

A Report Addressing Key Tasks and Findings of the Vermont Payment for Ecosystem Services and Soil Health Working Group, Including Recommendations for the Working Group's Actions in 2021

Prepared by the Food and Agriculture Clinic at Vermont Law School's Center for Agriculture and Food Systems, in partnership with Rural Vermont and the White River Natural Resources Conservation District

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EXECUTIVE SUMMARY

In early 2019, farmers representing the Champlain Valley Farmer Coalition, Franklin-Grand Isle Farmer's Watershed Alliance, and the Connecticut River Watershed Farmers Alliance called upon the Vermont General Assembly for support in launching a pilot project to "create a prototype ecosystem services funding model to pay farmers for the production of fairly valued ecosystem services." **The farmers hoped to dispel a dominant narrative in which agriculture is seen as an environmental problem, and instead develop a new paradigm presenting agriculture as an environmental solution.** Through this new paradigm, emerging technology would be used to quantify the outcomes of conservation approaches on an individual farm basis, thereby informing farm management decisions and providing a basis for supplying payments for environmental benefits produced.

The General Assembly responded by convening a Soil Conservation Practice and Payment for Ecosystem Services Working Group, which met several times between September 2019 and January 2020. The legislation establishing the working group directed it to identify agricultural standards or practices that farmers can implement to improve and enhance soil health, crop resilience, carbon storage and stormwater storage capacity, and reduce agricultural runoff; recommend existing financial incentives available to farmers to implement these standards or practices; propose new financial incentives if necessary; and recommend legislative changes as necessary to implement any new or modified financial incentives. By not comprehensively assessing existing standards, practices, and financial incentives, the working group did not fully meet these charges. Given the breadth of the task, as well as the short

timeframe, such a comprehensive review may not have been feasible. Indeed, the working group's report to the legislature identified the need for more time and resources to address the legislative charges. The General Assembly responded by reauthorizing the working group, renamed the Payment for Ecosystem Services and Soil Health (PES) Working Group, to reconvene in 2021 and issue a report to the legislature by January 2022.

Ecosystem Services

Ecosystem services have been defined as the *conditions and processes through which natural ecosystems, and the species that make them up, sustain and fulfill human life*. The Vermont legislature identified soil health, crop resilience, carbon storage and stormwater storage capacity, and reduced agricultural runoff as priority services. The working group focused on soil health as an umbrella service to accommodate many ecosystem services. **Substantial research is needed to determine the current state of soil health in Vermont and the links between soil health and ecosystem services.**

Farmer Input

In the time since the working group's report in January 2020, additional discussions and research have yielded guiding information from farmers across the state. Farmers from varying and diverse fields have noted a need for financial incentives that are adequate to offset costs of compliance, are available for multiple services, and are provided for quantified outcomes based on field-specific data. Additionally, farmers have noted:

- A desire to implement a program that fairly compensates those who have already adopted conservation practices;
- The importance of structuring the program to keep land in production; and
- An interest in fostering a collaborative approach for farmers to develop and share information regarding new and emerging management approaches.

Farmers have also voiced skepticism of a program based on public market trading and voiced support for leveraging preexisting government programs such as the federal Conservation Stewardship Program or other state or federal programs that currently exist to help farmers improve conservation practices.

Findings and Recommendations

This report serves two purposes. First, it offers an objective assessment of the working group's progress toward meeting its legislative charge. Second, it provides a summary of the information received by the working group during its initial authorization both to assist new working group members in getting up to speed, and to identify the points of tension or issues to resolve upon reconvening. The primary recommendations for the working group are as follows.

Recommendation #1: As a threshold matter, and pursuant to its authorizing legislation, the working group should first inventory the standards and practices employed by existing federal and state programs to enhance soil health and crop resilience, increase

carbon storage and stormwater storage capacity, and reduce agricultural runoff into waters. Using this inventory, the working group can then propose an approach that leverages existing standards and practices to target a set of discrete services while still working on the larger goal of establishing a program for ecosystem services.

Recommendation #2: The working group should identify existing federal and state funding streams and explore how to direct financial incentives from various sources and for multiple ecosystem services into a single payment. The working group can then align funding options with the assessment of standards and practices (as described in Recommendation #1) to determine the scope of a potential approach built off of existing programs.

Recommendation #3: The working group can identify gaps in funding which do not provide incentives for maintaining an outcome, and prioritize a PES program on maintenance payments. A thorough assessment of existing standards and funding, as described in Recommendations 1 & 2, will need to be executed first in order to identify any such gaps.

Recommendation #4: After the working group conducts the activities related to Recommendations 1-3, they can better suggest changes to legislation to adapt pre-existing programs or establish new ones.

Additional areas of friction or priority areas for the working group to resolve and seek advice from other stakeholders include:

1. Whether the primary focus of any new program is to prioritize an environmental solution or support farm viability;
2. How to structure any new program to equitably compensate those farmers who have historically been responsible land stewards;
3. Whether to source funding for payments from governmental or private-market sources;
4. Whether to base any new program off a baseline or a threshold measurement; and
5. How to balance limits on available funding with the costs of monitoring accurate outcomes.

As a fundamental step, this report calls on the working group to include the voices of Black, Indigenous, and People of Color (BIPOC) farmers and stakeholders in the process to ensure the proposal incorporates equity and combats systemic racial inequities in our food system. Furthermore, while the farmers who initially called upon the General Assembly for support envisioned a PES program, the original charges of the working group do not specify a strict focus on that approach. Notably, the working group's name changed during the reauthorization to remove 'Soil Conservation Practices' and instead include 'Soil Health,' identifying that improving healthy soils is a primary goal of the working group. However, PES programs are but one tool of many which can influence Vermont's agriculture system and the

health of its soils, and farms depend on various forms of capital to maintain stable, viable businesses. By design, PES programs focus mainly on revenue and may fail to address other capital issues which can limit a farm’s ability to adopt conservation practices. Alternative approaches such as Debt for Stewardship models, redesigned financial institutions which accommodate regenerative farming practices, or socially responsible impact investments could also be used to incentivize farmers to solve environmental problems while also directly targeting specific issues within our farm economy. As we strive to establish a just and equitable food system in Vermont, these models may also help accommodate the specific needs of BIPOC farmers who face systemic challenges in obtaining secure capital for business management.

Conclusion

How the working group chooses to resolve the above issues has the potential to steer Vermont towards a new agricultural system. This report intends to act as an aid for the working group as they reconvene, and to facilitate discussions to work towards an agricultural vision that is shared by all stakeholders.

PES Working Group Timeline

February 25, 2019: Watershed coalitions approach General Assembly for support in developing a PES program.



May 29, 2019: House passes Act 83 (2019).



June 20, 2019: Act 83 signed by Governor, authorizes the Soil Conservation Practice and Payment for Ecosystem Services Working Group.

Sept. 30, 2019: The Working Group convenes for their first meeting.



January 15, 2020: Ryan Patch and Maddie Kempner present the working group report to the Legislature.



July 1, 2020: Act 129 (2020) passed by the Senate and signed by the Governor, reauthorizes the working group and renames it as the Payment for Ecosystem Services and Soil Health Working Group.

TBD 2021: Date set for the working group to reconvene for an update meeting.



January 15, 2022: Date by which the reauthorized working group must submit their report to the Legislature.

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INTRODUCTION

The Vermont legislature enacted Act 83 of 2019 and convened the Soil Conservation Practice and Payment for Ecosystem Services (PES) Working Group in response to the advocacy of three farmer-led watershed coalitions.¹ Notably, the coalitions “[did] not want to reinvent the wheel or make a complicated, burdensome system for farmers to have to navigate.”² Some key design factors the coalitions identified as important for a PES program are:

1. Providing payments for outcomes and performance, rather than practices;
2. Including eligibility requirements, such as actively working the land and creating a farm management plan;
3. Basing program implementation on an accurate inventory of resources;
4. Ensuring equitable opportunities for landowners newly implementing conservation practices and those with a pre-established legacy of good land stewardship; and
5. Using a system of farmer-led evaluation to provide measurements for ecosystem services.³

Further discussions with farmers across the state present interests which strongly align with those presented by the coalitions and add some additional considerations. Those discussions note that a PES program should:

1. Provide financial incentives which are adequate to offset the cost of compliance;
2. Make incentives available for multiple services;
3. Present farmers as ecosystem stewards;
4. Provide equitable incentivization for farmers who have “previously invested in environmental outcomes and benefits to society”;
5. Use regional and site-specific information about potential environmental outcomes from each farm, to better inform management decisions; and
6. Be designed to keep farms in agriculture, rather than being taken out of production.⁴

¹ VT Agency of Agriculture, Food, and Markets, “Soil Conservation Practice and Payment for Ecosystem Services Working Group Report,” 2, (January 15, 2020) [hereinafter Working Group Report]. The three coalitions are the Champlain Valley Farmer Coalition Inc., the Franklin-Grand Isle Farmer's Watershed Alliance, and the Connecticut River Watershed Farmers Alliance.

