



Financial Incentives for Water Quality Protection and Restoration on Agricultural Lands in Pennsylvania



Prepared by the Environmental Finance Center at the University of Maryland
September 2016



This report was produced by the **Environmental Finance Center (EFC)** at the University of Maryland in College Park. For more than twenty years, EFC has served communities in the Mid-Atlantic region by addressing the how-to-pay issues associated with natural resource restoration and protection. One of the EFC's core strengths is its ability to bring together a diverse array of individuals, agencies, and organizations to develop coordinated, comprehensive solutions for a wide variety of resource protection problems. The EFC has provided assistance on issues related to energy efficiency, stormwater management, source water protection, land preservation, green infrastructure planning, low impact development, septic system management, waste management, community outreach and training. For more information on EFC, please visit our website at www.efc.umd.edu.

Prepared for the Chesapeake Bay Program Office on behalf of the Commonwealth of Pennsylvania, this report presents and discusses financial incentives that may be used to catalyze water quality conservation and restoration activities on privately-owned agricultural lands. Pennsylvania is facing a significant challenge in meeting water restoration goals - both for local waterways and for the Chesapeake Bay, to which half of the state's land area drains. The Commonwealth has identified its **agriculture sector** as a target for enhanced efforts to stem nutrient and sediment pollution in order to comply with federally-mandated Total Maximum Daily Load goals. Offering financial incentives for installing conservation practices on farms is a powerful tool for reducing nonpoint source pollution from agricultural lands. While the report is targeted to Pennsylvania, many of the ideas are transferrable to other states in the Bay watershed and beyond.

Table of Contents

- I. Introduction and Summary Recommendations 4**
- II. Background 5**
 - a. Pennsylvania’s role in Chesapeake Bay restoration 5
 - b. Progress toward meeting TMDL goals 5
 - c. Current agriculture BMP tracking methods 7
- III. Financial Incentive Options..... 8**
 - a. Subsidies and cash incentives 8
 - i. USDA Farm Bill programs..... 8
 - ii. Lease agreements and conservation easements 11
 - b. Tax incentives and lending tools 13
 - i. Tax incentives 13
 - ii. Lending tools..... 15
 - c. Insurance products..... 17
- IV. Conclusion..... 18**

I. Introduction and Summary Recommendations

Pennsylvania is facing a significant challenge in meeting water restoration goals – both for local waterways and for the Chesapeake Bay. The Commonwealth has identified its agriculture sector in particular as falling behind in meeting federally-mandated Total Maximum Daily Load goals for nutrient and sediment pollution.¹ While myriad approaches will be necessary to meet TMDL targets for this sector, financial incentives are a powerful tool for catalyzing agricultural conservation activities that can help clean up the Bay.

This report begins by briefly describing Pennsylvania’s role in Chesapeake Bay restoration, the scope of the state’s challenge in meeting pollution reduction goals, and the need for creative, high-impact options for ramping up restoration efforts within the state’s agriculture sector. Next, a menu of financial incentive options is presented, including existing federal and state programs as well as newer, more innovative strategies. As will be discussed, Pennsylvania and other states have three basic options for incentivizing agricultural operators to integrate conservation practices into their operations: (1) subsidies and cash incentives; (2) tax incentives and lending tools; and (3) innovative insurance products. Within those categories, our **key recommendations** include:

- *Subsidies and cash incentives*
 - o Conduct in-depth analysis to ensure that the state is maximizing use of federal Farm Bill programs to meet WIP goals.
 - o Augment effective federal programs such as Environmental Quality Incentive Program, Conservation Stewardship Program, and Conservation Reserve Enhancement Program with state funding, especially to expand highly effective elements of these programs, such as pay-for-performance.
 - o Modify the state’s Agricultural Conservation Easement Purchase program to give greater priority to properties that implement desired conservation practices and/or are located in target watersheds.
 - o Target funds to the highest-impact conservation practices in identified high-priority watersheds, as recommended by Pennsylvania Department of Environmental Protection.²

- *Tax incentives and lending tools*
 - o Reform Pennsylvania tax code to allow costs associated with BMPs to be eligible for personal income tax deductions.

¹ Pennsylvania Department of Environmental Protection. January 21, 2016. *A DEP Strategy to Enhance Pennsylvania’s Chesapeake Bay Restoration Effort*.

² While DEP does not discuss targeting existing incentive programs, it does call for “putting new high-impact, low-cost BMP projects on the ground in watersheds that are currently impaired by agriculture.” Pennsylvania Department of Environmental Protection. January 21, 2016. *A DEP Strategy to Enhance Pennsylvania’s Chesapeake Bay Restoration Effort*.

- Expand popular and effective existing programs such as Resource Enhancement and Protection (REAP) tax incentive program.
 - Embed conservation requirements into farm lending products, specifically through the use of subsidized loans and credit enhancements.
- *Insurance products*
- Supplement federal crop insurance subsidies in return for desired conservation activity.

II. Background

a. Pennsylvania's role in Chesapeake Bay restoration

Pennsylvania plays a critical role in restoring the health of the Chesapeake Bay. While the state does not directly border the Bay, it makes up a large share of its watershed (35%), and half of the state's land area drains to the Bay.³ The Susquehanna River is the largest tributary to the Bay, providing 90% of the freshwater flow to the upper Bay and 50% of the Bay's total freshwater flow.⁴

"Simply stated, the water quality of the Chesapeake Bay cannot be restored without Pennsylvania's support. But even more important, water quality in Pennsylvania must be restored."

-Pennsylvania Department of Environmental Protection¹

To clean up the Bay, as well as the state's own creeks and rivers, Pennsylvania has set aggressive targets for reducing nutrient and sediment pollution. These targets are specified in the state's Watershed Implementation Plan and driven by the U.S.

