Natural Forest Standard
Forest Project Annual Verification Report

TROCANO ARARETAMA CONSERVATION PROJECT

Report Date: 13 August 2014

Project Developer:
Celestial Green Ventures PLC

Verification Conducted by:
Environmental Services, Inc.
Forestry, Carbon, and GHG Services Division
Corporate Office at:
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Project Number: VO12068.00

ANSI ACCREDITED PROGRAM
GREENHOUSE GAS
VALIDATION AND VERIFICATION
0800

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1 EXECUTIVE SUMMARY

Environmental Services, Inc., (ESI) was contracted by Celestial Green Ventures PLC (CGV) on 06 May 2014 to conduct the Natural Forest Standard (NFS) Annual Verification of the *Trocano Araretama Conservation Project*'s Project Implementation Report (PIR) dated 08 August 2014 for the reporting period 21 May 2013 to 31 July 2013. The verification process closely followed the NFS Standard Requirements (v1.2, March 2014), the selected methodology (NFS AM001.1 June 2014), ISO14064-3:2006, and ISO 14065:2007.

The *Trocano Araretama Conservation Project's* primary objective is to mitigate GHG emissions; including the conservation of the natural forest ecosystem, the protection of endangered habitats of the Indigenous Tribes and other communities, and biodiversity protection of both plants and animals, which are reliant on this vulnerable habitat. "The *Trocano Araretama Conservation Project* was conceived in order to generate reductions in deforestation in the project areas while preserving existing biomass in this region. This project presents a carbon stock baseline estimation of 65,708,138 tC at risk over the 20 year crediting period of the project, from the project start date of 10th June 2011, as calculated using the Natural Forest Standard AM001.1 methodology and the Geospatial Platform data layers. The project is located in the Municipality de Borba, Amazonia, Brazil. Nearest city is Manaus (150km). The project area is 1,346,541.26 hectares or 13,465.4126 km2."[1]

The annual verification objective was to ensure the project is in compliance with the NFS Standard methods of quantification of carbon benefits and previously verified processes. ESI assessed the GHG emission reductions through avoiding deforestation and/or degradation of natural forests, and/or restoration of degraded natural forest. The scope of the annual verification included an evaluation of the accuracy, appropriateness and consistency of the quantification processes for generation of potential credits during the quantification period.

The verification criteria followed the guidance documents provided by NFS: NFS Standard Requirements (Version 1.2, March 2014), NFS Glossary of Terms (Version 1.2 March 2014), NFS Standard Guidance (Version 1.3, March 2014), and Natural Forest Standard Approved Methodology NFS AM001.1 (June 2014). The method employed by ESI in the verification process was derived from all items in ESI's internal verification process, which included utilizing NFS documents and ISO 14064-3 to develop and implement a Verification & Sampling Plan.

A summary of all verification findings is included in Appendix B.

ESI confirms all annual verification activities including objectives, scope and criteria, level of assurance, and project documentation adhere to NFS (Version 1.2) as documented in this report are complete. ESI concludes without any qualifications or limiting conditions that the *Trocano Araretama Conservation Project's* Project Implementation Report (dated 08 August 2014) for the 21 May 2013 to 31 July 2013 reporting period meets the requirements of NFS.

The GHG assertion provided by CGV and verified by ESI has resulted in the GHG emissions reduction or removal of 7,579,393 tCO_2 equivalents by the project during the quantification period of 01 August 2012 to 31 July 2013.

[1] *Trocano Araretama Conservation Project, Project Design Document, March 2013*

2 INTRODUCTION

This annual verification report is prepared in accordance with the requirements of the Natural Forest Standard (NFS) Version 1.2 (March 2014). Environmental Services, Inc., (ESI) presents annual verification findings of the *Trocano Araretama Conservation Project* – prepared by Celestial Green Ventures PLC (CGV). The annual verification was conducted as part of the NFS's program requirements for GHG offset projects. ESI is accredited by the American National Standards Institute under ISO14065:2007 for greenhouse gas validation and verification bodies including ISO 14064-3:2006, ISO 14065:2007, and validation/verification of assertions at the project level for Land Use and Forestry (Group 3) and is approved to validate/verify for the NFS.

2.1 Project Developer and Other Entities - Contact Information

This project is implemented by CGV. Information regarding the project proponent is included below:

Project Proponent	Point of contact	Roles/ Responsibility	Contact Details
Celestial Green Ventures PLC	Ciaran Kelly Chief Executive Officer	Project developer, implementer, manager	Merchants Hall 25-26 Merchants Quay, Dublin 8, Ireland Telephone: +353 (0) 1 444 3662 Email: info@celestialgreenventures.com Web: www.celestialgreenventures.com

In addition to the project proponents, there are other individuals and organizations that play an operative role in the project. These entities are presented below:

Other Entities	Point of contact	Roles/ Responsibility	Contact Details
Municipality of Borba	José Maria da Silva Maia, Prefeito (Mayor) de Borba	Represents ownership and management of project lands.	Av May 13, 108 – Centro, Borba - Amazonas – Brazil, CEP: 69200-000 Tel: + 0055 92 35122065 Web: www.prefeituradeborba.am.gov.br
Instituto Amazon Livre (Institute Free Amazon)	Antônio José do Nascimento Fernandes, , General Secretary	Project technical consultant	Dr. Almínio Street, 236 – Centro, Manaus - Amazonas – Brazil, CEP: 69005-200 Tel: +55 92 8143 8420 Email: antoniojnf@hotmail.com
Ecometrica	Karin Viergever, Head of Land Use and Spatial Analysis	Project technical consultant, Geospatial Platform Liaison	Top Floor, Unit 3B, Kittle Yards, Causewayside, Edinburgh, EH9 1PJ Telephone: +44 131 662 4342 Email: karin.viergever@ecometrica.com Web: www.ecometrica.com

2.2 Verification Team - Roles and Responsibilities and Contact Information

Accredited Validation Entity: Environmental Services, Inc.	Environmental Services, Inc. Forestry, Carbon, and GHG Services Division 7220 Financial Way, Suite 100 Jacksonville, Florida 32256 Phone: 904-470-2200 www.esicarbon.com Lead Verifier: Stewart McMorrow Verification Team Members: Shawn McMahon, Rich Scharf, Jonathan Pomp, Matt Perkowski, Guy Pinjuv and Eric Jaeschke QA/QC/Internal Reviewer: Janice McMahon

2.3 Project Description

The *Trocano Araretama Conservation Project's* primary objective is to mitigate GHG emissions through avoided deforestation; including the conservation of the natural forest ecosystem, the protection of endangered habitats of the Indigenous Tribes and other communities, and biodiversity protection of both plants and animals, which are reliant on this vulnerable habitat.

"The *Trocano Araretama Conservation Project* was conceived in order to generate reductions in deforestation in the project areas while preserving existing biomass in this region. This project presents a carbon stock baseline estimation of 65,708,138 tC at risk over the 20-year crediting period of the project, from the project start date of 10th June 2011, as calculated using the Natural Forest Standard AM001.1methodology and the Geospatial Platform data layers.

The primary objectives of the project are as follows:

- Avoid deforestation within the project area for the duration of the project;
- Categorize the risk of deforestation to the project area, using the ACEU rule as per the NFS AM001.1 methodology;
- Identify the areas most at risk of deforestation and implement effective protection and monitoring;
- Conservation and preservation of the natural forest;
- Raising civic pride and appreciation of the natural forest;
- Strengthening of Local Forest Protection;
- Biodiversity protection of the plants, animals and the ecosystem as a whole;
- Socio-economic enhancements for the local communities, including healthcare, education, employment and infrastructure improvements; and
- Data collection, including inventorying biodiversity, forest, flora and fauna."[2]

[2] *Trocano Araretama Conservation Project, Project Design Document, March 2013*

2.4 Verification Objective

The annual verification objective was to ensure the project is in compliance with the NFS Standard methods of quantification of carbon benefits and previously verified processes. ESI assessed the GHG emission reductions through avoiding deforestation and/or degradation of natural forests, and/or restoration of degraded natural forest. The scope of the annual verification included an evaluation of the accuracy, appropriateness and consistency of the quantification processes for generation of potential credits during the quantification period.

2.5 Verification Level of Assurance

The level of assurance was used to determine the depth of detail that the verifier placed in the verification plan to determine if there were any errors, omissions, or misrepresentations (ISO 14064-3:2006). For this annual verification, ESI duplicated and assessed the analysis of data used in the generation of potential credits to provide *reasonable assurance* and to meet the materiality requirements of the specific project (NFS).

2.6 Verification Criteria

The verification criteria followed the verification guidance documents provided by NFS. These documents included the following:

- *NFS Standard Requirements (Version 1.2, March 2014)*
- *Natural Forest Standard Approved Methodology NFS AM001.1 (June 2014)*
- *Natural Forest Standard Guidance for Annual Reporting (v1 March 2014)*
- *Natural Forest Standard Guidance for Periodic Reporting (v1 March 2014)*
- *NFS Standard Guidance (Version 1.3, March 2014)*
- *NFS Glossary of Terms (v1.2, March 2014)*

2.7 Verification Scope

The scope of the annual verification included the following items:

- Ensure the accuracy, appropriateness and consistency of the quantification process.
- Ensure the quantification of carbon benefits is in accordance with the Standard, the approved NFS methodology and previously verified quantification processes.
- Ensure that the project is conforming to and applying the NFS approved methodology and that the recommended procedures for quantification methods and calculations are being utilized.
- Ensure that the data used for quantification is correct and appropriate.
- Ensure appropriate deductions of potential credits have been applied correctly and in accordance with the approved NFS methodology and previously verified processes.
- Identify any deviations from the Standard, approved NFS methodology or previously verified quantifications.
- Assess the extent to which the assertion of carbon benefits quantified is materially accurate.

The scope of The Trocano Conservation Project's was outlined by the project developer prior to this Verification and Sampling Plan in the project description and is re-defined as follows for the GHG project:

Baseline Scenario	Natural forest deforestation and degradation – threats from large scale illegal logging and mining, slash and burn agriculture, and transport routes. No increase in environmental services to the project area.

Activities/Technologies/Processes	The Trocano Conservation Project's primary project activity over the 1,346,541.26-ha total project area is to reduce GHG emissions from avoiding deforestation and degradation within the project area. This will be achieved by implementing an effective monitoring and management plan, whilst encouraging more effective forest governance and providing additional co-benefits to the communities and biodiversity within the project area. These additional activities include the following: • Conservation and preservation of the natural forests; • Biodiversity protection of the plants, animals and the ecosystem as a whole; • Socio-economic enhancements for the local communities, including healthcare, education, employment and infrastructure improvements; and • Data collection, including inventorying biodiversity, forest, flora and fauna.
Sources/Sinks/Reservoirs	Above-ground biomass, Below-ground biomass
GHG Type	CO_2
Time Period	Start Date: 10 June 2011 Crediting Period: 20 years (10 June 2011 to 09 June 2031) Current Reporting/Verification Period: 21 May 2013 to 31 July 2013 Current Quantification Period: 01 August 2012 to 31 July 2013
Project Boundary	Portion of the Municipality of Borba – total eligible project area is 1,346,541.26 hectares

2.8 Verification Materiality Threshold

Materiality is a concept that errors, omissions and misrepresentations could affect the GHG reduction assertion and influence the intended users (ISO 14064-3:2006). As the NFS does not define a materiality threshold, ESI defined the materiality threshold as being ± 5%. As defined by the NFS Requirements (v1.2), verifiers can identify major or minor discrepancies. Major discrepancies identified by the verifier were addressed prior to credit issuance. Major discrepancies are defined as errors in quantification that exceed the 5% materiality threshold or are deemed to be out of compliance with the NFS Requirements or other guidance documentation. Minor discrepancies include errors, omissions or other misstatements and clarifications that area raised by the verifier. Minor discrepancies identified by the verifier were addressed within a timescale agreed with the verifier.

3 VERIFICATION PROCESS

3.1 Overall Process

The verification assessed the Project's compliance with the NFS (v1.2, March 2014) the selected methodology (NFS AM001.1), and the validated PDD. This verification assessed the GHG emission removals through avoiding deforestation and/or degradation of natural forests, and/or restoring degraded natural forest.

A Verification & Sampling Plan methodology was used to guide the verification process. Specifically, the sampling plan utilized the NFS guidance documentation and ISO 14064-3. No site visit was performed for this annual verification.

