# DORCHESTER COUNTY CHESAPEAKE BAY TMDL PHASE II WATERSHED IMPLEMENTATION PLAN

## (PROPOSED FOR PUBLIC COMMENT)

## LOCAL TEAM MEMBERS

| | |
|---|---|
| Keith Lackie | Maryland Department of Planning |
| Mike Moulds | Dorchester County DPW |
| Mike Bonsteel/Janice Henderson | Dorchester County Planning and Zoning |
| Greg LeBlanc | City of Cambridge |
| Jim Newcomb | Dorchester Soil Conservation District |
| Bill Giese/Matt Whitbeck | Blackwater Refuge |
| William Layton/Bill Edwards | Dorchester County Farm Bureau |
| Beth Lynch | Dorchester Citizens for Planned Growth |
| Bill Forlifer | Dorchester County Dept of Health |
| Jennifer Dindinger | Choptank Tributary Team |
| John Avery/Russ Brinsfield | Towns of Hurlock and Vienna |

# Dorchester County Phase II Watershed Implementation Plan (WIP)

## Background

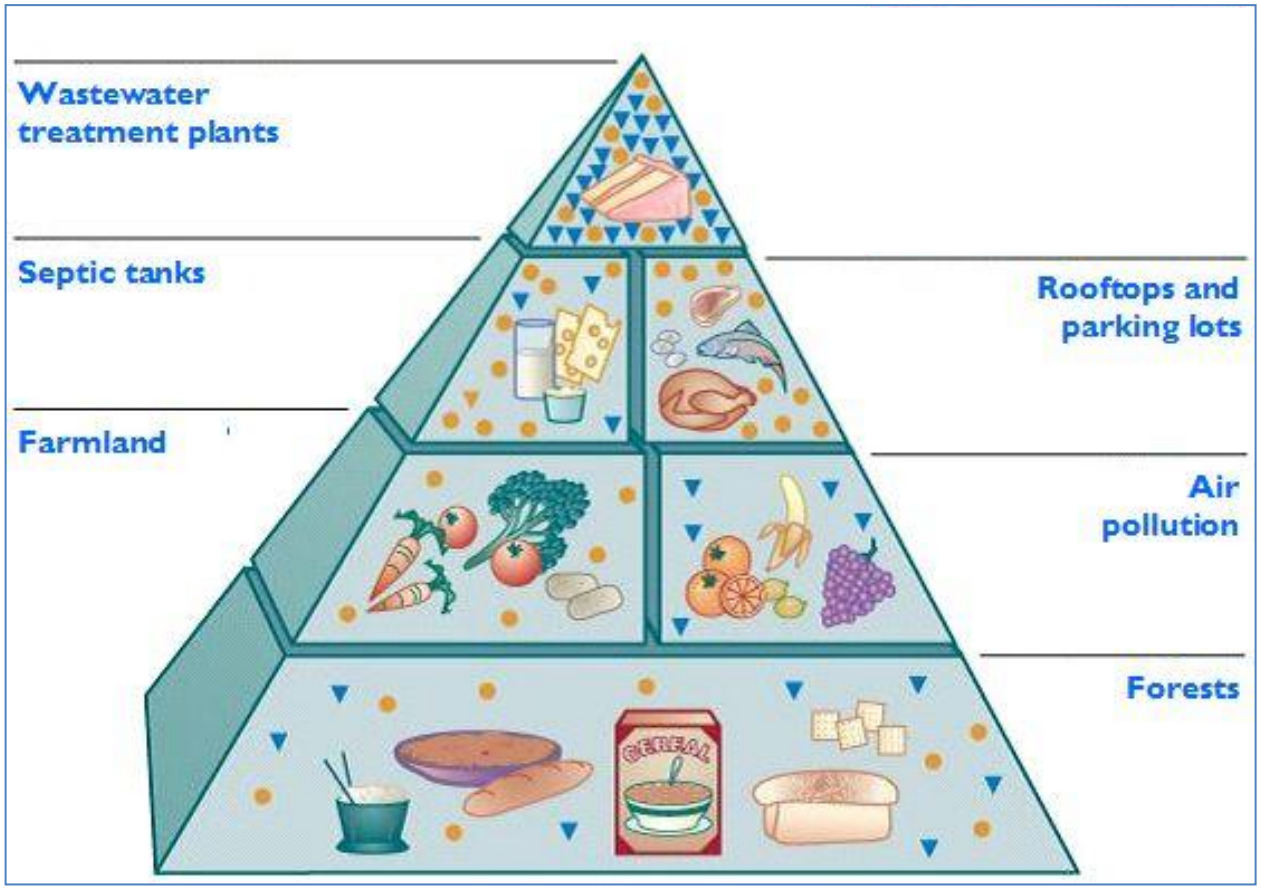
The Dorchester County Phase II Watershed Implementation Plan is part of a process to identify local goals and objectives to achieve reductions in nutrient loadings to the Chesapeake Bay.

Efforts to clean up the Chesapeake Bay have been ongoing for over 35 years since the mid 1970's when EPA conducted research identifying needs to reduce toxic pollution, over enrichment of nutrients and restore dwindling underwater bay grasses. There have since been three previous multi-jurisdictional efforts to clean up the Chesapeake Bay. The first effort creating the Bay Program was signed in 1983. A second agreement was signed in1987 and amended in 1992.
In 1998 major portions of the Chesapeake Bay were identified to be impaired waters. A third agreement in 2000 continued to attempt to coordinate voluntary State efforts to improve water quality with a completion date of 2010. These previous voluntary efforts have been unsuccessful in meeting the necessary goals in restoring the Bay's water quality.

In accordance with the Clean Water Act of 1972 and in accordance with a Federal Court ruling, EPA developed and released a Total Maximum Daily Load (TMDL) for the Chesapeake Bay on December 29, 2010. A TMDL is the maximum amount of a pollutant that can be received by the Bay and still meet water quality standards. The TMDL allocates the pollutant loads among sources of pollution and geographic areas. The TMDL is based on scientific studies of the Bay often using computer models.

A TMDL is similar to a pollution diet for the Bay and the streams that feed into it. The diet establishes limits on the amount of nutrients consisting of nitrogen, phosphorus and sediment that can be deposited into the Bay from all sources. High levels of nitrogen and phosphorus promote the growth of algae that consume oxygen in the water and prevent penetration of sunlight through the water. This results in the creation of "dead zones" of no oxygen and loss of bay grasses that provide habitat for marine life.

Nutrient sources in the form of nitrogen and phosphorus come from a variety of sources. The food pyramid we are all familiar with can be used to illustrate the different sources that contribute nutrients to the Bay.




