NICE

Nanticoke Integration for a Cleaner Environment

Group 6

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Contents

Mission Statement

The Nanticoke Integration for a Cleaner Environment (NICE) aims to protect and improve the surface water quality of the Nanticoke River through the management of the non-point sources of pollution (agricultural runoff) and anthropogenic activities. This plan recommends the additional adjustment on existing agricultural policy, and implementation of best management practices that will alleviate problems associated with non-point source pollution from agricultural runoff and human activities in order to restore boatable, fishable waters, and reduce TMDLs by 50% by 2035.

Basemap of Nanticoke River Watershed
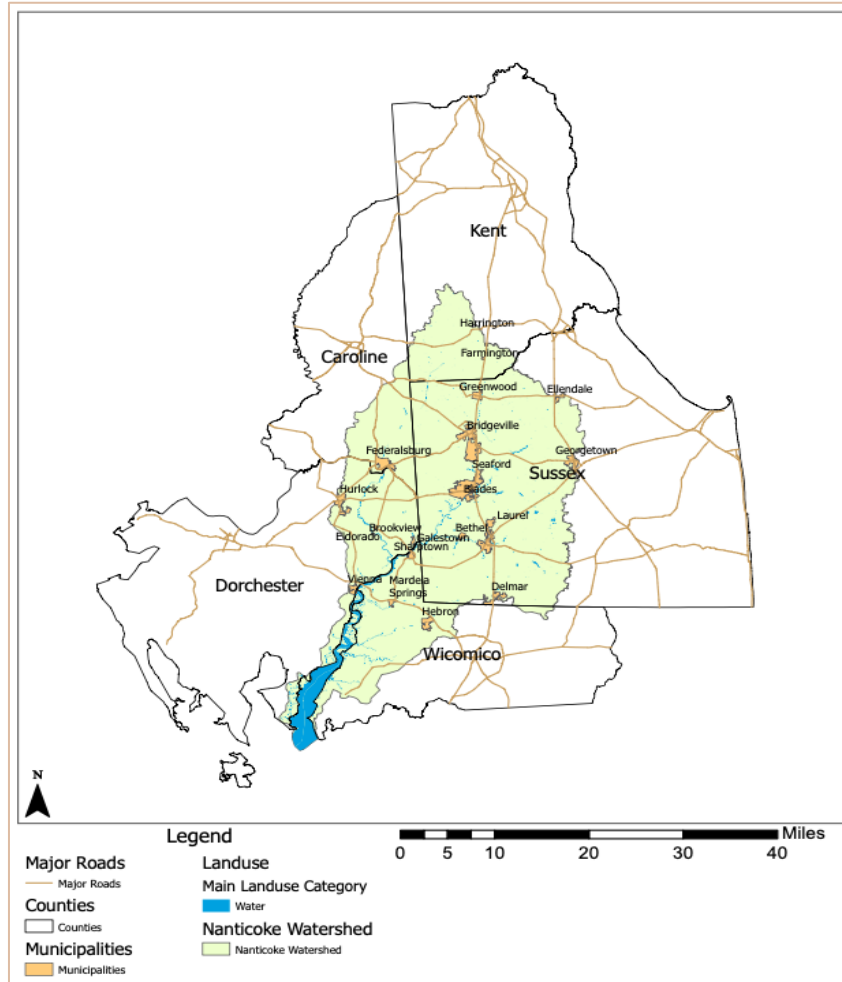
Background

★ One of the Chesapeake Bay Tributary that flows for 50 miles from Southern DE to Maryland

★ Encompasses approximately 725,000 acres, including over 50,000 acres of tidal wetlands

★ Watershed is 88.5 miles in length with elevation of 19.8 ft

★ Home to 42,459 residents

★ Region was settled by several Native American tribes 12,000 years ago, continues through the colonial and civil war eras and end with the 19th century's growing seaports and agricultural community

★ Served as an important waterway for hunting, fishing, farming and travel

Ecological Significance

- Nanticoke watershed has diverse natural conditions and an abundance of wildlife.
- **Has distinctive ecosystems**, it provides good habitat for rare plants and animal species
- **Bird species** found in this area are: Neotropical songbirds, eagles, ospreys, peregrine fowls, owls, wild turkeys etc.
- **Designated as focal area** for waterfowls by North American Waterfowl Management Plan
- **Main migratory game species** that breed in this region are: mallards. Black ducks and Canada geese
- **Rare amphibians**: Eastern Tiger Salamander and Carpenter Frog

Problem 1: Decreasing Wetland

- Nanticoke Area's topography is best for agriculture due to its flat surface and the soils of unconsolidated sands and clays are perfect for crop
- More urban development is present now a days.
- Increasing civilization and Farmland

