

PAYMENT FOR ECOSYSTEM SERVICES
AND SOIL HEALTH WORKING GROUP
INTERIM REPORT

Prepared as an interim, informational update regarding

Act No. 83, Section 3 (2019)
Act No. 129, Section 24 (2020)
Act No. 47, Section 6 (2021)

Submitted to the

Senate Committee on Agriculture

House Committee on Agriculture and Forestry

By the

Vermont Agency of Agriculture, Food and Markets

February 1, 2022

Payment for Ecosystem Services and Soil Health Working Group Interim Report

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I. PES Working Group Background

Due to the initiative of three farmer-led watershed coalitions, the Vermont Legislature enacted [Act 83 of 2019, Section 3](#) charging the Secretary of Agriculture to convene a Working Group to discuss Soil Conservation Practices and Payment for Ecosystem Services. Between September 2019 and January 2020, the Working Group met in-person five times and held six webinars with experts and practitioners who provided resources and perspectives to aid in the Working Group's thinking about PES tools, metrics, and system design.

Following several recommendations of the Soil Conservation Practice and Payment for Ecosystem Services Working Group, as laid out in the January 15, 2020 Report to Legislature, [Act 129 of 2020](#) amended Act 83 of 2019 to rename the group the "Payment for Ecosystem Services and Soil Health Working Group," establishing the Working Group through January 2022, to direct the inclusion of several additional seats on this Working Group, and to lay out specific charges for this Working Group. Specifically, the Legislature named the following findings and recommendations be considered and included in the Working Group's final report:

1. a recommended payment for ecosystem services approach the State should pursue that benefits water quality, flood resilience, and climate stability, including ecosystem services to prioritize and capital or funding sources available for payments.
2. a recommended definition of healthy soils, a recommended method, or systems for measuring soil health and other indicators of ecosystem health, and a recommended tool for modeling and monitoring soil health.
3. a recommended price, supported by evidence or other justification, for a unit of soil health or other unit of ecosystem service or benefit provided.
4. proposed eligibility criteria for persons participating in the program.
5. proposed methods for incorporating the recommended payment for ecosystem services approach into existing research and funding programs.
6. an estimate of the potential future benefits of the recommended payment for ecosystem services approach, including the projected duration of the program.
7. an estimate of the cost to the State to administer the recommended payment for ecosystem services approach; and
8. proposed funding or sources of funds to implement and operate the recommended payment for ecosystem services approach.

The Working Group has met fourteen times in 2021 in one and a half-to-two-hour meetings, via Zoom due to COVID-19, to advance work in preparing the finding and recommendations above. The Payment for Ecosystem Services and Soil Health Working Group (PES WG) had its charge extended through February 1, 2023 by [Act 47 of 2021](#).

Information about the PES WG – including documents and recordings of past meetings – can be found at: <https://agriculture.vermont.gov/pes>

II. PES Working Group: Spring 2021

The spring of 2021 involved reviewing the 2019 work, connecting with related research projects by University of Vermont (UVM) and other initiatives like the CSP+ [Conservation Stewardship “Plus”] program idea developed by several farmers and Vermont Natural Resource Conversation Districts (NRCs), and beginning to scope and review the charges set forth by the legislature. As requested by the PES Working Group in its report in 2020, and as directed by Act 129 of 2020, the membership of the PES

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Working Group was expanded and new members began attending meetings of the working group when the Working Group reconvened on Tuesday, March 16th, 2021.

The Working Group formed three Task Groups or subcommittees to develop: 1) greater clarity on analyzing costs and benefits of soil health; 2) identifying specific metrics and components of soil health, and 3) considering program design by first analyzing existing programs and considering broad criteria for quality program design.

