

WATER RESOURCES PROGRAM

Fiscal Years 2025 – 2027

SUSQUEHANNA RIVER BASIN COMPACT, SECTION 14.2 – WATER RESOURCES PROGRAM

The [Commission](#) shall annually adopt a [Water Resources Program](#), based upon the [Comprehensive Plan](#), consisting of the projects and facilities which the Commission proposes to be undertaken by the Commission and by other authorized governmental and private agencies, organizations, and persons during the ensuing six years or such other reasonably foreseeable period as the Commission may determine.



Susquehanna River, Bradford County, Pennsylvania (Nicholas A. Tonelli)

ADOPTED JUNE 2024

WATER RESOURCES PROGRAM

Fiscal Years 2025 – 2027

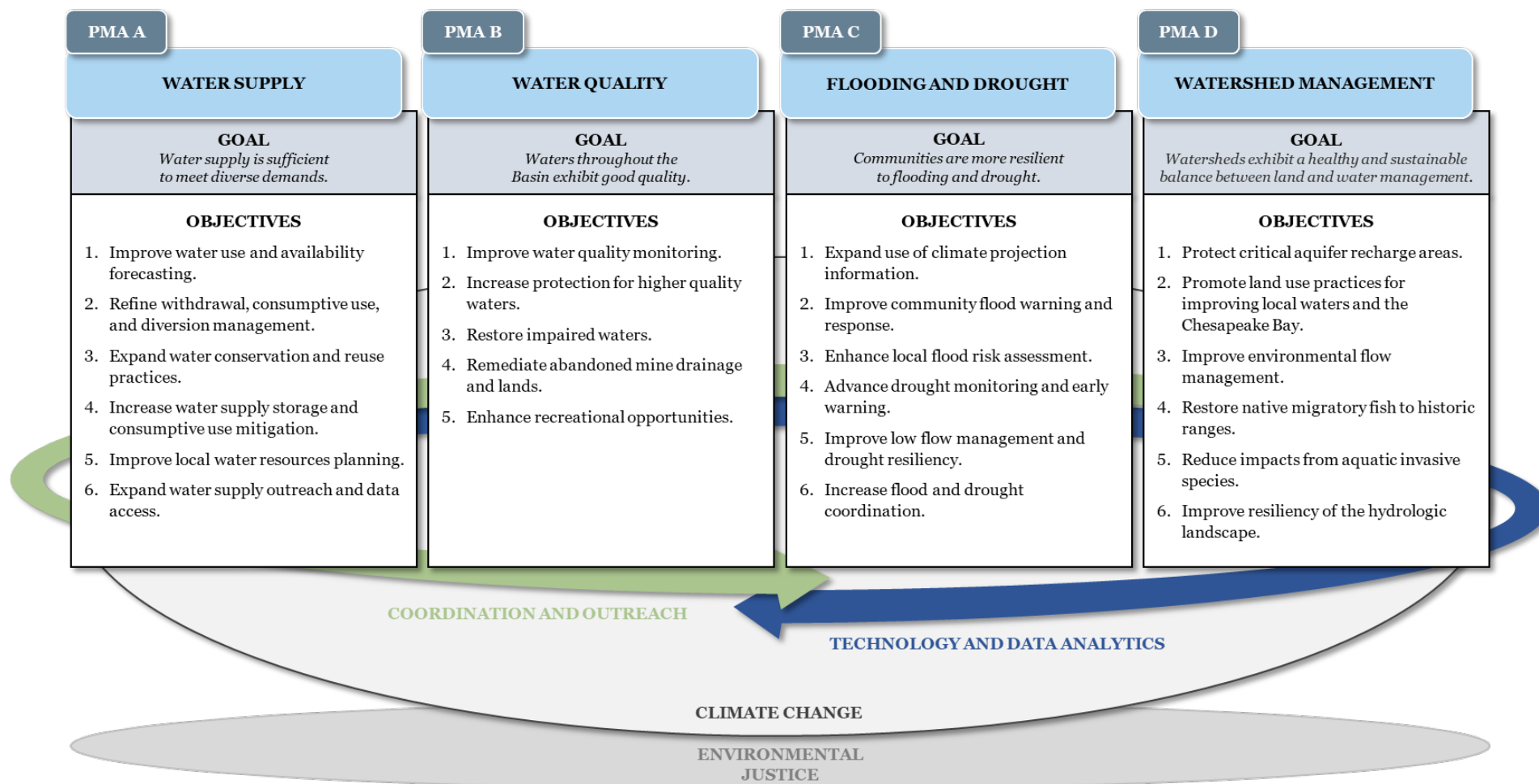
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WATER RESOURCES PROGRAM

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COMPREHENSIVE PLAN OVERVIEW



WATER RESOURCES PROGRAM

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WATER RESOURCES PROGRAM OVERVIEW – COMMISSION PROJECTS

The Water Resources Program presents the priority projects the Commission plans to undertake to address the water resources needs and objectives outlined in the Comprehensive Plan.

Comprehensive Plan Priority Management Areas

A. Water Supply		B. Water Quality		C. Flooding and Drought		D. Watershed Management	
Susquehanna River Basin Commission Projects							
A1a	Water Use and Availability Assessment and Forecast Website • Project Summary	B1a	Continuous Instream Monitoring Network Website • Project Summary	C1a	HyperFACETS Climate Science Research Project Project Summary	D1a	Critical Aquifer Recharge Area Protection Initiatives <i>*New*</i> Project Summary
A2a	Regulatory Review, Approval, and Efficiency Improvement Website • Project Summary	B1b	Chesapeake Bay Nontidal Water Quality Monitoring Website • Project Summary	C2a	Susquehanna Flood Warning and Response System Website • Project Summary	D2a	Conowingo Watershed Implementation Plan Website • Project Summary
A2b	Project Compliance and Enforcement Refinements Website • Project Summary	B1c	Water Quality and Biological Index Evaluation Website • Project Summary	C2b	Montour County Pennsylvania Flood Warning System Project Summary	D2b	Octoraro Agricultural Best Management Practices Website • Project Summary
A2c	Integrated Water Resources Management Projects <i>*New*</i> Project Summary	B1d	New York Water Quality Monitoring Collaborative <i>*New*</i> Website • Project Summary	C3a	National Water Model Flood Inundation Mapping Validation <i>*New*</i> Website • Project Summary	D2c	Pennsylvania Countywide Action Plan Implementation Project Summary
A2d	Holtwood and Safe Harbor Hydroelectric Project Relicensing <i>*New*</i> Project Summary	B2a	Lower Susquehanna Source Water Protection Partnership Website • Project Summary	C4a	Public Water Supply Reservoir Level Monitoring Network Website • Project Summary	D3a	Tioga-Hammond Lakes Environmental Flow Study <i>*New*</i> Project Summary
A3a	Public Water Supply Water Loss Reduction Projects <i>*New*</i> Project Summary	B3a	Morris Run Abandoned Mine Drainage Treatment Plant Website • Project Summary	C4b	Susquehanna Drought Monitor Website • Project Summary	D4a	Hydroelectric Dam Fish Passage Upgrades Project Summary
A4a	Consumptive Use Mitigation Projects Website • Project Summary	B3b	Abandoned Mine Drainage/ Land Remediation Projects Website • Project Summary			D5a	Environmental DNA Aquatic Invasive Species Monitoring Website • Project Summary
A5a	Regulated Project Technical Assistance Program Website • Project Summary	B4a	Harmful Algal Bloom Monitoring and Assessment Website • Project Summary			D6a	Stream and Watershed Enhancement Grant Website • Project Summary
A5b	Susquehanna Water Use Network Project Summary					D6b	Kehm Run Environmental Restoration Project Project Summary

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WATER RESOURCES PROGRAM OVERVIEW – PARTNER PROJECTS

The Water Resources Program also presents the priority projects the Commission’s partner agencies plan to undertake to address the water resources needs and objectives outlined in the Comprehensive Plan.

