PUBLIC CONSULTATION ON ABACUS VCU LABEL

15 NOVEMBER 2023

Updated 15 December 2023

1 INTRODUCTION

The proposed ABACUS VCU label aims to advance methodological innovations that enhance scientific rigor and public confidence in high-quality, nature-based carbon dioxide removal credits. Projects using Verra's *VM0047 Afforestation, Reforestation, and Revegetation* methodology that also meet the ABACUS label requirements will be eligible to apply the ABACUS label to their Verified Carbon Units (VCUs).

Note: Verra is extending the public comment period for this consultation until January 8, 2024.

The ABACUS Working Group[1] proposed this label and has selected reforestation and agroforestry as the label's initial focus due to the significant potential of these activities to remove carbon with benefits for climate, local communities, and the environment. Despite rapidly growing interest and the enormous potential to restore degraded and deforested land globally, less than 4 percent of carbon credits issued through 2021 came from ARR projects[2].

The ABACUS label will allow for piloting and testing new concepts that advance credit integrity and quality. The label requires project proponents to apply innovations in additionality, baseline, leakage, accounting, and permanence. Its implementation supports several Sustainable Development Goals, including 'zero hunger,' 'climate action,' and 'life on land.'

Embedding these innovations in an opt-in VCU label allows Verra and the ABACUS Working Group to monitor and facilitate the continuous development of their performance and workability. The label may be updated and refined as the ABACUS Working Group learns from the early experiences of project developers and verifiers implementing activities to meet the label. The ABACUS label is focused on greenhouse gas quantification procedures and does not replace the due diligence and stakeholder

[1] ABACUS Working Group members include Bronson Griscom (Senior Director of Natural Climate Solutions, Conservation International), Barbara Haya (Director, Carbon Trading Project, University of California, Berkeley), Kyle Hemes (Research Scientist, Natural Climate Solutions and Carbon Dioxide Removal, Amazon Worldwide Sustainability), Campbell Moore (Carbon Markets Lead, The Nature Conservancy), Jamey Mulligan (Head of Carbon Neutralization, Amazon Worldwide Sustainability), Connor Nolan (Postdoctoral Scholar, Stanford Woods Institute for the Environment), Christie Pollet-Young (Managing Director, SCS Global Services), Matthew Potts (Chief Science Officer, Carbon Direct; Professor, University of California, Berkeley), David Shoch (Director of Forestry, TerraCarbon), and Carlos Silva (Forest Carbon Scientist, Pachama). Participation in the Working Group does not reflect endorsement by members' organizations.

[2] Ivy S. So, Barbara K. Haya, Micah Elias. (2023, May). Voluntary Registry Offsets Database v8, Berkeley Carbon Trading Project, University of California, Berkeley. Retrieved from: https://gspp.berkeley.edu/faculty-and-impact/centers/cepp/projects/berkeley-carbon-trading-project/offsets-database

engagement through which project proponents, investors, and buyers should ensure social and local environmental benefits.

A pre-consultation including high-level concepts underpinning the ABACUS label was held in July 2022. Verra now requests public comment on the full version of the ABACUS label.

2 CONSULTATION PROCESS AND TIMELINE

The planned timeline for public consultation and approval of the ABACUS label is set out in Table 1 below.

Table 1. Tentative timeline

Tentative Date(s)	Activity
15 November 2023 – ~~15 December 2023~~ 8 January 2024	Public consultation
December 2023 – February 2024	Review comments and incorporate feedback into final label requirements
End of February 2024	Decision by Verra
TBD	ABACUS label implemented

Responses to the questions below and any other feedback may be submitted using this form by 8 January 2024. The ABACUS Working Group will review, respond, and use these comments and other feedback to finalize the label requirements; Verra will approve the label and develop guidance for its application. We look forward to your feedback. If you have any questions about this consultation, please email programupdates@verra.org.

3 PROPOSED ABACUS LABEL REQUIREMENTS

3.1 Applicability Requirements

Principle: Projects meet the requirements of a peer-reviewed and publicly consulted ARR quantification methodology.

The ABACUS label is designed to complement the latest version of *VM0047 Afforestation, Reforestation, and Revegetation*.

The label is agnostic to an area-based or census-based quantification approach, so long as a dynamic performance benchmark is used and leakage is fully accounted for.

3.1.1 Proposed Label Requirements

1) Project proponents must apply the latest version of the ABACUS label requirements set out in the ABACUS Label Guidance document, and the latest version of *VM0047 Afforestation, Reforestation, and Revegetation*.
2) Project proponents must utilize the area-based quantification approach, or, if using census-based quantification approach, area-based leakage and a dynamic performance benchmark.

