C.A.R.E.S.

Chester River **A**ction, **R**estoration, and **E**nforcement **S**cheme

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Overview

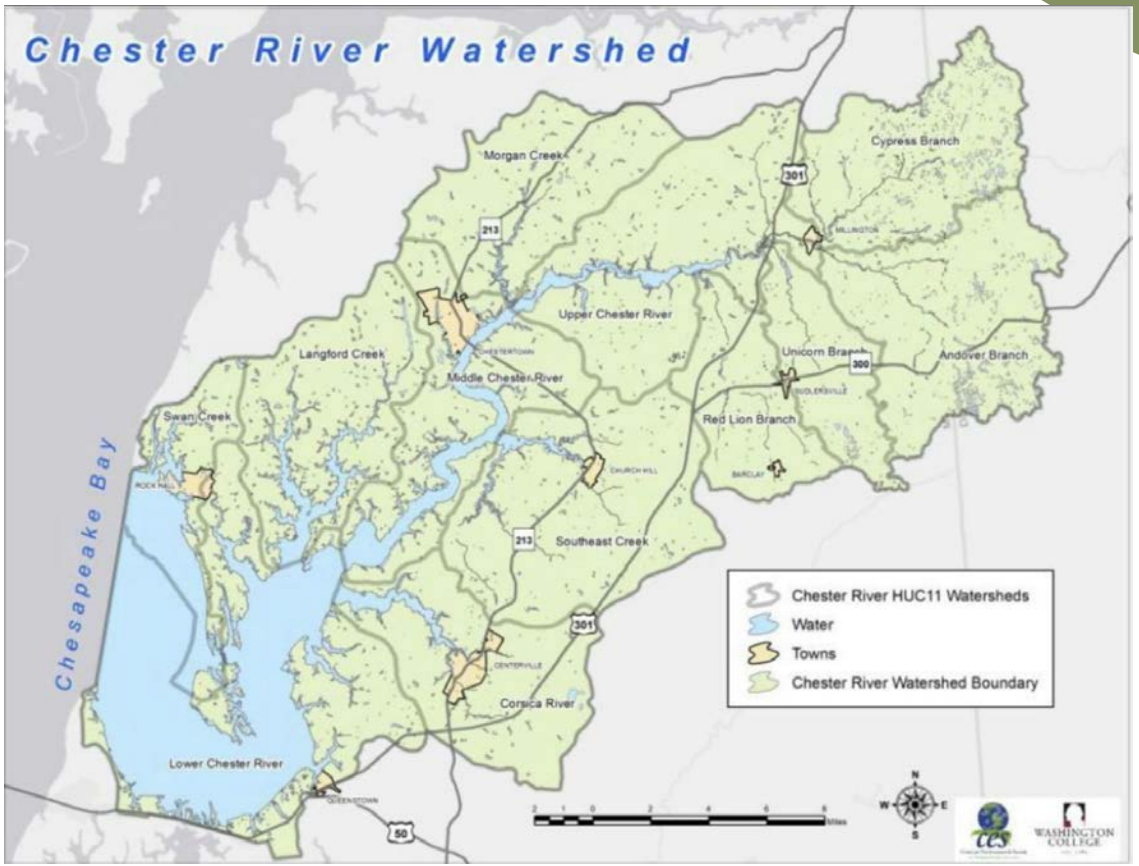
- ➔ Background/History
- ➔ Mission statement
- ➔ Current policies
- ➔ Problem + goal #1
- ➔ Problem + goal #2
- ➔ Problem + goal #3
- ➔ Questions

Background- Chesapeake Bay (Chester River)

- Major tributary located on Maryland's Eastern Shore, flowing into the Chesapeake Bay
- Supports important aquatic habitats, fisheries, and recreational use
- Main water quality concerns include nutrient runoff, sediment erosion, and stormwater discharge
- Economically dominated by farmland and agricultural production

Sources of Pollution

- Agricultural runoff: Largest source causing excess nutrient runoff into stream
- Urban stormwater runoff: Rainwater carries chemicals, lawn fertilizer, and debris
- Sediment / soil erosion: Loose soil clouds the water and harms aquatic habitats
- Wastewater and septic discharge: Treatment plants and leaking septic systems contribute nitrogen and phosphorus to stream



Mission Statement

The goal of the CARES initiative is to analyze multiple problems that face the tributaries of the Chesapeake Bay. More specifically, to analyze environmental issues facing the Chester River in Maryland, which flows into the Chesapeake Bay.

As a result of our analysis, steps can be taken to mitigate these issues to promote a healthy tributary of one of America’s most important bays.

