

REPORT OF THE AGRICULTURAL LANDS WORKING GROUP FOR
THE VERMONT CONSERVATION STRATEGY INITIATIVE

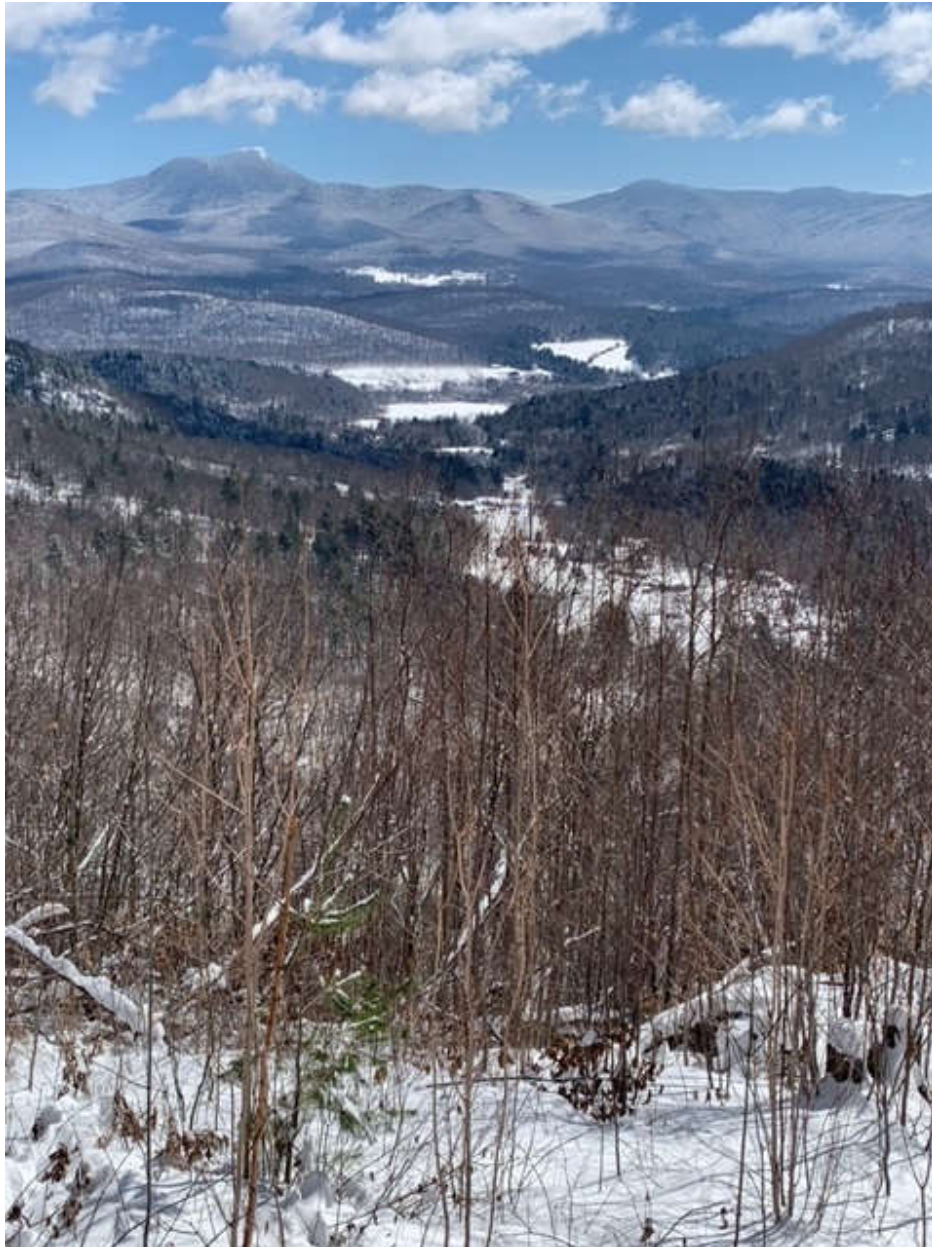


Photo Credit: Scott Magnan

State of Knowledge of Soil Biodiversity (2020)

Soil biodiversity could constitute, if an enabling environment is built, a real nature-based solution to most of the problems humanity is facing today, from the field to the global scale. Therefore, efforts to conserve and protect biodiversity should include the vast array of soil organisms that make up more than 25% of the total biodiversity of our planet.

Signed by:

*United Nations Food & Agriculture Organization Director-General, QU Dongyu
Executive Secretary of the United Nations Convention on Biodiversity, Elizabeth Maruma Mrema*

March 29, 2024

Introduction

The Vermont Conservation Strategy Initiative (VCSI) has established working groups to address specific themes or questions raised by Act 59 of 2023 – the Community Resilience and Biodiversity Protection Act (CRBPA). The Agricultural Lands Working Group (ALWG) was established by the VCSI to investigate and deliberate on a deliverable established by the CRBPA at 10 V.S.A. § 2803(b)(1)¹ – ‘criteria shall be developed to determine the types of agricultural lands that will qualify as supporting and restoring biodiversity and therefore count towards the natural resource management area category’. During the inventory phase of the VCSI, the ALWG considered what is at stake in conserving agricultural land, what agricultural lands already are conserved, and if those conserved agricultural lands could count towards the 30 by 30 goal under the vision, goals, and definitions of the CRBPA.

Membership

Agricultural Lands Working Group Members:

Caroline Gordon – Rural Vermont
Darlene Reynolds – VT Dairy Producers Alliance
Dave Blodgett – USDA NRCS
Eric Clifford – Champlain Valley Farmers Coalition
Jen Miller – NOFA VT
Jennifer Byrne – Natural Resources Conservation District
Marli Rupe – VANR DEC

Mike Snow – CT River Watershed Farmers Alliance
Ryan Patch – VAAFAM (Co-Chair)
Scott Magnan – Franklin Grand Isle Farmers Watershed Alliance
Stacy Cibula – VHCB (Co-Chair)
Stephen Leslie – VT Healthy Soils Coalition
Tyler Miller – Vermont Land Trust

The Process

The Agricultural Lands Working Group (ALWG) met nine times during December through March of 2024. Meeting times were usually two hours in length, and the group met on Wednesdays, generally from 11am – 1pm. Meeting recordings, notes and presentations are available on the VHCB website: <https://vhcb.org/our-programs/VCS>. The ALWG also hosted a public roundtable on March 21, 2024 from 6 – 8pm. The proceedings were recorded and are also on the VHCB website. Drafting of this report was conducted over at least three distinct drafts, authored primarily by staff at the Vermont Housing and Conservation Board (VHCB) and the Vermont Agency of Agriculture, Food & Markets (VAAFAM) as VCSI contracted facilitation services were not available to support drafting the report for the ALWG. Drafts were reviewed at publicly recorded meetings of the ALWG.

Recommendations

To advise VHCB on their charge at 10 V.S.A. § 2803(b)(1): ‘The [Conserved Lands] inventory shall include: A review of the three conservation categories defined in section 2801 of this title and suggestions for developing any modifications or additions to these categories that maintain or complement the core concepts of ecological reserve areas, biodiversity conservation areas, and natural resource management areas in order to complete the conserved land inventory and inform the comprehensive strategy in the conservation plan. As part of this review, criteria shall be developed to determine the

¹ VCSI ALWG charge available at: <https://docs.google.com/document/d/e/2PACX-1vQZR0yaFuI7MQOt2xkeL7mfhkzuQ8H-1QOz0LjNk7AFzXinw6Lr0dgifYUUHwuZ2dHfvTnrVDz0ryf/pub>

types of agricultural lands that will qualify as supporting and restoring biodiversity and therefore count towards the natural resource management area category’ – the ALWG broke the request and the response down into two distinct parts:

For the question of: ‘criteria shall be developed to determine the types of agricultural lands that will qualify as supporting and restoring biodiversity and therefore count towards the natural resource management area category’ – the ALWG recommends the following criteria:

1. **All current and future conserved agricultural lands should be counted towards State goals of conserving 30 percent of the land of the State by 2030 and 50 percent by 2050.**

For the question of: ‘A review of the three conservation categories defined in section 2801 of this title and suggestions for developing any modifications or additions to these categories that maintain or complement the core concepts of ecological reserve areas, biodiversity conservation areas, and natural resource management areas in order to complete the conserved land inventory and inform the comprehensive strategy in the conservation plan,’ the ALWG recommends the following changes be made to definitions and titles used in the CRBPA:

2. The term ‘biological diversity’ or ‘biodiversity’ should be defined by the VCSI; the ALWG recommends utilizing the term ‘Biological Diversity’ as defined by the UN Convention on Biological Diversity: ‘Biological diversity’ means the variability among living organisms from all sources including, inter alia, terrestrial, marine and other aquatic ecosystems and the ecological complexes of which they are part; this includes diversity within species, between species and of ecosystems.”²
3. The Natural Resources Management Area definition [10 V.S.A. § 2801(3)] should be amended to be retitled the: **Natural and Working Lands Management Area.**
4. The ALWG recommends keeping the term Sustainable Land Management [10 V.S.A. §2801(5)], but **recommends redefining SLM to be analogous with the UN Convention on Biological Diversity definition from which the findings of the CRBPA are derived:** *Sustainable Land Management is defined in this report as “the stewardship and use of land resources, including soils, water, animals and plants, to meet changing human needs, while simultaneously ensuring the long-term productive potential of these resources and the maintenance of their environmental functions”*³

The Holistic Agricultural Context

The VCSI Agricultural Lands Working Group answers its charge with the following statement: **All current and future conserved agricultural lands should be counted towards State goals of conserving 30 percent of the land of the State by 2030 and 50 percent by 2050.** The conservation of agricultural lands prevents those lands from being developed and protects biological diversity – including soil biodiversity – on those parcels. At present, lands protected by agricultural conservation easements are 33 percent forested, 43 percent pasture or hay, 14 percent in annual crop production, and 10

² Convention on Biological Diversity (CBD), 1992: text and annexes / Secretariat of the Convention on Biological Diversity, first adopted 22 May 1992. p.4. Available at: <https://www.cbd.int/doc/legal/cbd-en.pdf>