3.1.2 Requested Feedback

1) Please identify specific challenges to utilizing a census-based quantification approach with the dynamic performance benchmark and leakage quantification.

3.2 Additionality & Baseline Requirements

Principle: Projects use a dynamic performance benchmark that tracks carbon stock change in statistically matched controls throughout the project's lifetime.

VM0047 allows for a dynamic performance benchmark approach to demonstrate additionality and set a baseline by requiring projects to match the project area ('treatment') to plots outside the project area that do not receive treatment ('control'). Well-matched control plots provide a statistical representation of what would have occurred in the project area absent treatment. Control plots are remotely monitored throughout the project crediting period, and the project is only credited for carbon removals above and beyond what occurs in 'untreated' control plots. This ensures the project cannot issue carbon removal credits for removals that would likely have occurred without carbon finance.

To ensure the best possible matches and to avoid selective choice of pre-project years for matching, ABACUS projects are encouraged to use as many annual time points as available in the pre-project period.

In addition to the performance benchmark, all projects using the ABACUS label must pass the investment barrier test. This is intended to explicitly demonstrate an expectation of carbon credits at project inception as added measures to build a body of evidence supporting additionality.

3.2.1 Proposed Label Requirements

1) Covariates for matching remotely-sensed control plots (*VM0047* Appendix 1, Table A2) must be based on time points from no less than five years.
2) In addition to the performance benchmark (*VM0047* Section 7, Step 2), all ABACUS projects must:
    a. Apply the 'Investment Barrier Test' to establish financial additionality (*VM0047* Section 7, Step 3), and
    b. Demonstrate an expectation of carbon credits at project inception.

3.2.2 Requested Feedback

1) How should the ABACUS label ensure that the choice of annual time steps on which control plots are matched are representative and not selectively chosen? Please explain. Does requiring no less than five time periods for matching help avoid this?
2) Should projects be able to include covariates from a shorter lookback (i.e., five years, instead of eight to ten, to provide consistency with satellite products that are not yet eight to ten years old) if they utilize a sufficient number of time points (i.e., no less than five)?
3) Is either option for the Investment Barrier Test - a Benchmark Analysis of NPV and an Investment Comparison Analysis of IRR – on its own sufficient to rigorously demonstrate financial additionality? Please explain.
4) How could financial additionality tests be strengthened within the ABACUS label?

3.3 Leakage Requirements

Principle: Projects effectively eliminate leakage by maintaining agricultural production.

The ABACUS Working Group has proposed new methods for managing and accounting for leakage to eliminate leakage from restoration projects and enhance food security. These revisions will be considered in a forthcoming version of *VMD0054 Module for Estimating Leakage from ARR Activities* (currently proposed as a methodology revision). The ABACUS Working Group is soliciting input on the key concepts of the proposed revisions and their underlying principles in this consultation.

The ABACUS label incentivizes project developers to effectively maintain or enhance agricultural production within a defined accounting area in the project area and surrounding landscape. The approach will require projects to assume that 100 percent of displaced agricultural production will result in converting natural ecosystems and associated GHG emissions. Because the GHG emissions from leakage under this conservative assumption would typically outweigh the project's carbon removal, projects must effectively eliminate leakage by:

- minimizing displacement of agricultural production and/or
- investing in enhancing agricultural productivity in the project area or surrounding landscape to compensate for displaced production

In this way, ABACUS enlists carbon projects as engines for food security while avoiding a persistent source of uncertainty in carbon accounting.

The ABACUS Working Group recognizes that the pre-intervention commodity mix in the project area may or may not represent the most efficient use of land. If the production of a commodity in the project area is displaced, projects could mitigate the resulting leakage by:

- Improving the productivity of the same commodity in the surrounding area or
- Producing other commodities to create a commensurate land-sparing effect ('cross-commodity leakage mitigation')

The land displacement or land-sparing effect of losses and gains in producing any given commodity would be calculated as a standard unit — the number of hectares of land required to produce the

commodity given typical productivity rates[3]. This approach allows projects to alter the commodity mix in the project area and surrounding landscape to increase agricultural production efficiency and avoid locking regions into the current commodity mix.

The ABACUS label recognizes that dispersed or low-density tree planting – for example, single trees within grazing lands, or shelterbelts on the edge of agricultural fields – may pose a much lower leakage risk due to their distributed nature and small relative area of canopy cover canopy cover area. Projects that can demonstrate dispersed tree planting with sufficiently low levels of added canopy cover can assume de minimis leakage[4].

