REVISION OF METHODOLOGY FOR AVOIDED ECOSYSTEM CONVERSION FIRST ASSESSMENT REPORT

Document Prepared By: Environmental Services, Inc.

Methodology Title	Methodology for Avoided Ecosystem Conversion VM0009, v3.0	
Version	3.81	
Methodology Category	Methodology	
	Methodology Revision	X
	Module	
	Tool	
Sectoral Scope(s)	14, REDD and ACoGS	

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Summary:

Environmental Services Inc. was commissioned by Wildlife Works LLC to perform the first methodology revision assessment of the Methodology for Avoided Ecosystem Conversion, VM0009, v3.81 in accordance with the VCS Methodology Approval Process, VCS Standard, VCS Program Guide, and the VCS AFOLU Requirements.

The methodology provides a means to quantify GHG emission reductions and removals from project activities that prevent conversion of forest to non-forest and grassland to a non-native state.

The purpose and scope of the methodology element first assessment was to evaluate whether or not the methodology was prepared in line with VCS program requirements. ESI's assessment included a detailed review of eligibility criteria, baseline approach, additionality, project boundary, emissions, leakage, monitoring, data and parameters, and adherence to the project level principles of the VCS program (relevance, completeness, consistency, accuracy, transparency and conservativeness). ESI's assessment also included a detailed analysis of the methodology, literature reviews, technical reviews and Wildlife Works' responses to all non-conformity reports (NCRs), clarifications (CLs) and opportunities for improvement (OFIs).

The ESI assessment team identified 30 NCRs/CLs/OFIs. All were addressed satisfactorily by Wildlife Works during the methodology assessment process. These NCRs and CLs provided necessary clarity to ensure that the methodology was in compliance with VCS rules and requirements.

ESI confirms all methodology assessment activities, including objectives, scope and criteria, level of assurance and the methodology adherence to the VCS Program and VCS Standard Version 3.4 (and associated updates), as documented in this report, are complete. ESI concludes without any qualifications or limiting conditions that the methodology element (Methodology for Avoided Ecosystem Conversion, VM0009, v3.81) meets the requirements of the VCS. ESI recommends that VCSA approve the methodology element.

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1 Introduction

1.1 Objective

This methodology element assessment report was performed to evaluate the likelihood that implementation of the methodology revision would result in accurate calculations and appropriate eligibility criteria of the GHG emission reduction/removal methodology (ISO 14064-3:2006). This report summarizes the findings of the first assessment of the Verified Carbon Standard (VCS) double approval process for a revised VCS AFOLU methodology element, referred to as the "Methodology". Wildlife Works LLC, referred to as the "Methodology Developer", has commissioned Environmental Services Inc. (ESI), referred to as the "Assessment Team" to perform an assessment of revisions to Methodology element VM0009 "Methodology for Avoided Deforestation".

This report presents the findings of a qualified assessment team of auditors and experts in methodologies for GHG emissions or who have assessed the methodology element for compliance under the applicable VCS rules. This methodology assessment report focuses on the latest revisions to methodology element VM0009, specifically to allow for baseline types which include the avoided conversion of grassland to a non-native state.

1.2 Summary Description of the Methodology

The methodology element VM0009 provides a means to quantify Net GHG Emission Reductions and Removals (NERs) and accommodates project activities that prevent conversion of forest to non-forest. The revisions to the methodology now accommodate grassland to a non-native state. The VCS AFOLU Requirements for REDD and ACoGS project categories account for all allowable carbon pools with the exception of peat soils and litter. The baseline scenarios allowed under the methodology element include avoided emissions from planned deforestation (APD), unplanned deforestation and degradation (AUDD), planned conversion (APC), and unplanned conversion (AUC). Nine baseline types are identified based on the approximate agent of conversion, the drivers of the conversion, whether the specific agent of conversion can be identified, and the progression of conversion. Projects are not limited to one baseline type.

The addition (in version 3.81) of ACoGS baseline types for grassland ecosystems substantially expands the applicability of the methodology, and now can be used to address both planned and unplanned conversion in both forest and grassland ecosystems. Compared to approaches taken by other REDD and ACoGS methodologies, the approaches used in this methodology differ significantly in three regards: First, the baseline emissions models predict cumulative emissions over time instead of a rate of ecosystem conversion in hectares per year. Second, important parameters to the baseline emissions models are fit using simple point observations of land use conversion over a historic reference period rather than requiring a series of complex Land Use Land Cover (LULC) classifications of full-coverage satellite imagery. Third, accounting for the various sources of emissions from biomass is dramatically simplified by rolling all sources of potential emissions into a single model and parameterizing the model based on easily understood baseline types.

2 Assessment Approach

2.1 Method and Criteria

This assessment is based upon standard auditing techniques in line with VCS Requirements to assess the correctness of the information provided. The assessment of a proposed revised methodology is also guided by ISO 14064-3:2006 (E), "the systematic, independent and documented process for the evaluation of a greenhouse gas assertion in a GHG project plan against agreed validation criteria." In accordance with VCS rules, a methodology assessment encompasses applicability conditions, project boundary, procedure for demonstrating additionality, procedure for determining baseline scenario, baseline emissions, leakage, quantification of net GHG emission reduction and/or removals, monitoring, data and parameters, and relationships to approved or pending methodologies.

The criteria will follow the VCS Program documents located at *http://v-c-s.org/program-documents*. These documents include the following:

- VCS Program Guide (v3.5, October 2013)
- VCS Standard (v3.4, October 2013)
- Program Definitions (v3.5, October 2013)
- Agriculture, Forestry and Other Land Use (AFOLU) Requirements (v3.4, October 2013)
- Methodology Approval Process (v3. 5, October 2013)

During the course of this methodology assessment, revisions to guidance documentation were issued by VCS in October 2013. VCS rules (Methodology Approval Process v3.5, October 2013) allow for a 6 month grace period for implementation by methodology developers and validation/verification bodies. Therefore, the methodology element revisions were written to adhere to the previous update and checked according to program guidance documentation released in October, 2013.

As this is an assessment of the revised methodology, the specific scope included an assessment of the revised sections of the methodology, and how these revisions fit into the broader methodology. ESI has also assessed whether other provisions of the methodology have been impacted by these revised sections:

- Section 3: Definitions and Acronyms - Updated to include ACoGS
- Section 4: Applicability Conditions - Updated to include ACoGS
- Section 5.4: Selecting Carbon Pools - Updated to include ACoGS
- Section 6: Baseline Scenario - Broadly updated to incorporate the ACoGS baselines.
- Section 6.3: Identifying Baselines - Significant Revision to include ACoGS baselines
- Section 8: Baseline Emissions - Broad updates to incorporate ACoGS baselines into the existing baseline models.
- Section 8.3.3: Determining Market Leakage - Significant Revision to include ACoGS baseline
- Appendix G: Equations - Equation G51 added.
- Appendix H: Validation Parameters - Updated to include ACoGS baselines
- Appendix I: Monitoring Parameters - Updated to include ACoGS baselines

Additional updates include:
Sections 6 & 8 where the Baseline type F-P1.b was added. This baseline type is for planned degradation with unplanned deforestation.

Reference Area Selection Criteria added to Section 6 per VCS request.

2.2 Document Review

The REDD VM0009 Methodology element was submitted to Environmental Services Inc. in September, 2013. The assessment team conducted a detailed review of the methodology documentation (Table 1) against the criteria of the VCS guidance documents listed in Section 3.1. Other items the assessment team reviewed were completeness, logical coherence, and consistency with current best practices for quantification of emissions reductions.

Name	First version assessed	Final version assessed
"*Methodology for Avoided Ecosystem Conversion" – VM0009*	VM0009 Methodology for Avoided Conversion v3.61.docx	VM0009 Methodology for Avoided Conversion v3.81.docx
"VCS Market Leakage Calculation Tool," – VM0009	Copy of Market Leakage Tool 2013-09-15.xlsx	Same
"Global Commodity Leakage Module: Production Approach" – LM-P v3.0	Global Commodity Leakage Module - Production Approach v 0 3_clean.docx	Same
Conservative analysis of lambda	subsetbygrassland.csv Boot CI 2.png Integration using lambda comparison1.2.png lambda1.4.r modeloutput.txt original data.csv	Same
Public comments: South Pole Carbon	131211_Comments on VM0009 v3 1.pdf	Same
WWC responses to South Pole Carbon	WWC Response to Comment on VM0009.pdf	Same
File developed as a result of comments received during the VCS public comment period.	Supporting Files.zip	Same
File developed as a result of comments received during the VCS public comment period.	SEK BEM Project Progress Report_12.20.2013.pdf	Same

File developed as a result of comments received during the VCS public comment period.	Samlout_BEM.xlsx	Same
File developed as a result of comments received during the VCS public comment period.	RanchCore.pdf	Same
File developed as a result of comments received during the VCS public comment period.	RanchCore_2.xlsx	Same
File developed as a result of comments received during the VCS public comment period.	output_final2.xlsx	Same
File developed as a result of comments received during the VCS public comment period.	Landsat13_GrassConv_dots.jpg	Same
File developed as a result of comments received during the VCS public comment period.	GoogleEarth_GrasslandConversion.jpg	Same
File developed as a result of comments received during the VCS public comment period.	Chyulus_BEMstrata1.pdf	Same
File developed as a result of comments received during the VCS public comment period.	Chyulus_BEMstrata_Grids.pdf	Same
File developed as a result of comments received during the VCS public comment period.	AreaF_RanchCore.csv	Same

Table 1. Documents received from project developers.

2.3 Interviews

The objective of the interview process was to resolve requests for clarifications, corrective action and other outstanding issues which are required as part of the methodology assessment. After issuance of a round of NCRs/CLs, conference calls between the assessment team and the authors were arranged to reconcile understanding of the issues. As a guarantee of transparency in the resolution process, concerns raised and responses given were documented in greater detail, given in Section 3.5.

The official opening meeting was conducted on 20 September 2013 between representatives from the methodology developer with authority to approve the Methodology Assessment Plan; the Lead Validator and Forestry, Carbon, and GHG Services Director from Environmental Services Inc. Attendees were: Jeremy Freund (WWC), Guy Pinjuv (ESI) and Janice McMahon (ESI). The agenda of the meeting consisted of review and mutual understanding of the components in the Methodology Assessment Plan including; potential revisions, project timeframes and the standardized processes to solicit feedback among the parties.

The methodology assessment audit process began with confirmation of the Assessment Plan. Upon confirmation of the plan, the assessment lead to the issuance of Round 1 of Non-conformance Reports (NCRs), Clarification Requests (CLs), and Opportunities for Improvement (OFIs). A categorical breakdown of findings is outlined in detail in Section 2.5

Additional interviews were arranged, as needed, after the authors addressed NCRs/CLs in subsequent versions of the methodology and reviewers required additional clarification on changes applied. The table below lists the individuals involved in the major meetings and their organizational affiliation for this first methodology assessment.

2.4 Assessment Team

The assessment team consisted of qualified individuals (Table 2) linked to the sectoral scope and technical areas of the methodology. The composition of the assessment team operated at several qualification levels:

- Lead Assessor (L)
- Assessment Team Member (TM)
- Assessment Expert (E)
- Assessment QA/QC (QA/QC)

Team Member	Expertise/Experience
Dr. Guy Pinjuv (L)	Senior Scientist. Expertise lies in forest carbon growth modeling, carbon project development, forest offset project validation and/or verification and forestry related methodology assessments. Dr. Pinjuv is responsible for team management, client coordination,

	and performance of senior technical project management.
Shawn McMahon (TM)	Senior Project Manager. Approved to conduct third-party carbon sequestration validations and verifications under VCS. Specializes in third-party carbon offset validations and verifications, carbon sequestration project development, development and implementation of management plans for enhancement of carbon stocks, development of carbon and environmental asset tracking programs, and team management.
Caitlin Sellers (TM)	Senior Scientist. Responsible for project management and client coordination; technical services such as wetland delineation, wetlands and wildlife permitting, vegetative community characterizations, mitigation area monitoring studies, forest inventories and assessments, and GHG validations/verifications.
Richard Scharf (TM)	Senior Soil Scientist, NCLSS, SC Soil Classifier. Over twenty-two years of experience in a variety of soils-related projects. Duties include managing and conducting soils work for wastewater projects, stormwater projects and wetland delineation. Provides expertise and experience on carbon offset projects/methodologies associated with agricultural land management and/or soil carbon pools.
Stewart McMorrow (TM)	Senior Scientist. Responsible for project management, client coordination and technical aspects; vegetative community characterizations, mitigation area monitoring studies, forest inventories and assessments, and GHG validations/verifications associated with agricultural, forestry and other land use sectors.
Jonathan Pomp (TM)	Project Forester. Specializes in carbon offset consulting, design and implementation, quantification & analysis, marketing, strategy development, project development, and verification. Responsible for GHG forestry offset project validations/verifications, forest biometrics, and field assessments for projects around the world.
Matthew Perkowski (TM)	Project Forester and Forest Biometrician. Responsibilities include meeting the internal and external client objectives in the fields of forest inventory and sampling, growth and yield modeling, and directly in support of offset validation/verification projects. In addition, he is focusing on streamlining and developing quantitative tools for the GHG group to increase product service value for clients.
Eric Jaeschke (TM)	Project Forester and Remote Sensing Specialist. Duties include technical GIS and remote sensing support for carbon offsetting projects through validations/verifications under various rule sets, data analysis, and field validations.
Dr. Richard Conant (E)	VCS-AFOLU-ACoGS Expert/Validation Team Member. Dr. Conant is an ecosystem ecologist at the Natural Resource Ecology Laboratory and an associate professor in the Department of Ecosystem Science and Sustainability at Colorado State University. His research focuses on understanding the feedbacks

	between human activities and ecosystem biogeochemistry. Specifically, he is interested in how land use and land management practices impact carbon and nitrogen cycling in agricultural and grassland ecosystems. In this methodology assessment Dr. Conant provided AFOLU-ACoGS technical expertise and review for the methodology revision validation.
Janice McMahon (QA/QC)	GHG Services Division Director for ESI. Specializes in natural resource management projects including carbon sequestration feasibility assessments, development/implementation of management plans for enhancement of ecosystem services, assessment of GHG emissions and reductions, development of environmental asset tracking programs, GHG validations and verifications, endangered/ threatened species assessments, habitat management plans, and integrated ecosystem services plans. Responsible for leading the Forestry, Carbon, and GHG Services Division, which includes client and team coordination, proposal preparation and review, marketing presentations, maintenance of ESI's ANSI accreditation and management System, and quality assurance and quality control for projects in the United States as well as the international market.

Table 2. Assessment team members and relevant expertise/experience.

2.5 Resolution of Findings

The process of methodology assessment involved 3 formal rounds of assessment by the assessment team and resulted in a methodology version which was in conformance to VCS rules. Findings related to corrective action, clarification requests or other findings were resolved during communication between the assessment team and the methodology developer. More specifically, where noted by the assessment team, authors implemented corrective actions by amending the methodology element components and providing written clarification responses. Types of findings were characterized in the following manner:

Non-Conformity Reports (NCRs) were issued as a response to material discrepancies in a part of the methodology and generally fell into one of the following categories:

- Non-conformity to VCS guiding documents listed in Section 2.1
- Internal consistency among sections was lacking
- Mathematical formulae in sections were incorrect
- Additional information was required by the assessment team in order to confirm reasonable assurance for compliance

Clarifications (CL) were issued when language within a section needed extra clarification to avoid ambiguity or to clarify an assertion made by the methodology developer.

Opportunities for Improvement (OFI) were issued to the methodology developer when an opportunity for improvement was identified.

Important findings and points of discussion from the newly revised sections of the methodology element are presented (Table 3). Detailed summaries of each finding, including the issue raised, responses and final conclusions are provided in Appendix A.

Finding/Discrepancy	**Assessed**	**Resolution**
Grazing is a common practice in many grassland ecosystems and is allowed under ACoGS project scenarios. The methodology did not mention emissions associated with grazing animals.	AFOLU Requirements v3.4 ACoGS. Project boundary, baseline scenario	When grazing emissions are not deemed *de minimis* for the project scenario, methane is now a required source.
N_2O emissions from the baseline were not addressed; omission would be conservative.	AFOLU Requirements v3.4: ACoGS. Baseline and Project Emissions/Removals	Both N_20 and CH_4 emissions were conservatively omitted from the baseline scenario.
Applicability conditions were used in the methodology to specify project activities that are applicable under certain conditions. More details were needed to describe the type of model or survey used to predict imminent conversion by agents of conversion.	VCS Standard v3.4. Applicability Conditions	More detailed guidance including a region specific model was discussed with the assessment team to demonstrate the threat of imminent conversion. A final decision was made to drop the use of a model to predict imminent conversion, as there are two remaining tests including a survey that were deemed sufficient.
It was not clear how the methodology established criteria and procedures for identifying alternative baseline scenarios and determining the most plausible scenario, taking into account relevant information concerning present or future legislative changes (i.e. a change in baseline scenario due to a change in legislation).	VCS Standard v3.4. Baseline Scenario	Extra guidance was given in order to “confirm plausibility of baseline types” in addition to the VCS Additionality Tool.

The methodology did not appear to identify default factors which could become out of date (i.e., those default factors that do not represent physical constants or otherwise would not be expected to change significantly over time). Such default factors are subject to periodic re-assessment, as set out in VCS document Methodology Approval Process.	VCS Standard v3.4. General Requirements	The methodology element identifies default factors used which may become out of date and properly identifies those which may require periodic re-assessment per the VCS Standard section 4.1.7.
Select public comment NCRs		
South Pole Carbon questioned the applicability of 30m resolution satellite imagery for grassland conversion detection. ESI found that the suitability of image resolution for grassland conversion could only be assessed on a case by case basis and there is little existing literature to set a precedent.	Related to VCS Standard 3.4 Sections 4.1.6, 4.5.1	The methodology element includes methods for the verifier to confirm image resolution suitability: 1. A set of geo-referenced photos taken on the ground in areas that represent both unconverted and converted land cover. 2. High-resolution imagery coinciding with both unconverted and converted areas within the reference area(s).
During the review of South Pole Carbon public comments, ESI noticed a possible inconsistency among remote sensing approaches offered in the methodology. The methodology was unclear that the baseline Biomass Emissions Model (BEM) and Leakage Model can utilize either the "heads-up" point interpreted approach or an automated pixel-based based approach.		The methodology element now includes this clarification in section B.2.11: "It should be noted that the activity-shifting leakage model is separate and unrelated to the Biomass Emissions Model (BEM), and we suggest this choice of remote sensing classification types only for the activity-shifting leakage model. As stated in section 6.8.6, the Biomass Emissions Model does not support automated, pixel-by-pixel classification

		techniques, and project proponents should not attempt to replace or sidestep manual image interpretation for the BEM with an automated process such as a maximum likelihood or nearest neighbour classifier."
South Pole Carbon comments pointed out the possible difficulty in assessing accuracy using the interpreted point-based approach for grassland conversion detection. The baseline Biomass Emissions Model (BEM) does not appear to address accuracy of interpreted points.	Related to VCS Standard 3.4 Sections 4.1.6, 4.5.1	The methodology element addresses this finding in the following manner: 1. A Standard Operating Procedure (SOP) for minimizing uncertainty is required, this is "A protocol for interpreting land cover state from imagery." 2. Interpreted points which are classified as "built up" or "converted" in the first image are discarded because they fail to undergo transition 3. Converted and unconverted states are assumed categorical variables of the population of interpreted points and therefore the variance determines the uncertainty. 4. Observation points are weighted to remove bias associated with non-uniform classifications and/or spatial non-uniformity. 5. An internal check of classifications is performed between at least 2 independent interpreters.

Table 3. Main assessment team findings and resolutions.

3 Assessment Findings

The proposed revisions were found to be in full compliance with the principles set out in the VCS Standard. Specifically, new conversion scenarios for grassland baseline types contained in this methodology revision appear to be consistent with best practice and scientific consensus. Grassland baseline types are defined in accordance with AFOLU Requirements and follow previously validated methods for determining emissions by using a project-tailored model approach. The AFOLU Non-Permanence Risk Tool was appropriately invoked to determine NPV (net present value) at the project and baseline scenario for planned conversion activities.

The assessment process focused on the principles set forth by the VCS Standard:

- The revised methodology element adheres to the principle of relevance by selecting the GHG sources, GHG sinks, GHG reservoirs, data and methodologies appropriate to the needs of the VCS Program.

- The revised methodology element adheres to the principle of completeness by including all relevant GHG emissions and removals, and including all relevant information to support criteria and procedures.

- The revised methodology element adheres to the principle of consistency by enabling meaningful comparisons in GHG-related information.