3.2 Document Review

A detailed review of all project documentation pertaining to the annual verification was conducted to ensure consistency with, and identify any deviation from, NFS and the validated PDD. Initial review focused on the Project Implementation Report (PIR), and the potential credit calculations contained within the project-specific Geospatial Platform. Quantification of GHG emission reductions and removals are performed exclusively within the Geospatial Platform and access was granted to verifiers for this annual verification.

Along with a review of the PIR, documentation and potential credit calculations were exported from the Geospatial Platform for review of consistency, accuracy, and appropriateness with regard to NFS program requirements and the validated PDD. Additional documents reviewed included materials related to responses for Non-conformance Requests (NCRs)/Clarification Requests (CLs)/Opportunities for Improvement (OFIs).

For a listing of all documents received from the client for this verification, please see Appendix A.

3.3 Resolution of Any Material Discrepancy

When potential material discrepancies were identified during the annual verification process, an NCR, CL, or OFI type request was issued. The verification team identified 18 NCRs/CLs/OFIs. All requests were addressed satisfactorily by the Project Developer during the verification process. The responses to these NCRs/CLs/OFIs and supporting documentation provided the necessary clarity to ensure the project was in compliance with NFS program requirements for carbon benefit quantification procedures for GHG projects. All requests and their resolutions are attached (Appendix B).

4.0 VERIFICATION FINDINGS

4.1 Project Reporting Period and Project Quantification Period

The project reporting period for this annual verification is 21 May 2013 to 31 July 2013. The project quantification period (period in which potential credit assertions were verified) is 01 August 2012 to 31 July 2013. The differences in dates among the reporting period and quantification period ensure for this verification that the dates are brought in line moving forward.

The project crediting period for this project is 20 years, beginning on 10 June 2011 and ending on 09 June 2031.

Estimated net GHG emission reductions for the *Trocano Araretama Conservation Project* are 7,579,393 tCO2e for the current quantification period. A risk buffer of 10% was estimated for the previous reporting period and a risk buffer will be determined by the NFS Risk Panel for the current quantification period. The Risk Panel assesses each project on an individual basis and set appropriate buffer levels of credits accordingly.

4.2 Project Implementation Status

Project activities and Management Plan as described in the validated PDD, have been fully initiated as outlined in the PIR (dated 08 August 2014), for the 21 May 2013 to 31 July 2013 Reporting Period. There are no remaining issues from the previous verification. An assessment of the implementation status of the Project was limited to review of the quantification methods for potential credits. An outline of this review is presented in the next section.

4.3 Accuracy of GHG Emission Reduction or Removal Calculations

The verification team conducted an intensive review of all data, parameters, formulas, calculations, and conversions to ensure consistency with NFS and the methodology. Further, the verification team reproduced calculations for selected samples to ensure accuracy of the results. As the Project stores its information in its Geospatial Platform, the verification team downloaded data in order to perform independent computations for comparison and correctness. Data according to project area was available in Microsoft Excel format for efficient computation review. The Project Developer also provided a step-by-step overview of calculations to ensure ESI understood the approach and could confirm its consistency with validated PDD.

A comprehensive assessment of data collection and storage procedures was reviewed in the previous verification to ensure all opportunities for error in transposition of data between data were minimized.

During the annual verification, the evidence provided by the Project Developer was sufficient in both quantity and quality to support the determination of GHG emission removals reported by the project. Throughout the verification, the Project Developer demonstrated a commitment toward conservativeness and took all measures appropriate to ensure the reliability of evidence provided.

5 VERIFICATION CONCLUSION

After review of all project information, procedures, calculations, and supporting documentation, ESI confirms that the quantification procedures for carbon benefits asserted by the Project Proponent are accurate and consistent with all aforementioned Natural Forest Standard Requirements and the selected methodology. ESI confirms that the *Trocano Araretama Conservation Project's*, Project Implementation Report (dated 08 August 2014) has been implemented according to the validated PDD and NFS criteria.

ESI confirms all annual verification activities, including objectives, scope and criteria, level of assurance, and quantification related project documentation adhere to The Natural Forest Standard (and all associated updates), as documented in this report are complete. ESI concludes without any qualifications or limiting conditions that the *Trocano Araretama Conservation Project*'s Project Implementation Report (dated 08 August 2014) meets the requirements of the Natural Forest Standard and all associated updates.

The GHG assertion provided by the Project Proponent and verified by ESI has resulted in the GHG emission reduction or removal of 7,579,393 tCO_2e equivalents by the project during the current quantification period (01 August 2012 – 31 July 2013). This does not include any deduction based on the non-permanence risk assessment as calculated and applied by the Natural Forest Standard.

GHG Emission Reductions or Removals	**Previous Verification 10 June 2011 to 31 July 2012** (tCO_2e)	**Current Verification 01 August 2012 to 31 July 2013** (tCO_2e)
Baseline Emissions Reductions	7,761,183	7,762,191
Project Emissions	0	0
Leakage	53,555	167,705
Undetected Emissions*	4,820	15,093
Net GHG emission reductions or removals	7,702,808	7,579,393

**In order to account for emissions undetected by the INPE's PRODES Amazon Annual Monitoring Program, an additional 9% was added to the deforested area extent within more intensely deforested areas. Please refer to the Assessment of PRODES data and Undetected Deforestation document available under the Science tab of the Geospatial Platform for the full methodology.*

Submittal Information:

Report Submitted to:	Natural Forest Standard Celestial Green Ventures PLC
Report Submitted by:	Environmental Services, Inc. Corporate Office 7220 Financial Way, Suite 100 Jacksonville, FL 32256
ESI Lead Verifier Name and Signature:	 Stewart McMorrow Lead Validator
ESI Division Regional Technical Manager Name and Signature:	 Janice McMahon Vice President and Forestry, Carbon and GHG Division Regional Technical Manager
Date:	13 August 2014

Appendix A - Documents Received / Reviewed

Documents received May 19, 2014

- Trocano Araretama Credit Calculations 2012-2013_190514

Documents received 01 June 2014

- Trocano Project Implementation Report_2_DRAFT COPY_290514.pdf

Documents received 25 June 2014

- Trocano Project Implementation Report_2_DRAFT COPY_V2_200614.pdf
- AV001_4 Flooded Areas ESAglobcover shapefile 170614
    - flooded_glob_covers_shapefile.shx
    - flooded_glob_covers_shapefile.dbf
    - flooded_glob_covers_shapefile.prj
    - flooded_glob_covers_shapefile.sbn
    - flooded_glob_covers_shapefile.sbx
    - flooded_glob_covers_shapefile.shp
    - flooded_glob_covers_shapefile.shp.xml
- AV001_7 Trocano GCS project areeas 150614
    - Borba_only_GCS_project_areas.shx
    - Borba_only_GCS_project_areas.dbf
    - Borba_only_GCS_project_areas.prj
    - Borba_only_GCS_project_areas.sbn
    - Borba_only_GCS_project_areas.sbx
    - Borba_only_GCS_project_areas.shp
- AV001_8 Trocano only GCS buffer leakageareas 150614
    - Borba_only_GCS_buffer_leakageareas_GCS.shx
    - Borba_only_GCS_buffer_leakageareas_GCS.dbf
    - Borba_only_GCS_buffer_leakageareas_GCS.prj
    - Borba_only_GCS_buffer_leakageareas_GCS.sbn
    - Borba_only_GCS_buffer_leakageareas_GCS.sbx
    - Borba_only_GCS_buffer_leakageareas_GCS.shp
    - Borba_only_GCS_buffer_leakageareas_GCS.shp.xml
- AV001_1 Reporting Period Confirmation Letter_CGV_NFS001_120514.pdf
- AV001_2 Difference in Query Area Sizes_Explanation_130614.pdf
- AV001_3 Summary of Quantification Calculations & Methodologies_180614.pdf
- AV001_5 CGV Amazon OE Application Report Borba 13_160813.pdf
- AV001_6 CGV Amazon OE Application Report Borba 13_200813.pdf
- AV001_9 Trocano_Araretama_Areas_Cloud_Cover_170614.jpg
- Trocano Araretama Project Annual Verification Round 1 NCR Responses_240614.docx

Documents received 17 July 2014

- Trocano Araretama Project Annual Verification Round 1 NCR Extended Responses_170714.docx
- AV001_10 Example calculations for Qp_160714.xlsx

Documents received 28 July 2014

- Trocano Araretama Project Annual Verification Round 2 NCR Responses_280714.docx
- AV001_7 Trocano-GCS_project areas 150614

    - Borba_only_GCS_project_areas.shx
    - Borba_only_GCS_project_areas.dbf
    - Borba_only_GCS_project_areas.prj
    - Borba_only_GCS_project_areas.sbn
    - Borba_only_GCS_project_areas.sbx
    - Borba_only_GCS_project_areas.shp
- AV001_8 Tracano only GCS Buffer leageares 150614
    - Borba_only_GCS_buffer_leakageareas_GCS.shx
    - Borba_only_GCS_buffer_leakageareas_GCS.dbf
    - Borba_only_GCS_buffer_leakageareas_GCS.prj
    - Borba_only_GCS_buffer_leakageareas_GCS.sbn
    - Borba_only_GCS_buffer_leakageareas_GCS.sbx
    - Borba_only_GCS_buffer_leakageareas_GCS.shp
    - Borba_only_GCS_buffer_leakageareas_GCS.shp.xml
- AV001_2 Difference in Query Area Sizes_Explanation_130614.pdf
- AV001_10 Example calculations for Qp_160714.xlsx

Documents received 07 August 2014

- Round 3 Responses_070814.docx
- AV001_2 Difference in Query Area Sizes_Explanation_130614.pdf
- AV001_11 Trocano Araretama Credit Calculations 2012-2013_Unrounded_CGV.xlsx

Documents received 08 August 2014

- Trocano Project Implementation Report_2_V3_FINAL_080814.pdf

Appendix B – NCR/CL Summary

Round 1 NCR/CL/OFI submitted	6 June 2014
Round 1 NCR/CL/OFI responses received	24 June 2014
Round 1 NCR/CL/OFI extended responses received	17 July 2014
Round 2 NCR/CL/OFI submitted	23 July 2014
Round 2 NCR/CL/OFI responses received	28 July 2014
Round 3 NCR/CL/OFI submitted	5 August 2014
Round 3 NCR/CL/OFI responses received	8 August 2014

	1 - OFI
NFS Requirement:	The annual quantification period is determined by the project start date and the 12 month monitoring period that is established as part of the project management plan. The annual reporting period is not necessarily a calendar year; it should be determined as a 12 month period according to the projects monitoring and management plan. The quantification of carbon benefits should be submitted for verification no more than 12 months after the annual quantification period ends.
ESI Finding:	The previous crediting period, as seen in the previous Implementation Report, indicates 10 June 2011 - 31 July 2012. The current crediting period runs from 1 August 2012 - 31 July 2013. It is unclear to verifiers if the "annual quantification period" refers to the crediting period or another purpose.
Evidence:	Trocano Project Implementation Report_2_DRAFT COPY_290514.pdf
Request:	OFI: The terminology for the Standard is not consistent with what is illustrated in the current implementation report, specifically the terms "quantification" and "crediting". Also, the terms "annual report" and "Project Implementation Report" appear to be used interchangeably. These terms could be revised for better clarity.
Response:	It is noted that there was some confusion within the draft Project Implementation Report with regards the terminology stated by the Standard. It is hereby confirmed that the project team have now ensured consistency with the Standard's terminology in the Project Implementation Report NFS001_2, with specific relation to the terms "quantification period" and "crediting period" and appropriate corrections have been applied to the draft report. With regards the terms "annual report" and "Project Implementation Report"; the Natural Forest Standard documentation includes a definition for the term "Project Implementation Report" in the "NFS Glossary of Terms v1.2 March 2014" and as such was felt by the project to be the more correct and appropriate term to be used for this particular report, given that it is not referring to a time period equal to one year, and could lead to confusion on the readers part had it been labelled as an annual report. The term "Annual Report" was used once in the draft report, on page 3 under 'Report Information'; this has been amended to avoid confusion. It is also the case that the Standard accepted the previously verified report termed as a "Project Implementation Report", and as such is further considered by the project team to be a consistent and appropriate use of the term.
ESI Final Finding	This issue has been corrected and will again be reviewed by the NFS staff when this report is submitted. Finding closed.