³ IPCC, 2019: Climate Change and Land: an IPCC special report on climate change, desertification, land degradation, sustainable land management, food security, and greenhouse gas fluxes in terrestrial ecosystems [P.R. Shukla, J. Skea, E. Calvo Buendia, V. Masson-Delmotte, H.-O. Pörtner, D. C. Roberts, P. Zhai, R. Slade, S. Connors, R. van Diemen, M. Ferrat, E. Haughey, S. Luz, S. Neogi, M. Pathak, J. Petzold, J. Portugal Pereira, P. Vyas, E. Huntley, K. Kissick, M. Belkacemi, J. Malley, (eds.)]. Cambridge University Press, Cambridge, UK and New York, NY, USA, 896 pp. <https://doi.org/10.1017/9781009157988>. p. 6

percent wetlands.⁴ The distribution of lands managed by agriculture in Vermont’s conserved agricultural parcels mirrors the balance of land types managed by agriculture across the entire State: Vermont farmers manage more forest than they

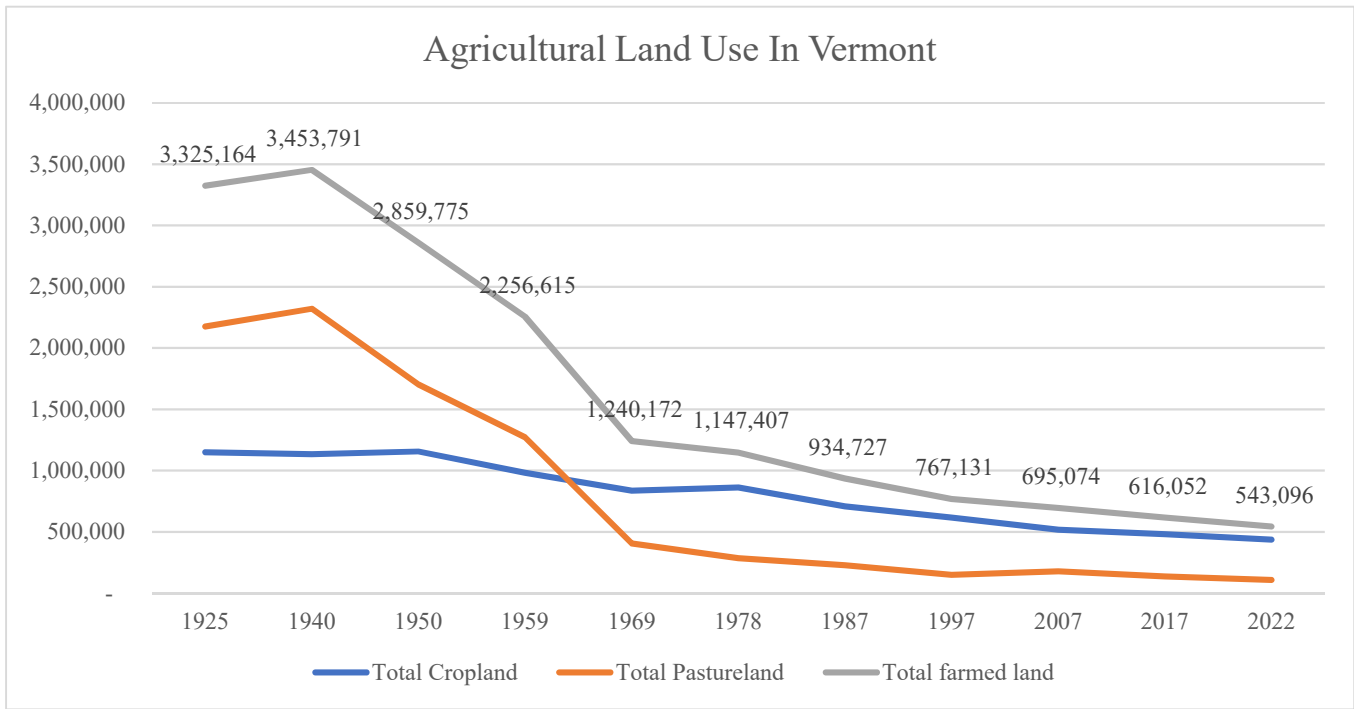


Figure 1

do cropland or pasture. Based on the 2022 USDA NASS Agricultural Census, Vermont farmers manage 543,096 acres of total cropland, permanent pasture, and pastured woodland. Based on the same census, farmers manage 551,271 acres of woodland not pastured. Vermont farmers manage 8,175 more acres of forestland than they do land used for growing food and crops.⁵ Figure 1 shows the decline of agricultural land use since 1925.

There exist 226,653 acres of agricultural conservation easements in Vermont which are ‘permanently secured for agriculture.’ Of this close to a quarter million acres, 127,744 – or 56% - of agricultural conserved parcels are used for farming, the balance of the easements are in wetlands or forest cover. 226,653 conserved agricultural easements represents 3.8% of Vermont’s terrestrial land area; 127,744 acres of conserved agricultural cropland and pasture represents 2.2% of Vermont’s terrestrial land area. The 543,096 acres of total land used for growing food and crops in Vermont in 2022 represents 9.4% of Vermont’s terrestrial land area. Only 18% of Vermont’s agricultural land is conserved in easements, and only 10% of Vermont’s prime soils are protected from development by these easements. At the present moment, only 2.2% of Vermont’s land area is conserved for agriculture, and actively used for farming. The ALWG believes including the 2.2% of existing conserved agricultural acres used for farming towards either the 2030 or 2050 goals in the CRBPA does not jeopardize or threaten other non-farming land use types and their specific biodiversity conservation goals and targets as articulated in the CRBPA. The ALWG believes including agricultural lands strengthens the totality of biodiversity services protected acknowledging that currently, arguably only agricultural conservation easements satisfy the requirements of the act regarding the terms ‘perpetuity’ and requirements for protection from ‘conversion’ for agricultural lands being counted towards CRBPA conservation targets and goals – the Conservation Planning portion of the VCSI

⁴ The Nature Conservancy, 2022: ‘Distribute_NE_Secured_Areas_2022_public.zip’. Available at: <https://tnc.app.box.com/s/cmhy0pubssnth0d276b9ecg5s2mwu6f0>

⁵ USDA National Agricultural Statistics Service (NASS), 2022: Census of Agriculture – Vermont, Table 8. Land: 2022 and 2017. Available at: https://www.nass.usda.gov/Publications/AgCensus/2022/Full_Report/Volume_1_Chapter_1_State_Level/Vermont/st50_1_007_008.pdf

should examine what other mechanisms exist to protect agricultural lands for 2050 in addition to agricultural conservation easements.

The ALWG recommendation to count all conserved agricultural lands towards 30 percent and 50 percent land conservation goals is made with significant, intentional, and broad deliberation within the ALWG and incorporates the established and latest science on soil biodiversity and agriculture⁶, guidance from the leading international governing bodies on biological diversity and climate change resilience from the United Nations⁷, and a belief that humans are a part of nature and, as such, human and societal needs and goals should also be considered as part of any land use planning exercise – especially one as impactful and novel as the CRBPA which seeks to set land use conservation policy for 50% of the terrestrial landscape – close to three million acres of soil – for perpetuity in Vermont.⁸

The CRBPA vision at 10 V.S.A. § 2802(a)⁹ is stated in such a way as to be reflective of a holistic planning framework; the ALWG believes this vision should be utilized for a statewide land use plan. The CRBPA vision section even includes explicit written support for working farms and forests. Similarly, the ‘Conservation Plan’ requirement section established by the CRBPA at 10 V.S.A. §§ 2804(a) – (b) speaks to the implementation of the vision established by the Act, which includes direct articulation of support for working farms and forests as part of a vision for a holistic ecologically functional Vermont.¹⁰ Where the ALWG finds friction in considering the CRBPA vision and plan, is with the specific goals of the CRBPA at 10 V.S.A. § 2802(c) which are narrowly focused on an undefined aspiration of ‘biodiversity’ and specific definitions of certain conservation categories in the Act which do not include agriculture *prima facie* – agriculture must meet certain, unspecified criteria to be included in one of the three conservation categories. In discussion with other VCSI subcommittees the ALWG learned that many stakeholders to the VCSI believe soil biodiversity in agricultural systems does not contribute to ecosystem function or biodiversity as they feel is promoted in the CRBPA¹¹. The ALWG believes there exists a global scientific consensus which supports the concept that soil biodiversity is an important component of biological diversity writ large, and that agriculture can – and does – positively contribute to the stewardship and improvement of soil biodiversity and other biodiversity metrics.¹²

Published literature on soil biodiversity has stated for almost three decades that the discipline is novel, understudied, and underappreciated.¹³ The ALWG – and the farmers that participated in this discussion, however, are no strangers to soil biodiversity and how the concept remains an essential component for sustainable agroecological systems that have been discussed not just within the ALWG but within the broader Vermont agriculture policy milieu: the importance of maintaining and improving ‘soil health.’¹⁴ The definitions in the CRBA - and many prominent stakeholders in the VCS-I - appear to object to the inclusion of agricultural soils in a ‘conserved lands for biodiversity future’ for Vermont.. The

⁶ FAO, ITPS, GSBI, CBD and EC. 2020. State of knowledge of soil biodiversity - Status, challenges and potentialities, Report 2020. Rome, FAO. <https://doi.org/10.4060/cb1928en>.

⁷ UN Convention on Biological Diversity (CBD) 2023: Conference of the Parties to the Convention on Biological Diversity. Fifteenth meeting – Part II and resumed part II, Report of the Conference of the Parties to the Convention on Biological Diversity, pp. 225 IPCC, 2019.

⁸ European Environment Agency (EEA), 2023: Exiting the Anthropocene? Exploring fundamental change in our relationship with nature. *From* <https://www.eea.europa.eu/publications/exiting-the-anthropocene/exiting-the-anthropocene-exploring-fundamental>

⁹ 10 V.S.A. § 2802(a) *The vision of the State of Vermont is to maintain an ecologically functional landscape that sustains biodiversity, maintains landscape connectivity, supports watershed health, promotes climate resilience, supports working farms and forests, provides opportunities for recreation and appreciation of the natural world, and supports the historic settlement pattern of compact villages surrounded by rural lands and natural areas.*

¹⁰ 10 V.S.A. § 2804(b)(1) *a comprehensive strategy for achieving the vision and goals of section 2802 of this title while continuing to conserve and protect Vermont’s agricultural land, working forests, historic properties, recreational lands, and surface waters; [emphasis added]*

¹¹ Conservation Categories Workgroup Report to the VCSI Science and Policy Committee – Draft, January 26, 2024.