- The revised methodology element adheres to the principle of accuracy by reducing bias and uncertainties as far as is practical.

- The revised methodology element adheres to the principle of transparency by disclosing sufficient and appropriate GHG-related information (i.e. giving sufficient and appropriate justification of procedures and criteria) to allow intended users to make decisions with reasonable confidence.

- The revised methodology element adheres to the principle of conservativeness by using conservative assumptions, values and procedures to ensure that net GHG emission reductions or removals are not overestimated.

3.1 Relationship to Approved or Pending Methodologies

This is an assessment of the revision to the previously approved methodology VM0009.

3.2 Stakeholder Comments

This methodology was open for public comment from 15 October 2013 until 14 November 2013 and (4) comments for suggested improvements were submitted by South Pole Carbon. WWC responses to South Pole Carbon comments were reviewed by the assessment team for completeness within the scope of this assessment and NCRs issued with associated responses are listed at length for clarity and context.

Public comment 1.

The numbering of monitoring periods appears inconsistent throughout the methodology, which has impacts on the calculation of NERs. In section 2.2.8, page 17, the first monitoring period is defined as m=1. In other sections of the document (e.g. 6.14, p. 67 or Annex H, p. 197), parameters denoted by m=0 are described as being monitored during the first monitoring period. This essentially means mixing up the time before project start with the first monitoring period, which should be avoided. We suggest that parameters denoted by m=0 are monitored prior to project start, not during the first monitoring period, in order to avoid over-estimation of NERs.

WWC Response

The numbering of the monitoring periods is in fact consistently applied and clearly denoted throughout the methodology. From section 2.2.8, "The first monitoring period is denoted by [*m=1*], the second monitoring period [*m=2*] and so forth."

VM0009 requires that Carbon Pools must be measured at the onset of project, and these measurements are held constant (for calculation purposes) for the remainder of the project. They are denoted by the superscript [*m=0*] to differentiate them from monitoring period data. Additionally, some project parameters, such as pL [m=0], are designated with the [*m=0*] superscript, as they are measured at the onset of a project and similarly held constant throughout.

In the special case where project validation and initial verification occur simultaneously, the values of [*m=0*] parameters will equal those of [*m=1*], as there will have been only one Carbon inventory. Whereas, if project validation and the [*m=1*] monitoring period verification event occur at different dates, the parameters for [*m=0*] will have been calculated from a different MRV inventory from those of [*m=1*]. It is therefore considered important to the overall clarity and organization of the methodology, as well as consistency of equations, to maintain the clear distinction between [*m=0*] and [*m=1*].

In regard to the commenters' assertion that there is some confusion surrounding the current description of *[m=0]* and *[m=1],* we believe it would help to explain the difference between [*m=0*] and [*m=1* … *m=n*], to place some clarifying language in section 2.2.8, as follows:

"The superscript *[m=0]* indicates the value of a carbon pool at project start. These values remain constant throughout the project crediting period. In the case where project validation and the first verification event fall on the same date, then *[m=0]* parameters will be equal to *[m=1]* parameters."

ESI Findings Round 1

Relevant requirements: 3.3.6 of the Methodology Approval Process V3.5

This response is sufficient to satisfy the public comment by elaborating on proper use of numbering subscripts for monitoring periods in the methodology element.

Public comment 2.

The expansion of VM0009 for crediting avoided grassland conversion has low compatibility with the other setup of the methodology. The visual image interpretation of sample points on medium resolution (30m pixel) multispectral imagery is insufficient both for observing degradation of forest due to harvesting and conversion of grasslands to other non-forest land uses. The application of visual interpretation on sample locations for neither of these two land use changes does not comply with best practice literature for forest carbon monitoring via remote sensing data like the GOFC-GOLD Sourcebook[1]. Other "non-grassland" non-forest land use types have strong seasonal variability (e.g. cotton plantations) between high and low carbon stocking during the year. At many phases such could be confused with presence or absence of grassland. Grassland itself has strong season photoactive (and therefore spectral) variability throughout the year. There are not sufficient safeguards against erroneous classification of presence / absence of grassland in the methodology proposal and it seems unclear how such could be implemented in visual interpretation without systematic ground truth data, map accuracy assessment or hyper-spectral imagery analysis.

WWC 1st Response

Wildlife Works respectfully disagrees with the commenters' contention that the ACoGS component has low compatibility with the REDD and IFM methodological elements. An identical manual image interpretation model is used for both the REDD/IFM and Avoided Conversion of Grassland and Shrubland (ACoGS) ecosystem project types.

Firstly, we point out that nowhere in VM0009 is it stated, nor inferred, that 30 m spatial resolution (i.e. Landsat imagery) *must* be used. In section 6.8.4, we state "The *minimum* spatial resolution of the imagery must be 30 m." VM0009 allows for, and encourages, the use of higher spatial-resolution imagery for use in the Biomass Emission Model (BEM), when available or within the project budget.

Regarding the subsequent sections of this comment, we address each part individually:

First, in response to:

"The application of visual interpretation on sample locations for neither of these two land use changes does not comply with best practice literature for forest carbon monitoring via remote sensing data like the GOFC-GOLD Sourcebook"

We agree with the commenters in that we do not believe that conversion of grassland / shrubland ecosystems can be accurately monitored using automated computer algorithms that observe only pixel spectral reflectance properties. It is for this very reason that we developed VM0009, a methodology that relies on manual, "heads-up" image interpretation model of a sampling of points overlaid on remotely sensed imagery. This Biomass Emissions Model (BEM), relies on the

[1] GOFC-GOLD, 2012, A sourcebook of methods and procedures for monitoring and reporting anthropogenic greenhouse gas emissions and removals associated with deforestation, gains and losses of carbon stocks in forests remaining forests, and forestation. GOFC-GOLD Report version COP18-1, (GOFC-GOLD Land Cover Project Office, Wageningen University, The Netherlands).

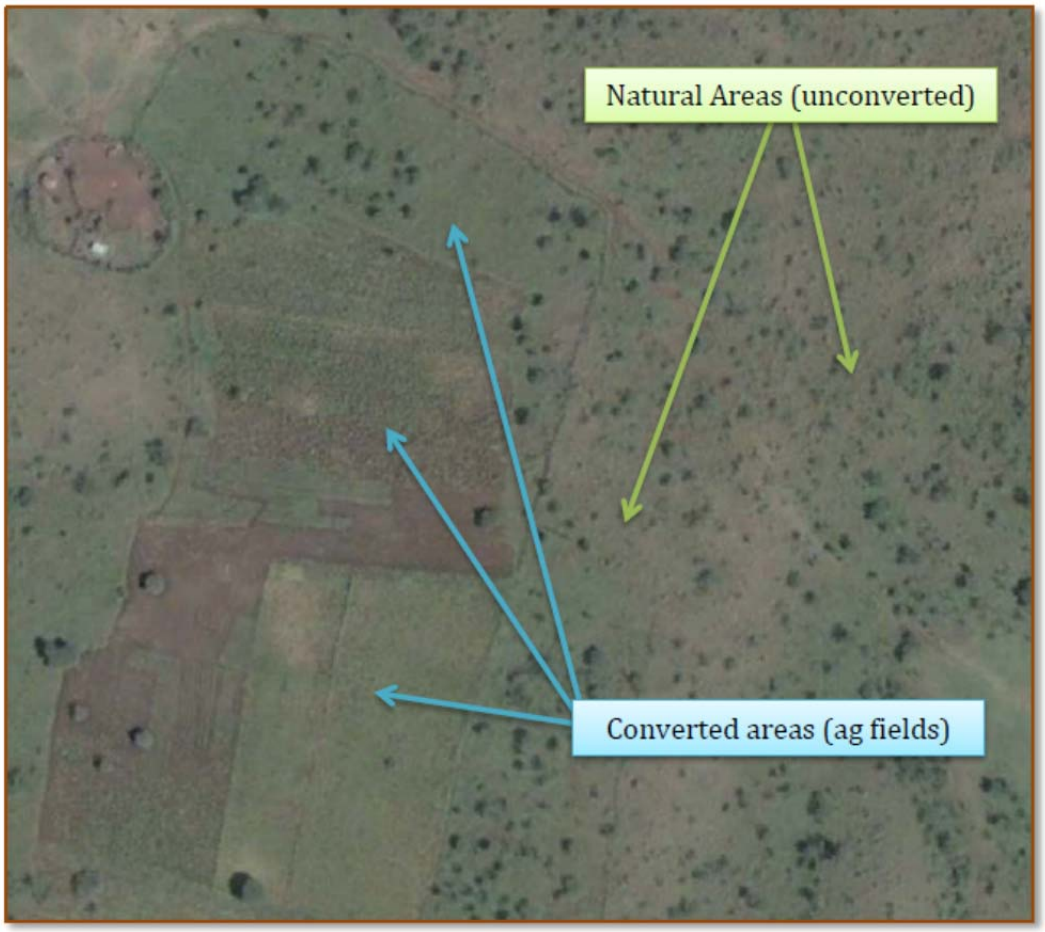
identification of non-natural shapes (i.e. agricultural fields), patterns (i.e. crops) and context (i.e. proximity to villages, roads, etc.) to separate areas of "conversion" from natural (unconverted) areas.

Addressing the commenters' assertion that VM0009 does not address any good practice guidance or similar literature, we offer the following: The BEM model used in VM0009 complies with, and was in fact build around, the 2003 IPCC Good Practice Guidance for Land Use, Land-Use Change and Forestry (GPG-LULUCF), Chapter 2, 'Basis for Consistent Representation of Land Areas', Approach 3, which states:

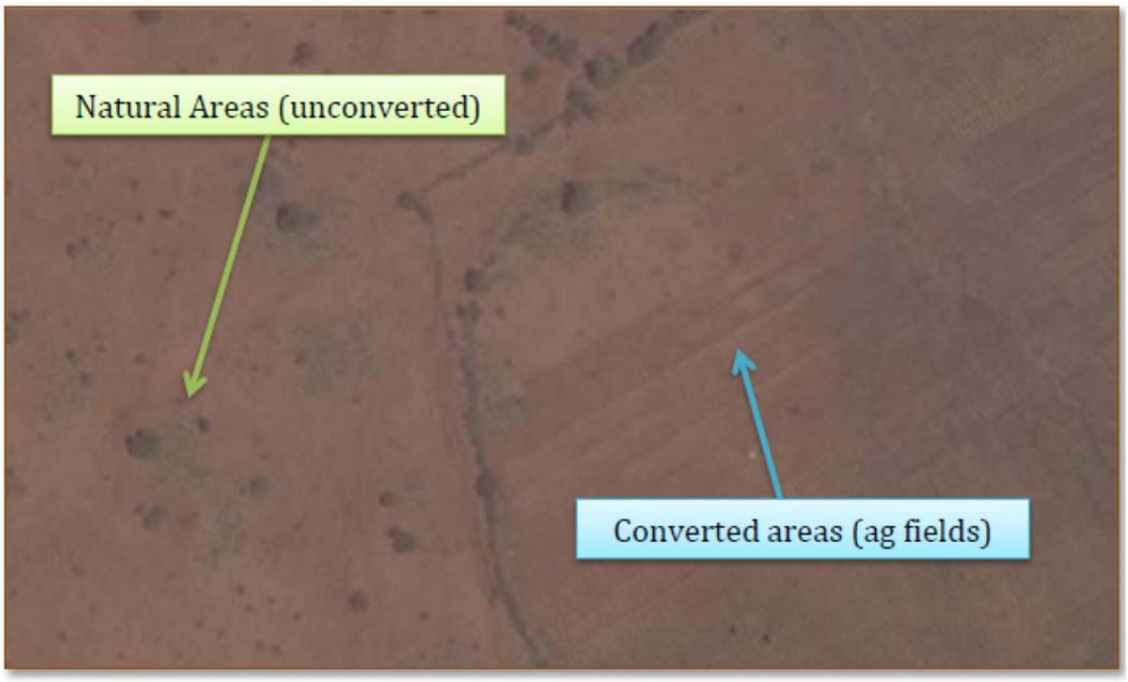
"Approach 3 (summarised in Figure 2.3.1) requires spatially explicit observations of land use and land-use change. The data may be obtained either by sampling of geographically located points, a complete tally (wall-to-wall mapping), or a combination of the two."

IPPC Approach 3 is reiterated / restated in the 2006 Good Practice Guidance, Chapter 3, Section 3.3.1.

Wildlife Works has explicitly tested the ability to identify both the native grassland state and converted states utilizing manual image interpretation of sample points, with 30 m resolution Landsat imagery, and shown that both land cover states can be reliably determined. Firstly, these states are quite easily visibly delineated, as stated above, using characteristics such as shape, texture and other contextual information only viable in manual image interpretation models like VM0009's BEM. (see below for an example of a grassland area with clearly converted areas of agriculture visible to the trained analyst's eye).



In this typical Kenyan dryland scenario, “converted” areas are delineated by their shape, texture and context. These areas are difficult, or often impossible to tease out using spectral reflectance alone, as both land-use areas exhibit similar spectral properties.



In this example, natural and converted lands exhibit a nearly identical spectral response. The two land-use classes are distinguishable using only pattern, texture and context (in this case, barrier vegetation), something VM0009 analysts are trained to recognize.

In these tests, 30 m pixels that have been manually classified by trained remote sensing analysts were verified against very high-resolution imagery. In all cases, manual interpretation was shown to identify land cover state to greater than 95% accuracy. Because of the sheer number of data points collected (typically more than 10,000 for an average project with ~8-9 years of imagery), and because it is assumed that properly-trained human analysts can always classify land cover more accurately than a computer, especially when using identifiers other than spectral reflectance values, we chose not to measure classification error using typical user/producer, error matrix techniques. This would unfairly produce extremely low error values, and almost always result in minimal accuracy deductions. Instead, we chose to conservatively calculate error for the baseline model (BEM) based on the weighted variance of the manual observations (equations [F.13] and [F.14] in VM0009). This type of error analysis for the baseline model has been reviewed and accepted by auditors multiple times.

To further clarify that VM0009's BEM model requires manual "heads-up" image interpretation of sample points place over imagery, using identification of shape, texture and context, and that the model does NOT support automated pixel-by-pixel spectral classification techniques, we agree to place clarifying language in Section 6.8.

ESI Findings Round 1

"The visual image interpretation of sample points on medium resolution (30m pixel) multispectral imagery is insufficient both for observing degradation of forest due to harvesting and conversion of grasslands to other non-forest land uses" (SPC)

ESI does not feel that WWC provided sufficient evidence or adequately answered the question that a visual image interpretation of sample points applied to 30m (medium) resolution imagery can be used to discern grassland conversion to a non-native state. The use of medium resolution imagery (i.e. Landsat) for grassland change detection is challenging even when paired with ground data or high resolution reference plots (See Ramspott, Pecora 16 Proceedings, 2005). Difficulty in land management practice change detection from different tillage techniques is explicitly mentioned in IPCC Good Practice Guidance for Land Use, Land-Use Change and Forestry (GPG-LULUCF) section 2.4.4.1.

ESI interprets this comment: "The application of visual interpretation on sample locations for neither of these two land use changes does not comply with best practice literature for forest carbon monitoring via remote sensing data like the GOFC-GOLD Sourcebook" (SPC) to mean that a sample point model for image interpretation is not in compliance with the GOFC-GOLD Sourcebook instead of an automated algorithm.

"We agree with the commenters in that we do not believe that conversion of grassland / shrubland ecosystems can be accurately monitored using automated computer algorithms that observe only pixel spectral reflectance properties. It is for this very reason that we developed VM0009, a methodology that relies on manual, "heads-up" image interpretation model of a sampling of points overlaid on remotely sensed imagery." (WWC)

If WWC is suggesting that an automated algorithm is completely unsuitable for grasslands, then the only other method allowed in the methodology is the sample point model. This contradicts Methodology section B.2.11 which allows project proponents flexibility in choosing the land cover classification regime for leakage: "This land-cover classification may be a supervised, pixel-based classification or use a point interpretation approach as in section 6.8" (WWC). The two different methods of grassland stratification give project proponents enough flexibility to choose a method which may result in a preferential accuracy. No accuracy standard threshold appears to be provided for project proponents as guidance in the methodology. The GOFC-GOLD

Sourcebook suggests 80-95% accuracy for medium resolution imagery and refers to Section 5 of the 2003 IPCC GPG-LULUCF where Approach 4 of section 5.7.2 specifies remote sensing "can be quite accurate, but ground truthing is needed to improve result accuracy". The IPCC guidance in section 2.4.4.1 also recommends ground points for accuracy verification as good remote sensing practice.

The weighted variance method for assessing accuracy of the point sampling method does not appear to be very common in REDD projects. Congalton and Green (1999) suggest that this method has not received widespread attention because of the need to select appropriate weights. The methodology does not seem to indicate whether project proponents are able to manipulate the weight which has the potential to introduce a large amount of subjectivity.

"In these tests, 30 m pixels that have been manually classified by trained remote sensing analysts were verified against very high-resolution imagery. In all cases, manual interpretation was shown to identify land cover state to greater than 95% accuracy" (WWC)

The resolution of the example imagery given by WWC responses to South Pole Carbon comments was not noted. It also appears that independent tests have been performed by WWC to validate their point sampling method. If this is the case, then ESI suggests inclusion of the test results to support the recommendation that the "heads-up" point model be used. More evidence is needed to demonstrate that the point sampling method for classification of grassland ecosystem conversion is robust enough to be applied in all areas applicable under the methodology.

One comment by South Pole does not appear to be addressed*: "Other "non-grassland" non-forest land use types have strong seasonal variability (e.g. cotton plantations) between high and low carbon stocking during the year. At many phases such could be confused with presence or absence of grassland. Grassland itself has strong season photoactive (and therefore spectral) variability throughout the year."*

ESI agrees that seasonal variability in grasslands is difficult to detect (See Guo et al. 2003) and requests additional clarification that a trained analyst can distinguish temporal differences consistently and accurately.

The following NCR's were issued as a result of public comment 2:

NCR 2a:

Relevant requirements: 3.3.6 of the Methodology Approval Process V3.5, VCS Standard 3.4 Section 4.1.6, and VCS Standard 3.4 Section 4.5.1.

Please provide evidence that a visual image interpretation of sample points applied to 30m (medium) resolution imagery can be used to discern grassland conversion to a non-native state.

ESI Additional Clarification Following Call on 12/11/2013 (Round 2)

Since the suitability of image resolution can only be assessed on a case by case basis and there is little existing literature using this method to set a precedent, clarifying language should be added to the methodology. Language should be added in section 6.8.4 to require the suitability of image resolution to be checked by geo-referenced photos. This ocular check should be completed by both the project proponent and the verifier, and photos should be presented to the verification body for this purpose upon validation/verification. The final determination of an acceptable resolution for the imagery is at the discretion of the verifier.

WWC Round 3 Official Responses to NCR 2a

Wildlife Works accepts this NCR and agrees to add the following verbiage to *section 6.8.4* to provide ground verification of manual image interpretation, as well as to place the onus of determining whether or not the resolution of the selected BEM imagery is adequate to discern natural from converted grassland:

"To ensure that the selected imagery is of adequate spatial resolution to allow for the identification and discernment between natural, unconverted status and converted status, the project proponent must provide evidence, by producing one of the following to the validator/auditor:

1. A set of geo-referenced photos taken on the ground in areas that represent both unconverted and converted land cover. The auditor should check that these photos satisfy the burden of proof that adequate shape, texture and context is discernable in order to identify land cover state change between unconverted and converted status. Adequacy for the number of photos and their interpreted accuracy should be at the discretion of the auditor.

2. High-resolution imagery coinciding with both unconverted and converted areas within the reference area(s). This imagery should be of significantly higher spatial resolution in comparison to the imagery used for the collection of data for the BEM, and should only be used to determine the adequacy of the spatial resolution of the data to be interpreted. Accuracy and resolution of the validation imagery should be at the discretion of the auditor."

ESI Round 3 Official Findings to NCR 2a

ESI accepts this response and additions to the methodology as sufficient to address NCR2a. The additional evidence provided to V/VBs ensures an additional check is in place to confirm that adequate spatial resolution is used. Finding closed.

OFI: Suggest changing the last word of item 2 from 'Auditor' to 'Validation/Verification Body'

NCR 2b:

Relevant requirements: 3.3.6 of the Methodology Approval Process V3.5, request for clarification

Please remove/justify the apparent contradiction in section B.2.11 of the methodology that allows project proponents flexibility in choosing the land cover classification regime, while it appears that WWC's response suggests an automated algorithm is completely unsuitable for grasslands.

ESI Additional clarification Following Call on 12/11/2013 (Round 2)

As discussed please add the clarifying language specifying another image classification technique can be used for leakage.