Comprehensive Plan Priority Management Areas

A. Water Supply		B. Water Quality		C. Flooding and Drought		D. Watershed Management	
Partner Agency Projects							
A1i	United States Geological Survey Estimates of Baseflow, Runoff, and Groundwater Recharge	B1i	U.S. Environmental Protection Agency National Lakes Assessment and National Rivers and Streams Assessment	C1i	National Oceanic and Atmospheric Administration Atlas 14 Precipitation Frequency Estimates Update	D1i	Natural Resources Conservation Service Groundwater Recharge Pilot Program
A1ii	Pennsylvania State Water Plan Implementation and Update	B1ii	U.S. Environmental Protection Agency Water Pollution Control (Section 106) Grant Activities	C1ii	New York State Climate Smart Communities Grant Program	D2i	Chesapeake Bay Program Beyond 2025
A2i	Maryland Department of the Environment Conowingo Hydroelectric Project Water Quality Certification	B1iii	U.S. Geological Survey Super Gages	C2i	National Weather Service National Water Prediction Service	D2ii	Maryland Department of the Environment Conowingo Reservoir Sediment & Nutrient Transport Model
				C2ii	U.S. Geological Survey Rapid Deployment Network	D2iii	U.S. Fish and Wildlife Service Chesapeake Watershed Investments for Landscape Defense
				C3i	New York Environmental Bond Act	D4i	U.S. Fish and Wildlife Service Fishway Prescriptions For Federal Energy Regulatory Commission Licensed Hydroelectric Projects
				C3ii	National Weather Service National Water Model Flood Inundation Mapping	D6i	U.S. Fish and Wildlife Service Upper Susquehanna Conservation Alliance
						D6ii	Natural Resources Conservation Service Environmental Quality Incentives Program
						D6iii	Natural Resources Conservation Service Small Watershed Program (PL 566)
						D6iv	Natural Resources Conservation Service Climate-Smart Mitigation Activities

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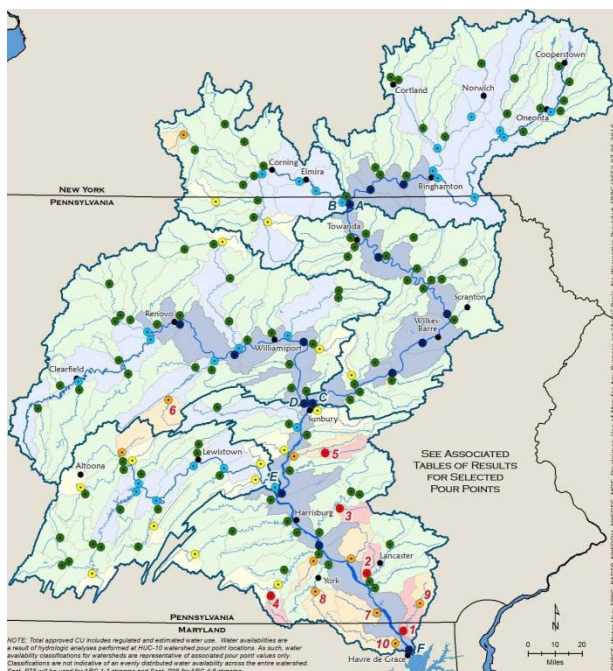
COMMISSION PROJECT SUMMARY

A1a. Water Use and Availability Assessment and Forecast

Priority Management Area: Water Supply

Objective: Improve water use and availability forecasting

Location: Susquehanna River Basin



Description: The Commission's Cumulative Water Use and Availability Study (CWUAS) represents the most inclusive evaluation of water use and availability throughout the basin conducted to date. Development of a comprehensive water use database, integrating Commission, member state, and estimated data, allowed for a thorough assessment of consumptive use for basin watersheds. The water capacity threshold, used to calculate water availability, integrated a sustainable limit for water development, protection of low flows, and a safety factor to balance water supply and environmental flow needs. The associated CWUAS Tool and Web Map enable users to interactively investigate water use and availability conditions for basin watersheds. Planned work includes updating water use and availability data, screening basin watersheds for water challenged and/or potentially stressed areas, and incorporating climate projections to provide insight into future conditions.

Schedule: Update Water Use database
Update water use and availability estimates
Incorporate climate and water use projections
Identify water challenged and potentially stressed areas
Update planning tool and web map

December 2024
June 2025
December 2025
June 2026
March 2027

Budget: \$155,000

Funding: Water Management Fund

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COMMISSION PROJECT SUMMARY

A2a. Regulatory Review, Approval, and Efficiency Improvements

Priority Management Area: Water Supply

Objective: Refine withdrawal, consumptive use, and diversion management

Location: Susquehanna River Basin



Description: The Commission will undertake two main areas of focus to include: development and implementation of a Memorandum of Understanding (MOU) with Maryland Department of Environment (MDE); and evaluation and identification of categories of regulated projects for which a general permit (GP) could be developed. The Compact directs staff to avoid duplicative activities with the states. Administrative agreements have been developed and executed for both PA and NY that establish the process for coordinated reviews of project types where there are overlapping regulatory authorities. Resolution 2023-08 was adopted in September 2023 that provided specific waiver of regulation for review of an individual project, but also directed staff to develop a proposed MOU with MDE and extend the process in the resolution to future applications of similar projects for MDE's review.

Schedule:	Complete internal review of draft MOU	September 2024
	and provide to MDE	
	Evaluate and identify potential GP categories	December 2024
	Develop draft general permit(s)	March 2025
	Adopt MDE MOU and general permit	June 2025

Budget: \$160,000

Funding: Regulatory Program Fees

WATER RESOURCES PROGRAM

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COMMISSION PROJECT SUMMARY

A2b. Project Compliance and Enforcement Refinements

Priority Management Area: Water Supply

Objective: Refine withdrawal, consumptive use, and diversion management

Location: Susquehanna River Basin



Description: As part of its routine duties, the Commission’s Compliance and Enforcement staff ensure the regulated community operates within the parameters of their approvals. Activities include inspections, audits, and review of monitoring data and post approval conditions. When projects fall out of compliance, staff has a number of options for guiding or assisting projects back into compliance with Commission regulations and/or approvals, with those options ranging from technical assistance to enforcement actions. Through inspections and other means of communication and coordination, staff is also constantly employing different tools and strategies to assist the regulated community with

maintaining compliance. Focused efforts in the next three years include developing online tools for projects to easily access data and information regarding their operations and compliance, implementing an inspection strategy to assist legacy projects (20+ year terms) with upcoming approval renewals, and working with projects in need of technical assistance or guidance for best operating within their approvals, such as the golf course and agriculture sectors.

Schedule:	Compliance/Enforcement public access website	September 2025
	Legacy project assistance	June 2027
	Project assistance	June 2027

Budget: \$600,000

Funding: Annual Compliance and Monitoring Fee

WATER RESOURCES PROGRAM

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COMMISSION PROJECT SUMMARY

A2c. Integrated Water Resources Management Projects **New**

Priority Management Area: Water Supply

Objective: Refine withdrawal, consumptive use, and diversion management

Location: Mahantango and Wiconisco Creek Watersheds – Dauphin, Northumberland, and Schuylkill Counties, Pennsylvania
Little Conestoga Creek Watershed – Lancaster County, Pennsylvania



Description: The Commission will conduct studies of sustainable water use and availability, as well as water quality, for the Wiconisco, Mahantango, and Little Conestoga Creek Watersheds. Efforts will focus on the importance of balancing economic, human, and aquatic ecosystems needs. The watersheds greatly differ with respect to dominant land uses and human needs, and the resulting water demands. The Wiconisco and Mahantango Creek Watersheds face pressure from agricultural operations with irrigation needs for potato growing. The Little Conestoga Creek Watershed faces challenges associated with agriculture and urbanization, with past/ongoing water quality and quantity impacts, while also experiencing increased water demands. The Commission intends to work with local stakeholders to best meet existing needs while also plan for the sustainable use of water resources into the future.

Schedule: Complete baseline assessments
Identify key implementation actions
Begin implement of selected actions

December 2024
March 2025
July 2025

Budget: \$285,000

Funding: Water Management Fund

WATER RESOURCES PROGRAM

Fiscal Years 2025 – 2027

COMMISSION PROJECT SUMMARY

A2d. Holtwood and Safe Harbor Hydroelectric Relicensing **New**

Priority Management Area: Water Supply

Objective: Refine withdrawal, consumptive use, and diversion management

Location: Lancaster and York Counties, Pennsylvania



Description: The Holtwood and Safe Harbor Hydroelectric Projects are located on the Lower Susquehanna River in Lancaster and York Counties, Pennsylvania. Holtwood has a hydraulic capacity of 61,460 cubic feet per second (cfs) and a generation capacity of 196 megawatts (MW). Safe Harbor has a hydraulic capacity of 110,000 cfs and a generation capacity of 417 MW. The Federal Energy Regulatory Commission (FERC) licenses for Holtwood and Safe Harbor expire in 2030. Key water resources management concerns at both projects include environmental flows, fish passage, water quality, debris management, and recreation. The relicensing process is anticipated to start in early 2025. The Commission intends to work closely with its partner agencies on formulating study requests, commenting on study plans, reviewing study reports, entering settlement discussions, and commenting on license applications, environmental documents, and license terms and conditions.