The TMDL distributed pollution reduction targets for these sources geographically across the entire drainage area of the Chesapeake Bay between the six states and the District of Columbia. Each state was requested to develop a Phase I Watershed Implementation Plan detailing how they would reduce nutrient loading among these sources within a target date of 2025. These plans were submitted to EPA as part of the TMDL on December 29, 2010. The development of a Phase II Watershed Implementation Plan is the next step in the planning process to establish nutrient reduction target levels and identify more specific efforts to reduce nutrient levels at the local County level. The Phase II Plan process provides the opportunity for local Counties to tailor the Plan to account for differences in development, agricultural activity, topography and hydrology that can affect how best to achieve nutrient reduction in the most efficient and cost effective way.

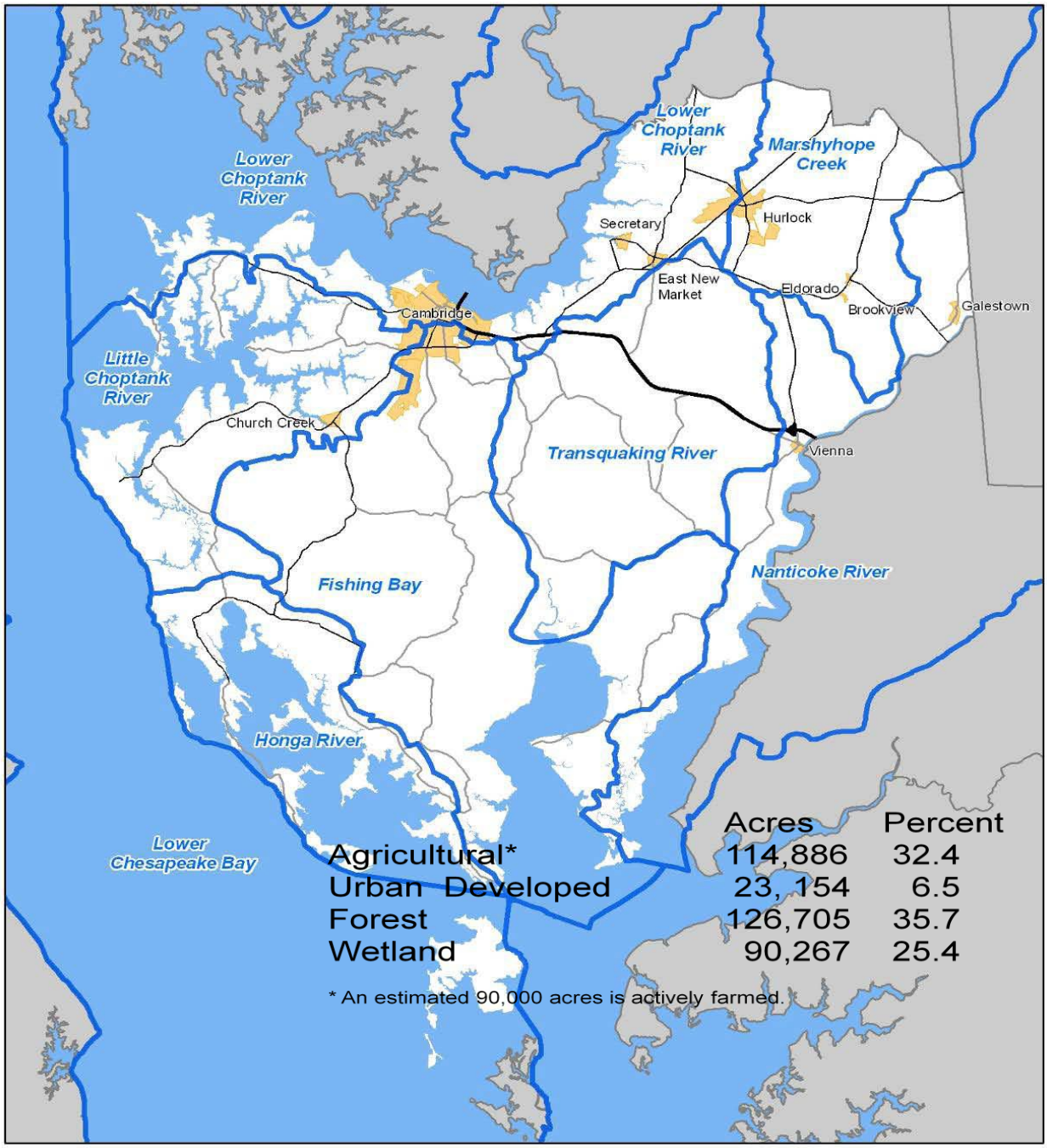
**County Characteristics**

Dorchester County, Maryland is located on Maryland's eastern shore region. The County is in the mid-bay portion of the Chesapeake Bay and is bordered by the Choptank River to the north and the Nanticoke River to the southeast. There are eleven stream designations (for water quality purposes) within the County. In addition to three salinity zones each in the Choptank and Nanticoke Rivers there are the Fishing Bay, Transquaking River, Little Choptank River, Honga River and Marshyhope Creek designations.

Dorchester County is known as the Heart of the Chesapeake. In addition to the characteristic "heart" shape of the County, the County has a long heritage and connection to the Bay with over 1,700 miles

of shoreline and thousands of acres of productive wetlands including the 27,000 acre Blackwater National Wildlife Refuge. The location of the County in the midpoint of the Bay and the extensive natural habitat provide the heart to support a healthy Bay marine environment.

According to the Maryland Department of Planning the 355,012 acres of land area in the County is characterized as follows:




**Dorchester County Water Resources Element**

**Watersheds**

Watersheds

Municipalities

0 1 2 3 4 5 Miles

N

The County population in 2010 was 32,618. There are approximately 16,554 housing units in the County. The City of Cambridge is the only micropolitan statistical area in the County.

Aside from Cambridge, the Towns of Hurlock, Vienna, Secretary and East New Market are the only other urban areas that utilize public sewer. There are no Municipal Separate Storm Sewer System (MS4) NPDES permit regulated regions in the County.

**County Load Allocation and Target Nutrient Reductions**

Current loads and 2025 State target allocations for the County as determined from the 5.3.2 version of the Bay Computer Model are as follows:

| Sector | 2009 Baseline Nitrogen Load | 2009 Baseline Phosphorus Load | 2025 Nitrogen Allocation | 2025 Phosphorus Allocation |
|---|---|---|---|---|
| Agriculture | 1,202,725.5 | 164,565.1 | 869,794.0 | 162,309.0 |
| Forest | 316,301.4 | 10,077.7 | 319,799.0 | 10,159.0 |
| Urban | 138,922.2 | 10,240.5 | 94,333.0 | 5,807.0 |
| Septic | 72,396.9 | 0.0 | 41,336.0 | 0.0 |
| Wastewater | 79,907.2 | 11,005.1 | 137,084.0 | 11,903.0 |
| Total | 1,810,253.2 | 195,888.4 | 1,462,346.0 | 190,178.0 |

Overall County loading reductions not including wastewater growth allocations are 402,669 pounds of nitrogen per year, a 22.2% reduction and 9,266.4 pounds of phosphorus per year, a 5% reduction. Statewide reduction targets are 22% for nitrogen and 14.9% for phosphorus. Within Dorchester County these reductions must come from improved agriculture practices, septic system treatment, public wastewater treatment improvements and stormwater management for water quality.

