Chester River Environmental Watershed Strategy (CREWS): A Comprehensive Management Plan

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Mission Statement:

The Chester River Environmental Watershed Strategy (CREWS) aims to improve the overall water quality rating of the river through the reduction of nutrient, sediment, and boating pollution. These intentions will all be achieved by the year 2030 with a significant reduction in boat discharge occurring in 2017 and the creation of a Total Maximum Daily Load for sediments transpiring by 2018.

Figure 1. Location Map of the Chester River Watershed

Background:

Watershed Characteristics

The Chester River Watershed is a major tributary of the Chesapeake Bay located primarily on the Eastern Shore of Maryland. It forms the barrier between Kent and Queen Anne's Counties in Maryland. The total drainage area is 368 square miles (235,520 acres). The headwaters are

located in Kent and New Castle Counties in Delaware. Approximately 40,000 people live within the Watershed.

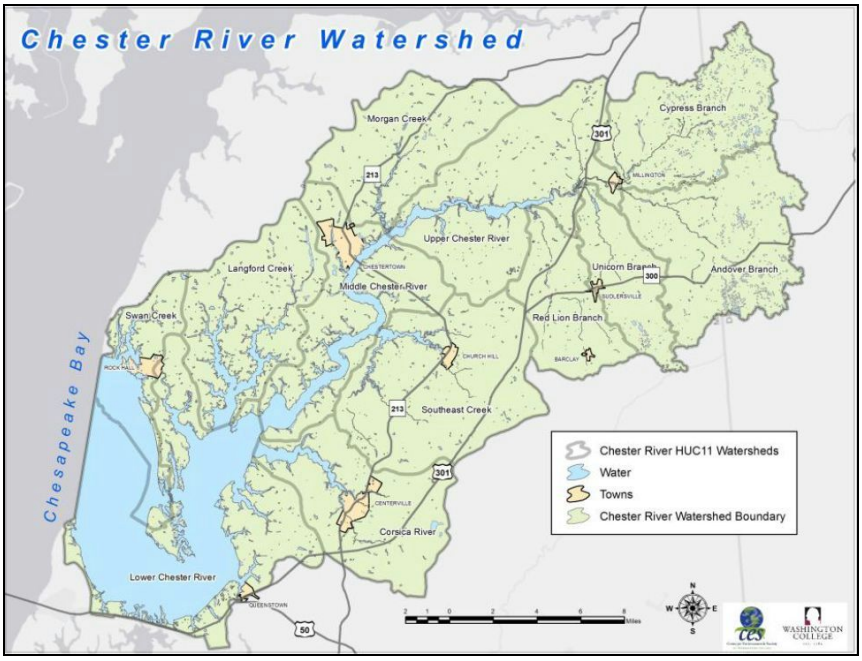

Figure 2. Chester River Watershed Area

History

The Chester River Watershed is home to Chestertown, Maryland, which has a long and storied history. During the Revolutionary War, Chestertown was the second largest port in Maryland and a major commercial area. Before the American Revolution in 1774, Chestertown issued as Resolve in support of the Boston Tea Party. According to local legend, tea from a British ship was also seized and disposed of in the Chestertown harbor, though there is no historic record of this until near the end of the 19th century. Chestertown is also home to Washington College, America's 10th oldest college. It was named for George Washington, who supported the school and allowed his name to be used for it.

Land Use

The land in the Chester River Watershed is primarily used for agricultural production (Figure 3). Because of this and the differences in the cost of rural best management practices being significantly cheaper than suburban and urban practices, the primary focus of this report will be on methods to reduce agricultural pollution.

