

PENNSYLVANIA

**RESOURCE ENHANCEMENT
AND PROTECTION PROGRAM
TAX CREDIT**

An Evaluation of Program Performance



March 2021

**COMMONWEALTH OF PENNSYLVANIA
INDEPENDENT FISCAL OFFICE**

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INDEPENDENT FISCAL OFFICE

March 25, 2021

The Honorable Members of the Performance-Based Budget Board and Chairs of the House and Senate Finance Committees:

Act 48 of 2017 requires the Independent Fiscal Office (IFO) to review various state tax credits over a five-year period. For the third year, the IFO reviewed five tax credits: the Neighborhood Assistance Program, Resource Enhancement and Protection Program, Entertainment Economic Enhancement Program, Video Game Production and Keystone Special Development Zones Tax Credits. The act requires the IFO to submit tax credit reviews to the Performance-Based Budget Board and the Chairs of the House and Senate Finance Committees and to make reports available to the public on the IFO website.

This report contains the tax credit review for the Resource Enhancement and Protection Program (REAP) Tax Credit. The IFO reviewed studies on the cost and environmental impact of agricultural best management practices (BMPs) for reducing water pollution, held discussions with various stakeholders and met with agency staff who administer the tax credit. Based on that research, the IFO submits this report to fulfill the requirements contained in Act 48.

Pennsylvania is one of two states in the Chesapeake Bay watershed to offer a tax credit to agricultural operations that implement and maintain BMPs, which reduce the amount of nitrogen, phosphorus and sediment pollution that enters waterways. Most watershed states provide grants or cost-sharing funds to encourage farmers to adopt these practices. Other states use various oversight measures to increase usage of BMPs. This analysis examines available data and other issues that determine the effectiveness of the REAP Tax Credit.

The IFO welcomes all questions and comments on the contents of this report. Questions and comments can be sent to contact@ifo.state.pa.us.

Sincerely,

A handwritten signature in blue ink that reads "Matthew J. Knittel".

Dr. Matthew J. Knittel
Director

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General Findings and Recommendations

The Resource Enhancement and Protection Program (REAP) Tax Credit created by Act 55 of 2007 is available to eligible farmers/landowners or project sponsors for the implementation of best management practices (BMPs) that reduce the environmental impact of the agricultural industry. The credit is equal to 50 to 75 percent of the BMP-eligible project costs and the BMP must be maintained for a predetermined lifespan (typically five to ten years). Act 13 of 2019 increased the annual cap on the REAP Tax Credit from \$10 million to \$13 million.

The **general findings** of this report are as follows:

- Pennsylvania and Virginia are the only states in the Chesapeake Bay watershed that utilize tax credits to incentivize the implementation of BMPs. Other states rely on grants, loans, technical assistance programs or the creation and enforcement of land management regulations.
- For 2019, the average REAP project totaled \$60,400 (includes eligible and non-eligible expenses). Roughly 42 percent of the cost was reimbursed by the REAP Tax Credit, with the remainder funded via grants and private investment.
- The bulk of REAP Tax Credits are issued to individuals and pass-throughs (84.9 percent) and are utilized to reduce personal income tax liabilities (79.3 percent). This implies that the REAP Tax Credit benefits small businesses.
- Available research generally concludes that incentives (e.g., tax credits and grants) combined with regulatory compliance efforts are the most effective way to increase the use of agricultural BMPs and reduce pollution in waterways.
- The State Conservation Commission (SCC) awards tax credits for previously completed BMPs. These credits do not incentivize new activity. Recent data suggest these credits comprise a significant share of total awards.
- Roughly 55 percent of REAP Tax Credits are sold for an average of 85 cents per dollar of credit issued. The remaining 15 cents is retained by the purchaser and third party facilitator.
- It is difficult to measure the pollution reduction attributed to the REAP Tax Credit Program for three reasons: (1) factors such as soil, geographic location and proximity to a body of water may improve or reduce the effectiveness of BMPs installed and maintained on the land, (2) there is no cost-effective way to measure pollution from nonpoint sources (e.g., agricultural operations) and (3) the impact of the REAP Tax Credit award on the behavior of the farmer is not easily separated from that of a grant that may be awarded for the same project.

The final section of this report contains various **recommendations**. A summary is as follows:

- The SCC should collaborate with the Department of Environmental Protection to estimate the pollution reduction resulting from REAP-qualified BMP projects.
- The SCC should review the current policy of approving tax credits for previously completed BMPs.
- Convert the existing tax credit to a competitive grant program. If the current tax credit program is retained, the credit should be made fully or partially refundable.

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Section 1: Introduction

Act 48 of 2017 requires the Independent Fiscal Office (IFO) to review various state tax credits over a five-year period.¹ For the third year, the IFO reviewed five tax credits: the Neighborhood Assistance Program, Resource Enhancement and Protection Program, Entertainment Economic Enhancement Program, Video Game Production and Keystone Special Development Zones Tax Credits. The act requires the IFO to submit tax credit reviews to the Performance-Based Budget Board and the Chairs of the House and Senate Finance Committees and to make reports available to the public on the IFO website.

The act specifies that tax credit reviews shall contain the following content:

- The purpose for which the tax credit was created.
- Whether the tax credit is accomplishing its legislative intent.
- Whether the tax credit could be more efficiently implemented through other methods.
- Any alternative methods which would make the tax credit more efficient.
- The costs to provide the tax credit, including the administrative costs to the Commonwealth and local government entities within this Commonwealth.

The act also specifies that the IFO shall develop a tax credit plan for all tax credits subject to review. The plans should include performance measures, and where applicable, the measures should reflect outcome-based measures (including efficiency measures), measures of status improvements of recipient populations, and economic outcomes or performance benchmarks against similar state programs or similar programs of other states or jurisdictions. The IFO submits this report to fulfill these requirements.

The remainder of this review contains four sections. **Section 2** discusses the administration of the tax credit and presents historical data. **Section 3** presents background on the Pennsylvania agriculture industry and the Chesapeake Bay Watershed Agreement. It concludes with a summary of various programs that have been implemented at the state and federal level to reduce agricultural pollution in the Chesapeake Bay watershed. **Section 4** provides relevant research on the cost and environmental impact of agricultural BMPs. **Section 5** concludes with the tax credit plan, as required by Act 48. A complete list of reports and data sources used for this review can be found in the **Appendix**. If submitted, written comments provided by stakeholders and affected agencies are also included in the Appendix.

¹ Act 48 of 2017 is also known as the Performance-Based Budgeting and Tax Credit Efficiency Act. See the Appendix for the Tax Credit Review Schedule.

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Section 2: REAP Tax Credit Overview

Article XVII-E of the Tax Reform Code of 1971 (Act 55 of 2007) created the Resource Enhancement and Protection Program (REAP) Tax Credit. The REAP Tax Credit is available to eligible farmers/land owners or project sponsors for the implementation of best management practices (BMPs) that reduce the environmental impact of the agriculture industry.² A project sponsor (generally a bank or lending institution but may also be a business or family trust) provides funding for the implementation of an eligible BMP project when the farmer/landowner is unable to fund the upfront cost of the project. The REAP Tax Credits are awarded directly to the farmer or sponsor (if applicable).

The REAP Tax Credit is available for eligible projects meeting the following criteria: (1) the applicant is subject to tax in Pennsylvania and (2) the agricultural operation is in compliance with the Pennsylvania Clean Streams Law.³ If the applicant is not compliant (i.e., does not have the required plans), the application for the REAP Tax Credit must include the development of these plans with the intent to implement. No credit will be awarded to an applicant until these plans are completed and certified. In addition, an agricultural operation with animal concentration areas (ACAs) must first implement all BMPs necessary to reduce nutrient, sediment and storm water runoff from the ACAs.⁴

The REAP Tax Credit is equal to 50 to 75 percent of eligible project costs.⁵ Eligible costs include: construction and installation, equipment and materials, project management, design, engineering and planning. The amount of the tax credit award depends on the type of agricultural project.⁶ The maximum amount of credit awarded to any applicant for a single project is \$250,000 for any seven-year period. Act 13 of 2019 increased the annual program cap from \$10.0 to \$13.0 million.⁷

Applications are accepted for proposed, in-progress or completed projects, but credits are only awarded upon project completion. An approved BMP project must be maintained for its predetermined lifespan (generally between five and ten years) as determined by the Pennsylvania State Conservation Commission (SCC) based on the type of agricultural project.⁸ If the applicant fails to maintain the BMP for its full lifespan,

² A BMP is defined by statute as a practice (or practices) to be effective and practical, considering technological, economic and institutional factors, to manage nutrients and sediment to protect surface water and ground water. Practices are designated BMPs by the State Conservation Commission based on guidance from the U.S. Department of Agriculture's Natural Resources Conservation Service.

