2019-2020
Biennial Report

Implementation of the *Patuxent River Policy Plan*

PATUXENT RIVER COMMISSION

Executive Summary

The Patuxent River is one of eight major tributaries of the Chesapeake Bay, and it is the longest and deepest, with a maximum depth of about 175 feet. Its watershed is contained entirely within Maryland, and it flows 110 miles and stretches more than one mile across at its entrance to the Bay. Its watershed covers 937 square miles, or about one-tenth of Maryland's land mass. The influence of the Patuxent extends into multiple jurisdictions within the state, including seven counties in the Baltimore/Washington D.C. metropolitan area, two of Maryland's largest cities (Laurel and Bowie), and one of Maryland's largest unincorporated areas (Columbia).

With incidents of heavy rain becoming more common and the 2025 deadline for achieving the Chesapeake Bay Total Maximum Daily Load (TMDL) cap for nitrogen, phosphorus, and sediment fast approaching, the health of the Patuxent River is more important than ever.

Forty years ago, the state recognized the importance of protecting the ecological, recreational, historical, and cultural resources of the Patuxent River and its tributaries. The Patuxent River Watershed Act, adopted in 1980, directed the establishment of the Patuxent River Policy Plan (Policy Plan) and the Patuxent River Commission (Commission or PRC). The Policy Plan serves as a guide for local jurisdictions and state agencies in carrying out their actions and regulatory programs in the Patuxent River watershed, while the PRC is charged with assisting in coordinating and facilitating the work of state and local governments in implementing the Policy Plan.

The original 1984 Policy Plan, signed by all seven counties within the Patuxent watershed and later approved by the City of Laurel, identified 20 goals and 10 recommendations to improve the Patuxent River. The 2015 Policy Plan, adopted in 2014 by all of the local governments represented on the PRC, and in 2016 by the Maryland General Assembly, replaces the original 1984 Policy Plan, last amended in 1997.

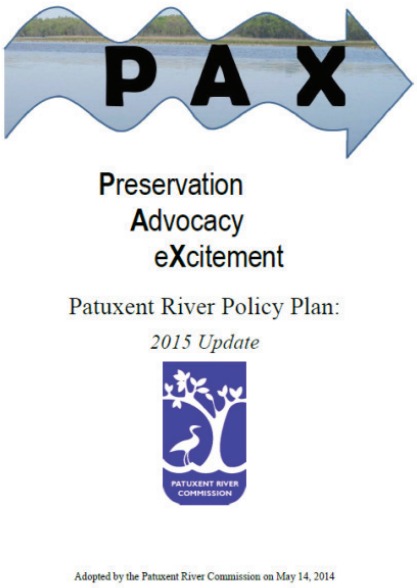
The 2015 Policy Plan

The 2015 Policy Plan contains three general policies - Preservation, Advocacy and eXcitement, or PAX for the Patuxent River - to guide the work of the local jurisdictions and the state within the Patuxent River watershed:

Preservation. Local jurisdictions and the state will work toward the preservation of the Patuxent River, and the land within its watersheds and the restoration of the ecological and economic functions of the river.

Advocacy. Local jurisdictions and the state will advocate for the Patuxent River by raising awareness among the general public, and elected and appointed officials of the challenges the river faces, and also to make recommendations for improvements.

eXcitement. Local jurisdictions and the state will create excitement about the Patuxent River and its value as a natural, scientific, economic, cultural and educational resource.

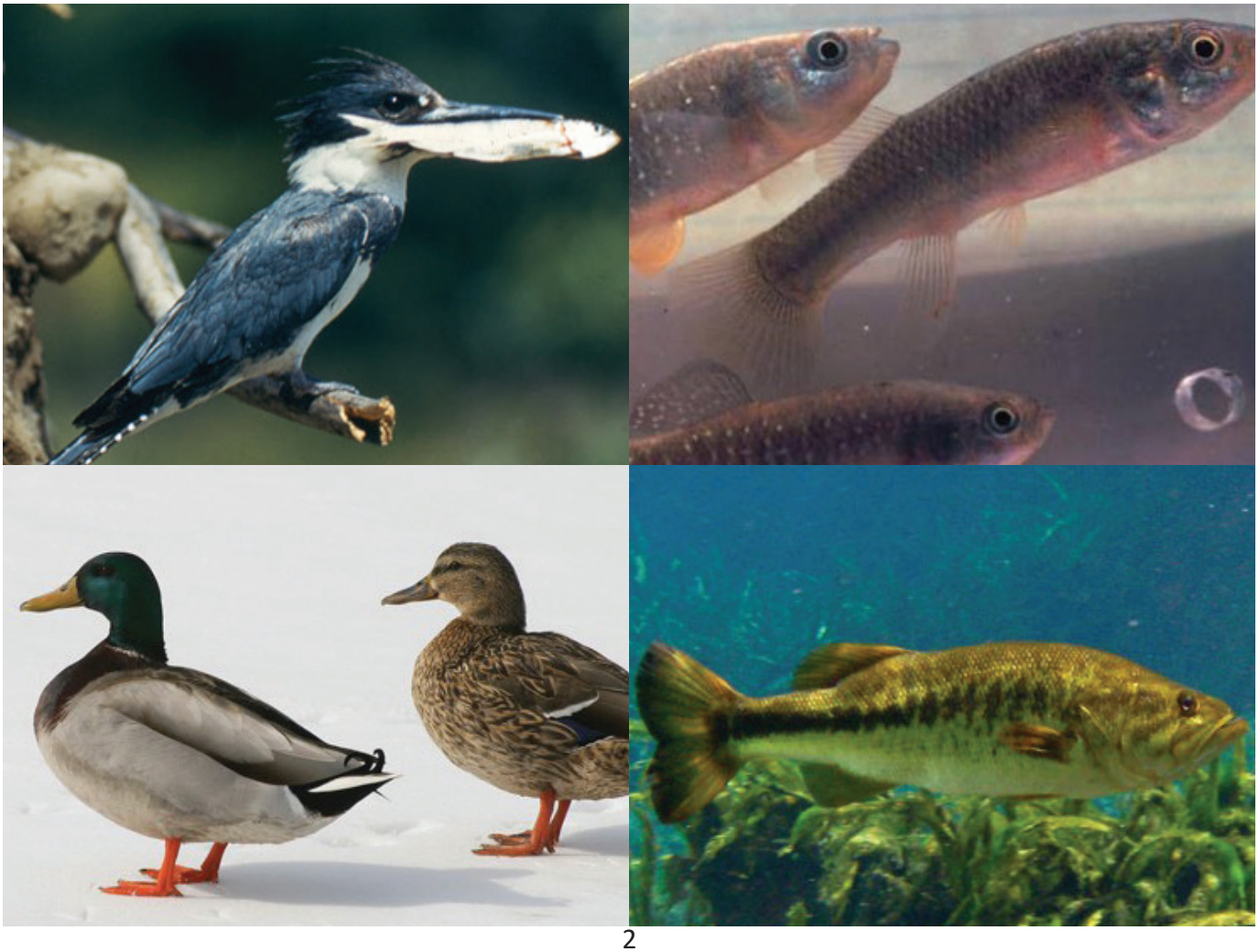


2019-2020 Biennial Report

The Maryland Department of Planning (Planning) submits a report biennially to the General Assembly on the implementation of the Policy Plan, and the status of the Patuxent River and its watershed. This report describes the work of the local governments and state agencies performed during 2019 and 2020 in support of the Policy Plan, along with PRC activities that support government implementation of the Plan.

The main areas for action described in the Patuxent River Policy Plan include preservation of the river, advocacy for the river, and eXcitement about the river.

A number of regulatory protocols require counties within the watershed to reduce pollution entering the river, including: Municipal Separate Storm Sewer System permits (MS4), issued under the Environmental Protection Agency National Pollutant Discharge Elimination System; TMDLs for local waters, required by the Clean Water Act of 1972, and also administered by EPA, but without a deadline for implementation; and the TMDL, required by the EPA to clean up the Chesapeake Bay by 2025, and implemented through Watershed Implementation Plans (WIPs). The counties reported progress in fulfilling these obligations by installing new measures to treat stormwater from 20% of the counties' previously untreated impervious surfaces and to reduce the loading of nutrients, bacteria, and even pollutants such as polychlorinated biphenyls into the Patuxent. The Maryland Department of Transportation/State Highway Administration (MDOT/SHA) is subject to a local TMDL and must comply with an MS4 permit as well. Maryland's Department of the Environment approves TMDLs on behalf of EPA, and reported the approval of one during 2019 and 2020.



Columbia, is not an incorporated jurisdiction; however, the Columbia Association, which controls many environmental activities in Columbia, completes numerous best management practices to control stormwater.

Local and state agencies reported fewer, but nonetheless important activities related to Advocacy and eXcitement. The PRC reviewed proposed bills from the 2019, and abbreviated 2020 session (COVID-19 pandemic) of the Maryland General Assembly that affected the Patuxent River and wrote the legislature to support or oppose a few.

The Commission's Tourism Workgroup continues to refine the Patuxent River Challenge, which has increased recreation on and appreciation of the Patuxent River, covering cultural and recreational amenities in all seven counties and the City of Laurel.

Overall, local governments, state agencies, and the PRC have completed numerous significant preservation, restoration, planning, advocacy, education, and tourism-related activities in the last two years to support restoration and the economic vitality of the Patuxent River. The report describes these activities in detail, reporting first on preservation and restoration activities, next on advocacy work, and last on activities that generate excitement for the river.

In addition to coordinating the preparation of this document, Planning's primary role in support of the Policy Plan is to serve as lead staff to the PRC, facilitating collaboration and helping coordinate the operations of PRC member agencies and communities. Planning also provides administrative, communications, research, analysis, and planning support for the PRC and its workgroups.

2019-2020 Biennial Report: Implementation of the Patuxent River Policy Plan

Background

Section 5-809 of the State Finance and Procurement Article requires the Maryland Department of Planning (Planning) to submit a report every other year to the General Assembly on the implementation of the Patuxent River Policy Plan (the Policy Plan) and the status of the Patuxent River and its watershed. This report describes the work completed in 2019 and 2020 by local governments and state agencies that are represented on the Patuxent River Commission (PRC) in support of the Policy Plan. These include (from north to south in the watershed) Montgomery, Howard, Prince George's, Anne Arundel, Charles, Calvert, and St. Mary's counties as well as the City of Laurel, the Maryland Department of Natural Resources (Natural Resources), the Maryland Department of Environment (Environment), the Maryland Department of Transportation (Transportation), the Maryland Department of Agriculture (Agriculture), and Planning.

