VALIDATION REPORT – ALTO MAYO CONSERVATION INITIATIVE

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Summary:

This report documents the validation of the Alto Mayo Conservation Initiative REDD project against the Verified Carbon Standard version 3.2 and it's supporting documents, including the approved methodology VM0015 version 1.0, "Methodology for Unplanned Deforestation." The validation activities included desk review of project design documentation and supporting documents, a field visit to the project area, interviews with relevant personnel, re-measurement of forest carbon plots, and review of calculations of the project's net carbon benefits. The project seeks to avoid deforestation on approximately 182,000 hectares of the Alto Mayo Protected Forest in Peru. The review of the project documentation, site visit, and the project proponent's response to findings issued by SCS has provided SCS with sufficient evidence to determine the fulfilment of the stated criteria. The Project correctly applies the selected methodology element and is in conformance with all applicable requirements of the Verified Carbon Standard (VCS). The Project is designed to lead to reductions of GHG emissions that are real, measurable and give long-term benefits to the mitigation of climate change. In summary, it is the opinion of SCS that the Project, as described in the project description (PD) document version 02 dated June 15, 2012 meets all relevant Verified Carbon Standard 3.2 requirements and correctly applies the selected methodology.

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1 INTRODUCTION

1.1 Objective

The purposes of this validation assessment were to review and confirm the project's conformance with all relevant requirements of the Verified Carbon Standard, supporting AFOLU guidance documents, and the selected methodology, Approved VCS Methodology VM0015 version 1.0, "Methodology for Unplanned Deforestation."

Validation activities included the following:

- Assess the validation criteria to determine completeness and compliance with VCS standards.
- Evaluate the validation scope, including the GHG project and baseline scenario; GHG sources, sinks, and reservoirs; and the physical infrastructure, activities, technologies and processes of the GHG project.
- Evaluate the monitoring plan and develop conclusions regarding the monitoring methodology and the collection and archiving of data relevant to GHG emissions estimation and baseline emissions.
- Assess conformance of the proposed Agriculture, Forestry and Other Land Use (AFOLU) Project Elements with the VCS Standard and VCS Program Guidelines;
- Evaluate the proposed AFOLU Project Elements based on guidance given under the Voluntary Carbon Standard Program and VCS Program Guidelines to provide a risk assessment and market leakage assessment, which will impact the issuance of VCUs
- Provide the first independent assessment of the double approval process for the proposed AFOLU Project Elements.
- Evaluate the calculation of GHG emissions, including appropriateness of source, sink, and reservoirs; the correctness and transparency of formulae and factors used; assumptions related to estimating GHG emission reductions; and uncertainties.
- Develop conclusions based on respective validation and verification standards, submitting any corrective action requests, as applicable.

1.2 Scope and Criteria

SCS assessed the completeness of the project document to ensure that all requirements of the VCS standards have been addressed. SCS assessed whether or not the project document respects the principles of the VCS standards. Assessment included but was not limited to evaluation of additionality, project design, baseline, monitoring plan, and calculation of GHG emissions.

The scope of validation encompassed desk and site validation and verification activities for the Alto Mayo Protected Forest REDD Project against the following requirements of the Verified Carbon Standard (VCS) Version 3 Program Documents:

- VCS Program Guide, version 3.3
- VCS Standard, version 3.2
- VCS AFOLU Requirements, version 3.2
- VCS AFOLU Non-Permanence Risk Tool, version 3.1

The validation process involved:

- Assessment of the management systems, data handling and estimation methods used in calculating and reporting emissions data;
- Assessment of baseline methodology and determination;

- Assessment of and issuance of an opinion on issues of leakage and additionality;
- Evaluation of the measurement and monitoring system and its ability of delivering high quality carbon stock data;
- Assessment of data accuracy and any assumptions made in the manipulation of data; Verification that the organization is operating according to the methodology approved by VCS;

1.3 Level of assurance

Per Section 5.3.1 of the VCS standard, the level of assurance is reasonable with respect to material errors, omissions and misrepresentations.

1.4 Summary Description of the Project

The following summary description of the project is quoted from Section 1.1 of the PD prepared by the project proponent:

> The Alto Mayo Protected Forest (AMPF) covers approximately 182,000 hectares of land in the Peruvian Amazon of extremely high value for biodiversity conservation and watershed protection. This area forms part of the Abiseo-Condor-Kutukú Conservation Corridor, one of the most threatened ecosystems in the world which houses an incredible number of endemic plants and animals of global importance. In addition, runoff from the Alto Mayo forests gives rise to several major rivers which provide clean and abundant water supplies and support several economic activities of the local population living in the Alto Mayo basin. For example, the Yuracyacu River provides water for the cities of Yuracyacu and Nueva Cajamarca, while supporting the irrigation of over 9,000 hectares of rice cultivation downstream. Its forests are also recognized for their importance in preventing soil erosion, protecting soils in the lowland areas from torrential flows and floods, and for their scenic beauty. The Alto Mayo forests also store a significant amount of carbon, whose release in the atmosphere through deforestation results in the emission of large quantities of greenhouse gases (GHG) which contribute to climate change. Conserving the Alto Mayo forests is therefore critical for mitigating global climate change, conserving biodiversity, and ensuring the provision of ecosystem services to the local population. For these reasons, the Peruvian government established the Alto Mayo Protected Forest in 1987 as part of the National System of Protected Areas.
>
> Despite the designation of the Alto Mayo forests as a Natural Protected Area (NPA) by the State, insufficient funds for managing the area, the building of a national highway in 1975 that crosses the AMPF, and the high rates of migration from the Andes to the Amazon region have resulted in widespread settlement inside the area, making it one of the NPAs with the highest deforestation rate in Peru. The threats to the area have increased in the last decade with the linking of the highway to other regional mega-development projects such as IIRSA[2]
>
> In response, Conservation International and its allies in the region designed the Alto Mayo Conservation Initiative (AMCI), whose main goal is to promote the sustainable management of the AMPF and its ecosystem services for the benefit of the local populations and the global

climate. The AMCI recognizes that the key to achieving significant GHG emissions reductions (ERs) and other ecological gains in the AMPF is designing a new mechanism to give the forest an economic value that competes with alternative uses of the land. Currently, conventional coffee production is the primary economic activity among settlers in the AMPF, despite the illegality of this activity under the land use restrictions of the NPA. The conventional coffee production techniques used by the vast majority of coffee producers within the AMPF are highly unsustainable. Most coffee plantations do not utilize organic fertilizers, pest control methods, or effective post-harvest management techniques, causing coffee plantations to quickly lose productivity. When production decreases, most coffee producers convert plantations to pastureland and deforest new areas to establish new coffee plantations. These poor management techniques dominate the coffee production systems in all the sub-basins of the AMPF and encourage the cycle of deforestation.

Conservation Agreements (CAs) are being established between local communities and the AMPF Head Office in order to increase the productivity and sustainability of their coffee plantations, thereby increasing individual family incomes and reducing their need to deforest other areas to establish new coffee plantations. Specifically, settlers are being instructed on the production of organic, shade-grown coffee, thereby replacing the current traditional coffee plantations with sustainable, low-impact agro-forestry systems with the goal of restoring degraded areas. In parallel, the AMCI is investing in strengthening the governance and enforcement capabilities of the AMPF Head Office in order to equip them with the necessary skills and resources to successfully manage the complex dynamics between local populations and the Protected Area's conservation goals and to address other drivers such as illegal land trafficking. Additionally, the AMCI is performing extensive outreach and sensitization activities to build awareness among the local population and increase their involvement in conservation activities. With the financial support of carbon financing, these actions are facilitating the conservation of large expanses of forest with associated climate change mitigation benefits, while also creating opportunities for the sustainable development of local communities.

2 VALIDATION PROCESS

2.1 Method and Criteria

SCS used document reviews, interviews, a site visit, and quantitative data analysis in the validation of this project as further described below. The criteria for validation are described in Section 1.2 of this report.

2.2 Document Review

SCS received and reviewed the Project Document, Methodological Annex, Non-permanence Risk Assessment, and supporting documentation to assess initial conformance with the requirements of the VCS standard. Key factors that impact the reported emission reductions and removals were identified, and a Validation Plan was created to focus on the critical elements presenting potential risk for errors. These elements included inventory data collection and handling, assumptions underlying the baseline characterization, the non-permanence risk assessment, and assessing relevant applicability and eligibility criteria. The audit team conducted interviews to understand the baseline scenario and conducted field work to verify the collection of carbon stock inventory data.

The validation team conducted a desk review of the documentation provided by the project proponent. The key project documents, as prepared by the client are as follows:

- Project Description Version 02 dated June 15, 2012
- Methodological Annex dated June 15, 2012
- Risk Assessment Report Version 02, dated June 15, 2012

The project proponent provided extensive supporting documentation in addition to the primary documents listed above. In summary, this documentation included, but was not limited to the following:

- Documents outlining the goals and strategies of the project
- Model conservation agreements and guidelines for developing these agreements
- Communication strategies and plans for managing the conservation initiative and working with stakeholders
- Management plans prepared by the National Service of Natural Protected Areas by the State (SERNANP)
- Maps of the project area
- Copies of legal documents describing agreements made between the project proponent and supporting organizations
- Evidence of progress toward entering into an administration contract granting co-management authority and rights of use over any to ecosystem services in the project area to the project proponent (Director Resolution which ends the administration contract process, granting the project proponent the administration contract; letters from government officials; records of consultations, draft agreements, etc).
- Copies of government documents describing the purpose, legal framework, and management of the project area
- GIS files, model inputs and outputs, and other spatial data related to project area, reference area, and leakage belt boundaries and project baseline deforestation modeling
- Photos and written reports describing the implementation of project activities
- A report of the assessment of agents and drivers of deforestation
- Scientific literature describing biodiversity, analysis approaches, and properties of the project area
- A legal analysis regarding the need for an environmental impact assessment

- Communication materials (brochures, photos, training materials, etc)
- A list of meetings held in relation to the project (for participatory appraisals, communication, training, etc)
- Copies of field data and spreadsheets used for calculations
- A report and calculations related to opportunity cost analysis
- A report of a land cover change analysis
- Standard operating procedures for field estimation of biomass stocks and for performing remote sensing analysis
- Financial Analysis of project cash flow and the project proponent's financial standing
- Documentation of the experience and technical expertise of the project implementation team
- A report of a legal analysis of land tenure in the project area
- Records of consultations of people living within and around the project area
- Reports of social assessments used to analyze project impacts, strategies, and the needs of local communities

2.3 Interviews

Interviews constituted an important component of the audit process. The following personnel associated with the project proponent and/or implementing partner were interviewed:

Braulio Andrade, Conservation International (CI)
Rossemary Yurivilca, CI
Christopher Tuite, CI
Stavros Papageogiou, CI
Fabiano Godoy, CI
Maximo Andres Arcos Sandoval, CI
Benjamin Kroll, CI
Percy Estares Recavarren, Asociación para la Investigación y Desarrollo Integral (AIDER)
Miriam Obando, AIDER
Manuel Aguilar, AIDER
Silvana Baldovino Beas, Jose Luis Capella Vargas, Jean Pierre Araujo Melloni, Claudia Gidfrey Ruiz, Representatives of Sociedad Peruana de Derecho Ambiental
Claudio Schneider, CI
Percy Summers, CI
Milagros Sandoval, CI
Representatives of the Coffee Association CAPEMA
7 Rangers employed by the Alto Mayo Protected Forest
Sres Gonzalo, Hugo, and Demostenes, Subscribers to conservation agreements
Sylvia Reategui, Regional Government of San Martin
Segundo Calle, President of AMPF management Committee

2.4 Site Inspections

Ryan Anderson and Tatiana Lapeyre visited the project area from 21 February 2012 to 25 February, 2012. The objectives of the on-site inspections performed were to:

- Ensure that the geographic area of the project, as reported in the PD and the accompanying KML file, is in conformance with Section 3.11.1 of the VCS Standard;
- Select samples of data from on-the-ground measurements for validation in order to meet a reasonable level of assurance and to meet the materiality requirements of the project, as required by Section 5.1.3 of the VCS Standard;

- Perform a risk-based review of the project area to ensure that the project is in conformance the eligibility requirements of the VCS rules and the applicability conditions of the methodology; and
- Perform a risk-based review of the project area to ensure that the project conforms to all other requirements of the VCS rules and the methodology.