The table below briefly summarizes the work of the Task Groups:

Table 1: Spring 2021 Task Groups

TASK GROUP	Charge 1	Charge 2	Charge 3
Costs, Benefits, Allocation	Analyze benefits of ES including nutrient reduction, flood mitigation and carbon sequestration	Explore unit price for unit of soil health and other ES	Propose eligibility requirements
<i>Status</i>	<i>A completed matrix of soil health key components, ESG benefits and possible metrics</i>	<i>Refinement of questions for an RFP for a Technical Advisor</i>	<i>Deferred to Fall work</i>
Soil Health	Identify metrics that relate soil health indicators to desired ecosystem services	Develop <ul style="list-style-type: none"> - Soil Health working definition and which ecosystem services it provides - Unit of soil health to pay for 	Develop research questions and RFP needs
<i>Status</i>	<i>A completed matrix of soil health key components, related ecosystem services, and possible indicators and metrics</i>		<i>Refinement of questions for an RFP for a Technical Advisor</i>
Programs	Inventory existing programs	Analyze Programs	Develop Program Definition Criteria
<i>Status</i>	<i>Matrices of existing practices, rankings, and current VT spending for these practices</i>	<i>Summary of TG review of programs, gaps, and lessons by June 23.</i>	<i>Deferred to Fall work</i>

III. PES Working Group: Summer 2021

Over the summer of 2021, the Vermont Agency of Agriculture, Food & Markets (VAAFMM) in service of goals developed by the Working Group issued a Request for Proposal (RFP) based on the work of the PES WG for a technical consultant to support and advise the Working Group. The RFP requested the following research activities to help the PES WG fulfill the charge set out by the legislature:

- Determine metrics for quantification of ecosystem services from soil health
- Establish range of acceptable/preferred payment rates using contingent valuation
- Calculate range of full economic cost to farmer per unit of soil health metric to provide lower bound on payment rate and aid farmer decision-making
- Establish an estimate of the total value to society of soil health in Vermont agriculture
- Review and summarize existing models of performance-based programs for PES working
- Provide clarity and recommendations on crucial PES program structure issues
- Collaborate closely with the PES WG and build trust in the process, the information and the recommendations from this work.

The RFP was issued on July 26, 2021, and awarded On September 29, 2021 to a team assembled by the University of Vermont (UVM). The work of the UVM technical team is ongoing through May of 2022.

IV. PES Working Group: Fall 2021

With the assistance of the UVM technical team, the Working Group accomplished the following tasks and activities. The final documentation for these tasks and activities can be found on the PES WG webpage: <https://agriculture.vermont.gov/pes>

A. *Measuring Ecosystem Services from Soil Health:* Building on the WG's spring soil health matrix, the technical team further refined the soil health indicators that could make up or define soil health and identified available methods and costs for measuring these soil health indicators. This information will allow the WG to build a PES program based on specific, meaningful, measurable indicators of soil health. The soil health indicators identified by the WG include:

- Organic matter
- Bulk density
- Aggregate stability
- Green House Gas emissions and sequestration modeling
- Biodiversity

These indicators in turn represent or result in five ecosystem services of interest as identified by the 2019 PES WG, as written into statute as a findings and recommendation goal, and as subsequently refined by the WG include: climate regulation (carbon), downstream flood mitigation, soil conservation and water quality protection, climate resilience and biodiversity.

B. *Establishing a Value for Ecosystem Services resulting from Improved Soil Health:* The PES Working Group utilized the UVM team to develop cost estimates for: 1) a "best" case scenario of a soil organic matter 50% higher than a reference condition and bulk density 20% lower; and 2) a "good" case scenario of a soil organic matter 25% higher than a reference condition and bulk density 10% lower. These soil health improvements would in turn produce ecosystem services for flood mitigation, erosion reduction, phosphorus retention, carbon storage, nitrogen retention, and soil biodiversity. Separately, the UVM team conducted a valuation of these benefits for these scenarios in dollars per acre. This information provides the WG essential valuation information, based on defensible analysis, for incorporating into a PES program and establishing prices and payments.

C. *Summarizing VT Farmer PES Program Proposals:* The WG reviewed a summary prepared by the technical team of three PES program concepts designed by Vermont farmers for Vermont farmers. These "home-grown" ideas will provide valuable options and ideas for designing a PES program(s) by the WG in 2022. While varying in detail, all these programs assume participants are in "good standing" with VAAF, farmers would be paid a base amount for participating, testing, and

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engaging, and the program would be tiered where farmers could be paid more for increased performance in providing ecosystem services.

