

BULL RUN OVERSEAS FOREST CARBON PROJECT: PHASE I MONITORING REPORT



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1 PROJECT DETAILS

1.1 Summary Description of Project

The goal of the project is to protect the property as a carbon sink, maintain the biodiversity values of the property, and enhance the local economic environment with sustainable livelihoods. The climate objective is to avoid emissions from deforestation during the project timeframe. The project area is slated for conversion to coffee agriculture.

The project consists of protection of the property through 2038 through patrols and placing a restriction on the property deeds for the life of the project. Bull Run Overseas Ltd. (BRO) owns the property. Forest Carbon Offsets LLC (FCO) is an agent of BRO to develop the carbon finance project. Conservation Management Institute at Virginia Tech (CMI) is a subcontractor hired to conduct technical analysis on behalf of FCO.

1.2 Sectoral Scope and Project Type

AFOLU: Reduced Emissions from Deforestation and Degradation. This project is not a grouped project.

1.3 Project Proponent

Bull Run Overseas (BRO) is the project proponent. BRO has hired FCO to develop the strategy, implementation, and monitoring of the carbon credits generated by this project. FCO has hired CMI Virginia Tech to collect initial data, develop the monitoring protocol and conduct the baseline study for the monitoring program. Supporting documents are available by contacting FCO. Decisions on implementation of the project activities are the responsibility of BRO.

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1.4 Other Entities Involved in the Project

The Conservation Management Institute, Virginia Tech, Blacksburg, VA USA provided technical support for field data collection, remote sensing, GIS, and modelling.

Verl Emrick, Technical Lead
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Blacksburg, VA USA
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1.5 Project Start Date

Project start date is 1/1/2009.

1.6 Project Crediting Period

Project crediting period start date is January 1, 2009. Project end date is December 31, 2038. Project length is 30 years.

1.7 Project Location

The Project area is located at Latitude 17°04'00.00" N and Longitude 88°47'00.00" W in the Cayo District, Belize 23.5 km east-southeast of San Ignacio, Belize. The Project boundary encompasses 4,662 ha of which 666.3 ha are available and suitable for conversion to agricultural uses in the absence of finance from a carbon trade scheme under this project document. Of the 666.3 ha planned for conversion, 567.3 ha are included in the project calculations. A one-chain buffer surrounding perennial streams is excluded from consideration. There are no regulatory constraints on land clearing for agriculture in the Project area.

1.8 Title and Reference of Methodology

VM0007 REDD Methodology Modules (http://www.v-c-s.org/methodology_rmm.html). In particular the following methodology modules were used for this project:

- REDD-MF
- M-MON
- T-ADD
- T-BAR
- X-UNC
- X-STR
- BL-PL
- LK-ASP
- CP-AB
- T-SIG
- E-BB
- A/R Methodological tool "Estimation of direct nitrous oxide emission from nitrogen fertilization" (Version 01) with correction for percentage of nitrogen in applied fertilizer (NCSFi) Provide the title, reference and version number of the methodology or methodologies applied to the project.

2 IMPLEMENTATION STATUS

2.1 Implementation Status of the Project Activity

The implementation status of the project is that it is ongoing. The project area has not been deforested. .

The primary goal of the project is to maintain the forest in its current state. The project proponent has patrolled the property on a regular basis and no reversals have been detected.

Following the methodology, leakage monitoring is focused on lands owned by the project proponent in Belize. These lands have been monitored and no deforestation has taken place.

2.2 Deviations from the Monitoring Plan

No deviations from the monitoring plan have occurred.

2.3 Grouped Project

Not applicable.

3 DATA AND PARAMETERS

3.1 Data and Parameters Available at Validation

3.2

Data Unit / Parameter:	<i>Project Forest Cover Monitoring Map</i>
Data unit:	Ha
Description:	Map showing the location of forest land within the project area at the beginning of each monitoring period. If within the Project Area some forest land is cleared, the benchmark map must show the deforested areas at each monitoring event
Source of data:	Remote sensing in combination with GPS data collected during ground truthing
Value applied:	100%
Justification of choice of data or description of measurement methods and procedures applied:	Required by methodology. The minimum map accuracy should be 90% for the classification of forest/non-forest in the remote sensing imagery. If the classification accuracy is less than 90% then the map is not acceptable for further analysis. More remote sensing data and ground truthing data will be needed to produce a product that reaches the 90% minimum mapping accuracy. Must be monitored at least every 5 years or if verification occurs on a frequency of

	less than every 5 years examination must occur prior to any verification event
Any comment:	If stratification is required in the future due to a reversal, then new strata will be identified using module X-STR.

Data Unit / Parameter:	$A_{DefPA,i,t}$
Data unit:	Ha
Description:	Area of recorded deforestation in the project area at time t (if any occurs)
Source of data:	Remote sensing imagery
Value applied:	0
Justification of choice of data or description of measurement methods and procedures applied:	Required by methodology. Head's up delineation using GIS and landsat imagery (or higher resolution) using multiple images to get a cloud free image. Must be monitored at least every 5 years or if verification occurs on a frequency of less than every 5 years examination must occur prior to any verification event
Any comment:	This is presumed to be zero ex ante.

