



2021-2022 Biennial Report

Implementation of the *Patuxent River Policy Plan*



Executive Summary

The Patuxent River is the longest and deepest of the eight major tributaries of the Chesapeake Bay. Its length and watershed are contained entirely within Maryland as it flows 110 miles and stretches more than one mile across at its entrance to the bay, with a maximum depth of about 175 feet. Its watershed covers 937 square miles — 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 (Howard, Montgomery, Prince George’s, Charles, St. Mary’s, Anne Arundel, and Calvert), 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 (nitrogen, phosphorus, and sediment) approaching, the health of the Patuxent River is more important than ever.

Almost 45 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 (the “Policy Plan”) and the Patuxent River Commission (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, and 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 the local governments represented in the PRC — and in 2016 by the Maryland General Assembly — replaces the original 1984 Policy Plan, last amended in 1997.



Kingfisher



Mummichog



Mallards



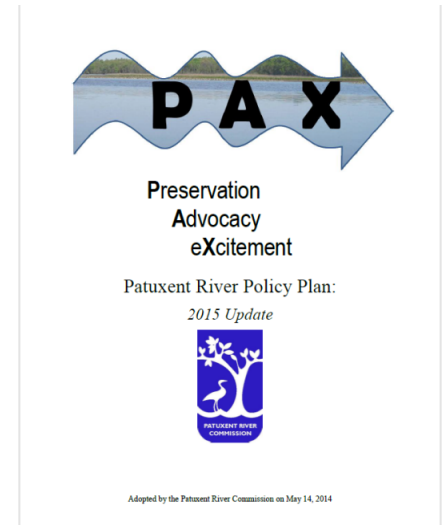
The 2015 Policy Plan

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 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.



2021-2022 Biennial Report

The Maryland Department of Planning (Planning) submits a report every two years 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 2021 and 2022 in support of the Policy Plan and the PRC's activities that support government implementation of the Plan.

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

A number of regulatory protocols require counties through which the Patuxent flows to reduce pollution entering the Patuxent, including the following:

- Municipal Separate Storm Sewer System permits (MS4) issued under the U.S. Environmental Protection Agency's (EPA) National Pollutant Discharge Elimination System;
- Total Maximum Daily Loads (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 is required by the EPA to clean up the Chesapeake Bay by 2025 and implemented through Watershed Implementation Plans (WIPs).

These counties reported progress in fulfilling these obligations by installing new measures to treat stormwater from previously untreated impervious surfaces and to reduce the loading of nutrients, bacteria, and polychlorinated biphenyls (PCBs) into the Patuxent.

The Maryland Department of Transportation's State Highway Administration (MDOT SHA) is subject to a local TMDL and must comply with an MS4 permit as well.¹ The Maryland Department of the Environment (MDE) approves TMDLs on behalf of EPA – there were no new TMDLs in 2021 or 2022.

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

Local and state agencies reported fewer but important activities related to Advocacy and eXcitement. The PRC reviewed proposed bills from the 2021 and 2022 sessions of the Maryland General Assembly that affect the Patuxent River and wrote the legislature in both years to support the Plastic Bag Reduction Act.

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 over 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, then on advocacy work, and finally on activities that generate excitement.

In addition to coordinating the preparation of this document, the primary role of the Maryland Department of Planning (MDP) in support of the Policy Plan is to serve as lead staff to the PRC and to facilitate collaboration and coordination of the operations of PRC members. MDP also provides administrative, communications, research, analysis, and planning support for the PRC and its workgroups.

¹ WSSC Water and the Patuxent Reservoirs Watershed Protection Group (PRWPG) advocacy partnership have reported informally on some progress in achieving the nutrient and sediment TMDLs for the reservoirs, but other TMDLs that affect the Parkway and Western Branch WWTPs do not have any TMDL reporting requirements. In addition, WSSC Water is not covered under any MS4 stormwater permit (WSSC Water received a waiver from the Phase II small system permit 13-SF-5501), so no reporting for that is provided either.

2021-2022 Biennial Report: Implementation of the Patuxent River Policy Plan

Background

Section 5-809 of the State Finance and Procurement Article requires MDP to submit a report every other year (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 completed in 2021 and 2022 by local governments and state agencies represented on the Patuxent River Commission. These include (from north to south in the watershed) Montgomery, Howard, Prince George's, Anne Arundel, Calvert, Charles, and St. Mary's counties as well as the cities of Laurel and Bowie, the Maryland Department of Natural Resources (DNR), the Maryland Department of Environment (MDE), the Maryland Department of Transportation (MDOT), the Maryland Department of Agriculture (MDAG), and MDP.

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



Patuxent River in winter.

governments and state agencies, this report also describes the work the PRC accomplished in 2021 and 2022. The Policy Plan in effect during this reporting period is the 2015 Policy Plan, which was adopted in 2014 by all the local governments represented on the PRC (except for the city of Bowie, which joined the PRC in 2022), and in 2016 by the Maryland General Assembly.

MDP serves as the lead staff to the PRC, providing administrative, communication, research, analysis, planning, and coordination support for the commission and its workgroups. To narrow the focus and guide the work of the commission's stakeholders, the PRC approved an action plan for the 2021-2022 time period. The action plan identifies specific tasks that support implementation of specific 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 MDP concerning implementation of the Policy Plan. These recommendations 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 (represented by the acronym PAX).

Preservation

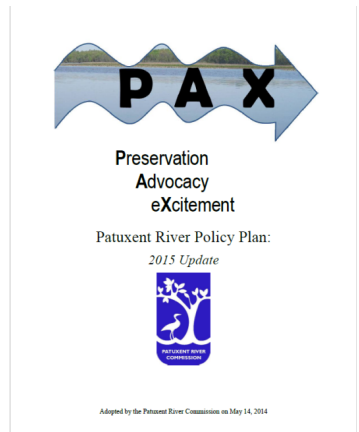
Local jurisdictions and the state will work toward the preservation of the Patuxent River and the land within its watersheds and the restoration of the ecological and economic functions of the river.

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

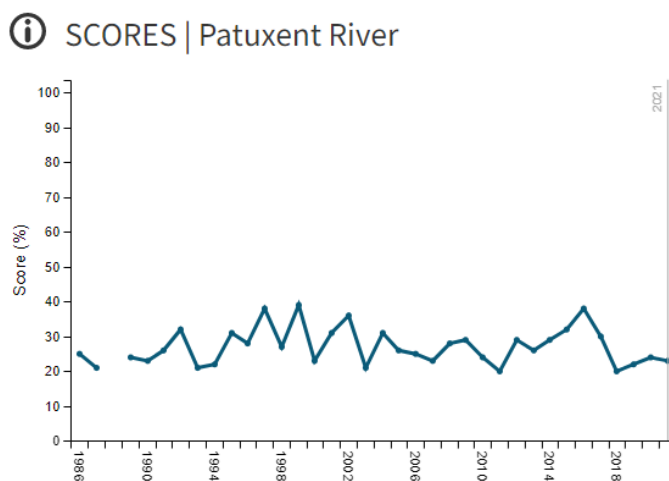
- X1. Maintain, create, and encourage opportunities for river-related economic activities in appropriate locations.
- X2. Ensure and encourage public access to the river, its tributaries, and recreational opportunities within the watershed.
- X3. Support economic and scientific research projects on the 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 (1985-2021) and short-term (2010-2021) trends for nitrogen, phosphorus, and suspended-sediment load are improving.²

However, the overall health index of the tidal portion of the Patuxent peaked at 39 in 1999. In 2021 it reached only 23, down from 24 in 2020 (Figure 1). The overall health index consists of ten indicators: dissolved oxygen, nitrogen, phosphorus, chlorophyll a, water clarity, aquatic grasses, benthic community, stewardship, walkability, and heat vulnerability index. More details on the index and score are discussed at the University of Maryland's Chesapeake Bay report card website on [its webpage](#).

