



# WATER RESOURCES PROGRAM

## Fiscal Years 2022 – 2024 (June 2023 Update)

The Water Resources Program (WRP) presents the key water resources needs for the basin over the next three fiscal years and the priority projects proposed to satisfy those needs, per the Susquehanna River Basin Compact requirements and based upon the 2021 Comprehensive Plan (CP).

### COMPREHENSIVE PLAN – PRIORITY MANAGEMENT AREAS (PMAs)

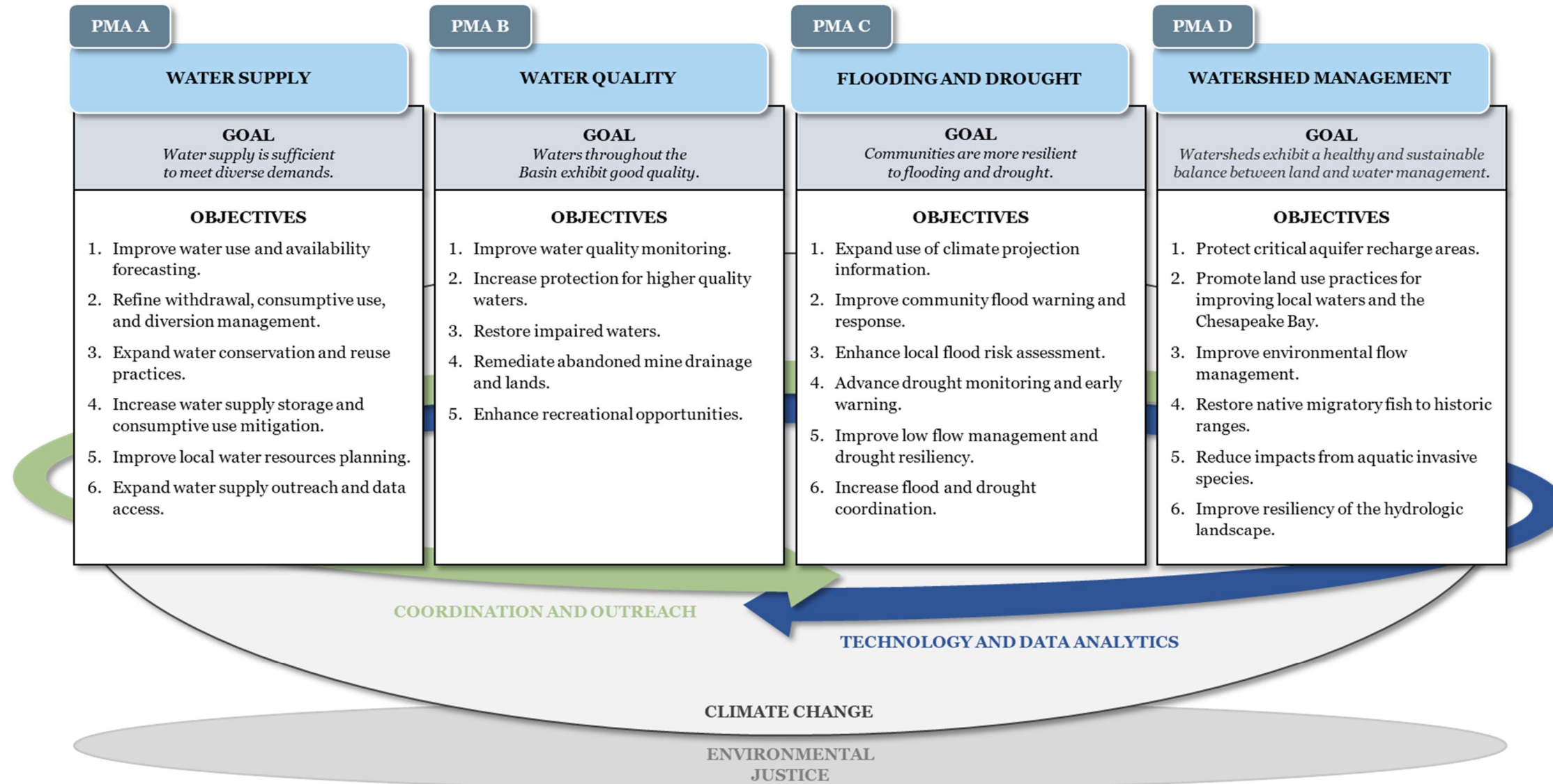
<b>(A) WATER SUPPLY</b>	<b>(B) WATER QUALITY</b>	<b>(C) FLOODING AND DROUGHT</b>	<b>(D) WATERSHED MANAGEMENT</b>
« <b>COORDINATION AND OUTREACH</b> • <b>TECHNOLOGY AND DATA ANALYTICS</b> »			
« <b>CLIMATE CHANGE</b> • <b>ENVIRONMENTAL JUSTICE</b> »			