¹² FAO, 2020

¹³ Neher D.A., 1999: Soil community composition and ecosystem processes - Comparing agricultural ecosystems with natural ecosystems. *Journal of Agroforestry Systems*. p. 1.

¹⁴ Vermont Agency of Agriculture, Food & Markets (VAAF) 2023: Payment for Ecosystem Services and Soil Health Working Group Final Report. Available at: <https://legislature.vermont.gov/assets/Legislative-Reports/PES-Working-Group-Final-Report-15Jan2023.pdf>

ALWG puts forward this report with the intent of providing a global scientific perspective on the importance of soil health for agriculture while simultaneously highlight the incredible work Vermont farmers have undertaken to meet recent environmental crises in Vermont. Vermont needs agriculture more than ever, not just to help meet biodiversity goals, but to also satisfy other human development needs – including food security into the near and medium term of a changing climate.

The ALWG is hopeful that since agricultural stakeholders and farmers were not invited to provide full testimony on the development and passage of the CRBPA, in either the House or Senate during deliberations, that the inclusion of extensive framing and references to academic literature on the topic of soil health and agriculture in this document will help inform VCSI stakeholders as it considers how best to incorporate agriculture into the goals of the CRBPA. The CRBPA cites the United Nations (UN) in the findings section to elucidate and frame the global biodiversity crisis – the ALWG draws heavily from UN sources for this reason, including references from the UN Convention on Biological Diversity (CBD), the UN Intergovernmental Panel on Climate Change (IPCC), and the UN Food and Agriculture Organization (FAO) to share the framework and roadmap the UN offers to respond to the global biological diversity crisis: *Soil biodiversity could constitute, if an enabling environment is built, a real nature-based solution to most of the problems humanity is facing today, from the field to the global scale. Therefore efforts to conserve and protect biodiversity should include the vast array of soil organisms that make up more than 25% of the total biodiversity of our planet.*¹⁵ The ALWG believes that excluding conserved agricultural lands from CRBPA 2030 and 2050 goals would deviate the VCSI from the UN Convention on Biodiversity framework for protecting and enhancing biological diversity which includes agriculture and agricultural soils.¹⁶

The food system in Vermont incurred over \$69 million in damages as a result of excessive precipitation in 2023 (one of four federally declared climate disasters in Vermont in thirteen months).¹⁷ With an agricultural economy that is already strained¹⁸ - irrespective of climate disaster - farmers may have no choice but to sell pieces of land, or the whole farm, to survive these climate disruptions – those primary agricultural soils are the same soils where developers can build unrestrained by many State environmental permitting programs, such as State wetlands permitting or State heavy cut permitting. Considering where and how lands are conserved to meet 2030 and 2050 land conservation goals - inclusive of an ecosystem which includes humans - is needed and is the framing the ALWG recommends the VCSI adopts to build towards a community resilient Vermont future. The ALWG believes biodiversity should not be considered absent its connection to other ecosystem services of land and the needs of humans, and should be considered in such a way as to include the source of 25% of the biodiversity on the planet – all soils, including agricultural soils.¹⁹

Ignoring the potential value and contributions of Vermont agriculture to State land use conservation goals is to – arguably – externalize, exploit, and commodify food, the environment, and the people that produce and harvest the food elsewhere. To consider what would happen if 50% of Vermont’s land area is proposed to be ‘set aside’ as an unmanaged or lightly managed biodiversity reserve for trees and plants is to not consider the cost to other regions of the world which produces the vast majority of food which is imported into Vermont. In addition to avoiding environmental externalities, a land use plan which anticipates changing human needs on a warming planet is to plan for community resilience – the majority of

¹⁵ FAO 2020, p. xxii.

¹⁶ CBD 2023.

¹⁷ Vermont Agriculture Recovery Task Force, 2023: Extreme Weather Impact & Recovery, P.5. Available at:

<https://agriculture.vermont.gov/sites/agriculture/files/documents/Ag%20Recovery%20Task%20Force%20Report.pdf>

¹⁸ Braun K. 2024: ‘US farm US farm income set for biggest plunge in 18 years as prices cool way off,’ Reuters. Available at:

<https://www.reuters.com/markets/commodities/us-farm-income-set-biggest-plunge-18-years-prices-cool-way-off-2024-02-14/>;

USDA 2023: The Outlook for U.S. Agriculture – 2023 Available at: <https://www.usda.gov/sites/default/files/documents/2023AOF-agricultural-economic-foreign-trade-outlook.pdf>. Note: The U.S. is a net food importer for the first time in 2023.

¹⁹ FAO 2020.

food flows from outside of Vermont to feed Vermonters; food produced elsewhere is more vulnerable to food system disruption than food grown and consumed in Vermont in a changing climate.²⁰ In order to increase Vermont's food security, more land will be needed for agriculture in the region. By including all conserved agricultural lands in the NRMA Category, we will acknowledge agriculture's contributions to both biodiversity and climate resilience, and in doing so we will bring CRBPA's Goals into alignment with the holistic Conservation Vision described in the CRBPA.

The ALWG recommendation: **'All current and future conserved agricultural lands should be counted towards State goals of conserving 30 percent of the land of the State by 2030 and 50 percent by 2050'** – is predicated on the concept that the resource being valued and protected above all else is the soils themselves and those soils which are best suited for agricultural production. The policy context of Vermont has changed over time – in 1970, agriculture was exempted from land use review²¹, and in 1987 VHCB was created to both build affordable housing and also protect Vermont's natural and cultural resources, which includes agricultural lands.²² In 1880, 84% of the land of Vermont was in farming.²³ In 2022, 9% of the land in Vermont was used for farming. Including all soils used for agricultural production today will, arguably, minimally affect the balance of 30% of 50% goals as stated in the CRBPA. Including only those agricultural lands that meet the tests for 'permanence' in the CRBPA and can therefore be counted towards 2030 or 2050 goals – those lands protected in an agricultural conservation easement – cover only 2.2% of land in Vermont will arguably impact the other land uses to be included in the CRBPA even less.

Looking at the land cover composition of Vermont, where almost 80% of the land is in forest today, it is hard to believe that agriculture poses the threat to biodiversity that the ALWG feels many CRBPA stakeholders - earnestly and without malice - mistakenly misappropriate from global perspectives on the biodiversity crises and the intensification of global agriculture to Vermont farming. The ALWG started to discuss some of the opportunities for new and existing conservation efforts to set incentives that enhance biodiversity on farms and is planning to continue this work in the next phase of this process when more decisive recommendations will be made for how to enhance support for biodiversity and the working lands through conservation planning. Just as the 'Green Revolution' did not consider the externalities of unfettered expansion of food production to feed a restless and hungry populous – so too does the ALWG advise the VCSI to not make the same mistakes of past policy initiatives: one where a singular goal of biodiversity [which is currently siloed and undefined in the CRBPA] is considered independently and does not consider the potential negative externalities of excluding most, if not all, of agricultural soils from being counted towards state land use conservation goals.

These negative externalities for agriculture referenced above are clear to those that work the land, as evidenced by comments received from farmers during the ALWG 'Round Table' public meeting. Failure to include agricultural soils in 2030 or 2050 goals is to, arguably, further expose agricultural soils to development pressure. All agricultural lands are an important and highly threatened natural resource that is crucial to Vermont's future food security, climate resilience, as well as biodiversity. Permanent land conservation – through the acquisition of development and management rights – is often that of balancing finite financial resources available for conservation for maximum conservation benefit. This often means that those natural resources which are not threatened by development or land use change are not prioritized for conservation as those that are under pressure from conversion. In the vision section of the CRBPA, the Act states that the vision of Vermont is to 'support historic settlement pattern[s] of compact villages surrounded by rural lands and natural areas' – As the State grapples with affordable housing needs, and an ever expanding set of development pressures around

²⁰ New England Feeding New England (NEFNE) 2023: A regional approach to food system resilience. Available at: https://nefoodsystemplanners.org/wp-content/uploads/NEFNE_Executive-Summary.pdf

²¹ An Act to Create an Environmental Board and District Environmental Commissions, Pub. Act. No. 250, § 1, 1969, Vt. Laws (Adj. Sess.) 237 (eff. Apr. 4, 1970).

²² Vermont Housing and Conservation Trust Fund Act, Pub. Act No. 88 § 1 1987. Vt Laws (eff. June 11, 1987)

²³ The Vermont Planning Council 1968: Vision and Choice: Vermont's Future – The State Framework Plan. p. 25. Available at: https://outside.vermont.gov/agency/ACCD/ACCD_Web_Docs/CD/CPR/Resources-and-Rules/DHCD-Planning-VisionChoice-FutureStateFramework-1968.pdf

village and city centers – conserving those ecological reserve areas (ERA) and biodiversity conservation areas (BCA) in areas that are most threatened by development are assumed to be where resources will be first deployed. This will limit where development can occur around the expanding village and city centers, increasing further pressure on those agricultural soils left in between development and ERA/BCAs. Agricultural soils very often do not require environmental permitting to be converted to developed uses – most USDA Prime and Statewide agricultural soils usually cannot definitionally be called a wetland and therefore do not require significant permit fees per acre to convert the land to development as the DEC Wetlands Program requires for the conversion of significant wetlands to other uses. If a development has a choice between conversion on a parcel which will require a wetlands permit for a portion of the parcel to convert at \$0.75 / square foot (\$32,670 acre), or a parcel which does not include wetlands, the most productive agricultural soils are those without wetland features in their land area and are likely the area to be chosen for conversion because it is cheaper to build there for a number of reasons.