3.3.1 Proposed Label Requirements

1) ABACUS projects must use the ABACUS ARR Leakage Module[5] once approved. Until the methodology revision is approved, ABACUS projects may use the current *VMD0054 Module for Estimating Leakage from ARR Activities*.

3.3.2 Requested Feedback

1) From the standpoint of global climate mitigation and food security, is it appropriate for projects to mitigate leakage effects by replacing the production of displaced commodities like-for-like or to provide flexibility to adjust commodity mix ('cross-commodity leakage mitigation') as long as a minimum equivalent land sparing effect is achieved?
2) Should the leakage tool assume that displaced production results in new production at the same productivity rates? In what cases should the tool assume regional, national, or global productivity rates for globally traded commodities?
3) What agricultural products should be applicable for cross-commodity leakage mitigation (i.e., global commodities, subsistence agricultural products, deforestation-driving commodities)?
4) What limitations are needed to ensure productivity enhancements are sustainable and avoid unintended consequences?
5) Which methods should be used to set an allowable canopy cover threshold for a given region and production type? How should projects verifiably demonstrate that their restoration systems are currently, and are likely to stay under, this canopy cover threshold?

[3] This approach is similar to, and takes inspiration from, the 'carbon opportunity cost' index in Searchinger, T. D., Wirsenius, S., Beringer, T., & Dumas, P. (2018). Assessing the efficiency of changes in land use for mitigating climate change. *Nature*. https://doi.org/10.1038/s41586-018-0757-z

[4] Maximum tree canopy cover threshold will be based on expert elicitation specific to biome (i.e., tropical, temperate) and agro-ecosystem (i.e., row croplands, grazing lands).

[5] Proposed as a revision to VMD0054 Module for Estimating Leakage from ARR Activities

3.4 GHG Accounting and Uncertainty Requirements

Principle: Project quantification is based on directly measured in-situ data and transparently reported data and models.

Carbon removal rates can vary highly across agroforestry and restoration system designs, climate, and soil conditions. Accounting for the net GHG impact of nature-based carbon removal projects requires in-situ sampling of project area carbon stocks at various time intervals (stock-change approach) or continuous net flux measurements of GHGs (net flux approach). Projects are not eligible for the ABACUS label if dominant carbon pools are quantified solely based on carbon stocks estimated from default emission factors created from data outside the project region.

Projects must publish in-situ inventory data (precise location can be withheld to protect landholder privacy) and allometric equations to allow stakeholders to understand the quality of the collected data and reproduce results. ABACUS intends to aid researchers in advancing scientific understanding of carbon dynamics in diverse agroforestry and restoration systems.

VM0047 requires projects to quantify the uncertainty associated with sample error in carbon stock estimation (VM0047: Section 8.4) and take deductions to creditable net GHG removals if uncertainty exceeds a precision tolerance of 10% of the mean at a 90% confidence interval. The ABACUS label further requires projects to identify all possible sources of measurement bias and, in each case, demonstrate measures to avoid systematic measurement bias.

3.4.1 Proposed Label Requirements

1) In-situ inventory measurements must be made publicly available (precise geospatial locations of inventory plots may be withheld to protect landholder privacy) to facilitate transparency, reproducibility, and advancement of related research.
2) All allometric models (for aboveground biomass) and root-to-shoot ratios (for belowground biomass) used in quantifying carbon stocks must be specifically identified in monitoring reports. Project proponents must articulate the appropriateness and conservativeness of their choice of allometric models and other scaling factors based on considerations including sample size, tree species specificity, destructive sample proximity, and size classes included in destructive sample.
3) Project proponents must include in their project description and monitoring reports a discussion of all possible sources of bias in estimation, efforts taken to eliminate bias, and any quantitative or qualitative indications of the absence of bias.

3.4.2 Requested Feedback

1) Should precise plot locations be required? Please explain. If not, how should the ABACUS label balance the need for data transparency in the market with landholder privacy?
2) Carbon stock estimates are sensitive to the choice of allometric equation and root-to-shoot ratio, some of which may be developed distant from the project area on a limited or

unrepresentative sample of trees. How should projects systematically demonstrate that their allometric or root-to-shoot ratio selection is appropriate and conservative[6]?

3) How can the ABACUS label enable more transparency in project measurement and uncertainty quantification?
4) As currently written, is the requirement to provide all possible sources of bias an enforceable requirement? If not, how can this requirement be refined?

