USDA United States Department of Agriculture

NATURAL RESOURCES CONSERVATION SERVICE

CHESAPEAKE BAY PROGRESS REPORT

Agricultural Lands – Key to a Healthy Bay

A vibrant and healthy agricultural sector is one key to restoring and improving the Chesapeake Bay – the largest estuary in North America and a national treasure. More than 83,000 farms make up a $10 billion agricultural industry in the Chesapeake Bay watershed.

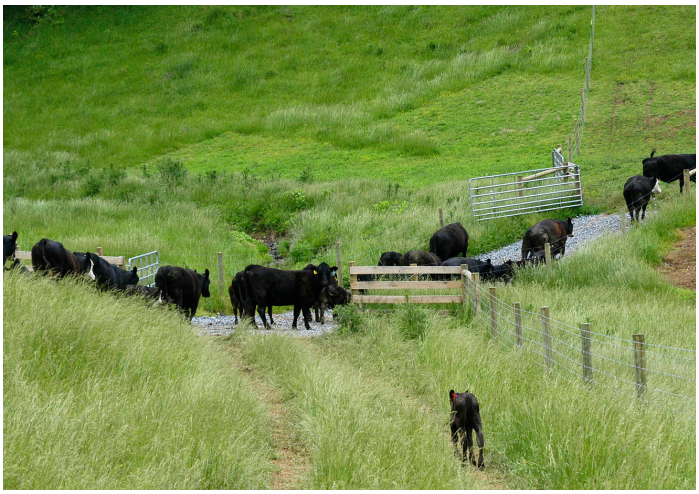
Since 2009, targeted agricultural conservation investments of nearly $1 billion are putting the agricultural community on its way toward meeting or exceeding key goals for cleaner water and a healthier ecosystem. Independent reports show positive trends for water quality, habitat and key aquatic species including crabs and oysters. Meanwhile, modeled results and monitoring stations show declines in nutrient and sediment loads to the Bay.

While there is no short-term solution for the complex and multi-decadal water quality issues in the watershed, working together can deliver real progress toward a healthier Chesapeake Bay.

The Agricultural Strategy

To improve the health of the watershed, farmers and forest landowners are using conservation systems that are reducing nutrient and sediment runoff by keeping soil in place and making working lands more efficient and productive. USDA's Natural Resources Conservation Service (NRCS) has developed a systems approach for designing and installing conservation activities on farms and forests to protect and improve water quality. The core parts of this approach are conservation activities that avoid, control and trap potential nutrient and sediment losses from farm fields.

In addition to helping improve water quality, these conservation systems help boost soil health and air quality, enhance wildlife habitat and strengthen the economic bottom lines for farms. Conservation applied on any acre delivers an environmental benefit, but when conservation efforts target the most vulnerable watersheds and lands, the results are greater. NRCS estimates that targeting conservation on the most vulnerable soils and in priority watersheds increases the per-acre conservation benefit by 70 percent for sediment losses, 30 percent for nitrogen losses, and 40 percent for phosphorus losses, as compared to no targeting.



Stream crossings help keep streambanks intact and waterways free of nutrients.