NCR/CL/OFI Closed	25 June 2014

	2 - CL
NFS Requirement:	The annual date for which the quantification period refers is determined by the initial verification and monitoring period and will recur on a 12 monthly basis for the duration of the project. The project reporting cycle may be revised by agreement with the NFS provided continuity of monitoring and reporting is maintained.
ESI Finding:	The current Implementation Report notes on the cover that the Reporting Period covers 21 May 2013 - 31 July 2013. These dates are not a calendar year nor a 12 month period per this requirement.
Evidence:	Trocano Project Implementation Report_2_DRAFT COPY_290514.pdf
Request:	CL: Please describe why the current reporting period is only a 3 month period (for documentation purposes). Please provide the NFS agreement documentation or communications which allows this reporting period to be less than the specified 12 month basis.
Response:	As per the Executive Summary within the Project Implementation Report, the reporting period that the Project Implementation Report covers is from 21st May 2013 to 31st July 2013, which is the remainder of the second quantification period of the project. This is in order for both the reporting and quantification time periods to be brought into alignment. The initial Project Implementation Report (NFS001_1) documented the progress made throughout the initial 23 months of the project implementation (being 10th June 2011 to 20th May 2013), despite the initial quantification period for the project being from the 10th June 2011 to 31st July 2012. This was due to the initial verification of the project being carried out in June 2013 and the Project Implementation Team's (PIT) desire to report as completely and transparently as possible for this process. The Trocano project has now completed the monitoring and reporting for the second quantification period of the project (1st August 2012 to 31st July 2013), and it is necessary for the remainder of the project activities corresponding with this period to be documented, reported and submitted in the form of a PIR, to allow both the reporting and carbon quantifications time periods to align. For this reason, it has resulted in the requirement for this subsequent PIR to report only on the remaining period that relates to the quantification period that was not previously reported on, which is from 21st May 2013 to 31st July 2013; this revised reporting period has been agreed in writing by the NFS Secretariat. The letter of agreement from the NFS Secretariat is attached, with documentation reference AV001_1.
ESI Final Finding	Verifiers accept this response and it appears to be a valid and acceptable arrangement as per the NFS Standard. Issue is addressed.
NCR/CL/OFI Closed	25 June 2014

	3 - OFI
NFS Requirement:	The annual date for which the quantification period refers is determined by the initial verification and monitoring period and will recur on a 12 monthly basis for the duration of the project. The project reporting cycle may be revised by agreement with the NFS

	provided continuity of monitoring and reporting is maintained.
ESI Finding:	Table 5 of the Implementation Report notes in the top heading "CURRENT CREDITING YEAR" and "PREVIOUS CREDITING YEAR". These years could be numbered to avoid future confusion over credits allocated for a given crediting period.
Evidence:	Trocano Project Implementation Report_2_DRAFT COPY_290514.pdf
Request:	OFI: Table 5 of the Implementation Report notes in the top heading "CURRENT CREDITING YEAR" and "PREVIOUS CREDITING YEAR". These years could be numbered to avoid future confusion over credits allocated for a given crediting period.
Response:	This observation has been duly noted and although the table did include the dates to which each column was referring, the table in the draft Project Implementation Report has been revised to ensure complete clarity.
ESI Final Finding	Clarifications made to the table in question. Further final review will occur with NFS staff. Issue is addressed.
NCR/CL/OFI Closed	25 June 2014

	4 - NCR
NFS Requirement:	Ensure that the data used for quantification is correct and appropriate.
ESI Finding:	The verifier downloaded data for Borba Area 1 and found that the values for "Adjusted Above-Ground Biomass" (5896412.5 t [t]) differ than "Above-Ground Biomass" (5907627.8 t [t]) while all other values remain the same between adjusted and not. This is the same case for all downloaded calculations for project area Borba 2.
Evidence:	Trocano Araretama Credit Calculations 2012-2013_190514.xlsx, OE calc exports
Round 1 Request:	NCR: Please explain the discrepancy between values for "Adjusted Above-Ground Biomass" and "Above-Ground Biomass" in the Total Biomass & Carbon tab of a downloaded data for any Project Area. Please also explain how these values are "adjusted."
Round 1 Extended Response:	There is a detailed explanation of how the Adjusted Carbon map was produced in the "Carbon Map Adjustment for Deforestation Methodology" document available under the Science tab of the Geospatial Platform. This document also explains the reason for doing the adjustment, and there is an overview of the reason for the adjustments given in section 4.1(i) of the Project Implementation Report. For clarification purposes; areas that have experienced deforestation between 2000 and 2011 (i.e. the period prior to the start of the project) should show different values in the queries for AGB and Adjusted AGB, BGB and Adjusted BGB as well as Total Carbon and Adjusted Total Carbon. However, small differences may occur in areas that have not experienced deforestation between 2000 and 2011. This is due to GIS processing of the Adjusted C map, specifically related to resampling of the dataset. Further Note: The verifiers comment regarding the difference between the original and the adjusted AGB values in areas that have not had deforestation prior to the project, prompted a detailed investigation of the data linked to this query. This showed that the query for the original AGB values was in fact linked to the wrong data file (still the JPL NASA AGB biomass map, but at a slightly lower resolution) and was returning different AGB query outputs than during the previous verification process in 2013. As the adjusted carbon map was made using the higher resolution AGB and BGB JPL NASA layers, the differences between the adjusted values and the higher resolution original AGB match

better.

It should be noted that this error only affected the original AGB data and didn't affect the credit and emissions values, as these are all calculated based on the adjusted carbon map and the Adjusted Carbon Values, which hadn't changed. As such it can be confirmed that none of the credit calculations were affected by this error. The original biomass and carbon values are displayed in the Geospatial Platform to show the difference between the original and adjusted values.

File A (which is currently used on OE) is the source NASA JPL AGB data (available to download at http://carbon.jpl.nasa.gov/). It is a geotif at 1km resolution (or 0.00833333 degrees).

The Geospatial Platform resamples .tif data when uploading it so that it fits into 1 of 28 grid resolutions (using nearest neighbour). This means that the data on the platform has been resampled to a resolution of approximately 611.50m at the equator (or 0.005493 degrees).

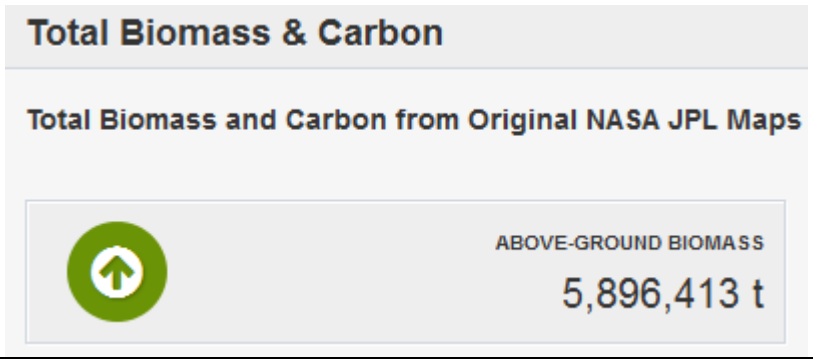
File A can be downloaded at:
http://rawgisdata.s3.amazonaws.com/CGV/AGB_pan_tropic_mosaic_clip_original_1km_onOE.tif (this file is the same as the source NASA JPL AGB data).

File B was derived from the same source data (NASA JPL), however it was resampled to 611.50m using ArcGIS software (also nearest neighbour), and then uploaded to the platform.

File B can be downloaded at:
http://rawgisdata.s3.amazonaws.com/CGV/AGB_pan_tropic_mosaic_clip_res16_-9999.tif

Both files are the same data; however there are small differences between them on the Geospatial Platform, as the Platform uses gdal to resample the data, and ArcGIS uses their own tool. Both are recognized resampling methods, however slight differences in how each method divides the .tif file into smaller pixels will mean individual pixel values may vary slightly.

The 'error ' in the AGB values occurred because the results on the platform were linked to File B, instead of File A. The only results affected by this were for the results for non-adjusted 'Above-Ground Biomass':



	While File B is not 'incorrect', using the same resampling method for both the original and adjusted AGB values means the differences between the original and adjusted AGB match better when compared directly to each other. This 'error' was corrected by linking File A to the question results for 'Above-Ground Biomass' instead of File B. This issue has now been resolved; the correct link to the correct data file is in place for this query, and all results are now displaying the same query outputs as were generated during the previous verification process.
Round 1 Findings:	Verifiers accept this response to explain the two different resampling procedures (i.e. nearest neighbor) used to derive the carbon map which accounts for deforestation prior to the project start. Previously the adjusted carbon map was linked within the geospatial platform to NASA JPL AGB data, but had been resampled using ArcGIS external to being uploaded to the geospatial platform. The change resulted in linking AGB to geospatial platform resampled (i.e. deforestation 2000-2011) data within the geospatial platform and thus the ArcGIS resampled data is not used. Previously downloaded worksheets were compared to the revised carbon calcs in OE for Borba 1 and 2. Only the AGB values within OE appear to have been revised according to the response from the project developer, and values were revised downward. The BGB/adjusted BGB and total/adjusted total stocks match, this does not appear to be correct and was applied to all 14 project areas. The adjusted carbon stock values should be accounting for deforestation prior to the project start date and instead all values match (AGB, BGB, and total).
Round 2 Request:	NCR remains open: Please explain why there is no difference in carbon stock values between the original and adjusted based upon the NASA JPL maps for some project areas. Please indicate if no deforestation occurred in some areas during years 2000-2011 and as a result the values for original and adjusted remain the same.
Round 2 Response:	As stated in our original Round 1 response (above) "...areas that have experienced deforestation between 2000 and 2011 (i.e. the period prior to the start of the project) should show different values in the queries for AGB and Adjusted AGB, BGB and Adjusted BGB as well as Total Carbon and Adjusted Total Carbon. However, small differences may occur in areas that have not experienced deforestation between 2000 and 2011. This is due to GIS processing of the Adjusted C map, specifically related to resampling of the dataset." Areas of deforestation as identified by PRODES for the period 2000 to 2011 can be viewed on the Geospatial Platform. This can be done by following these steps: 1. Click on the "Map Layers" icon in the left hand margin. 2. Select the "Past Deforestation" layer under the "Deforestation" heading in the list of "Layers". NOTE: when you click on the '?' next to the layer name, a description of the data layer appears in an information box; it will confirm that this data layer shows INPE's PRODES deforestation data for 2000 to 2011. 3. To check for instances of deforestation that occurred between 2000 and 2011 in any of the project areas, click on the "Areas" icon in the left hand margin, then click the little down arrow next to the "Borba" heading. When a project area name is selected (click on the name), the map interface zooms to the extent of that project area.

	Examples of project areas that have not experienced any deforestation from 2000-2011 are: Project Areas 1, 2, 3, 4, 5 and Leakage area 2. These areas all give the same ABG, BGB and Carbon Stock totals for the original carbon map and the adjusted carbon map. Leakage area 2 shows a slightly higher adjusted BGB value; this is due to resampling of the Adjusted BGB data during upload to the platform. Additional note: The verifier's Round 1 finding refers to 14 project areas; there are in fact 13 project areas.
Round 3 Findings:	Verifiers accept this response as sufficient to address the original NCR, it is now clear why some project areas reflect the occurrence of deforestation prior to the Project start date. In reviewing the export worksheets from the OE, verifiers noticed that for any project area with more than one risk category it was impossible to compute the same values of the relationship "Total Biomass & Carbon" and "Average Biomass & Carbon Density (where >0 tC/ha". For instance "Average Above-Ground Biomass Density" does not factor mathematically into "Average Above-Ground Biomass Density" using the area (identical for both worksheet tabs).
Round 3 Request:	NCR remains open: Please address the findings and explain in detail the relationship between carbon stock values in Total Biomass & Carbon" and "Average Biomass & Carbon Density (where >0 tC/ha". In doing so, please provide a verifiable demonstration of the results.
Round 3 Response:	In our original response to NCR 5, we supplied supporting document AV001_2, and also as was included in our Round 2 response to NCR 5, we explained that the area given in ha, (as given by the Geospatial Platform at the very top of the query report, and also in the top section of each worksheet on the downloadable spreadsheets) is calculated by the platform using the vector-based outline of the project area. However, areas used in the calculations for Total Carbon (from carbon density) are calculated by using the actual pixel size at the centre of the project area and are therefore more accurate. The average figures are not used within the calculations. Areas given in the tables of the query report, such as those listed in the "Area (ha)" column of the table in the query tab for "Risk of Deforestation (~ 2011 carbon values)" are based on the actual cell (pixel) size of the data layer at the centre point of the query area and are therefore more accurate than the approximate area size given at the top of the query report. Document AV001_2 is submitted again for reference.
Final ESI Finding:	Verifiers accept this written response and supplied documentation as sufficient to address this finding. The areas used for quantification (Risk of Deforestation (~ 2011 carbon values) are deemed more accurate as only pixels contained in the polygon area of interest are included. Further, the average figures are not used in carbon accounting and only for display on the Geospatial Platform. Finding closed.
NCR/CL/OFI Closed	08 August 2014

	5 - NCR
NFS Requirement:	Ensure that the data used for quantification is correct and appropriate.