² White River NRC, “Payment for Ecosystem Services Farmer Discussion Notes Summary,” (February 2020).

³ *Id.*; For further discussion of a farmer-led evaluation network see Alissa White, “The Vermont Ecosystem Services Farmer Research Network,” (2020), [forthcoming: draft on file with the author].

⁴ Alissa White & Joshua Faulkner, “Enhancing Participation in Payment for Ecosystem Services Programs: Understanding Farmer Perspectives,” Research Update for Policy-makers, (2019), https://www.uvm.edu/sites/default/files/The-Center-for-Sustainable-Agriculture/farmer_perspectives_on_PES_AW_JF_working_version.pdf.

Act 83 directed the Secretary of Agriculture, Food, and Markets (AAFM) to convene a Soil Conservation Practice and Payments for Ecosystem Services Working Group.⁵ The legislative charges put to the working group are as follows:

1. *Identify agricultural standards or practices that farmers can implement that improve soil health, enhance crop resilience, increase carbon storage and stormwater storage capacity, and reduce agricultural runoff to waters;*
2. *Recommend existing financial incentives available to farmers that could be modified or amended to incentivize implementation of the agricultural standards identified under subdivision (1) of this subsection or incentivize the reclamation or preservation of wetlands and floodplains;*
3. *Propose new financial incentives, including a source of revenue, for implementation of the agricultural standards identified under subdivision (1) of this subsection if existing financial incentives are inadequate or if the goal of implementation of the agricultural standards would be better served by a new financial incentive; and*
4. *Recommend legislative changes that may be required to implement any financial incentive recommended or proposed in the report.*⁶

As discussed in greater detail in Part I below, the first charge of the working group to identify standards or practices that farmers can implement to improve services was not met. The working group also did not include any recommendation of existing financial incentives—called for in the second charge—to be used to implement identified standards and practices.⁷

The third and fourth charges—which call for proposals that identify new financial incentives to implement the agricultural standards, and any legislative changes required to implement the financial incentives—are also not included in the report.⁸ Notably, the third charge includes an ‘if’ clause designating that proposals for new financial incentives rely on an identified inadequacy of the incentives identified by the group when fulfilling the second charge.⁹ **The language here indicates that new incentives should be proposed only when pre-existing incentives are not available or a new incentive would better serve the goals of implementing the identified standards, and underscores the need to initially fulfill the first two charges with a comprehensive evaluation of existing programs and resources.**

As required by Act 83,¹⁰ the working group’s efforts culminated in a report issued on January 15th, 2020, which details the information gathered and provides the following recommendations:

⁵ Vermont Act 83 (2019), Sec. 24 (3)(a).; Working Group Report, *supra* note 1, at 2.

⁶ Vermont Act 83 (2019), Sec. 24 (a) (1-4) (emphasis added).

⁷ Vermont Act 83 (2019), §24 (3)(a)(2).

⁸ Vermont Act 83 (2019), §24 (3)(a)(3)-(4).

⁹ Vermont Act 83 (2019), §24 (3)(a)(3).

¹⁰ *Id.*

1. Charge and resource this Working Group over the next two years to explore and advance transformative investment in agriculture's role *to rebuild the natural capital* of Vermont.
2. Advance our *understanding of soil health* and the services it provides.
3. *Review, evaluate, and integrate existing tools* for PES monitoring and modeling and also *identify new tools* and their potential for use in Vermont.
4. Support the tailoring or advancement of new emerging tools or programs.
5. Advance the design and development of PES approach(es) that *regrow or sustain our natural capital* so that it provides *at least three ecosystem services*: water quality, flood resilience, and climate stability.
6. *Refine and evolve the Vermont Environmental Stewardship Program (VESP)* to allow continued joint learning and engagement with farmers around PES.
7. *Maximize access and use of existing programs* to ensure farmers have capital to continue to implement practices or actions that lead to increased ecosystem services.
8. Seek additional grant opportunities, where feasible, to advance the vision of the Working Group during its chartered lifetime.¹¹

To frame the need for a PES program in Vermont, the working group notes that Vermont farmers are “[confronting] issues of low incomes, limited profitability, inadequate health and childcare, labor shortages, declining community support, and decreased acceptance and understanding of agriculture.”¹² Notably, the working group looks past the charges laid out by the legislature and adopts as their mission to “catalyze a paradigm shift in how farmers are acknowledged and empowered to perform their essential roles of environmental stewardship, as well as providing food and fiber.”¹³ The group further notes that “investment and capital, as well as technological, programmatic, and market developments that do not currently exist are essential to making this transformative change possible.”¹⁴ Fulfilling this mission may ultimately be necessary to overcome the significant problems of our agriculture system. **However, the original charges outline an essential process to first conduct a comprehensive evaluation of the resources available to combat these problems.**

Additionally, the original charges do not limit the working group to focus only on PES models, though the reauthorizing languages does call for the working group’s next report to include “a recommended payment for ecosystem services approach the State should pursue.”¹⁵ **Still, the working group is not constrained to offer only an approach based on PES. Indeed, other options may offer a better or complementary approach for realizing the vision for a**

¹¹ Working Group Report, *supra* note 7, at 2-3 (emphasis added).

¹² *Id.*, at 7.

¹³ *Id.*, at 2.

¹⁴ *Id.*

¹⁵ Vermont Act 129 (2020), page 31 (amending Act 83, §24 (3)(d)(1)).

“paradigm shift” in Vermont agriculture.¹⁶ PES models aim to incentivize farmers with additional revenue, which only addresses a narrow range of the capital needs of farm businesses.¹⁷ Alternative approaches could include options such as a debt-for-stewardship program or an inventory of existing federal and state programs that already fund the activities aligned with the working group’s objectives.

In their Call to Action report, the Vermont Dairy and Water Collaborative, in addition to describing a possible role for PES programs to address environmental issues, also described other approaches such as a Debt-for-Stewardship program.¹⁸ It is important to consider the potential of other models to tackle problems of our agricultural system which cannot be solved by only increasing revenue. For instance, modest payments for ecosystem services may not be enough to allow farmers to change practices if they still owe debt for the equipment and infrastructure dictating those practices.¹⁹ Additionally, difficulties with securing credit and loans can present opportunities for supporting good stewardship in agriculture by offering better access to socially responsible impact investments²⁰ or redesigning financial institutions to better accommodate regenerative farming practices.²¹

These alternative models are also important to consider in designing a program to promote a just and equitable food system. Many of the obstacles which undermine the success of BIPOC farm businesses are barriers to accessing “capital, credit, land, infrastructure, and information.”²² Reviewing models for supporting ecosystem services that do not strictly rely on revenue incentives therefore offers an opportunity to begin removing these barriers while building natural capital.

Following the working group’s request for additional time to address the charges, the General Assembly reauthorized the working group to continue their work in early 2021 and conclude with recommendations to the legislature by January 15, 2022.²³ As the working group reconvenes, this report is intended to serve as a resource. The first part of the report provides an objective assessment of the working group’s progress toward meeting its original legislative charges and provides recommendations to the working group as it reconvenes in 2021 under its reauthorization. The remainder of the report synthesizes the information provided to the working

¹⁶ Working Group Report, *supra* note 1, at 6.

¹⁷ Janice St. Onge et al., “Vermont Food system Plan Issue Brief: Access to Capital,” 1, (2020), <https://www.vtfarmtoplate.com/assets/resource/files/Vermont%20Agriculture%20and%20Food%20System%20Plan%20-%20Access%20to%20Capital.pdf>. “Properly capitalized farms and food businesses are critical for a healthy food system. Food system businesses need different kinds of capital depending on their stage of growth, scale of operation, and the markets into which they sell.”

