

# **N.E.R.D**

## **Nanticoke Environmental Remediation Division**



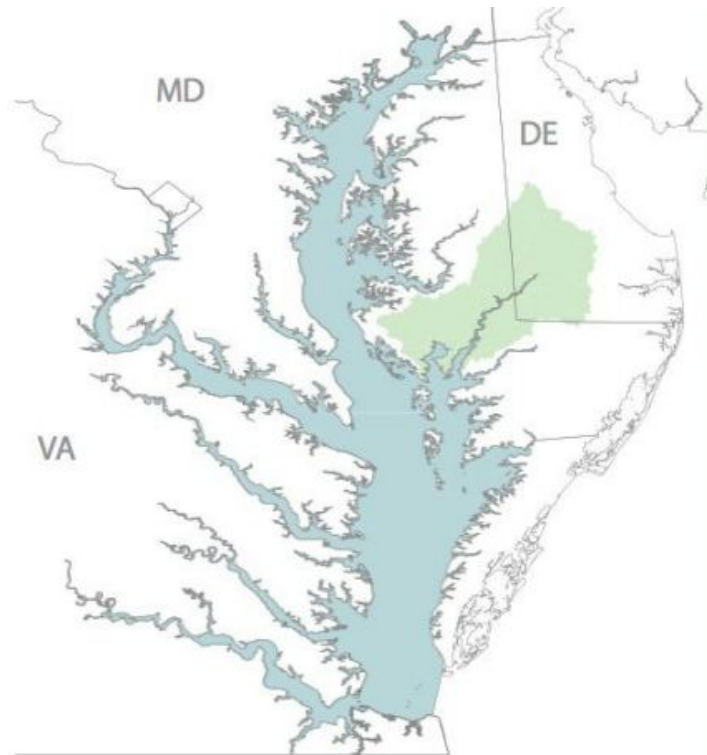
**Report by:  
Andrew Boyd, Brad Koontz, and Steven Lobo II**

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## **Mission Statement**

The Nanticoke River is a historically “dirty” river but, conditions are improving. This watershed is home to more than 250 endangered plant and animal species as well as containing the most significant wetlands of the Delmarva peninsula. Nitrogen and phosphorous are causing algal blooms. Also, the sandy soil is allowing groundwater pollution to travel faster. We seek to reduce nitrogen and phosphorus levels by 50% in the next 20 years, as well as reduce groundwater pollution transport by 25%..



(Figure 1: Nanticoke River Watershed is shaded in light green)