**Local Team Development**

Dorchester County authorized the formation of a Local Team to develop the County Phase II WIP on March 15, 2011. The Local Team representation is as follows:

| | |
|---|---|
| Keith Lackie (State Liaison) | Maryland Department of Planning |
| Mike Moulds (Team Coordinator) | Dorchester County DPW |
| Mike Bonsteel/Janice Henderson | Dorchester County Planning and Zoning |
| Greg LeBlanc | City of Cambridge |
| Jim Newcomb | Dorchester Soil Conservation District |
| Bill Giese/Matt Whitlock | Blackwater Refuge |
| William Layton/Bill Edwards | Dorchester County Farm Bureau |
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| Jennifer Dindinger | Choptank Tributary Team |
| John Avery/Russ Brinsfield | Town of Hurlock/Vienna |

Team members also serve as a contact for information for other organizations interested in development of the WIP including Nanticoke Watershed Alliance, Dorchester Sanitary District, Eastern Shore Land Conservancy, Chamber of Commerce, Forestry Board and Chesapeake Bay Foundation.

Local Team meetings have been held monthly and are open to the public. In addition the Local Team has an information link on the County website.

**Current Capacity**

Current capacity in Dorchester County is limited. The County has no direct regulatory authority over the three major pollutant sectors (agricultural, wastewater and septic systems). This highlights the importance of all sectors working together to meet the County's allocated pollution limits. All existing public wastewater treatment facilities are owned as follows:

| | Current flow* | Capacity* | Status |
|---|---|---|---|
| City of Cambridge | 2.60 | 8.10 | Major Converting to ENR |
| Town of Hurlock | 1.55 | 1.65 | Major ENR |
| Town of Vienna | 0.098 | 0.1375 | Minor Conventional |
| Towns of Secretary and East New Market | 0.184 | 0.280 | Minor Conventional |

* Million gallons per day

The City of Cambridge is in the process of upgrading to Enhanced Nutrient Removal (ENR) by the end of 2012. There are presently no plans for expansion or upgrade of the Vienna facility. The Twin Cities treatment facility serving the Towns of Secretary and East New Market has proposed an ENR upgrade and expansion based on proposed growth and annexation.

The majority of urban developed land is in the incorporated City and Towns.

There is no County-wide system in place to track, monitor and report activities across sectors. There are no stormwater restoration programs in the County.

Other Local Government Programs

The following are programs that play a direct or indirect role in reducing nutrients and sediments to the Chesapeake Bay and local streams.

- County Master Water and Sewer Plan, Water Resources Element and local development regulations: Addresses planning for orderly expansion and utilization of water resources and public sewer for future development. Current stormwater regulations are likely to improve water quality on redevelopment sites. Program is administered by the County Planning and Zoning Department.

- Rural Legacy Programs: Nanticoke and Marshyhope Rural Legacy Focus Areas : Utilizes state funding to preserve one to two properties per year. Limited funding and no dedicated staffing. Administered by the County Department of Planning and Zoning

- Forest Conservation Program: Preservation of an estimated 2 acres per year. Limited funding and no dedicated staffing. Administered by the County Department of Planning and Zoning

- Critical Area Program: State and local funding for monitoring compliance with Critical area regulations. An estimated 1.5 acres per year is preserved. One staff member.

- Vegetative Buffers: County forest replacement program funded by development fees in lieu of tree replacement. Limited funding and no dedicated staffing. Administered by the County Department of Planning and Zoning

- MALPF: Maryland Agricultural Land Preservation Fund: Limited State funding for agricultural preservation easements. No dedicated staffing. Administered by the County Department of Planning and Zoning

**Agricultural Best Management Practices**

Effort from the agricultural community is a key part of the overall success towards meeting nutrient reduction targets for the County. Of the five source sectors in terms of nitrogen loading agriculture represents two thirds of the 2009 baseline nitrogen load in the County. To meet target levels by 2025 the agricultural sector is tasked with a 27.7% (332,932 lb.) reduction in nitrogen.

Agriculture is a significant part of the County economy. Over 90,000 acres are actively farmed in Dorchester County. Significant efforts have already been made to contribute to better water quality. For example in Dorchester County 97% of the farms encompassing 98% of the active farmland have an approved nutrient management plan and over 50% of farmland have approved soil conservation and water quality plans. 20% of farmland is cover cropped in the winter to reduce erosion and absorb nutrients.

## DORCHESTER COUNTY AGRICULTURE BEST MANAGEMENT PRACTICE GOALS

| BMPs to be Implemented Annually | Unit | 2013 Milestone | 2017 Goal | 2025 Goal |
|---|---|---|---|---|
| Conservation Tillage | Acres/Year | 70,344 | 70,423 | 70,423 |
| Cover Crop | Acres/Year | 25,113 | 29,500 | 30,000 |
| Cropland Irrigation Management | Acres/Year | 21,000 | 27,973 | 27,973 |
| Dairy Manure Incorporation | Acres/Year | - | - | - |
| Decision Agriculture | Acres/Year | - | 44,368 | 73,947 |
| Enhanced Nutrient Management | Acres/Year | - | 1,247 | 2,079 |
| Manure Transport | Tons/Year | 1,306 | 1,800 | 3,000 |
| Nutrient Management on Crop & Hayland | Acres/Year | 80,532 | 41,759 | 15,910 |
| Nutrient Management on Pasture | Acres/Year | 1,878 | 1,878 | 1,878 |
| Poultry Litter Incorporation | Acres/Year | 2,271 | 9,539 | 15,898 |
| Poultry Litter Treatment | Operations/Year | 8 | 32 | 53 |
| Soil Conservation and Water Quality Plans | Acres/Year | 53,516 | 66,501 | 74,206 |