During the site visit, the audit team interviewed stakeholders, observed conditions in the region to understand the baseline, and conducted field verification of biomass plots.

2.5 Resolution of Any Material Discrepancy

Any potential or actual material discrepancies identified during the assessment process were resolved through the issuance of findings. The types of findings issued by SCS were characterized as follows:

Non-Conformity Report (NCR): An NCR signified a material discrepancy with respect to a specific requirement. This type of finding could only be closed upon receipt by SCS of evidence indicating that the identified discrepancy had been corrected. Resolution of all open NCRs was a prerequisite for issuance of a validation statement.

New Information Request (NIR): An NIR signified a need for supplementary information in order to determine whether a material discrepancy existed with respect to a specific requirement. Receipt of an NIR did not necessarily indicate that the project was not in compliance with a specific requirement. However, resolution of all open NIRs was a prerequisite for issuance of a validation statement.

Opportunity for Improvement (OFI): An OFI indicated an area that should be monitored or ideally, improved upon. OFI's were considered to be an indication of something that could become a non-conformity if not given proper attention, and were sometimes issued in the case that a non-material discrepancy was identified. OFIs were considered to be closed upon issuance.

All findings issued by the audit team during the validation process have been closed. In accordance with Section 5.3.6 of the VCS Standard, all findings issued during the validation process, and the impetus for their closure, are described in Appendix A of this report.

3 VALIDATION FINDINGS

3.1 Project Design

3.1.1 Project Scope and Type

The project is an AFOLU project under falling under VCS sectoral scope 14. The project is designed to avoid unplanned frontier deforestation. Specifically, it meets the requirements outlined in the VCS AFOLU requirements document Section 4.2.9(2) because it implements activities designed to reduce net GHG emissions by reducing deforestation that is not planned or legally authorized.

3.1.2 Project Eligibility

The primary project activity involves protection of forest from unplanned illegal deforestation. The audit team determined that the project is consistent with the requirements of the VCS standard, the relevant VCS AFOLU requirements, and the approved VCS methodology VM0015 and is therefore an eligible

project under the VCS. The project sectoral scope is 14 "Agriculture Forestry and Other Land Use" and the project type is Avoided Unplanned Deforestation.

3.1.3 Project Proponent

The project proponent is Conservation International Foundation, working through its Peru Office. Contact information for the project proponent is provided in Section 1.3 of the PD.

3.1.4 Project Start Date

The project start date is June 15, 2008, which corresponds with the beginning of the implementation of conservation agreements by the project proponent in the field. The project has completed validation within five years of the project start date, in accordance with Section 3.8.2 of the VCS standard.

3.1.5 Project Crediting Period

The project proponent has selected a crediting period of 20 years (15 June 2008 to 14 June 2028), subject to renewal. The monitoring and implementation plans submitted by the project proponent cover this entire period.

3.1.6 Project Scale and Estimated GHG Emissions Reductions or Removals

The *ex-ante* estimates of GHG emissions reductions or removals for the project are provided in Section 1.7 of the project document. The calculations used to produce these estimates were checked by the audit team during the assessment of the application of the methodology (see Section 2.7). All material errors discovered by the auditor have been corrected by the project proponent. Based on the estimates reported, the project's emissions reductions and removals are expected to qualify it as a "project," rather than a "mega project."

3.1.7 Project Activities

The project activities are described in Section 1.8 of the project document. In summary, the project seeks to avoid deforestation by implementing a broad range of strategies within the Bosque de Proteccion Alto Mayo and its buffer area. These include working to improve governance and enforcement capabilities of the AMPF head office; promoting sustainable land use by implementing conservation agreements with settlers; increasing environmental awareness and involvement of local populations; providing for the long term financial sustainability of the protected forest; working to integrate project activities into regional development planning. In addition to the information provided in the project document, the project proponent provided detailed documentation related to the development, strategies, and implementation plans for each of these activities. The audit team also conducted interviews during the site visit to better understand the pressures in the area and challenges to conservation. Based on this information gathered, the audit team concludes that the project activities were described in adequate detail for evaluation and that they appear to be appropriate to the local context of the project.

3.1.8 Project Location

The project location is described in Section 1.9 of the PD. The project is located in the San Martin department of Peru. Shapefiles delineating the project area and leakage belt boundaries were provided and reviewed by the auditor, and a kml file was provided in accordance with the specifications of the VCS standard. The project location as described in these documents and files is consistent with GPS data collected by the auditor during the site visit.

3.1.9 Project Compliance with Applicable Laws, statutes, and other regulatory frameworks

The project document describes compliance with laws, statues, and regulatory frameworks in Section 1.11. The audit team conducted interviews with stakeholders including representatives of the regional government and the head of the alto mayo protected forest. No evidence was seen that suggested that the project activities were contrary to any applicable laws, statutes, or regulatory frameworks. Additionally, the project proponent provided written legal analyses describing the framework for conservation agreements, land tenure, and environmental impact assessment. These analyses supported the assertion that the project is in compliance with relevant laws, statutes, and regulatory frameworks.

3.1.10 Ownership and other programs

Right of Use

Ownership of carbon rights for the project area is described in Section 1.12.1 of the project document. In summary, the project area is located in a national protected area in Peru. Such areas are considered natural patrimony according to Peruvian law, and are managed by the Servicio Nacional de Areas Naturales Protegidas por el Estado (SERNANP). The laws of Peru provide SERNANP the ability to "promote, grant, and regulate rights for environmental services (servicios ambientales) and other similar mechanisms generated by the Natural Protected Areas under SERNANP's administration." The project proponent is in the process of entering into an administration contract with SERNANP that will grant rights to co-manage the project area and to grant right of use with respect to the greenhouse gas emission reductions and removals that are generated in the project area.

The audit team had an opportunity to interview government officials, including representatives of SERNANP and the regional government to confirm that the process of executing and obtaining the administration contract is underway and that the granting of rights of use with respect to the carbon and greenhouse gas emissions reductions is likely to occur as described. Additionally, the project proponent documented the process with, among other records, a copy of the official letter from SERNANP commencing the Direct Grant Process; a copy of the draft form of the administration contract; and records of required technical proposals and public consultation, all of which were reviewed by the audit team. The audit team concludes that, after the administration contract is obtained, the project will comply with Section 3.12.1 of the VCS standard describing right of use. We note, however, that the administration contract has not actually been obtained yet as of the time of validation. This is in conformance with Section 3.4.2 of the VCS AFOLU requirements, which states that "The entire project area shall be under the control of the project proponent at the time of validation*, or shall come to be under the control of the project proponent by the first verification event* [emphasis added]. Where the project proponent does not yet have control over the entire area at validation, the entire project area is to be validated as if it were

under control and the project is ready to be implemented." The audit team has concluded that the project meets requirements (a)-(d) of Section 3.4.2 of the VCS AFOLU requirements, which apply to projects for which the proposed area is not under control of the project proponent at the time of validation. Namely, the additionality test is applicable to the entire project area to come under control of the project proponent in the future; the monitoring plan is designed to accommodate changes in the size of the project (that is, it has been designed under the assumption that the entire project are will come under control of the project proponent after the granting of an administration contract); The project area will be required to be verified within five years of validation, at which time the project area will become fixed; and the rules of clause 3.4.2(d) will apply in the event that the area fixed at verification is smaller than intended at validation. We note that evidence of the actual granting of an administration contract will be required for project verification.

Emissions Trading and Other Binding Limits

The project is not located in an area with binding limits on greenhouse gas emissions.

Participation in Other Greenhouse Gas Programs

The project proponent has stated that the project does not participate in other greenhouse gas programs. An internet search by the audit team showed no indication that the project has participated in other greenhouse gas programs.

Other forms of environmental credits

The project proponent has stated that the project does not generate any other form of environmental credit. An internet search by the audit team showed no indication that the project has generated any other form of environmental credit.

Rejection by other programs

The project proponent has stated that the project has not been rejected by any other greenhouse gas program. An internet search by the audit team showed no indication that the project had been rejected by another greenhouse gas program.

3.1.11 Additional Information

Eligibility criteria for grouped projects

The project is not a grouped project.

Leakage management for AFOLU projects

The project includes leakage management measures in accordance with the selected methodology. Leakage management areas (areas near the project zone that have already been deforested) have been delineated, and the project includes activities implemented in these areas that are designed to reduce the threat of leakage. These activities include the development of conservation agreements, as well as communication efforts. These activities are intended to enhance agricultural productivity, and have been identified in accordance with Section 1.1.4 of approved VCS methodology VM0015.

Commercially sensitive information

The project proponent has stated that **"**All information collected or generated by the AMCI, except proprietary information and that which is considered confidential information as per contractual obligations, will be made available upon request." No essential information has been withheld from the project document. The audit team concludes that the project is in compliance with VCS requirement regarding commercially sensitive information.

Any further information

The project proponent provided additional descriptive information regarding the environmental characteristics in the project area. This information is not required by the VCS standard and was not specifically assessed by the audit team, but is consistent with observations made by the audit team while in the field.

3.2 Application of Methodology

3.2.1 Title and Reference

The project applies approved VCS methodology VM0015, "Methodology for Unplanned Deforestation, version 1. The methodology is current as of the date of this report.

3.2.2 Applicability

The applicability conditions of the methodology are as follows:

a) Baseline activities may include planned or unplanned logging for timber, fuel-wood collection, charcoal production, agricultural and grazing activities as long as the category is unplanned deforestation according to the most recent VCS AFOLU requirements.

The baseline activity consists of avoidance of unplanned deforestation, which the audit team was able to verify via interviews during the site visit and observation of recent deforestation near the project area. The deforestation threat driven primarily by coffee plantation was obvious during the site visit.

b) Project activities may include one or a combination of the eligible categories defined in the description of the scope of the methodology (table 1 and figure 2).

The scope of the methodology defines several categories of potential project activities. This project applies a baseline of deforestation in old growth forests without logging and project activity consisting of protection without logging, significant (greater than *de minimus*) fuel wood collection, or charcoal production. The project therefore is eligible under project type A described in the methodology. The lack of significant logging and fuel wood collection was evidenced by documented participatory appraisals conducted by the project proponent.

c) The project area can include different types of forest, such as, but not limited to, old-growth forest, degraded forest, secondary forests, planted forests and agro-forestry systems meeting the definition of "forest".

The project proponent used the definition of forest applied under the CDM – crown cover of at least 30% and am minimum area of at least 0.5 ha at least ten years prior to the project start date. The project developer used images to verify that the project area meets this definition and excluded cleared areas and other regions that did not meet this description from the project area.

d) At project commencement, the project area shall include only land qualifying as "forest" for a minimum of 10 years prior to the project start date.

The project proponent provided imagery that could be used to verify that the project area consisted only of land qualifying as forest for a minimum of 10 years prior to the project start date. The kml file delineating the project boundary only includes areas meeting this requirement.

e) The project area can include forested wetlands (such as bottomland forests, floodplain forests, mangrove forests) as long as they do not grow on peat. Peat shall be defined as organic soils with at least 65% organic matter and a minimum thickness of 50 cm. If the project area includes a forested wetlands growing on peat (e.g. peat swamp forests), this methodology is not applicable.

