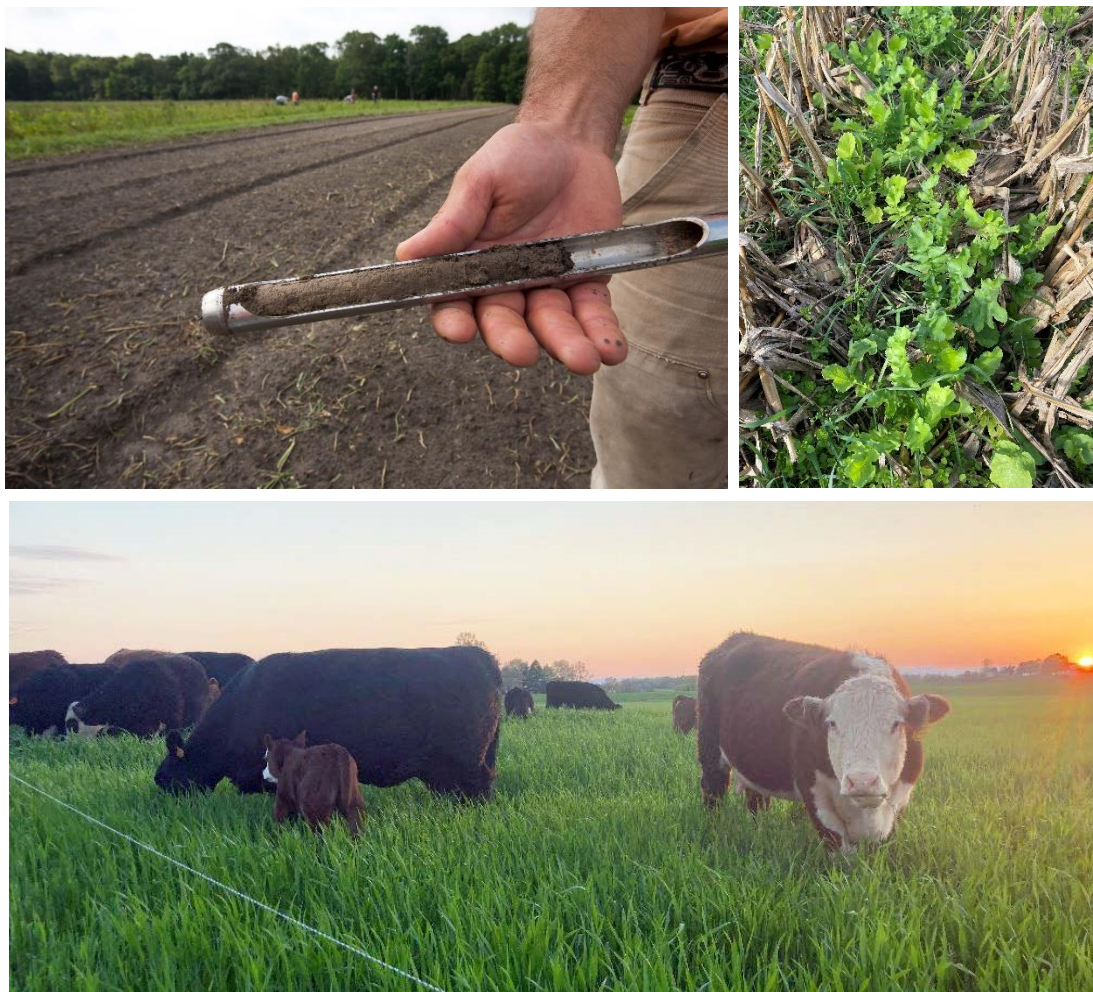


Maryland's Healthy Soils Program: A Path Forward



*A report prepared by the Maryland Department of Agriculture on
behalf of the Soil Health Advisory Committee*



Maryland Healthy Soils Program

Report prepared on behalf of the Soil Health Advisory Committee

January 2022

Executive Summary

In 2017, Maryland was one of the first states in the nation to take another step toward expanding on-farm conservation through the creation of the Maryland Healthy Soils Program. As defined by the [2017 law](#), healthy soils means: *the continuing capacity of the soil to function as a biological system, increase soil organic matter, improve soil structure and water and nutrient holding capacity, and sequester carbon and reduce greenhouse gas emissions.*

To this end, the Maryland Department of Agriculture (Department or MDA) is charged with developing the Healthy Soils Program to:

- **Improve the health, yield, and profitability of the soils of the state;**
- **Increase biological activity and carbon sequestration in agricultural soils; and**
- **Promote further education and adoption of healthy soil practices.**

To further support MDA in the development of a Healthy Soils Program for all producers in the state, the Healthy Soils Advisory Committee (SHAC) was formed in fall 2019. Over the course of two years, members have contributed more than a combined 1,200 hours of time devoted to advancing soil health in Maryland. MDA owes much to their dedication and is extraordinarily thankful for SHAC's focus on producers, resource conservation, and environmental resiliency.

