



Lancaster Countywide Action Plan

A Strategy for Restoring Lancaster's Waterways

REVISED SEPTEMBER 2021







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City of Lancaster stormwater staff lead a Green Infrastructure Bike Tour during Lancaster Water Week. Lancaster Water Week is a public awareness campaign that celebrates Lancaster's 1,400 miles of streams and rivers.



Michelle Johnsen, Courtesy of Lancaster Conservancy

Lancaster County streams have the biggest restoration opportunity of any monitored areas of the Chesapeake Bay watershed. With a mixture of rural, suburban, and urban landscapes, the sources for water pollution are broad – but, so are the opportunities for conservation and restoration.

Introduction

More than half of Lancaster County's 1,400 miles of streams, and much of its groundwaters, are unhealthy. Because of this, the Environmental Protection Agency designated the county as a priority area to reduce nitrogen and phosphorus loads by 2025. The Lancaster Countywide Action Plan (CAP) outlines Lancaster's path for reducing 11.7 million lbs. of nitrogen and 524,000 lbs. of phosphorus by the 2025 deadline.

Developed through a grassroots approach, the CAP embraces collaboration and scientifically-based practices as the main strategies for achieving ambitious, yet realistic, reduction goals. The plan includes a diverse collection of conservation practices on different land uses in the county.

This revised version of the CAP emphasizes Lancaster's progress, as well as the lessons learned and new strategies to meet our reduction goals by 2025. Based on scenarios run through the Bay model in summer 2021, the combination of those conservation practices is expected to meet 75 percent of the nitrogen reduction goal and 92 percent of the phosphorus reduction goal. Progress is consistent and exciting. New data from each project will influence those percentages every year. While reviewing, readers should note that the Bay model used to create the CAP in 2018 was recently updated.

The update caused slight changes to the nitrogen, phosphorus, and sediment reductions associated with the conservation practices included.

In the end, achieving these high reduction numbers will be a huge success for Lancaster County and the Chesapeake Bay watershed.

Progress tracked at the state level for all best management practices (BMPs) is current as of June 2019. The CAP Coordinator Team has used local project tracking since then to guide the planning efforts. ALL projects and practices will ultimately be counted towards the CAP.

In addition to the Lancaster Clean Water Partners and the Lancaster County Conservation District, the Lancaster CAP is managed by the CAP Coordinator Team, including: David Miller/Associates, Lancaster Farmland Trust, and LandStudies.

Thank you to all organizations, companies, and individuals working in Lancaster to make this work possible! A special thank you to those that contributed to revising this narrative.





Preserved farmland in Lancaster County. The farm was preserved with guidance and assistance from Lancaster Farmland Trust. Lancaster Farmland Trust explores and implements an innovative, acceleratory approach to water quality improvement that couples two proven strategies – the permanent protection of farmland and the implementation of conservation practices on agricultural lands. Linking together the permanent preservation of strategic agricultural lands with the implementation of cost-effective, priority agricultural practices will achieve maximum long-term impact on water quality in Lancaster County and in the Chesapeake Bay watershed.



Lancaster Farmland Trust

Plan Highlights

The CAP was originally developed in 2018 through a significant and collaborative grassroots approach with local partner organizations, experts, community members, and state agencies. Now, with nearly two years of implementation efforts, this revised version of the plan emphasizes Lancaster's progress, as well as detailing lessons learned and new strategies to meet our reduction goals by 2025.

Revisions include the consolidation of several initiatives to eliminate redundancy and duplicative efforts. The updated plan now reflects a more distinct, iterative process. The revised plan guides and invites all partner organizations to respond to new opportunities, funding streams, and changing conditions.

The CAP is centered around the following priority initiatives:

1. Agriculture
2. Stormwater
3. Riparian buffers
4. Data management and monitoring

Each initiative has an Action Team working in that focus area. Additional teams and working groups exist to support individual or multiple priority initiatives (e.g. Watersheds and Communication Action Teams). In addition, the CAP calls out programmatic and policy elements that are necessary at a state and local level for success in multiple areas.

The CAP implementation is led by the Lancaster Clean Water Partners (the Partners) and the Lancaster County Conservation District with technical support provided by the CAP Coordinator Team. The Partners' Steering Committee is a diverse, multi-sector leadership team that provides overarching strategic and visionary guidance for the collective effort, which includes CAP implementation.

Additionally, the Steering Committee and/or the CAP Coordinator Team provides oversight to, and management of, related CAP considerations and functions including, but not limited to:

- Identifying and securing long-term, dedicated funding for CAP management

- Creating and managing coordination and collaboration opportunities for partners
- Driving programmatic and policy change
- Managing project implementation funding
- Providing administrative support, communications, and outreach management to each Action Team



East Cocalico Township in northern Lancaster County stabilized 265 feet of streambanks and planted a 75 foot wide riparian buffer along a section of Stony Run, a small stream adjacent to the township building. A previous lack of adequate vegetation along the stream led the streambanks to become severely eroded. This project will prevent an estimated 30,475 lbs. of sediment from entering the stream each year. When the trees planted are sufficiently established, they will be used to cut live stakes suitable for other streambank stabilization projects elsewhere in the township.



Kenn McCrea, East Cocalico Township



(Top photo) Members of Blackbirds Environmental Justice group pose after a morning of lead awareness canvassing with the City of Lancaster. Blackbirds Environmental Justice creatively and boldly support water, food, energy, and waste equity in the pursuit of environmental justice for marginalized communities, and to inspire the next generation of environmental activists from the global community.

(Left, Above) Carly Dean, Action Team member and co-lead, helped plant 2.5 acres of riparian forest buffer along the Little Conestoga Creek at Manheim Township’s Overlook Park. The trees will annually filter out an estimated 59 lbs. of nitrogen, 2.6 lbs. of phosphorus, and 3,471 lbs. of sediment.



Zeshan Ismat, Blackbirds Environmental Justice
 Lauren Shaffer, Penn State Agriculture & Environment Center

Progress on Key Goals

In the table below, progress is displayed with a red, yellow, or green color in the left-most column. Red indicates there has been little to no progress or we have encountered significant roadblocks. Yellow indicates that we have taken meaningful steps forward to achieve the goal and seen some success. Goals that are marked with yellow are not entirely complete to date. Green indicates we have achieved the goal or gone above and beyond our intended outcome.

Continue building capacity by using the CAP Coordinator Team's strengths and skills

The CAP Coordinator Team really took shape in 2020-2021, developing new processes and systems to manage implementation dollars, lead data collection, complete required documentation to DEP, research creative funding and policy options, and manage outreach to landowners for implementation. Capacity grew to include specific projects, geographically precise outreach, and overall coordination of implementation efforts.