Current land use proposals being considered in the Vermont Legislature in both the House of Representatives and the Senate (including: S.311 and H.687)²⁴ propose to loosen and/or remove land use development restrictions in designated downtown and village center areas and a large periphery around those zones. The CRBPA proposes to prioritize conservation of ERA's and BCA's of which agricultural land cannot be a part.²⁵ Jurisdictional to all lands in Vermont, existing environmental permitting programs regulate conversion of those landscape features which are most valued by the CRBPA – forest and wetlands. The Wetlands Program at VANR DEC has required single family homes that are sub-jurisdictional to Act 250 be torn down because those projects did not seek nor acquire a wetlands permit for conversion.²⁶ VAAFM has no land use review authority to recommend – as a hypothetical – a proposed development converts too much primary agricultural soils to impervious surface in a region and shouldn't proceed.²⁷ There is no authority at VAAFM – or VANR – to stop development of primary agricultural soils, only a condition to make them pay if the project is jurisdictional to Act 250; often that fee is fraction of what the acreage sells for either at agricultural rates or market rates.²⁸ There is no tool or program to review or halt the conversion of primary agricultural soils to development but for farmers voluntarily conserving their farms and agricultural soils through the sale of development rights through land conservation programming. This is why the ALWG is urging the VCSI to consider how further development restrictions on already protected natural resources further tips the balance and focus of development to the best soils for productive agriculture.

In many ways, land use protection policy for Agriculture has not kept up with the economic realities of farming in Vermont. In 1969, the year before Act 250 was instituted, there were 836,246 acres of total cropland. As of 2022, there were 436,297 acres of total cropland. That's a 47.8% decrease, or a loss of 399,949 acres.²⁹ New England Feeding New England suggests that the region will need 588,000 acres of additional (*new*) acres of cleared land in order to feed 30% of New England's dietary needs with New England grown food by 2030. Vermont and Maine are states that are identified in the report as areas of existing agricultural potential and opportunity to produce the additional food needed by New England to meet their 30% by 2030 goals. Vermont is losing farmland, but New England needs more land used to grow food and crops. Planning only for biodiversity protection goals, without considering additional needs of Vermont or regional society, sets the VCSI up for conflict with changing societal needs in a changing climate.

²⁴ S.311 available at: <https://legislature.vermont.gov/bill/status/2024/S.311> ; H.687 available at: <https://legislature.vermont.gov/bill/status/2024/H.687>

²⁵ 10 V.S.A. § 2802(c) – “prioritizing ecological reserve areas to protect highest priority natural communities and maintain or restore old forests.”

²⁶ RE: Larry Westall, Docket No. CUD-99-02 and RE: James and Catherine Gregory, CUD-99-03 (Consolidated), Findings of Fact, Conclusions of Law and Order Conditional Use Determination (Mar. 15, 2000); <https://www.sevendaysvt.com/news/drain-the-swamp-scott-wades-into-state-wetland-dispute-21883189>

²⁷ 10 V.S.A. § 6001(15); 10 V.S.A. § 6086; 10 V.S.A. § 6093

²⁸ *ibid*

²⁹ USDA NASS Ag Census 1969, 2022.

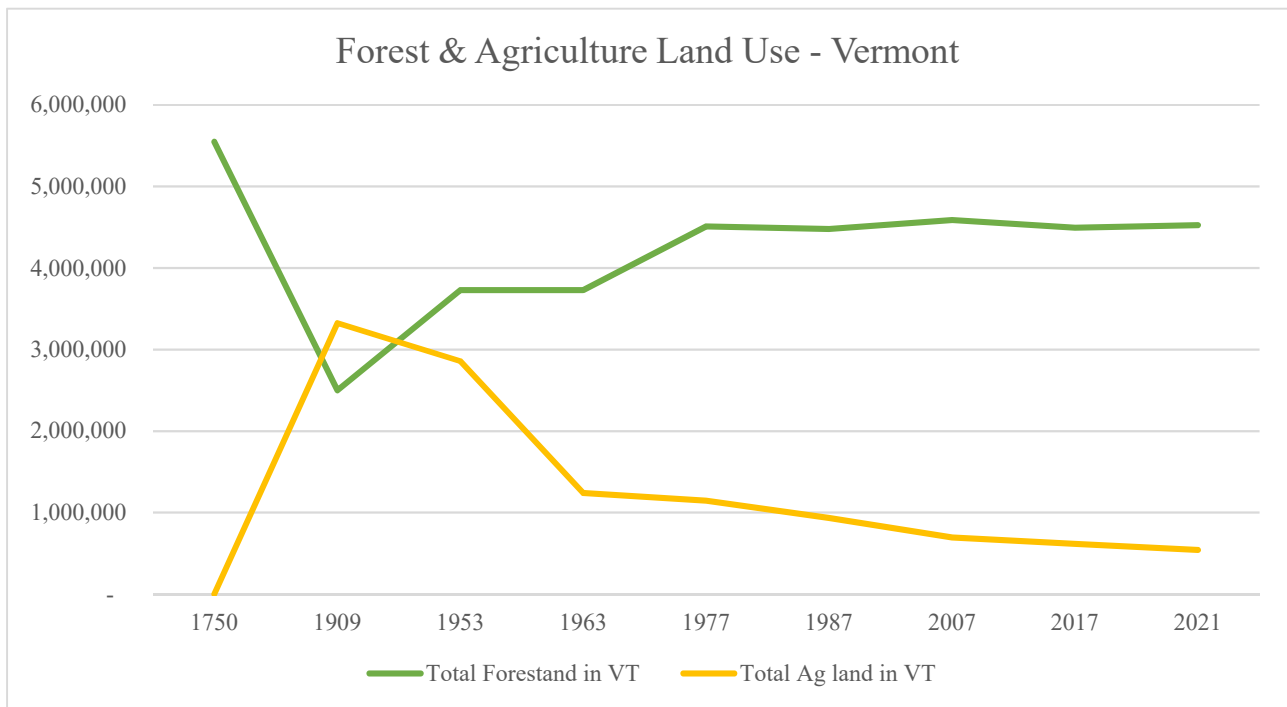


Figure 2

It is the ALWG’s hope to work collaboratively with other stakeholders in the VCSI to stand together with a unified voice to conserve Vermont’s natural and working lands. Vermont is undergoing a housing and development crisis, and if the natural and working landscape does not stand together in the face of development pressures to say: ‘build where we currently have development and leave these natural and working lands in their current states,’ then the ALWG fears goals of the CRBPA will not be met.

Findings of the Agricultural Lands Working Group

Biodiversity

Undefined in the CRBPA is the term ‘biodiversity.’ The term biodiversity is not further defined in Title 10 of the Vermont Statutes Annotated in which the CRBPA is established, as far as the ALWG could find. That the term biodiversity can be interpreted by different peoples in different ways - and that many interpretations can be considered valid based on context or whichever academic literature someone chooses to cite - makes for a rather confusing and ever-changing discourse. Since the CRBPA chose to use UN framing in the findings section of the CRBPA, the ALWG suggests utilizing the United Nations (UN) Convention on Biological Diversity (CBD) definition of ‘biological diversity’ to mean ‘biodiversity’ as used in the CRBPA. The UN CBD defines the term as: “‘Biological diversity’ means the variability among living organisms from all sources including, *inter alia*, terrestrial, marine and other aquatic ecosystems and the ecological complexes of which they are part; this includes diversity within species, between species and of ecosystems.”³⁰

The UN CBD for World Biodiversity Day [May 22nd] has put together the following explainer on the differences between biodiversity and nature, stating: “Biodiversity and Nature, close but not quite the same:”

According to the officially adopted definition by the [UN] Convention on Biological Diversity, biodiversity is “the variability among living organisms from all sources including, inter alia, terrestrial, marine and other aquatic

³⁰ CBD 1992.

ecosystems and the ecological complexes of which they are part; this includes diversity within species, between species and of ecosystems.” In other words, biodiversity is the part of nature that is alive, and includes every living thing on Earth. Nature is all the existing systems created at the same time as the Earth, all the features, forces and processes, such as the weather, the sea and mountains. In other words, nature is all life on Earth (i.e. biodiversity), together with the geology, water, climate and all other inanimate components that comprise our planet. Perhaps the best way to truly understand the importance of biodiversity is try to imagine what nature would look like without it.³¹

The ALWG particularly enjoys that humans are integrated into the picture of biodiversity chosen by the UN CBD – along with other representations of wildlife (Figure 3).

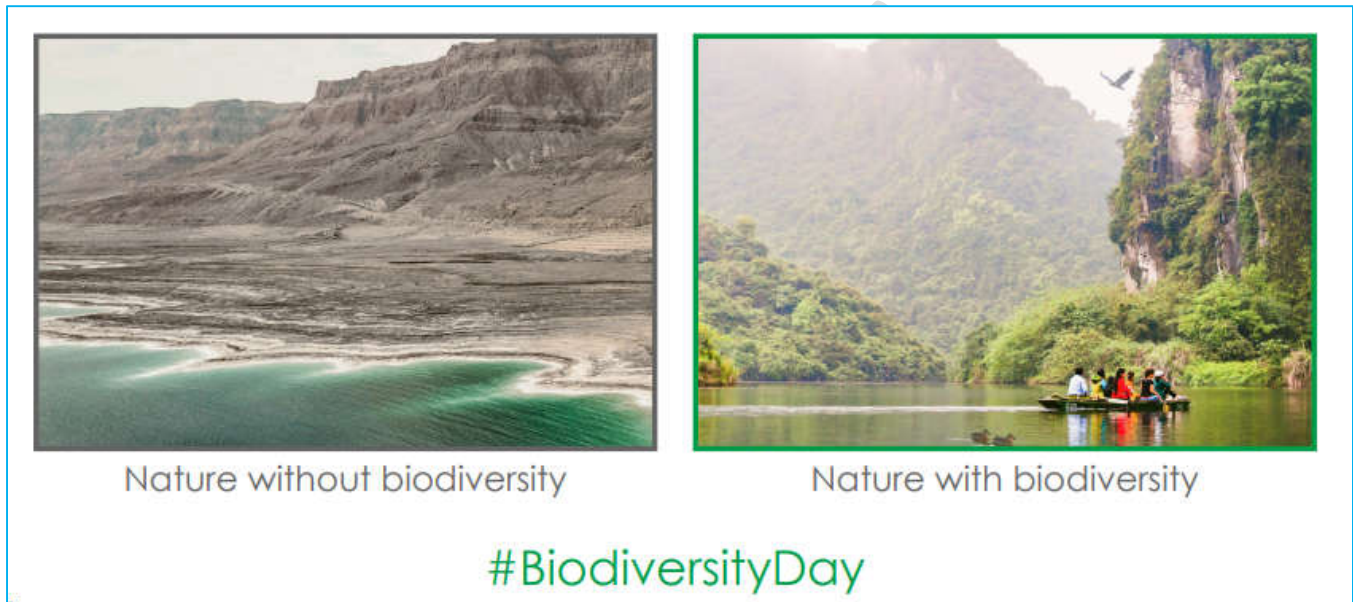


Figure 3

While arguably not an academic or legal explanation that is governed by the CRBPA nor which the VCSI is bound to include, understanding how the ALWG has conceived of biodiversity and nature and why the ALWG has utilized the UN CBD definition is central to understanding the ALWG recommendation. The ALWG looked to the UN CBD as the CRBPA has cited the UN in its findings section to establish the state of the global biodiversity crisis.

