The Nature Conservancy
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AGRIBUSINESS ASSOCIATION

Delmarva Conservation Partnership

From Field to Stream

August 2020

Wetland restoration at edge of agricultural field in Wicomico County, MD © TNC

Thank You

This project was only possible with the support of our partners. Collectively, they supported the goals of this venture with science, outreach and restoration projects totaling over $9M in contributions.

Chesapeake Conservancy (CC)

Ducks Unlimited (DU)

Eastern Shore Land Conservancy (ESLC)

France Merrick Foundation

Maryland Department of Agriculture (MDA)

Maryland Department of Natural Resources (DNR)

National Fish and Wildlife Foundation (NFWF)

National Oceanic and Atmospheric Administration (NOAA)

Soil Country Conservation Districts

The Nature Conservancy

University of Maryland Center for Environmental Science (UMCES)

U.S. Fish and Wildlife Service (USFWS)

Young native Virginia longleaf pine seedlings at the Garland Gray Forestry Center in VA © Robert B. Clontz

Project Summary

In 2014, The Delmarva Conservation Partnership (DCP), led by The Nature Conservancy (TNC) and the DE-MD Agribusiness Association, initiated one of the first Regional Conservation Partnership Program (RCPP) projects that supported farmers and landowners to improve water quality and wildlife habitat.

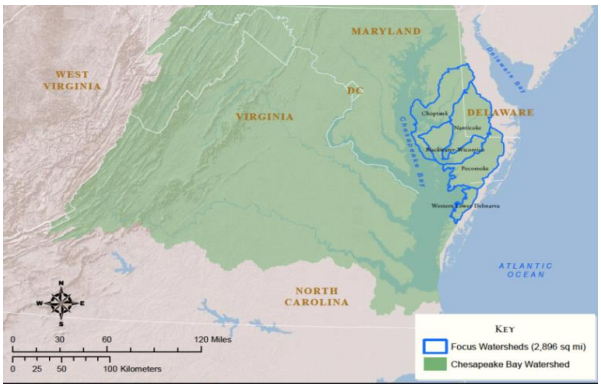

Figure 1. Focus watersheds outlined in blue for the Delmarva Conservation Partnership.

Comprised of more than 30 groups, including conservation organizations, agribusinesses, government agencies, and the scientific community, the DCP was awarded $5M to deliver a science-based approach to:

- ❑ Target infield advanced nutrient management practices and edge-of-field / edge-of-stream trapping practices where they will achieve the greatest benefits to reducing nutrients and sediment reaching waterways and enhancing terrestrial and in-stream habitat;
- ❑ Increase implementation of conservation practices using innovative delivery mechanisms;
- ❑ Monitor and evaluate outcomes to continually improve effectiveness and efficiency.

We engaged a broad diversity of partners and stakeholders to identify the project's objectives and address resource concerns of degraded water quality and wildlife habitat in our focus area (Figure 1). During the duration of the project, partners contributed over $9M in additional support through technical assistance, outreach, targeting, implementation, and monitoring.

Partners executed on the following strategies for the project: 1) identified and targeted conservation practices to priority locations, 2) engaged landowners to enroll in programs, 3) implemented over 15,000 acres of infield and wetland restoration practices, and 4) performed monitoring in our focus areas. We provide a brief overview of the accomplishments for each of these areas of work and conclude with lessons learned to inform future efforts.

Thompson Farm in Hartly, DE © Isaac Shaw

Identifying Priority Locations

We identified priority locations to direct RCPP funding to implement infield practices and wetland restoration where they would have the greatest potential to capture excess nutrients and sediment while also enhancing terrestrial and in-stream habitat.

Using input and review by DCP partners, we developed screening and ranking criteria for NRCS applications that were submitted to the Environmental Quality Incentive Program (EQIP) and the Wetland Reserve Easement Program (WRE).

Landscape and local/field scale data were evaluated as part of these criteria to identify where infield and edge-of-field practices would have the greatest benefit on water quality and terrestrial and aquatic habitat (Figure 2).

Higher priority was given to locations with high predicted nutrient loading, high ecological integrity, and in sub-watersheds that were being monitored. Detailed procedures and ranking criteria can be requested from the project leads.

