the Germantown Master Plan. They are available as drafts at montgomeryplanning.org.

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The Agricultural Reserve

The General Plan position that the desired land use in the Agricultural Reserve is agriculture is supported by the *Functional Master Plan for the Preservation of Agriculture and Rural Open Space*. It established two zones, Rural Density Transfer (RDT) and Rural Cluster (RC), in conjunction with a Transfer of Development Rights (TDR) system. The RDT Zone requires a minimum of 25 acres per dwelling unit and the RC Zone allows one dwelling unit per five acres. These densities enable the County to limit development and preserve large amounts of land for agriculture.

The Agriculture and Open Space Plan also prohibits extending sewer and water to areas zoned RDT, unless needed to address public health problems. This has helped preserve agricultural uses and limited sprawl, thereby protecting water quality and supply. Continuing these policies will help guarantee these benefits in the future. (See, Appendix 1, and Chapter 1 of *Ten-Year Comprehensive Water Supply and Sewerage Systems Plan*.)

Agriculture is also supported by Department of Economic Development's (DED) Agricultural Land Preservation Easements program. This program protects and preserves agricultural land from development with the goal of 70,000 protected acres by 2012. Montgomery County has protected a higher proportion of agricultural land than any other county in the nation. As of 2009, the County has exceeded its goal, protecting 71,000 acres, 20,000 of which are permanently preserved through perpetual easements. The remaining 51,000 acres are protected under TDR easements, but retain development rights of one unit per 25 acres (Appendix 7).

The County has recently passed a Building Lot Termination (BLT) program designed to extinguish remaining residential development rights through purchase. As with TDRs, the purchased density is transferred to development in mixed-use zones close to services and transit.

Regulatory Framework

Montgomery County Municipal Separate Storm Sewer System (MS-4) Permit

The County's MS-4 Permit is the principal implementation tool in meeting stormwater point source water quality regulatory requirements. DEP is the lead agency for implementing this permit, but most County agencies participate. Watershed analyses will identify pollutant sources so that reduction and control options that meet stormwater point source load reduction requirements can be developed. [Information on the County's MS-4 Permit is available online at: www.montgomerycountymd.gov/DEP](http://www.montgomerycountymd.gov/DEP)

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Site Design and Development Practices

Environmental Site Design (ESD), which is required by State stormwater management regulations to be implemented to the Maximum Extent Practicable (MEP), is vital to realizing this Plan's goals. These standards apply to any remaining greenfield development in the County, as well as to infill and redevelopment projects. Redevelopment projects offer challenging constraints, but ESD approaches are especially important when using redevelopment to improve water quality in urban areas.

water supply

Both the Water and Sewer Plan and other planning and program efforts address water supply by addressing water sources, its treatment and protection, and developing estimates for demand and future protection efforts.

Findings

The County has a strong water and sewer policy and program structure. The comprehensive interagency water and sewer planning process [summarized above](#) discussed in this Plan and detailed in the Water and Sewer Plan is designed to ensure that water supply is adequate for existing and future growth. WSSC periodically assesses water supply and demand projections based on planned growth to ensure this adequacy.

Appendices 3 and 5 contain technical summaries from the Water and Sewer Plan and WSSC projections, respectively, comparing projected water demand with water supply capacity. The projections indicate that water supply is adequate for existing needs and will be adequate to at least 2030. (See Chapter 3 of the *Ten-Year Comprehensive Water Supply and Sewerage Systems Plan*.)

Although comprehensive planning by DEP and WSSC has ensured the adequacy of water supplies to accommodate projected growth to 2030, there are still issues and challenges.

With only four percent of the County left for new development, and much of that in environmentally sensitive areas, accommodating future growth through redevelopment of existing built areas presents excellent opportunities for improving and funding water supply infrastructure, without extending water and sewer service or expanding the water and sewer service envelope. This approach also provides opportunities to grow even smarter and greener, in accordance with the State's Planning Visions Act of 2009. Recent master plan revisions have focused on redevelopment and M-NCPPC is coordinating closely with DEP and WSSC to ensure that the plans' proposed zoning and densities can be accommodated by water supply infrastructure. Close coordination among the various agencies will continue to be a critical component of future planning.

The County will continue to evaluate and pursue policies and programs to ensure that source waters are protected and infrastructure is maintained, particularly:

- protecting the Agricultural Reserve and other areas planned for low-density development
- coordinating water planning with the County's land use plan and Growth Policy
- educating the public on water resources, conservation, and reuse
- reducing the impacts of infrastructure failure on streams and water quality.

Sources

Surface Water

The County's water supply comes from the Potomac and Patuxent Rivers. The Potomac is the larger source; WSSC withdraws water from the Potomac at Watkins Island near the mouth of the Watts Branch. WSSC is also working on a new Potomac Water Filtration Plant Submerged Channel Intake. This intake is still in the planning and design stage, and is intended to provide higher quality Potomac source water, not increased water withdrawals. WSSC operates two reservoirs along the Patuxent River, the Triadelphia and Rocky Gorge Reservoirs, created by the Brighton and T. Howard Duckett Dams, respectively.

At low flow periods, the Potomac River flowsource can be supplemented by the Jennings Randolph Reservoir on the River's North Branch, 200 miles upstream from the Watkins Island intake, and by Little Seneca Lake in western Montgomery County. WSSC operates this dam and release facility.

Long-range water resource development options are considered on a regional basis. As potential opportunities arise, they are examined. A number of alternatives have been suggested, some of which are being investigated in a preliminary way because the need is not currently pressing. These include a number of potential quarry options in Maryland and Virginia for water storage and settling, as well as the rehabilitation of an estuarine pumping station and possible treatment of estuarine water.

Distribution and Storage

WSSC delivers drinking water from treatment plants to consumers throughout the community water service area in Montgomery County through a series of pumping facilities, transmission mains, and storage facilities. The County's water distribution system is aging, and mMaintenance and replacement of this infrastructure is vital for continued adequate public water service. It is also important in preventing stream erosion and adverse water quality impacts that result from water line breaks. WSSC is completing a Utility-Wide Master Plan to ensure that its entire infrastructure is adequate to meet the service area's present and future needs (Appendix 1).