### WATER RESOURCES PROGRAM – PRIORITY PROJECTS

	Water supply is sufficient to meet diverse demands.	Waters throughout the Basin exhibit good quality.	Communities are more resilient to flooding and drought.	Watersheds exhibit a healthy and sustainable balance between land and water management.
GOAL				
POC	<b>Todd Eaby</b> <a href="mailto:teaby@srbc.net">teaby@srbc.net</a>	<b>Jamie Shallenberger</b> <a href="mailto:jshallenberger@srbc.net">jshallenberger@srbc.net</a>	<b>John Balay</b> <a href="mailto:jbalay@srbc.net">jbalay@srbc.net</a>	<b>Andy Gavin</b> <a href="mailto:agavin@srbc.net">agavin@srbc.net</a>
CP	<b>OBJ</b>	<b>PROJECTS</b>	<b>OBJ</b>	<b>PROJECTS</b>
SRBC	<b>A-2</b> <ul style="list-style-type: none"> <li>Groundwater Regulation &amp; Policy Updates</li> <li>Grandfathered Water Use Registrations</li> <li>Water Conservation &amp; Reuse Pilot Projects</li> <li>Octoraro Consumptive Use Mitigation Project</li> <li>Consumptive Use Mitigation Grant Program</li> <li>County Water Use &amp; Availability Studies</li> <li>Public Water Supply Assistance Program</li> </ul>	<b>B-1</b> <ul style="list-style-type: none"> <li>Chesapeake Bay Sediment &amp; Nutrient Assessment Program</li> <li>Continuous Instream Monitoring Network</li> <li>Harmful Algal Bloom Studies</li> <li>Lower Susquehanna Source Water Protection Program</li> <li>Chiques Creek Restoration Initiative</li> <li>Morris Run Abandoned Mine Drainage Treatment Plant</li> </ul>	<b>C-1</b> <ul style="list-style-type: none"> <li>HyperFacets Climate Science Research Project</li> <li>Susquehanna Flood Warning &amp; Response System</li> <li>Middle Susquehanna Flood Mitigation Project</li> <li>National Water Model Flood Inundation Mapping</li> <li>Drought Management Strategy Update</li> </ul>	<b>D-1</b> <ul style="list-style-type: none"> <li>Critical Aquifer Recharge Area Pilot Projects</li> <li>Conowingo Watershed Implementation Plan</li> <li>Pennsylvania County Watershed Implementation Plan Support</li> <li>Federal/State Reservoir Environmental Flow Enhancements</li> <li>Hydroelectric Dam Fish Passage Upgrades</li> <li>Stormwater Management Pilot Projects</li> <li>Kehm Run Dam Removal &amp; Restoration Project</li> <li>Integrated Watershed Management Pilot Projects</li> </ul>
PARTNERS	<b>A-1</b> <ul style="list-style-type: none"> <li>National Assessment of Water Availability &amp; Use Program (USGS)</li> <li>Water Use Data Report Updates (NY/PA/MD)</li> <li>State “One Water” &amp; Integrated Planning Initiatives (NY/PA/MD)</li> <li>Pennsylvania State Water Plan Update (PADEP)</li> <li>Lancaster County Water &amp; Sewer Capacity Study (LCPC)</li> <li>Public Water Supply Technical Assistance Programs (NYRWA/NYDOH/PADEP)</li> </ul>	<b>B-1</b> <ul style="list-style-type: none"> <li>Susquehanna Spill Tracking Tool (Harrisburg Univ.)</li> <li>Chesapeake Bay Program Nontidal Water Quality Monitoring Program (USEPA/USGS/NY/PA/MD)</li> <li>Mine Drainage Active Treatment Projects (PADEP)</li> <li>Pennsylvania Groundwater Quality Monitoring Network (PADEP/USGS)</li> </ul>	<b>C-1</b> <ul style="list-style-type: none"> <li>Community Risk &amp; Resiliency Act Implementation (NYSDEC)</li> <li>National Water Model Updates (NOAA)</li> <li>Juniata Subbasin Flood Study (USACE)</li> <li>Greater Muncy Resiliency Project (USACE/Muncy)</li> <li>Drought Monitoring and Planning Updates (USGS/PADEP)</li> <li>Codorus Creek Flood Risk Management Rehabilitation Project (USACE)</li> </ul>	<b>D-2</b> <ul style="list-style-type: none"> <li>Chesapeake Bay Comprehensive Plan Implementation (USACE)</li> <li>Conowingo Watershed Implementation Plan (PA/MD)</li> <li>Chesapeake Bay BMP Audit Initiative (USGS)</li> <li>County Watershed Implementation Plans (NY/PA/MD)</li> <li>Susquehanna American Eel &amp; Migratory Fish Restoration Programs (USFWS)</li> <li>Chesapeake Bay Mussel Restoration Initiative</li> <li>Debris Management Workgroup</li> </ul>
C	<b>OBJ</b>	<b>MEASURES</b>	<b>OBJ</b>	<b>MEASURES</b>
METRICS	<b>A-1</b> <ul style="list-style-type: none"> <li>Watersheds with current or projected future water availability limitations (# or %)</li> </ul> <b>A-2</b> <ul style="list-style-type: none"> <li>Project application review time (days)</li> </ul> <b>A-3</b> <ul style="list-style-type: none"> <li>Water conservation &amp; reuse savings (mgd or Mgal/yr)</li> </ul> <b>A-4</b> <ul style="list-style-type: none"> <li>Regulated consumptive use offset by mitigation projects (mgd or %)</li> </ul> <b>A-5</b> <ul style="list-style-type: none"> <li>Local water resources plans supported (#)</li> </ul>	<b>B-1</b> <ul style="list-style-type: none"> <li>Watersheds prioritized for restoration &amp; protection having adequate monitoring (%)</li> </ul> <b>B-2</b> <ul style="list-style-type: none"> <li>Waters with excellent water quality or use designations requiring special protections (miles or %)</li> </ul> <b>B-3</b> <ul style="list-style-type: none"> <li>Delisted impaired waters (miles)</li> </ul> <b>B-4</b> <ul style="list-style-type: none"> <li>Restored AMD impacted streams &amp; lands (miles &amp; acres)</li> </ul> <b>B-5</b> <ul style="list-style-type: none"> <li>Stream reaches attaining recreational protected water uses (miles or %)</li> </ul>	<b>C-1</b> <ul style="list-style-type: none"> <li>New regulations, plans &amp; studies that incorporate climate projections (# or %)</li> </ul> <b>C-2</b> <ul style="list-style-type: none"> <li>Communities with river forecast points &amp;/or flood warning &amp; response systems (# or %)</li> </ul> <b>C-3</b> <ul style="list-style-type: none"> <li>Communities with updated flood studies &amp;/or inundation mapping (# or %)</li> </ul> <b>C-4</b> <ul style="list-style-type: none"> <li>Drought monitoring stations &amp; early warning products available to communities &amp; water users (#)</li> </ul> <b>C-5</b> <ul style="list-style-type: none"> <li>Consumptive use mitigation funds allocated to drought resiliency projects (\$ or %)</li> </ul>	<b>D-1</b> <ul style="list-style-type: none"> <li>Critical aquifer recharge areas enhanced &amp;/or protected (acres)</li> </ul> <b>D-2</b> <ul style="list-style-type: none"> <li>Sediment &amp; nutrient load reductions (lbs or %)</li> </ul> <b>D-3</b> <ul style="list-style-type: none"> <li>Reservoirs with environmental flow releases (# or %)</li> </ul> <b>D-4</b> <ul style="list-style-type: none"> <li>Stream reaches accessible to migratory fish via fish passage upgrades (miles or %)</li> </ul> <b>D-5</b> <ul style="list-style-type: none"> <li>Habitat restored &amp;/or acres captured by water resource resiliency measures (acres)</li> </ul>

# 2021 COMPREHENSIVE PLAN

## Priority Management Areas, Goals, and Objectives



# Water Resources Program

## Fiscal Years 2022 – 2024

### Priority Management Area A: Water Supply

**Goal:** Water supply is sufficient to meet diverse demands.

**Objective A-2:** Refine withdrawal, consumptive use, and diversion management

**Project:** Groundwater Regulation & Policy Updates

**Location:** Susquehanna River Basin

**Lead:** Jason Oyler



**Description:** SRBC has proposed regulations and policies designed to provide clarity to project sponsors, target only the most appropriate activities, and establish a more efficient and effective framework to review groundwater withdrawals. In addition, with the successful implementation of grandfathered water use registrations, SRBC proposes to simplify its regulations for these grandfathered projects. The regulations also build upon successful changes with SRBC’s ABR(f) program and its minor modification regulation. SRBC is also proposing policies to improve its groundwater review processes to increase efficiency, leverage existing operational data, and reduce review costs.

#### Challenges:

- Handling an anticipated 200-250 groundwater project renewals over the next 5 years.
- Ensuring that wells are permitted and monitored in efficient but robust ways to allow dynamic decision making as impacts of climate change manifest.
- Reducing costs for project sponsors, especially water systems that are small and economically challenged, including communities with environmental justice concerns.