¹⁸ Vermont Dairy and Water Collaborative, “A Call to Action,” 27, (March 15, 2019), <https://www.vtfarmtoplate.com/assets/resource/files/VDWC%20Final%20Report%20Compilation.pdf> [hereinafter *VDWC*].

¹⁹ Michael Colby, “Vermont Rising: Beyond Big Dairy,” *VT Digger* (2018), <https://vtdigger.org/2018/06/14/michael-colby-vermont-rising-beyond-big-dairy/>. For a discussion on the importance of returns on assets, see Jonathan Walsh et al., “What Makes an Organic Dairy Farm Profitable in the United States? Evidence from 10 Years of Farm Level Data in Vermont,” *Agriculture*, (2020), <https://www.mdpi.com/2077-0472/10/1/17/htm>.

²⁰ Christi Electris, Joshua Humphreys, Kristin Lang, David LeZaks, and Jaime Silverstein, “Soil Wealth: Investing in Regenerative Agriculture across Asset Classes,” *Croatan Institute*, IV, (2019).

²¹ *Id.*, at 23.; *See also*: Maine Harvest Federal Credit Union, “About Us,” (2020), <https://maineharvestfcu.coop/about/>.

²² HEAL Food Alliance & Union of Concerned Scientists, “Leveling the Fields: Creating Farm Opportunities for Black People, Indigenous People, and Other People of Color,” (2020), https://www.sfa-mn.org/wp-content/uploads/2020/06/Leveling-the-Fields_final.pdf.

²³ Vermont Act 129 (2020), page 30 (amending Act 83, §24 (3)(d)(1)).

group during its initial authorization, and describes the ideas and suggestions for further research into a PES program that came out of those information-gathering sessions.

I. ASSESSMENT OF WORKING GROUP'S PROGRESS IN MEETING LEGISLATIVE CHARGES

This section provides a deeper analysis of the working group's progress in meeting its charges from the Vermont Legislature. Following an assessment of each of the four initial legislative charges from the original working group authorization, this report provides recommendations as to how the working group can proceed in 2021 based on the new legislative language reauthorizing the working group.

Additionally, while the working group focused on solutions to environmental concerns and farm support, as directed by the legislature, our country has been experiencing a national reckoning with racial injustice. Racial inequities are present in all aspects of our daily life including politics, economics, and our food system. PES programs span all these areas. Though racial equity is not specifically identified in the charges, as the working group moves forward it can and should incorporate principles to ensure that racial equity is inherent in any proposed program. Potential actions that the working group could undertake include inviting the participation of, and consulting with, representatives from government entities such as Vermont's Racial Equity Advisory Panel²⁴ and the Vermont Commission on Native American Affairs,²⁵ or other organizations like the RELEAF Collective.²⁶

A. First Legislative Charge

The first task given to the working group was to identify “agricultural standards or practices that farmers can implement that improve soil health, enhance crop resilience, increase carbon storage and stormwater storage capacity, and reduce agricultural runoff to waters.”²⁷ While the working group's recommendation that a PES program focus on improving natural capital to support “at least” three specified services allows for other services to be supported, the working group decided to focus on “water quality, flood resilience, and climate stability.”²⁸

These three services were selected after the working group explored a range of possible services, and were prioritized because the working group was “interested in establishing the relationship between each of [these three services] and soil health, and because the [working group] contends and hopes that they may each engage distinct and complementary stakeholders, approaches, and revenue streams.”²⁹ Given the time constraints on their work, it makes sense that the working group would focus on a narrowed list of services. However, narrowing their research to focus on these three services before fully assessing the potential of existing practices and programs for the services identified by the legislature may have led the working group to

²⁴ State of Vermont: Office of Governor Phil Scott, “Racial Equity Advisory Panel,” Vermont Official State Website (2020), <https://governor.vermont.gov/content/racial-equity-advisory-panel>.

²⁵ State of Vermont, “Vermont Commission on Native American Affairs,” Vermont Official State Website, (2020), <https://vcnaa.vermont.gov/>.

²⁶ Vermont RELEAF Collective, “Homepage,” (2020), <https://www.vtreleafcollective.org/>.

²⁷ Vermont Act 83 (2019), Sec. 24 (a) (1).

²⁸ Working Group Report, *supra* note 1, at 13.

²⁹ *Id.*

overlook helpful opportunities to leverage existing programs or practices. **The working group will be best equipped to meet the first legislative charge if they compile a full list of existing standards and practices available for all services initially listed by the legislature before narrowing their scope.**

The approach taken by the working group will require first resolving some crucial knowledge gaps. As noted by Dr. Heather Darby, there is not yet a calibrated standard to value the current state of soil health in Vermont, nor is there an agreed-upon standard of soil health that can be identified as a desirable outcome.³⁰ While Vermont’s statutory definition of soil health describes qualities of healthy soil, it does not quantify or assign measurable values.³¹ The working group’s second recommendation to “advance our understanding of soil health and the services it provides” could result in research to identify these values.³² However, to meet the specific need outlined by Dr. Darby, the second recommendation could be honed to focus on advancing the understanding of the current state of soil health in Vermont. An inventory and assessment of existing standards or practices addressing the specific resource concerns listed in the charge might suggest a PES approach that could be more readily implemented than that described by the working group.

The working group was motivated to “avoid the risk of standing up something modest that could preclude the option of revisiting and creating a more ambitious plan later.”³³ However, while the working group laid important groundwork for approaching a program based on soil health, they did not meet the charge to identify existing standards or practices that farmers could implement for the other prioritized services. Standards and baselines for some of these services, such as carbon storage and reduced agricultural runoff, have been outlined by other entities and programs.³⁴ Without first creating an assessment of what approaches are already available, the working group’s approach may overlook opportunities to build natural capital with existing tools. Given the pressing circumstances faced by farmers,³⁵ and the concerns from farmers about delays in receiving payments,³⁶ it is critical to understand the full suite of options that already exist, which can inform or serve as interim options while a more ambitious program is undertaken. As one example, work such as that done by the Gund Institute, which prescribes a baseline for phosphorus reduction, can be identified by the working group to meet this charge.³⁷ For other services less easily quantified, such as crop resilience, the working group can identify practices already utilized by other agencies to achieve related environmental outcomes, such as the NRCS Conservation Practice Standards.³⁸

³⁰ Webinar presented by Dr. Heather Darby, UVM Extension Agronomist, (10/18/2019) <https://www.youtube.com/watch?v=b5jcGMqyzz4>.

³¹ 6 V.S.A. §4802(4).

³² Working Group Report, *supra* note 1, at 2-3.

³³ *Id.*, at 33.

³⁴ See e.g., Courtney Hammond Wagner et al., “Payment for Ecosystem Services for Vermont,” *Gund Institute for Environment*, 14, (2019).

³⁵ Working Group Report, *supra* note 1, at 7.

³⁶ White River NRCD, *supra* note 2.

³⁷ Wagner et al., *supra* note 34, at 14.

³⁸ USDA NRCS, “Conservation Practices,” (2020), https://www.nrcs.usda.gov/wps/portal/nrcs/detailfull/national/technical/cp/ncps/?cid=nrcs143_026849#Q.

Looking forward to the reconvening of the working group, compiling, evaluating, and recommending from among these existing approaches remains a necessary first step to meet the first legislative charge³⁹ while still working on the larger goal of establishing a program for soil health.

Recommendation #1: As a threshold matter, the working group should first inventory the standards and practices employed by existing federal and state programs to address soil health, enhance crop resilience, increase carbon storage and stormwater storage capacity, and reduce agricultural runoff into waters. Using this inventory, the working group can then propose an approach that leverages existing standards and practices to target a set of discrete services while still working on the larger goal of establishing a program for ecosystem services.

B. Second Legislative Charge

In the second charge, the working group was directed to “recommend existing financial incentives available to farmers” to establish a PES program.⁴⁰ In its report, the working group issued a recommendation directed towards “NRCS, VAAFM, VACD, and others” to “maximize access and use of existing programs to ensure farmers have capital to continue to implement practices or actions that lead to increased ecosystem services.”⁴¹ While the entities listed in the recommendation are most knowledgeable about the funding of their own programs, this charge presents the need for an entity to more broadly consider programs and funding opportunities across multiple agencies at the state and federal level and make recommendations as to how they can be streamlined and targeted toward the prioritized services.