Figure 1. Tidal Portion – Overall Index



² Nitrogen, Phosphorus, and Suspended-Sediment Loads and Trends Measured at the Chesapeake Bay River Input Monitoring Stations: Water Years 1985-2021. Christopher A Mason, Alexander M Soroka, U.S. Geological Survey, November 4, 2022.

In 2021, the tidal score for nitrogen was 29, lower than the highest rating of 54 in 2002 and below 46 in 2020, but above 16 in 2019 (Figure 2). In 2016, phosphorus registered its best score, 69, since tracking started in 1986; in 2021, it dropped to 19, which is higher than the score of 17 achieved in 2020. Although the tidal scores for nitrogen and phosphorus have fluctuated over the past thirty years (in 2021 nitrogen was down and phosphorus up over 2020), the trend is moving in a slightly positive direction for nitrogen since 2002 and slightly negative or static direction for phosphorus (Figures 2 and 3).³

Figure 2. Tidal Portion - Nitrogen Scoring

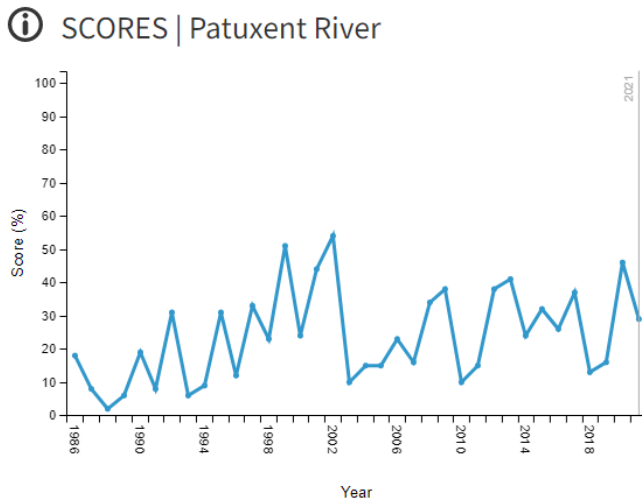
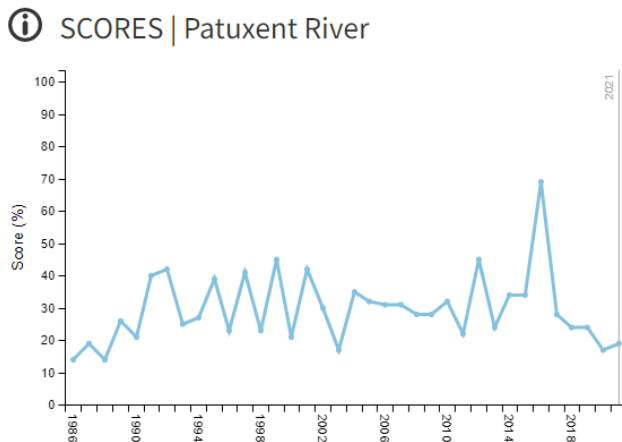


Figure 3. Tidal Portion - Phosphorus Scoring



³ Eco Health Report Cards. University of Maryland's Center for Environmental Science. <https://ecoreportcard.org/report-cards/chesapeake-bay/bay-health/>. Accessed February 2023.

Preservation Strategy Implementation: 2021-2022

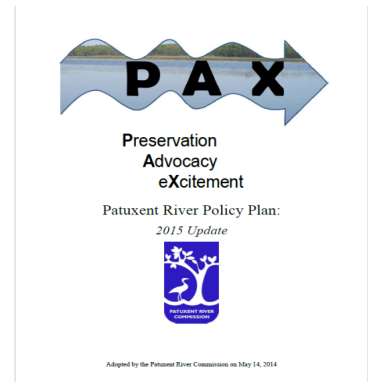
During 2021 and 2022, local jurisdictions, state agencies and PRC completed several tasks to support the Policy Plan's preservation strategies:

PRC

In 2022, to help implement its action plan, the PRC created three new workgroups: the Long-Range, Federal Assistance, and Geodatabase workgroups. The PRC Geodatabase Workgroup explored the possibility of creating a geodatabase that could assist PRC staff and members with creating detailed analyses and maps to assist in understanding the implications of issues brought to the PRC's attention. After exploring several possibilities in 2022, the workgroup decided that the Maryland Watershed Resources Registry (WRR) could potentially meet the PRC's needs.

The PRC Long-Range Workgroup focused on the action plan goal of establishing a wetland park in each Patuxent county within five years. Central to this task is locating all of the wetlands, which led the workgroup to also identify the Maryland WRR as a useful tool. Given the needs of both workgroups, PRC staff have scheduled training for March 2023 for interested PRC members on how to use the Maryland WRR.

The PRC Federal Assistance Workgroup analyzed new and expanded funding sources and services made available through the federal Infrastructure Investment and Jobs Act and worked closely with the town of Eagle Harbor to follow-up on concerns about flooding and stormwater runoff that the town brought to the PRC's attention in 2021. Workgroup members met with the mayor and town council in Eagle Harbor on August 4, 2022, to identify all projects, both ongoing and proposed, that the town wished to pursue to address water, wastewater, stormwater, flooding, erosion, and sedimentation concerns. In response, the workgroup worked with the town to propose a funding forum where federal, state, and nongovernmental financing experts would attend to discuss next steps to facilitate the town's projects. For the remainder of 2022, PRC staff identified participants for the forum, connected multiple service providers to coordinate efforts, and researched applicable federal and state programs. The forum is scheduled for March 2023.



Maryland Department of Planning (MDP)

MDP serves as lead staff of the PRC, providing communications to PRC members, arranging and facilitating meetings of the PRC and its workgroups, drafting agendas and minutes, and completing supportive research and analysis. In 2022, to help implement the PRC's action plan, MDP provided funding to the University of Maryland Center for Environmental Science (UMCES) Integration and Application Network (IAN) to complete the first phase of a Patuxent River Report Card project. More information on the first phase of the project can be found on the UMCES IAN [Bringing People Together for the Patuxent River website](#).



Aside from its PRC assistance, MDP 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.

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

MDP's work in support of local and state resource conservation efforts also 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.

MDP 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, Charles, Montgomery, Prince George's, and St. Mary's counties. The Secretary of Planning is also 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 the Patuxent counties include at least one Rural Legacy area.

City of Bowie

In 2022, the city completed its first stream restoration project using a regenerative stormwater conveyance in Saddlebrook Branch (an Upper Patuxent tributary). The project treats 99 acres of 1960's era impervious cover that was previously untreated. Through the city's street, park, and private/residential tree planting programs, 587 native trees were planted. Also, nearly 2,500 pounds of medications, which could have been flushed into the state's waterways, were collected during four National Prescription Drug Take Back Days.

During the Maryland-National Capital Park & Planning Commission’s (M-NCPPC) development of the Bowie-Mitchellville and Vicinity Master Plan (approved by the County Council in March 2022), the city made several recommendations to reduce potential future development in the watershed by expanding the Rural Area Designation in areas with drainage directly into the Patuxent Mainstem (at MD Routes 3 and 450). The city supported several areas of increased recreational opportunities and opposed several recommendations to create additional roads.

City staff updated Bowie’s Development Review Guidelines in 2021, and in 2022 the city Council adopted a no-net loss policy for trees. Lastly, staff, city contractors, and volunteers helped remove invasive species from more than five acres of city-owned land.