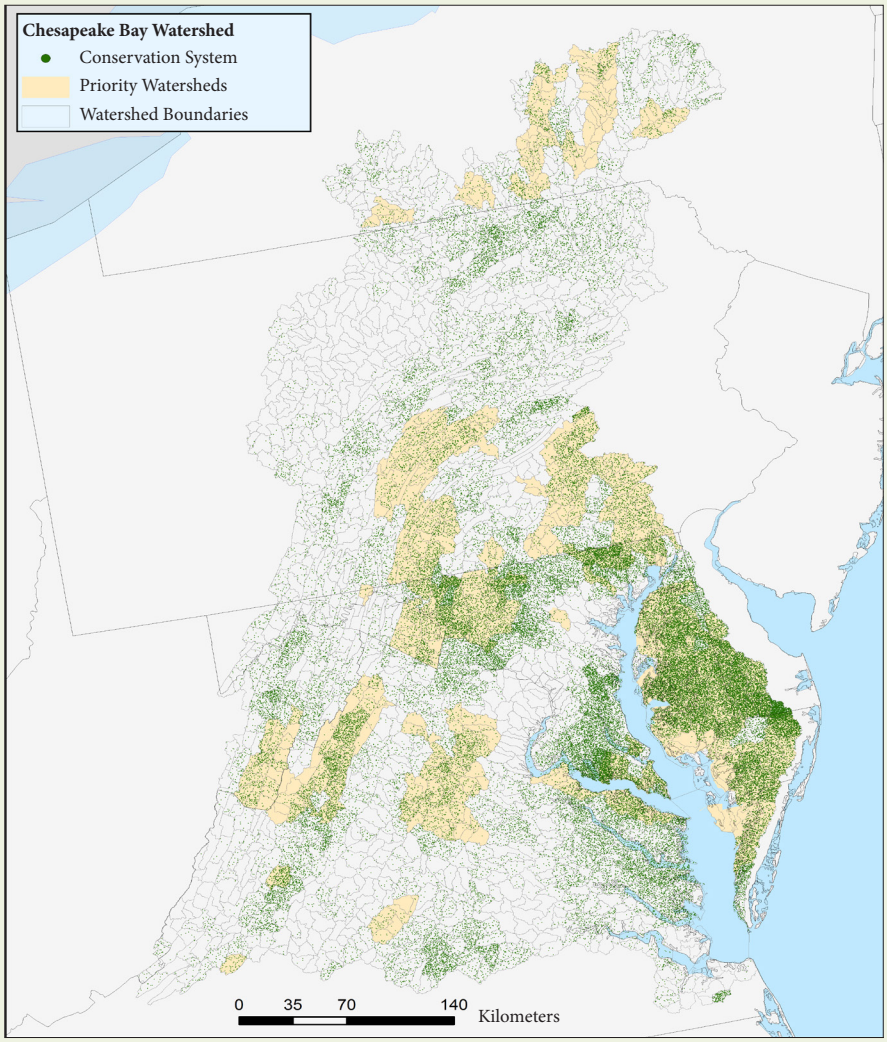
TARGETING AND INVESTMENTS

Targeting Action... and Results

President Obama issued an Executive Order in 2009 that directed government agencies to focus resources and identify innovative solutions for improving water quality in the bay. NRCS collaborated with other federal partners, including the U.S. Environmental Protection Agency and U.S. Geological Survey, as well as with state and local partners, to use scientific tools to target conservation investments and accelerate results.

Through this process, NRCS identified approximately 500 small watersheds as priority areas for partnering with farmers to install additional conservation. USDA has a goal of helping to install conservation practices on 4 million acres of farmland in these priority areas by 2025. NRCS and its conservation partners have worked with farmers to install practices on 1.6 million acres in priority areas since 2010 — about 41 percent of the 2025 goal.

CONSERVATION INVESTMENTS IN THE WATERSHED



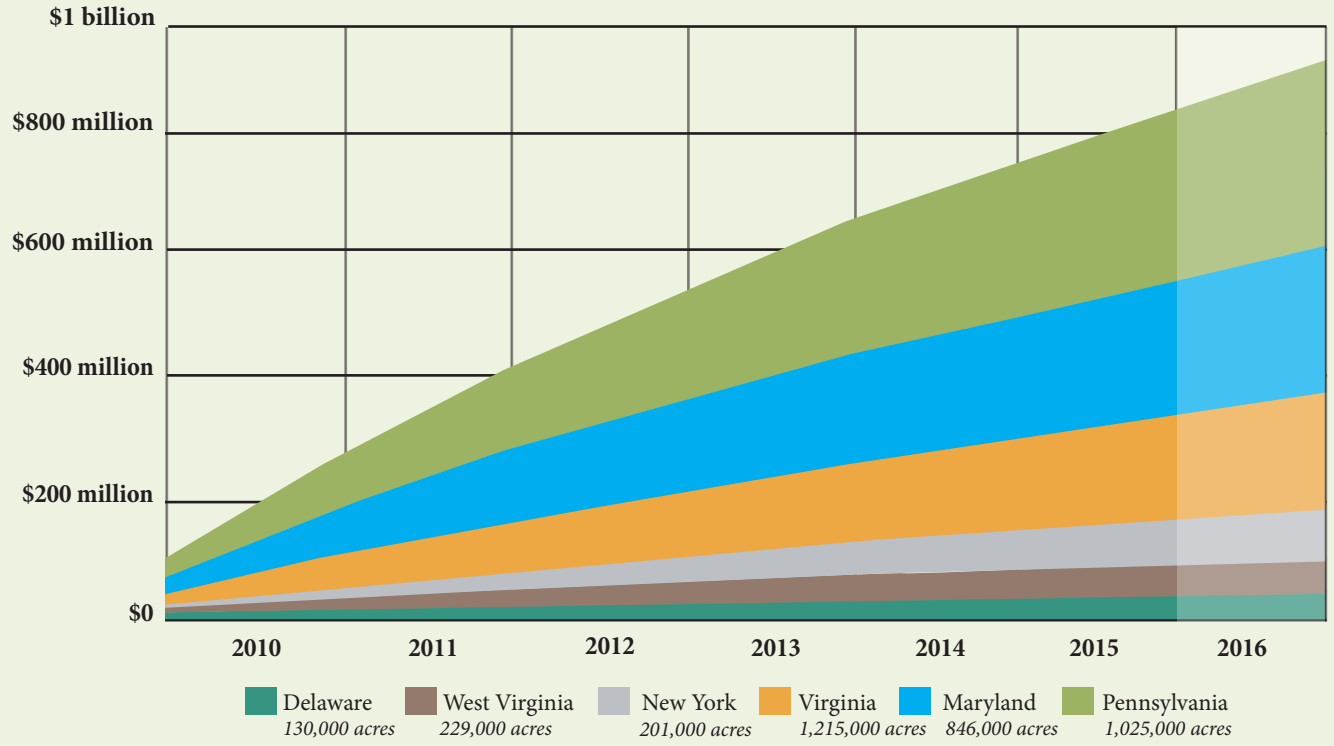
This map depicts the more than 82,000 conservation systems where since 2009, a combination of the 28 identified high-impact "Avoid-Control-Trap" conservation practices have been applied within the Bay watershed as well as in the high-priority watersheds identified for targeted efforts.

