Verified Carbon Standard
A VERRA STANDARD

ABACUS Label Guidance

29 July 2024

v1.0

ABOUT VERRA

Verra sets the world's leading standards for climate action and sustainable development. We build standards for activities as diverse as reducing deforestation, improving agricultural practices, addressing plastic waste, and achieving gender equality. We manage programs to certify that these activities achieve measurable high-integrity outcomes. We work with governments, businesses, and civil society to advance the use of these standards, including through the development of markets. Everything we do is in service of increasingly ambitious climate and sustainable development goals – and an accelerated transition to a sustainable future.

Verra's certification programs include the Verified Carbon Standard (VCS) Program and its Jurisdictional and Nested REDD+ (JNR) framework, the Climate, Community & Biodiversity Standards (Climate, Community & Biodiversity (CCBS) Program, the Sustainable Development Verified Impact Standard (SD VISta) Program, and the Plastic Waste Reduction Program.

Intellectual Property Rights, Copyright, and Disclaimer

CONTENTS

1 INTRODUCTION

The ABACUS Verified Carbon Unit (VCU) label, developed by the ABACUS Working Group,[1] aims to advance methodological innovations that enhance scientific rigor and public confidence in high-quality, nature-based carbon dioxide removal credits. This document guides project proponents on the requirements of and process of applying the ABACUS label to VCUs.

The ABACUS label introduces additional requirements to augment existing VCS Program and methodology requirements. It is focused on greenhouse gas (GHG) quantification procedures. The ABACUS label does not replace the due diligence and stakeholder engagement through which project proponents, investors, and buyers should ensure social and local environmental benefits.

2 ABACUS CONCEPTS

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 and baseline setting, GHG accounting, and permanence. It may be added to VCUs issued using *VCS Methodology VM0047 Afforestation, Reforestation, and Revegetation*.

2.1 Additionality and Baseline Setting

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 without treatment. Control plots are remotely monitored throughout the project crediting period, and the project is only credited for carbon removals exceeding those that occur in control plots. This ensures the project cannot issue carbon removal credits for removals that would likely have occurred without carbon finance.

As set out in Section 3.2.1 below, ABACUS additionality and baseline requirements aim to:

- Ensure the best possible matches and avoid selectively choosing pre-project years for matching by requiring the use of five annual time points. Project proponents are encouraged to use as many annual time points as are available in the pre-project period.

[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 (Senior Research Scientist, Carbon Neutralization, 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.

- Add to the evidence that carbon credits were expected at project inception (and therefore the project is additional) by requiring investment barrier analysis in addition to the performance benchmark.

2.2 GHG Accounting and Uncertainty

Carbon removal rates vary greatly across afforestation, reforestation, and revegetation (ARR) system designs, climate, and soil conditions. Accounting for the net GHG impact of ARR 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).

VM0047 requires projects to quantify the uncertainty associated with sampling error in carbon stock estimation (*VM0047, v1.0,* Section 8.4) and deduct creditable net GHG removals where uncertainty exceeds a precision tolerance of 10% of the mean at a 90% confidence interval.

As set out in Section 3.2.2 below, ABACUS GHG accounting and uncertainty requirements aim to:

- Increase confidence in carbon accounting by requiring in-situ measurement of dominant carbon pools within the project area or region, even when remote-sensing based approaches are used (e.g., two-phase sampling).
- Allow stakeholders to understand the quality of the collected data and reproduce the project's results by mandating the publication of project inventory data and allometric equations more frequently than otherwise required.
- Make potential sources of measurement bias transparent and demonstrate measures to avoid systematic measurement bias.

The data shared by projects generating ABACUS-labeled VCUs will aid researchers in advancing the understanding of carbon dynamics in diverse ARR activities, especially in agroforestry and restoration systems.

2.3 Permanence

Carbon storage in tree biomass is inherently impermanent, but ARR projects (especially those implementing agroforestry and restoration activities) 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 issued and ensuring this balance is maintained indefinitely.

The ABACUS label employs several strategies to improve the likelihood that credits meet this threshold while recognizing that further innovation may be required to enhance ex-ante confidence that credits will represent effective permanence (see Box 1: Notice of Future Permanence Requirement).