The project proponent has states that no forested wetland is found within the project area. No forested wetlands were observed by the audit team during the site visit.

3.2.3 Project Boundary

Spatial Boundaries

The project proponent provided GIS files and printed maps that clearly define the spatial boundaries of the project area, reference area, leakage belt, and leakage management areas. SCS reviewed the definitions of these areas and compared them to criteria provided by the methodology. The audit team concluded that the way these areas are defined is consistent with the criteria provided in Section 1.1 of the methodology.

The reference region is defined based on an analysis of agents, drivers and patterns of deforestation similar to those expected in the project area. The project proponent used expert opinion and participatory analysis to identify agents and drivers of deforestation and selected a reference region based on similarity to the results of this analysis. The identified agents and drivers are consistent with the results of interviews in the project area by the audit team. Additionally, the project proponent demonstrated the similarity of the landscape structure and ecological conditions of the selected reference area to the project are using a GIS analysis. The audit team reviewed this analysis and concluded that the reference area has been selected in conformance to the criteria of the methodology.

The project area conforms to the methodology requirements of including only forest land as of the project start date, as evidenced by comparison of defined project area boundary to remote sensing images (i.e. areas classified as non-forest have been excluded). Each of the requirements for the description of the project area provided by Section 1.1.2 of the methodology is included in the corresponding section of the methodology annex prepared by the project proponent.

The leakage belt was delineated using a mobility analysis (Option II, Section 1.1.3 of the methodology). According to the requirements of the methodology, a mobility analysis is always an acceptable means of

defining the leakage belt. The mobility analysis conducted by the project proponent used a documented participatory rural appraisal accompanied by a spatial analysis. The project proponent produced a continuous map of the probability of mobility of agents of deforestation, and assigned an area of sufficient size to potentially contain all of the deforestation predicted by the baseline deforestation model to the leakage belt. The audit team reviewed reports resulting from the participatory rural appraisal as well as the underlying assumptions of the GIS analysis and determined that the location of the leakage belt was determined reasonably and in conformance with the methodology.

A description of leakage management areas is provided in Section 2.6.11 of this report.

Temporal Boundaries

The temporal boundaries of the project are described in Section 2.6.4 and 2.6.5 of this report. In addition, SCS verified that the chosen historical reference period, monitoring period, and fixed baselines periods are defined in the PD as required by the methodology.

Carbon Pools

The project proponent has selected the above ground tree, above ground non tree, and below ground biomass pools for inclusion in the project. Harvested wood products were excluded as insignificant. Interviews carried out by the audit team during the site visit supported the conclusion that harvested wood products were not likely to be a significant contributor to carbon pools within the project boundary. Additionally, the audit team observed first hand evidence of recent deforestation that indicated the predominant fate of cut trees is burning, rather than production of wood products. No optional pools were included in the project boundary.

Sources of Emissions

The project boundary does not include any non-carbon stock sources of GHG emissions. The exclusion of these emissions sources is conservative because burning is expected to be more prevalent under the baseline scenario than the project scenario, and is consistent with guidance provided by the methodology and the VCS standard. The project proponent demonstrated that non-CO_2 greenhouse gasses resulting from burning in the project scenario are not significant using a quantitative analysis based on the *ex-ante* procedures provided by the methodology.

3.2.4 Baseline Scenario

Under VM0015, the baseline scenario is made up of several components: an analysis of historical land cover change, an analysis of agents, drivers and causes of deforestation and their likely future development, projection of future deforestation, calculation of baseline land lover changes, and estimation of baseline carbon stock changes.

The first step in the baseline methodology is the identification of key spatial and temporal project boundaries, which has been described above.

The second step requires an analysis of remote sensing imagery for historical land cover change analysis. For this step, the project proponent used a combination of medium and high resolution images

from the historical reference period to prepare maps and tables describing past land cover change in the reference region. The classified images appeared consistent with observations made in the field. In addition, the project developer conducted an accuracy assessment in which the classifications were visually compared to high resolution images. The audit team reviewed the methodologies applied in this analysis to confirm that they conform to methodology requirements and best practices in the field of remote sensing and are in conformance with the methodology.

The third step in the baseline methodology is the identification of agents and drivers of deforestation. To do this, the project developer used a combination of interviews with local experts and a participatory workshop following the Open Standards for the Practice of Conservation methodology. The analysis identified seven agents of deforestation, the most significant of which were coffee producers. Interviews and observations made by the audit team during the site visit were consistent with the conclusions reported by the project developer with regard to identification of agents and drivers of deforestation. We conclude that the analysis is consistent with the methodology and accurately reflects conditions in the project area.

The fourth step of the baseline deforestation methodology is the projection of the quantity and location of future deforestation. Methodology VM0015 allows for three approaches to predicting future deforestation. The project developers have selected option (b) as outlined in the methodology, in which the rate of baseline deforestation is estimated by extrapolating the historical trend observed within the reference region as a function of time using either linear regression, logistic regression or any other statistically sound regression technique. The project proponent proposed the use of the cumulative deforestation model as described in approved VCS methodology VM0009. The audit team concluded that this is a statistically valid modelling approach and that the application of this approach is consistent with approach (b) outlined in VM0015. This modelling approach fits a logistic deforestation curve based on a statistical sample of forest state observations taken from remote sensing imagery. The audit team carefully reviewed all calculations made in the application of this model to ensure that they were consistent with VM0009. This included calculation of weights, evaluation of stationary assumptions, assessment of areas of double coverage, estimation of model uncertainty, and selection of conservative linear approximation to the deforestation model. The final quantitative deforestation model that resulted from this analysis predicts a baseline deforestation rate of .998 % per year. The audit team concludes that this rate is consistent with the data presented and the analysis methods prescribed by the selected methodology and represents an estimate of baseline deforestation that is likely to be conservative. The rate is below the lower bound of the uncertainty predicted by the logistic cumulative deforestation model.

The fifth step in the application of the methodology requires a spatial model be used to predict the location of baseline deforestation. The audit team reviewed the steps performed in this analysis in order to ensure they were conducted in a way that was consistent with the methodology. These steps include the preparation of factor maps, preparation of deforestation risk maps, selection of a deforestation model, and mapping of the location of future deforestation. These steps were conducted using the “Land Change Modeler,” a well documented and professionally accepted model that is a direct predecessor to a model referenced specifically by the methodology. The methodology specifies that “minimum threshold for the best fit as measured by the Figure of Merit (FOM) must be more than 50% for frontier landscape configuration... Where this minimum standard is not met, the project proponent must demonstrate that at least three models have been tested, and that the one with the best FOM is used.” The project developer was unable to achieve the specified level of accuracy, and instead elected to demonstrate that at least

three models had been tested. The audit team determined that there was a low level of risk to the project's reported greenhouse gas reductions and removals due to difficulties in accurately predicting the location of baseline deforestation because the vast majority of deforestation occurs in the cloud forest stratum, regardless of specific spatial patterns. That is, the baseline carbon stock change is minimally effected by changes to the specific spatial pattern because nearly all (>99%) of the area readily accessible for deforestation is classified as cloud forest, which is represented by a single stratum in the carbon inventory. The audit team concluded that the application of three models satisfies the requirements of the methodology and that the difficulty in predicting the location of deforestation has minimal impact on resultant project benefits.

The sixth step in the application of the baseline methodology requires the estimation of carbon stocks in each land use class. The project proponent used an on the ground inventory to estimate these stocks. The assessment team visited four plots that were part of this inventory to confirm that field methods accurately reflected conditions seen on the ground. Due to time constraints and long travel times between plots, the assessment team measured a subsample of trees on each plot and assessed the inventory data for common errors. The assessment team saw no indication that there were systematic errors made during field measurement. On the plots visited, the audit team was able to relocate all trees that were present on the original data sheets (i.e. there were no discrepancies regarding the number of trees on the plot), and diameters reported on field data sheets were consistent with those made by the auditor for the vast majority of trees sampled. For the largest trees in the plots, the auditor noted that tree shape was often irregular and diameter measurement was often required to be made very high on the tree due to buttresses and tree taper. On these trees, it was very difficult to replicate the measurements originally made by the field crews. However, subjective assessment of the data in the field indicated that the measurements appeared reasonable and were made in a conservative fashion.

In addition to field assessment of the biomass inventory, the audit team reviewed all spreadsheets, and equations used to calculate the carbon stock of each stratum and its associated uncertainty. The project used allometric equations and root to shoot ratios selected from the literature that are appropriate to the project area. The audit team also traced a subset of data sheets from their initial field recording through the full calculation process. Results from these assessments can be found in the list of findings. After all findings were closed, the audit team concluded that the carbon stock estimates were made in a way that is free from material error and consistent with the requirements of the methodology.

Steps seven through nine in the application of the baseline methodology consist of manipulation of the data discussed above through a series of tables and equations to estimate the *ex ante* changes in carbon stocks in the project and leakage areas as well as the *ex* ante estimation of project GHG gas benefits. The audit team traced the data in the excel worksheets used by the client to conduct this analysis to ensure that it was conducted in accordance with the methodology and is free from material errors. The validated baseline carbon stock changes and ex ante project benefits are given in Section 2.7.6 of this report.

3.2.5 Additionality

The project uses the VCS Tool VT0001 "Tool for the Demonstration and Assessment of Additionality in VCS Agriculture, Forestry and Other Land Use (AFOLU) Project Activities" in order to demonstrate additionality. In the application of this tool, the project developer analyzed three alternative land use scenarios: Continued illegal deforestation and conversion of forest to other land uses, conservation as a

result of improvements in the governance and enforcement capabilities of the AMPF Head Office, and conservation as a result of a shift in the current land use practices of the population of settlers living in the AMPF towards sustainable, organic coffee production. The requirement of the tool that the project developer analyze the consistency of each land use scenario with enforced mandatory applicable laws deserves particular discussion here, as the project takes place in an area already protected by the laws of Peru. The project proponent provided evidence that, despite protected status, National Protected Areas in Peru and the Alto Mayo Protected Forest in particular, suffer from widespread illegal deforestation. Interviews with authorities at the Alto Mayo Protected Forest supported the conclusion that, without the resources provided by the project, it would be unlikely that management could effectively reduce the deforestation rate. Additionally, the project proponent conducted a spatial analysis that demonstrated that illegal deforestation is already present on greater than 30% of the area being assessed (see Appendix A for additional discussion). Evidence of widespread illegal deforestation was obvious during the site visit. The analysis met the requirements of the Additionality Tool.

In addition to assessing the legality of proposed baseline scenarios, the project proponent conducted Financial Analyses, Barrier Analysis, and Common Practice Analysis in accordance with the Additionality Tool. The audit team reviewed the documentation and assumptions associated with these analyses and concluded that the project proponent's assertion that the project is additional is reasonable and was arrived at in a way that is consistent with the tool. Interviews conducted during the site visit and documentary evidence presented by the project developer supports the additionality of the project.

3.2.6 Quantification of GHG Emission Reductions and Removals

The steps involved in validating the quantification of GHG Emissions Reductions and Removals are discussed in Section 2.7.4 of this report, in which the baseline scenario is discussed. The baseline scenario constitutes the majority of the quantification steps that can be assessed at the validation phase. Quantification of ex-ante project benefits assumes an effectiveness factor that increases steadily from 50% in 2009 to 90% in 2018. Uncertainties in carbon stock estimates were discounted as required by the methodology and are reflected in the figures reported below. All calculations leading to the below validated figures were checked by the auditor for calculation errors and conformance with the methodology requirements.