³ The Pennsylvania Clean Streams Law requires that farmers have (1) a current Agricultural Erosion and Sediment Control Plan/Conservation Plan and/or (2) a current Nutrient Management/Manure Management Plan.

⁴ ACAs are outdoor areas of any agricultural operation where vegetation is unable to grow due to the concentration and frequency of animal traffic. ACAs include barnyards, exercise pens, high traffic areas of a pasture, etc.

⁵ The State Conservation Commission may establish a list of certain, high-priority BMPs that when implemented within a watershed covered under a federally-approved total maximum daily load (TMDL) are eligible for a tax credit worth 90 percent of costs.

⁶ High-priority practices that are eligible for a 75 percent tax credit include: plan writing, animal-related practices and riparian buffers (50+ feet). Projects that are eligible for a 50 percent tax credit include: no-till planting equipment, precision nutrient application equipment, cover crop rollers, manure storage systems, composting, pollution runoff practices in crop fields, cover crops and rotational grazing.

⁷ The annual program cap has been amended several times since inception, but most recently, the annual cap was increased from \$10.0 million to the current \$13.0 million. Up to \$3.0 million may be reserved specifically for projects relating to the Chesapeake Bay watershed.

⁸ A schedule that lists the lifespan for the most commonly-used BMPs can be found in the REAP Tax Credit guidelines. See https://www.agriculture.pa.gov/Plants_Land_Water/StateConservationCommission/REAP/Documents/202021%20REAP%20Guidelines.pdf.

previously issued REAP Tax Credits may be rescinded in full or on a prorated basis by the Pennsylvania Department of Revenue (DOR).⁹

Tax credits may be utilized against Pennsylvania personal income, corporate net income, bank and trust company shares, title insurance companies shares, insurance premiums and mutual thrift institutions taxes for the tax year in which the tax credit is issued. Credits not used in the tax year they are issued may be carried forward for an additional 15 tax years. The credit is non-refundable and may not be carried back to preceding tax years. The credit may be sold, assigned or transferred but must be used within the year of sale, assignment or transfer.¹⁰

This section begins with a statement of the goals and purpose of the tax credit. It then discusses the application process and administration of the tax credit, concluding with a presentation of program data.

Goals and Purpose

Act 48 of 2017 requires that all tax credit reviews published by the IFO shall discuss (1) the purpose for which the tax credit was created and (2) whether the tax credit is accomplishing its legislative intent. For this credit, the IFO reviewed the stated intent of the authorizing legislation and documentation provided by the SCC. For this review, the IFO established the specific and quantifiable goals and general purpose of the REAP Tax Credit as follows:

Goals

- Encourage private investment in the implementation of BMPs on agricultural operations, the planting of riparian forest buffers and the remediation of legacy sediment.
- Reduce the financial burden on farmers who implement BMPs in accordance with environmental regulations.
- Increase voluntary compliance with environmental and agricultural management laws.

Purpose

- Improve water quality by reducing nitrogen, phosphorus and sediment pollution through BMPs.

Administration

The SCC administers the tax credit and reviews applications. Applicants for the REAP Tax Credit must provide a complete application package that includes the following:

- Completed REAP Tax Credit application with appropriate verifications.¹¹

⁹ If the BMP will not be maintained due to the sale of property, termination of agricultural operations/projects, weather or other factors outside the applicant's control, then the recipient may be permitted to keep a portion of the credit if written notification is provided in advance to the SCC.

¹⁰ Recipients must first apply the tax credit against their Pennsylvania liability in the year of issuance. Any unused credit may be sold or transferred after a 12-month waiting period.

¹¹ Includes a verified current Agricultural Erosion and Sediment Control Plan/Conservation Plan and/or a current Nutrient Management/Manure Management Plan that the applicant has or intends to implement. Plan verification must be

- REAP Project Cost/Funding Summary Table.
- Map of the agricultural operation (if necessary to illustrate the construction of the BMP).
- Application page completed and signed by the sponsor (if applicable).

Additional application materials are required depending on the type of project or agricultural operation and whether the project will be finished in the near future or is already completed.

Applications for the REAP Tax Credit are accepted for projects that are proposed, in-progress or completed at the time of application. Applications are accepted annually on a first-come, first-served basis starting in the late summer/early fall. Projects that include the purchase of equipment or implementation of structural BMPs approved by the SCC are given a timeframe for completion. If the project is not finished by the specified time, then the project may be removed from the program.¹²

The SCC processes applications within 60 days of receipt and notifies the applicant of approval or denial. Tax credits are approved upon completion of the project and the submission of (1) receipt evidence for the project costs and (2) REAP Project Completion Certification for BMPs.

Upon verification of project completion, the SCC will notify DOR of credit eligibility. DOR conducts a compliance check and the SCC issues the tax credit certificate (generally within 10 days).¹³ REAP Tax Credits are submitted to DOR for application against the recipient’s Pennsylvania state tax liability. DOR ensures that the issued tax credit is applied appropriately.

The administration of the REAP Tax Credit requires roughly 1.4 full-time equivalent (FTE) DOR staff at a cost of \$0.1 million annually. The SCC estimates that the credit requires 1.3 FTE staff at cost of \$0.1 million annually.

Historical Data

Table 2.1 provides detail on REAP Tax Credits issued and project funding for award years 2015 to 2019. Notable trends include the following:

- The annual number of eligible projects that benefit from REAP Tax Credits fluctuates from year to year. The number increased in 2019 due in part to the higher program cap.
- In 2019, total project costs increased dramatically to \$25.4 million (also due to the higher cap) and yielded an average cost per project of \$60,400.
- The average REAP Tax Credit issued was \$25,500 in the most recent year.
- Historically, the REAP Tax Credit offsets roughly 40 percent of total BMP project costs. The remaining portion is funded via other public sources (20 percent) and private investment (40 percent).

done by a qualified individual (i.e., a representative from the applicant’s local conservation district, a U.S. Natural Resource and Conservation Service officer or a qualified private sector technical service provider).

¹² Extensions are granted at the discretion of the SCC on a case-by-case basis as long as the applicant notifies the SCC of circumstances that may affect the ability of the applicant to meet the approved deadlines.

¹³ Prior to DOR’s tax modernization project in 2019, DOR issued REAP Tax Credit certificates and the turnaround time was approximately 60 days.

- The tax credit is not oversubscribed. All projects that were issued REAP Tax Credits received the full amount of the eligible credit and total credits issued are less than the current program cap.¹⁴

Table 2.1
REAP Tax Credit Awards and Project Funding

	Award Year					AAGR 15-19
	2015	2016	2017	2018	2019	
Number of Projects	514	410	424	360	421	-4.9%
Total Project Costs	\$19.8	\$22.0	\$22.8	\$19.8	\$25.4	6.5
REAP Eligible	16.9	17.1	17.7	16.0	20.3	4.6
Share	85.5%	78.0%	77.8%	80.6%	79.8%	
Credits Issued	\$8.6	\$8.5	\$9.1	\$8.1	\$10.7	5.7
% of Total Cost	43.4%	38.9%	39.8%	40.7%	42.1%	
Average Credit	\$16,700	\$20,800	\$21,400	\$22,400	\$25,500	11.2
Other Public Funds¹	\$2.6	\$4.4	\$4.5	\$2.9	\$4.0	11.2
% of Total Cost	13.3%	20.1%	19.9%	14.9%	15.8%	4.5
Private Investment²	\$8.6	\$9.0	\$9.2	\$8.8	\$10.7	5.7
% of Total Cost	43.3%	41.1%	40.3%	44.4%	42.0%	-0.7

Note: Dollar amounts in millions, except for Average Credit. AAGR is average annual growth rate. Act 13 of 2019 increased the seven-year project cap from \$150,000 to \$250,000 and the annual program cap from \$10.0 million to \$13.0 million.

1 The portion of BMP project costs offset by other sources of public funding (e.g., grants).

2 The residual portion of BMP project costs which must be offset by private investment.

Source: Pennsylvania State Conservation Commission.

BMP projects are classified into four basic categories: (1) constructed, (2) equipment, (3) planning and (4) grazing. Other projects that do not fit into these categories may also receive credits as long as they are necessary to reduce runoff pollution into surface waters. These projects are approved by the SCC on a case-by-case basis.

Constructed BMPs represent the largest category, with 37 practices outlined in the guidelines. These projects involve the construction, installation and maintenance of structures or improvements to the land and soil. Examples include the use of cover crops, construction of animal waste storage facilities or development of grassed waterways. In 2019, the average cost per constructed BMP project was \$81,500.

