

THE LOWER ZAMBEZI REDD+ PROJECT



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Table of Monitoring Report Requirements

MR #	Category	Requirement	Applicability
MR.1	Spatial Project Boundaries	A digital (GIS-based) map of the project area with at least the above minimum requirements for delineation of the geographic boundaries.	Applicable
MR.2	Temporal Project Boundaries	The project start date.	Applicable
MR.3	Temporal Project Boundaries	The project crediting period start date, end date and length.	Applicable
MR.4	Grouped Projects	A list and descriptions of all instances in the group.	Not Applicable
MR.5	Grouped Projects	A map of the locations or boundaries of all instances in the group indicating that all instances are in the same region.	Not Applicable
MR.6	Accounting Areas	A digital (GIS-based) map of the accounting areas with at least the above minimum requirements for delineation of the geographic boundaries.	Applicable
MR.7	Determining Time until Project Activity Instance Start Date	For each project activity instance in the group, its project activity instance start date.	Not Applicable
MR.8	Determining Time until Project Activity Instance Start Date	For each project accounting area, the value of t_{PAI}	Not Applicable
MR.9	Determining Covariate Data as of the Project Activity Instance Start Date	A table of covariate values as of the project activity instance start dates and a description of how the values were determined including any interpolation or extrapolation methods.	Not Applicable
MR.10	Baseline Emissions	Calculations of current baseline emissions $E_{BA}^{[m]}$ as of the current monitoring period.	Applicable
MR.11	Baseline Emissions	Calculations of baseline emissions $E_{BA}^{[m-1]}$ from prior monitoring periods.	Applicable
MR.12	Baseline Emissions	Calculations of cumulative baseline emissions for each selected pool ($E_{BBM}^{[m]}$ and $E_{BSOC}^{[m]}$) and undecayed carbon ($C_{BBB}^{[m]}$, $C_{BDW}^{[m]}$, $C_{BSOC}^{[m]}$, and $C_{BWP}^{[m]}$), as of the current monitoring period.	Applicable
MR.13	Baseline Emissions from Biomass for Types P1, P2, U1, U2 and U3	Calculations of cumulative baseline emissions from biomass $E_{BBM}^{[m]}$ for the current monitoring period.	Applicable
MR.14	Baseline Emissions from Biomass for Types P1, P2, U1, U2 and U3	Calculations of cumulative baseline emissions from biomass $E_{BBM}^{[m]}$ for all prior monitoring periods.	Applicable
MR.15	Applying the Spatial Algorithm	The order of strata from lowest carbon stocks to highest carbon stocks based on the average across all pools.	Applicable
MR.16	Applying the Spatial Algorithm	Calculations for each step which are carried through from monitoring period to monitoring period.	Applicable
MR.17	Applying the Spatial Algorithm	Calculations of cumulative baseline emissions from biomass $E_{BBM}^{[m]}$ for prior monitoring periods.	Applicable
MR.18	Baseline Emissions from SOC for Types P1 and P2	An estimate of current baseline emissions from SOC $E_{BA SOC}^{[m]}$ as of the current monitoring period.	Not Applicable
MR.19	Baseline Emissions from SOC for Types P1 and P2	An estimate of cumulative baseline emissions from SOC $E_{BSOC}^{[m]}$ for the current monitoring period.	Not Applicable

MR #	Category	Requirement	Applicability
MR.20	Baseline Emissions from SOC for Types P1 and P2	Calculations of cumulative baseline emissions from SOC $E_{B\ SOC}^{[m]}$ for all prior monitoring periods.	Not Applicable
MR.21	Baseline Emissions from SOC for Type U1	An estimate of current baseline emissions from SOC $E_{B\Delta\ SOC}^{[m]}$ as of the current monitoring period.	Not Applicable
MR.22	Baseline Emissions from SOC for Type U1	An estimate of cumulative baseline emissions from SOC $E_{B\ SOC}^{[m]}$ for the current monitoring period.	Not Applicable
MR.23	Baseline Emissions from SOC for Type U1	Calculations of cumulative baseline emissions from SOC $E_{B\ SOC}^{[m]}$ for all prior monitoring periods.	Not Applicable
MR.24	Baseline Emissions from SOC for Types U2 and U3	An estimate of current baseline emissions from SOC $E_{B\Delta\ SOC}^{[m]}$ as of the current monitoring period.	Applicable
MR.25	Baseline Emissions from SOC for Types U2 and U3	An estimate of cumulative baseline emissions from SOC $E_{B\ SOC}^{[m]}$ for the current monitoring period.	Applicable
MR.26	Baseline Emissions from SOC for Types U2 and U3	Calculations of cumulative baseline emissions from SOC $E_{B\ SOC}^{[m]}$ for all prior monitoring periods.	Applicable
MR.27	Carbon Not Decayed in DW	An estimate of carbon stored in non-decayed DW $C_{B\ DW}^{[m]}$ for the current monitoring period.	Not Applicable
MR.28	Carbon Not Decayed in DW	An estimate of cumulative baseline emissions from DW $E_{B\ DW}^{[m]}$ for the current monitoring period.	Not Applicable
MR.29	Carbon Not Decayed in DW	An estimate of cumulative baseline emissions from AGMT $E_{B\ AGMT}^{[m]}$ for the current monitoring period.	Not Applicable
MR.30	Carbon Not Decayed in DW	Calculations of cumulative baseline emissions from DW $E_{B\ DW}^{[m]}$ for all prior monitoring periods.	Not Applicable
MR.31	Carbon Not Decayed in DW	Calculations of cumulative baseline emissions from AGMT $E_{B\ AGMT}^{[m]}$ for all prior monitoring periods.	Not Applicable
MR.32	Carbon Not Decayed in BGB	An estimate of carbon stored in non-decayed BGB $C_{B\ BGB}^{[m]}$ for the current monitoring period.	Applicable
MR.33	Carbon Not Decayed in BGB	An estimate of cumulative baseline emissions from BGB $E_{B\ BGB}^{[m]}$ for the current monitoring period.	Applicable
MR.34	Carbon Not Decayed in BGB	Calculations of cumulative baseline emissions from BGB $E_{B\ BGB}^{[m]}$ for all prior monitoring periods.	Applicable
MR.35	Carbon Not Decayed in SOC	An estimate of carbon stored in non-decayed SOC $C_{B\ SOC}^{[m]}$ for the current monitoring period.	Applicable
MR.36	Carbon Stored in Wood Products	Carbon stored in long-lived wood products $C_{B\ WWP}^{[m]}$ after 100 years.	Not Applicable
MR.37	Carbon Stored in Wood Products	Calculations to determine $C_{B\ WWP}^{[m]}$	Not Applicable
MR.38	Emissions Events in Project Area	A map of the boundaries of any significant disturbance in the project accounting areas during the monitoring period.	Applicable
MR.39	Emissions Events in Project Area	Evidence that plots were installed into these disturbed areas and were measured per section 9.	Applicable
MR.40	Emissions from Burning from Project Activities	A table of events when woody biomass was burned during the monitoring period, showing the weight of woody biomass in tonnes and the date consumed.	Applicable
MR.41	Carbon Stored in Wood Products from Project Activities	Carbon stored in long-lived wood products $C_{P\ \Delta\ WWP}^{[m]}$ after 100 years.	Not Applicable

MR #	Category	Requirement	Applicability
MR.42	Carbon Stored in Wood Products from Project Activities	Scale reports or records of carbon in log production by wood product type $C_{P\ ty}^{[m]}$	Not Applicable
MR.43	Carbon Stored in Wood Products from Project Activities	Calculations to determine $C_{P\ ΔWP}^{[m]}$	Not Applicable
MR.44	Leakage Mitigation Strategies	A description of project activities that have been implemented since the project start date and the estimated effects of these activities on leakage mitigation.	Applicable
MR.45	Estimating Emissions from Activity-Shifting Leakage	Calculated cumulative emissions from activity-shifting leakage for the current monitoring period $E_{L\ AS}^{[m]}$ and supporting calculations.	Applicable
MR.46	Estimating Emissions from Activity-Shifting Leakage	Calculated cumulative emissions from activity-shifting leakage for the prior monitoring periods $E_{L\ AS}^{[m]}$	Applicable
MR.47	Change to the Activity-Shifting Leakage Area	A description and justification of the change to the activity-shifting leakage area.	Applicable
MR.48	Change to the Activity-Shifting Leakage Area	A map of the delineated boundaries.	Applicable
MR.49	Change to the Activity-Shifting Leakage Area	Maps of the landscape configuration, including: a. Topography (elevation, slope, aspect); b. Recent land use and land cover (either a thematic map created by the project proponent or publicly available map); c. Access points; d. Soil class maps (if available); e. Locations of important markets; f. Locations of important resources like waterways or roads; and g. Land ownership/tenure boundaries.	Applicable
MR.50	Change to the Activity-Shifting Leakage Area	A narrative describing the rationale for selection of activity-shifting leakage area boundaries. If the activity-shifting leakage area is smaller than the project accounting area or cannot be defined, justification for the size of the area.	Applicable
MR.51	Change to the Activity-Shifting Leakage Area	Results of a spatial analysis to demonstrate the activity-shifting leakage area is entirely forested as of the project start date.	Not Applicable
MR.52	Change to the Activity-Shifting Leakage Area	Results of a spatial analysis to demonstrate the activity-shifting leakage area is no larger than the project accounting area.	Applicable
MR.53	Estimating $P_{L\ DEG}^{[m]}$	The estimated value $\hat{P}_{L\ DEG}^{[m]}$ for the current monitoring period and supporting calculations.	Applicable
MR.54	Estimating $P_{L\ DEG}^{[m]}$	The calculated value $\hat{P}_{L\ DEG}^{[m=0]}$ calculated for the first monitoring period.	Applicable
MR.55	Determining Emissions from Market-Effects Leakage	Estimated cumulative emissions from market-effects leakage for the current monitoring period $E_{L\ ME}^{[m]}$ and supporting calculations.	Not Applicable
MR.56	Determining Emissions from Market-Effects Leakage	Calculated cumulative emissions from market-effects leakage for the prior monitoring periods $E_{L\ ME}^{[m]}$	Not Applicable
MR.57	Ensuring Constancy of Baseline Operator Management	Provide evidence in the form of GIS imagery, PRA evidence, or the baseline operator's management plan that management plans or land-use designations have not changed in the baseline operator's other lands.	Not Applicable

MR #	Category	Requirement	Applicability
MR.58	Quantification of GERs	Quantified GERs for the current monitoring period including references to calculations.	Applicable
MR.59	Quantification of GERs	Quantified GERs for the prior monitoring period.	Applicable
MR.60	Quantification of GERs	A graph of GERs by monitoring period for all monitoring periods to date.	Applicable
MR.61	Confidence Deduction	The confidence deduction $E_U^{[m]}$ and estimated standard errors used to determine the confidence deduction.	Applicable
MR.62	Confidence Deduction	Reference to calculations used to determine the confidence deduction.	Applicable
MR.63	Quantification of NERs Using a Linear Model	The linear model used to generate GERs for the current monitoring period.	Not Applicable
MR.64	Quantification of NERs Using a Linear Model	A graph of GERs from the linear model by monitoring period for all monitoring periods to date that used a linear model.	Not Applicable
MR.65	Reversal Event	A description of the reversal including which pools contributed to the reversal and reasons for its occurrence.	Not Applicable
MR.66	Reversal Event as a Result of Baseline Re-evaluation	A description of the reversal including a summary of new data obtained in the reference area.	Not Applicable
MR.67	Quantification of NERs for a PAA	Quantified NERs for the current monitoring period including references to calculations.	Applicable
MR.68	Quantification of NERs for a PAA	Quantified NERs for the prior monitoring period.	Applicable
MR.69	Quantification of NERs for a PAA	A graph of NERs by monitoring period for all monitoring periods to date.	Applicable
MR.70	Buffer Account	Reference to the VCS requirements used to determine the buffer account allocation.	Applicable
MR.71	Buffer Account	Reference to calculations used to determine the buffer account allocation.	Applicable
MR.72	Quantification of NERs across PAAs	Quantified NERs for the current monitoring period including references to calculations.	Not Applicable
MR.73	Quantification of NERs across PAAs	Quantified NERs for the prior monitoring period.	Not Applicable
MR.74	Quantification of NERs across PAAs	A graph of NERs by monitoring period for all monitoring periods to date.	Not Applicable
MR.75	Vintages	Quantified NERs by vintage year for the current monitoring period including references to calculations.	Applicable
MR.76	Evaluating Project Performance	Comparison of NERs presented for verification relative to NERs from ex-ante estimates.	Applicable
MR.77	Evaluating Project Performance	Description of the cause and effect of deviations from ex-ante estimates.	Applicable
MR.78	Data and Parameters Monitored	List of parameters from Appendix H, their values and the time last measured.	Applicable
MR.79	Data and Parameters Monitored	Quality assurance and quality control measures employed for each.	Applicable
MR.80	Data and Parameters Monitored	Description of the accuracy of each.	Applicable
MR.81	Description of the Monitoring Plan	Documentation of training for field crews.	Applicable
MR.82	Description of the Monitoring Plan	If included in project activities, a description of procedures used to estimate the rate of biomass burning and charcoal production and demonstration that these estimates are conservative.	Applicable

MR #	Category	Requirement	Applicability
MR.83	Description of the Monitoring Plan	Documentation of data quality assessment such as a check cruise and plots of the data such as diameter distributions by strata or plot.	Applicable
MR.84	Description of the Monitoring Plan	Maps of a stratification (if any) and references to plot allocation.	Applicable
MR.85	Description of the Monitoring Plan	List of plot GPS coordinates.	Applicable
MR.86	Description of the Monitoring Plan	Description of plot size and layout (such as the use of nests and their sizes) for each carbon pool.	Applicable
MR.87	Description of the Monitoring Plan	If applicable, a detailed description of the process used to develop allometric equations, to include: a) Sample size b) Distribution (e.g. diameter) of the sample c) Model fitting procedure d) Model selection	Not Applicable
MR.88	Description of the Monitoring Plan	The estimated carbon stock, standard error of the total for each stock, and the sample size for each stratum in the area selected.	Applicable
MR.89	Description of the Monitoring Plan	Log export monitoring records and standard operating procedure in the project area, if there is commercial harvest in the project scenario.	Not Applicable
MR.90	Description of the Monitoring Plan	Deviations from the measurement methods set out in Appendix B or the monitoring plan, per current VCS requirement.	Applicable
MR.91	Description of the Monitoring Plan	The frequency of monitoring for each plot for all plots – all plots should be measured for the first verification. All leakage plots should be measured every verification, and all proxy and project accounting area plots at least every 5-10 years, or after a significant event that changes stocks.	Applicable
MR.92	Sources of Allometry	A list of all selected allometric equations used to estimate biomass for trees and non-trees.	Applicable
MR.93	Sources of Allometry	For each selected allometric equation, a list of species to which it is being applied and the proportion of the total carbon stocks predicted by the equation.	Applicable
MR.94	Sources of Allometry	For each selected allometric equation, indication of when it was first employed to estimate carbon stocks in the project area (monitoring period number and year of monitoring event).	Applicable
MR.95	Sources of Allometry	For each selected allometric equation, indication of whether was validated per sections 9.3.1.1 or 9.3.1.2 .	Applicable
MR.96	Sources of Allometry	Documentation of the source of each selected allometric equation and justification for their applicability to the project area considering climatic, edaphic, geographical and taxonomic similarities between the project location and the location in which the equation was derived.	Applicable
MR.97	Validating Previously Developed Allometry	A list of allometric equations validated by destructive sampling.	Applicable
MR.98	Validating Previously Developed Allometry	For each, the number of trees (or non-trees) destructively sampled and the location where the measurement were made relative to the project area.	Applicable
MR.99	Validating Previously Developed Allometry	A field protocol used to measure destructively sampled trees (or non-trees).	Applicable
MR.100	Validating Previously Developed Allometry	Justification that the field protocol for the destructive measurement method is conservatively estimates biomass.	Applicable

MR #	Category	Requirement	Applicability
MR.101	Validating Previously Developed Allometry	For each allometric equation in the list, a figure showing all the descriptive measurements of biomass compared to predicted values from its selected allometric equation.	Applicable
MR.102	Validating Newly Developed Allometry	A list of allometric equations cross validated.	Not Applicable
MR.103	Validating Newly Developed Allometry	For each, the number of trees (or non-trees) destructively sampled to build the equation and the location where the measurement were made relative to the project area.	Not Applicable
MR.104	Validating Newly Developed Allometry	A field protocol used to measure trees (or non-trees) when developing the equation.	Not Applicable
MR.105	Validating Newly Developed Allometry	Justification that the field protocol for the measurement method to build the equation conservatively estimates biomass.	Not Applicable
MR.106	Validating Newly Developed Allometry	For each allometric equation in the list, the value of $\bar{E}$	Not Applicable

1 PROJECT DETAILS

1.1 Summary Description of Project

The Lower Zambezi REDD+ Project (Project) is a reducing emissions from deforestation and degradation (REDD+) project on 40,126ha of privately-owned land in Rufunsa District, Zambia. The Project Area is known as 'Rufunsa Conservancy', and is owned by a Zambian company named Sable Transport Limited. The Conservancy is one of the last intact areas of forest within Lusaka Province (named after the nearby capital city), and provides a 60-kilometer buffer to Lower Zambezi National Park (NP), a strategic protected area in Zambia in a globally significant trans-frontier conservation area. Lower Zambezi NP is adjacent to Mana Pools National Park in Zimbabwe which is a UNESCO designated World Heritage Site. The population of the Project Zone is approximately 8,300 people living in 28 villages spread within 4 community zones.

The Project Proponent is BioCarbon Partners, which is responsible for certifying the Project and for early-stage Project finance.

The core project climate activities undertaken include forest carbon inventorying, modelling cumulative deforestation patterns, and soil carbon assessments. Core community project activities include up to eighteen different types of community-based deforestation mitigation initiatives designed to create sustainable, scalable alternatives to deforestation, and strategic, meaningful incentives that comprise part of pay for performance programs that support forest conservation. Core biodiversity project activities include forest conservation systems, biodiversity monitoring and management, and fire management.

The Project is being developed to conform to the Climate, Community and Biodiversity Standard (CCBS, Second Edition) and the Verified Carbon Standard (VCS, Version 3.3). Furthermore, the Project is aligned with the Government of the Republic of Zambia's (GRZ) National REDD+ Program, implemented through the Forestry Department.

The project start and implementation date is 1 October 2009 and will be operational until 1 October 2039. The total estimated Gross Emissions Reductions over the project lifespan are 6,133,007 tCO₂e at an average of 204,434 tCO₂e/yr and 150,982 tCO₂e for this monitoring period.

1.2 Sectoral Scope and Project Type

VCS Sectoral Scope 14 – Agriculture, Forestry, and Other Land Uses (AFOLU), project activities Reduced Emissions from Deforestation and Degradation (REDD), using Methodology for Avoided Deforestation, VM0009 V2.1 and qualifies as baseline type U3, unplanned mosaic or frontier deforestation.

1.3 Project Proponent

Organization name	BioCarbon Partners
Contact person	Dr. Hassan Sachedina
Title	Managing Director
Address	5 th Floor, Barkly Wharf, Le Caudan Waterfront, Port Louis, Republic of Mauritius
Telephone	+260971729034
Email	hassan@biocarbonpartners.com

BioCarbon Partners is the project proponent. It is a Mauritian and Zambian registered company with the explicit aim of implementing REDD+ projects in African dryland forests. BCP implements in Zambia through BioCarbon Partners Ltd., a Zambian registered entity, that is majority owned by BCP Mauritius.

1.4 Other Entities Involved in the Project

The project proponent has gone to great lengths to secure local partners to support its projects and other technical advisors. Community projects are implemented through the BioCarbon Partners Trust, a separate not-for-profit registered legal entity in Zambia. Other organisations involved in the project are listed in Table 1.

Table 1. Other entities involved in the project including partners.

Organization name	Musika Development Initiatives Ltd
Role in the project	Technical Partner
Contact person	Mr. Rob Munro
Title	Director of Strategy
Address	6 Tukuluho Rd. Longacres, Lusaka, Zambia
Telephone	+260 211 251 371
Email	info@musika.org.zm

Organization name	Conservation Farming Unit
Role in the project	Technical Partner
Contact person	Peter Agaard
Title	Director
Address	23 B Twin Palm Rd, Kabulonga, Lusaka, Zambia
Telephone	+260-11-265455
Email	cfu@zamnet.zm

Organization name	Water282
Role in the project	Implementing Partner
Contact person	Jacob Eubanks
Title	Founder
Address	5430 Kasangula Road, Lusaka, Zambia
Telephone	+260 966339855
Email	jacob@water282.org

Organization name	Shared Value Africa
Role in the project	Implementing Partner
Contact person	John Fay
Title	Director
Address	5 Joseph Mwilwa Road, Rhodes Park, Lusaka, Zambia
Telephone	+260 978431684
Email	john.fay@sharedvalueafrica.com

Organization name	BioCarbon Partners Trust
Role in the project	Implementing Partner
Contact person	Molly Crystal
Title	Director
Address	1128 Mambilima Road, Rhodes Park, Lusaka, Zambia
Telephone	+260 211 290 051
Email	molly@biocarbonpartners.com

Organization name	Sunny Money/Solar Aid
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Role in the project	Implementing Partner
Contact person	Sarah Bentley
Title	Operations Director
Address	Plot no. 2b/25/377A House B, Off Roan Road, Kabulonga, Lusaka
Telephone	+260974 793 464
Email	Sarah.Bentley@sunnymoney.org

Organization name	BetterWorld Energy (BwE)
Role in the project	Implementing Partner
Contact person	Ben Warr
Title	Director
Address	Private Bag E017, Postbox No. 395, Cross Roads, Lusaka
Telephone	+260 978 391 304
Email	betterworldenergy@gmail.com

1.5 Project Start Date

MR.2 The project start date.

1 October 2009

1.6 Project Crediting Period

MR.3 The project crediting period start date, end and length.

The project crediting period starts on the project start date – 1 October 2009 and ends on 1 October 2039 and runs for a total of 30 years with the option to renew.

1.7 Project Location

MR. 1 A digital (GIS-based) map of the project area with at least the above minimum requirements for delineation of the geographic boundaries.

The Lower Zambezi REDD+ project is located approximately 120 km southeast of Lusaka and falls within the miombo eco-region which is host to a plethora of endemic species. It falls within the recently declared Rufunsa district and borders the Lower Zambezi National Park to the east and south, Chiawa Game Management Area (GMA) to the west and the Soli Shamifwi Royal Establishment (Chief Unda Unda's Chieftdom) to the north (Figure 1). The project area is accessible by road via the small towns of Chinyunyu and Sinjela on all-weather dirt roads. The project area is the Rufunsa Conservancy, privately owned by Sable Transport Ltd, a local Zambian company. The project area consists primarily of intact, primary miombo woodland that has never been logged with some open grassland and deep ravines with dense Acacia woodland. The project area is 40,126 ha in size.

A portion of Rufunsa Conservancy has been encroached by illegal charcoal producers and this area has been excluded from the project area (labelled Encroachment, Figure 1).

There are an estimated 8,300 people living in the project zone which falls in the Rufunsa district which is further divided into four zones and 28 villages. The project zone is bound between -15° 16' 57.72"S – 28° 58' 25.68"E (NW Corner) -15° 16' 57.72"S – 29° 23' 43.4394"E (NE Corner), -15° 35' 51.3594"S – 29° 23' 43.4394"E (SE Corner), and -15° 35' 51.3594"S – 28° 58' 25.68"E (SW corner).