Schedule:	Notice of intent & pre-application document	March 2025
	Project scoping	September 2025
	Study requests	March 2026
	Study plan	September 2026
	Study implementation	March 2028
	License application	September 2028
	Environmental document	September 2029
	License decision	June 2030
Budget:	\$65,000	
Funding:	Regulatory Program Fees	

WATER RESOURCES PROGRAM

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COMMISSION PROJECT SUMMARY

A3a. Public Water Supply Water Loss Reduction Projects **New**

Priority Management Area: Water Supply

Objective: Expand water conservation and reuse practices

Location: Susquehanna River Basin



Description: In the Susquehanna River Basin, public water supply water loss presents a pressing concern with implications for both communities and sustainable water supplies. Leakage from aging infrastructure and inaccuracies in metering contribute to substantial water loss, straining utility budgets and putting unnecessary stress on water sources. This loss not only threatens the sustainability of the basin's water resources but also compromises the reliability of water supply systems for residents and industries.

Addressing this challenge necessitates coordinated efforts among water utilities, local governments, and communities.

Implementing advanced technologies for leak detection, investing in infrastructure upgrades, and promoting water conservation practices are crucial steps toward mitigating water loss. The Commission has identified the water supply systems in the basin that have the highest percent water losses to their system, and is prioritizing the systems for both funding and technical assistance. By prioritizing sustainable water management practices, and fostering collaboration, the Commission can safeguard the availability and quality of water resources in the Susquehanna Basin for current and future generations.

Schedule:	Formulate assistance plan	December 2024
	Incorporate plan into FY25 budget	March 2025
	Begin implementation of plan	July 2025

Budget: \$55,000

Funding: Water Management Fund

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COMMISSION PROJECT SUMMARY

A4a. Consumptive Use Mitigation Projects

Priority Management Area: Water Supply

Objective: Increase water supply storage and consumptive use mitigation

Location: Susquehanna River Basin



Description: The Commission initiated a new Consumptive Use (CU) Mitigation Grant Program in 2021. The purpose of the grant is to implement projects that mitigate consumptive use or otherwise improve drought resilience in the basin. Eligible project categories include water supply, project operation, demand modification, and environmental and water quality alternatives. This includes projects that increase water supply storage, modify drought operations, implement water conservation technologies, and enhance groundwater recharge. The grant program has funded \$4M to \$8M in projects annually since its inception in 2021. In addition to grant projects, the Commission also funds other traditional low flow augmentation projects and innovative CU mitigation pilot projects. Moving forward, the Commission plans to continue funding and partnering on impactful CU mitigation projects to help offset impacts from reduced water availability during critical low flow periods and droughts.

Schedule:	Issue annual grant funding opportunity	November 2024
	Close annual grant application period	January 2025
	Announce annual grant awards	April 2025
	Execute annual grant agreements	July 2025
	Initiate other traditional & innovative projects	Through July 2027
Budget:	\$13,948,000	
Funding:	Water Management Fund	

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COMMISSION PROJECT SUMMARY

A5a. Regulated Project Technical Assistance Program

Priority Management Area: Water Supply

Objective: Expand water supply outreach and data access

Location: Susquehanna River Basin



Description: In recognizing the continuing challenges facing small drinking water systems, the Commission intends to continue the successful Public Water Supply Assistance Program (PWSAP) that was initiated in 2012. PWSAP has been providing general and targeted assistance in addition to in-person and virtual training events. The Commission intends to continue the expansion of assistance to regulated projects with increased focus on other regulated project sectors with training events, targeted pre-application meetings, and general assistance for projects undergoing renewals. The Commission has recently adopted regulation changes providing more options for how projects navigate through the renewal process and options for how projects meet regulatory obligations (e.g., consumptive use mitigation). Staff intend to provide assistance and training to explain those

newly effective options so projects can make informed decisions as they continue to work through the regulatory processes for renewal and continued operations.

Schedule:	Conduct biannual training workshops	Through June 2027
	Conduct annual training session for golf course projects	Through June 2027
	Provide targeted project assistance	Through June 2027

Budget: \$300,000

Funding: Sustainable Water Resources Fund

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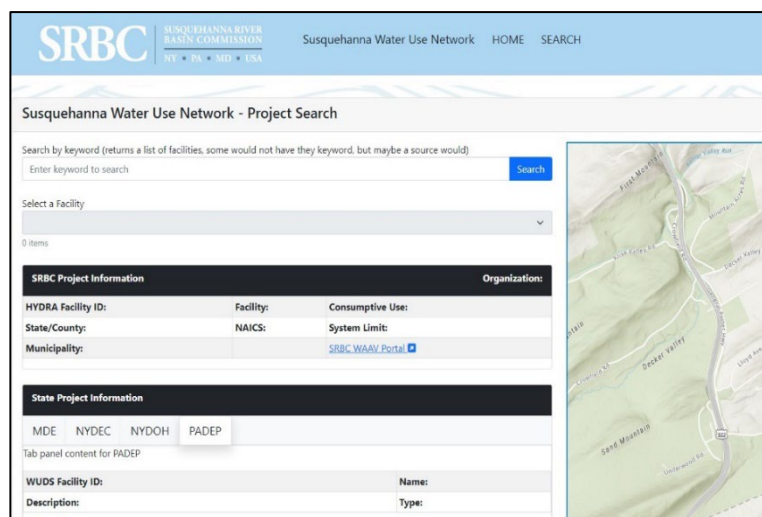
COMMISSION PROJECT SUMMARY

A5b. Susquehanna Water Use Network

Priority Management Area: Water Supply

Objective: Expand water supply outreach and data access

Location: Susquehanna River Basin



Description: The Susquehanna Water Use Network (WUN) website presents Commission and member state agency water use permit information together on one page in a dashboard format. This application allows for the comparison of all known water use permits or registrations for a given facility and source(s) regardless of the permitting agency and graphs reported water use trends. The website is password-protected and intended for internal and member state agency staff. This website supports more accurate water resources management activities and promotes data sharing between the Commission and member state regulatory agencies. Future enhancements would allow for limited editing capabilities and project sponsor access.

Schedule: Member state agency outreach on Susquehanna WUN
Explore data sharing pilot with NYSDEC
Explore project sponsor module
Explore data sharing pilot with NYSDOH
Explore data sharing pilot with MDE

Through June 2025
Through June 2025
Through June 2025
Through June 2026
Through June 2027

Budget: \$75,000 annually

Funding: Water Management Fund

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COMMISSION PROJECT SUMMARY

B1a. Continuous Instream Monitoring Network

Priority Management Area: Water Quality

Objective: Improve water quality monitoring

Location: Susquehanna River Basin



Description: Continuous instream monitoring (CIM) allows for decisions based on the real-time examination of water quality indicators, supports assessment of water quality trends through time, and fosters scientific analyses of cause-and-effect relationships that impact water resources. The Commission currently maintains over 70 stations basinwide, and recently re-evaluated the network to determine if it is positioned to best understand and answer water quality concerns, track changes due to landscape and climate change, and maintain/protect high quality water resources.

Several priorities have been identified to address in the next three years, including shifting some stations into select forested watersheds across the different ecoregions, increasing focus on climate change, collecting continuous nitrate data at select stations in agricultural settings, and monitoring select water challenged areas. The majority of CIM stations will remain in place to continue to allow long-term water quality trends to build given existing

priorities, as well as to continue to provide the backbone for the Commission’s overall water quality and aquatic ecosystem monitoring programs.