Project year *t*	Baseline carbon stock changes: annual $\Delta CBSLPA_t$ tCO$_2$-e	Baseline carbon stock changes: cumulative $\Delta CBSLPA$ tCO$_2$-e	Baseline GHG emissions: annual $EBBBSLPA_t$ tCO$_2$-e	Baseline GHG emissions: cumulative $EBBBSLPA$ tCO$_2$-e	*Ex ante* project carbon stock changes: annual $\Delta CPSPA_t$ tCO$_2$-e	*Ex ante* project carbon stock changes: cumulative $\Delta CPSPA$ tCO$_2$-e	*Ex ante* project GHG emissions: annual $EBBPSPA_t$ tCO$_2$-e	*Ex ante* project GHG emissions: cumulative $EBBPSPA$ tCO$_2$-e	*Ex ante* leakage carbon stock changes: annual ΔCLK_t tCO$_2$-e	*Ex ante* leakage carbon stock changes: cumulative ΔCLK tCO$_2$-e	*Ex ante* leakage GHG emissions: annual ELK_t tCO$_2$-e	*Ex ante* leakage GHG emissions: cumulative ELK tCO$_2$-e	*Ex ante* net anthropogenic GHG emission reductions: annual $\Delta REDD_t$ tCO$_2$-e	*Ex ante* net anthropogenic GHG emission reductions: cumulative $\Delta REDD$ tCO$_2$-e	*Ex ante* VCUs tradable: annual VCU_t tCO$_2$-e	*Ex ante* VCUs tradable: cumulative VCU tCO$_2$-e	*Ex ante* buffer credits: annual VBC_t tCO$_2$-e	*Ex ante* buffer credits: cumulative VBC tCO$_2$-e
2009	1,055,304	1,055,304	0	0	(527,652)	(527,652)	0	0	(52,765)	(52,765)	0	0	474,887	474,887	422,122	422,122	52,765	52,765
2010	1,009,116	2,064,420	0	0	(504,558)	(1,032,210)	0	0	(50,456)	(103,221)	0	0	454,102	928,989	403,646	825,768	50,456	103,221
2011	946,233	3,010,653	0	0	(473,116)	(1,505,326)	0	0	(47,312)	(150,533)	0	0	425,805	1,354,794	378,493	1,204,261	47,312	150,533
2012	918,704	3,929,357	0	0	(413,417)	(1,918,743)	0	0	(36,748)	(187,281)	0	0	468,539	1,823,333	418,010	1,622,272	50,529	201,061
2013	915,884	4,845,241	0	0	(412,148)	(2,330,891)	0	0	(36,635)	(223,916)	0	0	467,101	2,290,434	416,727	2,038,999	50,374	251,435
2014	837,983	5,683,224	0	0	(335,193)	(2,666,084)	0	0	(25,139)	(249,056)	0	0	477,650	2,768,084	427,371	2,466,370	50,279	301,714
2015	811,379	6,494,602	0	0	(283,983)	(2,950,067)	0	0	(24,341)	(273,397)	0	0	503,055	3,271,139	450,315	2,916,685	52,740	354,454
2016	817,353	7,311,955	0	0	(245,206)	(3,195,272)	0	0	(16,347)	(289,744)	0	0	555,800	3,826,938	498,585	3,415,270	57,215	411,668
2017	803,253	8,115,208	0	0	(160,651)	(3,355,923)	0	0	(8,033)	(297,777)	0	0	634,570	4,461,508	570,309	3,985,579	64,260	475,928
2018	767,972	8,883,179	0	0	(76,797)	(3,432,720)	0	0	0	(297,777)	0	0	691,175	5,152,682	622,057	4,607,637	69,117	545,046

3.2.7 Methodology Deviations

The project developer did not deviate from the methodology.

3.2.8 Monitoring Plan

The project proponent has provided a monitoring plan in Section 4.3 of the project document and supporting appendices containing specific standard operating procedures. All of the required data and procedures relative to ongoing monitoring of the project are described in this plan. The plan describes the organizations and staff responsible for carrying out the monitoring, the data to be collected, plans for data storage and management, quality control procedures, and detailed technical specifications. The monitoring procedure is appropriate to the project and methodology and is described in sufficient technical detail to allow it to be carried out consistently throughout the lifetime of the project.

3.3 Environmental Impact

The project does not appear to have a negative environmental impact. The project developer conducted a legal analysis with regard to the need for a formal environmental impact assessment and concluded that the project activities fall outside the scope of the regulatory framework regarding environmental impact assessments in Peru. The project is carried out in partnership with the national authority governing protected areas in Peru.

3.4 Comments by stakeholders

The project proponent has conducted extensive stakeholder consultation as a part of project planning and implementation. This includes direct work with the National Service of Natural Protected Areas (SERNANP), the Management Committee of the AMPF, Regional and Local Governments of San Martin, and members of the Local Population. The project proponent presented a well developed communication strategy for ongoing engagement with these groups. Interviews conducted during the site visit verified that many local stakeholders have been heavily involved in project design and implementation. The project is currently undergoing validation against the CCB standards as well, which will further serve to facilitate ongoing consultations with stakeholders throughout the project lifetime.

4 NON-PERMANANCE RISK ASSESSMENT

The project developer described the non permanence risk assessment process and summarized supporting data in a document titled “ICAM-VCS_Non-Permanence Risk Report_v_02_06_15.pdf.” The document outlines a risk assessment conducted using the VCA AFOLU Non-Permanence Risk Tool Version 3.1. SCS reviewed the risk scores assigned and the supporting evidence presented. During field interviews, SCS inquired about risk elements, and as relevant, checked any calculations made. SCS determined that the risk score assigned by the project proponent is appropriate and in conformance with the tool. The risk score assigned and evidence reviewed is summarized below:

Project Management		
Risk Factor	Summary of evidence reviewed and validation comments	Risk Rating
a)	The nature of the project (avoided deforestation) does not lead to the use of non-native species.	n/a
b)	Ongoing Enforcement is a major part of the project activity.	2
c)	The validation team conducted interviews and reviewed CVs of members of the project management team. The team demonstrated strong experience with skills necessary for project activities.	0
d)	The management team has a full time presence near the project area, and conducts regular patrols within the area as a part of project activities. The audit team visited project offices in this area and observed records of patrols.	0
e)	The project development team provided a list of many carbon projects they have participated in that have been validated or will soon be validated, including a VCS REDD project that was validated in Peru shortly before this validation was concluded.	-2
f)	The audit team reviewed documentation of participatory workshops that are used to inform management plans.	-2
Total Project Management (PM) [as applicable, (a + b + c + d + e + f)] Total may be less than zero.		**-2**

Financial Viability		
Risk Factor	Summary of evidence reviewed and validation comments	Risk Rating
a)	The project proponent presented financial models at a variety of carbon prices to demonstrate the project cash flow breakeven point. The audit team examined the assumptions of the model and the sensitivity of the model to those assumptions and determined that the conclusions reported by the project proponent are reasonable.	n/a
b)		n/a
c)		1
d)		n/a
e)	The project proponent provided audited financial statements and evidence of an executed contract from project investors providing evidence that the project has secured funding.	n/a
f)		n/a
g)		n/a
h)		0
i)	The project proponent provided audited financial statements and evidence of an executed contract from project investors providing evidence that the project has secured funding.	-2
Total Financial Viability (FV) [as applicable, ((a, b, c or d) + (e, f, g or h) + i)] Total may not be less than zero.		**0**

Opportunity Cost		
Risk Factor	Summary of evidence reviewed and validation comments	Risk Rating
a)	The project proponent presented documented opportunity cost analyses conducted as part of the implementation of conservation agreements. This analysis demonstrates that the net present value from the most profitable alternative land use activity (conventional land conversion to coffee and pasture) is 20%-50% less profitable than the land use promoted by the project (sustainable agriculture involving organic fertilizer and improved farming techniques).	n/a
b)		n/a
c)		n/a
d)		n/a
e)		-2
f)		-4
g)	Conservation International is a no n profit organization.	-2
h)	The managers of the project area have an explicit legal restriction to maintain its natural condition in perpetuity because of its status as a National Protected Area.	-2
i)	The managers of the project area have an explicit legal restriction to maintain its natural condition in perpetuity because of its status as a National Protected Area.	-8
Total Opportunity Cost (OC) [as applicable, (a, b, c, d, e or f) + (g or h)] Total may not be less than 0.		**0**

Project Longevity		
a)	NA	n/a
b)	The managers of the project area have an explicit legal restriction to maintain its natural condition in perpetuity because of its status as a National Protected Area. Consequently, the project is assigned a longevity risk score of zero in accordance with Section 2.2.4.5 of the AFOLU Non-Permanence Risk Tool.	0
Total Project Longevity (PL) May not be less than zero		**0**

Land Ownership and Resource Access/Use Rights		
Risk Factor	Summary of evidence reviewed and validation comments	Risk Rating
a)	Ownership and resource access/use rights to the AMPF are both held by the Peruvian government.	0
b)	Ownership and resource access/use rights to the AMPF are both held by the Peruvian government.	0
c)	While there are many people living illegally in the project area, there is no dispute over land tenure or ownership. The project proponent presented comprehensive legal analysis that concludes that the project area is registered in the name of SERNANP. It is clear that the land is owned by the government of Peru and that the laws of Peru do not allow for the granting of property rights to individuals within national protected areas. This was confirmed by review of legal documents provided by the project proponent and discussions with government officials.	0
d)	While there are many people living and working illegally in the project area, there is no dispute over access rights. Rather, it is clear that those in the area are present illegally. The project proponent presented comprehensive legal analysis that concludes that the project area is registered in the name of SERNANP. It is clear that the land is owned by the government of Peru, and that the laws of Peru do not allow for the granting of property rights to individuals within national protected areas. This was confirmed by review of legal documents provided by the project proponent and discussions with government officials.	0
e)	The managers of the project area have an explicit legal restriction to maintain its natural condition in perpetuity because of its status as a National Protected Area.	-2
f)	The project developer has taken several documented actions to identify and resolve any disputes, including the commissioning of a legal analysis of land tenure rights and development of communications strategies and a legal basis for continued land use by those currently in the project area.	-2
Total Land Tenure (LT) [as applicable, ((a or b) + c + d + e+ f)] Total may not be less than zero.		**0**

Community Engagement		
Risk Factor	Summary of evidence reviewed and validation comments	Risk Rating
a)	The project proponent provided several lists of people who have attended meetings associated with project design and implementation, been contacted by rangers, or have otherwise been involved in participatory planning and outreach. Assuming the estimate of population size in the BPAM management plan represents a reasonable approximation of the number of people living in the project area, this list indicates that the number of people consulted is adequate to meet the VCS requirements for assignment of a risk score of zero.	0
b)	Additionally, the project developer carried out an analysis of the estimated population size outside the project area that may rely on the project area and documented that greater than 20% of that population had been consulted. The auditor reviewed the assumptions of this analysis and found them reasonable, and reviewed records of the workshops and consultations conducted.	0
c)	The auditor has reviewed results of a participatory assessment carried out by the project proponent as part of a parallel assessment against the CCB standards. This assessment indicates that the project has net positive impacts.	-5
Total Community Engagement (CE) [where applicable, (a+b+c)] Total may be less than zero.		**-5**

Political Risk		
Risk Factor	Summary of evidence reviewed and validation comments	Risk Rating
a)	The governance score of Peru is -0.3156, calculated as described in the AFOLU Non-Permanence Risk Tool. These calculations were made by the project proponent and cross-checked by the validator.	n/a
b)		n/a
c)		2
d)		n/a
e)		n/a
f)	The project proponent presented evidence of Peru's REDD-Readiness activities, including fact sheets and references to Peru's activities in CDM projects.	-2
Total Political (PC) [as applicable ((a, b, c, d or e) + f)] Total may not be less than zero.		**0**

With regard to natural risks, the project developer conducted a likelihood and significance assessment of the risk of landslides, geological risk, forest fires, droughts, and extreme weather. Third party documentary evidence was presented for each of these risk elements and reviewed by the audit team, and the risk rating was also assessed by the Peruvian Technical Expert on the audit team for reasonableness. A risk rating of 2 was assigned to natural risks.