¹⁴ The SCC awards all tax credits available for each fiscal year but ultimately issues a lower amount, as applicants withdraw from the program or are unable to complete their planned BMP. In addition, the SCC reports that some applications are "rolled" to the next fiscal year because they are submitted after the application deadline or the current year allocation has been reached. This annual roll could range from \$100,000 to \$1 million. The IFO does not consider the program fully or oversubscribed because the annual roll does not grow from year-to-year and the demand for the credit is generally met by moving applications to subsequent fiscal years.

Seven types of projects fall under **equipment BMPs**, which include new or used pieces of equipment that are purchased for use on land. No-till drills and planters are the most common pieces of equipment purchased. The average 2019 project cost of an equipment BMP was \$61,000.

Grazing BMPs are implemented to reduce the environmental impact of livestock and improve forage conditions. These BMPs are constructed, but are only eligible for the REAP Tax Credit when used in conjunction with prescribed grazing practices, such as a livestock transportation management plan. Eight practices are considered grazing BMPs, and in 2019, the average cost per project was \$24,500.

There are five types of **planning BMPs** that are eligible for the REAP Tax Credit. These involve the documentation of the planned use of land based on the identification of specific conditions, such as erosion, crop nutrient needs and manure output. The costs associated with these BMPs typically reflect only technical consultation, generating a low average project cost of roughly \$7,000 for 2019.

Table 2.2 provides detail on the types of projects that received REAP Tax Credits and associated project costs. Most project costs are for constructed (51.5 percent) or equipment (45.2 percent) BMPs. Planning BMPs comprise about one percent of all project costs, but are 10 to 15 percent of projects that receive credits each year.

Table 2.2
Project Costs by Type of BMP

	Award Year				
	2015	2016	2017	2018	2019
Constructed	\$8,076	\$11,495	\$13,486	\$11,315	\$12,228
Equipment	10,975	9,718	8,601	7,965	12,260
Grazing	297	394	513	341	539
Planning	208	232	165	137	312
Other	<u>233</u>	<u>129</u>	<u>6</u>	<u>33</u>	<u>99</u>
Total Project Costs	19,788	21,969	22,771	19,791	25,439

Note: Dollar amounts in thousands.
Source: Pennsylvania State Conservation Commission.

The portion of BMP project costs offset by other sources of public funding (e.g., grants) are excluded from reimbursement via the REAP Tax Credit (i.e., deemed ineligible costs). **Table 2.3** displays other sources of funding that credit recipients received over the past five years. The number of projects that benefited from other public funds declined at an average rate of 13.2 percent per annum (not shown), while the dollar amount of funds grew at an average rate of 11.2 percent per annum. Federal programs (e.g., Environmental Quality Incentives Program and Conservation Innovation Grants) comprise over three-quarters of public funds provided. The Pennsylvania Growing Greener program is also a significant source of project funding, while other state programs and agencies provide occasional, one-time grants to fund specific projects.

Table 2.3
Other Public Funding Sources for REAP Projects

	Award Year				
	2015	2016	2017	2018	2019
Federal Program ¹	\$2,184	\$3,565	\$3,845	\$1,993	\$2,855
State Program ²	188	401	433	764	873
Chesapeake Bay ³	43	186	151	178	273
Local Gov./Other	<u>217</u>	<u>255</u>	<u>91</u>	<u>7</u>	<u>27</u>
All Sources	2,632	4,407	4,521	2,941	4,029

Note: Dollar amounts in thousands.

1 Funds from the Natural Resource Conservation Service or the U.S. Department of Agriculture (e.g., Environmental Quality Incentives Program, Conservation Innovation Grants, etc.).

2 Funds from Growing Greener, the Pennsylvania Department of Environmental Protection and the Department of Community and Economic Development (includes the Commonwealth Financing Authority).

3 Funds from the Chesapeake Bay Foundation and the Chesapeake Bay Program.

Source: Pennsylvania State Conservation Commission.

Most REAP Tax Credit recipients are individuals. **Table 2.4** shows that 57.2 percent of 2019 credits issued went to individuals who received 42.6 percent of total credit dollars. Corporations represent 3.1 percent of projects and received 6.1 percent of tax credit funds. As project sponsorship has grown, the share of banks and other financial institutions receiving credits has increased. Those entities made up 3.3 percent of projects and 9.0 percent of tax credit dollars issued. These recipients also received the highest average credit amount, because expensive projects likely require a financial sponsor to bring the project to completion.

Table 2.4
REAP Tax Credit Awards by Entity Type (2019)

	Awards		Dollars (\$000s)		Average Award
	Number	Share	Amount	Share	
Individuals	241	57.2%	\$4,563	42.6%	\$18,900
Pass-throughs	153	36.3	4,535	42.3	29,600
Banks	14	3.3	964	9.0	68,800
Corporations	<u>13</u>	<u>3.1</u>	<u>658</u>	<u>6.1</u>	<u>50,600</u>
Total	421	100.0	10,720	100.0	25,500

Note: The table reflects tax credits issued for the 2019 award year.

Source: Pennsylvania State Conservation Commission.

Table 2.5 displays credits issued for award years 2015 and 2019. For 2019, less than one-fifth of total credits issued were to firms that received an award in excess of \$100,000. By contrast, firms that received a credit of less than \$50,000 comprised approximately 80 percent of all recipients but less than half of total credit dollars issued.

Table 2.5
REAP Tax Credits Issued by Size

Credit Award	Award Year 2015				Award Year 2019			
	Number	Share	Amount	Share	Number	Share	Amount	Share
\$0 to \$9,999	261	50.8%	\$0.9	10.2%	178	42.3%	\$0.7	6.9%
\$10,000 to \$24,999	141	27.4	2.3	26.6	102	24.2	1.7	15.7
\$25,000 to \$49,999	73	14.2	2.4	28.2	67	15.9	2.2	20.6
\$50,000 to \$99,999	32	6.2	2.0	23.8	59	14.0	4.2	38.9
\$100,000+	<u>7</u>	<u>1.4</u>	<u>1.0</u>	<u>11.3</u>	<u>15</u>	<u>3.6</u>	<u>1.9</u>	<u>17.9</u>
Total	514	100.0	8.6	100.0	421	100.0	10.7	100.0

Note: Dollar amounts in millions.
Source: Pennsylvania State Conservation Commission.

Table 2.6 displays REAP Tax Credit utilizations by tax type for the most recent five-year period. Most tax credits (79.3 percent) were used to reduce PIT liabilities. This is consistent with the credit data presented in Table 2.4 and implies that REAP Tax Credit recipients are primarily small businesses.

Table 2.6
REAP Tax Credit Utilization by Tax Type

	Fiscal Year					Avg. Share
	2015-16	2016-17	2017-18	2018-19	2019-20	
PIT	\$4,091	\$4,286	\$4,286	\$4,286	\$4,462	79.3%
Bank Shares	892	934	934	934	973	17.3
CNIT	<u>178</u>	<u>186</u>	<u>186</u>	<u>186</u>	<u>194</u>	<u>3.4</u>
Total	5,160	5,406	5,406	5,406	5,629	100.0

Note: Dollar amounts in thousands. PIT is personal income tax and CNIT is corporate net income tax.
Source: Pennsylvania Department of Revenue.

Individual taxpayers and small farm operations often lack sufficient tax liability to absorb the credit and sell any unused credit to increase cash flow. Historical data indicate that roughly 55 percent of REAP Tax Credits are sold after a required 12-month waiting period for an average of 85 cents per dollar of credit issued. The remaining 15 cents is retained by the purchaser and third party facilitator.

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Section 3: Background and Government Policies

The first part of this section presents background on the agriculture industry and the Chesapeake Bay Watershed Agreement to provide context for the REAP Tax Credit. The second part describes current state and federal programs that target improved environmental outcomes for the Chesapeake Bay watershed.

Agriculture in Pennsylvania

The Commonwealth has a rich agricultural history and with roughly 50,000 farms in operation, agriculture is a significant contributor to the state economy. An understanding of the sector and the environmental impact of farmland operations provide context for the goals and purpose of the REAP Tax Credit.

Every five years, the U.S. Department of Agriculture's National Agricultural Statistics Service (NASS) conducts the Census of Agriculture, a complete count of U.S. farms and ranches and the individuals who operate them. The NASS publishes data on agricultural production and sales, land use, production practices, finances, farm labor and wages and other industry detail. Because data are collected every five years, the tables in this section display data for 2007, 2012 and 2017.