Where the CRBPA cites the UN in its findings section to establish the state of the global biodiversity crisis,³² the CRBPA then does not incorporate the clear framework for addressing the global biodiversity crisis as promulgated by UN – which, in fact, includes agriculture as a necessary and impactful partner that can improve biodiversity.³³ The most explicit and direct example of this deviation from international framing is in the definition of ‘Sustainable Land Management’ used in the CRBPA; The UN framing specifically includes land resources (soil, water, animals) as well as referencing the “productive potential” of these resources and the “maintenance of their environmental functions.” The definition in Act 59 of 2023 specifically excludes agricultural lands unless they support biodiversity in an undefined manner. The ALWG respectfully rejects the CRBPA framing and argues that agricultural lands in Vermont are important for many biodiversity quantifications and should be considered as an important land use for biodiversity protection. Since the CRBPA references the UN findings to demonstrate the need for attention to biodiversity, the ALWG recommends consistency by adopting the UN definition of biological diversity for the purposes of discussing the concept of biodiversity in the VCSI.

³¹ CBD: ‘Biodiversity and Nature, close but not quite the same. Available at: <https://www.cbd.int/idb/activities/difference-biodiversity-nature.pdf>

³² Act 59 of 2023; Section 2 §§ 3(A) – (D) “According to the United Nations:...”

³³ CBD 2023, pp. 225

The ALWG would like to enter into the record of the VCSI, the following framework and plan of action for agriculture and biodiversity as adopted by the UN CBD. This section will transcribe from the UN Convention on Biodiversity and the UN IPCC Special Report on Land Use adopted by the UN CBD to establish that the CRBPA takes a concerningly narrow approach to building Community Resilience and Biodiversity Protection – at least compared to how the UN recommends such goals to be conceptualized, planned for and implemented. This section is intended to further demonstrate that agriculture is a part of the UN Convention on Biodiversity, and the UN recommends that all stakeholders be at the table when planning and setting land use goals.

CBD/COP/15/17 Page 225

15/28 Biodiversity and agriculture:

“Acknowledging the importance of soil biodiversity in underpinning the functioning of terrestrial ecosystems and, therefore, most of the services it delivers, Recognizing that activities to promote the conservation, restoration and sustainable use of soil biodiversity, and the ecosystem functions and services they provide, are key in the functioning of sustainable agricultural systems for food and nutrition security for all, for climate change mitigation, adaptation and co-benefits, for the transition towards more sustainable agricultural and food systems and to enhance the achievement of the Sustainable Development Goals.”³⁴

In 2019, the UN published a Special Report on climate change and land. The UN describes the effort as such:

*The Special Report on Climate Change and Land broke new ground for IPCC. It was the first IPCC report to be produced by all three Working Groups in collaboration with the Task Force on National Greenhouse Gas Inventories (TFI), and it was the first IPCC report with more authors from developing countries than authors from developed countries. **It was marked by an inspiring degree of collaboration and interdisciplinarity, reflecting the wide scope of the mandate given to authors by the Panel.** It brought together authors not only from the IPCC’s traditional scientific communities, but also those from sister UN organisations including the Intergovernmental Science-Policy Platform on Biodiversity and Ecosystem Services (IPBES), the Science-Policy Interface of the UN Convention to Combat Desertification (UNCCD) and the **Food and Agriculture Organization of the UN (FAO).**³⁵*

This report recommends:

*Inclusiveness in the measurement, reporting and verification of the performance of policy instruments can support sustainable land management (medium confidence). **Involving stakeholders in the selection of indicators, collection of climate data, land modelling and land-use planning, mediates and facilitates integrated landscape planning and choice of policy** (medium confidence). {3.7.5, 5.7.4, 7.4.1, 7.4.4, 7.5.3, 7.5.4, 7.5.5, 7.6.4, 7.6.6}*

The CRBPA cites the UN in the framing and findings of its law; therefore considering the full suite of assumptions and recommendations published by the UN from that same biodiversity framework lends important context for the VCSI process. For this reason, the ALWG believes the VCSI should include agriculture as a full partner, and work to set shared goals to ensure the permanent protection of all lands that support all of society to be resilient – not just a single priority of biodiversity.

Agriculture & Biodiversity

“The condition of our soils ultimately determines human health by serving as a major medium for food and fibre production and a primary interface with the environment, influencing the quality of the air we breathe and water

³⁴ ibid

³⁵ IPCC 2020

we drink. Thus, there is a clear linkage between soil quality and human and environmental health. As such, the health of our soil resources is a primary indicator of the sustainability of our land management practices.” (Acton and Gregorich, 1995; from the Report of the International Technical Workshop organized by EMBRAPA-SOYBEAN and FAO, Londrina, Brazil, 24 to 27 June 2002)³⁶

Soil organisms contribute a wide range of essential services to the sustainable function of all ecosystems, by acting as the primary driving agents of nutrient cycling, regulating the dynamics of soil organic matter, soil carbon sequestration and greenhouse gas emission, modifying soil physical structure and water regimes, enhancing the amount and efficiency of nutrient acquisition by the vegetation, and enhancing plant health. These services are not only essential to the functioning of natural ecosystems but constitute an important resource for the sustainable management of agricultural systems.³⁷

The ALWG suffered from a lack of inclusion of a member from the local university researchers and practitioners of plant and soil science who have dedicated entire careers to researching biodiversity and agricultural soils and the impacts on ecosystem function. The ALWG recommends that the Science and Policy subcommittee invite local experts from the University of Vermont (UVM) Extension and from the Gund Institute for the Environment at UVM to receive a briefing on the current state of soil science, biodiversity, and agriculture.

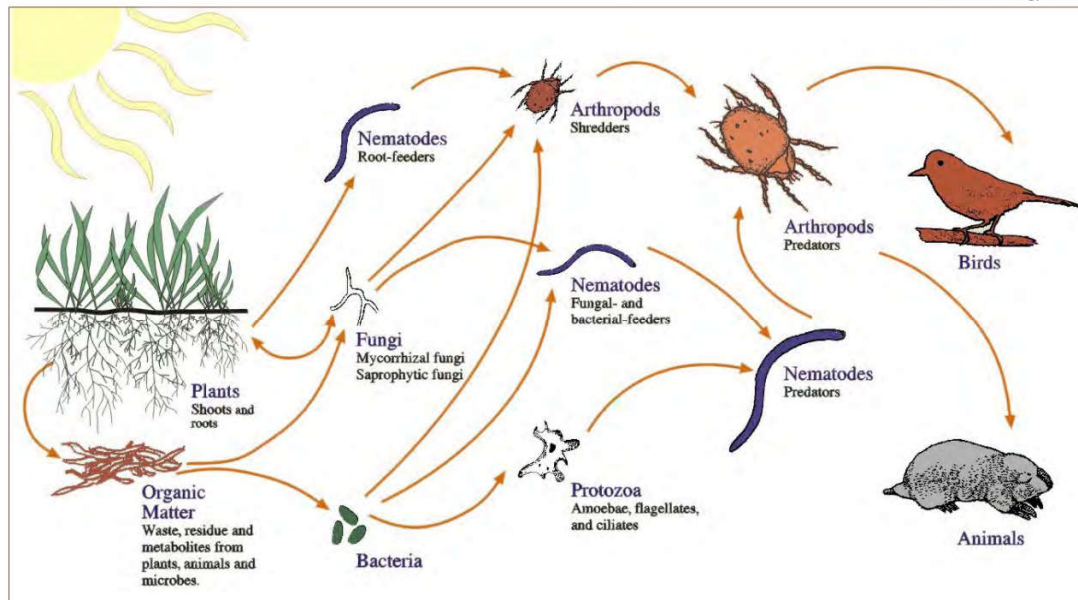
In reflecting on this process, there is a type of confusion many participants felt when faced with a prevailing perspective amongst other VCSI subcommittees that agriculture – and the soils which are cultivated by agriculture – do not contribute to biodiversity. As an example why, and for background, farmers in Vermont are required to engage in nutrient management planning and develop a written nutrient management plan to ensure compliance with state environmental rules for agriculture – the Required Agricultural Practices (RAPs).³⁸ Within the Nutrient Management Plan (NMP) development process, many farmers have taken a UVM Extension course on nutrient management planning so farmers can write their own NMP. Within the curriculum is great discussion about the ‘soil food web’ and the biodiversity that is present within the soil and how managing agricultural soils for ‘soil health’ contributes to improved agricultural and ecological function of the soils. Figure 3 is extracted from this UVM Extension farmer NMP course and will help readers visualize how the soil-food-web within agricultural soils are connected to a vision of ‘biodiversity’ that is perhaps meant by other subcommittees within the VCSI: fauna which is much easier to observe above ground than that which goes on below ground.³⁹

³⁶ <https://www.cbd.int/agro/soil.shtml>

³⁷ <https://www.cbd.int/agro/soil.shtml>

³⁸

³⁹ https://www.uvm.edu/sites/default/files/media/DiggingIn2017_Final_ReducedSize.pdf



Even though it may not be obvious at first, soil is full of life. Complex food webs exist in the soil ecosystem that help to cycle nutrients.