City of Laurel

In October 2022, the U.S. Army Corps of Engineers, Baltimore District, completed the Flood Risk Management Study for the Patuxent River. The study includes portions of the city of Laurel, Prince George’s County, the city of Bowie, Anne Arundel County, and Howard County. The city is working on a feasibility study for two of the recommendations from the study to determine the possibility of applying for a grant. Additionally, the city of Laurel is continuing planning efforts on a flood warning system and has identified six locations to install the gauges: Patuxent River at I-95; Patuxent River at Riverfront Park; Patuxent River at Brockbridge Road; Crow Branch at US-1; Bear Branch at Cherry Lane; and Bear Branch at Van Dusen Road. The city anticipates installation of these gauges by early February 2023, followed by one year of beta-testing of the system.



Anne Arundel County

The portion of the Patuxent River watershed in Anne Arundel County consists of three separate watersheds: Little Patuxent, Upper Patuxent, and Lower/Middle Patuxent. The watershed is located along the western border of Anne Arundel County and shares political boundaries with Howard, Prince George’s, and Calvert counties. Within Anne Arundel County, the Patuxent River watershed is approximately 125 square miles and contains 573.5 miles of streams.



On November 5, 2021, the county was issued its 4th generation National Pollution Discharge Elimination System (NPDES) Municipal Separate Storm Sewer System (MS4) permit. Accomplishments associated with implementation of that permit and other planning, restoration, and preservation activities within the Patuxent watershed include:

- Completion of 26 stormwater management infrastructure projects.
- Completed design of the Evergreen Towsers stream restoration project, involving the restoration of approximately 2,500 linear feet of an unnamed tributary to Towsers Branch. Construction is anticipated to begin in fall 2023.
- Completed construction of the Towsers Branch Dairy Farm Road Area stream restoration project—approximately 1,400 linear feet.

- Initiated design of the Crofton Golf Course (a.k.a. Beaver Creek) stream restoration project—2,400 linear feet—with construction for Phase I beginning in 2023 and Phase II in 2024.
- Initiated a schematic design of stream restoration for the Russett Community watershed restoration project.
- Adopted the county’s General Development Plan, *Plan2040*, in May 2021 and received the 2021 Maryland Sustainable Growth Award for Sustainable Communities, the highest level of recognition for sustainable community planning in the state.
- Adopted the county’s Green Infrastructure Plan in April 2022.
- Adopted an update to the county’s Water and Sewer Master Plan in June 2022—approved by the MDE in October 2022.
- Initiated multi-jurisdiction collaboration to develop a polychlorinated biphenyl (PCB) monitoring strategy to address the Patuxent River Mesohaline, Oligohaline, and Tidal Fresh PCB Total Maximum Daily Load (TMDL) requirement.
- Conducted biomonitoring in primary sampling units (PSUs) in 2021 during Round 3 of the countywide Biological Monitoring Program: Ferry Branch, Cabin Branch, Lyons Creek, and Hall Creek. Results from these and all other PSUs in the Patuxent River watershed are available online.
- Added a total of 189 acres to its Rural Legacy Program—two farms on 118 acres in the Upper Patuxent and one farm on 71 acres in the Middle Patuxent.
- Submitted a request for recertification of the county’s Agricultural Land Preservation Program to MDP and MDAG in December 2022.
- Converted 36.5 acres of agricultural fields into forests of native species—planting 9,000 trees—at the Jug Bay Emory Waters Nature Preserve.
- Converted 17.5 acres of agricultural fields into a native pollinator meadow at the Jug Bay Emory Waters Nature Preserve.
- Acquired a 2.79-acre property in the Middle Patuxent watershed—now part of Jug Bay Wetlands Sanctuary—29.17 acres along Sands Road in the Upper Patuxent watershed, and 12.01 acres along Laurel-Ft. Meade Road in the Upper Patuxent watershed.

Calvert County

As part of its MS4 permit, the county must mitigate for the impervious coverage within the permit area (Solomons and Lusby). At the time the permit was issued there were 1,175 acres of impervious coverage within the permit area. Currently, the BMPs in the permit area treat a total of 121.19 acres, leaving 1,053.81 acres of impervious coverage untreated.



Calvert County must mitigate 20 percent of that amount or 210.76 acres of equivalent impervious area. The county developed a restoration activity schedule which is tracked as the various methods of mitigation are completed. The updated restoration activity schedule is submitted with the county’s MS4 annual report.

Charles County



Charles County’s implementation of its NPDES Phase I MS4 permit and the county’s Watershed Protection and Restoration Program (WPRP) (from January 2021 through December 2022) supported the goals and recommendations of the Patuxent River Policy Plan.

The county continues to address the fecal coliform bacteria TMDL for Indian Creek, a tributary of the Patuxent River, and will be revising the restoration plan based on MDE’s *Guidance for Developing Bacteria TMDL Stormwater Wasteload Allocation Watershed Implementation Plans*, released in February 2022.

In early 2021, the county contracted with UMCES to collect water samples from groundwater wells and surface water around the unincorporated town of Benedict to analyze the impact of septic effluent on receiving waters. In November 2022, the findings were presented, including the next step to develop a feasibility study to identify low-cost sewer options to serve Benedict.

The county continued to implement a Septic Pump-Out and Riser Reimbursement Program through 2022. Approximately 354 septic system owners in the Charles County portion of the Patuxent River watershed received pump-out reimbursement and 44 received riser reimbursement through the program in 2021 and 2022. Charles County incentivizes the installation of septic tank risers because they serve as a visual reminder to homeowners of where their tank is located, including the importance of routine maintenance. Risers also provide permanent access to the tank, which is necessary for conducting inspections, pump-outs, cleanings, and repairs. Additionally, five traditional septic systems were replaced with best available technology systems using Bay Restoration Funds.

	FY19-FY20	FY21-FY22
Septic Tank Pump-Out	202	354
Septic Tank Riser Installations	24	44
Best Available Technology	6	5

The EPA-approved sediment TMDL for the Patuxent River applies to all non-tidal tributaries in the watershed; however, most of the non-tidal tributaries in Charles County are high quality Tier II and therefore do not require a TMDL restoration plan. As of 2019, the non-tidal tributaries maintained their Tier II status with sampling scores greater than four. To meet the requirements for delisting the high-quality portions of the Patuxent watershed, the county monitored again in 2022.

As of 2020, Charles County has established in the lower Patuxent River watershed 1,811 acres of protected lands (e.g., parks, natural resource management areas, transferable development rights or TDR easements), 292 acres of recorded designated open space, and 1,522 acres of recorded forest conservation easements. As of 2022, the county added an additional 206 acres of protected lands and 58 acres of forest conservation easements.

In June 2021 and 2022, the county surveyed commercial and industrial properties within the Patuxent River watershed for potential illicit discharges. Visual surveys were conducted on hundreds of parcels in the Hughesville and Benedict areas. Several businesses were documented as having practices or conditions that could send pollution into nearby storm drain inlets or surface waters. The issues included improper storage of industrial materials, batteries, and used oil drums, evidence of commercial vehicle washing without wastewater collection, and overflowing dumpsters. Per Charles County's Illicit Discharge and Detection Elimination (IDDE) Standard Operating Procedures, the properties were cleaned and brought into compliance.

In 2021, Charles County inspectors began distributing public outreach brochures to educate businesses and industry on preventing stormwater pollution. The brochures include information on Charles County's IDDE program and listed proper practices to prevent water pollution, as well as photographs of correct and incorrect examples for automotive businesses, dumpsters, restaurants, and outdoor storage.