ESI Finding:	Quantified carbon stocks (adjusted and unadjusted) are available quickly to download from the OE interface into .xls format. The exported values (total biomass and average biomass worksheets) were used to duplicate the computations for potential credits using the "Calculation of Natural Capital Credits to be Issued" equation in the methodology (page 3) for Borba area 1 and results differed slightly from Potential Credits reported in the Implementation Report. Accordingly, "Potential Carbon Credits Earning" was calculated from the implementation Report (page 46) and the verifier achieved the same result as reported in the Implementation Report. The verifier did not have the data used to determine Average Carbon Density (tC/ha) or Std. deviation of carbon (tC/ha) and so those values were gleaned from the exported .xls worksheets from the OE. The Implementation Report does not outline procedures to calculate an intermediate parameter, Vc (Vulnerable Carbon) and verifiers calculated this parameter using options 1 and 2 from the Methodology (Available literature or RAINFOR method) but achieved a result different than Ecometrica.
Evidence:	Trocano Araretama Credit Calculations 2012-2013_190514.xlsx, OE calc exports
Round 1 Request:	NCR: Please revise all calculations for Potential Credits in the Implementation Report to be in line with methods required by the Methodology, taking into account whether Vc was calculated using option 1 or 2 from the Methodology (Available literature or RAINFOR method). Please confirm if the ""AvgCredits"" equation in the Implementation Report is synonymous with ""Vc"" (Vulnerable Carbon) from the Methodology and revise this terminology to match that of the Methodology. Please also adjust the ""Potential Carbon Credits Earning"" equation in the Implementation report to match that of the Methodology. The explanation for calculation of Potential Credits is contained in Section 7.1.6 ""Risk of Deforestation - ACEU Deforestation Risk"" of the Implementation Report and it would improve readability to separate these calculation steps to another section."
Round 1 Extended Response:	The Geospatial platform calculates the Qp (potential credits) as set out on page 3 of the Methodology. The equation used to obtain Vc (Vulnerable Carbon) is: Vc = {[AvgC - (2xStdDevC)] x Vf} + VSoilC. The Values for Area, AvgC (Average Carbon) and StdDevC as well as the calculated value for Vc can be obtained from the query reports generated within the Geospatial Platform in the “Risk of deforestation (~2011 carbon values)” tab. This clearly sets out which equations are used and where the input values are obtained from as well as which constant values are used. The attached spreadsheet, with documentation reference AV001_10 can be used to double check these calculations, using the equations and input variables and constants as set out above. Two worksheets have been completed as an example of calculations for Area 1 and Area 6. Cells highlighted in yellow list constant values. To complete a different example on the third worksheet, copy relevant information into the cells highlighted in blue (see highlighted section above on where to obtain the values). It should be noted that the values for Area, AvgC (Average Carbon), StdDevC and Vc shown in the query reports in the “Risk of deforestation (~2011 carbon values)” are calculated by the calculation engine of OE geospatial platform. For additional information, see below the query that OE uses to calculate the Qp values that are shown

	in the Risk of deforestation (~2011) Tab. The variables, for which the backend calculations are shown below, reported in the table in the “Risk of deforestation (~2011 carbon values)” query are: category, area, total, average, stddevone, avgatriskbgb, credits. AnnotateResultSetsOperation(rs=AnnotateResultSetsOperation(rs=ClassificationOperation(operations=('Count', 'Sum', 'Avg', 'StdDev'), layer=requested_layer, classification=Layer('amazon_risk_aceu_discreet')), annotate_ops=(Annotation(annotate_name='coverage', field_name=LayerOperationFieldName(layer=requested_layer, operation='Count'), operation='div', annotate_value=polygon.number_of_cells/100,), Annotation(annotate_name='area', field_name=LayerOperationFieldName(layer=requested_layer, operation='Count'), operation='mul', annotate_value=polygon.cell_area,), Annotation(annotate_name='average', field_name=LayerOperationFieldName(layer=requested_layer, operation='Avg'), operation='div', annotate_value=1.0,), Annotation(annotate_name='total', field_name=LayerOperationFieldName(layer=requested_layer, operation='Sum'), operation='mul', annotate_value=polygon.cell_area,), Annotation(annotate_name='stddevone',

```
            field_name=LayerOperationFieldName(
                layer=requested_layer,
                operation='StdDev',
                ),
            operation='mul',
            annotate_value=1.0,
        ),
        Annotation(
            annotate_name='stddevtwo',
            field_name=LayerOperationFieldName(
                layer=requested_layer,
                operation='StdDev',
                ),
            operation='mul',
            annotate_value=2.0,
        ),
        Annotation(
            annotate_name='avgatriskmin',
            field_name='average',
            operation='sub',
            annotate_value='stddevtwo',
        ),
        Annotation(
            annotate_name='avgatrisk',
            field_name='avgatriskmin',
            operation='mul',
            annotate_value=0.9,
        ),
        Annotation(
            annotate_name='avgatriskbgb',
            field_name='avgatrisk',
            operation='add',
            annotate_value=8.0,
        ),
        Annotation(
            annotate_name='crisktotal',
            field_name='avgatriskbgb',
            operation='mul',
            annotate_value='area',
        ),
    )
),
  annotate_ops=(
        ConditionalAnnotation(
            'category_value',
            'eq',
            5.0,
            'credits',
            'crisktotal',
            'mul',
            0.8*3.667/20
```

	), ConditionalAnnotation('category_value', 'eq', 4.0, 'credits', 'crisktotal', 'mul', 0.6*3.667/20), ConditionalAnnotation('category_value', 'eq', 3.0, 'credits', 'crisktotal', 'mul', 0.4*3.667/20), ConditionalAnnotation('category_value', 'eq', 2.0, 'credits', 'crisktotal', 'mul', 0.2*3.667/20), ConditionalAnnotation('category_value', 'eq', 1.0, 'credits', 'crisktotal', 'mul', 0.0*3.667/20), ConditionalAnnotation('credits', 'lt', 0.0, 'credits', 'credits', 'mul', 0.0),)) It should be noted that the Area given in the query table is more accurate than the Area estimate given at the very top of the query report. This query also reports the calculated

	Qp value (in the column marked "Credit potential"). Please refer to attached document AV001_2 which provides an explanation for this difference (this document was originally supplied within the supporting documentation for the validation of the Trocano Project (PDD Annex Document 11), and is also fully detailed within the validated PDD on pages 98-100. It should be noted that the table in the query report shows rounded values for the various parameters but the platform does the calculations using the non-rounded values. These small differences may cause slight discrepancies when manually calculating the Qp values based on the values given in the on-screen query report. However, the downloadable Excel sheet gives the non-rounded values which can be used to double check the calculations. Note that we have used 3.667 to represent 44/12 in the calculations. For example, please see the values for Borba Area 1 as set out below: Values obtained from the query table in the "Risk of deforestation (~2011 carbon values)" tab: Area - 25260.21692 AvgC - 148.0102941 StdDevC - 11.27144544 Constant values as defined in Appendices of the Methodology AM001.1b: Vf (Vulnerable Fraction of woody biomass): 0.9 VSoilC: 8 R: 0.4 (for the medium risk category) We used 44/12 = 3.667 Calculated values based on input values above: Vc (VulC) - 120.9206629 Qp - 224015.7227 This is identical to the value for Credit Potential given in the downloadable Excel spreadsheet in the "Risk of deforestation (~2011 carbon values)" worksheet. The query report gives Qp as 224016, which is the rounded value of the calculation above. It is confirmed that the equations stated on page 46 of the draft Project Implementation Report were written with errors taken from a historic and incorrect document. These equations have now been amended to reflect the correct calculations and terminology, consistent with the approved Methodology. It is also confirmed that the explanation for the calculation of Potential Credits that was previously in section 7.1.6 of the draft PIR has been moved to section 4.1.3 of the updated PIR document. There is also an updated version of the 'Summary of Quantification Calculations and Methodologies' document included in the Science tab of the Geospatial Platform (also attached herewith under document reference AV001_3) to also reflect the consistent use of terminologies.
Round 1 Findings:	Verifiers accept this detailed response and reviewed calculations for potential credits using exported worksheets for project areas. The AM001.1b methodology has been followed per the equations on page 3. However, there are still discrepancies with areas,

	for instance Borba Area 5 contains 2 risk categories (low and medium) and the areas summed in the "Risk of Deforestation (~ 2011 c" tab do not match the total area. Verifiers are unable to confirm computation of potential credits for Borba Area 5, 6, 9 or 10 because computations are performed separately for each risk category and result in a different sum of the potential credits. This appears to be the case for any project area containing more than 1 risk category. Calculations performed in "Trocano Araretama Credit Calculations 2012-2013_190514.xlsx" do not match those found in "AV001_10 Example calculations for Qp_160714.xlsx". Further, the geospatial portal would result in an error when attempting to export worksheets for the larger project areas.
Round 2 Request:	NCR remains open: Please address the findings as written and explain the difference in potential credit computations for project areas containing more than 1 risk category. Please also supply all query results for the Borba project areas to facilitate verifier review.
Round 2 Response:	1. In response to the request to "Please also supply all query results for the Borba project areas to facilitate verifier review"; it is unfortunate that the verifier did not report this issue with the Geospatial Platform immediately upon encountering the problem for the first time. The technical team at Ecometrica has investigated, and have confirmed that Internet Explorer is indeed having trouble to download the spreadsheets for larger areas of interest (AOI); this is currently being fixed. Had the verifier gotten in touch immediately, this issue would have been fixed sooner. Furthermore, the technical team at Ecometrica would have also been able to advise that the download function for the spreadsheets works perfectly on browsers such as Mozilla Firefox and Google Chrome. Please use either of these to download the spreadsheets that you have previously had problems downloading. The verifier should get in touch with Ecometrica's technical team immediately if technical problems arise with the Geospatial Platform. Contact details for the technical team can be found by clicking on the 'OE' icon at the bottom left of the screen within the Geospatial Platform. 2. In response to the request to "explain the difference in potential credit computations for project areas containing more than 1 risk category", the AM001.1b methodology equations on page 3 are as follows: $$Qp = \sum \text{Area} \cdot R \cdot Vc \cdot \frac{44}{12} \cdot 0.05$$ The Sigma notation indicates that Qp is calculated by summing the product of values for Area, R, Vc, 44/12 and 0.05 for each of the risk categories that occur within a project area. The R Indices to be used for each of the different risk categories are listed in the approved methodology AM001.1b, on page 10. Please refer to our original Round 1 response (above) for a detailed explanation on the calculation of Vc, as well as an explanation of where to obtain the other input values from on the query reports, with example Area 1 as an example (which only contains 1 risk category). Furthermore, the Excel spreadsheet that was sent with our previous response (reference AV001_10) clearly sets out the steps to be followed during calculation of Vc and Qp,

	and allows the verifier to enter values to facilitate the process of double checking the calculations. Algorithms entered in the Excel spreadsheet have been left unlocked for the verifier to double check against the documentation. Document AV001_10 is submitted again for reference. 3. In response to your finding "...the areas summed in the...tab do not match the total area", please refer again to this extract of our extended Round 1 response: "*It should be noted that the Area given in the query table is more accurate than the Area estimate given at the very top of the query report. This query also reports the calculated Qp value (in the column marked "Credit potential").* *Please refer to attached document AV001_2 which provides an explanation for this difference*". Document AV001_2 is submitted again for reference.
Round 3 Findings:	The verifier was able to download all data for all Project areas successfully with Mozilla Firefox web browser. Calculations for potential credits were successfully duplicated using areas supplied in the query table for "Average Biomass & Carbon Density (where >0 tC/ha" and following equation for Qp on page 3 of the AM001.1 Methodology. However, there are small rounding errors reported in the Implementation Report Table 8 which need to be corrected.
Round 3 Request:	Please address the findings and fix all rounding errors located in Table 8 of the Implementation Report. Also, verifiers suggest removing "Undetected Emissions 9%(ii)" under the Project Area heading in Table 8 as this exclusion is only applied to the Leakage Areas per the Methodology.
Round 3 Response:	1. The differences in rounding that the verifier has reported are not "errors". In our Round 1 extended response above, we explained why sometimes there is a small difference in the values reported in the downloadable spreadsheet and the rounded values reported in the query results. The values we used in the credit calculations sheet, and that are displayed in Table 8 of the PIR, are the rounded values given in the query reports from the Geospatial Platform (on-screen and in the downloadable PDF files). It appears that the verifier has used the unrounded values obtained from the downloadable spreadsheets for each of the project areas. It should be noted that this step involves rounding of the unrounded totals obtained from the downloaded spreadsheet to use a rounded value in the credit calculations sheet. We have re-calculated the credit calculations using the unrounded values in the downloadable spreadsheets for each of the project areas and have obtained a different total for "Credits due 2014" than the total that the verifier calculated (7,762,195 versus the verifiers' total of 7,762,192). The difference is mainly due to differences between our calculations for "Credits Excluded for Soil Carbon in Deforested Areas 2000-2011 (tCO2)". We have attached our spreadsheet with the calculations using the unrounded values, with document reference AV001_11. However, we would like to confirm that we consider it appropriate for us to continue using the rounded figures that were originally submitted, as this provides consistency in our calculation approach; with the rounded figures being previously applied to our calculations in the preceding quantification period and corresponding with the rounded

	values given in the query reports generated from the Geospatial Platform. 2. The "Undetected Emissions 9%" was included within the project area calculations as this adjustment should be applied across all project and leakage areas that have detected deforestation. Since there has been no detected deforestation in any of the project areas during this quantification period, the value is 0% for this period. This might be a different value for the subsequent quantification periods, therefore we would prefer to keep this item in the calculations spreadsheet, and displayed in Table 8 of the PIR, to allow for clear reporting and consistent comparison purposes across all previous, current and forthcoming reporting periods.
Final ESI Finding:	The verifier performed duplicated computations of potential credits using exclusively data derived from the Geospatial Platform export worksheets. Regarding the minor differences in re-calculated values, some values were different because a value of 3.667 was used to represent 44/12 in the calculations. In general, the difference in potential credit computations due to rounding is not significant and does not warrant corrective action. Finding closed.
NCR/CL/OFI Closed	08 August 2014