Figure 4

In 2020, the Food and Agriculture Organization of the United Nations (UN FAO or FAO) published the ‘State of Knowledge of Soil Biodiversity: Status, challenges and potentialities.’⁴⁰ The ALWG would like to submit into the VCSI record the foreword as published in the UN FAO report cited above in its entirety – the argument made by the UN FAO provides the best positive underline on the points attempted to be articulated by the ALWG:

Our well-being and the livelihoods of human societies are highly dependent on biodiversity and the ecosystem services it provides. It is essential that we understand these links and the consequences of biodiversity loss for the various global challenges we currently face, including food insecurity and malnutrition, climate change, poverty and diseases. The Agenda 2030 for Sustainable Development sets out a transformative approach to achieve socio-economic development while conserving the environment.

There is increasing attention on the importance of biodiversity for food security and nutrition, especially above-ground biodiversity such as plants and animals. However, less attention is being paid to the biodiversity beneath our feet, soil biodiversity. Yet, the rich diversity of soil organisms drives many processes that produce food, regenerate soil or purify water.

In 2002, the Conference of the Parties (COP) to the Convention on Biological Diversity (CBD) decided at its 6th meeting to establish an International Initiative for the Conservation and Sustainable Use of Soil Biodiversity and since then, the Food and Agriculture Organization of the United Nations (FAO) has been facilitating this initiative. In 2012, FAO members established the Global Soil Partnership to promote sustainable soil management and increase attention to this hidden resource. The Status of the World’s Soil Resources (FAO, 2015) concluded that the loss of soil biodiversity is considered one of the main global threats to soils in many regions of the world.

The 14th Conference of the Parties invited FAO, in collaboration with other organizations, to consider the preparation of a report on the state of knowledge on soil biodiversity covering its current status, challenges and potentialities. This report is the result of an inclusive process involving 300 scientists from around the world under the auspices of the FAO’s Global Soil Partnership and its Intergovernmental Technical Panel on Soils, the

⁴⁰ FAO 2020.

Convention on Biological Diversity, the Global Soil Biodiversity Initiative and the European Commission. The report presents the state of knowledge on soil biodiversity, the threats to it, the solutions that soil biodiversity can provide to problems in different fields, including agriculture, environmental conservation, climate change adaptation and mitigation, nutrition, medicine and pharmaceuticals, remediation of polluted sites, and many others.

The report will make a valuable contribution to raising awareness of the importance of soil biodiversity and highlighting its role in finding solutions to today's global threats; it is a cross-cutting topic at the heart of the alignment of several international policy frameworks, including the Sustainable Development Goals (SDGs) and multilateral environmental agreements. Furthermore, soil biodiversity and the ecosystem services it provides will be critical to the success of the recently declared UN Decade on Ecosystem Restoration (2021-2030) and the upcoming Post2020 Global Biodiversity Framework.

Soil biodiversity could constitute, if an enabling environment is built, a real nature-based solution to most of the problems humanity is facing today, from the field to the global scale. Therefore efforts to conserve and protect biodiversity should include the vast array of soil organisms that make up more than 25% of the total biodiversity of our planet. [emphasis added]

*FAO Director-General Qu Dongyu
Executive Secretary of CBD Elizabeth Maruma Mrem*

The current enabling environment of the VCSI is not inclusive of agriculture and agricultural soils. The ALWG recommends the VCSI include conserved agricultural lands as important contributors to biodiversity through their stewardship of agricultural soils and other natural and working lands managed by farmers both adjacent and within farm boundaries.

Soil Health & Agriculture

The U.S. Department of Agriculture Natural Resources Conservation Service (USDA-NRCS) defines soil health as the “continued capacity of soil to function as a vital living ecosystem that sustains plants, animals, and humans”⁴¹. Soil health integrates the physical, chemical, and biological characteristics, distinguished by emphasis on biological properties such as biodiversity, food web structure and ecosystem function⁴². A great diversity of organisms inhabit healthy soils in managed and unmanaged ecosystems, where they support ecosystem multi-functionality, suggesting that soil biodiversity is a key factor in regulating the functioning of ecosystems^{43, 44}.

USDA NRCS has provided significant resources to farmers across the nation to educate on soil health, and to support implementation of conservation practices which maintain and improve soil health. The State of Vermont has been similarly engaged in supporting NRCS and local approaches to improving soil health on farms. The State of Vermont defines ‘healthy soils’ in Title 6 of the Vermont Statutes Annotated as: ‘soil that has a well-developed, porous structure, is chemically balanced, supports diverse microbial communities, and has abundant organic matter.’⁴⁵ The Required Agricultural Practices (RAPs) – Vermont’s agricultural environmental land use regulations for water quality – include soil

⁴¹ NRCS. Soil Health. Available online: <https://www.nrcs.usda.gov/wps/portal/nrcs/main/national/soils/health/> (accessed on 7 September 2019).

⁴² Lavelle, P.; Decaens, T.; Aubert, M.; Barot, S.; Blouin, M.; Bureau, F.; Margerie, P.; Mora, P.; Rossi, J.P. Soil invertebrates and ecosystem services. *Eur. J. Soil Biol.* 2006, 42, S3–S15. [Google Scholar]

Culliney, T. Role of arthropods in maintaining soil fertility. *Agriculture* 2013, 3, 629–659. [Google Scholar]

⁴³ Wagg, C.; Bender, S.F.; Widmer, F.; van der Heijden, M.G. Soil biodiversity and soil community composition determine ecosystem multifunctionality. *Proc. Natl. Acad. Sci. USA* 2014, 111, 5266–5270. [Google Scholar] [CrossRef]

⁴⁴ Neher D. and Barbercheck M. E. 2019: Soil Microarthropods and Soil Health: Intersection of Decomposition and Pest Suppression in Agroecosystems, *Journal of Insects*. Available at: <https://www.mdpi.com/2075-4450/10/12/414>

⁴⁵ 6 V.S.A. § 4802(4)

health management activities within the rule at Section 6.04.⁴⁶ In 2019, after three years of deliberations, the Vermont General Assembly passed Act 64 of 2019 with enabled nation leading legislation around regenerative farming. Act 64 of 2019 took the term ‘healthy soils’ and embedded it in a mandate for the Payment for Ecosystem Services and Soil Health Working Group (PES Working Group) to explore and recommend a program to quantify the ecosystem service benefits provided by farming and to support farmers to steward and improve soil health.

The PES Working Group met from 2019 through 2022 to deliver a final report in 2023 which included 475 pages of report⁴⁷ and appendices documenting the research and deliberation the greater Vermont agricultural community put in to recommend a program and policy on improving healthy soils in Vermont. A focus on soil health provides a focal point for action and plausibly addresses several desired outcomes, including improved farm productivity. Healthy soil is central to the sustainable, productive, and climate resilient cultivation of food and crops in Vermont and provides a host of additional environmental, economic, and social co-benefits. A framework that rewards farmers for rebuilding healthy soils could potentially improve many ecosystem services simultaneously and provide a framework for a viable, sustainable, and regenerative Vermont agricultural system.

The PES Working Group, based on its legislative charge, deliberations, and research from its technical contractors, prioritized the following ecosystem services as the key services which could be feasibly linked as measurable outcomes to farmer improvements in soil health management:

1. Climate regulation, particularly carbon storage and sequestration
2. Climate resilience, that is, the ability of food production and the associated landscape to be resilient in the face of more intense heat and storm events brought about by climate change⁴⁸
3. Downstream flood risk mitigation
4. Soil conservation
5. Biodiversity

The PES Working Group recognized that ecosystem services do not operate in isolation but are intrinsically linked with one another. Therefore, while it is useful to assess ecosystem services individually to understand their relationship to soil health, the Working Group took the approach of understanding the joint value of ecosystem services from agriculture and how ecosystem services are “stacked” within an area of land to produce multiple co-benefits.

The PES Working Group also explored where on the farm these services might be provisioned, including in the soil, in the field, at the edge of field, in the farm’s forest, on the farmstead, and on the farm as a whole. For guiding an initial program, the Working Group concluded that the program should focus on outcomes in the soil (e.g., improved carbon sequestration), in the field (e.g., more diverse cover crops to support biodiversity), and at edge-of-field (e.g., increased stormwater retention) while considering outcomes in other parts of the farm.

Following extensive deliberation, the PES Working Group selected an idea first proposed by a group of small farmers to supplement payments to farmers in Vermont who enroll in the United States Department of Agriculture (USDA) Natural Resources Conservation Service (NRCS)’s Conservation Stewardship Program (CSP). The PES Working Group proposed that a performance program be created to incentivize and reward agronomic management for soil health – in addition to traditional pay-for-practice agronomic conservation programs – this program has been stood up and is called the Vermont

⁴⁶ VT Code of Rules 20-010-008 (6.07). Available at: https://agriculture.vermont.gov/sites/agriculture/files/documents/RAPFINALRULE12-21-2018_WEB.pdf

⁴⁷ VAAF, 2023: PES. <https://legislature.vermont.gov/assets/Legislative-Reports/PES-Working-Group-Final-Report-15Jan2023.pdf>

⁴⁸ 10 V.S.A. § 590(4) “Resilience” means the capacity of individuals, communities, and natural and built systems to withstand and recover from climatic events, trends, and disruptions.

Farmer Ecosystem Stewardship Program (VFESP).⁴⁹ 83 Farmers have joined the VFESP with close to 15,500 acres enrolled in the program in its first year.

The PES Working Group's technical contractors conducted a survey of farmers in Vermont, the results of which reinforce this emphasis, focus, and support for soil health within the agricultural community. The survey found that 99 percent of Vermont farmers believe improvements in soil health have benefits for the environment off their farm, 95 percent of Vermont farmers believe that they should take additional steps beyond required practices to protect soil health, and 90 percent of Vermont farmers believe they have a responsibility to be part of climate solutions.⁵⁰ These findings suggest that Vermont farmers have an innate understanding of their responsibility for soil health management and that the value of their management practices extends beyond their farms. **94% of Vermont farmers believe they have the knowledge and technical skill to enhance soil health on their farm, yet only 58% have the financial capacity to do so.**

The global food system into which Vermont farmers are selling their food and crops necessitates producing the most amount of food at the least cost to survive on an economic basis. Vermont farmers – and supporting state and federal technical and financial assistance programs - push against this intensification trend by supporting adoption of conservation practices; but, despite unprecedented investments in Vermont agriculture since Act 64 of 2015, farmers are still subject to the limitations of a global economic system which is predicated on cheap food.⁵¹ All agricultural soils can contribute to biodiversity; losing those primary agricultural soils to development never even gives future farmers a chance to improve and steward biodiversity, which the vast majority of farmers clearly want to undertake, are able to undertake, but the economic system under which they produce food does not always allow them to farm in ways they might want to.