The University of Maryland, Charles County Extension office, expanded community outreach efforts in 2021 and 2022 by offering a virtual *Wednesday Water Webinar Series* for homeowners to teach proper septic system maintenance, well water protection, and residential pond management. The virtual format attracted more than 300 attendees and was recorded and posted on the UMD website at <https://extension.umd.edu/locations/charles-county>.

In early 2021, the county and the Chesapeake Bay Trust awarded a grant to the Alliance for the Chesapeake Bay to convert 1.4 acres of cropland to warm season meadow at Serenity Farm along the shores of the Patuxent River in Benedict. Serenity Farm, owned and operated by the Robinson family, is a fully operational farm and serves as an example of sustainable farming. A workshop for local landowners was also held at Serenity Farm in October of 2021 on how to successfully establish meadows and their benefits for the river and the farming community. The newly installed meadow attracts local pollinators and removes nitrogen, phosphorus, and sediment from stormwater runoff while serving as a demonstration project for other local conservation-minded organizations and landowners.

Howard County

Approximately 75 percent of Howard County lies within the Patuxent River watershed. Approximately 62 percent of the watershed lies in the Rural West, which contains predominantly low density residential development, agriculture, and forest. The remainder of the watershed is within the county's Planned Service Area for public water and sewerage, and is home to more intensive residential and commercial development, including Columbia New Town.



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 recommended policies and actions to help the county manage water resources more sustainably and to ensure that as the county grows, its water resources will be conserved, protected, and restored.

Howard County received its fourth NPDES MS4 permit in December 2014. This permit required the county to develop plans to achieve stormwater pollutant load reductions for each local TMDL by December 2015 and to provide water quality treatment for 20 percent of its untreated impervious area by the end of the permit term in December 2019. In response, the county completed an initial Countywide Implementation Strategy (CIS) in December 2015 and an updated CIS in 2017. The CIS determined the county's 20 percent impervious surface treatment goal and demonstrated the means to achieve local stormwater TMDLs. Howard County revised its 20 percent impervious surface restoration goal in 2018, 2019, and 2020, and met the restoration requirement as of March 30, 2018. More recent achievements are discussed below.

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 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.

The NPDES permit also required 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 county's 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.

Howard County received its fifth NPDES MS4 permit in December 2022. This permit includes the following requirements:

- Provide water quality treatment for 1,345 acres of the county's untreated impervious area by December 2027.
- Continue progress toward achieving stormwater pollutant load reductions for each local TMDL.
- Develop a plan within one year of approval for a new local TMDL to achieve the specified stormwater pollutant load reduction.

- Develop and begin implementation of a salt management plan to reduce the use of winter weather deicing materials in the third year of the permit term.
- Develop, implement, and maintain a good housekeeping plan (GHP) for county-owned properties not required to be covered under Maryland’s Stormwater Industrial General Permit. Submit the GHP and begin implementation by the third year of the permit term.

The county has been conducting biological and physical assessments of the streams in each major watershed on a 5-year rotating basis since 2001. The biological assessments study the benthic macroinvertebrates (bottom-dwelling organisms) as an indicator of water quality and stream health. There is currently no specific NPDES MS4 permit requirement to complete this type of monitoring; however, the county recognizes the importance of understanding the conditions of its stream systems. Data is used for general characterization, to support watershed assessment and management efforts, and to track conditions over time. The county uses the same monitoring protocols as DNR in their Maryland Biological Stream Survey. Assessments were conducted in the Dorsey Run, Hammond Branch, and Rocky Gorge watersheds in 2022.



Montgomery County

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

Montgomery County is operating under its 4th generation NPDES MS4 Permit, which was issued to the county on November 5, 2021. The permit expires in November 2026 and is available on MDE’s website.

Montgomery County’s FY22 MS4 Annual Report was provided to MDE and is available on the [county’s website](#). In FY22, the county updated the TMDL Implementation Plan for the Rocky Gorge and Triadelphia Reservoir phosphorus and sediment wasteload allocations. This plan was submitted to MDE for review. In 2023, the county will hold outreach events and a public comment period on the updated TMDL Implementation Plan. The outreach and public comment period will be announced on the county’s [website](#).

In FY22, the county inspected 143 stormwater management facilities located in the Patuxent River watershed. Maintenance activities were conducted as needed to ensure these facilities were functioning properly.

The Montgomery County Department of Environmental Protection (DEP) uses a multi-metric Index of Biological Integrity (IBI) to develop narrative ratings of biological conditions in wadeable streams. In 2020 DEP monitored 29 stations in three sub-watersheds of the Patuxent River—the Upper Patuxent (above Triadelphia Reservoir), the Hawlings, and the Lower Patuxent. In the Upper Patuxent sub-watershed 13 stations were monitored, 38 percent (5) rated *Excellent* and

62 percent (8) rated *Good*. Seven stations were monitored in the Hawlings sub-watershed with 57 percent (4) rated *Good* and 43 percent (3) rated *Fair*. Ratings were most varied in the Lower Patuxent sub-watershed, where nine stations were monitored with 44 percent (4) rated *Excellent*, 44 percent (4) rated *Good* & 11 percent (1) rated *Fair*. No stations were monitored in the Patuxent watershed in 2021. Data collected at 11 stations in 2022 will be included in future reports.

Maryland-National Capital Park and Planning Commission (M-NCPPC)—Montgomery County Environmental Activities in the Patuxent River Watershed January 2021-December 2022

The Montgomery County 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 a 1-acre parks department tree planting project and an additional .35 acres planted by private property owners mostly using *Reforest Montgomery* coupons for purchasing trees. In 2021, the Montgomery County Department of Parks purchased five parcels in the Hawlings River watershed, totaling 72.6 acres of new parkland. In addition, about 16.5 reforested acres in the Hawlings River watershed and 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 259.75 person-hours within the Patuxent watershed were logged. 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 Department of Parks has continued to implement its Deer Population 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, 66 deer were harvested from the park. Yearly deer harvests have resulted in a continuing decline in population, with an estimated population that fluctuates between 15-30 deer per square mile through the course of the calendar year.

An update of the county's general plan, *Thrive Montgomery 2050*, was approved and adopted in 2022. *Thrive Montgomery's* focus on a compact form of development with a mix of uses supported by transportation systems that make alternatives to driving practical and attractive will be essential pieces of a comprehensive strategy to fight climate change and preserve the Patuxent River. A stronger focus on walking, biking, and transit infrastructure will be crucial but

the significance of mixed uses and compact development in reducing driving is equally important. The environmental benefits of dense, walkable neighborhoods dovetail with the desired outcome of increasing preference across age groups to live in walkable places served by a mix of uses and amenities.

Prince George's County



The Prince George's County Department of the Environment (DoE) administers the county's MS4 permit. Prince George's County submitted its FY22 Annual NPDES Report to MDE in December 2022 as per requirements in the county's current NPDES MS4 permit issued in 2014. A copy of the county's 2022 annual report can be found on [its website](#). Prince Georges County government was issued its new Generation 5 MS4 Permit on December 2, 2022.

The county's efforts under the implementation of the MS4 permit and through the county's WIP from January 2020 through December 2022 supported the goals and recommendations of the *Patuxent River Policy Plan*.