Environmental Protection Agency (EPA)'s 2010 Chesapeake Bay Total Maximum Daily Load (TMDL). The TMDL mandates levels of nutrient and sediment pollution reductions that must be achieved in each Bay state by 2025. EPA uses a suite of modeling tools developed by the Chesapeake Bay Program partnership to determine load reductions for each major sector (agriculture, urban runoff, wastewater and combined sewer overflow systems, septic systems, and forests and atmospheric deposition), as well as to gauge states' progress toward achieving milestone implementation targets.

b. Progress toward meeting TMDL goals - and need for ramping up restoration activity in the agriculture sector

EPA estimates that Pennsylvania has achieved 27% of the nitrogen reductions, 31% of the phosphorous reductions, and 50% of the total suspended sediment reductions needed to

³ Pennsylvania Department of Environmental Protection. January 21, 2016. *A DEP Strategy to Enhance Pennsylvania's Chesapeake Bay Restoration Effort*.

⁴ "Susquehanna River." *Wikipedia: The Free Encyclopedia*. Wikimedia Foundation, Inc., date last updated: 1 September 2016. Web. Date accessed: 7 September 2016. https://en.wikipedia.org/wiki/Susquehanna_River

achieve its 2025 TMDL goals.⁵ The state has significantly reduced nutrient discharges from point sources such as wastewater treatment plants and is also on track to meet its phosphorous pollution reduction goals.⁶

Despite this progress, the state is falling behind on its nitrogen and sediment reduction goals, especially from nonpoint sources in the urban stormwater and agriculture sectors. The state's failure to meet interim targets has triggered initial backstop actions by EPA, which may eventually include expansion of point source permitting, permit application objections, re-directing or conditioning of federal grants, and increased EPA enforcement.⁷

In a recently-released strategy document, Pennsylvania Department of Environmental Protection (DEP) made six recommendations to improve the Commonwealth's approach to Bay restoration. Half of these recommendations directly target the agriculture sector:

- Recommendation 1: Addressing Pollutant Reduction Deficiencies by meeting the EPA recommended goal of inspecting 10 percent of farms in the Bay watershed annually, with **increased inspection and compliance efforts in the agricultural sector** using existing DEP and Conservation District staff, and with continued DEP outreach and program development for urban stormwater systems.
- Recommendation 2: Focusing on Local Water Quality Improvement and Protection (LWQ) by locating and quantifying previously undocumented BMPs, and **putting new, high-impact, low-cost BMP projects on the ground in watersheds that are currently impaired by agriculture** or stormwater by shifting an additional 15 percent of available statewide water quality funding (\$1,250,000) to Bay work.
- Recommendation 3: Improving Reporting, Record Keeping, and Data Systems (RRKD) to provide better and more accessible documentation of progress made toward Pennsylvania's restoration effort, including consideration of **establishing mandatory reporting requirements for the agriculture sector** in place of so-far unsuccessful voluntary reporting measures.⁸

Targeting the agriculture sector makes sense, as the portion of the state that drains to the Chesapeake Bay is intensively farmed. More than a quarter of that land area is currently in agricultural use,⁹ and the watershed is home to an estimated 33,610 farms.¹⁰ While farming is certainly not incompatible with clean waterways, agricultural operations can contribute excess nutrients to streams and rivers if manure and other fertilizers are not properly

⁵ Pennsylvania Department of Environmental Protection. March 30, 2012. *Pennsylvania Chesapeake Watershed Implementation Plan - Phase 2*.

⁶ Pennsylvania Department of Environmental Protection. January 21, 2016. *A DEP Strategy to Enhance Pennsylvania's Chesapeake Bay Restoration Effort*.

⁷ Ibid.

⁸ Ibid.

⁹ USDA Economic Research Service, Washington, DC. "Farm Income and Wealth Statistics." Last updated 8/30/16. <http://www.ers.usda.gov/data-products/farm-income-and-wealth-statistics/data-files-us-and-state-level-farm-income-and-wealth-statistics.aspx>

¹⁰ Pennsylvania Department of Environmental Protection. January 21, 2016. *A DEP Strategy to Enhance Pennsylvania's Chesapeake Bay Restoration Effort*.

managed. A recent analysis by the Chesapeake Bay Foundation finds that “the leading source of nitrogen, phosphorus, and sediment pollution to the Chesapeake Bay from Pennsylvania is agricultural activities.”¹¹ The good news is that nutrient pollution from farms can be effectively managed by an array of best management practices (BMPs), from well-known approaches such as planting cover crops and building manure storage sheds, to more experimental ideas such as on-farm composting and manure-to-energy projects.

Given the great need and the great opportunity for improving nutrient management on Pennsylvania farms, putting more high-impact BMPs on the ground could go a long way toward bringing Pennsylvania’s agriculture sector into compliance with TMDL mandates. To make this a reality, myriad approaches will likely be necessary, including education, enhanced regulation, and **financial incentives** for installing conservation practices. Incentives are a powerful mechanism for engaging farmers because they impact the operation’s bottom line, which not only provides a strong enticement to act but also integrates conservation into farmers’ everyday way of doing business.

Financial incentives affect farmers’ bottom line, which not only provides a strong enticement to act, but also integrates conservation into farmers’ everyday way of doing business.

c. Current agriculture BMP tracking methods

To understand the opportunity for getting more BMPs on the ground in Pennsylvania’s agricultural sector, it is helpful to have a sense for how BMPs are currently tracked and reported. To date, the state has been most effective at recording the number of cost shared BMPs, those that were funded in part by state and/or federal funds. These are reported to EPA annually by multiple federal and state agencies, and they are used to provide input to the Chesapeake Bay Program partnership’s Watershed Model for estimating load reductions.