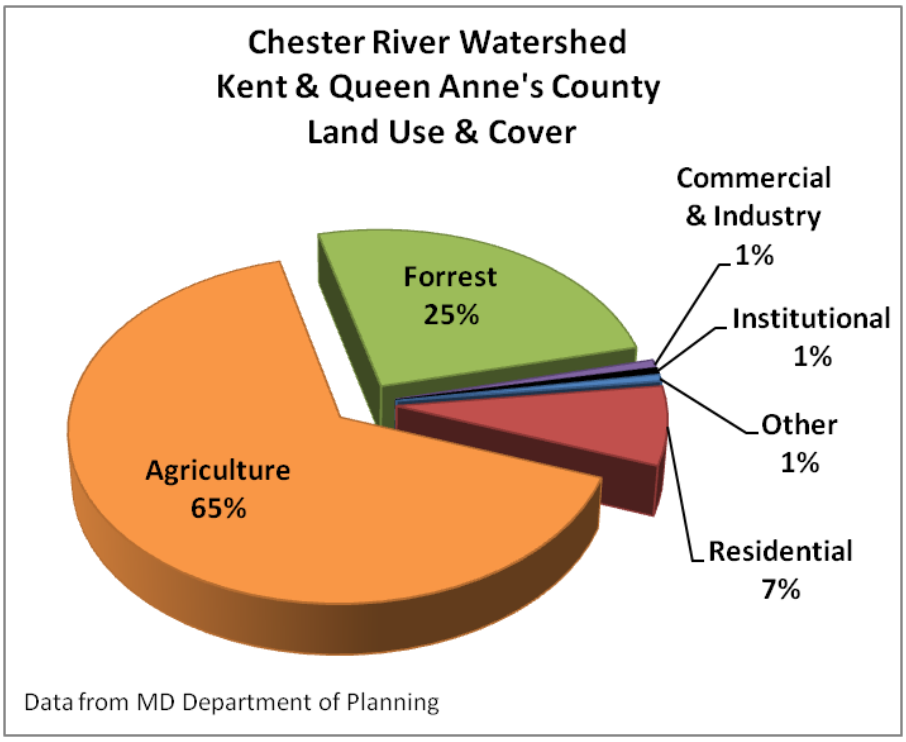

Figure 3. Land Use and Cover in the Chester River Watershed

<u>Management Organizations:</u>

Soil Conservation Districts - Kent Soil and Water Conservation District and Queen Anne's Soil Conservation District both work within the Chester River Watershed. Their mission is to work with farmers to protect agricultural soils throughout the region. This is primarily done through government incentive programs for the implementation of best management practices by farmers.

Maryland Department of Natural Resources - The Maryland Department of Natural Resources is the state agency in charge of environmental matters, including restoration, protection and preservation of the local ecosystem.

Chester River Association - The Chester River Association is the riverkeeper organization for the Chester River. As the riverkeeper organization, they have a number of roles in protecting the watershed. One of their major roles is performing water quality monitoring on the Chester River and its tributaries. Another of their roles is to work with farmers to implement new best management practices and test effectiveness of newly developed techniques. They also work to educate local communities about the Chester River and how their actions impact the environment.

Chesapeake Bay Trust - The Chesapeake Bay Trust is a grant writing organization. They provide funding to many local conservation programs throughout the Chesapeake Bay Watershed, including those in the Chester River Watershed.

Chesapeake Bay Foundation - The Chesapeake Bay Foundation is a nonprofit organization specializing in advocacy, environmental education, litigation and restoration in order to protect the Bay.

Previous and Current Plans:

Middle Chester River Watershed Restoration Strategy (2002) - Aimed to create strategies to guide local and regional initiatives that worked towards improving conditions and conserving resources in the watershed. This plan offered a vision and goals for the future of the watershed, a

toolkit of strategies, and an implementation plan. Strategies included developing a comprehensive farm management plan and promoting conservation programs.

Upper Chester River Watershed Restoration Action Strategy (2006) - Implemented strategies that would improve the water quality of the Upper Chester River Watershed in order to remove it from the list of impaired watersheds. This strategy envisioned sustainable working landscapes and an understanding between people, land, and water. Management strategies included restoring stream buffers, lessening the impact of stormwater, and conserving natural species.

Watershed Report for Biological Impairment of Upper Chester River Watershed in Kent and Queen Anne's Counties, Maryland (2012) - Analyzed the numerous impairments to the Upper Chester River Watershed. This report found that biological communities were likely to degrade due to sediment and in-stream habitat related stressors, as well as anthropogenic changes. Nutrients were found to be a significant cause of impairment.

Chesapeake Bay Total Maximum Daily Load (current) - Identifies the necessary pollution reductions from major sources of nitrogen, phosphorus, and sediment. It also sets pollution limits. This plan involves all of the Chesapeake Bay jurisdictions and is not simply limited to the Chester River Watershed.

Chesapeake Bay Watershed Implementation Plans (current) - Creates a road map and accountability framework that will lead to the restoration of the Chesapeake Bay and clean local streams. This involves nutrient loads in planning and creates management strategies. Nutrient target loads were set for the future.

Problem Statement:

The Chester River currently suffers from two major issues: excessive nutrient loading, which causes eutrophication, and sediment pollution from soil that is washed into the river. Nutrients, such as nitrogen and phosphorus, are received from a variety of sources. While agriculture is undoubtedly a major source, others include lawn fertilizer, septic systems, and wastewater treatment plants. Sediment pollution is also contributed from agricultural sites, as well as many developed areas. In addition to these significant issues, boat pollution threatens the Chester River through boat cleaning, fuel operations, and marine head discharge. A reduction in all of these destructive practices would greatly improve the condition of the Chester River.