Table 3.1 presents sales data for Pennsylvania farms by the type of product sold. For 2017, the state's agriculture industry generated approximately \$7.76 billion in sales. The Commonwealth is a major dairy producer, with over a quarter of agricultural sales generated from cow's milk. However, milk sales have stagnated over the last ten years, likely due to the increased popularity of non-dairy milk alternatives (e.g., almond milk and soy milk). Poultry and egg sales have steadily increased (average growth rate of 5.2 percent per annum over the period) and comprise roughly 20 percent of all agriculture sales.

Table 3.1
Major Categories of Farm Products Sold by Pennsylvania Farms

	2007	2012	2017	AAGR 2007-12	AAGR 2012-17
Milk from Cows	\$1,890	\$1,967	\$1,979	0.8%	0.1%
Poultry and Eggs	1,016	1,362	1,685	6.0	4.3
Nursey-Greenhouse	892	945	1,016	1.2	1.5
Grains and Oilseeds	500	1,211	981	19.3	-4.1
Wholesale Cattle	556	717	626	5.2	-2.7
All Other	<u>954</u>	<u>1,199</u>	<u>1,473</u>	<u>4.7</u>	<u>4.2</u>
Total Sales	5,809	7,401	7,759	5.0	0.9

Note: Dollar amounts in millions. AAGR is average annual growth rate. All Other includes products such as hogs and pigs, hay, melons, potatoes, fruits, berries and tree nuts.
Source: National Agricultural Statistics Service, U.S. Census of Agriculture.

Many of the trends in Pennsylvania agricultural production are often tied to broader trends in global agriculture markets. For example, sales of grains and oilseeds, notably corn, soybeans and barley, grew at an average annual rate of 19.3 percent from 2007 to 2012, due to robust grain prices generated by high international demand but low supply (due to significant droughts in other countries) during that period. In more recent years, that trend slowed as markets partially returned to historical levels.

Table 3.1 also highlights the primary uses of Pennsylvania agricultural land, which affects the type and amount of environmental pollution. Animal operations (e.g., those that produce cow’s milk, eggs, poultry and beef) produce significant amounts of livestock manure that leeches into the soil and results in water pollution. Proper land management practices for these operations could result in a notable reduction in environmental degradation.

Table 3.2 displays sales data by the size of farming operation based on gross sales.¹⁵ Product sales from all farms except those characterized as “very small” increased from 2007 to 2012, but only “large” farms increased sales during the subsequent five-year period. Overall, the data reflect a continued shift to large-scale agricultural production.

Table 3.2
Pennsylvania Sales of Agricultural Products by Farm Size

	2007	2012	2017	AAGR 2007-12	AAGR 2012-17
Very Small	\$74	\$71	\$65	-0.9%	-1.7%
Small	472	591	523	4.6	-2.4
Midsized	1,928	2,153	1,984	2.2	-1.6
Large	<u>3,335</u>	<u>4,586</u>	<u>5,187</u>	<u>6.6</u>	<u>2.5</u>
Total Sales	5,809	7,401	7,759	5.0	0.9

Note: Dollar amounts in millions. AAGR is average annual growth rate. Very Small farms recorded annual gross sales under \$10,000; Small farms recorded \$10,000 to \$99,999; Midsized farms recorded \$100,000 to \$499,999 and Large farms recorded \$500,000 or more.

Source: National Agricultural Statistics Service, U.S. Census of Agriculture.

However, as shown in **Table 3.3**, very small farms represent more than half of total farm operations in the state. Although the number of very small farms declined at an average rate of 2.6 percent per annum from 2012 to 2017, the large number of properties in this category presents challenges with regard to the implementation of agricultural practices, as small farms are less likely to have sufficient capital to invest in environmentally-friendly BMPs. In addition, regulatory agents may have more difficulty visiting these locations for the purpose of enforcement.

¹⁵ For the 2017 release, the NASS changed the basis for determining farm size and type from gross sales to gross cash farm income. This report uses the former convention for 2017 for a consistent comparison to prior years.

Table 3.3
Distribution of Pennsylvania Farms by Size

	2007	2012	2017	AAGR 2007-12	AAGR 2012-17
Very Small	38,850	30,767	27,000	-4.6%	-2.6%
Small	13,658	16,728	14,809	4.1	-2.4
Midsize	8,413	8,913	8,261	1.2	-1.5
Large	2,242	2,901	3,087	5.3	1.3

Note: AAGR is average annual growth rate. Very Small farms recorded annual gross sales under \$10,000; Small farms recorded \$10,000 to \$99,999; Midsize farms recorded \$100,000 to \$499,999 and Large farms recorded \$500,000 or more.

Source: National Agricultural Statistics Service, U.S. Census of Agriculture.

Table 3.4 displays Pennsylvania agricultural sales by legal tax status of the farm. Most farm operations (60 percent) filed as sole proprietors. The remaining farms generally filed as partnerships (19 percent) or family-held corporations (18 percent) with a small share of sales generated by other types of operations.

Table 3.4
Pennsylvania Sales of Agricultural Products by Business Type

	2007	2012	2017	AAGR 2007-12	AAGR 2012-17
Sole Proprietorship	\$3,722	\$4,577	\$4,615	4.2%	0.2%
Partnership	972	1,393	1,492	7.5	1.4
Family-Held Corporations	914	1,208	1,396	5.7	2.9
Nonfamily Corporations	154	138	183	-2.2	5.8
Other	<u>47</u>	<u>85</u>	<u>73</u>	<u>12.8</u>	<u>-3.1</u>
Total Farms	5,809	7,401	7,759	5.0	0.9

Note: Dollar amounts in millions. AAGR is average annual growth rate. Other includes cooperatives, estates and trusts, etc.

Source: National Agricultural Statistics Service, U.S. Census of Agriculture.

Chesapeake Bay Watershed Agreement

The Chesapeake Bay, the largest estuary in the U.S., is approximately 200 miles in length and covers portions of six states (Pennsylvania, New York, Delaware, Maryland, Virginia and West Virginia) and the District of Columbia. It is home to a diversity of fish, shellfish, bird and aquatic vegetation whose habitats are threatened by oxygen-depleted waters due to the overgrowth of algae. These algal blooms are primarily caused by phosphorus and nitrogen pollution from the runoff of residential, farm and industrial waste. The

runoff often flows into the bay from nonpoint sources (NPS), where contaminants enter the environment from multiple, unidentifiable locations (e.g., fertilizers from suburban lawns and farms).¹⁶

In the late 1970s, residents and policymakers of the bay area noticed a significant loss of wildlife and aquatic life from the Chesapeake Bay. Concern over the loss prompted a 1976 Congressionally-funded, five-year study to identify the cause of this phenomenon. The study published its findings and recommendations in 1983 concluding that excess nutrient pollution, primarily nitrogen, phosphorus and sediment, was the main cause of the environmental degradation.

In that same year, Maryland, Virginia, Pennsylvania and the District of Columbia established the Chesapeake Bay Program Executive Council to assess and oversee the implementation of coordinated plans to improve and protect the bay.¹⁷ The original agreement was a simple pledge that recognized that the pollution problems identified by the study would need to be addressed through regional cooperation. A few years later, the Chesapeake Bay Commission was established to coordinate policy action in the region.

By 1987, the first formal agreement had been signed by the four jurisdictions, the U.S. Environmental Protection Agency (EPA) and the Chesapeake Bay Commission, collectively referred to as partners. This agreement established pollution reduction goals. A key goal was a 40-percent reduction target for nitrogen and phosphorus entering the main stem of the bay. Although a goal to reduce levels of nonpoint sources of pollution was included in the agreement, the primary focus was on the regulation of point source pollution sources.¹⁸

In 2000, a 10-year agreement set 102 goals to guide further restoration efforts, reduce pollution and protect natural resources in the bay.¹⁹ Delaware and New York joined the Chesapeake Bay Program at this time as two of the three “headwater states” with smaller rivers and streams that ultimately connect to the larger stem of the Chesapeake Bay watershed. West Virginia, the third headwater state, joined in 2002. The new agreement laid the groundwork for a second phase of progress and achieved some success, including land conservation and forest buffer restoration. Little advancement was made in the overall health of the bay due, in part, to a failure to reduce nutrient pollution from agricultural, nonpoint sources.

The shortcomings of the 2000 agreement spurred the EPA to establish a Total Maximum Daily Load (TMDL) for the Chesapeake Bay watershed. The TMDL is a regulatory term that quantifies the maximum amount of a pollutant that a body of water can receive while still meeting water quality standards. It is calculated as the sum of all allowable pollutant loads from all contributing point and nonpoint sources of pollution. Although the abbreviation stands for “total maximum daily load,” TMDL for purposes of the Chesapeake Bay Program represents annual limits. Participating state/jurisdiction TMDLs were outlined in the 2010 Chesapeake Bay Watershed Agreement (CBWA), with the intent of establishing a system of accountability. Although challenged initially, all partners signed the new agreement in 2014.