Data Unit / Parameter:	$A_{burn,i,t}$
Data unit:	Ha
Description:	Area burnt at time t (if any occurs)
Source of data:	Remote sensing imagery
Value applied:	0
Justification of choice of data or description of measurement methods and procedures applied:	Required by methodology. Head's up delineation using GIS and landsat imagery (or higher resolution) using multiple images to get a cloud free image. Areas burnt shall be monitored at least every 5 years or if verification occurs on a frequency of less than every 5 years examination must occur prior to any verification event
Any comment:	This is presumed to be zero ex ante.

Data Unit / Parameter:	$CAB_{tree,i}$
Data unit:	t CO ₂ -e ha ⁻¹
Description:	Carbon stock in aboveground biomass in trees in the project case in stratum <i>i</i> .
Source of data:	Field measurements applied with allometric equation published in Pearson et. al. (2005)
Value applied:	In 2009, 173.417 t CO ₂ -e ha ⁻¹
Justification of choice of data or description of measurement methods and procedures applied:	Required by methodology. See field methods section. Must be monitored at least every 5 years or if verification occurs on a frequency of less than every 5 years examination must occur prior to any verification event.
Any comment:	Key variable used to calculate with project carbon stocks and year by year growth rate. Measurements conducted in 2011 and conservatively presumed to be the same in 2009.

Data Unit / Parameter:	$DBH_{tree,i}$
Data unit:	cm
Description:	Diameter at 1.3 meters above the ground of each tree on each plot.
Source of data:	Field measurements
Value applied:	See database of tree measurements.
Justification of choice of data or description of measurement methods and procedures applied:	Required by methodology. See field methods section of monitoring plan. Must be monitored at least every 5 years or if verification occurs on a frequency of less than every 5 years examination must occur prior to any verification event.
Any comment:	Key variable used to calculate with project carbon stocks and year by year growth rate.

Data Unit / Parameter:	$N_2O_{direct-N,I,t}$
Data unit:	mtCO ₂ e
Description:	Leakage related to non CO ₂ emissions from increased use of nitrogen fertilizer
Source of data:	Landowner records
Value applied:	0
Justification of choice of data or description of measurement methods and procedures	Required by methodology. This is a source of potential leakage that monitors an increase of

applied:	nitrogen fertilizer application elsewhere on the landowner's property.
Any comment:	

3.3 Data and Parameters Monitored

Data Unit / Parameter:	<i>Project Forest Cover Monitoring Map</i>
Data unit:	Ha
Description:	Map showing the location of forest land within the project area at the beginning of each monitoring period. If within the Project Area some forest land is cleared, the benchmark map must show the deforested areas at each monitoring event
Source of data:	Remote sensing in combination with GPS data collected during ground truthing
Description of measurement methods and procedures to be applied:	The minimum map accuracy should be 90% for the classification of forest/non-forest in the remote sensing imagery. If the classification accuracy is less than 90% then the map is not acceptable for further analysis. More remote sensing data and ground truthing data will be needed to produce a product that reaches the 90% minimum mapping accuracy.
Frequency of monitoring/recording:	Must be monitored at least every 5 years or if verification occurs on a frequency of less than every 5 years examination must occur prior to any verification event
Value applied:	100%
Monitoring equipment:	Computer and appropriate analytical software.
QA/QC procedures to be applied:	Based on plot remeasurements.
Calculation method:	Head's up delineation using GIS and landsat imagery (or higher resolution) using multiple images to get a cloud free image.
Any comment:	If stratification is required in the future due to a reversal, then new strata will be identified using module X-STR.

Data Unit / Parameter:	<i>ADefPA,i,t</i>
Data unit:	Ha

Description:	Area of recorded deforestation in the project area at time t (if any occurs)
Source of data:	Remote sensing imagery
Description of measurement methods and procedures to be applied:	Head's up delineation using GIS and landsat imagery (or higher resolution) using multiple images to get a cloud free image.
Frequency of monitoring/recording:	Must be monitored at least every 5 years or if verification occurs on a frequency of less than every 5 years examination must occur prior to any verification event
Value applied:	0
Monitoring equipment:	Computer and appropriate analytical software.
QA/QC procedures to be applied:	Remeasurement of permanent plots.
Calculation method:	Head's up delineation using GIS and landsat imagery (or higher resolution) using multiple images to get a cloud free image.
Any comment:	This is presumed to be zero ex ante.

Data Unit / Parameter:	$A_{burn,i,t}$
Data unit:	Ha
Description:	Area burnt at time t (if any occurs)
Source of data:	Remote sensing imagery
Description of measurement methods and procedures to be applied:	Head's up delineation using GIS and landsat imagery (or higher resolution) using multiple images to get a cloud free image.
Frequency of monitoring/recording:	Areas burnt shall be monitored at least every 5 years or if verification occurs on a frequency of less than every 5 years examination must occur prior to any verification event
Value applied:	0
Monitoring equipment:	Computer and appropriate analytical software.
QA/QC procedures to be applied:	Remeasurement of permanent plots.
Calculation method:	Head's up delineation using GIS and landsat imagery (or higher resolution) using multiple images to get a cloud free image.
Any comment:	This is presumed to be zero ex ante.