#### Milestones:

- Issue proposed rule and policies for public comment (March 2021)
- Issue final rule and adopt policies (September 2021)
- Complete rule and policy implementation (December 2021)

**Funding:** General Fund

# Water Resources Program

## Fiscal Years 2022 – 2024

### Priority Management Area A: Water Supply

**Goal:** Water supply is sufficient to meet diverse demands.

**Objective A-2:** Refine withdrawal, consumptive use, and diversion management

**Project:** Grandfathered Water Use Registrations

**Location:** Susquehanna River Basin

**Lead:** Jeremy Hoffman



**Description:** SRBC estimates more than 700 older, unpermitted grandfathered facilities with a total estimated water use of nearly one billion gallons per day located in the Basin. This volume of water use is roughly equal to the total amount currently accounted for, and managed by, SRBC. The registration program is designed to close this significant knowledge gap of existing water use and demands to ensure SRBC's ability to effectively manage the water resources of the Basin. Grandfathered facilities registered their maximum 30-day average water uses with SRBC during 2018 and 2019.

#### Challenges:

- Verifying the accuracy of data and information contained within submitted registrations.
- Assisting ineligible facilities with obtaining SRBC approval.
- Coordinating with facilities for ongoing data collection and reporting.

#### Milestones:

- Grandfathered water use determinations issued for all eligible facilities (June 2022)
- Contact and provide direction to all ineligible facilities (June 2023)
- Complete inspections at all registered facilities (June 2024)

**Funding:** Registration fees, Fiscal Stabilization Fund

# Water Resources Program

Fiscal Years 2022 – 2024

## Priority Management Area A: Water Supply

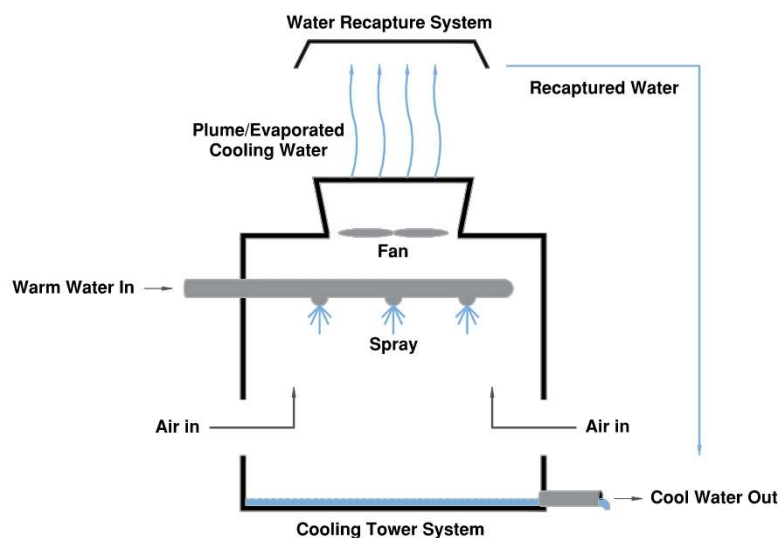
**Goal:** Ensure water supply is sufficient to meet diverse demands.

**Objective A-3:** Expand water conservation and reuse practices

**Project:** Evaporative Cooling Water Conservation Pilot Project

**Location:** Susquehanna River Basin

**Lead:** Julian Mazero



**Description:** A wide range of industries in the Basin, such as power plants, food processors, and waste-to-energy plants, operate cooling systems that consumptively use water. Replacing these existing cooling systems can be cost-prohibitive. However, water conservation technology manufacturers have recently developed cost-efficient systems that allow these various industries to retrofit their existing cooling towers to recapture water. Subsequently, recaptured water can be reused and therefore reduces an operator’s demand on Basin water resources. To increase the likelihood of adoption of these new technologies, SRBC will partner

with several consumptive users within the Basin in varying industries to pilot recently developed water conservation technologies. SRBC will assess each technology to determine its water conservation efficacy and quality for reuse, general costs, and potential barriers to adoption.

### Challenges:

- Securing a project partner to pilot water conservation technologies.
- Developing a post-pilot project assessment for public consumption.

### Milestones:

- Select a project partner (September 2021)
- Design, manufacture, and install technology (December 2022)
- Complete pilot project study (June 2023)
- Finalize pilot project findings report (September 2023)

**Funding:** Water Management Fund

# Water Resources Program

## Fiscal Years 2022 – 2024

### Priority Management Area A: Water Supply

**Goal:** Water supply is sufficient to meet diverse demands.

**Objective A-4:** Increase water supply storage and consumptive use mitigation

**Project:** Octoraro Consumptive Use Mitigation Project

**Location:** Octoraro Creek Watershed

**Lead:** John Balay / Jamie Shallenberger



**Description:** SRBC and Chester Water Authority (CWA) staff will partner to evaluate alternatives that would adequately mitigate CWA's diversion and consumptive use. Project alternatives related to infrastructure and operational changes will be considered for offsetting consumptive use during low flow events. Alternatives related to Octoraro watershed restoration efforts, particularly reduction of high nitrate concentrations, are included for water quality (WQ) improvement. A detailed evaluation will be performed on operational parameters, lake level management, water supply reliability, etc. Staff efforts will also include working with the Octoraro Source Water Collaborative for

the identification and implementation of priority pilot restoration projects in upland areas of the watershed to reduce pollutant inputs to the reservoir to allow for greater operational flexibility. SRBC will prepare documentation detailing the efforts, including the identification of a preferred project operation alternative that will adequately mitigate the CWA's diversion and consumptive use.

#### Challenges:

- Close coordination with CWA regarding operational specifics and challenges.
- Severity of nutrient and sediment loadings from upland areas of the watershed.

#### Milestones:

- Develop model simulations for project operation alternatives (June 2023)
- Refine model elements and conduct alternatives analysis (June 2024)
- Identify priority pilot WQ restoration projects for implementation (December 2022)

**Funding:** Water Management Fund

# Water Resources Program

## Fiscal Years 2022 – 2024

### Priority Management Area A: Water Supply

**Goal:** Ensure water supply is sufficient to meet diverse demands.

**Objective A-4:** Increase water supply storage and consumptive use mitigation

**Project:** Consumptive Use Mitigation Grant Program

**Location:** Susquehanna River Basin

**Lead:** John Balay



**Description:** Using the Consumptive Use Mitigation Policy’s goals and objectives, SRBC will develop a grant program to fund various water supply, project operation, demand modification, and environmental and water quality projects for consumptive use mitigation. A grant program will allow SRBC to solicit projects from a broad base of consumptive water users and Basin communities. By creating a grant program, SRBC will also be able to incorporate climate change resiliency and environmental justice into its decision making and funding matrix. Additionally, a grant program can provide SRBC with innovative projects, which it will be able to highlight on its website and social media feeds, as well as

during stakeholder outreach efforts. By creating a grant program and highlighting innovative projects, SRBC can provide Basin communities and project sponsors with mitigation solutions they can tailor to their specific sites.