The following pages detail the process, discussions, and considerations of the SHAC that have culminated into the following recommendations, overwhelmingly accepted on January 24, for the MDA Secretary:

1. The following conservation practices are recommended for inclusion in the Healthy Soils Program: Cover crops; Conservation Tillage – Reduced and No-till; Prescribed Grazing; Pasture & Hay Planting; Conservation Cover; Critical Area Planting; Conservation Crop Rotation; Nutrient Management; Integrated Pest Management; and Agroforestry. More detailed recommendations for each eligible conservation practice, and their role within the Healthy Soils Program, are found in Appendix C.
2. The Healthy Soils Program should include two new initiatives to further encourage the adoption of soil health practices across the state. Both initiatives would prioritize financial assistance for practice adoption (pay-for-practice) as more understanding of measurable soil health outcomes (pay-for-performance) is pursued. Enrolled fields in both initiatives would be evaluated for soil health measures including the Maryland Soil Health Card, to support a transition toward pay-for-performance. MDA commits to a fiscal year 2023 launch date for a pilot version of each initiative with an update to the SHAC and key stakeholders by August 2023.

- a. The **Healthy Soils Competitive Fund** should provide financial resources and flexibility for a producer(s) to implement and evaluate the eligible conservation practices cited in Recommendation #1. Funds are envisioned to be applied as cost-share with no minimum acreage or animal unit requirements, in collaboration with appropriate technical expertise, to also evaluate practice outcomes. Funding will be awarded on an annual cycle as determined by MDA and the Program Development Workgroup*. Equipment rental/access and purchases should be considered an eligible expense under the Healthy Soils Competitive Fund to address barriers for producer participation.
 - b. **Cover Crop+** should leverage the success of the current MDA Cover Crop Program to focus primarily on multispecies and extended season cover crops over the course of a long-term contract. Many producers are already familiar with the state Cover Crop Program, and *Cover Crop+* is recommended as a platform to incentivize managing cover crops for multiple co-benefits. The department, as appropriate, should also consider opportunities to stack/bundle conservation practices within *Cover Crop+*, such as the incorporation of livestock grazing, to maximize soil health benefits.
3. Research outcomes from the Healthy Soils Competitive Fund and *Cover Crop+*, and emerging soil health science, should inform future program direction with regards to outcomes measurement, practice landscape impact, and to refine the support offered to meet producers' needs. Annual meetings of the SHAC will contribute to this recommendation.
4. The Department should continue to work with partners to quantify the value, based on the goals of the Healthy Soils Program, and the cost effectiveness of eligible conservation practices per acre using best available tools.

* The **Program Development Workgroup** would be formed in Spring 2022. The Workgroup would be comprised of 5-6 members of the SHAC as a balanced representation of the full SHAC. The Workgroup members would support MDA in establishing ranking criteria for applications eligible for the Healthy Soils Competitive Fund. See Section 7 for additional details.

1. History of Farm Conservation Programs

MDA is known for its longstanding commitment to on-farm conservation. Foremost, the Maryland Agricultural Water Quality Cost Share (MACS) Program was authorized in 1982, as a key component of the state's efforts to address water quality concerns in the Chesapeake Bay. The state recognized the costs of installing best management practices (BMPs) to improve water quality and achieve public benefits could present a financial burden to farm operations, especially when many conservation BMPs do not generate additional revenue for the farm. The Department established the MACS program to provide voluntary financial assistance, coupled with free technical assistance from Soil Conservation Districts (SCDs), to advance the adoption of many nutrient reducing BMPs. Today, the [MACS Capital program](#) currently includes over 40 eligible BMPs for financial assistance, and over half are eligible for up to 100% cost-share in recognition of the strong public benefit they provide.

Additionally, MDA offers annual financial assistance for its Cover Crop Program and Manure Transport/Injection Program, and offers low-interest loans and income tax subtractions to offset other conservation equipment costs.

2. Healthy Soils Program Enabling Legislation

Through financial incentives and voluntary conservation programs, Maryland has become a national leader in the adoption of conservation practices like no-till and cover cropping. In 2017, Maryland was one of the first states in the nation to take another step towards expanding on-farm conservation through the creation of the Maryland Healthy Soils Program. As defined by the 2017 law, healthy soils means: *the continuing capacity of the soil to function as a biological system, increase soil organic matter, improve soil structure and water and nutrient holding capacity, and sequester carbon and reduce greenhouse gas emissions*. To this end, the Department is charged with developing the Healthy Soils Program to:

- Improve the health, yield, and profitability of the soils of the state;
- Increase biological activity and carbon sequestration in agricultural soils; and
- Promote further education and adoption of healthy soil practices.