Conservation practices should be focused on the most critical areas in a watershed or those acres with the most vulnerable soils or near sensitive landscape features such as streams, wetlands or the Bay itself. But while all conservation within these priority watersheds will provide an environmental benefit, identifying those practices that will have the greatest impact on water quality, especially when applied in conservation systems that avoid, control and trap nutrients and sediment, is critical to realizing water quality improvement.

Dots are randomly placed within priority watersheds to protect landowner privacy.

TARGETING AND INVESTMENTS

CUMULATIVE INVESTMENT BY STATE AND YEAR



Source: NRCS Resources Economics, Analysis and Policy Division. Fiscal year 2016 numbers are projected.

NRCS Investment in Watershed

Since 2009, NRCS has worked with thousands of farmers and forest landowners to implement "Avoid-Control-Trap" conservation systems on over 3.6 million acres in the watershed, or a land area almost three times larger than the entire state of Delaware. Critically, about 50 percent of this work has been focused on the most vulnerable areas, generating even better water quality returns for the Bay.

Conservation systems are tailored to each farm and working forest and described in a conservation plan, which serves as a blueprint for conservation activities. These conservation blueprints help both the farmer and NRCS ensure that the right suite of conservation activities will be delivered and thereby ensuring the best return on investment.

Through these partnerships with farmers and landowners, NRCS has invested over $890 million in federal conservation funding to deliver these conservation systems in just eight years. In turn, this federal investment is leveraged by the financial and management resources of the watershed's farmers and forest landowners – increasing the investment by a conservative estimate of $400 million. In addition to the federal and farmer investments, state and local governments are providing substantial financial assistance to help farmers implement key actions in each of the Bay states' watershed implementation plans.

NRCS works with farmers to implement conservation practices that help improve water quality.