| Additional BMPs to be Implemented | Unit | 2013 Milestone | 2017 Goal | 2025 Goal |
|---|---|---|---|---|
| Alternative Crops | Acres | - | - | - |
| Barnyard Runoff Control | Projects | 1 | 6 | 10 |
| Forest Buffers | Acres | 2 | 9 | 15 |
| Grass Buffers | Acres | 123 | 517 | 861 |
| Heavy Use Area Protection for Livestock | Acres | - | - | - |
| Heavy Use Poultry Area Concrete Pads | Operations | - | 1 | 2 |
| Horse Pasture Management | Acres | - | - | - |
| * Land Retirement | Acres | 60 | 253 | 421 |
| Livestock Waste Storage Structures | Projects | - | - | - |
| Loss of Agricultural Land | Acres | 71 | 300 | 500 |
| Mortality Composters | Projects | 3 | 11 | 18 |
| Non Urban Stream Restoration | Linear Feet | - | - | - |
| Nursery and Greenhouse Runoff Capture and Reuse | Acres | - | - | - |
| Off Stream Watering Without Fencing | Acres | - | - | - |
| Phosphorus Sorbing Materials in Ag Ditches | Acres | - | - | - |
| Poultry Waste Storage Structures | Projects | 1 | 3 | 5 |
| Precision Intensive Rotational Grazing | Acres | - | - | - |
| Prescribed Grazing | Acres | 9 | 36 | 60 |
| Shoreline Erosion Control | Linear Feet | - | - | - |
| Stream Access Control with Fencing | Acres | 18 | 76 | 129 |
| Vegetative Environmental Buffers on Poultry Operations | Acres | - | - | - |
| Water Control Structures | Acres | 200 | 838 | 1,400 |
| Wetland Restoration | Acres | 4 | 17 | 28 |

* 2017 Goal revised to 541 acres and 2025 Goal revised to 623 acres.

Due to limits in the Bay model at the smaller County scale the State has shifted the focus for agriculture from the County level to a larger regional (eastern shore) and drainage basin format. However the State Department of Agriculture will still establish nutrient reduction contributory allocations for each County as a means of mapping progress. Clarification from MDE indicates that the

State Department of Agriculture and the Conservation Districts will be responsible for meeting the agricultural target reductions for nitrogen and phosphorus.

The development of agricultural Best Management Practices (BMP's) in Dorchester County is being addressed by a working group from the farm community, local soil conservation district and the Maryland Department of Agriculture. Progress on achieving reductions in loading from best management practices by the working group had initially indicated that the County would meet its targets for nutrient reduction by 2025. However in addition to the above goals the final State WIP strategy submitted to EPA on March 30, 2012 included an additional 490 acres of agricultural land retirement. Due to the amount of nutrient reduction identified there will be limited opportunity at this time for trading agricultural nutrient credits towards meeting nutrient reductions from other sectors.

Additional proposed best management practices for agriculture as a part of the State phase II WIP are being developed by the Maryland Department of Agriculture to provide more opportunities for nutrient reduction that can be utilized by the farm community.

Grant funding and staff support will be critical to provide needed technical guidance and to track the effectiveness of BMPs. It is noted that the Dorchester County portion of the Nanticoke River drainage area is currently in a USDA/NCRS "Priority Funding Area" for cost share funding to install agricultural best management practices.

**Forest Best Management Practices**

The load allocations for the forest sector are proposed for a slight increase as efforts to meeting bay load reductions are anticipated to increase forest conservation areas using existing best management practices. Dorchester County is covered by over a third of its land area by forest and has an active forest harvest program and extensive land areas in conservation. The proposed WIP includes a goal to develop opportunities to work with conservation groups and the forest industry to reforest unused and no longer productive farmland in the southern part of the County. Nutrient credits from these efforts can then be applied as a cost effective alternative to nutrient reduction in other sectors.

**Wastewater Best Management Practices**

As noted in the current capacity section by the end of 2012, the largest public wastewater treatment facility in the City of Cambridge will be converted to an Enhanced Nutrient Removal (ENR) facility. The Town of Hurlock is already an ENR facility. These conversions should be sufficient to meet the countywide target allocation for wastewater. Discussion with MDE indicates that proposed load allocations for minor wastewater treatment facilities have been evenly allocated state wide.

Because of the County's location in the critical mid-bay region of the bay, opportunities are there for significant environmental benefit for conversion of the remaining two minor treatment facilities to ENR. Upgrades of these facilities are generally considered to be more cost effective per pound of nutrient reduction than other best management practices for urban areas. The State Phase II WIP includes a strategy in Appendix A for evaluating the feasibility of upgrading at least five of the more

significant minor municipal WWTP's to ENR treatment by 2017. BFR and other funding sources would potentially be utilized to fund upgrades. The Twin Cities plant is included in the list of 10 facilities. While the Vienna WWTP is not included on the initial list, the opportunity may exist to petition MDE for inclusion as an alternative to upgrade of the nearby Sharptown WWTP which is on the list if progress is not made on upgrade of their facility. The upgrade of the two remaining public wastewater treatment plants to ENR is proposed to meet a portion of the County's stormwater burden. The ability to be selected for an upgrade will depend on a proactive effort by the County to be in a position of a "readiness to proceed" with design and permitting as funding becomes available due to the competition with the other treatment plant project on the list.

Proposed load reductions from private industrial, commercial and institutional wastewater treatment facilities in the County are being addressed by the Maryland Department of the Environment through renewals of their National Pollutant Discharge Elimination System (NPDES) permits.

**Septic System Loading Best Management Practices**

The data from the Maryland Assessment Scenario Tool (MAST) provided the following inventory of septic systems in the County.

| Septic System Inventory | |
|---|---|
| Critical Area | 2,947 |
| Systems within 1,000 ft of a perennial stream | 1,522 |
| Systems outside of Critical Area and > than 1,000 from a Stream (Remaining) | 2,269 |
| Total | 6,738 |

Septic Allocation Targets for 2017 are 50,672 pounds of Nitrogen delivered. The target for 2025 is 41,336 pounds of Nitrogen delivered.

Current 2009 baseline septic nitrogen loading is as follows:

| 2009 Septic Loads (lbs. N delivered) | |
|---|---|
| Critical Area | 44,736.6 |
| 1,000 Ft. | 14,583.4 |
| Beyond 1,000 Ft | 13,076.9 |
| Total | 72,396.9 |

The approach to development of septic system BMP's is as follows:

- Reduction of 38,565 lbs. of Nitrogen is to be achieved.
- Get credit for any septic system conversions being completed.
- Prioritize septic conversions in areas that result in the greatest nutrient reduction.
- Utilize all BMP's available to include all contributing septic systems.
- Target suburban areas adjacent to existing sewer for possible sewer connection. Sewer connection maybe less costly than denitrification and results in a greater pollution reduction per dwelling unit.
- Where possible consider grouping existing systems into a single community denitrification system.

Septic denitrification conversions in the MAST software were revised from 1.088% (73 systems) across all three areas to an updated 150 conversions in only the Critical Area.