Score for each natural risk applicable to the project (Determined by (LS × M)	
Fire (F)	0
Extreme Weather (W)	0
Geological Risk (G)	2 (from landslides)
Other natural risk (ON)	0
Total Natural Risk (as applicable, F + PD + W + G + ON)	**2**

Risk Category	Rating
a) Internal Risk	0
b) External Risk	0
c) Natural Risk	2
Overall Risk Rating (a + b + c)	**2**

Following the AFOLU non-permanence risk tool, paragraph 2.5.2, a minimum risk rating of 10 shall apply to the project.

5 VALIDATION CONCLUSION

The project conforms to the validation criteria for projects, as set out in the VCS Version 3 guidance documents referenced in Section 1.2 of this report. No qualifications or limitations exist with respect to the validation opinion reached by the audit team. In the opinion of the audit team, the project is likely to achieve the estimated GHG emission reductions and removals that are described in the PD.

APPENDIX A: LIST OF FINDINGS

SCS SCIENTIFIC CERTIFICATION SYSTEMS

Certification for a Sustainable World ™

VALIDATION UNDER THE VERIFIED CARBON STANDARD (VCS)

List of Findings

Project Proponent:
Conservation International

Project:
Alto Mayo Conservation Initiative

NIR 2012.1 dated 02/03/2012

Standard Reference: VT0001

Document Reference: PD Section 2.5

Finding: The VCS Tool for the demonstration and Assessment of Additionality in VCS AFOLU Project Activities states "If an alternative does not comply with all mandatory applicable legislation and regulations then show that, based on an examination of current practice in the region in which the mandatory law or regulation applies, those applicable mandatory legal or regulatory requirements are systematically not enforced and that non-compliance with those requirements is widespread, i.e., prevalent on at least 30% of the area of the smallest administrative unit that encompasses the project area"

The alternative land use scenario selected as most likely is continued illegal deforestation. Based on the documentation provided, it appears that non-compliance with forest protection laws in the project area is widespread, but it is unclear if the specific requirement of being prevalent on at least 30% of the area of the smallest administrative unit that encompasses the project area is satisfied. Please provide additional information to demonstrate that this requirement is met.

Proponent Response: Evidence that the specific requirement of the VCS Additionality Tool to demonstrate that non-compliance with the mandatory legal or regulatory requirements that apply to the baseline scenario (in this case the Protected Areas Law) is widespread in the project area (i.e. prevalent on at least 30% of the smallest administrative unit that encompasses the project area) has been provided to the validator. The PD has been updated accordingly.

Auditor Response: To address the specific requirement that laws regarding forest protection are prevalent on at least 30% of the area of the smallest administrative unit that encompasses the project area, the project proponent conducted an additional GIS analysis, which is described in section 2.5 of the revised PDD as "To further demonstrate that non-compliance with the NPA law is widespread within the AMPF, i.e., prevalent on at least 30% of the area of the smallest administrative unit that encompasses the project area (in this case, the Protected Area is this unit since it falls under the administrative jurisdiction of the SERNANP), we defined a grid of regular cells of 500 meters covering the project area, and for each cell we estimated the deforestation by applying the Tabulate Area tool from the Spatial Analysis extension of ArcGIS 10. The cells that did not have any deforestation were excluded from the total counting. The results counted 1316 cells out of 2032 having presented deforestation, representing 35% the project area (see Sup.Inf_PD_2.1)". The auditor found the approach to be reasonable and unbiased, checked calculations used to estimate the percentage of gridcells in which deforestation appears. No errors were found in the calculations. Additionally, based on the site visit, it was clear that deforestation was occurring, despite the forest protection laws in the project area. The auditor observed evidence recent illegal deforestation first hand while travelling to forest inventory plots. Finally, interviews with BPAM officials supported the claim that illegal deforestation is prevalent across the project area. As a result of this additional analysis, the auditor concludes that the project proponent has adequately demonstrated that illegal deforestation is present prevalent on at least 30% of the area of the smallest administrative unit that encompasses the project area. We do note that this does not suggest that 30% of the area has been illegally deforested, but rather that if the entire project area is divided into regular gridcells,

deforestation is observable on more than one third of those cells.

Closing Remarks: The Proponent's response adequately addresses the finding.

NCR 2012.2 dated 02/03/2012

Standard Reference: VM0015 page 146

Document Reference: Sup.Inf_Meth_04b_Carbon_Stock_Inventory_AMPF_2011+sp&fg.pdf

Sup.Inf_Meth_04c_Carbon_Stock_Inventory_Yuracyacu_2008.pdf

Finding: The project applies biome-level allometric equations as cited by Pearson (2005), Brown (2007), Fragi (1985), Chave (2005) and others.

The methodology requires that "When allometric equations developed from a biome-wide database...are used, it is necessary to verify by destructively harvesting, within the project area but outside the sample plots, a few trees of different species and sizes and estimate their biomass and then compare against the selected equation."

The selected allometric equations must be verified as described in the methodology.

Proponent Response: Please refer to the document "Corrective Action Plan_NCR-2012.2_Allometry", and "Response_Corrective Action Plan_NCR-2012.2_Allometry". The PD has been updated accordingly.

Auditor Response: *The text of the first referenced corrective action plans reads as follows:*

> "This Corrective Action Plan is in response to Non Conformity Report 2012.2 [NCR-2012.2_Verificationof Allometry_020312) which states:
>
> *"The project applies biome-level allometric equations as cited by Pearson (2005), Brown (2007), Fragi (1985), Chave (2005) and others. The methodology requires that "When allometric equations developed from a biome-wide database are used, it is necessary to verify by destructively harvesting, within the project area but outside the sample plots, a few trees of different species and sizes and estimate their biomass and then compare against the selected equation." The selected allometric equations must be verified as described in the methodology."*
>
> The methodology VM0015, annex 03, page 147, states:
>
> *"The allometric equations are preferably local-derived and forest type-specific. When allometric equations developed from a biome-wide database, such as those in Annex 4A.2, Tables 4.A.1 and 4.A.2 of GPG LULUCF, are used, it is necessary to verify by destructively harvesting, within the project area but outside the sample plots, a few trees of different species and sizes and estimate their biomass and then compare against the selected equation .Also generic allometric equations can be used, as long as it can be*

proven that they are conservative." (*emphasis* added).

As a response to NCR-2012.2, we are no longer using "*allometric equations developed from a biome-wide database*." Rather, we conducted an extensive literature review and identified regionally-derived allometric equations that are more specific to our forest type and appropriate for the conditions of our project site. Specifically, the equations used for broadleaf species, which are predominant in our forest inventory (82.6%), are derived from a study developed by Alvarez et. al. (2012) in the nearby forests of Colombia and are specific to the altitudinal and precipitation conditions of the forest strata in our project site, based on the Holdridge classification (see AMPF Management Plan, pages 36-39). In addition, the equations chosen include wood density as one of the parameters, which were derived from national data-bases (Conferencia Peruana de la Madera. 2008. Compendio de Información Técnica de 32 Especies Forestales. Tomo I y II. Lima, Perú). Similarly, allometric equations for palms (6.2%) and lianas (10.5%) were derived from a study developed by Sierra et. al. (2007) in pre-montane forests of Colombia. Species specific equations were used for the *wasai* palm (0.2%) and *Cecropia* (0.4%), derived from Pearson et. al. (2005), as before. The equations used are reported in Table 01_NCR-2012.2 below; a copy of the original studies will be provided to the validator for review.

Table 01_NCR-2012.2. Allometric equations identified for the AMPF:

Forest type/Species group	Equation	Source	Original location
Pre-montane	1.96 - 1.098 ln(D)+ 1.169 $(\ln(D))^2$ -0.122 $(\ln(D))^3$ + 1.061 ln(ρ)	Alvarez et al. (2012)	Colombia (pre-montane moist)
Cloud	1.836 - 1.255 ln(D)+ 1.169 $(\ln(D))^2$ - 0.122 $(\ln(D))^3$ - 0.222 ln(ρ)	Alvarez et al. (2012)	Colombia (lower montane wet)
Dwarf	3.13 - 1.536 ln(D)+ 1.169 $(\ln(D))^2$ - 0.122 $(\ln(D))^3$ + 1.767 ln(ρ)	Alvarez et al. (2012)	Colombia (montane wet)
Palms	0.360 + 1.218 ln (H)	Sierra et al. (2007)	Colombia (pre-montane)
Lianas	0.028 + 1.841 ln (D)	Sierra et al. (2007)	Colombia (pre-montane)
Palms (*wasai*)	6.666 + 12.826 $H^{0.5}$ Ln(H)	Pearson et al. (2005)	Bolivia
Cecropia species	12.764 + 0.2588 $(dbh)^{2.0515}$	Pearson et al. (2005)	Bolivia

In addition (and although not specifically required by the methodology), we validated the allometric equations of Alvarez et al. (2012) by following the steps of the "Limited measurements" method included in VCS Module VMD0001: *Estimation of carbon stocks in the above- and belowground biomass in live tree and non-tree pools (CP-AB), v1.0*[1]. The results confirm the applicability of the allometric equations identified for our project site (see Annex 01_NCR-2012.2). As shown in Table 02_NCR-2012.2, the application of this new set of allometric equations has reduced the total carbon stocks for each of our forest strata, therefore producing more conservative results compared to the previous, biome-wide equations.

Table 02_NCR-2012.2 Comparison of total carbon stocks for the AMPF using biome-wide vs. regional equations

[1] Available at: http://www.v-c-s.org/methodologies/VMD0001

	Biome-wide equations (Brown, Frangi, Putz, etc)	Regional equations (Alvarez, Sierra, etc)
Pre-montane	147.4	127.92
Cloud	156.6	138.54
Dwarf	63.1	33.07

SCS responded to this corrective action plan as follows:

Background: In response to NCR 2012.2, the project proponent has reviewed scientific literature to select a new set of more applicable allometric equations for prediction of biomass of individual trees. The primary equations selected are from Alvarez et al, in which equations are developed for Colombia using the methods of Chave et al and assessing equation grouping according to the Holdridge Life Zone Classification. The new equations selected are more appropriate to the project area than the pan-tropical equations originally provided by the project proponent in that they are developed in a neighbouring country and are specific to the Holdridge life zone bioclimatic classifications in which the project area falls. Other regionally developed equations have been chosen for other species.

Apart from the presentation of the equations themselves, the primary conclusion of the Alvarez et al paper is that Type II models (i.e. those incorporating a measure of diameter and density, but not height) require assessment with external data prior to site-specific implementation (discussed in abstract, section 4.1 last paragraph, and section 5 of the Alverez et al paper), as these models are not able to account for local variations in height-diameter relationships and in wood density. In the Alverez study, the initial Chave models of this type had local biases of greater than 50%. Similar biases were also reported in another study in Peru (Girardin et al 2010). The possibility of bias of this order of magnitude certainly meets the materiality definition for VCS audits, suggesting that evaluation of equation suitability is important.

The models selected from the Alverez paper for use in the current project are of type II, but have been fitted to data from Colombia, rather than the global dataset used by Chave et al. It is not known whether biases such as those observed by Alverez in the assessment of Pan-Tropical equations in Colombia would be observed in the assessment of Columbian equations applied in Peru.

The methodology requires that “When allometric equations developed from a biome-wide database, such as those in Annex 4A.2, Tables 4.A.1 and 4.A.2 of GPG LULUCF, are used, it is necessary to verify by destructively harvesting, within the project area but outside the sample plots, a few trees of different species and sizes and estimate their biomass and then compare against the selected equation.” It is not clear how a “biome-wide database” is defined. If a Holdridge Bioclimatic zone is considered a biome, the equations selected by the project proponents could still be considered those from a “biome-wide database.” It can similarly be argued that, given the much more locally specific nature of the Columbian Life Zone equations, these represent a regional equation, rather than a biome-wide equation. Given the equation developers’ (Alverez et al) strong cautions about models of the type chosen, local verification of the adequacy of the models still appears relevant to determining whether they are appropriate to use in the forests of the project area as well as the Columbian forests in which they were originally developed.