⁴⁹ <https://agriculture.vermont.gov/CSP-Assist#:~:text=The%20Vermont%20Farmer%20Ecosystem%20Stewardship%20Program%20is%20designed%20to%20ensure,enhancements%20through%20the%20CSP%20program.>

⁵⁰ UVM Extension, 2022: Results of the 2022 Vermont Farmer Conservation & Payment for Ecosystem Services Survey. Available at: https://agriculture.vermont.gov/sites/agriculture/files/doc_library/3.%20Farmer%20PES%20Survey%20Results_%20VT%20PES%20Task%203a%20Report.pdf

⁵¹ Patel & Moore 2017. pp. 138 – 160.

Soil health has been studied extensively in Vermont. In 2021, UVM Extension undertook the *State of Soil Health in Vermont* project which is an initiative to measure soil health and soil carbon on farms across the state of Vermont. Initial results are heartening: each category of crop tested for soil health through the Cornell Assessment for Soil Health (CASH) test had both mean and median scores in the ‘Very High Soil Health’ category [80-100]. Surprising for many outside

CASH scores by crop type

Table 32. Descriptive statistics of overall soil health scores by crop type.

Type	n	Minimum	Q1	Median score	Mean score	Q3	Maximum	Standard Deviation
Vegetable	22	54.59	70.74	84.99	80.16	90.48	97.06	13.21
Field crops	4	83.04	85.96	90.27	89.88	94.19	95.94	5.94
Corn	114	52.57	74.88	81.21	81.53	89.01	98.15	9.08
Pasture	37	60.29	84.06	87.83	87.54	96.48	99.23	9.51
Hay	44	64.00	79.91	89.55	87.16	94.55	98.58	8.70

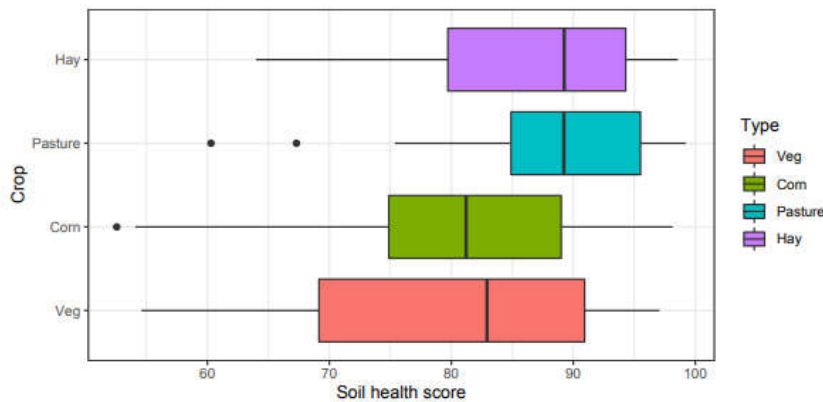


Figure 34. Boxplot of overall soil health scores by crop type.

Figure 5

agriculture which may assume corn grown in Vermont can only negatively affect soil health; the mean score for corn crops was higher than the mean score for vegetable crops.

The *State of Soil Health in Vermont* (SOSH) provides the VCSI with some important contextual information about Vermont farmer’s management: Organic matter content in Vermont’s agricultural soils is high when compared against national and neighboring states’ numbers. Average soil organic matter content based on the SOSH data for agricultural fields in Vermont is 4.3%. National mean organic matter content in agriculture based on the NRCS Rapid Carbon Assessment data is 3.2%. In New York, average agricultural field organic matter content is 3.1%. **High organic matter content on Vermont farms is evidence of good soil stewardship by many farmers.**⁵² Again, the SOSH points to an interactive understanding of soil health, one where corn fields have a higher mean soil organic matter rate compared to vegetable fields. The ALWG brings up these data points to attempt to underline the point that the soil science does not paint as linear a story about certain types of agriculture improving soil health, and other types of agriculture harming soil health – it depends on management and many other factors. Regardless, as supported by the SOSH all farm sectors, on balance, have a very high degree of soil health – certainly when compared to the national or regional average. New York

⁵² Alissa White, Heather Darby, Lindsey Ruhl & Erin Lane. 2022. The State of Soil Health in Vermont: Summary statistics from Vermont agriculture in 2021. University of Vermont Extension. Burlington, VT. Available at: https://www.uvm.edu/sites/default/files/Northwest-Crops-and-Soils-Program/Articles_and_Factsheets/State_of_Soil_Health_Summary_Statistics_2022.pdf

State is the fourth largest dairy producer in the United States – so the organic matter content in Vermont soils cannot only be attributed to sufficient dairy manure volumes; farmer current and historic management practices have a large influence on improving soil health.

Table 3. Soil organic matter content collected on Vermont farms in 2021 by the State of Soil Health project.

Field Type	Number of fields	Soil organic matter			
		Min	Mean	Q3	Max
Vegetable	20	1.5%	3.7%	4.9%	6.2%
Field crops	4	3.6%	5.5%	6.7%	7.3%
Corn	112	1.6%	4.1%	4.7%	7.2%
Pasture	21	3.1%	5.3%	6.2%	9.1%
Hay	38	2.3%	4.8%	5.8%	7.5%
All fields	195	1.5%	4.3%	5.3%	9.1%

Figure 6

Farmers can affect soil health through the agronomic management choices they make. The most common principles for managing farmed land for soil health is to:

- Maximize Presence of Living Roots
- Minimize Disturbance
- Maximize Soil Cover
- Maximize Biodiversity⁵³

The practices which Vermont farmers can adopt which improves soil health includes: cover crop, reduced tillage, no-till, crop rotation, manure and compost application, grazing management, filter strips, forage and biomass planting, nutrient management, riparian buffer, and silvopasture – among other practices. Vermont farmers have been adopting conservation practices at an increasing and dramatic rate post the passage of Act 64 of 2015 – Vermont’s Clean Water Act. Since 2016, close to 300,000 acres of conservation practices have been implemented by Vermont farmers through just VAAFM agronomic programs.⁵⁴ Evaluating the newly released USDA NASS Ag Census for 2022 for Vermont, the scale of adoption of conservation practices by farmers extends beyond state and federal financial assistance programs. For all tillage practices performed in 2022, 71% of all cultivated acres in Vermont were managed with either reduced or no-tillage. Only 29% of Vermont agricultural fields that were cultivated in 2022 were cultivated with intensive tillage. In 2014, under 2,500 acres were subject to no-till or reduced-till management. In 2022, over 80,000 acres were cultivated

⁵³ USDA NRCS: <https://www.nrcs.usda.gov/conservation-basics/natural-resource-concerns/soils/soil-health>

⁵⁴ VAAFM 2024: <https://app.powerbi.gov.us/view?r=eyJrIjoiOGU4ZGVlOWYtNzFkZC00ODM4LTgINDctYmI3YWZhNThmYTM5IiwidCI6IjIwYjQ5MzNiLWJhYWFkNDMzYy05YzAyLTcwZWRjYzclNTIjNiJ9>

with no or reduced tillage. Cover crop adoption shares a similar impressive increase in adoption amongst Vermont farmers: from under 10,000 acres in 2014 to over 37,000 in 2022.⁵⁵

In summary, **94% of Vermont farmers believe they have the knowledge and technical skill to enhance soil health on their farm, yet only 58% have the financial capacity to do so.** Excluding conserved agricultural soils from the VCSI and excluding conserved agricultural land from counting towards CRBPA goals will leave behind the immense effort and progress all sectors of Vermont agriculture have undertaken to improve soil health on their farms. Recognizing farming as the culture to steward the soil and its potential to enhance and improve soil biodiversity should be recognized and championed as an important part of Vermont’s biodiversity protection goals, especially given how few acres are left in agriculture in Vermont and how fewer still are conserved for agriculture in perpetuity.

How should Vermont agriculture be counted towards Vermont’s 30x30 and 50x50 goals?

As stated above, the ALWG believes that **all conserved agricultural lands should be counted towards Vermont’s 30 by 30 and 50 by 50 land use conservation goals.** Currently, based on a narrow reading of the CRBPA, only conservation easements satisfy the requirement of protecting the land use of the majority of an area from conversion. Other conservation tools exist for agriculture and the ALWG believes these should be assessed extensively for the second phase of the VCSI. Conserved agricultural easements include forestlands, wetlands, riparian corridors, pastures and open cropland that directly support biodiversity, as well as other critical co-benefits such as food security and flood resilience – both necessary to future the ecological, economic and social functions identified in the definition of sustainable land management. For the reasons established in prior sections, if the land is conserved for agriculture, it should be counted towards state land use conservation goals. That being said, the ALWG has investigated deeply both how agricultural lands fit not only into the category of a Natural Resource Management Area as defined in the CRBPA, but also how Vermont agriculture fits well into the definition of sustainable land management. The ALWG believes there is ample evidence to support the ALWG position that all agricultural lands should be counted based on the current construction of the CRBPA; but, notwithstanding this argument, the ALWG recommends that amending the NRMA category and the ‘Sustainable Land Management’ definition to be congruent with UN policy recommendations is the most equitable option for the VCSI to consider. Setting such a baseline does not take away from the need and the charge to enhance the support for the working lands in the conservation planning phase for transitioning in a just way towards more sustainable land management on the farms that already exist and on the farms we need to support to launch in those important decades to come.

Below is a summary of each way that agriculture fits into the VCSI framework and should be counted towards the goals established in the CRBPA.

