P.R.O. Watershed Plan

Patuxent River Organization Watershed Plan

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Mission Statement

Our goal is to continue the efforts of the 1984 Policy Plan, and improve upon them as new problems arise in the present day. By 2030, we contrive to decrease the amount of pollutant runoff into the Patuxent River, to increase its ability to support local biodiversity, and protect the natural habitats, while educating the local community about its role in this PRO Watershed plan.

Figure 1. Patuxent River Watershed

History

The Patuxent River is the longest river running entirely through Maryland that is part of the eight major tributaries that feeds into the Chesapeake Bay. The Patuxent River Watershed covers over 937 square feet and the river flows for approximately 110 miles through the state of Maryland and has a maximum depth of 175 feet. The Patuxent River was first explored in 1608 by European settlers and soon played a key role in the southern Maryland transportation network as well as providing power to the numerous mills along its waterfront. In 1942 and 1954, two large dams were build at the Triadelphia and Rocky Gorge reservoirs, making the Patuxent River's headwaters key as a regional source for drinking water. It provides drinking water for approximately 650,000 people living in Montgomery, Prince George's, and Howard Counties. In addition, the river provides numerous recreational opportunities which includes kayaking, hiking, fishing, and is a key feature of many local parks.

In addition to being a key feature in everyday life for many residents in Maryland counties, the Patuxent River is key in assessing the water quality health of the Chesapeake Bay which is an essential economic engine for many Maryland residents. A 2012 study conducted by the Chesapeake Bay Foundation (CBF) concluded that the Chesapeake Bay was worth an estimated $1 trillion related to fishing, tourism, property values, and commerce. Additional findings included the fact that recreational boating contributes $2.03 billion per year and creates about 35,025 jobs for the Maryland economy. Most importantly though, an EPA study concluded that public health issues and economic losses experienced by the bay are not restricted to the tidal regions of the bay area and can extend back up each of its major tributaries as well.

Water Quality

The Patuxent River has had increasing issues over the years as the water quality and conditions of the river has progressively gotten worse over time. From 2006 to 2010 the Patuxent River received an average score of D as indicated by studies conducted to by University of Maryland Center for Environmental Science (UMCES). Water quality, chlorophyll a, and phytoplankton index of biotic integrity have consistently scored in the very poor range.

Land Use

The main contributor to this rapid change in water conditions has been the drastic shift in land use in the recent years. From 1973 to 2010, development increased from 68,000 acres to 230,000 acres within the watershed, while during that same time period the population doubled. The 2007 Patuxent River Report Card generated by Echocheck and UMCES reported that at that time over 53% of the land was being used for agriculture and urban development. It is believed that a majority of the pollution was caused by the sediment runoff that was generated due to different land use. The numerous wastewater treatment plants located along the river actually received upgrades in 1994 which reduced nitrogen loads by 50% and phosphorous loads by 76%. This resulted in positive growth by aquatic vegetation and fish.