Work will continue into 2022 using lessons learned to improve the efficiency of the team.

Identify and secure long-term dedicated funding for CAP implementation

Funding increases came from federal, state, and regional sources for both implementation and capacity. However, the need remains to establish sustained sources of funding to ensure long-term success.

Work will continue into 2022 with more focus on exploring creative and collaborative municipal and agricultural financing opportunities, plus covering cost-share needs for landowners.

Continue to work within and implement the stream delisting strategy, which has already collected useful data for priority work and local demand

The rapid stream delisting strategy anchors the Partners' Regional Conservation Partnership Program (RCPP) project with \$7.4 million worth of support from NRCS. To lead work in each priority catchment, technical service providers known as catchment leads have started outreach and implementation support. Data tracking and mapping work is happening in innovative and collaborative ways thanks to the Chesapeake Conservancy.

More information on the rapid stream delisting strategy is available on our website under the *Get Involved* tab.

Work will continue into 2022 with more emphasis on signing landowners up for implementation practices. The Partners were also awarded funding from the National Fish and Wildlife Foundation (NFWF) to work in priority catchments that are at the unique intersection of agriculture and urban/suburban land use to advance the delisting strategy.

Document and share success stories

The Partners and partner organizations continue to increase efforts to tell Lancaster's clean water story, highlighting successes in implementation and collaboration.

Work continues in 2022: Expand communications through increased documentation and sharing of success stories in multiple mediums, grow the impact of Lancaster Water Week, and other efforts.

Ensure all partner organizations can and do use custom tools like the Collaborative Watershed Mapping Tool and FieldDoc for better collaboration and crediting

On a regular basis, partners are using the latest version of the Collaborative Watershed Mapping Tool released in spring 2021 (approximately 1,000 total views and 700 unique views since September 2020). In addition to updating the tool, the Chesapeake Conservancy created user guides and a video to show new layers within the tool and best ways to use it. The user guide video has more than 40 views.

More information on the Collaborative Watershed Mapping Tool is available on our website under the *Resources and Tools* tab.

Work continues into 2022: With dollars from NFWF (announced in 2021), the Partners have sub-granted to the Chesapeake Conservancy and Water Science Institute to create new data layers for the tool including tree canopy and erosion rate layers. These will help all partner organizations do more strategic implementation across the county.

Plant and maintain 1000 new acres of riparian buffer every year and bring on the appropriate staff capacity to do so across partner organizations

The Buffer Action Team and technical service providers have been hard at work planting riparian forest buffers across the county. In fall and spring 2021 planting seasons, the Buffer Action Team estimates planting approximately 120 new acres of buffers. Additionally, through the Buffer Establishment Support Team (BEST), the Partners maintained 32 acres of new buffers for two years. There is still unmet demand from landowners for more buffers and maintenance especially after intense weather events, and we need to keep that pipeline of projects flowing.

Our partnership is thankful to have staff dedicated to buffer implementation and maintenance across multiple organizations, i.e. Lancaster County Conservation District, Alliance for the Chesapeake Bay, and Chesapeake Bay Foundation.

Work to continue in 2022 by driving the expanded awareness and implementation of riparian buffers through scaled up public outreach efforts, larger maintenance program, and accurate tracking system.

Use the pre-application meeting opportunity on a regular basis to support an increased pace for permits and project implementation

The Partners increasingly took advantage of this unique opportunity to facilitate faster implementation by bringing at least five projects to the weekly meeting with DEP's South Central Regional Office and directing appropriate projects to the Conservation District staff for a similar opportunity related to local permits.

Work continues into 2022: In 2022, we will focus on sharing this opportunity with more technical service providers and organizations to increase implementation.

Lean on local expertise to align ordinance and easements across the county

Partner organizations have examined riparian buffer ordinances and overlays in the Susquehanna Riverlands area, but are leaning into expertise from neighboring groups, such as the Brandywine Conservancy. The Lancaster County Department of Planning continues to prioritize the need for ordinances and work with partners that educate landowners about the value of easements.

Work continues into 2022 as municipalities and watershed associations work regionally or by watershed for comprehensive planning and aligned CAP goal implementation.

Publish the Resource Inventory, produced by Penn State, of all partner organizations across the county

The Partners & Resource Inventory was completed in March 2021. Since then, the Center for Watershed Protection and Chesapeake Conservancy created a user-friendly map for the website showing all the organizations listed in the inventory, as well as their location and expertise. We shared these products with the Center for Water Quality Excellence as they conduct pilots in Lancaster and York counties.

Access the Partners & Resource Inventory on our website under the *Resources and Tools* tab.

Work to continue in 2022: We will continue to update the Partners & Resource Inventory and add additional information where needed. As needs from partner organizations emerge regarding the inventory, we will address them as appropriate and where capacity is available.

Successfully manage the CAP Implementation Grants

Even amongst COVID-related delays, we successfully implemented the 2020 CAP implementation grant for \$699,000 for nine projects by the deadline. Over 85% of the 2021 funds (totaling \$2.1 million) have been allocated and projects are on-track for implementation.

Work to continue in 2022: We will continue to successfully allocate and manage the CAP implementation dollars from DEP and other implementation-focused dollars.



Volunteers work together to clean up trash from the Conestoga River during Lancaster Water Week. The event was organized by the Alliance for the Chesapeake Bay with multiple participating partners at sites throughout the county. Lancaster Water Week is a public awareness campaign hosted by the Lancaster Conservancy that celebrates Lancaster's 1,400 miles of streams and rivers.



Michelle Johnsen, Courtesy of Lancaster Conservancy

Opportunities & Successes

Collaborative Spirit

In alignment with our value and commitment to collaboration not duplication, the Partners recognizes its most significant opportunity for successful implementation is its partner organizations and stakeholders. Continued collaboration with organizations and dedicated individuals throughout Lancaster County will allow us to achieve Bay-wide and local goals. Large, watershed-scale projects as well as the stream delisting strategy, both build and rely upon regional collaboration, a priority within our county comprehensive plan, Places2040. These are opportunities where we can grow.

In addition to our dedicated Steering Committee and multi-sector partner organizations, we are bringing new organizations, individuals, and full-time Partners employees to the table to increase diversity and capacity across our work.

A full list of partner organizations is available on our website on the *Who We Are* page, in addition to a comprehensive inventory of conservation organizations and resources in Lancaster County.