	6 - CL
NFS Requirement:	Ensure that the data used for quantification is correct and appropriate.
ESI Finding:	Verifier needs to confirm the previous validated "base" values (2011 carbon map) to those values used in carbon estimates for this reporting period.
Evidence:	Trocano Araretama Credit Calculations 2012-2013_190514.xlsx, OE calc exports
Round 1 Request:	CL: Please supply underlying average and std. deviation carbon values for all vegetation types as derived from the NASA JPL dataset so verifiers can confirm they remain unchanged from the previously validated values.
Round 1 Response:	The vegetation types from the ESA Globcover 2009 map are only used to define 'regularly or permanently flooded areas' and are included on the platform to provide the project with general information on the breakdown of average and total Carbon within different land cover types within project areas. The base carbon values are reported in the results under the following query results tabs on the Geospatial Platform: • 'Total Biomass and Carbon from NASA JPL Maps Adjusted for Deforestation between 2000 and 2011'; • 'Vegetation (using ~ 2011 carbon values)'; and • 'Risk of Deforestation (~ 2011 carbon values)'. These are derived from the same raster file (the JPL NASA Carbon map Adjusted for deforestation between 2000 and 2011). This data layer was used for both this and the previous quantification period. The underlying average and std. deviation values for the base carbon values are given per risk category (rather than vegetation type) for all areas. This is due to the Methodology calculating potential credits based on risk categories rather than vegetation types.
Round 2 Findings:	Verifiers now understand the use of the ESA Globcover 2009 map for flooded areas which the potential credits are excluded from carbon accounting. The rest of this

	response finding is pending receipt of all project and leakage area data worksheets exported from the geospatial portal.
Round 2 Response:	As stated in our Round 2 response to NCR 5 above; it is unfortunate that the verifier did not report this issue with the Geospatial Platform immediately upon encountering the problem for the first time. The technical team at Ecometrica has investigated, and have confirmed that Internet Explorer is indeed having trouble to download the spreadsheets for larger areas of interest (AOI); this is currently being fixed. Had the verifier gotten in touch immediately, this issue would have been fixed sooner. Furthermore, the technical team at Ecometrica would have also been able to advise that the download function for the spreadsheets works perfectly on browsers such as Mozilla Firefox and Google Chrome. Please use either of these to download the spreadsheets that you have previously had problems downloading. The verifier should get in touch with Ecometrica's technical team immediately if technical problems arise with the Geospatial Platform. Contact details for the technical team can be found by clicking on the 'OE' icon at the bottom left of the screen within the Geospatial Platform. Calculations can be double-checked using the spreadsheet accompanying our extended responses on 17th July 2014 with document reference AV001_10; this document is submitted again for reference.
Final ESI Findings:	The verifier was able to download all data for all Project areas successfully with Mozilla Firefox web browser. The AM001.1 Methodology does not address updating of forest cover changes (JPL NASA Carbon map Adjusted for deforestation prior to project start) and uses the same baseline carbon stock data set at validation for this second reporting period. The AM001.1 Methodology accounts for changes in deforestation only. Finding closed.
NCR/CL/OFI Closed	05 August 2014

	7 - OFI
NFS Requirement:	Ensure that the data used for quantification is correct and appropriate.
ESI Finding:	General
Evidence:	Trocano Araretama Credit Calculations 2012-2013_190514.xlsx, OE calc exports
Request:	OFI: There are some inconsistencies between parameters contained in the equations presented in the Implementation Report and the Methodology. For instance "VulC = Vulnerable component of carbon [=0.9]" in the Implementation Report is known as "Vf = the vulnerable fraction of woody biomass (%)" in the Methodology. There are other examples of inconsistency in terminology between the Implementation Report and the Methodology. Ensuring consistency among parameters would improve clarity.

Response:	Inconsistencies in parameters and terminologies presented in the draft PIR have been addressed where appropriate, and are now consistent with the parameters and terminology contained in the NFS Methodology. As a result of this OFI, it was identified that the Vf figure of 0.9 should be applied as a fraction and should not include a unit or % and could be misinterpreted. This potential revision was raised to the NFS, and it was subsequently agreed that removing the tC unit and the percentage within the Methodology would avoid causing any potential or future confusion. For clarity and documentation purposes, the methodology amendments are detailed as follows: Methodology AM001.1 Page 4; "Vf = the vulnerable fraction of woody biomass (%)" has changed to ""Vf = the vulnerable fraction of woody biomass". Methodology AM001.1 Page 18; " Vf = vulnerable fraction (tC)" has changed to " Vf = vulnerable fraction". The Methodology was duly updated on 19th June 2014 and on this date, an email confirming these amendments was sent from the NFS to the verifier and the project developer, with a copy of the updated Methodology document attached to be applied to the remainder of this verification process. It is confirmed herewith that the updated version of the Methodology is the version applied to this quantification process here forward, as of 19th June 2014. The 'Summary of Quantification Calculations and Methodologies' document under the Science tab of the Geospatial Platform (also attached herewith under document reference AV001_3) has been updated to account of these amendments and also to ensure consistency with the overall Methodology terminology.
Final ESI Finding:	Updated methodology was received and reviewed by verifiers. Project Implementation Report is also now consistent with this terminology. Issue addressed.
NCR/CL/OFI Closed	25 June 2014

	8 - NCR
NFS Requirement:	Ensure that the data used for quantification is correct and appropriate.
ESI Finding:	Verifiers checked Potential Credits for this reporting period to the previous one to ensure that the "baseline" stocks remained unchanged and values appropriately match. Credits excluded for flooded areas were also checked and found to differ from the previous reporting period. The flood credits excluded should be the same as the previous reporting period unless the ESA Globcover V2.3 land cover map for 2009 was adjusted.
Evidence:	Trocano Araretama Credit Calculations 2012-2013_190514.xlsx, OE calc exports
Request:	NCR: Please explain why seasonally flooded credits for this reporting period differ from the previous reporting period and correct. Please provide clear and transparent calculations and all data illustrating the revision, as well as spatial files specific to Regularly Flooded Areas.
Response:	We note that Project Area 13 shows a different amount of credits excluded from flooded areas in this quantification period compared to the previous quantification period (77,534

	in 2012 vs 76,526 in 2013); this has prompted an extensive investigation into the reason for this difference. During the previous verification period, a number of adjustments were applied to the calculations following suggestions by the verifier, including adjusting the carbon map so that all AGB and BGB carbon was 0 in areas deforested before the project start date; adjusting the risk map to account for seasonally flooded areas; and subtracting Vulnerable Soil Carbon assumed lost due to past deforestation. These adjustments were officially proposed to the NFS Technical Panel on the 14th August 2013 and consequently approved. The Methodology was amended to take into account of these changes and the updated version (AM001.1) was published on 22nd August 2013. The approved adjustments were applied to the Geospatial Platform and amendments applied to the calculations, in alignment with the amended Methodology. During the process of internally applying the final adjustments to the Geospatial Platform and calculations, (15th -20th August 2013), a number of iterations were internally produced to ensure the adjustments were applied completely and appropriately and in alignment with the newly amended methodology. It was found during this time that the adjusted carbon layer had developed a 'stripe-effect' over some of the project areas. Time was spent correcting this, and once complete the corrected layer was uploaded to the Geospatial Platform and the final calculations were generated. Following this process, the final calculations were submitted to the verifier (in the final version of the PIR, dated 30th August 2013) for the initial quantification period. Although a thorough QA process was carried out on the calculations at this time, it appears that a human analyst oversight occurred and caused the value attributed to the "Credits excluded for Flooded Areas" for Project Area 13 to remain uncorrected in the final calculations table that was submitted within the final version of the PIR and that was subsequently verified. Below is a table showing extracted figures of the adjustments made relating to the calculations relating to the initial quantification period and applied during the initial verification process (June-September 2013) with particular reference to Project Area 13:

	Original Figures Submitted 24th July 2013			**Internal Figures Generated 16th August 13**			**Final Figures Submitted 30th Aug 2013**		
Project Area	**Potential Credits (tCO2)**	**Credits Excluded for Flooded Areas (tCO2)**	**Area flooded (ha)**	**Potential Credits (tCO2)**	**Credits Excluded for Flooded Areas (tCO2)**	**Area flooded (ha)**	**Potential Credits (tCO2)**	**Credits Excluded for Flooded Areas (tCO2)**	**Area flooded (ha)**
(A)	**(B)**	**(C)**	**(D)**	**(E)**	**(F)**	**(G)**	**(H)**	**(I)**	**(J)**
1	224,015	-	-	224,016	-	-	224,016	-	-
2	104,356	-	-	104,357	-	-	104,357	-	-
3	90,169	-	-	90,170	-	-	90,170	-	-
4	640,168	1,259	185	640,170	1,259	185	640,297	1,259	185
5	10,863	-	-	10,863	-	-	10,863	-	-
6									

	1,324,221	6,010	1,565	1,325,724	6,012	1,565	1,325,486	6,012	1,565
7	919,415	661	74	918,755	661	74	919,434	661	74
8	834,591	17,832	4,177	831,065	17,813	4,177	831,065	17,813	4,177
9	69,434	11,207	2,685	69,188	11,196	2,685	69,188	11,196	2,685
10	140,108	3,927	1,677	137,583	3,927	1,677	142,338	3,927	1,677
11	615,336	34,685	8,983	598,771	34,442	8,983	598,546	34,442	8,983
12	32,255	3,556	1,565	31,958	3,434	1,565	31,958	3,434	1,565
13	2,950,254	77,659	12,562	2,945,293	77,534	12,562	2,940,023	76,526	12,562
Totals	7,955,185	156,796		7,927,913	156,278		7,927,741	155,270	

	The values in Columns B and C made up the first round of calculations, submitted on 24th July 2013. Corrections to address the striped/faulty Adjusted Carbon layer that was identified gave rise to corrections being applied to the figures generated on 16th August in Columns E-F to the resulting corrected values in Column H-I, with these final figures submitted and verified. As can be seen, the only difference between the figures in columns F and I occurs in Area 13, and exactly illustrates the figures in question. We have attached the Geospatial Platform PDF reports that were downloaded for Area 13 on the 16th and 20th August 2013 to also demonstrate the generation of these figures (document references AV001_5 and AV001_6). These show that the figures generated were correct, and that the figures transposed to the calculations spreadsheet remained uncorrected. To ensure the assumption of human error is substantiated, for completeness we have also investigated whether the error cold have been caused by the underlying adjusted carbon layer being changed after the 2012 verification numbers were produced; we have re-uploaded and queried all interim adjusted carbon maps that were worked on within the period 17-18 Aug 2013. This would have shown that another data layer had been used between doing the 2012 and the 2013 verification calculations. Moreover, had the underlying adjusted carbon layer been changed, one would expect more than the values in Area 13's "Credits Excluded for Flooded Areas" column to differ between the 2012 and 2013 verification calculations. Based on these finding, we rule out a possible change in the underlying Carbon layer, and conclude human error is at fault here. It is hereby confirmed that the correct figure reflecting the "Credits Excluded for Flooded Areas" for Area 13 is 76,526, which corresponds as the figure that has been submitted for verification for this current quantification period. Although this means a higher amount of credits were deducted within the calculations of the previous verification period than were required, as this resulted in a more conservative figure, (i.e. more credits than applicable being deducted, rather than fewer) it has not resulted in an over-issuance of credits for the quantification period and in light of this, the project is happy to forego the difference. We have attached the shapefile (document reference AV001_4) that represents the seasonally flooded areas in the ESA Globcover map v2.3 (i.e. categories 160, 170 & 180) as requested.