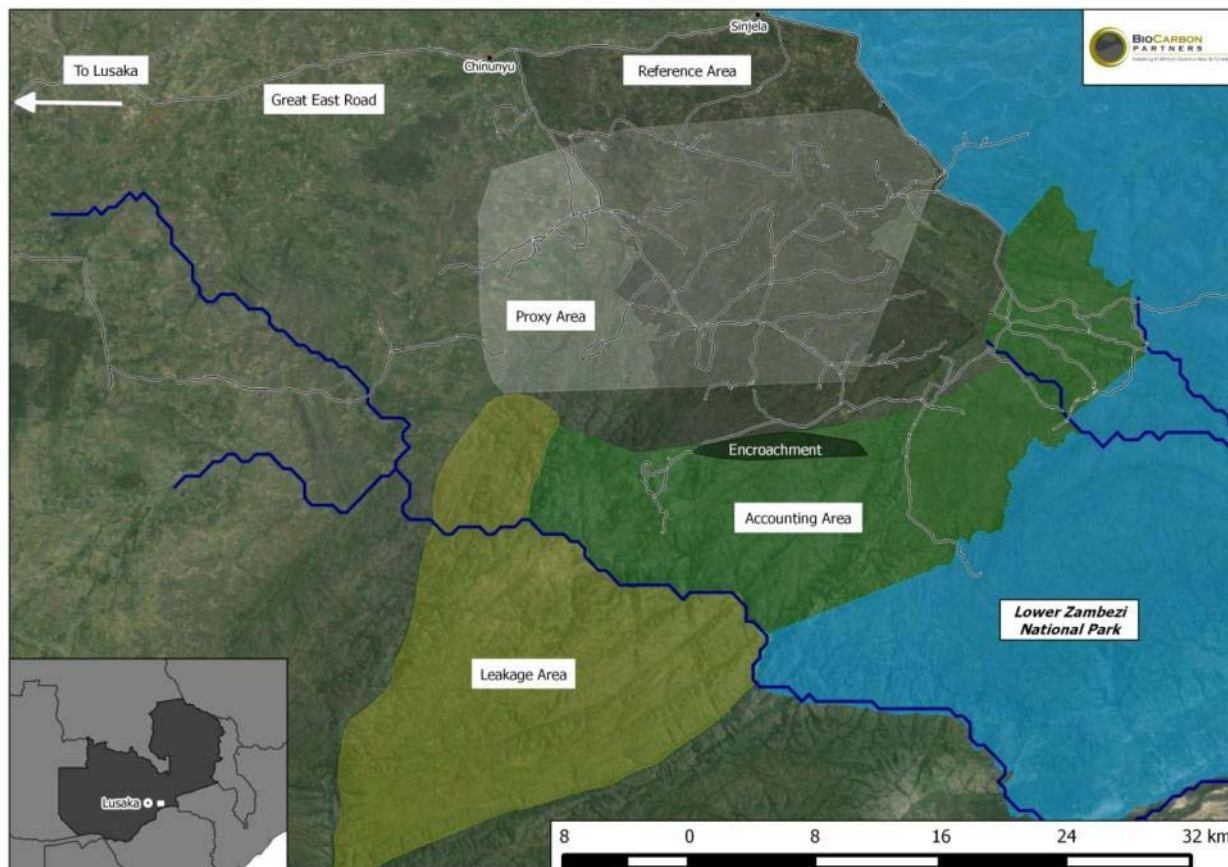


Figure 1. Location map of the Lower Zambezi REDD+ Project.

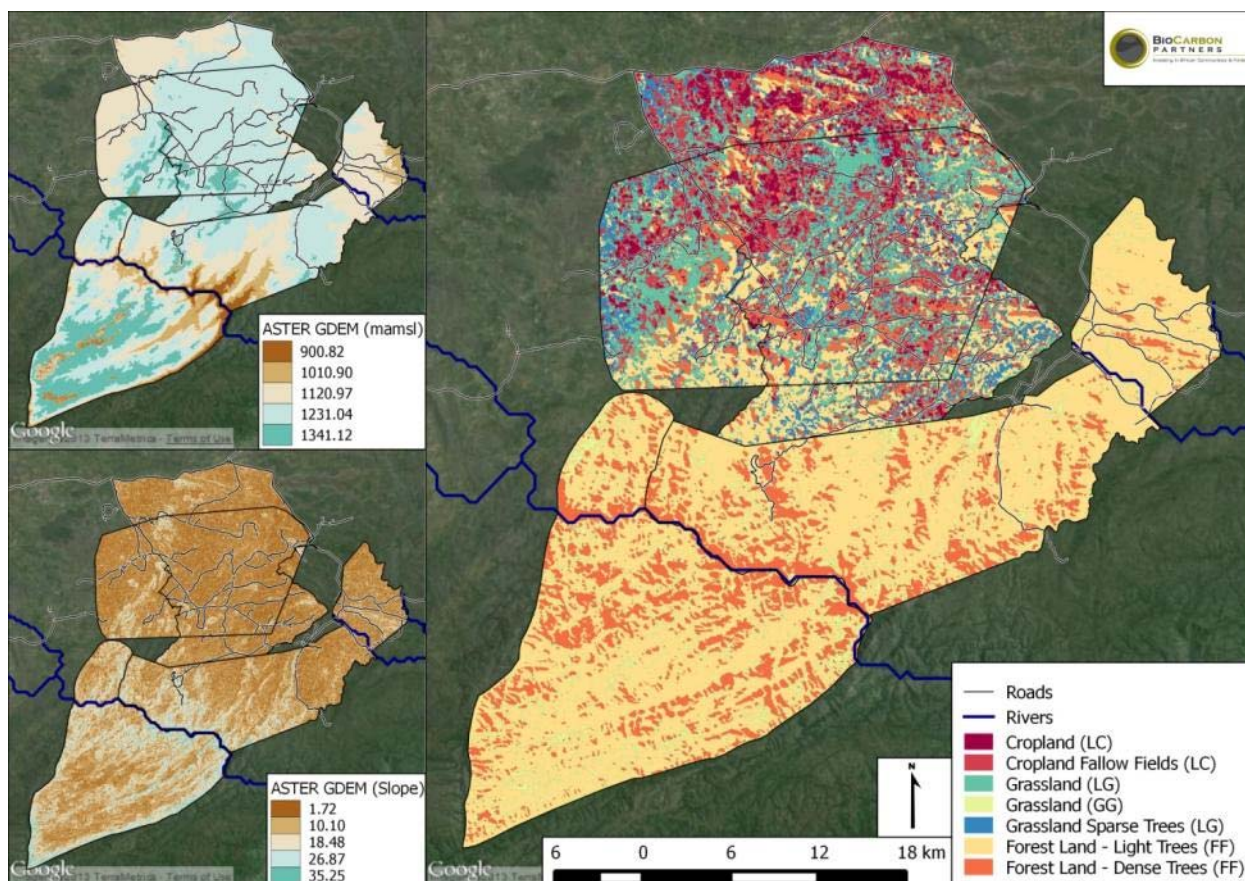


Figure 2. Land cover and topography of the Lower Zambezi REDD+ Project.

MR.6. A digital (GIS-based) map of the accounting areas with at least the above minimum requirements for delineation of the geographic boundaries.

The project accounting area is the boundary of Farm 10800, known as Rufunsa Conservancy, as shown in Figure 1 above. Sable Transport Limited, a Zambian registered and 100 percent Zambian citizen owned company, privately owns Rufunsa Conservancy under leasehold from the Government of the Republic of Zambia. This area was originally registered as a game ranch for wildlife tourism operations. Due to a lack of resources and wildlife poaching pressure, the area has not been used or promoted for eco-tourism or hunting and has been operated as a *conservancy*.

The accounting area was calculated by firstly excluding non-forested portions of the project area (bare earth and grassland). Then, all steeply sloped lands (greater than 20 degrees slope) which are inaccessible to agents of deforestation were excluded. The slope of 20 degrees was selected based on the assessment of the maximum slope of fields in the reference area. For clarity, steep slopes were excluded only if the size of the polygon to be excluded is greater than 0.4 ha, in which case a 15 m buffer was created around these polygons. The accounting area comprises 33,338 ha of the total project area of 40,126 ha. A 30m Digital Elevation Model (ASTER Global Digital Elevation Model Version 2) was used in the slope calculation.

For the project accounting area boundaries it is important to note that while the title deed outlines the boundaries of the conservancy, the reader will see that a portion of this area has been removed along the northern boundary (Figure 1). This excluded area has been removed as this portion of the property has been encroached by illegal squatters currently undertaking charcoaling and subsistence agriculture activities. This illegal squatting resulted from confusion as to the exact location of the Northern boundary of the property. As a result of this confusion, a small number of households (approximately 19) had settled on private property within the boundaries of the Project Area. An additional 24 households live on communal land on or near to the boundary of the property. It is possible that some of these illegal squatters arrived prior to the project start date, but there certainly has been new occupation after the project start date. It has now been brought under control.

Due to the sensitive nature of land tenure in Zambia it was decided not to evict these people, but rather exclude this encroached area from the accounting area. It has been decided that the best option is to exclude the encroached area from carbon accounting as including it will most likely make it necessary to relocate the occupants which could lead to unnecessary conflict. Squatters are being continuously monitored and are not allowed to move further into the property. It is thus a conservative exclusion, the area has not been included in emissions reductions accounting.

The boundaries of the exclusion area are based on a survey undertaken by BioCarbon Partners. Each illegal squatting household was surveyed with additional location data also collected using a hand held Global Positioning System (GPS). A convex hull was then generated around these points and used to adjust the boundaries of the conservancy. BioCarbon Partners will not be including this area in the calculation of net emission reductions.

There will be no BCP eco-charcoal production in the Project Area (Rufunsa Conservancy- boundaries as per title deed) or the accounting area or the excluded encroached area. All eco-charcoal production is taking place in a degraded patch of forest in the proxy area several kilometres from the project area (Figure 9).

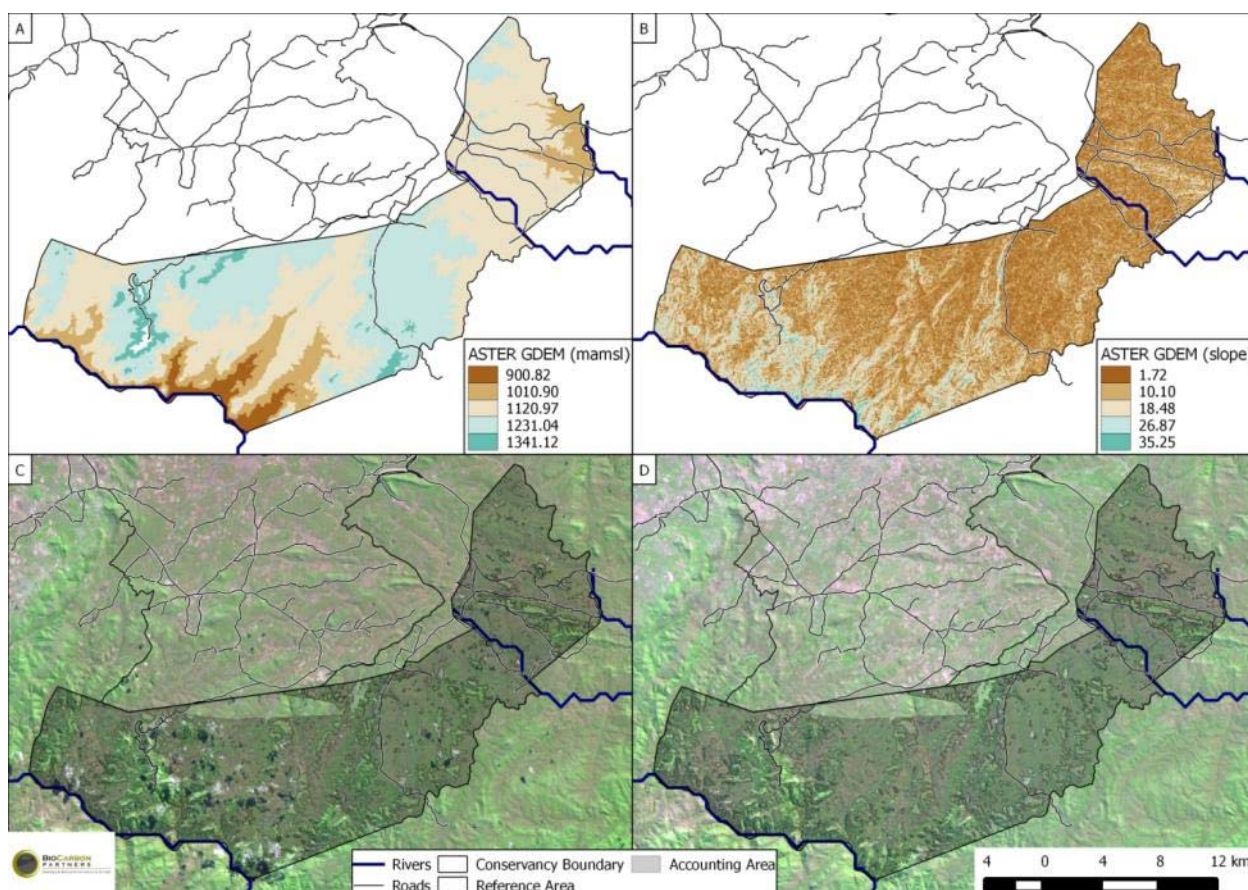


Figure 3. Topography (A), Slope (B), Accounting Area and forest cover in 1989 (C) and 2009 (D).

1.8 Title and Reference of Methodology

VM0009 – Methodology for Avoided Mosaic Deforestation of Tropical Forests, v2.1. Other tools include AFOLU Non-Permanence Risk Tool v3.2 and VT0001 Tool for the Demonstration and Assessment of Additionality in VCS AFOLU Project Activities, v3.0.

1.9 Other Programs

1.9.1 Emissions Trading Programs and Other Binding Limits

The Lower Zambezi REDD+ Project is not subject to binding emissions limits or emissions trading programmes.

1.9.2 Other Forms of Environmental Credit

The project has not applied to any other GHG programmes.

1.9.3 Participation under Other GHG Programs

The project was validated under the Climate, Community and Biodiversity Standards (Second Edition – Gold Level) on 21 June 2013 by Environmental Services Incorporated (CCBS, Second Edition, Project No. VO12079, <http://www.climate-standards.org/2013/03/13/lower-zambezi-redd-project/>).

2 IMPLEMENTATION STATUS

2.1 Implementation Status of the Project Activity

Key project activities include community sensitization, education and consultation to ensure an in depth understanding of deforestation agents and drivers and successful implementation of mitigation activities. All these projects follow an adaptive management strategy described in Appendix A and a rigorous set of procedures described in Appendix B. Records are kept of all community sensitization activities and project implementation (Appendix B)

Protection, Enforcement and Monitoring activities additionally ensure that project boundaries are known and respected by all parties, and that ongoing carbon stock monitoring activities take place. All project activities are designed to run the length of the project. Evidence of this such as employment contracts, time sheets and payslips for protection and monitoring teams are kept by BCP.

Key project activities with a description of how they will achieve GHG emissions reductions are listed in Table 2 below. All of these project activities are anticipated to continue throughout the lifetime of the project.

Table 2 . Project activities and implementation status for the LZRP.

Project Activity	Project Description	Status	Project Start Date
Community Sensitization, Education and Consultation: stakeholders understand and support the objectives of BCP's project activities, and are meaningfully involved in decision-making processes so as to ensure local legitimacy and buy-in to the project			
Community Sensitization	BCP works closely with local representatives and traditional community leaders to identify local causes and drivers of deforestation, and to design projects that are anticipated to meaningfully and sustainably address them. BCP's community-based approach allows project activities to benefit from local knowledge, legitimacy and support. Since February 2012, BCP representatives have engaged with local communities through a robust and extensive "community consultation and sensitization" process, which adheres to the principles of obtaining Free, Prior and Informed Consent (FPIC) from local stakeholder communities. We have thus far consulted over 86% of community stakeholders, and benefit from a 96% approval rating among stakeholders	On-going Implementation – Since 2012, BCP has undertaken an extensive sensitization and consultation process with community stakeholders living adjacent to Rufunsa Conservancy, the project area for the Lower Zambezi REDD+ Project, in line with the principles of ensuring Free, Prior and Informed Consent (FPIC). Since 2012, BCP has facilitated 142 Formal Sensitization Meetings across the 28 villages within the LZRP project zone, with 1,116 heads of household formally documented as attending these meetings (factoring out double-counting and repeat attendance). We anticipate that the household-reach of our sensitization is by now nearly 8,000 -- nearly the entire population of the community" project zone." All of these meetings have been documented in formal meeting minutes; a total of 3,384 names are listed on attendance sheets accompanying these meeting minutes. In 2014, BCP has focused on building the capacity of "Zone	February 2012

Project Activity	Project Description	Status	Project Start Date
	surveyed at community meetings.	Development Committees," which are hybridized institutions comprised of traditional authorities and democratically elected leaders. ZDCs are designed to lead and support decision-making about community-based livelihoods activities supported by BCP. As such, throughout 2014, we have held over 10 meetings with over 70 representatives from the 4 ZDCs, in order to raise awareness about REDD+ and involve local leaders in decision-making about community-based institutions. In August, BCP began to involve Drama Groups in ZDC capacity efforts, as a means of presenting information about BCP's REDD+ model and the imperatives of environmental protection in locally appropriate (and interesting!) ways.	
School Environmental Education Program	BCP aims to reach out to youths to raise awareness about forests and the environment. By teaching youths about the dangers of deforestation, and raising awareness about alternative activities, BCP hopes to change attitudes and actions, and to promote "better practices" and improved awareness among future generations. Beginning in 2013, BCP coordinated for the	On-Going Implementation – The EEP is being implemented in two schools in the project zone; Ndubulula and Namanongo Primary and Basic schools. A total of 101 students and 4 teachers are participating in the program. The program consists of 21 Lessons which have been divided into three parts including; Living Things, Natural Systems and Protection our Planet. It also consists of Special Environmental Education Days (SEEDs) – these are three special days/events that	February /November 2013

Project Activity	Project Description	Status	Project Start Date
	instruction of short “environmental awareness” programs at community schools. In November 2013, BCP will launch an intensified Environmental Education Program—which includes intensive teacher training and the provision of specific training materials and course handbooks for students—which fits within the national curriculum. This program will be a robust way of consistently engaging with youth in a meaningful way, to raise awareness about environmental protection.	BCP assists in facilitating, including: Environmental Protection in Action Day, Teach Your.....Day, and Environmental Awareness Days (EADs). The EEP materials were developed in 2013, and were adapted from the “Lolesha Luangwa” environmental education program from the North Luangwa Conservation Project (NLCP). 2014 was the first pilot year of the program. At the start of the program, BCP facilitated a three-day training for 5 teachers—three from Ndubulula School and two from Namanongo. Four of these teachers—two from each school have continued teaching the program. At the end of the school year in 2014, BCP staff will re-evaluate the program and will revise materials based on “lessons learned” and feedback from this initial pilot. We intend to continue supporting the EEP, and intend to expand its reach to include at least one more school in 2015.	
Scholarship Program	Designed to facilitate access to high quality education services for youth with demonstrated academic ability and interest in environmental issues. This program will promote education,	Design Phase – the BCP Scholarship Program is still intended/anticipated to be launched in 2015. We are currently actively seeking donors to support this program.	January 2015 (Planned)

Project Activity	Project Description	Status	Project Start Date
	promote youth involvement in and enthusiasm for environmental protection, and will support and develop young leaders as activists and ambassadors who can help to spread messages about forest protection and promote involvement in alternative activities.		
Forest Football: Youth Football and Environmental Education Program	The Eco-Kick program specifically targets youth for involvement in environmentally conscious activities, as well as promoting a healthy lifestyle that emphasizes alternatives to engaging in deforestation (as well as other less-desirable activities, that similar programs are generally designed to steer youths away from).	Implementation – In mid-2014, members of the BCP Community Engagement Team (CET) designed a program outline for the “Forest Football” program, based on feedback from community stakeholders (through ZDCs and existing football players). The pilot event is set to take place at the end of October 2014.	October 2014
Governance: Institution Building	BCP has worked with local communities to develop and support ‘hybridized’ community decision-making institutions, called Zone Development Committees (ZDCs). ZDCs address (avoid) problems of elite capture by combining local, democratically elected representatives from each village with local traditional	Implemented / On-Going Support – In early 2013, BCP facilitated the development of “Zone Development Committees” (ZDCs), which are hybridized institutions that combine traditional authority and democratically elected representatives from villages within each zone. The ZDCs are designed to promote local ownership of projects and to support locally appropriate decisions made through transparent decision-	January 2013

Project Activity	Project Description	Status	Project Start Date
	leaders, to allow decisions about project activities to simultaneously benefit from local knowledge and support, as well as legitimacy maintained through the inclusion of traditional leaders. BCP meets regularly with ZDCs in each of the 4 community zones for the Lower Zambezi REDD+ Project, to promote local sensitization and understanding of project activities, solicit feedback, and discuss upcoming project activities (including: project identification, project design, and project implementation).	making structures. Currently, there are 51 ZDC members representing 28 villages from the four community zones within the “project zone” for the LZRP. These ZDCs serve as useful consultative and decision-making bodies through which BCP can promote effective engagement with local communities. Thus, as BCP began to launch and support new activities in 2013, ZDC’s have been consulted and engaged in decision-making concerning these new project activities. Since 2013, 17 ZDC meetings have been held, involving over 70 representatives from local stakeholder communities. In August 2014, BCP launched a pilot “Drama Group” performance program, as part of a new awareness-raising and sensitization campaign, through the ZDC structures. Important decisions about major BCP activities and investments, including the project model for BCP’s “Village Chicken Project” (VCP) have been made through consultation and support with local ZDCs. In upcoming years, BCP intends to continue working through ZDCs as consultative and decision-making bodies. We also intend to launch an improved “capacity building” training program across ZDCs from the end of 2014.	

Project Activity	Project Description	Status	Project Start Date
Community-Based Deforestation Mitigation Projects: address (reduce) local drivers of deforestation by improving local livelihoods and by providing meaningful alternatives to deforestation-dependent livelihood activities.			
Agro-forestry	Promotes tree-planting and reforestation projects, particularly those with a commercial or food security improvement aspect (such as agro-forestry activities in combination with vegetable gardens or conservation farming plots).	Implemented – There is an agro-forestry component in the Conservation Farming Training Program (CFTP). In 2012, as part of an initial pilot, BCP partnered with CFU and Musika to provide initial agro-forestry trainings to ten households as part of the CFTP. In 2014, BCP focused on the expansion of the CFTP to include 197 new households. In 2015, BCP aims to include agro-forestry as a key component of the CFTP for participating farmers.	November 2012
Conservation Farming	BCP's Conservation Farming Training Program (CFTP) is led in partnership with the Zambian Conservation Farming Unit (CFU) and Musika Development Initiatives. The CFTP is designed to teach farmers how to become more efficient and productive on their farms, with an aim to improving local food security and reducing two of the strongest local drivers of deforestation: clearing for agricultural expansion, and clearing for charcoal production (to earn income to supplement incomes	Implemented/On-Going Support – In November 2012, BCP launched an initial pilot Conservation Farming Training Program (CFTP) with 10 households, through support and collaboration with CFU and Musika. In 2014, BCP expanded participation in the CFTP to include 197 households , with 4 individuals trained as “Senior Lead Farmers” and 41 trained as “Lead Farmers.” Trainings were provided through a combination of CFU, Musika and BCP trainers, with SLFs and LFs playing an important role in disseminating information and providing training to Contact Farmers in their	November 2012

Project Activity	Project Description	Status	Project Start Date
	from agriculture). There are six main ‘interventions’ promoted by the CFTP: 1. Early Planting – helps farmers to take advantage of “natural fertilizer” from first rains 2. No burning of crop residue – improves soil health, reduces emissions 3. Minimum-tillage basins – allows farmers to plant without needing animals to plough (less labour, less expensive, and allows for early planting that allows for “natural fertilizer” from first rains) 4. Precision farming – higher efficiency; maximum yields from minimum inputs 5. Agro-forestry – helps to minimize inputs (fertilizer) over time; <i>Faidherbia albida</i> trees provide natural fertilizer 6. Inter-cropping, crop rotation, diversification – help farmers to remain productive on the	villages. According to Baseline Survey results, at least 216 individuals from these 197 households have implemented conservation farming training techniques on their own farms as a result of these trainings. Applying the Baseline Survey results across all participating households, BCP projects that over 300 individuals in total implemented conservation farming techniques in 2013-2014 through this program. In 2014, BCP facilitated the registration of four “Farmers’ clubs” as part of the CFTP. The formal registration of these groups is intended to facilitate engagement with these groups, and allows them to be eligible to certain programs and/or benefits through other potential government agencies and partner organizations. By working with these clubs, BCP is able to support the development of systems that allow participating farmers to access services, aggregate their orders and access new markets through partner organizations such as Musika. Facilitating these improved market linkages is an important component of the CFTP, as it helps to create an incentive for farmers to adopt CF practices, and helps to make these practices	

Project Activity	Project Description	Status	Project Start Date
	same area of field/farm over time (reduces need to clear new areas of fields)	more profitable to participating producers. In 2014, BCP also conducted an initial baseline survey of 127 (of 197) participants in the CFTP. The data collected in this survey was important on two levels: - First, the baseline survey allowed BCP to calculate “adoption rates” of CF practices through the program. BCP found there was a 78% adoption rate overall among farmers who had received training, with 28% of farmers applying CF techniques to over 50% of their farms. These statistics compare favourably to national statistics that estimate national CF adoption rates at less than 10%, and demonstrate the importance (and potential for success) of BCP's intensive, field-based approach to community engagement. - Second, the Baseline Survey will allow for the measuring and tracking of program impacts on participants' well-being over time, through surveys to be undertaken on a regular basis among participating households in subsequent years, as part of BCP's Social Monitoring Program.	
Eco-Tourism	The involvement of local community stakeholders in Eco-Tourism activities is designed to achieve two main aims: 1) To provide local stakeholders with	Implemented / On-Going Support – In August 2013, BCP constructed an initial basic campsite within the Rufunsa Conservancy. There is a small camping fee attached to the	August 2013

Project Activity	Project Description	Status	Project Start Date
	income through employment created through the tourism activities, and 2) To help local stakeholders to perceive and receive tangible benefits from their (protected) forest environment.	use of the campsite, which includes a “community fee” that is intended to be delivered back into local communities along the boundary, through transparent benefit-sharing mechanisms (implemented through the ZDCs). In 2013, there were a low number of bookings due to the newness of the site. However, in 2014, BCP was able to advertise the campsite better through local networks, and we have had a greater number of tourists (although still low volume) visiting the campsite. At the end of the season (when the rains begin in November/December) BCP will remit the funds generated through this eco-tourism process to local community stakeholders. In 2014, BCP also launched a pilot “Bio Bank” project, in which 990.4 hectares of demarcated community forest land are protected through community-based forest management activities. Stakeholder participants in the “BB Project” are provided with pay-for-performance incentives, and have also been provided with priority support and training in the development of sustainable NTFP enterprises—such as honey production, mushroom collection/production, and dried fruits. Eco-tourism has also been explored for its potential to fit within this project model, and	