Celebrating Successes, Embracing Opportunities

Projects in the Ground

Lancaster is embracing a bias towards action with multiple manure storages, barnyard controls, and soil health practices being implemented on farms, all benefitting local water quality as well as the farmer's bottom line. Over 250 stormwater projects have been installed in the last two years alone and include vegetated swales and rain gardens that not only filter runoff but also absorb floodwater and protect vital infrastructure. More developers are embracing floodplain restoration projects as part of a land use plan that also improves economic development and local water quality. The hundreds of acres of trees, shrubs, and cover crops we've planted increases filtration, which purifies the groundwater we drink, protecting our community's public health. But the need for more implementation remains and the demand from our community is growing. Funding sources like the CAP Implementation Grant (a.k.a. Implementation Large Grant through the

Lancaster Clean Water Fund) provide flexibility to install the kinds of projects described above that implement the CAP effectively. We need even more implementation support for both projects and people between now and 2025.

Rapid Stream Delisting Strategy

With a goal of delisting 350 miles of stream by 2030, the Partners officially launched the rapid stream delisting strategy in April 2021 with the announcement of the Partners' RCPP proposal being accepted at \$7.4 million. Since then, catchment leads have been identified and started working in nine priority catchment areas. Additionally, NFWF funding awarded in 2021 that was also based on the rapid delisting strategy will accomplish three stormwater-focused implementation projects in priority catchment areas, plus build capacity across multiple partners.

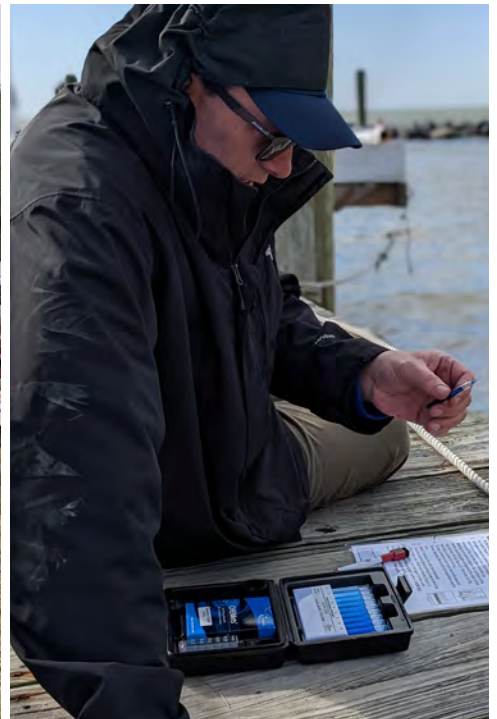
Clean and Clear Water for All Lancastrians

In May 2020, our communities witnessed blossoming demand for diversity, equity, inclusion, and justice (DEIJ) following the death of George Floyd. The Partners lived up to its commitments to start a DEIJ advisory committee, discuss DEIJ efforts with the Steering Committee, and continue to learn independently and together. Additionally, we added DEIJ as an official value of the Partners. But our work continues. Throughout the rest of 2021 and into 2022, we will continue to discuss DEIJ efforts with partner organizations and stakeholders to determine needs and efforts. We will collaborate with organizations working in diverse, underserved communities to expand our clean water resources and implementation.

Can you see our shared values in action clearly in YOUR work?

- 1 Collaboration not duplication
- 2 Operate with a bias towards action
- 3 Trust
- 4 Clean and clear water for all Lancastrians
- 5 Transparency

Learn more on the *Who We Are* page on our website: www.lancastercleanwaterpartners.com.



Scholars in the Lancaster Watershed Leadership Academy attend monthly classes across Lancaster County. Eight scholars will complete their leadership journeys in December 2021, becoming the next generation of clean water leaders. Scholars have learned the basics of watershed management, applying BMPs on differing land uses, how to work with varying leadership styles and personalities, and how to lead clean water projects.

Learn more about the Academy and its scholars on our website under the Get Involved tab.



Allyson Gibson and Matt Royer, instructors for the Lancaster Watershed Leadership Academy

Next Generation of Leaders

This year, eight scholars will complete their leadership journeys in the Lancaster Watershed Leadership Academy to become the next generation of clean water leaders in Lancaster County. Scholars have learned the basics of watershed management, applying BMPs on differing land uses, how to work with varying leadership styles and personalities, and how to lead clean water efforts. Scholars have designed an Action Project to assist in getting Lancaster waterways closer to being clean and clear by 2040. Action Projects focus on implementation as well as educational events and outreach. With funding from NFWF (acquired in summer 2021), the Academy will open applications for the next cohort of scholars in mid-2022 and expect to start classes in early 2023.

Consistent Communications

To put our value of trust and transparency into practice, we continued to improve our website and social media presence, and started sending monthly emails to partners and stakeholders with key updates, opportunities, and resources. We successfully shared implementation success stories from partner organizations and Clean Water Fund grantee projects. This work will continue into 2022 with increased prioritization. Additionally, we communicated via the Menu for Success to document ways partner organizations can contribute to the CAP goals through big and small efforts. To create a common understanding of how we can continue to collaborate successfully, we put pen to paper to write out values for our partnerships. In October 2021, the Partners launched a public opinion survey focusing on clean water issues and resources in the county. Those results will assist greatly in focusing communication efforts to achieve the CAP. The newly relaunched Communications Action Team played a large role in crafting the survey questions and will assist in using the data in future communication efforts.

Sustainable Funding

The Partners continue to navigate Lancaster's collective approach to sustainable funding sources. Multiple funding opportunities have grown or taken shape as a result of the CAP, highlighting Lancaster's bias towards action. Action requires funding, so the Partners have provided shared language for partner organizations to use in grant applications to demonstrate our collective approach. These funding opportunities, among others, are examples of ways

Lancaster groups use funds to get projects in the ground quickly. And they can easily show in an application how projects will support the CAP. In August 2021, the Partners applied for dollars to fund a Finance Director position. This full-time employee will strategize sustainable funding opportunities to accomplish the CAP.

Communicating Our Approach


Sparked by the CAP work and the rapid delisting strategy, the Partners were given the opportunity to share Lancaster's unique work for clean water in over 15 presentations. Audiences included the Chesapeake Bay Commission, Pennsylvania's Watershed Implementation Plan Steering Committee, Environmental Protection Agency (EPA), Lancaster County's Ag Council, and our neighboring county in Maryland that shares the Octoraro watershed with us. These presentations allowed us to amplify the collective voices for Lancaster's clean water efforts. The CAP efforts and successes from a collaborative approach was also shared through the Lancaster County Clean Water Consortium's MS4orum, Stormwater Action Team Lunch & Learn webinars, Lancaster Water Week, and Riparian Buffer Month.

The Partners thrives because of the immense dedication and collaboration from our partner organizations. They are at the center of our shared mission: Rapidly accelerate and expand the ability of the partner organizations to restore and sustain healthy Lancaster County waterways.