The project proponent *has* locally verified the selected equations, and that verification suggests that the equations are suitable for use. The method they have used for doing so, however, comes from VCS Module VMD0001, rather than the methodology applied to the project, VM0015. VM0015 specifies destructive harvest, rather than the volume based estimates that can be used according to VMD0001. Approved methodologies differ in their requirements for verifying allometric equations – several methodologies require a destructive verification, while others (e.g. VMD001, VM0003, VM006) allow for a verification based only on measurements required to estimate tree volume and wood density. The volume-based verification method does not have the same degree of scientific rigor as a destructive sample, but is an accepted method as demonstrated by its inclusion in approved VCS methodologies and modules. Legal requirements in the project area make destructive verification of allometric equations problematic in the specific case of the project being assessed.

Conclusion: The auditor does not believe it is appropriate to completely skip the site specific verification of the selected allometric equations given cautions emphasized by the equation developers and uncertainty regarding the similarity between forests in Columbia where the equations were developed and those in the project area. However, verification of equations has already been completed by the project proponent and that verification indicates that the equations meet the requirements of the selected tool. Because the verification was not conducted according to the chosen methodology (but was instead conducted according to a different, approved VCS tool), SCS has elected to confirm with the VCSA that such a methodological substitution is allowed. Based on the legal difficulties of a destructive sample and the appearance of the implemented verification procedure in a number of approved methodologies, the auditor believes the verification tool used (VMD001) is adequate. Assuming that the VCSA approves the methodological substitution, implementation of the provided corrective action plan is sufficient to close NCR2012.2.

The VCSA later indicated to the audit team that methodological substitution is not generally allowed. The project proponent then issued an additional response as follows:

> "Following up on SCS's conclusion to our Corrective Action Plan for NCR-2012.2_Allometry on May 5th, i.e. on our choice of allometric equations, we have conducted further research and would like to respond with our opinion on this matter:
>
> We entirely agree with the validator that site-specific verification is the ideal method for evaluating the applicability of allometric equations in forest carbon projects.
>
> However, legal restrictions that apply to the project site (Protected Area) do not allow us to conduct such verification method in the near-term.
>
> Furthermore, we understand the need to comply with any methodology-specific requirements with regards to the methods to be applied to conduct a particular methodological step.
>
> In this regard, the methodology applied, VM0015, clearly states that (annex 03, page 147):
>
> "The allometric equations are preferably local-derived and forest type-specific. When allometric equations developed from a biome-wide database, such as those in Annex 4A.2, Tables 4.A.1 and 4.A.2 of GPG LULUCF, are used, it is necessary to verify by destructively harvesting, within the project area but outside the sample plots, a few trees of different species and sizes and estimate their biomass and then compare against the selected equation" (emphasis added)

In our Corrective Action Plan, we have argued that the equations chosen from the Alvarez et al. (2012) paper for our project site should not be considered as being derived from a "biome-wide database", since they have been specifically developed for a similar set of life zones (sensu Holdridge) in the same mountain range (Tropical Andes) of nearby Colombia. Thus, they should be considered as being "local-derived and forest type-specific" rather than "developed from a biome-wide database".

Even if the Holdridge life zones could be considered a "biome", as mentioned in the validator's response, these equations cannot be considered to be "biome-wide" since they do not represent the entire spatial extent of the biomes for which they were developed (i.e. these equations would not be applicable to the same biomes in Asia or Africa). Thus, we strongly believe that these equations are not at the biome-level but have been scaled down to the regional level. In fact, as pointed out by the authors in their paper (Abstract, section 4.4 first paragraph):

"The new models presented here can be considered as an alternative option for assessing carbon stocks in the above-ground biomass of natural forests in neotropical countries."

In this context it is also relevant to note that the allometric equations developed by Alvarez et al (2012) are part of a broader project developed by the Colombian Ministry of Environment in collaboration with IDEAM named "Building institutional and technical capacity to support REDD projects", and that these equations are expected to greatly contribute to the Colombian MRV system for REDD. For further information on the project, please visit:

http://www.siac.gov.co/contenido/contenido.aspx?catID=697&conID=1076

Furthermore, the biases observed by Alvarez et al in the assessment of Chave-Type II equations in Colombia, of about 50%, refer to the use of the actual pantropical Chave Type II models, not the Colombian Type II models developed by the authors of the study and used in our project site. In the next section (4.2 Allometric models for the estimation of AGB in Colombia) the bias and accuracy of each Type II model developed by the authors for Colombia is reported in Table 6, where the authors indicate that:

"The Type I.1 models developed in this study using the life zones classification was the best model for assessing the AGB of individual trees, yet this model showed an overall higher bias (8.1%) and lower accuracy (22.5%) at the site scale than that obtained employing the Type II.1 model (6.0 and 19.6%, respectively)."

And:

"The accuracy of these findings was even better than that obtained with model Type II.1, which still showed the lowest bias of all of the tested models (1.8 ± 11.3%), after excluding the SCRion site (Table 6)."

And finally:

"Therefore, the two best models already presented here both with and without including H (Type I.3 and Type II.1), based on all 631 trees instead of 603 (not including the SCRion site), appear to be the best option for estimating the carbon stored in the AGB of individual trees and forest stands in Colombian natural forests."

Importantly, we note that the equations chosen for our project site in Alto Mayo are the Type II.1 developed for Colombia in similar life zones (sensu Holdridge).

To further support and validate our arguments, we have contacted the methodology developer who has confirmed (see Attachment A-1) that the specific set of allometric equations chosen for our project site should not be considered "biome-wide" in the sense given by the methodology (e.g. for the Amazon region or for tropical forests).

Also, we have contacted the authors of the Alvarez et al (2012) paper who have also confirmed that these equations should not be considered biome-wide since they were developed for Colombia with potential applicability to other neotropical countries (see Attachment A-2). Also, they confirmed that the specific equations we have chosen (among all of the ones developed by them) are the most applicable to our project site given the life zones present.

Nevertheless, we entirely agree with the validator, as well as the author of the Alvarez paper, that the applicability of the equations chosen still requires an evaluation prior to their use at the site scale. However, an evaluation through destructive sampling would not be a mandatory requirement in our case since we propose that we are not using equations "derived from a biome-wide database".

Therefore, we have chosen to verify the Alvarez et al equations by applying the non-destructive method included in the VCS approved Module VMD0001: Estimation of carbon stocks in the above- and belowground biomass in live tree and non-tree pools (CP-AB), v1.0 (See Corrective Action Plan). As confirmed by the validator, the results confirm that the Alvarez et al equations chosen are applicable to our project site, in fact, they have generated more conservative results compared to the use of the original Chave Type II pantropical models or the Brown pantropical models to our tree data set, resulting in a reduced carbon density per hectare, which we are willing to accept, as shown in the table below:

Table 1. Comparison of carbon stocks/ha in Alto Mayo based on pantropical vs. Alvarez models (tC/ha)

	Biome-wide equations (Brown, Frangi, Putz, etc)	Regional equations (Alvarez, Sierra, etc)
Pre-montane	147.4	127.92
Cloud	156.6	138.54

Dwarf	63.1	33.07

In conclusion, based on the above discussion, we firmly believe that the methodology does not require us to verify the allometric equations chosen through the destructive sampling method, since we are not using a “biome-wide” equation.

Based on the evidence that we have provided, we propose that the Alvarez et al (2012) equations represent an appropriate dataset to the project location that is in compliance with the methodology.

Attachment 1 - email from Alvaro Vallejo, Carbon Decisions International:

Dear Percy,

We had an internal discussion about this issue. One of our experts, Diego Navarrete, had previous and close knowledge of the work done by Álvarez and others. In this case, all the equations were developed from data collected in the same study and not from different literature sources.

We fully agree that these equations can not be considered as "biome-wide", since they were indeed developed using local data and for specific life zones (i.e. for specific types of forests) and not for entire regions, as those suggested in the methodology (e.g. for the Amazon region or for tropical forests).

On the other hand, in order for these equations to be correctly applied in San Martin region, you should check that they are applied to the same life zones from where they were developed, even if you are using a different stratification map.

I don't know if you also have this reference:

Álvarez, E., Saldarriaga, J.G., Duque, A.J., Cabrera, K.R., Yepes, A.P., Navarrete, D.A., Phillips, J.F. 2011 Selección y validación

de modelos para la estimación de la biomasa aérea en los bosques naturales de Colombia. Instituto de Hidrología, Meteorología

y Estudios Ambientales-IDEAM-. Bogotá D.C., Colombia. 26 p

In case you don't and you think it is of any value to you (the file is 38 MB), we can send it to you, just check if your email server accepts attachments of this size.

Best regards,

Alvaro, Vallejo

Attachment 2 - email from Alvaro Duque, Universidad Nacional de Colombia:

Estimado Stavros:

Con respecto a su consulta, como autor del artículo en mención por parte suya (Alvarez et al. 2012), puedo concluir lo siguiente: nuestras ecuaciones, tal como se sugiere en el artículo mismo (página 306, segunda columna primeras líneas), se recomienda básicamente como un modelo alternativo especialmente para países Neotropicales. Una ecuación que no incluye árboles de otros continentes, como por ejemplo Asia o Africa, donde algunas publicaciones sugieren cambios en la alometría de los árboles (i.e. Feldespauch et al. 2010), no tendrá aplicabilidad en éstos. Por este motivo, si usted considera como un bioma por ejemplo el bosque húmedo tropical sensu Holdridge (1971), nuestras ecuaciones no aplican en este tipo de bosques en Africa o Asia.

El uso de los Modelos de Chave et al. (2005) en bosques de montaña, según estudios que ahora adelanto, creo que puede ser más controversial que el uso de los nuestros. Por ejemplo, cuando usé estos modelos en 16 parcelas de 1-ha a lo largo de un gradiente ambiental que incluye una alta variación altitudinal (50 -2900 msnm), la correlación entre los estimados de biomasa por los modelos de Tipo I y Tipo II de Chave fue apenas cercana a 0.3. Lo anterior significa, que el uso de estos modelos en ecosistemas neotropicales de montaña, puede conducir a patrones diferentes, según el modelo que se aplique.

En síntesis, yo creo que en este campo de los modelos alométricos hay todavía un gran camino por recorrer, siendo nuestros modelos un nuevo aporte a la discusión, con aplicación por ahora, más de tipo regional que global. Los modelos fueron incluso construidos para mejorar nuestros estimados en Colombia, pero creemos que en países con clima y topografía similar, tal como aquellos localizados sobre las montañas de los Andes, estos podrán también ser de utilidad.

Espero esto le sea de alguna ayuda.

Atentamente,

Alvaro Duque

Profesor Asociado

Departamento de Ciencias Forestales

Universidad Nacional de Colombia

The audit team found this response, coupled with the direct opinion of a member of the methodology development team and the equation development team, to be a convincing argument that the selected equations did not meet the methodology developer's intended definition of "Biome-wide." Since the methodology does not require validation for allometric equations not derived from a "biome-wide

database," the audit team determined that the destructive validation exercise was not required by the methodology, and that the non destructive validation that was present constituted adequate supplementary evidence (not specifically required by the methodology) of the appropriateness of the selected equations. The finding was closed.

Closing Remarks: The Proponent's response adequately addresses the finding.