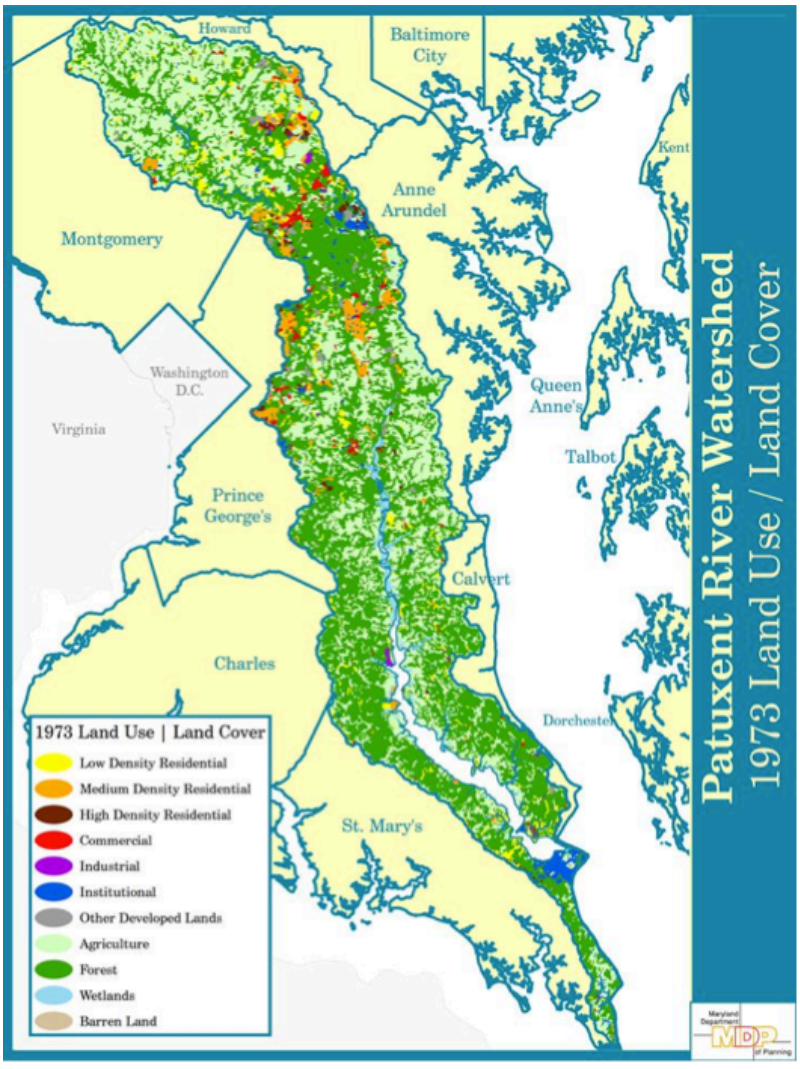

Figure 2. Patuxent River Watershed land use map in 1973

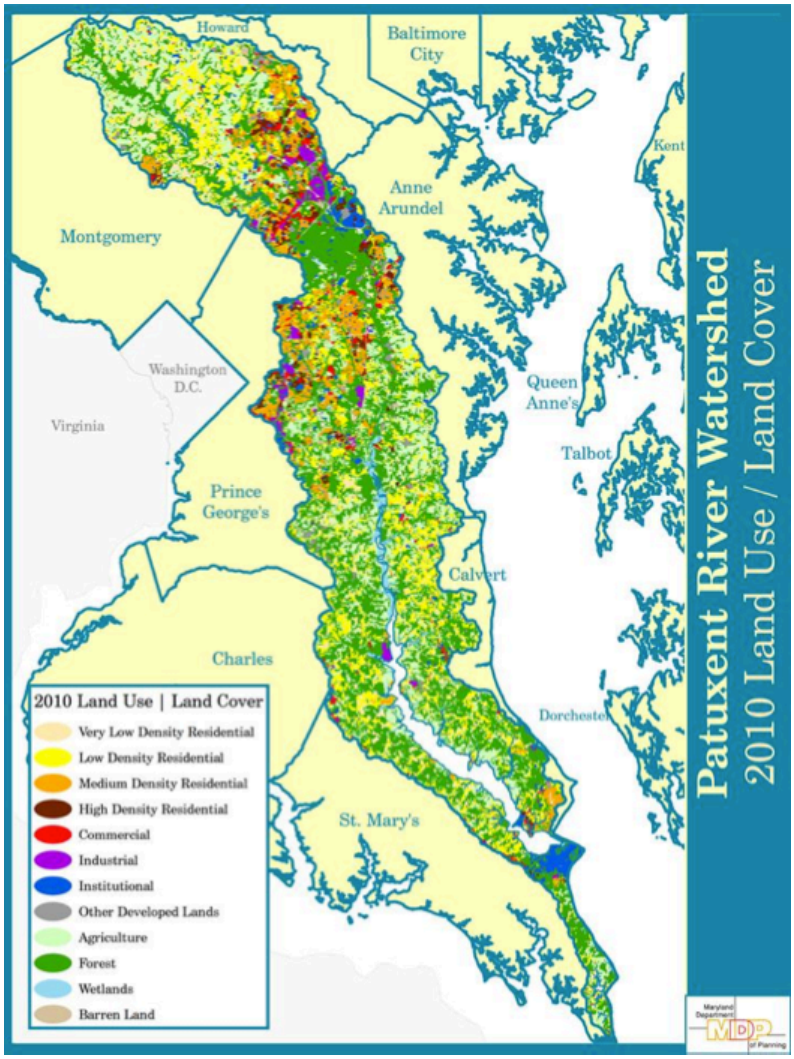

Figure 3. Patuxent River Watershed land use map in 2010

As shown in the comparison of Figure 2 to Figure 3, there has been a large increase in the commercial, residential, and industrial land use. This is a major contributor to the increase of impervious land cover, which may cause the decrease of water quality, and the increase of runoff.

Problems

As discussed previously, a major source of issues in the Patuxent River Watershed is the land use. Drastic increase of impervious cover over the years has not been handled in the best way, which has increased sediment load on the watershed and caused a decrease in the water quality. Although a focus on point source pollution stemming from wastewater treatment plants in the 1980's did increase the water quality, it was determined that nearly 50% of the nitrogen runoff and nearly 100% of the sediment transport was due to land use issue and nonpoint source pollution rather than from the wastewater treatment plants. Despite an effort in the 1990's to decrease

nitrogen and phosphorus loads, the effect could not overcome the population growth of the area, which caused more land to become developed instead of protected. Although urbanization is to be expected, best management practices should be followed, as will be discussed later.

The Patuxent River is an integral part of the fisheries, particularly oyster fisheries, in the Chesapeake Bay system. For this reason it is vital to maintain and improve upon fishable waters. Although oyster harvests have increased to over 8,000 bushels a year as of 2012, this is relatively small compared to the rate of 96,000 in 1986. Thus one major issue of the Patuxent River Watershed is its ability to support local biodiversity. Guidelines for Total Maximum Daily Loads (TMDLs) have been established, but a clear set of standards is not easily found. TMDLs for fecal coliform, BOD, and sediment exist for particular areas of the watershed, but a clear determination of TMDLs is necessary.