In addition to official partnerships, there are several organizations working within Lancaster on conservation projects and strategies. For more information on capacity and expertise, view Penn State Agriculture and Environment Center's Partners & Resource Inventory under the *Resources and Tools* tab on our website.



Partner organizations, including Penn State Agriculture and Environment Center and Economic Development Company of Lancaster County, enjoy a day kayaking on the Conestoga River. Kayaking was led by Todd Roy, founder and president of the Conestoga River Club. “Any day that begins with being on the water has the potential to be a great day. Add sharing that experience with others for the first time, it’s nearly impossible to not turn into a perfect day,” says Roy.

 Allyson Gibson, Lancaster Clean Water Partners

Challenges

More than half of Lancaster County's 1,400 miles of streams, and much of its groundwaters, are unhealthy. And with a nitrogen and phosphorus reduction goal that is 20 percent of the entire Commonwealth's goal, Lancaster County needs to be the driver of change. Acknowledging that "change can be disruptive, challenging, and exciting," we will tackle these challenges to achieve local as well as downstream successes. We've identified the following as challenges:

- Achieving such a large nitrogen and phosphorus reduction goal.
- We worked with limited capacity until February 2020, when the CAP Coordinator Team, a Senior Adviser, and Communications and Program Manager started, which gave our implementation efforts a boost.
- As we worked to create buy-in for the updated plan and engage with local stakeholders, we did not have the official status of specific BMPs that go into the state's tracking system. Without sufficient data of current implementation rates or locations, strategic outreach and project selection suffered.
- A global pandemic put all field and in-person work on hold in spring 2020. The ripple effects of the shutdown continue, delaying certain aspects of work.
- A strained state budget raised concerns about the availability of traditional funding avenues for conservation work going forward.
- Historic state funding streams do not reflect the favorable, flexible conditions and timelines associated with the CAP Implementation Grants (a.k.a. Implementation Large Grant through the Lancaster Clean Water Fund).
- Because each situation, region, and landowner's needs are different, determining ways to engage the non-regulated community can be challenging.
- In 2018-19, the downturn in the agricultural commodity markets and the downright collapse of the dairy industry severely hampered landowner willingness and capacity to participate in projects and programs.
- Extreme weather, including 1,000-year storm events, impacted project sustainability and budgets.
- Dam removals and breaches that are not part of planned restoration projects contribute hundreds of thousands of pounds of unplanned sediment and nutrients flowing downstream.

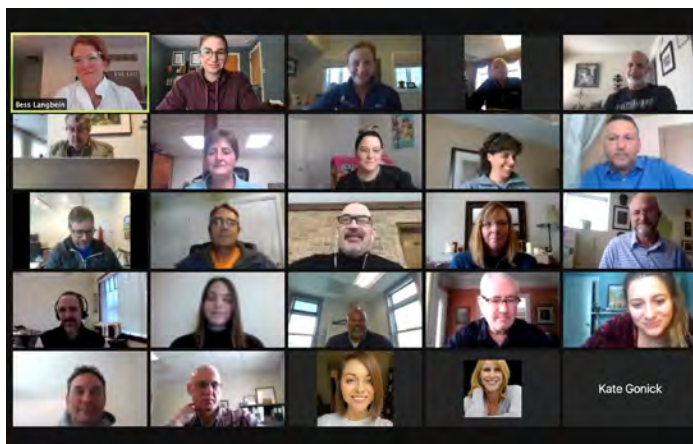
Resource Gaps

The largest resource gap is funding and exists across the priority initiatives outlined in the templates. At the on-the-ground implementation level, the gaps show up in various ways. They appear through a lack of implementation and construction dollars needed to match the scale of Lancaster County's demand, as well as not enough administrative time to put the overall implementation plan into place and manage grants, equipment, maintenance, programs, and policy.

Schedules and Timelines

With the COVID-19 outbreak in March 2020, field work and project implementation were put on hold or schedules and timelines were drastically shifted. Ripple effects continue to be felt through supply chain delays, price inflation, and backed up contractors. In-person field visits with landowners were also severely limited, which negatively impacted the reach that our intended education efforts would have achieved.

Prior to the pandemic, though, the CAP Coordinator Team was able to hit the ground running in February 2020. Meetings were held via Zoom and were productive as the team created new processes and systems to manage implementation dollars, lead data collection, complete



The Lancaster Clean Water Partners' Steering Committee and Action Teams came together in February 2021 for its first virtual annual retreat hosted by Due East Partners.



Screenshot by Emily Smedley, Lancaster Clean Water Partners

required documentation to DEP, research creative funding and policy options, and manage outreach to landowners for implementation. The team has become more efficient and created tools, templates, and processes that are now replicated across the state. CAP Implementation Grant dollars (a.k.a. Implementation Large Grant through the Lancaster Clean Water Fund) were allotted in early 2020. All projects will meet adjusted deadlines, finishing in fall 2021. Additional CAP Implementation Grant dollars were added in early 2021. Eighty-five percent of funds were allotted by the end of summer 2021 with a deadline of mid-2023.

Policy and/or Programmatic Requests

The CAP includes several programmatic or policy recommendations, which would remove hurdles in the success of implementation efforts.

Fertilizer legislation approval: A large portion of our phosphorus reductions are tied to the fertilizer legislation which would limit urban and suburban nutrient application. This legislation has been proposed for over 10 years, but the time is now for it to become reality so we get closer to clean and clear water.

Sustainable funding: The Partners continue to navigate Lancaster's collective approach to sustainable funding sources. Multiple funding opportunities have grown or taken shape as a result of the CAP highlighting Lancaster's bias towards action. Action requires funding, so the Partners have provided shared language for partner organizations to use in grant applications to demonstrate our collective approach. These funding opportunities, among others, are examples of ways Lancaster groups use dollars to get projects in the ground quickly. And they can easily show in a grant application how projects will support the CAP. The Partners are looking ahead at options and adding capacity to formally strategize sustainable funding that will expand the impact of all our partners that work tirelessly to accomplish the CAP.

Verification process for BMP implementation: The lack of clarity around the required steps, timing, and mechanisms makes verifying BMP implementation difficult. But without verification, Lancaster County's progress towards meeting its pollutant reduction goals is not being accurately tracked.

Dam removal and restoration: Provide state-level regulatory and policy guidance that requires appropriately

significant restoration practices in conjunction with dam removals.

Long-term funding streams for Act 537 plans and Act 167 plan updates: Help align or incorporate water quality components related to local stream health and CAP efforts. Without these updates, the county is limited with regards to the policy-based drivers it can use to propel changes to them that will engage more municipalities and local communities.