WWC Round 3 Official Responses to NCR 2b

The methods described in section B.2.11 address the leakage model, and have nothing to do with the Biomass Emissions Model (BEM). There is no contradiction between our response to this question from South Pole and section B.2.11. This section of the methodology provides guidance on the methods that can be used for estimating the *activity shifting leakage* in grasslands. For the monitoring of activity-shifting leakage, a wall-to-wall, automated land cover classification would provide sufficient leakage model accuracy, as the land cover for the leakage area is stratified. This stratification will often have been accomplished using supervised or unsupervised pixel classification methods. Therefore, using the same method for monitoring has been entirely appropriate and consistent. Additionally, the leakage area to be monitored may be of a smaller size than the reference area, significantly reducing the difficulty in acquiring wall-to-wall imagery. TO clarify that Section B.2.11 addresses the activity shifting leakage model, and not the baseline model addressed by the BEM, we have added language in that section indicating that the

monitoring of landcover change in the leakage area is a separate and distinct model from that of the BEM, and therefore wall-to-wall, automated methods may be used for this particular model:

"It should be noted that the activity-shifting leakage model is separate and unrelated to the Biomass Emissions Model (BEM), and we suggest this choice of remote sensing classification types only for the activity-shifting leakage model. As stated in section 6.8.6, the Biomass Emissions Model does not support automated, pixel-by-pixel classification techniques, and project proponents should not attempt to replace or sidestep manual image interpretation for the BEM with an automated process such as a maximum likelihood or nearest neighbour classifier."

ESI Round 3 Official Findings to NCR 2b

ESI accepts this response and additional clarifying detail to the methodology as sufficient to address NCR2b. Finding closed.

NCR 2c:

Relevant requirements: 3.3.6 of the Methodology Approval Process V3.5, and VCS Standard 3.4 Section 4.1.6.

Please provide an accuracy standard threshold for project proponents as guidance in the methodology. The GOFC-GOLD Sourcebook suggests 80-95% accuracy for medium resolution imagery and refers to Section 5 of the 2003 IPCC GPG-LULUCF where Approach 4 of section 5.7.2 specifies remote sensing "can be quite accurate, but ground truthing is needed to improve result accuracy". The IPCC guidance in section 2.4.4.1 also recommends ground points for accuracy verification as good remote sensing practice.

ESI Additional Clarification for NCR 2c Following Call on 12/11/2013 (Round 2)

- Please provide example SOP's for more clarity on how sample points are discarded, and more clarity on how grasslands seasonal characteristics are distinguished by a trained analyst.
- Please add clarifying language to methodology to ensure that the project proponents are adding these criteria in their project level SOP's for discarding sample points, and how they are discerning between seasonal grassland changes.

Add language to methodology in section 6.8.5 to clarify the inclusion of grasslands into the determination of sample size. If the current determination method does include grasslands, please provide evidence that this level will accomplish a reasonable level of accuracy. Evidence could be presented in the form of some analysis (e.g. WWC tests run in Kenya mentioned during discussions) comparing interpretation of the imagery to what is actually on the ground (provide a goodness of fit statistic, such as r^2 or what is common in published literature).

WWC Round 3 Official Responses to NCR 2c

Wildlife Works accepts this NCR with minor caveats, as explained below. Each subsection of the NCR is addressed separately:

a. Minimizing Uncertainties in the BEM

To address the concern by the auditor that BEM model accuracy is overlooked, or perhaps inadequately addressed, we offer the fact that in Section 6.8.9, titled "Minimizing Uncertainty", a protocol for interpretation (SOP) is required to be developed and presented to the auditor. The requirement is ensured by PDR.63 "A protocol for interpreting land cover state from imagery." Additionally, an extremely integral and robust part of the BEM process is the identification of "problem points", which as previously described to the validator, represent temporal land cover transitions that are assumed to be physically impossible (e.g. a point that transitions from unconverted to converted and then back to unconverted in a matter of a few years). The Wildlife Works GIS toolbar contains a tool which automatically flags these points for review. Wildlife Works actually reviews each of these flagged points and "fixes" them, ensuring plausible temporal transitions. This is performed by an independent analyst. The results of this check are ensured in PDR.65 "Evidence that systematic errors, if any, from the independent check of the interpretation were corrected."

Wildlife presents our version of the aforementioned SOP for the auditor's consideration. We note that the SOP cannot be integrated into the methodology, because SOPs are specifically appropriate for individual ecosystems, and they also should vary from proponent to proponent, depending on the particular organizations implementation of the BEM model. In addition, we present to the auditor an excel spreadsheet containing the "problem points" and their "fixed" status for the Kasigau Corridor REDD+ Project, Phase II. These points were independently verified by the project validator, and it was deemed an adequate and robust way to ensure classification accuracy.

b. Additional requirements for the image interpretation protocol (SOP)

To address the confusion concerning the validator's statement requesting clarifying language to the methodology to ensure that the project proponents are adding these criteria in their project level SOP's for *discarding sample points*, and how they are discerning between seasonal grassland changes: Section 6.8.7 "Discarded Sample Points" addresses the fact that the BEM model must ignore points in the first image (oldest image) which are classified as "converted" or "built-up", as they would otherwise never transition through conversion, and are therefore irrelevant to the model (note that points classified initially as "cloud" or "no image" could still go through the conversion process in later years, and should therefore not be discarded). The Wildlife Works tool that automatically calculates weights and outputs points into a .csv file for input into the logistic regression (export to text file tool) automatically discards these points. To provide more clarity in the methodology, we agree to add the following verbiage to section 6.8.7: "The Wildlife Works export to text file tool automatically discards sample points whose initial observations were converted or built-up, as they are of no use to the BEM model."

Additionally, the weighting function takes into account when a particular point observed at a particular time should not be applied to the weighting scheme (e.g. if the point is classified as cloud or no-image). This function, however, is "baked in" to the weighting equation. Weights are not selected manually by the project proponent… rather, they are applied according to the process described in section A.1.1 "Probabilities and Weights for Conversion State." The weighting function is intended to remove bias that would be present due to non-uniform

observation of imagery and/or spatial non-uniformity. The weighting equation(s) reference both temporal and spatial observation bias (see equations A.2 and A.3). In this sense, the fact that some points were classified as cloud or no-image cause them to not be included in the weighting equations, but these points are never removed from the model. Figure 16 explains how the weighting function treats such points. We have included an example of a project's BEM data, including calculated weights for each point that was classified. This function is also performed in the export to text file tool.

1. Wildlife Works' official BEM SOP ('Image Classification Protocol grassland.pdf'): "How to use the Wildlife Works toolbar Grassland.pdf"

2. BEM summary file for the Cambodia Samlout REDD+ Project ('Samlout_BEM.xlsx'). In this file, we include three tabs (1 – "Status". The percentage of each land cover class for each year analyzed, 2. - "ImageList" A list of all images used for the BEM, 3. – "Samlout_ProblemPT" A list of 'problem points' and the ensuing 'fix' that was made to the BEM grids)

3. BEM data (including weights) for the Kasigau Corridor REDD+ Project, Phase II ('output_final2.xlsx'). This spreadsheet contains the actual data that is entered into the logistic regression. Columns 1, 2 and 3 contain the timestamp, land cover state (converted or unconverted) and calculated weight for each observed point. Time is expressed in number of days before present day. The other columns were added after insertion into the BEM for our own testing purposes and should not be considered to be essential input data for the BEM regression.

Please treat all of these files as proprietary and confidential.

c. Evidence that conversion of grassland can be identified using 30m imagery

To address the issue of proving that natural and converted land cover can be distinguished using 30m data (which is the lowest spatial resolution allowable for use with the BEM), we submit the following example from southern-central Kenyan grasslands. In this infamous grassland area (the Serengeti), we have included an example where shape, texture and/or context was clearly used to identify area(s) of anthropogenic conversion. A high-resolution image of the same area is included for comparison purposes:

Landsat Image from southeastern Kenyan grasslands where conversion can be easily identified using shape, texture and context. Here, the dot which fell on a converted area was classified as "converted" and shown in red.

High-resolution imagery covering the same area as depicted above. The area can clearly be seen to be grassland, with some areas of conversion to agriculture. Identical areas are circled.

d. Evidence that grassland is included in the determination of sample size

Sample size is currently determined, as discussed with the validator on a call which took place on 12/12/2013, using a pilot sample of approximately 300 points. From this pilot sample, a Horovitz-Thompson estimator is used to estimate variance from the categorical variable that represents land cover state (equation F.13), and then ultimate BEM sample size is then determined using equation F.12, which estimates minimum sample size based on the assumption of a normal approximation and a confidence level at 90% with a threshold of +/- 1% of the estimated mean. We then divide the sample size in half because at least double-coverage of each point was required to estimate the sample size (see description of equation F.12, pg. 181 and Lohr, 2009). To address the validator's concern, this estimation treats all ecosystems identically, and assumes that grassland can be discerned as well as forested land and converted land. We specifically look for only two land-cover states: unconverted and converted, when estimating sample size. Therefore, because we don't believe that the depiction of conversion of grassland is any more difficult that the conversion of forested land (see above), we contend that the determination of sample size includes grassland already, and is therefore appropriate as currently written.

e. Evidence that inclusion of grassland includes achieves reasonable accuracy in the BEM

Once again, as we contend that conversion of grassland is essentially as accurate as conversion of forested land (because we use shape, texture and context, rather than the spectral response, which would be subject to confusion between seasons), we feel that the current method for

determining accuracy of the BEM adequately addresses a conversion model that includes grassland. As evidence, we submit the data and subsequent result using the uncertainty model currently used in VM0009 for an area of grassland that we have analyzed in southern Kenya. A map is included of the area for which the data was collected. The data, and uncertainty results are included in an excel spreadsheet. The resulting uncertainty (variance) from this dataset, using equation F.13 is: 0.111115346, a value when compared to multiple other BEM models we have performed, is on the low end. (BEM variance for the Kasigau Corridor REDD+ Project: 0.335770609, BEM variance for the Lac Mai Ndombe REDD+ Project: 0.354015901). This implies that the inclusion of grassland does not present unusually high uncertainties into the BEM model. To estimate uncertainty in the BEM, we use equation F.14, which uses the variance from the BEM multiplied by the current measured baseline emissions and then divided by the square root of the total number of samples. This estimate of uncertainty is derived from Lohr, 2009. The premise for this method of uncertainty estimation is that any large sample population should follow a normal distribution. The greater the deviation (variance) from a normal distribution, the greater the model bias, and therefore, the higher the estimated uncertainty.

It is extremely important to note that the BEM is a statistical sampling method, in which it is assumed that the analyst's ability to identify ground features based on shape, texture and context is essentially perfect (a human being is assumed to be able to recognize shapes without error). For this type of model, a user's and producer's accuracy cannot be determined from an error matrix which compares estimated pixel values and "truth" pixel values, because there are no "pixel values" in the BEM. It is a formal statistical sampling method, which uses a large sample population to estimate a deforestation rate throughout time according to a temporal logistic pattern. The data collected is categorical in nature, and sample values can essentially only be one of two values (converted or unconverted). It is therefore not appropriate to measure uncertainty in the model using traditional pixel-by-pixel measures. Estimation of uncertainty for a categorical statistical population is most accurately estimated by examining the variance of that population from a normal distribution, because as mentioned above, this variance represents systematic bias in the model, which in a large population represents uncertainty in the model. The following files address the issues discussed above:

1. Map of the "Ranch Core" stratum for the Chyulu Hills project reference area in Kenya. This area consists mostly of Serengeti grassland savannah ('RanchCore.pdf).

2. Excel spread sheet containing the data from this BEM, as well as result from Equation F.13, calculation of variance for the BEM ($\widehat{\sigma}_{EM}$ = 0.111115346) ('RanchCore_2.xlsx'). As mentioned above, this result is fairly low in comparison to results from equation F.13 from other BEM's that Wildlife Works has performed.

f. Addressing an accuracy threshold and excerpts from the GOFC-GOLD guidance

This NCR does not seem to be specifically related to the addition of grassland into the methodology, as the uncertainty model applies to all carbon pools and baseline types. The uncertainty model has been implicit in VM0009 since it was first written, and was validated with the first edition. That said, we offer the following explanation about the uncertainty model:

The uncertainly threshold for VCS projects is calculated using equation F.57, and described in Section 8.4.1.1. F.57 essentially involved the summing of all uncertainties calculated for individual models, and if the total uncertainty exceeds 15%, the percentage uncertainty over 15% (i.e. measured uncertainty – 15%) is multiplied by measured net emission reductions, and that amount is then deducted from overall original NERs. This is a standard confidence deduction as required by the VCS AFOLU requirements. As stated in 8.4.1.1, overall uncertainty deduction is not a propagation of errors. This is because the various errors are calculated separately and individually for each applicable model. Which model was subject to uncertainty calculation was determined and negotiated with the validator of the first edition of the methodology, and to re-hash the decision about which models deserve to contribute to the overall uncertainty model would be highly redundant and inappropriate at this stage.

As described above, the BEM itself does not involve a typical error matrix or an evaluation of User's and Producer's accuracy. Therefore, the industry standard accuracy thresholds, such as those found in Congalton et al, cannot be used for the BEM model. As stated above, the accuracy of the BEM is a measure of the standard error of the mean observed cumulative deforestation in the spatial domain during the historic reference period based on a Bernoulli model of state observation. This type of observation is a commonly used estimator for the precision of the mean in *sample surveys*. The BEM is a sample survey, not a pixel-by-pixel analysis… the data that is collected for the BEM model does not represent pixel values at all… the data is a sample population that contains categorical data. The appropriate way to estimate accuracy in such a model is to observe deviation from a normal distribution, which the Horovitz-Thomson estimator does. This uncertainty is summed with uncertainties from the biomass estimation in the project area, total uncertainty in the estimation of carbon stocks in the proxy area and carbon stocks in the project area to yield total confidence deduction (over 15%) for the project. In short, we are unable to present a threshold for accuracy for the BEM like that which was cited by the validator from the GOFC-GOLD guidance.

In addition, we believe the reference to the 2003 IPCC GPG-LULUCF guidance was taken out of context and therefore slightly misrepresented: Continuing to read section 5.7.2 of the IPCC guidance quoted by the validator above, it states "It is also important to bear in mind that although remote sensing will in many cases readily detect changes in land cover (e.g., from a vegetation cover to bare ground), it may not always provide adequate and accurate information on changes in land use or vegetation types (e.g., from Crop A to Crop B). For example, *detecting clear-cuts in forests based on remotely-sensed data alone is relatively easy*, *but it is more difficult to distinguish whether these are part of on-going forest management or represent deforestation* …." We feel that in considering the entire statement from IPCC 2003, our method is actually substantiated, in that it actually suggests that remote sensing should be able to detect changes in land use i.e. *state changes* from forest (or grassland) to converted, but that it is the *gradations within the state* for which ground truthing is needed (i.e. changes in crops or forest *degradation*). The second section that is referenced, 4.4.1, states that ground truthing is "good practice" when relating land cover to land use. We don't actually determine land use in the BEM. Rather, we actually determine *land cover*, which the IPCC document doesn't specifically recommend ground truthing for.

ESI Round 3 Official Findings to NCR 2c

Relevant requirements: 3.3.6 of the Methodology Approval Process V3.5, and VCS Standard 3.4 Section 4.1.6.

No action is required for NCR 2c, all concerns have been addressed and are further discussed:

Clarifying language for discarding sample points and additional explanation on the weighting function used to remove bias sufficiently addresses that part of the NCR. WWC also sufficiently explained the statistical background for deriving uncertainty deductions in the remote sensing methods. The additional language at PDR.63 in Methodology section 6.8.9 is appropriate to address the South Pole comment on seasonality detection by requiring project proponents to account for seasonality in the development of remote sensing analyst SOPs.

Discerning non-native grassland using shape, texture, and/or context with 30m resolution imagery is still unclear from the examples given. A good example is a blue dot in the upper left hand of the 30m image, the area is actually converted when compared. But the colour, texture, and context would indicate that is an area similar to blue areas in the right side of the same image which are unconverted. However, WWC has supplied ample evidence to support their remote sensing "heads up" approach and are sufficient to address interpretation concerns with medium resolution imagery.

It is the understanding of ESI that a classified point estimate is not really a point, but a representation of a sample location and classification would largely depend on image resolution for the area of classification. In cases where systematic incorrect recognition of shape or texture occurs among interpreters, the aggregated uncertainty (uncorrected classification errors) might result in gross over/under estimations of baseline emissions. It also seems possible that improper sample sizes can be determined from the pilot sample variance due to incorrect initial classifications. Given the inherent difficulty in grassland change detection using 30m imagery, the assumption that an analyst(s) is always able to detect shapes may not always reasonable. The use of an independent reference dataset eliminates both the need for normal distribution assumptions around variance and gross over/under estimations of uncertainty.

The following methods currently in the methodology are sufficient to address the aforementioned concerns and within the scope of this assessment: a) The internal collaboration check between 2 separate interpreters b) Land cover variability should be captured by the very large number of sample points c) Observation data must be checked for consistencies (i.e discarded points) and d) The VCS verification process can identify possible gross interpretation errors.

To clarify WWC comments to the 2003 IPCC GPG-LULUCF guidance document section 5.7.2, ESI interprets the following statement: "it may not always provide adequate and accurate information on changes in *land use* or *vegetation types"* as where vegetation type is likely to change from grassland conversion. Looking at converted and unconverted grasslands is more similar in discerning between crop A and crop B than it is in trying to locate deforestation.

To clarify WWC comments to the 2003 IPCC GPG-LULUCF guidance document section 2.4.4.1, land use and land cover can be related (see footer 25 in section 5.7.2) and ESI interprets it to

mean that good practice of remote sensing data makes use of ground reference data in vegetation cover that that is known to be easily misclassified.

In conclusion, no action is required.

OFI: ESI recommends requiring project proponents to use a higher resolution for grassland detection than the current minimum specified.

NCR 2d:

Relevant requirements: 3.3.6 of the Methodology Approval Process V3.5, and VCS Standard 3.4 Section 4.1.6.

Please provide evidence that the weighted variance method for assessing accuracy of the point sampling is appropriate for use in delineating converted grasslands and describe how possible subjectivity in choosing weights is addressed? It does not appear common to use the weighted variance method in REDD projects. Congalton and Green (1999) suggest that this method has not received widespread attention because of the need to select appropriate weights. The methodology does not seem to indicate whether project proponents are able to manipulate the weight which has the potential to introduce a large amount of subjectivity.

ESI Additional Clarification Following Call on 12/11/2013 (Round 2)

Please see requests for NCR 2c

WWC Round 3 Official Responses to NCR 2d

Wildlife Works accepts this NCR, although we fail to understand the nature of the non-conformance. We believe that the description of the uncertainty model applied to the BEM above adequately addresses this request. Additionally, the validator suggests that the weights for the data are somehow “selected” by the project proponent, and that this selection might introduce subjectivity into the model. In fact, the weights for the BEM are not selected, but calculated using equation A.6. Again, we feel that the calculation of weights for the BEM is not at all specific to the grasslands addition to the methodology, and therefore need not be re-evaluated. However, in the interest of clarity, weights are calculated based on the observations of points throughout space and also throughout time. They are not in any way selected by the proponent. In the BEM model, the weights, which sum to 1, represent the probability that each point will be observed in space and time. There is no subjectivity involved in the calculation of the weight for each point.

ESI Round 3 Official Findings to NCR 2d

ESI accepts this response from WWC and the reconfirmation of methods used to derive uncertainty deductions. Finding closed.

OFI: During the initial pilot sample phase of the remote sensing process, ESI suggests requiring project proponents to use an independent reference dataset to verify the quality of classifications using conventional remote sensing accuracy assessments (i.e. error matrices).

NCR 2e:

Relevant requirements: 3.3.6 of the Methodology Approval Process V3.5, and VCS Standard 3.4 Section 4.1.6.

Please provide evidence to demonstrate that the point sampling method for classification of grassland ecosystem conversion is robust enough to be applied in all areas applicable under the methodology.

ESI Additional Clarification Following Call on 12/11/2013 (Round 2)

Per our discussion, please provide your approach used in Kenya for ESI review.