Data Unit / Parameter:	$CAB_{tree,i}$
Data unit:	t CO ₂ -e ha ⁻¹
Description:	Carbon stock in aboveground biomass in trees in the project case in stratum <i>i</i> .
Source of data:	Field measurements applied with allometric equation published in Pearson et. al. (2005)
Description of measurement methods and procedures to be applied:	See field methods section.
Frequency of monitoring/recording:	Must be monitored at least every 5 years or if verification occurs on a frequency of less than every 5 years examination must occur prior to any verification event.
Value applied:	In 2011, 173.417 t CO ₂ -e ha ⁻¹ . 2009 conservatively presumed to be the same.
Monitoring equipment:	Computer and spreadsheet software.
QA/QC procedures to be applied:	Independent 3 rd party audit of field measurements utilizing remeasurement of a sample of plots.
Calculation method:	Calculation method follows Pearson et. al. 2005.
Any comment:	Key variable used to calculate with project carbon stocks and year by year growth rate.

Data Unit / Parameter:	$DBH_{tree,i}$
Data unit:	cm
Description:	Diameter at 1.3 meters above the ground of each tree on each plot.
Source of data:	Field measurements
Description of measurement methods and procedures to be applied:	See field methods section of monitoring plan.
Frequency of monitoring/recording:	Must be monitored at least every 5 years or if verification occurs on a frequency of less than every 5 years examination must occur prior to any verification event.
Value applied:	See database of tree measurements.
Monitoring equipment:	Diameter tape incremented in centimetres. Measuring tape to determine inclusion of trees on plots. GPS to navigate to permanent plots.
QA/QC procedures to be applied:	Independent 3 rd party audit of field measurements utilizing remeasurement of a

	sample of plots. Field observation sheets will include DBH of each tagged tree for evaluation of reasonableness of measurement based on feasible growth rate.
Calculation method:	Direct observation.
Any comment:	Key variable used to calculate with project carbon stocks and year by year growth rate.

Data Unit / Parameter:	$N_2O_{direct-N,I,t}$
Data unit:	mtCO ₂ e
Description:	Leakage related to non CO ₂ emissions from increased use of nitrogen fertilizer
Source of data:	Landowner records
Value applied:	0
Justification of choice of data or description of measurement methods and procedures applied:	Required by methodology. This is a source of potential leakage that monitors an increase of nitrogen fertilizer application elsewhere on the landowner's property.
Any comment:	

3.4 Description of the Monitoring Plan

The overall objectives of the monitoring plan are to detect any reversals in forest cover for baseline renewal after 10 years. To accomplish this, a system of permanent plots has been established and remote sensing will be used to produce a forest/nonforest map. The plot data will be used as ground truth for the mapping work as well as to confirm growth rate assumptions. The map will be produced for each verification audit and the plots will be measured annually and a report of the results produced for each verification audit. There may be years when all plots are not measured due to weather or other factors that cause remeasurement to be too costly or unsafe. In that case enough plots will be measured to support the required precision goals of the methodology or the verification audit will be delayed until such time as enough plots can be remeasured to meet those guidelines.

Nitrogen fertilizer use will be monitored to detect increases of fertilizer use over preproject levels.

Fuel wood collection was analyzed and considered de minimis prior to project start and is considered de minimis during the project and will not be monitored during the project.

All data collected as part of monitoring will be archived electronically on DVD (or similar media) in Excel compatible spreadsheets or Arc/View compatible (.shp) files and kept at least for two years after the end of the project. All of the data will be monitored if not indicated otherwise in tables

below. Monitoring data will be collected annually, except in cases where some plots are inaccessible due to high water or other factor making access unsafe, and summarized for periodic 3rd party independent audits. Audits will occur no less frequently than every 5 years. It is the responsibility of the landowner to conduct monitoring either utilizing contractors or in-house staff.

Updating of Strata

The ex-post stratification shall be updated if the following conditions occur:

- unexpected disturbances occurring during the crediting period (e.g. due to fire, pests, storms, or disease outbreaks), affecting differently various parts of an originally homogeneous stratum; and
- unplanned forest management activities (illegal reversals) that affect the existing stratification.

Established strata may be merged if reason for their establishing said strata have disappeared. Line diagrams may be used to display the GHG collection and management system.

4 QUANTIFICATION OF GHG EMISSION REDUCTIONS AND REMOVALS

4.1 Baseline Emissions

Baseline emissions avoided equal 338,573 mtCO₂e.

4.2 Project Emissions

Project emissions equal 0 mtCO₂e.

4.3 Leakage

No leakage has been detected.

4.4 Summary of GHG Emission Reductions and Removals

Years	Estimated baseline emissions or removals (tCO ₂ e)	Estimated project emissions or removals (tCO ₂ e)	Estimated leakage emissions (tCO ₂ e)	Estimated net GHG emission reductions or removals (tCO ₂ e) after reductions for statistical uncertainty
2009	169,011	0	0	158,221
2010	169,562	0	0	158,737
Total	338,573	0	0	316,958