

Countywide Strategies

Countywide Strategies: Objectives & Action Items for All

This chapter contains the individual concepts, objectives, and policies and the associated specific action items recommended for all nine jurisdictions as a means of implementing the plan and moving the entire county on a path toward achieving the goals of the plan.

The objectives/policies that follow generally apply to all of the eight municipal water supply and wastewater systems in the county. Under each objective/policy, action items are already completed or being done by *some* of the municipalities or systems. However, if it would still apply to most of the systems, it was included in this section. Action items that are very specific, or would only apply to a particular system are included in relevant sections in the Overview of Municipal Systems in this plan document.

Water Supply Options

■ Countywide/Regional Planning and Coordination

In general, much of the water supply planning that has been conducted historically within Carroll County has been somewhat incremental in that the needs of individual towns have often been considered without a view toward a more countywide perspective. The countywide perspective used in the WRE Alternatives Evaluation fostered development of several alternatives where the needs of multiple communities could be met by a single large project, thereby offering potential economies of scale. Another consideration in moving toward countywide planning is that large projects, such as reservoirs or large interconnections with other water systems, can have the added benefit of helping avoid the sprawl that may otherwise occur where new development is based on individual large lots dependent on groundwater wells and septic systems, rather than a large reliable water source. Avoiding such sprawl and instead continuing to concentrate development in DGAs can help achieve the goal of the County Master Plan to preserve more farmland in the county.

■ Diversification of Water Supplies

One of the most important recent trends in sustainable water supply planning is a movement toward diversified water supply development (e.g., not placing all your reliance on groundwater supplies). This new trend is often referred to as integrated water resources planning and can ensure that options still exist to meet water supply needs, even if the continued use of one water source becomes severely constrained. For example, regulatory or natural constraints can greatly limit use of certain water supplies during drought or other

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emergency conditions. As a result, a diverse range of options were identified and included in this plan for future consideration to meet the county's future needs through a combination of reservoir, quarry, groundwater, and interconnection alternatives.

■ **Water Conservation and Demand Management**

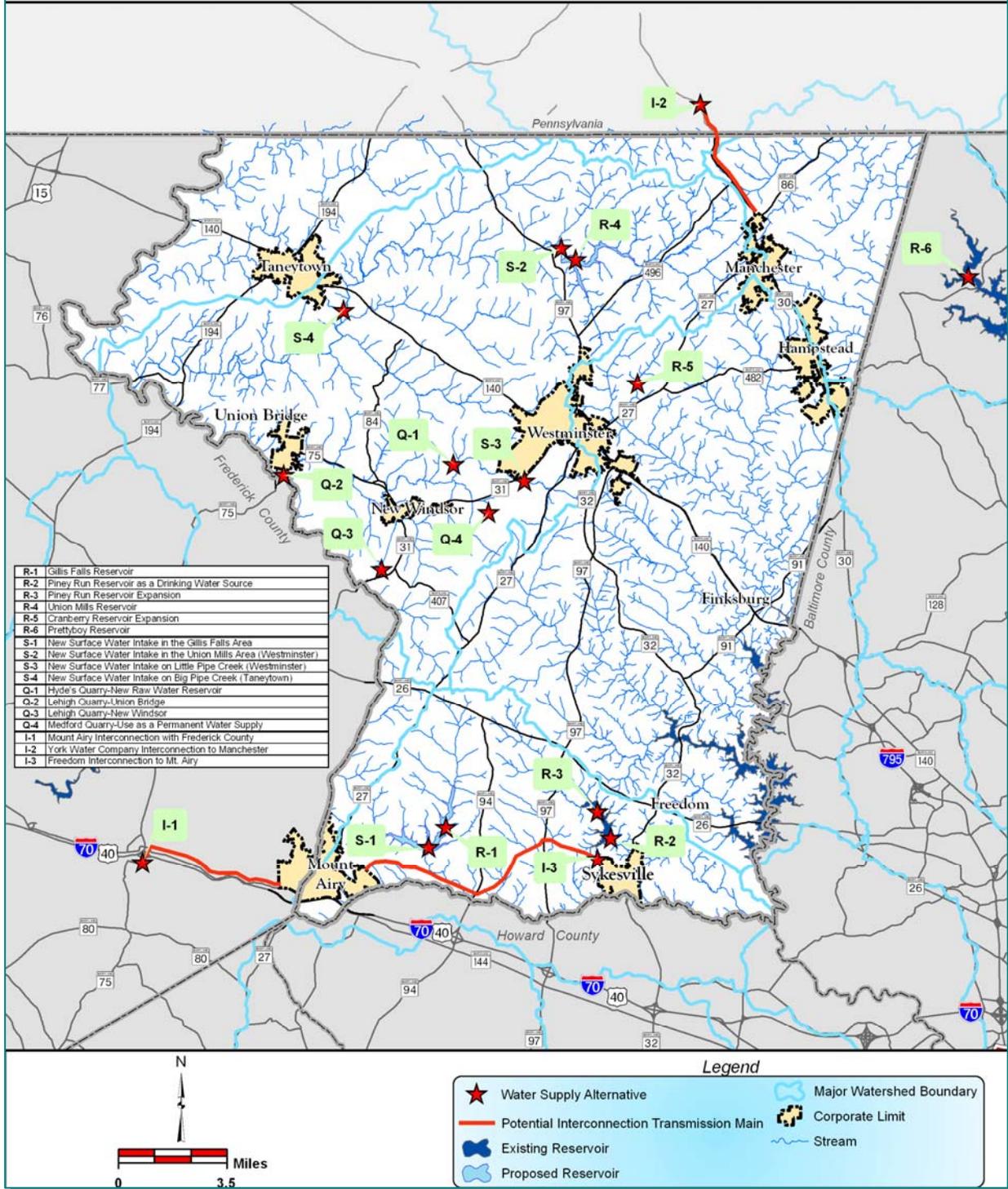
Water conservation is the most cost-effective and sensible way to minimize our demand for water, a valuable and limited resource. Over the last decade, the county has experienced drought conditions on numerous occasions. As a result, water restrictions have been placed on publicly-maintained systems either through state, county, or municipal declaration or a combination thereof. As managed growth continues, both in and out of the DGAs, demand for water through public and private systems will persist.