The reauthorization of the working group offers the opportunity to fully meet this charge, which is a critical piece of the foundation to building a PES program in Vermont. By identifying the suite of existing programs and funding options at both the state and federal level, the working group could identify entities that could channel funding from various sources and direct financial incentives for multiple ecosystem services into a single payment, thereby acting as the ‘low-cost transaction institution’ discussed above.⁴² This entity could be a state agency, a non-regulatory agency, or a non-governmental organization. The farmer coalitions further suggested looking to the Grange system or dairy cooperative models to “create a community-based award system for PES.”⁴³

³⁹Vermont Act 83 (2019), Sec. 24 (a) (1).

⁴⁰ Vermont Act 129 (2020), page 29 (amending Act 83, §24 (3)(a)(2)).

⁴¹ Working Group Report, *supra* note 1, at 15.

⁴² Jim Salzman et al., “The Global Status and Trends of Payments for Ecosystem Services,” *Nature*, 140 (2018).

⁴³ White River NRCD, *supra* note 2.

Recommendation #2: Identify existing federal and state funding streams and explore how to channel funding from various sources and direct financial incentives for multiple ecosystem services into a single payment. The working group can then align funding options with the assessment of standards and practices (as described in Recommendation 1) to determine the scope of a potential PES approach building off existing programs.

C. Third Legislative Charge

The third charge directed the working group to “propose new financial incentives” if current incentives are insufficient.⁴⁴ As noted in the previous section, the working group did not conduct a comprehensive assessment of existing financial incentives. Therefore, before the third legislative charge can be addressed, the working group must first meet the first and second charges. It will be difficult to evaluate the sufficiency of existing incentives and where additional funds are needed without that assessment. However, the working group does recommend further research to explore possible programs around each of the priority ecosystem services, the most robust of which concerns climate stability.⁴⁵ Following the charge to also identify a “source of revenue,” the working group notes that these programs could be funded by a Conservation Innovation Grant from the USDA.⁴⁶

Statements from Dr. Heather Darby corroborate that many programs already exist to help farmers adopt new practices in response to resource concerns.⁴⁷ Because these programs are in place, she suggests that a PES program could be established as compensation for maintaining a specific outcome.⁴⁸ As many of these programs only incentivize solutions to environmental issues, a potential step forward is for the working group to identify gaps in funding that do not provide incentives for maintaining an outcome. Such an approach would help meet the charge of the reauthorization, especially where asked to “[propose] funding or sources of funds to implement and operate the recommended payment for ecosystem services approach.”⁴⁹

Recommendation #3: A potential step forward is for the working group to identify gaps in funding which do not provide incentives for maintaining an outcome and to prioritize a PES program on maintenance payments. A thorough assessment of existing standards and funding, as described in Recommendations 1 & 2, will need to be executed first before identifying gaps.

⁴⁴ Vermont Act 83 (2019), Sec. 24 (a) (3).

⁴⁵ Working Group Report, *supra* note 1, at 14.

⁴⁶ *Id.*

⁴⁷ Darby, *supra* note 29.

⁴⁸ *Id.*

⁴⁹ Vermont Act 129 (2020), page 31 (amending Act 83, §24 (3)(d)(8)).

D. Fourth Legislative Charge

In the fourth charge, the working group was asked to suggest any specific legislative changes “that may be required to implement any financial incentive recommended or proposed in the report.”⁵⁰ No particular legislative changes are included in the working group’s recommendations, though it should be noted that the initial timeline granted for the working group was quite brief. The reauthorization gives more time to consider possible changes by extending the charter of the working group into 2022.⁵¹

In one of the working group’s discussions, Ryan Patch from the Vermont Agency of Agriculture, Food, and Markets noted that a particular area of legislation to consider is Vermont’s Required Agriculture Practices (RAPs), and he identified that current regulations “establish standards for nutrient management on farms, including: recommended practices for improving and maintaining soil quality and healthy soils in order to increase the capacity of soil to retain water, improve flood resiliency, reduce sedimentation, reduce reliance on fertilizers and pesticides, and prevent agricultural stormwater runoff.”⁵² He therefore recommended that the group consider using RAPs as the baseline for a PES program.⁵³ However, a program founded on RAPs would require modifications to the regulations to include ecosystem services other than water quality.⁵⁴

The Gund Institute also identifies RAPs as a potential foundation for a PES program based on phosphorus reduction, and additionally considers the Comprehensive Energy Plan’s (CEP) identified potential of agricultural BMPs to contribute to the state’s reduced emissions goal as a basis for a carbon storage PES program.⁵⁵ Dr. Heather Darby noted that a PES program based on RAPs, but implemented to employ CASH, would cover most of the working landscape.⁵⁶

However, the working group maintained that “a proposal to build on what we have and build on the baseline of RAPs is in some ways designating a tolerable level of degradation and loss of soil.”⁵⁷ As a result, their report ultimately takes a different approach and instead suggests keeping RAPs in place as a determination of program eligibility while implementing a program which exceeds RAPs to “orchestrate the shift from exploitive practices to generative ones.”⁵⁸

As the working group defines their proposal to the General Assembly, they can identify language to modify or incorporate into enabling legislation. This language should be carefully chosen to support their objectives in light of the considerations listed above, such as measuring outcomes relative to a baseline or a threshold, or prioritizing environmental problem solving or farm viability.

⁵⁰ Vermont Act 83 (2019), Sec. 24 (a)(4).

⁵¹ Vermont Act 129 (2020), page 31 (amending Act 83, §24 (3)(d)).

⁵² Working Group Report, *supra* note 1, at 23.; 6 V.S.A. §4810a(4)(B).

⁵³ Working Group Report, *supra* note 1, at 23.

⁵⁴ *Id.*

⁵⁵ Wagner et al., *supra* note 34, at 11.

⁵⁶ Darby, *supra* note 30.

⁵⁷ Working Group Report, *supra* note 1, at 32.

⁵⁸ *Id.*

Recommendation #4: Potential legislative changes depend on the outcomes of the three charges listed above. After the working group outlines their proposal, they can suggest changes to legislation to adapt pre-existing programs to better meet the working group’s objectives.

II. CONSIDERATIONS FOR THE REAUTHORIZATION PERIOD

In response to the working group’s recommendation to “charge and resource this working group over the next two years,”⁵⁹ the General Assembly reauthorized the working group for one year to continue their work.⁶⁰ In this reauthorization, the working group is tasked with providing a report to the Legislature on January 15, 2022, which contains the following information:

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.⁶¹

The recommendations of the working group support the development of an outcome-based PES program focused on soil health and natural capital. Given the difficulty of this task, many of the working group’s recommendations address the need for additional time and expenses to be allocated towards researching and designing this program. Notably, to fulfill their task to “recommend financial incentives designed to encourage farmers in Vermont to implement agricultural practices that exceed” the state’s water quality requirements, the working group has largely focused on PES models.⁶² As mentioned above, PES models are but one tool which can

⁵⁹ *Id.*, at 10.

⁶⁰ Vermont Act 129 (2020), page 31 (amending Act 83, §24 (3)(d)).

⁶¹ Vermont Act 129 (2020), page 31 (amending Act 83, §24 (3)(d)). (*emphasis added*).

⁶² Vermont Act 83 (2019), Sec. 24 (a).

be used to influence agricultural practices, and other options should be considered before determining the best approach.

Several of the working group’s recommendations align with the objectives of the farmer coalitions, such as the emphasis on a program based on performance.⁶³ The working group laid important groundwork to establish “a system in which farmers are hired to use their ingenuity and know-how in caring for the land to rebuild Vermont’s natural capital.”⁶⁴ The recommendations identify critical knowledge gaps to be filled for a PES program centered on soil health. Additionally, the working group takes a broad and progressive view of its charge, aware of the “risk of standing up something modest that could preclude the option of revisiting and creating a more ambitious plan later.”⁶⁵

However, the legislative charges clearly indicate the need to identify existing mechanisms to build off of when designing a program to improve ecosystem services.⁶⁶ The charges called for specific standards and existing financial incentives to be identified as a necessary first step.⁶⁷ Recommendation #5 in the working group’s report comes closest to meeting these charges, in which the working group describes some potential approaches to improving clean water, flood resilience, and climate stability.⁶⁸ Continuing to pursue these options, as the working group intended to do, could be aided after performing a clear assessment of existing standards and practices.