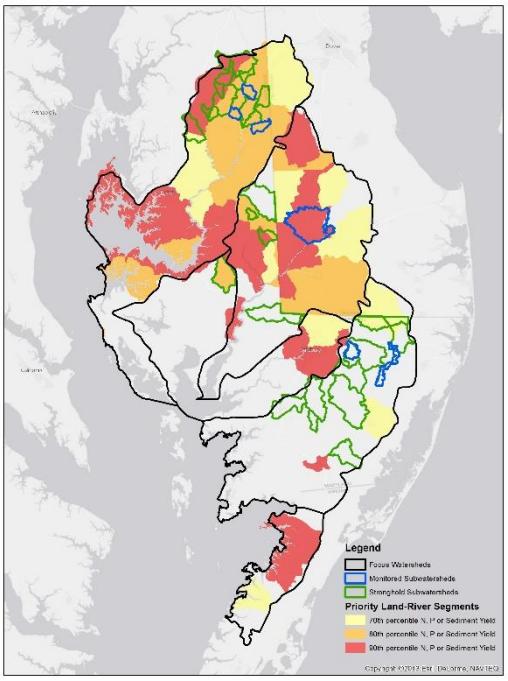

Figure 2. Example of one prioritization criteria at the subwatershed level based on nutrient and sediment loading.

Willin Farm, LLC in Seaford, DE © Isaac Shaw

Engaging Priority Landowners

To engage landowners in our focus area, partners hosted field days, participated in local events and meetings of farmers, led workshops and meetings for technical assistance providers and performed direct outreach to priority landowners. At all events, partners distributed printed materials with an overview of the RCPP project and available cost-share to support implementation of practices. A summary of these activities is provided in Table 1.

The Delaware-Maryland 4R Alliance (DM4R) was formed in 2014 to support implementation of the RCPP partnership. The Delaware Maryland Agribusiness Association and The Nature Conservancy created this forum for agribusinesses, agencies, researchers, and conservation groups to work together to promote the use of 4R Nutrient Stewardship (applying nutrients in the right place, at the right rate, at the right time, and using the right method) considering the social, economic, and environmental impacts of fertilizer use.

The Alliance identified practices that have the greatest opportunity to work for local farming operations on Delmarva, integrated science to evaluate and improve the efficiencies of 4R practices, increased delivery of information on practices through certified crop consultants and professionals from the agriculture industry, and promoted improvements in agricultural sustainability achieved by 4R stewardship.

The DM4R hosted five field days throughout the Delmarva Peninsula which drew farmers, agribusiness and conservation professionals as well as government and university employees (Figure 3). Experts provided information on the benefits of 4R practices and wetland and buffer practices to facilitate enrollment in NRCS and partner programs.

4R Technology Field Day in Greenwood, Delaware on August 22, 2019 © Matt Kane/TNC

Engaging Priority Landowners

Grower meetings were also an effective means of sharing scientific findings with farmers, agribusinesses, conservation professionals, and government and university employees. The DM4R hosted grower meetings focused on cover crops, 4R practices for manure, and how to establish on-farm research trials.

The partners also performed direct outreach to farmers and landowners to discuss opportunities to implement infield and wetland restoration projects. In the Pocomoke River watershed, partners sent letters and followed-up with phone calls to 36 priority landowners about opportunities to restore floodplain wetlands along the river. To date, 25 of these landowners were interested in performing restoration, several of which enrolled in WRE through this RCPP project.

Table 1. Outreach Activity Summary for the Delmarva Conservation Partnership RCPP

Outreach Type	Total for Project
Fairs/ shows	14
Workshops	5
Presentations	11
One-to-one Meetings with Agribusinesses and Agribusiness Groups	60
Direct outreach to landowners for wetland restoration opportunities	36
Outreach Materials	
Flyers	8
Website (Mid-Atlantic Nutrient Stewardship Association)	5
Media Outlets	
Social media (Facebook)	180 page likes
People Reached	1,719
New Clients not worked with NRCS	5

4R Technology Field Day in Greenwood, Delaware on August 22, 2019 © Matt Kane/TNC

Conservation Practice Implementation

The DCP supported the implementation of over 13,700 acres of infield practices to improve water quality and habitat on Delmarva. Practices included advanced nutrient management, multi-species cover crops, and gypsum soil amendments. These practices benefited the sustainability and efficiency of local farmers.

11,813ac. enrolled in Environmental Quality Incentive Program (EQIP)

Scott Webb and his dad Ronnie farm 1,000 acres of corn, soybeans, wheat, and barley on their family-based operation, Lea View Farms[1]. For the last thirty years, Scott and his dad properly managed nutrients through soil sampling and following the recommendations based on yield goals. This included using split and timely application techniques to increase productivity of fertilizer applications. When an opportunity arose that would help them implement advanced nutrient management practices, the pair seized the chance.