As set out in Section 3.2.3 below, ABACUS permanence requirements aim to:

- Enhance the durability of ARR systems by ensuring they are ecologically appropriate (e.g., by excluding plantation forests, which may be less resilient than multi-species systems).
- Stimulate the development of projects in which project carbon stocks can be maintained even without carbon revenues – for example, due to the financial benefits to landholders or transfer to public ownership.
- Increase unclaimed GHG benefits to the atmosphere by focusing on interventions that accelerate restoration of the landscape beyond the project area, invest in agricultural productivity to create a net land-sparing effect (see Box 2: Notice of Future Leakage Requirement), and limit crediting duration to allow enduring carbon removal to accrue uncredited to the atmosphere.

The adequacy of these measures will need to be evaluated in practice over time as the first generation of projects generating ABACUS-labeled VCUs begins operating.

Projects generating ABACUS-labeled VCUs also strive to enhance transparency associated with potential loss events. Additional ABACUS permanence requirements aim to:

- Ensure transparency of losses via comprehensive monitoring, with results made public annually.
- Where possible, compensate for losses using ABACUS-equivalent credits from the Verra buffer pool.

Box 1: Notice of Future Permanence Requirement

Project proponents that plan to generate ABACUS-labeled VCUs should expect a portion of carbon credits issued late in the crediting period (i.e., years 31–40) to be allocated to a to-be-determined ABACUS-aligned and Verra-approved long-term permanence mechanism (e.g., an enhanced buffer pool or insurance product).

2.4 Leakage

Project proponents must use the most recent version of *VMD0054 Module for Estimating Leakage from ARR Activities* to qualify for the ABACUS label.

Box 2: Notice of Future Leakage Requirement

The ABACUS Working Group has proposed a revision to *VMD0054*, introducing an option that incentivizes project proponents to effectively maintain or enhance agricultural production in the project area.

In the proposed revised version of *VMD0054,* project proponents who wish their projects to qualify for the ABACUS label would assume for the purposes of leakage accounting that 100% of displaced agricultural production will result in converting natural ecosystems, releasing associated GHG emissions. The GHG emissions from leakage under this conservative assumption would typically outweigh the project's carbon removals. Project proponents could effectively eliminate leakage by:

- Improving productivity of the same commodity in the surrounding area (same-commodity leakage mitigation), and/or
- Enhancing other commodities within the project area to create a commensurate land-sparing effect (cross-commodity leakage mitigation).

The land displacement or land-sparing effect of agricultural production would be calculated as a standard unit: the area of land required to produce the commodity given typical productivity rates in the appropriate domain.[2] This cross-commodity approach allows projects to alter the commodity mix in the project area to increase efficiency and optimize the landscape for agricultural production and carbon removal. By taking this food-forward leakage approach, carbon projects can serve as engines for food security while avoiding a persistent source of uncertainty in carbon accounting.

3 ELIGIBILITY AND REQUIREMENTS

3.1 Eligibility

3.1.1 Projects are only eligible to receive ABACUS-labeled VCUs where the following applies:

1) The project initiates verification[3] using the most recent versions of *VM0047 Afforestation, Reforestation, and Revegetation* and *VMD0054 Module for Estimating Leakage from ARR Activities*.

2) The project's crediting period does not exceed 40 years.

3) The project initiates verification using the most recent version of the ABACUS label.

3.1.2 ABACUS labels must apply to an entire verification period; all VCUs issued for that verification period must meet the ABACUS label requirements.

3.1.3 ABACUS labels cannot be issued retroactively.

[2] 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*, *564*, 249–253. https://doi.org/10.1038/s41586-018-0757-z

[3] Combined validation and verification are initiated when a project is listed as under validation; verification initiation is demonstrated by proof of VVB contracting and a complete draft monitoring report.

3.2 Requirements

3.2.1 Additionality and baseline setting

1) Project proponents must use a dynamic performance benchmark that tracks carbon stock change in statistically matched controls throughout the project's lifetime.

2) Covariate matching of remotely sensed control plots (*VM0047, v1.0* Appendix 1, Table A2) must be based on five or more annual time points. Project proponents are encouraged to use as many time points as possible.

3) The selection protocol and the location of the matched control points must be transparently reported in the project description. Stocking indices for every year of the period and all project and control plots must be included as an appendix to the monitoring report.

4) In addition to the performance benchmark (*VM0047, v1.0* Section 7, Step 2), project proponents must complete the following steps at validation:

    a) Apply the investment barrier analysis to establish financial additionality (*VM0047, v1.0*, Section 7, Step 3), and
    b) Demonstrate through verifiable evidence that the incentive from the planned sale of carbon credits was seriously considered in the decision to proceed with the project activity.

3.2.2 **GHG accounting and uncertainty:** Project quantification is based on directly measured project data and transparently reported data and models.