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Water Supply Alternatives

Carroll County, MD



Draft for Official 60-Day Review by State Agencies and for Adjoining Jurisdictions, & Public

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In general, all jurisdictions and associated utilities should be encouraging water conservation and efficiency to reduce long-term system costs and produce additional societal benefits. In addition, as part of moving forward with development of new water supply alternatives that require significant regulatory approvals, it will be important to continue to document demand management practices that are already being followed within Carroll County. Water use tracking methods would allow the County and towns to better quantify the effect of demand management efforts already being taken. Careful evaluation of existing water use data (including numbers and types of connections) is typically required to quantify such effects. These data can then be used in support of permit applications required to implement new water supply projects.

Wastewater Options

■ Effluent Recycle / Reuse

“In addition to providing a dependable, locally-controlled water supply, water recycling provides tremendous environmental benefits. By providing an additional source of water, water recycling can help us find ways to decrease the diversion of water from sensitive ecosystems. Other benefits include decreasing wastewater discharges and reducing and preventing pollution. Recycled water can also be used to create or enhance wetlands and riparian habitats.” Source: <http://www.epa.gov/region09/water/recycling/index.html>

The recycling and reuse of WWTP effluent (or “reclaimed water”) is a viable long-term strategy for overcoming wastewater disposal limitations. In Maryland, the great majority of effluent reuse projects take the form of spray irrigation of cropland, as is practiced by the Town of Manchester. In states with a longer history of promoting effluent reuse (e.g., Florida and California), many urban areas have separate distribution systems for reclaimed water, suitable for residential irrigation. There are also a growing number of examples nationwide of reclaimed water use by industries for process or cooling water. In areas such as Carroll County that have a predominance of rural and suburban land uses, irrigation of cropland or turfgrass is expected to remain the most prevalent opportunity for effluent reuse. Turfgrass opportunities include irrigation of golf courses, athletic fields, park land, or other green space.

As the Manchester situation illustrates, use of reclaimed water for irrigation does not eliminate the need for a NPDES permit, because it will still be necessary to discharge to surface water during the winter or when soil conditions do not permit irrigation. Both a surface water discharge permit and a groundwater discharge permit are required for such projects. State requirements for effluent irrigation systems are documented in MDE’s *Guidelines for Land Treatment of Municipal Wastewaters*. Under these regulations, water used for irrigation must meet either Class I or Class II quality requirements, with associated buffer requirements. Maryland has also proposed draft amendments to the land treatment guidelines, which include Class III requirements for systems to which the public would have access.

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Under Maryland's policy, application rates for new systems are limited by the most restrictive of either soil infiltration capacity or crop nitrogen requirements. Due to the prevalence of clay soils in the Piedmont, many parcels in Carroll County will not be suitable for reclaimed water irrigation. However, the restriction associated with the crop nitrogen requirement can actually be more limiting in many situations unless the WWTP employs nitrogen removal technology. Generally, application rates would be no greater than two inches per week, depending upon soil type, and can conservatively be estimated at one inch per week for planning purposes. This is equivalent to approximately 1.0 mgd per 260 acres of irrigated area, not including buffer zones.