BRINGING TOGETHER PARTNERS

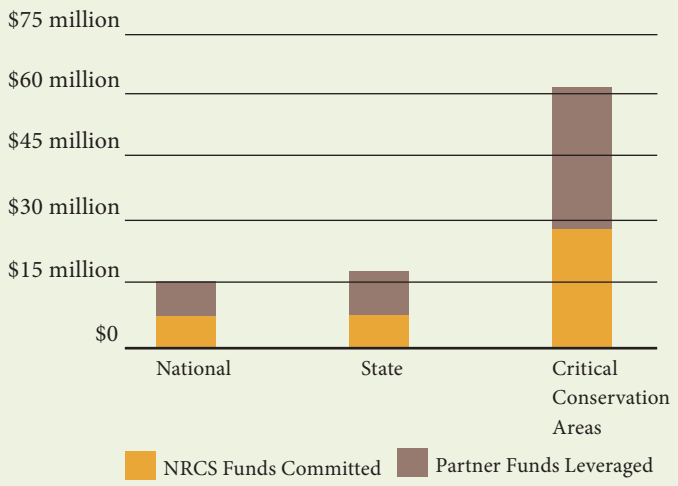
Leveraging the Public Investment

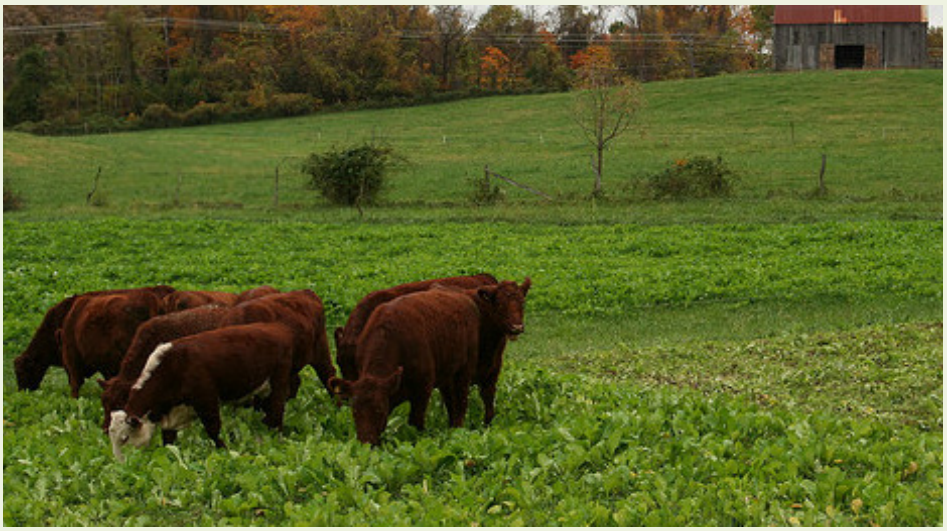
The significant federal investment is amplified by expanding private sector engagement in conserving and restoring the Bay. NRCS has been helping to build the next generation of conservation science and innovation through Conservation Innovation Grants. Between 2009 and 2015, nearly $14.5 million has been invested in 32 projects that are testing new approaches and technologies, while deepening the bench of partners and tools that will drive continued progress in the Chesapeake Bay watershed. These partners match or exceed the federal investment, adding another $15 million to finding and disseminating conservation tools, technologies and approaches to accelerate progress.

The Regional Conservation Partnership Program (RCPP) provides the newest platform for partners to collaborate and work cooperatively with producers. By harnessing the power of the public-private partnership, leveraging the investments, bringing in new partners, new resources and new ideas to the table, significant investments in conservation will result to benefit the soils, water and wildlife of the Bay ecosystem.

USDA designated the Chesapeake Bay Watershed as one of eight critical conservation areas for RCPP funding, which provides access to all RCPP funding pools. In the two signups since the program started, NRCS has awarded funding to 14 projects in the watershed, leveraging a total federal and non-federal investment of over $100 million in total resources. These projects will help to improve water quality and wildlife habitat in the Bay region, while also enhancing the resiliency and productivity of the area's farms and forests. The next round of RCPP projects will amplify that contribution.

REGIONAL CONSERVATION PARTNERSHIP PROGRAM PUBLIC-PRIVATE INVESTMENT, FY15-16





Intensive grazing systems, a type of rotational grazing that uses higher per-acre stocking rates in smaller grazing or pasture units, can provide multiple benefits for farmers and the environment. Chesapeake Bay partners are using funds from a Conservation Innovation Grant to promote use of intensive rotational grazing among the watershed's producers.

CONSERVATION ON THE GROUND

Investments Paying Dividends

Historic levels of conservation are achieving unprecedented results in the Chesapeake Bay region. According to USDA's Conservation Effects Assessment Project (CEAP), conservation practices are significantly reducing the loss of sediment and nutrients like phosphorus and nitrogen, and the adoption of conservation practices is on the rise.

Reducing Erosion

Controlling erosion reduces losses of sediment and nutrients, leading to cleaner water entering the Bay. For instance, producers are combining cover crops and field buffers to control erosion and reduce sediment leaving their land. CEAP found that the number of cropped acres that farmers planted to cover crops every year more than tripled, and 52 percent of all cultivated acres in the region had cover crops applied at least one out of every four years. CEAP also found that the adoption of additional conservation practices reduced sheet and rill erosion rates by 57 percent and edge-of-field sediment losses by 62 percent since 2006.