Creation of Quality Assurance/Quality Control procedure for local water quality monitoring: Alignment of parameters, equipment, processes, etc. is needed to ensure we are measuring apples-to-apples across sectors and areas as well as connecting our work with established data experts.

Permit timing and flexibility: Long timelines and the strict nature of permit interpretations and approaches create consistent hurdles for project implementation. Weekly pre-application meetings with DEP as well as the Pennsylvanian's Guide to Permitting for Watershed Improvement Projects are much appreciated and have opened the door for faster processes in Lancaster County. MS4-specific flexibility referenced in the FAQ sheet is progress as well, specifically as it relates to agricultural BMPs within the urban area or the one-mile surrounding area. Continued support for these unique opportunities that municipal partners and individual landowners can take advantage of in Lancaster County will be needed as we move into the next permit cycle.

Continued support and leadership from PA's Chesapeake Bay Program Office: Thank you for the opportunity to work together and provide feedback in both directions.

Continued interagency work and support: Thank you for continued communication. We emphasize this need in order to collaboratively meet our common goals.



(Left) A new heavy use area and manure stacking area are installed at a farm in Lancaster County. The project was funded by the Conservation Excellence Grant (CEG), one of the newest grants available to farmers through the Lancaster County Conservation District. Three projects have been completed to date: implementation of a grassed waterway, construction of four terraces, and one project over \$100,000 that included a roofed heavy use area and manure stacking area. Nineteen CEG projects have been approved to date and will be implemented over the next two years. CEG has proven to be an incredibly successful grant program in Lancaster that is helping farmers improve their farm and local water quality!



Lancaster County Conservation District



Roger Rohrer holds an earthworm he found in a field of wheat planted with no-till methods on the farm he owns jointly with his two sons in Strasburg, Pa., on April 28, 2021. “As you’re tilling, that [earthworm] actually takes your poultry manure, your nutrients that are on top of the ground and works them down through the soil profile. And then the wheat roots, the corn roots will follow the cavity that these earthworms make. To me it’s a sign of healthy soil. Right there that’s exactly what no-till is all about right there—being able to get a good stand of the crop in amongst the residue that’s covering 90% of the soil surface.”



Photo by Will Parson, Chesapeake Bay Program

Plan Summary

Priority Initiative: Agriculture

The agricultural sector will require significant BMP implementation and be the key driving factor in achieving long-term success in reducing pollution. Agricultural BMPs are captured by this initiative.

Focus Areas

- Capture conservation plans and/or agriculture-related BMP reductions across platforms into PracticeKeeper.
- Eliminate the need for winter spreading.
- Explore digesters/manure treatment technologies at a variety of scales, learning from current success models as well as previously conducted research.
- Work in priority areas for contiguous projects that will improve local water quality and promote economic stability for farmers.
- Promote and assist with implementation of agricultural compliance, soil health, nutrient management, and manure management BMPs.
- Focus education and outreach on flood control, public health benefits, herd health, building legacy options for families, economics, and achieving compliance (including outreach activities with the Plain Sect community).
- Use the delisting strategy to drive priority locations.

Implementation Challenges

- COVID-related delays and limitations for both in-person meetings as well as supply chain issues
- Farmer buy-in or resistance (cultural shifts necessary)
- BMP implementation funding
- Conservation Plan capture and long-term verification processes
- Increase in extreme weather events
- Limited technical staff resources
- Shifts from dairy farming to other products

Opportunities for Success

- One-on-one farmer engagement
- Available acreage for increased cover crops, no-till/conservation tillage, and riparian buffers in agricultural areas
- Manure digester technology advancements
- A local incentive program(s)

- Improved manure transport reporting
- Balance the benefits of no-till with increased organic production practices
- Expanding dairy co-op and corporate engagement in conservation work
- Delisting catchment focus areas and increased funding for work in those areas

Resources for Implementation

Learn more on the *Who We Are* page on our website: www.lancastercleanwaterpartners.com.

Proposed Agricultural BMPs

Agriculture Compliance

- **Soil Conservation and Water Quality Plans (247,167 total acres):** Plans are a combination of agronomic, management and engineered practices that protect and improve soil productivity and water quality, and to prevent deterioration of natural resources on all or part of a farm. Plans must meet technical standards
- **Barnyard Runoff Controls (23 new acres):** This includes practices such as roof runoff control, diversion of clean water from entering the barnyard and control of runoff from barnyard areas.

Soil Health

- **High Residue Tillage Management (110, 570 total acres/year):** A conservation tillage routine that involves the planting, growing and harvesting of crops with minimal disturbance to the soil in an effort to maintain at least 60 percent crop residue coverage immediately after planting each crop
- **Conservation Tillage Management (78,129 total acres/year):** A conservation tillage routine that involves the planting, growing and harvesting of crops with minimal disturbance to the soil in an effort to maintain 30 to 59 percent crop residue coverage immediately after planting each crop
- **Traditional Cover Crops (43,559 total acres/year):** A short-term crop grown after the main cropping season to reduce nutrient losses to ground and surface water by sequestering nutrients. This type of cover crop may not receive nutrients in the fall, and may not be harvested in the spring.

- **Traditional Cover Crops with Fall Nutrients (100,000 total acres/year):** A short-term crop grown after the main cropping season to reduce nutrient losses to ground and surface water by sequestering nutrients. This type of cover crop is planted upon cropland where manure is applied following the harvest of a summer crop and prior to cover crop planting. The crop may not be harvested in the spring.
- **Commodity Cover Crops (11,241 total acres/year):** A winter cereal crop planted for harvest in the spring which does not receive nutrient applications in the fall. Any winter cereal crop which did receive applications in the fall is not eligible for nutrient reductions.
- **Prescribed Grazing (12,603 total acres):** This practice utilizes a range of pasture management and grazing techniques to improve the quality and quantity of the forages grown on pastures and reduce the impact of animal travel lanes, animal concentration areas or other degraded areas.