Furthermore, the farmer coalitions note concern about delaying the opportunity for payments under the extended timeframe for implementing a new PES program.⁶⁹ The coalitions also note the alignment of existing programs—most notably, CSP—with their current objectives, and state that:

We must take a closer look at how to leverage existing systems to simplify the process of getting payments for ecosystem services to farmers and limit increases in paperwork. We should partner with the NRCS and the state to strengthen existing initiatives in order to make programs more consistent and reliable for farmers as they plan for the future.⁷⁰

Included in the working group’s reauthorization is a requirement for the working group to draft a report containing several recommendations.⁷¹ Many of the required items are not particular to soil health and still leave room for pursuing programs for other services.⁷² While the legislature supports the working group’s efforts to establish a program for soil health (as indicated in the legislation changing the working group’s name from the “Soil Conservation

⁶³ White River NRCD, *supra* note 2.

⁶⁴ Working Group Report, *supra* note 1, at 6.

⁶⁵ *Id.*, at 33.

⁶⁶ Vermont Act 83 (2019), Sec. 24 (a)(1).

⁶⁷ *Id.*

⁶⁸ Working Group Report, *supra* note 1, at 14.

⁶⁹ White River NRCD, *supra* note 2.

⁷⁰ *Id.*

⁷¹ Vermont Act 129 (2020), page 31 (amending Act 83, §24 (3)(d)).

⁷² *Id.*

Practice and Payment for Ecosystem Services” working group to the “Payment for Ecosystem Services and Soil Health” working group), the requirements also perpetuate the call to propose programs which more narrowly improve “water quality, flood resilience, and climate stability.”⁷³

The working group does not need to stop pursuing a program for soil health. However, there is information available to use pre-existing programs to develop a strategic approach to support ecosystem services while pursuing the necessary research to establish a soil health PES program. The original charges called for available information to be identified for any of the listed services.⁷⁴ After reporting that a program for soil health would be preferable, but that there are knowledge gaps still to be filled, the working group has been reauthorized to deliver a report which fills those gaps or provides proposals for programs for other services.⁷⁵ **The working group will be best positioned to answer the charges of the reauthorization by first performing a thorough assessment of existing standards and funding opportunities which address the services listed by the legislature.**

III. SUMMARY AND SYNTHESIS OF INFORMATION GATHERED BY THE WORKING GROUP

In light of the above assessment of the working group’s report, and the recommendations that follow, this section presents an overview of the information gathered by the working group during its initial authorization. To explore the possibilities for a PES program in Vermont, the working group performed extensive research and met five times in late 2019 and early 2020 to review and discuss potential options,⁷⁶ including participation in a series of webinars to interact with experts in the field. A brief roadmap of the six webinars is as follows:

1. Cat Buxton and Didi Pershouse of the Vermont Healthy Soils Coalition (VHSC) presented on the benefits of healthy soil and current threats to soils and natural capital.
2. Dr. Heather Darby of the University of Vermont Extension discussed the CASH tool as a method for measuring and monitoring soil health. In the course of discussion, Dr. Darby recommended that a first step before setting up a PES program in Vermont be a pilot study of the current state of soil health in Vermont.
3. Dr. Jon Winsten of Winrock International informed the group of Winrock’s pilot program to reduce phosphorus in the Missisquoi River Basin and discussed the potential trade-offs of monitoring outcomes versus using a modelling tool.
4. Dr. Jim Salzman, Environmental Law Professor at UCSB, gave the group a broad overview of globally established PES programs. He additionally raised some initial questions to be answered, such as whether a PES program is the right tool for addressing a resource concern and whether the program should be framed as a tool for solving an environmental problem or for providing financial support to farms.

⁷³ Vermont Act 129 (2020), page 31 (amending Act 83, §24 (3)(d)(1)).

⁷⁴ Vermont Act 129 (2020), page 31 (amending Act 83, §24 (3)(d)(3)).

⁷⁵ Vermont Act 129 (2020), page 31 (amending Act 83, §24 (3)(d)).

⁷⁶ Working Group Report, *supra* note 1, at 2.

5. Abe Collins, co-founder of Landstream, presented the potential for Landstream’s New Scale tool to measure natural capital using biophysical data.
6. Chris Kopman and Jamie Vander Molen presented on Newtrient’s proposed program for phosphorus reduction, as developed with a grant from AAFM. Newtrient approaches the issues of PES implementation from a private-markets perspective, and the webinar focused on how to establish a program which gives private companies the greatest return on investment.

A series of key questions presented throughout the referenced webinars and texts, and relevant to addressing the first charge of the working group’s reauthorization to “[recommend a] payment for ecosystem services approach the State should pursue,”⁷⁷ are: (A) what is the service; (B) how is the service measured; and (C) how can a PES program be implemented? The following summary of information presented in this report is framed around these three questions and attempts to answer them based on the information presented to the working group. However, this framework is only helpful in the context of the working group’s discussions so far, which have focused almost exclusively on using PES models to achieve their goals. While the following section maintains this framework to analyze the research to date, the working group should also consider options other than PES models, as mentioned above in Part I.

A. What is the Service?

Ecosystem services include both tangible and intangible environmental and cultural benefits to society, and are defined as “the conditions and processes through which natural ecosystems, and the species that make them up, sustain and fulfill human life.”⁷⁸ While the legislature initially directed the working group to explore possibilities for agricultural standards and practices which improve “soil health, enhance crop resilience, increase carbon storage and stormwater storage capacity, and reduce agricultural runoff to waters” the working group determined that PES programs in Vermont should prioritize three primary ecosystem services: clean water, flood mitigation, and carbon sequestration⁷⁹

Because of its contribution to a wide range of ecosystem services—including the three listed above—the working group identified soil health, as a form of natural capital, to serve as a foundation for a PES system.⁸⁰ Natural capital “encompasses the earth’s surface, its species, the nonliving material stocks of the earth’s crust, the atmosphere, and even the sun, the source of

⁷⁷ Vermont Act 129 (2020), page 30 (amending Act 83, §24 (3)(d)(1)).

⁷⁸ Working Group Report, *supra* note 1, at 2.; Daily, G.C. (1997) Introduction What Are Ecosystem Services in Daily, G.C., Ed., *Nature’s Services Societal Dependence on Natural Ecosystems*, Island Press, Washington DC, 1-10. - References - Scientific Research Publishing.; (“*Examples of [ecosystem] services include the supply of food, water and timber (provisioning services); the regulation of air quality, climate and flood risk (regulating services); opportunities for recreation, tourism and education (cultural services); and essential underlying functions such as soil formation and nutrient cycling (supporting services).*” Dept. for Env’t, Food, & Rural Affairs, “Payment for Ecosystem Services: A Best Practice Guide,” 10, (2013), <https://www.cbd.int/financial/pes/unitedkingdom-bestpractice.pdf>.

⁷⁹ Working Group Report, *supra* note 1, at 4.

⁸⁰ Webinar presented by Cat Buxton and Didi Pershouse, Vermont Healthy Soils Coalition, (10/11/2019), https://www.youtube.com/watch?v=oeEzxx_9jeM&t=2s.

solar radiation from which input flows are extracted.”⁸¹ The working group ultimately favored this comprehensive approach rather than recommending separate approaches for individual ecosystem services like water quality or carbon sequestration.⁸²

Dr. Heather Darby noted that a challenge to this approach is that there is not enough information to clearly correlate soil health with particular service outcomes, and there is not yet a set standard of soil health to aim for.⁸³ Furthermore, she noted that much of the farming in Vermont depends on deep rooted, soil-friendly perennial grasses, and there has not yet been a comprehensive assessment of the current state of Vermont’s soils to determine whether the soil needs improving or to what degree.⁸⁴ She recommended that a program not be implemented to improve soil health without first knowing how far we are from achieving an identified soil health outcome.⁸⁵ As a first step, a soil health program could coordinate with Cornell University, which already has access to Vermont soil information, to build a calibrated model of Vermont soil health.⁸⁶ This model would help the working group design a program tailored to Vermont’s soil health resource concerns. This recommendation aligns with the perspective shared by the farmer coalitions, as discussed in the introduction, who also noted that both a proper inventory of resources and a proper evaluation of the effects of different management scenarios are integral to establishing a successful PES program.⁸⁷

These suggestions echo a recommendation posed by Jim Salzman for all PES policymakers: to first consider both what level of service is needed to meet a given outcome and whether a given issue can be addressed by changes in land management rather than infrastructure development.⁸⁸ In the context of the working group’s goals, this advice is better considered in terms of whether the outcomes aimed for can be addressed by *soil* management. As an example, while improving water quality is a clear goal for a PES program, there is insufficient data to define the various links between soil health-related management practices and outcomes in water quality conditions in watersheds.⁸⁹ As modified, Dr. Salzman’s question echoes Dr. Darby’s suggestion that a program based on soil health should begin with an accurate analysis of to what degree Vermont’s soils need improving, what improvements need to occur, and whether these improvements will support “water quality, flood resilience, and climate stability” more effectively than a program that directly funds those services.⁹⁰

⁸¹ Thomas C. Brown et. al., “Defining, Valuing, and Providing Ecosystem Goods and Services,” 336, *Natural Resources Journal*, (2007).