Another key problem in the Patuxent River Watershed is the lack of necessary public involvement. Most of the solutions regarding other problems that concern the wellness of the watershed require the participation and educated action of the people residing in the watershed. Therefore, the PRO-Watershed Plan would like to make a push to increase the number of public involvement and awareness programs to create a generation of informed citizens.

Existing Organizations

Maryland Department of Natural Resources- report annually about the status of the fish and shellfish within the Patuxent

Maryland Department of the Environment- report annually about the status of water quality within the Patuxent

Maryland Department of Planning- report annually about the forecasted changes in land Use within the watershed

Chesapeake Research Consortium- works to accurately report annually on the status of the watershed in order to initiate change

Patuxent River Commission- reviews the status of the watershed as reported by the Chesapeake Research Consortium, Maryland Department of Natural Resources, Environment, and Planning, and takes action to implement plans and foster environmental stewardship

Chesapeake Bay Foundation (Save the Bay)- advocates to protect, restore, and preserve the health of the Chesapeake Bay and surrounding area

Problems and Solutions

Problem	Cause	Result
P1. Excessive Sediments	Accelerated Erosion from Human Land Use	Degraded quality of water for marine species and destruction of small stream organism habitat
P2. Excessive Nutrients(Nitrogen and Phosphorous)	Stormwater runoff from agricultural areas, increased impervious land and municipal wastewater treatment plants	Increased amounts of dense algae blooms that are harmful for fish species
P3. Pollutants	Stormwater runoff from urban and agricultural areas and releases from new industries	Degradation overall water quality of watershed
P4. Increased Impervious Cover	Increase in Development of Residential and Commercial Areas to support growing population	Increase in amount of runoff and less open green spaces for public excitement regarding 7environment/watershed with help of Maryland Department of Planning
P5. Public Involvement	Lack of education and excitement regarding the watershed	Less than maximum possible interest and actions taken towards the preservation of watershed

Problem	Solution	Goal
P1. Excessive Sediment	S1. Encourage Residents to Use Compost or Weed-Free Mulch on lawns and gardens and avoid mowing near streams	G1. Decrease the amount of sediment entering watershed using an awareness program of best practices that reaches at least 80% of the residents
P2. Excessive Nutrients(Nitrogen and Phosphorous)	S2. Keeping farm animals in barns and increase efficiency of wastewater treatment plant furthermore	G2. Assess and Achieve that over 90% of farmers participate in this practice and reduce nutrient outflows from wastewater plants by 50% of current levels with the Maryland Department of the Environment
P3. Pollutants	S3. Expand on the current Total Daily Maximum Loads(TMDLs) and make the standards more coherent and accessible throughout the watershed	G3. Create a new database/resource as an avenue for clearly communicating TMDLs to be enforced with Chesapeake Research Consortium
P4. Increase in Impervious Cover	S4. Increase Vegetative Buffers and Rain Gardens to increase infiltration and add greenery to local spaces	G4. Establish a new law mandating a certain increase in vegetative cover/rain gardens that is proportional to increase in impervious cover
P5. Public Involvement	S5. Develop new education and awareness programs tailored to various audiences ranging from school children to working adults such as farmers and construction workers	G5. Assess that at least 75% of the inhabitants of the watershed have attended or been informed about the various Watershed Awareness programs created and run Patuxent River Commission and Chesapeake Bay Foundation

References

History

- http://ian.umces.edu/ecocheck/report-cards/chesapeake-bay/2006/summaries/patuxent_river/
- http://web.archive.org/web/20110403122704/http://www.montgomerycountymd.gov/content/dep/downloads/PatuxentProfile.pdf
- http://planning.maryland.gov/PDF/OurWork/PRC/3-2015/patuxent-plan2010-2014-implementation-report-FINAL.pdf
- http://www.paxriverkeeper.org/about-us/about-the-river/
- http://www.cbf.org/about-cbf/our-mission
- http://planning.maryland.gov/PDF/OurWork/PRC/3-2015/patuxent-plan2010-2014-implementation-report-FINAL.pdf
- http://www.paxriverkeeper.org/about-us/about-the-river/
- http://www.cbf.org/about-cbf/our-mission
- http://planning.maryland.gov/PDF/OurWork/PRC/PRC-policy-plan-adopted-2014-0514.pdf
- https://planning.maryland.gov/PDF/OurWork/PRC/water.pdf

Existing Organizations

- http://www.cbf.org
- http://dnr2.maryland.gov/Pages/default.aspx
- http://www.mde.state.md.us/Pages/Home.aspx
- http://planning.maryland.gov
- http://www.chesapeake.org
- http://planning.maryland.gov/ourwork/patuxentrivercomminfo.shtml

Images

- http://mdpgis.mdp.state.md.us/landuse/imap/index.html?dynTheme=dynExample3&webmap=0174e52812434a8a9284299ff8bdeb74&extentBBox=-8570848.107171357,4610555.926978258,-8469874.792806774,4675756.712105425&extentSR=102100