Goals and Objectives:

In order to improve and protect the water quality, the goals of the Chester River Environmental Watershed Strategy (CREWS) are as follows:

1. Nutrients - By 2030, to limit nitrogen and phosphorus pollution to below the Total Maximum Daily Loads set by the State of Maryland in 2006. This will be accomplished by working with farmers and the community to implement best management practices including cover properly timing fertilizers and the installation of riparian buffers, as well as the installation of other best management practices.
2. Sediments - To establish a science based Total Maximum Daily Load for sediments by 2018. To reduce sediment discharge to these levels by 2030 by working with farmers and the community to implement best management practices including stabilizing river banks

using vegetation, planting of cover crops during the non growing season, and implementation of tillage practices that will reduce sediment discharge.

3. Boating Pollution - To reduce pollution from boat discharge by 2017. The Chester River will become a no discharge zone and all waste produced by boats will be pumped out at designated pumping stations or discharged while at sea.

Management Strategies:

Nutrient Pollution

Riparian Buffers: Riparian buffers are an important tool to help reduce both sediment and nutrient runoff to rivers. It provides a barrier between the farmland and the water while absorbing many of the nutrients that runoff from the fields. Buffers also remove high sediment producing field sections from production, further reducing sediment runoff. One plant currently in use for buffers in the Chester River Watershed is switchgrass, which is a native grass that can easily grow on land that is not suitable for other crops. There are efforts being made to develop a market for switchgrass, which would help to perpetuate buffer growth without requiring funding from outside organizations or government programs. One possible use for switchgrass is as a renewable fuel in coal fired power plants. Another possible market is as pellets for chicken litter.

Figure 4. Switchgrass Used As a Buffer

Fencing off Waterways: Installing animal fences prevents animals from entering waterways. Separating animals from nearby waterways eliminates the threat of water contamination from animal waste. In addition, when livestock are not permitted to roam near flowing water, there will be a lower risk of soil disturbance and erosion.

Figure 5. Livestock Near an Open Waterway

Figure 6. Livestock Separated from Water by a Fence

Precision Farming: Precision farming is the process in which the application of fertilizer is limited to only those plants that need it. This means that farmers will use less fertilizer, therefore reducing the amount of nutrients that can runoff into streams and rivers. GreenSeeker is the current technology that exists to implement precision farming. Plants that require fertilizer are identified by color. Studies have shown that GreenSeeker reduces nitrogen application by twenty percent and can also increase crop yields. In addition, farmers save money on fertilizer. Engaging farmers and educating them on this method is key.

Figure 7. A GreenSeeker Implementing Precision Farming

Sediment Pollution

Cover Crops: Cover crops are crops that are planted on fields after the fall harvest, and they remain in the ground during winter. Cover crops stabilize the soil and remove excess nutrients, thus reducing nutrient and soil runoff from fields. This practice is cost effective and affordable. Organizations will work with farmers to increase cover crop acreage. In the fall and winter of 2011-2012, Kent County planted fifty-three percent of its available farmland in cover crops, while Queen Anne's County planted forty-five percent. These percentages will be increased.

Figure 8. A Field Planted with Cover Crops.

No Tillage Farming: This is the practice of planting a season of crops in the remnants of previous crops without tilling in between plantings. No tillage farming has many benefits, as it preserves soil architecture and reduces total soil loss. In addition, crop residue reduces evaporation.

Figure 9. Young Soybean Plants Protected by Remnants of a Wheat Crop

Boat Pollution

No Discharge Zone: In a No Discharge Zone, it will be required that sewage is pumped at designated locations at docks rather than flushing sewage into the river. The No Discharge Zone has finished its periods of planning and public comment and is now awaiting final approval by the Maryland Department of Natural Resources. Gas and oil must also be disposed of properly (e.g. at a gas station) so that these substances do not end up in waterways. In addition, people will also have to manage their trash. This can be accomplished by reducing the number of items brought onto vessels and increasing the amount of reusable materials. Trash should also be securely collected while on vessels and then disposed of at designated locations upon returning to a dock.

Marinas: Pollution from marinas will be reduced by managing activities, such as boat cleaning, fueling operations, and marine head discharge. These can all be easily managed as long as people are willing to be vigilant. A reduction in stormwater runoff will also occur. Stormwater

runoff often comes from marina parking lots and from hull maintenance and repair areas. Runoff can be reduced by using less impervious surfaces, planting more vegetation, and keeping areas clean.

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