NIR 2012.3 dated 02/03/2012

Standard Reference: VM0015 page 107

Document Reference: PD section 4.3

Finding: Please provide a more detailed monitoring plan that describes the specific variables that are to be measured as described in appendix 5 of the methodology and a technical description of the procedures used to obtain each. The monitoring plan must include technical descriptions of the monitoring tasks and quality control and quality assurance procedures of sufficient detail to ensure data collection and processing is handled in a consistent manner over the life of the project.

Proponent Response: Please refer to the document "Corrective Action Plan_NIR-2012.3_MonitoringPlan". The PD has been updated accordingly.

Auditor Response: The text of the corrective action plan referred to in the proponent response is as follows:

> The following sections of the Methodological Annex and the PD will be modified to include further details on the monitoring procedures used as requested by NIR-2012.3. In addition, Supportive Information Sup.Inf_Meth_03 will be updated to include a description of CI's standard land use land cover change detection methods.
>
> **Methodological Annex – Part 3 – Task 1 - Section 1.1.2**
>
> **5.1.1.1 1.1.2 Monitoring of land-use and land-cover change within the project area**
>
> As of the date of validation no regional, national or jurisdictional monitoring system of land-use and land-cover change was in place. Therefore, the project proponent will be responsible for developing the land-use and land-cover change component of the monitoring plan for the project area and leakage belt. The analysis will cover the monitoring of forest land converted to non-forest. The land cover and change maps will be produced following the technical steps described below and in detail in Sup.Inf_Meth_03, including quality assurance procedures. Accuracy assessment as described in steps 2.4 and 2.5 of part 2 will be performed. The minimum accepted accuracy of the final classification will be 80%.
>
> The project proponent will complete the following technical steps (described in detail in Sup.Inf_Meth_03a):
>
> 1. Acquire appropriate Landsat images with minimal cloud cover from multiple sources including the United State Geographical Survey (USGS), the Global Land Survey (GLS), and the Brazilian National Institute for Space Research (INPE).
>
> 2. Atmospherically correct images
>
> 3. Orthorectify images to within one pixel using a single base image (generally a GeoCover image, or similar image, used to generate the forest benchmark map)
>
> 4. In areas where no-data values exist in the base image (due to clouds, cloud shadows,

SLC-off artifacts), composited images will be generated using the base image and multiple gap-filling images. A cloud, cloud shadow, and SLC-off mask for the base image will first be generated and gap-filling scenes identified to fill the mask of the base image. Temporal and gap extent criteria will be used to select the gap-filling scenes; scenes with similar acquisition dates will be given preference, as well as minimal cloud, cloud shadow, and SLC-off gap artifacts.

5. Classify images in two-date image stacks using decision tree analysis (a combination of ERDAS and See5, or similar). Only areas which were forested in the baseline period will be classified, as they are the only class subject to deforestation.

a. Map classes include: 1=forest, 2=non-forest, 4=water, and 5=cloud

b. Collect training data to represent both change and non-change areas

c. Include numerous sub-classes in the training data for each land-cover and change class, to incorporate the full range of spectral variability within the image

6. Filter classifications using a three step process:

a. Neighborhood majority filter 3x3, corners unchecked

b. Clump, 4 way

c. 1-hectare eliminate

7. To produce multi-date classifications the new classification will be merged with the existing classification. In the updated map product each digit in the final classification represents the land-cover at the corresponding time period.

To ensure a high quality analysis, the project proponent will closely follow the methods, rules and procedures specified in Conservation International's standard change detection methodology (See Sup.Inf_Meth_03b).

The project proponent will continue to use, primarily, Landsat images, as this source is expected to keep providing continued coverage, at low or no-cost, due to the Landsat Data Continuity Mission (LDCM). However, in the cases were Landsat imagery is not available or cannot provide adequate coverage, other types of imagery will be used. When incorporating other types of imagery it is important to consider spectral resolution, spatial resolution, continuity, seasonality, and context. Context refers to the types of activity in the area, such as in an area that is not likely to experience deforestation due to a lack of accessibility. Regardless of the data used, all the images will be co-registered to the baseline image.

Imagery with acquisition dates as close as possible to the reporting period date will be used. For the 2011 monitoring period, the new images will be combined with those from 2006 to conduct a multi-temporal analysis of change; this is similar to the approach used in the historical analysis. The forest benchmark map and source imagery used for the historical analysis will also be consulted to ensure maximum consistency in image interpretation. This will include using the image-display stretches used during the historical analysis, in order to minimize the risk of inconsistent interpretation. All data used to create the updated map and the resulting classification will be stored and backed-up along other GIS data.

The final product will be validated with high resolution imagery (i.e. 5 meter spatial resolution or less) and/or field-collected ground-truth data. The minimum accuracy for each land-cover class

will be 80%. In addition, accuracy assessments of the decision tree generation will be conducted using a stratified sampling method with 50% of the training done to test how well the model fits the training data. Analyst interpretation will still be necessary to determine the best land-cover product and adjust the model using multiple iterations.

Project Description – Section 4 – Sub-section 4.2 & 4.3

4.2 Data and Parameters Monitored

In addition to the data listed below that will be collected directly at every verification period, the following tables in the methodological annex will be updated and included in the verification report: VM tables 15a, 15b, 15c, 22, 24, 29a, 29b, 29c, 32, 33, and 34. Also, in the case of a catastrophic event, VM Tables 20e, 20f, 20g, 21e, 21f, and 21g will be updated.

4.3 Description of the Monitoring Plan

For a technical description of the AMCI monitoring plan, please refer to the Methodological Annex, Part 03. The data and parameters monitored during the project's lifetime are described in the previous section of this PD. Below follows a description of the AMCI data management plan[2].

Purpose of the AMCI GHG monitoring plan:

- Standardize methods and procedures applied for the collection, compilation and analyses of the data used to estimate the GHG benefits of the AMCI REDD project;

- Guarantee that the information is processed in a consistent way throughout the project's lifetime, comparable with the data and processes used during validation and in accordance with VCS approved methodology VM0015;

- Assure that the GHG benefits are estimated in a conservative manner with accuracy, precision and reliability;

- Document results to demonstrate the achievement of the AMCI project's goals in terms of emissions reductions in the AMPF.

Organization(s) and staff involved:

The responsible organization for the data management of the AMCI project will be Conservation International, supported by the AMCI partners as appropriate:

- Overall administration and supervision: Project manager - CI Peru

- Data storage and organization: GIS Manager - CI-Peru

[2] The AMCI data management plan was designed based on the data management and publishing guidelines of the MIT Libraries, available at: http://libraries.mit.edu/guides/subjects/data-management/index.html

- Back up and system security: IT manager - CI-Peru
- Remote sensing processing: RS Specialist - CI-Peru/HQ
- GIS analysis - GIS specialist: CI-Peru/HQ
- Documentation and outreach: Communications coordinator - CI-Peru

Description of the data to be collected:

- The GHG benefits of the AMCI project will be estimated by comparing the baseline emissions with the actual emissions during each monitoring period. The actual emissions will be estimated by measuring the forest loss in each stratum multiplied by the respective emission factor. Note that the emission factors will be constant during the project lifetime, since the carbon stock of each forest class is considered constant and the post-deforestation class is estimated as the weighted average of all non-forest classes in the historic reference period. Therefore the only data to be measured in each monitoring event will be forest loss due to land use change.

- Forest loss will be estimated in each monitoring period by analyzing a time series of Landsat images. See the methodological annex for the methods used in acquiring, pre-processing (including cloud removal), classifying, and post-processing images. Subsequently, the forest loss map will be overlaid with the project area and leakage belt to estimate the area converted to non-forest within those boundaries.

- The AMPF falls within two Landsat scenes (paths 08 and 09, row 064). Images will be compiled from USGS and UMD archives, with enough dates within one year period to ensure the least amount of cloud problems possible. In the cases where areas obscured by clouds still remain in the project area and leakage belt, these areas will be temporarily excluded from the project until the next verification period.

Plans for storage and data management:

- All the GIS data, including the raw and processed satellite images will be stored in the GIS lab of CI-Peru.

- All data will initially be backed up using an external drive with weekly backups to a network drive. The network drive uses CI's SAN server system and provides redundant backup. This will ensure that a retrieval system will be in place in case of computer, hardware, or internet connection failure.

- The folder structure will be reflected in the backup system to guarantee that the integrity of GIS map files (e.g. mxd for ArcGIS) will be maintained and links will not be broken.

- The backup system will be tested systematically (monthly) to ensure that the system is working properly.

- Any data collected in hard copy (paper) will be converted to digital (i.e. scanners), unless otherwise specified in the monitoring report. In that case, a physical location in the GIS-lab of CI-

Peru will be designated to store such material. An electronic inventory document will identify the name, type of document and a brief description of all the hard copy products. This inventory will be located in the GIS-lab of CI-Peru.

- The GIS manager of CI-Peru will be responsible for keeping any hard copies in a secure location, protected from intense humidity or sunlight exposure. In addition, the GIS Manager will be in charge of collecting, copying and storing any relevant files generated by the AMCI's partners or external consultants.

Legal and ethical issues:

- The data collected or generated by the AMCI project are property of CI-Peru, unless otherwise specified. Confidentiality of research subjects, where applicable, will be maintained to ensure continuing participation in research and monitoring activities.

Access policies and provisions:

- All data collected or generated by the AMCI project will be publicly available upon request through the contact information provided in the PD, unless under contractual obligation not to be disclosed.

For further information with regards to the AMCI GHG monitoring plan please refer to the monitoring section of the Methodological Annex – Part 3 and to the Supl.Info_Meth_03.

In addition, the proponent submitted additional documentation of standard operating procedures for land cover change analysis, supervised classification, and co-registering images. The project proponent has now provided detailed procedures for monitoring land cover change within the project area in the form of proposed changes to the PD and three supporting documents. The newly provided procedures have been described with sufficient technical detail to ensure data collection and processing is handled in a consistent manner over the life of the project. The provided information is sufficient to close NIR2012.3.

Closing Remarks: The Proponent's response adequately addresses the finding.

NCR 2012.4 dated 02/03/2012

Standard Reference: VCS 3.2 Standard Section 3.11

Document Reference: GIS data provided

Finding: The VCS standard requires that project location for AFOLU projects be specified using geodetic polygons to delineate the geographic area of each AFOLU project activity and provided in a KML file. The project boundaries have been provided as a shapefile, rather than a KML file.

Proponent Response: The KML file has been provided to the validator with the revised PD.

Auditor Response: The project proponent has submitted the file in the required format. The finding has been closed.

Closing Remarks: The Proponent's response adequately addresses the finding.

NIR 2012.5 dated 02/26/2012

Standard Reference: VM0015 pages 63-64

Document Reference: Methodological Annex page 55

Finding: The Figure Of Merit statistic(FOM) applied by the project differs in form from the FOM statistic described by the methodology in that the number of misses and false alarms appears in the numerator of the statistic. A statistic of this form leads to increases in FOM as the number of misses and false alarms increases, which does not appear to accurately assess the predictive ability of the model. Please justify the form of the FOM statistic applied in model selection or apply the FOM statistic as it is described by the methodology.

Proponent Response: Please refer to the document "Corrective Action Plan_NIR-2012.5_FOM". The PD has been updated accordingly.