Landuse in Nanticoke River Watershed
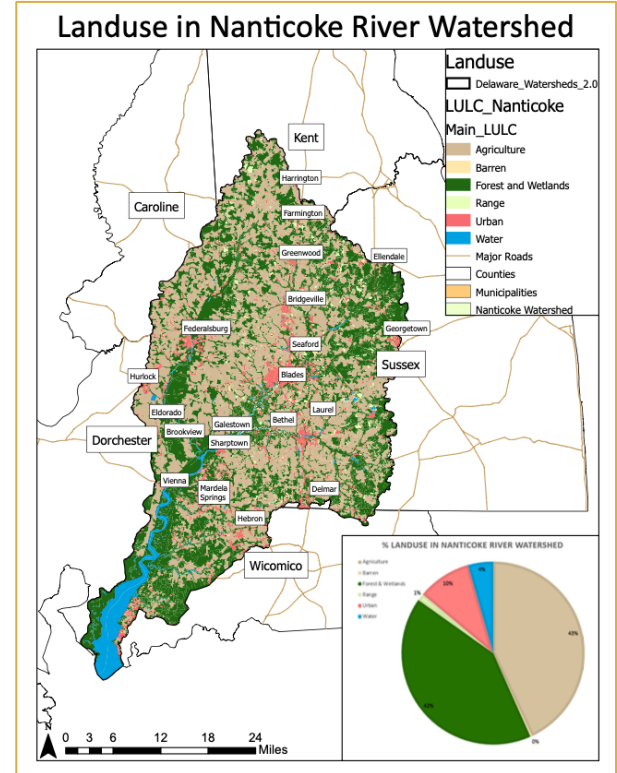
Wetland Type	Pre-settlement Area (% of Wetlands)	1998 Area (% of Wetlands)	Net Area Change (% of Pre-settlement)
Estuarine Intertidal	9,569.6 (10.3)	6,849.4 (11.9)	−2,720.2 (−28.4%)
Palustrine Emergent			
Tidal	1,091.7 (1.2)	273.2* (0.5)	−818.5 (−75.0%)
Nontidal	25.7 (<0.1)	2,169.3 (3.7)	+2,143.6 (+8341%)**
Total	1,117.4 (1.2)	2,442.5 (4.2)	+1,325.1 (+118.6%)
Palustrine Forested			
Tidal	2,926.4 (3.1)	3,307.9*** (5.8)	+381.5 (+13.0%)
Nontidal	79,511.8 (85.4)	42,975.5*** (74.8)	−36,536.3 (−46.0%)
Total	82,438.2 (88.5)	46,283.4 (80.5)	−36,154.8 (−43.9%)
Other Palustrine			
Farmed	-0-	1,428.3 (2.5)	+1,428.3 (NA%)
Ponds	-0-	488.0 (0.8)	+488.0 (NA%)
Total	-0-	1,916.3 (3.3)	+1,916.3 (NA%)
Grand Total	93,125.2	57,491.6	−35,633.6 (−38.3%)

* Includes 153.3 ha of riverine tidal wetlands, mostly marshes.
** This increase is an artifact, since the pre-settlement extent of non-tidal emergents could not be accurately established.
*** Includes scrub-shrub wetlands and mixed communities where forested or scrub-shrub wetland was the dominant class.