## **Nanticoke Watershed Characteristics**

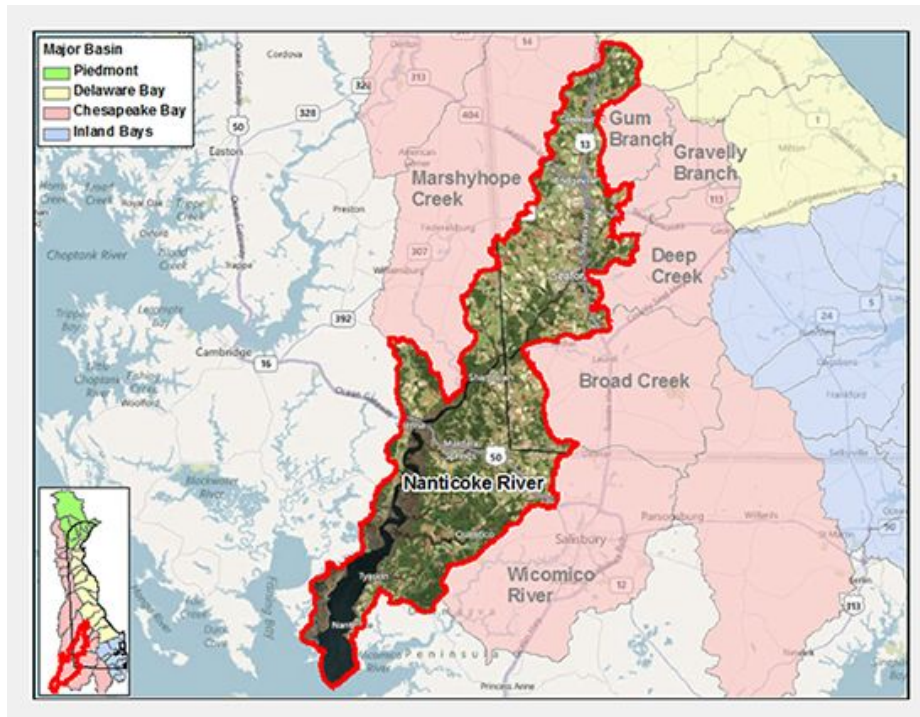
### **History**

Since as early as the 10th Century C.E., the Nanticoke River has served as an important waterway for hunting, fishing, farming, and travel. Up until the mid-1700's, the Nanticoke River was the lifeblood of the Nanticoke Indians. The River was rich in fish, shellfish, and its surrounding marshlands served as bountiful hunting grounds. The Nanticoke River also served as an excellent trading route and John Smith called the Nanticoke Indians "the best Marchants" of all other tribes in the region. John Smith sailed up the Nanticoke River in the summer of 1608 as he explored the many rivers that fed the Chesapeake Bay. With the arrival of Europeans, several shipbuilding hubs emerged in the towns Sharptown and Vienna, in Maryland, and Bethel in Delaware. These towns remained important shipbuilding hubs until the early 20th Century.

### **General Characteristics**

The Nanticoke River Watershed is Delaware's largest watershed and it covers over 725,000 acres in total. The Watershed is 88.5 miles in length with a maximum elevation of 19.8 ft. The Nanticoke River Watershed features very flat terrain overall. The Watershed spans two states and five counties (Kent and Sussex in DE; Caroline, Dorchester, and Wicomico in MD). The Chesapeake Bay ultimately receives all water that flows into the Nanticoke River Watershed. The Watershed consists of 38% forested land and 22% wetlands. Agricultural activity utilizes around 43% of the watershed

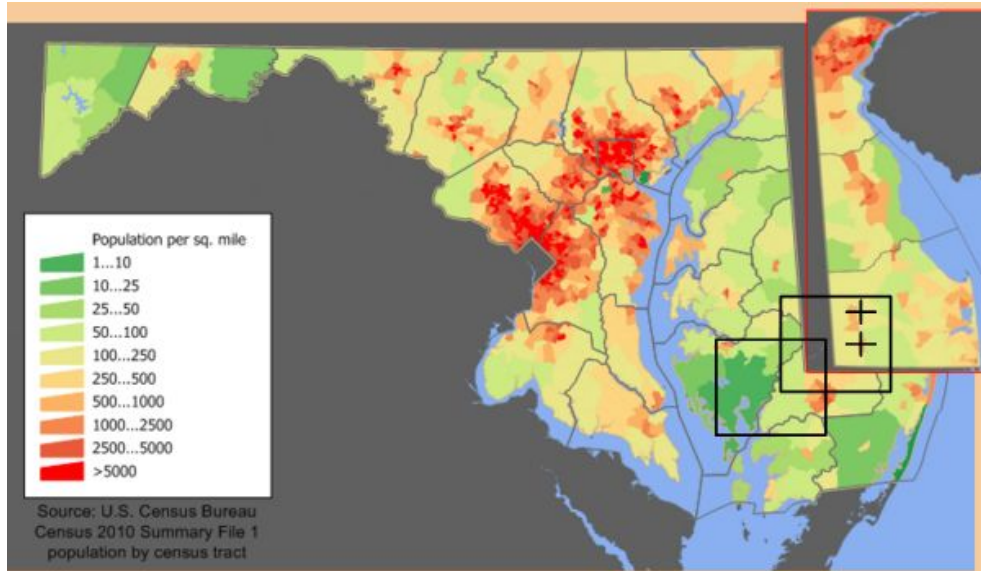
area. The Nanticoke Watershed serves as the habitat for a wide variety of plants and animals, especially waterfowl, which particularly thrive in the watershed. Many rare or endangered plants and animals also call the Nanticoke Watershed home.



(Figure 2: Aerial Overview of the Nanticoke Watershed)

## **Population**

The Nanticoke Watershed has a population of over 40,000 people. Two major cities, Seaford, DE and Laurel, DE, lie within the watershed with 2013 populations of 7,325 and 3,912 persons, respectively. Seaford lies directly on the Nanticoke River while Laurel lies on a tributary of the Nanticoke River, Broad Creek.