WWC Round 3 Official Responses to NCR 2e

Wildlife Works agrees to provide an example of a BEM used for a very large extent analysis. We conducted a BEM for our upcoming Chyulu Hills model in Southern Kenya. The reference area for this project was selected to be identical to our estimate of a reasonable Jurisdiction, as we assume this project will eventually be nested into a Jurisdictional approach (JNR). We wanted to ensure that the reference emission level (REL) was similar to the REL that we would need to use when nested into the Jurisdiction. That said, the reference level encompasses 5 Kenyan counties, covering over 6.7 Million hectares and a diverse list of land use and land cover regimes. We feel that the success of the BEM model in this area, which contains a very large portion of grassland, proves that the BEM does work in larger, more diverse locations. To summarize the work done so far on the Chyulus BEM, we present the following files:

1. A map of landcover in the Chyulu Hills reference area ('Chyulus_BEMstrata1.pdf')

2. A map indicating the sample points used for sampling the various land-use strata (we have an algorithm for determining the grid spacing density based on a pilot study which determines variance within each strata) ('Chyulus_BEMStrata_Grids.pdf)

3. A progress report of the interim results for the completed strata. This file shows summary statistics for the different "areas" that were made anonymous for the purposes of ensuring random and unbiased sampling from the analysts. This program saw 7 separate analysts who collected data for over 90,000 sample points (~13,300 points over 7 years of imagery). ('SEK BEM Project Progress Report_12.20.2013')

4. Point data, weights and calculated variance for the Ranch Core land-use strata, which happens to contain primarily grassland. (see also answer for 2c) ('RanchCore_2.xlsx').

ESI Round 3 Official Findings to NCR 2e

ESI accepts this response from WWC and the materials supplied to the assessment team are sufficient to address the NCR. Finding closed.

NCR 2f:

Relevant requirements: 3.3.6 of the Methodology Approval Process V3.5, and VCS Standard 3.4 Section 4.1.6.

Please provide additional evidence that a trained analyst can distinguish temporal differences consistently and accurately in grasslands. ESI agrees that seasonal variability in grasslands is difficult to detect (See Guo et al. 2003).

ESI Additional clarification Following Call on 12/11/2013 (Round 2)

Please see requests for 2c

What Guy or Eric really means here is that can an analyst detect land cover despite seasonal variations. This NCR is reasonable and within in the scope. The South Pole question does specifically question the ability to discern conversion despite seasonal variation. The difference is that South Pole's question was from the perspective that the classification of conversion was through pixel-based spectral analysis. Guy has indicated that providing examples of our SOPs, clarifying language in the Meth around how project developers create their SOPs in regards to detecting seasonal variation, and supplying the Chyulus BEM would answer this NCR.

WWC Round 3 Official Responses to NCR 2f

Wildlife Works accepts this NCR. It is a very important for an analyst to be able to correctly classify conversion in a grassland system, and Wildlife Works has instituted several safeguards to ensure proper image interpretation. Seasonal variation may provide additional complexity in the consistent interpretation of imagery, as the converted or unconverted state may present similar spectral response (and therefore "color" to the human eye). However, with regular and robust training and resources, our analysts have been able to consistently and accurately classify the landcover state despite any seasonal variation. The Wildlife Works Image Interpretation Protocol provides guidance and examples for analysts to consider if a portion of an image presents challenges due to seasonal variations. We have supplied this Protocol to the validator for evidence of this guidance. Wildlife works has also added additional language to the methodology to ensure that project developers are including this guidance into their required image interpretation protocols. Please see PDR.63, for which 3 additional requirements have been added to clarify the information that must be included in the image interpretation protocol.

As stated above in our response to NCR (2c), we have provided the file 'Samlout_BEM.xlsx', which shows the summary results from the BEM for our Cambodia Samlout REDD+ Project. In this file, we include three tabs (1 – "Status". The percentage of each land cover class for each year analyzed, 2. - "ImageList" A list of all images used for the BEM, 3. – "Samlout_ProblemPT" A list of 'problem points' and the ensuing 'fix' that was made to the BEM grids). This BEM provides evidence of our ability to determine landcover state despite any seasonal variation. If the analyst had incorrectly determined a state due to seasonal variation, this would be reflected in the problem points identified by the Toolbar software. The analyst then goes back to correct these problem points. The following files are submitted, as referenced above:

1. Samlout Cambodia BEM summary statistics, including "problem points" and their corresponding "fixes" ('Samlout_BEM.xlsx').

ESI Round 3 Official Findings to NCR 2f

ESI accepts this response from WWC and the materials supplied to the assessment team are sufficient to address NCR 2f. The extra guidance provided for interpretation of seasonal variations and the treatment of problem points is sufficient to address the assessment team's concerns. Finding closed.

Public comment 3.

The posterior land use change of grassland to "non-grassland" is not clearly defined. A more precise definition of post-grassland land uses and their assumed carbon stock differences should be made more explicit.

WWC 1st Response

In this current revision to VM0009, Wildlife Works has strived to produce a methodology that is broadly applicable to a diverse set of geographic and ecological regions, as well as drivers of conversion. As such, we must broadly define the many land-use states applicable to a range of baseline scenarios, ensuring that no projects are disqualified by accidental exclusion. We clearly define in the methodology the characteristics of "grassland" and "native grassland" in Section 3, (Definitions).

However, we do agree with the commenters that the definition of the "posterior" or converted state for the grassland/shrubland ecosystem is not well defined in VM0009. We currently define the converted grassland/shrubland state as an observable increase in Net Present Value (NPV). Upon further review, we feel that this definition is too broad, and also cannot be visually interpreted using remotely sensed imagery, something that is absolutely required in order to engage the BEM model for the baseline scenario. We firstly propose to strike the current definition of converted grassland / shrubland. We further propose to add the following definition for the converted grassland / shrubland:

"Grassland and shrubland conversion shall be defined as, and limited to, the conversion of grassland or shrubland in its natural state to one of anthropogenic use. This includes the land-use categories of agriculture, development (including housing) or other anthropogenic land-use discernable from remotely sensed imagery. Conversion to grazing lands and/or pasture shall not be included in the grassland/shrubland converted category, for the following reasons:

- In some cases, cattle or other crazing results in increased carbon stocks. It is furthermore conservative to exclude pasture/grazing lands from the converted category.

- Pasture/grazing lands are highly difficult to identify using nominal remote sensing techniques, and would thus prove impossible to recognize with the BEM model.

The conversion of natural grassland / shrubland should be discernable using the same techniques as used for REDD/IFM type baseline models. Pixel pattern, texture and context

should be employed to delineate anthropogenically converted grassland / shrubland from its natural state, just as deforested areas are delineated from natural forest within the BEM."

ESI Findings Round 1

Relevant requirements: 3.3.6 of the Methodology Approval Process V3.5

ESI accepts this response and methodology amendments as sufficient to better define grassland conversion and address the public comment.

Public comment 4.

Already from the anterior version of the methodology, v2.1, the calculation of baseline carbon stock change from avoided planned deforestation in baseline types F-P1 is vaguely defined to be based on "results of the PRA or expert knowledge" (page 64). While other Avoided Planned Deforestation methodologies determine planned deforestation baseline emissions by very detailed harvesting plans, VM0009 is giving a very broad spectrum including in transparent data hard to verify independently.

WWC 1st Response

We believe that this comment was made due to a misinterpretation, or possible misreading of the methodology. Firstly, Wildlife Works is unsure which section the commenter is referring to in the methodology. The commenter states that "in baseline types F-P1 is vaguely defined to be based on 'results of the PRA or expert knowledge' (page 64)." However, the section on page 64 of the VM0009, v3.62, which is the public comment version of the methodology, is Section 6.10. This section describes one of the parameters that eventually gets used in the calculation of F-P1a (as well as the newly added F-P1b) baseline type. However, this parameter in no way fully defines all of the inputs to the F-P1 baseline scenario. It is true that the parameter described in the section to which the commenter refers, tsa, may be determined using "the results of the PRA or expert knowledge", but this is but one of the many parameters required for the calculation of Carbon Stock changes for the F-P1 baseline scenario. It is therefore entirely unclear what the exact assertion for this comment is.

In the section which does describe how Carbon Stock changes are calculated for the F-P1 baseline scenario (avoided planned deforestation), which is Section 6.14 (page 67 in VM0009, v3.1), we state that "The project proponent must estimate m using timber harvest plans, if available, which apply to the project accounting area and were developed by the specific agent of deforestation under the baseline scenario. In the absence of timber harvest plans, m may be conservatively determined from the measurement of carbon stocks in merchantable trees in the project accounting area using equation [F.1]…" The m parameter represents the amount of carbon in merchantable trees that are harvested each year under legally-sanctioned commercial logging. This parameter is then incorporated into the BEM, which is developed from historic imagery of a reference area.

In short, we don't believe, nor do we assert in VM0009, that an avoided planned deforestation scenario could be defined simply from the "results of a PRA or expert knowledge." We believe that the methodology adequately calculates all parameters and inputs to a robust NER model that

describes the F-P1 scenario. This is described in multiple subsections under Section 6, but most importantly, in Section 6.14, in which the determination / calculation of Carbon Stock changes under the avoided planned deforestation scenario, is carefully described.

ESI Findings Round 1

Relevant requirements: 3.3.6 of the Methodology Approval Process V3.5

ESI accepts this response from WWC that describes the determination of carbon stock changes in the F-P1 scenario as sufficiently detailed to address the concerns of the public commenter.

3.3 Structure and Clarity of Methodology

The methodology element has followed a unique approach to designing the structure as compared to other REDD and ACoGS methodologies. The document contains all information necessary for project implementation and notably absent are modules, which can be invoked depending on the project scenario. The body of the document is absent of equations and background information. In this manner, the complexity of accounting procedures has been re-located to the end of the document. Hyperlinks interspersed throughout the document are intended to aid in efficient equation and term definition retrieval.Due to the approach taken by the methodology developers in structuring the document, the VCS template has, in large part, not been followed. The terminology used in the methodology revision is consistent with the VCS Program and GHG accounting and language chosen is precise. Specific key terms were used appropriately; must, should, and may to indicate a firm requirement and permissible or allowable options, respectively. The notation of the methodology makes sufficient use of VCS rules and procedures. Overall, it is of the assessment team's opinion that the structure of the document meets the strict requirements of the VCS Program. Opportunities for improvement are offered in items 22-29 of the detailed findings in Appendix A.

Though the spatial analysis approach required by this methodology has not been validated in peer reviewed publications, it has successfully been used within previous projects implemented by the project developer. Verification of the accuracy of 100% human interpretation may be challenging for validation/verification bodies to achieve, as the methodology does not use ground points for accuracy verification (which is recommended by the IPCC guidance in section 2.4.4.1 as good remote sensing practice for automated image analysis). Instead, the methodology assumes that human interpreters are 100% accurate while analyzing a subset of the landscape. This assumption may not always be reasonable in the case of highly variable land covers. To address this, the methodology requires the development and application of appropriate SOPs such as training and internal testing which when combined with confirmation by the project verifier that the image resolution is sufficient and resampling of a subset of the human interpreted points, serves to reduce concerns for error.

Definitions

The key terms defined in the methodology element are presented clearly and appropriately in a definition section at the beginning of the document for ease of use by project proponents. The comprehensive list of terms relevant to the methodology is ordered alphabetically and definitions

for acronyms are provided. Definitions of key terms are presented concisely and assist the reader in comprehension for effective implementation of the methodology.

3.4 Applicability Conditions

The methodology includes the following applicability conditions to ensure adherence to VCS rules and requirements, and to address specific issues that arose in the methodology assessment process. A key applicability condition of this methodology is that project proponents must conduct surveys to predict the likelihood of unplanned conversion activities, or show proof that similar conversion is occurring near the project area.

The first assessment determined that the applicability conditions contained within the methodology are appropriate, adequate and in compliance with the VCS rules (Table 4). The results of the assessment are summarized:

Applicability Conditions	**Assessment Team Findings**
1. Project must pertain to avoidance of land use conversion of forest and grassland ecosystems. The drivers and agents of conversion in the baseline scenario must be consistent with those described in section 6 of this methodology and the end land use in the baseline scenario is non-forest or converted grassland. Project activity must be APD or AUDD for forested project accounting areas and APC or AUC for grassland project accounting areas	The condition is consistent with sections 4.2.9.1, 4.2.9.2, and 4.2.15 of the AFOLU Requirements and with the scope of the methodology. This applicability condition is entirely appropriate and written in a concise manner for project proponents to assess if conditions are met. During the period of project validation this criteria sufficiently ensures that the project will remain avoiding land use conversion of forest and grassland ecosystems.
2. Project accounting areas shall have been in an unconverted state (*i.e.*, forest or grassland) for at least 10 years prior to the project start date according to:	This condition is consistent with AFOLU Requirements sections 4.2.5, 4.2.10 and with the scope of the methodology. It is written in a clear and concise manner so as to allow for effective determination of whether a project activity meets the condition.
a. Qualifies as forest on average as defined by FAO or national authority	This condition is consistent with AFOLU Requirements section 4.2.5 that “The project area shall meet an internationally accepted definition of forest, such as those based on UNFCCC host-country thresholds or FAO definitions”.
b. Land in all grassland project areas qualifies as native grassland	This condition is consistent with AFOLU Requirements section 4.2.11 that “The project area shall be native grasslands”.

3. Baseline type unplanned project areas require a conversion threat of two types:	An unplanned conversion threat in the baseline is determined by a) conversion probability survey, or b) confirmation of a point within 2 km of the project boundary perimeter of the same conversion threat. It is written in a clear and concise manner so as to allow for effective determination of whether a project activity meets the condition.
a. Imminent conversion threat as predicted by a survey. Moderate risk defined as when more than 60% of respondents predict the end land use identified in the baseline scenario	A Participatory Rural Appraisal is used to help identify unplanned conversion risk by using a questionnaire of the local people. The inclusion of Appendix E ensures this condition is adequately clear and precise.
b. As of the project start date, some point within 2 kilometer of the perimeter of the project accounting area has been converted to the end land use identified in the baseline scenario	If imminent threat of conversion is detected from a) the conversion probability model or b) conversion survey, then this point confirms the baseline unplanned conversion type.
4. In the case of baseline type F-U1, at least 25% of the project area boundary is within 120 meters of deforestation and at least 25% of the project area boundary is adjacent to the reference area	Not applicable to current methodology revision as this baseline type has been previously validated.
5. In the case of baseline type G-U1, at least 25% of the project area boundary is adjacent to the reference area	The unplanned conversion (AUC) of grasslands is determined by percent perimeter in proximity to reference areas and divided into types G-U1 and G-U2. This is well illustrated in Figure 1 (baseline determination decision tree) of methodology.
6. In the case of baseline type F-U2, at least 25% of the project area boundary is within 120 meters of deforestation	Not applicable to current methodology revision as this baseline type has been previously validated.
7. The project accounting area(s) shall not contain peat soil	This condition is consistent with AFOLU Requirements sections 4.2.11 and with the scope of the methodology.

8. For each project accounting area, a reference area can be delineated for each baseline type in the baseline scenario that meets the requirements, including the minimum size requirement, of section 6.8.1 of this methodology	Not applicable to current methodology revision as this baseline type has been previously validated.
9. As of the project start date, historic imagery of the reference area(s) exists with sufficient coverage to meet the requirements of section 6.8.4 of this methodology	Not applicable to current methodology revision as this baseline type has been previously validated.
10. Project activities are planned or implemented to mitigate ecosystem conversion by addressing the agents and drivers of conversion as described in section 8.3.1 of this methodology	Primary and secondary agents and drivers of conversion are well-defined for determination of the baseline scenario. This applicability condition is written in a clear and concise manner to ensure project compliance.
11. The project proponent has access to the activity-shifting leakage area(s) and proxy area(s) to implement monitoring (see sections 8.3.2.1 and 6.4), or has access to monitoring data from these areas for every monitoring event	Not applicable to current methodology revision as this baseline type has been previously validated.
12. If logging is included in the baseline scenario and a market-effects leakage area is required per section 8.3, then the project proponent has access to (or monitoring data from) the market-effects leakage area if measurement is needed (see section 8.3.3)	Not applicable to current methodology revision as this baseline type has been previously validated.
13. This methodology is applicable to all geographies, however if SOC is a selected carbon pool and the default value from section 6.19.2 is selected then the project must be located in a tropical ecosystem	This condition establishes the geographic (i.e. socio-economic, climatic, energy and electricity related emission factors and additionality) scope of validity by ensuring conservativeness in applying data from one geographic area to another. Conformance is demonstrated by proper selection of SOC carbon pools in tropical ecosystems.

14. If livestock are being grazed within the project area in the project scenario, there shall be no manure management taking place, as emissions from N2O as a result of manure management are not quantified or addressed in this methodology.	This condition is consistent with AFOLU Requirements section 4.3.19 that "Where grazing occurs in both the baseline and project scenarios, net changes in CH_4 and N_2O associated with grazing may be deemed *de minimis* and excluded in accordance with Sections 4.3.3 and 4.3.4"

Table 4. Applicability conditions and assessment team findings.

3.5 Project Boundary

The VCS Standard requires that the methodology establish criteria and procedures for describing the project boundary and identifying and selecting optional carbon pools, i.e. sources, sinks, and reservoirs relevant to the baseline and project scenarios. Procedures are included in the methodology to quantify emissions for all carbon pools and sources included within the project boundary that can demonstrate significance in using the appropriate VCS tools.

The methodology addresses the establishment of spatial, temporal, and gaseous boundaries to meet VCS AFOLU Requirements for REDD and ACoGS project categories and applicable to APD, AUDD, APC, and AUC project scenarios. Mandatory and optional pools (Table 5) in this methodology are appropriate for planned and unplanned conversion of forests or grasslands to non-forest and grassland to a non-native state.

The spatial boundaries in this methodology were assessed for conformance to the VCS rules and found to be sufficiently detailed, appropriate, and adequate for project scenarios and in compliance with AFOLU Requirements section 4.2.14. Similarly, temporal boundaries were reviewed within the context of VCS rules and found to detailed and sufficient. The methodology further defines temporal boundaries as the period of time when degradation, deforestation, and conversion in the project area are mitigated by project activities. Significant sources of gaseous emissions accounted for are in compliance with AFOLU Requirements sections 4.3.19, 4.3.20.

The methodology allows for flexibility in selecting carbon pools depending on forest or grassland projects and extent of demonstrable conservative exclusion. The following table presents a brief review of all considered carbon pools, and the assessment findings.

Pool	Included	Justification/Comments	Assessment Findings
Above-ground merchantable tree (AGMT)	Yes if baseline scenario of project activities include harvest of long-lived wood	Major pool considered when accounting for emissions from long-lived wood products	This is a sub-component of above-ground tree biomass and is consistent with Table 2 of AFOLU Requirements section 4.3.1. Allows for

	products, otherwise NOT required		distinguishing carbon-capturing long-lived wood products. This pool is appropriately optional because of the likelihood of merchantable biomass harvested by agents of deforestation.
Above-ground other (non-merchantable) tree (AGOT)	Required	Major pool considered	This is a sub-component of above-ground tree biomass and is consistent with Table 2 of AFOLU Requirements section 4.3.1. This pool accounts for non-commercially viable or non-woody above-ground biomass that is conservatively assumed to be immediately burned upon land conversion. This pool is appropriately required because of the likelihood of residual biomass left behind by agents of deforestation.
Above-ground non-tree (AGNT)	Optional; Required if baseline includes perennial crops	May be conservatively excluded; Required if baseline includes perennial crops	This is consistent with Table 2 of AFOLU Requirements section 4.3.1. This pool is appropriate where perennial crop (does not meet tree definition) residue is left on-site and pertains to grassland baseline scenarios.
Below-ground merchantable tree (BGMT)	Optional	May be conservatively excluded	This is a sub-component of below-ground biomass and inconsistent with Table 2 of AFOLU Requirements section 4.3.1. This pool is appropriate when decay from below-ground biomass is considered.
Below-ground other (non-merchantable)	Optional	May be conservatively excluded	This is a sub-component of below-ground biomass and consistent with Table 2 of

tree (BGOT)			AFOLU Requirements section 4.3.1. This pool is appropriate when decay from below-ground biomass is considered.
Below-ground non-tree (BGNT)	Optional	May be conservatively excluded	This is a sub-component of below-ground biomass and consistent with Table 2 of AFOLU Requirements section 4.3.1. This pool is appropriate when decay from below-ground biomass is considered.
Litter (LTR)	No	May be conservatively excluded	This is consistent with AFOLU Requirements section 4.3.1 under REDD project categories. This pool is appropriately excluded to be conservative.
Dead wood (DW)	Optional	May be conservatively excluded	This is consistent with Table 2 of AFOLU Requirements section 4.3.1. This pool is appropriately optional because dead wood can be conservatively excluded in forest and grassland baseline scenarios.
Standing dead wood (SD)	Optional	May be conservatively excluded	This is a sub-component of dead wood and is consistent with Table 2 of AFOLU Requirements section 4.3.1. This pool is appropriately optional because standing dead wood can be conservatively excluded in forest baseline scenarios.
Lying dead wood (LD)	Optional	May be conservatively excluded	This is a sub-component of dead wood and is consistent with Table 2 of AFOLU Requirements section 4.3.1. This pool is appropriately optional because lying dead

			wood can be conservatively excluded in forest baseline scenarios.
Soil organic carbon (SOC)	Optional	May be conservatively excluded	This is consistent with Table 2 of AFOLU Requirements section 4.3.1. This pool is appropriately optional because SOC is optional unless tropical forest (See applicability condition 13).
Long-lived wood products (WP)	No	*De minimis*	AFOLU Requirements section 4.3.1 allows for exclusion as determined by the methodology developer. This pool is appropriately excluded to be conservative in forest baseline scenarios.