#### Challenges:

- Designing a new grant program to fund consumptive use mitigation projects.
- Designing grant approval and funding matrices.

#### Milestones:

- Finalize grant program details (September 2021)
- Initiate grant program (November 2021)
- Approve and award grants (July 2022)
- Initiate annual grant offerings (November 2022 and 2023)

**Funding:** Water Management Fund

# Water Resources Program

Fiscal Years 2022 – 2024

## Priority Management Area A: Water Supply

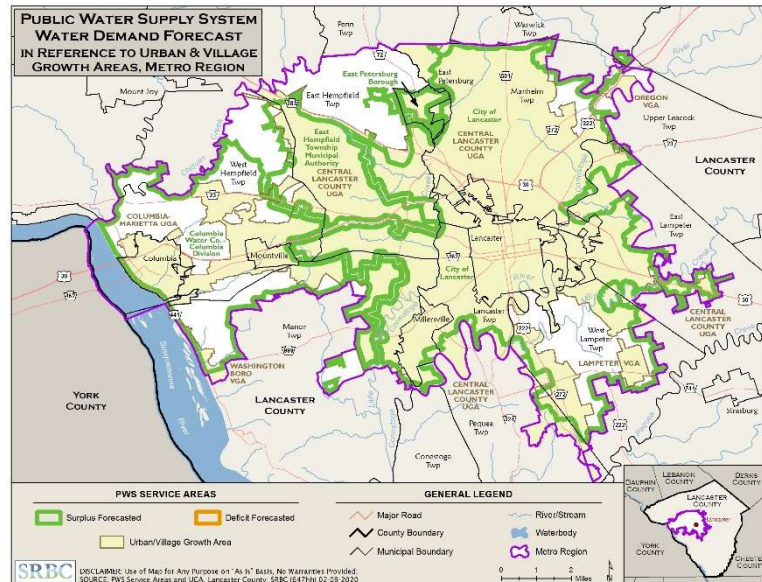
**Goal:** Water supply is sufficient to meet diverse demands.

**Objective A-5:** Improve local water resources planning

**Project:** County Water Use & Availability Studies

**Location:** Susquehanna River Basin

**Lead:** John Balay



**Description:** SRBC’s 2016 Cumulative Water Use & Availability Study included a recommendation to conduct finer scale water availability analyses, in partnership with local stakeholders, for watersheds with more limited water availability. SRBC recently partnered with Lancaster County Planning Commission on a Public Water Supply Forecast Study that assessed current and projected 2040 population and water demand, compared to current water supply allocations, to help identify areas with potential future water supply surpluses and deficits. SRBC is committed to providing technical support and resources to other local planning agencies regarding water use and availability assessments that will help

facilitate the inclusion of water supply considerations in growth planning activities.

### Challenges:

- Engaging local planning agencies and water users in a collaborative manner.
- Obtaining detailed information on water supply sources, distribution systems, and water use.
- Proactively identifying areas of more limited and ample water availability to support development.

### Milestones:

- Complete Lancaster County Water & Sewer Capacity in Growth Areas Analysis (June 2023)
- Identify another local planning agency to partner with (December 2023)
- Provide technical support on Spring Creek One Water Plan (Through June 2024)

**Funding:** Sustainable Water Resources Fund



# Water Resources Program

Fiscal Years 2022 – 2024

## Priority Management Area A: Water Supply

**Goal:** Water supply is sufficient to meet diverse demands.

**Objective A-6:** Expand Water Supply Outreach and Data Access

**Project:** Public Water Supply Assistance Program

**Location:** Susquehanna River Basin

**Lead:** Dave Haklar



**Description:** In recognizing the challenges facing small drinking water systems, SRBC intends to continue the highly successful public water supply assistance program (PWSAP). PWSAP was initiated in 2012 and will continue to offer general and targeted system-specific assistance and Pre-Drill Well Site Review (PDWSR) services along with training and education opportunities on topics of interest for those same systems and the consulting professionals that support those systems. SRBC is expecting over 200 groundwater renewal applications in the next several years and has been focusing much of the training offerings on topics related to preparing for the renewal process. The recent development and use of webinars has allowed SRBC to expand access to the training events which has resulting in nearly double to fivefold increase in participants per training event. SRBC intends to continue with webinar-based training and education in an attempt to provide assistance and training to an even wider audience of projects and supporting consultants.

### Challenges:

- Staffing to provide and develop targeted system specific assistance such as voluntary action plans.
- Convincing systems to take advantage of the targeted system assistance in preparing for renewals.

### Milestones:

- Conduct biannual management training workshops (Through June 2024)
- Conduct annual consultant training sessions (Through June 2024)
- Provide targeted system assistance (Through June 2024)

**Funding:** Sustainable Water Resources Fund

# Water Resources Program

## Fiscal Years 2022 – 2024

### Priority Management Area B: Water Quality

**Goal:** Waters throughout the Basin exhibit good quality.

**Objective B-1:** Improve water quality monitoring

**Project:** Chesapeake Bay Sediment & Nutrient Assessment Program

**Location:** Susquehanna River Basin

**Lead:** Jamie Shallenberger



**Description:** Since the 1980s, SRBC 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 are used to track pollutant loads, evaluate trends, calibrate various Bay-related models, and update/revise targets for the Bay jurisdiction members.

#### Challenges:

- Funding for NTN monitoring activities has been static for the past 5 years.
- Changing climate conditions complicate data analyses.

#### Milestones:

- Upload NTN water quality data package (Annually by March)
- Annual Sediment & Nutrient Assessment Program report (Annually by April)
- Compute pollutant loads & trends analyses (Annually by August)

**Funding:** Clean Water Act Section 117e Grant

# Water Resources Program

Fiscal Years 2022 – 2024

## Priority Management Area B: Water Quality

**Goal:** Waters throughout the Basin exhibit good quality.

**Objective B-1:** Improve water quality monitoring

**Project:** Continuous Instream Monitoring Network

**Location:** Susquehanna River Basin

**Lead:** Dawn Hintz



**Description:** SRBC began continuous instream monitoring (CIM) in 2003 when the Early Warning System (EWS) was launched to help protect and manage public water supply operations with sources in the Basin’s major rivers. In 2010, SRBC launched the Remote Water Quality Monitoring Network (RWQMN) to measure water quality indicators in real-time across parts of the Basin where unconventional natural gas production was, or could become, underway. SRBC expanded the RWQMN to areas outside natural gas production and expanded the EWS to tributaries of the major rivers. Currently there are approximately 65 stations that measure and report conditions from streams and small rivers located

throughout the Basin continuously. SRBC’s real-time CIM networks generate water quality data using instruments sensitive enough to detect subtle change. Water quality parameters monitored include water temperature, specific conductance, pH, dissolved oxygen, and turbidity. One of the invaluable facets of SRBC’s CIM programs are that the stations remain fixed in location for years and thereby support scientific analyses of long-term trends and exploration of predictor–response relationships.

### Challenges:

- Changing climatic and landscape conditions.
- Changing technology (monitoring equipment and software).
- Funding sources.