Project Activity	Project Description	Status	Project Start Date
		in 2015, we hope to include eco-tourism as part of the BB Project. In 2015, BCP intends to undertake a more formal assessment of tourism potential within the Project Zone for the LZRP.	
Improved Small Livestock Production	Throughout BCP's extensive first round of the community "Project Identification and Design Process," which was designed to solicit detailed community feedback concerning priority project activities, Small Livestock Projects were consistently and frequently identified as a top-priority project activity. BCP's small livestock projects are designed to simultaneously improve local food security and help participants to develop small-scale community-owned livestock businesses that can generate income for participants. Participation in livestock project activities is linked to deforestation mitigation through the use of Community Covenants, which restrict participation to those members who agree not to engage in deforestation or poaching activities inside the project	Implemented / On-Going Support – The VCP aims to provide an alternative to deforestation by supporting the development of successful community-owned village chicken businesses that channel benefits in terms of improved income and food security to households. Following the initial pilot project launch in 2013, in 2014, BCP has focused on providing intensive training on Improved Village Chicken Care and Production, and small-business development. In 2014, through a VIGOR grant from USAID, BCPT has been able to facilitate the donation of "improved" village chickens to 266 participating households in 22 pilot groups. Also in 2014, BCP has collected feedback from participants in these initial pilot projects and has these incorporated "lessons learned" into a new project design that promotes a more "individualised" model, that provides support at a household level, instead of group level. From the end of 2014, BCP will be transitioning support to 8 new	February 2013

Project Activity	Project Description	Status	Project Start Date
	area of Rufunsa Conservancy. In February 2013, BCP launched a “pilot” round of 23 Village Chicken projects taking place throughout the Project Zone. Ongoing “success and compliance” monitoring activities are taking place, and there is much reported enthusiasm for the project. By October 2013, the project is anticipated to “intensify” through the provision of improved-genetics chickens to project groups. In 2014, groups will begin to receive focused “small business development” training. Additional goat, duck, pig and cattle projects are currently under consideration, as well as fish farming activities.	“household level” projects selected from across the project zone; and 80 improved village chickens will be provided to participants in the next phase of this project. In 2015, participants will continue to receive trainings, business development support and market-linkages support through BCP and supporting implementing partners, such as Musika.	
Community Livestock Worker Program: Improved Animal Care	The Community Livestock Worker (CLW) Program is designed to train representatives from each village in the improved care of livestock, and facilitate their access to necessary training, information and resources that will help to improve local care for livestock animals. This program is designed to	Implemented / On-Going Support and Development: In 2014, BCPT trained and provided equipment (bicycles, cooler boxes, records-keeping materials) to 4 CLWs—1 from each community zone. Throughout 2014, these CLWs have received on-going training and support from BCP, and BCP has worked closely with the CLWs and local partners to develop an improved program design.	June 2013

Project Activity	Project Description	Status	Project Start Date
	provide support to BCP livestock projects, as well as to improve health of livestock living within the project zone, overall. In so doing, BCP hopes to help rural stakeholders to develop livestock rearing activities as sources of food and income for their families, reducing their current 'need' to engage in deforestation-related activities to access income. As such, the CLW project supports and is part of other efforts to develop viable alternatives to deforestation within the project zone.	As of mid-2014, a partnership has been formed with the Chinynuyu Ministry of Agriculture and Livestock office to facilitate the opening of a "livestock drug store" in Ndubulula Zone so that all the CLW's will have access to the drugs and will additionally be trained under the Ministry so that their capacity is built. Henceforth, the store has been identified and negotiations with the "shop owner" have begun.	
Solar Technology Extension Project	This project is designed to reduce local practices of using firewood for lighting, to help promote the availability of alternative solar technologies, and to empower local "extension agents" as operators of their own small-scale solar businesses. Increased access to solar technology also promotes other forms of development, for example, by facilitating children to study for school at night.	Implemented – The Solar Extension Agent program began in early 2014, with trainings facilitated by SunnyMoney, an implementing partner. 4 SEAs were identified and trained —one from each zone—and provided with bicycles and records-keeping materials, as well as specific support in the use and maintenance of basic solar technology, and support in small-business development techniques (including records-keeping). Throughout 2014, only one SEA has remained active in the program. BCP is currently working with that SEA, with SunnyMoney	June 2013

Project Activity	Project Description	Status	Project Start Date
		and with institutions such as ZDCs to identify ways that the program can be grown and/or changed to improve its success.	
Miombo Mushroom Business	Promotes the collection and growing of mushrooms as forest-compatible activities that promote forest protection and the sustainable use of natural resources, with the aims of improving food security and developing an alternative source of income for local families who wish to participate in the commercial sale of mushroom products.	Implemented / On-Going Support - Through BCP and a partnership with a former Peace Corps Volunteer, 64 participants have received training mushroom production and small business development. Mushroom production trainings began in September 2013. In 2014, BCP has worked with local producers and participants to identify and develop a potential new project and business-development model to be pursued in 2015. BCP is currently working with a local women's group in order to develop an initial pilot plan for a mushroom production business.	October 2013
Seasonal Thatch Business	Facilitate local, traditional practices of collecting thatch, by linking participants to transportation 'at cost' and access to markets for their thatch products. In so doing, the project is designed to develop a small business opportunity that additionally reduces fuel-loads for hot late-season fires.	Pending - In 2014, this project was assessed for its business potential / viability, and it was concluded that the business value and potential for such a project were currently low due to low demand and low prices. BCP aims to re-consider this project in 2015 as part of other activities taking place, for example, linked improved forest management practices taking place through the eco-charcoal project, in any case.	N/A
Social Services (ex: school,	BCP's social service projects are intended to improve quality of life for	On-going Implementation – In 2014, through the School Support Program, BCP has	October 2012

Project Activity	Project Description	Status	Project Start Date
borehole, clinic)	residents within the project zone, and to ensure that our project activities are designed to target and involve the “poorest of the poor”—defined, for example, as those who cannot otherwise access decent educational facilities, medical care or clean water supplies. - In October 2012, BCP refurbished the borehole for central Ndubulula Zone (Kantanyantya village). - In February 2013, BCP collaborated with Forestry Department to assist with the planting of 2 School Fruit Orchards, in Mweeshang’ombe and Chilimba Zones. - In April 2013, BCP provided solar lighting to the Namanongo Clinic. - In June and August 2013, BCP provided support (locks, desks) to classrooms at Chilimba School Additional project activities are planned, and will continue to be scheduled according to newly prioritized needs.	continued to subsidize 3 teacher salaries at two community schools (Chilimba and Mweeshangombe). In August 2014, BCP— through a partnership with Water282, an implementing partner— helped to facilitate Water, Sanitation and Hygiene training programs for 4 local villages. In October 2014, through this same partnership, 3 new boreholes will be sunk in 3 stakeholder villages. BCP currently has plans to invest into borehole repairs and community school classroom refurbishments in two zones. We also intend to continue our partnership with Water282, to continue providing trainings and boreholes to communities in need.	
Sustainable Eco-Charcoal Production	BCP’s flagship Sustainable Eco-Charcoal project combines sustainable	Implemented / On-Going Support – The Eco-charcoal project is currently being	August 2012

Project Activity	Project Description	Status	Project Start Date
	harvesting practices taking place on protected areas of (degraded) community forest, improved higher-efficiency kiln technologies, and critical value chain interventions (such as access to transportation “at cost” for sustainably produced products), with the aim of creating strong incentives for rural producers to switch from current unsustainable charcoal production practices to sustainable charcoal production practices. The project is designed to replace unsustainable harvesting practices with sustainable practices that allow for the regeneration of forests, promote community-based forest protection, and improve rural producer livelihoods through the development of a commercially viable sustainably harvested charcoal product.	expanded into Namanongo and Mweeshan’gombe zones. Agreements have been signed with 15 “Charpreneurs” to implement sustainable forest management (and harvesting) techniques through the project on 167 hectares of community forest – in addition to the 93 hectares that are still under improved management through the pilot project in Ndubulula Zone (which is on-going). There are now a total of 10 project sites involved in this project, across 3 community zones. In 2014, BCP has worked to raise sensitization and awareness, and to expand participation in the program. We have consistently communicated that the requirements to engage in the project are that: participants should be existing charcoal producers, and that charcoal production should take place at a household level on forests that are degraded and close to the road (to allow for logistical and business viability). A practical <i>cassamance</i> kiln construction training recently took place on the 24th of September 2014 in the Ndubulula community Eco-charcoal forest. The Charpreneurs recently harvested their <i>cassamance</i> kiln in strip 214 and produced 23 X 90 kg bags. To date, 238 bags of eco-	

Project Activity	Project Description	Status	Project Start Date
		charcoal have been produced through the expanded eco-charcoal program. Importantly, there are clear signs of re-growth and regeneration in the eco-charcoal forest, demonstrating the positive impacts of improved forest management techniques. The eco-charcoal forest area already looks “healthier” than nearby areas, where large, unsustainably produced “marco polo” kilns stand in contrast to the regenerating forest. Additionally, in 2014, BCP has involved a new partner—Shared Value Africa—in adding value to the sustainable harvesting techniques promoted by the eco-charcoal program. SVA are currently sourcing “biomass” in the form of canopy—which is traditionally burned as “waste,” under normal charcoal production—for chipping to be used for improved energy-efficient cook-stoves. This partnership with SVA is intended to continue and grow in upcoming years, and is intended to similarly expand into new areas demarcated for the project.	
Sustainable Honey Production	BCP aims to promote honey production as an alternative source of food and income among rural stakeholders. Since honey	Implementation – BCP has launched an initial pilot honey production training program in 2014. In April, BCP partnered with the local Forest Department officer	March 2014

Project Activity	Project Description	Status	Project Start Date
	production is reliant on the protection of forest areas, the project will also create an incentive for participants and beneficiaries from the project to protect areas of forest where the production is taking place. BCP will help to connect participants to markets for locally produced honey. We have already formed a strategic partnership with a large-scale honey seller in Zambia.	to provide a three-day honey production training in Shimaluba village—a village that is also participating in the “Bio Bank” project. 55 participants from 7 villages were trained at this time. In October 2014, BCP will distribute 30 hives to initial participants in the program. These hives will be hung at the start of 2015 as part of an initial production pilot. BCP is currently actively seeking partners to support the business-development aspect of a honey production project. We aim to identify a potential partner for the development of a local honey business by the start of 2015.	
Sustainable Hydra-Form Brick Making	Hydra-form bricks require less cement and do not require wood-firing. BCP has purchased a hydra-form brick-making machine, which will be used for the construction of BCP facilities and can be loaned to community projects (such as classroom construction). In the long-term, a hydra-form brick making ‘business’ involving employees from the local community will simultaneously create local employment and reduce the high prevalence of deforestation for wood-	On-Going Implementation – BCP’s Hydra-Form Brick-Making machine has been in-country and operational since mid 2013. From early 2014, BCP has begun using the Hydra-Form Brick-Making machine to produce bricks that are now being used in the construction of infrastructure at the Headquarters of the Rufunsa Conservancy, including improved staff housing for local community hires. In mid-2014, BCP coordinated a training program for local community members, which allowed them first-hand experience with brick production using the machine, as well as comprehensive training in basic	July 2013

Project Activity	Project Description	Status	Project Start Date
	burning kilns for 'traditional' bricks.	construction techniques. This training program was an initial step as part of a broader local capacity building program that BCP intends to support, simultaneously as we also complete infrastructure improvements to the project headquarters as well as make the machine available to support community development activities, such as classroom construction or refurbishment, according to "priority plans" to be developed through local institutions (ZDCs) in early 2015. <u>Statistics for 2014 include:</u> - 10 Structures built using hydraform (6-room accommodation block; 3-room ablution block; 1-room store-room) - 8,450 hydraform bricks produced - 610 "man days" of community labour in construction and land management	
Tree Planting (woodlots), Tree Nurseries, Orchards	BCP's tree planting and afforestation projects are the result of a strong partnership and collaboration with the Zambian Forestry Department. In February and March 2013, over 500 trees were planted in 2 School Fruit Orchards, as part of a community 'nursery' project, as well as	Implementation - In 2014, BCP facilitated 40 fruit trees to be planted at Namanongo and Ndubulula Schools as part of the Environmental Education Programme Special Environmental Education Day in the first quarter of the year. In 2014, BCP also facilitated an afforestation program taking place in the harvested "strip" areas within the Ndubulula Eco-Charcoal forest,	February 2013

Project Activity	Project Description	Status	Project Start Date
	a forest rehabilitation project connected to the Sustainable Eco-Charcoal Project. Tree planting will be promoted as a means of afforestation and improved forest management, which can additionally support the health of forest-compatible projects that promote the sustainable management of forest resources, as well as commercial opportunities for communities that wish to develop and manage local nurseries.	in partnership with the local Forestry Department officer. Through this program, 100 indigenous trees were planted. In 2014, BCP also facilitated introductory meetings between local communities and BetterWorld Energy, concerning the potential for woodlots and agro-forestry programs taking place on community lands, as part of biofuels project with the potential to generate income and promote access to alternative fuel sources. For 2015, BCP hopes to support the establishment of a community-owned nursery, in partnership with Forestry Department.	
Crop Diversification	As a key element to the Conservation Farming Training Program (CFTP), crop diversification will be promoted through BCP's strategic partnership with Musika Development Initiatives—an organization committed to connecting rural producers to urban markets. Crop diversification will promote long-term field health, increase yields, and improve household resilience in the face of climactic changes or other unexpected phenomena, reducing the likelihood of	Implementation - The Crop Diversification program is being implemented through Musika, a partner organization, and it is linked closely to the CFTP supported by BCP. As such, 197 participating households have access to this program. BCP intends to access data related to the extent of this program in 2014 by the end of the year. In 2015, we aim to develop an improved agreement concerning collaboration and data-sharing, and expansion activities, related to this project.	June 2013

Project Activity	Project Description	Status	Project Start Date
	total poverty or livelihood destruction—especially among the ‘poorest of the poor’— as a result of such unfortunate events.		
Vegetable Production	BCP will promote rural stakeholders interested in forming vegetable gardens, either as family food sources or commercial business opportunities, by facilitating their access to training and inputs through partner organizations such as Musika. Vegetable production projects are designed to improve food security and to provide alternative sources of income, reducing the need that many households currently face to engage in deforestation to access food or income.	Implementation / Start-Up: In 2014, BCP has identified a “model” household for a pilot vegetable growing project—the household is located along the boundary of the protected forest area, and this proximity has made it possible for BCP to begin purchasing vegetables for consumption by BCP staff based at the Rufunsa Conservancy, creating an initial market to support vegetable production. BCP is supporting the farmer in identifying seeds that he can use to diversify and develop his supply. BCP is also in initial discussions with this farmer about using his farm/gardens as a model and training grounds for other interested farmers, and engaging him as a formal trainer for households interested in beginning to grow vegetables and engage in other NTFP activities, as he is already a local expert in these practices. BCP aims to launch an expanded vegetable/NTFP program in 2015, and we very much hope that this initial farmer will play a leading role in the development of that program.	March 2014

Project Activity	Project Description	Status	Project Start Date
Sewing Project	BCP works with interested participants (especially women's groups) to develop commercially viable sewing projects, which are ultimately intended to turn into locally-owned small businesses. BCP has already begun employing local women with sewing training to assist with the completion of items for the Rufunsa Conservancy Headquarters.	Implementation / Re-Design: In April 2013, BCP started an initial pilot sewing project. 2 women from Ndubulula Zone were identified as trained seamstresses with access to sewing machines, and they were engaged by BCP to sew some initial sample designs of functional materials (curtains, pillow cases), which BCP then purchased for use at the Rufunsa Conservancy. Unfortunately, in this initial pilot it became clear that the women involved in the program would need capacity building in terms of meeting order expectations (ie: number and quality of products produced) and deadlines, and more time would be needed to develop a market for sewn products produced through the project, to ensure its sustainability. As such, we aim to re-visit this project model in 2015. A pilot sewing project has been identified for inclusion on grant funding proposals for 2015, and we hope that with further grant funding we will be able to devote more staff time and resources to supporting this pilot project, and networking and marketing to build a market for sewn products—locally and in Lusaka.	April 2013
Edible Insect Project	This forest-compatible edible insect harvesting project is designed to simultaneously: 1) improve	Design – This project has not been implemented yet, but it has been under consideration by the BCP Community Engagement	2015

Project Activity	Project Description	Status	Project Start Date
	food security among participants and beneficiaries, 2) increase income/provide an alternative source of income among participants who wish to sell locally, sustainably harvested edible insects as part of a small-scale community-owned business, and 3) to promote protection of community forests where edible insects can be harvested. As such, this project is designed to promote forest protection, address/reduce local drivers of deforestation (including poverty and lack of access to alternatives) and improve local livelihoods.	Team (CET) as a possibility to support in 2015. At the end of 2014/start 2015, the BCP CET will be undertaking a review of BCP's Community Engagement Strategy, and as part of that, we will undertake (or facilitate) an analysis of business viability for various NTFP products. As part of this analysis, we will analyse the potential viability for an edible insect project, including: assessing local experience and interest in undertaking this activity, assessing local demand for this product, and assessing market potential for development of this project into a financially viable small-scale community-owned business.	
Savings and loans groups	BCP facilitates community access to training and support/resources for community Savings and Loans groups. This project will be administered through a strategic partnership with a local organization. Savings and Loans groups will be designed to help rural stakeholders to develop their own alternatives to deforestation, and improve access to financial	Design – In 2014, BCP has tasked a locally-based Peace Corps volunteer with looking into various potential models for Savings and Loans programs, including assessing past local experiences with Savings and Loans programs. Local an Lusaka-based Savings and Loans projects have been identified as potential partners, and a program in Malawi has been identified as a potential training partner—they have come highly recommended as a result of their success in providing training and	2015 (Planned)

Project Activity	Project Description	Status	Project Start Date
	resources for household wellbeing.	support to an independent Savings and Loans project in Eastern Zambia. BCP will consider assessing the potential viability of various training and support models, including partnerships, and we aim to launch a Savings and Loans program by 2015.	
Employment	BCP views meaningful job creation as one of the strongest and most sustainable ways of providing an alternative livelihood opportunity to local stakeholders. By providing community stakeholders with regular alternative sources of income, BCP hopes to drastically reduce the pressures they otherwise face to engage in deforestation-dependent activities, such as charcoal production, to earn income.	Implementation – BCP has created multiple employment opportunities in local communities, including: - Forest Inventory Team: Members of local communities trained in forest carbon measurement and reporting techniques, including data collection using Android phone technology. In 2014 there have been 3 members of the team, with 5 members from the local community trained in plot sampling and MRV techniques. In 2015 BCP aims to hire 1-2 more individuals to support this team. - Village Scouts: In 2014, BCP collaborated with ZAWA to undertake a selection-process to identify 12 new scouts who are being sent for formal training through ZAWA, who will then form a Security Team at Rufunsa Conservancy. - Tourism Support / Domestic Workers: Throughout 2013-14, BCP has employed 1-2 “Domestic Workers” who assist with campsite maintenance as part of a tourism	March 2012

Project Activity	Project Description	Status	Project Start Date
		development initiative at the Rufunsa Conservancy, and who assist with basic camp maintenance at the Rufunsa Conservancy headquarters. - Land Management / Construction: Employment opportunities have been created through construction (infrastructure improvement) and land management activities (such as roads maintenance, erosion control) at Rufunsa Conservancy. These activities will continue into 2015, and on-going construction activities are planned as part of BCP's social services program, which aims to improve social services (including infrastructure of clinics, schools and boreholes) in local communities. - Community "Agent" Network: BCP has transitioned to a decentralised community engagement model, with networks of part-time "Agents" identified and trained to provide support to community engagement efforts, such as: coordinating meetings, collecting documentation, coordinating trainings, gathering social data, conducting monitoring activities, promoting awareness about BCP's REDD+ activities. This part-time schedule has been identified as more effective as it allows Agents to maintain their other household commitments.	

Project Activity	Project Description	Status	Project Start Date
		- Extension Agents: BCP is supporting two pilot “extension agent” project models—the Community Livestock Worker program and the Solar Extension Agent Program. These activities are designed to promote rural access to veterinary care and services, as well as solar technology, and are also intended to support interested individuals in the development of small-scale businesses based on the distribution of these products/services. In 2014, BCP has provided these Extension Agents with bicycles, basic equipment and training related to the technical and business development aspects of their roles. In 2015 we will continue to track and monitor the impacts and potential for these projects to scale, and to identify further opportunities to develop new Extension Agent models in the community project zones.	
Protection, Enforcement and Monitoring: project boundaries are known and respected by all parties, and ongoing carbon stock monitoring activities take place.			
Forest Monitors and Scouts	Trained security teams comprised of local community members patrol and secure the project area, reporting any acts of deforestation or wildlife poaching that take place. Particular emphasis is	Implementation / On-Going: Four Community members mandated by the Zambia Wildlife Authority (ZAWA) as Village Scouts have been patrolling strategic zones within the project area. Several trespassers attempting to extract timber were arrested on the	September 2012

Project Activity	Project Description	Status	Project Start Date
	placed on protecting the perimeter of the property, especially the boundary adjacent to community lands, with an aim to preventing further encroachment of the project area. Security activities will be undertaken through close collaboration with the Forestry Department, Zambian Police and the Zambia Wildlife Agency (ZAWA). Security teams will also be trained in effective conflict resolution practices, for example, effective communication styles for pursuing non-confrontational discussions with local community stakeholders. BCP's Forest Monitors are also engaged in ongoing comprehensive biodiversity monitoring programs, which are designed to track the ongoing impacts of BCP's REDD+ activities on local wildlife.	property with the assistance of the Zambia Police. Several dozen snares have been collected, mostly along the boundaries of the project area. Collaboration between BCP, ZAWA resulted in the successful arrest of several timber harvesters inside Lower Zambezi National Park, within a few km of the boundary of the project zone. Two of the currently-employed scouts are in the process of obtaining their licenses to ride motorcycles. Once licensed they will begin mobile patrols, thereby covering a wide area. From October to December 2014 twelve new recruits will receive intensive paramilitary and conservation-oriented training at a ZAWA training facility at Chunga, Zambia. They will graduate from their course at the end of December and will be deployed in the project area as fully-certified Village Scouts. BCP Forest Monitors have received refresher training in biodiversity data collection and plot sampling. Several community members have been trained in plot sampling so as to be available for sampling fieldwork. The lead Forest Monitor has begun the process of acquiring his driving licence.	
Boundary Demarcation	In October 2012, BCP undertook a "boundary	Implementation – In 2014, BCP has communicated and collaborated	October 2012

Project Activity	Project Description	Status	Project Start Date
	demarcation” activity along the Northern boundary of the property, which separates the project area from community lands. The purpose of this activity was to ensure local community stakeholder awareness and acceptance of project area boundaries, in the interest of reducing the potential of conflict stemming from confusion about the boundary location. This activity was undertaken in cooperation with the Principal Surveyor from the GRZ Ministry of Lands, to ensure correctness and legitimacy of the demarcation in the eyes of all stakeholders, including local government authorities. In the demarcation process, local traditional leaders, BCP representatives, and the GRZ Surveyor walked along the demarcated boundary, following the GPS points listed on the original Title Deed and beacons that had been placed on the ground to mark the boundary. BCP representatives painted trees along the boundary, to provide a more visual	extensively with local government, traditional leaders and the landowner in an effort to coordinate a re-demarcation of the boundary. Unfortunately, there have been numerous delays to this activity, and as such, it is anticipated to be completed in 2015. In 2014, the landowner consulted with local community traditional leaders, who have formally agreed that they consent to the existing boundary—especially including the boundary of the “excluded zone” that BCP has removed from carbon accounting, to avoid any problems with relocating communities that have been living in this area. It is important to note that BCP is not calling for any changes to be made to the existing project area boundary, and we are not advocating for or requesting for the relocation of any communities. This is simply a matter of physically demarcating the agreed and legally gazetted boundary of Rufunsa Conservancy. All parties have agreed for the need to publicly, transparently and clearly (physically) demarcate the boundaries of the property.	