Seasonal reuse of treated effluent can benefit those localities whose discharge to surface water is limited by loading caps or other water quality parameters such as temperature. Because a high level of treatment is still required, it does not provide relief for facilities that are primarily limited by treatment capacity. However, irrigative reuse is expected to be especially beneficial for major WWTPs that would be limited by nutrient loading caps even after installation of ENR technology. In most cases, it would still be necessary to discharge to surface water in the winter, or in other seasons, if the demand/land area for reused water is less than the total effluent generated. Facilities that have concentration-based nutrient limits would still be required to attain those limits when discharging to surface water.

■ Infiltration and Inflow Reduction

In addition to preserving treatment capacity for sanitary wastewater, I&I reduction also prevents sanitary sewer overflows (by reducing the amount of 'extra' flows during storm events), protects public health, reduces WWTP O&M costs, and improves the treatment process. I&I reduction programs should be considered a mainstay of collection system maintenance activities and a primary strategy for addressing wastewater limitations. In many of the systems, this may be the single most cost-effective means to increase capacity.

■ Bubble Permits

A bubble permit, also called an overlay permit, is an NPDES permit issued to two or more dischargers within a watershed and establishes aggregate loading limits with respect to one or more constituents, such as nitrogen and/or phosphorus. Under a bubbled permit, all facilities are deemed in compliance as long as the combined load does not exceed the combined load allocation. A bubble permit can be issued to either a single association (formed by multiple individual permittees) or a group of "co-permittees." Bubbling can only be performed within three large trading regions in Maryland, two of which include land area in Carroll County – Potomac trading region and Patuxent trading region.

Because different subwatersheds within these trading regions have different delivery factors (i.e., the ratio of the load delivered to tidal waters to the end-of-pipe load), the aggregate nutrient cap may have to be adjusted to ensure that it does not cause an increase in the delivered load. Technology-based or local water quality-based limits might still apply to individual facilities. In other words, bubbling cannot create a local water quality impairment. Bubbling is not a substitute for ENR upgrades at any major facility.

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In Carroll County, bubbling of nutrient permit limits would be a viable option for reducing wastewater limitations under future growth scenarios.

■ Point Source Nutrient Credit Trading

The *Maryland Policy for Nutrient Cap Management and Trading in Maryland's Chesapeake Bay Watershed* establishes the principles by which discharges may obtain nutrient credits to offset loads above their nutrient caps. Nutrient credits may be generated by the following actions:

- Maintaining flow at ENR facilities at less than the design flow basis of its nutrient wasteload allocation
- Optimizing operation of ENR facilities
- Upgrading an existing minor WWTP to BNR or ENR
- Retiring an existing minor WWTP after connecting its flow to a BNR or ENR facility
- Retiring an existing Onsite Disposal System OSDS by connecting to an ENR facility
- Land application of wastewater with pre-treatment and nutrient management controls
- Implementing NPS practices.

Nutrient credit trades are subject to many requirements and caveats, including the following:

- Trades are not a substitute for upgrading major facilities to ENR
- Trading may not cause local water quality impairments
- Trades may only be performed within three large trading regions, two of which include land area in Carroll County
- Trades will be enforced through NPDES permits
- All trades will require a 5 percent retirement of nutrient credits to the State
- Nutrient credits are based on load delivered to tidal waters, not to the edge of stream; hence, delivery factors must be applied in the credit calculation
- Credits must be calculated and verified on an annual basis and cannot be banked for future years

In Carroll County, trading of nutrient credits between point sources would be a viable option for reducing wastewater limitations under future growth scenarios.

■ Onsite Disposal System Hookup Credits

Under the *Maryland Policy for Nutrient Cap Management and Trading in Maryland's Chesapeake Bay Watershed*, nutrient credits can be generated by the removal of OSDSs and by directing the flow to an ENR facility. In Carroll County, 7.5 lb/yr of credits would be generated by the hookup of an OSDS within 1,000 feet of a perennial stream, and 4.6 lb/yr of credit would be generated by the hookup of any other OSDS. As with point source nutrient credits, 5 percent of the credits would be retired to the State.

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Potential OSDS hookup credits in Carroll County were estimated, applying the credit factors above and subtracting 5 percent of the credits to account for the mandatory retirement to the State. OSDS hookup credits were only estimated for the major SSAs that are likely to install ENR technology. Results demonstrate that OSDS hookup credits can serve an important role in offsetting nutrient discharges above load caps under buildout conditions. Such credits could potentially meet most if not all of the nutrient offset requirements. The large number of potential hookups in the Sykesville/Freedom DGA represents an especially large potential source of nutrient credits.