### Milestones:

- Spill tracking model upgraded (December 2022)
- 10-year water quality trends for CIM sites (December 2023)
- Final data available on the website (December 2024)

**Funding:** ACMF Fund, USEPA 106 Grant, Susquehanna Heartland Coalition, PADCNR

# Water Resources Program

## Fiscal Years 2022 – 2024

### Priority Management Area B: Water Quality

**Goal:** Waters throughout the Basin exhibit good quality.

**Objective B-1:** Improve water quality monitoring

**Project:** Harmful Algal Bloom Studies

**Location:** Susquehanna River Basin Lakes

**Lead:** Luanne Steffy



**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 cause damage to the ecosystem of the lake as they severely lower dissolved oxygen levels. Climate change threatens to increase the frequency of HABs within the Basin, as precipitation and temperature are key causes. In late FY21, SRBC initiated a pilot monitoring project in Lackawanna State Park in partnership with PADCNr. This pilot project and future studies will use a wide variety of monitoring approaches, including continuous monitoring and remote satellite imaging to begin to develop relationships between observed values and remotely sensed data as a potential predictive tool. Future studies in FY22-FY24 will

build off the results from the pilot project.

#### Challenges:

- New monitoring technologies.
- Regional climate change.
- Rapidly changing lake conditions.

#### Milestones:

- Complete Pilot Project data collection (November 2021)
- Analyze and disseminate results (March 2022)
- Prepare study plan for next steps (May 2022)
- Initiate second phase of monitoring (July 2022)

**Funding:** USEPA 106 Grant

# Water Resources Program

Fiscal Years 2022 – 2024

## Priority Management Area B: Water Quality

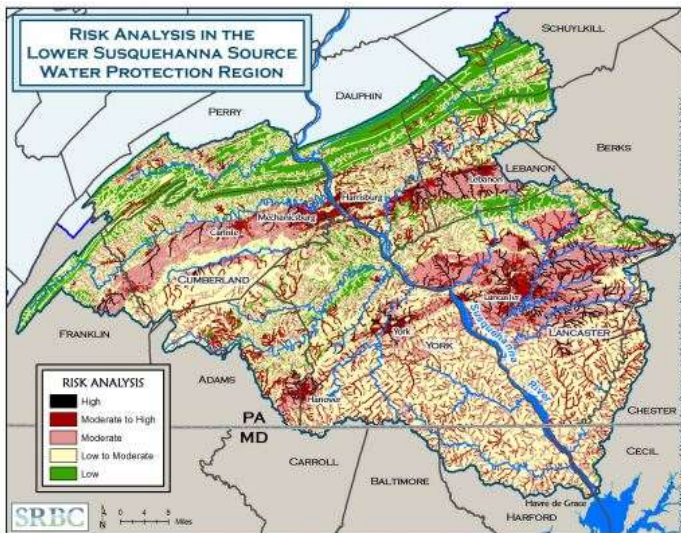
**Goal:** Waters throughout the Basin exhibit good quality.

**Objective B-2:** Increase protection for higher quality waters

**Project:** Lower Susquehanna Source Water Protection Program

**Location:** Lower Susquehanna River Subbasin

**Lead:** Jamie Shallenberger



**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 continues 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.

### Challenges:

- The Lower Susquehanna Subbasin is the most developed region of the Basin.
- Over 40% of the landscape contributes to an area captured by a PWS well/intake.
- Protection requires collaboration among a broad range of stakeholders.

### Milestones:

- Minimum of 4 steering committee meetings annually (Ongoing)
- Spring/Fall meeting of the entire partnership (Ongoing)
- Implementation of CU/SWP pilot project (June 2024)
- Five-year assessment of Lower Susquehanna CIM stations (June 2024)

**Funding:** U.S. Environmental Protection Agency 106 Grant Program

# Water Resources Program

Fiscal Years 2022 – 2024

## Priority Management Area B: Water Quality

**Goal:** Waters throughout the Basin exhibit good quality.

**Objective B-3:** Restore impaired waters

**Project:** Chiques Creek Restoration Initiative

**Location:** Chiques Creek Watershed, Lancaster County, Pennsylvania

**Lead:** Jamie Shallenberger



**Description:** In 2015, a partnership was formed among the Pennsylvania Department of Environmental Protection (PADEP), Penn State University Agriculture and Environment Center, SRBC, other organizations, and a committed group of local stakeholders with goals of restoring aquatic life use impairments throughout the watershed and reducing pollutants that reach Chesapeake Bay. Momentum fostered by the partnership continues to accelerate the implementation of conservation practices, stormwater best management practices, and stream restoration – particularly in conjunction with the management of legacy sediment accumulated at old mill dams.

### Challenges:

- Over 95% of stream length in the watershed is impaired for Aquatic Life Use.
- The watershed has among the highest yields for sediment and nutrient pollutants.
- Nearly 75% of the watershed area consists of agriculture and urban land uses.

### Milestones:

- Phosphorus Total Maximum Daily Load submittal to PADEP (December 2021)
- 9-Year Continuous Instream Monitoring (June 2024)
- Dam removal case study evaluation (June 2024)

**Funding:** PADEP Total Maximum Daily Load Grant, Clean Water Act Section 106 Grant

# Water Resources Program

Fiscal Years 2022 – 2024

## Priority Management Area B: Water Quality

**Goal:** Waters throughout the Basin exhibit good quality.

**Objective B-4** Remediate abandoned mine drainage and lands

**Project:** Morris Run Abandoned Mine Drainage Treatment Plant

**Location:** Tioga River Watershed, Tioga County, Pennsylvania

**Lead:** Thomas Clark



**Description:** In 2019, SRBC was awarded a contract from the Pennsylvania 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.

### Challenges:

- Designing the most efficient mine pool water conveyance system for the treatment plant.
- Securing landowner permissions and land acquisition.

### Milestones:

- RFP for Design Consultant (November 2021)
- Final treatment plant design (December 2022)
- Construction RFP (July 2023)

**Funding:** PA Department of Environmental Protection, Bureau of Abandoned Mine Reclamation

# Water Resources Program

## Fiscal Years 2022 – 2024

### Priority Management Area C: Flooding and Drought

**Goal:** Communities are more resilient to flooding and drought.

**Objective C-1:** Expand use of climate projection information

**Project:** HyperFacets Climate Science Research Project

**Location:** Susquehanna River Basin

**Lead:** John Balay

**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.

#### Co-Produced Climate Science in 4 Key Water Regions



Both research projects will provide valuable climate science insight and data for informing SRBC’s water resources planning and management efforts.

#### Challenges:

- Bridging the gap between climate science experts and water management practitioners.
- Translating climate model results to actionable water management regulations, policies, and plans.