Table 5. Relevant forest and grassland carbon pools.

3.6 Baseline Scenario

Procedures and assumptions for determination of the baseline scenario are developed by identifying agents and drivers of conversion and formulating a unique baseline emissions model. In other words, the baseline scenario is determined by; the baseline type, end land use, and historical patterns of conversion to develop a "Biomass Emissions Model" and "Soil Emissions Model". Detailed guidance is provided for determination of the baseline scenario using selected carbon pools and a conceptual diagram (Figure 3) outlines steps for project proponents to follow. This methodology allows for more than one baseline scenario if the project entails more than one baseline type, thus allowing for multiple project accounting areas.

The decision tree for determining the baseline type has also been expanded to include the IFM components of certain baselines. ESI assessed the appropriateness of these updates, by evaluating whether procedures used for determining the baseline are appropriate, adequate, and in compliance with VCS rules and AFOLU Requirements for ACoGS project activities. Specifically ESI evaluated:

- As per section 4.5.3 of the AFOLU Requirements (General) the methodology establishes patterns of carbon loss using carbon and decay emissions models (properly calibrated) over a period of time using appropriate pools.

- As per sections 4.3.19 and 4.4.8 of the AFOLU Requirements, the methodology appropriately accounts for methane emissions associated with grazing animals under Avoiding Planned Conversion (APC) or Avoiding Unplanned Conversion (AUC).

- As per section 4.4.9 (1, 2) of the AFOLU Requirements, the methodology requires the grassland baseline scenario to provide evidence that it meets the current definition of APC and NPV is increased. If the baseline scenario is not APC, spatial analysis (i.e. models) is required to show that the reference area is adjacent to at least 25% of the project area. In this methodology the historical conversion rate and agents and driver of conversion are determined by the reference area.

3.7 Additionality

The methodology satisfies VCS rules for providing a procedure to demonstrate additionality by requiring projects to use the latest version of the VCS "Tool for the Demonstration and Assessment of Additionality" in AFOLU Requirements. Demonstration of project additionality allows for transparent identification of baseline scenarios and encouraging conservative baseline net greenhouse gas removals by reductions. The VCS tool provides steps to assess; identification of alternative land use scenarios, investment or barriers analysis, and common practice analysis. Legality and conservativeness applicability conditions are appropriately selected to initiate the additionality tool. The methodology further requires that at least one driver of conversion be accounted for in a "common practice test" to demonstrate that the driver would not have been considered had the project not been implemented. The procedures for demonstrating additionality are appropriate, adequate and conform to VCS rules.

3.8 Quantification of GHG Emission Reductions and Removals

3.8.1 Baseline Emissions

Procedures for quantifying the baseline emissions for REDD and ACoGS project activities are determined by baseline type and selected carbon pools as per the AFOLU Requirements section 4.5.19 and described in the methodology element sections 6, 8 and Table 4. Biomass and soil organic carbon are calculated from specific models (See Section 3.7 of this report) and baseline emissions for a monitoring period are determined separately for; carbon not decayed in deadwood, carbon not decayed in below-ground biomass, carbon not decayed in soil organic carbon, and carbon stored in wood products.

Major findings related to the assessment of ACoGS category baseline emissions are presented:

- As per the AFOLU Requirements section 4.5.21, N2O emissions are conservatively omitted and described in the methodology element section 5.3, Table 2.

- As per the AFOLU Requirements section 4.5.23, the methodology element addresses uncertainty and describes methods for calculating uncertainty and how it is used for deductions. Methodology element sections 6.8.9, 6.8.10, and 8.4.1.1 adequately address the AFOLU Requirements.

- As per the AFOLU Requirements section 4.5.24, the rate of carbon stock decline before reaching equilibrium is based on proxy areas and data synthesized by Davidson and Ackerman (1993). Methodology element section 6.5.7 and Appendix A.2 adequately address the AFOLU Requirements.

The baseline emissions model approach encompasses all GHG sources, sinks, and carbon pools as specified by the delineated project boundary. Because models are tailored to the project, the number of parameters and equations are substantially reduced and result in uniform accounting. Furthermore, the baseline emissions models for biomass and soil organic carbon are robust for predicting cumulative emissions over time. The parameterizing of models in this methodology by avoided conversion baseline type is consistent with AFOLU Requirements sections 4.4.4, 4.4.7, and 4.4.9. However, model calibration and validation for the new ACoGS extension may be challenging for project proponents because of the initial complexity in model development. In conclusion, methods for calculation of baseline emissions are appropriate, adequate and in compliance with VCS rules.

3.8.2 Project Emissions

Project emissions for any monitoring period are calculated from the events of biomass consumption through fire, burning, logging or other disturbance. The methodology element specifies that carbon stock monitoring inherently captures forest fire and logging emissions, if a major disturbance occurs total project emissions reductions are permissible to be negative. Project proponents are allowed flexibility in choosing the observation method (in a timely manner) for disturbance detection.

Major findings related to the assessment of ACoGS category project emissions are presented:

- As per section 4.5.18 of the AFOLU Requirements, referencing the CDM A/R tool for estimation of fertilizer (N2O) emissions is conservative under the project scenario in the event that fertilizer inputs are large relative to the baseline scenario. Methodology element sections 5.3, 8.2.5 and Appendices H and J adequately address the AFOLU Requirements.

- As per section 4.5.20 of the AFOLU Requirements, the methodology element monitors for changes in project carbon stocks from natural or anthropogenic causes and accounts for gains or losses in the previously validated monitoring procedures. Methodology element section 9 adequately addresses the AFOLU Requirements.

Parameters and equations to calculate project emissions were checked and found to be appropriate and without apparent errors. The assessment team found that the procedures for calculating project emissions cover all GHG sources, sinks and reservoirs and are adequate and in compliance with VCS rules.

3.8.3 Leakage

This revision adds the VCS Production Approach leakage tool as the means to assessing market leakage of commodities other than wood products. This tool originally was designed to be applied to jurisdictional and regional programs, and in this case is being applied at a project level. ESI assessed that the tool is appropriate to use in the project case by ensuring that the tool was in compliance with VCS requirements and specifically focussed on aspects related to how leakage calculations would fit within the general methodology (e.g. baseline emissions model time steps, see below). Leakage is defined in this methodology element by proximity to the project area and

anticipated directional shifts in conversion activities, a strategy that differs from the more common project area leakage buffer. The leakage definition is in compliance with AFOLU requirements section 4.6.17.

Major findings related to the assessment of leakage are presented:

- Leakage in this methodology element is quantified using activity-shifting leakage area(s) and market-effects leakage area(s), where activity-shifting leakage is calculated from a Leakage Emissions Model and the optional market-based leakage is estimated from the area and default values. Methodology element sections 8.3 and 2.1.1 adequately address the AFOLU Requirements section 4.6.18. Since the baseline emissions model utilizes a daily time step and the VCS leakage tool operates a yearly time step, the market effects are conservatively assumed to occur on the last day of the year.

- As per AFOLU Requirements section 4.6.6, leakage mitigation measures for prevention of significant increases in GHG emissions is accounted for as a qualitative determination or deemed *de minimis* or conservatively excluded. Methodology element sections 4.3.3, 4.3.4 adequately address the AFOLU requirements section 4.6.6.

The methodology element is in compliance with the VCS Standard and AFOLU Requirements for REDD and ACoGS project categories: APD, AUDD, APC and AUC, and procedures for calculating leakage are appropriate and adequate.

3.8.4 Net GHG Emission Reductions and Removals

The methodology element calls for quantifying net GHG emissions reductions and removals (NERs) in each monitoring period by subtracting gross reductions and removals (GERs) from the buffer amount allocation. Uncertainty is addressed appropriately through the use of weighted standard errors of estimates from the baseline emissions models and carbon stock measurements. The methods for calculation of emission reductions and removals from methodology element section 8.3 are appropriate, adequate and in compliance with the VCS Standard, section 4.7.1.

3.9 Monitoring

The methodology element establishes criteria for monitoring by requiring project proponents to develop a monitoring plan to guide monitoring efforts and the revision now includes variables pertaining to grasslands. The scope of this assessment therefore includes new data and parameters available at validation and to be monitored (Tables 6 and 7). However, the general procedures for determining baseline emissions and emissions in the project scenario remain the same as validated and in accordance with the VCS Standard section 4.8.

The methodology element notes appropriately that data and parameters for leakage, proxy areas, and project accounting areas must be measured at a minimum of every 5 years or after a significant event that changes carbon stocks. Measurement interval is cited correctly per AFOLU Requirements section 4.5.23. The methodology element identifies default factors used which may become out of date and properly identifies those which may require periodic re-assessment per

the VCS Standard section 4.1.7. For a complete list of data and parameters refer to Appendices G and H of the methodology element.

Data and parameters available at validation

Data parameter	Assessment team findings
$\mathcal{T}$	This data/parameter was appropriately chosen because it pertains to the set of all species/categories of livestock. The methodology element specifies this data parameter in formula 43 (Cumulative project emissions due to livestock grazing within the project area). Calculations of GHG emissions as a result of livestock grazing performed using the IPCC Good Practice Guidelines and IPCC Guidelines for National Greenhouse Gas Inventories is properly justified.

Table 6. Data and parameters available at validation.

Data and parameters monitored

Data parameter	Assessment team findings
$E_{L\,ASG}^{[m]}$	This data/parameter was appropriately chosen because it pertains to cumulative emissions from activity-shifting leakage in grassland strata at the end of the current monitoring period. Formulas 44 (Total emissions from leakage for the current monitoring period) and 45 (Cumulative emissions from leakage) of the methodology element utilize this data parameter. This data/parameter is justified because leakage is accounted for in baseline and project emissions and is relevant to applicability condition 11.
$E_{P\,\Delta\,LS}^{[m]}$	This data/parameter was appropriately chosen because it pertains to cumulative project emissions due to livestock grazing within the project area and is referred to as formula 43 in the methodology element. This data/parameter is suitable because grazing can occur in the project area in the baseline scenario.
$E_{P\,\Delta\,SF}^{[m]}$	This data/parameter was appropriately chosen because it pertains to cumulative project emissions due to the use of synthetic fertilizers within the project area. It is a key data/parameter for calculation of formula 53 (GERs for the current monitoring period). This data/parameter is suitable because it accounts for direct and indirect emissions from nitrogen fertilizer applied in the project area.
$n_{LS\,i}$	This data/parameter was appropriately chosen because it pertains to the number of head of livestock species/ category *i* in the project area. The data/parameter is related to formula 43 (Project Emissions from Livestock Grazing, with default value of 21 set for conversion from tCH4 to tCO2e) of the methodology element. This data/parameter is suitable because grazing can occur in the project

	area in the baseline scenario. It is also relevant to applicability condition 11 and section 8.3 of the methodology element per AFOLU Requirements section 4.6.
$p_{L\,CON\,G}^{[m=0]}$	This data/parameter was appropriately chosen because it pertains to the portion of leakage due to grasslands prior to the first verification event. The data/parameter is related to formulas 47 (Cumulative emissions from activity-shifting leakage in grassland areas) and 49 (Leakage Emissions Model for activity shifting leakage in grassland areas) of the methodology element. It is also relevant to applicability condition 11 and section 8.3 of the methodology element per AFOLU Requirements section 4.6.
$p_{L\,CON\,G}^{[m]}$	This data/parameter was appropriately chosen because it pertains to the portion of leakage due to grasslands conversion at the beginning of the current monitoring period. Formulas 47 (Cumulative emissions from activity-shifting leakage in grassland areas) and 49 (Leakage Emissions Model for activity shifting leakage in grassland areas) of the methodology element specify this data parameter in calculations. It is also relevant to applicability condition 11 and section 8.3 of the methodology element per AFOLU Requirements section 4.6.
$p_{L\,CON\,G}^{[m-1]}$	This data/parameter was appropriately chosen because it pertains to the portion of leakage due to grasslands conversion at the end of the current monitoring period. Formulas 47 (Cumulative emissions from activity-shifting leakage in grassland areas) and 49 (Leakage Emissions Model for activity shifting leakage in grassland areas) of the methodology element specify this data parameter in calculations. It is also relevant to applicability condition 11 and section 8.3 of the methodology element per AFOLU Requirements section 4.6.

Table 7. Data and parameters monitored.

The assessment team concludes that monitoring procedures are appropriate, adequate and in compliance with the VCS rules.

4 Assessment Conclusion

Environmental Services Inc. completed the first assessment of the revisions to methodology element “VM0009: Methodology for Avoided Ecosystem Conversion”. The assessment team confirms that all activities adhere to the criteria established for this assessment and are documented and complete. ESI approved changes to the methodology and concludes without any qualifications or limiting conditions that the methodology element documentation (VM0009: Methodology for Avoided Ecosystem Conversion v3.81) meets the requirements of the: VCS Program Guide v3.5, VCS Standard v3.4, VCS AFLOU Requirements v3.4, and the VCS

Methodology Approval Process v3.5. Therefore, ESI recommends that VCSA approve the revised methodology element (VM0009: Methodology for Avoided Ecosystem Conversion v3.81) as prepared by Wildlife Works Carbon LLC.

5 Report Reconciliation

Det Norske Veritas Inc. (DNV GL) performed the second validation assessment of the proposed revised methodology element ((VM0009: Methodology for Avoided Ecosystem Conversion v3.81). A brief summary and ESI's assessment of the major revisions to the methodology by the second assessor are presented (Table 8):

2nd Assessor Revision	**Revision Evaluation by 1st Assessor**
CAR 1: Definition for "imminent conversion" is not clear and transparent, appear to suggest that a new accounting area is being created.	WWC appropriately revised the definition to affirm that the definition of "imminent conversion" applies only to the project area. WWC further elected to remove applicability condition 3a to not allow a demonstration of conversion risk by use of a model. These revisions are acceptable by ESI and appropriate to address the definition and risk of conversion.
CAR 2: Methodology is not consistent in use of definitions and parameters.	ESI agrees that inconsistencies in data and parameters due to incorporation of the ACoGS project category needed to be revised. Terminology and baseline identifiers have been appropriately revised for consistency throughout the methodology.
CAR 3: Methodology does not define unplanned degradation of grassland, nor does it exclude it from the methodology applicability conditions.	WWC recognized that it is not possible to detect grassland conversion to pasture using satellite imagery, therefore it was appropriately excluded. ESI agrees with DNV GL regarding the reduction of scope of grassland conversion given the more precise definition.
CAR 5: Incomplete methodology requirements for ACoGS project category.	ESI agrees that changes made to the methodology were appropriate and now includes all set of requirements pertaining to each and every project category covered (as required by VCS AFOLU Requirements section 4.1.3). The methodology now includes the necessary clarity in language to describe the ACoGS project category.

CAR 9: Methodology incomplete for grassland project emissions	ESI agrees with this revision and project baselines for grasslands are now clearly accounting for natural disturbances such as biomass burning in woody and non-woody material. Changes made to section 8.2.2, and equation [F.42] now include variables for woody and non-woody biomass burning and appear appropriate. **Forward Action Request**: However, ESI believes that stock estimation techniques for burning of woody and non woody biomass (in both forests and grasslands), should be included in the methodology (i.e. Appendix B.2 Stock Estimation Techniques Applicable to Specific Carbon Pools). Currently, the methodology leaves the procedures for estimating woody and non woody biomass burning up to the project proponent, and the evaluation of those procedures up to the verification body, "*If included in project activities, a description of procedures used to estimate the rate of biomass burning and charcoal production and demonstration that these estimates are conservative"* (from section 9.3). This is not consistent with Appendix B.2, where Stock Estimation Techniques Applicable to Specific Carbon Pools are described in detail. A procedure for estimating weight of woody or herbaceous biomass in tonnes and the date consumed for both forests and grasslands should be described. In summary, ESI suggests methodology developers provide more precise guidance to distinguish estimation methods of biomass types in forests and grasslands. Since this issue falls outside the scope of the reconciliation process, it is ESI's recommendation that it be addressed in a streamlined update to the next version of the methodology.
Public comments were reviewed and DNV GL found WWC responses to sufficiently address each public comments.	ESI believes that the second assessor did not sufficiently evaluate WWC responses to the public comments with adequate detail. The remote sensing approach employed by the methodology element is untested for detection of grasslands and not supported in the literature or best practice for remote sensing (GOFC-GOLD Sourcebook). The changes as requested by ESI to the proposed methodology element revision place the responsibility on the VVB to evaluate the accuracy of land cover classification and appropriateness of image resolution used.

Table 8. 2nd Assessor revisions and 1st Assessor Evaluation.

6 Evidence of Fulfilment of VVB Eligibility Requirements

As set out in the VCS Methodology Approval Process for REDD and ACoGS AFOLU Methodology elements:

1) Both validation/verification bodies shall be eligible under the VCS Program to perform validation for sectoral scope 14 (AFOLU); AND

2) At least one of the validation/verification bodies shall use an AFOLU-ACoGS expert (Richard Conant) in the assessment; AND

3) At least one of the validation/verification bodies shall have completed at least ten project validations in any sectoral scope. Project validations can be under the VCS Program or an approved GHG program, with the projects having been registered under the applicable program. A validation of a single project under more than one program (e.g., VCS) counts as one project validation. The validation/ verification body that meets this eligibility requirement may be the same validation/verification body that uses an AFOLU expert.

ESI fulfils the eligibility requirements in the following ways:

1) ESI is accredited by the American Standards Institute under ISO 14065:2007 for GHG Validation and Verification Bodies; including validation/verification of assertions related to GHG emission reductions and removals at the project level for Land Use and Forestry (Group 3). VCS accepts this accreditation.

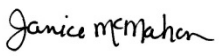
2) During the methodology assessment, ESI utilized Dr. Richard Conant VCS approved ACoGS Expert

3) To date, ESI has completed 25 VCS project validations under AFOLU Requirements. Please see Appendix C for the required evidence.

7 Signature

Signed for and on behalf of:

Name of entity: Environmental Services, Inc.

Signature: 

Name of signatory: Janice McMahon
Vice President & Regional Technical Manager

Date: 22 May 2014

GP/EJ/JPM/rb/VO13053.00 WWC Methodology Assessment Report-final
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Appendix A – NCRs/CL/OFIs

Item Number	1
VCS Standard 3.4 Requirements (October 2013)	4) Other relevant information concerning present or future conditions, such as legislative, technical, economic, socio-cultural, environmental, geographic, site-specific and temporal assumptions or projections.
Evidence Used to Assess (Location in PD, MR or Supporting Documents	VM0009 V3.62 Section 6.
ESI Findings - Round 1 (16 October 2013)	Evidence for this requirement could not be located in the methodology.
Round 1 NCR/CL/OFI	CL: Please clarify how the methodology establishes criteria and procedures for identifying alternative baseline scenarios and determining the most plausible scenario, taking into account relevant information concerning present or future legislative changes (i.e. a change in baseline scenario due to a change in legislation). (e.g. where a project area has been recently legally sanctioned for commercial harvest after the project start date, and an original baseline type of F-U1 had been selected. In this case, how would project accounting rules and requirements change if the baseline type was to switch from F-U1 to F-P1b?
Round 1 Response from Project Proponent (24 October 2013)	Wildlife Works accepts this finding. As a clarification, please note that the VCS Additionality tool is currently the mechanism in the methodology where alternative baseline scenarios are identified and the most likely baseline scenario determined. This tool is integrated into section 7, and there are 2 PD requirements (PDR 99 and PDR 100) for the proponent to list alternative baseline scenarios and the justification for the scenario chosen. We feel this is the most appropriate location for this action to occur. Therefore, we contend that any additional alternative baseline scenario determination would be redundant and confusing. To further clarify the methodology, we have added a reference to section 7 to Figure 3, which provides guidance for the determination of baseline scenarios. This addition shows that the project proponent will have to "confirm plausibility of baseline type." Additionally, a reference to section 7 was added to section 6.3, stating that the any chosen baseline scenario shall match with the baseline scenario determined to be most plausible in section 7.
ESI Findings - Round 2 (14 November 2013)	**Finding Closed**: Response from Methodology Developer was reviewed and appears sufficient. Confirmed addition of added a reference to section 7 to Figure 3, which provides guidance for the determination of baseline scenarios.