The latter will be lead through MDA programs and the incentives available to producers for research and education, technical assistance, and to access (dependent on available funding) financial assistance. Permanent funding for the Healthy Soils Program was not provided, so MDA secured temporary grant funding through two sources - National Fish and Wildlife Foundation's Innovative Nutrient and Sediment Reduction grant and an US Department of Agriculture's Regional Conservation Partnership Program grant - to explore interest and needs among farmers adopting healthy soils practices.

Concurrently, to accomplish the ambitious goals of the legislation and to continue the work of a predecessor Healthy Soils Consortium, the SHAC was created in fall 2019. The SHAC is comprised of Secretary appointed members charged with developing recommendations for the Healthy Soils Program, consistent with the legislation. A key objective of the SHAC is the development of recommendations outlining incentive options to further the adoption of healthy soils practices.

3. Role and Members of the SHAC

The SHAC is charged with providing recommendations to MDA for the development of the Healthy Soils Program, including the activities and potential incentives necessary to increase adoption of healthy soils practices. Recommendations should also be consistent with the following philosophy:

1. MDA recognizes that our state's producers have already made significant contributions to conservation;
2. MDA recognizes that improving soil health increases on-farm climate and economic resilience;
3. MDA will continue in its leadership capacity to support producer's needs as the industry and policy drivers evolve; and
4. MDA programs will be inclusive of all producers, regardless of crop type, farm size, and management style.

Accordingly, the following members of the SHAC have been meeting quarterly:

- Aaron Cooper (Cut Fresh Organics),
- Thomas Croghan, M.D. (The Vineyards at Dodon, LLC),
- Steven Darcey (Edgewood Farm/Prince George's SCD),
- Steve Ernst (Ernst Grain and Livestock),
- Matt Fry (Fair Hill Farms),
- Trey Hill (Harborview Farms),
- Robert Hutchison (Hutchison Brothers),
- Janet O'Meara (Stone Valley Farm),
- Michael Calkins (Maryland Young Farmers Advisory Board),
- Colby Ferguson (Maryland Farm Bureau),
- Amy Jacobs (Delaware-Maryland 4R Alliance/TNC),
- Denzell Mitchell Jr. (Farm Alliance of Baltimore),
- Jen Nelson (Maryland Association of Soil Conservation Districts, MASCD),
- Mike Twining (Willard Agri-Service),
- Christopher Beck (MDE),
- Elliott Campbell, Ph.D. (DNR),
- Grace Garst (USDA Natural Resources Conservation Service),
- Deborah Herr Cornwell (Maryland Department of Planning),
- Alisha Mulkey (MDA, SHAC facilitator),
- Ray R. Weil, Ph.D. (University of Maryland),
- Dietrich J. Epp Schmidt (University of Maryland),
- Kathryne Everts, Ph.D. (Harry Hughes Center for Agroecology),
- Kate Tully, Ph.D (University of Maryland),
- The Honorable Jason C. Gallion (Maryland State Senate, District 35),
- The Honorable Dana Stein (Maryland House of Delegates, District 11),
- Phillip Bogdonoff (Biodiversity for a Livable Climate),
- Cleo Braver (Maryland Pesticide Education Network),
- Alan Girard (Chesapeake Bay Foundation),
- Lisa Garfield (Future Harvest CASA), and
- Tim Rosen (ShoreRivers).

Past members have included: Laura Starr, Ph.D. (Delaware-Maryland 4R Alliance/TNC), Steven B. Mirsky, Ph.D. (USDA-ARS), Lindsay Thompson (MASCD), Christy Brown (USDA-NRCS), David Smith (USDA, retired), Dena Leibman (Future Harvest CASA), Lori Arguelles (COMPASS) and Theodore “Tod” Wickersham Jr. (Beneficial Results, LLC).

Full biographies for members, present and previous, can be found in Appendix A.

5. SHAC Meeting Process and Summary

To facilitate the charge of the SHAC, MDA proactively set the agenda, guest speakers, and supporting documents for each meeting. Meetings were organized around the following topics, and included abundant discussion and roundtable opportunities.

1. Background and expectation setting for the SHAC;
2. Evaluation and prioritization of conservation practices to be included in the Healthy Soils Program, including scientific assessment;
3. Incentive concepts to advance the prioritized conservation practices; and
4. Recommendations and next steps for the Healthy Soils Program.