1) Project inventory measurements must be publicly available in the GHG emission reduction and carbon dioxide removal calculation spreadsheet to facilitate transparency, reproducibility, and advancement of related research.

2) Monitoring reports must explicitly identify all allometric models (for aboveground biomass), root-to-shoot ratios (for belowground biomass), and other scaling approaches used in quantifying carbon stocks and refer to a methodological source.

    a) In the "Data and Parameters Monitored" section of the monitoring report, project proponents must demonstrate that their choice of scaling factors is appropriate and conservative. To do so, the project proponent must use a systematic, data-driven approach that considers the relevant allometric variables (i.e., diameter and height), sample size, tree species specificity, destructive sample proximity, or size classes included in a destructive sample.

    b) In the "Monitoring Plan" section of the monitoring report, project proponents must identify all reasonably expected sources of uncertainty and bias in estimation, describe efforts taken to eliminate such sources, and provide any quantitative or qualitative indication of the reduction in uncertainty.

3.2.3 **Permanence:** Projects are explicitly designed to reduce reversal risk, annually monitored to

increase transparency, and designed to maintain carbon stocks after a limited crediting duration.

1) Established ARR systems must be "ecologically appropriate" for the geographic area. ARR systems are considered ecologically appropriate for a geographic area where the local climate, soil properties, elevation, and slope can sustain the proposed system's vegetation and biomass. This may be demonstrated through evidence such as:

    a) Remote (e.g., biomass mapping products) or direct (e.g., biomass inventory data) observations of biomass in the project region;

2) Modeling of biomass potential given historical or near future climatic, edaphic, and topographical conditions;[4] and/or

    a) Peer-reviewed publications quantifying historical biomass in the project region.

3) Projects must not include areas of more than one contiguous hectare of plantation forests.[5]

4) Following the first verification, project proponents must monitor the project area for disturbance events annually and publish an annual disturbance map on the project proponent's website or other public domains. The link to the disturbance map must be included in the "Monitoring Plan" section of the monitoring report. Where a disturbance qualifies as a loss event according to the *VCS Program Definitions*, the project proponent must report the event within one year of detection of the loss event.

5) At validation, project proponents must include a long-term durability plan in the project description. At every verification, project proponents must provide evidence of the project's ongoing approach to stabilizing project carbon stocks after the project's longevity period. Updates on material changes to the durability plan should be provided in the "Implementation Status of the Project Activity" section of the monitoring report. Evidence must include one of the following:

    a) Demonstration of projected financial sustainability after the longevity period; or

    b) A specific plan to attain legal protection beyond the longevity period; or

    c) Ongoing technical capacity-building or employment that facilitates long-term carbon stock stewardship.

[4] For example, see 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*, *119*(23), Article e2111312119. https://doi.org/10.1073/PNAS.2111312119

[5] The ABACUS label defines plantation forest as planted forest which is intensively managed and meets all the following criteria at planting and stand maturity: one or two tree species, even age class, and regular spacing (excluding agroforestry and silvopasture systems that integrate forestry with food production and systems that naturally exist in extensive single-species stands (e.g., bamboo)). See "plantation forest" in Food and Agriculture Organization (2023). Terms and Definitions FRA 2025. Food and Agriculture Organization of the United Nations. https://openknowledge.fao.org/server/api/core/bitstreams/a6e225da-4a31-4e06-818d-ca3aeadfd635/content

4 PROCEDURE

4.1 Verification

4.1.1 To qualify for ABACUS-labeled VCUs for a verification period, the project proponent (or authorized representative) must:

6) In the monitoring report, demonstrate that all ABACUS label requirements are met for the entire verification period, and

7) Present all supporting documentation to the validation/verification body during the verification audit.[6]

4.1.2 Where ABACUS label requirements regarding the information presented in the project description are not met at validation, the project proponent or its authorized representative may submit a project description deviation (as set out in the *VCS Standard*) to demonstrate conformance with the ABACUS label requirements.

4.1.3 During its verification assessment of a project, a validation/verification body must:

8) Complete Appendix 1: ABACUS Verification Report Checklist by replacing the italicized text in the right-side columns with assessments of requirements and include it as an appendix to the verification report; and

9) Issue a verification opinion regarding conformance with the ABACUS label requirements in the "Verification Conclusion" section of the verification report.[7]

4.2 Issuance and Labeling

4.2.1 Where the validation/verification body issues a positive opinion for all ABACUS label requirements and Verra has approved the verification report, the project proponent (or its authorized representative) may submit a VCU issuance request and a request for the ABACUS label for the VCUs of vintage(s) covered by that verification report.