The CBWA is in use today and sets the bay area TMDL at 185.9 million pounds of nitrogen, 12.5 million pounds of phosphorus and 6.45 billion pounds of sediment per year by 2025. If this target is achieved, the

¹⁶ Alternatively, point source pollution is when contaminants enter the environment from an identifiable location (e.g., a sewage treatment plant).

¹⁷ “1983 Chesapeake Bay Agreement,” The Chesapeake Bay Program.

¹⁸ “1987 Chesapeake Bay Agreement,” The Chesapeake Bay Program.

¹⁹ “Chesapeake 2000,” The Chesapeake Bay Program.

result will be a 25 percent reduction in nitrogen, 24 percent reduction in phosphorus and 20 percent reduction in sediment. These limits are divided by major river basin and then by state and jurisdiction. Each state and the District of Columbia must develop Watershed Implementation Plans (WIPs) that detail how they expect to meet pollution allocations within the specified timeframes.²⁰ Phases I and II of the WIPs were developed between 2010 and 2012. The current Phase III plans have been in use since 2019.²¹

State and Federal Programs

The subsections that follow describe efforts by CBWA states and the federal government to achieve TMDL targets and improve outcomes for the Chesapeake Bay watershed.

Pennsylvania

The Commonwealth's TMDL targets for 2025 are 73.5 million pounds of nitrogen, 3.0 million pounds of phosphorus and 2,161 million pounds of sediment per year.²² The scale of nonpoint source pollution from Pennsylvania agricultural- and urban-based runoff is considered the most significant factor in meeting the program targets.

The state has primarily employed the use of regulations that require certain farms, such as concentrated animal feeding operations (CAFOs), to obtain permits that require the use of appropriate BMPs.²³ These permits and other regulations require the inspection of properties by the state Department of Environmental Protection (DEP). It is estimated that DEP inspects 10 percent of the Pennsylvania farms located in the Chesapeake Bay watershed annually.²⁴ The Pennsylvania Infrastructure Investment Authority (PENNVEST) and Growing Greener programs provide grant and loan funds for environmental improvement projects, but the REAP Tax Credit is the only program to provide financial assistance in the form of tax credits to farmers who implement BMPs.

From 2009 to 2019, Pennsylvania reduced its nitrogen, phosphorus and sediment by 3.9 percent, 14.6 percent and 13.7 percent, respectively. However, the state remains furthest of all CBWA partner states from its phosphorus and sediment targets.

Virginia

Virginia's TMDL targets for 2025 are 53.0 million pounds of nitrogen, 5.6 million pounds of phosphorus and 6,872 pounds of sediment per year.²⁵ The state is the only other CBWA partner with tax credit programs to incentivize the implementation of BMPs. In addition to the credits, the Virginia Agricultural Cost-Share

²⁰ "Chesapeake Bay TMDL," U.S. Environmental Protection Agency.

²¹ "Watershed Implementation Plans," The Chesapeake Bay Program. Link: https://www.chesapeakebay.net/what/programs/watershed_implementation.

²² "Phase 3 Chesapeake Bay Watershed Implementation Plan," Pennsylvania Department of Environmental Protection (August 2019).

²³ The EPA defines a CAFO as (1) an agricultural enterprise where more than 1,000 animal units are confined on site for more than 45 days during the year or (2) any agricultural enterprise that discharges manure or wastewater into a natural or manmade ditch, stream or waterway. An animal unit is the equivalent of 1,000 pounds of live animal weight.

²⁴ "Phase 3 Chesapeake Bay Watershed Implementation Plan," Pennsylvania Department of Environmental Protection (August 2019).

²⁵ "Chesapeake Bay TMDL Phase III Watershed Implementation Plan," Virginia Department of Environmental Quality (2019).

Program and other grant programs provide technical and financial assistance to farmers who voluntarily install select BMPs on their land. These programs are funded through federal and state sources.²⁶

The Conservation Tillage Equipment Credit was enacted in 1985 and allows individuals or corporations to claim a tax credit equal to 25 percent of expenses incurred in the purchase of conservation tillage equipment that minimizes soil disturbance, thereby reducing runoff into the bay.²⁷ Applicants may claim up to \$4,000 a year in credits, and if the amount of credit exceeds tax liability, the remaining amount may be carried forward up to five tax years. There is no cap, and in FY 2019-20, the Virginia Department of Taxation reported applicants claimed \$244,000 in credits.²⁸

The Agricultural BMP Tax Credit Program began in 1998 to support the voluntary installation of BMPs on agricultural operations. It allows for a refundable credit equal to 25 percent of the first \$70,000 expended. The amount of credits claimed per applicant cannot exceed \$17,500 in the year the project was completed. For FY 2019-20, \$1.1 million in credits were claimed.²⁹

Maryland

Maryland's TMDL targets for 2025 are 45.8 pounds of nitrogen, 3.7 million pounds of phosphorus and 8,343 million pounds of sediment per year.³⁰ Maryland relies on regulatory compliance efforts in combination with grants and loans to achieve its TMDL goals.

One of the major policies the state implemented to reduce pollution from agriculture was the 2012 Nutrient Management Law, which requires all farmers with gross incomes exceeding \$2,500 or livestock producers with 8,000 pounds or more of live animal weight on the agricultural operation to follow nutrient management plans developed by certified consultants.³¹ To assist farmers in achieving compliance, the Maryland Agricultural Water Quality Cost-Share Program provides conservation grants and loans that cover up to 87.5 percent of the cost to install BMPs on agricultural operations. For FY 2019-20, the state granted \$7.0 million for 359 projects.³²

Maryland credits its success in agriculture-related nutrient and sediment reduction to a combination of technical assistance and financial incentives. The state emphasized that on-site inspections, reliable data and outreach to stakeholders were more essential for effective compliance than merely a properly implemented, current nutrient management plan. Since 2009, Maryland has reduced its nitrogen and phosphorus TMDLs by 11.6 and 2.4 percent, respectively.

²⁶ Ibid.

²⁷ "Guidance Document on the Tax Credit for Precision Agriculture Equipment," Virginia Department of Conservation and Recreation (August 2018).

²⁸ "Annual Report for Fiscal Year 2019," Virginia Department of Taxation.

²⁹ Ibid.

³⁰ "Maryland's Phase III Watershed Implementation Plan to Restore Chesapeake Bay by 2025," Maryland Department of the Environment (August 2019).

³¹ Ibid.

³² "Maryland Agricultural Water Quality Cost-Share Program: Annual Report 2019," Maryland Department of Agriculture.

Headwater States

The TMDLs for New York's 2025 targets are 11.53 million pounds of nitrogen, 0.59 million pounds of phosphorus and 533 million pounds of sediment per year.³³ The Concentrated Animal Feeding Operation Permit Program requires a permit for animal operations above a certain size. Those operations must adhere to state wastewater discharge practices, including the development of certified nutrient management plans. This also allows for comprehensive compliance monitoring, as individual farms are recorded in a database and must retain accurate records of land, weather and other operational conditions.³⁴

The TMDLs for Delaware's 2025 targets are 4.55 million pounds of nitrogen, 0.11 million pounds of phosphorus and 27 million pounds of sediment per year.³⁵ Delaware's programs primarily coordinate with federal-level initiatives, and the state's 1999 Nutrient Management Law requires every farmer to submit an annual report on nutrient management activities or face penalties for noncompliance.³⁶

West Virginia's 2025 TMDL targets are 8.23 million pounds of nitrogen, 0.43 million pounds of phosphorus and 609 million pounds of sediment per year.³⁷ Like Delaware, many programs in West Virginia are derived from federal initiatives, notably the Environmental Quality Incentive Program (EQIP). In 2008, the West Virginia Agricultural Enhancement Program was developed to encourage voluntary implementation of BMPs by providing technical and financial assistance to agricultural operations. Local conservation districts determine eligible BMPs, address concerns and develop criteria such as cost-share rates and financial caps.³⁸

Federal Programs

The federal EQIP provides financial and technical assistance to agricultural producers for the implementation of structural and management conservation practices that improve agricultural production and reduce environmental harm. Each year, the U.S. National Resource Conservation Service determines the amount of financial assistance available for each type of practice in each state. For federal FY 2019, Pennsylvania producers received \$29.1 million in direct funding and an additional \$7.7 million in technical assistance from EQIP. That represents roughly 2 percent of the \$1,780 million in total EQIP funding distributed to all U.S. states and territories.³⁹

The Innovative Nutrient and Sediment Reduction Grant Program (INSR) is one of the main funding sources available to support projects that reduce nutrient and sediment pollution to the bay watershed, including the implementation of BMPs. It is administered by the National Fish and Wildlife Foundation in cooperation with the EPA and the Chesapeake Bay Program. Grants range from \$200,000 to \$1 million, and for application year 2020 roughly \$5 to \$7 million in grants were expected to be awarded nationwide.⁴⁰

³³ "Final Phase III Watershed Implementation Plan," New York Department of Environmental Conservation (February 2020).