3.5 Permanence Requirements

Principle: Projects are explicitly designed to reduce reversal risk, annually monitored to increase transparency, and are designed to maintain carbon stocks after a limited crediting period.

Carbon storage in tree biomass is inherently impermanent, but agroforestry and restoration projects can catalyze shifts to land-use systems that durably enhance mean carbon stocks even as carbon continues to cycle through these natural systems. Achieving "effective permanence" requires achieving an actual net GHG benefit to the atmosphere equal to or greater than the net GHG benefit represented by the credits and ensuring this balance is maintained indefinitely. The ABACUS label employs several strategies to improve the likelihood that nature-based credits meet this bar while recognizing that further innovation (see Section 4) may be required to enhance confidence ex-ante that credits will represent effective permanence.

First, the durability of any given agroforestry or restoration system can be enhanced. The ABACUS label requires the use of ecologically appropriate restoration systems, excludes monoculture plantations, and focuses on intervention types that can be demonstrated to be sustainable long-term even in the absence of carbon revenues — for example due to the financial benefits to landholders or legal protection. Monocultures are excluded because they are less likely to be financially additional, less resilient than multi-species systems, and when planted explicitly for harvest, they may not offer sufficient durability.

Second, unclaimed GHG benefit to the atmosphere can be increased by focusing on interventions that accelerate restoration on the landscape beyond the project area, by incentivizing investments in agricultural productivity to create a net land-sparing effect, and by limiting crediting periods to allow enduring carbon removal to accrue uncredited to the atmosphere once project investors and landholders have achieved a return.

The adequacy of these measures, in addition to the Verra permanence buffer pool withholding, will need to be evaluated in practice over time as the first generation of projects using the ABACUS label come online. This will be achieved through enhanced transparency in loss events; projects must monitor the project area comprehensively every year and make results publicly available. Reversals that do occur in ABACUS labeled projects will be compensated by canceling other ABACUS-equivalent credits from the Verra buffer pool when available.

[6] For example, see hierarchy of allometric equation quality on page 96 of Haya, B. K., Alford-Jones, K., Anderegg, W. R. L., Beymer-Farris, B., Blanchard, L., Bomfim, B., Chin, D., Evans, S., Hogan, M., Holm, J. A., McAfee, K., So, I. S., West, T. A. P., & Withey, L. (2023). Quality assessment of REDD+ carbon credit projects. Berkeley Carbon Trading Project. https://gspp.berkeley.edu/research-and-impact/centers/cepp/projects/berkeley-carbon-trading-project/REDD+

3.5.1 Proposed Label Requirements

1) Established restoration systems must be 'ecologically appropriate' for the geographic area. Restoration systems are ecologically appropriate for a geographic area when the climatic, edaphic, and topographical conditions can sustain the proposed restoration system's biomass without specific anthropogenic intervention (i.e., irrigation). This can be demonstrated through evidence such as:
    a. Biomass inventory data in proximal intact forests demonstrating biomass carrying capacity;
    b. Remote sensing or geotagged photographic evidence of project region, demonstrating existence of ecosystems with similar or greater aboveground biomass levels;
    c. Geospatial modeling of biomass carrying capacity given climatic, edaphic, and topographical conditions[7];
    d. Peer reviewed publications demonstrating historical land cover or biomass carrying capacity in the project region.
2) Projects must not include areas of more than one contiguous hectare in monoculture plantations[8].
3) Project proponents must annually monitor the project area for disturbance events, annually publishing a biomass, tree cover, or forest area loss map (resolution <1ha). As required by the VCS Standard, project proponents must determine whether the disturbance is likely to qualify as a loss event.
4) At project validation, project proponents must document the project's proposed approach to stabilizing project carbon stocks after the crediting period. Evidence may include:
    a. Demonstration of projected financial sustainability after the crediting period;
    b. A specific plan to attain legal protection beyond the crediting period; or
    c. A curriculum of ongoing technical capacity-building that facilitates long-term carbon stock stewardship.
5) The crediting period for any given activity instance must not exceed 30 years.