Round 2 Findings:	Verifiers understand that flooded areas are simply subtracted from the carbon accounting of potential credits. The clerical error for Borba area 13 is noted. However, no equation or further guidance is explicitly stated in the Methodology other than "excluded" on page 14. Determination of the area of flooded areas is pending correct projection coordinate system requested elsewhere.
Round 2 Request:	NCR remains open: This finding is pending correct projection for determination of flooded area.
Round 2 Response:	The shapefile that was sent as part of our earlier response giving the extent of flooded areas (reference AV001_4) is of a known projection. The information can be obtained from the .prj file and is as follows: GEOGCS["GCS_WGS_1984",DATUM["D_WGS_1984",SPHEROID["WGS_1984",6378137.0,298.257223563]],PRIMEM["Greenwich",0.0],UNIT["Degree",0.0174532925199433],METADATA["World",-180.0,-90.0,180.0,90.0,0.0,0.0174532925199433,0.0,1262]] This projection information is automatically recognized by GIS software such as ESRI ArcGIS when it is opened. Since it is based on Globcover classes categories, the shapefile delineating the flooded areas are in the same projection as the original GlobCover data (http://geoserver.isciences.com:8080/geonetwork/srv/en/metadata.show?id=228) Areas of polygons cannot be obtained using the GCS WGS84 projection. In order to obtain areas of the polygons, the shapefile needs to be projected to a conformal projection that allows Cartesian math to calculate area. A well-known projection that allows this is UTM. (http://en.wikipedia.org/wiki/Universal_Transverse_Mercator_coordinate_system) The correct UTM zone can be easily obtained here: http://www.dmap.co.uk/utmworld.htm For the Borba area, it is UTM 21 South. We have not projected the shapefile into UTM because the data is uploaded to the Geospatial Platform in the GCS WGS 1984 projection. Therefore, we have provided the data in the format that is used by the Geospatial Platform and the verifier will have to re-project the shapefile to UTM in order to double check the areas by means of a GIS.
Final ESI Findings:	Verifiers were able to reproduce computations for excluded potential credits of flooded areas. This finding was resolved as part of CL request #10 below.
NCR/CL/OFI Closed	05 August 2014

	9 - CL
NFS Requirement:	Ensure that the data used for quantification is correct and appropriate.
ESI Finding:	Vegetation classes for the project area were obtained from the ESA Globcover V2.31 land cover map for the year 2009 derived from MERIS sensor (300m). Unclear if carbon calculations incorporated segmented vegetation classes.

Evidence:	CGVCalculationsMethodology.pdf
Request:	CL: Please confirm the specific individual vegetation classes used for the project area for generating the carbon stock estimates, providing clear and transparent calculations for carbon calculations aggregated by vegetation class.
Response:	An explanation of the data used to obtain carbon values is given on pages 12-15 of the Methodology AM001.1b. The vegetation classes on the ESA Globcover 2009 map are only used to define 'Regularly or Permanently Flooded Areas'. The Carbon values are obtained from the NASA JPL pan-tropical carbon map (Saatchi et al, 2011); the Geospatial Platform calculates the average and total carbon values from this NFS approved 1km resolution JPL NASA map. Again, this is because the Methodology calculates potential credits based on risk categories rather than vegetation class.
Final ESI Finding:	Verifiers accept this response and understand that vegetation classes are used solely for determination of flooded areas per the ESA Globcover 2009 map. Actual carbon values are based upon the NASA JPL carbon map. Finding closed.
NCR/CL/OFI Closed	25 June 2014

	10 - CL
NFS Requirement:	Ensure that the data used for quantification is correct and appropriate.
ESI Finding:	Verifier is unable to confirm spatial area size for Borba project areas and leakage areas. Project areas illustrated in OE (25260.2 ha) and those reported in OE calc export worksheets (25242.7 ha) differ for Borba Project Area 1 and may differ for other Borba Project Areas.
Evidence:	Trocano Araretama Credit Calculations 2012-2013_190514.xlsx
Request:	CL: Please provide all spatial files in ArcGIS format for confirmation of ha of all project and leakage areas. Further, please explain the area discrepancy between Project Areas illustrated in OE and those reported in OE calc export worksheets.

Round 1 Response:	It should be noted that the area estimate given at the very top of the query report from the Geospatial Platform (e.g. 25,243 ha, Borba Area 1) is only an approximate size generated by the Geospatial Platform. A more accurate area estimate is given within the query report tabs (e.g. 25,260 ha, Borba Area 1 in the tabs "Vegetation" and "Risk of Deforestation"). The latter, more accurate, area estimate is used in the calculations. The document attached with reference AV001_2 explains the reason for the difference between the two area estimates; this explanation document was originally supplied within the supporting documentation for the validation of the Trocano Project (PDD Annex Document 11), and is also fully detailed within the validated PDD on pages 98-100. The polygons for the areas in the shapefiles will give slightly different area estimates to the estimates we used from the Geospatial Platform. These differences may be caused by re-projection from GCS to UTM, but the differences are minor, and in most cases account for <1% of the query area. For example, leakage area 1: the difference between OE estimate (202,372 ha) vs the area estimate from ArcGIS (201,567 ha) is 805 ha, which makes up 0.4% of the ArcGIS area estimate. The shapefiles for all Trocano project and leakage areas are attached for further inspection (document references AV001_7 and AV001_8).
Round 2 Finding:	Verifiers were unable to confirm project or leakage area files due to coordinate system issues. The projected coordinate system employed by the geospatial platform is needed, or one that is used for all project related spatial files.
Round 2 Request:	CL remains open: Please address the findings and confirm the proper projected coordinate system to be applied to project spatial files.
Round 2 Response:	The data is uploaded to the Geospatial Platform in the GCS WGS 1984 projection. Therefore, we have provided the data in the format that is used by the Geospatial Platform and the verifier will have to re-project the shapefile to UTM in order to double-check the areas by means of a GIS. The shapefiles (document references AV001_7 and AV001_8) that were submitted as part of our response to the Round 1 CL request giving the extent of the project and leakage areas are of a known projection. The information can be obtained from the .prj file and is as follows: GEOGCS["GCS_WGS_1984",DATUM["D_WGS_1984",SPHEROID["WGS_1984",6378137.0,298.257223563]],PRIMEM["Greenwich",0.0],UNIT["Degree",0.0174532925199433]] Documents AV001_7 and AV001_8 are submitted again for reference. Please also note our Round 2 response to NCR 5, which explains why the area estimate given at the very top of the generated query report will differ slightly from the area estimates given within the query report tabs. To support this, document AV001_2 is submitted again for reference.
Final ESI Findings:	Verifiers were unable to confirm project areas using spatial files provided. Shapefile AV001_7 was projected into WGS1984 UTM Zone 21S (deemed zone of project area) and areas calculated resulted in total hectares differing from those reported in

	the project area exported worksheets. Individual parameter areas calculated within the OE also differ, for example area from "Total Biomass & Carbon" and total area from "Risk of Deforestation (~ 2011 carbon values)". The reasons for area discrepancies are sufficiently explained in document AV001_2 (supplied in validation), and clearly the aggregation of different remotely sensed data sources is the cause. However, the area discrepancies tend to be relatively small on the scale of the overall project boundaries. In general, verifiers observe that the risk-based approach for calculating potential credits uses areas which are lower than calculated areas for other parameters (i.e. "Total Biomass and Carbon"). In this sense, the method of calculating potential credits is conservative. The NFS and AM001.1b Methodology do not address a threshold for calculation errors nor provide guidance on whether an error is eligible to be material. Fixing all of the area issues will likely require a complete overhaul of the geospatial methods thus far employed and the geospatial computations within the OE have been previously validated and verified. Finding closed. OFI: Geospatial tools exist to get around the area retrieval issue between a raster and vector as described in document AV001_2. A closer integration among the existing remote sensing data sources in the OE could be implemented for more precise areal measurements as part of future monitoring.
NCR/CL/OFI Closed	05 August 2014

	11 - CL
NFS Requirement:	Ensure that the data used for quantification is correct and appropriate.
ESI Finding:	Prior issues of image acquisition are described in the PDD related to the NASA JPL pan-tropical map, unclear if project developers had image acquisition issues for detection of deforestation in this reporting period.
Evidence:	Trocano Project Implementation Report_2_DRAFT COPY_290514.pdf
Request:	CL: Please confirm If there was sufficient PRODES data to detect deforestation in the reporting period for the entire project and leakage areas, and if there wasn't please explain how it was accounted for.
Response:	Deforestation detection data is obtained from INPE's PRODES system, which is produced by INPE (National Institute for Space Research), and PRODES being Brazil's Amazon Deforestation Monitoring Project. Deforestation estimates for the quantification period August 2012 – July 2013 were obtained from the PRODES product as produced by INPE. INPE's processing methodology goes to great lengths to fill in data gaps caused by clouds and haze using various medium resolution satellite data sources (Landsat, CBERS, DMC, etc). The program began accuracy assessments in 2010 and is known to be able to accurately detect deforestation events >6.5 ha in extent with >95% accuracy. The system uses skilled visual interpretation rather than automated processes. Previously, PRODES deforestation data did not indicate areas that were continuously obscured by cloud cover in a mapping-year. However, when an area has been mapped as deforested in a specific year and that area has been continuously

	obscured by cloud cover the previous year(s), this will be indicated in the PRODES classification. In 2013 PRODES released a new separate dataset that included areas continuously covered by cloud for 2013. This data shows that minimal areas within the project areas were continuously cloud covered (please see attached document AV001_9 for an illustrative image). The total area classified as cloud within the project areas are as follows: Leakage Area 1 & 4 = 830ha Project Area 7 = 896ha This file is available to download at: http://www.dpi.inpe.br/prodesdigital/prodes.php. PRODES have not clarified if this will be released for subsequent years. All areas shown as deforested but obscured by clouds in previous years are included in the deforestation data on the Geospatial Platform. Further Note: Although we have fully responded to the clarification request with regards the availability of sufficient deforestation data, a point of clarification we would like to raise is that we were unable to locate the findings as stated by the verifier that: "prior issues of image acquisition are described in the PDD related to the NASA JPL pan-tropical map". It would be appreciated by the project team if clarification could come back from the verifier as to where this information was found in the PDD, for us to fully understand the basis for this clarification point.
Final ESI Finding:	Verifiers accept this response as sufficient to address the clarification request. The earlier clarification point was intended to address PRODES data and is no longer a verification issue. Verifiers independently examined Brazilian government deforestation data and found deforestation to be isolated since project start in the leakage areas. This ocular check of deforestation provides reasonable assurance that deforestation is being appropriately accounted for. Finding closed.
NCR/CL/OFI Closed	25 June 2014

	12 - CL
NFS Requirement:	Ensure that the data used for quantification is correct and appropriate.
ESI Finding:	In the past, the project dealt with clouded imagery by compiling multiple time steps to achieve a cloud-free scene. It is unclear whether deforestation detection in this reporting period encountered cloud or haze imagery related issues.
Evidence:	Trocano Project Implementation Report_2_DRAFT COPY_290514.pdf
Request:	CL: Please confirm if cloud, haze, sensor problems or other related issues were encountered in reviewing the results of the PRODES data for deforestation detection in this reporting period as well as any methods employed to correct for these image related issues.
Response:	For information on how cloud cover affected the PRODES data, please refer to our response to Item 11 herewith, and the attached image with document reference AV001_9. We believe this finding is relating to our use of RapidEye imagery for the previous

	reporting period. As is stated in the PIR, we did not use any new RapidEye data to review the results of PRODES deforestation for this quantification period; this is an exercise we intend to apply to alternate quantification periods. The review carried out for the previous quantification period is described in the "Assessment of PRODES data and Undetected Deforestation" document, available under the Science tab of the Geospatial Platform. Based on the result of this work carried out for the previous quantification period, an additional 9% of undetected deforestation has been applied to emissions from deforestation detected by PRODES for this quantification period, which is consistent with the AM001.1b methodology.
Final ESI Finding:	Verifiers accept this response providing additional clarity on remote sensor cloud cover issues. However, the original clarification request was aimed at confirming whether or not cloud cover was an issue for acquisition of the PRODES dataset employed by the project. A statement to this effect has been addressed above and is sufficient to explain cloud cover issues for the PRODES dataset. The attachment supplied to verifiers illustrates cloud cover in the region restricted PRODES image acquisition for the current reporting period for some areas in the project. Further, verifiers observe that the 9% undetected deforestation applied to leakage areas is unrelated to satellite sensor issues. Finding closed.
NCR/CL/OFI Closed	25 June 2014