Problem 2: Channelization

- According to Watershed Report conducted by Maryland, Department of Environment, the risk of channelization at Nanticoke Watershed is roughly 62% to be affected due to anthropogenic activities.
- Instreams Habitat are being affected, also the recreational activities present.
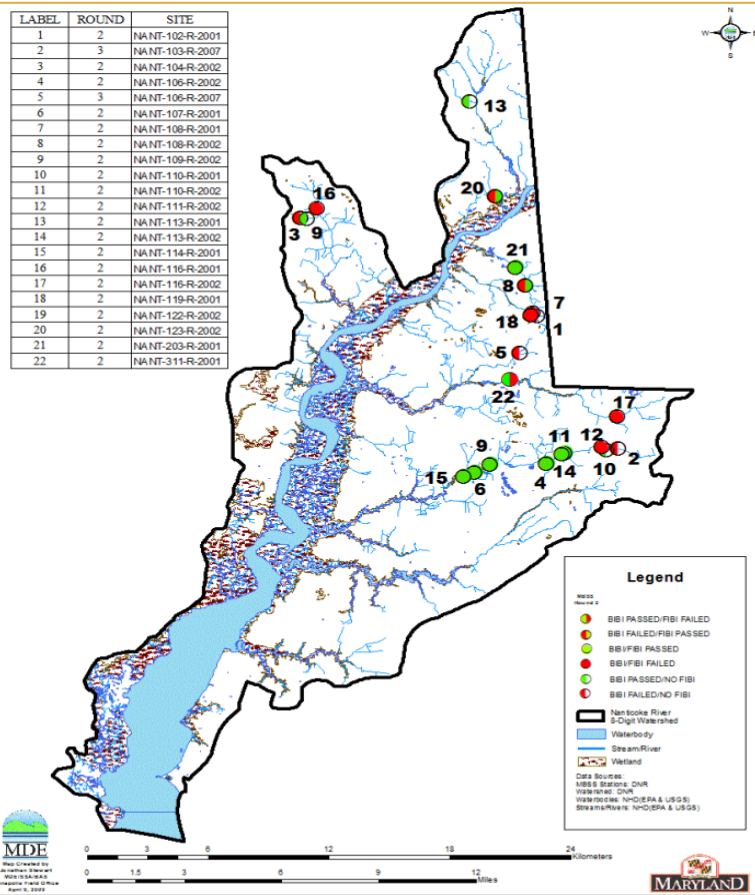
Figure 5. Principal Dataset Sites for the Nanticoke River Watershed

LABEL	ROUND	SITE
1	2	NANT-102-R-2001
2	3	NANT-103-R-2007
3	2	NANT-104-R-2002
4	2	NANT-106-R-2002
5	3	NANT-106-R-2007
6	2	NANT-107-R-2001
7	2	NANT-108-R-2001
8	2	NANT-108-R-2002
9	2	NANT-109-R-2002
10	2	NANT-110-R-2001
11	2	NANT-110-R-2002
12	2	NANT-111-R-2002
13	2	NANT-113-R-2001
14	2	NANT-113-R-2002
15	2	NANT-114-R-2001
16	2	NANT-116-R-2001
17	2	NANT-116-R-2002
18	2	NANT-119-R-2001
19	2	NANT-122-R-2001
20	2	NANT-123-R-2002
21	2	NANT-203-R-2001
22	2	NANT-311-R-2001

Table 5. Habitat Biological Stressor Identification Analysis Results for the Nanticoke River Watershed

Parameter group	Stressor	Total number of sampling sites in watershed with stressor and biological data	Cases (number of sites in watershed with poor to very poor Benthic or Fish IBI)	Controls (average number of reference sites with fair to good Benthic or Fish IBI)	% of case sites with stressor present	% of control sites per stratum with stressor present	Statistical probability that the stressor is not impacting biology (p value)	Possible stressor (odds of stressor in cases significantly higher than odds of stressor in controls using p<0.1)	% of case sites associated with the stressor (attributable risk)
Instream Habitat	Channelization present	22	12	167	75%	13%	0	Yes	62%

Problem 3: Increasing loads of Nitrogen and Phosphorus

- Increased nutrient loading usually comes from Agriculture and Urban activities.
- Agriculture has a huge impact on this since Nanticoke area has abundant farm lands that is used for agriculture.
- This increase in nutrients pollutes the watershed affecting aquatic ecosystem, and promotes eutrophication.

(Nanticoke Watershed Alliance,
 Report Card 2020)

Fishing Bay

FISHING BAY SCORES A D+, ITS CONSISTENT GRADE SINCE 2018.

Fishing Bay neighbors the Nanticoke River. Along with the Wicomico River, they empty into the Tangier Sound. Due to this influence, Nanticoke Creekwatchers monitor four sites in Fishing Bay, and we include Fishing Bay in the Nanticoke River Report Card.

Unlike other Creekwatchers, the volunteers who monitor the Fishing Bay sites collected the same number of nutrient samples in 2020 as in 2019, so the data are directly comparable.

Once again, Fishing Bay scored a D+ overall. **Total Phosphorus worsened, with Fishing Bay earning an F in 2020. Otherwise, the region's parameter grades were very similar to 2019 grades.**
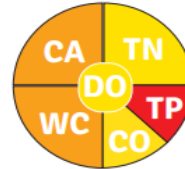
FISHING BAY SITES
● Nanticoke Creekwatcher Sites
○ Chesapeake Bay Program Site

FIGURE 11

D+ **Fishing Bay**

CA TN DO TP WC CO

FIGURE 12

A   B   C   D   F

Goal 1: Reduction of Manmade Activities/Use Monitoring Tools

- Promote less on anthropogenic activities
- Provide better knowledge for people living in the vicinity of Nanticoke Watershed with regards to the adverse effects of anthropogenic activities to the watershed.
- Use Monitoring tools like Remote Sensing, Station Monitoring, GIS, etc..
- Gather best practices from other states with regards to enhanced monitoring of watersheds

Goal 2: Promote Stream Restoration

- Channelization may be done to reduce flooding and increase in runoff, but it has negative effects to the streams.
- Promote Stream Restoration by joining organizations that focuses on this activity. Some group like the Maryland Stream Restoration Association.
- Help gather more people to be involved and be educated on the positive side of restoring streams in terms of increasing habitat and its designated use.