³⁴ "ECL SPDES General Permit for Concentrated Animal Feeding Operations (CAFOs)," New York Department of Environmental Conservation (January 2017).

³⁵ "Delaware's Chesapeake Bay Watershed Implementation Plan: Phase III," Delaware Department of Natural Resources and Environmental Control (August 2019).

³⁶ *Ibid.*

³⁷ "West Virginia's Phase III Watershed Implementation Plan for the Chesapeake Bay Total Maximum Daily Load," West Virginia's Chesapeake Bay Program (August 2019).

³⁸ *Ibid.*

³⁹ See http://www.nrcs.usda.gov/Internet/NRCS_RCA/reports/fb08_cp_eqip.html.

⁴⁰ See <https://www.nfwf.org/programs/chesapeake-bay-stewardship-fund/innovative-nutrient-and-sediment-reduction-grants-2021-request-proposals>.

Progress

Table 3.5 displays the most recent TMDL reduction data for nitrogen (N), phosphorus (P) and sediment (Sed) pollution in the Chesapeake Bay watershed. These data are produced from the Chesapeake Bay Program Phase 6 Watershed Model to simulate pollutant loads based on land and environmental factors that influence the amount of runoff. Historical data suggest states have made progress towards the 2025 targets, with an 8.5 percent reduction in nitrogen, 10.4 percent reduction in phosphorus and 4.0 percent reduction in sediment since 2009.

Table 3.5
Chesapeake Bay Program Partner State Pollutant Reductions

	% Reduction 2009 to 2019			% Reduction Needed for 2025		
	N	P	Sed	N	P	Sed
Delaware	-10.7%	-19.3%	-41.5%	-29.7%	-3.7%	-11.6%
Maryland	-11.6	-2.4	-0.3	-9.9	-6.9	0.0
New York	-5.6	-15.4	-7.0	-15.8	-5.8	-18.2
Pennsylvania	-3.9	-14.6	-13.7	-32.1	-23.7	-23.9
Virginia	-13.8	-9.8	-2.4	-9.7	-11.4	0.0
West Virginia	-3.6	-30.9	-7.9	0.0	0.0	0.0
Total¹	-8.5	-10.4	-4.0	-19.7	-12.2	0.0

Note: N is nitrogen, P is phosphorus and Sed is sediment. A zero under the percent of reduction needed for 2025 indicates the target has been met or exceeded.

¹ Includes reduction amounts from the District of Columbia.

Source: Pennsylvania Department of Environmental Protection.

Section 5: National and State Studies

The REAP Tax Credit differs from other state tax credits because program goals do not include increased economic development or job creation. Instead, the REAP Tax Credit seeks to improve water quality by reducing nitrogen, phosphorus and sediment pollution through BMPs. Currently, it is not possible to quantify the impact of the REAP Tax Credit due to lack of data regarding the impact from nonpoint-source pollutants (e.g., agricultural runoff). To evaluate the impact of BMPs implemented under the REAP Tax Credit, the IFO reviewed literature on the cost and environmental impact of these practices. This section includes a brief review of relevant reports and studies to assist in the general assessment of the effectiveness of the REAP Tax Credit.

Key Findings from National Studies

An Economic Assessment of Policy Options to Reduce Agricultural Pollutants in the Chesapeake Bay (2014)

A report by the U.S. Department of Agriculture's Economic Research Service utilized modeling software to determine that performance-based policies (e.g., emission limits) were the lowest cost policy option to reach TMDL goals. However, it was noted that these policies are difficult to implement for nonpoint-source pollutants because pollutant discharge is not easily measured and regulators lack the data necessary to set optimal performance goals. The report specified design-based policies (e.g., regulations and tax credits for preferred conservation practices) as reliable alternatives to the optimal scenario.⁴¹

Cost-Effective BMP Placement: Optimization Versus Targeting (2004)

An article published in *Transactions of the American Society of Agricultural Engineers* found that optimization, where the farmer has the ability to determine the lowest cost BMPs that will achieve the maximum pollution reduction, is the most effective policy to allocate BMPs on agricultural lands. Targeting plans, which involve a regulator directing BMPs to lands that release the most pollutants, were found to cost \$48.03 per kilogram (\$105.91 per pound) of sediment pollution reduced. By comparison, optimization plans that allowed for more flexibility of BMPs selected achieved the same pollutant reduction at a cost of \$42.86 per kilogram (\$94.51 per pound) of sediment reduced. The authors conclude optimization policies offer flexibility in BMP implementation by providing a number of near-optimal solutions, which offers alternatives to stakeholders while still meeting pollutant load criterion. Therefore, farms and other agricultural enterprises could choose the most cost-effective BMP and still achieve maximum environmental benefit.⁴²

Options to Address Nutrient Management Pollution from Agricultural Drainage (2016)

A report by the National Wildlife Federation found that voluntary approaches to address nutrient pollution (e.g., tax credits) alone are not effective. The scope of the pollution problem and the variability and complexity of farm-to-farm conditions makes it important to consider all policy options with proven efficacy, such as performance-based incentives, taxes on nutrient pollution and, if necessary, enforceable emission

⁴¹ "An Economic Assessment of Policy Options to Reduce Agricultural Pollutants in the Chesapeake Bay," Ribaudo, Savage and Marcel Aillery, U.S. Department of Agriculture Economic Research Report Number 166 (June 2014).

⁴² "Cost-Effective BMP Placement: Optimization Versus Targeting," Veith, Wolfe and Conrad D. Heatwole, American Society of Agricultural Engineers (September 2004).

limits. The report highlights the practice of cover cropping, which involves the planting of certain crops to manage soil erosion rather than to be harvested, as the most cost-effective option for farms to reduce their output of nutrient runoff.⁴³

Evaluating Agricultural Best Management Practices in Tile-Drained Subwatersheds of the Mackinaw River, Illinois (2011)

A joint study by the American Society of Agronomy, Crop Science Society of America and Soil Science Society of America in the *Journal of Environmental Quality* found that when the adoption of BMPs is voluntary, economic incentives are critical, as the profit gain from implementation of the practice may not be sufficient to incentivize a change in the farmer's current practices. In those cases, the economic incentive is necessary to make the project viable. In addition, farmer outreach is essential in ensuring that BMPs are placed where they will be most effective.⁴⁴

Key Findings from Other State Studies

Impacts of Transactions Costs and Differential BMP Adoption Rates on the Cost of Reducing Agricultural NPS Pollution in Virginia

A case study from the Virginia Polytechnic Institute and State University found that transaction costs related to BMP implementation increased total project costs by 44 percent on average, with a range from 19 and 81 percent. These transaction costs, which could include expenses related to land assessment, BMP monitoring and enforcement, are often not reimbursed by public entities. The author recommends that targeted policies be used to determine areas where BMPs will have the most impact on nutrient reduction to avoid high costs that return less benefit to the environment.⁴⁵

2020 Tax Preference Performance Reviews: Livestock Nutrient Management Equipment

A short study by the Washington Joint Legislative Audit and Review Commission on the state sales and use tax exemption for purchases of certain equipment used exclusively to manage livestock nutrients (i.e., manure) stated it is unclear if it improved water quality. Many factors impact water quality and the exemption was one piece of a broad effort to reduce pollution in ground and surface waters.⁴⁶

Evaluation of Best Management Practice (BMP) Effectiveness: Final Report (2005)

A research project by the California State Water Resources Control Board assessed water quality in southern California as it relates to BMPs and BMP technologies. The assessment pointed to several issues that make the evaluation of BMP effectiveness difficult: (1) BMP effectiveness must be differentiated from variability in land, pollutant discharge and other conditional factors, (2) the relative level of pollutant reduction due

⁴³ "Options to Address Nutrient Management Pollution from Agricultural Drainage," Bryant and Goldman-Carter, National Wildlife Federation (March 2016).

⁴⁴ "Evaluating Agricultural Best Management Practices in Tile-Drained Subwatersheds of the Mackinaw River, Illinois," Lemke et al., American Society of Agronomy, Crop Science Society of America and Soil Science Society of America (August 2011).

⁴⁵ "Impacts of Transactions Costs and Differential BMP Adoption Rates on the Cost of Reducing Agricultural NPS Pollution in Virginia," Rees, Virginia Polytechnic Institute and State University (May 2015).