Between 2006 and 2011, average edge-of-field sediment loss has decreased by 15.1 million tons per year, which is enough soil to fill 150,000 train cars, stretching 1,704 miles or a distance further than from Washington D.C. to Albuquerque, New Mexico. These conservation practices are generating huge results.

Managing Nutrients

Clean water is a priority for all of us, and when farmers manage nutrients, they are also helping to minimize the runoff of nutrients into local streams and rivers. NRCS and farmers are protecting the Bay using practices such as residue and tillage management, nutrient management and waste storage facilities to minimize the risk of nutrients and sediment, including animal waste, reaching the Bay while maintaining productive farming operations. NRCS estimates, from 2006 to 2011, that improved nutrient management has reduced the loss of nitrogen by 38 percent and phosphorus by 45 percent.

Protecting Stream Corridors

Farmers and forest managers are also working with NRCS to install conservation systems that help protect the streams and rivers in the Bay. Fencing, livestock stream crossings and similar conservation practices prevent farm animals from accessing water from the streambanks where there is possibility of disturbance and erosion, causing sediment and nutrients to flow downstream and into the Bay.

Farmers use fences to protect riparian areas and implement rotational grazing systems.

Cover crops prevent soil erosion while boosting soil health.

Since 2009, NRCS partnered with farmers to install nearly 3,500 miles of fences and riparian buffers—equivalent in length to installing conservation practices that protect streams that stretch from Annapolis, Maryland, to San Francisco, California, and then north to Seattle, Washington. In addition, NRCS helped farmers further protect streams by restricting livestock access on almost 10,000 acres of stream corridors that intersect with agricultural lands.

REBOUNDING ECOSYSTEM

Don't Just Take It from Us

The signs of a healthier Bay are evident across the watershed, from grasses on the sea floor to more abundant fish and wildlife, and ultimately cleaner water. A number of agencies and non-government organizations are studying the rebound of the Chesapeake Bay ecosystem made possible by a variety of sectors, including agriculture.

Underwater Ecosystems

Underwater grasses, which provide critical food and shelter to wildlife, are thriving. Between 2013 and 2015, they've grown from nearly 60,000 acres to more than 91,000, which is the largest amount of grass ecosystems in the past three decades and exceeds the 2017 restoration target two years early (Bay Barometer). The grass provides a critical nursery habitat for baby crabs, and its return is a sign of a recovering Bay and, hopefully, a more stable fishery (The Washington Post).

Wildlife

The blue crab, an indicator of the Bay's health, has seen population spikes. Adult females are up 92 percent in 2016 compared with last year, building on population climbs over the past few years. The overall crab population is the fourth highest level in two decades, and builds on last year's 38-percent boost in abundance (Maryland Department of Natural Resources). And crab fishermen report a marked improvement in water quality. "The water is as clear as I've seen it," said Nick Crook, a 29-year-old waterman who lives on Kent Island, Md. "I think the pollution controls are having a positive effect" (The Washington Post).

Meanwhile, oyster populations in Maryland show signs of revival inside the state-created sanctuaries that have been off-limits to harvesting for the past decade (Maryland Department of Natural Resources). And American shad populations have seen steady growth over the past decade and a half, increasing by three-fold in key Bay tributaries (Bay Barometer: Health and Restoration in the Chesapeake Bay Watershed).

Surveys of striped bass and bay anchovy have also found significant increases in their populations since 2009

Populations of blue crab are climbing. Photo from University of Maryland's Center of Environmental Science.

(University of Maryland's Center for Environmental Science). And people are spotting dolphins further and further into the Bay, including rivers around Annapolis. The Severn Riverkeeper calls the dolphin sightings a sign of improved water quality (The Bay Journal).