#### Milestones:

- Results for 1960s drought and rain on snow flooding story lines (September 2021)
- Publications on drivers and characteristics of future floods and droughts (June 2022)
- Quarterly stakeholder meetings and annual workshops (December 2022)
- Final project report and data (March 2023)

**Funding:** General Fund



# Water Resources Program

## Fiscal Years 2022 – 2024

### Priority Management Area C: Flooding and Drought

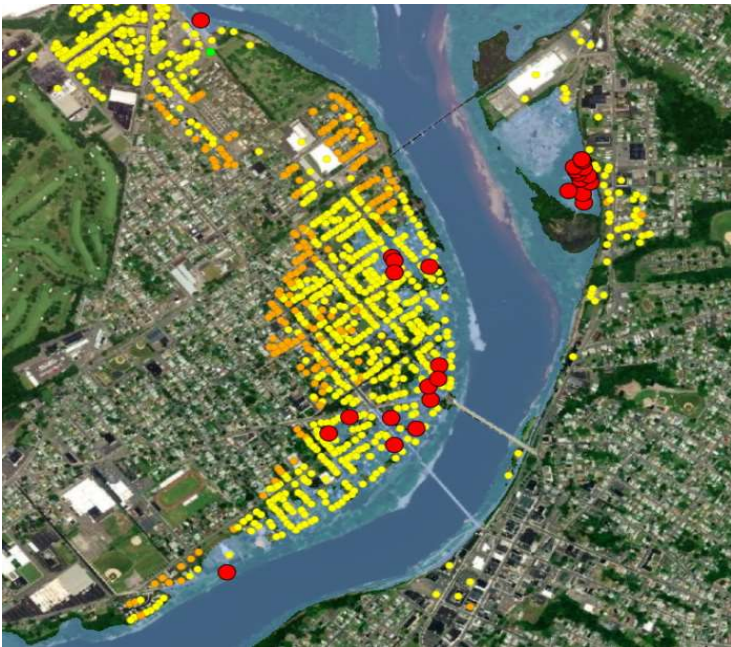
**Goal:** Communities are more resilient to flooding and drought.

**Objective C-2:** Improve community flood warning and response

**Project:** Susquehanna Flood Warning and Response System

**Location:** Susquehanna River Basin

**Lead:** Ben Pratt



**Description:** Originally developed to serve riverine communities protected by the Wyoming Valley Levee System, SRBC, in partnership with USACE and others, completed Version 1.0 of the Susquehanna Flood Warning and Response System. The online toll provides expected damages associated with various levels of flooding as well as response actions related to forecast stage. This project will expand the functionality and accessibility of Version 1.0 by developing additional reporting features and incorporating additional communities with available inundation map libraries. Providing a tool such as this to community officials and stakeholder agencies facilitates hazard mitigation planning, flood event response, and recovery after an event.

#### Challenges:

- Data collection and processing.
- Engaging community partners.
- Supportive infrastructure.

#### Milestones:

- Project scoping (June 2022)
- Community data collection (October 2022)
- Damage assessments (March 2023 )
- Online Functionality enhancements (September 2023)

**Funding:** General Fund

# Water Resources Program

## Fiscal Years 2022 – 2024

### Priority Management Area C: Flooding and Drought

**Goal:** Communities are more resilient to flooding and drought.

**Objective C-3** Enhance local flood risk assessment

**Project:** Middle Susquehanna Flood Mitigation Project

**Location:** Middle Susquehanna River Subbasin

**Lead:** Ben Pratt



**Description:** SRBC, working in partnership with the Pennsylvania Emergency Management Agency, will identify flood mitigation projects eligible for Federal funding within impacted communities and watersheds. The project will prioritize nature-based solutions if feasible and will also consider more traditional flood mitigation/hazard reduction efforts. This effort will target communities with elevated flood risk in the Pennsylvania counties of Bradford, Columbia, Lackawanna, Luzerne, Lycoming, Montour, Northumberland, Snyder, Sullivan, Susquehanna, Tioga, and Wyoming.

#### Challenges:

- Managing partner timelines and expectations.
- Establishing positive benefit/cost.
- Demonstrating flood hazard reduction.

#### Milestones:

- Grant agreement (September 2021)
- Community engagement (September 2022)
- Project identification/conceptual design (December 2022)
- FEMA grant application (September 2023)

**Funding:** PEMA Advanced Assistance Grant

# Water Resources Program

## Fiscal Years 2022 – 2024

### Priority Management Area C: Flooding and Drought

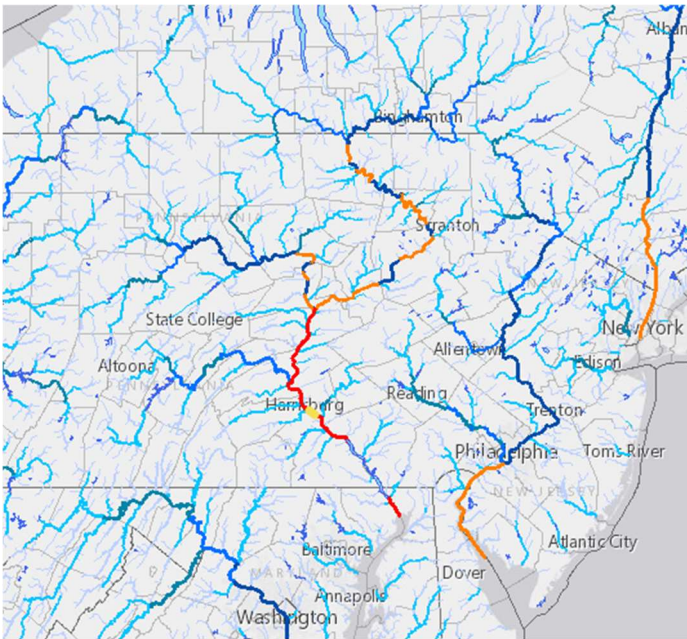
**Goal:** Communities are more resilient to flooding and drought.

**Objective C-3:** Enhance local flood risk assessment

**Project:** National Water Model Flood Inundation Mapping

**Location:** Susquehanna River Basin

**Lead:** Ben Pratt



**Description:** Leveraging a long-standing partnership with NOAA National Weather Service, SRBC will work to operationalize recent advancements in the National Water Model and related inundation map products. The project will involve evaluation, testing, and calibration of National Water Model output and related inundation map products and seek to integrate the same into SRBC's non-structural flood risk reduction efforts. Of particular interest will be developing capability to generate and disseminate "on the fly" inundation map products which are both accurate and easily accessible to communities where no river forecast is currently available.

#### Challenges:

- Project partner timelines and access to NWM products.
- Appropriate dissemination platform.
- Flood events to test mapping.