⁴⁶ "2020 Tax Preference Performance Reviews: Livestock Nutrient Management Equipment," Joint Legislative Audit and Review Commission (July 2020).

to a BMP may be underestimated if the applicable land already emitted lower amounts of pollution prior to implementation, (3) large reductions in pollutant levels do not necessarily imply effectiveness if emissions are still at a high level and (4) approaches to evaluate BMP effectiveness are not consistent across studies.⁴⁷

⁴⁷ "Evaluation of Best Management Practice (BMP) Effectiveness: Final Report," Bay and Brown, California State Water Resources Control Board (December 2005).

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Section 6: Tax Credit Plan

Act 48 of 2017 directs the IFO to review tax credits and develop a tax credit plan for all credits subject to review. The act states that tax credit plans should include performance metrics for each credit. The act does not specify any other elements of the tax credit plan. For this review, the IFO defined the tax credit plan more broadly to include the following elements: (1) the general findings of the review, (2) specific recommendations, including performance metrics and (3) key decision points for policymakers to consider.

General Findings

For the purpose of this report, the IFO reviewed studies on the cost and environmental impact of agricultural BMPs that reduce water pollution and spoke with stakeholders, as well as the agencies that administer the tax credit. The following bullet points summarize the main findings of this research:

- Pennsylvania and Virginia are the only states in the Chesapeake Bay watershed that utilize tax credits to incentivize the implementation of BMPs. Other states rely on grants, loans, technical assistance programs or implementation and enforcement of land management regulations.
- For 2019, the average REAP project totaled \$60,400 (includes eligible and non-eligible expenses). Roughly 42 percent of the cost was reimbursed by the REAP Tax Credit, with the remainder funded via grants and private investment.
- Most REAP Tax Credits are issued to individuals and pass-throughs (84.9 percent) and are utilized to reduce personal income tax liability (79.3 percent). This implies that the REAP Tax Credit benefits small businesses.
- Available research generally concludes that incentives (e.g., tax credits and grants) combined with regulatory compliance efforts are the most effective way to increase the use of agricultural BMPs to reduce pollution in waterways.
- The SCC awards tax credits for previously completed BMPs. These credits do not incentivize new activity. Recent data suggest these credits comprise a significant share of total awards.
- Roughly 55 percent of REAP Tax Credits are sold for an average of 85 cents per dollar of credit issued. The remaining 15 cents is retained by the purchaser and third party facilitator.
- It is difficult to measure the pollution reduction attributable to the REAP Tax Credit Program for three reasons: (1) factors such as soil, geographic location and proximity to a body of water may improve or reduce the effectiveness of BMPs installed and maintained on the land, (2) there is no cost-effective way to measure pollution from nonpoint sources (e.g., agricultural operations) and (3) the impact of the REAP Tax Credit award on the behavior of the farmer is not easily separated from a grant that may be awarded for the same project.

Specific Recommendations

Based on the general findings, the IFO submits the following recommendations to enhance the efficiency of the tax credit and improve its ability to achieve its goals and purpose.

The SCC should collaborate with DEP to estimate the reduction of nitrogen, phosphorus and sediment resulting from REAP Tax Credits issued to qualified BMP projects.

It is difficult to measure the pollution reduction attributable to the REAP Tax Credit Program due to variable factors such as soil composition, geographic location of the BMP and proximity to a body of water. However, the IFO identified the Chesapeake Assessment Scenario Tool (CAST) model as one potential tool to evaluate the impact of BMPs at the program level. It is a web-based, EPA-funded software that allows users to build scenarios to estimate nitrogen, phosphorus and sediment load reductions.⁴⁸

An environmental model such as CAST would allow the SCC to award tax credits for BMPs based on objective data that will allow funds to have the maximum impact and provide additional data by which policy-makers could evaluate the effectiveness of the REAP Tax Credit. Additionally, the SCC could utilize the model to provide technical assistance to applicants trying to identify the most cost-effective BMPs for their farming operation and location.

The SCC should review the current policy of approving REAP Tax Credit applications for projects that have been completed.

Credits awarded after the BMP is in place subsidizes existing activity and does not incentivize new pollution reduction practices.

Convert the existing tax credit to a competitive grant program to enhance the economic impact of the state spending and assist farmers that may have limited access to capital.

The newly created grant should be available to owners of agricultural lands and sponsors that invest in BMP projects and target areas or farm operations that likely release high levels of pollution. Grants also provide up-front funds to cover implementation costs. This conversion benefits small farms that may lack access to capital and must satisfy the 12-month waiting period before selling the tax credit.

If the current tax credit program is retained, the credit should be made fully or partially refundable.

The tax credit is currently sellable and could be made refundable for 95 cents per credit dollar. Data suggest that 55 percent of REAP Tax Credits are transferred or sold to entities other than the original recipient. For recent years, sellers received roughly 85 cents per dollar issued with the remaining 15 cents retained by the purchaser and the third party facilitator. These transactions represent leakage that does not incentivize BMP usage. This change also simplifies administration.⁴⁹

⁴⁸ See <https://cast.chesapeakebay.net/>.

⁴⁹ A refundable tax credit or tax credit that is sold represents taxable income and taxpayers would need to weigh tradeoffs if opting for that treatment.

Key Decision Points

In addition to the specific recommendations above, policymakers should also consider general issues that merit discussion if the REAP Tax Credit is amended. These issues are strategic and will be related to the overall goals and purpose of the tax credit as envisioned by policymakers.

- Would a grant program better incentivize the use of BMPs in farming? The availability of funds is often critical to small farms that may lack access to capital.
- Does the Commonwealth have an appropriate mix of enforcement (e.g., inspections and regulations), incentives (e.g., tax credits and grants) and technical support (e.g., assistance in the farmer's selection of the most cost-effective and efficient BMPs) to incentivize farmer behavior and generate the maximum reduction in agricultural pollution?
- What factors drive the undersubscription or continual roll forward of the tax credit? How can that be improved?

Conclusion

Act 48 requires that the IFO make a determination regarding whether the tax credit has achieved its goals and purpose. For this review, the analysis establishes the specific and quantifiable program goals as:

Goals

- Encourage private investment in the implementation of BMPs on agricultural operations, the planting of riparian forest buffers and the remediation of legacy sediment.
- Reduce the financial burden on farmers who implement practices in accordance with environmental regulations.
- Increase voluntary compliance with environmental and agricultural management laws.

Purpose

- Improve water quality by reducing nitrogen, phosphorus and sediment pollution through BMPs.

Although the IFO was unable to determine specific pollution reductions attributable to the REAP Tax Credit, based on existing research, conversations with stakeholders and reasonable assumptions, this review finds that the credit does reduce agricultural pollution by making BMPs more affordable.

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Appendix

Performance-Based Budgeting and Tax Credit Review Schedule

Year		Performance-Based Budgets				
1	Corrections	Board of Probation and Parole	PA Commission on Crime & Delinquency	Juvenile Court Judges' Commission	Banking and Securities	General Services
2	Economic & Community Development	Human Services – Part 1	Health	Environmental Protection	PA Emergency Management Agency	State
3	PennDOT	Human Services – Part 2	State Police	Military & Veterans Affairs		
4	Education	Human Services – Part 3	Aging	PA Historical & Museum Commission	Agriculture	Labor and Industry
5	Drug and Alcohol Programs	Insurance	Revenue	Executive Offices	Environmental Hearing Board	Conservation and Natural Resources
Year		Tax Credits				
1	Film Production	New Jobs	Historic Preservation Incentive			
2	Research and Development	Keystone Innovation Zones	Mobile Telecom and Broadband	Organ and Bone Marrow		
3	Neighborhood Assistance	Resource Enhancement and Protection (REAP)	Entertainment Economic Enhancement Program	Video Game Production	Keystone Special Development Zones	
4	Educational Tax Credits	Coal Refuse and Reclamation	Mixed Use	Community-Based Services		
5	Resource Manufacturing	Brewers'	Computer Data Center	Manufacturing and Investment	Waterfront Development	Rural Jobs and Investment

Tax Credit Review Mandate

Act 48 of 2017 is the Performance-Based Budgeting and Tax Credit Efficiency Act. The act requires the Independent Fiscal Office (IFO) to review tax credits based on a five-year schedule determined jointly by the Secretary of the Budget and the Director of the IFO. The act specifies that the schedule must ensure that tax credits are subject to a review by the IFO at least once every five years. The IFO will submit reviews to the Performance-Based Budgeting (PBB) Board and the Chairs of the House and Senate Finance Committees and make the report available to the public through its website.