- D. *Reviewing Existing PES Programs:* The UVM team also undertook a review of several PES programs already underway in the U.S. and abroad. This report includes a comparison of 10 programs involving such ecosystem services as soil health, carbon storage, water protection, and nutrient retention. The lessons from these programs will help inform WG as it hones one or more program designs in 2022.
- E. *Supporting Integration of Agroforestry Practices in Vermont Conservation Practices.* The WG identified a few key NRCS agroforestry practices that are currently not funded in Vermont. The NRCS-VT Office is now pursuing how to include additional practices eligible for payment in Vermont.

V. PES Working Group: 2022 Areas of Focus

The PES WG is well-positioned to build on its work to discuss, explore, define, and hone and recommend one or more programs for payment of ecosystem services. The Governor's Future of Agriculture Commission and the Vermont Climate Council also support the on-going advancement of a PES program or programs in Vermont. The PES WG anticipates being able to deliver a final report on January 15, 2023 that provides the findings and recommendations outlined in Act 129 of 2020.

2021's focus has been on soil health and the WG will continue to work with the UVM team to design a soil health program. This work will include developing and exploring various program design elements, reaching out to farmers and technical advisors through surveys and focus groups to further test ideas and willingness to accept dollars for outcomes or outputs, and creating a well-analyzed and supported program.

In addition, and importantly, the WG will explore in 2022 PES program possibilities beyond soil health including edge-of-field¹ monitoring, and whole farm approaches that might further advance ecosystem services and farm incomes.

More about the WG and its work can be found at: <https://agriculture.vermont.gov/pes>.

VI. Appendices

- A. PES Working Group Members
- B. PES Working Group Meeting Summary Information

¹According to NRCS, voluntary edge-of-field water quality monitoring enables agricultural producers and scientists to quantify the impacts of conservation work on water quality. Through edge-of-field (EoF) monitoring, NRCS works with producers and conservation partners, such as universities, agencies, and non-governmental organizations, to measure the amount of nutrients and sediment in water runoff from a field and compare the improvements under different conservation systems.

Appendix A: PES Working Group Members

Pursuant to Section 24 of Act 129 of 2020

The Working Group shall include the following members:

- 1) the Secretary of Agriculture, Food and Markets or designee;
 - a) Deputy Secretary Alyson Eastman
- 2) the Secretary of Natural Resources or designee;
 - a) Marli Rupe (DEC)
- 3) a representative of the Vermont Housing and Conservation Board;
 - a) Stacy Cibula
- 4) a member of the former Dairy Water Collaborative;
 - a) Brian Kemp (CVFC)
- 5) two persons representing farmer's watershed alliances in the State;
 - a) Paul Doton (CRWFA)
 - b) Scott Magnan; Franklin & Grand Isle Farmer's Watershed Alliance (FWA)
- 6) a representative of the Natural Resources Conservation Council;
 - a) Jill Arace (VACD)
- 7) a representative of the Gund Institute for Environment of the University of Vermont;
 - a) Alissa White
- 8) a representative of the University of Vermont (UVM) Extension;
 - a) Joshua Faulkner
- 9) two members of the Agricultural Water Quality Partnership;
 - a) Matt Vaughan (LCBP)
 - b) Vicky Drew (NRCS-VT)
- 10) a representative of small-scale, diversified farming;
 - a) Maddie Kempner (NOFA-VT)
- 11) a member of the Vermont Healthy Soils Coalition
 - a) Cat Buxton / Didi Pershouse
- 12) a person engaged in farming other than dairy farming;
 - a) Ed Pitcavage (Philo Ridge Farm)
- 13) a representative of an environmental organization with a statewide membership that has technical expertise or fundraising experience;
 - a) Heather Furman, The Nature Conservancy in Vermont
- 14) an agricultural economist from a university or other relevant organization within the State;
 - a) David Conner, University of Vermont [*now vacant*]
- 15) an ecosystem services specialist from UVM Extension; and
 - a) Juan Alvez
- 16) a soil scientist
 - a) Meredith Albers (NRCS-VT)

Appendix B: PES Working Group Meeting Summary Information

2021

Tuesday, March 16th, 2021 from 1:00-3:15pm, via Zoom.