#### Milestones:

- NWS Engagement (March 2023)
- Map Calibration Assistance (December 2023)
- Develop internal routines (June 2024)

**Funding:** General Fund

# Water Resources Program

## Fiscal Years 2022 – 2024

### Priority Management Area C: Flooding and Drought

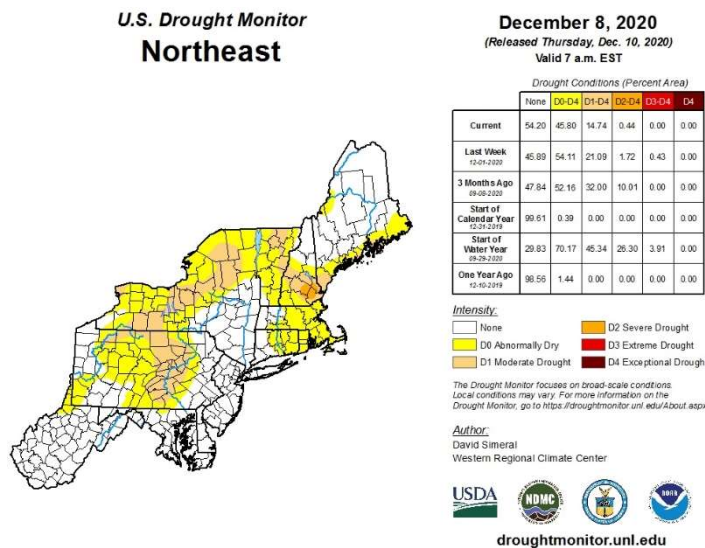
**Goal:** Communities are more resilient to flooding and drought.

**Objective C-4:** Advance drought monitoring and early warning

**Project:** Drought Management Strategy Update

**Location:** Susquehanna River Basin

**Lead:** Ben Pratt



**Description:** SRBC’s Drought Coordination Plan describes the agency’s drought management authority, drought watch, warning, and emergency stages, monitoring data and criteria for determining drought stage, and drought response actions by SRBC and partner agencies. Since adoption of the plan in 2000, monitoring networks have changed, data portals have improved, new drought indicators have emerged, and climate science research has provided new insights. Accordingly, there is a need to update SRBC’s drought monitoring, early warning, and management procedures and tools to increase drought preparedness in the Basin.

### Challenges:

- Identifying drought monitoring/management gaps and collaborating with partners to address them.
- Engaging with vulnerable water users as a partner, not just a regulator.
- Exchanging sensitive but critical water supply status and impact data.
- Incorporating forecast information into drought planning and operations.

### Milestones:

- Conduct outreach to key water use sectors (December 2022)
- Improve drought monitoring network and tools (December 2023)
- Update drought management plan (June 2024)

**Funding:** General Fund

# Water Resources Program

Fiscal Years 2022 – 2024

## Priority Management Area D: Watershed Management

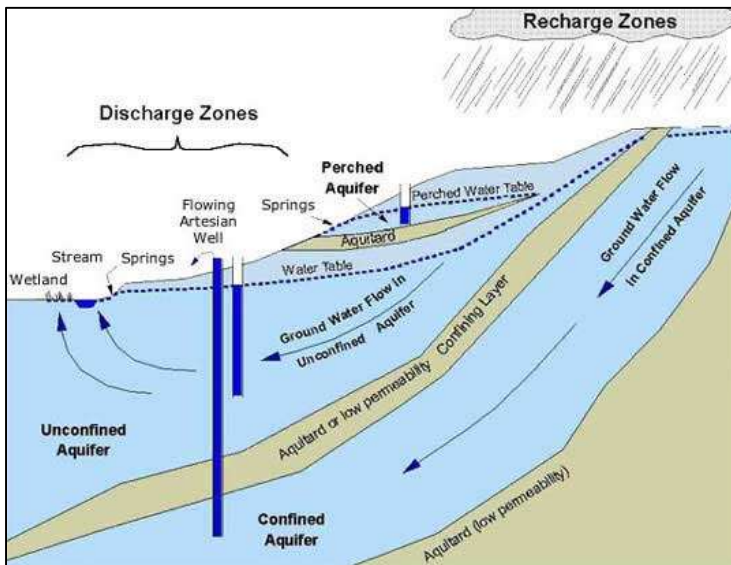
**Goal:** Watersheds exhibit a healthy and sustainable balance between land and water management.

**Objective D-1:** Protect Critical Aquifer Recharge Areas

**Project:** Critical Aquifer Recharge Area Pilot Projects

**Location:** Susquehanna River Basin

**Lead:** Pierre MaCoy



**Description:** Groundwater recharge is the primary means of ensuring water is available as base flow to streams and refill for aquifers. Different geologic materials, structures, or land uses impact groundwater recharge rates. This project aims to identify discrete areas of the Basin that provide greater recharge and are critical to maintaining adequate water supply. This will be accomplished by identifying areas of critical recharge, and developing preservation, restoration, or enhancement projects in these watersheds. Protecting and enhancing critical aquifer recharge areas (CARA) will help provide drought resiliency, enhance water quality, and preserve water supply for the future.

### Challenges:

- Complex surface and subsurface geology across the Basin.
- Quantifying increased aquifer recharge via enhancement and preservation projects.
- Land use changes and development can negatively impact aquifer recharge.

### Milestones:

- Evaluate CARA variable combinations and weightings (September 2022)
- Develop CARA geodatabase and maps for priority watersheds (December 2022)
- Validate CARA delineation results for select watersheds (March 2023)
- Finalize CARA maps for the basin and priority watersheds (June 2023)

**Funding:** Water Management Fund

# Water Resources Program

Fiscal Years 2022 – 2024

## Priority Management Area D: Watershed Management

**Goal:** Watersheds exhibit a healthy and sustainable balance between land and water management.

**Objective D-2:** Promote land use practices for improving local waters and the Chesapeake Bay

**Project:** Conowingo Watershed Implementation Plan

**Location:** Lower Susquehanna River Subbasin

**Lead:** Andy Gavin



**Description:** SRBC is assisting the Chesapeake Bay Program Partnership with development and implementation of a Watershed Implementation Plan (WIP) that will reduce pollutant loads delivered to the Bay because of lost trapping capacity in reservoirs of 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.

### Challenges:

- Identifying and implementing practices and projects in the Susquehanna Region that further reduce nitrogen and phosphorus loadings to the Bay beyond those practices identified in state WIPs.

### Milestones:

- Establish financing pilot structure (August 2022)
- Implement first pilot projects (January 2023)
- Complete project implementation for 2025 goal (December 2025)

**Funding:** Federal and state funds, as well as private investment

# Water Resources Program

Fiscal Years 2022 – 2024

## Priority Management Area D: Watershed Management

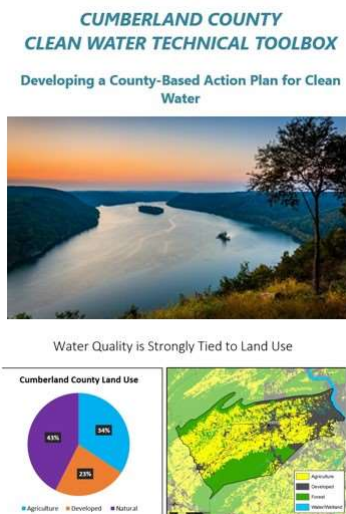
**Goal:** Watersheds exhibit a healthy and sustainable balance between land and water management.