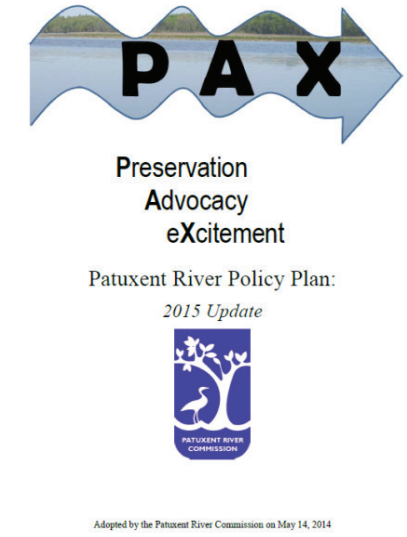
Through the Patuxent River Watershed Act, adopted in 1980, the Maryland General Assembly created the PRC (consisting of local government, state agency, and other representative stakeholders) to facilitate implementation of the Policy Plan. In addition to the efforts of local governments and state agencies, this report also describes the work the PRC accomplished in 2019 and 2020. The Policy Plan in effect during this reporting period is the 2015 Policy Plan, which was adopted in 2014 by all of the local governments represented on the PRC, and in 2016 by the Maryland General Assembly.
Planning serves as the lead staff to the PRC, providing administrative, communication, research, analysis, planning, and coordination support for the Commission and its workgroups.

Patuxent River in winter.

Planning provided the PRC with a draft of this report on January 6, 2020 through January 15, 2020. The report incorporates those comments.

To narrow the focus and guide the work of the commission's stakeholders, the PRC approved an Annual Action Plan for 2019 and 2020. This plan identifies specific tasks that support implementation of particular Policy Plan strategies. To help guide these strategies forward, workgroups convened periodically between regular PRC meetings.

As required by statute, this report includes recommendations from Planning on implementation of the Policy Plan and are provided at the end of this report.



Overview of the 2015 Patuxent River Policy Plan

The 2015 Patuxent River Policy Plan guides the actions of the state, the seven Patuxent counties, and the City of Laurel in their efforts to restore the Patuxent River.

General Policies

The Policy Plan's general policies are divided into three focus areas: Preservation, Advocacy, and eXcitement (PAX for the Patuxent River).

Preservation

Local jurisdictions and the state will work toward the preservation of the Patuxent River, and the land within its watersheds and the restoration of the ecological and economic functions of the river.

Advocacy

Local jurisdictions and the state will advocate for the Patuxent River by raising awareness among the general public, and elected and appointed officials of the challenges the river faces and make recommendations for improvements.

eXcitement

Local jurisdictions and the state will create excitement about the Patuxent River and its value as a natural, scientific, economic, cultural and educational resource.

Strategies

The Policy Plan's implementing strategies for each of the general policies include:

Preservation

P1. Maintain and improve the health of the Patuxent River so it can support sustainable commercial and recreational fishing, and seafood harvesting.

P2. Identify preservation and conservation priorities for the critical natural resources within the Patuxent River Watershed in county and municipal land use documents.

P3. Embrace smart growth and smart conservation practices in the counties and municipalities in the Patuxent River watershed to reduce sprawl and preserve irreplaceable resources.

P4. Restore the health of the river by actions such as encouraging acquisition of properties or easements in sensitive resource areas, planting stream buffers, and controlling invasive plants, focusing on stream buffers.

P5. Preserve the Patuxent River headwaters as a permanent and reliable source of drinking water, and improve and restore water quality in the tributaries feeding the reservoirs.

P6. Support the work of local jurisdictions and the state in meeting their respective water quality goals as stated in approved plans and permits.

P7. Preserve and restore the movement of water, fish, and wildlife through identifying and removing barriers.

Advocacy

A1. Keep abreast of issues facing the river in communities within the Patuxent River watershed and share experiences and challenges with the PRC.

A2. Pursue resolution of pollution concerns for communities within the Patuxent River watershed.

A3. Keep elected and appointed officials aware of the issues and opportunities facing the river, and seek their support when appropriate.

A4. Recommend changes to policies, programs, legislation, and/or regulations to improve and restore water quality in the river, and its watershed.

eXcitement

X1. Maintain, create, and encourage opportunities for river-related economic activities in appropriate locations.

X2. Ensure and encourage public access to the river, its tributaries, and recreational opportunities within the watershed.

X3. Support economic and scientific research projects on the river, and seek or support funding where possible.

X4. Create and support educational and stewardship opportunities for all communities within the watershed.

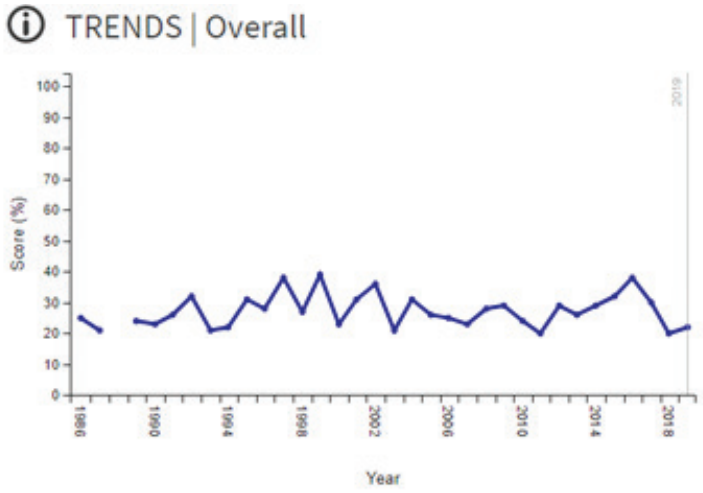
X5. Protect valuable cultural resources and historical properties within the watershed.

Status of the Patuxent River

In the non-tidal portion of the Patuxent River near Bowie, long-term (1985-2019) and short-term (2010-2019) trends for nitrogen, phosphorus, and suspended-sediment load are improving.

On the other hand, the overall health index of the tidal portion of the Patuxent peaked at 39 in 1999. In 2016 it was 38, but reached only 22 in 2019. (Figure 1).

Figure 1. Tidal Portion – Overall Index



In 2019, the tidal score for nitrogen was 16, below the highest rating of 54 in 2002, but slightly above the 13 score of 2018 (Figure 2). In 2016, phosphorus registered its best score, 69, since tracking started in 1986; in 2019, it dropped to 24. Although the scores for nitrogen and phosphorus have fluctuated over the past 30 years the trend is moving in a positive direction since 2002 (Figures 2 and 3).

Figure 2. Tidal Portion – Nitrogen Scoring

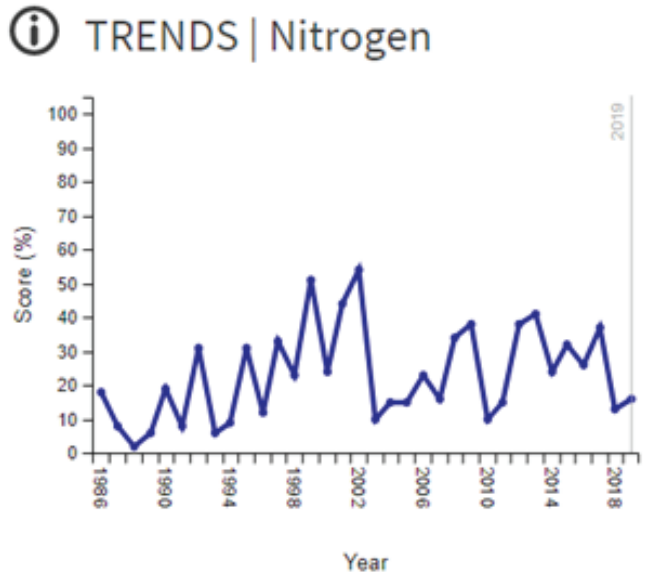
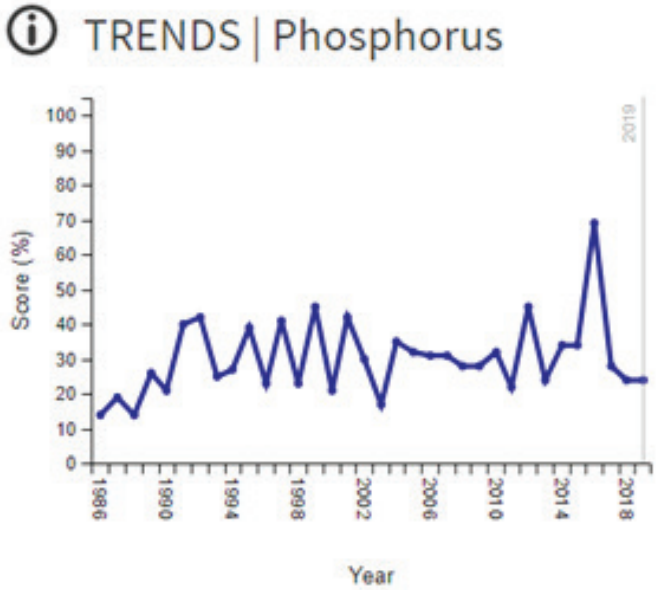


Figure 3. Tidal Portion –Phosphorus Scoring



[1] Eco Health Report Card. University of Maryland's Center for Environmental Science. http://ecoreportcard.org/report-cards/chesapeake-bay/health/. Accessed October 2018.

[2] Summary of Nitrogen, Phosphorus, and Suspended-Sediment Loads and Trends Measured at the Chesapeake Bay Nontidal Network Stations: Water Year 2016 Update. Prepared by Douglas L. Moyer and Joel D. Blomquist, U.S. Geological Survey, December 13, 2017.

Preservation Strategy Implementation: 2019-2020

During 2019 and 2020, the local jurisdictions, state agencies and PRC completed several tasks that support the Policy Plan's Preservation strategies:

PRC Preservation and Restoration Workgroup

In 2020, the Workgroup investigated obstacles to achieving the many TMDL limits for the mainstem and tributaries for the Patuxent River.

This effort included a conference call with representatives of the Patuxent counties and Washington Suburban Sanitary Commission Water to discuss Planning staff's summary of previous interviews with local WSSC Water and MDE representatives regarding TMDL limits, and to initiate a summary table of county goals and progress toward achieving the stormwater load TMDL limits.

In support of the Workgroup's focus, DNR took the lead in arranging PRC's annual site visit in 2019 to the Manning Hatchery at Cedarville State Forest in Prince George's County. The hatchery includes 28 fish production ponds, two fish culture buildings, one water supply reservoir, a combination building (garage, shop, office, and laboratory) and three water supply wells. The facility cultures warm water, cold water, and anadromous fish species for stocking in Maryland waters. Commissioners were impressed by the volume of fish produced at the facility with only a small staff.

Troughs can be used to culture larval fish of various species, including striped bass, Atlantic sturgeon and yellow perch. Troughs can be operated as either flow through or recirculating systems. dnr.maryland.gov/fisheries/Pages/hatcheries/manning.aspx

Patuxent River Commission

As an outgrowth of the Commission's review of the Savage Mill development (see the Advocacy section below), they invited several counties and soil conservation districts to discuss their responsibilities for stormwater regulation and sediment and erosion control.