Groundwater

In less densely-populated parts of Montgomery County, water is supplied primarily by groundwater wells. Approximately 80,000 residents rely on groundwater as their only source of water, with approximately 50,000 individual wells in use. Although most wells are located in areas not served by the community water supply systems, older wells are found throughout the County. Only Poolesville's municipal wells are part of a community water supply system.

According to the Maryland Geological Survey (MGS) and the Department of Permitting Services (DPS), the County's groundwater is generally of good quality with fairly reliable flow rates. The levels of nitrates and natural pollutants are generally low. Local problems, especially low flow, occur during significant drought. But the overall picture is good because of the County's relatively thick soils, the low density development in the Agricultural Reserve, and the high level of care in installing septic systems over the years.

DPS's Well and Septic Section is responsible for administering and enforcing County and State laws governing on-site individual water supply systems. The Water and Sewer Plan identifies problem areas based on well information from DPS, and that Plan will continue to be the County's tool for identifying and addressing groundwater and well issues. (See Appendix 3, and Chapter 3 of the *Ten-Year Comprehensive Water Supply and Sewerage Systems Plan*)

Treatment and Protection

Treatment Facilities

The County's drinking water is treated at two WSSC two filtration plants: the Potomac Water Filtration Plant, on River Road west of Potomac Village, and the Patuxent Water Filtration Plant, on Sandy Spring

a Utility-Wide Master Plan to ensure that its entire infrastructure is adequate to meet the service area's present and future needs (Appendix 1).

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Treatment and Protection

Treatment Facilities

The County's drinking water is treated at two WSSC two filtration plants: the Potomac Water Filtration Plant, on River Road west of Potomac Village, and the Patuxent Water Filtration Plant, on Sandy Spring Road just east of the County limits in Laurel. These plants draw untreated water from the Potomac and Patuxent Rivers and process it into drinking water.

The Agricultural Reserve and Water Resources

~~Although some uses in Montgomery County's Agricultural Reserve are sources of non-point pollutants associated with farming, the Montgomery County's Agricultural Reserve~~ has served to help protect water quality and supply ~~in many ways~~. By keeping density and imperviousness low, the Reserve has limited sprawl and promoted smart growth. The Reserve has also served to protect drinking source waters in the Potomac River and Patuxent River reservoirs. Low density and low imperviousness ~~within the Reserve~~ have also helped protect water quality and keep stream erosion low ~~not only within the Reserve, but also~~ by attenuating water ~~quantity and~~ quality impacts from more dense upstream areas in the central portion of the County.

In addition to surface water benefits, the Agricultural Reserve and associated policies have provided excellent protection of groundwater resources in the portion of the County outside of the water and sewer service envelope, where groundwater is the only source of drinking water. According to MGS hydrogeologists, low densities and imperviousness levels in the Agricultural Reserve have been instrumental in protecting the County's groundwater quantity and quality. The County's ~~commitment~~ ~~commitment~~ to continue these policies will help safeguard groundwater as a reliable resource.

Potomac River Basin Drinking Water Source Protection Partnership

The ICPRB coordinates a voluntary association of 19 water suppliers and government agencies that focuses on protecting drinking water sources in the Potomac River basin. This coalition of water utilities

For detailed information on water supply systems, see Appendix 3, and Chapter 3 of the *Ten-Year Comprehensive Water Supply and Sewerage Systems Plan*.

wastewater

Both the Water and Sewer Plan and WSSC planning and program efforts address wastewater conveyance and treatment needs by estimating existing and future demand, and by providing the wastewater capacity, maintenance, and replacements needed to meet those demands.

Findings

The comprehensive interagency water and sewer planning process ~~summarized above~~ discussed in this Plan and detailed in the Water and Sewer Plan is designed to ensure that wastewater treatment capacity is adequate for existing and future growth. WSSC periodically assesses water supply and demand projections based on planned growth to ensure this adequacy.

Appendices 4 and 6 of this Plan contain graphics and tables from the Water and Sewer Plan and WSSC projections, respectively, comparing projected sewerage system needs with sewage treatment capacity. Projections indicate that capacity is adequate for existing needs and at least to the planning horizon of 2030, including a six million gallon per day expansion of the Seneca Wastewater Treatment Plant (WWTP) that is currently underway. (See Chapter 4 of the *Ten-Year Comprehensive Water Supply and Sewerage Systems Plan*.)

Although comprehensive planning by DEP and WSSC has ensured the adequacy of wastewater treatment capacity to accommodate projected growth to 2030, there are still issues and challenges.

With only four percent of the County left for new development, accommodating future growth through redevelopment of existing built areas presents excellent opportunities for improving and funding wastewater infrastructure, without extending water and sewer service or expanding the water and sewer service envelope. This approach also provides opportunities to grow even smarter and greener, in accordance with the State's Planning Visions Act of 2009. Recent master plan revisions have focused on redevelopment, and M-NCPPC is coordinating with DEP and WSSC to ensure that the plans' proposed zoning and densities can be accommodated by sewer infrastructure. Close coordination among the various agencies will continue to be a critical component of future planning, especially beyond 2030, to continue to ensure wastewater adequacy.

The County will continue to evaluate and pursue policies and programs to ensure wastewater infrastructure is maintained and nutrient inputs from septic systems and wastewater infrastructure are reduced, particularly:

- protecting the Agricultural Reserve to limit sprawl and the expansion of wastewater infrastructure and sewage loads to WWTPs.
- coordinating sewer planning with the County's land use plan and Growth Policy
- educating the public on wastewater and sewage system issues
- reducing nutrient loadings from wastewater treatment plants
- reducing water pollution from wastewater infrastructure
- reducing nitrogen from septic systems
- addressing sand mounds and other technologies in the Agricultural Reserve.

Collection and Conveyance

Wastewater either flows by gravity or is pumped through sewer lines to the nearest wastewater treatment plant. **The County's wastewater collection and conveyance system is aging, and maintenance and replacement of this infrastructure is vital for continued adequate public sewer service.** It is also important for water resources protection because of negative water quality impacts that result from sewer line leaks and breaks. WSSC is completing a Utility-Wide Master Plan to ensure that its entire infrastructure is adequate to meet present and future needs of the service area. WSSC is also complying with a Consent Decree to minimize and eliminate where possible sanitary sewer overflows and pipe breaks (Appendix 1). Further information on the WSSC Consent Decree is also available on the WSSC website wsscwater.com. Minimizing water quality impacts from wastewater collection and conveyance infrastructure will continue to be important in meeting water quality standards.