The SHAC held a total of 10 full committee meetings between December 2019 and January 2022 with a summary of each meeting below. Outside of the full committee meetings, 12 subcommittee and 9 focus group meetings were also held. Subcommittees were composed of approximately 8-10 members representing all sectors of the membership, while focus groups were composed of subject matter experts from the SHAC, e.g., all producers in one focus group. Both focus groups and subcommittees were intended to elicit additional feedback from the members between the meetings of the full SHAC. Five webinars were also hosted with outside experts on the scientific and economic support for healthy soils practices.

Dec. 2, 2019

The inaugural meeting contextualized the objective of the SHAC and set the framework for the coming discussions. A roundtable discussion was held to assess initial needs for increased practice adoption. Questions fell into five broad categories: 1) further research, 2) increased technical assistance and education, 3) financial incentives, 4) soil health evaluation tools, and 5) programmatic changes needed.

March 2, 2020

The SHAC heard presentations from Alisha Mulkey and Dr. Kate Tully on the value and effectiveness of conservation practices with an identified soil health benefit. An initial list of conservation practices with soil health benefits was presented, followed by a roundtable discussion to begin refining and prioritizing among the practices. Post meeting, a survey was conducted to obtain additional feedback from members. A copy of the initial practice list and the survey results are in Appendix B.

Sept. 21, 2020

The SHAC held a roundtable discussion to delve deeper into the priority practices identified based on the March survey. Overall, committee members prioritized working lands practices that are valuable to all operational sizes as key to the Healthy Soils Program. Land retirement practices, such as buffers,

remain valuable but already have existing funding sources and incentives. In addition to the prioritized practices, MDA recommended, and the SHAC affirmed, that agroforestry practices should all be included within the Healthy Soils Program. See Section 6 below for additional detail.

Jan. 11, 2021

With the list of priority conservation practices largely finalized, the SHAC held virtual “breakout groups” of the three subcommittees to begin organizing facilitated discussions around select priority conservation practices for subsequent meetings.

Feb. 8, 2021

This meeting focused on facilitated discussion around the priority conservation practices: Cover Crops and Conservation Tillage. A memo for each conservation practice was developed to support SHAC discussions. A copy of the memos is included in Appendix C.

Kate Macfarland, USDA National Agroforestry Center presented on practices Alley Cropping and Hedgerow/Windbreak Establishment.

March 1, 2021

This meeting focused on facilitated discussion around the priority conservation practices: Pasture & Hay Planting, Conservation Cover, Critical Area Planting, and Prescribed Grazing. A memo for each conservation practice was developed to support SHAC discussions. A copy of the memos is included in Appendix C.

Kate Macfarland, USDA National Agroforestry Center presented on Silvopasture.

March 15, 2021

This meeting focused on facilitated discussion around the priority conservation practices: Integrated Pest Management, Precision Nutrient Management, and Conservation Crop Rotation. A memo for each conservation practice was developed to support SHAC discussions. A copy of the memos is included in Appendix C.

Further discussion of agroforestry practices was held to outline steps for advancing the adoption of agroforestry practices.

June 7, 2021

Before proceeding with recommendations for individual conservation practices, the SHAC considered incentive concepts based on a briefing document provided by MDA (Appendix D). The briefing document outlined nine incentives options and a self-evaluation of MDA’s capacity to implement specific incentive programs and allowed time for members to provide feedback and ask clarifying questions. After this meeting, several small group discussions were held to obtain more targeted feedback.

Aug. 30, 2021

Based on feedback from June 7 and after, MDA presented three program initiatives to consolidate from the options previously discussed. The three programs could occur simultaneously and fill different roles. After the presentation, the SHAC held a roundtable discussion to address concerns and collect initial comments. See Section 7 below for additional detail.

During fall 2021, the three subcommittees were reconvened to gather more targeted feedback, refine and finalize the conservation practice memos attached as Appendix C, and draft recommendations for the full committee's consideration.

January 24, 2022

The SHAC discussed and voted on recommendations for MDA's forthcoming Healthy Soils Program. MDA reviewed next steps for the SHAC, including the formation and role of the Program Development Workgroup.

The detailed minutes of each meeting and outcomes are available on the [Maryland Soil Health webpage](#).

Worth noting is the SHAC's strong interest in tools or metrics to measure soil health, and potentially tie financial assistance to measurable soil health outcomes (pay-for-performance versus pay-for-practice). The topic was prevalent in all meetings and is an area of evolving scientific research currently. Accordingly, the Department will retain its focus on promoting conservation practices with known soil health benefits and will collaborate with its scientific partners to identify the appropriate measures for soil health as research is vetted. Financial assistance criteria can evolve as scientific consensus is achieved.