Regarding oyster management, PRC received updates on the fishery, including presentations from Robert Brown, Sr., representing watermen on the Commission, DNR on its Oyster Sanctuaries and Restoration Programs and Oyster Management Plan, and the extent of and potential of oyster aquaculture in the Patuxent River, including DNR's online tool to help streamline the process for siting oyster aquaculture. Prior to the presentations, the Commission's Scientific and Technical Workgroup provided and discussed a handout to frame the importance of oyster management, which impacts the lower, tidal portion of the Patuxent River, and to provide context for how the Commission could use the presented information for future actions and decisions.

The Commission also received several presentations about Per- and polyfluoroalkyl substances (PFAS): a family of thousands of manmade compounds that are chemically stable and now found in surface and groundwater as well as soils. PFAS were introduced in nonstick Teflon cookware, and their resistance to grease, oil, and water led to their common use in carpets, textiles, paper, packaging materials, etc. Their resistance to heat makes them the primary ingredient in fire-fighting foam. Unfortunately, PFAS can accumulate in living tissue and pose a health threat to wildlife and humans.

The presentations included an overview of PFAS and wildlife impacts from Dr. Christopher Salice of Towson University, and a review of MDE's efforts to study PFAS and better understand where the compounds are found and how they interact with our environment.

The proposed construction of a Maglev train line between Washington and New York and its attendant maintenance buildings raised concerns among Commission members due to its proposed alignment through the Patuxent watershed. After receiving presentations on the proposed project from the Northeast Maglev US Co. and possible environmental impacts from two biologists, the Commission established in late 2020 a Maglev Workgroup to track the project and the National Environmental Policy Act (NEPA) process associated with it.

Maryland Department of Planning

Planning provides administrative, policy, and technical assistance to local governments and state agencies in two areas: programs and projects that support development and reinvestment in our current growth areas, which reduces development pressure on the Patuxent River watershed's forests and farmland; and programs and projects that support local and state resource conservation efforts.

Planning's work in support of development and reinvestment in our current growth areas includes helping jurisdictions identify obstacles and solutions to reinvestment, assisting in the development of plans in support of local growth areas, and administering the Heritage Structure Rehabilitation Tax Credit Program to support redevelopment and reuse of historical Maryland properties for residential and commercial purposes.

Planning's work in support of local and state resource conservation efforts includes: developing a forest planning resources webpage to provide local jurisdictions with guidelines, recommendations, and technical assistance on policies and standards to protect forests and trees as lands are developed; creating an online protected lands dashboard to facilitate public access to the latest statistics and data concerning land preservation in Maryland; and providing analysis and policy support for Maryland's agricultural preservation programs.

In 2019 and 2020, Planning staff continued to administer the subcommittees of the Rural Economies Workgroup (Sustainable Forestry Subcommittee, Land Preservation Subcommittee, Food Policy Subcommittee) of the Maryland Sustainable Growth Commission to help protect the resources that support our rural economy.

Planning is a member of the board of the Maryland Agricultural Land Preservation Foundation (MALPF), and partners with MALPF to certify county agricultural land preservation programs. Certified counties in the Patuxent watershed include Anne Arundel, Calvert, Montgomery, Prince George's, and St. Mary's. Also, the Secretary of Planning is a member of the Rural Legacy Board, which makes final decisions on annual land preservation grants and on proposals for the creation and expansion of Rural Legacy areas. All of the Patuxent counties include at least one Rural Legacy area.

In support of the PRC's Preservation and Restoration Workgroup, Planning staff arranges and conducts conference calls with county staff and drafts minutes and findings to support the Workgroup's efforts.

Charles County

Charles County's efforts under the implementation of the NPDES Phase I MS4 permit and through the county's Watershed Protection and Restoration Program (WPRP) from January 2019 through December 2020 supported the goals and recommendations of the Patuxent River Policy Plan.

The county continued to address the fecal coliform bacteria TMDL for Indian Creek and has reduced the bacterial load 11.6% since the baseline year of 2001, which is a quarter of the way to the goal.

Indian Creek Watershed TMDL Loads and Reductions

	Bacteria (bn MPN/day)
Baseline and Target	
Baseline Load (2001 Baseline Year)	3,038
Target Percent Reduction	43.94%
Target Load	1,703
Permit Load	2,974
FY20 Progress	
FY19 Current Load	2,686
FY19 Current Load Reduction from 2001 Baseline	352
FY19 Percent Reduction	11.59%
Reduction Remaining for Treatment	983
Planned FY21-FY25	
FY21-FY25 Planned Reduction	990
Total Reductions	
Reduction (Progress + Planned)	1,342
Total Percent Reduction	44.17%
Reduction Remaining for Treatment	0

In 2020, funding was approved for a Benedict Water Quality Study. The study will analyze water quality along the Patuxent River shoreline to determine if area septic systems are contributing to excess nutrients in the water body. A cost-benefit analysis will also be conducted of the potential water quality benefits to be gained by extending public sewer to the area.

The unincorporated town of Benedict is included in the county's MS4 Permit's 20% impervious surface restoration requirement. Therefore, in 2019, the county completed the Benedict living shoreline project on the lower Patuxent River. An easement protects the restored shoreline and ensures that maintenance and inspections can occur as needed. This shoreline restoration project coincided with the eXcitement strategies of the 2015 Patuxent River Policy Plan Update, since this project enhances public access and accessibility to the Patuxent River.

The county continued to implement a Septic Pump-Out Reimbursement Program in 2019 and 2020. Approximately 200 septic system owners in the Charles County portion of the Patuxent River watershed received reimbursement through the program in 2019 and 2020 and five additional septic Best Available Technology (BAT) systems were installed with MDE's Bay Restoration Funds.

The county remains in communication with MDE on additional guidance regarding achievement of the EPA-approved sediment TMDL for the Patuxent River. The sediment TMDL applies to all non-tidal tributaries to the Patuxent River; however, most of the non-tidal tributaries in Charles County are Tier II, and therefore do not qualify for a TMDL restoration plan. As of 2019, the non-tidal tributaries maintained their Tier II status with sampling scores greater than four. Impervious surfaces account for 4.2% of the watershed area as shown on the following table.

Lower Patuxent River Watershed in Charles County:
Land Cover, Chesapeake Conservancy Dataset

Land Cover	Acres	Percent of Watershed
Water	92.8	0.5%
Wetlands	253.5	1.4%
Tree Canopy	12,290.5	68.0%
Shrubland	29.0	0.2%
Herbaceous Vegetation	4,419.7	24.5%
Barren	122.7	0.7%
Structures	179.1	1.0%
Impervious Surfaces	316.9	1.8%
Impervious Roads	258.9	1.4%
Tree Canopy over Structures	19.0	0.1%
Tree Canopy over Impervious Surfaces	58.4	0.3%
Tree Canopy over Impervious Roads	21.4	0.1%
Total	**18,062.0**	**100.0%**

As of 2020, Charles County has established in the Lower Patuxent River watershed 1,811 acres of protected lands (i.e., parks, Natural Resource Management Areas, TDR easements, etc.), 292 acres of recorded designated open space, and 1,522 acres of recorded Forest Conservation easements.

Public outreach efforts to educate citizens on how to help protect water quality and reduce nutrients from entering the river are increasing. Two new public service announcements (PSAs) aired in 2019. The first explains why rain should be the only thing that goes into storm drains, and the second teaches proper lawn care and disposal of yard waste. The new storm drain PSA can be viewed here: youtube.com/watch?v=4XfrHMxJZcM&list=PLYKfJ608FjL9iMMhiTn5kjvWv8sDNmoz2&index=4 and the new lawn care PSAs can be viewed here: youtube.com/watch?v=5DDw0Bjoo4Y&list=PLYKfJ608FjL9iMMhiTn5kjvWv8sDNmoz2&index=5.

In 2019 and 2020, these PSAs were viewed approximately three million times on cable television, smart TVs, desktop computers, and mobile devices. PSAs on the radio that address proper lawn care and pollution prevention, and encourage the proper amount of salt for deicing, were aired 475 times on southern Maryland radio stations.

Anne Arundel County

The county's planning efforts were significant during the reporting period. An update of the county's General Development Plan, *Plan 2040*, was drafted in 2020. The draft plan was presented to the county's Planning Advisory Board on December 9, 2020, and posted for public comment. The *Final Lower and Middle Patuxent Watershed Sediment TMDL Restoration Plan* was submitted to MDE on February 12, 2020 with the county's Annual MS4 report. Also, the *Patuxent Watershed PCB TMDL Restoration Plan*, submitted to MDE February 12, 2019, was revised in response to MDE comments and submitted to MDE on August 31, 2020. The revised draft included a revision to the proposed PCB monitoring approach based upon MDE guidance and in collaboration with Howard County.

Numbers tell the story of restoration activities in Anne Arundel County:

- 1.5 acres of the Ford Property in Davidsonville were reforested, including removal of 0.12 acres of impervious cover (completed 2019).
- Fifty-one stormwater infrastructure projects were completed.
- Evergreen Towsers Stream Restoration is underway, involving restorating ~2,500 linear feet of an unnamed tributary to Towsers Branch using valley restoration techniques. The county worked with developers to satisfy adequate outfall requirements; the developer's agents are designing and permitting plans, with construction anticipated in 2022.
- Construction was completed in July 2020 on the Towsers Branch Outfall Retrofit: Installation of a two step pool storm conveyance (SPSC) systems (2,400 linear feet combined) and retrofitting three storm drain outfalls.
- Construction began in November 2020 on the Towsers Branch Dairy Farm Road Area Stream Restoration, 1,400 linear feet; completion is anticipated in April 2021.
- Crofton Golf Course (aka Beaver Creek) Stream Restoration—8,400 linear feet—is being designed, with construction anticipated summer 2022.
- Maryland City Stream Restoration—2,518 linear feet—is being designed, with construction anticipated summer 2021.
- Mount Airy Court Stream Restoration—236 linear feet—involving construction of intermittent stream outfall stabilization, was completed summer 2020.
- Continuous Monitoring and Adaptive Control (CMAC) for Stormwater (SW) Services, which is essentially a remote controlled valve system added to an existing stormwater pond to optimize storage, is planned for Pond 13163.
- Preliminary studies have been completed and schematic design of stream restoration is in process for the Russett Community Watershed Restoration.
- The AJ&C Garfunkel Pond Retrofit was completed in 2019.
- Biomonitoring was conducted in three primary sampling units (PSUs) in 2019- Upper Patuxent, Middle Patuxent, and Little Patuxent. The countywide Biological Monitoring Program completed its final report of the findings.
- A separate summary report has been completed detailing biological conditions on the Anne Arundel County side of the Patuxent Research Refuge. This report was done as a condition of obtaining permission to sample on the Refuge. The data collected here is also discussed in the 2019 countywide report.
- In 2020, sampling was conducted in the Rock Branch PSU, a tributary to the Patuxent. These data will be reported out by January 2021.
- Planning and landowner contact work is underway to sample the Ferry Branch, Lyons Creek, Hall Creek, and Cabin Branch PSUs in 2021, all of which are part of the Patuxent drainage.
- The county added 93 acres in the Upper Patuxent to its county Agriculture and Woodland Preservation Program in October 2019.
- The county added 117 acres in the Middle Patuxent to its Rural Legacy Program in July 2019.