Treatment

Wastewater Treatment Plants (WWTPs)

WSSC operates three wastewater treatment plants (WWTPs) in Montgomery County: the Seneca, Damascus, and Hyattstown WWTPs (Map 2). The Mill Bottom WWTP, located in and operated by Frederick County, treats sewage from the Rattlewood Golf Course in Montgomery County. But most of the County's sewage is treated at the Blue Plains WWTP, operated by the District of Columbia Water and Sewer Authority. The Town of Poolesville operates its own WWTP. In addition, there are a number of small privately operated WWTPs in Montgomery County.

National Pollutant Discharge Elimination System (NPDES) Permits

All wastewater treatment plants are required to have State-issued NPDES permits that regulate what can be discharged to streams. The permits specify discharge limitations for each pollutant and specify reporting requirements.

Biological Nutrient Reduction (BNR) and Enhanced Nutrient Reduction (ENR)

WSSC uses BNR—a standard treatment using bacteria to reduce nutrients discharged from sewage treatment plants—and is planning and installing plant upgrades to ENR status, which will lower nutrients to near the limits of current technology.

ENR upgrades are in various stages of design, construction, and application. Estimated completion dates are:

- Seneca WWTP operational 2013
- Damascus WWTP operational 2010
- Hyattstown WWTP below the ENR flow threshold
- Blue Plains WWTP operational 2015
- Poolesville WWTP operational 2010.

Each WWTP has been assigned a cap on the amount of nutrients that can be discharged in its treated effluent. These caps are or will be specified in the plants' NPDES discharge permits. Even with the implementation of enhanced nutrient reduction at all the major WWTPs, these caps may eventually limit

the amount of sewage that can be treated. It should be noted, however, that the WWTP flow projections and nutrient caps were calculated based on the same maximum permitted flow, so they correspond exactly. As a result, the nutrient caps will expire at the same rate as the flow capacity expires. Because of this, the caps will only be limiting when the flow reaches the permitted maximum. The WSSC flow projections in Appendix 6 indicate that this will not occur within the 2030 horizon of the Plan.

Onsite Wastewater Treatment Systems

The more rural, less-densely populated parts of the County depend primarily on septic systems that discharge effluent to the ground. Although properly maintained septic systems contribute some nitrogen to groundwater, failing systems can contribute much more. Septic system areas generally coincide with the County's well service areas. Although most septic systems are located in areas not served by community sewer systems, as with wells, older septic systems are found throughout the County. Some larger individual treatment systems are referred to as "multi-use systems."

DPS's Well and Septic Section administers and enforces County and State laws governing on-site, individual sewerage systems to prevent failing or improperly maintained septic systems that can contribute excessive nitrogen to ground and surface waters. Based on information collected by DPS, problem areas are reported in the Water and Sewer Plan. The Water and Sewer Plan will continue to be the County's planning mechanism for identifying and addressing septic issues. (See Appendix 4 and Chapter 4 of the *Ten-Year Comprehensive Water Supply and Sewerage Systems Plan*)

Sand Mound and Alternative Technology Septic Systems

County regulations allow two types of septic systems for new construction: conventional in-ground trench systems, with trenches installed in existing soil, and sand mound systems, with trenches installed within a constructed mound above the original ground level. Enhanced nutrient reduction technologies to improve effluent quality are encouraged in both of these systems. Septic systems using alternative technologies (such as low-pressure drip systems) are allowed only as replacements for existing septic systems.

Although sand mounds and alternative septic systems can provide a higher quality of effluent than trench septic systems, they can allow development on land where in-ground trench systems are not permitted due to high water tables or unacceptable percolation rates. These systems could enable development in the Agricultural Reserve, which was established in the early 1980s when State and County regulations did not allow sand mound systems for new construction.

Sand mound systems could add pressure for residential subdivisions on sites that are not suitable for standard in-ground trench systems, and that might have otherwise remained agricultural land or open space. This development pattern was not anticipated in the County's Agriculture and Open Space Plan and could result in increased imperviousness and associated negative water quality impacts. The use of alternative technology septic systems that can allow development on sites without adequate percolation would certainly exacerbate this problem.

In cases where conventional systems fail and owners can no longer rely on standard in-ground trench systems, sand mounds and alternative technology septic systems should be generally encouraged since they can reduce pressure to provide public sewer systems to relieve failing septic systems in low-density areas outside the planned public sewer service envelope.

But these systems may have unforeseen development and water quality impacts in the Agricultural Reserve. The County Council is reviewing the use of these systems on sites that do not meet standard septic system regulatory requirements. Consistent with State regulations, the Water and Sewer Plan will continue to be a key tool in implementing the County's land use plan, and is the appropriate context in which to address this and other septic system issues.

Chesapeake Bay Restoration Fund for Septic Upgrades

Part of the State's Bay Restoration Fund comes from fees assessed to homes served by an on-site wastewater system, and a portion of those fees is used for septic system upgrades. DPS works with septic system owners to use these funds to upgrade their systems. DPS has applied to the State to assume responsibility for administering the Bay Restoration Fund monies for qualifying on site systems in Montgomery County.

Emerging Contaminants

Emerging contaminants are chemicals or materials that have a real or perceived threat to human health or the environment. They include endocrine (hormonal) disrupters, pharmaceutical drugs, and personal care products. In 2008, WSSC and its regional and national partners tested the Potomac and Patuxent source waters and its drinking water for emerging contaminants. The findings indicated that WSSC drinking water is safe to consume due to the extremely low levels of contaminants. Likewise, the findings for both source waters showed extremely small amounts of emerging contaminants. WSSC will continue to work with its partners to understand and treat emerging contaminants. Further information is available on the WSSC website wsscwater.com

There are still many unanswered questions and additional data needed regarding emerging contaminants. Research is underway in many agencies to address this issue, which is likely to become increasingly important in the future as the concentrations and the effects of these contaminants also increase. A recent report on emerging contaminants in the Potomac River is available online at: www.potomac.org. Further information on this issue is available at the Potomac Drinking Water Source Partnership at: www.potomacdwspp.org.