Schedule:	Install new monitoring stations	October 2024
	Enhance water quality monitoring capabilities	June 2025
	Update CIM dashboard and create	June 2027

Budget: \$605,000

Funding: Annual compliance and monitoring fees, U.S. Environmental Protection Agency Section 106 funds and funds from both the PA Departments of Environmental Protection and Conservation and Natural Resources

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COMMISSION PROJECT SUMMARY

B1b. Chesapeake Bay Nontidal Water Quality Monitoring

Priority Management Area: Water Quality

Objective: Improve water quality monitoring

Location: Susquehanna River Basin



Description: Since the 1980s, the Commission and various partner agencies have collected samples from a fixed station network of locations throughout the entire Chesapeake Bay watershed known as the Non-Tidal Network (NTN). NTN monitoring represents one of the country's longest, largest, and most rigorous water quality monitoring programs. NTN data collected by Commission staff are used to track pollutant loads, evaluate trends, calibrate various Bay-related models, and update/revise targets for the Bay jurisdiction members within the Susquehanna River Basin.

Schedule:	Upload water quality data package	Annually in March
	Annual Sediment & Nutrient Assessment Program report	Annually in April
	Compute pollutant loads & trends analyses	Annually in August

Budget: \$390,000

Funding: U.S. Environmental Protection Agency and PA Department of Environmental Protection agency funds

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COMMISSION PROJECT SUMMARY

B1c. Water Quality and Biological Index Evaluation

Priority Management Area: Water Quality

Objective: Improve water quality monitoring

Location: Susquehanna River Basin



Description: The Commission is committed to tracking water quality and biological conditions across the basin over time. Commission staff has developed a Water Quality Index (WQI) for the basin which scores basic water quality on a score of 0-100. Additionally, a biological index of biologic integrity (BIBI) applicable in small streams for macroinvertebrate across the entire Chesapeake Bay Watershed is available. Staff has recently compiled data from the last 25 years and created a sentinel WQI network of 17 sites that represents the main categories of streams in the basin across land use, drainage area size, and ecoregion. Moving forward, at least two water quality and two macroinvertebrate samples will be collected at each site every five years. Trends and changes will be tracked over time as a way to better understand changes in water quality and biological conditions across the basin. Observed changes in high quality waters may trigger additional monitoring and any changes at any site may have implications for climate change research.

Schedule:	Sample remaining sentinel stations for 2020-2024	October 2024
	Begin WQI sentinel site routine monitoring	July 2025
	Create interactive WQI/BIBI Sentinel Network Dashboard	December 2026
Budget:	\$10,000/year	
Funding:	U.S. Environmental Protection Agency Clean Water Act Section 106 grant funds	

WATER RESOURCES PROGRAM

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COMMISSION PROJECT SUMMARY

B1d. New York Water Quality Monitoring Collaborative **New**

Priority Management Area: Water Quality

Objective: Improve water quality monitoring

Location: Chemung and Upper Susquehanna Subbasins



Description: With substantial and ever-mounting demands placed on its water resources, those who rely on New York State’s Susquehanna and Chemung River Watersheds will benefit from a solid framework for coordinating water quality management planning activities throughout the region. The Commission will lead the Southern Tier New York Susquehanna Basin Monitoring Collaborative (Collaborative), along with key partners including (1) the Regional Planning Development Boards (Southern Tier 8 and Southern Tier Central), (2) the Upper Susquehanna Coalition, (3) the Alliance for Aquatic Resource Monitoring, and (4) New York State Department of Environmental Conservation, Division of Water (NYSDEC).

In particular, the Collaborative will focus on targeted surface water monitoring to support statewide water quality reporting and specific NYSDEC planning and implementation initiatives associated with their Clean Water Act requirements and achieving clean water goals as part of the Chesapeake Bay restoration efforts. The Collaborative will build a regional water quality monitoring coordinating apparatus to achieve its goals by (1) forming a steering committee consisting of core partners and others, chaired by Commission staff, and meeting at least quarterly to define roles and responsibilities, (2) establish objectives and milestones, (3) coordinate actions consistent with the stated objectives and timelines, and (4) seek and disseminate information from/to the broader Collaborative.

Schedule:	Collect, compile, analyze, and summarize water quality data for the region related to identified priorities	Through June 2026
	Develop and implement monitoring plan to address gaps	Through June 2028
	Provide targeted stormwater BMP assistance	Through June 2028
Budget:	\$135,000	
Funding:	NY Department of Environmental Conservation Clean Water Act Section 604(b) Grant	

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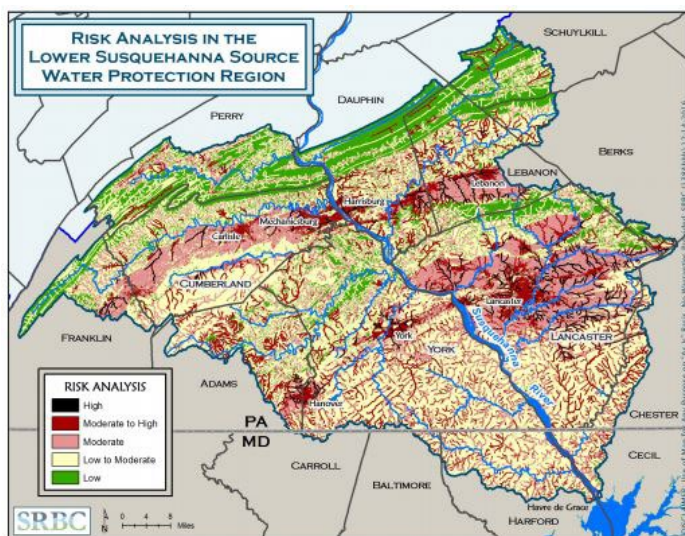
COMMISSION PROJECT SUMMARY

B2a. Lower Susquehanna Source Water Protection Partnership

Priority Management Area: Water Quality

Objective: Increase protection for higher quality waters

Location: Lower Susquehanna Subbasin



Description: The Lower Susquehanna Source Water Protection Partnership (Partnership) was formed in 2012 to examine ways in which agencies and organizations can collaborate to address common issues and challenges related to protecting sources of drinking water on a regional scale. This partnership has led to actions in the Lower Susquehanna region to expand source water monitoring, establish local source water collaborative groups, and continue to serve as a forum for highlighting critical issues/needs and formulating recommended actions. The Partnership now has more than 40 organizations that meet twice a year to utilize their shared knowledge and technical expertise.

Schedule:	Minimum of 4 steering committee meetings annually	Ongoing
	Spring/Fall meeting of the entire partnership	Ongoing
	Implementation of CU/SWP pilot project	Ongoing
	Continued operation of Lower Susquehanna CIM stations serving as early warning to drinking water sources	Ongoing

Budget: \$70,000

Funding: U.S. Environmental Protection Agency Clean Water Act Section 106 grant funds

WATER RESOURCES PROGRAM

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COMMISSION PROJECT SUMMARY

B3a. Morris Run Abandoned Mine Drainage Treatment Plant

Priority Management Area: Water Quality

Objective: Remediate abandoned mine drainage and lands

Location: Tioga County, Pennsylvania



Description: In 2019, the Commission was awarded a contract from the PA Department of Environmental Protection, Bureau of Abandoned Mine Reclamation for the design of an active treatment plant for the three Morris Run deep-mine discharges and the Coal Creek discharge, which is the largest and most impactful discharge in the entire Tioga River system. The pumping and conveyance of the mine pool may also eliminate the Bear Creek discharge. Once design is completed, another contract will be awarded to construct the plant. Once built, around 22 miles of the Tioga River, Morris Run, Coal Creek, and Bear Creek will be improved/restored. This includes the restoration of the 500-acre Tioga Reservoir, part of the greater Tioga-Hammond Lakes Recreation Area managed by the U.S. Army Corps of Engineers.

Schedule:	Final treatment plant design	July 2024
	Request for proposals issued for plant construction	January 2025
	Construction begins	July 2025
Budget:	\$1,150,000	
Funding:	PA Department of Environmental Protection, Bureau of Abandoned Mine Reclamation funds	

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COMMISSION PROJECT SUMMARY

B3b. Abandoned Mine Drainage/Land Remediation Projects

Priority Management Area: Water Quality

Objective: Remediate abandoned mine drainage and lands

Location: Bituminous/Anthracite regions of the basin



Description: The Commission has long collaborated on inter-agency and other stakeholder organization partnerships to restore water quality and related ecosystem functions as the result of legacy mining impacts. Dollar-for-dollar, the remediation of legacy coal mine impacts has consistently demonstrated tangible and positive investments in terms of natural resources service and function uplift. Over the years, tightening federal and state budgets have given funding priority to “shovel-ready” abandoned mine land and abandoned mine drainage (AML and AMD) projects, which has made it increasingly difficult to acquire the resources to perform the necessary preliminary work. Commission staff will work towards investigation, design, permitting, and other related activities to ensure a steady progression of “shovel-ready” AML/AMD projects exist for pursuing implementation with state/federal funding.