■ **Nonpoint Source Nutrient Credits**

In 2008, the MDA issued guidelines for generation and exchange of nutrient credits from agricultural operations. Under these guidelines, farmers may generate credits by implementing nutrient reduction practices that are above and beyond a baseline level established by the State, or by converting land uses with high nutrient loads to those with lower nutrient loads. This program is in an early stage, and the degree to which NPS credits will be available is currently unclear. Given the challenges of meeting the baseline requirements of the Maryland's tributary strategies, few NPS credits are expected to be available in the near term. NPS credits are also made less attractive by the greater complexity of identifying, obtaining, and documenting NPS credits, and by the application of "uncertainty ratios" which further decrease the credits available.

Urban and suburban stormwater management practices also have the potential to generate nonpoint credits. However, as with agriculture, credits would only be associated with practices that are above and beyond regulatory requirements and tributary strategy baselines. Given the stringent stormwater management requirements and high costs of stormwater management, it is not expected to be cost effective to offset excess point source loads by urban stormwater management. Such offsets might serve as a minor component of the countywide nutrient credit balance.

Due to the limitations and uncertainties discussed above, it is recommended that Carroll County explore point source nutrient credit trading and OSDS hookup credits before relying on NPS credits.

Water Supply Strategies

Specific “To Do” Action Items under each strategy in this plan are grouped by timeframe into short-term and long-term action items. Short-term action items are intended to refer to actions that are recommended to occur within the six-year timeframe before the plan will need to be updated again. Items listed as long-term are anticipated to occur more than six years after the adoption of the plan.

1. Protect and sustain existing water supplies serving existing development

Specific Action Items Already in Place:

- ✓ Continue to implement Chapter 218, Water Resource Protection, which provides programmatic and management practices such as buffering and setbacks needed to protect water resources from the impacts of development [from Guidance doc]
- ✓ Well sites are identified within and outside the GAB for future groundwater development potential
- ✓ Protect existing and potential sources from development

Specific “To Do” Action Items:

Short-term

- Use the WSCMP worksheets for each community water system to identify impacts of development and support new allocations or connections to the system and to prevent capacity over allocation [from Guidance doc]
- Continue to deny allocations and/or connections to any system that would cause system capacity to exceed a set percentage of maximum capacity in conformance with each jurisdiction’s Adequate Public Facilities Ordinance [from Guidance doc]
- Require watershed and wellhead protection around existing water supply sources [from Guidance doc]
- Incorporate the county’s open space and land preservation program measures that will support water protection requirements [from Guidance doc]
- Use interjurisdictional/regional approaches as necessary and adopt or amend ordinances as necessary to protection water resources [from Guidance doc]
- Identify existing older water pipes in need of repair or replacement and program improvements into the Community Investment Plan
- Promote and assist municipalities in the adoption of water resource management ordinances

Long-term

- Delineate and phase community water service areas in the land use element consistent with the ability of the water resource to support development based on population growth and development capacity analysis [from Guidance doc]
- Examine source water protection opportunities and threats to drinking water supplies, including streams and their buffers, from development, runoff, pollution and other

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causes. Identify private or government actions that can be effective in protecting drinking water supplies [from Guidance doc]

- Create and implement drought management procedures and requirements [from Guidance doc]
- Examine the feasibility of re-using water pumped from area quarries

2. Identify and develop, as needed, new water supplies adequate to support planned future growth without over-allocating available sources

Specific Action Items Already in Place:

- ✓ Insist on rigorous implementation of existing laws that development plan approval be contingent upon a demonstration that water supplies are adequate to meet requested demands
- ✓ Include provisions in the subdivision/development regulations that require that site plan/subdivision plat submittals have documentation from an engineer or official notification from the appropriate municipal or county agency(ies) stating that adequate water either presently exists or will exist for all development approved
- ✓ Continue supporting future reservoir or watershed areas and the appropriate restrictions and/or protections to ensure water supply development can proceed in the designated future time period
- ✓ Continue collaboration efforts between the County and municipalities in the development and protection of water resources throughout the county

Specific "To Do" Action Items:

Short-term

- Ensure new development pays for the cost of providing water [from Guidance doc]
- Collaborate with the State on our regional contribution to the Piedmont water availability study [from Guidance doc]
- Implement a system to track demand for all known and potential development projects