Project Activity	Project Description	Status	Project Start Date
	demarcation than the beacons had originally provided. Demarcation activities are expected to continue in 2014, as BCP would like to provide a more 'permanent' and visually clear demarcation than simply painting trees, and in order to extend the length of boundary that was reviewed by community stakeholders and the GRZ Surveyor, to reduce the potential for confusion or conflict.		
Community-Based Forest Biomass and Carbon Stock Monitoring	The Forest Inventory Team comprised of local community members, has pioneered the use of innovative digital biomass data collection systems, using smartphone devices, in order to collect important data concerning forest carbon stocks in Rufunsa Conservancy. Members of BCP's community-based Plot Teams have received intensive training in tree and soil sampling, and the use of smartphone technology to collect data used for carbon accounting. The FIT serves an important dual-function of promoting community involvement and ownership	Implementation / On-Going	March 2012

Project Activity	Project Description	Status	Project Start Date
	of local forest resources, and ensuring high quality data collection for the purposes of our carbon accounting.		
Social Monitoring Program	The robust Social Monitoring Team Standard Operating Procedure (SOP) calls for the ongoing monitoring and evaluation of the impacts of project activities on local stakeholder livelihoods. This will allow BCP to ensure that it's project activities are effectively designed (and re-designed, as necessary) to achieve their aims of positively impacting local communities and effectively addressing (reducing) local drivers of deforestation. In 2012, BCP completed a robust and representative Baseline Survey of community stakeholders living within the project zone for the Lower Zambezi REDD+ Project. Throughout 2013, as BCP has continued to implement a variety of project activities, BCP representatives have collected data through project-specific surveys	Implementation / On-Going: BCP's Social Monitoring Program has been on-going, with recent efforts in 2014 to improve our data collection and tracking capacity. In 2014, a database of community project participants has been created, with the aim of allowing for more centralised reporting on overall project impacts, and reducing the risk of double-counting, as many community stakeholders are by now engaged in multiple BCP activities. In 2014, BCP has also hired a full-time Monitoring and Evaluation Specialist, who will further assist with the formalisation and strengthening of BCP's data collection and monitoring techniques, and who can assist with data analysis and reporting. Also in 2014, BCP has piloted the use of digital (Android) based data-collection tools to support social monitoring. Android devices have been procured for all Community Engagement Team members, and an initial training in digital data collection has been provided. Initial basic social monitoring surveys have been converted into digital formats. A	August 2012

Project Activity	Project Description	Status	Project Start Date
	that are specially designed to track the impacts of each project.	Baseline Survey of 127 participants in the Conservation Farming Training Program was undertaken. At the end of 2014/start 2015, members of BCP's CET will receive further training in the use of Android devices for improved data collection and communication. We aim to transition to a predominantly digital based social monitoring system within 2015. In early 2015, a follow-up Social Monitoring Survey is scheduled to take place as part of BCP's overall Social Monitoring program—this survey will be a follow-up to the initial Baseline Survey that was conducted in September/October 2012, and will allow for an initial assessment of the impacts of BCP's projects on local community stakeholders. Project-specific surveys and monitoring as per BCP's Social Monitoring Program SOP have been on-going since 2012 when initial pilot activities were launched.	
Community Covenants	BCP has pioneered the use of innovative "Community Covenants," which are written contracts between BCP and project participants that explicitly link participation in BCP-supported projects to achievable forest protection	Implementation – Community Covenants continue to be used as an innovative tool for linking community development / livelihoods "benefits" to biodiversity and forest protection aims of the project. In some cases, we have transitioned from the title of "Community Covenant" and	August 2012

Project Activity	Project Description	Status	Project Start Date
	aims. For example, all BCP employees from local communities are required to sign a Community Covenant, written into their employment contract, which specifies the conditionality of their ongoing employment on their agreement to stop any deforestation activities taking place in the project zone. The purpose of the Community Covenants is two-fold: first, Community Covenants provide a direct and explicit link between BCP's activities and reductions in deforestation activities taking place within the project zone. Second, Community Covenants prevent/reduce the risk of adverse effects from project activities or benefits—for example, BCP does not want community stakeholders to use their incomes from employment with BCP in order to fund charcoal production or poaching activities that threaten the project.	have begun to use the language of a Memorandum of Understanding (MoU), in which the forest protection terms of the project are clearly outlined. In 2014, MoUs linking participation in community projects to forest protection were signed as part of the Eco-Charcoal Project expansion into Namanongo and Mweeshangombe Zones (nine new project sites identified) and the “Bio Bank” project that is implementing forest protection activities on 990.4 hectares of community forest in Mweeshangombe Zone, adjacent to the Rufunsa Conservancy. These MoUs explicitly document participants' agreement to implement improved/sustainable forest management techniques on demarcated areas of community forest, in exchange for access to services / “benefits” through these projects. Additionally, all of BCP's employment contracts contain an enforceable “Community Covenant” clause, that documents that employment is contingent upon respect for BCP's on-going deforestation mitigation activities, and violation of this covenant is a terminable offence.	
Monitoring of carbon stocks	There is a dedicated forest inventory team that monitors all permanent	Implementation / On-Going	February 2012

Project Activity	Project Description	Status	Project Start Date
	biomass plots across the project accounting area and proxy area. The team was first trained in February 2012		
Forest Patrols	Rufunsa Conservancy scouts patrol the conservancy and its boundary on an ongoing basis. Due to capacity constraints, there was only a low level of patrolling in the early stages of project implementation, but following improved management and capacity with the handover of land management to BCP in 2012 patrols have been dramatically stepped up. Subsequently it was discovered that there had been some boundary transgressions and the area was excluded.	Implementation / On-Going – See above (“Forest Monitors and Scouts”)	October 2009
Leakage Monitoring	30 permanent 1 ha plots have been monitored in the activity shifting leakage area and this will continue on an ongoing basis.	Implementation / On-Going	May 2013
Road Network Monitoring	BCP currently deploys a number of a scouts to the property for biodiversity monitoring as well as general security. Scouts monitor for illegal activities such as poachers and illegal harvesting. In	Implementation / On-Going	January 2014

Project Activity	Project Description	Status	Project Start Date
	addition, scouts are also responsible for reporting any suspicious activities. One such activity is the cutting of illegal roads to facilitate the harvesting of high value timber species. Scouts are equipped with tools to record the locations of the suspicious activities. This information is passed on to project management who then undertake mapping activities to determine the extent of the illegal activities. This data is then used for effective management decision making		

Table 3 below outlines project activities and implementation status for *m2*. Eight direct deforestation mitigation activities, two social services investment projects and five types of employment opportunities were directly implemented by BCP. Access to improved agricultural markets was also facilitated by partner organizations such as Musika. Further descriptions of these project activities and their anticipated impacts are provided in Table 2 above.

Table 3. Results of LZRP deforestation mitigation activities for *m2*.

Direct Community Based Deforestation Mitigation Activities:					
Project	Ndubulula	Namanongo	Chilimba	Mweeshangombe	Total Participants
Eco-Charcoal	5	7	-	3	15
Village Chicken Project (VCP)	63	86	83	35	267
Mushroom / Dried Fruit Production	4	8	-	52	64
Honey Production	-	-	-	55	55
Conservation Farming Training Program (CFTP)	67	49	55	26	197 households / 216+ individuals
Community Livestock Worker	1	1	1	1	4
Solar Extension Program	1	1	1	1	4
Environmental Education Program	35	70	-	-	105
Total	176	222	140	173	707
Employment:					
Community “Agents”	5	6	7	4	22
Campsite/Domestic	2				
Forest Inventory Team	4				
Village Scouts	4 (employed) – 12 (hired and in training, to begin in 2015)				
Land Management / Construction	610 man days (part-time employment)				
Social Services Investments:					
Boreholes/WASH trainings (Water282)	N/A	1 borehole / 146 village residents	1 borehole / 563 village residents	1 borehole / 209 village residents	3 boreholes / 918 village residents impacted
School Support Program	N/A	N/A	2 teachers / 200+ students	1 teacher / 100+ students	3 teachers / 300+ students

2.2 Deviation

2.2.1 Methodology Deviations

MR.90 Deviations from the measurement methods set out in Appendix B or the monitoring plan, per current VCS requirement.

Section 2.2.2 describes a project description deviation that also equates to a methodology deviation by retroactively correcting a materiality error to the previous monitoring period, whereas VM0009 V2.1 Section 8.1 requires that baseline emissions of a specific monitoring period remain fixed once verified. The VCS Association has allowed this retroactive correction as it is a more accurate estimate of GHG reductions.

There was a minor deviation of the visual approach for leakage monitoring (Appendix B, VM0009). Instead of Forest Inventory Team members estimating degradation, they were required to geo-reference every felled tree in the permanent plots and the total number of felled trees were compared against the average density of trees/ha in the project accounting area, again avoiding biased estimations/erroneous counting of trees in 1ha plots. This value was then placed in a degradation category as per VM0009. This approach removed all potential bias and greatly improves the robustness and repeatability of degradation monitoring.

MR.38 below discusses a disturbance event of illegal timber harvesting. The significance of the event was assessed against emissions reductions by thoroughly searching harvested areas and recording the location stumps and described in more detail under M.38 instead of using existing monitoring plots as the incidences were so widely dispersed and isolated that monitoring plots would not have picked them up.

2.2.2 Project Description Deviations

During the second verification site visit, the BCP Biomass and Soil Monitoring Protocol (Appendix E) was found to not be in conformance with the validated allometric equation applied to calculate biomass of individual trees (Chidumayo 2013) during Monitoring Period 1. This was neither flagged during the first validation, no verification. The protocol designated that multi-stemmed tree DBH be measured at the base of the fork of the tree, whereas the equation was developed measuring all stems at 1.3m, regardless of multi- or single stemmed status. This has resulted in larger diameter measurements and a subsequent over estimation of biomass. During the inventory process all trees are differentiated as multi- or single stemmed. The equation is applied to individual stems.

Subsequently it was decided that the most efficient and conservative approach to correct the error was to develop a taper function to reduce the measured diameter of all multi-stemmed trees and subsequently recalculate the inventory and emissions reductions for this monitoring period, but the project proponent is committed to revise the entire inventory in due course to conform with the VCS's accuracy requirements.

A total of 1124 individual multi-stemmed trees within the project area were measured as prescribed by the protocol (just above the fork) and at the correct height (1.3m). Of the 1124 trees, 493 forked at or just below ground level and 631 forked above ground level but below 1.3m. The sample consisted of 3001 stems in total of which 1729 forked above ground level, but below 1.3m and 1272 forked just above ground level or below ground. The sample covered 43 tree species ranging in diameter from 4.8cm to 50.3cm. The inventory upper diameter limit is 55cm.

An ordinary least squares regression model was fitted to the dataset and the taper of stems between the fork measurement and 1.3m was described by $y=0.8511x-1.5842$, $R^2=0.93$. This function was then applied to all multi-stemmed trees measured in the inventory. The adjusted values are reported in Section 3.2 Monitoring Parameters affected were:

$$\begin{aligned} C_{B\ b}^{[m]} \\ C_B^{[m]} \\ C_{B\ BGB}^{[m]} \\ C_{B\ BM}^{[m]} \\ C_P^{[m]} \\ C_P^{[m-1]} \\ C_P^{[m=0]} \\ C_{P\ 1\ BM}^{[m=0]} \\ C_{P\ 2\ BM}^{[m=0]} \\ C_{P\ BM}^{[m=0]} \\ C_{P\ b}^{[m]} \end{aligned}$$

The impact of this error on m2 emissions reductions were dramatic due to the fact that VM0009 V2.1 uses cumulative emissions models and the entire overestimation would have been deducted from m2, threatening project viability. The project proponent requested from the VCSA a deviation allowing the error to be corrected retrospectively in contrast to what is stipulated in VM0009 V2.1 Section 8:

“8.1 Baseline Emissions

This section is to be applied separately for each identified project accounting area. The baseline emissions for the current monitoring period are given by [F.15]. This is a function of the cumulative baseline emissions at the beginning and end of the current monitoring period as given by [F.16]. **After this quantity is verified, it becomes fixed when determining emissions at subsequent monitoring events.** It is possible that could be less than zero due to conditions in the proxy area and parameter effects in the baseline emissions models over time. However for most projects, this value will be positive indicating baseline emissions would have occurred in the absence of the project.”

The VCSA granted the deviation and the error was fixed retrospectively, thus adjusting the verified amount of emissions reductions for m1 as not all m1 emissions have been sold.

The adjusted emissions reductions are reported in section 4.4, MR.76, but in summary, the correction applied retrospectively impacted m1 as follows in Table 4:

Table 4. LZRP emissions reductions as verified in 2014 and corrected retrospectively following a request to the VCSA.

Parameter	M1 corrected	M2 corrected	M1 verified	M2 ex-ante
Current Baseline Emissions (tCO ₂ e)	479,286	150,983	567,538	179,131
Current Project Emissions (tCO ₂ e)	0	0	0	0
Current Leakage (tCO ₂ e)	0	0	0	0
Confidence Deduction (tCO ₂ e)	0	0	0	0
NERs (tCO ₂ e)	479,286	150,982	567,537	179,130
NERs to Buffer Account (tCO ₂ e)	-67,101	-18,117	-79,456	-25,079
Buffer Account Release (tCO ₂ e)	0	0	0	0
VCUs (tCO ₂ e)	412,185	132,865	488,081	154,051

The application of this taper function has resulted in a significant reduction in *ex ante* emissions reductions above the 5% materiality threshold.

The Biomass and Soil Monitoring Protocol has subsequently been updated and the inventory team alerted to the error to ensure it does not occur in future (Appendix E).

2.3 Grouped Project

This is not a grouped project.

3 DATA AND PARAMETERS

3.1 Data and Parameters Available at Validation

Data / Parameter	α
Data unit	unitless
Description	Combined effects of β and θ at the start of the historic reference period
Source of data	Reference area and historic reference period
Value applied:	0.5791768
Justification of choice of data or description of measurement methods and procedures applied	Time and place in which the logistic model is fit. BioCarbon Partners Carbon Accounting department. Analysis undertaken in 2013.
Purpose of Data	Calculation of baseline emissions
Comments	α is one of the results of applying the cumulative deforestation model but is not used in baseline type U3 as it is replaced with r_u

Data / Parameter	β
Data unit	unitless
Description	Effect of time on the cumulative proportion of deforestation over time
Source of data	Reference area and historic reference period
Value applied:	0.000365
Justification of choice of data or description of measurement methods and procedures applied	Time and place in which the logistic model is fit. BioCarbon Partners Carbon Accounting department. Analysis undertaken in 2013.
Purpose of Data	<i>Calculation of baseline emissions</i>
Comments	

Data / Parameter	γ
Data unit	Days
Description	Time shift from beginning of historic reference period to project start date
Source of data	Historic reference period
Value applied:	10957
Justification of choice of data or description of measurement methods and procedures applied	Time and place in which the logistic model is fit. BioCarbon Partners Carbon Accounting department. Analysis undertaken in 2013.
Purpose of Data	<i>Calculation of baseline emissions</i>
Comments	

Data / Parameter	λ_{soc}
Data unit	proportion (unitless)
Description	Exponential soil carbon decay parameter
Source of data	VCS AFOLU default for tropical regions
Value applied:	0.2
Justification of choice of data or description of	Conservative default based on IPCC value.

measurement methods and procedures applied	
Purpose of Data	Calculation of baseline emissions
Comments	

Data / Parameter	$\hat{\sigma}_{EM}$
Data unit	standard deviation (unitless)
Description	The estimated standard deviation of the state observations used to fit the logistic function
Source of data	Remote sensing image interpretation
Value applied:	0.455
Justification of choice of data or description of measurement methods and procedures applied	Time and place in which the logistic model is fit. BioCarbon Partners Carbon Accounting department. Analysis undertaken in 2013.
Purpose of Data	Calculation of baseline emissions
Comments	

Data / Parameter	$\mathcal{B}$
Data unit	Set
Description	The set of all selected carbon pools in biomass. Is a subset of $\mathcal{C}$
Source of data	PD
Value applied:	2
Justification of choice of data or description of measurement methods and procedures applied	The project accounts for AGOT and BGOT. All other biomass pools are conservatively excluded and were found to be insignificant. AGMT and BGMT pools are not applicable to the project as there are no commercially valuable timber trees that occur in the accounting area.
Purpose of Data	Calculation of baseline emissions
Comments	

Data / Parameter	$\mathcal{C}$
Data unit	Set
Description	The set of all selected carbon pools
Source of data	Monitoring records
Value applied:	3
Justification of choice of data or description of measurement methods and procedures applied	The project accounts for AGOT, BGOT and SOC. All other pools are optional, were found to be insignificant and have been conservatively excluded.
Purpose of Data	Calculation of baseline emissions
Comments	

Data / Parameter	$\mathcal{J}$
Data unit	Set
Description	The set of all observations of deforestation. When superscripted with a monitoring period, the deforestation observations are taken for leakage analysis.
Source of data	Remote sensing image interpretation or field observations in the reference area.

Value applied:	15600
Justification of choice of data or description of measurement methods and procedures applied	VM0009 V2.1 section 6.6 onwards. The number of observations of forest state in the reference area and minimum sample size calculated using equation F.12. Originally quantified as 3120 but some points removed due to complications with forest state interpretation or non-forest at start of historic reference period.
Purpose of Data	Calculation of baseline emissions
Comments	

Data / Parameter	$\mathcal{M}$
Data unit	Set
Description	The set of all monitoring periods
Source of data	Monitoring records
Value applied:	27
Justification of choice of data or description of measurement methods and procedures applied	There will be 27 monitoring events over the project crediting period of 30 years. The project proponent has decided on annual monitoring following
Purpose of Data	Calculation of baseline emissions
Comments	

Data / Parameter	A_{PAA}
Data unit	ha
Description	Area of Project Accounting Area
Source of data	GIS analysis prior to sampling
Value applied:	33338
Justification of choice of data or description of measurement methods and procedures applied	See GIS data in Appendix H. BioCarbon Partners, Carbon Accounting Department. Data used to generate this value include the title deed, GIS layers, several tiles from the ASTER Global Digital Elevation Model, Land cover classification undertaken using Landsat imagery - 2013 - Appendix H
Purpose of Data	Calculation of baseline emissions
Comments	

Data / Parameter	A_{PX}
Data unit	ha
Description	Area of proxy area
Source of data	GIS analysis and participatory rural appraisal prior to sampling
Value applied:	42794
Justification of choice of data or description of measurement methods and procedures applied	GIS layers and expert knowledge - BioCarbon Partners Carbon Accounting department - 2013 - Appendix H
Purpose of Data	Calculation of baseline emissions
Comments	

Data / Parameter	A_{AS}
Data unit	ha

Description	Area of activity-shifting leakage area
Source of data	GIS analysis
Value applied:	27805
Justification of choice of data or description of measurement methods and procedures applied	<i>GIS layers and expert knowledge</i> - BioCarbon Partners Carbon Accounting department - 2013 - Appendix H. Fulfils criteria stipulated in VM0009.
Purpose of Data	Calculation of baseline emissions
Comments	

Data / Parameter	n_d
Data unit	Set
Description	Number of spatial points in the reference area
Source of data	Remote sensing image interpretation
Value applied:	2600
Justification of choice of data or description of measurement methods and procedures applied	Number of points defined as per the methodology VM0009 to adequately quantify forest state in the reference area - BioCarbon Partners Carbon Accounting department - 2013 - Appendix H
Purpose of Data	<i>Calculation of baseline emissions</i>
Comments	

Data / Parameter	o_i
Data unit	Binary
Description	State observation for the i^{th} sample point in the reference area
Source of data	Cumulative Deforestation Model - BioCarbon Partners Carbon Accounting Department - 2013 - Appendix H
Value applied:	0 or 1
Justification of choice of data or description of measurement methods and procedures applied	Data collected as per the methodology.
Purpose of Data	Calculation of baseline emissions
Comments	

Data / Parameter	p_{LME}
Data unit	Proportion (unitless)
Description	Portion of leakage related to market effects
Source of data	Leakage monitoring data - See Appendix C and Appendix F
Value applied:	0
Justification of choice of data or description of measurement methods and procedures applied	Market effect and activity shifting leakage are the same as the same agents are clearing forest for commodities and for agricultural purposes. They are not separate entities as is often the case in planned deforestation scenarios.
Purpose of Data	Calculation of leakage
Comments	

Data / Parameter	q
Data unit	Days
Description	Lag between start of degradation and deforestation
Source of data	Consultation with local agents of deforestation – 28 farmers were questioned to determine how long they usually wait after clearing an area before ploughing it.
Value applied:	620
Justification of choice of data or description of measurement methods and procedures applied	Based on observations in the reference area, hence applicable to the project area.
Purpose of Data	Calculation of baseline emissions
Comments	

Data / Parameter	r_{RS}
Data unit	Unitless
Description	Expansion factor for above-ground biomass to below-ground biomass (root/shoot ratio)
Source of data	Chidumayo, E. N. 2013. Forest degradation and recovery in a miombo woodland landscape in Zambia: 22 years of observations on permanent sample plots. Forest Ecology and Management 291:154-161.
Value applied:	0.54
Justification of choice of data or description of measurement methods and procedures applied	The root-shoot ratio was determined within a study site that overlaps the project reference area
Purpose of Data	Calculation of baseline emissions
Comments	

Data / Parameter	r_U
Data unit	Unitless
Description	Onset proportion of deforestation immediately adjacent to project area
Source of data	GIS analysis and image interpretation
Value applied:	0.126
Justification of choice of data or description of measurement methods and procedures applied	Positions the baseline emissions models relative to the instantaneous rate of deforestation. Measurement was undertaken using GIS analyses described elsewhere in the document. BCP Carbon Accounting Department - 2013 - Appendix H
Purpose of Data	<i>Calculation of baseline emissions</i>
Comments	

Data / Parameter	t
Data unit	Days
Description	Time since project start date
Source of data	Calendar
Value applied:	1461

Justification of choice of data or description of measurement methods and procedures applied	Project start date is 1 October 2009 and first monitoring period ended 1 October 2013.
Purpose of Data	Calculation of project emissions
Comments	

Data / Parameter	t_i
Data unit	Days
Description	The point in time of the observation made at point i
Source of data	Remote sensing image interpretation
Value applied:	1 - 9072
Justification of choice of data or description of measurement methods and procedures applied	The historic reference period stretches from 1984 to 2009, the exact dates of the first and last images are 1984-06-29 and 2009-05-01, the time span is thus 9072 days in total.
Purpose of Data	Calculation of baseline emissions
Comments	

Data / Parameter	t_{PL}
Data unit	Days
Description	Length of project crediting period
Source of data	Project Document
Value applied:	10957
Justification of choice of data or description of measurement methods and procedures applied	The project crediting period stretches from 1 October 2009 to 1 October 2039. This complies with the minimum project lifespan of AFOLU projects as stipulated by the VCS.
Purpose of Data	Calculation of baseline emissions
Comments	

Data / Parameter	w_i
Data unit	Unitless
Description	weight applied to the i^{th} sample point in the reference area
Source of data	Remote sensing image interpretation based on six time steps in the historic reference period which is related to availability of suitable imagery.
Value applied:	0.0000641
Justification of choice of data or description of measurement methods and procedures applied	GIS layers and expert knowledge - BioCarbon Partners Carbon Accounting department - 2013 - Appendix H. Quantified using equation A.6 of VM0009 V2.1
Purpose of Data	Calculation of baseline emissions
Comments	

3.2 Data and Parameters Monitored

MR.78 List of parameters from Appendix H, their values and the time last measured.