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For detailed information on wastewater systems, see Appendix 4, and Chapter 4 of the *Ten-Year Comprehensive Water Supply and Sewerage Systems Plan*.

stormwater and water quality

Stormwater runoff generates additional flow and carries pollutants to receiving water bodies. Because of the close connection between stormwater and water quality, stormwater management is a vital component of protecting and improving water quality. Stormwater management is a constantly evolving field that has in recent years seen significant advancements in Best Management Practices (BMPs), both structural and non-structural, including Environmental Site Design (ESD) practices.

Both the Water and Sewer Plan and other planning and program efforts address stormwater and its effect on water quality by addressing sources and treatment techniques, and by estimating demand and developing future efforts. The County's extensive set of programs and policies minimize stormwater impacts and the State's legal requirements for nutrient loadings and receiving waters are addressed below.

Findings

State and County monitoring data show that water quality is continuing to degrade in many portions of Montgomery County and regionally as growth continues, especially in older developed areas and areas with increasing impervious cover. In response, water quality regulatory requirements are also increasing. As a result, where and how the County grows and how it manages stormwater will be increasingly important in meeting water quality regulations.

New State regulations requiring ESD to the maximum extent practicable will help decrease the water quality impacts of growth, and County codes and regulations are being revised to remove impediments.

Because the County is currently near build-out, opportunities to realize significant changes in water quality through land use and alternative development patterns will not be available. For Montgomery County, addressing water quality issues will center on retrofitting older development, pollution prevention, implementing ESD, and accommodating growth through redevelopment and infill. Designing redevelopment and infill projects to reduce impervious cover such as parking lots, and improving stormwater management will help to improve water quality.

This approach is consistent with the EPA report, *Protecting Water Resources with Higher Density Development*, available online at epa.gov/smartgrowth.

Enhancing stewardship of natural areas including resource protection, conservation, enhancement, and restoration, especially in riparian and headwater areas, will also be important in achieving and maintaining water quality standards. These efforts will be prioritized to focus on areas most in need of water quality protection and improvement by coordinating existing programs and plan implementation with water resource needs.

Results of County analyses, MS-4 implementation plans, and TMDL plans for non-point sources water quality will help guide the implementation and updating of master plans, natural area protection, enhancement and restoration efforts, stormwater management, and the development review process.

Other findings include:

- regulatory requirements for water quality will require more effective stormwater management and environmental site design for new development, redevelopment, infill, and roads, as well as the retrofitting of older development
- increased inter-agency cooperation and collaboration will be essential to meet water quality standards and regulatory requirements

- a watershed-based approach should be used to identify and prioritize opportunities for improving and protecting water quality
- coordinating water quality improvement efforts with local and regional jurisdictions will be important in addressing TMDLs and meeting water quality standards
- maintaining adequate resources to meet evolving water quality regulatory requirements will continue to be important.

Sources

Point Sources

The County's storm drain system collects and discharges stormwater runoff in most developed areas. This system is considered a pollutant point source under the Clean Water Act and the State TMDL Program. The County has been issued a NPDES permit to operate its storm drain system. This permit is also known as a Municipal Separate Storm Sewer System (MS-4) Permit.

Non-Point Sources

Areas without storm drains are considered non-point sources of pollution, contributing to the total pollutant load governed under the TMDL program. In Montgomery County, these areas are mostly in the Agricultural Reserve. The non-point source pollutants where non-point pollutants contribute to an impaired water body, they are included only as part of the overall County TMDL allocations, and but are not covered by the County's MS-4 permit. Agricultural operations are required to implement nutrient management plans and BMPs, and County farmers have a high compliance rate with these requirements. Although these practices help to significantly reduce non-point pollution, they are not tied to any particular TMDL. As a result, there is currently no enforcement to ensure any needed load reductions from non-point sources can be achieved. If a water body remains impaired and there is no enforcement plan to achieve the entire TMDL including non-point sources, then theoretically, no further discharges could be allowed to that water body, including those resulting from land conversion. This scenario highlights the need for an implementation strategy with a clear regulatory framework and designated responsibilities. Ensuring that loads are reduced equitably across all contributing sources will require additional guidance from the State.

Treatment

Stormwater Management

In 2000, the County adopted the State Stormwater Management Manual as a minimum to guide its stormwater management program. In some instances, however, Montgomery County sets more stringent standards than the State. The County's stormwater management manual details a variety of structural and non-structural practices that control stormwater quantity and quality according to specified standards.

The management of stormwater is regulated through the County's Stormwater Ordinance, which implements the State Manual with additional County requirements. In 2009, the State Stormwater Manual was revised to include requirements for enhanced stormwater management through the use of Environmental Site Design (ESD) techniques to the Maximum Extent Practicable (MEP). All jurisdictions are required to revise their stormwater ordinances to reflect the new requirements.

As the County moves forward in implementing ESD, it will be important to continue to build our information base on ESD practices in different settings. This can include ongoing research on innovative ESD practices elsewhere in the County, as well as opportunities for monitoring specific applications of ESD in the County. This will provide a foundation for refining the use of ESD in the County, as well as helping to further clarify the meaning of MEP in different development contexts.

Natural Resources Management

The County's natural resources, including forests, wetlands, and meadows, provide vital natural water quality protection and treatment functions. In addition, urban trees and canopy provide water quality and other environmental benefits. The County has many programs and plans that are designed to protect and manage these resources. Because of the close linkage between healthy natural areas and water quality,

it will be important to seek ways to enhance ongoing urban tree programs and natural resource management, conservation, enhancement, and protection efforts to accomplish multiple objectives including maximizing benefits to water resources.

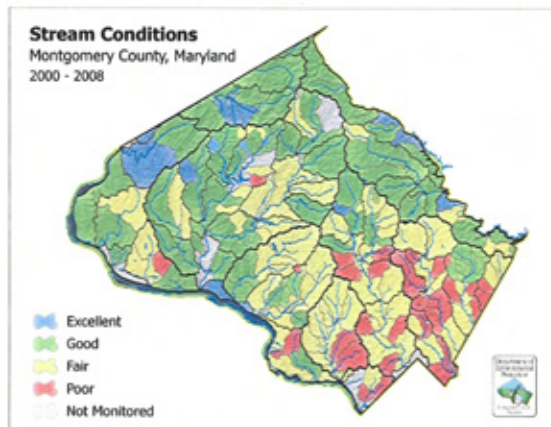
Water Quality Monitoring

County Monitoring

The County DEP and the M-NCPPC Department of Parks monitor streams for benthic macro-invertebrates, fish, and habitat. The Department of Parks monitors on parkland and DEP covers the remainder of the County. ~~DEP is the lead agency for County stream monitoring and maintains the County wide monitoring data database. DEP has maintained a countywide stream monitoring program since 1994, and monitors stations throughout the County both on parkland and in the remainder of the County. DEP coordinates the yearly countywide monitoring with the Department of Parks so that duplication of effort is avoided and collected information can be shared to the benefit of the County, the Department of Parks, and the Planning Department. DEP develops the monitoring methods and maintains quality assurance of the data.~~ The entire County is covered during a five-year cycle of watershed monitoring.