In addition, Pennsylvania DEP has extensive efforts underway to estimate BMPs that have been installed without cost share, including remote sensing, transect surveys, and farmer self-assessment inventories, to help produce more reliable, verified, and usable data.¹²

Ramping up BMP tracking and monitoring is one of the key recommendations DEP makes in its 2016 *Strategy to Enhance Pennsylvania’s Chesapeake Bay Restoration Effort*. Better tracking will enable Pennsylvania to more accurately account for pollution reductions already in place, and better monitoring will help advance a “culture of compliance.”¹³ Both are essential in order for incentive programs to be effective. With reliable monitoring protocols in place, farmers will be motivated to maintain conservation BMPs over the lifespan of the

¹¹ Chesapeake Bay Foundation. October 2013. *Manure: Not the Leading Cause of Nitrogen Pollution to the Chesapeake Bay*.

¹² Pennsylvania Department of Environmental Protection. January 21, 2016. *A DEP Strategy to Enhance Pennsylvania’s Chesapeake Bay Restoration Effort*.

¹³ Ibid.

practices. Effective tracking will enable Pennsylvania to know what it is getting for its money and assess whether incentive programs are worth their cost.

III. Financial Incentive Options

Pennsylvania farmers currently have available to them a handful of incentives to install water quality BMPs on their land. Below, we summarize existing options, offer suggestions for better utilizing them, and present additional incentive ideas. Strategies are organized into three broad categories, which represent Pennsylvania's basic options for incentivizing farmers to integrate conservation into their operations: (1) subsidies and cash incentives; (2) tax incentives and lending tools; and (3) innovative insurance products.

a. Subsidies and cash incentives

Direct subsidies - including grants, cost share programs, and rental payments - are the most straightforward incentive approach. They make a direct link between the desired conservation activity and the incentive payment, and they have the added benefit of being well-known and trusted among the agriculture community. A challenge with subsidies, however - especially cost share programs - is the difficulty of establishing a price that clears the market, satisfying both buyer and seller.

i. USDA Farm Bill programs

U.S. Department of Agriculture Natural Resources Conservation Service (NRCS) administers three financial and technical assistance programs that are important in the context of incentivizing agriculture BMPs: Environmental Quality Incentive Program (EQIP), Conservation Stewardship Program (CSP), and Agricultural Management Assistance (AMA) Program.

- **EQIP** offers technical and financial assistance to agricultural operators who implement conservation practices that "improve soil, water, plant, animal, air and related natural resources on agricultural land and non-industrial private forestland."¹⁴ To be eligible, producers must have an adjusted gross income of no more than \$900,000 and develop an approved conservation plan addressing at least one natural resources concern. Payments up to a total of \$450,000 per contract are made once conservation practices have been installed.¹⁵

To determine how extensively Pennsylvania is utilizing the EQIP program, the commonwealth's EQIP contracts between 2009 and 2014 were compared with those

¹⁴ USDA Natural Resources Conservation Program. Environmental Quality Incentives Program website. Last accessed 9/1/16: <http://www.nrcs.usda.gov/wps/portal/nrcs/main/national/programs/financial/eqip/>

¹⁵ Ibid.

of four states with similar agricultural profiles, as well as with neighboring states of Maryland and Virginia. This comparison suggests that while Pennsylvania farmers are making good use of EQIP, there is some room for enhanced utilization. Compared to five other states with comparable acres of agricultural land, Pennsylvania had fewer active or completed EQIP contracts in 2014 than three states; Georgia, Mississippi, and Virginia had more contracts¹⁶ (61%, 67%, and 16% more, respectively), yet those states have significantly fewer farm operations than Pennsylvania (29%, 35%, and 21% fewer, respectively). However, Pennsylvania is on par with these states in terms of the percentage of total agricultural land covered by an EQIP contract. Pennsylvania's EQIP usage far exceeds that in neighboring Maryland, but this is to be expected given Maryland's comparably small agriculture sector.

Table 1. EQIP utilization in Pennsylvania and in comparison states

State	Acres of agricultural land (2014)	Number of farm operations (2014)	State receipts for ag commodities, \$1,000 (2014)	Number of active or completed EQIP contracts (2014)	Acres covered by EQIP contracts (2014)	Percentage of total acreage covered by EQIP	EQIP Technical and Financial Assistance (2014)
Georgia	9,400,000	41,100	\$9,966,228	1,721	112,275	1.19%	\$29,493
Maryland	2,030,000	12,300	\$2,430,859	314	18,549	0.91%	\$13,581
Mississippi	10,900,000	37,100	\$6,573,317	2,011	196,382	1.80%	\$35,969
New York	7,180,000	35,500	\$6,359,513	542	53,462	0.74%	\$18,752
North Carolina	8,400,000	49,500	\$13,006,621	647	61,008	0.73%	\$22,161
Pennsylvania	7,720,000	58,800	\$8,294,978	672	81,724	1.06%	\$29,449
Virginia	8,200,000	45,900	\$4,176,569	799	86,096	1.05%	\$24,732

Sources:

USDA Economic Research Service, Washington, DC. "Major Land Uses of the United States." Last updated 5/17/16.

<http://www.ers.usda.gov/data-products/major-land-uses.aspx>

USDA Economic Research Service, Washington, DC. "Farm Income and Wealth Statistics." Last updated 8/30/16.