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) Phase III. In FY22, the county vigorously continued its efforts to reduce pollutants entering its waterways in accordance with the objectives of the MS4 permit. These efforts cut across a wide swath of agencies and programs. In FY22, the county's notable restoration accomplishments toward meeting the MS4 goals included:

- 5,230.6 acres of the impervious area have been treated, of which 2,498.24 impervious acres have been restored in the Patuxent watershed.
- Through its Rain Check Rebate Program, 30 environmentally sensitive design BMPs were installed as of FY22 on private properties in the Patuxent watershed. This program provides great incentives for property owners to minimize stormwater runoff and prevent stormwater pollution in the county waterways while at the same time providing an excellent educational platform for the neighborhood residents.
- Under its Stormwater Stewardship Grant Program, 12 additional projects were approved for \$675,000 to various nonprofit organizations to treat impervious acres. These projects include on-the-ground efforts such as water quality retrofit projects, tree planting, rain gardens, and bio-retention practices. In 2022, the county awarded a \$30,000 grant to the National Wildlife Federation for *Public Outreach and Stewardship to Care for Creation along the Upper Patuxent River: A Multifaith Sacred Grounds Partnership Phase II*.

Currently, efforts are underway to restore 2,300 impervious acres in the Patuxent watershed. Tables 1 through 3 depict the current list of projects (Capital Improvement Plan and CWP) in planning, design, or under construction under DoE's restoration plan through stream restoration, shoreline restoration, and pond retrofit for the upcoming fiscal years (FY24-FY27).

Current TMDL reductions based on the MDE TMDL Implementation Progress and Planning (TIPP) tool are depicted in Table 4, which includes the Upper, Middle, and Lower Patuxent and the Western Branch (Chesapeake Bay names: Patuxent Lower Mesohaline, Patuxent Middle Oligohaline, Patuxent Upper Tidal Fresh and Western Branch).

Table 1: Current Projects in Design by DoE/ CWP

Project Name	Project Status	Project Type	Impervious Restoration Credit	Builder or Implementor
Patuxent River Park III (S-35)	Design	Stream Restoration	50.32	DOE CIP
T.H. Duckett Park Stream Restoration (Rocky Gorge)	Design	Stream Restoration	44.1	DOE CIP
Upper Marlboro Levee	Design	Stream Restoration	267.4	DOE CIP
Cabin Branch Stream Valley Park - O-15	Design	Outfall Restoration	17.6	DOE CIP
Liberty Sports Park Stream Restoration Phase I	Design	Stream Restoration	124.9	DOE CIP
Patuxent Watershed - McCarthy Park Stream Restoration	Design	Stream Restoration	284.25	DOE CIP
Liberty Sports Park Stream Restoration Phase II	Design	Stream Restoration	79.8	DOE CIP
Windsor Stream Restoration	Design	Outfall Restoration	3.09	Clean Water Partnership
Outfall Restoration Projects - W 34	Design	Outfall Restoration	24.6	Clean Water Partnership
Magruder's Ferry Shoreline Restoration	Design	Shoreline Restoration	92.3	Clean Water Partnership
Marietta Woods	Design	Pond Retrofit	25.86	Clean Water Partnership
Spriggs Request Way (Woodmore)	Design	Pond Retrofit	12.45	Clean Water Partnership
Equestrian Center	Design	Pond Retrofit	23.13	Clean Water Partnership
Springdale Section II	Design	Pond Retrofit	38.05	Clean Water Partnership
			1087.85	

Table 2. Current Projects Under-Construction by DoE/ CWP:

Project Name	Project Status	Project Type	Impervious Restoration Credit	Builder or Implementor
Bear Branch Stream Restoration Phase II	Completed FY23	Stream Restoration	341.79	DOE CIP
Camelot Park Outfall Restoration	Under Construction	Outfall Restoration	48.28	DOE CIP
Barack Obama Elementary School Outfall Restoration	Under Construction	Outfall Restoration	22.31	DOE CIP
La Dova Way Outfall Restoration	Under Construction	Outfall Restoration	20.4	DOE CIP
Inglewood Business Center	Under Construction	Pond Retrofit	111.45	Clean Water Partnership
Foxchase II A	Under Construction	Pond Retrofit	27.04	Clean Water Partnership
Hakes Lakewood	Under Construction	Pond Retrofit	60.83	Clean Water Partnership
			632.1	

Table 3: Current Projects in Planning by DoE/ CWP:

Project Name	Project Status	Project Type	Impervious Restoration Credit	Builder or Implementor
Upper Patuxent Watershed, SR-27	Planning	Stream Restoration	73.26	Clean Water Partnership
SR-77 Walker Branch	Planning	Stream Restoration	112.7	Clean Water Partnership
Springfield Manor Pond #2	Planning	Pond Retrofit	26.98	Clean Water Partnership
Mellwood Park -Patuxent Watershed	Planning	Stream Restoration	28.34	DOE CIP
Woodstream Park Stream Restoration (S-41)	Planning	Stream Restoration	36.66	DOE CIP
Parker Lane Headwater Channel Stabilization Project	Planning	Stream Restoration and Tree Planting	159.74	DOE CIP
Patuxent S-09	Planning	Stream Restoration	32.2	DOE CIP
Patuxent S-34	Planning	Stream Restoration	92.16	DOE CIP
Patuxent O-32	Planning	Stream Restoration	19.16	DOE CIP
			581.2	

Table 4: Current TMDL Reductions:

Pollutant	Total Nitrogen (lbs./year)	Total Phosphorus (lbs./year)	Total Suspended Solids (lbs./year)
TMDL Issuance Date	2010	2010	2010
Target Load Reduction¹	38,962.4	21,494.5	N/A
3rd Generation Permit			
BMP Reduction – FY 2010	11.8	2.1	1,448
BMP Reduction – FY 2011	8.9	14.2	29,009
BMP Reduction – FY 2012	202.9	188.9	258,275
BMP Reduction – FY 2013	10.7	15.3	30,435
4th Generation Permit			
BMP Reduction – FY 2014	0.7	0.3	202
BMP Reduction – FY 2015	46.9	69.7	137,818
BMP Reduction – FY 2016	4.1	1.6	1,260
BMP Reduction – FY 2017	658.7	302.3	232,591
BMP Reduction – FY 2018	2,962.1	1,615.9	1,116,742
BMP Reduction – FY 2019	108.1	70.5	52,590
BMP Reduction – FY 2020	3,664.9	1,306.7	970,228
BMP Reduction – FY 2021	2,156.9	1,493.9	2,227,510
BMP Reduction – FY 2022	145.4	177.3	325,440
Total BMP Reduction	9,982.0	5,258.6	5,383,548
Percent Reduction of Target	26%	24%	N/A

¹ TMDL-required load reduction for MS4 areas

Outreach and Education

The county has implemented a wide range of educational and outreach initiatives to inform the public about impacts of their daily activities on the health of the watershed.

- The county hosted 105 environmental education and outreach events, mostly virtual due to COVID-19, that promoted environmental awareness, green initiatives, and community involvement in reducing pollutants to its waterways.
- The county’s Tree Planting Program planted 3,922 new trees under its Right Tree, Right Place Program.

Monitoring and Assessment

- The county continued its chemical, physical, and biological monitoring and assessment of the Bear Branch watershed. Slight improvements in water quality were noted. With the restoration of Bear Branch Phase II, the county expects to see further improvements in the upcoming years.

- The county resumed its physical monitoring of the Black Branch watershed in FY22 to determine the effectiveness of stormwater management practices for stream channel protection.

(M-NCPPC)—Prince George’s Department of Parks and Recreation, Environmental Outreach and Education in the Patuxent River Watershed January 2021-December 2022

M-NCPPC offers a wide variety of educational programs and outreach opportunities through its Special Programs and Natural and Historical Resources divisions. M-NCPPC has classroom programs to educate students on watersheds, wetlands, native plants, stormwater, pollution, wildlife, insects, and more. M-NCPPC naturalists and park rangers also attend career days at Prince George’s County schools. Through each career day, staff share their environmental knowledge and passion, providing excellent opportunities to educate students and encourage them to become stewards of the environment. M-NCPPC staff also offers onsite programs so that classes can visit one of its nature centers or waterfront parks. Programs at these sites include river ecology boat tours, nature hikes, and other hands-on activities. The M-NCPPC Patuxent River Park is a unique site that offers a wide variety of onsite programs for adults and students. Patuxent River Park partners with many state and federal agencies to conduct wetland and water quality research along the Patuxent River.