County monitoring shows that urban and suburban streams are generally in fair to poor condition while less densely developed watersheds often are in good and in some cases excellent condition (Map 5). This pattern supports the correlation between higher levels of imperviousness and lower water quality, a trend that supports accommodating future growth in existing urban areas near transit as opposed to developing in greenfields, which would increase impervious cover. [More information on the County's stream monitoring program is available online at: www.montgomerycountymd.gov/DEP](http://www.montgomerycountymd.gov/DEP)

map 5 stream quality conditions 20030-20078



State Monitoring

The Maryland Department of the Environment maintains stream monitoring stations in Montgomery as part of a statewide network. Monitoring parameters include chemical, sediment, bacteria, trash, and stream biology, and the data is used to document water quality impairments statewide.

The State also maintains and updates the Integrated Report of Surface Water Quality, a list of impaired waters (Tables 1-6). As required by federal law, the Report describes categories of water quality, and identifies waters with pollutant loads or conditions that require a TMDL limitation to reach the state standards. Waters that do not meet standards may require a state TMDL study to determine the maximum amount of an impairing substance or pollutant that a particular water body can assimilate and still meet water quality criteria. The Report also helps prioritize watersheds that should be restored and those in need of protection.

The State is developing a GIS-based system for mapping and reporting the information in the Integrated Report, projected to be available in 2010. Access to the State's detailed water quality data in GIS format will greatly improve its usefulness in County water quality analyses and planning.

The Agricultural Reserve and Nutrients

The County's Agricultural Reserve provides many water supply and quality benefits. Agriculture contributes **less-fewer** pollutants than many other land uses, including urban land. This reinforces the need to continue to maintain the Reserve and accommodate growth through redevelopment and infill in existing urban areas. It should be noted, however, that agriculture has been identified by the EPA Chesapeake Bay Program as the leading contributor of nutrients to the Bay due to the **large** amount of agricultural land in the Bay's watershed. While nutrients are significant pollutants in the Bay, they do not affect local streams as much and so the Agricultural Reserve's streams have relatively high overall water quality conditions.

Although the benefits provided by the Agricultural Reserve generally outweigh its pollutant contributions (which have already been **significantly** reduced through **the high compliance rate of farmers with a series of** regulations and conservation practices), the role of nutrients in the Bay and the pending Bay nutrient TMDLs may require additional measures to further reduce nutrients in all sectors of the County, including the Agricultural Reserve.

Regulatory Framework

Many government agencies at the State, Regional, bi-County, and County levels are responsible for water quality and stormwater management. Each agency has its own focus and jurisdiction under various laws and charters. This distribution of responsibilities creates a challenge in dealing with increasingly complex water resource issues and regulations. But with continued and enhanced efforts to coordinate and collaborate more effectively, progress can continue to be made in identifying and implementing solutions (Chart 1).

State Water Quality Policies and Regulations

management programs, program funding, assessment of controls, and annual reporting on compliance status.

~~MDE has published a Final Determination for the County's current MS-4 Permit, to be issued by the end of 2009. On February 16, 2010, MDE issued the third round of the Montgomery County's MS-4 Permit. It will be.~~ The new permit is more stringent, including the requirement to develop implementation plans to achieve the assigned MS-4 Permit waste load (i.e. point source) allocations for all EPA-approved TMDLs.

The permit will also require the County to manage runoff from an additional twenty percent of the County's impervious surface area not currently treated to the maximum extent practicable. Management techniques must include ESD practices as well as more conventional stormwater retrofits and stream restoration.

Meeting these requirements will be a technical and fiscal challenge and will be the focus of County watershed management and restoration. DEP will continue to be the lead agency for those affected by the permit including DPS, the Department of General Services (DGS), DOT, and Montgomery County Public Schools (MCPS). DEP will also be the lead agency for coordinating with other local agencies and municipalities with water resource responsibilities. [More information on the County's MS-4 Permit is available online at: www.montgomerycountymd.gov/DEP](http://www.montgomerycountymd.gov/DEP)

Environmental Guidelines

State law requires all local governments to protect sensitive areas during the development process. The Planning Board's Environmental Guidelines cover the protection of streams and their buffers, wetlands, steep slopes, floodplains, and rare, threatened and endangered species. The Environmental Guidelines are available online at: montgomeryplanning.org

The Guidelines are coordinated with State and County programs and laws to protect and conserve sensitive environmental resources, including forest conservation legislation. They also implement strategies for non-point source pollution reduction, relying on appropriate land use design, stream buffer protection, and Best Management Practices.

The Clean Water Task Force

In 2006, the County Executive and County Council established the Clean Water Task Force to evaluate existing agency coordination of water resources protection programs, and to examine in detail agency responsibilities for stormwater management and water resources protection.

Task Force members included the directors and high-level administrators from the Department of Environmental Protection, Department of Permitting Services, Department of Transportation, Montgomery County Public Schools, Maryland-National Capital Park and Planning Commission, and the Washington Suburban Sanitary Commission.

In 2007, Task Force members identified a number of high priority recommendations, including creating a Water Resources Protection Policy Committee to improve stormwater management approaches, encourage innovation, and integrate natural drainage and volume reduction design approaches into existing processes. [A final report of the Task Force was created and is available online at: www.resolv.org/montgomery/index.html](http://www.resolv.org/montgomery/index.html)

Some of the Task Force's recommendations are being implemented. Since 2007, significant regulatory changes have occurred in stormwater management and water quality. ~~To continue meeting standards, the recommendations should be revisited, particularly the recommendation to form a Water Resources Protection Policy Committee.~~

~~In early 2010, the Clean Water Task Force reconvened to begin considering the implications and needs of the County's new MS-4 Permit, the new State regulations requiring the use of Environmental Site~~

Design (ESD), code revisions to address ESD, and the need to establish an ongoing Water Resources Policy Coordinating Committee, as recommended in the 2007 Task Force Report.