Data / Parameter	$A_{P1}^{[m=0]}$
Data unit	ha
Description	Area of project accounting area stratum 1 prior to first verification event
Source of data	GIS analysis prior to sampling
Description of measurement methods and procedures to be applied	Supervised land cover classification employing the Support Vector Machine algorithm (Landsat 5 TM Image). Classification accuracy was 76.84% with a kappa value of 0.745
Frequency of monitoring/recording	First monitoring period / 10 years
Value monitored:	27322
Monitoring equipment	Landsat TM satellite
QA/QC procedures to be applied	Classification accuracy using training and validation data. Classification error matrix
Purpose of data	Calculation of baseline emissions
Calculation method	$K = \frac{N \sum_{i=1}^r x_{ii} - \sum_{i=1}^r (x_{i+} * x_{+i})}{N^2 - \sum_{i=1}^r (x_{i+} * x_{+i})}$ Quantification of the Kappa statistic to determine that classification is non-random.
Comments	The statistic adjusts overall accuracy to account for chance agreement

Data / Parameter	$A_{P2}^{[m=0]}$
Data unit	ha
Description	Area of project accounting area stratum 2 prior to first verification event
Source of data	GIS analysis prior to sampling
Description of measurement methods and procedures to be applied	Supervised land cover classification employing the Support Vector Machine algorithm (Landsat 5 TM Image). Classification accuracy was 76.84% with a kappa value of 0.745
Frequency of monitoring/recording	First monitoring period / 10 years
Value monitored:	6016
Monitoring equipment	Landsat TM satellite
QA/QC procedures to be applied	Classification accuracy using training and validation data. Classification error matrix

Purpose of data	Calculation of baseline emissions
Calculation method	$K = \frac{N \sum_{i=1}^r x_{ii} - \sum_{i=1}^r (x_{i+} * x_{+i})}{N^2 - \sum_{i=1}^r (x_{i+} * x_{+i})}$
Comments	The statistic adjusts overall accuracy to account for chance agreement

Data / Parameter	$C_B^{[m]}$
Data unit	tCO2e/ha
Description	Baseline carbon stocks at the end of the current monitoring period
Source of data	Proxy area sampling
Description of measurement methods and procedures to be applied	Proxy area sampling as per the protocol Appendix E.
Frequency of monitoring/recording	20% of plots measured annually.
Value monitored:	5.6
Monitoring equipment	See Appendix E. Standard vegetation quantification equipment.
QA/QC procedures to be applied	See Appendix E and description in monitoring report.
Purpose of data	Calculation of baseline emissions
Calculation method	Using standard vegetation ecology plot sampling techniques and subsequent quantification of biomass using allometric equations.
Comments	Parameter corrected following materiality error

Data / Parameter	$C_{B\ BGB}^{[m]}$
Data unit	tCO2e
Description	Carbon not decayed in BGB at the end of the current monitoring period
Source of data	Default equation F.10 VM0009 applied to AGB.
Description of measurement methods and procedures to be applied	Ongoing forest monitoring as per Appendix E
Frequency of monitoring/recording	Based on peer reviewed literature and prescribed equation in VM0009
Value monitored:	2760
Monitoring equipment	See Appendix E

QA/QC procedures to be applied	See Appendix E
Purpose of data	Calculation of baseline emissions
Calculation method	Applied equation F.10 in VM0009 V2.1
Comments	The project proponent has suggested a correction to equation F.10

Data / Parameter	$C_{B\ SOC}^{[m]}$
Data unit	tCO ₂ e
Description	Carbon not decayed in SOC at the end of the current monitoring period
Source of data	Default equation F.7 VM0009 applied to SOC quantified in the project accounting area and proxy area.
Description of measurement methods and procedures to be applied	Proxy area sampling as per the protocol in Appendix E and application of equation F.7, VM0009 V2.1
Frequency of monitoring/recording	Fixed once off sampling, not repeated as per VM0009
Value monitored:	31590
Monitoring equipment	See Appendix E standard soil sampling procedures and equipment.
QA/QC procedures to be applied	See Appendix E. The soils were analysed at a reputable laboratory – The Institute of Soil, Water and Climate in South Africa.
Purpose of data	Calculation of baseline emissions
Calculation method	Application of equation F.7 Vm0009 V2.1 using SOC values from the project accounting area and proxy area.
Comments	

Data / Parameter	$C_{B\ h}^{[m]}$
Data unit	tCO ₂ e/ha
Description	Baseline scenario average carbon stock in selected carbon pools
Source of data	Proxy area sampling
Description of measurement methods and procedures to be applied	Proxy area sampling as per the protocol in Appendix E
Frequency of monitoring/recording	20% of all permanent monitoring plots re-monitored annually.
Value monitored:	5.6
Monitoring equipment	See Appendix E

QA/QC procedures to be applied	Review of monitoring records and re-sampling of 20% of plots
Purpose of data	Calculation of baseline emissions
Calculation method	Using standard vegetation ecology plot sampling techniques and subsequent quantification of biomass using allometric equations.
Comments	Adjusted following materiality error

Data / Parameter	$C_{B\ BM}^{[m]}$
Data unit	tCO ₂ e/ha
Description	Baseline carbon stocks in biomass at the end of the current monitoring period
Source of data	Proxy area sampling
Description of measurement methods and procedures to be applied	Proxy area sampling as per the protocol in Appendix E
Frequency of monitoring/recording	20% of all permanent monitoring plots re-monitored annually.
Value monitored:	5.6
Monitoring equipment	See Appendix E.
QA/QC procedures to be applied	Review of monitoring records as described in Appendix E and re-sampling of 20% of plots
Purpose of data	Calculation of baseline emissions
Calculation method	Using standard vegetation ecology plot sampling techniques and subsequent quantification of biomass using allometric equations. Averages calculated as per equation B.9 VM0009 V2.1
Comments	Adjusted due to sampling error in multi-stemmed trees

Data / Parameter	$C_{B\ SOC}^{[m]}$
Data unit	tCO ₂ e/ha
Description	Baseline soil carbon stocks at the end of the current monitoring period
Source of data	Proxy area sampling
Description of measurement methods and procedures to be applied	Proxy area sampling as per the protocol in Appendix E
Frequency of monitoring/recording	Once off measurement as per VM0009 V2.1
Value monitored:	131.7

Monitoring equipment	See Appendix E, standard soil sampling equipment
QA/QC procedures to be applied	Review of monitoring records at next baseline re-evaluation
Purpose of data	Calculation of baseline emissions
Calculation method	Quantification of SOC done according to Annex B, VM0009
Comments	

Data / Parameter	$c_p^{[m]}$
Data unit	tCO ₂ e/ha
Description	Project carbon stocks at the end of the current monitoring period
Source of data	Project accounting area sampling
Description of measurement methods and procedures to be applied	Appendix E describes the plot based monitoring procedure.
Frequency of monitoring/recording	20% of plots monitored annually.
Value monitored:	203.6 Dense Tree Stratum, 185.6 Light Tree Stratum
Monitoring equipment	See Appendix E, standard vegetation sampling equipment
QA/QC procedures to be applied	Review of monitoring records, see Appendix C.
Purpose of data	Calculation of baseline emissions
Calculation method	Standard plot sampling techniques to quantify vegetation and application of allometric equations. Averages calculated using equation B.9 VM0009 V2.1.
Comments	Adjusted due to sampling error in multi-stemmed trees

Data / Parameter	$c_p^{[m-1]}$
Data unit	tCO ₂ e/ha
Description	Project carbon stocks at the beginning of the current monitoring period
Source of data	Project accounting area sampling
Description of measurement methods and procedures to be applied	See Appendix E, standard vegetation sampling equipment.
Frequency of monitoring/recording	20% of plots monitored annually.
Value monitored:	203.6 Dense Tree Stratum, 185.6 Light Tree Stratum

Monitoring equipment	Review of monitoring records, see Appendix C.
QA/QC procedures to be applied	Review of monitoring records, re-sampling of 20% of plots
Purpose of data	Calculation of baseline emissions
Calculation method	Standard plot sampling techniques to quantify vegetation and application of allometric equations. Averages calculated using equation B.9 VM0009 V2.1.
Comments	

Data / Parameter	$c_p^{[m=0]}$
Data unit	tCO ₂ e/ha
Description	Project carbon stocks prior to first verification event
Source of data	Project accounting area sampling
Description of measurement methods and procedures to be applied	Appendix E describes the plot based monitoring procedure.
Frequency of monitoring/recording	20% of plots monitored annually.
Value monitored:	233.8 Dense Tree Stratum, 225.0 Light Tree Stratum
Monitoring equipment	See Appendix E, standard vegetation sampling equipment
QA/QC procedures to be applied	Review of monitoring records, see Appendix C.
Purpose of data	Calculation of baseline emissions
Calculation method	Standard plot sampling techniques to quantify vegetation and application of allometric equations. Averages calculated using equation B.9 VM0009 V2.1.
Comments	

Data / Parameter	$c_{P\ 1\ BM}^{[m=0]}$
Data unit	tCO ₂ e/ha
Description	Project carbon stocks in biomass in stratum 1 prior to first verification event
Source of data	Project accounting area sampling
Description of measurement methods and procedures to be applied	Appendix EC describes the plot based monitoring procedure.
Frequency of monitoring/recording	20% of all plots sampled annually
Value monitored:	225.0
Monitoring equipment	See Appendix E, standard vegetation sampling equipment

QA/QC procedures to be applied	Review of monitoring records, see Annex C.
Purpose of data	Calculation of baseline emissions
Calculation method	Standard plot sampling techniques to quantify vegetation and application of allometric equations. Averages calculated using equation B.9 VM0009 V2.1.
Comments	

Data / Parameter	$C_{P\ 2\ BM}^{[m=0]}$
Data unit	tCO ₂ e/ha
Description	Project carbon stocks in biomass in stratum 2 prior to first verification event
Source of data	Project accounting area sampling
Description of measurement methods and procedures to be applied	Appendix E describes the plot based monitoring procedure.
Frequency of monitoring/recording	20% of all plots sampled annually
Value monitored:	233.8
Monitoring equipment	See Appendix E, standard vegetation sampling equipment
QA/QC procedures to be applied	Review of monitoring records, see Appendix C.
Purpose of data	Calculation of baseline emissions
Calculation method	Standard plot sampling techniques to quantify vegetation and application of allometric equations. Averages calculated using equation B.9 VM0009 V2.1.
Comments	

Data / Parameter	$C_{P\ BM}^{[m=0]}$
Data unit	tCO ₂ e
Description	Project carbon stocks in biomass prior to first verification event
Source of data	Project accounting area sampling
Description of measurement methods and procedures to be applied	Appendix E describes the plot based monitoring procedure.
Frequency of monitoring/recording	20% of all plots sampled annually

Value monitored:	7554258
Monitoring equipment	See Appendix E, standard vegetation sampling equipment
QA/QC procedures to be applied	Review of monitoring records, see Appendix C.
Purpose of data	Calculation of baseline emissions
Calculation method	Standard plot sampling techniques to quantify vegetation and application of allometric equations. Averages calculated using equation B.9 VM0009 V2.1 multiplied by area of each stratum.
Comments	

Data / Parameter	$c_{Pb}^{[m]}$
Data unit	tCO ₂ e
Description	Average carbon in biomass in the project accounting area
Source of data	Project accounting area sampling
Description of measurement methods and procedures to be applied	Appendix E describes the plot based monitoring procedure.
Frequency of monitoring/recording	20% of all plots sampled annually
Value monitored:	6296931
Monitoring equipment	See Appendix E, standard vegetation sampling equipment
QA/QC procedures to be applied	Review of monitoring records, see Appendix C and Appendix E.
Purpose of data	Calculation of baseline emissions
Calculation method	Standard plot sampling techniques to quantify vegetation and application of allometric equations. Averages calculated using equation B.9 VM0009 V2.1 multiplied by area of each stratum.
Comments	

Data / Parameter	$c_{P SOC}^{[m=0]}$
Data unit	tCO ₂ e/ha
Description	Project soil carbon stocks prior to first verification event
Source of data	Project accounting area sampling
Description of measurement methods and procedures to be applied	See Appendix E

Frequency of monitoring/recording	Once of monitoring as per VM0009 V2.1
Value monitored:	192.6
Monitoring equipment	See Appendix E, standard soil sampling equipment.
QA/QC procedures to be applied	Soil analysed at a reputable laboratory – Institute for Soil, Water and Climate in South Africa.
Purpose of data	Calculation of baseline emissions.
Calculation method	Standard soil sampling techniques. Averages calculated using equation B.9 VM0009 V2.1
Comments	

Data / Parameter	$E_{\Delta GER}^{[m]}$
Data unit	tCO ₂ e
Description	GERs for the current monitoring period
Source of data	Area measurements
Description of measurement methods and procedures to be applied	See Appendix E
Frequency of monitoring/recording	Every monitoring period
Value monitored:	150982
Monitoring equipment	See Appendix E, standard plot sampling equipment
QA/QC procedures to be applied	Review of GER calculations
Purpose of data	Calculation of project emissions
Calculation method	Application of equation F.48, VM0009 V2.1 to monitoring data.
Comments	

Data / Parameter	$E_{\Delta GER}^{[i]}$
Data unit	tCO ₂ e
Description	GERs for monitoring period <i>i</i>
Source of data	Area measurements
Description of measurement methods and procedures to be applied	Quantifying deforestation in the reference area, carbon stock quantification in the baseline and with project scenario fed into equation F.48 of VM0009 V2.1.
Frequency of monitoring/recording	Every monitoring period
Value monitored:	6133007
Monitoring equipment	See Appendix E, standard plot sampling equipment
QA/QC procedures to be applied	Review of GER calculations

Purpose of data	Calculation of baseline emissions
Calculation method	Application of equation F.48, VM0009 V2.1 to monitoring data.
Comments	

Data / Parameter	$E_{\Delta NER}^{[i]}$
Data unit	tCO ₂ e
Description	NERs for monitoring period i
Source of data	Area measurements
Description of measurement methods and procedures to be applied	Quantifying deforestation in the reference area, carbon stock quantification in the baseline and with project scenario and non-permanence risk assessment fed into equation F.50 of VM0009 V2.1.
Frequency of monitoring/recording	Prior monitoring period
Value monitored:	5498112
Monitoring equipment	See Appendix E, standard plot sampling equipment
QA/QC procedures to be applied	Review of NER calculations and non-permanence risk assessment
Purpose of data	Calculation of baseline emissions
Calculation method	Project non-permanence risk assessment (VCS AFOLU Non-Permanence Risk Tool V3.2 and application of equation F.50, VM0009 V2.1 to monitoring data.
Comments	

Data / Parameter	$E_B^{[m]}$
Data unit	tCO ₂ e
Description	Cumulative baseline emissions at the end of the current monitoring period
Source of data	Proxy area measurements
Description of measurement methods and procedures to be applied	See Appendix E, standard plot sampling techniques and quantifying deforestation in the reference area as per VM0009 V2.1
Frequency of monitoring/recording	Every monitoring period - annually
Value monitored:	630269
Monitoring equipment	Standard vegetation and soil sampling equipment, see Appendix E.
QA/QC procedures to be applied	Annual monitoring of proxy area, see Appendix E for error correction procedures.

Purpose of data	Calculation of baseline emissions
Calculation method	Application of the baseline emissions model, F.4 VM0009 V2.1
Comments	

Data / Parameter	$E_B^{[m-1]}$
Data unit	tCO ₂ e
Description	Cumulative baseline emissions at the beginning of the current monitoring period
Source of data	Proxy area measurements
Description of measurement methods and procedures to be applied	See Appendix E, standard plot sampling techniques and quantifying deforestation in the reference area as per VM0009 V2.1
Frequency of monitoring/recording	Every monitoring period - annually
Value monitored:	479286
Monitoring equipment	Standard vegetation and soil sampling equipment, see Appendix E.
QA/QC procedures to be applied	Annual monitoring of proxy area, see Appendix E for error correction procedures.
Purpose of data	Calculation of baseline emissions
Calculation method	Application of the baseline emissions model, F.4 VM0009 V2.1
Comments	

Data / Parameter	$E_{BA}^{[m]}$
Data unit	tCO ₂ e
Description	Change in baseline emissions
Source of data	Proxy area measurements
Description of measurement methods and procedures to be applied	See Appendix E, standard plot sampling techniques and quantifying deforestation in the reference area as per VM0009 V2.1
Frequency of monitoring/recording	Every monitoring period - annually
Value monitored:	150983
Monitoring equipment	Standard vegetation and soil sampling equipment, see Appendix E.
QA/QC procedures to be applied	Annual monitoring of proxy area, see Appendix E for error correction procedures.

Purpose of data	Calculation of baseline emissions
Calculation method	Application of the baseline emissions model, F.4 VM0009 V2.1
Comments	

Data / Parameter	$E_{B\Delta BGB}^{[i]}$
Data unit	tCO ₂ e
Description	Change in baseline emissions from below-ground biomass during monitoring period i
Source of data	Monitoring the proxy area
Description of measurement methods and procedures to be applied	See Appendix E
Frequency of monitoring/recording	Every monitoring period
Value monitored:	47718
Monitoring equipment	See Appendix E
QA/QC procedures to be applied	See Appendix E
Purpose of data	Calculation of baseline emissions
Calculation method	Calculation of above ground biomass using standard vegetation sampling techniques and application of an acceptable root:shoot ratio and application of equation F.10 of VM0009 V2.1, the decay emissions model
Comments	

Data / Parameter	$E_{B\Delta SOC}^{[m]}$
Data unit	tCO ₂ e
Description	Baseline change in emissions from soil carbon
Source of data	Measurements in the proxy area
Description of measurement methods and procedures to be applied	See Appendix E
Frequency of monitoring/recording	Every monitoring period
Value monitored:	43381
Monitoring equipment	See Appendix E

QA/QC procedures to be applied	See Appendix E
Purpose of data	Calculation of baseline emissions
Calculation method	Calculation of SOC using standard soil sampling techniques and application of equation F.7 and F.26 of VM0009 V2.1, the SOC decay emissions model
Comments	

Data / Parameter	$E_{B \Delta SOC}^{[i]}$
Data unit	tCO ₂ e
Description	Baseline emissions from soil carbon in monitoring period i
Source of data	Measurements in the proxy area
Description of measurement methods and procedures to be applied	See Appendix E
Frequency of monitoring/recording	Every monitoring period
Value monitored:	1695711
Monitoring equipment	See Appendix E
QA/QC procedures to be applied	See Appendix E
Purpose of data	Calculation of baseline emissions
Calculation method	Calculation of SOC using standard soil sampling techniques and application of equation F.7 and F.26 of VM0009 V2.1, the SOC decay emissions model
Comments	

Data / Parameter	$E_{B BGB}^{[m]}$
Data unit	tCO ₂ e
Description	Cumulative baseline emissions from below-ground biomass at the end of the current monitoring period
Source of data	Measurements in the proxy area
Description of measurement methods and procedures to be applied	Standard vegetation sampling techniques to quantify above ground biomass, application of a root-shoot ratio and a decay emissions model.
Frequency of monitoring/recording	Every monitoring period

Value monitored:	202802
Monitoring equipment	See Appendix E
QA/QC procedures to be applied	See Appendix E
Purpose of data	Calculation of baseline emissions
Calculation method	Calculation of above ground biomass using standard vegetation sampling techniques and application of an acceptable root:shoot ratio and application of equation F.10 of VM0009 V2.1, the decay emissions model
Comments	

Data / Parameter	$E_{BGB}^{[m-1]}$
Data unit	tCO ₂ e
Description	Cumulative baseline emissions from below-ground biomass at the beginning of the current monitoring period
Source of data	Measurements in the proxy area
Description of measurement methods and procedures to be applied	Standard vegetation sampling techniques to quantify above ground biomass, application of a root-shoot ratio and a decay emissions model.
Frequency of monitoring/recording	Every monitoring period
Value monitored:	155084
Monitoring equipment	See Appendix E
QA/QC procedures to be applied	See Appendix E
Purpose of data	Calculation of baseline emissions
Calculation method	Calculation of above ground biomass using standard vegetation sampling techniques and application of an acceptable root:shoot ratio and application of equation F.10 of VM0009 V2.1, the decay emissions model
Comments	This is the first monitoring period, hence the emissions are 0.

Data / Parameter	$E_{BBM}^{[m]}$
Data unit	tCO ₂ e
Description	Cumulative baseline emissions from biomass at the end of the current monitoring period
Source of data	Measurements in the proxy area

Description of measurement methods and procedures to be applied	See Appendix E
Frequency of monitoring/recording	Every monitoring period
Value monitored:	578362
Monitoring equipment	See Appendix E
QA/QC procedures to be applied	See Appendix E
Purpose of data	Calculation of baseline emissions
Calculation method	Standard vegetation sampling techniques, quantification of deforestation in the reference area and application of equation F.4 and F.21, VM0009 V2.1
Comments	

Data / Parameter	$E_{B\text{SOC}}^{[m]}$
Data unit	tCO ₂ e
Description	Cumulative baseline emissions from soil carbon at the end of the current monitoring period
Source of data	Measurements in the proxy area
Description of measurement methods and procedures to be applied	Standard soil sampling techniques in the proxy area, laboratory analysis and application of the soil decay model.
Frequency of monitoring/recording	Soil carbon is only quantified once at the first verification event as per VM0009.
Value monitored:	180883
Monitoring equipment	Standard soil sampling equipment, see Appendix E.
QA/QC procedures to be applied	Soil analysed at a reputable laboratory – Institute of Soil, Climate and Water in South Africa.
Purpose of data	Calculation of baseline emissions
Calculation method	Quantification of soil carbon and application of equation F.9 and F.28, VM0009, V2.1
Comments	

Data / Parameter	$E_{B\text{SOC}}^{[m-1]}$
Data unit	tCO ₂ e

Description	Cumulative baseline emissions from soil carbon at the beginning of the current monitoring period
Source of data	Measurements in the proxy area
Description of measurement methods and procedures to be applied	Standard soil sampling techniques in the proxy area, laboratory analysis and application of the soil decay model.
Frequency of monitoring/recording	Soil carbon is only quantified once at the first verification event as per VM0009.
Value monitored:	137503
Monitoring equipment	Standard soil sampling equipment, see Appendix E.
QA/QC procedures to be applied	Soil analysed at a reputable laboratory – Institute of Soil, Climate and Water in South Africa.
Purpose of data	Calculation of baseline emissions
Calculation method	Quantification of soil carbon and application of equation F.9 and F.28, VM0009, V2.1
Comments	This is the first monitoring period, emissions are thus zero at the start.

Data / Parameter	$E_{BA}^{[m]}$
Data unit	tCO ₂ e
Description	Cumulative emissions allocated to the buffer account at the end of the current monitoring period
Source of data	VCS Non-Permanence Risk Report, See Appendix G
Description of measurement methods and procedures to be applied	See Appendix G – standard VCS procedure used.
Frequency of monitoring/recording	Non-permanence risk revised at every baseline re-assessment.
Value monitored:	85218
Monitoring equipment	None
QA/QC procedures to be applied	Annual review of risk criteria and disturbance monitoring
Purpose of data	Calculation of emissions submitted to VCS buffer account
Calculation method	Procedure followed in VCS non-permanence risk tool and emissions allocated to buffer account subtracted from GERs.
Comments	

Data / Parameter	$E_L^{[m]}$
Data unit	tCO ₂ e
Description	Cumulative emissions from leakage at the end of the current monitoring period
Source of data	Measurements in the leakage area(s)
Description of measurement methods and procedures to be applied	Plot based sampling of leakage area and estimation of degradation.
Frequency of monitoring/recording	Every monitoring period
Value monitored:	0
Monitoring equipment	See Appendix F, standard vegetation sampling equipment
QA/QC procedures to be applied	See Appendix F, all evidence of tree-felling by humans are geo-referenced and plots photographed
Purpose of data	Calculation of activity shifting leakage
Calculation method	Application of equation F.44 and F.45 to field data collected.
Comments	Leakage in this monitoring period is considered insignificant. No deforestation has taken place in the leakage area, only minor degradation.

Data / Parameter	$E_L^{[m-1]}$
Data unit	tCO ₂ e
Description	Cumulative emissions from leakage at the beginning of the current monitoring period
Source of data	Measurements in the leakage area(s)
Description of measurement methods and procedures to be applied	Plot based sampling of leakage area and estimation of degradation.
Frequency of monitoring/recording	Every monitoring period
Value monitored:	0
Monitoring equipment	See Appendix F, standard vegetation sampling equipment
QA/QC procedures to be applied	See Appendix F, all evidence of tree-felling by humans are geo-referenced and plots photographed
Purpose of data	Calculation of project emissions
Calculation method	Application of equation F.44 and F.45 to field data collected.

Comments	Leakage in this monitoring period is considered insignificant. No deforestation has taken place in the leakage area, only minor degradation.
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Data / Parameter	$E_{LA}^{[m]}$
Data unit	tCO ₂ e
Description	Change in emissions due to leakage
Source of data	See Appendix F
Description of measurement methods and procedures to be applied	Plot based sampling of leakage area and estimation of degradation.
Frequency of monitoring/recording	Every monitoring period
Value monitored:	0
Monitoring equipment	See Appendix F, standard vegetation sampling equipment
QA/QC procedures to be applied	See Appendix F, all evidence of tree-felling by humans are geo-referenced and plots photographed
Purpose of data	Calculation of leakage
Calculation method	Application of equation F.44 and F.45 to field data collected.
Comments	Leakage in this monitoring period is considered insignificant. No deforestation has taken place in the leakage area, only minor degradation.

Data / Parameter	$E_{LAS}^{[m]}$
Data unit	tCO ₂ e
Description	Cumulative emissions from activity-shifting leakage at the end of the current monitoring period
Source of data	Measurements in the activity-shifting leakage area
Description of measurement methods and procedures to be applied	Plot based sampling of leakage area and estimation of degradation.
Frequency of monitoring/recording	Every monitoring period
Value monitored:	0
Monitoring equipment	See Appendix F, standard vegetation sampling equipment
QA/QC procedures to be applied	See Appendix F, all evidence of tree-felling by humans are geo-referenced and plots photographed
Purpose of data	Calculation of leakage

Calculation method	Application of equation F.44 and F.45 to field data collected.
Comments	Leakage in this monitoring period is considered insignificant. No deforestation has taken place in the leakage area, only minor degradation.