Additionally, in FY-2024, the Commission received funding through a grant from PADEP to characterize AMD conditions in the Moshannon Creek Watershed, and focus efforts in one of the three primary AMD source areas in the watershed; i.e., the Osceola Mills source area. The Commission’s characterization activities will culminate in development of technically-feasible treatment options for the priority AMD pollution discharges in the Osceola Mills area.

Schedule:	Shortlist of potential project pursuits	December 2024
	Proposals for priority projects submitted for funding	June 2025
	Completion of data collection and characterization for the Moshannon project	June 2025
	Formulation of treatment options for the Moshannon project	June 2026

Budget: \$300,000

Funding: Sustainable Water Resources Fund, PA Department of Environmental Protection Grant, U.S. Environmental Protection Agency Clean Water Act Section 106 Grant

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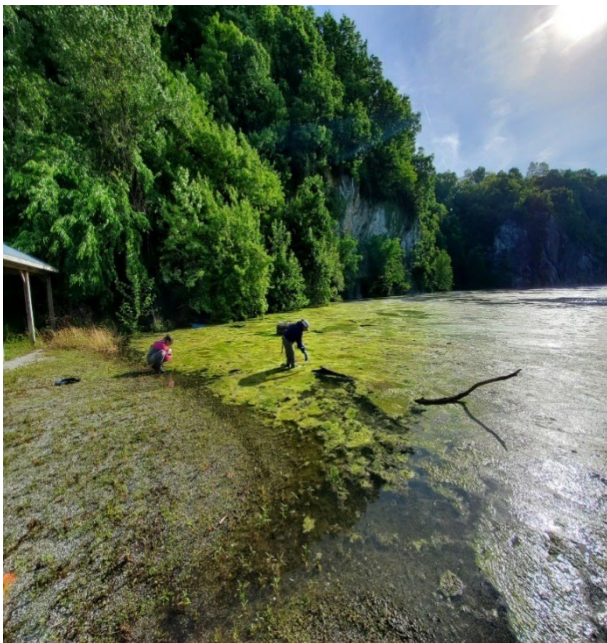
COMMISSION PROJECT SUMMARY

B4a. Harmful Algal Bloom Monitoring and Assessment

Priority Management Area: Water Quality

Objective: Enhance recreational opportunities

Location: Octoraro Reservoir – Chester County, Pennsylvania
 Tioga Reservoir – Tioga County, Pennsylvania
 Billmeyer Quarry – Lancaster County, Pennsylvania



Description: Harmful Algal Blooms (HABs) occur when conditions in lakes allow for excessive blooms of cyanobacteria, which can produce toxins that have harmful impacts on human health. HABs can also damage ecosystems as they severely lower dissolved oxygen levels, in addition to often inhibiting recreational opportunities. Climate change threatens to increase the frequency of HABs, as precipitation and temperature are key contributors. In recent years, Commission staff has moved into leadership roles in HABs monitoring and research in Pennsylvania and intend to integrate more with other basin states HABs programs in the upcoming three years. Since the first pilot project in FY21, Commission staff has been involved in a variety of HABs research including an ongoing monitoring partnership with a public water supplier, continued multi-agency coordination and monitoring in a quarry where a HAB recently occurred, a brand new effort examining the fate of nutrients and the potential for HABs after AMD remediation in a reservoir in northcentral PA, and coordination with USEPA on their upcoming nationwide effort to use satellite imagery to predict HABs conditions in smaller lakes.

Schedule:	Coordination with CWA and monitoring in Octoraro Reservoir	Through October 2024
	Begin HABs/fate of nutrients research in Tioga Reservoir	October 2024
	Coordinate with USEPA on nationwide effort using Sentinel-2 Satellite Imagery	July 2025

Budget: \$75,000

Funding: Water Management Fund, U.S. Environmental Protection Agency Clean Water Act Section 106 Grant

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COMMISSION PROJECT SUMMARY

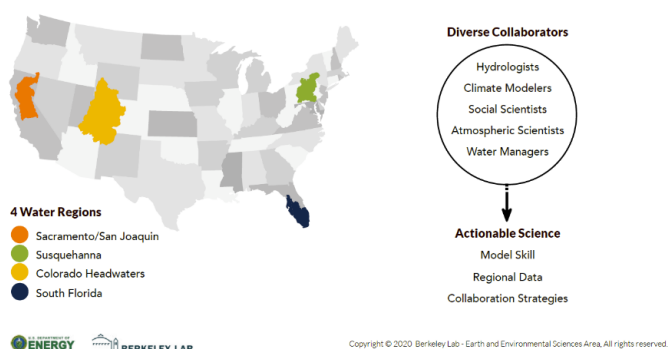
C1a. HyperFACETS Climate Science Research Project

Priority Management Area: Flooding and Drought

Objective: Expand use of climate projection information

Location: Susquehanna River Basin

Co-Produced Climate Science in 4 Key Water Regions



Description: The Susquehanna River Basin was selected as one of four case study watersheds to be investigated in the Hyperion Project. This Department of Energy-funded research, run by leading climate science experts across the country, aims to develop new high-quality regional climate data specifically targeted to support stakeholder needs. The Hyperion Project was completed at the end of 2020. A second phase of the project called HyperFACETS is underway with components focused on evaluating the 1960s Northeastern United States drought and rain on snow flooding in the Susquehanna under future climate conditions. Both research efforts will provide valuable climate science insight and data for informing the Commission’s water resources planning and management efforts.

Schedule:	Summarize results of 1960s drought story line	December 2024
	Summarize results of flooding and rain on snow flooding story line	June 2025
	Create web page with climate projections relative to flooding and drought	December 2025
	Monthly stakeholder meetings and annual workshops	Through June 2027
	Final project report and data	June 2027

Budget: \$100,000

Funding: Sustainable Water Resources Fund

WATER RESOURCES PROGRAM

Fiscal Years 2025 – 2027

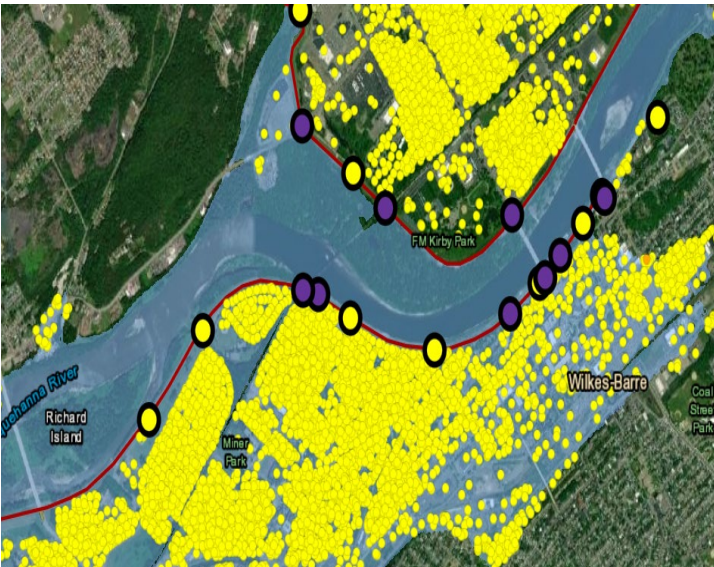
COMMISSION PROJECT SUMMARY

C2a. Susquehanna Flood Warning Response System

Priority Management Area: Flooding and Drought

Objective: Improve community flood warning and response

Location: Broome and Tioga Counties, New York



Description: The Susquehanna Flood Warning and Response System (SFWRS) provides communities with a tool to assess resultant damages to structures associated with a specific level of flooding, as well as response actions for community officials to follow when managing a flood event. The tool may be applied to communities who have stage based inundation mapping at a local river forecast point (24 total). Currently, the tool has been applied to five river forecast points in the Susquehanna basin and the Commission is working to provide the tool to all communities with available inundation mapping. This project will add an additional five river forecast points to the SFWRS including the Susquehanna River at Owego, Vestal, Binghamton, and Conklin, as well as the Chenango River at Chenango Forks, which includes approximately 15,000 additional at risk structures.