Special Protection Areas

The County has identified Special Protection Areas (SPAs) where existing water resources or other high quality and unusually sensitive environmental features would be threatened by proposed land uses. The County's four SPAs are Upper Rock Creek, Upper Paint Branch, Piney Branch, and Clarksburg.

In SPAs, land use controls and management techniques help ensure that impacts from master planned development activities are mitigated as much as possible. These controls include limiting imperviousness, planting forest buffers before construction, and extra measures to protect natural features. Special engineered water quality protection measures include enhanced sediment and erosion control and redundant stormwater management structures that go beyond minimum standards.

Performance goals guide design and monitoring for each development project. DEP also performs watershed wide biological and water quality monitoring to study the overall effects of development on the watershed. The monitoring data is used to evaluate the design and function of SPA Best Management Practices, link their performance to changing stream conditions, and guide future planning decisions.

Patuxent Primary Management Area

The 1984 *Patuxent River Policy Plan*, adopted by the Maryland General Assembly and the seven Patuxent watershed counties, was prepared by the Maryland Office of State Planning to direct local and State agencies in carrying out programs and regulatory decisions in the Patuxent River Watershed. It recommends that local governments enact a Primary Management Area, establishing a wide buffer around reservoirs and streams.

Montgomery County's *Functional Master Plan for the Patuxent River Watershed* focuses on protecting stream systems and the two drinking water reservoirs, and reducing water quality impacts on downstream counties and the Chesapeake Bay. The Plan established the Patuxent River Watershed Primary Management Area where stream buffers are protected, development densities are limited, and extra Best Management Practices are used to control runoff from developing land and agriculture. These requirements are also incorporated in the Environmental Guidelines.

County Climate Protection Plan

In January 2009, the Montgomery County Sustainability Working Group presented the County's first Climate Protection Plan to the County Executive and the County Council. The Plan starts the County along the path of reducing greenhouse gas emissions by 80 percent by 2050. Its 58 recommendations cover seven areas: renewable energy; residential building energy efficiency; commercial, multifamily, and public building energy efficiency; transportation; forestry and agriculture; long-term planning; and education and outreach. The recommendations that overlap with water resources issues should be identified for priority implementation to achieve multiple environmental benefits. The Climate Protection Plan is available at: montgomerycountymd.gov

Healthy and Sustainable Communities Project

Following the County Council's direction in the 2007 Growth Policy, Planning staff delivered an initial set of potential Healthy and Sustainable Communities policy goals and indicators, or ways to measure progress. These goals and indicators will help policymakers and community members

judge how their policies, programs, and actions contribute to achieving goals such as clean air and water.

The Framework for Action report, drafted with the County Department of Environmental Protection, evolved from public input gathered at a Healthy and Sustainable Communities workshop in 2007. The report's six goals and its indicators will help measure the County's collective efforts toward reaching those goals. This project is viewed as a starting point and will continue coordinated work with the County Executive to create more indicators to measure our mutual goals for housing, transportation, public safety, education, environment, and others. The Framework for Action Report is available online at: montgomeryplanning.org

Nutrient Loading Analysis

Under HB1141, the State requires a nutrient loading analysis for existing and 2030 land cover to estimate the amount of nutrients contributed by land uses in the County's Potomac and Patuxent watersheds. As part of the analysis, the State requested at least two 2030 land cover scenarios.

Land Cover Scenarios

The State's land cover data for the analysis was updated in 2007, and augmented with major roads and highways, wetland areas, and mixed land use areas. Because the State's model does not include loading factors for mixed uses, they were aggregated-with-assigned loading rates of other land cover types with comparable density already in the spreadsheet.

To develop the nutrient loading analysis, the County coordinated with MDE and the its seven municipalities with planning and zoning authority—Rockville, Gaithersburg, Poolesville, Laytonsville, Washington Grove, Brookeville, and Barnesville. Each municipality reviewed and modified the State's 2007 land cover data, and provided 2030 land cover projections for two County 2030 scenarios.

Scenario 1 was based on information contained in County master and sector plans, municipality projections, and the development pipeline in conjunction with demographic and employment projections for 2030.

Scenario 2 is similar to Scenario 1, but with some potential additional areas of development that might occur regardless of horizon year. These additional areas were taken from a strategic growth map (Map 7), that was developed during the 2009 revision to the Growth Policy, and redevelopment-as-identified in the County's Growth Policy (Map 7).

Nutrient Loading Results

The estimated nutrient loads include loadings from surface runoff, WWTPs, and septic systems. The results indicate only minor changes in nutrient loading between existing land cover and both 2030 scenarios, and even less difference between the two future scenarios (Charts 2-6). These results are not unexpected because there is little vacant land left in the County, and therefore no significant land conversion scenario options remain (Appendix 8).

map 7 strategic growth map

Environmental Site Design is a comprehensive site design method that reduces and treats stormwater runoff using techniques including:

- building placement
- parking areas with minimal impervious cover
- roads with vegetative buffers
- vegetated rooftops
- rain gardens
- minimizing grading
- maximizing vegetative cover and infiltration.

Montgomery County already has in place two important programs for protecting sensitive watersheds, namely the Special Protection Area (SPA) program and the Patuxent Primary Management Area. These programs prescribe standards and measures to resources that merit additional levels of protection. Although these measures predate TMDLs and are therefore not indexed to water quality standards, they are examples of the County's ongoing efforts to implement measures that provide extra protection to sensitive watersheds.

The County's commitment to protecting sensitive and high quality watersheds, MS-4 implementation, ESD implementation, maintaining the Agricultural Reserve, protecting and enhancing natural resources, and accommodating future growth through redevelopment and infill will be instrumental in establishing and maintaining the suitability of receiving waters to receive discharges.