Item Number	2
VCS Standard 3.4 Requirements (October 2013)	4.3.1 The methodology shall use applicability conditions to specify the project activities to which it applies and shall establish criteria that describe the conditions under which the methodology can (and cannot, if appropriate) be applied. Any applicability conditions set out in tools or modules used by the methodology shall also apply.

Evidence Used to Assess (Location in PD, MR or Supporting Documents	VM0009 V3.62 Section 4, Applicability condition 3
ESI Findings - Round 1 (16 October 2013)	The methodology appears to use applicability conditions to specify the project activities to which it applies and establishes criteria that describe the conditions under which the methodology can (and cannot, if appropriate) be applied. Some of the conditions could be clarified such as the types of models used in criteria 3 and the specifications of the models accepted.
Round 1 NCR/CL/OFI	CL: Please provide more details describing type of model that can be used in Applicability condition to predict Imminent Conversion (*a. Imminent conversion by the agents of conversion as predicted by a model (see definition of imminent conversion)*.). E.g. is this a model that predicts rates of deforestation? Does the model need to be parameterized to a particular ecosystem or region (site-specific), and what are the criteria for parameterization? Are there any constraints on model validation or sources of models that are accepted? Please either fully describe these criteria or reference them.
Round 1 Response from Project Proponent (24 October 2013)	Wildlife Works accepts this finding. We have revised the description in section 3, number 3a to provide more detailed guidance on the type of model that may be used to demonstrate threat of imminent conversion. The text in number 3a now provides a clear description of what the model will predict, that the model does not need to be spatially explicit and that the model does not have to be validated. Number 3b has also been corrected, it now states "survey" in place of "model".
ESI Findings - Round 2 (14 November 2013)	VM0009 V3.72 Section 4, Applicability condition 3 was reviewed. It is not clear what "appropriate to the region" means exactly, and a justification is not provided for the use of an un validated model.
Round 2 NCR /CL/OFI	CL open: Please provide further detail on what is meant by appropriate to the region. Please also provide a justification for why the model used in applicability condition 3 does not need to be validated.
Round 2 Response from Project Proponent (26 November 2013)	Wildlife Works accepts this finding. The methodology has been updated to provide greater clarity on the meaning of "appropriate" to the region. When we stated that this model does not have to be validated, we were referring to the fact that this model need not be validated by VCS separately from the PD and or Monitoring Report. However, we do state that the model must originate from "reputable and recognized source".
ESI Findings - Round 3 (13 December 2013)	CL Open: Text has been added to Section 4 to clarify what is meant by "appropriate" to the region and is sufficient. Section 4 states "The model must be appropriate to the project area region. by considering settlement patterns, drivers of conversion, topography and ecology". However the second part of this clarification has not been addressed in the text of the document. Section 4 now states, "The model does not have to be independently validated by a VVB." Where your response is referring to the fact this model need not be validated by VCS separately from the PD as the model must originate from a reputable and recognizable source. This reference is not clear.

Round 3 NCR /CL/OFI	CL: Please clarify in the applicability conditions that this model need not be validated by VCS separately from the PD as the model must originate from a reputable and recognizable source. CL: This applicability condition references Broadbent et al. 2008. That study actually found a higher incidence (57%) of forest fragmentation near the perimeter at 2km, than the fragmentation which occurred at 1km (37%). By that study, a 2km buffer around the perimeter would better detect fragmentation and indicate unplanned deforestation. Please clarify.
Round 3 Response from Project Proponent (DD Month YYYY)	WWC Response: After consideration, Wildlife Works has decided to remove the option for a developer to use a model to demonstrate imminent threat of conversion in unplanned type projects. Based on the Validator's clarification requests, we contend that the other two methods provided to demonstrate imminent threat of conversion are sufficient for all potential projects. WWC Response: Wildlife Works accepts this finding. We have updated applicability condition 3.b to require conversion to have occurred within a 2 km buffer around the project area perimeter rather than within 1 km. This change has been made in response to the Validator's CL in regards to the Broadbent et al. 2008 study.
Final ESI Findings	Finding Closed: The two methods provided to demonstrate imminent threat of conversion are sufficient for all potential projects. Applicability condition 3.b has been confirmed to now require conversion to have occurred within a 2 km buffer around the project area perimeter rather than within 1km.

Item Number	3
VCS Standard 3.4 Requirements (October 2013)	1) Where the methodology uses third party default factors and/or standards, such default factors and standards shall meet with the requirements for data set out in Section 4.5.6, mutatis mutandis. 2) Where the methodology itself establishes a default factor, the following applies: a) The data used to establish the default factor shall comply with the requirements for data set out in Section 4.5.6, mutatis mutandis. b) The methodology shall describe in detail the study or other method used to establish the default factor. c) The methodology developer shall identify default factors which may become out of date (i.e., those default factors that do not represent physical constants or otherwise would not be expected to change significantly over time). Such default factors are subject to periodic re-assessment, as set out in VCS document Methodology Approval Process. 3) Where methodologies allow project proponents to establish a project-specific factor, the methodology shall provide a procedure for establishing such factors.
Evidence Used to Assess (Location in PD, MR or Supporting Documents	VM0009, V3.0 (throughout)
ESI Findings - Round 1 (16 October 2013)	The methodology does not appear to identify default factors which may become out of date (i.e., those default factors that do not represent physical constants or otherwise would not be expected to change significantly over time). Such default factors are subject to periodic re-assessment, as set out in VCS document Methodology Approval Process.

Round 1 NCR/CL/OFI	NCR: Please identify default factors (used to ascertain GHG emission data) which may become out of date (i.e., those default factors that do not represent physical constants or otherwise would not be expected to change significantly over time). Such default factors are subject to periodic re-assessment, as set out in VCS document Methodology Approval Process.
Round 1 Response from Project Proponent (24 October 2013)	Wildlife Works accepts this finding. The methodology has been revised so that all default values used are identified in the text as such by adding a sentence at each instance. At each instance of a default value being used the Methodology also notes that the value may become out of date over time and that the value is subject to periodic re-assessment. The only default value identified in the Methodology that would meet this requirement is the soil decay factor in section 6.19.2.
ESI Findings - Round 2 (14 November 2013)	VM0009, V3.72 Section 6.19.2. has been revised. The methodology states "*Projects located in tropical climates may apply this default value. This is a default that may become out of date and is subject to periodic re-assessment. All other projects must empirically estimate λ_SOC or use appropriate decay rates from peer-reviewed literature.* "Other default factors in the methodology are IPCC values and are not expected to change drastically over time or will be periodically updated, and periodic re-assessment, as set out in VCS document Methodology Approval Process in not needed. **Finding Closed**

Item Number	4
VCS Standard 3.4 Requirements (October 2013)	4.2.2 Methodology revisions shall be prepared using the VCS Methodology Template and shall be managed via the methodology approval process. They may be prepared and submitted to the methodology approval process by the developer of the original methodology or any other entity.
Evidence Used to Assess (Location in PD, MR or Supporting Documents	VM0009 Methodology for Avoided Conversion v3 62.pdf, and VCS Methodology, v3.3
ESI Findings - Round 1 (16 October 2013)	The methodology does not appear to use the most current version of the methodology template.
Round 1 NCR/CL/OFI	NCR: Please use the most current version of the methodology template V3.3 (Methodology, v3.3), available at: http://www.v-c-s.org/program-documents.
Round 1 Response from Project Proponent (24 October 2013)	Upon further research, this NCR is not applicable. Sam Hoffer, Senior Program Officer at VCS has informed us that since this is a revision to an already accepted methodology we are not required to update to the new methodology template. Additionally, there is a 6 month grace period for methodologies to adopt this new template.
ESI Findings - Round 2 (14 November 2013)	This is confirmed, the new template is not mandatory until April 2014. **Finding Closed.**

Item Number	5

VCS AFOLU Requirements Version 3.4 (October 2013)	4.6.2 Leakage that is determined, in accordance with Section 4.3.3, to be below de minimis (i.e., insignificant) does not need to be included in the GHG emissions accounting. The significance of leakage may also be determined using the CDM A/R methodological tool *Tool for testing significance of GHG Emissions in A/R CDM Project Activities.*
Evidence Used to Assess (Location in PD, MR or Supporting Documents	VM0009 V3.62 sections 8
ESI Findings - Round 1 (16 October 2013)	There does not appear to be direct mention of this option in the methodology for Activity or Market based leakage. Section 8.3.3 does state "*If there are barriers to an alteration of the rate of illegal logging which follows legal logging (i.e. primary and secondary agents) or illegal logging cannot increase in the same country, than then leakage from illegal logging may be de minimis or not occur*. "
Round 1 NCR/CL/OFI	CL: Please clarify the methodology in section 8.3 to notify project proponents that Leakage that is determined, in accordance with Section 4.3.3, to be below de minimis (i.e., insignificant) does not need to be included in the GHG emissions accounting.
Round 1 Response from Project Proponent (24 October 2013)	Wildlife Works rejects this finding. The section referenced in the VCS AFOLU guidance states that a methodology "may" exclude specific carbon pools that are deemed de minimis. In order to be conservative we have chosen to not include this option in the methodology. Wildlife Works believes that it is good practice and more robust for projects to measure actual leakage based on the unique project scenario. Therefore, project proponents must monitor and quantify activity shifting and market leakage as detailed in the methodology. If the monitoring and quantification of leakage shows that there has not been any leakage or negative leakage then the proponent does not make any deduction in their credits for that monitoring period. Additionally, if there is no other accessible land for the activity or market leakage to shift to, then the project proponent can demonstrate that the project will result in zero leakage.
ESI Findings - Round 2 (14 November 2013)	Though the language in this requirement is open to interpretation, the assessment team has concluded it is conservative to require measurement of leakage. **CL Closed.**

Item Number	**6**
VCS AFOLU Requirements Version 3.4 (October 2013)	4.6.7 Projects shall not account for positive leakage (i.e., where GHG emissions decrease or removals increase outside the project area due to project activities).
Evidence Used to Assess (Location in PD, MR or Supporting Documents	VM0009 V3.62 section 8.3.3, and VCS Global Commodity Leakage Module section 5.1.2.
ESI Findings - Round 1 (16 October 2013)	NCR findings: The methodology states "*The cumulative emissions from market-effects leakage for the prior monitoring periods* $E^{[m]}_{LME}$ *shall be the sum of all calculated market leakage per the tool, across all current and prior monitoring periods.*"

Round 1 NCR/CL/OFI	NCR: It does not appear that the methodology "does not account for positive leakage (i.e., where GHG emissions decrease or removals increase outside the project area due to project activities)". If a simple sum of all calculated market leakage estimates (per the tool are added together), unless the tool reports a 0 for situations of positive leakage, the methodology needs to be modified. Please either provide evidence that positive leakage is not accounted for in the VCS Global Commodity Leakage Module or modify the statement in section 8.3.4 to not account for potential positive leakage.
Round 1 Response from Project Proponent (24 October 2013)	NCR: Wildlife Works accepts this finding. The methodology states in section 8.3 that "VCS does not allow crediting for 'negative leakage.'" However, with the VCS production leakage tool it was not clear that negative emissions from leakage were to be set to zero. To ensure this, a sentence has been added to the methodology in section 8.3 stating that if the emissions from activity shifting or market effects leakage are positive their value shall be set to zero.
ESI Findings - Round 2 (14 November 2013)	**Findings Closed:** Response sufficient

Item Number	7
VCS AFOLU Requirements Version 3.4 (October 2013)	4.6.7 Projects shall not account for positive leakage (i.e., where GHG emissions decrease or removals increase outside the project area due to project activities).
Evidence Used to Assess (Location in PD, MR or Supporting Documents	VM0009 V3.62 section 8.3.3, and VCS Global Commodity Leakage Module section 5.1.2.
ESI Findings - Round 1 (16 October 2013)	CL findings: The VCS Global Commodity Leakage Module states "*Note that this calculation must be done on a time step that matches the basis on which the changes in deforestation are being measured (i.e., where annual data are available, the procedure described here for estimating leakage must be performed annually).*".
Round 1 NCR/CL/OFI	CL: Please clarify how the methodology deals with market leakage calculated on an annual basis, or a time step that matches the basis on which the changes in deforestation are being measured (within the VCS Global Commodity Leakage Module) while emissions models within the methodology make estimates to a particular day within the monitoring period(i.e. how will leakage estimates be prorated to accommodate for differing time steps).
Round 1 Response from Project Proponent (24 October 2013)	CL: Wildlife works rejects this finding. While the BEM does utilize a daily time-step for the determination of baseline emissions and the VCS production leakage tool a year time step, it is always conservative to assume that the market effects leakage emission occurred on the last day of the year. Additionally, the emission reductions from the project are predicted cumulatively, since the avoided project emissions and any leakage over the monitoring period is the difference between the two cumulative estimates.

ESI Findings - Round 2 (14 November 2013)	**Findings Closed**: Response sufficient

Item Number	**8**
VCS AFOLU Requirements Version 3.4 (October 2013)	4.6.6 Where leakage mitigation measures include tree planting, aquacultural intensification, agricultural intensification, fertilization, fodder production, other measures to enhance cropland and/or grazing land areas, leakage management zones or a combination of these, then any significant increase in GHG emissions associated with these activities shall be accounted for, unless deemed de minimis (as set out in Section 4.3.3) or can be conservatively excluded (as set out in Section 4.3.4).
Evidence Used to Assess (Location in PD, MR or Supporting Documents	VM0009 V3.62 sections 8.3.1.1 and 8.3.3
ESI Findings - Round 1 (16 October 2013)	Could find no evidence in the methodology that any significant increase in GHG emissions associated with leakage mitigation activities shall be accounted for.
Round 1 NCR/CL/OFI	NCR: Please provide evidence in the methodology that where leakage mitigation measures include tree planting, aquacultural intensification, agricultural intensification, fertilization, fodder production, other measures to enhance cropland and/or grazing land areas, leakage management zones or a combination of these, then any significant increase in GHG emissions associated with these activities shall be accounted for, unless deemed de minimis (as set out in Section 4.3.3) or can be conservatively excluded (as set out in Section 4.3.4).
Round 1 Response from Project Proponent (24 October 2013)	Wildlife Works rejects this finding. The Methodology already accounts for all emissions occurring from project activities. The leakage mitigation activities included in the methodology do not involve calculating an emission or forgone emission, but rather other metrics of the activity. As seen in section 8.3.1, the leakage mitigation is a qualitative determination. In section 8.3.1.1 the measured quantity is the production increase or the consumption decrease resulting from the leakage mitigation of a commodity. Additionally, the project proponent does not need to account for project emissions occurring outside of the project area.
ESI Findings - Round 2 (14 November 2013)	Response insufficient: In section 8.3.1.1 the measured quantity is the production increase or the consumption decrease resulting from the leakage mitigation of a commodity, though it is not clear that the actual increase in GHG emissions associated with leakage mitigation activities (i.e. GHG emissions associated this production increase or consumption decrease) are accounted for, unless deemed de minimis (as set out in Section 4.3.3) or can be conservatively excluded (as set out in Section 4.3.4).
Round 2 NCR /CL/OFI	**NCR:** Please provide evidence in the methodology that where leakage mitigation measures include tree planting, aquacultural intensification, agricultural intensification, fertilization, fodder production, other measures to enhance cropland and/or grazing land areas, leakage management zones or a combination of these, then any significant increase in GHG emissions associated with these activities shall be accounted for, unless deemed de minimis (as set out in Section 4.3.3) or can be conservatively excluded (as set out in Section 4.3.4).

Round 2 Response from Project Proponent (26 November 2013)	Wildlife Works accepts this finding. An applicability condition has been added to the methodology that states that all GHG emissions from project activities must be de minimis. The applicability condition instructs the program developer to show this by the use of either peer reviewed literature or the CDM tool *Tool for testing significance of GHG emissions in A/R CDM project activities*. This will ensure that there cannot be a significant increase in GHG emissions resulting from project activities.
ESI Findings - Round 3 (13 December 2013)	**Findings Closed:** Response sufficient, applicability condition 15 has been added to ensure that there cannot be a significant increase in GHG emissions resulting from project activities.

Item Number	9
VCS AFOLU Requirements Version 3.4 (October 2013)	2) ARR, IFM, REDD, ACoGS and WRC: GHG emissions from the removal or burning of herbaceous vegetation and collection of non-renewable wood sources for fencing of the project area.
Evidence Used to Assess (Location in PD, MR or Supporting Documents	VM0009 V3.62 Section 5.4 tables 3 and 4 and equation [F.42]
ESI Findings - Round 1 (16 October 2013)	GHG emissions from the removal or burning of herbaceous vegetation is included in the methodology in equation [F.42]
Round 1 NCR/CL/OFI	OFI: Links to equations and links to variables in equations are very helpful. It may also increase clarity to include links from variables to sections in the methodology that discuss the source of those variables (measurements from plot data, IPCC defaults etc.). Further, it would also be helpful to include hyperlinks to the description of dependent variables in all equations.
Round 1 Response from Project Proponent (24 October 2013)	Wildlife Works rejects this finding. Wildlife Works feels that this is already present in the Methodology. Appendix H and J, which list all variables and parameters used in the methodology, contain links to each formula in which the variable or parameter appears as well as any specific measurement method that is described in the methodology. Due to the sheer number of instances that variables and parameters are referenced in the text, it would be impractical to link to each occurrence. However, if a reader follows a link to a formula in which the variable or parameter is used, they will find a corresponding link to the relevant section in which that formula is discussed.
ESI Findings - Round 2 (14 November 2013)	
Round 2 NCR /CL/OFI	OFI: Links to equations and links to variables in equations are very helpful. It may also increase clarity to include links from variables to sections in the methodology that discuss the source of those variables (measurements from plot data, IPCC defaults etc.). Further, it would also be helpful to include hyperlinks to the description of dependent variables in all equations.
Round 2 Response from Project Proponent (26 November 2013)	Wildlife Works appreciates this suggestion, however we do feel that this would create too many links and cross references in the methodology. This would make the methodology document more complex and unwieldy. We believe that it is more efficient for the user of the methodology to print out the variables tables and follow along as they are reading the equations, as suggested in Section 2.2.2 of the methodology.

ESI Findings - Round 3 (13 December 2013)	OFI not addressed. Please note that OFIs are not required to be addressed by the methodology developer.

Item Number	10
VCS AFOLU Requirements Version 3.4 (ACoGS) (October 2013)	4.5.20 Under the default assumption that management does not change in the project scenario and carbon pools are at steady state, the project scenario shall ensure the maintenance (or increase) of existing carbon pools. Where methodologies include criteria and procedures to account for increases in carbon pools on lands where conversion is avoided, evidence shall be provided that such increases may occur. Where changes in management are the basis for increases in carbon pools, ALM accounting rules shall be followed. Where revegetation or restoration is the basis for increases in carbon pools under the project scenario, projects shall follow ARR or ALM requirements for quantifying GHG emissions/removals, depending on whether the project activities involve woody biomass.
Evidence Used to Assess (Location in PD, MR or Supporting Documents	Section 8.2
ESI Findings - Round 1 (16 October 2013)	
Round 1 NCR/CL/OFI	NCR: this is not addressed for ACoGS in the methodology; revising section 8.2 to reflect the possibility of C losses from grassland C stocks due to disturbance or mis-management would address this.
Round 1 Response from Project Proponent (24 October 2013)	Wildlife Works does not accept this finding. The Methodology already incorporates procedures for the monitoring of project carbon stocks in Section 9 (MRV). MRV under the methodology addresses all Carbon losses and gains throughout the project lifetime. All carbon pools that are included in project accounting, including all above-ground biomass and soil carbon pools, must be monitored a minimum of every 5 years. The methodology requires that any disturbances that result in reductions of carbon stocks are identified and sampled, quantifying any emissions in the project accounting area. Therefore, any reduction in project carbon stocks through natural or anthropogenic causes will be captured and incorporated into project carbon accounting using the MRV procedures described in section 9. Any gains in Carbon stock will similarly be captured through the same MRV procedures.
ESI Findings - Round 2 (14 November 2013)	**Findings Closed**: This clarifies the issue, updates in the methodology address this issue.

Item Number	11
VCS AFOLU Requirements Version 3.4 (ACoGS) (October 2013)	4.5.18 Procedures for quantifying N2O emissions from the use of synthetic fertilizers may reference the CDM A/R methodological tool for the Estimation of direct and indirect (e.g., leaching and runoff) nitrous oxide emission from nitrogen fertilization.