6. Priority Conservation Practices

On March 3, 2020, the SHAC began initial discussion of conservation practices for potential inclusion in the Healthy Soils Program shown in Appendix B. The initial list of practices was presented as a matrix with evaluations based on four components: 1) USDA-Natural Resource Conservation Services conservation practices to address soil quality and soil erosion resource concerns, 2) CO₂e sequestration potential, based on work by Dr. Sara Via (University of Maryland), 3) alignment with current Watershed Implementation Plan (WIP) goals and current state programming, and 4) Soil Health Quadrant scores based on work by Dr. Kate Tully and partners. All conservation practices have a definition and code (3-digit number) consistent with USDA-Natural Resource Conservation Services. The intent of the matrix was to examine conservation practices across multiple lenses, while not mutually exclusive, to begin prioritizing practices into a smaller menu for inclusion in the Healthy Soils Program. The exercise of prioritizing conservation practices was not meant to eliminate practices from future consideration.

Significant progress was made during the initial meeting and more time was allotted during the Sept. 9, 2020, meeting. Additionally, during summer 2020, more detailed feedback was gathered from SHAC members through survey responses and three focus group discussions. Through this process, the SHAC identified 10 priority conservation practices:

1. Cover crops
2. Conservation Tillage – Reduced and No-till
3. Prescribed Grazing
4. Pasture & Hay Planting
5. Conservation Cover
6. Critical Area Planting

7. Conservation Crop Rotation
8. Nutrient Management
9. Integrated Pest Management
10. Agroforestry **

Each conservation practice (excluding agroforestry) was subsequently assigned to a subcommittee for deeper review and discussion. To advance the SHAC discussion, MDA drafted a memo for each conservation practice to outline the context of that practice within Maryland including available cost share options, adoption rates, and environmental and economic evaluation of the practice based on guest presentations. The facilitated discussions in February and March 2021, led by the subcommittees, refined practice options with potential advantages and disadvantages that could be considered for the Healthy Soils Program. Several iterations of the memos were developed to serve as a living document cataloging the work and thought process of the SHAC. The memos culminated into a recommendations section that is inclusive of program recommendations, common across all memos, as well as recommendations specifically pertaining to each priority conservation practice. The catalog of practice memos can be found in Appendix C.

** In addition to the suite of nine conservation practices shown above, the SHAC has endorsed the inclusion of agroforestry practices in the Healthy Soils Program. Agroforestry would include Alley Cropping, Hedgerow Planting, Windbreak/Shelterbelt Establishment, Silvopasture, and Tree & Shrub Establishment. Importantly, this suite of agroforestry practices is largely already eligible for cost-share assistance in the state MACS Capital program. However, cost share would not cover early years when the agroforestry practices may not generate revenue for the farm. Opportunities to offset potential losses will need to be explored. Additionally, given low levels of adoption, MDA recognizes additional technical and outreach assistance will be necessary to support integration of these practices on the farm landscape and is pursuing demonstration projects with state and university partners.

7. Proposed Incentive Programs

In addition to the suite of conservation practices that would be recommended in the Healthy Soils Program, the SHAC was also asked to consider several incentive program options to advance the adoption of the practices. As such, the SHAC began considering potential incentive options during the June 2, 2021 meeting. Prior to the meeting a briefing document was distributed outlining nine potential options (Appendix D) developed by MDA and scored based on MDA's self-evaluation of state capacity, funding availability (current and likely), and perceived producer experience. The Department committed to pursue any incentive option(s) preferred by the SHAC, even if capacity would need to be expanded in new ways. However, MDA acknowledged all incentive concepts could not be pursued at once, so it was the role of the SHAC to recommend a best starting point among the incentive options.

Robust conversation occurred during the June 2 meeting; however, not all SHAC members were present. Most producers could not attend the meeting due to the demands of the planting season. To ensure input from the majority of SHAC members, Alisha Mulkey and Kevin Antoszewski (both MDA) met with producers individually, to accommodate their busy schedules, and held focus groups with the service providers, academics, and nonprofit organizations on the SHAC.

The feedback from SHAC members affirmed that multiple incentive options may be necessary to advance the Healthy Soils Program, and it would be most important to retain maximum producer flexibility within the Healthy Soils Program and to prioritize financial assistance. Additionally, the Healthy Soils Program framework should look different than existing state programs to support soil health and resiliency, e.g., continued adoption of soil health practices over multiple years. Taking this feedback into consideration, MDA consolidated the incentive options into three initiatives to consider, and presented the following at the August 30 meeting:

1. Healthy Soils Competitive Fund (“Fund”)

The Fund would be an annual competitive funding cycle targeted toward producers that don’t currently qualify for existing state programs and/or producers interested in conducting on-farm research to support their soil health goals. Eligible conservation practices would include the 10 practices recommended by the SHAC, and the application process would be simplified to build engagement with producers and partners. Contracts would have a 5-year term and include support for soil sampling and data collection to evaluate soil health metrics.