Expanded Nutrient Management

- **Core Nitrogen Nutrient Management (215,324 total acres):** Applications of nitrogen are made in accordance with certain elements as applicable (e.g. land-grant university recommendations, spreader calibration, manure analysis, etc.)
- **Core Phosphorus Nutrient Management (214,784 total acres):** Applications of phosphorus are made in accordance with certain elements as applicable (e.g. land-grant university recommendations, spreader calibration, manure analysis, etc.)
- **Nutrient Management-Nitrogen Rate (6,661 total acres):** Applications of nitrogen are made in accordance to all elements of the Nitrogen Core practice and an additional element from a list of options (e.g. Nitrogen applications are made using variable rate goals)
- **Nutrient Management-Phosphorus Rate (6,661 total acres):** Applications of phosphorus are made in accordance to all elements of the Phosphorus Core practice and an additional element from a list of options (e.g. Phosphorus applications are made using variable rate goals)
- **Nutrient Management-Nitrogen Placement (6,661 total acres):** Applications of nitrogen are made in accordance to all elements of the Nitrogen Core practice and an additional element from a list of options (e.g. Applications of inorganic nitrogen are injected into the subsurface or incorporated into the soil)
- **Nutrient Management-Phosphorus Placement (6,661 total acres):** Applications of phosphorus are made in accordance to all elements of the Phosphorus Core practice and an additional element from a list of options (e.g. Applications of inorganic phosphorus are injected into the subsurface or incorporated into the soil)



Lancaster Farmland Trust successfully launched a program linking preservation and conservation efforts across the county. This program offered funding to fast-track farmers on the preservation waiting list who opted to install BMPs simultaneously. Leveraging the \$490,000 from National Fish and Wildlife Foundation, LFT preserved five Lancaster farms and completed BMP implementation on those properties. Combined, these improvements will lead to the prevention of 13,703 lbs. of nitrogen, 1,176 lbs. of phosphorus and 572,338 lbs. of sediment from flowing into the Chesapeake Bay every year.



Lancaster Farmland Trust

total acres): Applications of phosphorus are made in accordance to all elements of the Phosphorus Core practice and an additional element from a list of options (e.g. Applications of inorganic phosphorus are injected into the subsurface or incorporated into the soil)

- **Nutrient Management-Nitrogen Timing (6,661 total acres):** Applications of nitrogen are made in accordance to all elements of the Nitrogen Core practice, and are split across the growing season into multiple applications
- **Nutrient Management-Phosphorus Timing (6,661 total acres):** Applications of phosphorus are made in accordance to all elements of the Phosphorus Core practice, and are split across the growing season into multiple applications



Manure

- **Manure Storage Facilities (263,088 New Animal Units (AUs)):** Any structure designed for collection, transfer and storage of manures and associated wastes generated from the confined portion of animal operations and complies with NRCS 313 (Waste Storage Facility) or NRCS 359 (Waste Treatment Lagoon) practice standards.
- **Manure Incorporation (10,000 total acres):** Manure is incorporated into the soil within a certain timeframe after application, and is dependent on level of soil disturbance (high vs. low).



Integrated System for Elimination of Excess

- **Manure Transport out of Lancaster County (149,536 total dry tons/year):** Transport of excess manure in or out of a county. Manure may be of any type—poultry, dairy, or any of the animal categories. Transport should only be reported for county to county transport.
- **Manure Treatment Technologies (20,000 total tons/year):** Thermochemical conversion (TCC) processes involving either combustion, gasification, and/or pyrolysis for livestock or poultry manure.

Agriculture Riparian Zone

- **Grass Buffer with Streamside Exclusion Fencing (2,432 new acres):** Linear strips of grass or other non-woody vegetation with fencing installed to prevent livestock from grazing and trampling the buffer or entering the stream and is maintained to help filter nutrients, sediment and other pollutants from runoff. The recommended buffer width for buffers is 100 feet, with a 35 feet minimum width required.

Every two months, Mr. Beiler found himself back in his family's fields to spread another layer of "farmer's gold." With inadequate manure storage, Beiler had to spread manure even when the ground didn't need it. But because of dollars granted from the Clean Water Fund and project partner Lancaster Farmland Trust, Beiler now has a six-month manure storage pit (left) and is doing his part for cleaner water for his family, farm, and community. This project in full is expected to reduce 5,625 lbs. of nitrogen per year, 2,562 lbs. of phosphorus per year, and 2.9 tons of sediment per year.



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Priority Initiative: Stormwater

Lancaster County includes urban/suburban, rural, forested, industrial/commercial, and open spaces not related to agricultural operations. Implementation of non-agricultural sector or non-agricultural related operations BMPs is captured by this initiative. This priority initiative includes management and considerations related to watersheds (Watersheds Action Team), land use, and stream restoration.

Focus Areas

- Urbanized areas (MS4 municipalities), impaired streams, and watersheds/catchments
- Alternative stormwater BMP implementation approaches
- Act 167 and Act 537 planning, funding, and related considerations
- State agency and legislator outreach and coordination
- Model ordinances as it relates to water resources, land use, etc.
- Watershed/catchment prioritization
- Stream delisting strategies
- Growth management (including integrated water resource planning)
- Natural lands and open space preservation and conservation
- Conservation landscaping
- Education and outreach with municipalities, local consultants, and the general public

Implementation Challenges

- COVID-related delays and limitations for both in-person meetings as well as supply chain issues
- General public and municipal buy-in, or resistance
- BMP implementation and maintenance funding
- Local landowner willingness to participate (private land BMP implementation)
- Resources for long-term verification processes
- Project tracking, reporting, and verification
- Programmatic consistency
- Permit specifics and limits to project scope/geography
- Expense per pound for gray infrastructure upgrades
- BMP reconciliation (effort necessary to capture and report existing BMPs on the ground)
- Climate change and storm intensity



Mural entitled *Be Like Water* on a pavilion at Culliton Park, painted by artist Salina Almanzar.

 Allyson Gibson, Lancaster Clean Water Partners

Opportunities for Success

- New and innovative stormwater management approaches that achieve both economic development improvements and protect local natural resources
- A needed update to Lancaster County's Act 167 Plan(s) that also includes compatibility or consistency with the Bay model and/or water quality considerations
- Integrated planning approaches for better growth management, capital improvements, source water protection, etc.
- Combine considerations for aquifer protection, source water protection, and sinkhole remediation along with economic development opportunities, transportation initiatives, and agricultural preservation for a more fully integrated approach
- Regional MS4/watershed-based permitting and/or collaboration
- Identification of BMPs that may not traditionally receive credit for nitrogen, phosphorus, and sediment reductions (or may not be captured for reductions) including from hazard mitigation plans, municipal capital improvement plans, and similar
- Local engineers roundtable discussions
- Stream restoration approaches tied to dam removals
- Contiguous projects in priority watersheds
- Projects incorporating floodplain restoration, in-stream habitat restoration, and wetland restoration that not only provides nitrogen, phosphorus, and sediment reductions, but also provides improved flooding conditions, stream uses attainment, and other related benefits
- Preserve, conserve, and restore natural resources and open space
- Delisting strategy

Proposed Stormwater BMPs

Riparian Zone

- **Forest Buffer (211.31 new acres):** Linear wooded areas that help filter nutrients, sediments and other pollutants from runoff as well as remove nutrients from groundwater. The recommended buffer width is 100 feet, with a 35 feet minimum width required.