1,976 ac. enrolled in Conservation Stewardship Program (CSP)

The Delmarva Whole System Conservation Partnership-Field to Stream project provided the Webb's with an opportunity to advance their GPS technologies. The difference in technologies is remarkable. "Before, I would try not to overlap rows or areas with fertilizer. With GPS, I don't have to worry about it," said Scott. "If I am turning or have a shorter row in places, the GPS maps the land and tracks my application and it will automatically turn the appropriate nozzles off and on so that there's no overlap," said Scott. He notes another added benefit of the GPS is that he can make prescriptions to fertilize at a higher rate only in spots as needed—such as when going from irrigated to non-irrigated land.

Edward H. and Constance P. McCabe Nature Preserve near Milton, Delaware © Sev Smith/TNC

1 – story adapted from 2017 NRCS press release

Conservation Practice Implementation

Scott is also thankful that this project has helped him pay for leaf tissue sampling. “It’s where I pick a leaf off of corn or small grain and then send it to a lab to see how much nitrogen it needs.” Once the results are back, he puts down precisely the remaining amount of nitrogen needed for optimal crop growth. This advanced practice provides a more accurate reading of nitrogen needs compared to soil sampling alone.

The use of the 4R concept of the right amount, right source, right placement, and right timing of nutrients in this partnership project is key to reduce any excess nutrient from running off into surface or ground water sources. Practices that use the 4R concept not only protect soil and water quality, but also benefit air quality and can enhance native habitats.

Farmer from Dorchester County: “You know, I really didn’t understand how these practices were going to help my operation, but after working with Ted [nutrient management consultant], three years after starting, I definitely won’t go back. It’s saving me money; it’s helping my operation. I’m really glad Ted talked me into trying something new.”

Edward H. and Constance P. McCabe Nature Preserve near Milton, Delaware © Sev Smith/TNC

Wetland Restoration

The DCP supported the implementation of over 2,700 acres of wetland restoration to improve water quality and habitat on Delmarva. Several projects contributed to a large-scale restoration effort along the Pocomoke River reconnecting floodplains along 14 miles of the channelized river that was dredged and channelized in the mid-20th century.

The project was completed with the collaboration of U.S. Department of Agriculture's (USDA) Natural Resources Conservation Service (NRCS), TNC, Maryland Department of Natural Resources, U.S. Fish and Wildlife Service (USFWS), the U.S. Geological Survey (USGS), the France-Merrick Foundation, and the National Fish and Wildlife Foundation (NFWF), and with the cooperation of local landowners.

260ac. Enrolled Wetland Reserve Easements (WRE)

2,538ac. Restored by partners

1,773ac. Protected by partners

After reaching voluntary agreements with landowners, local construction firms performed surveys and removed earth from the Pocomoke's banks at more than 130 locations targeted to provide the most water quality benefit. Now during heavy rainstorms, resulting flood waters which carry nutrients and sediment from both developed and agricultural lands, flow from the river into forested wetlands where they can be absorbed.

Once all restoration work has been completed over the next two to three years, we expect this project will result in the annual reduction of 71,000 pounds of total nitrogen, 7,600 pounds of total phosphorus, and 47,500 pounds of total suspended sediment, or on average, 20% of the total reduction goals set by the Chesapeake Bay Program for the Pocomoke River watershed. The project is one of the largest ecological restoration projects in Maryland's history. A video of the project can be viewed here.

Breaching berm along the Pocomoke River in Maryland © Daniel White/TNC

Project Monitoring

The DCP conducted several studies in our focus area to assess water quality and habitat outcomes from various conservation practices.

University of Maryland's Center for Environmental Science (UMCES) tested whether conservation practices added to three agriculturally dominated watersheds improved water quality. Funded by the National Science Foundation's Coastal SEES program from 2013-2020, four principal investigators (Tom Fisher, Rebecca Fox, Anne Gustafson, and Kalla Kvalnes) from the Horn Point Laboratory of UMCES and Washington College recruited ~60% of farmers from the watersheds. Farmers completed surveys, implemented conservation practices (winter cover crops, ditch bioreactors, drainage control structures, split fertilizer applications, and precision fertilizer applications) and allowed monitoring of groundwater and surface waters on their farms.

Water quality in the control watershed did not change, but water quality improved with lower nitrogen concentrations in two of the three experimental watersheds. The decreasing nitrogen had started in ~2008 prior to this project, but was accelerated by the additional practices. The third experimental watershed has 80% agricultural land use, sandy soils, and is heavily irrigated; in this watershed, despite additional conservation practices, nitrogen concentrations have increased continuously since 2003 and during the 7 years of the project. This research showed that additional conservation practices can improve water quality, but areas with well-drained and irrigated soils will require additional measures to improve water quality.