Howard County

Approximately 75% of Howard County lies within the Patuxent River watershed and this portion contains a variety of land uses. Approximately 62% of the watershed is in the rural west, which is predominantly low density residential, agriculture and forest. The remainder of the watershed is within the county's Planned Service Area for public water and sewerage, and has more intensive residential and commercial development, including Columbia.

Howard County's Water Resources Element (WRE) was adopted in April 2010 as an Amendment to General Plan 2000, and subsequently incorporated by reference into PlanHoward 2030, the county's current general plan. The WRE contains recommended policies and actions to help the county manage water resources more sustainably to ensure that as the county continues to grow, its water resources will be conserved, protected, and restored to health.

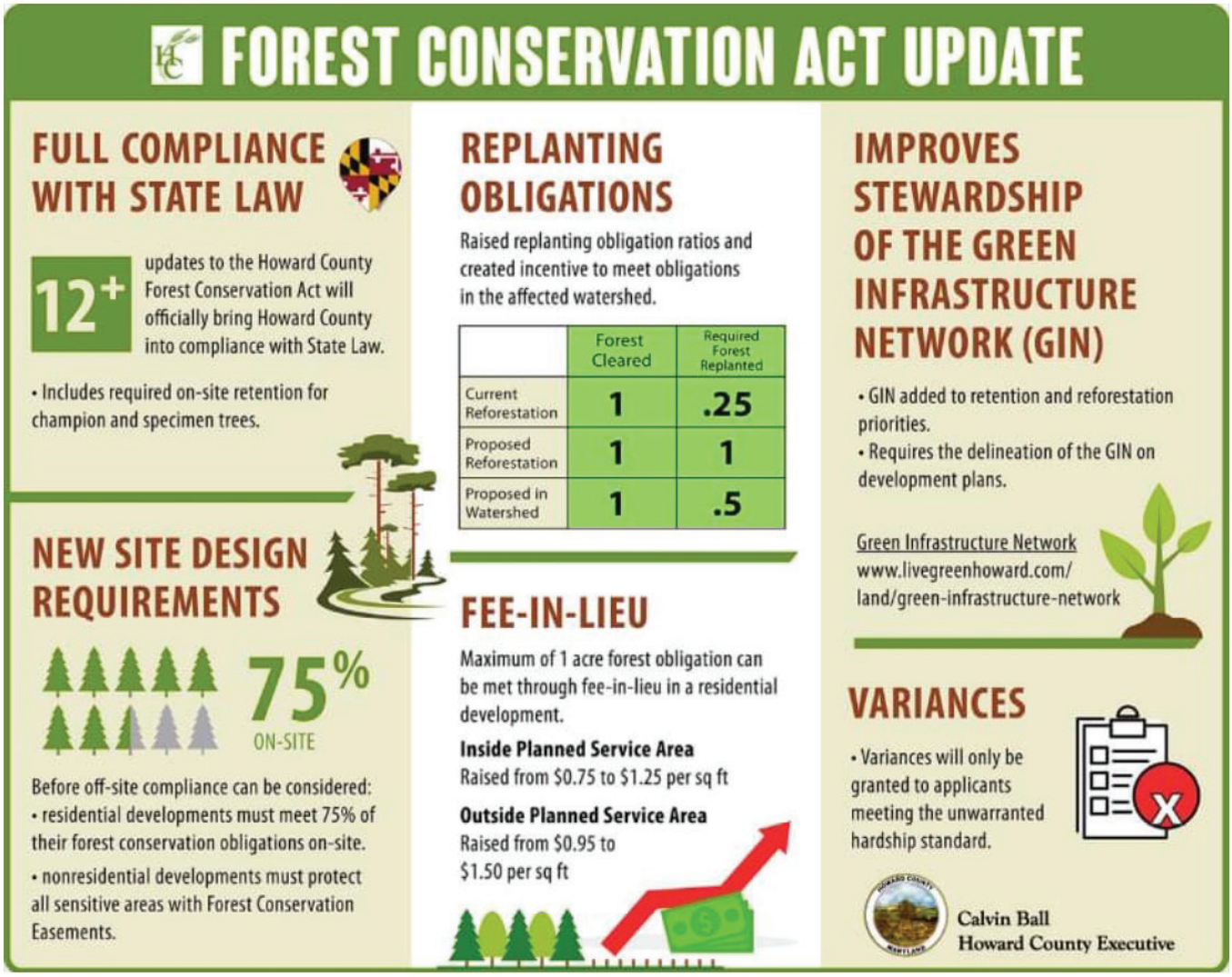
Howard County received its fourth NPDES MS4 Discharge Permit in December 2014. This permit requires the county to do the following: provide water quality treatment for 20% of its untreated impervious area by the end of the permit term in December 2019, and develop plans to achieve stormwater pollutant load reductions for each local TMDL by December 2015. In response, the county completed an initial Countywide Implementation Strategy (CIS) in December 2015, and a revised CIS in 2017. The CIS determined the county's 20% impervious surface treatment goal and demonstrated the means to achieve local stormwater TMDLs. Since completion of the CIS, only one new local TMDL has been adopted, a PCB TMDL for the Patuxent approved by the EPA in September of 2017. Howard County submitted a draft PCB TMDL Restoration Plan for the Tidal Fresh portion of the Patuxent River to MDE in September 2018. MDE approved the county's plan in a comment letter dated September 23, 2019. Howard County revised its 20% impervious surface restoration goal in 2018, 2019, and 2020, and met the restoration requirement as of March 30, 2018.

The NPDES permit also requires that the county develop watershed assessments and restoration plans to address stormwater pollutant load reductions for each watershed in the county by the end of the permit term. The county completed watershed assessments and restoration plans for the Middle Patuxent River and Little Patuxent River watersheds in 2015, and for the Patuxent River mainstem watershed in 2017.

The watershed assessments and restoration plans measure current environmental conditions and identify opportunities for restoration projects to be included in the capital budget. These projects will improve water quality in the county's streams and rivers, as well as the Chesapeake Bay. Potential projects include stream restoration, reforestation, adding water quality treatment to existing stormwater management ponds, constructing new stormwater management facilities, and stabilizing existing storm drain pipe outfalls.

The county has been conducting biological and physical assessments of the streams in each major watershed on a five-year rotating basis since 2001. The biological assessments study the benthic macro-invertebrates (bottom dwelling organisms) as an indicator of water quality and stream health. The county uses the same monitoring protocols as the Department of Natural Resources (DNR) in their Maryland Biological Stream Survey (MBSS). Assessments were conducted in the Middle Patuxent watershed in FY19.

Also, during the 2019-2020 reporting period, Howard County updated its local Forest Conservation Act ordinance as follows:



Montgomery County

The Patuxent River Watershed in Montgomery County drains to the two-reservoir system maintained by Washington Suburban Sanitary System (WSSC) - the Triadelphia and Rocky Gorge reservoirs. There are three sub-watersheds including Upper Patuxent, Lower Patuxent, and Hawlings River. The total drainage area of these sub-watersheds is approximately 61 square miles, about 7% of the total Patuxent River basin.

Montgomery County is operating under its 3rd generation NPDES MS4 Permit, which was issued to the county on February 16, 2010. The permit expired on Feb. 15, 2015, and was administratively continued by MDE. In April 2018; the county signed a consent decree with MDE committing to fulfill the restoration requirement by December 2020. In December 2018, the county met the restoration goal, completing restoration of 3,778.9 impervious acres. The county submitted its final Consent Decree Completion Report to MDE on October 1, 2019, documenting that the requirements of the consent decree had been met. On November 22, 2019, MDE approved the final report and agreed that the conditions of the consent decree had been met. The Consent Decree was officially terminated on December 30, 2019.

On October 23, 2020, MDE published the county's draft MS4 permit on their website. The public comment period ran through January 21, 2021, and MDE held a public hearing webinar on the draft permit on November 16, 2020. The draft permit, fact sheet, accounting guidance, and monitoring guidelines are available on MDE's website at mde.maryland.gov/MS4.

Montgomery County's Department of Environmental Protection (DEP) Stormwater Management Facility Maintenance and Inspection Program oversees the triennial inspections and structural and nonstructural maintenance of all stormwater management facilities under the county's jurisdiction. In 2019, the county inspected approximately 93 stormwater management facilities located in the Patuxent River Watershed. Maintenance activities were conducted as needed to ensure these facilities were functioning properly.

The DEP's Stream Monitoring team monitors the biological community and stream habitat conditions in all county watersheds on a rotating basis over a five-year cycle. DEP uses a multi-metric Index of Biological Integrity (IBI) to develop narrative ratings of biological conditions in water bodies. From 2017-2018, DEP monitored 28 stations in the Patuxent River watershed. Of those 28 stations, 32% were in excellent condition, 57% were in good condition, and 11% were in fair condition. No new monitoring was conducted in this watershed in 2019, and data collected in 2020 has not yet been analyzed.

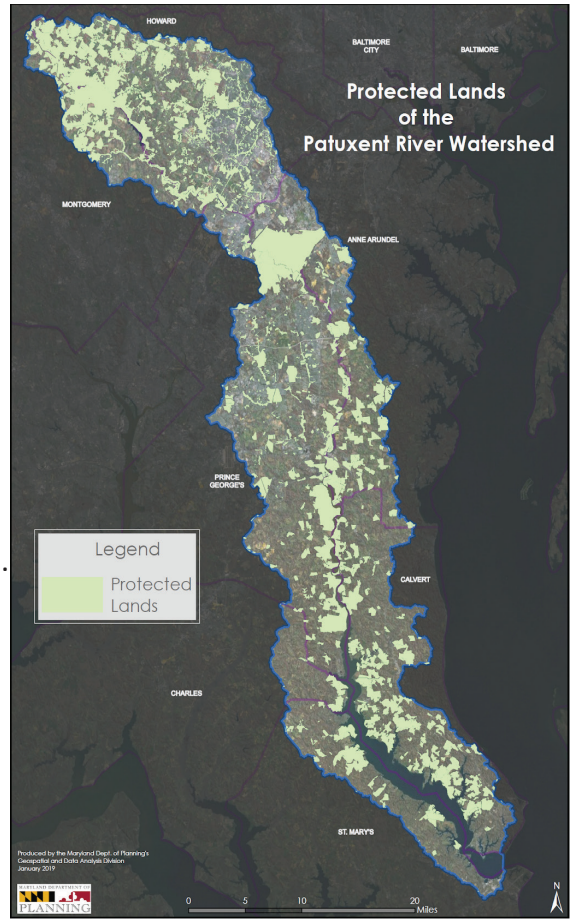
Maryland-National Capital Park and Planning Commission (M-NCPPC)—Montgomery County Environmental Activities in the Patuxent River Watershed January 2019-December 2020

The Department of Parks, through its natural resources management and park stewardship plans and programs, protects and manages terrestrial and aquatic natural resources including wildlife, plants, and habitats that occur on M-NCPPC parkland. The department conducts annual stream habitat and biomonitoring on lands within the M-NCPPC park system, coordinating its monitoring work with the county DEP stream monitoring program. DEP includes the data collected by Department of Parks staff in the county's comprehensive stream condition monitoring database.