	13 - NCR
NFS Requirement:	Ensure that the data used for quantification is correct and appropriate.
ESI Finding:	Fire events during the current crediting period do not appear to have been accounted for and simply presented as occurring as stated in section 7.1.5 of the Implementation Report. Implementation report states "Fire events are recorded by the MODIS instrument on board the NASA Terra (EOS AM) Satellite9. A density map (no. of events/sq.km) was created based on the Global 10-day fire maps from recorded fire events in each year for 2005 to 2010. The results are given in a bar chart." Verifiers believe that the coarse resolution employed in the project to detect deforestation is insufficient to detect fire ignition sources and burnt area size. However, the methodology does not appear to account for emissions estimates from fires.
Evidence:	Trocano Project Implementation Report_2_DRAFT COPY_290514.pdf
Request:	NCR: As fire is a known factor in deforestation pressures in the Amazon, please explain how the results of the MODIS hotspot data are incorporated into emissions estimates. Please also justify the choice of MODIS for fire ignition monitoring and whether it used to estimate burnt area size in the reporting period.
Response:	It is confirmed that fire events are neither accounted for nor included within the project emissions estimates for the Trocano project, as it is not a requirement of the approved NFS methodology AM001.1b. The Past Fire events data within the Geospatial Platform, the explanation of those results in the "Summary of Quantification Calculations and Methodologies" document and the corresponding section within the PIR are included for background information purposes only, to provide general information on the number of historical fire events within project and leakage areas prior to the start of the project.

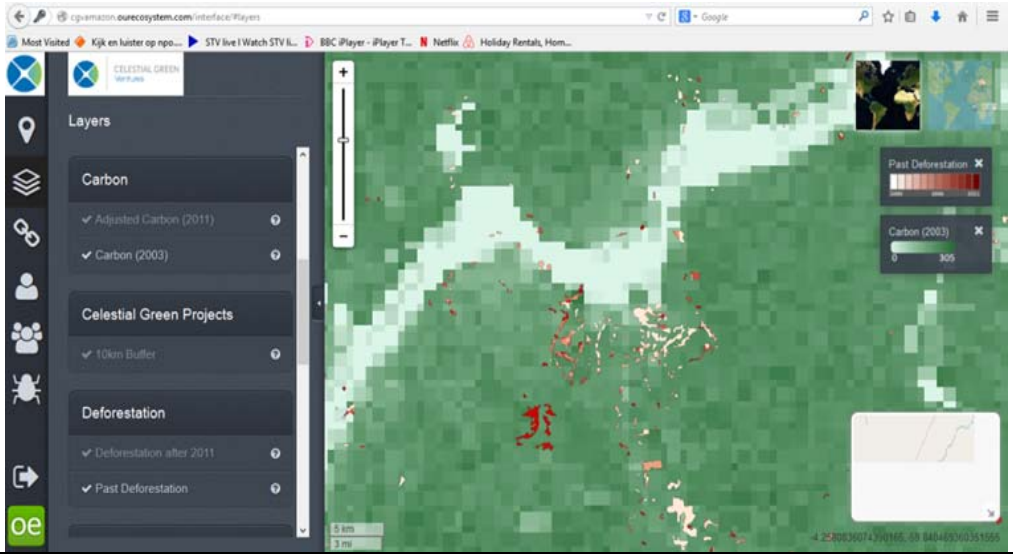
	By not including fire events within the calculations, the quantification process is consistent with the approved NFS Methodology, and as such it is deemed that this should not be included as a valid NCR. However, having reviewed the inclusion of this information for the purposes of responding to this NCR, it is concluded that including this information in the current PIR may be confusing and infer that fire events have been accounted for, which is not a requirement of the Standard or the NFS Methodology. The Past Fire Events information has therefore been removed from the PIR to avoid further confusion. The data will however remain in the Geospatial Platform for the pre-project information purposes detailed above. This pre-project information was derived from point data available from the Fire Information for Resource Management System (FIRMS) who provide global fire locations based on MODIS data. These data were used to create fire density maps. As they are derived from point data, they would only show numbers and approximate locations of historical fires and can't be used to estimate fire or burn scar extents. Other data sources exist that can be used to derive burnt area estimates if and when it becomes a requirement to do so.
Final ESI Finding:	Verifiers accept this response and observe that fire is not part of carbon accounting in the methodology. It has also been confirmed to have been removed from the PIR. However, photos 22-24 (photo 25 is noted but does not exist) in the PIR seem to suggest that fire is a driver of deforestation in the region. Perhaps it is more clear if fire is included in the context of land clearing activities if the photos are to remain. Finding closed. OFI: Fire could be incorporated into carbon accounting to more accurately portray standing carbon stocks.
NCR/CL/OFI Closed	25 June 2014

	14 - NCR
NFS Requirement:	Ensure that the data used for quantification is correct and appropriate.
ESI Finding:	Implementation report indicates that no new deforestation was detected within the Project Area, but was detected within the Leakage buffer. Verifiers are unsure of this conclusion given the regional history of deforestation, motivation by local people, and the regular patrols which were not implemented. Further, a summary of observation sheets noted deforestation in every case. Verifiers performed an independent ocular check of deforestation in the project area/leakage using free imagery (e.g. Google Earth) and found deforestation evidence throughout these areas. Since the acquisition date for all available free imagery is pre project initiation, deforestation could not be detected by verifiers for the current reporting period. The PDD in section 4.5 indicates that during monitoring the change of forest cover within the project area, the benchmark baseline data generated via the carbon and vegetation layer data in the Geospatial Platform will be compared with a newly-generated forest cover map for the monitoring period."" The OE only shows "Deforestation after 2011", which presumably was used for the previous reporting

	period. Further, the Implementation Report for this reporting period in section 4.1 reports deforestation detected between August 2011 and July 2012.
Evidence:	Trocano Project Implementation Report_2_DRAFT COPY_290514.pdf, PDD March 2013
Round 1 Request:	NCR: Please provide additional evidence (i.e. spatial files of deforestation in leakage areas etc.) to support the assertion that no deforestation occurred in the project area during the reporting period. In doing so, please also confirm that the deforestation accounted for in this reporting period is current, please also provide all spatial files for the newly generated forest cover map. Finally, as the Geospatial Platform serves as the portal to access data for deforestation assessment, it should be updated to reflect levels of deforestation for this reporting period.
Round 1 Response:	The "Deforestation after 2011" data layer of the Geospatial Platform includes PRODES deforestation for both 2012 and 2013. The figures for 2013 are included in the query and can be visualized on the map by clicking on the 'Deforestation after 2011' display layer under the "Map Layers" icon within the Geospatial Platform. Deforestation detected in 2012 is shown in purple on the map interface, while 2013 deforestation is shown in pink. The query output in the "Deforestation after project start (if present)" tab demonstrates the results in the corresponding colors in a pie chart and table. Where no deforestation was detected by PRODES, the query results return 'No Data Available'. This results in the 'newly-generated forest cover map for the monitoring period' which has been applied and is available within the Geospatial Platform to show the detected deforestation, according to PRODES. The yearly PRODES deforestation data for 2013 covers the period from August 2012 to July 2013 and is generated from the interpretation of Landsat and CBERS images, with a spatial resolution of approximately 30m. Spatial files are available for download at: http://www.dpi.inpe.br/prodesdigital/prodes.php. Query reports generated on the Geospatial Platform for Borba Leakage Areas 1 and 4 show incidences of deforestation in 2013. With reference to the observed deforestation indicated in this reporting period; it is confirmed that the deforestation observed and summarized within the draft PIR was historical deforestation. It was recorded to assist in compiling complete and thorough project area records and chronicle all/any deforestation identified within the project area, regardless of whether it is current or historic, so that the data can be used for future referencing for the project and monitoring activities. As previously stated, fire events are not required within the Methodology to be included in the emissions calculations; the fires observed during the monitoring activities were again recorded for the purpose of compiling complete and thorough project area records, for future project activity/ monitoring purposes only.
Round 2 Findings:	Deforestation for 2013 was viewed in the geospatial platform and ocularly checked in Borba leakage areas 1 and 4. In both leakage areas, the imagery did not display that deforestation had occurred. This is likely due to historical imagery used to generate the base layer for the geospatial portal. Verifiers did not download the PRODES data separately to confirm accurate portrayal of deforestation and were unable to locate newer imagery. Query reports for Borba leakage areas are requested in an NCR below.

	Deforestation noted by on-the-ground observers (Table 3 PIR) does not appear to be accounted for, and further it is unclear where the deforestation was detected as the location is not specified. It is also unclear what the "newly generated forest map" the PDD refers to and whether or not this monitoring component has been adhered to.
Round 2 Request:	NCR remains open: Please address all findings as written and explain why deforestation detected by PRODES does not display on the geospatial portal. Please see attachments in email accompanying Round 2 response findings.
Round 2 Response:	1. In response to the following request in the Round 1 findings "Query reports for Borba leakage areas are requested in an NCR below", please use Mozilla or Google Chrome to download those reports directly from the Geospatial Platform (for further explanation, please see our Round 2 responses for NCRs 6 and 15). 2. In response to the following comment in the Round 1 findings "Deforestation for 2013 was viewed in the geospatial platform and ocularly checked in Borba leakage areas 1 and 4"; the areas mapped by PRODES as having been deforested in 2012 are shown in purple and the areas mapped by PRODES as having been deforested in 2013 are displayed in pink on the screenshots sent by the verifier that accompanied the Round 2 NCRs spreadsheet. 3. In response to the following request in your Round 1 findings "...the imagery did not display that deforestation had occurred. This is likely due to historical imagery used to generate the base layer for the geospatial portal"; the high resolution imagery that forms the "Earth" base layer is of unknown acquisition date and was never intended to act as data layer for detecting or visualizing deforestation. The high resolution optical imagery that makes up the base layer is merely intended to give context on land cover patterns in the area. The methodology accounts for small areas of deforestation not detected by PRODES by adding 9% to the detected deforestation (as per the approved methodology AM001.1b, page 17). 4. In response to the Round 1 finding that "Deforestation noted by on-the-ground observers (Table 3 PIR) does not appear to be accounted for, and further it is unclear where the deforestation was detected as the location is not specified"; the approved method for the calculation of emissions from deforestation after the project start date is as follows: "PRODES deforestation data from the Brazilian space agency (INPE) is used to quantify deforestation within a project area in a given year" (see AM001.1b page 17). Again it should be noted that the approved methodology accounts for small areas of deforestation not detected by PRODES by adding 9% to the detected deforestation (as per the approved methodology AM001.1b, page 17). Also, according to the approved methodology AM001.1b on page 16, under *Ground based monitoring from road and boat*, "Where deforestation activity is detected, the team will report a hotspot for medium to high resolution remote sensing analysis to assess the extent of the area affected". The data in Table 3 of the draft PIR, gathered by the project area observers, was recorded to assist in compiling complete project area records to contribute to this monitoring activity (as was stated in our Round 1 response to this request). The data