Current Policies

- EPA's Chesapeake Bay Total Maximum Daily Load (TMDL), 2010
  - Nitrogen (185.9 million lb/year)
  - Phosphorus (12.5 million lb/year)
  - Sediment (6.45 million lb/year)
- Watershed Implementation Plans (WIPs)
  - For each state to show how they plan to meet the TMDL goals
  - Delaware and Maryland
- Maryland Nutrient Management Law, 1998
  - fertilizer application rates
  - manure use
  - timing of spreading
  - setback distances from waterways

Problem 1: Low Dissolved Oxygen Content

Oxygen levels drop in deeper waters. Causing fish, crabs, and other aquatic life to struggle to live or just die. It creates “dead zones” in summer.

- Decomposing of algal blooms - Microbes consume oxygen as they break down algae.
- Water stillness - Warm surface water prevents mixing with cooler bottom water.
- Slow tidal flushing - Some tributaries do not exchange water quickly, allowing oxygen depletion to persist.

Goal 1: Raise Summer Dissolved Oxygen Above 5.0 mg/L by 2035.

What?

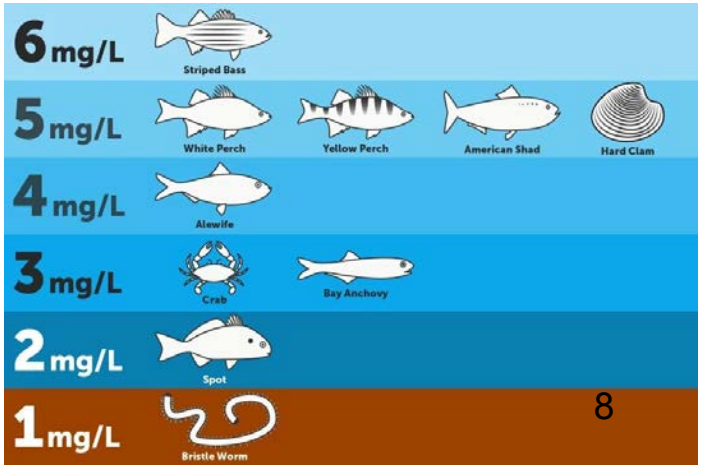
- Applies to all major tributary segments
- Focus on Chester River and Eastern Bay tributaries
- Improve aquatic life

How?

- Reduce nitrogen and phosphorus runoff
- Restore riparian buffers and wetlands
- Improve stormwater and agricultural management practices

Why?

It supports aquatic life, fish health, and help prevent fish kills.



Problem 2: Algal Blooms from Eutrophication

Eutrophication is when a body of water is over encumbered by nutrients such as phosphorus or nitrogen, which leads to problems like algal blooms. Algal blooms block sunlight from reaching the water and deplete oxygen from the water.

- Excess nutrient runoff - Nitrogen and phosphorus from fertilizers applied to agricultural fields.
- Animal waste - Poultry and livestock manure from farms in the watershed.
- Septic system leakage - Failing or outdated septic systems releasing nutrients into groundwater.

Goal 2: Reduce Total Nitrogen and Phosphorus Loading to the Chester River by 30% by 2035.

What?

- Focus on lowering nutrient inputs from agriculture, stormwater runoff, and wastewater
- Supports Chesapeake Bay TMDL and local watershed restoration goals

How?

- Reduce agricultural fertilizer runoff
- Improve stormwater treatment and BMPs
- Restore riparian buffers and wetlands

Why?

Reducing nitrogen and phosphorus inputs is essential to prevent algal blooms, improve dissolved oxygen levels, and protect the ecological health of the Chester River and Chesapeake Bay.

Problem 3: Sedimentation/Habitat Loss

Increased turbidity (cloudy water), which makes the water less clear. Loss of spawning and nursery habitats due to sedimentation.

- Agricultural erosion - Soil washing off fields during rain events.
- Shoreline erosion - Loss of natural buffers like marshes and forests.
- Development and impervious surfaces - Stormwater runoff carrying sediment into tributaries.

Goal 3: Restore 25 km² of Riparian Buffers and Wetlands in the Chester River Watershed by 2035.

What?

- Focus on streambanks, floodplains, and low-lying wetland areas
- Increase natural filtration zones throughout the watershed

How?

- Plant native trees, shrubs, and grasses along streambanks
- Remove invasive species and stabilize eroded banks
- Protect restored areas through conservation easements and land management policies

Why?
To naturally filter pollutants, reduce erosion, and improve habitat quality throughout the Chester River watershed.

Conclusions / Recommendations

- Improving dissolved oxygen levels, reducing nutrient loading, and restoring buffers/wetlands are interconnected goals that support long-term watershed health
- Agricultural runoff and stormwater remain the primary drivers of water quality degradation in the Chester River
- Continued implementation of TMDLs, nutrient management practices, and restoration projects is essential to meet 2035 targets
- Prioritize riparian buffer restoration and agricultural BMPs as the most cost-effective short-term actions
- Long-term success depends on state policy enforcement, local stakeholder cooperation, and sustained monitoring

A balanced approach between environmental restoration and sustainable land use is critical for protecting the Chester River and the broader Chesapeake Bay watershed.

Questions?

Sources

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