Data / Parameter	$E_{LME}^{[m]}$
Data unit	tCO ₂ e
Description	Cumulative emissions from market effects leakage at the end of the current monitoring period
Source of data	Measurements in the market-effects leakage area
Description of measurement methods and procedures to be applied	Market and activity shifting leakage are the same for the LZRP
Frequency of monitoring/recording	Every monitoring period
Value monitored:	0
Monitoring equipment	See Appendix F
QA/QC procedures to be applied	See Appendix F
Purpose of data	Calculation of leakage
Calculation method	See calculations for activity-shifting leakage above
Comments	

Data / Parameter	$E_{PA}^{[m]}$
Data unit	tCO ₂ e
Description	Change in project emissions
Source of data	Monitoring records for Forest Fire, Burning, logging, wood products, and natural disturbance events
Description of measurement methods and procedures to be applied	Standard vegetation sampling techniques and remote sensing to determine the extent of fires.
Frequency of monitoring/recording	Every monitoring period
Value monitored:	0
Monitoring equipment	Standard vegetation sampling equipment and satellite imagery.
QA/QC procedures to be applied	See monitoring report, section 4.2

Purpose of data	Calculation of leakage
Calculation method	Monitoring of burnt wood in the project accounting area and equation F.40 VM0009 V2.1.
Comments	

Data / Parameter	$E_{P,ABRN}^{[m]}$
Data unit	tCO ₂ e
Description	Cumulative project emissions due to burning at the end of the current monitoring period
Source of data	Monitoring plots in the project accounting area
Description of measurement methods and procedures to be applied	Standard vegetation sampling techniques and remote sensing to determine the extent of fires.
Frequency of monitoring/recording	Every monitoring period
Value monitored:	0
Monitoring equipment	Standard vegetation sampling equipment and satellite imagery.
QA/QC procedures to be applied	See monitoring report section 4.2
Purpose of data	Calculation of baseline emissions Calculation of project emissions
Calculation method	Monitoring of burnt wood in the project accounting area and equation F.40 VM0009 V2.1
Comments	

Data / Parameter	$E_U^{[m]}$
Data unit	tCO ₂ e
Description	Cumulative confidence deduction at the end of the current monitoring period
Source of data	Biomass and soil carbon inventory data, Appendix C
Description of measurement methods and procedures to be applied	Calculation of the standard error of the total of the baseline emissions model, proxy area carbon stocks and accounting area carbon stocks
Frequency of monitoring/recording	Every monitoring period
Value monitored:	0
Monitoring equipment	See Appendix C
QA/QC procedures to be applied	See Appendix C

Purpose of data	Calculation of baseline emissions Calculation of project emissions Calculation of leakage
Calculation method	Equation B.10, F.14 and F.52, VM0009 V2.1
Comments	There were no confidence deductions as the uncertainty was insignificant.

Data / Parameter	$p_{L, DEG}^{[m]}$
Data unit	proportion (unitless)
Description	Portion of leakage due to degradation at the end of the current monitoring period
Source of data	Monitoring in the leakage area
Description of measurement methods and procedures to be applied	Plot based sampling of leakage area and estimation of degradation.
Frequency of monitoring/recording	Every monitoring period
Value monitored:	0.066667
Monitoring equipment	See Appendix F, standard vegetation sampling equipment
QA/QC procedures to be applied	See Appendix F, all evidence of tree-felling by humans are geo-referenced and plots photographed
Purpose of data	Calculation of leakage
Calculation method	Calculated using equation B.9, VM0009 V2.1. Minimum sample size determined using equation B.29, VM0009 V2.1
Comments	Leakage in this monitoring period is considered insignificant. No deforestation has taken place in the leakage area, only minor degradation.

Data / Parameter	$p_{L, DEG}^{[m=0]}$
Data unit	proportion (unitless)
Description	Portion of leakage due to degradation prior to first verification event
Source of data	Monitoring in the leakage area
Description of measurement methods and procedures to be applied	Plot based sampling of leakage area and estimation of degradation.
Frequency of monitoring/recording	Every monitoring period
Value monitored:	0.087
Monitoring equipment	See Appendix F, standard vegetation sampling equipment

QA/QC procedures to be applied	See Appendix F, all evidence of tree-felling by humans are geo-referenced and plots photographed
Purpose of data	Calculation of leakage
Calculation method	Calculated using equation B.9, VM0009 V2.1. Minimum sample size determined using equation B.29, VM0009 V2.1
Comments	This is the first monitoring period, leakage is assumed 0 at the project start date as per VM0009 V.2.1

Data / Parameter	$t^{[i-1]}$
Data unit	Days
Description	Time from project start date to beginning of monitoring period i
Source of data	Monitoring records
Description of measurement methods and procedures to be applied	NA
Frequency of monitoring/recording	NA
Value monitored:	10592
Monitoring equipment	NA
QA/QC procedures to be applied	NA
Purpose of data	Calculation of baseline emissions
Calculation method	Count of days in project crediting period
Comments	

Data / Parameter	$t^{[m]}$
Data unit	Days
Description	Time from project start date to end of current monitoring period
Source of data	Monitoring records
Description of measurement methods and procedures to be applied	NA
Frequency of monitoring/recording	Every monitoring period
Value monitored:	1826
Monitoring equipment	NA

QA/QC procedures to be applied	Monitoring records
Purpose of data	Calculation of baseline emissions
Calculation method	Deduct project start date from end of date of current monitoring period.
Comments	

Data / Parameter	$t^{[m-1]}$
Data unit	Days
Description	Time from project start date to beginning of current monitoring period
Source of data	Monitoring records
Description of measurement methods and procedures to be applied	NA
Frequency of monitoring/recording	Prior monitoring period
Value monitored:	1462
Monitoring equipment	NA
QA/QC procedures to be applied	Monitoring records, Appendix C
Purpose of data	Calculation of baseline emissions and compliance with VM0009 V2.1 minimum monitoring intervals.
Calculation method	NA
Comments	

Data / Parameter	$U_B^{[m]}$
Data unit	tCO ₂ e
Description	Total uncertainty in proxy area carbon stock estimate
Source of data	Biomass and soil carbon inventory data, Annex A
Description of measurement methods and procedures to be applied	Calculation of the standard error of the total of the baseline emissions model, proxy area carbon stocks and accounting area carbon stocks
Frequency of monitoring/recording	Every monitoring period
Value monitored:	60520
Monitoring equipment	NA

QA/QC procedures to be applied	NA
Purpose of data	Calculation of baseline emissions
Calculation method	Equation B.10, VM0009 V2.1
Comments	

Data / Parameter	$U_{EM}^{[M]}$
Data unit	tCO ₂ e
Description	Total uncertainty in Baseline Emissions Models
Source of data	Forest State Interpretation
Description of measurement methods and procedures to be applied	Calculation of the standard error of the total of the baseline emissions model, proxy area carbon stocks and accounting area carbon stocks
Frequency of monitoring/recording	Every baseline revision
Value monitored:	5063
Monitoring equipment	Appendix H
QA/QC procedures to be applied	Appendix H
Purpose of data	Calculation of baseline emissions
Calculation method	Equation F.14, VM0009 V2.1
Comments	

Data / Parameter	$U_P^{[m]}$
Data unit	tCO ₂ e
Description	Total uncertainty in project accounting area carbon stock estimate
Source of data	Forest State Interpretation
Description of measurement methods and procedures to be applied	Calculation of the standard error of the total of the baseline emissions model, proxy area carbon stocks and accounting area carbon stocks
Frequency of monitoring/recording	Every monitoring period
Value monitored:	882520
Monitoring equipment	Appendix E
QA/QC procedures to be applied	Appendix E

Purpose of data	Calculation of baseline emissions
Calculation method	Equation B.10, VM0009 V2.1
Comments	

MR.79 Quality assurance and quality control measures employed for each.

Twenty percent of all permanent monitoring plots and all leakage plots were re-measured as per VM0009 V2.1 requirements. Please see tables in section 3.2 for assurances.

MR.80 Description of the accuracy of each.

The accuracy of each parameter can be found in Appendix C.

3.3 Description of the Monitoring Plan

3.3.1 Overview

MR.84 Maps of a stratification (if any) and references to plot allocation.

The monitoring strategy for the LZRP followed a stratified random approach for the accounting area. The vegetation in the project accounting area is fairly homogenous Miombo woodland, but two different strata, namely light and dense tree cover were distinguished using remote sensing techniques (Figure 2).

A total of 186 circular, permanent inventory plots are located in Rufunsa Conservancy, and soil was sampled at 59 of these plots during *m1*. 26 plots fell within the dense tree stratum, the remainder were in the light tree stratum which incidentally covers the majority of the accounting area.

Twenty percent of plots are re-measured every year – stocks estimates are updated every 5 years, following complete re-measurement.

MR.85 List of plot GPS Coordinates

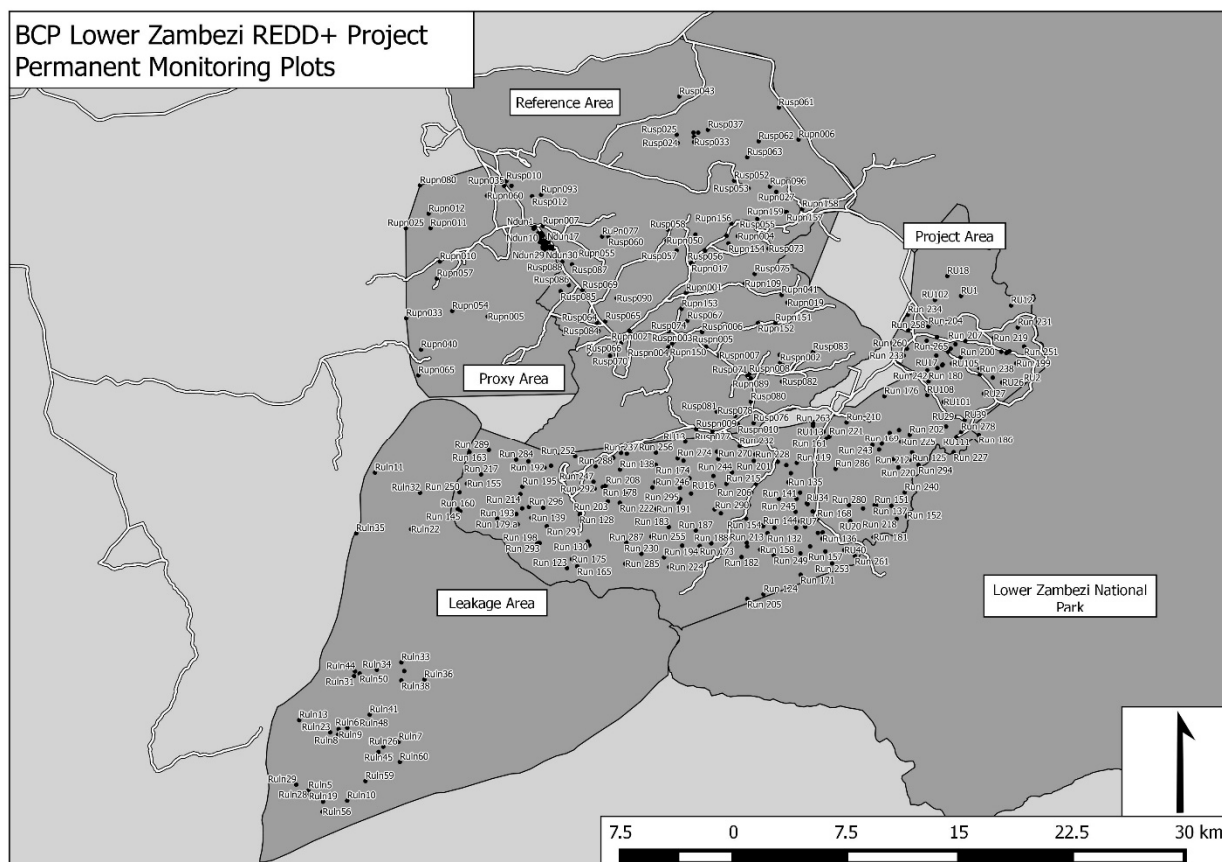


Figure 4. Permanent carbon stock monitoring plots for the Lower Zambezi REDD+ Project.

A list of the plots names and geographic coordinates are provided in Appendix H. The list has over 300 entries and as such is best presented in a separate document.

MR.91 The frequency of monitoring for each plot for all plots – all plots should be measured for the first verification. All leakage plots should be measured every verification, and all proxy and project accounting area plots at least every 5-10 years, or after a significant event that changes stocks.

All leakage plots were monitored as per VM0009 requirement for verification events.

Table 5. Summary of monitoring activities.

Monitoring Activity	Timing	Methods
Conservancy trespassing and boundary transgressions	Monthly patrols	Scouts patrol the conservancy on an ongoing basis, it is their core duty
Leakage monitoring	Annually	Forest Inventory team following VM0009
Plot measurements	Annually	Forest Inventory Team following VM0009, re-sample 20% of plots in project accounting and proxy areas
Disturbance monitoring	Monthly in the fire season and otherwise as BCP becomes aware of disturbances.	Remote sensing (NASA FIRMS alerts) followed by ground based inspections
Charcoal production	Monthly	Charcoal operations managers records all charcoal production on an ongoing basis.

3.3.2 Carbon Stocks Monitoring – Biomass

Plot design, size and sample size

MR.86 Description of plot size and layout (such as the use of nests and their sizes) for each carbon pool.

Biomass monitoring was conducted according to the BCP field sampling manual (copy provided to VVB, Appendix E). Optimum plot size and minimum tree diameter were determined during a trial sampling run in February 2012. Circular plots (12m radius) were used due to their simplicity, ease of layout and reduced measurement error. A randomly generated plot location was navigated-to using a handheld GPS or Android Smart Phone. When the plot location was reached, the centre was permanently marked with a steel rebar driven into the ground. If, for some reason, a plot could not be reached due to terrain, the location was moved following a predetermined deviation that lead to the location of another plot. Very few plots could not be reached.

Trees were identified to species level as far as possible, noting that there are several miombo species (some common) that require taxonomic revision (M. Bingham. Pers Comm¹). The use of a generic allometric equation to calculate AGOT mass fortunately negated mistakes or uncertainties with tree species identification.

As explained above, plots are re-measured on a rotating basis, with 20% re-measured per year, however stock estimates are only updated every 5 years after all plots have been re-measured.

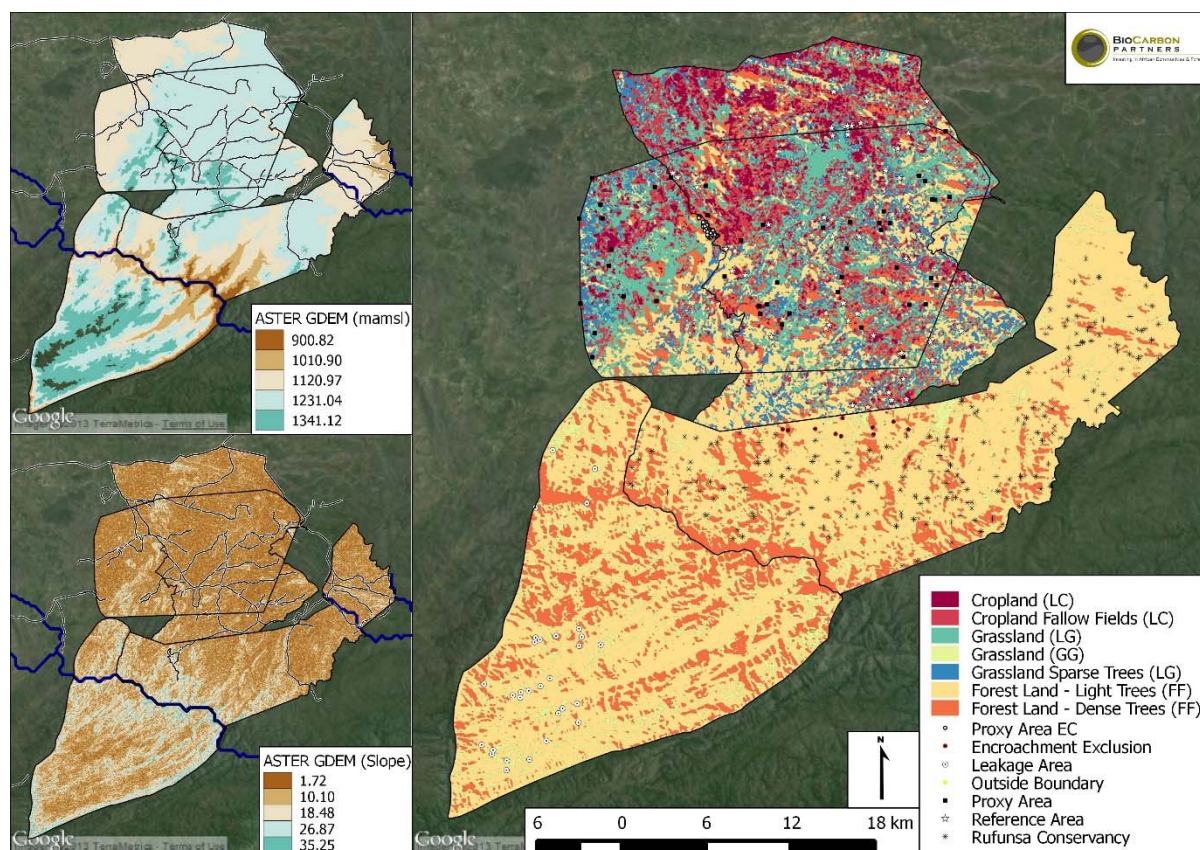


Figure 5. Location of Permanent Monitoring Plots in context of land cover.

3.3.3 Carbon Stock Monitoring – SOC

SOC was quantified during *m1* as per VM0009 V2.1 requirements and a description of the procedure can be found in the *m1* monitoring report in the online VCS project database.

¹ Mike Bingham, Zambian Miombo Ecosystem Authority.

3.3.4 Leakage Monitoring

Degradation in the leakage area was monitored in 30 leakage plots (23 minimum requirement as calculated using equation B.29, VM0009 Vers. 2.1). A slight variation of the visual approach was used (Appendix F) and see MR.90.

3.3.5 Organizational Structure, responsibilities and competencies

BioCarbon Partners has a team of experts responsible for the carbon inventory and standards compliance. There is a dedicated carbon accounting department that oversees all inventory data collection, processing, storage, GIS and remote sensing and electronic data capture systems (Figure 6).

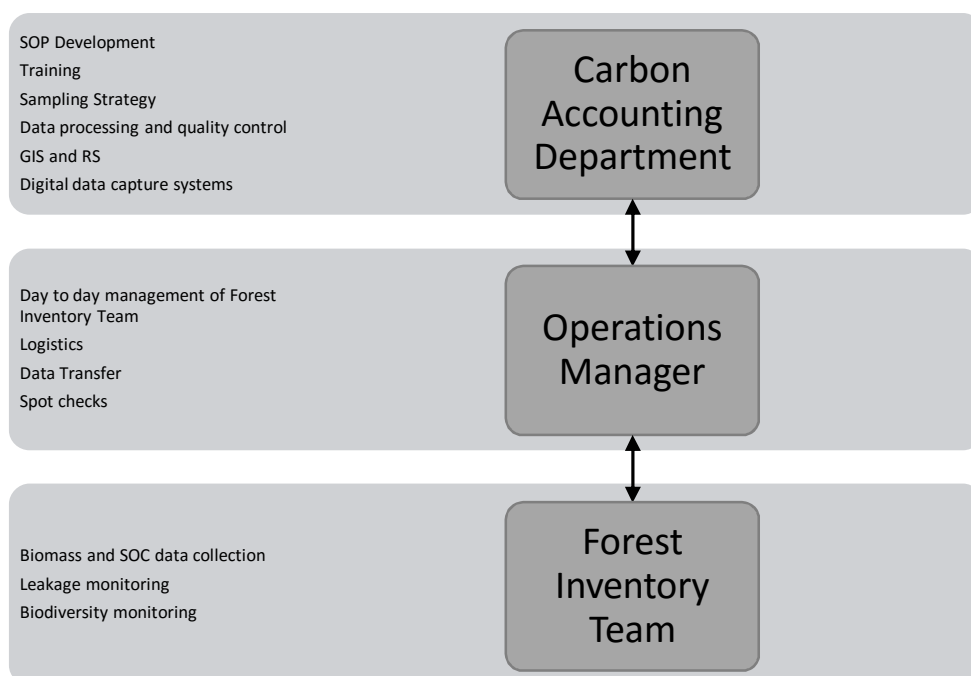


Figure 6. BioCarbon Partners carbon monitoring organisational structure.

Both the carbon accounting manager and remote sensing and GIS specialist have post graduate degrees with a strong focus on African ecology and collectively have more than 20 years' experience in biological inventories, remote sensing and GIS.

A field team consisting of local residents from neighbouring communities have been trained in forest monitoring (see below) in line with BCP's policy of local capacity building and investment. The team has intimate knowledge of local flora and fauna and their knowledge of the area enables them to locate inventory plots with limited difficulty.

The inventory team's day-to-day activities are monitored by the Rufunsa Conservancy Operations Manager who is based on site at the conservation centre. The operations manager sees to the logistical needs of the plot team, ensures that deadlines are adhered to, assists with any equipment failures and transfers data to the carbon accounting department.

3.3.6 Data Management

The initial inventory data for the project accounting area was collected using pen and paper, transferred to BCP HQ for copying, storage and entry. The data was entered by an experienced data capturer with specific experience in collating and capturing ecological data. Data was captured in spreadsheets and original data sheets are kept in a safe place at the BCP HQ. The data was then error checked by the carbon accounting manager to identify any obvious errors. Following this process, an intensive error checking was conducted with the data capturer and two of the senior inventory team members.

Subsequently, BCP developed a digital data capturing system using Android Smartphones. The advantage of this system is that it dramatically reduces errors and adds a significant element of quality control to data collection as start and end times plus location are recorded for all plots. Furthermore, the digital system allows for restrictions in data collection by using drop down menus and upper and lower bounds for figures. It also guides the data collector through the process with a series of text prompts and diagrams.

The process followed for data collection is outlined in Figure 7 and a spot error check SOP can be found in Appendix E. It is a feedback system that relies heavily on training, review and good communication. All training is followed by trial runs of the sampling procedure and then actual data collection under supervision (see MR.81 for more details). Data is continuously submitted from the field to the carbon accounting department, and feedback is provided if any corrective actions are required. Furthermore, plots are visited in the field periodically and subjected to an internal audit process.

Once data has been error checked and cleaned it is safely stored online using Google Drive.

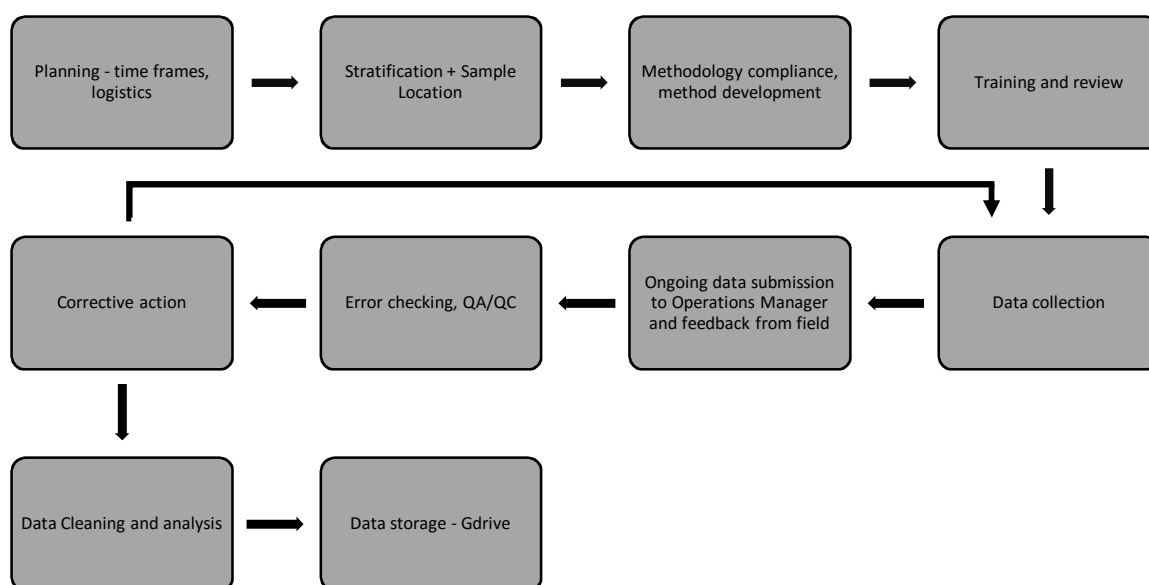


Figure 7. BioCarbon Partners data collection, QA/QC and storage process.

3.3.7 Quality Assurance and Quality Control

MR.83 Documentation of data quality assessment such as a check cruise and plots of the data such as diameter distributions by strata or plot.

A set of Standard Operating Procedures and Field Manuals have been developed for all the various aspects of the carbon inventory. As indicated above, BCP has strong systems in place to ensure all carbon related data is collected according to the required quality standards. Quality Control is embedded in the organisational structure of the Carbon Accounting department (Figure 6).

Continuous feedback from the field, coupled with field visits from senior staff, ensure that errors are identified in a timely fashion and corrected (Figure 7). Spot checks and internal audits are conducted to make sure all data collected is of the highest standard. The new digital data capture system furthermore ensures that errors are identified and rectified immediately, unlike paper based systems where data often takes weeks to enter and error check. Spot errors are dealt with as per Appendix E.

With regards to GIS and RS, similar procedures are followed although this role resides mainly within the senior management's responsibility. The RS aspect of the Cumulative Deforestation Model was undertaken independently by two associates from a South African tertiary institution. The CDM point interpretation was then submitted to a rigorous third party audit by BCP staff.

MR.81 Documentation of training of field crews

Local capacity building and employment creation is one of the core focus points of BioCarbon Partners and this is clearly reflected in our approach to field based carbon accounting practices. Table 6 is a summary of all forest inventory training undertaken for the first monitoring period. BCP initially trained a group of 19 local residents consisting of neighbouring villagers, officials from the Department of Forestry and local post graduate ecology students in basic forest enumeration techniques followed by hands-on sampling and data collection according to our carbon stock assessment field manual (Appendix E).