3.5.2 Requested Feedback

1) The ABACUS label defines 'ecologically appropriate' restoration systems in (1) above. Do you think this is an appropriate definition? Please explain.
2) What additional kind(s) of auditable information could be provided to demonstrate that the project area historically sustained biomass with similar resource requirements?
3) The ABACUS label requires proponents to describe how they will address permanence after the crediting period, allowing buyers and the public to understand why the project believes stored

[7] Walker, W. S., Gorelik, S. R., Cook-Patton, S. C., Baccini, A., Farina, M. K., Solvik, K. K., Ellis, P. W., Sanderman, J., Houghton, R. A., Leavitt, S. M., Schwalm, C. R., & Griscom, B. W. (2022). The global potential for increased storage of carbon on land. Proceedings of the National Academy of Sciences of the United States of America, 119(23). https://doi.org/10.1073/PNAS.2111312119

[8] Except for systems that naturally exist in extensive single-species stands, e.g. bamboo. Using the definition from the Food and Agriculture Organization of the United Nations (UN FAO) Forest Resource Assessment: "Planted forest which is intensively managed and meets all the following criteria at planting and stand maturity: one or two species, even age class, and regular spacing."

carbon will remain durably stored after the crediting period. What kind of verifiable evidence for this would be practical and compelling?

4 ABACUS AREAS OF FUTURE INNOVATION

To ensure that the ABACUS label continues piloting and testing new concepts that advance credit integrity and quality, the Working Group intends to collaboratively pursue the following areas of innovation. **These are not currently requirements of the label**, but the ABACUS Working Group and Verra welcome your input on them along with the currently proposed label requirements.

Regulatory additionality: Regulatory surplus is required to be assessed per the *VCS Methodology Requirements*, but the dynamic baseline approach effectively integrates an assessment of regulatory additionality by monitoring carbon dynamics in matched control plots that are subject to the same regulatory requirements (i.e., private land in the same jurisdiction). Whereas traditional regulatory surplus tests are complicated by regulatory requirements that may be unenforced, the dynamic baseline can theoretically capture the actual effects of regulatory requirements and the degree of compliance on the landscape. As the dynamic performance benchmark is applied in projects using VCS carbon project methodologies, we seek to assess if this approach can serve as an additional form of evidence to support evidence of regulatory surplus.

Biophysical impacts: Biophysical impacts of restoration, including changes to albedo, energy partitioning, and turbulent fluxes, can enhance or counteract biogeochemical benefits (i.e., the reduction in global warming attributable to removing carbon from the atmosphere)[9]. Despite this, biophysical impacts have not been typically considered in the net climate impacts of nature-based carbon removal due to challenges in harmonizing the spatial scale and units (local to regional; W/m^2 or °C) with those of biogeochemical impacts (global in scale; tCO_2e). The ABACUS Working Group is exploring sensible approaches that integrate the biophysical impacts with the biogeochemical, or thresholds to precautionarily avoid negative biophysical impacts.

'Effective permanence': The ABACUS Working Group expects that further innovation will be necessary to provide assurance of effective permanence of the carbon removals underlying ABACUS credits. Verra may work with ABACUS projects to test innovative strategies to sharpen risk characterization and incentivize risk management, which may affect withholding requirements in the future. Ultimately, permanence assurance in nature-based carbon credits may require, depending on the unique durability characteristics of any given credit, some form of 'stacking' or 'blending' by users of carbon credits. This could take the form of purchasing additional credits upfront, or if and when there is a reversal affecting a credit previously retired that cannot be compensated from the buffer pool.

[9] Section 2.5.2.1 in Jia, G., et al., 2019. Land–climate interactions. In: Climate Change and Land: an IPCC special report (https://www.ipcc.ch/srccl/chapter/chapter-2/)

Adverse selection: In the context of matching to establish a performance benchmark, adverse selection can occur when project enrollees are more likely than their matched controls to have restored lands in the absence of carbon market incentives. This can occur when controls are not adequately matched on the relevant socio-economic drivers of restoration. Allowing project-specific flexibility, as in *VM0047*, to filter prospective controls by parameters that impact 'likelihood to reforest,' like income, family size, or distance to roads, for example, can help mitigate this risk. The ABACUS Working Group seeks opportunities to study these dynamics in order to quantify the potential impact of adverse selection and find ways to minimize it.

Non-destructive allometric equations: Allometric equations relate tree census measurements like diameter and height to tree volume and are typically derived from destructive samples. These destructively sampled trees may not be representative of the species, climate, site-class, or age-class of the trees that the allometric equation is being applied to. Allometric models are a source of uncertainty that is typically unaccounted for in carbon inventories. The ABACUS Working Group seeks compelling solutions to locally validate allometric models or create project-specific allometric equations especially through non-destructive means.

4.1.1 Requested Feedback

Please share any insights, questions, or additional information we should consider as we begin developing these innovations into actionable requirements.