Boat tours are one of the best ways to engage people in environmental stewardship by providing a direct experience of the waterways. Patuxent River Park arranges boat tours, often combined with trash pick-up, invasive plant removal, or other service activity that promotes environmental stewardship and helps reduce stormwater pollution.

M-NCPPC also has a strong volunteer program, logging thousands of volunteer-hours each year towards environmental projects. These projects include river cleanups, pond cleanups, park/trail cleanups, non-native invasive plant removal, nest box monitoring, water quality monitoring, and public education. All volunteer programs have a vital educational component.

Although some volunteer opportunities are one-time projects, M-NCPPC also has strong Adopt-A-Trail and Adopt-A-Park programs. Through these programs, local schools, churches, groups, and families make a two-year commitment to take care of a specific section of trail or park. Many of the trail sections run parallel to streambeds, and so by adopting the trail, many of these groups also clean the streams.

(M-NCPPC)—The Prince George’s County Planning Department January 2021-December 2022

M-NCPPC Prince George’s County Planning Department adopted a new zoning and subdivision ordinance in 2018 to implement the goals of *Plan 2035* (the current general plan), adopted in 2014. The county council adopted a Countywide Zoning Map Amendment on April 1, 2022, to implement the new zoning and subdivision ordinance. The goals of *Plan 2035* include: concentrating future growth, prioritizing and focusing county resources, creating choice communities, and protecting and valuing county natural resources.

Plan 2035 commits to proactively greening the built environment, restoring degraded resources, and promoting a more sustainable development pattern that reduces reliance on driving and shifts development pressures away from greenfields.

St. Mary's County

St. Mary's County contains 67.9 square miles within the Patuxent River watershed. County leadership, in collaboration with the Department of Public Works and Transportation (DPW&T), Department of Economic Development, Department of Recreation and Parks, the Department of Land Use and Growth Management (LUGM), local non-profits, higher education partners, and state agencies work to achieve the strategies set forth in the *Patuxent River Policy Plan*. These partnerships address the goals outlined under the plan strategies of Preservation, Advocacy and eXcitement.

Preservation

Southern Maryland Resource Conservation and Development (RC&D)—a local non-profit—and the Commissioners of St. Mary's County supported the expansion of the Mattapani Rural Legacy Area by 17,065 acres. This request was approved by the Rural Legacy Board and the Maryland Board of Public Works (BPW) in October 2022. The expansion allows for the purchase and preservation of land surrounding the Patuxent River. The approval resulted in grants to RC&D of more than \$1.3 million for land purchases in the Patuxent River watershed.

In CY21 and CY22, LUGM staff conducted 778 Critical Area reviews, 526 stormwater reviews, and 268 floodplain reviews of development applications. Staff used these reviews to ensure compliance with regulations and require the installation of thousands of acres of native trees and shrubs, stormwater control devices, and floodplain safety measures in the Patuxent and Chesapeake Bay watersheds.

DPW&T is responsible for carrying out inspections, surveillance, monitoring, and enforcement to ensure compliance with MDE's NPDES MS4 permit. The county has completed an initial phase of a stormwater outfall GIS mapping project and has proactively screened 265 outfalls for dry weather flows to ascertain the presence of illicit discharges. DPW&T receives reports of illicit discharges via a newly developed 311 public reporting system as well as other means.

The MS4 program employed contractors to inspect 42 county-owned facilities to ensure a reduction in the amount and type of pollution that could enter the storm drainage systems. County inspections of these systems continue routinely. Maryland Environmental Service inspects and collects data from stormwater BMP facilities. The county collects and tracks the data and completes additional inspections as needed.

DPW&T continues to seek equivalent impervious acre credit associated with alternative practices that result in pollutant load reductions such as stream restoration, forest planting, mechanical street sweeping, installation of septic BAT systems, stabilization of existing storm drain systems or outfalls, and shoreline restoration, while encouraging low impact development throughout the county.

The total current impervious acres treated by stormwater-quality BMPs in St. Mary's County is 423 acres. The county restoration activity schedule has identified additional water quality projects to restore additional acres in the effort of helping the Patuxent River drainage area.

Advocacy

To help with pollution prevention, DPW&T developed an Inspection & Investigation Program Standard Operating Procedure that was put into place in July 2020; subsequently, a new local Storm Water Pollution IDDE ordinance was adopted and became effective in January 2021.

LUGM is working to update St. Mary's County's Comprehensive Plan with cooperation from community stakeholders and a focus on responsible development to protect all the county's watersheds. LUGM is simultaneously working to complete a comprehensive review and update of the county's Critical Area program. LUGM also works with the Federal Emergency Management Agency on the National Flood Insurance Program.

To help with regional water quality and nutrient removal within the St. Mary's County Patuxent watershed, the county created a capital fund that provides basic planning and implementation financing as necessary to implement the federally mandated NPDES permit and the Chesapeake Bay WIP.

eXcitement

The University of Maryland Extension in partnership with St. Mary's County government started the Watershed Stewards Academy (WSA) in 2016. The academy is an adult program offering hands-on and classroom training in a diverse range of topics including watershed processes, stormwater BMP installation and maintenance, native plants, project funding, and permitting and community engagement.

DPW&T [created a webpage](#) to share information with the public about its various preservation programs including MS4, nuisance flooding, and environmental landfill monitoring links. LUGM also maintains a [webpage to inform the public about Critical Area shore erosion](#) and control measures and floodplain management initiatives and regulations.

The St. Mary's County Department of Recreation and Parks (R&P) has acquired an additional 365 acres of land south of the Patuxent River Naval Air Station for a new community park named Shannon Farm Park. R&P is planning to install living shorelines at both Snow Hill Park and Shannon Farm Park. R&P and their Museum Division are working on developing educational programs around these conservation efforts.

LUGM, Visit St. Mary's, and the St. Mary's County Department of Economic Development are members of the Chesapeake Bay Passenger Ferry Feasibility Study Consortium that has now issued a Request for Proposals for a feasibility study for a public passenger ferry to transport visitors to points of interest along the Chesapeake, Potomac, and Patuxent watersheds. As a member of the five-county consortium, St. Mary's County hopes the ferry will assist in educating the public and generate excitement for the preservation of the impacted watersheds while providing additional, equitable access to the Bay.

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

WSSC Water and the Patuxent Reservoirs Watershed Protection Group

Founded in 1996, the Patuxent Reservoirs Watershed Protection Group (PRWPG) has worked to protect the water quality in the Patuxent reservoirs and the contributing 132 square mile watershed. The PRWPG is a partnership that includes several PRC member agencies (Howard, Montgomery, and Prince George's counties and WSSC Water), as well as the Howard and Montgomery Soil Conservation Districts (SCDs).



Patuxent Reservoirs Watershed Mapping and Geodatabase Project

With assistance from the Prince George's County DoE, the partnership's Technical Advisory Committee continued to develop a web-based GIS application tool that will enable the creation of maps and analyses to track data trends in the watershed of the Patuxent Reservoirs and to support more detailed modeling. The initial version of this application has been created.