<http://www.ers.usda.gov/data-products/farm-income-and-wealth-statistics/data-files-us-and-state-level-farm-income-and-wealth-statistics.aspx>

USDA Natural Resources Conservation Service, Washington, DC. "NRCS Conservation Programs." Last updated 7/15/15. http://www.nrcs.usda.gov/Internet/NRCS_RCA/reports/fb08_cp_eqip.html

- **CSP** takes a performance-based approach to incentivizing conservation by making annual payments to farmers in proportion to the environmental benefits that actually occur from installed BMPs. When benchmarked against the same five comparable states, Pennsylvania initially appears to be underutilizing CSP. All but North Carolina had a greater percentage of total agricultural land affected by a CSP contract in 2014, and in several cases the difference is quite stark – such as Mississippi, which had 93% more acres under CSP than Pennsylvania even though it has 30% fewer farm operations. Yet looking more broadly at the national picture, Pennsylvania seems to receive a reasonable share of CSP funding. In 2014, the Commonwealth received

¹⁶ The most recent year for which data is available.

1.7% of total CSP contracts awarded across the country, which is on par with its share of nationwide agricultural commodity value (1.9%).¹⁷

Table 2. CSP utilization in Pennsylvania and in comparison states

State	Acres of agricultural land (2014)	Number of farm operations (2014)	State receipts for ag commodities, \$1,000 (2014)	Number of active or completed CSP contracts (2014)	Acres covered by CSP contracts (2014)	Percentage of total acreage covered by CSP	CSP Technical and Financial Assistance (2014)
Georgia	9,400,000	41,100	\$9,966,228	343	168,471	1.79%	\$38,954,500
Maryland	2,030,000	12,300	\$2,430,859	2	619	0.03%	\$1,308,900
Mississippi	10,900,000	37,100	\$6,573,317	177	217,314	1.99%	\$28,642,600
New York	7,180,000	35,500	\$6,359,513	40	32,732	0.46%	\$6,503,400
North Carolina	8,400,000	49,500	\$13,006,621	19	11,460	0.14%	\$3,732,200
Pennsylvania	7,720,000	58,800	\$8,294,978	43	12,232	0.16%	\$7,528,200
Virginia	8,200,000	45,900	\$4,176,569	47	17,977	0.22%	\$7,085,700

Sources:

USDA Economic Research Service, Washington, DC. "Major Land Uses of the United States." Last updated 5/17/16.
<http://www.ers.usda.gov/data-products/major-land-uses.aspx>

USDA Economic Research Service, Washington, DC. "Farm Income and Wealth Statistics." Last updated 8/30/16.
<http://www.ers.usda.gov/data-products/farm-income-and-wealth-statistics/data-files-us-and-state-level-farm-income-and-wealth-statistics.aspx>

USDA Natural Resources Conservation Service, Washington, DC. Last updated 7/15/15.
http://www.nrcs.usda.gov/Internet/NRCS_RCA/reports/fb08_cp_cstp.html

- **AMA** gives financial and technical assistance to agricultural operators who address "issues such as water management, water quality, and erosion control by incorporating conservation into their farming operations."¹⁸ The program covers up to 75% of the cost of installing conservation practices such as water management structures, forested buffers, erosion control, and transition to organic farming, among others. In Pennsylvania, irrigation and cover crop practices are the most commonly funded practices via AMA.¹⁹

Among the 16 states eligible for AMA funding, Pennsylvania received the greatest overall allocation of AMA financial and technical assistance funding - as well as the greatest number of contracts - between 2009 and 2014. With the exception of Wyoming and Utah, it also had the greatest amount of acreage under an AMA contract during this timeframe.²⁰

¹⁷ USDA Economic Research Service. Washington, DC. "Farm Income and Wealth Statistics." Last updated 8/30/16.
<http://www.ers.usda.gov/data-products/farm-income-and-wealth-statistics/data-files-us-and-state-level-farm-income-and-wealth-statistics.aspx>

¹⁸ USDA Natural Resources Conservation Service. Agricultural Management Assistance website. Last accessed 9/12/16:
<http://www.nrcs.usda.gov/wps/portal/nrcs/main/national/programs/financial/ama/>

¹⁹ Barry France, Natural Resources Conservation Service. Personal communication with EFC, 1/7/16.

²⁰ Natural Resources Conservation Service, Washington, DC. 9/1/2016:
http://www.nrcs.usda.gov/Internet/NRCS_RCA/reports/fb08_cp_ama.html

Opportunity for enhancement: While this cursory analysis of utilization data suggests that Pennsylvania is taking relatively good advantage of NCRS Farm Bill funds, EFC recommends more in-depth study to ascertain whether the state is maximizing use of these dollars to meet WIP goals, and to identify successful approaches from other states that can be transferred to Pennsylvania to increase use of these federal Farm Bill programs. In addition, Pennsylvania may consider enhancing popular programs with state funds or through public-private partnerships. The market-like features of CSP in particular make it worth expanding or emulating with a complementary state program. By paying for performance, this program has greater potential than other cost share programs to result in actual pollution reductions.

Perhaps more important than expanding programs, Pennsylvania should verify that NRCS dollars are going where they are most effective in helping the state comply with TMDL goals and achieving local water quality restoration. One of the six core recommendations made in PA DEP's Bay restoration strategy document is the "implementation of **targeted efforts in impaired watersheds** where the cause listed is either agricultural or urban stormwater, and where geography and land use are amenable to successful BMP implementation, that lead to quick results in gaining attainment status."²¹ Pennsylvania's DEP should engage with the state Department of Agriculture, county conservation districts, and local nonprofits and outreach organizations to assess whether NRCS funds are currently being used to install high-impact BMPs in high priority sub-watersheds and to encourage farmers in priority areas to access these funds. This may be done by providing assistance to farmers in preparing NRCS applications, or by offering additional state funding coupled to NRCS awards.

ii. Lease agreements and conservation easements

The Conservation Reserve Program (CRP), administered by the USDA Farm Service Agency (FSA), makes yearly rental payments to farmers who voluntarily remove environmentally sensitive land from production and plant vegetation that will improve water quality.²² An expansion of this program is the Farmable Wetlands Program (FWP), which is intended to restore wetlands; farmers and ranchers receive rental payments in return for planting species to restore wetlands and wetland buffer zones.²³ A further extension of CRP is the Conservation Reserve Enhancement Program (CREP), which "targets high-priority conservation issues identified by government and non-governmental organizations."²⁴ In exchange for removing from production land that affects these conservation issues, farmers receive annual rental payments.