Inter-jurisdictional Coordination

Meeting water quality standards in watersheds that extend beyond the borders of a given jurisdiction will require the coordination of plans, programs, and efforts among the involved jurisdictions. This will especially be important in TMDL implementation. Guidance from the State will be needed to facilitate this process, especially as the Chesapeake Bay TMDLs are developed and allocated on a smaller scale.

looking ahead

Clearly, Montgomery County is blessed with many valuable water resources. It is equally clear, however, that although much has been done, much more needs to be done to improve and safeguard them, and to meet State standards and TMDLs. The value of our water resources for the County's environmental and economic health and sustainability is simply too great to do otherwise. And continually evolving water quality regulations will also necessitate careful planning and cost-effective actions.

As the County runs out of open space to develop, accommodating future growth through redevelopment and infill will become increasingly important. Redevelopment will afford new opportunities to green our urban areas for multiple environmental benefits, including stormwater quantity and quality management. Implementing Environmental Site Design will play a large role in both remaining greenfield development and redevelopment in the future. Finding ways to retrofit older development with no or inadequate stormwater controls will also be needed, considering the past and ongoing water quality and habitat degradation in the County's urban streams. And increasing the area, quality, and connectivity of our natural resources, especially in riparian areas, will continue to be vital in protecting the integrity of our water resources.

The need for adequate funding to implement the County's MS-4 Permit, meet water quality standards, and to replace and maintain our water and sewer infrastructure, will be a continuing challenge, especially in the face of competing needs and scarce resources. And to meet the challenges ahead, implement the County's regulatory programs, and achieve our water resources goals, inter-agency and inter-jurisdictional coordination and cooperation will be even more vital.

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policies and recommendations

The following policies and recommendations address the main water resource issues addressed above including stormwater and water quality, and water supply and wastewater capacity. A separate section is devoted to land use and growth policy because these are key components in all water resources issues.

Land Use and Growth Policy

Policy 1. ~~Plan future growth to not exceed water supply and wastewater treatment capacity~~water supply and wastewater treatment capacity to meet the demand of future growth.

Recommendations

- 1.1 Continue to ensure that future development and redevelopment is coordinated with WSSC and the *Ten-Year Comprehensive Water Supply and Sewerage Systems Plan*.
- 1.2 Reassess the *Patuxent River Functional Master Plan*, and update if needed to respond to and coordinate with the updated *Patuxent River Policy Plan*.

Policy 2. Ensure that future growth is consistent with smart growth principles.

Recommendations

- 2.1 Accommodate future growth through redevelopment and infill in existing urban areas within the Priority Funding Areas.
- 2.2 Continue to support agriculture as the preferred land use in the County's Agricultural Reserve.
- 2.3 Evaluate the effectiveness of the Building Lot Termination (BLT) Program for limiting non-agricultural development in the Agricultural Reserve.

Policy 3. Plan future growth to minimize impacts to water resources.

Recommendations

- 3.1 ~~Design and implement redevelopment and infill to maximize water resources improvements~~The County's regulatory framework for redevelopment and infill should facilitate levels of stormwater management that exceed State requirements.
- 3.2 Evaluate and recommend new or enhanced incentives for constructing green buildings, and green retrofitting and redevelopment to maximize water resource benefits.
- 3.3 Continue to integrate land use, zoning, redevelopment, and urban design planning and strategies into water resources protection and regulatory programs and plans.
- 3.4 Use results from approved water quality implementation plans, watershed studies, Special Protection Areas, and State and County water resource monitoring to guide the master plan update process.

Policy 4. Focus natural area protection, conservation, mitigation, enhancement, restoration, and management to maximize water resources protection and quality.

Recommendations

- 4.1 Increase forest, wetland, meadow, stream buffer, and urban tree canopy County wide, especially in watersheds with regulatory limits, water quality impairments, or Tier II designations.
- 4.2 Adopt a Tree Ordinance to ~~increase protect~~ urban tree canopy, which provides stormwater benefits.

- 4.3 Revise the Forest Conservation Law and regulations and the *Trees Technical Manual* as needed to increase the speed and success of reforestation efforts.
- 4.4 Continue to support natural land preservation and easement programs, especially in watersheds with known water quality impairments.
- 4.5 Coordinate park planning and development with Countywide efforts to address water quality regulations.
- 4.6 Develop and implement natural resource management plans for lands owned by local governments.
- 4.7 Identify ways to maximize water quality protection and improvement through protecting, restoring, and enhancing natural areas.

Stormwater and Water Quality

Policy 5. Manage stormwater and non-point source pollution to maximize water quality and quantity benefits, and meet regulatory requirements and inter-jurisdictional commitments.

Recommendations

- 5.1 Develop and implement a collaborative interagency and external stakeholder process to effectively address water resource regulatory issues.
- 5.2 Establish a Water Resources Policy Coordination Committee as recommended by the Clean Water Task Force, and implement an institutional framework to ensure broad-based interagency coordination and collaboration.
- 5.3 Coordinate activities in inter-jurisdictional watersheds with municipalities, adjacent counties, and federal and state property owners to meet water quality protection, compliance, and improvement needs.
- 5.4 Adopt guidelines, regulations, and practices, including rainwater harvesting and reuse, and identify improvements needed to maximize water quality improvement and protection associated with new development, redevelopment, infill, roads, and retrofitting of older development.
- 5.5 Coordinate efforts with the Maryland Department of the Environment and other State and County agencies and municipalities to meet their separate MS-4 permit requirements and develop TMDL implementation plans for pollutant sources not covered by the County's Permit.
- 5.6 Use results from approved water quality implementation plans, watershed studies, Special Protection Areas, and State and County water resource monitoring to **guide-inform any needed changes to** development review requirements.
- 5.7 Identify and pursue priority implementation for those recommendations of the County's Climate Protection Plan and any subsequent efforts of the Sustainability Working Group that have direct benefits on water quality and quantity.
- 5.8 Maintain adequate resources and expertise in agencies with water resources responsibilities to meet evolving water quality regulations.

Policy 6. Maintain effective public outreach and educational programs to convey the vital role of water resources and water quality in the County's overall health and sustainability.

implementation

Dealing with water resources issues comprehensively is beyond the scope of any one agency or plan. Consequently, this Plan establishes policies and recommendations to guide the more specific plans and implementation actions of a number of different entities.

Implementing and updating this Plan (as required by State law) will involve more detailed analyses, programs, and action strategies by a variety of stakeholder agencies that have responsibilities related to water resources. A coordinated and collaborative interagency approach consistent over many years will be needed to make progress in meeting this Plan's goals, including meeting water quality requirements that will continue to evolve.