During the reporting period, Montgomery County stream valley buffer reforestation efforts in the Patuxent watershed included ongoing management of about 16.5 reforested acres in the Hawlings River Watershed. In addition, about 68 reforested acres at the Oaks Landfill site continue to be managed.

Under the Department of Parks Weed Warrior Program, which coordinates volunteer efforts to remove invasive plants from natural areas, a total of 570.75 person-hours within the Patuxent watershed were logged within the reporting period. Some of the Weed Warrior group efforts are coordinated with other events, such as Earth Day, to draw more attention to the environmental needs of natural areas and the importance of stewardship.

The Montgomery County Department of Parks has continued to implement its Deer Management Program, which reduces the number of deer in M-NCPPC parkland and, therefore, the adverse effects of deer overpopulation on forest and other ecosystems. The program focuses on large wooded areas within parkland and along stream valley parks. Within the Patuxent River Watershed, the program has centered on Rachel Carson Park. In the reporting period, 59 deer were harvested from the park. Yearly deer harvests have resulted in a continuing declining population, with an estimated population that fluctuates between 15-30 deer per square mile through the course of the calendar year.



The Montgomery County Parks Department hosted four trash cleanups in the parks within the Patuxent River Watershed. A total of 630 person-hours were logged, and a total of 1,424 pounds of trash and 450 pounds of recyclables were removed.

In 2019, the Montgomery County Planning Department began work on updating the county's General Plan. The work centered on research, data collection, drafting issues and opportunities, developing education and outreach strategies, and the preliminary drafting of goals, policies, and actions. In 2020, the work continued with a focus on drafting the text and refining the goals, policies, and actions. An important focus for the environmental recommendations is climate change, which has emerged since the last update of the plan as a major driver of environmental health and sustainability. A working draft was completed, and a public hearing was held. The plan is expected to be approved and adopted in 2021.

Calvert County

In Calvert County, stormwater management, wastewater, and landfill BMPs are administered by Calvert County Department of Public Works (DPW). During the reporting period, DPW established a hotline for citizens to report water quality complaints, and created outreach programs to inform citizens about issues relating to water quality such as water conservation, fertilizer and chemical applications to lawns, recycling, hazardous waste collection, and trash pick-up.

Stormwater management (SWM) facility maintenance instructions are available on the county DPW website. Staff is trained on SWM facility inspections and erosion and sediment control inspections. The department reviews all proposed stormwater management designs to ensure compliance with the Calvert County Stormwater Management Ordinance and the 2000 Maryland Stormwater Management Design Manual, Volumes I & II, and obtains a Declaration of Restrictive Covenants form with each grading permit, which allow inspectors to access private property to inspect stormwater facilities and make sure that they are adequately maintained. DPW investigates complaints from any interested party related to construction activities and provides a response to the complainant within seven days.

During the reporting period, the Calvert County BPW accomplished the following:

- Established the Watershed Stewards Academy with the help of the University of Maryland Extension watershed coordinators.
- Prepared a draft Illicit Discharge and Detection and Elimination ordinance.

- Mapped all existing BMPs within the permit area from January 2019 to present. Other BMPs outside of the current permit area are also being mapped.
- Tracked the disturbed areas for all active grading permits. From July 1, 2019 to June 30, 2020, a total of 278.66 acres were disturbed within the county.
- Completed 19 outfall restoration projects.
- Removed 308 tons of debris and sediment from five county-owned stormwater management ponds.
- Prepared Good Housekeeping Plans for the handling and disposal of deicers, fertilizers, and herbicides at the Highway Maintenance division; cleaning chemicals, paint, and herbicides at the Buildings & Grounds division; and oil, antifreeze, and other hazardous wastes at the Fleet Maintenance division.
- Swept 95.6 miles of streets each year to prevent trash and sediment from entering waterways

Accomplishments for the Calvert County Planning and Zoning Department include recertification of the county as Class 8 in the National Flood Insurance Program Community Rating System, which earns the county discounts for premiums through the National Flood Insurance Program; and a rewriting of the Calvert County Zoning Ordinance sections regarding the Critical Area, Floodplain, and Water Dependent structures.

Prince George's County

The Prince George's County Department of the Environment (DoE) administers the county's MS4 Discharge Permit. Prince George's County submitted its FY20 Annual NPDES Report to MDE in early 2021 as per requirements in the county's current NPDES MS4 Permit issued in 2014. A copy of the county's 2018 Annual Report can be found at princegeorgescountymd.gov/293/NPDES-MS4- Permit. The county is awaiting the new MS4 Permit and requirements.

As a component of the stormwater management reporting program, the county completed a major effort to update its database of stormwater BMPs through standardization of the geographic database so its information could be utilized in the MDE Chesapeake Bay Model. The county also expanded its restoration activities to meet conditions in its MS4 Permit, key among them the county's public-private partnership with Corvias Solutions to form a Clean Water Partnership (CWP). The partnership was charged with restoring 2,000 impervious acres by FY20, thus meeting almost a third of the county's restoration requirement under its MS4 Permit. As of June 30, 2020, CWP met the restoration requirements and will be entering into Phase III for an additional restoration of 1,436 impervious acres starting in July 2021.

The partnership initially focused in the highly urban and degraded Anacostia watershed. The DoE Capital Improvement Program (CIP) and the CWP have made progress in the Patuxent watershed by restoring more than 738 impervious acres. Restoration activities include Environmental Site Design for stormwater BMPs, pond retrofits to enhance water quality benefits, stream restoration, shoreline stabilization, and outfall stabilization. Currently, efforts are underway to restore about 1,087 impervious acres in the Patuxent watershed. Tables 1 through Table 3 depict the current list of projects in planning, design, and under construction, respectively under DoE's (CIP and CWP) restoration plan. Additionally, projects restoring hundreds of impervious acres in the Patuxent watershed are being considered through stream restoration, shoreline restoration, and pond retrofit for the upcoming fiscal years (FY23-FY25).

Table 1: Current Projects in Planning by DoE/ CWP:

Project Name	Project Status	Project Type	Proposed or Actual Impervious Restoration Credit	Builder or Implementor
Patuxent Watershed Stream Restoration SR 27	Planning	Stream Restoration	35	DOE CIP
Patuxent Watershed, SR-77 Walker Branch	Planning	Stream Restoration	59.02	CWP
Patuxent Watershed O-6	Planning	Stream Restoration	25	DOE CIP
Patuxent Watershed O-12 and O-15	Planning	Stream Restoration	25	DOE CIP
		Total Restoration:	**144.02**	

Table 2: Current Projects in Design by DoE/ CWP:

Project Name	Project Status	Project Type	Proposed or Actual Impervious Restoration Credit	Builder or Implementor
Outfall Rest. Projects - Anacostia Watershed -Carrington Avenue - Outfall 34	Design	Stream Restoration	2	DOE CIP
Patuxent River Shoreline - Magruders Ferry	Design	Shoreline Restoration	67.4	DOE CIP
Black Swamp Creek	Design	Stream Restoration	296.21	CWP
Crain Highway	Design	Stream Restoration	93.9	CWP
Springfield Manor Pond #2	Design	Pond	26.98	CWP
		Total Restoration:	**486.49**	

Table 3. Current Projects Under-Construction by DoE/ CWP:

Project Name	Project Status	Project Type	Proposed or Actual Impervious Restoration Credit	Builder or Implementor
Bear Branch Stream Restoration Phase II	Under Construction	Stream Restoration	268	DOE CIP
Oakland Stream Restoration	Under Construction	Stream Restoration	253.56	CWP
Hillmeade Rd	Under Construction	Stream Restoration	79.56	CWP
		Total Restoration:	**601.12**	

The county has implemented a wide range of educational and outreach initiatives such as the Rain Check Rebate Program to inform the public about impacts of their daily activities on the health of their watershed. This program promotes installation of eligible stormwater practices that can reduce runoff from residential areas.

In 2015, the county developed comprehensive watershed restoration plans for all watersheds that had local TMDLs. Four local TMDLs have been issued by MDE within the county's portion of the Patuxent River Watershed, including Rocky Gorge Reservoir – Total Phosphorus; Patuxent River Upper – Bacteria & Sediment; and Western Branch – Biological Oxygen Demand.

The restoration plans seek to:

- Improve watershed health, including hydrology, water quality, and habitat, using a balanced approach that minimizes negative impacts;
- Support compliance with regional, state, and federal regulatory requirements; and
- Increase awareness and stewardship within the watershed, including encouraging decision-makers to develop policies that support a healthy watershed.

Each plan presents a strategy to manage urban stormwater and limit the amount of pollutants reaching the county's water bodies. The plans include a methodology to estimate pollutant loads from different urban land types along with anticipated pollutant load reductions from a variety of restoration activities. Additionally, the plans provide a timeline to meet the local TMDL targets that accounts for the estimated costs of implementing and maintaining restoration activities and the county's anticipated funding sources. For more information on the watershed plans, please visit pgcdoe.net/pgcountyfactsheet/Factsheet/Default.

MDE's Water and Science Administration awarded a grant to Prince George's DoE to develop a comprehensive watershed restoration plan for the Western Branch watershed. The watershed study was completed in December 2018. Using the Stream Corridor Assessment and biological monitoring data, the county identified 58.4 mi of streams with erosion issues in the Western Branch watershed. Several stream restoration scenarios were evaluated and are now part of the planning and design programs as shown in Tables 1 and 2. The county is currently working with multiple design consultants to implement stream restoration projects in the Western Branch watershed, as identified in the 2018 study.

Since January 2015, the Prince George's DoE has enhanced the health of the Patuxent River watershed through tree planting and litter reduction programs. Students and community groups can plant native trees in their school yards and neighborhoods through DoE's Arbor Every Day, Tree ReLeaf programs, Right Tree- Right Place, and CIP Reforestation Projects. Due to the COVID-19 pandemic, the outreach events goals for the Patuxent watershed were not met. There were 12 outreach events within the Patuxent watershed area in 2020.