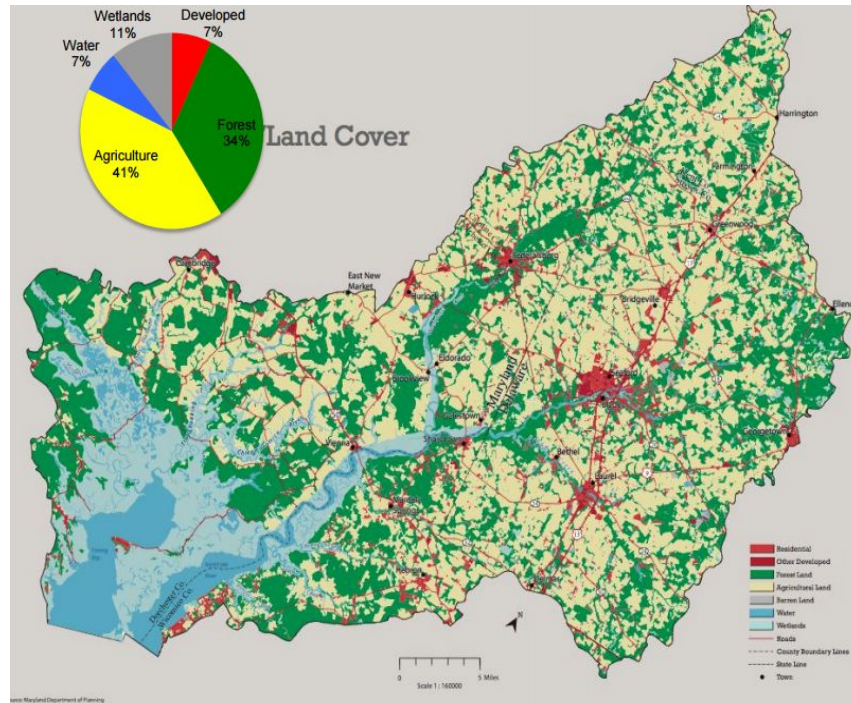


(Figure 3: Population Density Map for DE and MD, black boxes represent the watershed area)

## **Land Usage**

Originally, the Nanticoke Watershed covered an estimated 46% of the Coastal Plain physiographic region of Delaware and is historically very rich in flora and fauna as well as wetland resources. However, in recent times, the size of its wetlands has shrunk by as much as 40% or more and it is under constant stress by human created factors. Due to the drastic reduction of the wetlands and the increase in development within the watershed, a serious issue of runoff has been created. By observing the fact that a city block often produces nearly nine times more runoff than a woodland area of the same size, it is clear why replacing natural areas with impervious ones is such an issue. The primary use of land within the watershed is agriculture. Forested areas are prevalent near the Chesapeake Bay in the southwest corner of the watershed and along its numerous waterways. Near the larger cities within the watershed such as Federalsburg, Seaford and Laurel, the land is largely used for residential and commercial purposes.

Currently, approximately 20% of the watershed is protected. Of this, the Blackwater Wildlife Refuge combined with other state and local parks accounts for nearly 60,000 acres of protected land.

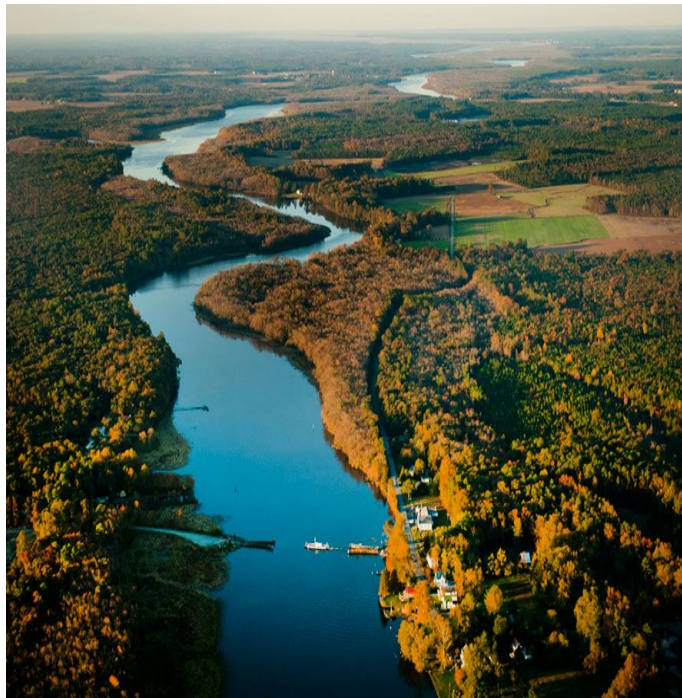


(Figure 4: Land use in the Nanticoke Watershed)

## Water Usage

Located just off of the Chesapeake Bay, the Nanticoke offers many of the opportunities that one may expect. Recreational fishing abounds throughout the region and other recreational activities such as boating are very popular. The Nanticoke and the numerous other waterways branching off of it support many marinas and yacht clubs, which are hubs from which boat owners can come and go. In the past, the Nanticoke supported a large commercial fishing industry, however in recent years, due to overfishing and poor water quality, it has been in decline. Oysters once accounted for a

large portion of this industry, however overfishing and disease took a toll on their populations and now only small patches of them remain. Thankfully, organizations such as Save The Bay work to restore their habitat and there are signs that they could make a comeback. Only blue crabs still provide a relatively plentiful and profitable harvest for these fishermen. Fortunately, there are no dams in the waterways of the Nanticoke watershed, and thus fishermen and all of the species that rely on these waters are free to traverse them as they please.