²¹ Pennsylvania Department of Environmental Protection. January 21, 2016. *A DEP Strategy to Enhance Pennsylvania's Chesapeake Bay Restoration Effort*.

²² USDA Farm Service Agency. Conservation Programs website. Last accessed 9/7/16: <http://www.fsa.usda.gov/programs-and-services/conservation-programs/index>

²³ USDA Farm Service Agency. Conservation Programs website. Last accessed 9/7/16: <http://www.fsa.usda.gov/programs-and-services/conservation-programs/index>

²⁴ Ibid.

Opportunity for enhancement: As above, Pennsylvania would benefit from maximizing the use of these federal resources, as well as tracking and reporting participation in order for conservation practices to be accounted for in the Chesapeake Bay Model. Because CREP in particular has been shown to be effective at protecting local waterways,²⁵ Pennsylvania might consider expanding its existing CREP to boost BMP installation, especially those practices shown to be effective in terms of both cost and nutrient reductions.

Maryland has a successful CREP that could be a good model for going above and beyond the federal program. This federal-state partnership “pays top dollar to landowners who agree to take environmentally sensitive cropland out of production for 10 to 15 years”²⁶ and to install BMPs such as planting streamside buffers, establishing wetlands, protecting highly erodible lands, and creating wildlife habitat. In exchange, farmers can receive five kinds of payments: a signing bonus (up to \$250 per acre), annual rental payments (significantly higher than rates offered by traditional CRP), cost share assistance (up to 87.5% of the cost to install eligible BMPs), a one-time practice incentive payment (worth 40% of the total cost of establishing qualifying BMPs, in addition to the cost share), and mid-contract management payments (up to 50% of the cost to implement practices).²⁷ Importantly, buffers eligible for cost share assistance through CREP are integrated with Maryland Nutrient Management Program setback standards; helping farmers achieve regulatory compliance is an added incentive of the program. But it is the program’s promise of steady, dependable rental income that is likely its chief appeal.

Pennsylvania’s Agricultural Conservation Easement Purchase Program (ACEPP) enables the state as well as county governments to protect active farmlands by purchasing conservation easements, which limit land uses on the parcel to activities compatible with farming. The program is overseen by the State Agricultural Land Preservation Board (State Board), and county conservation districts or planning commissions run county-level programs. Funding comes from various sources including the state Agricultural Conservation Easement Purchase Fund, the federal USDA Farm and Ranchland Protection Program, as well as municipal and private funding.²⁸

To be eligible for inclusion in the program, parcels must be located in a designated Agricultural Security Area and meet additional requirements such as minimum acreage and portion of land in active agricultural use. In addition, counties employ a ranking system to prioritize which parcels to purchase. Scoring criteria include the use of soil and water conservation practices and best land management practices, and farms that implement

²⁵ Maryland Department of Natural Resources. Conservation Reserve Enhancement Program website. Last accessed 9/12/16: <http://dnr2.maryland.gov/wildlife/Pages/habitat/milo.aspx>

²⁶ Maryland Department of Agriculture. Conservation Reserve Enhancement Program website. Last accessed 9/12/16: http://mda.maryland.gov/resource_conservation/Pages/crep.aspx

²⁷ Maryland Department of Agriculture. Undated. “Maryland’s Conservation Reserve Enhancement Program.” Available: http://mda.maryland.gov/resource_conservation/Documents/CREP%20Brochure.pdf

²⁸ Pennsylvania Land Trust Association. Agricultural Conservation Easement Purchase Program. Last accessed 9/8/16: <http://conservationtools.org/guides/47-agricultural-conservation-easement-purchase-program>

nutrient management practices can earn additional points.²⁹ Before the State Board can approve an easement purchase, it must receive the parcel's approved Conservation Plan, which must include a nutrient management component stating whether a Nutrient Management Plan is required and if so, confirmation that the parcel is in compliance with that Plan.³⁰ Counties must use the minimum state scoring criteria but can add their own additional criteria, subject to state approval.³¹

Opportunity for enhancement: State and county boards should consider prioritizing parcels that are located in target watersheds as determined by PA DEP as part of its watershed implementation planning process. Location in a priority area could be added as a Farmland Potential factor (under the existing categories of land stewardship or listing by local/state/federal authorities as a significant location), or the ranking system could simply add bonus points for these properties. Either way, the points should be significant enough so that parcels in priority areas are more competitive when seeking funding through ACEPP.

b. Tax incentives and lending tools

The subsidies discussed above create a direct link between the conservation activity and the incentive payment. Tax credits and lending tools, on the other hand, create a direct link between conservation incentives and core farm business activities - namely, paying taxes and accessing financial products such as loans and leases. By reducing an agricultural operator's tax burden or the cost of credit, these incentives can also affect the farmer's bottom line and therefore provide a strong catalyst to action.

i. Tax incentives

Emerging research indicates that farmers are in favor of income tax credits as a form of compensation for conservation activity. In fact, tax credits are viewed as favorably as direct payments, perhaps in part because they are perceived to have low transaction costs.³² Further, a recent study found that tax credits were more effective than direct payments at reducing nutrient pollution.³³ In the study, farmers in Florida's Everglades Agricultural Area received tax credits for installing agricultural conservation BMPs that reduced phosphorous runoff, while farmers in the nearby Okeechobee Drainage Basin received only technical and financial support for BMP installation. The former program resulted in greater overall water quality gains.³⁴

²⁹ 7 Pa. Code § 138e.15. Farmland Ranking System.