Table 6. Summary of field based carbon accounting training for the LZRP.

Date	Training course	Number of trainees	Duration of training (days)	Venue	Trainers
Feb 2012	Biomass Inventory	19	8	Rufunsa Conservancy	L. Theron & H. Sachedina
Sep 2012	Biomass Inventory Advanced Training	5	4	Rufunsa Conservancy	L. Theron, W. Roberts & M. Bingham
Dec 2012	Biomass Inventory refresher course including use of improved bulk density corer	4	2	Rufunsa Conservancy	L. Theron
Jan 2013	Charcoal Inventory and Soil Proxy Sampling and electronic data capture	4	4	LRZP Eco-Charcoal Forest	L. Theron, W. Roberts, E. Chidumayo
Apr 2013	Tree allometry equation development	3	1 and 5 sampling	LRZP Eco-Charcoal Forest	L. Theron, W. Roberts

Date	Training course	Number of trainees	Duration of training (days)	Venue	Trainers
			under supervision		
Jun 2013	NT and DW allometry development, Residual Biomass Sampling, Leakage Monitoring	4	3 and 4 sampling	Rufunsa Conservancy and Leakage Area	L. Theron
June 2014	Biomass Inventory refresher course	5	2	Rufunsa Conservancy	L. Theron

Following the viability phase of the project, five people were selected from the 19 originally trained, to undertake the required monitoring in preparation for the verification under the VCS of the project and one additional member selected from a local village. The forest inventory team members were:

- Pythias Sebente
- Collins Jere Kaoma
- Andrew Tembo
- Christopher Wanga
- Elvin Muchimba

The inventory team then underwent refresher and advanced training during September 2012 (Figure 8). The training particularly focussed on correct data capture and measurement techniques, use of clinometers, GPS use and advanced tree identification presented by local Zambian expert Mike Bingham. Plots were then enumerated under supervision until a satisfactory level of proficiency was achieved.

Pythias Sebente resigned in November 2013 due to the physical nature of the work and was replaced as team leader by Andrew Tembo. The team were by that time well versed in the sampling method and did not need five people to complete the inventory.

BCP in the interim developed an electronic data capture system using Android smartphones and the Open Data Kit (ODK) software. This software allows for the design of custom data capture forms, capturing geographic data and images. It allows for the introduction of stringent data quality control features. A trial version was developed and in January 2013 the team was trained on it and it was piloted in the eco-charcoal forest to quantify the biomass available for charcoal. Since then all new data has been captured using this system.

The soil sampling procedure was also revised during this time; it included training in collecting metadata required for collecting data on residual soil carbon stocks and soil decay rates.

A refresher training course was again held in June 2014. It included a review of the upcoming leakage monitoring and planning for leakage monitoring.



Figure 8. Copy of certificate issued to Forest Monitoring Team members after completion of the advanced training course.

MR.88 The estimated carbon stock, standard error of the total for each stock, and the sample size for each stratum in the area selected.

Summarised in Table 7 below, for calculations please see Appendix C.

Table 7. Estimated carbon stock, standard error and the sample size of each stratum.

Parameter	Project Accounting Area			Proxy Area	
	Dense Tree OT	Light Tree OT	Soil (Dense + Light)	Proxy Area OT	Proxy Area Soil
Plots (P)	26	160	48	46	16
Total Possible plots ($N_{p,k}$)	132986	603954	736941	945964	945964
C	1224780	5072150	6420888	239397	5634229
U (B.10) per stratum	112770	240524	841589	76711	283500

MR.82 If included in the project activities, a description of procedures used to estimate the rate of biomass burning and charcoal production and demonstration that these estimates are conservative

Biomass available for charcoal production was estimated following the BCP carbon stock assessment field manual in the Eco-charcoal forest located to the north of the project accounting area. The eco-charcoal area is approximately 93 ha in size and would have been deforested in the baseline scenario. The area was identified by local community leaders and charcoal producers who agreed to harvest it in a sustainable manner. Biomass was enumerated in 30 plots. Figure 9 shows the location of the eco-charcoal forest, biomass inventory plots and the harvesting strips. Charcoal is harvested using a coup & shelter belt system (eco-charcoal harvesting and production system documents have been made available to the VVB); the plan is to harvest up to 7ha of forest per year for charcoal on a rotational basis, returning to the first strip after approximately 18 years. Only 0.3 ha was harvested during *m2*.

Charcoal production and sales are carefully monitored by BCP staff and project participants. Charcoal production figures per month are listed in Table 8 below.

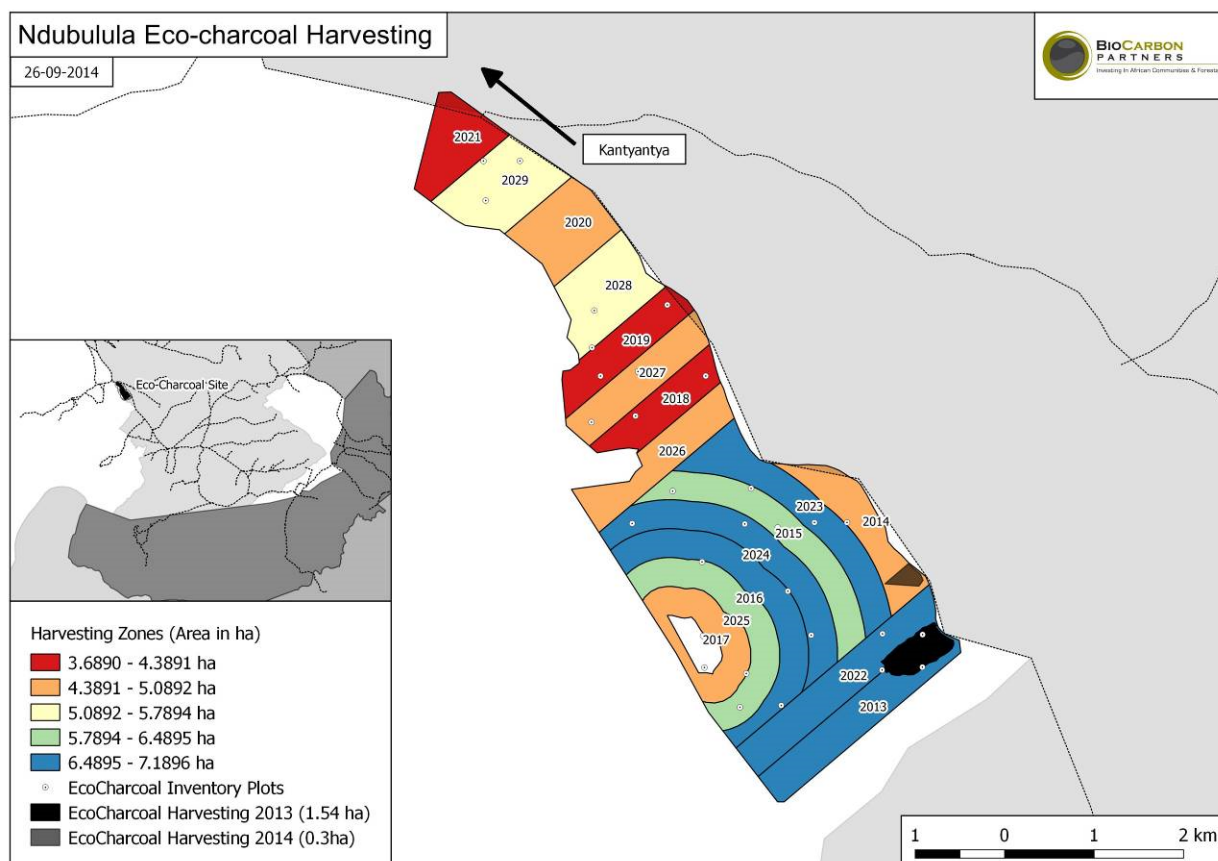


Figure 9. Eco-charcoal production forest with coupe and shelter belt harvesting plan and area harvested to date. The 93 ha forest is located to the north of the project accounting area, outside of the Reference Area.

Table 8. Summary of Eco-charcoal production for the LZRP

Month	Number of bags produced	Mass (t)
October 2013	30	3.06
November 2013	0	0
December 2013	0	0
January 2014	21	2.14
February 2014	0	0
March 2014	0	0
April 2014	0	0
May 2014	35	3.57
June 2014	11	1,12
July 2014	0	0
August 2014	0	0
September 2014	0	0

4 QUANTIFICATION OF GHG EMISSION REDUCTIONS AND REMOVALS

4.1 Baseline Emissions

MR.10 Calculations of current baseline emissions $E_{B\Delta}^{[m]}$ as of the current monitoring period.

Gross Emissions Reductions (baseline emissions) for the second monitoring period (2013-2014) are summarized in Table 9. Emissions reductions were calculated using a logistic deforestation model, based upon a point interpretation of forest state in the reference area applying equation F.16 VM0009 V2.1

Table 9. Baseline emissions reduction summary for the second monitoring period (see Appendix D for calculations).

Monitoring Period	Carbon Pool	Baseline Emissions Reductions (tCO ₂ e)
M2	AGOT	88,367
M2	BGOT	47,718
M2	SOC	11,790
Total		150,982

MR.11 Calculations of baseline emissions $E_{B\Delta}^{[m-1]}$ from prior monitoring periods.

The baseline emissions model, VM0009, equation F.4 was used to calculate emissions for the prior monitoring period as it was the first monitoring period. Please see Appendix D for calculations of $m1$.

MR.12 Calculations of cumulative baseline emissions for each selected pool ($E_{B\Delta}^{[m]}$ and $E_{B\Delta}^{[m]}$) and undecayed carbon ($C_{B\Delta}^{[m]}$, $C_{B\Delta}^{[m]}$, $C_{B\Delta}^{[m]}$, and $C_{B\Delta}^{[m]}$), as of the current monitoring period.

Summarised in Table 9. Refer to Appendix D for calculations.

MR.13 Calculations of cumulative baseline emissions from biomass $E_{B\Delta}^{[m]}$ for the current monitoring period.

578,362 tCO₂e

Cumulative baseline emissions were calculated using equation F.4 and F.21, VM0009 V.2.1 Refer to Appendix D for calculations.

MR.14 Calculations of cumulative baseline emissions from biomass $E_{BBM}^{[m]}$ for all prior monitoring periods.

442,277 tCO₂e

Cumulative baseline emissions were calculated using equation F.4 and F.21, VM0009 V.2.1 Refer to Appendix D for calculations.

MR.15 The order of strata from lowest carbon stocks to highest carbon stocks based on the average across all pools.

As the project is baseline type U3, the spatial algorithm (equation F.24) had to be applied to biomass stocks (Table 10).

Table 10. Results of applying the spatial algorithm (equation F.24) to carbon stocks per strata (see Appendix C for calculations).

Stratum	Carbon Density (tCO ₂ e/ha)
Light Tree	185.6
Dense Tree	188.9

MR.16 Calculations for each step which are carried through from monitoring period to monitoring period.

See Appendix D for application of the spatial algorithm to baseline emissions calculations. For this monitoring period predicted emissions only stemmed from the first stratum, *Light Tree*.

MR.17 Calculations of cumulative baseline emissions from biomass $E_{BBM}^{[m]}$ for prior monitoring periods.

The cumulative baseline emissions from biomass for *m1* is 442,277 tCO₂e, for calculations please see Appendix D.

MR.24 An estimate of current baseline emissions from SOC $E_{BSOC}^{[m]}$ as of the current monitoring period.

Current baseline emissions from soil are 43,381 tCO₂e applying equation F.9 and F.32, VM0009 V.2.1 Please see Appendix D for further details.

MR.25 An estimate of cumulative baseline emissions from SOC $E_{B\text{ SOC}}^{[m]}$ for the current monitoring period.

Cumulative baseline emissions for SOC for $m2$ is 180,883 tCO₂e

MR.26 Calculations of cumulative baseline emissions from SOC $E_{B\text{ SOC}}^{[m]}$ for all prior monitoring periods.

Cumulative baseline emissions for $m1$ is 137,503 tCO₂e.

MR.32 An estimate of carbon stored in non-decayed BGB $C_{B\text{ BGB}}^{[m]}$ for the current monitoring period.

Current carbon stocks stored in non-decayed BGB are 2,760 tCO₂e, equation F10 and F.29 VM0009 V.2.1. Please see Appendix D for further details.

MR.33 An estimate of cumulative baseline emissions from BGB $E_{B\text{ BGB}}^{[m]}$ for the current monitoring period.

Current baseline emissions from BGB are 47,718 tCO₂e using the revised version of equation F.10. Please see Appendix D for calculations and equations

MR.34 Calculations of cumulative baseline emissions from BGB $E_{B\text{ BGB}}^{[m]}$ for all prior monitoring periods.

Cumulative baseline emissions from BGB equals to 155,084 tCO₂e.

MR.35 An estimate of carbon stored in non-decayed SOC $C_{B\text{ SOC}}^{[m]}$ for the current monitoring period.

Current carbon stocks stored in non-decayed SOC are 31,590 tCO₂e as per equation F.32 of VM0009 V.2.1. Please see Appendix D for calculations and equations.

4.2 Project Emissions

The project accounting area falls within a fire prone ecosystem that has evolved over millennia with frequent (often annual) fires. The project proponent is actively implementing an ecologically sound fire management system that is aimed at preventing potentially catastrophic late season fires through a firebreak system, early, cool season burns and reduction of fuels through community-based seasonal enterprises (such as thatch and reeds for urban markets). This fire management system is designed to mitigate the impact hot fires have on woody biomass. The project proponent acknowledges that fire is a common occurrence during the dry season and that fires actually play a positive role in maintaining the ecological integrity of the project area.

However, hot late season fires can have a negative impact on the woody biomass in the area as well as the potential for regeneration following degradation related activities such as charcoaling and agriculture. As such, the fire management system will reduce the occurrence of such fires in the future and prevent unnecessary emissions and loss of woody biomass.

Figure 10 to Figure 15 show the occurrences of fires in the project area as recorded by the MODIS Active fire and Burned Area Products as well as the NASA FIRMS data for both 2013 and 2014.

Figure 10, is the 2013 fire season maps burn scars whereas the rest of the figures are fire incidence and the size of the point indicates the confidence of an actual fire occurring, not the spatial extent of a fires event. No losses were found in the sampling following the 2013 fire season. Sampling within the burn scar areas has occurred as part of the continued biomass monitoring initiatives described in table 2. Additional informal visits conducted by project management have also taken place and confirm that no emissions resulted from the burning of woody biomass.

During this monitoring period no emissions from woody biomass occurred and project emissions from burning are thus zero.

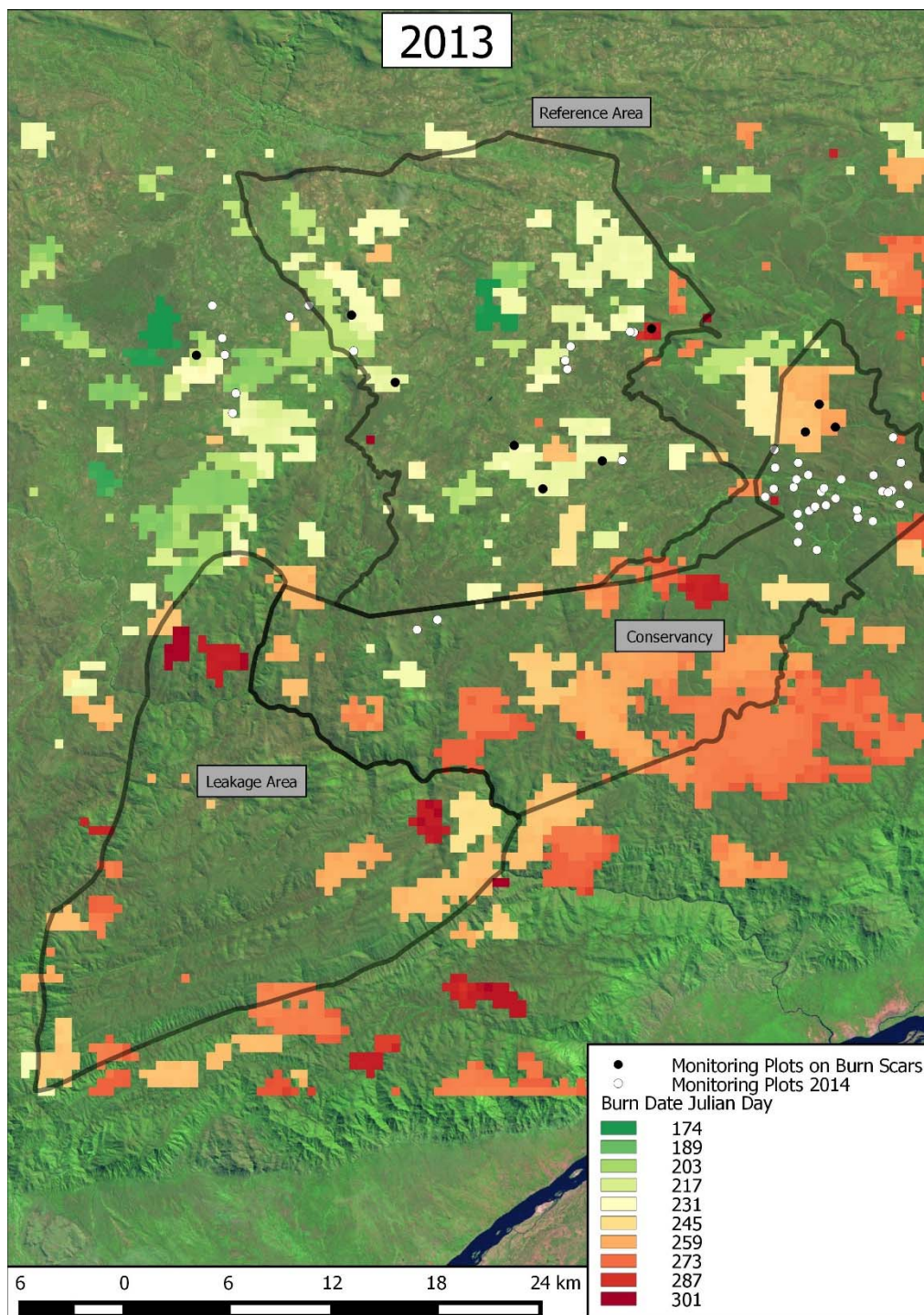


Figure 10 Locations of burn scars during 2013 (recorded by MODIS – <http://modis-fire.umd.edu/>)

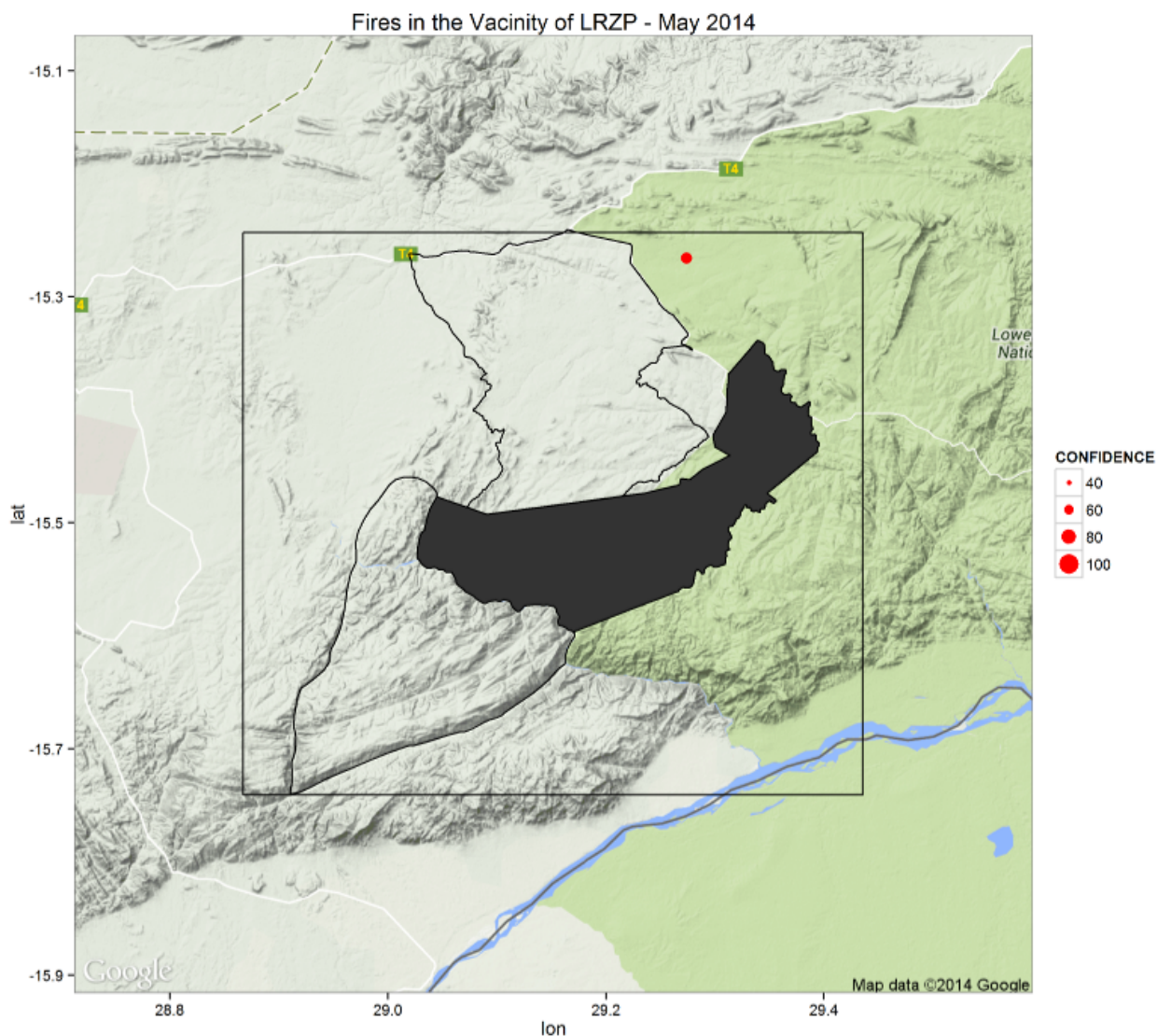


Figure 11 Locations of fires during May 2014 (Provided by NASA FIRMS – <https://earthdata.nasa.gov/data/near-real-time-data/firms>)

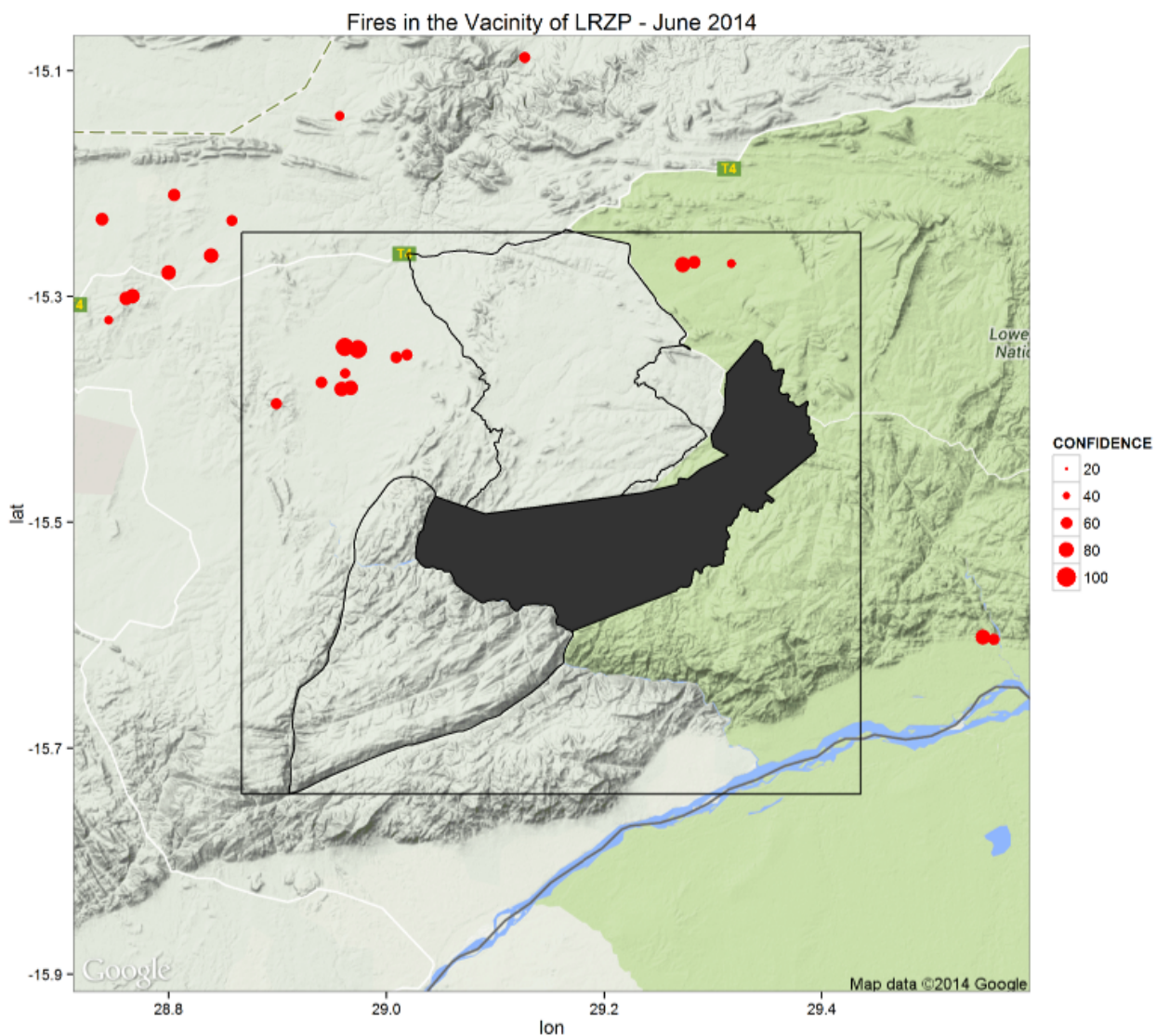


Figure 12 Figure 11. Locations of fires during June 2014 (Provided by NASA FIRMS – <https://earthdata.nasa.gov/data/near-real-time-data/firms>)