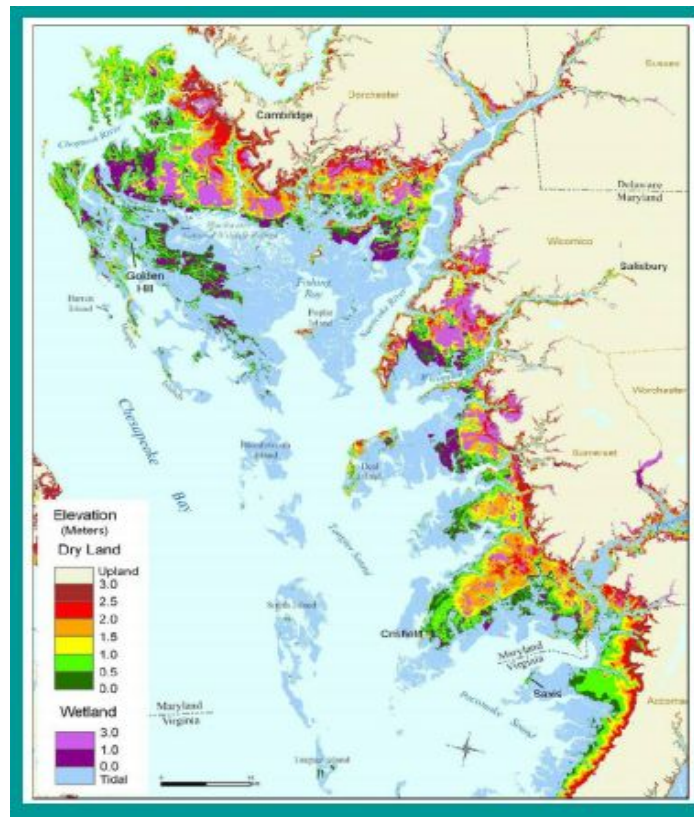
(Figure 5: Aerial View of the Nanticoke River and Surrounding Areas)



## Environmental Issues Facing the Nanticoke Watershed

### Sea Level Rise

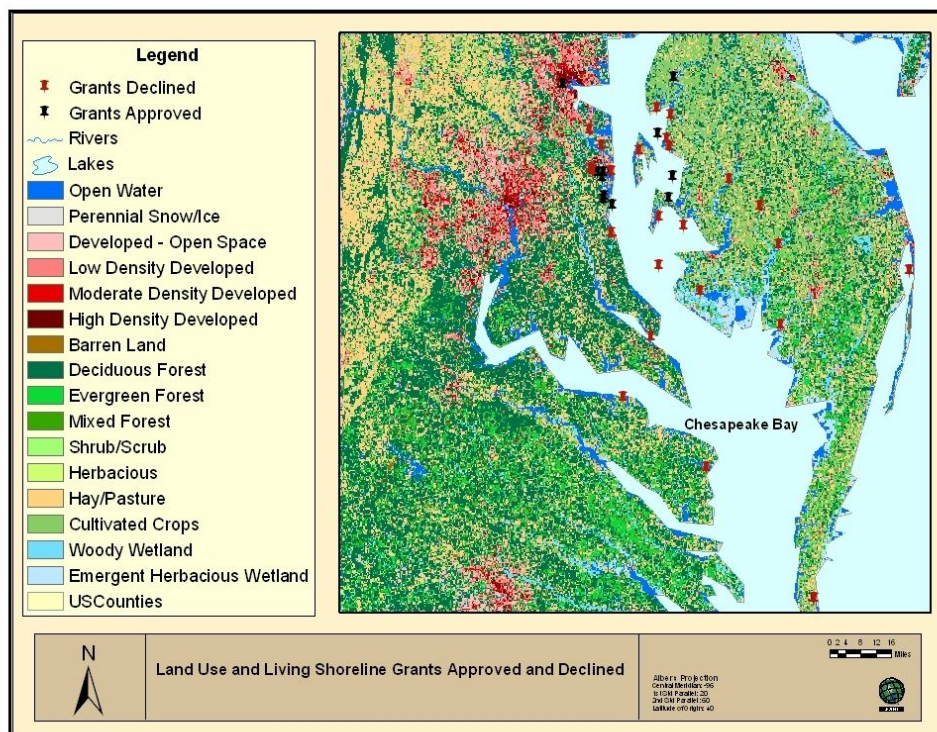
As climate change continues to gradually warm our planet and melt ice caps on land, the oceans are also warming, which causes water to slightly expand and occupy more volume. This will ultimately affect even small rivers like the Nanticoke. Much of the land bordering the river is flat and low, meaning that even a small increase in water depth could result in the inundation of a large amount of previously un-submerged land. Wetlands would be the first to go and would soon disappear beneath the water's surface. This would result in the destruction of vital habitat for many organisms and could impact coastal communities.