Goal 3: Macromanagement on Agriculture and Point Source Pollution

- Get involved in helping understand better what the current regulatory is implying (CWA).

- Get involved in the regulation making with regards to the nutrient placing of farmers for their crop. (with existing regulation for Delmarva)

Water Quality Regulations

- Federal
  - Clean Water Act
    - Pollution Control practices
    - Inspections and Monitoring
- State
  - MD Department of Natural Resources
  - DE Department of Natural Resources and Environmental Control
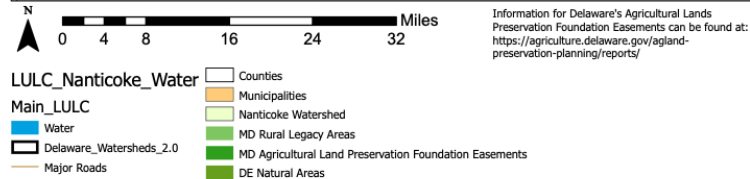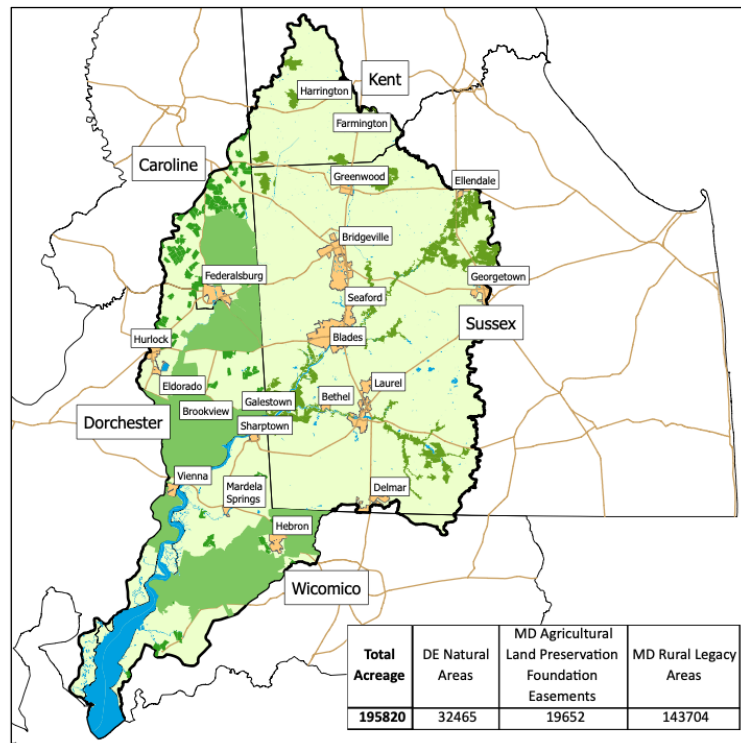
Protected Lands

- Federal
  - National Register of Historic Places

- State
  - Maryland
    - Rural Legacy Program
    - Agricultural Land Preservation
  - Delaware
    - State Parks / Natural Areas
    - Agricultural Land Preservation

Protected Lands in Nanticoke Watershed

Recommendations

To enhance the efficiency of implemented regulations and policies, NICE recommends:

- The provision of education, information, and incentives to the farmers

  Problem: increasing loads of nitrogen and phosphorous
  Goal: micromanagement in agriculture and point source pollution

- The use of runoff reduction practices such as reforestation, soil restoration, or replacing impervious surfaces with conservation landscaping using native plants

  Problem: channelization and decreasing wetlands
  Goal: stream restoration, reduction of manmade activities

Conclusion

- The effective management of the Nanticoke river is pivotal to the preservation of the benefits of the Nanticoke watershed to the ecology and population from the problems such as decreasing wetlands, channelization, and increasing loads of nitrogen and phosphorus

- The reduction of man-made activities, promotion of stream restoration, and macro management in agriculture and nonpoint source pollution are goals that can supplement the implemented regulations and policies to overcome the mentioned problems

- Further recommendations include the provision of education, information, and incentives to farmers to promote their participation in overcoming the problems and attaining the goals. There is also the use of runoff reduction methods to help improve the water quality and protect the land of the watershed