MDA would establish a Program Development Workgroup comprised of 5-6 members of the full SHAC to support the development of application materials and selection criteria for the Fund. Examples of selection criteria could include preferences for new or underserved producers, carbon sequestration potential (per unit or total acres) of project scope, and/or innovative partnerships that advance the goals of the Healthy Soils Program. The Workgroup will also provide important input on application simplicity and program equity to address gaps in current programming.

2. Cover Crop+

Cover Crop+ would leverage the success of the state’s existing cover crop program with a requirement for extended season or multispecies cover crops and engage in multi-year planning. The program would also consider greater ability to integrate livestock, and the stacking of conservation practices beyond cover crops to maximize ecosystem benefits. The latter could include additional payments to the producer. Contracts would have a 5-year term and include support for soil sampling and data collection to evaluate soil health metrics.

3. Continued Improvements to the MACS Program

Concurrent with the two new initiatives for the Healthy Soils Program, MDA would retain the well-established MACS Capital Program as the primary program to recognize the co-benefits of nutrients and soil carbon obtained from conservation. Recent program updates (new eligible practices, cost-share up to 100%, etc.) would be promoted, and future refinements for program eligibility and administration would be evaluated.

As previously mentioned, the three initiatives could occur concurrently allowing producers the flexibility to apply for multiple programs as desired. Caps for financial assistance will need to be established to ensure equitable program access. MDA is preparing to proceed with a pilot phase for the Healthy Soils Competitive Fund and *Cover Crop+* for FY23.

8. Accounting for Soil Health Benefits

Express purposes of the Healthy Soils Program are to increase the health, yield, and profitability of the soils and to increase carbon sequestration in the soils, accomplished through the widespread use of healthy soils practices. These goals are qualitative, as is the charge to the SHAC, but MDA recognizes the ability to quantify program outcomes (perceived and actual) is of keen interest to many stakeholders. Thus MDA, in parallel to the SHAC's objectives, have been working to quantify the goals associated with the Healthy Soils Program. The initial priority has been soil carbon sequestration potential given MDA's commitment of the Healthy Soils Program towards the state's climate change goals.

Maryland's current Greenhouse Gas Reduction Act calls for a 40% emissions reduction, from 2006 baseline, by 2030. However, the [2030 Greenhouse Gas Reduction Act \(GGRA\) Plan](#) recently released by Maryland Department of Environment (MDE) pursues a more ambitious goal of 50% reduction by 2030. Meeting this goal includes an explicit role for natural and working lands to mitigate climate change. The Department has been working closely with MDE and Maryland Department of Natural Resources (DNR) to estimate the greenhouse gas impacts of key conservation practices. The Department currently estimates ~5.7 million metric tons of carbon dioxide equivalent (CO₂e) could be sequestered between 2021-2030 from agricultural lands based on the COMET tool (version 1.0) and research supported by Dr. Sara Via ([Accessed Here](#); 2030 GGRA Plan, pages 141-142). Current estimates for the adoption rate of conservation practices are consistent with the Phase 3 WIP, but as incentives and funding evolve, the Department is proactively working to update such estimates. Active efforts also include determining the metrics and tools that will be used to quantify soil carbon in the state's 2023 Greenhouse Gas Inventory. Staff from MDA, MDE, and DNR continue to engage with the U.S. Climate Alliance on best practices for inventory, and accounting of natural and working lands toward climate change solutions. Notably, opportunities to accelerate conservation practice adoption will allow MDA to leverage its program data to also refine the accounting of the Healthy Soils Program.

Additionally, the Department recognizes that many of the conservation practices promoted for carbon sequestration also reduce nutrients and sediment loss. Accordingly, MDA is already evaluating its existing programs, like MACS, to capitalize on the co-benefits of conservation practices that will contribute to the [Watershed Implementation Plan](#) (WIP) goals for the Chesapeake Bay, while it is also working to finalize the Healthy Soils Program.

Appropriate metrics to account for other Healthy Soils Program goals (health, yield, and profitability) are still being determined, but are anticipated to retain flexibility for producer's interests and could be complemented by on-farm data collection from fields enrolled in the Healthy Soils Program.

All proposed accounting is consistent with Recommendation #4, and will be included in annual updates to the SHAC.

9. Recommendations from the SHAC

Based on the process outlined in the preceding sections, the SHAC met on January 24, 2022 to review and consider advancing the following recommendations to the Secretary of Agriculture. All recommendations were supported by at least 22 of 27 voting members present.