Schedule:	Data collection and processing	September 2024
	Tool integration	December 2024
	Binghamton outreach	June 2025
Budget:	\$85,000	
Funding:	General Fund	

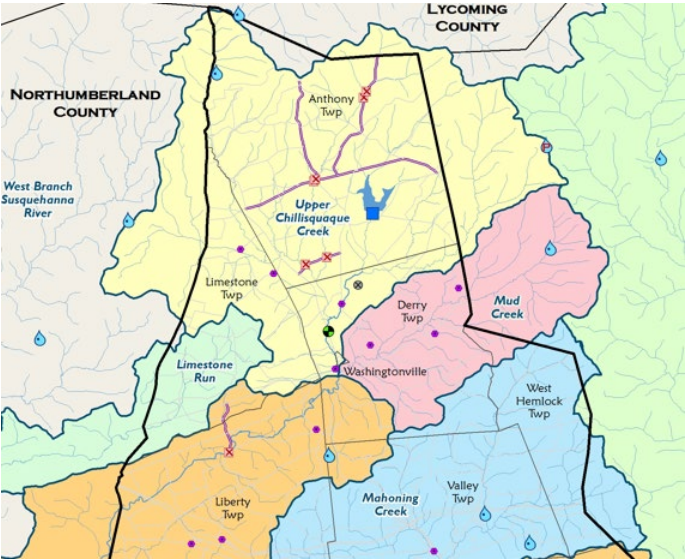
COMMISSION PROJECT SUMMARY

C2b. Montour County Pennsylvania Flood Warning System

Priority Management Area: Flooding and Drought

Objective: Improve community flood warning and response

Location: Montour County, Pennsylvania



Description: The project is being undertaken as an interagency partnership of Pennsylvania Silver Jackets team members including USACE, PEMA, FEMA, SRBC, USGS, NOAA NWS, and Montour County Emergency Management. Project tasks include hydrologic/hydraulic modelling to inform timing and extent of flooding as well as installation of an integrated flood warning system in the northern portion of Montour County to include Washingtonville, PA. The flood warning system will be comprised of rain gages, stream gages, and cameras to inform multiple dissemination pathways including reverse 911 and sirens. The project is the first of its kind completed by the Pennsylvania Silver Jackets and will be used as an example for implementation of future community-based flood warning systems.

Schedule:	System design, modelling, and mapping	September 2024
	Equipment procurement	December 2024
	System installation and testing	June 2024
Budget:	\$100,000	
Funding:	General Fund	

WATER RESOURCES PROGRAM

Fiscal Years 2025 – 2027

COMMISSION PROJECT SUMMARY

C3a. National Water Model Flood Inundation Mapping Validation **New**

Priority Management Area: Flooding and Drought

Objective: Enhance local flood risk assessment

Location: Susquehanna River Basin



Description: The Mid-Atlantic Region is among the first in the nation to have real-time inundation mapping available from the National Oceanic and Atmospheric Administration’s National Weather Service. The Commission has a long history of involvement in the development of inundation map products and has advocated over the years for “on the fly” map products. Leveraging the collective resources of the Pennsylvania Silver Jackets, the project will seek to provide critical calibration data to NOAA for integration with National Water Model map products to verify and validate the same. The team will focus its efforts on flood-impacted communities across Pennsylvania with no local reference stream gage or forecast. Calibration data will include both real-time event driven data (High Water Marks/discharge, etc.) and historical data (images, anecdotal, etc.).

Schedule: Project award
Data collection
Project completion

September 2024
June 2026
September 2026

Budget: \$125,000

Funding: General Fund

WATER RESOURCES PROGRAM

Fiscal Years 2025 – 2027

COMMISSION PROJECT SUMMARY

C4a. Public Water Supply Reservoir Level Monitoring Network

Priority Management Area: Flooding and Drought

Objective: Advance drought monitoring and early warning

Location: Susquehanna River Basin



Description: The Commission’s Drought Coordination plan establishes a drought monitoring protocol for the basin and facilitates interaction with member jurisdictions to assess and respond to declining hydrologic conditions in the basin. The plan directs the Commission to evaluate reservoir levels of “Key Public Water Suppliers” within the basin to help inform the status of public water supply (PWS) relative to hydrologic conditions. The Commission is currently developing an online platform to receive and display reservoir information for the key public water suppliers. The platform will be used by technical staff from member agencies and the key public water suppliers themselves to inform water resource management decision-making.

Schedule:	Key PWS outreach	September 2024
	Key PWS data acquisition	June 2025
	Enhanced Reservoir Monitoring tool	December 2025
Budget:	\$100,000	
Funding:	General Fund	

WATER RESOURCES PROGRAM

Fiscal Years 2025 – 2027

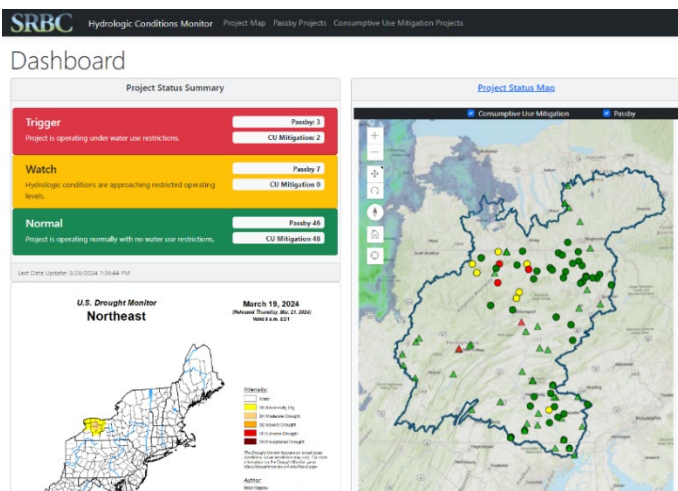
COMMISSION PROJECT SUMMARY

C4b. Susquehanna Drought Monitor

Priority Management Area: Flooding and Drought

Objective: Advance drought monitoring and early warning

Location: Susquehanna River Basin



Description: The Susquehanna Drought Monitor will be developed as part of a basin-wide hydrologic conditions and project operations tracking tool. The Susquehanna Drought Monitor will encompass not only existing drought monitoring parameters outlined in the Commission’s Drought Coordination Plan, but also emerging drought indicators, such as Evaporative Demand Drought Index. A web-based GIS portal that compiles basin-wide available hydrologic data will be presented in a consolidated location for comprehensive and standardized evaluation of existing hydrologic conditions. Quantitative trigger thresholds linked to drought status will be established. Existing conditions will be visualized and assessed relative to various levels of drought.

Schedule:	Incorporate streamflow and groundwater monitoring data	September 2024
	Incorporate precipitation departure and PDSI data	December 2024
	Incorporate emerging drought indicator data	June 2025
	Finalize Susquehanna Drought Monitor GIS portal	December 2025

Budget: \$100,000

Funding: General Fund

WATER RESOURCES PROGRAM

Fiscal Years 2025 – 2027

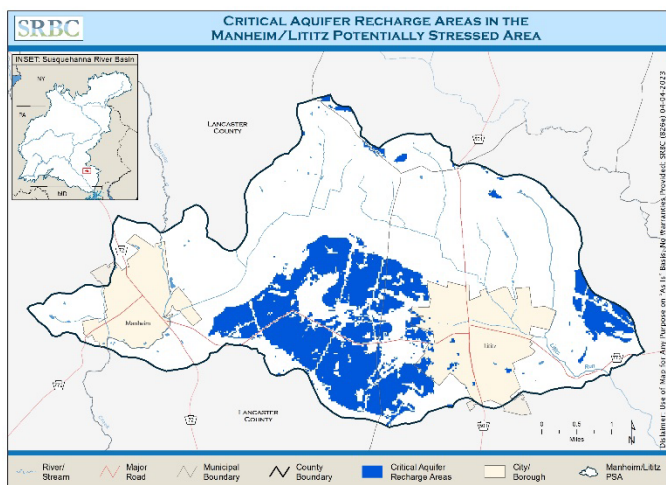
COMMISSION PROJECT SUMMARY

D1a. Critical Aquifer Recharge Area Protection Initiatives **New**

Priority Management Area: Watershed Management

Objective: Protect Critical Aquifer Recharge Areas

Location: Susquehanna River Basin



Description: In 2024, the Commission published *Identifying Optimal Groundwater Recharge Locations and Critical Aquifer Recharge Areas (CARAs) Within the Susquehanna River Basin*, which presents a Geographic Information Systems (GIS) framework to identify areas of greater and lesser recharge potential throughout the basin. Building on the successes of this framework, staff plan to explore additional applications, including those presented as recommendations in the report. These include, but are not limited to, mapping CARAs in priority watersheds with intense water resource utilization and increased development, refining and illustrating recharge rate estimates spatially, summarizing recharge rate information for geologic formations, validating recharge rates and/or areas of high recharge potential through field investigations, and promoting and implementing CARA protection projects.