TMDLs

The sediment TMDL for Triadelphia Reservoir was established to address excess sedimentation and the resultant loss of storage capacity for long-term water supply. Considering the recent project undertaken by WSSC Water (2017-2019) to excavate sediment from the upper portions of Triadelphia Reservoir, and bathymetric survey results used to measure water storage capacity loss in the reservoirs, the PRWPG's Technical Advisory Committee (TAC) continued to investigate the possibility that the sediment TMDL has been achieved. The TAC met with MDE representatives in May 2021 and presented the information. MDE expressed interest in the results and indicated that if the TAC would present the findings in a formal technical memorandum, then the sediment TMDL for Triadelphia Reservoir could be reconsidered during the next Integrated Report for 2022-2024, effectively delisting the reservoir from an impaired status for sediment. A draft of the technical memorandum was completed in 2022 and will be sent to MDE for their consideration in 2023.

Land Acquisitions

As part of its source water protection efforts, WSSC Water purchased six acres of land in Howard County near the Patuxent reservoirs to expand the forested buffer surrounding the area.

Agriculture

The Patuxent Reservoirs Watershed Agricultural Cost-Share Program is a collaborative local funding source established in 1998 by Howard and Montgomery counties and WSSC Water to assist small farming operations that are ineligible for state and federal programs.

The Howard and Montgomery Soil Conservation Districts (SCDs) both provide technical and financial assistance from this funding source to implement BMPs that reduce soil loss and improve water quality. The Howard SCD used \$4,014 from this program to install one BMP that redirects livestock from a nearby stream channel.

Restoration Projects

In cooperation with Howard County, WSSC Water completed the water chemistry monitoring effort for the Cattail Creek restoration project at the Maple Dell Dairy Farm located in northwestern Howard County. The goal of the monitoring project was to measure anticipated pollutant reductions resulting from the restoration. The final analysis of the data has yet to be completed, but preliminary results suggest there have been annual reductions in pollutant concentrations since the restoration was completed in 2018. A separate biological monitoring effort continues to determine the response of the fish and aquatic insect communities from the restoration activities, which included the establishment of a 15-acre forested riparian area and the stream channel restoration.

Public Awareness and Stewardship Initiatives

A variety of successful outreach events occurred in 2021 including the Howard County SCD's Mid-Winter Agricultural Meeting, the Montgomery County SCD's Farmside Chats with elected officials to educate them on current issues and challenges facing the agricultural community, and WSSC Water's *Patuxent Watershed Protector* outreach effort for families, youth, and corporate groups at public recreation areas surrounding the reservoirs. WSSC Water has also created a [Be Salt Wise in Winter](#) web page to inform customers about the connection between salt use and the impacts to drinking water sources as well as the appropriate application of salt to treat sidewalks and driveways.

Reservoir Water Quality Monitoring

WSSC Water continued its reservoir water quality monitoring, including monitoring the public recreation areas at both reservoirs for harmful algal blooms. Although no Water Contact Health Advisories were initiated during 2021 due to harmful algal blooms, in 2022 a Water Contact Health Advisory was initiated from mid-July through mid-October for Triadelphia Reservoir and a second advisory was implemented from September to mid-October for Rocky Gorge (T. Howard Duckett) reservoir. The advisories were triggered solely on elevated cell counts of cyanobacteria (i.e., blue-green algae). No algal toxins were detected above their advisory thresholds within either reservoir in 2022.



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

Maryland Department of Agriculture

Maryland Department of Agriculture (MDAG) and Soil Conservation District staff 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 the impacts on natural resources from urban growth.



The Maryland Agricultural Water Quality Cost-Share Program and federal programs like the Environmental Quality Incentive Program 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 695 agricultural BMPs such as grassed waterways, streamside fencing, field borders, and waste storage facilities were implemented in the Patuxent River watershed in 2021-2022. Conservation planners developed 570 soil conservation and water quality plans on 30,940 acres within the Patuxent River watershed.

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. Farmers in the seven counties with cropland in the Patuxent River watershed planted an average of 38,200 acres/year of cover crops in 2021-2022.

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 (MDAG and Farm Service Agency) partnership that makes it easy for farmers to do their part to protect local waterways without hurting their bottom line. All existing CREP contracts within the watershed were monitored during 2021-2022 and remain fully functional.

Agricultural land preservation plays a key role in protecting open space and keeping development focused within locally designated growth areas. Through MDAG’s MALPF program, the seven counties with land in the Patuxent River watershed preserved an additional 3,911 acres during 2021-2022.

Maryland Department of the Environment



The Maryland Department of the Environment (MDE) approved the following TMDLs for the Patuxent River and its tributaries as of January 2023 (no new TMDLs were approved during 2021-2022):

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 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 the Lower Patuxent River Basin in Charles County	August 20, 2009

Title of TMDL	Date Approved
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

Maryland Department of Natural Resources

The Maryland Department of Natural Resources (DNR) supports the Patuxent River and its watershed with a variety of programs. In 2021, DNR's Aquatic Resources Division accomplished the following activities throughout the state of Maryland, including the Patuxent River watershed.



Maryland Resource Assessment Service

- Performed sampling at 224 locations to help evaluate non-tidal stream habitat and/or biological condition.
- Recorded more than 880,000 water temperature readings using temperature logging instruments deployed in 138 non-tidal stream locations during summer 2021.
- Mapped more than 35,000 acres of submerged aquatic vegetation in Maryland's portion of the Chesapeake Bay, achieving 44 percent of the state's 2025 restoration target.
- Collected, processed, and analyzed more than three million water quality records, while following strict pandemic sampling protocols, to help guide the management, protection and restoration of Maryland's bays and tidal tributaries.

- Made more than 2,500 site visits to collect water quality data. More than 500,000 automated water quality measurements were taken and reviewed in 2021, surpassing 20 million total records since 2000.
- Thirty-four thousand citizens visited the [Eyes on the Bay website](#) to learn more about Maryland's tidal water quality and aquatic habitat conditions.
- Measured groundwater levels in 477 wells to help assess the status of Maryland's aquifers.
- Collected, analyzed, and reported on more than 500 sediment samples for both physical and chemical properties related to dredge material, Bay bottom habitats, dam removals, and site remediation.
- Identified and counted more than 40,000 fish of 73 species from 138 sites sampled to help assess stream ecological conditions.

Maryland Chesapeake and Coastal Service

- Through investment in land use and annual BMPs, the Chesapeake and Atlantic Coastal Bays Trust Fund reduced 3.16 million pounds of nitrogen, 24,298 pounds of phosphorus, and 7,399 tons of suspended solids from reaching the mainstem of the Chesapeake Bay and Atlantic Coastal Bays.
- Statewide, projects supported by the Chesapeake and Coastal Service included 130 acres of riparian buffer planted, 3,824 urban trees planted, 21,258 linear feet of stream restoration completed, and 309 acres of non-tidal and tidal wetlands created or restored.
- One hundred six marinas enrolled in the DNR Pumpout Operations and Maintenance Program to assist marinas in keeping pumpouts operational and available to the public.
- Drafted four climate change adaptation and resilience planning guides to foster an understanding of climate vulnerability and threats on Maryland's public lands and offer strategies for adaptation and resilience.
- Initiated an update of the Maryland Green Infrastructure network through a partnership with the Chesapeake Conservancy using newly produced high-resolution land-use/land-cover mapping. This is part of a larger project to map ecological restoration co-benefits and climate resilience.
- Collected more than 300 unique reports through [MyCoast-MD](#) documenting nuisance and precipitation-based flooding throughout Maryland.
- Produced *Guidance for Using Maryland's Sea Level Rise Projections* in collaboration with 18 partners in local, state, and federal governments, academia and private business, and more than 50 technical reviewers.