Progress adjustments for 2013 were included to account for ongoing sewer projects being completed by the end of 2012. These included the Woolford - Madison Sewer Connection project with a 272/43/80 (Critical Area/Within 1,000 ft of a Water Source/Beyond 1,000 ft.) system distribution, the Christ Rock Sewer Connection project with 45 systems beyond 1,000 feet of a water source, and 130 critical area denitrification septic system conversions.

| 2013 Septic Loads (lbs. N delivered) | |
|---|---|
| Critical Area | 39,683.5 |
| 1,000 Ft. | 14,175.0 |
| Remaining | 12,357.7 |
| Total | 66,216.2 |

The State MDE has introduced new regulations that will require all new septic systems in the Chesapeake Bay watershed and any replacement systems in the critical area to utilize nitrogen removal technology. The replacement of a failing septic system will become even more of a significant expense for homeowners. The cost of these nitrogen removal systems is estimated at $15,000 per installation. To ensure existing septic systems continue to function properly, the 2017 Progress Scenario proposes the implementation of a County wide septic system pump out program. In addition obtaining nutrient reduction credit and ensuring the regular inspection and maintenance of septic systems for preservation of system operation and protection of groundwater, a pump out program and management district would provide a means to educate the public on protection of water quality, distribute a shared responsibility to all residents of the County and establish an enterprise fund for revenue generation to fund septic connection and conversions in the County. The management district would also be able to assume oversight of maintenance programs for denitrification systems.

In order to achieve 2017 target goals, sewer connection projects for the Oak Hill area (connection of 70 systems beyond 1,000 ft) and Suburban Drive/Bonnie Brook areas would be implemented. The Oak Hill project is a planned project by the City of Cambridge utilizing the recent extension of sewer on Bucktown Road. The proposed Suburban Drive/Bonnie Brook project would provide sewer to the County Sanitary District No. 5 and the adjacent Bonnie Brook development. The Bonnie Brook development is in the Critical area and is presently served by water. This project would add an estimated 75/10/35 distribution of septic systems connected to sewer.

The balance of the interim target would need to be filled by septic system denitrification conversions in the critical area at a 62% conversion rate for a total of 1200 units @ 240/yr for the 5 year period from 2013 to 2017. It should be noted that the current conversion rate is 75 units per year in the County. The 2017 targets are met with the following projected loading.

| 2017 Septic Loads (lbs. N delivered) | |
|---|---|
| Critical Area | 25,900.3 |
| 1,000 Ft. | 13,369.3 |
| Remaining | 11,168.4 |
| Total | 50,438.0 |

The 2025 Scenario progress would likewise require acceleration of the current septic system conversion rate to meet the 2025 targets as there are currently no other planned sewer connection projects under consideration. In order to meet the 2025 targets the County would need to achieve 100% Critical area denitrification conversion of the remaining septic systems for a total of 1,120 units @ 140/yr for 8 years. In addition, a 20% denitrification conversion of systems in the 1,000 ft. area for a total of 282 units @ 35/yr. for 8 years would need to be implemented. The total number of systems converted in this 8 year period is 175 per year. The resulting 2025 septic loading would be as follows:

| 2025 Septic Loads (lbs. N delivered) | |
|---|---|
| Critical Area | 18,211.2 |
| 1,000 Ft. | 11,962.0 |
| Remaining | 11,168.4 |
| Total | 41,341.6 |

Preliminary Cost Considerations

An initial estimate of project costs associated with implementation of septic system load reductions are as follows:

| | | |
|---|---|---|
| Oak Hill Project | $ 810,000 | City of Cambridge estimate |
| Suburban Dr./Bonniebrook | $ 2,400,000 | 120 EDU's @ $20,000/EDU |
| Denitrification conversions | $39,030,000 | Unfunded beyond 2012- 2,602 systems @ $15,000 ea. |
| Pump Outs | $ 1,527,000 | 6,108 systems pumped twice 2016/2020 @ $125/pump out. |
| | $43,767,000 | |

Sewer Extension estimate based on:
Woolford- Madison Cost $9,842,106/395 ≈ $25,000/ connection.
Oak Hill $810,000/70 ≈ $11,570/ connection.
Christ Rock $1,552,864/45 ≈ $35,000/ connection

As noted the rate of septic system conversions is increased significantly by over 2.5 times with respect to current capacity for review, approval and inspection by the County Health Department. Implementation presents problems with not only staffing as well as contractor and manufacturer availability to meet this demand for denitrification systems. In addition the cost is significant and exceeds available funding sources. Alternative analysis to identify more cost effective methods such as community denitrification systems and sewer connections is warranted as planning proceeds.

Issues and Needs

- Identify future connection projects if more cost effective than denitrification.
- Enable planning and inter-municipal cooperation to be able to implement projects.
- Develop local funding mechanisms in addition to state and federal funding sources.

Septic system funding is anticipated to come from State bay restoration funding as well as enterprise funding under a septic management district. The Oak Hill and Suburban Drive funding is anticipated to come from State water quality grant/loans with revenue from sewer customer bases in the City and County Sanitary Districts.

**Urban Area Best Management Practices**

Urban loading allocations require the greatest percentage decrease in nutrients of all the sectors representing a 32% reduction of nitrogen and the majority of the decrease (43%) in phosphorus. Urban pollutant load reductions are more difficult to achieve as runoff is more related to land use and existing facilities were historically designed for controlling water flows and not pollutant removal. As a non-point source dealing with private and public property, stormwater water quality retrofits are typically site specific and expensive to implement.

In addition, development of specific Urban BMP's is difficult due to a lack of land use mapping and data to allow for confirmation and location of urban areas to assess specific potential projects and correct data in MAST. As noted previously there is no existing MS4 stormwater NPDES program in the County which can be utilized for data and resources.

Areas outside of the City and town limits do not have piped public stormwater facilities. Almost all County road drainage is to a vegetated roadside drainage ditch.

Only the County and City of Cambridge manage administration of local stormwater management ordinances with respect to review of development plans.

Due to the difficulty of implementing stormwater BMP's and the time needed to investigate, design, obtain funding and construct, the WIP only addresses the time frame to meet the 2025 targets.

The Urban 2009 Baseline loading from MAST is:

138,922.2 N delivered
10,240.4 P delivered

The 2017 Target is:

104,501 lbs. N delivered (Reduction of 17,426.7 lbs.)
6,693 lbs. P delivered (Reduction of 1,769.8 lbs.)

The 2025 Target is:

94,333 lbs. N delivered (Reduction of 44,589.2 lbs.)
5,807 lbs. P delivered (Reduction of 4,433.2 lbs.)

Land use data from the MAST program provides the following breakdown:

Land Area under construction

| | |
|---|---|
| Combined Sewer System (CSS) | 62.3 acres (City) |
| Regulated Construction | 683.7 acres NPDES Construction Permits |
| Total | 748.0 acres |

Total Combined Sewer System (CSS) Acres

| | |
|---|---|
| Under Construction | 62.3 acres |
| Impervious | 517.5 acres |
| Pervious | 1,791.2 acres |
| Total | 2,371.0 acres |

Note: City of Cambridge 1995 CSO Study Final Report identified only 200 acres tributary to the Combined Sewer system.