³⁰ 7 Pa.Code § 138e.222. Conservation Plan.

³¹ 7 Pa.Code § 138e.16. Agricultural Conservation Easement Purchase Program.

³² Ibid.

³³ Abrams, Ryan. "The Problem of Nutrient Pollution: Lessons from Florida's Fragmented Approach." *University of Denver Water Law Review*. 17 (2013): 207.

³⁴ Ibid.

Income tax deductions. In Pennsylvania, the majority – 82.7% – of farms are family-owned operations, rather than corporations or partnerships.³⁵ For family-owned farm operations, any tax deductions are taken on personal income tax returns. Yet the Pennsylvania tax code only permits business expense deductions to be made for “those ordinary, necessary, and reasonable expenses currently paid or incurred during the taxable year which are directly related to and necessary for the production and marketing of the taxpayer’s products, goods, and services.”³⁶ Agricultural BMPs are not expressly or implicitly eligible.

Income tax deductions for conservation-related expenses are already allowed at the federal level. Federal tax code permits farmers to deduct expenditures made for “the construction, control, and protection of diversion channels, drainage ditches, irrigation ditches, earthen dams, watercourses, outlets, and ponds” but not for depreciable items such as tanks, pipes, or pumps.³⁷

Resource Enhancement and Protection (REAP). Administered by the Pennsylvania State Conservation Commission, REAP enables farmers, landowners or businesses to earn tax credits for implementing BMPs that enhance farm production and protect natural resources, such as manure storage systems, alternative manure treatment practices, grassed waterways, rotational grazing systems, no-till planting equipment, cover crops and stream bank fencing.³⁸ Farmers receive a state income tax credit equal to 50-75% of the cost of BMP installation, up to \$150,000 per farm, and tax credits may be used incrementally as needed for up to 15 years. To be eligible for REAP, farmers must be on schedule to implement their Conservation Plan, Nutrient Management Plan, and/or Manure Management Plan.³⁹ Tax credits are earned after the BMP is installed, and the tax credit must be returned if the practice is not maintained over its lifespan.

An innovative feature of this program is that credits are transferrable and can be sold to other taxpayers after one year. Additionally, the program allows a “sponsor” business to pay for the BMP purchase or installation and then apply for the tax credit instead of the agricultural producer or landowner. The program is available on a first-come, first-served basis, and it is so popular that demand regularly outpaces REAP’s annual allocation.⁴⁰

Clean and Green. Authorized by the Pennsylvania General Assembly in 1974 to preserve farmland and open space, Clean and Green is a preferential tax assessment program which

³⁵ USDA Economic Research Service. “State Fact Sheet: Maryland.” Last updated 8/30/16. [http://www.ers.usda.gov/data-products/state-fact-sheets/state-](http://www.ers.usda.gov/data-products/state-fact-sheets/state-data.aspx?StateFIPS=24&StateName=Maryland#P851b7a2d362540ddb27c9bc57f8b4893_2_428iT15C0x0)

[data.aspx?StateFIPS=24&StateName=Maryland#P851b7a2d362540ddb27c9bc57f8b4893_2_428iT15C0x0](http://www.ers.usda.gov/data-products/state-fact-sheets/state-data.aspx?StateFIPS=24&StateName=Maryland#P851b7a2d362540ddb27c9bc57f8b4893_2_428iT15C0x0)

³⁶ Pennsylvania Department of Revenue. *Pennsylvania Personal Income Tax Guide*. Last accessed 9/7/16:

<http://www.revenue.pa.gov/FormsandPublications/PAPersonalIncomeTaxGuide/Pages/default.aspx#.V9BNvJMrJmA>

³⁷ 26 C.F.R. § 1.175-2. Definition of soil and water conservation expenditures.

³⁸ Pennsylvania Department of Agriculture. Resource Enhancement and Protection (REAP) website. Last accessed 9/7/16:

<http://www.agriculture.pa.gov/Protect/StateConservationCommission/REAP/Pages/default.aspx>

³⁹ Ibid.

⁴⁰ Ibid.

assesses property taxes on use value rather than fair market value.⁴¹ Statewide, there is robust participation in the Clean and Green program, with 3,681,489 acres of agricultural land enrolled statewide, the vast majority of which (3,029,451) are in the Bay watershed. There is currently no requirement for parcels enrolled in the program to have conservation or nutrient management plans in place,⁴² although legislation to integrate this program with state agricultural regulations has recently been introduced.⁴³

Opportunity for enhancement: Given the popularity of tax credits as compensation for conservation activity, Pennsylvania should consider expanding these programs. State tax code should be reformed to enable costs associated with installing and maintaining BMPs to be eligible for business expense deductions on personal income tax returns. Expanding REAP would likely produce significant additional conservation activity, and while the current budget climate is not particularly conducive to allocating new funding, an advantage of tax credits is that they do not require the state to generate additional revenue upfront. Additionally, the state should accelerate efforts to integrate tax credit programs with conservation regulations and even consider strengthening the conservation components of these program's eligibility requirements.

ii. Lending tools

Farm Credit is a century-old network of nearly 75 local, independently-owned lenders across the country that provides loans, equipment leases, and financial services to agricultural producers and other rural businesses such as infrastructure service providers.⁴⁴ Pennsylvania's agriculture community is served by two Farm Credit lenders - AgChoice, located in Mechanicsburg, Pennsylvania, and Mid-Atlantic Farm Credit (MAFC), based in Westminster, Maryland.