Agriculture and the Natural Resource Management Area (NRMA) definition

The CRBPA at 10 V.S.A. § 2801(3) defines NRMA as: “**Natural resource management area** means an area having permanent protection from conversion for the majority of the area but that is subject to long-term, sustainable land management.” Breaking down the definition into the sum of its parts, ‘Natural resources’ is defined by the Oxford Dictionary as: ‘Factors of production provided by nature. This includes land suitable for agriculture, mineral deposits, and

⁵⁵ USDA NASS Ag Census – Vermont 2022:

https://www.nass.usda.gov/Publications/AgCensus/2022/Full_Report/Volume_1,_Chapter_1_State_Level/Vermont/st50_1_047_047.pdf

water resources useful for power generation, transport, and irrigation. It also includes sea resources, such as fish and offshore mineral deposits.⁵⁶

Sustainable land management as defined in the CRBPA means ‘the stewardship and use of forests and forestlands, grasslands, wetlands, riparian areas, and other lands, including the types of agricultural lands that support biodiversity, in a way, and at a rate, that maintains or restores their biodiversity, productivity, regeneration capacity, vitality, and their potential to fulfill, now and in the future, relevant ecological, economic, and social functions at local, State, and regional levels, and that does not degrade ecosystem function.’⁵⁷

The other subordinate definition to NRMA which is of importance is ‘conversion’ which is defined in the CRBPA as: “a fundamental change in natural ecosystem type or habitat, natural or undeveloped land cover type, or natural form and function of aquatic systems.”

Breaking down these definitions, the ALWG feel agricultural lands fit well into the above definition of NRMA in the following ways:

1. *Natural resource* – utilizing the Oxford Dictionary definition as an example of the common understanding of the word, it appears clear that since agriculture is in the definition, agricultural lands and the soil used to grow food, crops and fiber should or could be considered a ‘natural resource’.
2. *Management area* – while ‘management area’ is undefined in the CRBPA, areas that are used for agriculture can be clearly defined and delineated from other land uses both with remote sensing technologies, as well as through visual observation. Though, areas of land used for the production of maple sap could often be classified as either ‘forestry’ or ‘agriculture’ depending on the regulatory context – so where those forests used for maple production need to be considered for both land use types is less necessary to be distinguished as they could both fit into the NRMA category definition.
3. *Permanent protection* - for the purposes of the VCSI, the ALWG has chosen to submit that those lands which are subject to conservation easements by qualified entities in Vermont meet the threshold for ‘permanent protection’ – because as the easement deeds detail, the extinguishment of development rights – and other land conservation mechanisms considered by the ALWG – are stated to be ‘in perpetuity’.
 - a. Entire parcels of property are conserved through VHCB sponsored agricultural land easements. The ALWG also feels that this meets another qualifying term within the definition: ‘majority of the area’.
4. *Conversion* – within the definition of conversion provided by the CRBPA, ‘undeveloped land cover type’ is listed as an initial state from which transformation or transition into other land uses would trigger the threshold of conversion. This framing is compatible with the State’s Land Use Law found in Title 10 Chapter 151 which states that the word ‘development’ does not include: ‘The construction of improvements for farming, logging, or forestry purposes below the elevation of 2,500 feet.’⁵⁸ The ALWG suggests that land used for farming qualifies as an ‘undeveloped land cover type’ both for the purposes of the VCSI as well as from the Act 250 perspective.
5. *But that is subject to long-term, sustainable land management* – ignoring the specifics of the CRBPA until the next section, all land used for farming must follow the Required Agricultural Practices (RAP) Rule as administered by the Vermont Agency of Agriculture, Food & Markets (VAAF). This rule, while primarily drafted to protect water quality, provides a framework for sustainable land management by setting erosion standards from fields which are compatible with specific soil type and condition, as well as nutrient management

⁵⁶

<https://www.oxfordreference.com/display/10.1093/oi/authority.20110803100225401?p=emailACF94RMACXBKE&d=10.1093/oi/authority.20110803100225401>

⁵⁷ 10 V.S.A. § 2801(5)

⁵⁸ 10 V.S.A. § 6001(3)(D)(i)

standards which ensure accumulation of nutrients in soils do not exceed environmental standards. That this rule applies to every farm, and is enforced by VAAF, supports the ALWG assertion that agriculture is the most heavily regulated working land use in Vermont – and therefore certainly meets the standards for long-term, sustainable land management.

Agriculture and Sustainable Land Management

Analyzing the definition ‘Sustainable Land Management’ as promulgated by the CRBPA, the ALWG asserts that agriculture in Vermont meets the threshold for this definition and therefore is eligible to be counted under the NRMA category as defined in the CRBPA.

1. *Types of agricultural lands that support biodiversity* – according to the UN IPCC and the UN Convention on Biodiversity, agriculture is a key land use to support biodiversity and combat biodiversity loss across the terrestrial landscape.

The following citations are derived from the 2019 UN Report on Climate Change and Land.⁵⁹ It frames how agricultural land can support and restore biodiversity, how agricultural land use policy can provide multiple co-benefits, and that if implemented with intention, agricultural lands can have benefits for a whole suite of needs, including biodiversity:

- a. ***Agricultural practices that include indigenous and local knowledge can contribute to overcoming the combined challenges of climate change, food security, biodiversity conservation, and combating desertification and land degradation (high confidence). Coordinated action across a range of actors including businesses, producers, consumers, land managers and policymakers in partnership with indigenous peoples and local communities enable conditions for the adoption of response options (high confidence) {3.1.3, 3.6.1, 3.6.2, 4.8.2, 5.5.1, 5.6.4, 5.7.1, 5.7.4, 6.2, 7.3, 7.4.6, 7.6.4}***
- b. ***Near-term actions to promote sustainable land management will help reduce land and food-related vulnerabilities, and can create more resilient livelihoods, reduce land degradation and desertification, and loss of biodiversity (high confidence). There are synergies between sustainable land management, poverty eradication efforts, access to market, non-market mechanisms and the elimination of low-productivity practices. Maximising these synergies can lead to adaptation, mitigation, and development co-benefits through preserving ecosystem functions and services (medium confidence). {3.4.2, 3.6.3, Table 4.2, 4.7, 4.9, 4.10, 5.6, 5.7, 7.3, 7.4, 7.5, 7.6, Cross-Chapter Box 12 in Chapter 7}***
- c. ***If implemented at appropriate scales and in a sustainable manner, land-based mitigation practices have the capacity to reduce emissions and sequester billions of tonnes of carbon from the atmosphere over coming decades, while also preserving or enhancing biodiversity, water quality and supply, air quality, soil fertility, food and wood security, livelihoods, resilience to droughts, floods and other natural disasters, and positively contributing to ecosystem health and human well-being (high confidence) (Toensmeier 2016; Karlsson et al. 2020).***

2. *...in a way, and at a rate, that maintains or restores their biodiversity, productivity, regeneration capacity, vitality, and their potential to fulfill, now and in the future, relevant ecological, economic, and social functions at local, State, and regional levels and that does not degrade ecosystem function.*
 - a. The European Environment Agency defines ‘Sustainable Forest Management as *‘the stewardship and use of forests and forest lands in such a way, and at a rate, that maintain their biodiversity, productivity, regeneration capacity, vitality and their potential to fulfil, now and in the future, relevant ecological,*

⁵⁹ IPCC 2019: https://www.ipcc.ch/site/assets/uploads/sites/4/2022/11/SRCCL_SPM.pdf

*economic and social functions, at local, national, and global levels, and that does not cause damage to other ecosystems.*⁶⁰ It appears to the ALWG that the term sustainable forest management has been transformed into a definition it was perhaps never intended to encompass. Adding agriculture, but only with a qualifier about certain types of lands that support biodiversity, and further restricting the qualifier in the EEA definition about ‘damage to other ecosystems’ – and changing it to ‘does not degrade ecosystem function’ is to perhaps stretching the intent of sustainable forest management in a way that degrades the usefulness – or intent – of the concept.

- b. This section is one of the explicit parts of the CRBPA definition of ‘sustainable land management’ which deviates significantly from the definition promulgated by the United Nations. The UN definition says: ‘ensuring the long-term productive potential of these resources and the **maintenance** of their environmental functions.’ The CRBPA definition sets the standard to one that when comparing agricultural lands to an unmanaged forest – agriculture cannot come out ahead when comparing soil biodiversity metrics. This does not mean that soil biodiversity is not unique or important within agricultural soils; but something as broad as ‘degrading ecosystem function’ leaves much room for many to argue for the exclusion of agricultural lands from contributing to biodiversity.

Agriculture’s recommendation for the VCSI: modify the definition of NRMA and attendant definitions to fit the Vermont context and align with UN conventions.

Conclusions

These recommendations of the ALWG conclude the inventory phase of the VCSI. It is the desire of the ALWG to be equitable partners during the two-year planning phase and take a holistic approach in considering how farmland should be conserved in the future and what incentives can be set through conservation planning for more sustainable land management. Conservation Easements will be one but not the only tool to take into consideration for the policy mix needed to enhance support for the working lands:

1. **All current and future conserved agricultural lands should be counted towards State goals of conserving 30 percent of the land of the State by 2030 and 50 percent by 2050.**
2. The term ‘biological diversity’ or ‘biodiversity’ should be defined by the VCSI; the ALWG recommends utilizing the term ‘Biological Diversity’ as defined by the UN Convention on Biological Diversity: ‘Biological diversity’ means the variability among living organisms from all sources including, inter alia, terrestrial, marine and other aquatic ecosystems and the ecological complexes of which they are part; this includes diversity within species, between species and of ecosystems.”⁶¹
3. The Natural Resources Management Area definition [10 V.S.A. § 2801(3)] should be amended to be retitled the: **Natural and Working Lands Management Area.**
4. The ALWG recommends keeping the title Sustainable Land Management (SLM) [10 V.S.A. §2801(5)], but **recommends redefining SLM to be analogous with the UN Convention on Biological Diversity definition from which the findings of the CRBPA are derived from:** *Sustainable Land Management is defined in this report as “the stewardship and use of land resources, including soils, water, animals and plants, to meet changing*

⁶⁰ European Environment Agency 1993: Glossary. Available at: <https://www.eea.europa.eu/help/glossary/eea-glossary/sustainable-forest-management>

⁶¹ CBD 1992.

*human needs, while simultaneously ensuring the long-term productive potential of these resources and the maintenance of their environmental functions*⁶²

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⁶² IPCC 2019, pp. 6.