DoE will continue to administer the Comprehensive Community Cleanup Program. This program is designed to revitalize, enhance, and help maintain unincorporated areas of the county through 21 concentrated cleanups each year. Through this program, DoE, the county Department of Permitting, Inspections and Enforcement (DPIE) and the county Department of Public Works and Transportation (DPW&T) partner with civic and homeowner associations to provide cleanup and maintenance services during a two-week period. Services provided by this program include bulk-trash collection, tagging and removal of abandoned vehicles, housing code/zoning ordinance violation surveys, storm drain outfall screening/sampling, roadside litter pick-up, tree trimming, and storm drain maintenance. The local nonprofit *Laurel for the Patuxent* hosted two invasive removal events at Laurel Riverfront Park during FY20 and hosted a Patuxent River Cleanup in Laurel on October 26, 2019.

DoE will continue its efforts to address the problem of pet waste under the Pet Waste Program, which was kicked off in 2017. DoE partnered with the Environmental Finance Center (EFC) at the University of Maryland and the People for Change Coalition to increase awareness about pet waste pollution and encourage residents to pick up their pets' waste.

St. Mary's County

In April 2018, MDE issued the county a letter designating St. Mary's County for coverage under the state's NPDES General Discharge Permit. The county issued its Notice of Intent to comply with the MS4 permit requirements in October 2018. The permit requires property owners to manage, implement, and enforce management programs for controlling all stormwater discharges in accordance with the Clean Water Act of 1972, and corresponding stormwater NPDES regulations. Now that it is included as an MS4 recipient, the county is actively taking the required measures to comply with its permit obligations. St. Mary's County is a peninsula so its activities under the MS4 will reduce pollution in the Potomac and Patuxent Rivers and Chesapeake Bay.

As a permittee, St. Mary's County is implementing the following control measures:

- Public Education and Outreach
- Public Involvement and Participation

- Illicit Discharge Detection and Elimination
- Construction Site Stormwater Runoff Control
- Post Construction Stormwater Management
- Pollution Prevention and Good Housekeeping

St. Mary's County contains 67.9 square miles within the Patuxent River watershed. A requirement of the MS4 permit is that the county develop an ordinance and program to address Illicit Discharge Detection and Elimination (to prevent pollution from moving though the stormwater flows of developed properties). The county's ordinance was adopted in October 2020. Eleven of the Illicit Discharge Detection and Elimination Outfall Inspection locations are in the Patuxent River Watershed. The county monitors and conducts outfall inspections. If any violations of any of the provisions of the ordinance are discovered, the county may issue a civil citation, including imposing a civil penalty up to $10,000.

In 2020, the county expanded the Huntersville Rural Legacy Area (RLA) by 5,956 acres to a total of 14,852 acres. The interest generated by the public process to expand that RLA, approval of the expansion and new Rural Legacy funding by Maryland, and cooperation with the U.S. Department of Defense's Readiness and Environmental Protection Integration (REPI) Program to provide match funding have significantly increased landowner applications for land protection in the Huntersville RLA. Since the expansion, the Patuxent Tidewater Land Trust (PTLT) has worked with interested landowners for protection of 350 acres, bringing the Huntersville RLA total of preserved land from all sources to 4,930 acres. In 2021, PTLT will work with owners interested in preservation of an additional 1,180 acres, much of which is critical to maintaining large blocks of habitat and sensitive resource connections between the Patuxent and Potomac watersheds.

City of Laurel

In January 2020, Steve Allen, Emergency Manager with the City of Laurel, presented to the PRC an overview of the Water Resources Study for the Patuxent River, which covers the portion of the Patuxent River from just upstream of Western Branch to downstream of Brighton Dam – approximately 37.7 miles. The study area includes portions of the City of Laurel, Prince George's County, the City of Bowie, Anne Arundel County, and Howard County. The U.S. Army Corps of Engineers is providing assistance in completing a flood evaluation for the study area. The Maryland Emergency Management Agency (MEMA) is a partner as well and once the technical study is complete, will take the lead in assisting with the implementation of the identified projects.

Additionally, the City of Laurel is planning a flood warning system in its section of the Patuxent to warn of events that could lead to flash flooding. According to Laurel's application for state FY21 Capital Project Financial Assistance, the flood warning system comprises a network of sensors that measure real-time environmental conditions and then report those conditions to a centralized software that interprets the conditions. The sensors constantly monitor data across the network for increases in rainfall and/or water body stage (flow depth, speed, height of streambank, or presence of water outside of streambank) that can indicate threatening conditions. The city has identified eight hot-spots where flooding may occur, and four additional areas that contribute to flood-threat in those areas. The flood warning system will send an alert to emergency responders to investigate and potentially evacuate an area where flooding is imminent. The system can also relay those messages to the general public via text, cell phone, or social media.

The 12 gauges also provide real time data during flooding incidents on the levels of sediment, nitrogen, and phosphorus. This system is modeled after the systems that are currently being used in Mecklenburg County, North Carolina, and Roanoke, Virginia.The City of Laurel has received a grant from MDE to support the alert gauge project and is currently completing a contract to start the technical study for this project.

WSSC Water and Patuxent Reservoirs Watershed Protection Group

The Patuxent Reservoirs Watershed Protection Group (PRWPG), which since 1996 has worked to protect the water quality in the Patuxent reservoirs and the contributing watershed, is a partnership that includes several PRC members (Howard County, Montgomery County, Prince George's County, M-NCPPC, and WSSC Water), as well as the Howard and Montgomery soil conservation districts.

In the 2017-2018 biennial report, results of a progress evaluation were presented for pollutant load reductions to the Patuxent reservoirs over the 15-year period from 2000 (baseline year) to 2015. Deducting the progress from the Total Maximum Daily Load (TMDL) pollutant reduction goals defines the "gap" for remaining load reductions required to meet the Patuxent reservoirs TMDLs.

The findings of the amended Patuxent reservoirs TMDL progress evaluation, which were further enhanced in 2019, are:

	Phosphorus in Rocky Gorge	Phosphorus in Triadelphia	Sediment in Triadelphia
TMDL Pollutant Reduction Goal	48%	58%	29%
Achieved (2015)	9%	16%	19%
Remaining Gap	39%	42%	10%

The PRWPG is developing a web-based GIS application that will enable the Technical Advisory Committee (TAC) to create maps, conduct analyses to track data trends in the Patuxent Reservoirs watershed, and support more detailed modeling. The objective is to create a watershed-wide database and geographic analysis platform to support efforts to better understand the reservoirs and their contributing watershed, and aid in developing better management options and recommendations for improving the overall health and long-term protection of the reservoirs and their watershed.

Using the new GIS tool, the PRWPG is conducting an analysis to evaluate the potential of stream buffer restoration as this BMP was determined to offer the best combined cost-effectiveness and implementation potential to reduce pollutant loadings to the reservoirs. The study will consider different buffer widths and types (grassed and forested) on both private and public lands, identify potential stream buffer restoration sites, evaluate different implementation scenarios and timeframes for accelerating pollutant reductions towards meeting the TMDLs, and estimate BMP implementation costs.

WSSC Water continued a project started in 2017, and had by late 2019 removed approximately 172,000 cubic yards of sediment from the headwaters of Triadelphia Reservoir to maintain the reservoir's storage capacity. This volume of sediment removed represents a restoration of approximately 35 million gallons of drinking water.

WSSC Water also acquired about 90 acres of land (in four properties) in the Patuxent Reservoirs watershed (adjoining existing WSSC Water land around Rocky Gorge and Triadelphia Reservoirs) for drinking water source protection purposes in 2019-2020.

In December 2018 and October 2019, WSSC Water hosted two "Salt Summit" meetings attended by state and local government agencies concerned about potentially adverse impacts to drinking water quality from road salt runoff.

In 2015, Howard County formed a partnership with the Howard Soil Conservation District, Resource Environmental Solutions (RES), and WSSC Water to collaborate on the Cattail Creek Stream Restoration Project for the Maple Dell Farm. From June through December 2018, RES restored about one mile of stream channel within a new 15-acre floodplain easement, planted the easement with trees, and fenced the easement to exclude the dairy herd. In cooperation with Howard County Government, WSSC Water continues its water quality monitoring effort to estimate anticipated pollutant load reductions resulting from the restoration.

In January 2020, WSSC Water presented on blue-green algae monitoring. WSSC Water has a reservoir monitoring program that has been monitoring the Triadelphia and Rocky Gorge reservoirs since the 1990s. In 2017, the monitoring program also began an analysis by a taxonomist to identify and provide quantification of specific algal species. In 2015, WSSC Water developed a response plan to develop the advisory and notification process. From 2015-2017 no detections were found in the finished drinking water; a minute trace of microcystins was occasionally found in the raw water. In addition to drinking water monitoring, the WSSC also monitors for concerns with recreational contact with the reservoir waters. A recreational water contact advisory was issued for Triadelphia Reservoir in mid-September until early October 2020 due to high concentrations of blue-green algae (drinking water was not affected).

Washington Suburban Sanitary Commission's T. Howard Duckett Dam on Rocky Gorge Reservoir, Howard and Prince George's Counties

Maryland Department of Transportation

MDOT continues to comply with Maryland state and federal laws and regulations for stormwater management (SWM) as well as MDE permit requirements. MDOT continues to implement the practices in the 2000 Maryland Stormwater Design Manual and remains in compliance with the Stormwater Management Act of 2007, including the revised Chapter 5 of the 2000 Maryland Stormwater Design Manual, by implementing environmental site design (ESD) to the maximum extent practicable (MEP) for all new and redevelopment projects.

Within the Patuxent River watershed, MDOT's State Highway Administration (MDOT SHA) owns, operates, and maintains an extensive roadway network with significant drainage and SWM systems. The MDOT SHA Water Quality Bank (WQB) was created to help ensure extra water quality credits are available for major highway, bridge, and district special projects from which to debit when other MDOT SHA projects are not able to provide water quality treatment for impervious areas. As of December 16, 2020, there are 22.11 acres of water quality credit available for debiting in the Patuxent River watershed.

MDOT SHA has established a systematic stormwater and drainage asset management program to operate and remediate permanent drainage and stormwater assets that convey and treat highway runoff. The program's goal is to provide preventive and remedial solutions for the drainage and stormwater infrastructure within MDOT SHA right-of-way (ROW) to provide required water quality treatment and protect valuable resources within the Patuxent River watershed. The SWM inventory database is continuously updated to include newly constructed SWM facilities. Rapid increase of the SWM inventory is expected in upcoming years with the ongoing watershed restoration efforts.

Between January 1, 2020 and December 16, 2020, MDOT SHA completed one Bay Restoration project within the Patuxent River watershed - a stream restoration project was completed in Prince George's County for a total treatment of 571 impervious acres. Cumulatively, MDOT SHA has completed 15 bay restoration projects between January 2015 and December 2020 for a total of 744 impervious acres within the Patuxent River watershed.

MDOT SHA is currently administering an Integrated Roadside Vegetation Management project that includes controlling invasive plant species within the ROW. Invasive species of note within the Patuxent River watershed are Bradford Pear, Tree of Heaven, and English Ivy.