Long-term

- Evaluate regional solutions to future water supply capacity planning [from Guidance doc]
- Explore additional sources for future water supply to prepare for policy changes or other changes that would result in the need for additional available water capacity, even in areas where current planned sources are enough to meet projected demand
- Approach future planning for water supply from a countywide, regional perspective for large projects to ensure collaborative implementation of comprehensive plans and use of water supplies to meet future demands

3. Develop emergency supply plans and measures

Specific "To Do" Action Items:

Short-term

- Determine the emergency supply measures or plans that are already in place

Long-term

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- Coordinate with appropriate jurisdictions and agencies to update or develop emergency supply plans that bring the various existing measures together and identify any additional options
- Work toward getting agreements and other measures in place to implement the emergency supply plans

4. *Promote water conservation measures and manage demand for potable water to ensure adequate supplies are available for planned development*

Specific Action Items Already in Place:

- ✓ Interjurisdictional Coordination / Collaboration: Continue to support the efforts of the Carroll County WRCC
- ✓ Implement programs educating water customers about the importance of, and methods to, conserve water

Specific "To Do" Action Items:

Short-term

- Foster water conservation habits, by placing an emphasis on major components like behavioral change, technology, or an improved design through, outreach programs in order to reduce water loss, waste, or use
- Reduce the amount of water wasted through leakage (I & I) by targeting, improving, and/or replacing aging infrastructure
- Implement the recommendations of the "Carroll County Comprehensive Water Conservation Recommendations" report prepared by the WRCC and Environmental Advisory Council (EAC)
- Establish water use tracking methods that will allow the County and municipalities to better quantify the effect of demand management efforts already in place

Long-term

- Implement a zone/conservation pricing system for the County's public water supply and sewerage systems to create an incentive for water conservation
- Evaluate and adopt policies requiring the use of rainwater collection and reuse systems, such as rain barrels and cisterns
- Create natural landscaping demonstration projects on public grounds and parks to reduce the amount of irrigation needed for landscaping
- Evaluate and adopt policies requiring high-efficiency plumbing fixtures in all new construction
- Provide incentives for development projects that take steps that go beyond what is required to reduce water usage
- Continue to implement programs educating water customers about the importance of, and methods to, conserve water
- Provide incentives for businesses and homeowners to retrofit existing structures using high-efficiency fixtures and appliances
- Adopt and implement policies requiring water conservation from all users to promote more efficient use of available treatment capacity

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- Design and implement a rigorous water conservation program including routine water audits, water accounting and loss-control procedures, water reuse initiatives, conservation rate structures, and outreach programs [from Guidance doc]
- Develop programs and modify regulations/policies that promote water conservation and reduced water demand by individual consumers (homeowners and business owners) of the public water supply systems

Water Quality Strategies

5. Sustain existing wastewater treatment capacity

Specific Action Items Already in Place:

- ✓ Limit allocations and connections that would not cause a system capacity to exceed a set level under maximum capacity

Specific “To Do” Action Items:

Short-term

- Use the WWCMP worksheets for each WWTP and system to determine the impact on capacity as part of the approval process for allocations and connections to the system [from Guidance doc]
- Establish and require water conservation measures to be implemented [from Guidance doc]
- Complete I&I studies for each system to determine where improvements can be made to reduce losses [from Guidance doc] and, thereby, potentially regain some capacity
- Share equipment among the jurisdictions to detect I&I to lower costs of this activity

Long-term

- Coordinate among the municipal systems on I&I reduction activities and identification of external funding sources to take advantage of economies of scale, thereby lowering costs to resource-limited communities
- Make system improvements to reduce identified I&I and adjust the capacity on the WWCMP worksheets to update available capacity
- Identify potential areas for spray irrigation and estimate the amount of additional wastewater capacity these areas would represent [from Guidance doc]
- Pursue nutrient offsets (point-nonpoint source nutrient credit trading) such as converting septic systems to connections to a public sewerage system [from Guidance doc]
- Continue efforts for planned ENR upgrade, enabling the current facility to operate at the limits of technology in terms of nitrogen and phosphorus removal and reducing the limitation on capacity that the caps might present

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6. Develop new public wastewater treatment and disposal capacity

Specific “To Do” Action Items:

Long-term

- Proceed with planned “capacity-only” improvements identified in the *Carroll County Water and Sewerage Master Plan* to ensure capacity is available to meet demand where the WWTP is not already exceeding nutrient caps
- Should the loading rates approach the permitted limits prior to completion of the planned upgrades, evaluate options for spray irrigation and onsite treatment/reclamation of industrial effluent to divert flow from the WWTP
- Further evaluate land available for irrigation using reclaimed water through a GIS analysis of potential land use constraints; identify and prioritize land areas that should be pursued for water reuse opportunities
- Evaluate regional solutions to ensure future wastewater capacity and adequate management planning