As of 2014, AgChoice had more than \$1.5 million in loan volumes across its lending area, which includes not only Pennsylvania but also the northern panhandle of West Virginia,⁴⁵ and MAFC had more than \$2.2 million in outstanding loans across its lending area, which also includes parts of Virginia, West Virginia, Maryland and Delaware.⁴⁶ Not surprisingly, the highest loan volumes in Pennsylvania for both lenders are in the state's agriculturally productive southeastern corner, including three counties that lie within the Chesapeake Bay watershed.

⁴¹ Pennsylvania Department of Agriculture. Clean and Green website. Last accessed 9/8/16:

<http://www.agriculture.pa.gov/Encourage/farmland/clean/Pages/default.aspx>

⁴² Pennsylvania Department of Agriculture. May 1, 2015. *2014 Farmland Preservation Annual Report*.

⁴³ Julie Winters and Kelly Shenk. US EPA Chesapeake Bay Program Office. Personal communication with EFC, 8/17/16.

⁴⁴ Farm Credit website. Last accessed 9/6/16: <https://www.farmcreditnetwork.com/about/overview>

⁴⁵ AgChoice Farm Credit. *2014 Annual Report*. Available: <http://www.agchoice.com/AgChoice/files/96/96a959bc-4775-4624-8fe0-750ba7dda83e.pdf>

⁴⁶ Mid-Atlantic Farm Credit *2014 Annual Report*. Available:

http://issuu.com/midatlanticfarmcredit/docs/31_quarterly_report_4q14final

USDA Farm Service Agency (FSA) provides loans to agricultural operators who are unable to obtain credit elsewhere, in order to start, sustain or expand their farms. FSA loan types include farm ownership loans (to purchase or expand a farm), operating loans (to pay for operating expenses or purchase livestock or equipment), emergency loans (to restore property after damage) and conservation loans (to help complete a conservation practice in an approved conservation plan).⁴⁷ FSA loans are intended to be transitional, helping farmers graduate to commercial credit.

In 2015, Pennsylvania farmers were approved for 635 FSA loans, for a total of \$72,882,000. The majority of these - 430 - were direct operating loans, or those made and serviced by the FSA with government money rather than those made and serviced by commercial lenders.⁴⁸ Direct loan recipients are required to be in compliance with all applicable environmental regulations and requirements.

Pennsylvania Industrial Development Authority (PIDA) provides low-interest loans and lines of credit for businesses that commit to creating and retaining full-time jobs.⁴⁹ Agricultural producers and processors are among the eligible businesses (provided they have at least 10 acres and \$1,000 in annual sales), and one type of eligible loan project is the adoption or installation of "pollution prevention or energy efficient equipment or processes that reduce or reuse raw materials on-site, reduce the production of waste, or significantly reduce energy consumption and are directly related to the business activity of the eligible business."⁵⁰ Loans cover 75% of project costs, up to \$100,000. Applicants must provide a detailed accounting of current generation of pollutants as well as anticipated reductions.⁵¹

Opportunity for enhancement: Embedding conservation requirements into the financial products that farmers regularly access is an opportunity to achieve nutrient and sediment pollution reductions. While farmers typically are not willing to borrow money to fund a BMP, they do borrow money to purchase land or buy new equipment. The key is to link conservation with these farm financing needs.

One option for achieving this is for the state to subsidize or buy down interest rates on loans that integrate desired conservation components, perhaps prioritizing loans made in DEP-targeted watersheds. The state could also provide credit enhancements on loans that include BMP installation provisions. Credit enhancements are additional collateral, insurance or third party guarantees attached to a loan that provide the lender with assurance that the borrower will honor the obligation.⁵²

⁴⁷ USDA Farm Service Agency. June 2012. *Your Guide to FSA Farm Loans*.

⁴⁸ USDA Farm Service Agency. *Farm Loan Programs Obligations Report - FY 2015 as of September 30, 2015*.

⁴⁹ Pennsylvania Department of Community and Economic Development. February 2015. *Pennsylvania Industrial Development Authority Program Guidelines*.

⁵⁰ Ibid.

⁵¹ Ibid.

⁵² Investopedia. "Credit Enhancement." Last accessed 9/7/16: <http://www.investopedia.com/terms/c/creditenhancement.asp>

In both of these scenarios, agricultural operators would enjoy a lower interest rate or a credit enhancement over the term of the loan, provided that the promised BMP is maintained over its lifespan (ongoing reporting and monitoring would need to be built into the program). If the farmer were to default on his/her commitment to install and maintain the BMP, the interest rate would return to market value and the borrower could also be required to pay back the subsidy.

Maryland's Linked Deposit Program is a model of using a subsidized lending tool to achieve a desired social outcome. Administered by the Maryland Department of Housing and Community Development, this is a statewide initiative designed to stimulate business development among minority-owned and small businesses. Borrowers receive up to a 2% discount on their interest rate over the life of the loan, as long as they remain in good standing as a certified minority-owned enterprise or small business. Loans enrolled in this program are not a debt of the State of Maryland.⁵³

For farmers to access these innovative loan products, it will be helpful to have a centralized place where applicants can find information and assistance in identifying the best lending options to meet their needs. University agricultural extension agents, local soil and water conservation districts, and Pennsylvania Department of Agriculture regional office staff would be ideal conduits of information regarding these tools, as they already regularly interact with agricultural operators. But it will also be necessary for a state agency to engage with lenders in making subsidized products available; PENNVEST may be good candidate for this role.

c. Insurance products

Subsidized insurance products offered in return for investment in conservation activities are a way to reduce agricultural operators' environmental impact and also their operational risk. Linking insurance products to conservation activities creates a direct connection to the core competencies of farming operations. Because subsidized insurance premiums require a relatively low level of investment, but can generate significant pollution reductions, they represent a way to effectively leverage public conservation investment dollars.