[3/16/2021 Agenda & Call-in Information](#) | [3/16/2021 Meeting Recording](#)

Supporting Materials:

[CBI Agenda & Background](#)

[Jon Winsten: Soil Health Investment Trust](#)

[Bio Logical Capital, Vermont Land Trust & UVM Extension: CIG Soil Health Research](#)

[Ryan Patch, AAFM: Current AAFM PES Projects](#)

[Jennifer Byrne: VT Soil Health Policy Network](#)

Thursday, April 15th, 2021 from 1:00-3:00 PM, via Zoom.

[4/15/2021 Agenda & Registration Information](#) | [4/15/2021 Meeting Notes](#)

Supporting Materials:

[Work Approach](#)

[Related Research](#)

Wednesday, April 28th, 2021 from 12:30-2:00PM, via Zoom.

[4/28/2021 Agenda & Registration Information](#) | [4/28/2021 Meeting Notes](#)

Supporting Materials:

[Task Group Workplans](#)

Wednesday, May 12, 2021 from 12:30-2:00PM, via Zoom.

[5/12/2021 Agenda & Registration Information](#) | [5/12/2021 Meeting Notes](#)

Wednesday, May 26, 2021 from 12:30-2:00PM, via Zoom.

[5/26/2021 Agenda & Registration Information](#)

Supporting Materials:

[Task Group Update](#)

Wednesday, June 9, 2021 from 12:30-2:00PM, via Zoom.

[6/9/2021 Agenda & Registration Information](#)

Supporting Materials:

[Draft Mitigation Strategies Template](#)

[Economics Soil Health Value Matrix](#)

[Soil Health Task Group Draft Approach](#)

[Input on PES: Stephen Leslie](#)

Wednesday, June 22, 2021 from 12:30-2:00PM, via Zoom.

[6/22/2021 Agenda & Registration Information](#)

Supporting Materials:

[Soil Health Values Matrix](#)

[Progress Summary](#)

Tuesday September 21, 2021 from 12:00 - 2:00PM, via Zoom

[9/21/2021 Agenda & Registration Information](#)

[9/21/2021 Meeting Recording](#)

Supporting Materials:

[The State of Soil Health in VT Project Update](#)

Tuesday October 5, 2021 from 12:00 - 2:00PM, via Zoom

[10/05/2021 Agenda & Registration Information](#)

[10/05/2021 Meeting Recording](#)

Supporting Materials:

[PES Research Contract Overview](#)

[Presentation: Responsible Innovation and Precision Ag](#)

Tuesday October 19, 2021 from 12:00 - 2:00PM, via Zoom

[10/19/2021 Agenda & Registration Information](#) | [Meeting Recording](#) | [Summary](#)

Supporting Materials:

[CSP+ Proposal for Discussion](#)

[Past CSP+ Webinar for Review](#)

[CSP+ Slides](#)

[Enhanced TA Teams Proposal Slides](#)

[Program Design Slides](#)

Tuesday November 2, 2021 - MEETING CANCELLED

[11/2/2021 Agenda & Registration Information](#)

Tuesday November 16, 2021 from 12:00 - 2:00PM, via Zoom

[11/16/2021 Agenda & Registration Information](#) | [Meeting Recording](#)

Supporting Materials:

[Review of PES Legislative Language](#)

[UVM Research Team Update Presentation](#)

[Ag & Soil Health Co-benefits - Ryan Patch](#)

[Soil Health and Biodiversity - Becky Maden](#)

Tuesday December 07, 2021 from 12:00 - 2:00PM, via Zoom

[12/07/2021 Agenda & Registration Information](#) | [Meeting Recording](#) | [Summary](#)

Supporting Materials

[PES Program Tables](#)

[UVM Updates](#)

[Stephen Leslie - Small Farmer Input](#)

[PES Observed Metrics](#)

Tuesday December 21, 2021 from 12:00 - 2:00PM, via Zoom

[12/21/2021 Agenda & Registration Information](#) | [Meeting recording](#) | [Summary](#)

[Winsten Program Design slides](#)

[UVM Soil Health Valuation slides](#)

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[Draft ES Valuation Report \(UVM\)](#)

[Draft Farmer PES Concepts Report \(UVM\)](#)

[Draft Measuring Soil Health Report \(UVM\)](#)

[Draft Review of PES Program Report \(UVM\)](#)