7. Reduce nutrient loading via the implementation of the Statewide Tributary Strategies

Specific Action Items Already in Place:

Urban Sources: Stormwater Strategy

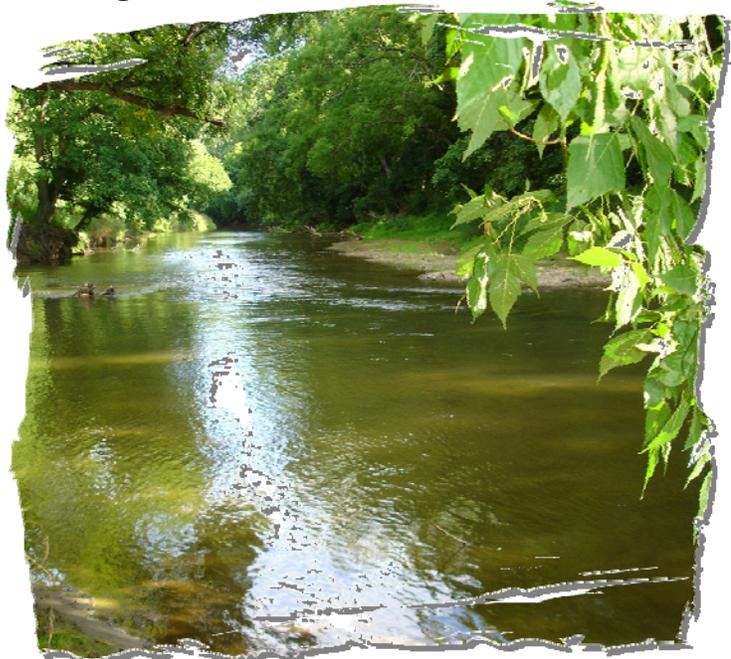
- ✓ Continue the County’s strong support and implementation of erosion and sediment control and stormwater management regulations
- ✓ Administer local development processes to support the implementation of the Tributary Strategy and minimize water quality impacts on local waterways

Urban Sources: Growth Management Strategy

- ✓ Continue to promote and direct growth to PFAs, which will resolve conflicting and competing requirements [from *MD Trib Strat Impl Plan doc*]

Agriculture Strategy

- ✓ Provide staff and funding to the Soil Conservation District for technical assistance to farmers and landowners for the implementation of BMPs [from *MD Trib Strat Impl Plan doc*]
- ✓ Provide technical assistance and guidance on programs available to farmers and landowners for the implementation of BMPs and coordinate activities and funding between district, State, and federal programs [from *MD Trib Strat Impl Plan doc*]



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Specific “To Do” Action Items:

Note: The timeframes for these items are organized differently than under other objectives. The order and categories are presented consistent with the Maryland Statewide Tributary Strategies Implementation Plan.

Identify realistic measures and timeframes for implementing the Tributary Strategies Point Source Strategy [*Long-term*]

Initiate the planning, design, and construction of ENR upgrades at all significant WWTPs in the county for which they are not yet complete [*from MD Trib Strat Impl Plan doc*]

Develop a trading/offset strategy to address growth and provide for nutrient cap maintenance [*from MD Trib Strat Impl Plan doc*]

Work with congressional delegations and request additional Federal funding to make projects more affordable [*from MD Trib Strat Impl Plan doc*]

Urban Sources: Stormwater Strategy [*Short-term*]

Revise and adopt local stormwater regulations to implement Maryland’s Stormwater Management Act of 2007

Investigate the creation of a countywide watershed protection (NPDES) utility fee
Urban Sources: Growth Management Strategy [*Long-term*]

Develop procedures and methods for considering TMDLs and impaired waters in comprehensive plans and development review processes

Air Deposition Strategy [*Long-term*]

Continue to work with State and regional partners (such as BMC) to develop local emission control programs needed to meet air quality goals [*from MD Trib Strat Impl Plan doc*]

Support State and regional partners to push efforts for regional controls to reduce air pollution transport [*from MD Trib Strat Impl Plan doc*]

8. Investigate the use of reclaimed water in appropriate areas to supplement water supply capacity and address water quality issues

Specific “To Do” Action Items:

Short-term

Work with MDE to develop regulations that would appropriately permit the use of reclaimed water technology in Maryland to enable the implementation of this infrastructure in Carroll County

Long-term

Identify areas where limitations on water supply capacity to serve existing or future development demand could be mitigated by reusing water for appropriate uses