The act specifies that reviews shall contain the following content:

- The purpose for which the tax credit was created.
- Whether that tax credit is accomplishing the tax credit's legislative intent.
- Whether the tax credit could be more efficiently implemented through alternative methods.
- Any alternative methods which will make the tax credit more efficient if necessary.
- The costs of providing the tax credit, including the administrative costs to the Commonwealth and local government entities within this Commonwealth.

The act also specifies that the IFO shall develop a tax credit plan for all tax credits subject to a review. The plans should include performance measures, and where applicable, the measures should reflect outcome-based measures (including efficiency measures), measures of status improvements of recipient populations, and economic outcomes or performance benchmarks against similar state programs or similar programs of other states or jurisdictions.

Sources

- "1987 Chesapeake Bay Agreement," The Chesapeake Bay Program (December 1987).
- "2020 Tax Preference Performance Reviews: Livestock Nutrient Management Equipment," Joint Legislative Audit and Review Commission (July 2020).
- "An Economic Assessment of Policy Options to Reduce Agricultural Pollutants in the Chesapeake Bay," Ribaud, Savage and Marcel Aillery, U.S. Department of Agriculture Economic Research Report Number 166 (June 2014).
- "Chesapeake 2000," The Chesapeake Bay Program (June 2000).
- "Chesapeake Bay TMDL Document," U.S. Environmental Protection Agency (December 2010).
- "Chesapeake Bay TMDL Phase III Watershed Implementation Plan," Virginia Department of Environmental Quality (August 2019).
- "Cost-Effective BMP Placement: Optimization Versus Targeting," Veith, Wolfe and Conrad D. Heatwole, American Society of Agricultural Engineers (September 2004).
- "Delaware's Chesapeake Bay Watershed Implementation Plan: Phase III," Delaware Department of Natural Resources and Environmental Control (August 2019).
- "ECL SPDES General Permit for Concentrated Animal Feeding Operations (CAFOs)," New York Department of Environmental Conservation (January 2017).
- "Evaluating Agricultural Best Management Practices in Tile-Drained Subwatersheds of the Mackinaw River, Illinois," Lemke et al., American Society of Agronomy, Crop Science Society of America and Soil Science Society of America (August 2011).
- "Evaluation of Best Management Practice (BMP) Effectiveness: Final Report," Bay and Brown, California State Water Resources Control Board (December 2005).
- "Final Phase III Watershed Implementation Plan," New York Department of Environmental Conservation (February 2020).
- "Guidance Document on the Tax Credit for Precision Agriculture Equipment," Virginia Department of Conservation and Recreation (August 2018).
- "Impacts of Transactions Costs and Differential BMP Adoption Rates on the Cost of Reducing Agricultural NPS Pollution in Virginia," Rees, Virginia Polytechnic Institute and State University (May 2015).
- "Innovative Nutrient and Sediment Reduction Grants," National Fish and Wildlife Foundation (2020).
- "Maryland Agricultural Water Quality Cost-Share Program," Maryland Department of Agriculture (2019).
- "Maryland's Phase III Watershed Implementation Plan to Restore Chesapeake Bay by 2025," Maryland Department of the Environment (August 2019).
- "Options to Address Nutrient Management Pollution from Agricultural Drainage," Bryant and Goldman-Carter, National Wildlife Federation (March 2016).

"Phase 3 Chesapeake Bay Watershed Implementation Plan," Pennsylvania Department of Environmental Protection (August 2019).

"Reforming Agricultural Nonpoint Pollution Policy in an Increasingly Budget-Constrained Environment," Shortle et al., American Chemical Society (January 2012).

"The Chesapeake Bay Agreement of 1983," The Chesapeake Bay Program (December 1983).

"Virginia Tax Annual Report," Virginia Department of Taxation (2019).

"West Virginia's Phase III Watershed Implementation Plan for the Chesapeake Bay Total Maximum Daily Load," West Virginia's Chesapeake Bay Program (August 2019).

Agency Feedback



COMMONWEALTH OF PENNSYLVANIA
DEPARTMENT OF AGRICULTURE
STATE CONSERVATION COMMISSION

March 5, 2021

Mr. Matthew J. Knittel, Director
Independent Fiscal Office
Rachel Carson State Office Building
400 Market Street
Harrisburg, PA 17105

Dear Director Knittel,

The Pennsylvania Department of Agriculture and the State Conservation Commission appreciate the opportunity to review the Independent Fiscal Office (IFO) draft Evaluation of Program Performance for the Resource Enhancement and Protection (REAP) Tax Credit Program. You and the IFO team should be commended for the thoroughness and quality of this report.

While we agree with the majority of the findings and recommendations made in the report and look forward to evaluating them further with you and other decision-makers, there are two areas where we have identified a variance of opinion. Therefore, we desire to further clarify the following two points made in the report:

1. In numerous locations in your report you state that “the tax credit is not oversubscribed”:

The REAP law stipulates that the program cannot approve more applicants than the allocation of REAP tax credits for that respective year (\$13 million in FY 19-20 and FY 20-21, \$10 million in all prior other years). Doing otherwise would violate the legislatively mandated annual limit.

Section 1709E of the REAP law also stipulates that the Commission may not allocate tax credits in excess of what the Commission is “authorized” in any given fiscal year. Therefore, the Commission may not reallocate credits from one fiscal year to another. Thus, the total value of REAP credits (“awarded” by DOR upon completion of project) is always less than the amount the program initially “allocates” to eligible applicants in a given year. This can make it appear that the program is “under-subscribed”. In fact, every year since 2007, the REAP program has received more applications for eligible projects than the Commission could fund with its allocation for that fiscal year.

2. In the summary of recommendations, the IFO suggests “converting the existing tax credit to a grant program”:

The Department of Agriculture and the State Conservation Commission appreciate the recognition that grants are an important component to effectively controlling NPS pollution, and most recently have been able to administer the Conservation Excellence Grant Program (CEG Program). Created by Act 39 of 2019 as part of the PA Farm Bill, the CEG Program provides financial and technical assistance for the implementation of Best Management Practices on agricultural operations in high-priority areas within Pennsylvania. The CEG Program can be combined with other grants, loans, and tax credits, proving a range of tools an operation can consider when seeking to implement Best Management Practices.

Having access to multiple tools including a tax credit program such as REAP are important to supporting financial assistance and technical assistance in addressing non-point source pollution. One of the goals of creating REAP in 2007, was to provide an alternative funding mechanism for certain agricultural communities in Pennsylvania that have historically been hesitant to participate in grant programs. Maintaining REAP in the form of a tax credit ensures that operators have options that will best meet their needs.

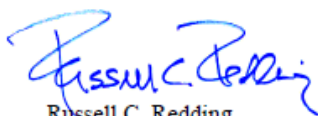
We are pleased that the remainder of the report reflects the numerous benefits REAP provides to Pennsylvania's efforts to protect the constitutional right of our residents to clean air, pure water, and to the preservation of the natural, scenic, historic and esthetic values of the environment. REAP is a valuable resource to Pennsylvania farmers and agribusinesses, many of whom are small, and independently owned, as they work diligently to protect and enhance Pennsylvania's natural resources.

Established by Act 55 of 2007, the Resource Enhancement and Protection Tax Credit Program was created to encourage private investment in the implementation of Best Management Practices (BMPs) on agricultural operations, the planting of riparian forest buffers and the remediation of legacy sediment. Since 2008, the REAP Program has invested \$105 million in the implementation of more than 6,900 Best Management Practices in 65 counties in Pennsylvania.

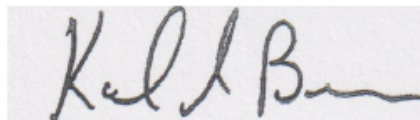
REAP continues to be a valuable program that plays a critical role in the commonwealth's efforts to help control agricultural non-point source pollution and sustain our agricultural viability. As the IFO astutely states, "Available research generally concludes that incentives (e.g., tax credits and grants) combined with regulatory compliance efforts are the most effective way to increase the use of agricultural BMPs to reduce pollution in waterways." The REAP Tax Credit Program gives farmers, landowners, and businesses an opportunity to enhance production and to protect natural resources, by enhancing the effectiveness of other incentive programs and encouraging the private investment in the installation of agricultural BMPs. As highlighted in your report, REAP projects consistently result in more than 40% private investment of the total project cost.

The Department of Agriculture and the State Conservation Commission will continue to consider all the findings and recommendations offered in the report as we feel that many of the findings and recommendations merit further consideration. We are firm in our commitment to ensuring that the Resource Enhancement and Protection Program can continue to benefit Pennsylvania's environment and economy. Once again, thank you for the opportunity to work with the IFO to review the REAP Tax Credit Program.

Sincerely,



Russell C. Redding
Secretary of Agriculture



Karl G. Brown
Executive Secretary, State Conservation Commission