Maryland Department of Natural Resources

The Department of Natural Resources supports the Patuxent River through a wide variety of initiatives, from research and monitoring, land preservation and restoration, to the river's fisheries.

Chesapeake Bay National Estuarine Research Reserve – Maryland (CBNERR-MD)

Over the past two years, the Chesapeake Bay National Estuarine Research Reserve - Maryland (CBNERR-MD) has worked with Patuxent River Park (PRP) and Jug Bay Wetlands Sanctuary (JBWS) to protect, restore, and excite visitors at the Jug Bay portion of the Patuxent River. CBNERR-MD supports three continuous monitoring stations and one weather station. Real-time data can be accessed at both NERRs Centralized Data Management Office and Maryland's Eyes on the Bay. CBNERR-MD also provides support for invasive species management, wild rice restoration (now in its 20th year), and species monitoring, such as the installation of Motus wildlife tracking equipment for PRP's sora rail (*Porzana carolina*) monitoring program.

Fisheries

Patuxent River Blue Catfish Diet and Tracking Study 2020 - 2021

Blue catfish (*Ictalurus furcatus*) are a Mississippi River drainage fish that was first introduced to Virginia's tidal rivers in the 1970's and has spread to most major Chesapeake Bay tributaries, including the Patuxent River. Able to attain weight in excess of 100 pounds, blue catfish often compete with commercially-important catfish in the Patuxent, such as white- and channel catfish.

Due to known and unknown impacts that a growing blue catfish population can have on resident aquatic resources, DNR's Freshwater Fisheries Program initiated several studies to document food preferences, growth, and life history information on blue catfish in the Patuxent River. As a result of the diet study, more than 2,000 blue catfish were collected from the Patuxent River between December 2019 and November 2020 (between Waysons Corner and Kings Branch). Data is currently being analyzed. Stomach contents were examined and length, weight, sex, maturity and ear bones (for aging) were recorded for each fish. Stomach contents that could be identified were weighed, measured, and recorded. Unidentifiable items were preserved and sent to the U.S. Geological Survey (USGS) National Fish Health Research Laboratory in Kearneysville, West Virginia for DNA analysis and identification.

It has become a high priority to identify overwintering (November–February) and spawning habitats (May–July) in order to guide efforts to suppress blue catfish populations and minimize impacts. DNR initiated a tagging/tracking study on the Patuxent River in fall 2020. Thirty-eight adult blue catfish were tagged with electronic tracking devices and fitted with an external dart tag with a unique number. Anglers who catch one of these fish are asked to record the tag number and call the phone number printed on the tag to report the location. A mark and recapture project is also scheduled in 2021 to determine blue catfish density in the study area. This type of project requires intensive sampling over the same area for several consecutive days using multiple boats and crews.

The Patuxent study has several objectives: 1) Learn where to find blue catfish during winter and the spawning season; 2) Learn their abundance in those areas; 3) Determine the percentage likely to stay in those areas year-round; and 4) Learn what blue catfish are eating across different seasons in freshwater and brackish habitats. This information will be invaluable when formulating a management policy that will benefit both the aquatic resource and the people who rely on those resources for commercial, recreational, and passive use.

For questions about this study, please contact Mary Groves (mary.groves@maryland.gov).

Striped Bass Stocking

In 2019, 350,000 striped bass fry were stocked at Magruders Ferry boat ramp on the Patuxent River. This section of the river is considered tidal freshwater. These fish were the progeny of three adult females that were caught in the spring of 2019 nearby at White's Ferry. The eggs were stripped from the adult striped bass and were raised in Manning Fish Hatchery until they were ready to be stocked. An additional 10,000 striped bass fry were stocked into Rocky Gorge Reservoir, a non-tidal lake in the upper reaches of the Patuxent River.

In 2020, 3,500,000 striped bass fry were stocked in the tidal freshwater portion of the Patuxent River. An additional 300,000 striped bass fry were stocked at a later date. Also, another 10,000 striped bass fry were stocked in Rocky Gorge Reservoir in 2020.

Tidal Black Bass Program

The Tidal Bass Program surveyed 30 sites on the Patuxent River in 2018 using electrofishing gear. Sites were randomly selected from more than 100 250-meter sites between Waysons Corner to the north and Kings Branch, just below Lyons Creek, to the south. During the survey, data was collected on 234 largemouth bass (length, weight, condition). Twenty other species were documented, including American eel, fallfish, striped bass, blue catfish, and northern snakehead. To help support largemouth bass fishing in Patuxent River, DNR stocked 215 subadult largemouth bass in 2018. **Patuxent River Oyster Update 2018-2020**

The Patuxent River has 7,780 acres of historic oyster bottom (as charted by the 1906-1912 Yates Survey plus amendments) of which 33% is in four sanctuaries. Various plantings and activities occurred during 2018-2020 in the river.

1. Marylanders Grow Oysters (MGO) - MGO participation remained steady in 2018 and 2019, even though the program was cancelled in 2019 due to low spat production (mostly due to weather). No Patuxent River areas participated in the 2020 MGO program. Oysters from the MGO program were planted in Solomon's Sanctuary and nearby at the Navy Recreation Center.

   2018: In the spring, 134 bags of spat on shell were planted and 103 bags were delivered to five groups in the fall.

   2019: In the spring, 103 bags of spat were planted and no bags were delivered in the fall due to the program being cancelled as a result of poor conditions, which led to limited spat production at the hatchery.

   2020: No spat was planted in the spring due to the program being cancelled in fall 2019. In the fall no spat was delivered due to COVID-19, and one local group left the program.

2. Public fishery plantings were done by the state for the local county oyster committees using bushel tax revenue, revenue from commercial oyster surcharges, and a grant from MDOT.

   2018: 5,861 bushels of wild seed was planted on 27 acres and 8,640 bushels of fresh shell was planted in nine acres.

   2019: 12.26 million hatchery spat on shell was planted on 13.3 acres and 40,049 bushels of fresh shell was planted on 84.8 acres.

   2020: 6.07 million hatchery spat on shell was planted on two acres and 36,368 bushels of fresh shell was planted on 30.8 acres.

3. Commercial public fishery harvest in the Patuxent River was:

   2018-2019: 9,440 bushels

   2019-2020: 23,806 bushels

4. DNR's Annual Fall Survey: The survey samples eight bars annually to assess mortality, natural recruitment, and disease intensity. Following the record high freshwater streamflows of 2018, elevated flows continued into the first half of 2019, depressing salinities, which in turn affected spatset, diseases, mortality, and growth of oysters. By mid-year, the above average flows had subsided and salinities returned to normal by the fall. Mortality remained low (5.1% in 2019 vs 5.3% in 2020), and while spatset also remained low, it was slightly better in the lower river in 2019 (16 spat/bushel in 2019 vs. six spat/bushel in 2020).

Water Quality Monitoring

DNR's Resource Assessment Service manages the Eyes on the Bay monitoring program. This program collects water quality data throughout the state, including the Patuxent River and its tributaries. In 2019 and 2020, DNR operated three continuous monitoring stations set up on the mainstem of the Patuxent River to collect data every 15 minutes. DNR also has 12 long-term fixed monthly monitoring stations located throughout the watershed. All data is made available at eyesonthebay.dnr.maryland.gov/.

The Resource Assessment Service also administers the Maryland Biological Stream Survey (MBSS), conducting assessments of stream health throughout Maryland based on biota found in the streams. The sites are chosen throughout the state's watersheds on a rolling basis. In 2019, three sites were sampled in the Patuxent River watershed and the data published to DNR's Stream Health Website at geodata.md.gov/streamhealth/. The MBSS group also coordinates the Maryland Stream Waders program, a volunteer effort to collect stream biological data. In 2019, 16 additional sites in the Patuxent watershed were surveyed by these volunteers. MBSS sampling was not conducted in 2020.

Habitat and Water Quality Restoration

DNR supports watershed restoration with the Chesapeake and Atlantic Coastal Bays Trust Fund. In the Patuxent River watershed, the state provided $12,018,287 in FY19 and FY20 to implement 24 watershed habitat and water quality restoration projects. When complete, these projects will create an estimated annual nutrient reduction of 29,300 pounds of nitrogen, 4,800 pounds of phosphorus, and 4,150 tons of sediment to the Chesapeake Bay.

Maryland Department of Agriculture

Soil conservation district staff have worked with Patuxent River watershed landowners to enhance farming operations and implement BMPs to protect water quality, prevent flooding, safeguard streams and reservoirs, foster wildlife habitat, manage forest resources, and address natural resource impacts from urban growth. The Maryland Agricultural Water Quality Cost-Share (MACS) Program and federal programs like the Environmental Quality Incentive Program (EQIP) provide farmers with grants to help protect natural resources on their farms, adopt sustainable agricultural practices, and comply with federal, state, and local environmental requirements by installing BMPs to prevent soil erosion, manage nutrients, and safeguard water quality in the Patuxent River. A total of 795 agricultural BMPs such as grassed waterways, streamside fencing, field borders, and waste storage facilities were implemented in the Patuxent River watershed during 2019-2020. Conservation planners developed 204 soil conservation and water quality plans on 20,189 acres within the Patuxent River watershed during 2019-2020.

Cover crops are important to the health of the Patuxent River and the productivity of Maryland's farmland. In the fall, cold-hardy cereal grains such as wheat, rye, barley, and approved mixed crops are planted as cover crops in newly harvested fields. Once established, cover crops recycle unused plant nutrients remaining in the soil from the previous summer crop and nutrients released by the mineralization of crop residue. They also protect fields against wind and water erosion. In addition to their water quality benefits, cover crops improve soil health, increase organic matter in the soil, reduce weeds and pests, and provide habitat for beneficial insects. An average of 13,951 acres/year of cover crops were planted within the Patuxent River watershed during 2019-2020.

Maryland's Conservation Reserve Enhancement Program (CREP) helped landowners in the Patuxent River watershed plant streamside buffers, establish wetlands, protect highly erodible land, and create wildlife habitat, while providing steady, dependable land rental income. CREP is a state-federal (MDA and USDA Farm Service Agency) partnership that makes it easy for farmers to do their part to protect local waterways without hurting their bottom line. Four CREP contracts were written for 14.4 acres within the watershed during 2019-2020.

Agricultural land preservation plays a key role in protecting open space and keeping development focused within locally designated growth areas. Through MDA's Maryland Agricultural Land Preservation Foundation (MALPF) program, the seven counties with land in the Patuxent River watershed have protected 45,525 acres to date.