Auditor Response: The text of the corrective action plan referred to in the proponent response is as follows:

> The VM0015 recommends that "*Preference should be given to techniques that assess the accuracy of the prediction at the polygon level, such as the predicted quantity of total deforestation within the project area as compared with the observed one*." In addition VM0015 suggest that "*One of the assessment techniques that can be used is the "Figure of Merit" (FOM) that confirms the model prediction in statistical manner."* In the same section the methodology states: *"The minimum threshold for the best fit as measured by the Figure of Merit (FOM) must be more than 50% for frontier landscape configuration and more than 80% for mosaic landscape configuration. Where this minimum standard is not met, the project proponent must demonstrate that at least three models have been tested, and that the one with the best FOM is used."* (*emphasis* added).
>
> If one would strictly follow the methodology, the comparative analysis of the predicted versus the observed deforestation in the project area would return a 0% FOM, since the project area is forest land at the project start date. Conservation International, in collaboration with Clark Labs, is testing several alternative approaches to determine a representative polygon-to-project area where the model accuracy would be assessed. In addition, more tests and research with scientific rigor is being conducted to propose an alternative statistic to assess the model at polygon level. The equation used as Figure of Merit by VM0015, should be more properly called the *Jaccard Index.* The results of our research will be discussed with the methodology developers to be incorporated in the next methodology revision. However, the results of this research might not be completed by the time of this validation, therefore we are opting to test three models as suggested by the methodology and use the one with best FOM.
>
> The PD Methodological Annex Section *4.2.3 Selection of the most accurate deforestation risk map* will be modified as follows to include the information requested by NIR-2012.5:

5.1.1.2 4.2.3 Selection of the most accurate deforestation risk map

After the risk map of deforestation has been created, the LCM process is used to distribute spatially the total deforestation rate. LCM assigns deforestation sequentially to the pixels of greatest potential, with a filter function to produce more realistic patches of deforestation.

To perform this task, option A was used, in which the predicted deforestation map is evaluated by comparing with a "true" observation using two sub-periods.

The actual rate of deforestation between 2001 and 2006 was then assigned to the model to predict the deforestation location in 2006. The resultant change map (2001-2006) was confirmed with the actual change map produced in step 2.4, by overlapping both maps in GIS.

The technique assessment - Figure of Merit (FOM) - was applied to assess the accuracy of the model in each forest stratum. FOM ranges from 0%, where there is no overlap between observed and predicted change, to 100%, where there is a perfect overlap between observed and predicted change.

The VM0015 suggests 50% as a minimum threshold for best fit for frontier configurations as measured by the Figure of Merit approach. Where this minimum standard is not met, the methodology asks the project proponent to demonstrate that at least three models have been tested, and that the one with the best FOM is used. The FOM within our forest strata polygons was less than 50%, therefore two other models were tested and the one with the best FOM was chosen. The models tested will be provided to the validator for review (see Annex NIR-2012.5).

Below is the risk map selected based on the highest P-FOM. The colors in the map describe the risk of deforestation, with dark red representing high potential, decreasing until low potential represented by dark blue. The left panel shows the parameter used in the model, including start and end leaning rates and final running statistics.

In response to the finding NIR, the project proponent has elected to apply the figure of merit (FOM) statistic as described by the methodology, rather than providing a justification for the altered FOM statistic that was initially used. Because the deforestation models used could not achieve the recommended 50% best fit statistic, comparison of three alternative models has been used to select the most accurate deforestation map. The three models vary in their fundamental underlying algorithms (logistic regression, neural network, and multicriterion analysis), and the procedure used to select the most accurate model was clearly consistent with that described in the methodology. Implementation of this procedure is sufficient to close NIR2012.5.

Closing Remarks: The Proponent's response adequately addresses the finding.

NCR 2012.6 dated 02/26/2012

Standard Reference: VM0015 page 57

Document Reference: Methodological Annex page 40-45

Finding: The project applies a statistical model to predict the baseline deforestation rate (Methodology section 4.1.3.1 approach (c)). The methodology requires that the model demonstrably comply with statistical good practice. To demonstrate that the model complies with statistical good practice and adequately represents the expected deforestation rate, please (1) justify the choice of model form (i.e. linear vs. non-linear model), considering the process being represented, the model form suggested by plots of the data to which the model is fitted, and an analysis of the residuals of the fitted model (e.g. for conditional bias, constancy of variance, and appropriate distribution as the assumptions of the model fitting technique applied dictate); (2) Correct the identified unit error in which different time scales are applied in each of the fitted sub-models; (3)explain and justify the rationale for the scaling factors applied to convert between the areas represented by different data sources used in model fitting.

If changes to the model substantially affect the number of credits generated, please provide a financial analysis that reflects the revised projection.

Proponent Response: Please refer to the document “Corrective Action Plan_NCR-2012.6_DeforestationModel”. The PD has been updated accordingly.

Auditor Response: In response to this finding, the project proponent has adopted a completely different form of deforestation model than that originally selected. The deforestation model form chosen is the logistic model fitted as described in VM0009. This is consistent with the selected methodology because approach "b" as described in VM0015 section 4.1.3.1 allows for the use of any model form that demonstrably complies with statistical good practice. The auditor has verified that the calculations used to fit this deforestation model are consistent with VM0009, including the calculation of point weights; assumptions regarding stationary and image "double coverage;" the fitting of the logistic curve; and calculation of model uncertainty. As allowed by VM0009 and reasonable under approach 'b' of VM0015, the project proponent has elected to use a conservatively selected linear model for actual credit generation. The validator confirmed that the linear model always predicts a cumulative deforestation amount that is less than that predicted by the lower bound of the logistic deforestation model (considering model uncertainty). Consequently, the validator concludes that an appropriate statistical model has been used to predict the baseline deforestation rate.

Closing Remarks: The Proponent’s response adequately addresses the finding.

NIR 2012.7 dated 02/26/2012

Standard Reference: VM0015 Section 1.1.3

Document Reference: Methodological Annex Section 1.1.3

Finding: The project applies a mobility analysis in the form of multi-criteria evaluation to determine the location of leakage belt. This process results in a continuous map of the relative accessibility potential of areas to which deforestation activities may shift. The project has selected the 1/3 of this map that represents the most accessible area for the monitoring of leakage, but no justification was provided for selecting this percentage, rather than some other fraction of the area evaluated. Please justify the size of the leakage belt, considering the amount of deforestation that would likely occur in the absence of the project and explaining how the size of the selected leakage belt is adequate to monitor any potentially displaced deforestation that may result from project implementation.

Proponent Response: The size of the leakage belt has been re-defined to contain enough forest to absorb 100% potential displacement of baseline deforestation due to the project implementation. The PD has been updated accordingly.

Auditor Response: The revised size of the leakage belt has been adequately justified by the project proponent. The leakage belt is now defined in such a way that it contains enough forest area to potentially absorb 100% of the deforestation that is predicted for the project area.

Closing Remarks: The Proponent's response adequately addresses the finding.

NIR 2012.8 dated 02/26/2012

Standard Reference: NA

Document Reference: NA

Finding: Please provide copies of field data sheets to allow the validator to trace the data from its initial collection through all calculations applied (e.g. to check for transcription errors). The validator has randomly selected plots 1, 5, 27, 75, and 117 for analysis.

Proponent Response: Copies of the field data sheets from the plots randomly selected by the validator have been provided with the revised PD.

Auditor Response: The project proponent provided the requested field data sheets. The data sheets were checked by the auditor and traced from initial data entry to final calculation of carbon stocks. One data entry error was discovered by the auditor (a single tree's diameter as entered into the spreadsheet did not match the diameter recorded in the field). This error was deemed immaterial because it represented less than 1% of all records examined and when corrected by the auditor resulted in less than a 1% change in the plot's carbon stocks.

Closing Remarks: The Proponent's response adequately addresses the finding.

NCR 2012.9 dated 02/26/2012

Standard Reference: AFOLU Non-Permanence Risk Tool section 2.3.2

Document Reference: Non-Permanence Risk Report pages 10-11

Finding: While project documentation and interviews conducted during the site visit support the assertion that the project has taken measures to communicate with communities and stakeholders and engage in outreach and consultation, evidence has not been provided that the specific requirements of table 7 of the AFOLU non-permanence risk tool have been met. Interviews during the site visit indicated that there are households within and around the project area that rely on the project area. The project must (1) demonstrate that 50% of households living within the project area who are reliant on the project area have been consulted or apply a risk score of 10 for the corresponding category; and (2) demonstrate that 20% of households living within 20km of the project boundary and who are reliant on the project area have been consulted or apply a risk score of 5 for the corresponding category.

As given by the AFOLU Non-Permanence Risk tool, households can be determined as consulted and involved in participatory planning where there have been direct meetings and planning with associations or community groups that are legally recognized to represent the households.

Proponent Response: Evidence that the specific requirements of Table 07 of the AFOLU Non-permanence Risk tool have been met has been provided to the validator. The Non Permanence Risk report has been updated accordingly.

Auditor Response: The project proponent provided several lists of people who have attended meetings associated with project design and implementation, been contacted by rangers, or have otherwise been involved in participatory planning and outreach. Assuming the estimate of population size in the BPAM management plan represents a reasonable approximation of the number of people living in the project area, this list indicates that the number of people consulted is adequate to meet the VCS requirements for assignment of a risk score of zero for item 7(a). Additionally, the project developer carried out an analysis of the estimated population size outside the project area that may rely on the project area and documented that greater than 20% of that population had been consulted.

Closing Remarks: The Proponent's response adequately addresses the finding.

NCR 2012.10 dated 02/26/2012

Standard Reference: AFOLU Non-Permanence Risk Tool section 2.3.2

Document Reference: Non-Permanence Risk Report pages 11-12

Finding: While interviews conducted with project participants during the site visit support the assertion that the project generates net positive impacts on the social and economic well-being of local communities who derive livelihoods from the project area, achievement of the mitigation credit requires that a participatory assessment of the positive and negative effects of the project activities be completed to demonstrate net positive benefits. The project must provide evidence of such an assessment in order to apply the mitigation credit.

Proponent Response: Evidence that the specific requirements of Table 07 of the AFOLU Non-permanence Risk tool have been met has been provided to the validator. The Non Permanence Risk report has been updated accordingly.

Auditor Response: The auditor has reviewed results of a participatory assessment carried out by the project proponent as part of a parallel assessment against the CCB standards. This assessment indicates that the project has net positive impacts.

Closing Remarks: The Proponent's response adequately addresses the finding.

NIR 2012.11 dated 02/26/2012

Standard Reference: AFOLU Non-Permanence Risk Tool section 2.2.2

Document Reference: Non-Permanence Risk Report page 4

Finding: Please provide evidence of the ability to meet financial obligations and the financial good standing of the implementing organization consistent with section 2.2.2 of the AFOLU Non-Permanence Risk Tool.

Proponent Response: Evidence regarding the good financial standing of the implementing organization (CI) and its ability to meet the financial obligations related to the project has been provided to the validator. The Non Permanence Risk report has been updated accordingly.

Auditor Response: The project proponent has provided copies of executed agreements with donors as well as audited financial statements that provide evidence that it is able to meet the project's financial obligations.

Closing Remarks: The Proponent's response adequately addresses the finding.

NCR 2012.12 dated 07/17/2012

Standard Reference: VM0015 pages 11,34, and 114

Document Reference: PD section 1.4

Finding: Pages 11, 34, and 114 of the VM0015 methodology indicate that non CO2 emissions from forest fires in the project scenario must be accounted when they are significant. Based on language on page 11, 34, and 114, this appears to apply regardless of whether greenhouse gas emissions from burning are included in the baseline. Forest fires in the project case may occur from either slash and burn agriculture activities from deforestation that is not successfully prevented by the project, or from unpredictable catastrophic events. Please either demonstrates that non CO2 emissions from forest fires are not significant in the project scenario or modify the monitoring plan and project boundary to include this emissions source in the project case.

Proponent Response: Evidence that non-CO2 emissions from forest fires are not significant in the project scenario was provided to the validator. Sections 7.2 and 1.1.3 (part 3) of the Methodological Annex have been updated accordingly.

Auditor Response: The project proponent provided a spreadsheet in which ex ante estimates of emissions from fire in the project scenario were calculated using the procedures provided by the methodology. The calculations were checked by the auditor and indicated that emissions from fire in the project scenario would constitute approximately 1.15% of the project's net GHG benefits, and therefore are not considered significant.

Closing Remarks: The Proponent's response adequately addresses the finding.