1. The following conservation practices are recommended for inclusion in the Healthy Soils Program: Cover crops; Conservation Tillage – Reduced and No-till; Prescribed Grazing; Pasture & Hay Planting; Conservation Cover; Critical Area Planting; Conservation Crop Rotation; Nutrient Management; Integrated Pest Management; and Agroforestry. More detailed recommendations for each eligible conservation practice, and their role within the Healthy Soils Program, are found in Appendix C.
2. The Healthy Soils Program should include two new initiatives to further encourage the adoption of soil health practices across the state. Both initiatives would prioritize financial assistance for practice adoption (pay-for-practice) as more understanding of measurable soil health outcomes (pay-for-performance) is pursued. Enrolled fields in both initiatives would be evaluated for soil health measures including the Maryland Soil Health Card, to support a transition toward pay-for-performance. MDA commits to a fiscal year 2023 launch date for a pilot version of each initiative with an update to the SHAC and key stakeholders by August 2023.
 - a. The **Healthy Soils Competitive Fund** should provide financial resources and flexibility for a producer(s) to implement and evaluate the eligible conservation practices cited in Recommendation #1. Funds are envisioned to be applied as cost-share with no minimum acreage or animal unit requirements, in collaboration with appropriate technical expertise, to also evaluate practice outcomes. Funding will be awarded on an annual cycle as determined by MDA and the Program Development Workgroup. Equipment rental/access and purchases should be considered an eligible expense under the Healthy Soils Competitive Fund to address barriers for producer participation.
 - b. **Cover Crop+** should leverage the success of the current MDA Cover Crop Program to focus primarily on multispecies and extended season cover crops over the course of a long-term contract. Many producers are already familiar with the state Cover Crop Program, and *Cover Crop+* is recommended as a platform to incentivize managing cover crops for multiple co-benefits. The department, as appropriate, should also consider opportunities to stack/bundle conservation practices within *Cover Crop+*, such as the incorporation of livestock grazing, to maximize soil health benefits.
3. Research outcomes from the Healthy Soils Competitive Fund and *Cover Crop+*, and emerging soil health science, should inform future program direction with regards to outcomes measurement, practice landscape impact, and to refine the support offered to meet producers' needs. Annual meetings of the SHAC will contribute to this recommendation.
4. The Department should continue to work with partners to quantify the value, based on the goals of the Healthy Soils Program, and the cost effectiveness of eligible conservation practices per acre using best available tools.

The eligible conservation practice-level recommendations consistent with Appendix C include:

Cover Crops

- The Department should prioritize financial incentives to encourage the adoption and evolution of cover crop management within Maryland in a way that is available to farms of all sizes, that supports plantings beyond the traditional fall planting season and that supports species mixes, planting methods, and termination options not currently eligible for the existing Cover Crop Program. All three options should be eligible for support under the Healthy Soils Competitive Fund, which should prioritize applications that result in year-round cover (cash crops and cover crops).
- In parallel, the Department should also provide financial incentives to increase the adoption of multispecies and extended season cover crops among producers currently using fall-planted cover crops in order to couple water quality and soil health benefits. As producers across the state adopt/evolve new cover crop management techniques, the Department should provide appropriate tools and access to technical support. Both of these latter options are recommended to be eligible for funding from *Cover Crop+*.

Conservation Tillage

- The Department should prioritize the adoption and evolution of conservation tillage management within Maryland to encourage avoided emissions from tillage passes and opportunities to increase soil carbon through the transition to conservation tillage. Such proposals would be eligible under the Healthy Soils Competitive Fund.
- The Department should consider incentives for producers to bundle conservation tillage with those fields enrolled in *Cover Crop+*, and as appropriate, should also consider opportunities to stack/bundle other conservation practices within *Cover Crop+* to maximize soil health benefits.

Prescribed Grazing

- The Department should incentivize Prescribed Grazing on cropland to increase perennial cover and promote the integration of livestock into cropping systems. Both options could be eligible for application under the Healthy Soils Competitive Fund, and could leverage existing state cost-share for supporting infrastructure such as fencing, water facilities, heavy use areas, etc.
- The integration of livestock on cropland has the potential to improve soil health and increase carbon sequestration potential. Accordingly, the Department should incentivize livestock grazing of cover crops under the *Cover Crop+* program and allow for grazing of cover crops by livestock not owned by the owner of the land where the cover crop is established.

Pasture and Hay Planting

- The Department should prioritize the adoption and evolution of Pasture and Hay Planting within Maryland to incentivize biodiverse plantings to promote increased biological activity and living cover and roots for longer periods. For example, funds from the Healthy Soils Competitive Fund could provide producer flexibility to trial new forage mixes for pastured-animals or incorporating forage into crop rotations. Additionally, adoption of the practice could leverage

existing state cost-share (MACS program) for supporting infrastructure such as pasture seeding, fencing, etc.