- Awarded funds for 60 applications requesting Waterway Improvement Funding for projects including 12 dredging related projects, 38 public motorboat facility improvements, and 10 safety vessels.
- Completed twenty-six projects to enhance and improve public boating access, facilities, and navigation throughout the state. Provided technical assistance to 28 projects toward the development of soft access for non-motorized recreational boating and water trails.
- Received and fulfilled 869 orders for water access and water trail maps and guides.
- Processed 26 shellfish aquaculture lease applications for approval.
- In support of DNR Land Acquisition and Planning and the Maryland Environmental Trust, used 1,174 maps, 149 green infrastructure reports, and 141 conservation scorecards as documentation and support for land conservation projects presented to the Maryland BPW to ensure the most ecologically valuable lands are protected and climate resiliency benefits are considered.

Maryland Fish and Boating Service

- Continued to expand the accountable harvest reporting platform, Fishing Activity & Catch Tracking System, or FACTS, to approximately 1,140 licensees. Seventeen percent of crabbers and fin-fish harvesters, 85 percent of charter captains, and 29 new individual shellfish (oyster and clam) harvesters are currently piloting the new shellfish module that became available in October 2021.
- Developed map layers to complete a digital mapping tool for the conservation of anadromous fish spawning streams that meets the needs of federal and state agencies conducting environmental reviews.
- Made contributions to ten key analytical efforts that led to management recommendations for multiple species including oysters, crabs, and striped bass.
- Crews placed more than 3,500 aids to navigation, resource management, and boating regulation markers to protect the boating public and our natural resources.
- *Diseases & Parasites of the Eastern Oyster, Crassostrea virginica, in Chesapeake Bay: A comprehensive illustrated guide to Eastern oyster pathology in Chesapeake Bay* was co-authored by Shellfish Health Project staff Christopher Dungan (retired) and Carol McCollough, along with Dr. Ryan Carnegie of Virginia Institute of Marine Science and was published by Maryland Sea Grant.
- Staff stocked 690,020 trout (366,800 juvenile and 323,220 adults) statewide for DNR's delayed harvest and put-and-take trout anglers.
- Staff reviewed 432 environmental review projects for potential impacts to Maryland's aquatic resources and fishing access during FY21 and reviewed and provided technical guidance on 275 requests for fish stocking permits.

- Staff tagged 1,472 blue catfish from the tidal Patuxent River to estimate population size in the Jug Bay area. DNR estimated that approximately 74,743 blue catfish greater than 200 millimeters in length occupy this stretch of river.

Maryland Department of Transportation



The Maryland Department of Transportation (MDOT) continues to comply with 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 to the maximum extent practicable for all new and redevelopment projects.

Within the Patuxent River watershed, MDOT State Highway Administration (SHA) owns, operates, and maintains an extensive roadway network with significant drainage and SWM systems. The MDOT SHA Water Quality Bank 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 July 2022, there are 21.45 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 rights-of-way 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.

Since 2015, MDOT SHA has implemented 44 BMPs recommended by MDE and the Chesapeake Bay Program for the improvement of water quality in the Patuxent River watershed (6-digit HUC 021311). Between January 2021 and December 2022, MDOT SHA restored 7,300 linear feet of streams in the Little Patuxent River watershed (8-digit HUC 02131105), constructed three new grass swales in the Brighton Dam watershed (8-digit HUC 02131108), and retrofitted three existing stormwater control structures to increase their water quality treatment in the Middle Patuxent River (8-digit HUC 02131106) and Little Patuxent River watersheds. MDOT SHA will continue to implement restoration BMPs in the Patuxent River watershed to attain TMDLs approved by EPA.

Advocacy Strategy Implementation: 2021-2022

In 2021 and 2022, the local jurisdictions and PRC completed the following tasks in support of the Advocacy strategies in the Policy Plan:

Patuxent River Commission

In 2021, the PRC reviewed and analyzed the proposed Northeast Superconducting Maglev (SCMAGLEV) project, whose route would traverse the Patuxent watershed. Because the draft environmental impact statement (DEIS) for the SCMAGLEV project was thousands of pages, the PRC wrote to the Federal Railroad Administration (FRA) requesting that the review period to be extended to 180 days. The FRA agreed to extend the review period. The workgroup also requested additional backup information from FRA, some of which was provided in response.

The PRC created a MAGLEV Workgroup to conduct a further evaluation and to report back to the PRC. PRC staff reviewed the sections of the DEIS pertaining to the Patuxent watershed and completed a comprehensive overview of the DEIS to highlight those issues. Workgroup members worked over several months to analyze the issues and to reach consensus on comments. The PRC then sent a letter to FRA endorsing a “no build” option for the SCMAGLEV. The federal government’s environmental review of the SCMAGLEV project is currently on hold. More information can be found at the [Baltimore-Washington Superconducting Maglev Project page on Permitting Dashboard](#).

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 the Plastic Bag Reduction Act bill in both 2021 and 2022.

Maryland Department of Planning

Planning staff coordinates and facilitates the meetings of PRC workgroups. Planning’s work includes drafting agendas and minutes and writing up workgroup findings for the PRC. Planning staff also completed research and analysis to inform workgroup policy discussions and recommendations.



City of Bowie

The city’s Environmental Advisory Committee supported the Patuxent Research Refuge’s goal to preserve land along the Patuxent Mainstem that is scheduled for development. The city’s nearly one dozen pet waste pick-up stations in city parks dispense nearly 20,000 bags annually to dog walkers; pet waste has become an increasing part of outreach for staff and the city’s Green Team resident-volunteers.

During the reporting period, staff and a resident task force began assessing the city’s landscaping requirements for stormwater management facilities. The goal is to update city guidance documents to increase native plants and decrease turf grass at these sites.

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 by Senator Fowler for the 34th consecutive year in June 2021, the wade-in relies on a simple scientific approach: how deep into the river can we wade in before losing sight of our sneakers?

Senator Fowler anticipated returning for the 2022 Wade-In but sadly, the 2021 Wade-in was Senator Fowler's last: he passed away on December 12, 2021, in his beloved Calvert County. Bernie Fowler served as Calvert County commissioner from 1970-1982 and as 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 1960's 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 2021, to 34 inches.

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 in Calvert County. 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: 2021-2022

In 2021 and 2022, several local jurisdictions and the PRC completed the following tasks in support of the eXcitement strategies in the Policy Plan.

After adoption of the Patuxent River Policy Plan, the PRC established a Tourism Workgroup to create, maintain, and encourage opportunities for river-related economic activities. The workgroup also seeks to increase public access to and recreational opportunities on the river and its tributaries throughout the Patuxent River watershed.

The Tourism Workgroup reported in 2022 that more than 150 households posted about their participation in the [Patuxent Challenge](#) over the three years of the event.

In 2023, the PRC Tourism Workgroup plans a coordinated Patuxent Challenge outreach event among the counties and WSSC Water representatives who serve on the workgroup. The workgroup also intends to get local businesses involved by having them offer gifts to Challenge participants. The workgroup includes county tourism officials and others who are working to implement the eXcitement strategies of the *Patuxent River Policy Plan*.

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 PRC, which is tasked with supporting state and local implementation of the Policy Plan, will continue to focus on a number of actions that can be accomplished during the year, in accordance with available staff resources, but will also continue focusing on longer-term actions through its new Long-Range Workgroup.

Longer-term actions currently include the PRC's goal to determine what needs to change (e.g., laws, regulations, policies, science) to achieve restoration of the Patuxent River by 2040. MDP recommends continued support from federal, state, and nongovernmental organizations to ensure the success of this goal.



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