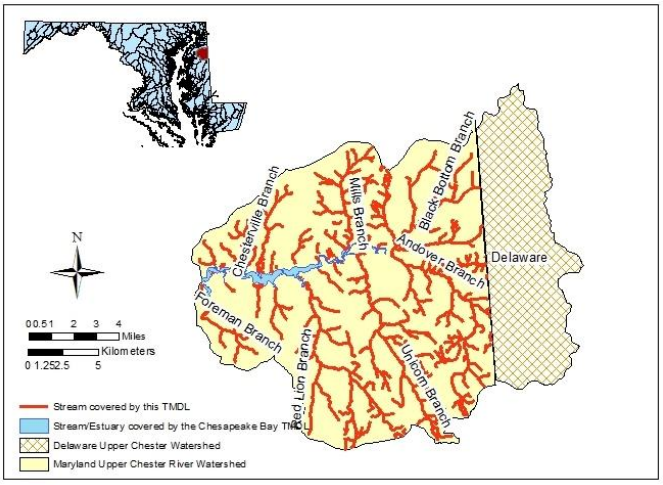
Maryland Department of the Environment

TMDL for Sediment in the Non-Tidal Upper Chester River

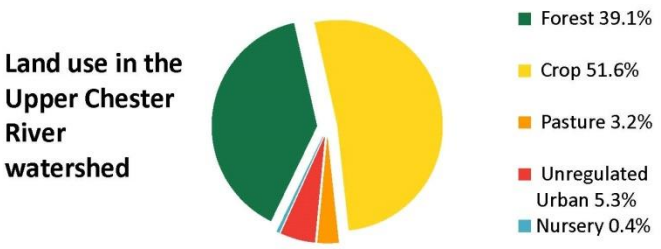
What You Need to Know

Background

The Total Maximum Daily Load, or TMDL, for sediment in the Upper Chester River watershed establishes an annual load limit for total suspended solids (TSS) to the non-tidal streams within the watershed. A separate sediment TMDL, for the tidal Upper Chester River, was established as part the Chesapeake Bay TMDLs in 2010.



The Upper Chester River watershed, as defined by the State of Maryland, is located in the eastern shore region of Maryland in Queen Anne's County, MD and Kent County, DE. The Upper Chester River extends from the headwaters in Delaware downstream to the confluence with Foreman Branch, and the Middle Chester watershed extends from that point downstream to the confluence with Southeast Creek. The watershed is located within the Coastal Plain eco-region.



Impaired aquatic life and wildlife in the watershed was first identified in 2002 based on results from the Maryland Biological Stream Survey (MBSS), a randomized survey of stream health. As part of the MBSS, streams are scored against reference watersheds where habitat and aquatic diversity is high, using two biological indices: the Benthic Index of Biotic Integrity (BIBI) which looks at the biological community in the bottom sediments, and the Fish Index of Biotic Integrity (FIBI).

Watershed ID	**Maryland 8-Digit: 02130510**
Watershed size	86,500 acres not including wetlands/water
Waterbody type	1st- through 4th-order non-tidal streams
Waterbody designated use not being met	Aquatic life and wildlife
Reason for impairment	Stream biology impacted by excessive sediment
TMDL Baseline year	2009
Overall sediment reduction percent	21%
Related Chesapeake Bay Segment	Upper Chester River Tidal Fresh (CHSTF)

A biological stressor identification (BSID) analysis was conducted in 2012 to identify possible causes of the stream degradation. Using MBSS data, the BSID showed sediment indicators, instream habitat, and water chemistry pollutants as potential causes. Based on this assessment, the Upper Chester River watershed was listed as impaired for sediment, as well as channelization on Maryland's 2012 Integrated Report of Surface Water Quality. The non-tidal sediment TMDL was approved April 8, 2019.

TMDL

The TMDL for sediment in the Upper Chester River watershed, was established at a level to ensure acceptable biological integrity in the watershed's streams.

The TMDL was developed with a reference watershed approach using loading results from the Phase 5.3.2 Chesapeake Bay Watershed Model. Annual sediment loads from reference watersheds—those with good biological integrity—were compared to predicted loads under a modeled all forest scenario to establish an acceptable ratio of current loadings to loadings in a natural condition. This ratio, known as the forest normalized load (FNL), was also calculated for the Upper Chester River watershed, and the TMDL was established based on the reduction needed to achieve the reference FNL.

Allocations

Allocations to point sources such as wastewater treatment plants and regulated stormwater, are called Wasteload Allocations (WLAs), and allocations to nonpoint sources, like cropland, are called Load Allocations (LAs). Sector load reductions in this TMDL were assigned using the controllable load methodology from Maryland's Phase II Watershed Implementation Plan (WIP) for the Chesapeake Bay. This methodology assigns reductions to controllable loads (e.g., agriculture & urban) and gives credit to existing implementation efforts, resulting in different percent reductions for different source categories.

The watershed has one municipal discharger, which was assigned a WLA of 10 tons of TSS per year—a load less than 1% of the TMDL. No reductions were applied to this source, as it would produce little discernible water quality benefit.

Regulated stormwater sources include one mining facility and several entities covered under general permits. The WLAs are described in detail in the TMDL's technical memorandum on point sources. Regulated stormwater WLAs represent less than 1% of the total TMDL.

The LAs for this TMDL, as presented in the technical memorandum on nonpoint sources, account for the remaining portion of the TMDL and are assigned to unregulated urban, agricultural, and natural source categories.

The Baseline and TMDL equations for the Upper Chester River watershed, including source categories and allocations are provided in the equation below.

Baseline Equation:	**7,150** Baseline Load	=	**1,170** Upstream Load	+	**333** Forest	+	**5,293** Agriculture	+	**329** Unregulated Urban	+	**15** Stormwater	+	**10** Wastewater	**TSS tons / year**
TMDL Equation:	**5,673** TMDL	=	**916** Upstream Load	+	**333** Forest LA	+	**4,251** Agriculture LA	+	**148** Unregulated Urban LA	+	**15** Stormwater WLA	+	**10** Wastewater WLA	**TSS tons / year**
Reduction from baseline	21%		22%		0%		20%		55%		0%		0%	

Note: The loadings in this TMDL are expressed as Edge-of-Stream, or EOS, loads, based on the Phase 5.3.2 Chesapeake Bay Watershed Model

Next Steps

Most of the sediment reductions in this TMDL are assigned to agricultural and urban stormwater sources. Implementation of these reductions will occur in parallel with efforts to fully implement the 2010 Chesapeake Bay TMDLs by 2025. While the endpoints of the TMDLs are different—tidal water quality actions will result in progress toward both goals.

Sediment reductions from agricultural sources are usually achieved by managing runoff and erosion with best management practices (BMPs) such as conservation tillage, and riparian buffers. Statewide programs and regulations that promote agricultural BMPs will reduce sediment loads in the Upper Chester River watershed. The Chesapeake and Atlantic Coastal Bays Trust Fund, for example, makes funds available for planting cover crops.

For urban stormwater, sediment reductions are typically achieved by addressing water quality and quantity with stormwater BMP retrofits. Retrofits include the modification of existing stormwater ponds, the installation of new structural BMPs, tree planting and stream restoration. Individually permitted MS4 jurisdictions are required to develop plans for implementing the sediment reductions from this TMDL. The BMPs described in these plans may also be used for meeting permit impervious area restoration requirements.

While this TMDL establishes a sediment loading target for the watershed, and sediment load reductions are an important tool for tracking progress, the measure of its successful implementation will be its effect on in-stream biological health. The watershed cannot be classified as meeting water quality standards until it is demonstrated that aquatic life is no longer impaired by sediment.