USDA Risk Management Agency (RMA) manages the federal crop insurance program, overseeing the activities of 17 private crop insurance companies nationwide who insure agricultural operators against crop loss or damage. The federal program was expanded in 2016 and now includes "more than 118,000 coverage options for 543 varieties of crops, nearly doubling from the roughly 64,000 different coverage options that were available in 2009."⁵⁴ Total crop insurance liability is \$102.4 billion.⁵⁵

⁵³ Maryland Department of Housing and Community Development. Undated. "Maryland Linked Deposit Program Fact Sheet."

⁵⁴ USDA Risk Management Agency. 7/7/16. News Release: "USDA Builds on Record of Crop Insurance Success for America's Farmers and Ranchers." Available: <http://www.rma.usda.gov/news/2016/07/cropinsurance.pdf>

⁵⁵ Ibid.

The 2014 Farm Bill established conservation compliance as a requirement for crop insurance subsidies.⁵⁶ To be eligible for premium subsidies, producers now must comply with Highly Erodible Land Conservation (HELC) and Wetland Conservation (WC) provisions, which affect activities such as breaking new land, creating or modifying drainage systems, removing fence rows, and filling wet areas.⁵⁷ These are the same provisions that affect eligibility for FSA or NRCS assistance.⁵⁸

Opportunity for enhancement: Deeper insurance subsidies for farmers that go above and beyond minimum conservation requirements could incentivize specific practices identified by PA DEP in its Chesapeake Bay restoration strategy. RMA currently provides additional support in the form of waived fees and greater subsidies to special categories of producers, such as beginning farmers and ranchers, as well as organic producers. Pennsylvania could model this approach by targeting certain producers – either those in high-priority watersheds or those who install advanced BMPs – by working with private crop insurance companies to offer these clients more deeply subsidized rates.

IV. Conclusion

As Pennsylvania considers refining and expanding its financial incentive programs in order to advance Bay restoration goals, EFC's key recommendation is to **link incentive programs - existing and future - to the state's Watershed Implementation Plan goals**. Significant federal and state resources are already flowing to support conservation in Pennsylvania; better targeting these dollars so that they help achieve TMDL targets could pay big dividends.

As has been noted, Pennsylvania DEP is already recommending that high-impact, low-cost BMPs be installed in watersheds that are impaired by agriculture and failing to meet TMDL goals.⁵⁹ A concerted effort should be made to funnel resources to those practices in those watersheds. As DEP is well aware, "attention to BMP selection and spatial targeting can produce big cost savings."⁶⁰ Choosing cost-effective BMP portfolios – defined as "a set of practices assigned to locations that minimizes the costs satisfying nitrogen, phosphorus, and sediment load allocation targets in each Chesapeake Bay jurisdiction" – could reduce Pennsylvania's cost of compliance by an estimated 36%.⁶¹

⁵⁶ Conservation compliance dates to 1985, but between 1996 and 2014, it was decoupled from the federal crop insurance program.

⁵⁷ USDA. Sept 2014. "Highly Erodible Land Conservation & Wetland Conservation Compliance for Crop Insurance Participants" fact sheet. Available: http://www.rma.usda.gov/pubs/rme/conservationcompliance_09.2014.pdf

⁵⁸ USDA. July 2014. "Conservation Fact Sheet: Highly Erodible Land Conservation and Wetland Conservation Compliance." Available: http://www.fsa.usda.gov/Internet/FSA_File/wetland_compliance_july2014.pdf

⁵⁹ Pennsylvania Department of Environmental Protection. January 21, 2016. *A DEP Strategy to Enhance Pennsylvania's Chesapeake Bay Restoration Effort*.

⁶⁰ J. Shortle, Environment & Natural Resources Institute, Penn State University. "The Costs to Agriculture of Saving the Chesapeake Bay" presentation. Accessed 9/12/16: http://files.dep.state.pa.us/Water/ChesapeakeBayOffice/CBMT_May2014_AgCostsChesapeakeBayTMDL.pdf

⁶¹ Ibid.

Beyond this key recommendation, if the Commonwealth is interested in exploring some of the newer, more innovative incentive options discussed in this report – such as paying down interest rates on agricultural loans in exchange for conservation, or reforming the state tax code – **further study could be overseen by the new Chesapeake Bay Office within DEP**, which DEP has proposed in order to ensure the “proper development, implementation and coordination of the commonwealth’s efforts for restoring the Chesapeake Bay.”⁶²

New and expanded programs will, of course, require funding – both for the incentives themselves and for project administration and monitoring. Pennsylvania is well aware of the need for additional resources in order to meet TMDL targets. Indeed, one of the six goals in PA DEP’s *Strategy to Enhance Pennsylvania’s Chesapeake Bay Restoration Effort* is “obtaining additional resources for water quality improvement by seeking new sources of funding, which will have Bay compliance as a primary goal.”⁶³ **Strategies for financing** the state’s Watershed Implementation Plan is the subject of EFC’s forthcoming report *Options for Financing Chesapeake Bay Restoration in Pennsylvania*. This report will also discuss the critical role of **public-private partnerships** in achieving restoration. While not a financial incentive per se, engaging the nonprofit community to reach Pennsylvania farmers – especially members of the Plain Sect community – has been shown to be an effective way to motivate these farmers to implement conservation practices on their land.⁶⁴

⁶² Pennsylvania Department of Environmental Protection. January 21, 2016. *A DEP Strategy to Enhance Pennsylvania’s Chesapeake Bay Restoration Effort*

⁶³ Ibid.

⁶⁴ Chesapeake Bay Foundation. 2/15/13. “A Model for Conservation Practices on Amish Farms.” Available: http://cbf.typepad.com/chesapeake_bay_foundation/2013/02/raymond-king.html