⁸² Working Group Report, *supra* note 1, at 9.

⁸³ Darby, *supra* note 30.

⁸⁴ *Id.*

⁸⁵ *Id.*

⁸⁶ *Id.*

⁸⁷ White River NRC, *supra* note 2.

⁸⁸ Webinar presented by Jim Salzman, UC Santa Barbara, (11/1/2019), <https://www.youtube.com/watch?v=Tv6mU6lSql8>. A specific scenario mentioned in the webinar dealt with stormwater drainage in a municipality, where drainage pipes were necessary and land management alone was insufficient to resolve the issue.

⁸⁹ Joshua Faulkner et al., “Vermont Food System Plan Issue Brief: Water Quality,” *Vermont Farm to Plate*, 64, (2020), <https://www.vtfarmtoplate.com/assets/resource/files/Vermont%20Agriculture%20and%20Food%20System%20Plan%20-%20Water%20Quality.pdf>.

⁹⁰ Vermont Act 129 (2020), page 29 (amending Act 83, §24 (3)(a)(1)).

Once a service is identified, it is important to consider who is providing the service and who is providing compensation for the service. To establish any transaction of value for services there first needs to be a driver for demand (e.g., a perceived scarcity).⁹¹ In a conventional market-driven economy, this is provided by either a physical limitation or by social demand.⁹² However, PES programs often arise because the traditional economic drivers fail to maintain the quality of public goods, and instead require a government intervention to create demand.⁹³ Demand can be created through either regulations or subsidies.⁹⁴ As an example in Vermont, the political emphasis to reduce phosphorus runoff into Lake Champlain, along with the Required Agricultural Practices (RAPs) and Total Maximum Daily Load (TMDL) for Lake Champlain, has created a demand for water quality.⁹⁵ The result is new implementation of public programs established to compensate farmers for phosphorus reductions in waterways,⁹⁶ as well as a proposed private credit-trading market developed by Newtrient.⁹⁷ The working group aims to initiate similar drivers to create a demand for soil health as an ecosystem service. While farmers are the presumed sellers, the working group does not clearly identify buyers for soil health. However, they do focus on discrete services linked to soil health and suggest that potential buyers could be found in insurers investing in a flood resilient landscape, or town, state or federal entities providing funding for soil water retention to prevent flood damage to roads.⁹⁸

Key Takeaways:

1. The working group envisions a program focused on soil health as an umbrella service to accommodate many ecosystem services. Services prioritized by the working group and the General Assembly are clean water, flood mitigation, and carbon storage.
2. There is limited data about the state of soil health in Vermont and the links between soil health and ecosystem services. Given the time required to accomplish this research, the working group should consider an interim solution based on currently available programs.
3. Buyers and Sellers of ecosystem services should be clearly identified to design a successful program. Inherent in identifying buyers and sellers is identifying what factors drive demand for a given service.

⁹¹ Salzman, *supra* note 88.

⁹² Webinar presented by Jon Winsten, Winrock International, (10/13/2019), <https://www.youtube.com/watch?v=LajIazIPHmM>.

⁹³ *Id.*

⁹⁴ Salzman et al., *supra* note 42.

⁹⁵ Courtney Hammond Wagner et al., *supra* note 34.

⁹⁶ USDA NRCS, "Regional Conservation Partnership program," (2020), <https://www.nrcs.usda.gov/wps/portal/nrcs/main/vt/programs/farmland/rcpp/>.

⁹⁷ Webinar presented by Chris Kopman and Jamie Vander Molen, Newtrient (12/3/2019)

<https://www.youtube.com/watch?v=MjzrpcLh8HA> [hereinafter Newtrient]. *It should be noted that the farmer coalitions do not intend to pursue strictly private solutions for ecosystem management.*

⁹⁸ Working Group Report, *supra* note 1, at 8.

B. How is the Service Measured?

After a service is identified, a key element of a PES program is establishing a standardized method for measuring performance towards achieving the identified outcome. To conduct the measurement, the farmer coalitions envision a program which uses farmers as the drivers of PES measurement.⁹⁹ To explore how this system may be implemented, the coalitions describe Organic Valley's model, which "operates on a farmer-driven model in which a farmer first self-evaluates and self-identifies what they are currently doing and where improvements could be made. Their evaluation is then scrutinized by Organic Valley staff and any inconsistencies or issues are brought before a panel of farmers. The PES model could begin with a self-evaluation; farmers could submit their plans for review by a local board of farmers."¹⁰⁰

Under a traditional Pay for Practice approach (like the USDA EQIP program¹⁰¹), a farmer can be reimbursed for the costs of implementing a practice like cover cropping without any monitoring of environmental outcomes. The working group prefers a Pay for Performance program which compensates for "measurable outcomes and natural capital."¹⁰² The farmer coalitions also welcome a shift to an outcome-based program, but are concerned that the length of time between implementation of practices and the measurement of outcomes will delay payments to farmers.¹⁰³ The coalitions state that "farmers and conservation specialists already know when and where practices will produce a desired outcome," and suggest designing an outcome-based program which starts with staggered payments to first implement a practice and continue with payments to maintain practices while simultaneously performing planning and data inventory to be refined to pay for outcomes as data becomes more accurate.¹⁰⁴ The coalitions explain that another way of looking at this is a "Start to Finish" plan, in which payment could center around a Whole Farm Plan, where payments are delivered for performance or on a maintenance payment schedule.¹⁰⁵

Considering the finances necessary to establish a PES program, there is an inherent tension created when balancing the costs of compensating the farmer while also accommodating the costs of monitoring outcomes.¹⁰⁶ The working group was presented with several suggestions to reduce the tension. One suggestion offered by multiple presenters was to use modeling to reduce the need for monitoring.¹⁰⁷ Modeling accommodates farmer autonomy and reduces the risk taken by the farmer by estimating the outcome that would be achieved through use of a particular practice, but bases payments on projected, rather than measured, outcomes.¹⁰⁸ The plan proposed by Newtrient uses modeling with Farm PREP to help farmers make management

⁹⁹ White River NRCD, *supra* note 2.

¹⁰⁰ *Id.*

¹⁰¹ USDA NRCS, "Environmental Quality Incentives Program," (2020), <https://www.nrcs.usda.gov/wps/portal/nrcs/main/national/programs/financial/eqip/>.

¹⁰² Working Group Report, *supra* note 1, at 4.

¹⁰³ White River NRCD, *supra* note 2.

¹⁰⁴ *Id.*

¹⁰⁵ *Id.*

¹⁰⁶ Salzman et al., *supra* note 88.; Also see *supra* notes 88, 92, and 97 for webinar discussions about modeling.

¹⁰⁷ Wagner et al., *supra* note 34, at 13.; Winsten, *supra* note 92.; Newtrient, *supra* note 97.

¹⁰⁸ Winsten, *supra* note 92.

decisions and to help private buyers prioritize their investments to only those farms which will guarantee a profitable return.¹⁰⁹

It should be noted that a Pay for Performance program requires a quantifiable outcome to be measured by either monitoring or by modelling,¹¹⁰ such as pounds of phosphorus measured in a water quality program. It may be very expensive to quantify many of the ecosystem services identified in Act 83 (i.e., carbon sequestration).¹¹¹ Therefore, an important consideration in designing a PES program is how to balance the costs of extensive measurement with the need for accurate data of outcomes. There are tools available to provide a holistic set of ecosystem service data,¹¹² but an assessment of the costs of implementation is necessary to determine if the costs exceed the resources available for a Vermont based program.