Maryland Department of the Environment

MDE approved the following TMDLs as of January 2021; (one new TMDL was approved during the 2019-2020 time period):

Maryland
Department of
the Environment

Title of TMDL	Date Approved
Fecal Coliform for Restricted Shellfish Harvesting Areas of Battle Creek, Buzzard Island Creek and Hog Neck Creek in the Lower Patuxent River Lower in Calvert and St. Mary's counties	May 21, 2019
Sediment in the Non-Tidal Patuxent River Middle Watershed, Anne Arundel, Calvert and Prince George's counties	July 2, 2018
Sediment in the Non-Tidal Patuxent River Lower Watershed, Anne Arundel, Calvert, Charles, Prince George's and St. Mary's counties	July 2, 2018
Polychlorinated Biphenyls in the Patuxent River Mesohaline, Oligohaline and Tidal Fresh in Chesapeake Bay Segments	September 19, 2017
Sediment in the Patuxent River Upper Watershed, Howard, Anne Arundel, and Prince George's counties	September 30, 2011
Sediment in the Little Patuxent River Watershed, Howard and Anne Arundel counties	September 30, 2011
Fecal Bacteria for the Patuxent River Upper Basin in Anne Arundel and Prince George's counties	August 9, 2011
Mercury to Cash Lake, Prince George's County	March 18, 2011
Fecal Coliform for the Restricted Shellfish Harvesting Area in Mill Creek of Lower Patuxent River Basin in Charles County	August 20, 2009
Phosphorus and Sediments for Triadelphia Reservoir (Brighton Dam) and Phosphorus for Rocky Gorge Reservoir, Howard, Montgomery, and Prince George's counties	November 24, 2008
Fecal Coliform for Restricted Shellfish Harvesting Areas in Solomons Island Harbor, Washington and Persimmon Creeks, and Cuckold Creek of the Patuxent River Lower Basin in Calvert and St. Mary's counties	September 27, 2005
Island Creek, Town Creek, Trent Hall Creek, St. Thomas Creek, Harper and Pearson Creeks, Goose Creek and Indian Creek and a Water Quality Analysis for Battle Creek of Fecal Coliform for Restricted Shellfish Harvesting Areas in the Lower Patuxent River Basin in Calvert, Charles, and St. Mary's counties	May 25, 2005
Mercury to Lake Lariat, Calvert County	January 27, 2004
Sediments and Phosphorus to Centennial Lake, Howard County	April 24, 2002
Biochemical Oxygen Demand (BOD) for the Western Branch of the Patuxent River, Prince George's County	June 6, 2000

Advocacy Strategy Implementation: 2019-2020

In 2019 and 2020, the local jurisdictions and PRC completed the following tasks in support of the Advocacy strategies in the Policy Plan:

Patuxent River Commission

Savage Mill development review and May 2019 letter

In 2018, the Commission learned about proposed residential development in Savage Mill, features of which raised concerns. In 2019, the Commission addressed a letter to the Howard County Planning Board, noting the jurisdiction's adoption of the Patuxent River Policy Plan and the Commission's duty to ensure protection of the river's water quality and resources. It also noted that the Commission had been following the development approval process of the Settlement at Savage Mill and encouraged the Planning Commission to consider any potential impacts on the health of the Patuxent River. In 2020, Howard County purchased the development site for use as parkland.

New by-laws developed

The Commission worked with Planning's legal counsel to arrive at a shared understanding of the statute governing the Commission and revised the Commission's bylaws accordingly. In addition to removing confusing language within the existing bylaws, the revised bylaws provide the Commission more flexibility to take action between meetings, allow for use of modern communications technology, and provide direction regarding certain votes.

Anne Arundel County

Outreach Activities on behalf of the Patuxent included the following:

Davidsonville Green Expo (February 23, 2019) - A community event was held, aimed at environmental awareness and education.

Monarch Academy – Laurel (January 22, 2020) - Bureau of Watershed Protection and Restoration (BWPR) staff provided an overview of the county's watershed program and environmental strategies for young residents at a charter school.

Dairy Farm Road Stream Restoration – Virtual Community Meeting (July 30, 2020) - BWPR staff provided community outreach for a restoration capital project in the Little Patuxent watershed.

Patuxent River Conference (PAXCON) Presentation (November 12, 2020) - BWPR staff took part in a presentation about the current state of stream restoration science and practice with a researcher from the University of MD.

Maryland Department of Planning

Planning staff coordinated and facilitated PRC Workgroup meetings, including drafting agendas and minutes and writing up workgroup findings for the PRC. Planning staff also completed research and analyses to inform workgroup policy discussions and recommendations.

PRC Legislative Review

During each Maryland legislative session, the PRC reviews proposed legislation germane to its mission and selects priority bills to support or oppose (PRC members who represent state agencies abstain from voting). The PRC provided testimony to the legislature on several bills in 2019-20.

The Bernie Fowler Wade-in

Many variables can be tracked to measure the health of the Patuxent River. One of the simplest and most fun is the Annual Bernie Fowler Wade-In, which also raises awareness and generates excitement about the Patuxent River. Conducted for the 33rd consecutive year in June 2020, the wade-in relies on a simple scientific approach: how deep into the river can Bernie Fowler wade before he loses sight of his sneakers?

Bernie Fowler served as Calvert County commissioner from 1970-1982, and as a Maryland State Senator from 1983-1994. As a young man in the 1950s, he stood chest-deep in the Patuxent while netting blue crabs and was able to see his feet on the river bottom. Years later he estimated water clarity in the 1960s to be 57 inches, but when he held the first "wade-in" in 1988 he lost sight of his sneakers at a depth of just 10 inches. In the 32 years since, the "Sneaker Index" hit a low of 8 inches in 1989, and reached a high of 47 inches in 2019. The measure fell a bit in 2020, to 43 inches as the event was held virtually but for Mr. Fowler being accompanied into the water by Congressman Steny Hoyer.

The Annual Bernie Fowler Wade-Ins were held on Broomes Island from 1988 through 2009. Since 2010, the event has been held at the Jefferson Patterson Park and Museum in Saint Leonard, Maryland. The Wade-In has evolved into a symbol of the need for stewardship of the state's precious water resources.

Senator Bernie Fowler at the 32nd Annual Wade-in

Bernie Fowler, *Chesapeake Quarterly,* April 2016

eXcitement Strategy Implementation: 2019-2020

In 2019 and 2020, the local jurisdictions and PRC completed the following tasks in support of the eXcitement strategies in the Policy Plan:

The Patuxent River Commission Tourism Workgroup 2019-2020 Year in Review

The Tourism Workgroup was established to maintain, create, and encourage opportunities for river-related economic activities, as well as public access to and recreational opportunities on the river and its tributaries throughout the Patuxent River watershed.

In 2019 and 2020, the Tourism Workgroup continued to focus its energy on the #PatuxentChallenge. The challenge encourages people to explore the recreational, cultural, and historical features along the river. Each local jurisdiction serving on the Commission suggested one or two sites for people to visit. By completing this challenge, the public can experience with each activity a different Patuxent River as it changes on its journey from its headwaters to the Chesapeake Bay.

For 2019 and 2020, the PRC Tourism Workgroup noted a continued growth in participants. As of October 2020, the number of participants exceeded the total number of participants in 2019. The sites with the smallest number of participants will be examined and reviewed to see why the site has a low rate of visitors. This might encourage the workgroup to consider other sites in that jurisdiction.

The Tourism Workgroup is currently developing its first marketing plan. They have enjoyed active participation from a number of tourism officials and recreation department leaders in this effort. Howard County is leading the effort to develop the marketing plan, which will be the workgroup's first coordinated effort to focus on having the Patuxent Challenge stimulate economic development. This will be achieved by identifying tourism opportunities in the watershed (e.g., dining, shopping, and lodging). In addition, Howard County has asked all tourism officials in the watershed's jurisdictions to come together as a group to audit the Patuxent Challenge website and make suggestions for improvement from a tourism official's point of view. The Workgroup projects that the marketing plan will be ready for the 2021 Patuxent Challenge Kickoff.

See planning.maryland.gov/Pages/OurWork/PaxRiverComm/PatuxentChallenge.aspx for more information about the Patuxent Challenge.

Charles County

In 2019, the county completed the Benedict living shoreline project on the lower Patuxent River. An easement protects the restored shoreline and ensures that maintenance and inspections can occur as needed. This shoreline restoration project coincided with the eXcitement strategies of the 2015 Patuxent River Policy Plan Update since this project enhances public access to the Patuxent River.

Howard County

In 2020, Howard County acquired the proposed Savage Mill development site for parkland. The 4.8-acre site is a DNR Targeted Ecological Area; the county will work with the community to determine how to utilize the space.

St. Mary's County

St. Mary's County purchased the 163-acre Snow Hill Park in March 2017. The park has 1,500 feet of sandy beach on the Patuxent River, as well as a canoe and kayak launch area. While a master plan is being prepared, the park, which currently includes a pavilion and picnic tables, is open. There are portable restrooms and pets on leashes are allowed. Snow Hill joins two other county parks on the Patuxent River.

Myrtle Point Park has nearly two miles of shoreline, including beach areas. There are areas for canoe and kayak launching, fishing, and three miles of hiking trails. The scrub and shrub habitat make great nesting areas for yellow-breasted chats, prairie warblers, and white-eyed vireos. Waterfowl hunting is allowed in the third split of the season. There are portable restrooms.

Elm's Beach Park has 500 feet of shoreline for swimming, fishing and picnicking. The park has a picnic pavilion, playground, portable restrooms, changing area, and parking. The park is an excellent location for birding because of the combination of pine forest/shrub, marsh, beach, and bay.

St. Mary's County lives up to its membership in the Patuxent River Policy Plan through responsible development guided by its comprehensive plan, zoning, and other ordinances and regulations, its MS4 permit, educational efforts; preservation; and park development.

Department of Natural Resources

CBNERR-MD education staff coordinates with both sides of Jug Bay to deliver programming for K-12 students on topics such as plankton, land use, and nutrient studies as part of a partnership between both parks and the dreserve. The reserve program has also partnered on stewardship activities, including as snakehead monitoring. In recent years, CBNERR-MD provided additional support for summer research interns, park naturalists, and in October 2020, was awarded funds from Anne Arundel County to begin developing a research and education field station at Jug Bay Farm Preserve.

Recommendations to Facilitate Implementation of the 2015 Patuxent River Policy Plan

State agencies and local governments continue to undertake significant projects to implement the adopted 2015 Patuxent River Policy Plan.

The Patuxent River Commission, which is tasked with supporting state and local implementation of the Policy Plan, should focus more narrowly on a smaller number of actions that can be accomplished during the year, in accordance with available staff resources.

The tidal portion of the Patuxent River is still in poor ecological condition. According to UMCES, "this is the lowest scoring region [in the Chesapeake Bay]. Five out of seven indicators had failing scores. In this region all indicators scored poor or very poor except for dissolved oxygen." (See Patuxent River at: ecoreportcard.org/report-cards/chesapeake-bay/health/) State agencies and local governments must continue making progress implementing the strategies of the adopted 2015 Patuxent River Policy Plan.

Maryland
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