Continuing the work begun by the County's Clean Water Task Force will also be instrumental in achieving these goals. A key Task Force recommendation was to create a Water Resources Policy Coordination Committee, to carry forth the work begun by the Task Force. This Water Resources Plan is one component of a coordinated interagency approach to dealing with water resources and water quality issues and needs.

Table 7 outlines the Plan's policies and recommendations by type and lead agency. It identifies the lead responsibility even though all would have a role in achieving these recommendations.

It classifies the policies and recommendation by type. The Umbrella category is for long-term policies or recommendations. The Implementation category applies to shorter-term actions. Policies and recommendations in the Further Study category will need additional research to set more specific actions.

table 7 recommendation type and interagency implementation/coordination

	Type			Lead Agency
	Umbrella	Implementation	Further Study	
Land Use Planning and Growth Policy				
Policy 1. Plan future growth to not exceed water supply and wastewater treatment capacity water supply and wastewater treatment capacity to meet the demand of future growth.	✓			M-NCPPC
Recommendations				
1.1 Continue to ensure that future development and redevelopment is coordinated with WSSC and the Ten-Year Comprehensive Water Supply and Sewerage Systems Plan.	✓			M-NCPPC
1.2 Reassess the <i>Patuxent River Functional Master Plan</i> , and update if needed to respond to and coordinate with the updated <i>Patuxent River Policy</i>		✓	✓	M-NCPPC

	Type			Lead Agency
	Umbrella	Implementation	Further Study	
<p><i>Plan.</i></p> <p>Policy 2. Ensure that future growth is consistent with smart growth principles.</p>	✓			M-NCPPC
Recommendations				
2.1 Accommodate future growth as much as possible through redevelopment and infill in existing urban areas within the Priority Funding Areas.	✓			M-NCPPC
2.2 Continue to support agriculture as the preferred land use in the County's Agricultural Reserve.	✓			M-NCPPC
2.3 Evaluate the effectiveness of the Building Lot Termination (BLT) Program for limiting non-agricultural development in the Agricultural Reserve.		✓		M-NCPPC
Policy 3. Plan future growth to minimize impacts to water resources.	✓		✓	M-NCPPC
Recommendations				
3.1 Design and implement redevelopment and infill to maximize water resources improvements The County's regulatory framework for redevelopment and infill should facilitate levels of stormwater management that exceed State requirements.		✓	✓	M-NCPPC /DPS/DEP
3.2 Evaluate and recommend new or enhanced incentives for constructing green buildings and green retrofitting redevelopment to maximize water resource benefits.			✓	M-NCPPC /DPS
3.3 Integrate land use, zoning, redevelopment, and urban design planning and strategies into water resources protection and regulatory programs and plans.		✓	✓	M-NCPPC /DEP
3.4 Use results from approved water quality implementation plans, watershed studies,		✓	✓	DEP/ M-NCPPC

	Type			Lead Agency
	Umbrella	Implementation	Further Study	
Special Protection Areas, and State and County water resource monitoring to guide the master plan update process.				
Policy 4. Focus natural area protection, conservation, mitigation, enhancement, restoration and management to maximize water resources protection and quality.	✓		✓	M-NCPPC
Recommendations				
4.1 Increase forest, wetland, meadow, stream buffer, and urban tree canopy area countywide, especially in watersheds with regulatory limits, water quality impairments, or Tier II designations.		✓	✓	M-NCPPC /DEP
4.2 Adopt a Tree Ordinance to increase-protect urban tree canopy, which provides stormwater benefits .			✓	DEP
4.3 Revise the Forest Conservation Laws and Regulations and <i>Trees Technical Manual</i> as needed to increase the speed and success of reforestation efforts.		✓		M-NCPPC
4.4 Continue to support natural land preservation and easement programs and activities, especially in watersheds with known water quality impairments.	✓			M-NCPPC /DEP
4.5 Coordinate park planning and development with countywide efforts to address water quality regulations.			✓	M-NCPPC
4.6 Develop and implement natural resource management plans for lands owned by local governments.			✓	DEP/ M-NCPPC
4.7 Identify ways to maximize water quality protection and			✓	DEP

	Type			Lead Agency
	Umbrella	Implementation	Further Study	
requirements, and develop TMDL implementation plans for pollutant sources not covered by the County's Permit.				
5.6 Use results from approved water quality implementation plans, watershed studies, Special Protection Areas, and State and County water resource monitoring to guide <u>inform any needed changes to</u> development review requirements.		✓	✓	DEP/ MNCPPC
5.7 Identify and pursue priority implementation for those recommendations of the County's Climate Protection Plan and any subsequent efforts of the Sustainability Working Group that have direct benefits on water quality and quantity.			✓	M-NCPPC /DEP
5.8 Maintain adequate resources and expertise in agencies with water resources responsibilities to meet evolving water quality regulations.	✓		✓	all
Policy 6. Maintain effective public outreach and educational programs to convey the vital role of water resources and water quality to the County's overall health and sustainability.	✓			DEP
Recommendations				
6.1 Evaluate existing efforts and implement more effective programs to increase awareness of stormwater as a valuable and usable resource.			✓	DEP
6.2 Enhance stewardship, education, and outreach programs to increase the voluntary implementation of pollution prevention and runoff management practices.			✓	DEP
6.3 Continue the development, refinement, and promotion of on-line tools to raise awareness and encourage stewardship of water resources issues.			✓	DEP

elected and appointed officials

County Council

Phil Andrews, President
Roger Berliner, Vice-President
Marc Elrich
Valerie Ervin
Nancy Floreen
Michael Knapp
George L. Leventhal
Nancy Navarro
Duchy Trachtenberg

County Executive

Isiah Leggett

The Maryland-National Capital Park and Planning Commission

Samuel J. Parker, Jr., Chairman
Royce Hanson, Chairman

Commissioners

Montgomery County Planning Board

Royce Hanson, Chairman
Joe Alfandre
Amy Presley
Marye Wells-Harley
Norman Dreyfus

Prince George's County Planning Board

Samuel J. Parker, Jr., Chairman
Sylvester J. Vaughns, Vice Chair
Sarah A. Cavitt
Jesse Clark
Colonel John H. Squire