Urban Tree Canopy

- **MS4 Urban Tree Canopy (10 new acres):** Includes

trees over roads and non-road impervious surfaces such as buildings and parking lots; and includes trees within 30'-80' of non-road impervious surfaces where the understory is assumed to be turf grass or otherwise altered through compaction, removal of surface organic material and/or fertilization.

Stream and Wetland Restoration

- **Urban Stream Restoration (35,179 new linear feet):** Refers to any Natural Channel Design (NCD), Regenerative Stream Channel (RSC), Legacy Sediment Removal (LSR), or other restoration project in an urban/suburban environment that meets the qualifying conditions for credits, including environmental limitations and stream functional improvements.
- **Non-urban Stream Restoration (76,775 new linear feet):** Refers to any Natural Channel Design (NCD), Regenerative Stream Channel (RSC), Legacy Sediment Removal (LSR), or other restoration project in non-urban/suburban environments that meets the qualifying conditions for credits, including environmental limitations and stream functional improvements.
- **Wetland Restoration (396 total acres):** The manipulation of the physical, chemical, or biological characteristics of a site with the goal of returning natural/historic functions to a former wetland.

Control Measures for Illicit Discharges

- **Advanced Grey Infrastructure for IDD&E Control (23,772 total acres treated):** Illicit discharge detection and elimination credits are only available to localities that show empirical monitoring for each eligible individual discharge.

Industrial Stormwater

- **Impervious Surface Reduction (58 acres):** Reducing impervious surfaces to promote infiltration and percolation of storm water runoff.

Fertilizer Legislation

- **Urban Nutrient Management (10,577 total acres):** The proper management of major nutrients for turf and landscape plants on a property to best protect water quality.

Street Sweeping

- **Street Sweeping (155 total acres treated):** Street cleaning practices through mechanical broom technology, vacuum assisted sweepers, regenerative air sweepers, or an advanced technology demonstrating greater abilities to remove solids and finer particles from street surfaces.

Stormwater Control Measures

- **Wet Ponds and Wetlands (322 new acres treated):** A water impoundment structure that intercepts stormwater runoff then releases it to an open water system at a specified flow rate. These structures retain a permanent pool and usually have retention times sufficient to allow settlement of some portion of the intercepted sediments and attached nutrients/toxics. There is little or no vegetation living within the pooled area. Outfalls are not directed through vegetated areas prior to open water release.
 - **Stormwater Performance Standards-Runoff Reduction (10,972 total acres treated):** The total post-development runoff volume that is reduced through canopy interception, soil amendments, evaporation, rainfall harvesting, engineered infiltration, extended filtration or evapo-transpiration.
 - **Stormwater Performance Standards-Stormwater Treatment (462 total acres treated):** Stormwater practices applied to post-development run-off that employ a permanent pool, constructed wetlands or sand filters.
 - **Bioretention/Raingardens (273 new acres treated):** An excavated pit backfilled with engineered media, topsoil, mulch, and vegetation. These are planting areas installed in shallow basins in which the storm water runoff is temporarily ponded and then treated by filtering through the bed components, and through biological and biochemical reactions within the soil matrix and around the root zones of the plants.
 - **Bioswale (1,389 total acres treated):** Channels designed to concentrate and convey stormwater runoff while removing debris and pollution. Bioswales can also be beneficial in recharging groundwater.
 - **Vegetated Open Channels (442 total acres treated):** Open channels are practices that convey stormwater runoff and provide treatment as the water is conveyed. Runoff passes through either vegetation in the channel, subsoil matrix, and/or is infiltrated into the underlying soils.
 - **Filtering Practices (137 total acres treated):** Practices that capture and temporarily store runoff and pass it through a filter bed of either sand or an organic media. There are various sand filter designs, such as above ground, below ground, perimeter, etc. An organic media filter uses another medium besides sand to enhance pollutant removal for many compounds due to the increased cation exchange capacity achieved by increasing the organic matter
 - **Filter Strip Runoff Reduction (10 total acres treated):** Practices that capture and temporarily store runoff and pass it through a filter bed of either sand or an organic media.
 - **Storm Drain Cleanout (29,610 lbs. total sediment/annual):** Mechanical (or similar) removal of collected sediment and debris in storm sewer systems
 - **Dry Ponds (396 new acres treated):** Dry ponds control peak flows of runoff, help improve water quality and lessen the effects of erosion. Between rain events, a dry pond looks like a large, grassy low area. When it rains, the pond fills with water. They hold water for 48-72 hours to allow sediment and pollutants to settle out.
 - **Infiltration Practices (121 new acres treated):** Infiltration practices utilize porous materials to facilitate infiltration of stormwater into soils.
 - **Dry Extended Detention Ponds/Basin (7,253 total acres treated):** Dry Detention Ponds are depressions or basins created by excavation or berm construction that temporarily store runoff and release it slowly via surface flow or groundwater infiltration following storms.
 - **Infiltration Basin (18.60 total acres treated):** A depression to form an infiltration basin where sediment is trapped and water infiltrates the soil. A sand layer and vegetation is required. No underdrains are associated with infiltration basins and trenches, because by definition these systems provide complete infiltration.
 - **Hydrodynamic Structures (74.10 total acres treated):** Hydrodynamic Structures are devices designed to improve quality of stormwater using features such as swirl concentrators, grit chambers, oil barriers, baffles, micropools, and absorbent pads that are designed to remove sediments, nutrients, metals, organic chemicals, or oil and grease from urban runoff.
 - **Permeable Pavement (0.89 new acres treated):** Pavement or pavers that reduce runoff volume and treat water quality through both infiltration and filtration mechanisms.
- ## Septic Systems
- **Septic Connections (3,008 total systems):** This is when septic systems get converted to public sewer and are connected to a wastewater treatment plant.
 - **Septic Pumpout (10,000 total systems):** Septic systems achieve nutrient reductions through several types of management practices, including frequent maintenance and pumping. On average, septic tanks need to be pumped once every three to five

years to maintain effectiveness. The pumping of septic tanks is one of several measures that can be implemented to protect soil absorption systems from failure.

Other

- **Dirt and Gravel Roads (158,000 feet):** Reduce the amount of sediment runoff from dirt and gravel roads through the use of driving surface aggregates (DSA) such as durable and erosion resistant road surface and through the use of additional Drainage Outlets (creating new outlets in ditchline to reduce channelized flow).