	in Table 3 will be considered as part of the medium to high resolution mapping process when this activity is repeated by the project, which as stated in the draft PIR, is planned for the next reporting period (1st August 2013 to 31st July 2014). Although the observations included in Table 3 of the PIR do not have specific coordinates noted, the column headed 'If yes, please give more details, including reference points for the locations' within Table 3 are meaningful to the inhabitants of the project area who carried out the observations, and are able to be located again easily using their local knowledge, and where specific coordinates can be gathered as required. 5. In response to the Round 1 finding that it is unclear what the "newly-generated forest cover map" the PDD refers to; this refers to the annual PRODES data that is applied within the deforestation layer of the Geospatial Platform to demonstrate the change in forest cover within the project area for the given monitoring period.
Round 3 ESI Findings:	The response is sufficient to address requests related to the purpose of the base layer and validation of deforestation for this reporting period as illustrated in the OE. Verifiers note that more comprehensive deforestation detection will be implemented with the next reporting period. The clarification related to the PDD reference is sufficient for verifiers to understand the intent of the "newly-generated forest cover map". In duplicating potential credit computations, verifiers noted that deforestation for some years prior to project start appears to have been counted more than once. For instance, Borba Area 10 has the same hectares noted for 5 of the years where deforestation was detected. Verifiers are unfamiliar with the PRODES dataset and are unsure if it may be aggregating deforestation year over year. Other reasons might be pixel dilution from geoprocessing, or the same number of deforestation pixels were detected for a given year resulting in the same area deforested in subsequent years.
Round 3 Request:	CL: Please address the findings and explain why for certain years the PRODES dataset generates identical deforested areas.
Round 3 Response:	The PRODES dataset maps annual deforestation (it is not cumulative). More information on the PRODES dataset can be readily found online, e.g.: http://www.obt.inpe.br/prodes/index.php The reason that some years show identical areas of deforestation is because the same number of deforestation pixels were detected for each of those years, resulting in the same area reported as deforested in those years. Note that the location and size of the deforested areas prior to project start can be viewed on the Geospatial Platform by following the steps set out in our Round 2 response for NCR 4. It should also be noted that in the table in the "Deforestation prior to project start" tab, the "carbon density in ~2003" is given for the area of deforestation mapped in each year, i.e. the Geospatial Platform extracts the relevant values from the Carbon (2003) data layer and calculates the Average C density for the mapped deforested area for each given year. This Average C density value is combined with the area of the mapped deforestation to calculate "Total Carbon Stock in ~2003". To use Project Area 10 as an example, where 2001, 2003, 2007, 2008, 2011 all show 75 ha of mapped deforestation, the "Carbon Density in ~2003" was only similar for the deforested areas mapped in 2003 and 2007 (i.e. for these two years the

	deforestation occurred in areas of similar carbon density). All data layers (Carbon (2003) and Deforestation prior to the project start date) can be viewed in the map interface, a screenshot of which is shown below: 
Final ESI Finding:	Verifiers accept this response as sufficient to address the clarification request. It is clear that the pixel generated areas for a given deforested location result in consistent areas. Further, the verifier recognizes that deforestation prior to the project start requires carbon density values associated with prior project start. Finding closed.
NCR/CL/OFI Closed	08 August 2014

	15 - CL
NFS Requirement:	Ensure that the data used for quantification is correct and appropriate.
ESI Finding:	Leakage emissions for the current reporting period are substantially higher than those reported for the previous reporting period. The Methodology does not appear to provide methods to quantify deforestation in the leakage areas and thus for verifiers to check the accuracy of deforestation reported in the leakage area. Verifiers are unclear as to whether deforestation in the leakage areas for this reporting period are being considered in addition to deforestation detected in the previous reporting period. However this may be allowed in the methodology as credits are not determined from the net change but simply as a percent of crediting years (20)?
Evidence:	Trocano Araretama Credit Calculations 2012-2013_190514.xlsx
Round 1 Request:	CL: Please clarify the intent of the methodology and confirm that leakage deforestation emissions accounted for in the previous reporting period are supposed to be accounted for in this reporting period or cumulative.
Round 1 Response:	As is detailed in Annex 3 (pages 16-17) of the NFS approved Methodology, the calculation of emissions from deforestation after the project start date does not differentiate between the project area and the leakage area; the quantification of emissions for project areas is exactly the same as for the leakage areas. It is also confirmed that these quantifications occur on an annual basis and are not cumulative. The higher leakage emissions in this reporting period are based on higher

	occurrences of deforestation detected in leakage areas 1 and 4 during this reporting period than the previous reporting period. This can be double checked in the "Deforestation after project start (if present)" tab of the query output on the Geospatial Platform.
Round 2 Findings:	Verifiers accept this response related to the intent of the methodology in distinguishing between deforestation in the project area and leakage belt. Verifiers are unable to confirm deforestation carbon accounting in the leakage areas 1 and 4 as there was an error in downloading worksheets from the geospatial portal.
Round 2 Request:	CL remains open: Please address the findings as written and supply excel worksheets for borba leakage areas 1 and 4.
Round 2 Response:	As already stated in our Round 2 responses above (see NCR 5 and CL 6); it is unfortunate that the verifier did not report this issue with the Geospatial Platform immediately upon encountering the problem for the first time. The technical team at Ecometrica has investigated, and have confirmed that Internet Explorer is indeed having trouble to download the spreadsheets for larger areas of interest (AOI); this is currently being fixed. Had the verifier gotten in touch immediately, this issue would have been fixed sooner. Furthermore, the technical team at Ecometrica would have also been able to advise that the download function for the spreadsheets works perfectly on browsers such as Mozilla Firefox and Google Chrome. Please use either of these to download the spreadsheets that you have previously had problems downloading. The verifier should get in touch with Ecometrica's technical team immediately if technical problems arise with the Geospatial Platform. Contact details for the technical team can be found by clicking on the 'OE' icon at the bottom left of the screen within the Geospatial Platform.
Final ESI Findings:	This finding was resolved from guidance provided by project developers in earlier requests and from reproducing potential credit computations. Finding closed.
NCR/CL/OFI Closed	05 August 2014

	16 - NCR
NFS Requirement:	Ensure appropriate deductions of potential credits have been applied correctly and in accordance with the approved NFS methodology and previously verified processes.
ESI Finding:	A separate analysis was performed to estimate undetected deforestation from the deforestation dataset, resulting in a blanket 9% deduction for undetected deforestation to be applied to the leakage areas. The project has applied the same "data correction" procedures for undetected deforestation to this 2nd crediting period as the initial crediting period, these procedures were outlined in the initial Implementation Report. Also, the undetected emissions were allocated to the leakage areas only. Presumably, implementation of the project would curb some deforestation and therefore a different deduction caused by undetected deforestation may be necessary.
Evidence:	Trocano Project Implementation Report_2_DRAFT COPY_290514.pdf
Request:	NCR: Please justify applying the same undetected deforestation factor of 9% to this reporting period and the reasoning for applying this deduction to the leakage area only.
Response:	The 9% deforestation factor was applied to this reporting period as this is consistent with the currently estimated figure that is stated in the approved NFS methodology AM001.1b (page 17).

	Whether there should be some adjustment for potential undetected deforestation in areas where no deforestation was detected by PRODES was discussed with the Technical Panel of the Natural Forest Standard when they met in August 2013 (minutes of which are freely available on the NFS website methodology page: http://www.naturalforeststandard.com/nfs-standard/methodology/. In summary (for documentation purposes herein), the Panel considered that it should be possible for an area to have zero estimated deforestation, and found no good evidence for setting a particular level of "undetected" deforestation in areas where none is detected. The undetected emissions of 9% were therefore only applied to areas where deforestation was detected (i.e. two of the leakage areas). Although PRODES is approved by the Standard as a measure of deforestation, due to being derived from approximately 30m resolution imagery, some small and localized disturbances and deforestation may be missed. As is stated in the PIR document, it is the intention of the project team to initiate ground-based data collection activities to better understand the limits of detectability of disturbance at the forest margins and in isolated areas, despite this not being included in the requirements of the Standard. The project recognizes the potential value of this for subsequent reporting periods and the project is keen to implement this once the appropriate and necessary carbon funding is achieved to mobilize this activity effectively.
Final ESI Finding:	Verifiers accept this response as the method applied is consistent with the approved NFS methodology AM001.1b. However, the 9% deforestation accounted for in leakage areas could be under or overestimating actual deforestation in the reporting period elsewhere. Deforestation drivers in Amazonas seldom follow regular trends in frequency and magnitude and instead are generally confined to transportation corridors (i.e. navigable streams and roads). Finding closed. OFI: Bolstering the PRODES deforestation dataset with other remote sensing data and/or incorporate an industry standard accuracy assessment to more accurately quantify deforestation as a project area of this size may be challenging to monitor using ground-based observations.
NCR/CL/OFI Closed	25 June 2014

	17 - NCR
NFS Requirement:	Identify any deviations from the Standard, approved NFS methodology or previously verified quantifications.
ESI Finding:	Per the NFS Standard Requirements v1.2, section 4.2.1 "The carbon stored in above-ground tree biomass at the start of the project shall be quantified using internationally recognized GHG inventory methods or approaches." According to section 7.1.1 of the Implementation Report, carbon stocks are being determined from both AGB and BGB, and the Standard says further "Carbon in a) Above-ground non-tree biomass; b) Below-ground biomass; c) Dead wood; d) Soil organic carbon; and e) forest products shall be quantified where project activities are likely to reduce these stocks." This may represent a methodology deviation as BGB is being quantified in the project scenario where carbon stocks are likely to increase.
Evidence:	Trocano Project Implementation Report_2_DRAFT COPY_290514.pdf
Request:	NCR: Please indicate if quantification of BGB in project scenario carbon stocks (used

	in annual crediting) represents a methodology deviation as the Standard only requires quantification of AGB and stipulates that BGB be quantified where project activities are likely to reduce those stocks.
Response:	The Methodology AM001.1b is an approved NFS methodology by the NFS Technical Panel, and the accompanying maps within the Geospatial Platform (including the NASA carbon map) were also approved as part of this process; for information purposes, the maps and original version of the methodology were approved by the NFS Technical Panel in January 2013. The approved methodology states that carbon stocks are to be calculated as 50% of AGB + BGB. The calculations performed on the platform are consistent with the methodology. The Standard requires projects to monitor carbon pools that may be adversely affected by project activities. For example if the project carried out some selective harvesting or cultivation activities that reduced one or more carbon pools, then it would be necessary to make measurements or estimates to take this into account. However, as the project has not undertaken activities that are likely to cause losses of carbon from these pools this calculation is not relevant. The Standard does not require projects to estimate uptake of carbon by the forest. This approach is normal, conservative practice within IPCC Good Practice Guidelines. It is only these approved calculations and maps that have been used for the quantification of project scenario carbon stocks, and it has been ensured that the project has consistently and diligently applied this methodology to the carbon quantifications for both this and the previous verification periods; it is therefore considered that there has been no methodology deviation
Final ESI Finding:	Verifiers accept this response and the explanation is reasonable given the context. However, there appears to be a contradiction between the Standard and the AM001.1b methodology as the Standard requires BGB to be measured only when project activities reduce that specific pool. The AM001.1b Methodology does not state directly that BGB must be measured and accounted for, only that BGB is factored into the computation of carbon stocks. Finding closed. OFI: More specific language in the Methodology (i.e. appropriate pools to be accounted for) or the Standard could clear up this discrepancy.
NCR/CL/OFI Closed	25 June 2014

	18 - CL
NFS Requirement:	Ensure that the data used for quantification is correct and appropriate..
ESI Finding:	Verifiers were unable to locate quantification materials for determination of Soil Credits per Table 9 of the Implementation Report
Evidence:	Trocano Project Implementation Report_2_DRAFT COPY_290514.pdf
Request:	CL: Please direct verifiers on where to find
Response:	The Methodology AM001.1b is an approved NFS methodology by the NFS Technical Panel, and the accompanying maps within the Geospatial Platform (including the NASA carbon map) were also approved as part of this process; for information purposes, the maps and original version of the methodology were approved by the

	NFS Technical Panel in January 2013. The approved methodology states that carbon stocks are to be calculated as 50% of AGB + BGB. The calculations performed on the platform are consistent with the methodology. The Standard requires projects to monitor carbon pools that may be adversely affected by project activities. For example if the project carried out some selective harvesting or cultivation activities that reduced one or more carbon pools, then it would be necessary to make measurements or estimates to take this into account. However, as the project has not undertaken activities that are likely to cause losses of carbon from these pools this calculation is not relevant. The Standard does not require projects to estimate uptake of carbon by the forest. This approach is normal, conservative practice within IPCC Good Practice Guidelines. It is only these approved calculations and maps that have been used for the quantification of project scenario carbon stocks, and it has been ensured that the project has consistently and diligently applied this methodology to the carbon quantifications for both this and the previous verification periods; it is therefore considered that there has been no methodology deviation
Final ESI Finding:	Verifiers accept this response and the explanation is reasonable given the context. However, there appears to be a contradiction between the Standard and the AM001.1b methodology as the Standard requires BGB to be measured only when project activities reduce that specific pool. The AM001.1b Methodology does not state directly that BGB must be measured and accounted for, only that BGB is factored into the computation of carbon stocks. Finding closed. OFI: More specific language in the Methodology (i.e. appropriate pools to be accounted for) or the Standard could clear up this discrepancy.
NCR/CL/OFI Closed	25 June 2014