Total Urban Impervious

| | |
|---|---|
| CSS | 517.5 acres |
| Non-regulated | 3,641.8 acres |
| Industrial | 285.8 acres |
| Total | 4,445.1 acres |

Total Developed Pervious

| | |
|---|---|
| CSS | 1,791.2 acres |
| Non-regulated | 12,702.5 acres |
| Industrial | 283.7 acres |
| Total | 14,777.4 acres |

The Total Urban Acreage is 20,150.8 acres. Of this total there are only 4,159.3 acres of Impervious Non-industrial available to apply most Urban BMP's.

Land use mapping that corresponds with urban stormwater discharge locations to identify potential project applications, associated acreage and nutrient credits needs to be developed. A review of construction land use acreage and CSS acreage is needed to confirm it is reflective of County actual land use.

Urban Proposed BMP's

The following BMP's were preliminarily developed for consideration to meet 2025 targets.

Urban Redevelopment to ESD SWM 182 acres

*Estimate of redevelopment activity resulting in modification of stormwater management facilities to Environmental Site Design standards.*

25% reduction of Urban Growth for pervious 3,170 acres

5% reduction of Urban Growth for impervious 182 acres

*Estimate of potential reductions in urban growth area as a result of more efficient land use of urban areas resulting in zoning changes.*

Urban nutrient management lawn fertilizer use reduction 20% 2,500 acres

*Estimated % participation of homeowners in a public education program to utilize lawn fertilizer more efficiently.*

Wetlands creation 50 acres

*Estimated credit from wetlands creation associated with living shoreline restoration projects.*

20% application of vegetated open channel drainage 2,540 acres

*Estimated increase in use of vegetated open channel drainage by optimizing existing stormwater drainage on road side ditches.*

Retrofit Projects

*Proposed existing stormwater facility urban retrofit projects applicable to Dorchester County soil and topography conditions.*

| | |
|---|---|
| Application of Urban Filtering Practices | 80 acres |
| Application of Urban Infiltration (no sand or under drains) | 82 acres |
| Bioswale creation | 75 acres |
| Bioretention/Rain garden application | 25 acres |
| Convert existing SWM controls to wet ponds | 50 acres |

MAST runs indicate an urban loading reduction to 109,450.1 lbs of Nitrogen and 8,234.2 lbs of Phosphorus delivered.

Urban stormwater loading also occurs from combined sewer overflows in the City of Cambridge. The City is currently in the process of completing a sewer separation project by 2012. The City of Cambridge 1995 CSO Study Final Report estimated the pollutant loads associated with combined sewer overflows at 2,378.4 lbs/yr of total nitrogen and 339.77 lbs. of phosphorus.

Nutrient credits from the sewer separation project are unable to be entered into the MAST accounting tool. Applying this credit brings the urban loading down to 107,071.7 lbs of Nitrogen and 7,894.4 lbs of Phosphorus delivered.

In order to reach the 2025 target loading it is proposed to obtain additional urban pollutant reduction credits by conversion of the Twin Cities and Vienna minor WWTP plants to ENR. Based on 3.0 mg/l N and 0.3 mg/l P effluent the following reductions are estimated.

| | Nitrogen | Phosphorus |
|---|---|---|
| Twin Cities | 7,843 | 1,477 |
| Vienna | 4,952 | 924 |
| Total Reduction | 12,795 | 2,401 |

The final calculated 2025 urban pollutant loading would be 94,276.7 lbs N and 5,493.4 lbs P delivered.

The State Phase II WIP submittal to EPA on March 30, 2012 included additional BMP effort for Dorchester County as the MAST input data does not recognize nutrient reductions for the Cambridge CSO project and minor WWTP upgrades credits being proposed by the Dorchester local WIP to meet the stormwater targets. The most significant differences are highlighted below. The changes are related to the application of statewide BMP goals to Dorchester County. The heavy influence on urban surface reduction, filtering practices, urban nutrient management and urban forest buffers BMPs are more applicable to denser urban areas on the western shore. In addition, the number of acres being applied to BMPs by the State to Dorchester County indicate a data gap with MAST input data showing only 4,445.1 acres of total urban impervious acreage in the County

| | | 2010 Progress | 2017 WIP Team | 2017 Interim Strategy | 2025 WIP Team | 2025 Final Strategy | Change in 2017 Submittal | Change in 2025 Submittal |
|---|---|---|---|---|---|---|---|---|
| BMP Name | Unit | | | | | | | |
| Bioretention/raingardens | Acres | 0 | 0 | 0 | 25 | 19 | 0 | -6 |
| Bioswale | Acres | 0 | 0 | 0 | 73 | 52 | 0 | -21 |
| Dry Detention Ponds and Hydrodynamic Structures | Acres | 357 | 357 | 347 | 356 | 341 | -10 | -15 |
| Dry Extended Detention Ponds | Acres | 216 | 216 | 210 | 216 | 207 | -6 | -8 |
| Impervious Urban Surface Reduction | Acres | 0 | 0 | 22 | 0 | 1,156 | 22 | 1,156 |
| MS4 Permit - Stormwater Retrofit | Acres | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Stormwater Management Generic BMP (1985 to 2002) | Acres | 206 | 206 | 200 | 207 | 198 | -6 | -9 |
| Stormwater Management Generic BMP implemented (2002 to 2010) | Acres | 2,481 | 2,481 | 2,408 | 2,489 | 2,382 | -72 | -107 |
| Urban Filtering Practices | Acres | 17 | 17 | 59 | 97 | 7,821 | 41 | 7,724 |
| Urban Forest Buffers | Acres | 0 | 0 | 555 | 0 | 817 | 555 | 817 |
| Urban Infiltration Practices | Acres | 139 | 139 | 135 | 223 | 196 | -4 | -27 |
| Urban Tree Planting; Urban Tree Canopy | Acres | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Vegetated Open Channel - Urban | Acres | 0 | 0 | 0 | 735 | 522 | 0 | -213 |
| Wet Ponds and Wetlands | Acres | 823 | 823 | 799 | 916 | 867 | -24 | -49 |
| Erosion and Sediment Control on Construction | Acres/Year | 673 | 673 | 746 | 746 | 746 | 73 | 0 |
| Erosion and Sediment Control on Extractive | Acres/Year | 0 | 0 | 0 | 0 | 128 | 0 | 128 |
| Forest Conservation | Acres/Year | 455 | 455 | 456 | 391 | 421 | 1 | 30 |
| Urban Nutrient Management | Acres/Year | 3,552 | 3,552 | 8,451 | 3,025 | 10,790 | 4,899 | 7,765 |
| Street Sweeping Pounds | Lbs/Year | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Urban Stream Restoration / Shoreline Erosion Control | Linear Feet | 0 | 0 | 0 | 0 | 0 | 0 | 0 |