Priority Initiatives: Riparian Buffers

Riparian forest and grass buffers provide habitat, serve as flood protection, and filter water before it enters streams and rivers. BMPs from this Priority Initiative are extremely important to reaching our nutrient and sediment reduction goals. Efforts listed here will be managed by the Buffer Action Team, which implements new and maintains existing buffers and documents progress towards the county's 8,655 total acres goal.

Focus Areas

- Creation of a Lancaster County buffer maintenance program



A green roof grows on top of Groff's Family Funeral Home in Lancaster on May 21, 2015. Lancaster's green infrastructure plan was born out of the Environmental Protection Agency's request that all municipalities in the Chesapeake Bay watershed detail how they plan to reduce pollution in their local Chesapeake Bay tributaries.



Steve Droter, Chesapeake Bay Program

- Model ordinance language or modifications to require buffers in new development and re-development projects
- Prioritize specific watersheds and headwaters for BMP implementation (along with agricultural areas).
- Design education and outreach to communicate the benefits, successes, lessons learned, maintenance requirements, and similar considerations for buffers in general

Implementation Challenges

- COVID-related delays and limitations for both in-person meetings as well as supply chain issues
- Climate change and storm intensity
- Public buy-in and extent of local landowner willingness to participate.
- Not enough boots on the ground for outreach, implementation, and maintenance
- BMP implementation funding
- Culturally appropriate outreach to the Plain Sect community

Opportunities for Success

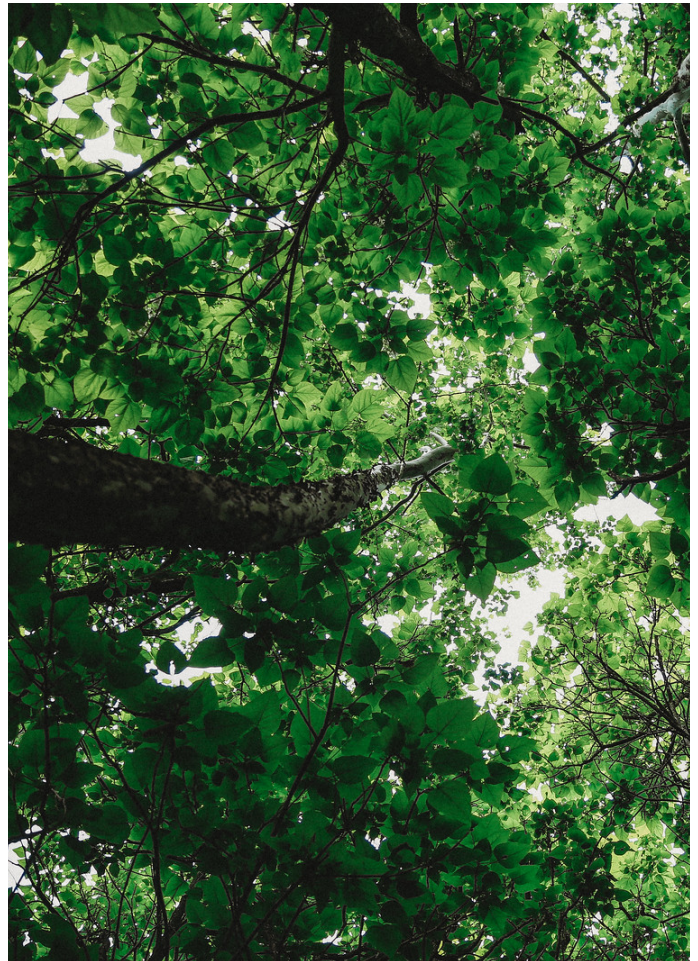
- Buy-in for buffers on all public and semi-public lands
- Tie incentives with buffer implementation and maintenance.
- A growing emphasis on buffers from multiple funding sources
- A strong Buffer Action Team of local partners organizations
- Lancaster’s Buffer Establishment Support Team (BEST)
- Demonstration projects in every municipality in the county
- The Chesapeake Bay Foundation’s Keystone 10 Million Trees program
- Stream delisting strategy with an emphasis on buffers for implementation dollars like RCPP

Proposed Riparian Buffer BMPs

Agriculture Riparian Zone

- **Forest Buffer (7,032 new acres):** Linear wooded areas that help filter nutrients, sediments and other pollutants from runoff as well as remove nutrients from groundwater. The recommended buffer width is 100 feet, with a 35 feet minimum width required.
- **Forest Buffer - Narrow (100 total acres):** Linear strips of wooded areas maintained on agricultural land between the edge of fields and streams, rivers or tidal waters that help filter nutrients, sediment and other pollutants from runoff. Narrow forest buffer strips are between 10 and 35 feet in width.

- **Grass Buffer with Streamside Exclusion Fencing (2,432 new acres):** Linear strips of grass or other non-woody vegetation with fencing installed to prevent livestock from grazing and trampling the buffer or entering the stream and is maintained to help filter nutrients, sediment and other pollutants from runoff. The recommended buffer width for buffers is 100 feet, with a 35 feet minimum width required.



Looking up into the canopy of Climbers Run Nature Center – one of over 47 nature preserves owned by the Conservancy that protect forests critical to keeping our headwaters, streams, and rivers healthy.



Michelle Johnsen, Courtesy of Lancaster Conservancy

Priority Initiative: Data Management and Monitoring

The Data Management and Monitoring Priority Initiative will be managed by the Data Management Action Team, which is working to develop a shared measurement system with access for multiple sources of data. A current focus area has been assembling water quality monitoring and planning data and information from multiple agencies, in both tabular and spatial formats.

Focus Areas

- Develop an enhanced documentation system of currently implemented practices.
- Increase in-stream water quality monitoring to establish baselines, and identify the best tools needed to achieve the goals and to measure progress/success.

Implementation Challenges

- Funding for equipment, analyses, staff support, equipment maintenance, etc.
- Not all partners, agencies, etc. are ready or allowed to share data

Opportunities for Success

- Alignment of multiple platforms where data can transfer
- Aligned data management structures centered around watershed and catchment units for the delisting strategy

There are no BMPs for implementation captured by this initiative.



Volunteers from the Octoraro Watershed Association measure stream flow at Bells Run on Bartville Road in Lancaster County in preparation for riparian buffer planting and streamside fencing. Volunteers from the Octoraro Watershed Association survey macroinvertebrates along Coopers Run to gauge water quality health.



Octoraro Watershed Association

Get In Touch

Online Resources

Website: www.LancasterCleanWaterPartners.com

Facebook: www.facebook.com/LancasterCleanWaterPartners

YouTube: Search “Lancaster Clean Water Partners”

Backbone Support

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Preserved farmland in Lancaster County. The farm was preserved with guidance and assistance from Lancaster Farmland Trust.



Lancaster Farmland Trust