[6] ABACUS requirements will be checked at verification. While some ABACUS requirements must be demonstrated in the VCS Project Description, neither the validation/verification body nor Verra assesses the project against the ABACUS requirements at validation.

[7] Verification assessment includes checking sections of the project description that have previously been validated. Those sections must conform to ABACUS label requirements or have successfully applied a project description deviation to meet current ABACUS label requirements.

APPENDIX 1: ABACUS VERIFICATION REPORT CHECKLIST TEMPLATE

This table must be completed and included as an appendix to the verification report. The requirement summaries and assessment guidance provided in the table should not be considered comprehensive; validation/verification bodies should refer to the full text of the requirements in Section 3.

Requirement section and summary	Project document and section where the requirement is addressed	Evidence-gathering activities, evidence checked, and assessment conclusion
3.1 Eligibility		
3.1.1(1) Use of the most recent version of methodology and module	*Indicate the section in the project documentation where the information is addressed (e.g., Monitoring Report Section 4.1)*	*Confirm that the project uses the most recent applicable version of the methodology and module for this verification period.*
3.1.1(2) Limited to a 40-year crediting period		*Confirm that the project proponent has chosen a crediting period no longer than 40 years to be eligible to receive ABACUS-labeled VCUs.*
3.1.1(3) Use of the most recent version of the ABACUS label requirements		*Confirm that the project uses the most recent applicable version of the ABACUS label requirements for this verification period.*

Requirement section and summary	Project document and section where the requirement is addressed	Evidence-gathering activities, evidence checked, and assessment conclusion
3.2.1 Additionality and baseline		
3.2.1(1) Additionality and baseline using dynamic performance benchmark		*Assess whether the project proponent has used the performance benchmark approach appropriately.*
3.2.1((2) Covariate matching of control plots (≥5 time points)		*Assess whether the project proponent has appropriately detailed the covariate time points used for matching and the methodological details of the approach.*
3.2.1(3) Reporting of project and control points and stocking indices		*Assess whether the location of matched project and control points and the stocking indices are reported in the project description and monitoring report, respectively.*
3.2.1(4)(a) Investment barrier analysis for financial additionality		*Assess whether the project proponent transparently demonstrated financial additionality using an investment barrier analysis at validation.*
3.2.1(4)(b) Expectation of carbon credits at inception		*Assess whether the project proponent provided verifiable documents at validation demonstrating the planned sale of carbon credits was seriously considered in the decision to proceed with the project activity.*

Requirement section and summary	Project document and section where the requirement is addressed	Evidence-gathering activities, evidence checked, and assessment conclusion
3.2.2 GHG accounting and uncertainty		
3.2.2(1) Public availability of in-situ inventory measurements		*Assess whether the project proponent has provided inventory measurements in the publicly available GHG emission reduction and carbon dioxide removal calculation spreadsheets.*
3.2.2(2)(a) Identification of allometric models and scaling approaches		*Assess whether the project proponent has listed models and provided appropriate justifications for using each.*
3.2.2(2)(a) Discussion of sources of uncertainty		*Assess whether the project proponent has appropriately identified sampling and measurement uncertainty and strategies to address such uncertainty.*
3.2.3 Permanence		
3.2.3(1) Ecologically appropriate ARR systems		*Assess whether the project proponent has provided sufficient evidence that the system is ecologically appropriate for the geographic area.*
3.2.3 (2)Prohibition of plantation forests		*Assess whether the project conforms to plantation forest restrictions.*

Requirement section and summary	Project document and section where the requirement is addressed	Evidence-gathering activities, evidence checked, and assessment conclusion
3.2.3(3) Annual monitoring for disturbance		*Assess whether the project proponent has appropriately implemented an annual monitoring approach and has published annual disturbance maps.*
3.2.3(4) Stabilizing carbon stocks post-longevity period		*Assess whether the project proponent has provided sufficient evidence of the ongoing approach to stabilizing carbon stocks after the project longevity period.* *Assess whether the project proponent has included a stabilization plan as part of the project description and assess any updates to and progress of the stabilization plan.*

APPENDIX 2: DOCUMENT HISTORY

Version	Date	Comment
v1.0	29 July 2024	Initial version released.

VERRA

Standards for a Sustainable Future

Verified Carbon Standard

Jurisdictional & Nested REDD+

Climate, Community & Biodiversity Standards

Sustainable Development Verified Impact Standard

Plastic Waste Reduction Standard