**Objective D-2:** Promote land use practices for improving local waters and the Chesapeake Bay

**Project:** Pennsylvania County Watershed Implementation Plan Support

**Location:** Pennsylvania Portion of Susquehanna River Basin

**Lead:** Jamie Shallenberger



**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. SRBC furnishes key technical and logistical support to local WIP-related action teams, state agencies, and USEPA. Since 2018, SRBC 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.

### Challenges:

- Activities expected to achieve pollution reduction targets are under-funded.
- Projects and programs needed to reach Phase 3 WIP targets are required by 2025.
- Changing climate conditions.

### Milestones:

- 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)

**Funding:** Clean Water Act Section 117e Grant

# Water Resources Program

Fiscal Years 2022 – 2024

## Priority Management Area D: Watershed Management

**Goal:** Watersheds exhibit a healthy and sustainable balance between land and water management.

**Objective D-3:** Improve environmental flow management

**Project:** Federal/State Reservoir Environmental Flow Enhancements

**Location:** Susquehanna River Basin

**Lead:** Can Liu / Graham Markowitz



**Description:** Federal- and State-owned reservoirs within the Basin are primarily operated for flood risk management, water supply, low flow augmentation, and/or recreation purposes. Reservoir operations used to support these purposes can sometimes produce altered flow regimes downstream. SRBC and the United States Army Corps of Engineers (USACE) have partnered on a study to explore environmental flow enhancements at federally operated reservoirs in the Basin. SRBC is also seeking a partnership with PADCNR to explore similar improvements at State-owned impoundments. Specific criteria used to assess benefits and impacts of operational enhancements include, but are not limited to, consistency with project purposes, SRBC regulations and policy, The Nature Conservancy's (TNC's) Ecosystem Flow Recommendations, and maintenance of downstream aquatic habitat.

### Challenges:

- Finding balance between ecosystem improvements, recreational impacts, and operational constraints.
- Defining acceptable levels of risk regarding in-lake impacts.
- Developing interagency partnership(s) and addressing shared goals.
- Implementing meaningful and impactful environmental flow alternatives.

### Milestones:

- Finalize USACE/SRBC environmental flow recommendations report (December 2021)
- Draft SRBC/DCNR state park lakes study agreement (December 2022)
- Convene state park lakes scoping meetings and develop work plans (June 2023)
- Implement USACE/SRBC environmental flow recommendations (June 2024)

**Funding:** Water Management Fund



# Water Resources Program

Fiscal Years 2022 – 2024

## Priority Management Area D: Watershed Management

**Goal:** Watersheds exhibit a healthy and sustainable balance between land and water management.

**Objective D-4:** Restore native migratory fish to historic ranges

**Project:** Hydroelectric Dam Fish Passage Upgrades

**Location:** Susquehanna River Hydroelectric Facilities

**Lead:** Aaron Henning



**Description:** SRBC 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 license and docket conditions to achieve success.

### Challenges:

- Declining migratory fish stocks.
- Balancing migratory fish passage with invasive species management.

### Milestones:

- Conowingo Dam fish lift improvements (Through June 2024)
- Holtwood Dam fish passage studies and refinements (Through June 2024)
- York Haven Dam nature-like fishway installation (Through June 2024)
- Colliersville Dam American eel passage facilities installation (December 2024)

**Funding:** General Fund

# Water Resources Program

Fiscal Years 2022 – 2024

## Priority Management Area D: Watershed Management

**Goal:** Watersheds exhibit a healthy and sustainable balance between land and water management.

**Objective D-6:** Improve resiliency of the hydrologic landscape

**Project:** Stormwater Management Pilot Projects

**Location:** Susquehanna River Basin

**Lead:** Jamie Shallenberger



**Description:** Today’s stormwater management programs must address multiple objectives: flood control to protect public health and reduce property damages, water pollution reduction to protect drinking water and natural habitats, public water supply availability, and healthy streamflows to protect ecosystems and recreational resources. As such, stormwater management lends itself to collaborative partnerships and approaches that meet multiple objectives and make it more affordable. More recently, SRBC began identifying and implementing practices that address both water quality pollution and concerns related to nuisance flooding, deprivation of groundwater recharge, and other stormwater-related impacts.

### Challenges:

- Financial resources to tackle typically expensive projects.
- Logistics associated with implementing projects in developed areas (utility lines, property access, etc.).

### Milestones:

- Complete the Hampden Township Delbrook project (December 2022)
- Select next pilot stormwater projects from CU mitigation grant applications (February 2023)

**Funding:** State/local funding, Water Management Fund

# Water Resources Program

## Fiscal Years 2022 – 2024

### Priority Management Area D: Watershed Management

**Goal:** Watersheds exhibit a healthy and sustainable balance between land and water management.

**Objective D-6:** Improve resiliency of the hydrologic landscape

**Project:** Kehm Run Dam Removal and Restoration Project

**Location:** York County, Pennsylvania

**Lead:** Pierre MaCoy



**Description:** SRBC and American Rivers have partnered to remove a high hazard dam along Kehm Run and restore floodplains and wetlands, as well as address offsite stormwater issues. This project is proposed under the Environmental and Water Quality Alternatives in SRBC’s Consumptive Use Mitigation policy. This project will consist of removing a hazard dam, restoring the stream channel, and reconnecting floodplains and wetlands. An offsite stormwater issue will be addressed to decrease sedimentation and provide groundwater recharge. The project will be completed in three phases: 1) Dewatering and initial dam breach; 2) Removing remaining embankment and stable channel excavation; 3) Restoring stream channel and wetlands and addressing legacy stormwater concern.

#### Challenges:

- Multiple stakeholders for land ownership and use.
- Legacy sediment issues exacerbated by adjacent stormwater concerns.
- Long-term monitoring and maintenance.

#### Milestones:

- Dewatering and initial dam breach (March 2020)
- Final dam removal and channel stabilization (December 2021)
- Stream, wetland, and stormwater improvements (June 2023)
- Long-term monitoring and maintenance (Through June 2024)

**Funding:** Water Management Fund

# Water Resources Program

Fiscal Years 2022 – 2024

## Priority Management Area D: Watershed Management

**Goal:** Watersheds exhibit a healthy and sustainable balance between land and water management.

**Objective D-6:** Improve resiliency of the hydrologic landscape

**Project:** Integrated Watershed Management Pilots

**Location:** Dauphin, Northumberland, Schuylkill, Lancaster Counties, Pennsylvania

**Lead:** Andy Gavin



**Description:** The Commission will conduct pilot studies of water quality and sustainable water availability and use for the Wiconisco, Mahantango and Little Conestoga watersheds with special 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 face pressure from agricultural operations with irrigation needs for potato growing. The Little Conestoga 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 meets existing needs while also plan for the

sustainable use of water resources into the future.

### Challenges:

- Increased water use demands with competing users and need for balancing aquatic ecosystem impacts.
- Increased growth and development.
- Additional stress to water resources resulting from impaired water quality.

### Milestones:

- Conduct background assessments (September 2023)
- Formulate work plans for each pilot watershed (December 2023)

**Funding:** Water Management Fund