Improving Water Quality

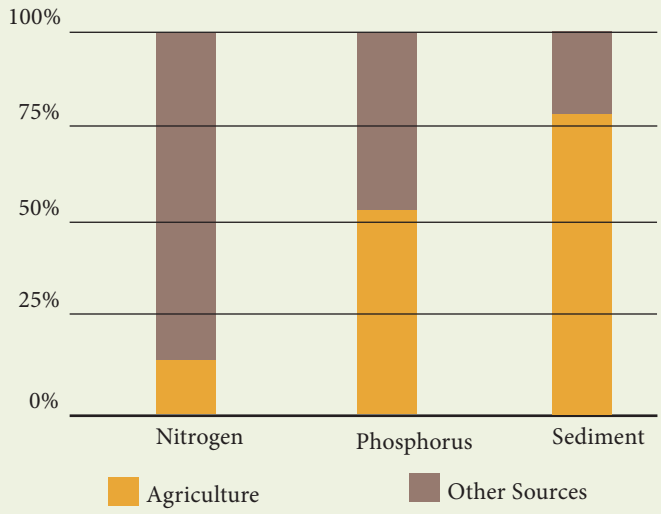
Good water quality largely depends on good management on the land. Maryland farmers planted over 492,000 acres of cover crops on their fields in fall 2015 as part of a state cover crop program, breaking the previous record of about 476,000 acres in fall 2014. Collectively, those cover crops planted in 2015 prevented an estimated 2.95 million pounds of nitrogen and 98,500 pounds of phosphorus from washing into Maryland waterways (Herald Mail Media Farm News).

Across the basin, cover crops and other conservation efforts have reduced runoff of nutrients and sediment. From 2009

REBOUNDING ECOSYSTEM

Underwater grass ecosystems are on the rebound. Photo from University of Maryland's Center of Environmental Science.

REDUCTIONS IN LOADS TO THE BAY, 2009-2015



Other sources: *septic, atmospheric deposition, urban runoff, forest and non-tidal atmospheric deposition, and wastewater and combined sewer overflow.*
Source: *Chesapeake Bay Program*

from tributaries have declined by 8 percent, phosphorus loads by 20 percent and sediment loads by 7 percent (The Chesapeake Bay Program). And the agriculture sector was the leading contributor for improving water quality — agriculture by itself provided over 50 percent of the phosphorous and 75 percent of the sediment runoff reductions during this period. *See bar graph.*

Monitoring Stations

Water quality monitoring stations managed by the U.S. Geological Survey (USGS) are showing trends of long-term improvements in the streams and rivers that flow into the Bay. For instance, USGS estimates that the Susquehanna River delivered 66.2 million pounds of nitrogen to the Bay from January to May 2016, which is 17 percent below average conditions.

As a result of improved water quality and reduced nutrients, the size of the hypoxic zone, or areas of water with little or no dissolved oxygen to support aquatic life, in the Bay has decreased. The dissolved oxygen levels in Maryland's portion of the Chesapeake Bay was the second best it has been since 1985, according to data released by the Maryland Department of Natural Resources in July 2016. DNR officials stated this signifies pollution reduction efforts in the watershed are working.

Furthermore, scientists from the University of Maryland's Center for Environmental Science, National Oceanic and Atmospheric Administration and the USGS released predictions for this summer's Bay hypoxic zone. They estimated that the hypoxic zone will be either average or slightly smaller compared to previous summers.

Report Card

And the overall health of the Bay is improving. In 2015, the watershed scored a "C," one of the three highest scores since 1986. Many parts of the basin are seeing strong improvements, including the Choptank River, Upper Eastern Shore, Lower Western Shore and Rappahannock River (University of Maryland Center for Environmental Science).

MOVING FORWARD

Continuing the Commitment

While there is no short-term solution for the complex and multi-decadal water quality issues in the Chesapeake Bay watershed, all sectors working together can deliver valuable solutions. Science shows that voluntary agricultural conservation is measurably reducing the runoff of nutrients and sediment into waterways. But solutions will take time.

NRCS and its conservation partners have worked with farmers in the Bay region for more than 80 years. NRCS is committed to helping agriculture continue its contribution to improving water quality in the watershed while remaining a strong and vibrant economic engine for the region.

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NATURAL RESOURCES CONSERVATION SERVICE