1. *Environmental Problem Solving vs. Farm Viability Support*

Policymakers considering a PES program should determine whether their goal is to solve an environmental problem or to alleviate poverty (in the context of the working group's report, poverty alleviation is better considered as related to farm viability).¹¹³ Notably, PES programs established in other areas have been shown to be more successful if they embrace multiple objectives rather than focusing strictly on an environmental problem.¹¹⁴ Whether a program is framed as efficiently contributing to a solution for farm viability or efficiently solving an environmental problem carries important implications.¹¹⁵ While a PES program can, and should, aim to support both farm viability and ecosystem health, programs established primarily to solve an environmental problem are designed to do so with an efficiently calculated allocation of funds.¹¹⁶ As a result, payments are directed to those service providers (farmers) who can provide the greatest return on investment.¹¹⁷ Often, the greatest return on investment is found with those who have neglected or degraded the services of their land.¹¹⁸ As an unfortunate outcome of this approach, payments are largely allocated towards the greatest offenders rather than more responsible land stewards.¹¹⁹

Alternatively, a program focused on farm viability can provide financial support to farms more equitably, rather than focusing payments on select farms, such as only those farms located in the area where a resource is of particular concern.¹²⁰ For example, a program in Costa Rica provided flat rates to all landowners to refrain from logging their properties.¹²¹ Although

¹⁰⁹ Newtrient, *supra* note 97.

¹¹⁰ Salzman et al., *supra* note 92.

¹¹¹ VDWC, *supra* note 18 at 9.; Salzman et al., *supra* note 42.; Also see *supra* notes 88, 92, and 97 for webinar discussions about modeling.

¹¹² For examples, see the System of Environmental Economic Accounting (<https://seea.un.org/content/homepage>) or the methodology used by the Glastir Programme in Wales (<https://gmp.wales/data-management>).

¹¹³ Salzman, *supra* note 88.

¹¹⁴ Heidi R. Huber-Stearns et al., "Social-ecological enabling conditions for payments for ecosystem services," *Ecology and Society* (2017).

¹¹⁵ Salzman, *supra* note 88.

¹¹⁶ *Id.*

¹¹⁷ *Id.*

¹¹⁸ *Id.*

¹¹⁹ *Id.*

¹²⁰ *Id.*

¹²¹ *Id.*

payments would have met particular environmental goals more effectively if only landowners in high risk areas (such as streambanks, which carry an added risk of erosion) were compensated, administrators instead chose to distribute payments to all landowners to achieve a larger goal of wealth redistribution.¹²² While the program effectively improved both an environmental concern and supported farm viability, the decision to frame the program as prioritizing farm support strongly influenced how payments were allocated and who was eligible. In the case of a program to address water quality in Vermont, creating a program which prioritizes an environmental solution could have the effect of supporting only farms directly located near impacted watersheds. As a result, the program may not support a larger political goal of acknowledging all Vermont farmers as environmental stewards and supporting farm viability across the entire state.

A PES program that emphasizes farm viability as a central goal can better justify extending payments towards all farms, including those which already prioritize ecosystem stewardship.¹²³ A program centered on farm viability can also accommodate measurement tools which reflect less certainty about outcomes (such as modelling).¹²⁴ Furthermore, PES programs established by other organizations have been shown to be more successful if they embrace multiple objectives rather than focusing strictly on an environmental problem.¹²⁵

2. Potential Tools for Measurement

The working group was presented with various tools for measuring ecosystem services. These include the Landstream New Scale, the Comprehensive Assessment for Soil Health (CASH), the Farm Phosphorus Reduction Planner (Farm PREP) and the Resource Stewardship Evaluation Tool (RSET). Which tool—or tools—are chosen carry important implications for the design of a PES program. The tools listed here vary in the extent of variables measured, and some (e.g., Landstream's New Scale) provide a more holistic data set than others (e.g., Farm PREP, which focuses on Phosphorus reduction). Furthermore, some tools obtain measurements relative to a baseline (e.g., Farm Prep) while others measure a threshold (e.g., CASH). A program which uses baseline measurements offers payments for improvements shown from a given starting point, while programs which use threshold measurements can provide payments for exceeding a given standard.

Landstream's New Scale is intended to engage farmer management decisions to develop and manage ecosystem services.¹²⁶ The platform starts with remotely sensed energy, water, and plant growth data gathered across Vermont and uses advanced three-dimensional soil mapping to monitor soil and watershed establishment.¹²⁷ The technology uses handheld measurement tools to gather information and incorporate records of farmer management.¹²⁸ Currently, this

¹²² *Id.*

¹²³ *Id.*

¹²⁴ *Id.*

¹²⁵ Huber-Stearns et al., *supra* note 114.

¹²⁶ Webinar presented by Abe Collins, Landstream, (11/8/2019) <https://www.youtube.com/watch?v=fT5I7OohY1A>

¹²⁷ *Id.*

¹²⁸ *Id.*

technology is being piloted as a consultation tool to inform grazing and watershed management.¹²⁹

CASH was developed by Cornell to measure degraded soils and address reduced farm productivity and profitability.¹³⁰ Dr. Heather Darby considers CASH to be the best available analytical framework for looking at soil health.¹³¹ CASH is an analytical technique that measures the integration of the biological, chemical, and physical properties of soil in a consistent, low-cost, and easy to interpret way.¹³² The tool depends on farmers to take soil samples from their own farm which they send to Cornell for a laboratory analysis.¹³³ The soil results are presented to the farmer using a color rating system to indicate low (red), medium (yellow), and high (green) soil health.¹³⁴

Currently, CASH is used to inform farm management, but Dr. Darby suggests it may be able to serve as a measurement tool in a PES program.¹³⁵ In the context of her recommendations listed above, Dr. Darby indicates that pre-existing programs are used to fund payments to incentivize farmers to improve red and yellow CASH results.¹³⁶ To ensure that farmers maintain management practices after achieving green CASH results, incentives would likely need to be provided by a new program that provides incentives to continue those management practices.¹³⁷

Farm PREP measures farm-scale phosphorus loss reductions and uses APEX modelling to evaluate different farm management outcomes.¹³⁸ Whereas the other tools take measurements which reflect outcomes at a given point in time, Farm PREP utilizes a data set reaching back 15 years to model outcomes for various farm practices.¹³⁹ Modelling does not directly measure outcomes or ensure that the predicted environmental benefits are being realized (Jon Winsten therefore referred to modelling as a “necessary evil”).¹⁴⁰ However, by basing payments on projected outcomes, modelling reduces the risk posed to the farmer for underperformance caused by uncontrollable events (such as drought or excessive rainfall).¹⁴¹ Farm PREP has already been used in a PES pilot program established by Winrock International¹⁴² and is the key tool suggested in Newtrient’s proposed PES program.¹⁴³

¹²⁹ *Id.*

¹³⁰ Darby, *supra* note 30.

¹³¹ *Id.*

¹³² *Id.*

¹³³ Cornell University, “Comprehensive Assessment of Soil Health: The Cornell Framework,” (2016)

<http://www.css.cornell.edu/extension/soil-health/manual.pdf>

¹³⁴ *Id.*

¹³⁵ Darby, *supra* note 30.

¹³⁶ *Id.*

¹³⁷ *Id.*

¹³⁸ Winsten, *supra* note 92.; Newtrient, *supra* note 97.

¹³⁹ Newtrient, *supra* note 92.

¹⁴⁰ Winsten, *supra* note 92.; Newtrient, *supra* note 97.

¹⁴¹ Winsten, *supra* note 92.

¹⁴² *Id.*

¹⁴³ *Id.*; Newtrient, *supra* note 97. Newtrient is a private consultation company which works to “bring partners together in both the public and private sectors for environmental asset trading opportunities.” (Newtrient, “Creating Value for All,” (2020) <https://www.newtrient.com/About/Creating-Value-for-All>). Newtrient entered into a grant agreement with AAFM to develop an 8-step model to establish a credit-trading scheme for phosphorus-reducing farming practices.