- To support producers electing to transition leased land from annual to perennial systems, MDA should work with partners and key stakeholders to increase appreciation/demand of longer lease terms that could accelerate adoption of conservation investments on rented land and improve soil health outcomes.

Conservation Cover and Critical Area Planting

- The Department should incentivize the multiple environmental benefits that can be gained when retiring marginal farmland to diverse, perennial cover, including pollinator habitat. State programs can offer increased flexibility for producers to elect to retire sensitive lands and should consider areas with increasing salinity due to saltwater intrusion as eligible to receive funding from the Healthy Soils Competitive Fund.
- Additionally, to support producers electing to install perennial practices on leased land, MDA should work with partners and key stakeholders to increase appreciation/demand of longer lease terms that could accelerate adoption of conservation investments on rented land and improve soil health outcomes.

Conservation Crop Rotation

- The Healthy Soils Competitive Fund should enable a producer to trial/evaluate expanding crop rotations that include perennial cover. Trial/evaluation objectives could include analyses of the environmental and economic benefits of perennial cover and potential/realized savings from reduced inputs should the new cover mitigate pest and disease pressure.

Nutrient Management

- The Department should make Healthy Soils Competitive funds available for on-farm nutrient management trials, in collaboration with appropriate technical expertise, to evaluate practice outcomes. As needed, a producer could request a research exemption from the Department.
- The adoption of organic nutrient applications should be explicitly named as eligible for funding under the Healthy Soils Competitive Fund. As nutritionally appropriate soil amendments become more available in the state, and policy initiatives to divert organic wastes increase, the Healthy Soils Program can support producer access to these nutrient sources consistent with all state regulations.
- In addition to the Healthy Soils Competitive Fund, the Department should leverage existing program initiatives such as manure transport, conservation equipment rentals, and purchase incentives to increase access to organic nutrient sources where appropriate.
- The Department should expand opportunities for technical assistance that addresses the intersection of soil health management and annual nutrient management planning.

Integrated Pest Management

- The Healthy Soils Competitive Fund should provide flexibility for a producer to define research objectives related to alternative pest management and/or reduced inputs to control pests.

Funds are envisioned to be applied on small plot or field trials, in collaboration with appropriate technical expertise, to evaluate practice outcomes. Outcomes could include economic evaluation such as savings from reduced applications compared to potential/realized yield impacts, if any.

10. Next Steps

Since 2019, the work of the SHAC has been to prioritize practices and incentives that would be offered within the MDA Healthy Soils Program. This prioritization has identified practices and incentives for first action, and has not eliminated other potential practices and incentives from future consideration. As we continue to learn more, it may be appropriate to revisit recommendations and make adjustments to adapt to new and developing science. Across multiple meetings and forums, members have devoted substantial time to advancing soil health in Maryland. The Department owes much to this dedication and is extraordinarily thankful for SHAC's focus on producers, resource conservation, and environmental resiliency. Given the large and diverse membership of the SHAC, it was expected that multiple viewpoints on soil health would emerge. While the recommendations presented in Section 9 reflect the majority of members, it is acknowledged that some members would prefer the Healthy Soils Program to go further, such as advocating the elimination of synthetic nutrients and chemicals, or only providing financial assistance for measured soil health outcomes. The meeting minutes serve as documentation of the robust discussions and varying priorities of each member. The recommendations made in 2022 by the SHAC reflect the best collective understanding of current science. To address and adapt to new information, the full SHAC will continue to meet annually to discuss program outcomes, new and relevant information, and potential adjustments to programs so that MDA can remain flexible enough to meet the needs of producers of all types across the state. A fuller program review will be planned for Year 5.

Additionally, a portion of the SHAC, as a Program Development Workgroup, will continue to support MDA in the development of application materials and selection criteria for the Healthy Soils Competitive Fund. The composition of the Workgroup is still being finalized, but MDA intends for it to be reflective of the various stakeholder groups that make up the SHAC.

As previously noted, data collection will be an important piece of the Healthy Soils Program. In addition to the soil and manure testing required for nutrient management plans, MDA may have funds to continue using the Maryland Soil Health Card as a physical assessment of the soil and using a portion of Cornell's Comprehensive Assessment of Soil Health for biological testing. MDA, with outside expertise, can also explore other scalable, reliable technologies that may measure soil health. As the SHAC learns more through this process, it may be appropriate to revisit the initial list of practices and incentives.

Lastly, voluntary carbon markets remain an evolving unknown for the world of soil health. Momentum to implement markets in a responsible and accurate way exists at the national level, though protocols are still being developed. The Department has committed to working with our state partners to evaluate natural and working lands as a catalyst for innovative private-public partnerships. Accordingly, as opportunities for producers to participate increases, it may be appropriate for the SHAC to consider how private market programs interface with the Healthy Soils Program.



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