Urban BMP Preliminary Cost Considerations

| | | Development Funded |
|---|---|---|
| Urban Redevelopment to ESD SWM | | |
| Reduction of Urban Growth Area | Planning Related | $ 200,000 |
| Urban nutrient management | Public Education | $ 77,500 |
| Vegetated open channel road ditch management | Construction & Maintenance | $ 800,000 |
| Wetlands creation | Construction | $ 8,900,000 |
| Retrofits | Construction | |
| Urban Filtering Practices Retrofits | | $ 4,480,000 |
| Urban Infiltration Retrofits | | $ 5,203,000 |
| Bioswale creation | | $ 3,300,000 |
| Bioretention /Rain garden | | $ 1,247,000 |
| Convert existing SWM controls to wet ponds | | $ 3,300,000 |
| Upgrades of Minor WWTP's to ENR | Construction | $12,500,000 |
| | Total Estimated Cost | $40,007,500 |

Due to the rural nature of the County an impervious area stormwater fee revenue source for funding would be difficult to support Countywide. At this time grant funding and County/municipal funding would be used to implement most retrofit capital projects. General funds and grant specific funding would be used for planning, public education and road ditch conversions. Minor WWTP upgrades are anticipated to be funded from the State Bay Restoration Fund. Wetlands creation projects would be funded by private property owners on projects improving their shoreline and specific DNR and Army Corps of Engineers projects at Rooster Island, Hurst Creek and Wrights Creek.

**State and Federal Facilities and Lands Strategies**

State property strategies are being addressed separately from the local team WIP. The most significant State facilities include the State road network, Fishing Bay, Taylors Island, LeCompte, and Linkwood Wildlife Management Area, University of Maryland Center for Environmental and Estuarine Studies and Eastern Shore State Hospital.

Federal facilities are incorporated into the overall County WIP goals and allocations. The largest Federal facility in the County is the Blackwater National Wildlife Refuge.

**2013 Milestones**

Implementation Actions

- Complete city WWTP upgrade
- Complete city CSO elimination
- Complete conversion of 45 septic systems to sewer in Christ Rock area.
- Complete 300 septic system upgrades in the Critical Area.
- Complete construction of 12.6 acres of wetlands (Elliott Island Road project).
- Complete Woolford-Madison project with conversion of 350 septic systems to sewer
- Complete 4.5 acres of riparian shoreline buffers
- Complete 4 acres of forest area restoration
- Increase cover crop by 30%
- Increase HUA pads by 15%
- Increase streamside grass buffers by 7%
- Increase Industrial pretreatment enforcement at Hurlock WWTP.

Program Milestones

- Investigate funding for Oak Hill septic system connection (70 systems)
- Develop methods to track
  - precision/decision agriculture
  - poultry manure incorporation
  - irrigation management

- Investigate development of a septic system management district.
  - mandatory pump-outs
  - funding and administration
- Evaluate future growth and capacity of city WWTP.
- Develop agreements to enable additional expansion of septic connection program.
- Update County water/sewer plan to address septic system conversions/connections.
- Investigate options and funding for upgrade of Vienna and Twin Cities WWTP's to ENR.
- Develop septic system GIS mapping capability
- Investigate funding for all of the above.
- Develop urban stormwater target areas.
- Identify pilot stormwater retrofit projects.

**Funding**

The estimated costs necessary to implement the WIP are preliminary budget numbers. More detailed study will need to be completed and specific projects identified to better refine the costs.

The projected cost of over $87 million is unprecedented for a rural County the size of Dorchester. These costs also do not include costs to address agriculture sector nutrient reduction or all local government staffing and administration costs associated with project implementation, tracking and reporting. To put this in some perspective the County 2011-2012 budget for all County departments and operations including education, public safety, public works, parks and recreation, landfill, airport, economic development, tourism and public health totaled almost $56 million. The $87 million estimated for the WIP would represent a 12% increase in the budget over the 13 year period from 2012 to 2025 if the County had to fund all the costs. This equates to a cost of $205 per year per County resident over 13 years.

While it is anticipated that cost savings will be realized as more specific projects are developed and subjected to a cost effectiveness review, there are still concerns of increased costs due to inflation and the increased demand for services as more Counties require engineering, construction and septic maintenance services to implement their plans. Clearly financial support in the form of grants and low or no interest loans are needed from federal, state and private foundations to help offset these costs.

The largest current source of funding for meeting water quality improvements is the State Bay Restoration Fund (BRF). Dorchester County residents currently pay an annual $30.00 Bay Restoration Fee per household. Based on a proportion of housing units in the County and State and fiscal 2012 revenue from the Bay Restoration Fund allocated for wastewater treatment plant upgrades and septic conversions, it is estimated that the County resident's contribution to the fund is between $450,000 and $500,000 per year.

The Governor's Task Force on Sustainable Growth and Wastewater Disposal published their final report in December 2011 with recommendations to increase funding to the BRF. The recommendation included doubling the annual fee to $60.00 in 2013 and to $90 in 2015. Thereafter the fee would be

increased based on the Consumer Price Index with a minimum of 1% and a cap of 2%. Funding would also be extended to stormwater retrofit projects. The 2012 State Legislative session only approved the initial doubling of the BRF fee at this time. Funding assumptions are based on future increases in the BRF as recommended by the Task Force to provide the additional funding to reduce the burden on local governments. Based on the Task Force recommendations, the County "share" of BRF funding for the period from 2012 to 2025 is estimated at $18.4 million. At a minimum if this recommendations are enacted into legislation, this local share should be returned to the County to be utilized for projects to meet water quality improvements in Dorchester County.

Based on funding strategies stated in the State Phase II WIP the following assumptions are made for funding the County WIP.

- 50% state cost share for of treatment plant upgrades
- 15% County Government share of BRF for stormwater BMP's (increase to 25% after 2015)
- State funding for 75% of the septic conversions in the critical area.

Estimated funding from these State BRF initiatives is estimated to total $37,250,000. This figure represents two times the amount of funding contributed to the BRF from the County. This will present a challenge to the County to be aggressive in pursuing grant opportunities.

Additional grant funding opportunities are anticipated to be used from Federal and private Foundations to address planning, public education and wetlands restoration goals of the WIP. This includes planning studies to evaluate growth area reduction and public education programs to increase awareness of proper lawn fertilizer application. A grant funding goal of 50% of the cost of wetland creation is proposed. Of the total estimated WIP implementation, a total of almost $42 million is proposed to come from grants and other non local sources for meeting septic and stormwater nutrient reduction targets. This leaves approximately 52% of the cost that is projected to need to come from local sources. As shown on the following table, sources of local funding could come from sewer revenue bonds or loans, budgeted general municipal annual funding and the creation of a septage management district.