RSET is developed by the USDA Natural Resources Conservation Service and incorporates “multiple resource concerns in an integrated tool: soil management, water quality, water quantity, air quality, and wildlife habitat.”¹⁴⁴ The tool is a web based platform designed to incorporate site-specific data from each field (such as slope and climate) as well as nutrient application data.¹⁴⁵ Like Farm PREP, RSET provides modeled outcomes based on information specific to each field to help farmers decide between different management approaches.¹⁴⁶ RSET determines outcomes by measuring them against thresholds specific to each site with an objective to meet or exceed a national target.¹⁴⁷ RSET is already being used in the Vermont Environmental Stewardship Program (VESP).¹⁴⁸

3. Working Group Assessment of Available Tools

Given the complexity of the issues presented by measuring and monitoring environmental outcomes, the working group concluded it “[did] not yet fully understand which of these tools are best fit for which purpose, which can harness actual or real-time Vermont-specific data, at what cost, and how these might be integrated into an overall approach.”¹⁴⁹ This passage from the notes taken during a working group discussion provides some important direction:

The group discussed the interactions between RSET, CASH, and other metrics including the P index and observed that though there is some overlap in the metrics of these tools, a field could score well on one while poorly on another. The group discussed the possibility of using CASH and RSET in combination for a demonstration project, as the VESP program does. For example, the group discussed that RSET may be able to capture some dimensions around nutrient management plans that CASH may not address.¹⁵⁰

The working group notes that their recommendations to advance our understanding of soil health, review existing tools for PES monitoring, and support the advancements of new emerging tools outline some necessary steps to take before identifying the tool best suited for the job.¹⁵¹ First, the working groups seeks to “learn more about soil capital, how it should be measured, by what metrics or tools, and the more precise stream of ecosystem services that arise from it.”¹⁵² Following this, the working group states it will be able to “determine the specific ecosystem services and/or natural capital they want to focus on...[to] inform which tools are used.”¹⁵³ Ultimately, the working group aims to “invest Vermont resources in key, select

¹⁴⁴ Working Group Report, *supra* note 1, at 28.

¹⁴⁵ *Id.*, at 40.

¹⁴⁶ *Id.*

¹⁴⁷ *Id.*

¹⁴⁸ *Id.*, at 28.

¹⁴⁹ *Id.*, at 9.

¹⁵⁰ *Id.*, at 40.

¹⁵¹ *Id.*, at 13.

¹⁵² *Id.*, at 11.

¹⁵³ *Id.*, at 12.

technologies to advance a powerful PES approach in Vermont that increasingly draws on real-time data and monitoring to pay farmers for producing clear, measurable outputs.”¹⁵⁴

Key Takeaways:

1. Both the working group and the farmer coalitions prioritize an outcomes-based program, but the coalitions note concern about delays between measurable outcomes and the receipt of payments.
2. There are trade-offs between the benefits of accurate measurement and the costs of tools to obtain accurate holistic ecosystem service data.
3. A program should consider whether its goal is to prioritize efficiency in solving an environmental problem or providing financial support to struggling farms. Many PES programs accomplish both objectives, but framing the program to prioritize one or the other carries important implications for how the program is executed.
4. Many tools for measurement exist. The working group has been presented with Landstream’s New Scale, CASH, RSET, and Farm-PREP as possible tools for a PES program.

C. How will the Program Be Implemented?

Answers to the first two questions about what the service is and how it is measured will strongly inform decisions about how a potential PES program might be implemented. Following its information gathering, the working group developed a list of priority research questions, many of which concern program implementation.¹⁵⁵ Some questions left to answer include: (1) what entity would oversee or administer a PES program in Vermont; (2) where funding will be sourced from; and (3) how payments and monitoring for various ecosystem services can be combined into a single program.

There are already a variety of programs established to help farmers adopt practices and overcome resource concerns.¹⁵⁶ Many programs are available at the federal level and funding can be sourced to implement Best Management Practices (BMPs) through programs such as the Environmental Quality Incentive Program (EQIP).¹⁵⁷ With this in mind, Dr. Darby recommended that a program based on soil health be focused on meeting a standard for soil that is healthy enough such that the desired benefits from identified ecosystem services, such as carbon storage or flood resilience, are observed.¹⁵⁸ However, as noted in the preceding section on measurement tools, a standard demonstrating these results still needs to be determined.¹⁵⁹ This approach would

¹⁵⁴ *Id.*, at 13.

¹⁵⁵ *Id.*, at 9.

¹⁵⁶ Darby, *supra* note 30.

¹⁵⁷ *Id.*

¹⁵⁸ *Id.*

¹⁵⁹ *Id.*

require employing existing programs to help farmers reach a certain state of ecosystem service compliance which they are then compensated to maintain.¹⁶⁰

The farmer coalitions note that ecosystem services provided by farmers are beneficial to all people, and that the costs to fund a PES program should thus be shared by all. Several suggestions provided by the coalitions to fund a PES program include:

1. Taxes levied on non-agricultural polluters and exploitive industries, or obtained through the Meals and Room Tax (or ‘Tourism Tax’).
2. A program modeled as an insurance policy, where towns and cities invest in land management as a measure to avoid future costs of environmental degradation.
3. Trading credits for ecosystem services in public markets.
4. Leveraging funds from pre-existing state and federal programs, such as the Environmental Quality Incentives Program (EQIP) or Best Management Practices (BMPs). The coalitions specifically noted interest in the Conservation Stewardship Program (CSP), which is already similar to a PES system, as well as the possibility of strengthening the Vermont Environmental Stewardship Program (VESP).¹⁶¹

While the option to trade credits for ecosystem services in public markets offers an alternative to increasing taxes and reliance on government spending, the coalitions identify a concern that doing so could make “the value of land and decision making authority vulnerable for take-over by outside forces and even other countries.”¹⁶² Additionally, this approach faces criticism from other small farmer organizations who see it as a “false solution” to environmental issues.¹⁶³ As reasons for concern, the organizations cite how these markets maintain power imbalances which undermine small farmers and perpetuate agriculture as an extractive industry which profits at the expense of natural capital.¹⁶⁴ These concerns echo the working group’s mission to create a system which changes these paradigms, and indicate that market-based trading programs should be approached carefully.

A key factor that Jim Salzman correlates with successful PES programs is the utilization of low cost transaction institutions.¹⁶⁵ To ensure that funding can accommodate a diffuse network of discrete buyers and sellers, “there must be an efficient means of exchange to collect and distribute funds.”¹⁶⁶ Because of this need, many of the most successful PES programs are associated with services which can use pre-existing mechanisms to transfer payments, such as a water quality service which can use water utilities to facilitate transactions.¹⁶⁷ Within the context of the working group’s objective, this is likely to be a state agency, a non-regulatory agency, or a

¹⁶⁰ *Id.*

¹⁶¹ White River NRCD, *supra* note 2.

¹⁶² *Id.*

¹⁶³ Tamra Gilbertson, “Carbon Pricing: A Critical Perspective for Community Resistance,” Indigenous Environmental Network & Climate Justice Alliance, 5, (2017).

¹⁶⁴ *Id.*; Also see Richard Conniff, “What’s Wrong With Putting a Price on Nature?,” Yale Environment 360, (2012), https://e360.yale.edu/features/ecosystem_services_whats_wrong_with_putting_a_price_on_nature.

¹⁶⁵ Salzman et al., *supra* note 42.

¹⁶⁶ *Id.*

¹⁶⁷ *Id.*

non-profit organization which connects farmers to sources of funding. Alternately, a program based on private markets could establish a ‘clearinghouse’ to coordinate transactions and make the market more liquid.¹⁶⁸

Key Takeaways:

1. The farmer coalitions suggest generating funding from taxes, an insurance-based program, public market trading, or preexisting government programs.
2. Several Federal and State programs currently exist to help farmers improve conservation practices and may complement or be employed within a PES program.
3. In identifying an appropriate administrator, successful PES programs emphasize relying on institutions that allow for low-cost transactions among many discreet buyers and sellers.

CONCLUSION

The information presented in this report aims to describe the charges given to the PES and Soil Health Working Group and assess whether the outcome of their work successfully meets those charges. While the working group conducted extensive information-gathering within a short time frame, and successfully presented an ambitious vision for a paradigm shift for Vermont agriculture, the process laid out in the legislative charges requires an initial evaluation of existing agricultural programs and incentives. Because this evaluation is not present in the working group’s final product, this report finds that the working group did not fully meet the original charges from the legislature. Following from this evaluation, this report recommends that the working group assess the extent of resources already available and can then identify where gaps in resources can be filled by new incentives and legislation. This approach can also help the working group to determine whether a PES program is the best option to achieve their objectives, or if an alternative model or models could be more successful.

¹⁶⁸ Newtrient, *supra* note 97.