SEPTEMBER 2016

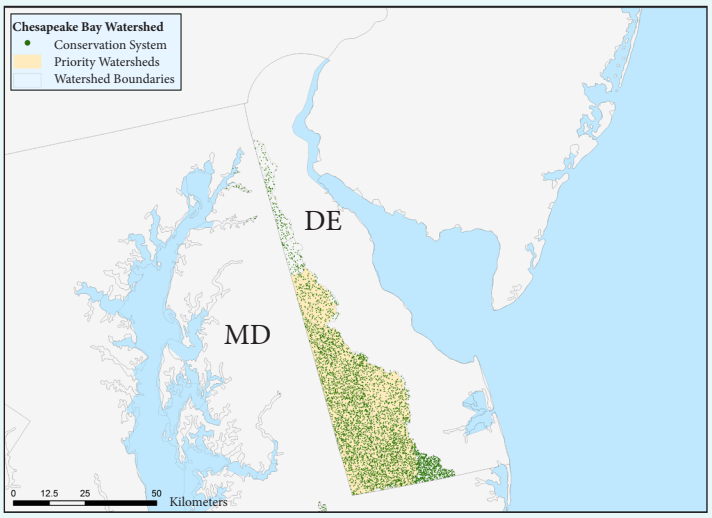
CHESAPEAKE BAY PROGRESS REPORT
DELAWARE

Agricultural Lands in Delaware Key to Healthy Bay

The saying, "everything flows downstream," is especially important in a place like Delaware where the land management decisions of farmers and forest landowners are helping send cleaner water downstream to the Chesapeake Bay and other waterways. The headwaters of the Chester, Choptank and Nanticoke rivers – all major tributaries to the Bay – are in western Delaware.

Farmers and forest landowners are using conservation systems that are reducing nutrient and sediment runoff by keeping soil in place and making agricultural lands more efficient and productive.

NRCS works closely with farmers to implement conservation systems to decrease nutrient and sediment runoff.



Each dot represents a farm where "Avoid-Control-Trap" conservation systems were implemented. Dots are randomly placed within priority watersheds to protect landowner privacy.

Targeted Approach in Delaware

USDA's Natural Resources Conservation Service (NRCS) has developed a systems approach for designing and installing conservation activities on farms and forests to protect and improve water quality. The core parts of this approach are conservation activities that avoid, control and trap potential nutrient and sediment losses from farm fields.

Most of the conservation work in Delaware focuses on controlling nutrients on livestock operations and on croplands where farmers use manure as fertilizer. Almost half of Delaware drains to the Chesapeake Bay, requiring NRCS to target investments in high-priority watersheds where nutrient and sediment pollution is highest. Since 2009, NRCS and conservation partners have worked with Delaware farmers and forest landowners to install conservation systems on more than 130,000 acres in the Chesapeake Bay basin.

CHESAPEAKE BAY PROGRESS REPORT: DELAWARE

Irrigation water management is one of many conservation practices used by Delaware farmers to conserve and clean water.

INVESTMENTS IN DELAWARE

YEAR	INVESTMENT	ACRES
2009	$4.7 million	21,000
2010	$5.9 million	25,000
2011	$7 million	24,000
2012	$4.6 million	20,000
2013	$3.7 million	18,000
2014	$3.6 million	20,000
2015	$2.5 million	2,000
TOTAL	$32 million	130,000

Source: NRCS Resources Economics, Analysis and Policy Division.

Leveraging the Help of Partners

NRCS investments are often matched two- and three-fold by conservation partners in Delaware. Through the Conservation Innovation Grants (CIG) program and Regional Conservation Partnership Program (RCPP), NRCS is building the next generation of conservation science and innovation and bringing together partners at the grassroots level to address natural resource challenges.

Through CIG, NRCS has invested about $4.4 million since 2009 in innovation efforts of universities, conservation districts, companies and other groups in Virginia. One of these grants is with the University of Delaware, which is funding innovative approaches to capture nitrogen and air pollutant emissions from poultry operations.

Through RCPP, NRCS is bringing conservation partners together across the state and basin, investing $4.6 million to get conservation practices on the ground. USDA designated the Chesapeake Bay as one of the eight critical conservation areas for RCPP funding. Right now, three projects are ongoing in the basin, bringing together an array of partners like the Sussex Conservation District, The Nature Conservancy and the Delaware Maryland Agribusiness Association.

Positive Outcomes in Delaware

Independent reports show positive trends for water quality, habitat and key aquatic species, and modeled results and monitoring stations show declines in nutrient and sediment loads to the Bay. The Midshore Riverkeeper Conservancy tracks 16 waterways, and 15 of them improved or maintained the same grade from the previous year. Increased water clarity — in part caused by decreased precipitation — helped the Choptank maintain its "B" grade from 2014. Eastern Bay and the surrounding creeks showed some of the best water quality recorded, all scoring "B" grades or higher. The Choptank is also less turbid, according to the conservancy.

Meanwhile, the Chester River Association measured improvement in the health in 2015, giving the waterway a "C+" on its latest report card, a step up from a "C" in 2014.

Rotational grazing leads to healthier pastures and cleaner water downstream.

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