Schedule:	Map estimated groundwater recharge rates by geologic formation	June 2025
	Map CARAs in priority watersheds	September 2025
	Conduct field investigations of CARAs in priority watersheds	March 2026
	Promote and implement CARA protection projects	Through June 2027

Budget: \$75,000

Funding: Water Management Fund

WATER RESOURCES PROGRAM

Fiscal Years 2025 – 2027

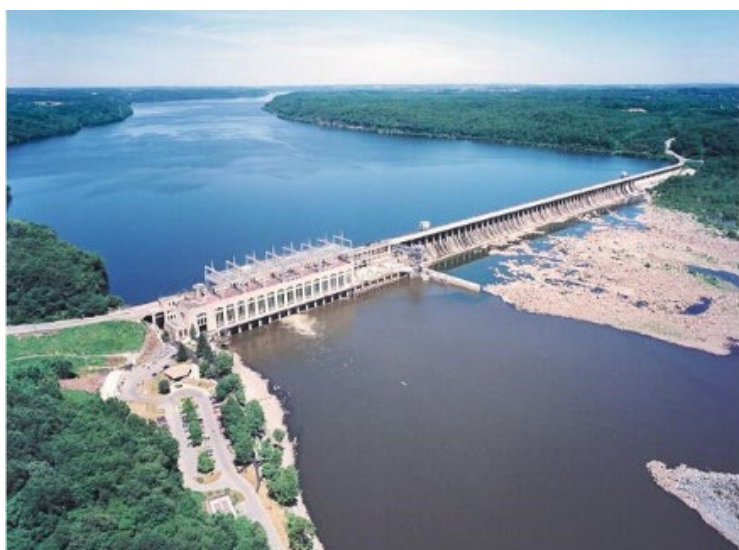
COMMISSION PROJECT SUMMARY

D2a. Conowingo Watershed Implementation Plan

Priority Management Area: Watershed Management

Objective: Promote land use practices for improving local waters and the Chesapeake Bay

Location: Lower Susquehanna Subbasin



Description: The Commission is assisting the Chesapeake Bay Program Partnership with implementation of the Conowingo Watershed Implementation Plan (CWIP) that will reduce pollutant loads delivered to the Bay because of lost trapping capacity in the Conowingo Reservoir in the Lower Susquehanna River. The Conowingo WIP is a supplemental action, triggered mainly due to sediment infill behind the Conowingo Dam, that is needed to meet the overall nutrient and sediment goals under the Chesapeake Bay TMDL and the 2014 Chesapeake Bay Watershed Agreement. Commission staff is assisting the member states of New York, Pennsylvania, and Maryland with implementing projects primarily focused on interstate waters, and in particular, those watersheds in the Lower Susquehanna region straddling the PA/MD state border.

Additionally in 2023, Maryland signed an agreement with the Commission to use \$25 million appropriated by the Maryland General Assembly to purchase “environmental outcomes”; in this case, reductions in nitrogen loading quantified by the Chesapeake Assessment Scenario Tool (CAST) and verified using Chesapeake Bay Program BMP verification guidance. The procurement process managed by the Commission will follow this “Pay for Success” financing strategy, a cost-effective and risk averse approach to reducing nutrients that flow into the Chesapeake Bay.

Schedule: First round of projects awarded July 2024
First round verifications July 2025

Budget: \$350,000 (Does not include payments made to projects after verification)

Funding: Maryland State Appropriation

WATER RESOURCES PROGRAM

Fiscal Years 2025 – 2027

COMMISSION PROJECT SUMMARY

D2b. Octoraro Agricultural Best Management Practices

Priority Management Area: Watershed Management

Objective: Promote land use practices for improving local waters and the Chesapeake Bay

Location: Lancaster and Chester County, Pennsylvania



Description: The Commission’s work will identify and implement water quality improvement projects that will assist with improving Chester Water Authority’s operational flexibility at their primary drinking water source, the Octoraro Reservoir. Currently, operations are greatly constrained by excessive nitrate pollution from upland agricultural sources. Treatment to meet drinking water standards requires mixing water from the Susquehanna River.

Funding will be provided to support the development of water quality BMP projects in identified priority locations within the Octoraro Creek Watershed. Projects selected will include those awarded federal funds, but are in need of non-state/federal match as provided by the Commission. The Commission will also provide support for an Amish Liaison program, alongside funding provided by the Lancaster Clean

Water Partnership, that will be administered by Alliance for Chesapeake Bay. The Amish Liaison program coordinates members of the local Plain Sect community who will work with technical service providers to promote, solicit, and deliver agriculture conservation practices and BMPs in the Upper Octoraro Watershed.

Schedule: Review of projects compiled by the liaison program
 Select and provide funding for the implementation
 of BMP projects in priority locations

Annually in July
 Annually in September

Budget: \$220,000

Funding: Water Management Fund

WATER RESOURCES PROGRAM

Fiscal Years 2025 – 2027

COMMISSION PROJECT SUMMARY

D2c. Pennsylvania Countywide Action Plan Implementation

Priority Management Area: Watershed Management

Objective: Promote land use practices for improving local waters and the Chesapeake Bay

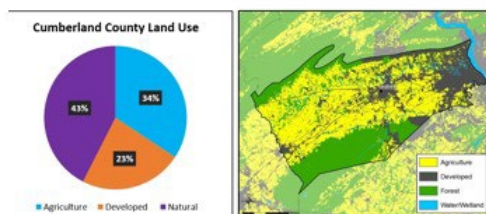
Location: Pennsylvania Counties in Susquehanna River Basin

CUMBERLAND COUNTY CLEAN WATER TECHNICAL TOOLBOX

Developing a County-Based Action Plan for Clean Water



Water Quality is Strongly Tied to Land Use



Description: The Chesapeake Bay region’s member jurisdictions are fulfilling Phase 3 Watershed Implementation Plan (WIPs) that were developed to restore water quality and habitat impairments to the Bay (impacts that are attributable to nutrient enrichment and excess sediment pollution). As both the largest source of freshwater as well as non-tidal nutrient and sediment loadings to the Bay, activities within the Susquehanna River Basin have a pivotal role in Bay restoration. The Commission furnishes key technical and logistical support to local WIP-related action teams, state agencies, and USEPA. Since 2018, Commission staff has worked in conjunction with PADEP’s Chesapeake Bay Program Office to produce data-information products for stakeholders, develop pollutant load and load-reduction scenarios using the Chesapeake Assessment Scenario Tool (CAST) model, and provide education and outreach support in coordination with state and county-level WIP leadership groups.

Schedule:	CAST calculations for Pennsylvania’s pollution-reduction progress	Annually by December
	Technical support to Pennsylvania’s County Action Plan work group	Ongoing
	Technical assistance to PADEP Chesapeake Bay Program	Ongoing
Budget:	\$150,000	
Funding:	PA Department of Environmental Protection Chesapeake Bay funds	

WATER RESOURCES PROGRAM

Fiscal Years 2025 – 2027

COMMISSION PROJECT SUMMARY

D3a. Tioga-Hammond Lakes Environmental Flow Study

Priority Management Area: Watershed Management

Objective: Improve environmental flow management

Location: Tioga County, Pennsylvania



Description: The primary purpose of the Tioga-Hammond Lakes project is to provide flood damage reduction for communities along the Tioga, Chemung, and Susquehanna Rivers. Secondary purposes include water quality control and recreation. In recent years, state and local organizations have initiated numerous efforts to reclaim abandoned coal mines and associated discharges upstream of Tioga Dam. The Commission has been actively engaged in this effort by developing a Watershed Assessment and Remediation Strategy for Abandoned Mine Drainage in the Upper Tioga River Watershed. These efforts have collectively resulted in measurable improvements in water quality upstream of Tioga Dam. Additionally, downstream water quality improvements and benefits are expected with the Morris Run Abandoned Mine Drainage Treatment Plant Construction. The water quality improvements may alleviate or lessen the need for water quality driven

operations at the project. The Commission believes that modifications to the project that result in (1) operations that provide flow augmentation during critical low flow periods, (2) modified conservation releases that are better aligned with the newly established ecological flow management standards, or (3) reallocation of flood storage to water supply storage, combined with associated environmental and recreational enhancements, would benefit in-lake resources and instream flow needs and aquatic habitat downstream of the project.