It is estimated that the regular pump out of the remaining 3,500 conventional septic systems will result in an annual reduction of almost 11,400 pounds per year of nitrogen. The County will need to provide assurances that all septic systems are properly maintained with regular pump outs to maintain effective treatment. The creation of a septage management district would meet the need to coordinate and track a reliable pump out program. The district would also manage a septic system continuing maintenance program for denitrification septic systems.

Funding for a septage management district is intended to be self supporting and function as an enterprise fund. It is proposed that residential flat fees also generate additional revenue to help support the conversion of additional septic systems in order for the County to meet nutrient reduction targets for the septic sector.

# Draft Dorchester County TMDL Capital Funding Scenario

2012-2025

| Sector | Project | Estimated Cost | BRF Grants | Septage District Funding (1) | Revenue Bonds (2) | General Fund (11) | Other Grants | Funding Gap |
|---|---|---|---|---|---|---|---|---|
| Septic Sector | | | | | | | | |
| | Oak Hill Sewer Connection | $810,000 | | | $810,000 | | | |
| | Suburban Drive/ Bonnie Brook Sewer Connection | $2,400,000 | | | $2,400,000 | | | |
| | Septic Connections | $39,030,000 | $26,100,000 (3) | $4,697,500 | $3,232,500 (4) | | | $5,000,000 |
| | Septic Pump Out Program | $4,890,500 | | $4,890,500 | | | | |
| | Total Septic Sector | $47,130,500 | $26,100,000 | $9,588,000 | $6,442,500 | $0 | $0 | $5,000,000 |
| Urban Sectors | | | | | | | | |
| | Minor WWTP Upgrades | $12,500,000 | $6,250,000 | | $6,250,000 | | | |
| | Urban Growth Area Reduction | $200,000 | | | | | $200,000 (7) | |
| | Urban Nutrient Management | $77,500 | | | | | $77,500 (8) | |
| | Open Channel Drainage Management | $800,000 | | | | $800,000 | | |
| | Wetlands Creation | $8,900,000 | | | | | $4,450,000 (9) | $4,450,000 |
| | Retrofit Projects | $17,530,000 | $4,900,000 (10) | | | $2,630,000 | | $10,000,000 |
| | Total Urban Sector | $40,007,500 | $11,150,000 | $0 | $6,250,000 | $3,430,000 | $4,727,500 | $14,450,000 |
| | Total Septic and Urban Sector | $87,138,000 | $37,250,000 (5) | $9,588,000 | $12,692,500 | $3,430,000 (6) | $4,727,500 | $19,450,000 |

Notes:

(1) Enterprise Fund. Based on $30/Quarter to fund pump outs, admin. and septic conversions.
(2) Bonds supported by sewer use fees.
(3) Assumes funding for conversion of 75% of Systems in critical area.
(4) Owner financing of 25% of conversion cost for remaining system conversions
(5) County "Share" of Bay Restoration Fund is estimated at $18.4M over years 2012-2025.
(6) Municipal General Funding of $264,000/ year
(7) Planning Grants
(8 State or Trust Public Education Grant
(9) Shoreline Restoration Living Shoreline Projects
(10) County Government Share of BRF for SWM. 15% of gross 2013-15 and 25% after 2015.
(11) Does not address increased annual operational costs (staffing, administration, etc.).

As the table shows there would still remain a funding gap of almost $20 million needed to meet the nutrient reduction goals for the County through 2025. This local funding gap will need to be filled by other sources of funding including new increased state and federal aid and or capital bonds or low interest loans that would allow a longer pay back beyond the 2025 implementation deadline.

**Growth Allocation**

Nutrient loading targets for the County include an estimated 54,700 pounds per year of nitrogen allocated for growth in the 2025 time frame. The growth in loading is accounted for in reductions from other sectors. Growth from development is intended to be connected to public sewer served by an ENR treatment facility. Cambridge and Hurlock are ENR facilities. Twin Cities and Vienna are proposed to be upgraded to ENR.

Future growth utilizing on lot septic systems is intended to be managed by requiring all new systems to be provided with enhanced treatment for nitrogen removal. The residual nutrient loading from new development after treatment of wastewater and stormwater will also need to be offset by the developer by mitigation or contributions to aid in implementation of regional stormwater retrofits and septic upgrades.

State and local legislation would need to be provided so that these costs are borne by development and are not future costs to County residents.

**Consequences**

The Watershed Implementation Plan would not be complete without addressing the possible consequences for the in County in not showing sufficient progress in meeting the target nutrient reductions.

The most likely consequences are EPA enforcement through existing permit programs including:

<u>Objecting to NPDES permits to require additional reductions from point sources.</u>

Requiring additional treatment upgrades from the Twin Cities and Vienna plants
Reductions in existing permitted capacity for growth at the Cambridge and Hurlock plants.

<u>Expanding NPDES permit coverage to currently unregulated sources.</u>

Requiring the City of Cambridge and surrounding areas to obtain an NPDES discharge permit for their stormwater system.

<u>Increase and target Federal enforcement and compliance assurance</u>

Stricter Federal audit and review of erosion and sedimentation permitting, construction NPDES permits including fines.

Enhanced oversight of State Programs

Potential for reduced or loss of grant funding for water quality programs by diversion to areas in greater compliance.

**Conclusions**

The Dorchester County Phase II WIP is intended as a framework for development of programs and best management practices to be implemented over the 2012 to 2025 timeframe to meet the targets for nutrient reduction. As further study is performed, and experience with implementation of BMPs is gained, it is anticipated that the plan will be adjusted to take advantage of new information to find the most cost effective and implementable BMPs available. Continued progress and effective BMP tracking will provide a valuable learning curve to be able to make informed future adjustments to the plan.

The successful implementation of the Phase II WIP is a public investment of $87 Million over a 12 year period. To help coordinate this effort, it is recommended that an administrative board or commission be formed to advise County and Municipal elected officials on the cost effective allocation of resources to fund and implement best management practices for septic wastewater and urban stormwater runoff.

Every two years the State and EPA will review the County's progress in working toward achieving progress and at the same time provide updated information to improve the bay model's accuracy. It is anticipated that there will be a biennial review and update of the plan to document progress and identify new milestones for the next two year cycle. A major assessment will also be performed in 2017 to evaluate overall progress in the cleanup of the Bay. Based on this evaluation a determination will be made on any additional measures that need to be taken to assure the 2025 deadline will be met.

The success of the plan will require contributions from every County resident, farmer and homeowner. Partnerships between the County, Towns and City along with Federal and State government will be necessary to administrate and coordinate implementation of the plan to achieve cost effective solutions and maximize grant potential.

In addition there are significant resources available from environmental and conservation organizations that can contribute funding, expertise and regional cooperation to support our local effort.