Evidence Used to Assess (Location in PD, MR or Supporting Documents	VM0009 V3.62
ESI Findings - Round 1 (16 October 2013)	
Round 1 NCR/CL/OFI	NCR: this is not addressed in the methodology
Round 1 Response from Project Proponent (24 October 2013)	Wildlife Works rejects this finding. It is conservative to not include these emissions in baseline accounting. Inclusion of these emissions are optional under the VCS AFOLU guidance. Therefore, we decided not to include these emissions in the baseline scenario.
ESI Findings - Round 2 (14 November 2013)	It is conservative to not include these emissions in the baseline accounting, but it would not be conservative to exclude them from the project scenario. Changes in N2O emissions seem likely to be de minimus in the absence of N inputs, but if there are substantial N inputs, N2O emissions from the project scenario could be large and exclusion would not be conservative if these inputs were large relative to the baseline scenario.
Round 2 NCR /CL/OFI	NCR: Please include procedures for quantifying N2O emissions from the use of synthetic fertilizers may reference the CDM A/R methodological tool for the Estimation of direct and indirect (e.g., leaching and runoff) nitrous oxide emission from nitrogen fertilization.
Round 2 Response from Project Proponent (26 November 2013)	Wildlife Works accepts this finding. Section 8.2.5 has been updated to include a requirement that if synthetic nitrogen fertilization is included in a project activity then N2O emissions must be quantified. The methodology states the CDM A/R tool *Estimation of direct and indirect (e.g. leaching and runoff) nitrous oxide emission from nitrogen fertilization* should be used for the quantification of these emissions.
ESI Findings - Round 3 (13 December 2013)	**Finding Closed**: Response sufficient, text has been added to Section 8.2.5 that addresses reviewers finding.

Item Number	12
VCS AFOLU Requirements Version 3.4 (ACoGS) (October 2013)	4.3.19 Grazing is a common practice in many grassland and some shrubland ecosystems. As such, livestock grazing does not preclude ACoGS project eligibility, and grazing may continue on project areas. Projects that incorporate improved grazing practices shall follow the Improved Grassland Management requirements for such activities in the ALM category. Such activities may provide GHG benefits in addition to those achieved by avoiding conversion under this ACoGS category. Where livestock grazing may be present in the project scenario, methodologies shall set out criteria and procedures to account for CH4 emissions from enteric fermentation and CH4 and N2O emissions from manure. Where grazing occurs in both the baseline and project scenarios, net changes in CH4 and N2O associated with grazing may be deemed de minimis and excluded in accordance with Sections 4.3.3 and 4.3.4.
Evidence Used to Assess (Location in PD, MR or Supporting Documents	VM0009 V3.62

ESI Findings - Round 1 (16 October 2013)	
Round 1 NCR/CL/OFI	NCR: This methodology does not mention emissions associated with grazing animals.
Round 1 Response from Project Proponent (24 October 2013)	Wildlife Works accepts this finding. Wildlife Works has added language to the Methodology to incorporate the accounting of emissions of CH4 from the grazing of livestock in the project scenario. The meth now instructs project developers that CH4 is a required source only when emissions from grazing are not de minimis. If CH4 emissions from grazing are not de minimis these emissions shall be quantified using equation F.43, which is based on guidance from IPCC Good Practice Guidelines and IPCC Guidelines for National Greenhouse Gas Inventories.
ESI Findings - Round 2 (14 November 2013)	**Finding Closed**: This response addresses the concern raised in round 1

Item Number	13
VCS AFOLU Requirements Version 3.4 (ACoGS) (October 2013)	4.4.8 The baseline for ACoGS projects is comprised of a land-use and land-cover (LU/LC) change component, a carbon stock change component, and a non-CO2 GHG component where applicable. These components may be addressed with separate analyses because the appropriate scale of analysis may differ for each component.
Evidence Used to Assess (Location in PD, MR or Supporting Documents	The land use component is addressed in section 4. The carbon stock change components are described in section 5 and section 8. Some of the non-CO3 GHG components are applicable but not addressed
ESI Findings - Round 1 (16 October 2013)	
Round 1 NCR/CL/OFI	NCR: This methodology does not mention emissions associated with grazing animals.
Round 1 Response from Project Proponent (24 October 2013)	Wildlife Works accepts this finding. As stated in the above finding, language has been added to the Methodology to incorporate the accounting of emissions of CH4 from the grazing of livestock. The meth now instructs project developers that CH4 is a required source only when emissions from grazing are not de minimis. If CH4 emissions from grazing are not de minimis these emissions shall be quantified using equation F.43, which is based on guidance from IPCC Good Practice Guidelines and IPCC Guidelines for National Greenhouse Gas Inventories.
ESI Findings - Round 2 (14 November 2013)	**Finding Closed**: This response addresses the concern raised in round 1

Item Number	14
VCS AFOLU Requirements Version 3.4 (ACoGS) (October 2013)	4.3.21 Where the baseline scenario may include the conversion of vegetation to perennial crops, such as where oil palm or short-rotation woody crops would be planted, the aboveground woody and non-woody biomass pools shall be included.

Evidence Used to Assess (Location in PD, MR or Supporting Documents	Appropriate C pools described in section 5, table 4
ESI Findings - Round 1 (16 October 2013)	
Round 1 NCR/CL/OFI	OFI: include belowground woody and non-woody biomass pools in cases of conversion of native vegetation to perennial crops
Round 1 Response from Project Proponent (24 October 2013)	Wildlife Works does not accept this finding. The VCS AFOLU guidelines state that including emissions from belowground woody and non-woody biomass in the baseline scenario is an optional carbon pool. It is conservative to not include these biomass pools in the carbon accounting. There are instances where project developers cannot measure these pools or where it would be cost prohibitive. Therefore we have determined that these carbon pools should not be made mandatory, but should be optional to be used at the project developer's discretion.
ESI Findings - Round 2 (14 November 2013)	Table 2 in VCS-AFOLU v3.4 suggests that these pools are optional, but 4.3.20 unambiguously states that they must be included in a cropped baseline. Their exclusion in such a case would not be conservative since exclusion would reduce C stocks in the baseline, increasing estimates of C retained in the project scenario.
Round 2 NCR /CL/OFI	OFI: include belowground woody and non-woody biomass pools in cases of conversion of native vegetation to perennial crops
Round 2 Response from Project Proponent (26 November 2013)	Wildlife Works appreciates this suggestion. However, we believe that the below-ground biomass carbon pool should remain an optional carbon pool for ACoGS project types. As the validator states, Table 2 in the VCS AFOLU V3.4 guidance states that belowground carbon pools are optional. We believe that the validator is mistaken with the VCS-AFOLU v3.4 guidance, as section 4.3.21 requires the inclusion of *above-ground* biomass in projects where the baseline scenario includes the conversion of vegetation to perennial crops. Not *below-ground* biomass as the validator contends.
ESI Findings - Round 3 (13 December 2013)	**OFI not addressed.** Please note that OFIs are not required to be addressed by the methodology developer.

Item Number	15
VCS AFOLU Requirements Version 3.4 (ACoGS) (October 2013)	4.5.24 Estimation of carbon stock change and/or soil emission factors shall be based on data from replicated field experiments whose management treatments have a duration of at least five years (preferably longer), for climate and soil conditions and management activities representative of the project conditions, using established, reliable measurement methods. Stock change factors for soil carbon or woody biomass carbon that are based on experiments shall not be projected over a longer period than the length of the study. Complex, dynamic models that have been validated for conditions representative of the project area are also acceptable. Models shall be parameterized to reflect the range of soil, climate, land use and management conditions in the project area.
Evidence Used to Assess (Location in PD, MR or Supporting Documents	The rate of decline is based on data synthesized by Davidson and Ackerman (1993). The amount of C expected to remain at and before a new (lower) equilibrium is reached, is based on sampling in the proxy area. Cumulative baseline emissions area calculated using F25.

ESI Findings - Round 1 (16 October 2013)	
Round 1 NCR/CL/OFI	OFI: It would be useful to illustrate the actual equation for F.25
Round 1 Response from Project Proponent (24 October 2013)	Wildlife Works does not accept this finding. The equation that the Validator is referencing is actually shown in equation F.6, the Soil Emissions Model (SEM) for the planned baseline types.
ESI Findings - Round 2 (14 November 2013)	**Finding Closed**: This response addresses the concern raised in round 1.

Item Number	16
VCS AFOLU Requirements Version 3.4 (ACoGS) (October 2013)	4.3.20 Where the baseline scenario may include conversion to cropland, methodologies may include CH4 and N2O emissions from fertilizer application (manure or synthetic) in the baseline and project scenarios.
Evidence Used to Assess (Location in PD, MR or Supporting Documents	VM0009, V3.62
ESI Findings - Round 1 (16 October 2013)	
Round 1 NCR/CL/OFI	OFI: link to or include methodology for characterizing N2O emissions from fertilizer in crop baseline scenario
Round 1 Response from Project Proponent (24 October 2013)	Wildlife Works rejects this finding. The AFOLU guidelines state that including N2O and CH4 emissions from fertilizer in the baseline scenario is an optional carbon pool. We decided to not include this pool because it is conservative to not include it in the baseline scenario accounting.
ESI Findings - Round 2 (14 November 2013)	**Finding Closed**: This response addresses the concern raised in round 1.

Item Number	17
VCS AFOLU Requirements Version 3.4 (ACoGS) (October 2013)	4.5.21 GHG emissions associated with conversion and post-conversion land management practices that are avoided shall be estimated based on expected land management practices. Baseline estimates for N2O and CH4 emissions shall be based on documented management practices used on lands similar to the project area, or that represent average local or regional land management practices. Preference shall be given to data that are more specific to the project area (e.g., site specific data, where available, are preferable to state or province level data). Documentation of land management practices may include, for example, fertilizer purchase or application records, manure production estimates and/or livestock data.
Evidence Used to Assess (Location in PD, MR or Supporting Documents	VM0009, V2.1

ESI Findings - Round 1 (16 October 2013)	
Round 1 NCR/CL/OFI	OFI: N2O emissions from the baseline case are not addressed. Text could mention that omission of these estimates is conservative and point to an approved methodology for estimating N2O emissions is the project wishes to get credit for eliminating these emissions.
Round 1 Response from Project Proponent (24 October 2013)	Wildlife Works accepts this finding. It is conservative to omit these emissions from the baseline scenario. There are many instances where project developers cannot measure these pools or where it would be cost prohibitive. Therefore, we believe that this pool should be omitted from the Methodology, and it is optional to include this emission anyway. The Methodology text has been updated to note that these emissions have been conservatively omitted from the baseline scenario.
ESI Findings - Round 2 (14 November 2013)	**Finding Closed**: This update clarifies this issue.

Item Number	18
General Technical Expert Review	See ESI findings Round 1
Evidence Used to Assess (Location in PD, MR or Supporting Documents	VCS Validation Verification Manual section 5.2, v3.1, VM0009 V3.72, throughout the document
ESI Findings - Round 1 (16 October 2013)	The verification manual states "*VVBs must also ensure that methodologies are written in a manner that provides a prescriptive set of criteria and procedures that projects can apply and VVBs can audit against, thereby minimizing the scope for subjective interpretation, or gaming, by project proponents and VVBs using the methodology. This includes the use of precise language and the avoidance of vague terminology. For example, VVBs must ensure the proper use of key words must, should and may. Consistent with best practice, must is to be used to indicate a firm requirement, should is to be used to indicate a (non-mandatory) recommendation and may is to be used to indicate a permissible or allowable option. The term shall is reserved for VCS program documents and is generally not appropriate for methodologies.*"
Round 1 NCR/CL/OFI	NCR: Please remove the use of the term "shall" from the methodology, and update all language to be compliant with the VCS Validation Verification Manual section 5.2
Round 1 Response from Project Proponent (24 October 2013)	Wildlife Works accepts this finding. The methodology has been updated to be in compliance with the VCS requirements of the use of the terms "shall", "may", "should" and "must". All instances of the word "shall" have been removed and replaced with either "should" or "must" as appropriate.
ESI Findings - Round 2 (14 November 2013)	**Finding Closed:** methodology has been updated to be compliant with requirement.

Item Number	19
General Technical Expert Review	See ESI findings Round 1

Evidence Used to Assess (Location in PD, MR or Supporting Documents	VM0009 V3.72 section 8.2
ESI Findings - Round 1 (16 October 2013)	Section 8.2 of the methodology states "Total project emissions for the current monitoring period can be negative if some major disturbance event occurs. "
Round 1 NCR/CL/OFI	OFI: It appears this statement should read, total project emissions reductions for the current monitoring period can be negative if some major disturbance event occurs? GP_12/06/13.
ESI Findings - Round 2 (13 December 2013)	**OFI Not addressed**. Please note that OFIs are not required to be addressed by the methodology developer.

Item Number	20
General Technical Expert Review	See ESI findings Round 1
Evidence Used to Assess (Location in PD, MR or Supporting Documents	VM0009 V3.62 (section 6.7.1, and Appendix G), and VCS Program Guide V.3.5 Section 3, (also mentioned in VCS Standard 3.4 section 4.1.6)
ESI Findings - Round 1 (16 October 2013)	**Page 17 of the methodology states** " *Some model parameters are defined in terms of days because of the instability caused by using larger units of time in logistic models. Data need not be collected on a daily basis, and the project proponent should simply make the necessary conversion to their data so that time units are in days where applicable. From a vintage perspective, it is desirable to use a number of days to determine the proportion of emissions reductions or removals that occur in part of a calendar year when monitoring periods are not defined by the first of the year".* **It is not clear that this assumption of defining model parameters in terms of days is conservative.**
Round 1 NCR/CL/OFI	NCR: Please demonstrate that using parameters defined in terms of days is conservative. Conservative predictions can be demonstrated through model validation (residual analysis and some goodness of fit statistic comparing measurements to predictions). Validation should show predictions made with parameters defined in two ways: 1) in terms of days, and 2) in terms of larger units (years) .
Round 1 Response from Project Proponent (24 October 2013)	
ESI Findings - Round 2 (14 November 2013)	**Finding Closed**. During a meeting with WWC on 10/10/2013 to review baseline models, Wildlife Works Baseline P1b Example.xls and Wildlife Works Baseline U1 Example.xls the issue was resolved. The models do not appear to have a compounding error problem that might be caused by a short time-step.

Item Number	21
General Technical Expert Review	See ESI findings Round 1

Evidence Used to Assess (Location in PD, MR or Supporting Documents	VM0009 V3.62 Appendix H
ESI Findings - Round 1 (16 October 2013)	**Units of some variables are not clearly and transparently stated as they are used in generic equations.**
Round 1 NCR/CL/OFI	CL: Please include all units for variable $x^{[m]}$ in Appendix H (and all other variables that are described this way in the methodology). The units for $x^{[m]}$ currently read "varies". This variable appears to be a covariate whose units vary by the carbon pool it is applied to. All possible units for this variable should be clearly listed to avoid confusion. Further, this and other similar variables should be defined separately for each carbon pool, and all units should be clearly defined (i.e. do not provide a single, generic equation like [B.11] with a placeholder variable *x* or *y*.
Round 1 Response from Project Proponent (24 October 2013)	Wildlife Works rejects this finding. The units of a covariate cannot be known until the project developer has determined that a covariate that should be used in the baseline model, if any, and decided on what covariate would add strength to the model. A selected covariate may include parameters such as population, population density, time, income, length of roads, or the presence of clean cook stoves to name a small number of the possible covariates that may be used. Therefore, it is impossible to anticipate all of the units that may be used in the covariate variable in the baseline model, and any attempt to do so would only serve to limit the types of covariates that may be used. A possibly more applicable step, as opposed to defining the potential units of the covariate, is to ensure that the covariate adds strength to the baseline emissions model in its prediction of conversion. This is accomplished with the AIC statistical test, which is used to demonstrate the appropriateness of a covariate.
ESI Findings - Round 2 (14 November 2013)	Section A.1.1 of the methodology states "*Akaike Information Criterion (AIC) is used to select the best nested model in θ. See Davidson (2003) or Freedman (2009) for information about linear predictors and logistic models*." AIC does not provide a test of individual covariates, but rather is a test for model section. How can this test be used to ensure that the covariate adds strength to the baseline emissions model and is appropriate to include? However, this method of covariate selection and testing is not new to this revision of the methodology.
Round 2 NCR /CL/OFI	CL: It is the verifiers understanding that AIC is not a test that can be used to test the appropriateness of a covariate, rather it is a test of an entire model (Bozdogan, H. 1987. Model selection and Akaike's information criterion (AIC): The general theory and its analytical extensions. Psychometrika 52:345–370.). If this is WWC's contention, please discuss.
Round 2 Response from Project Proponent (26 November 2013)	The validator is correct in their understanding that AIC is a test of an entire model, not the appropriateness of a single parameter. Wildlife Works' contention in the previous response was that the AIC test is a tool that enables the developer to test multiple iterations of the baseline model and determine which one is the best approximating model. By using the AIC to test the baseline model with and without covariates, the project developer can demonstrate the appropriateness of a covariate. If the covariate increases the strength of the model fit, then this will be shown with a lower AIC value. This can be compared to the AIC value for the model with no covariates or different covariates, to determine if the use of the covariate is appropriate and increases the robustness of the model.

ESI Findings - Round 3 (13 December 2013)	**Finding Closed:** Variables for covariates cannot be included as the methodology allows for unlimited number of possible covariates. This method has been used in previous versions of the methodology. Further, the use of the AIC model to test single covariates has been clarified.

Item Number	22
General Technical Expert Review	See ESI findings Round 1
Evidence Used to Assess (Location in PD, MR or Supporting Documents	VM0009 V3.62 (Validation and verification of grassland all AGoGS equations and new baseline type P1.b ([B.31], [F.46], [F.48],[F.6] etc.)
ESI Findings - Round 1 (16 October 2013)	**<u>Notation:</u> Notation used in the methodology is uncommon and reduces transparency for both project proponents and verification bodies. These deviations decrease the clarity and readability of this document (see comments below).**
Round 1 NCR/CL/OFI	See Items 6-11
Round 1 Response from Project Proponent (24 October 2013)	Wildlife Works rejects this finding. We have responded to each comment individually below.

Item Number	23
General Technical Expert Review	See ESI findings Round 1
Evidence Used to Assess (Location in PD, MR or Supporting Documents	VM0009 V3.62 section 2.2.1
ESI Findings - Round 1 (16 October 2013)	**Equations need to be written out for all carbon pools and should be repeated in text, page 17 of the methodology states,** "*Equations in this methodology are numbered and bracketed (e.g. [F.7]). The equations themselves are located in Appendix F and are referenced in the text by number. The intent is that Appendix F will be printed and used as a separate document in conjunction with the text of the methodology. Equations in Appendix F contain additional information including citations, literature sources and comments.* *In some instances, similar operations are performed on different variables in multiple places. For example, estimating above-ground carbon stock in the merchantable tree, non-merchantable tree, and non-tree biomass pools involve summing plot level measurements, dividing by plot area, summing across plots in a stratum, and multiplying by stratum area. Rather than repeat nearly identical equations for each estimate, we provide a single, generic equation like [B.11] with a placeholder variable x or y. To estimate each pool, the relevant variable or equation can be substituted for x as indicated by the methodology. "*

Round 1 NCR/CL/OFI	CL: Equations should be inserted into the text as well as left in appendices (even if it increases the length of the overall document). Each instance an equation is used there should be a description of all variables in the equation and a description of units at a minimum. Appendices with further information such as references and sources is also useful and should be maintained.
Round 1 Response from Project Proponent (24 October 2013)	Wildlife Works rejects this finding. This finding is an issue of Methodology formatting and the Validators preference and is outside the scope of this audit. The current formatting was not chosen arbitrarily, but developed systematically with Methodology readability and usability as a primary goal. The equation B.11 was developed for the specific use of converting an individual tree measurement to a carbon stock for that tree. We cannot make a separate equation for each conceivable tree species or type of tree carbon pool (i.e. merchantable, non-merchantable), therefore, a generic equation with placeholder variables is needed to allow for the flexibility that is needed by project developers.
ESI Findings - Round 2 (14 November 2013)	After discussions with VCS, it clear this issue is outside the scope of this validation. Accordingly, we are issuing this as an OFI to improve clarity of the document.
Round 2 NCR /CL/OFI	OFI: Equations should be inserted into the text as well as left in appendices (even if it increases the length of the overall document). Each instance an equation is used there should be a description of all variables in the equation and a description of units at a minimum. Appendices with further information such as references and sources is also useful and should be maintained.
Round 2 Response from Project Proponent (26 November 2013)	OFI: Wildlife Works is committed to producing a methodology that has a high degree of clarity and broad applicability for project types. We appreciate the suggestions given by the Validator for improvements in the methodology and its format, and will consider them at the next opportunity for the revision of this methodology.
ESI Findings - Round 3 (13 December 2013)	**OFI not addressed.** Please note that OFIs are not required to be addressed by the methodology developer.