Schedule:	Submit study request	June 2025
	Develop study scope and budget	December 2025
	Initiate study	March 2026
	Complete study	September 2027

Budget: \$5,000,000 (modified conservation release) – \$50,000,000 (water supply storage)

Funding: Water Management Fund

WATER RESOURCES PROGRAM

Fiscal Years 2025 – 2027

COMMISSION PROJECT SUMMARY

D4a. Hydroelectric Dam Fish Passage Upgrades

Priority Management Area: Watershed Management

Objective: Restore native migratory fish to historic ranges

Location: Susquehanna River Basin



Description: The Commission works with fellow resource agencies as a member of the Susquehanna River Anadromous Fish Restoration Cooperative (SRAFRC) and through its participation in the federal re-licensing process to improve fish passage provisions at hydroelectric projects. Individual project improvements and passage efficiency goals are developed to collectively increase successful upstream and downstream movement of native diadromous fish species with a goal of restoring self-sustaining stocks of American shad, river herring, blueback herring, and American eel to the basin. Technological innovations and adaptive management based on contemporary science drive passage improvements and are incorporated into operations to achieve success.

Schedule:	Conowingo Dam fish lift improvements	Through June 2027
	Holtwood Dam fish passage studies and refinements	Through June 2027
	York Haven Dam nature-like fishway installation	Through June 2025

Budget: \$20,000

Funding: Regulatory Program Fees

WATER RESOURCES PROGRAM

Fiscal Years 2025 – 2027

COMMISSION PROJECT SUMMARY

D5a. Environmental DNA Monitoring of Aquatic Invasive Species (AIS)

Priority Management Area: Watershed Management

Objective: Reduce impacts from aquatic invasive species

Location: Susquehanna River Basin



Description: The Commission has been a leader in using Environmental DNA (eDNA) to monitor the spread of multiple aquatic invasive fish species across the basin for more than five years. The expanding ranges of non-native Blue catfish, Northern Snakehead, and Round Goby present extant threats to the ecological integrity of the watershed. Using eDNA attained by filtering a 2-liter water sample, the presence or absence of each target species can be evaluated over a large geographic area much more cost-effectively than traditional fishing sampling techniques. Routine monitoring of the species' ever changing distributions allows for effective management through coordinated efforts with member jurisdictions and rapid response actions to limit further dispersal.

As new non-native species are detected within the basin, Commission staff has the operational flexibility to respond quickly to emerging species invasions. The Commission will continue to partner with the United States Fish & Wildlife Service to process samples and align efforts through interagency workgroups to meet the needs of our member states.

Schedule: Monitor 100 sites for AIS via eDNA
 Compile/analyze data and disseminate to agency partners

Annually through June 2027
 Annually in December

Budget: \$45,000

Funding: Sustainable Water Resources Fund

WATER RESOURCES PROGRAM

Fiscal Years 2025 – 2027

COMMISSION PROJECT SUMMARY

D6a. Stream and Watershed Enhancement Grant

Priority Management Area: Watershed Management

Objective: Improve resiliency of the hydrologic landscape

Location: Susquehanna River Basin



Description: Each year, the Commission awards several million dollars in funding through a variety of grant and other assistance programs. In 2023, the Commission offered the Stream and Watershed Enhancement Grant to support local organizations dedicated to the health and wellness of our basin's waterways. The grant program provided funding for community-based environmental and water resources projects or events that improve, restore, or protect local watersheds, promote watershed education, offer watershed-based community outreach, address climate resiliency, or promote recreation on basin waterways. In its first year, the Commission awarded more than \$150,000 to 34 projects. Seven of those 34 projects were located in,

or offered benefit to, environmental justice area communities. The grant program also supports the Commission's outreach efforts to advance our mission to communities across the basin.

Schedule:	First round grant recipients complete projects	December 2024
	Second round grant program opens	September 2024
	Grant team awards projects	March 2025
	Grant administration and project completion	December 2026

Budget: \$200,000

Funding: Sustainable Water Resources Fund

WATER RESOURCES PROGRAM

Fiscal Years 2025 – 2027

COMMISSION PROJECT SUMMARY

D6b. Kehm Run Environmental Restoration Project

Priority Management Area: Watershed Management

Objective: Improve resiliency of the hydrologic landscape

Location: York County, Pennsylvania



Description: The earthen Kehm Run dam was constructed in 1954 and has deteriorated over time, posing safety risks. The PADEP classified it as a high-hazard dam due to the decay of its components, including the bypass pipe and spillway. American Rivers secured a grant to remove and remediate the dam; however, due to increased construction costs, only a partial breach and removal was completed. The Commission stepped in to complete the dam removal and is currently in the design phase to restore the stream channel as well as severely eroded stormwater channels on the property. Easements will be secured to ensure project longevity and preserve the open green agricultural space that resides amongst strong development pressures. The Commission anticipates purchasing an easement for the property. This project, coupled with several other downstream restoration projects, will help

restore and preserve Muddy Creek.

Schedule:	Complete permitting	September 2024
	Secure property easement	December 2024
	Complete construction	September 2025

Budget: \$900,000

Funding: Water Management Fund

WATER RESOURCES PROGRAM

Fiscal Years 2025 – 2027

CROSS CUTTING THEMES AND INITIATIVES

➤ Environmental Justice

- Continue prioritization of EJ communities within Commission grant programs
- Evaluate notices of proposed Commission actions to ensure appropriate public access is achieved
- Enhance access for non-English speaking communities near proposed projects by providing interpretative services including for the hearing-impaired
- Develop an environmental justice community outreach plan
 - a. Flood Risk Management
 - b. AMD Remediation
 - c. Water-Based Recreation Enhancements
 - d. Water Resources Education Programs

➤ Climate Change

- Incorporate latest applicable climate science into Commission programs from the [HyperFACETS](#) Climate Science Research Project
- Examine vehicle fleet and building to identify opportunities to reduce carbon footprint
- Review term limits for project approvals in consideration of changing conditions and water availability
- Raise profile regarding climate resiliency activities through development of a web page
- Continue data collection at select CIM Stations focused on climate change monitoring
- Maintain updated streamflow statistics
- Maintain water use and availability projections

➤ Technology and Data Analytics

- Use dashboards and storymaps to enhance presentation and understanding of data and project outcomes
- Support more accurate water resources management and promote data sharing between the Commission and member state regulatory agencies through the development of the Susquehanna Water Use Network, as well as other online applications
- Continue to adopt new sensor technology for the CIM network (i.e., continuous nitrate)
- Continue to coordinate and implement improved access to flood warning and preparedness information through Internet-based portals
- Continue to promote use on new/enhanced remote sensing techniques for assessing environmental conditions or identifying problem areas associated with legacy mining impacts, failing infrastructure, etc. (use of satellite imagery, LiDAR, drones)

➤ Coordination and Outreach

- Continue to promote/expand the [Eels In The Classroom](#) program
- Continue technical assistance to regulated communities with focus on strategic return on investment (i.e. streamlined renewals, achieving significant water conservation)
- Review Commission committees and other routine coordination activities to assess need for any changes in approach
 - Member agencies, non-governmental organizations, academia, stakeholder groups, etc.
- Continue to coordinate issue-specific committees/workgroups, such as the Drought Coordination Committee, Lower Susquehanna Source Water Protection Partnership, Chesapeake Mussel Partnership, Public Water Supply Assistance workshops; consider topics with leadership gaps the Commission could fill
- Continue to refine public outreach strategy and objectives

WATER RESOURCES PROGRAM

Fiscal Years 2025 – 2027

KEY PERFORMANCE INDICATORS

A. Water Supply

1. Water use by sector versus water availability (million gallons per day)
2. Water conservation and reuse savings (million gallons per year)

B. Water Quality

1. Water quality index and index of biotic integrity (change in score)
2. Stream impairments by source (stream miles)

C. Flooding and Drought

1. Communities with flood forecasts, inundation mapping, or warning and response systems (number)
2. Consumptive use offset during drought (million gallons per day)

D. Watershed Management

1. Critical aquifer recharge areas enhanced or protected (acres)
2. Sediment and nutrient load reductions (million pounds)