TNC and USGS led a USDA funded study to evaluate hydrology and water quality benefits of reconnecting floodplains in the Pocomoke River watershed. They developed continuous monitoring at seven sites along the Pocomoke River to collect hydrologic and water quality data to evaluate relative contributions from different sources and changes after restoration.

Project Monitoring

The observed water table depths were consistent with those predicted by the computer-based tool, indicating that it provides valuable information to identify potential wetland restoration and protection efforts. At all sites, the floodplains received a large portion of water from the local contributing areas, supporting the importance of these wetlands to filter both local and regional water supplies. Reconnected floodplains showed some evidence of a more natural flooding regime; however, the frequency and duration of flooding is still shorter than naturally connected floodplains.

Overall, floodplains along the mainstem of the Pocomoke have the greatest potential to divert and filter river discharge, but all floodplains provide important filtration benefits, which are especially critical to improve local water quality. Water chemistry among and within sites varied significantly, highlighting a critical need to target restoration efforts at fine scales to maximize water quality benefits.

NOAA evaluated the biotic resource by monitoring restored oyster reefs in the Choptank River complex to achieve the success metrics adopted by the Chesapeake Bay Program's Sustainable Fisheries Goal Implementation Team.

Lessons Learned

The Delmarva Conservation Partnership was one of the first projects initiated under the new RCPP program in the 2014 Farm Bill. We greatly appreciate the support of NRCS and all our partners for developing a new program and partnership that successfully implemented conservation practices that resulted in cleaner water and improved habitat. As NRCS continues to make improvements and revisions to the program to allow for additional flexibility and efficiency to deliver conservation, we offer the following lessons learned and recommendations:

Targeting Practices

- ❑ NRCS should allow for different ranking criteria for groups of practices (i.e. infield versus edge-of-field). Using a single ranking for all conservation practices limited our ability to target practices at the farm-scale because different types of practices perform best in different landscape positions.

Outreach and Technical Assistance

- ❑ NRCS should continue to build relationships and partnerships with agribusinesses and certified crop advisors to inform farmers of NRCS programs and provide technical assistance. Several farmers shared that the only reason they signed up for an NRCS program was because their crop consultant did the work to submit the application. Additionally, farmers expressed a need for service providers that can help them implement advanced nutrient management practices and manage data on their farms.
- ❑ An effective outreach approach for advanced nutrient management should be multifaceted, combining research information about a specific 4R practice, economic data, and farmers' experiences in using the practice, and delivered by a trusted advisor, such as a peer or agribusiness representative.

4R field day near Easton, MD in August 2018 © Matt Kane/TNC

Lessons Learned

Implementation of Practices/ Farmer Insights

- ❑ Funding should continue to be prioritized for advanced nutrient management and soil health practices. Funding to farmers to implement new or technologies resulted in the adoption of these practices at a larger scale. Many of the farmers relayed that they were curious about the advanced nutrient management practices but would not have tried these practices without NRCS funding. Support from NRCS enabled initial testing of practices and reduced financial risk to the farmer. The results of the practices were not necessarily evident until the last year of the contract, however, once farmers observed results, they adopted these practices on their own.

- ❑ NRCS should evaluate if they can offer a CAP plan related to precision agriculture. A barrier to implementing advanced nutrient management is the ability/capacity of farmers to compile, analyze, and interpret large amounts of data to develop appropriate prescriptions.

- ❑ Guidance should be clarified for the application of the gypsum practice. Farmers relayed that logistics were a challenge (e.g., one truck delivery per day and needing to have a place on the farm to keep the material under cover).

4R field day near Easton, MD in August 2018 © Matt Kane/TNC

Lessons Learned

Partner Insights on NRCS/ RCPP programs

- ❑ National program deadlines should be able to be adjusted based on project needs. We were unable to change the national deadlines for sign-ups for WRE and CSP which limited our ability to advance applications.

- ❑ NRCS should work with partners to be able to prioritize CSP applications. Including ranking criteria specific to the project would target funds to those sites that would best achieve our goals.

- ❑ WRE funds from various funding pools should be able to be combined. Because of the inability to combine funding pools (state allocated funds, RCPP, additional funds from national), we had a project that exceeded our RCPP funds and therefore had to request national funds. However, this in turn limited our ability to use all the RCPP funds. There was also a sense of competition among NRCS staff on which funds should be used first.

- ❑ Funds should be able to be moved between states to allow the best utilization of resources where there is need. The inflexibility to move funds between states resulted in some funds not being fully utilized.

- ❑ Technical assistance guidelines should be clarified to provide clear direction on how these funds can be used and billed. We were unable to use the majority of our technical assistance funds because it took several years to reach agreement on the process which was different than the original agreement stated.

4R field day near Easton, MD in August 2018 © Matt Kane/TNC