Identify areas that could be suitable for spray irrigation as an alternative to discharging wastewater effluent to streams where a WWTP would otherwise exceed caps to meet demand

Maximize the use of recycled water for appropriate applications including outdoor irrigation, toilet flushing, and commercial and industrial processes

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9. Reduce the amount of impervious surface that could result from new development

Specific “To Do” Action Items:

Short-term

- Work with the municipalities, where applicable, to incorporate in their road standards measures that reduce the required street width and that allow for the minimum required pavement width needed to support travel lanes, on-street parking, and emergency vehicle access
- Implement new State stormwater management regulations, which are designed to reduce impervious surface associated with new construction
- Evaluate and adopt, where needed, amendments to parking requirements, imposing limits on the surface area of a site devoted to parking
- Evaluate and adopt policies that reduce the amount of impervious surface permitted

Impervious surfaces are mainly constructed surfaces - rooftops, sidewalks, roads, and parking lots - covered by impenetrable materials such as asphalt, concrete, brick, and stone. These materials seal surfaces, repel water, and prevent precipitation from infiltrating soils. Soils compacted by urban development are also highly impervious. By decreasing infiltration, impervious surfaces increase stormwater runoff.

Impervious surfaces allow many types of pollutants, derived from a variety of sources, to accumulate upon them. Many of these pollutants are subsequently washed into waterbodies by stormwater runoff, severely degrading water quality. This type of pollution is known as nonpoint source water pollution and is linked to land use activities. Water quality problems increase with greater levels of imperviousness and intensity of land use. Carroll County currently has a number of streams on Maryland’s list of impaired waters.

TMDL stands for “Total Maximum Daily Load.” The load refers to the amount of a specific pollutant found in a body of water coming from all sources. Simply put, the TMDL is the highest amount of foreign substance that a body of water can accept from all sources without exceeding water quality standards. Once a TMDL is set and approved by the US EPA, requirements are imposed that are intended to correct existing impairments. New federal and state regulations for meeting TMDLs also mean planning to prevent activities that may add pollutants in the future. Changes to land use or the amount of planned development may be necessary to address the requirements of the TMDL.

Please refer to the table in Appendix D entitled “MDE Documented TMDL Impairments for Carroll County” for a status of each of the pending and completed TMDLs for Carroll County.

in new development

Long-term

- Retrofit stormwater management facilities into existing subdivisions where there are no stormwater facilities in order to help meet the NPDES permit requirements of reducing impervious cover
- Promote the use of landscaped islands as stormwater areas
- Investigate the feasibility of incorporating stormwater conveyance and treatment features, such as grass channels, stormwater curb extensions, and linear stormwater tree pits, into closed-section roadways
- Encourage the use of alternative, permeable sidewalk and trail surfaces

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10. Protect or restore water quality, keep waters off Maryland's list of impaired waters, and make progress toward any applicable TMDLs

Specific "To Do" Action

Items:

Short-term

- Develop education materials and programs to raise public and individual awareness of water quality measures, how our actions impact water quality, and what individuals can do
- Decrease allowable residential densities in rural areas outside DGAs to reduce the number of future residential septic systems that could be added, thereby reducing some of the potential increase in nitrogen loads
- Implement measures to increase the urban tree canopy, thereby increasing the interception of rainfall

Long-term

- Participate in State program of trading or offsets to maintain or reduce nutrient loading in impaired watersheds
- Initiate the planning, design, and construction of ENR upgrades at all significant WWTPs in the county for which they are not yet complete
- Collect/monitor water quality data on pollutant loads in local stream basins
- Explore water reuse and zero discharge treatment plant systems to maintain nutrient loading caps in water bodies that have been deemed impaired by the State
- Identify land application sites that could be used as an alternative to discharging directly to streams for wastewater treatment plant capacity expansion
- Retrofit existing municipal stormwater management facilities that do not meet existing stormwater management requirements, where doing so would have a significant water quality impact
- Develop a program to systematically re-establish forested stream buffers in the municipalities



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- Increase the frequency of municipal storm drain cleanouts to prevent storm drain clogging and reduce the amount of stormwater runoff that bypasses existing stormwater management practices
- Preserve or restore riparian stream buffers with native vegetation that can be maintained throughout the municipal plan review, construction, and occupancy stages of development
- Conserve trees and other vegetation at a site by planting additional vegetation, clustering tree areas, and promoting the use of native plants
- Connect existing, unserved development within GABs to public sewer systems to reduce nutrient loading to groundwater and to be eligible for offset credits
- Ensure adequacy of wastewater treatment operations in terms of quantity and quality, while maintaining compliance with regulatory requirements

There are six existing or planned water supply **reservoirs** whose watersheds extend partially or entirely within Carroll County: Loch Raven, Prettyboy, Liberty, Piney Run, Gillis Falls, and Union Mills. Combined, these existing and planned reservoirs could potentially provide high-quality water for nearly 2 million people in Baltimore City and the five surrounding counties.