Item Number	24
General Technical Expert Review	See ESI findings Round 1
Evidence Used to Assess (Location in PD, MR or Supporting Documents	VM0009 V3.62 section 2.2.1

ESI Findings - Round 1 (16 October 2013)	**Equations need to be written out for all carbon pools and should be repeated in text, page 17 of the methodology states,** "*Equations in this methodology are numbered and bracketed (e.g. [F.7]). The equations themselves are located in Appendix F and are referenced in the text by number. The intent is that Appendix F will be printed and used as a separate document in conjunction with the text of the methodology. Equations in Appendix F contain additional information including citations, literature sources and comments.* *In some instances, similar operations are performed on different variables in multiple places. For example, estimating above-ground carbon stock in the merchantable tree, non-merchantable tree, and non-tree biomass pools involve summing plot level measurements, dividing by plot area, summing across plots in a stratum, and multiplying by stratum area. Rather than repeat nearly identical equations for each estimate, we provide a single, generic equation like [B.11] with a placeholder variable x or y. To estimate each pool, the relevant variable or equation can be substituted for x as indicated by the methodology. "*
Round 1 NCR/CL/OFI	CL: Equations such as [B.11] should be re-written identically for all carbon pools, and units should be clearly stated to avoid any confusion, as is commonly done in all other carbon methodologies.
Round 1 Response from Project Proponent (24 October 2013)	Wildlife Works rejects this finding. This finding is an issue of Methodology formatting and the Validators preference and is outside the scope of this audit. The current formatting was not chosen arbitrarily, but developed systematically with Methodology readability and usability as a primary goal. The equation B.11 was developed for the specific use of converting an individual tree measurement to a carbon stock for that tree. We cannot make a separate equation for each conceivable tree species or type of tree carbon pool (i.e. merchantable, non-merchantable), therefore, a generic equation with placeholder variables is needed to allow for the flexibility that is needed by project developers.
ESI Findings - Round 2 (14 November 2013)	After discussions with VCS, it clear this issue is outside the scope of this validation. Accordingly, we are issuing this as an OFI to improve clarity of the document.
Round 2 NCR /CL/OFI	CL: Equations such as [B.11] should be re-written identically for all carbon pools (and need not be species specific as is common in other carbon methodologies), and units should be clearly stated to avoid any confusion, as is commonly done in all other carbon methodologies.

Round 2 Response from Project Proponent (26 November 2013)	CL: The Equation B.11 is specific to the determination of above-ground biomass with the use of an allometric equation. Several different carbon pools may use this method of biomass determination, including merchantable trees (AGMT), non-merchantable trees (AGOT), standing dead trees in decay class I and non-tree (AGNT). This equation provides a standardized form that incorporates the species and carbon pool specific allometric equation with the appropriate conversion factors to estimate the above-ground biomass for the individual tree or non-tree. Although this is a diverse set of carbon pools, since the biomass determination in all these instances involves the use of a species and carbon pool specific allometric equation, the equation B.11 is identical for every pool. We believe that this is clearly noted in the appropriate sections of the methodology and the references in the equation. Adding an identical version of this equation for each of the carbon pools would only add to the length and complexity of the methodology without adding significant benefit to the project developer. The units for the allometric equation and carbon fraction are listed in the appropriate sections of the methodology for each carbon pool. However, we agree that this may not be sufficiently clear for all users, therefore guidance on the units has been added to the description of equation B.11 in Appendix B.
ESI Findings - Round 3 (13 December 2013)	**Response to CL is insufficient, Finding Open:** Adding an identical version of this equation for each of the carbon pools, and listing units is common in carbon methodologies as it adds clarity and transparency.
Round 3 NCR /CL/OFI	CL: Equations such as [B.11] should be re-written identically for all carbon pools (and need not be species specific), and units should be clearly stated to avoid any confusion, as is commonly done in all other carbon methodologies.
Round 3 Response from Project Proponent (DD Month YYYY)	WWC Response: Wildlife Works accepts this finding. At the validator's request, we have rewritten equation B.11 identically for all carbon pools that utilize this equation. Please see equations B.11 - B.13. Equation B.11 is now solely used for the determination of above-ground biomass in merchantable trees (AGMT) and other tree (AGOT) carbon pools (see section B.2.1). Equation B.12 has been added for the determination of the carbon stock in non-tree biomass (AGNT) if an allometric equation method is chosen (see section B.2.2.2). Equation B.13 has been added for the determination of above-ground carbon stock in standing dead, decay class I trees (see section B.2.4.1). In section B.6, each equation has been clearly labeled to identify which carbon pool (tree, non-tree or standing dead tree) it is applied to.
Final ESI Findings	**Finding Closed**: Response sufficient. Equations have been added for each carbon pool, however for clarity the dependent variable for each should be renamed to be descriptive of the pool it is applied to (as is common in all other carbon methodologies). OFI: Please rename the dependent variables in equations B.11 - B.13 to be descriptive of the pool it is applied.

Item Number	25
General Technical Expert Review	See ESI findings Round 1
Evidence Used to Assess (Location in PD, MR or Supporting Documents	VM0009 V3.62 section 2.2.2

ESI Findings - Round 1 (16 October 2013)	**Variables descriptions should be included in text alongside equations, page 17 of the methodology states** "*Variables in this methodology and their units are enumerated in the list of variables in Appendix G and H. The intent is that Appendix G and H will be printed and used as a separate document in conjunction with the text of the methodology. For most of these variables, their units are in tonnes of carbon dioxide equivalents. The variables x and y (with and without subscripts) are sometimes used as placeholder variables — they may stand in for another variable or the results of an equation as indicated by the methodology text. The variables x and y are also used to indicate geographic coordinates in the development of the deforestation and soil carbon loss models in the baseline scenario section (see section 6). The meaning of these variables should be clear based on the context provided in the methodology text.*"
Round 1 NCR/CL/OFI	CL: Variables listed in Appendix G and H are very helpful, however variables should be described in the text of the document along with equations they are used in, as is common in other carbon methodologies, scientific texts, and peer reviewed publications (such as modelling papers).
Round 1 Response from Project Proponent (24 October 2013)	Wildlife Works rejects this finding. This finding is an issue of Methodology formatting and the Validators preference and is outside the scope of this audit. The current formatting was not chosen arbitrarily, but developed systematically with Methodology readability and usability as a primary goal.
ESI Findings - Round 2 (14 November 2013)	After discussions with VCS, it clear this issue is outside the scope of this validation. Accordingly, we are issuing this as an OFI to improve clarity of the document.
Round 2 NCR /CL/OFI	OFI: Variables listed in Appendix G and H are very helpful, however variables should be described in the text of the document along with equations they are used in, as is common in other carbon methodologies, scientific texts, and peer reviewed publications (such as modelling papers).
Round 2 Response from Project Proponent (26 November 2013)	Wildlife Works is committed to producing a methodology that has a high degree of clarity and broad applicability for project types. We appreciate the suggestions given by the Validator for improvements in the methodology and its format, and will consider them at the next opportunity for the revision of this methodology.
ESI Findings - Round 3 (13 December 2013)	**OFI not addressed.** Please note that OFIs are not required to be addressed by the methodology developer.

Item Number	26
General Technical Expert Review	See ESI findings Round 1
Evidence Used to Assess (Location in PD, MR or Supporting Documents	VM0009 V3.62 section 2.2.3

ESI Findings - Round 1 (16 October 2013)	**Summations need common notation, page 17 of the methodology states** "*Summations use set notation. Sets of variables are indicated using script notation. For example, S represents the set of all strata in the project area, while P_k represents the set of all plots in stratum k. Set notation greatly reduces the number of variables used in the methodology as well as the complexity of summations".*
Round 1 NCR/CL/OFI	CL: Please use standard sigma summing notation (with index, lower, and upper bound of summation) to improve the clarity and readability of this document.
Round 1 Response from Project Proponent (24 October 2013)	Wildlife Works rejects this finding. We use set notation to make the writing of the summations cleaner. This is accepted and standard summation notation. The methodology provides clear guidance to a project developer on the use of this summation notation.
ESI Findings - Round 2 (14 November 2013)	After discussions with VCS, it clear this issue is outside the scope of this validation. Accordingly, we are issuing this as an OFI to improve clarity of the document.
Round 2 NCR /CL/OFI	OFI: Please use standard sigma summing notation (with index, lower, and upper bound of summation) to improve the clarity and readability of this document.
Round 2 Response from Project Proponent (26 November 2013)	Wildlife Works is committed to producing a methodology that has a high degree of clarity and broad applicability for project types. We appreciate the suggestions given by the Validator for improvements in the methodology and its format, and will consider them at the next opportunity for the revision of this methodology.
ESI Findings - Round 3 (13 December 2013)	**OFI not addressed.** Please note that OFIs are not required to be addressed by the methodology developer.

Item Number	27
General Technical Expert Review	See ESI findings Round 1
Evidence Used to Assess (Location in PD, MR or Supporting Documents	VM0009 V3.62 section 2.2.4
ESI Findings - Round 1 (16 October 2013)	**Elements need to be removed for clarity, page 17 of the methodology states "***Elements of a set are denoted using subscript notation. A sum over the elements of a set is indicated by the notation* $\sum_{(k \in S)} A_k$ *. This particular example sum indicates the sum of the area of all strata, where* A_k *indicates the area of stratum k. The number of elements in a set is indicated by functional notation #(S) where the pound sign stands for "count of".*
Round 1 NCR/CL/OFI	CL: See comment for summation, and remove notation for elements of sets to avoid confusion.
Round 1 Response from Project Proponent (24 October 2013)	Wildlife Works rejects this finding. We use set notation to make the writing of the summations cleaner. This is accepted and standard summation notation. The methodology provides clear guidance to a project developer on the use of this summation notation.

ESI Findings - Round 2 (14 November 2013)	After discussions with VCS, it clear this issue is outside the scope of this validation. Accordingly, we are issuing this as an OFI to improve clarity of the document.
Round 2 NCR /CL/OFI	OFI: Please use standard sigma summing notation (with index, lower, and upper bound of summation) to improve the clarity and readability of this document.
Round 2 Response from Project Proponent (26 November 2013)	Wildlife Works is committed to producing a methodology that has a high degree of clarity and broad applicability for project types. We appreciate the suggestions given by the Validator for improvements in the methodology and its format, and will consider them at the next opportunity for the revision of this methodology.
ESI Findings - Round 3 (13 December 2013)	**OFI not addressed.** Please note that OFIs are not required to be addressed by the methodology developer.

Item Number	28
General Technical Expert Review	See ESI findings Round 1
Evidence Used to Assess (Location in PD, MR or Supporting Documents	VM0009 V3.62 section 2.2.8
ESI Findings - Round 1 (16 October 2013)	**Monitoring Periods notation should be changed to avoid confusion, page 17 of the methodology states "***Monitoring periods are notated using bracketed superscripts [m]. The first monitoring period is denoted by [m=1], the second monitoring period [m=2] and so forth. These superscripts should not be confused with references to equation numbers, as equation numbers are never in superscript. Also see the definition for monitoring period. A monitoring event is the reporting and verification of NERs claimed for a monitoring period".*
Round 1 NCR/CL/OFI	CL: Superscript notation used to indicate monitoring periods [m] (e.g.. $c_P^{[m]}{}_{AGMT}$) can easily be confused for powers (e.g.. x^y). Please use subscript to indicate monitoring period (e.g.. $c_{PAGMT[m]}$) to avoid confusion.
Round 1 Response from Project Proponent (24 October 2013)	Wildlife Works rejects this finding. This finding is an issue of Methodology formatting and the Validators preference and is outside the scope of this audit. The current formatting was not chosen arbitrarily, but developed systematically with Methodology readability and usability as a primary goal.
ESI Findings - Round 2 (14 November 2013)	After discussions with VCS, it clear this issue is outside the scope of this validation. Accordingly, we are issuing this as an OFI to improve clarity of the document.
Round 2 NCR /CL/OFI	OFI: Superscript notation used to indicate monitoring periods [m] (e.g.. $c_P^{[m]}{}_{AGMT}$) can easily be confused for powers (e.g.. x^y). Please use subscript to indicate monitoring period (e.g.. $c_{PAGMT[m]}$) to avoid confusion.
Round 2 Response from Project Proponent (26 November 2013)	Wildlife Works is committed to producing a methodology that has a high degree of clarity and broad applicability for project types. We appreciate the suggestions given by the Validator for improvements in the methodology and its format, and will consider them at the next opportunity for the revision of this methodology.

ESI Findings - Round 3 (13 December 2013)	**OFI not addressed.** Please note that OFIs are not required to be addressed by the methodology developer.

Item Number	29
General Technical Expert Review	See ESI findings Round 1
Evidence Used to Assess (Location in PD, MR or Supporting Documents	VM0009 V3.62 section 2.2.14
ESI Findings - Round 1 (16 October 2013)	**Vector notation should not be used in this methodology to avoid complexity and confusion, page 17 of the methodology states "***Vectors are indicated using bold face; for example* ***θ*** *is the vector of conversion: The removal or replacement of vegetation and/or disturbance of soil. conversion parameters: the parameters of the baseline emissions models that describe the behavior of degradation and conversion over time. covariate parameters to the logistic function of conversion are described in section 6.8. This vector may include numerous elements such as the numeric effects of population density, road density or per-capita household income on predicted conversion".*
Round 1 NCR/CL/OFI	CL: Please remove all vector notation from the methodology to avoid complexity and confusion.
Round 1 Response from Project Proponent (24 October 2013)	Wildlife Works rejects this finding. This finding is an issue of Methodology formatting and the Validators preference and is outside the scope of this audit. Vector notation is an accepted and standard mathematical method. The current formatting was not chosen arbitrarily, but developed systematically with Methodology readability and usability as a primary goal.
ESI Findings - Round 2 (14 November 2013)	After discussions with VCS, it clear this issue is outside the scope of this validation. Accordingly, we are issuing this as an OFI to improve clarity of the document.
Round 2 NCR /CL/OFI	OFI: Please remove all vector notations from the methodology to avoid complexity and confusion.
Round 2 Response from Project Proponent (26 November 2013)	Wildlife Works is committed to producing a methodology that has a high degree of clarity and broad applicability for project types. We appreciate the suggestions given by the Validator for improvements in the methodology and its format, and will consider them at the next opportunity for the revision of this methodology.
ESI Findings - Round 3 (13 December 2013)	**OFI not addressed.** Please note that OFIs are not required to be addressed by the methodology developer.

Item Number	30
VCS Methodology Approval Process Version 3.5 (October 2013)	3.3.1 The developer shall submit to the VCSA a signed methodology approval process submission form (available on the VCS website) and the methodology element documentation.

Evidence Used to Assess (Location in PD, MR or Supporting Documents	http://www.v-c-s.org/methodologies/in-development
ESI Findings - Round 1 (16 October 2013)	No evidence could be found on the VCS website of a signed methodology approval process submission form, nor was a copy provided to ESI
Round 1 NCR/CL/OFI	NCR: Please provide evidence of a signed methodology approval process submission form
Round 1 Response from Project Proponent (24 October 2013)	Wildlife Works has met this requirement. The Signed Methodology Approval Process submission form v3.1 was submitted to VCS via email on September 25th, 2013.
ESI Findings - Round 2 (14 November 2013)	**Finding Closed:** This response addresses the concern raised in round 1.

Appendix B – Documents Received from client

Documents received 17 September 2013

- VM0009 Methodology for Avoided Conversion v3.61.docx

Documents received 20 September 2013

- VM0009 Methodology for Avoided Conversion v3.62.pdf
- VM0009 Methodology for Avoided Conversion v3.62.docx

Documents received 30 September 2013

- Methodology for Avoided Ecosystem Conversion compare v3.62 (new) to v2.161 (old).docx
- Copy of Market Leakage Tool 2013-09-15.xlsx
- Global Commodity Leakage Module - Production Approach v 0 3_clean.docx
- conservative analysis of lambda
    - subsetbygrassland.csv
    - Boot CI 2.png
    - Integration using lambda comparison1.2.png
    - lambda1.4.r
    - modeloutput.txt
    - original data.csv

Documents received 04 October 2013

- Copy of Wildlife Works Baseline U1 Example v2.xlsm
- Copy of Wildlife Works Baseline P1b Example.xlsm

Documents received 24 October 2013

- VM0009 Revision _VCS_3.3_Methodology_Validation_Checklist_round1_WWCResponse v1.xlsx
- VM0009 Methodology for Avoided Conversion Redline v3.62 and v3.72.docx
- VM0009 Methodology for Avoided Conversion v3.72.docx

Document received 15 November 2013 (from VCS)

- 131211_Comments on VM0009 v3 1.pdf

Document received 26 November 2013

- Copy of VM0009 Revision _VCS_3 3_Methodology_Validation_Checklist_Round2_WWCResponse v1.xlsx
- VM0009 Methodology for Avoided Conversion Redline v3.72 and v3.76.docx
- VM0009 Methodology for Avoided Conversion v3.76.docx

Document received 05 December 2013

- 131211_Comments on VM0009 v3 1.pdf
- WWC Response to Comment on VM0009.pdf

Documents received 06 December 2013

- VM0009 Methodology for Avoided Conversion v3.77.docx

Documents received 20 December 2013

- ESI Round III NCRs_CLs South Pole NCR2.docx
- VM0009 Methodology for Avoided Conversion v3.81.docx
- VM0009 Revision _VCS_3 3_Methodology_Validation_Checklist_Round3_wwc response.xls
- AreaF_RanchCore.csv
- Chyulus_BEMstrata_Grids.pdf
- Chyulus_BEMstrata1.pdf
- GoogleEarth_GrasslandConversion.jpg
- Landsat13_GrassConv_dots.jpg
- output_final2.xlsx
- RanchCore.pdf
- RanchCore_2.xlsx
- Samlout_BEM.xlsx
- SEK BEM Project Progress Report_12.20.2013.pdf

Documents received 16 January 2014

- 053-WWC-Methodology Assessment Report_DRAFT_v4_wwc review.doc

Documents received 09 March 2014 (from VCS)

- 053-WWC-Methodology Assessment Report_DRAFT_v4_to VCS + VCSA.pdf

Documents received 09 May 2014 (from VCS)

- WWC_Methodology Assessment Report v3.1_20140508.pdf
- VM0009 Methodology for Avoided Conversion v3.83, 8 MAY 2014.docx

Appendix C – AFOLU Project Validation Evidence

Name of Project	Validation Report – Date Issued	Date Project Registered	GHG Program Registered With
Kariba REDD+ Project	29 September 2012	15 October 2012	VCS
Lower Mississippi Valley Grouped Afforestation Project	11 October 2012	12 November 2012	VCS
Restoration of degraded areas and reforestation in Cáceres and Cravo Norte, Colombia	24 February 2011	14 March 2011	VCS
TIST Program in Kenya VCS-001	2 March 2011	15 April 2011	VCS
TIST Program in Kenya VCS-002	2 March 2011	15 April 2011	VCS
TIST Program in Kenya VCS-003	2 March 2011	15 April 2011	VCS
TIST Program in Kenya VCS-004	2 March 2011	17 April 2011	VCS
TIST Program in Kenya VCS-005	16 December 2011	22 December 2011	VCS
Bull Run Overseas Forest Carbon Project: Phase 1	15 March 2012	13 April 2012	VCS
Redd Forests Grouped Project: Protection of Tasmanian Forest	13 December 2012	pending	VCS
TIST Program in Uganda VCS-001	20 March 2012	25 May 2012	VCS
TIST Program in Uganda VCS-002	20 March 2012	25 May 2012	VCS
TIST Program in Uganda VCS-003	20 March 2012	25 May 2012	VCS
TIST Program in Uganda VCS-004	20 March 2012	25 May 2012	VCS
Protection of the Bolivian Amazon Forest	26 March 2012	25 May 2013	VCS
Reforestation of Degraded Lands in the Valle California of Patagonia, Chile	18 June 2012	29 August 2012	VCS
April Salumei Sustainable Forest Management Project	08 October 2013	Pending	VCS
TIST Program in Kenya – VCS-006	27 September 2012	01 October 2012	VCS
TIST Program in Uganda – VCS-005	7 March 2013	13 March 2013	VCS
TIST Program in Uganda – VCS-006	7 March 2013	13 March 2013	VCS

TIST Program in India VCS-001	7 March 2013	13 March 2013	VCS
Avoiding Planned Deforestation and Degradation in the Valdivian Coastal Reserve, Chile	12 November 2013	pending	VCS
TIST Program in Kenya – VCS-009	7 March 2013	13 March 2013	VCS
Reforesting Degraded Lands in Chile Through the use of Mycorrhizal Inoculation	23 April 2013	02 May 2013	VCS
Tasmanian Land Conservancy–New Leaf Project	29 October 2013	pending	VCS/CCB