(Figure 6: Graph showing low-lying areas around Nanticoke River)

## Impervious Land

Impervious land cover refers to artificial surfaces that consist of impenetrable materials, such as pavement or concrete. Impervious land does not allow for the infiltration of water into soil and expedites runoff into the nearest catchment and, in this instance, the Nanticoke River. Impervious cover also will more readily hold chemicals and other toxins until being washed away by runoff. Overall, more impervious land cover means more runoff and that the runoff will move quicker. Total impervious land cover for the Nanticoke River Watershed is low at only 2%. Low impervious cover area is vital for maintaining a clean watershed especially because the Nanticoke Watershed already has an agricultural runoff problem.



(Figure 7: Map presenting detailed land use information)

## **Problems and Solutions**

<b>Problem</b>	<b>Effect</b>	<b>Solution</b>
Excess nutrients (Nitrogen & Phosphorus) from poultry and crop farms	Algal blooms that result in decreasing dissolved oxygen	Agricultural programs or legislation to minimize runoff into the river
Sandy soil conditions in the watershed lead to groundwater pollution negatively impacting the river	Nitrates in groundwater flow in Nanticoke River	Regular emptying and maintenance of septic systems

## **Existing Programs and Organizations**

### **Nanticoke Creekwatchers**

The Nanticoke Watershed Alliance Creekwatchers Citizen Monitoring Program began in July 2007. The 2007 was a partial pilot season; the program's first full season began in 2008. The program's primary goal is to accumulate long-term, scientifically credible data and to monitor the health of the Nanticoke River and the Fishing Bay headwaters.

### **Nanticoke River Conservation Corridor Initiative**

The effort began in 2008 when the Conservancy brought together the states of Delaware and Maryland and the National Park Service to sign a Nanticoke Partnership Agreement. The agreement commits the partners to work together to identify and implement best practices for the protection, restoration and enhancement of the Nanticoke watershed's natural, historic and cultural resources. The partnership also seeks to enhance public access and land conservation

along the Nanticoke and its tributaries, and to foster environmental education and stewardship opportunities.

**The Friends of the Nanticoke River** were formed in 1991, around a local issue of development of riverfront property for condominiums in Tyaskin, MD. Several citizens rallied around protecting their traditional way of life, and it became incorporated as a citizen's non-profit in that same year.

## **Sources**

### **Characteristics**

- <http://delawarewatersheds.org/chesapeake-bay/nanticoke-river/>
- [http://www.dnrec.delaware.gov/Admin/DelawareWetlands/Documents/Nanticoke%20Wetland%20Profile\\_final.pdf](http://www.dnrec.delaware.gov/Admin/DelawareWetlands/Documents/Nanticoke%20Wetland%20Profile_final.pdf)

### **Landuse**

- [ftp://131.252.97.79/Transfer/WetlandsES/Articles/weller\\_wetland\\_landscapeindicators.pdf](ftp://131.252.97.79/Transfer/WetlandsES/Articles/weller_wetland_landscapeindicators.pdf)
- <http://nanticokeriver.org/programs/atlas/>
- <http://www.arcgis.com/home/webmap/viewer.html?basemapUrl=http://tiles.arcgis.com/tiles/l6k5a3a8EwwGOEs3/arcgis/rest/services/MyMapService/MapServer>

### **Population**

- [https://upload.wikimedia.org/wikipedia/commons/f/f5/Maryland\\_population\\_map.png](https://upload.wikimedia.org/wikipedia/commons/f/f5/Maryland_population_map.png)

### **Impervious Land**

- <http://ldecola.net/edu/jhu/sp09/final/kbarrett.jpg>

### **Problems and Solutions**

- <http://imblackeagle.tripod.com/index-8.html>

### **Programs and Organizations**

- <http://www.friendsofthenanticoke.org/aboutUs.htm>
- <http://nanticokeriver.org/programs/volunteer/creekwatcher/>
- <http://www.dnrec.delaware.gov/News/Pages/Reclaim-Our-River-Program-to-hold-Second-Annual-Recycled-Cardboard-Boat-Regatta-Aug-8-on-Nanticoke-River.aspx>