Most of the watersheds for these reservoirs are on the State's list of "impaired" waters (the 303(d) list), and a TMDL will ultimately be set for the impairing substance. A TMDL for phosphorus has already been set for Prettyboy Reservoir. A TMDL for phosphorus and sediments has been set for Loch Raven Reservoir. Liberty Reservoir is listed as impaired, which indicates that a TMDL will eventually be set for it as well. While no TMDL has been set for Piney Run Reservoir, a watershed management plan is being developed to ensure continued maintenance of its water quality. To ensure the future quality of water provided by these reservoirs, the County needs to take measures both to address the TMDLs as well as make certain that future development does not further negatively impact the watersheds that drain to these reservoirs.

The Board of County Commissioners signed a new Reservoir Watershed Management Agreement in 2005. This was an updated agreement whose beginnings date to 1984.

11. Establish additional measures to protect Carroll County's and Baltimore City's reservoir watersheds

Specific "To Do" Action Items:

Long-term

- Support the Reservoir Watershed Protection Agreement

12. Enhance stormwater management programs

Specific Action Items Already in Place:

- ✓ Continue to incorporate the use of nonstructural BMPs such as natural conservation areas, roof and non-roof top disconnection, vegetated swales, sheet flow to buffer, reduced impervious cover to the maximum extent practicable and promote ESD or LID techniques, as required in Carroll County local laws since 2004
- ✓ Continue to require permanent protection of existing forest on development sites and promote the enhancement of existing contiguous and creation of new forest areas

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Specific “To Do” Action Items:

Short-term

- Revise stormwater management regulations to incorporate requirements of the 2007 Stormwater Act
- Evaluate and adopt policies requiring increased bioretention of stormwater and onsite infiltration of stormwater, i.e., bioretention areas
- Investigate a countywide watershed protection (NPDES) utility fee

Long-term

- Retrofit developed municipal areas lacking stormwater management systems.
- Retrofit existing stormwater management facilities that do not meet current stormwater management requirements where doing so would have a significant water quality impact

13. Address NPS loading impacts

Specific Action Items Already in Place:

- ✓ Continue to aggressively promote Carroll County’s land preservation programs, such as the Maryland Agricultural Land Preservation Foundation (MALPF), Rural Legacy, Critical Farms, and the Leveraged Installment Purchase Agreement (IPA) program
- ✓ Decrease allowable residential densities in rural areas outside DGAs that are within reservoir watersheds or areas targeted for farmland preservation

Specific “To Do” Action Items:

Short-term

- Adopt changes to the Landscape Ordinance to require the use of xeriscaping principles

Long-term

- Modernize subdivision ordinances to promote innovative site design techniques [from Guidance doc]
- Create a dedicated fund for enhanced inspection, maintenance, and restoration activities for stormwater
- Further evaluate the causes of individual changes and differences between scenarios for each 8-digit watershed to determine more specific actions that could be taken in each watershed to address or NPS impacts
- Identify failing septic systems, prioritize the systems that should be either connected to public sewer or upgraded or replaced using best available technology, and leverage funds to pay for such improvements



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14. Identify changes to planned land use patterns and land development requirements to help achieve the needed reduction in pollutant loads

Specific "To Do" Action Items:

Short-term

- Reduce water and wastewater demand from new development by adopting land use policies that promote higher densities and clustering within DGAs
- Evaluate and implement changes to the land use designation and/or zoning of certain areas to promote development in areas not environmentally sensitive and in locations with appropriate infrastructure
- Adopt zoning and land use changes to severely limit development in sensitive areas such as stream and wetland buffers, floodplains, areas underlain by carbonate rock, and steep slopes

15. Refine the NPSS to more accurately reflect Carroll County conditions and to coincide with the revised Chesapeake Bay Program model and results

Specific "To Do" Action Items:

- Coordinate w/ the County to provide municipal data needed as inputs to the NPSS model

Nonpoint source loading analyses, conducted in support of a WRE, provide a preliminary assessment of potential changes in NPS loads due to land use planning decisions. Implementation policies should include a commitment to refining these analyses over time and at more refined geographic scales.

MDE estimates individual private septic systems generate a load of 11 pounds per year of nitrogen. Loads per household on public wastewater systems are estimated to produce nitrogen loads of only 3 pounds per year.