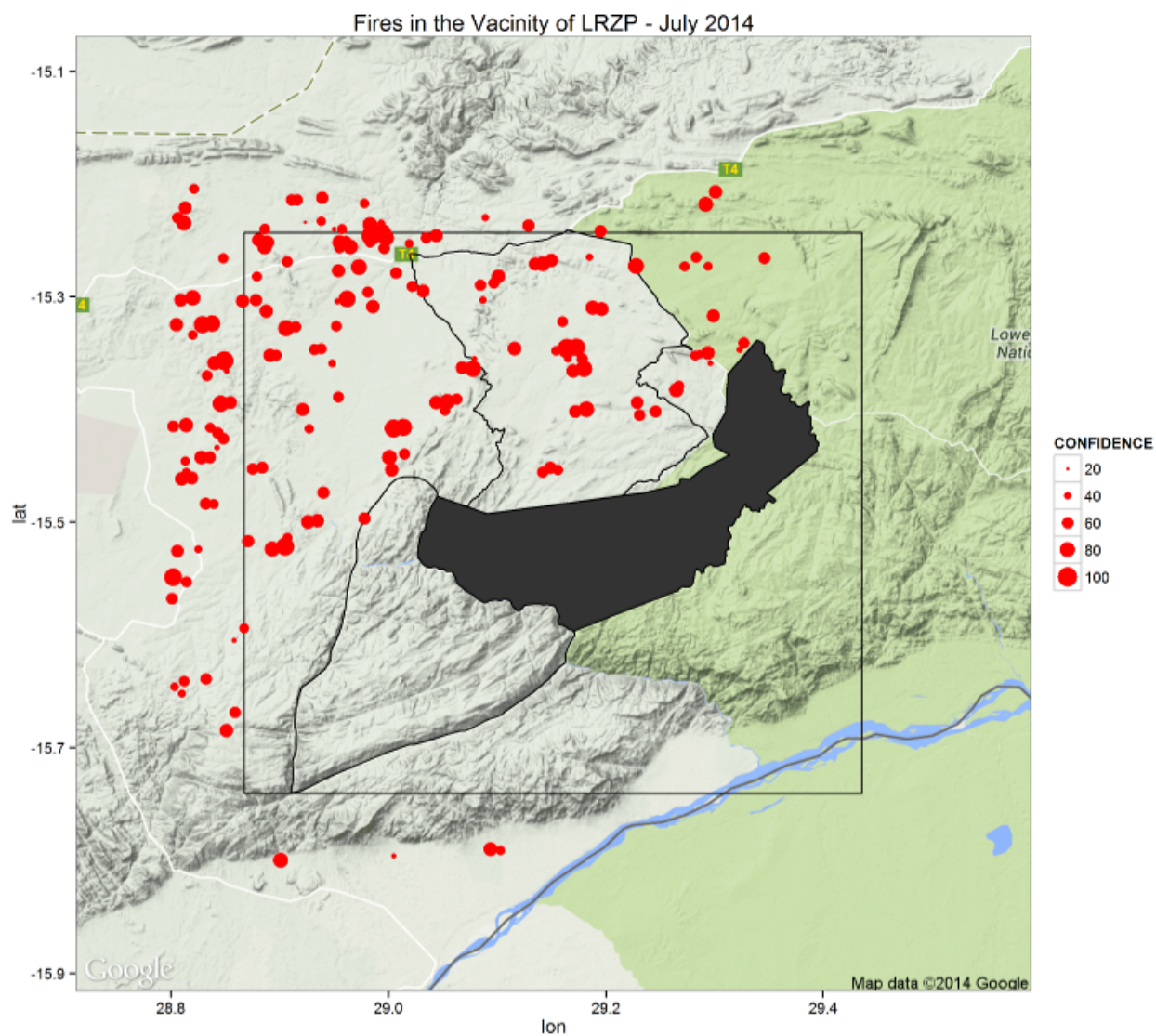


Figure 13 Locations of fires during July 2014 (Provided by NASA FIRMS – <https://earthdata.nasa.gov/data/near-real-time-data/firms>)

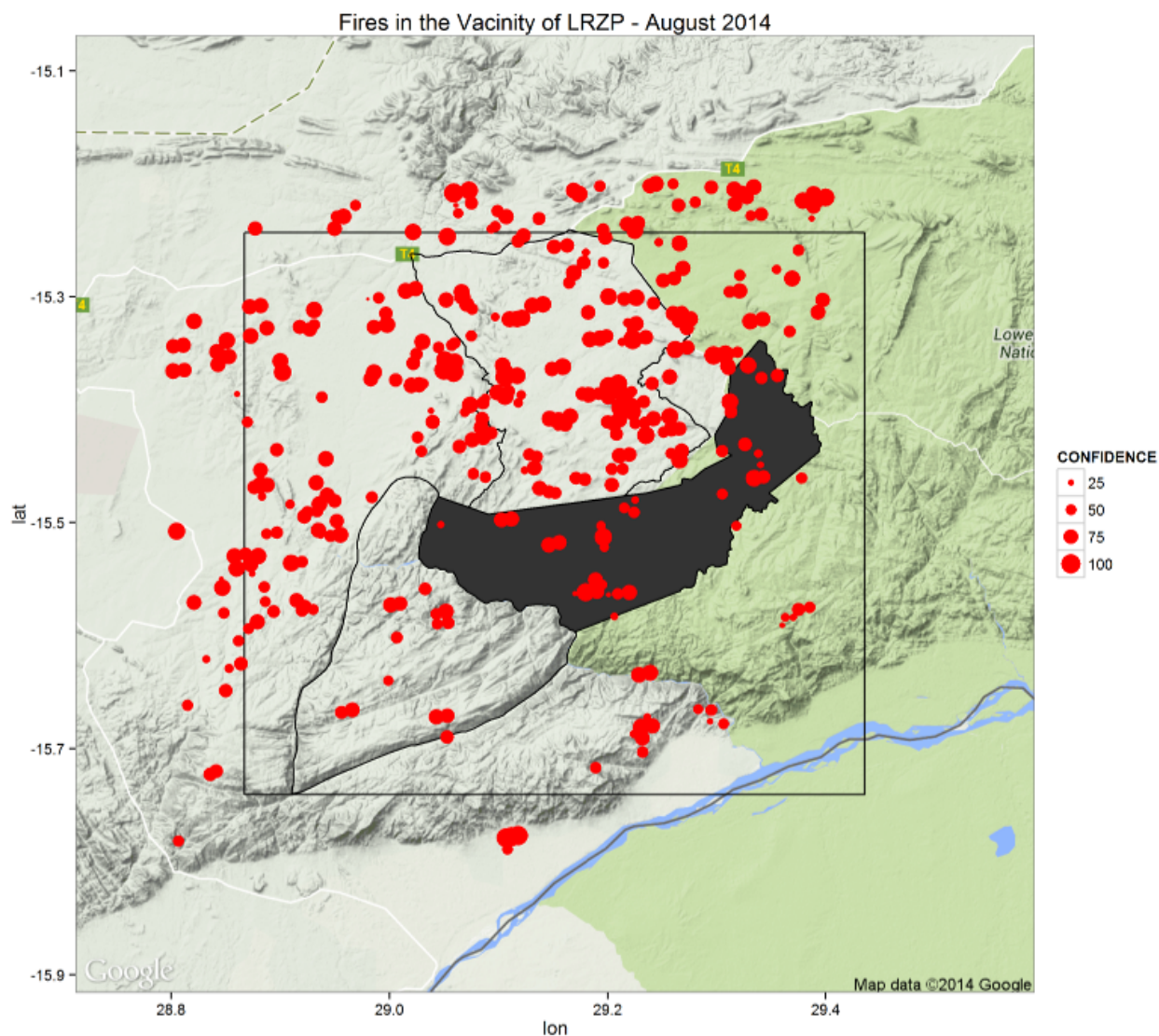


Figure 14 Locations of active fires during August 2014 (Provided by NASA FIRMS – <https://earthdata.nasa.gov/data/near-real-time-data/firms>).

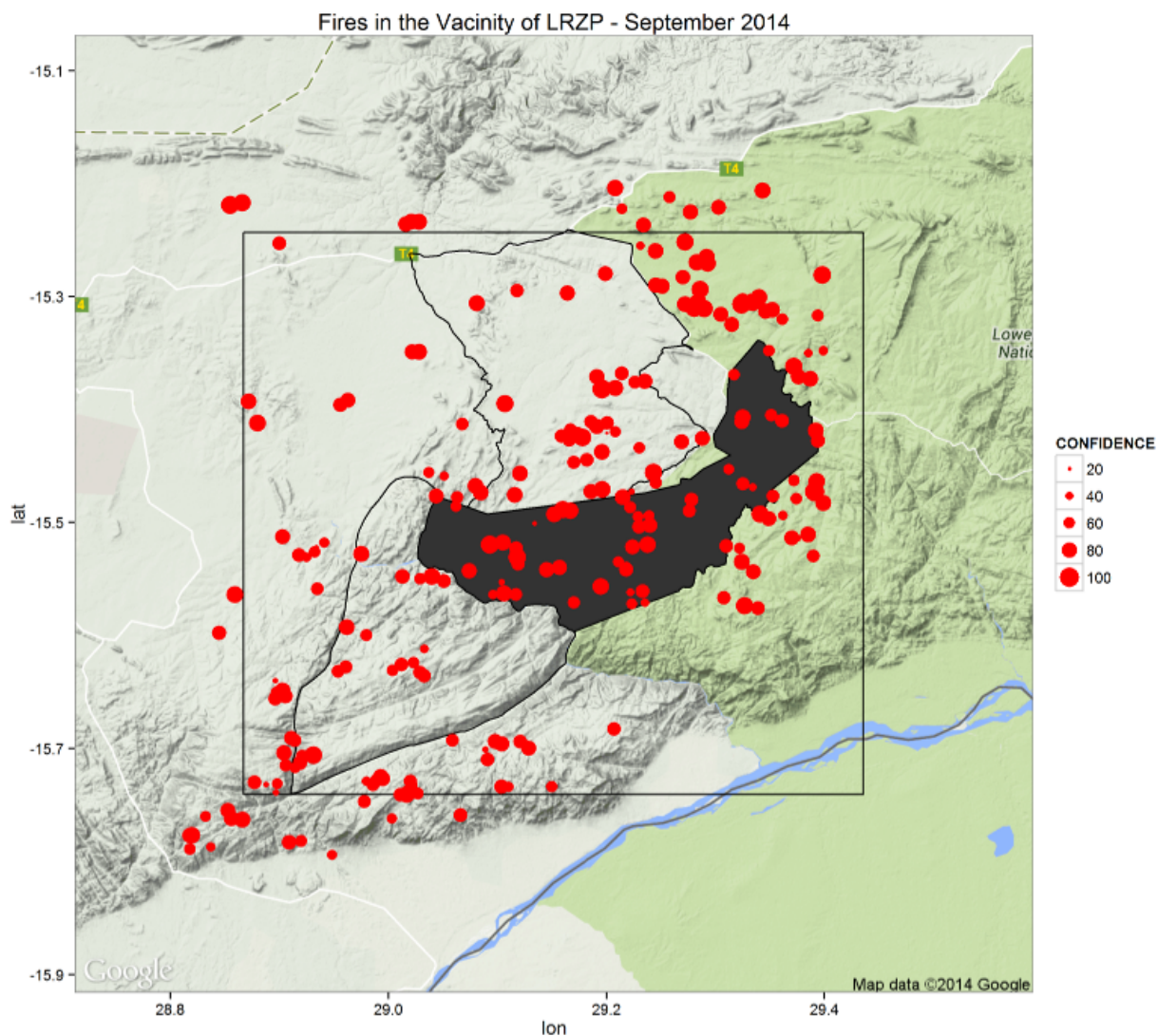


Figure 15 Locations of fires during September 2014 (Provided by NASA FIRMS – <https://earthdata.nasa.gov/data/near-real-time-data/firms>)



Figure 16. LZRP 2014 active fires.

MR.38 A map of the boundaries of any significant disturbance in the project accounting areas during the monitoring period.

Please see Figure 10 to Figure 16 for a record of fire events in the accounting area since 2009. These events did not constitute disturbance events as tree biomass was not compromised.

Furthermore, Zambia recently has had a spate of illegal timber harvesting cases on an almost national scale. See below for a list of newspaper articles on the subject:

<http://www.daily-mail.co.zm/index.php/local-news/item/2222-illegal-timber-seized>

<http://www.daily-mail.co.zm/index.php/editorial/comments/item/2315-investigate-illegal-timber-cutting>

<http://www.daily-mail.co.zm/index.php/local-news/item/2311-now-kapeya-threatens-to-ban-timber-trade-if>

<http://lusakavoice.com/2014/04/23/govt-confiscates-249-mukula-logs-in-lundazi-district/>

<http://lusakavoice.com/2014/04/24/govt-intercept-timber-en-route-to-malawi/>

http://www.postzambia.com/post-read_article.php?articleId=44902

<http://www.daily-mail.co.zm/index.php/local-news/item/1953-35-timber-laden-trucks-impounded>

The project area was not spared this onslaught, particularly as it is one of the larger tracts of intact forest in Lusaka province. Hilly, remote parts of the project area were targeted. BCP acted immediately when we became aware of the harvesting activities. It became evident that loggers entered the property on foot, dragged logs to central areas and these were then moved by truck out of the conservancy.

Trucks were stopped and loggers apprehended, but unfortunately there were no prosecutions due to a lack of capacity of the designated authorities.

This illegal timber harvesting has been aimed at *Pterocarpus* spp., notably *P. chrysanthrix*. This is not a well-known species, and generally not a recognised timber species, but it seems there is now an export market for it as it has dense heartwood that can be used for ornaments. *Pterocarpus* spp. do occur in the project area, albeit at low densities (Appendix C). Only *P. angolensis* and *P. rotundifolius* were identified, but it is very difficult to distinguish *P. rotundifolius* from *P. chrysanthrix*. that was identified during the biomass inventory. It is most likely that *P. rotundifolius* was misidentified and was in fact *P. chrysanthrix*.

On learning of illegal extraction activities in the project accounting area, members of the Forest Inventory team were deployed to identify areas where extraction took place. The FIT members used their expert knowledge of the project area and the tracks left by the loggers to find the sites where logs were harvested. Areas of recent extraction activities were readily identified by newly-cleared paths and felling gaps visible from the main roads traversing the project accounting area.

Areas were roughly delineated in the field, then intensively surveyed to identify and record cut stumps, aiming to achieve a complete census of cut stumps (Figure 17). The location of all stumps were mapped and are shown in Appendix C. A total of 306 cut stumps, all of *Pterocarpus spp*, were recorded and identified in the project accounting area. Stump dimensions were not measured, and for emissions estimates we conservatively assumed that all trees had a circumference of 110 cm (35 cm dbh), which is the largest circumference recorded for *Pterocarpus rotundifolius* and *Pterocarpus angolensis* in the inventory. We further conservatively assumed complete emissions from total above and belowground biomass, using the general allometric equation (see section 5.1) and root:shoot ratio, with no storage in wood products. Total estimated emissions from the illegal logging activity are 717.2 tCO₂, or 0.5% of m2 NERs. Admittedly, some stumps are likely to have gone un-detected, however, even if the actual amount were 5 times greater than the 306 cut stumps identified and recorded, total emissions from illegal logging would still be unambiguously under the 5% significance threshold, equivalent to 2.5% of m2 NERs. This source of emissions is thus considered *insignificant* and is ignored in project accounting.

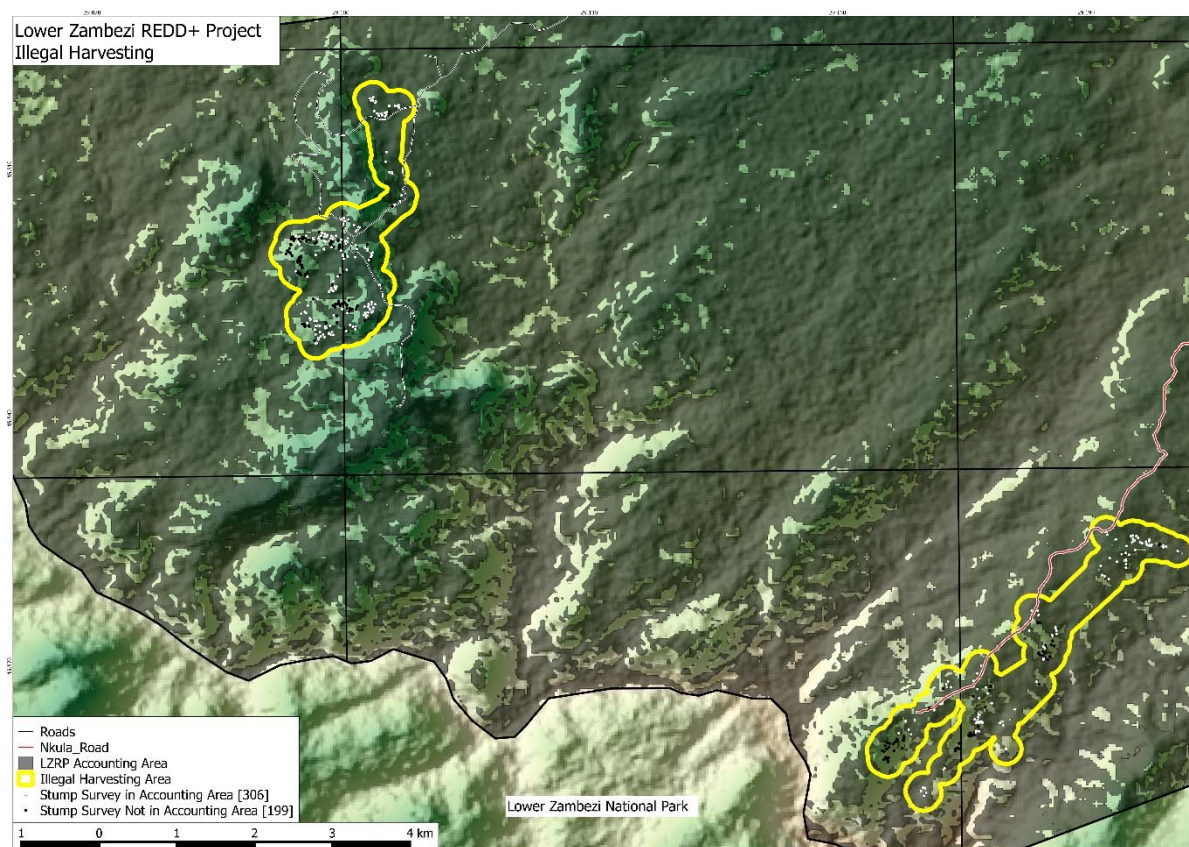


Figure 17. Map of the area where stump survey data was completed in 2014.

MR.39 Evidence that plots were installed into these disturbed areas and were measured per section 9.

Figure 16 is a summary of fire frequency in the accounting area and the location of permanent monitoring plots. Please see Appendix C and Appendix H for coordinates of permanent monitoring plots. A systematic search was undertaken in areas where illegal logging took place and all stumps enumerated (Appendix C, Figure 17)

MR.40 A table of events when woody biomass was burned during the monitoring period, showing the weight of woody biomass in tonnes and the date consumed.

No woody biomass (AGOT) has been burnt in the accounting area during *m2*. 10 plots were re-measured on sites burned in 2013 between October 2013 and January 2014 and no mortality recorded.

Table 8 is a summary of all charcoal produced by project activities. Charcoal production takes place outside of the accounting area in an area that would have been deforested as part of the baseline.

4.3 Leakage

MR.44 Leakage Mitigation Strategies A description of project activities that have been implemented since the project start date and the estimated effects of these activities on leakage mitigation.

See Table 2 For a summary of project leakage mitigation activities and a detailed description of how these projects will achieve leakage mitigation can be found in the Project Design Section 1.8.

During the second monitoring period, a total of 30 plots were sampled using a predefined leakage monitoring strategy. Observed degradation was calculated from these plots as being 0.066667 using equation B.9 VM0009 V.2.1 (see Appendix A for calculations). This value is slightly lower than what was recorded for monitoring period 1. This minor deviation can simply be assigned to sampling error, possibly due to denser herbaceous cover during Monitoring Period 2 leakage monitoring. The plot is very big and there is always the possibility of missing a stump.

Table 11. Monitoring results for the activity shifting leakage area for the first monitoring period.

Plot no	Stump count	Degradation Factor
Ruln 11	3	0.2
Ruln 13	5	0.2
Ruln 22	8	0.2
Ruln 23	1	0.2
Ruln 26	2	0.2
Ruln 31	2	0.2
Ruln 35	5	0.2
Ruln 48	61	0.2
Ruln 60	14	0.2
Ruln 9	5	0.2
Ruln 8	0	0
Ruln 6	0	0
Ruln 41	0	0
Ruln 12	0	0
Ruln 33	0	0
Ruln 36	0	0
Ruln 38	0	0
Ruln 34	0	0
Ruln 50	0	0
Ruln 44	0	0
Ruln 7	0	0
Ruln 45	0	0
Ruln 59	0	0
Ruln 10	0	0
Ruln 56	0	0
Ruln 19	0	0
Ruln 28	0	0
Ruln 5	0	0
Ruln 29	0	0
Ruln 32	0	0
Pldeg		0.066667

MR.45 Estimating Emissions from Activity-Shifting Leakage Calculated cumulative emissions from activity-shifting leakage for the current monitoring period $E_{LAS}^{[m]}$ and supporting calculations.

Using the Leakage Emissions Model, emissions from activity shifting leakage were calculated as - 830,433 tCO₂, corrected to zero in overall estimation of leakage (equation F.42), as no positive leakage is credited. Results are reported in Table 11 and calculations can be found in Appendix C and Appendix D. None of the leakage plots obtained a rating of greater than 0.8, the deforestation threshold prescribed in VM0009 V2.1.

MR.46 Calculated cumulative emissions from activity-shifting leakage for the prior monitoring periods $E_{LAS}^{[m]}$

Equal to zero, there was no activity shifting leakage in $m2$.

MR.47 Estimating Emissions from Activity-Shifting Leakage Calculated cumulative emissions from activity-shifting leakage for the prior monitoring periods $E_{LAS}^{[m]}$

Equal to zero, activity shifting leakage for $m1$ and $m2$ are zero.

MR.48 A map of the delineated boundaries.

Figure 1 shows the boundaries of the leakage area.

MR.49 Maps of the landscape configuration, including:

- a. Topography (elevation, slope, aspect);
- b. Recent land use and land cover (either a thematic map created by the project proponent or publicly available map);
- c. Access points;
- d. Soil class maps (if available);
- e. Locations of important markets;
- f. Locations of important resources like waterways or roads; and
- g. Land ownership/tenure boundaries.

Figure 2 and Figure 3 show the landscape configuration of the leakage area.

MR.50 A narrative describing the rationale for selection of activity-shifting leakage area boundaries. If the activity-shifting leakage area is smaller than the project accounting area or cannot be defined, justification for the size of the area.

Forested areas adjacent to the project accounting site have been selected as the activity-shifting leakage area. Landsat imagery from a number of dates throughout the reference period were visually interpreted to determine if the leakage area has been forested for at least ten years prior to the project start date.

To preserve the conservative nature of the project, only areas accessible to the agents of deforestation were selected. To maintain the conservative nature of the project, areas with steep slopes were removed from the leakage area. These included areas with a slope of greater than 20°.

In the present project, the leakage area abuts the project accounting area on its north western border and shares approximately 26 km of its perimeter with the accounting area. The leakage area also shares approximately 5 km of its boundary with the Lower Zambezi National Park. The rest of the perimeter allows free access to the leakage area. Free access to the leakage area was determined during sampling activities undertaken by the BioCarbon Partners field sampling team. During these monitoring activities the team were able to easily access the entire leakage area as shown by the locations of monitoring plots (Figure 5), there were no issues with private land owners, rivers, or rugged terrain.

MR.51 Results of a spatial analysis to demonstrate the activity-shifting leakage area is entirely forested as of the project start date.

Figure 18 shows the results of a supervised classification of the activity shifting leakage area indicating that all areas with a slope <20% were forested as of the project start date.

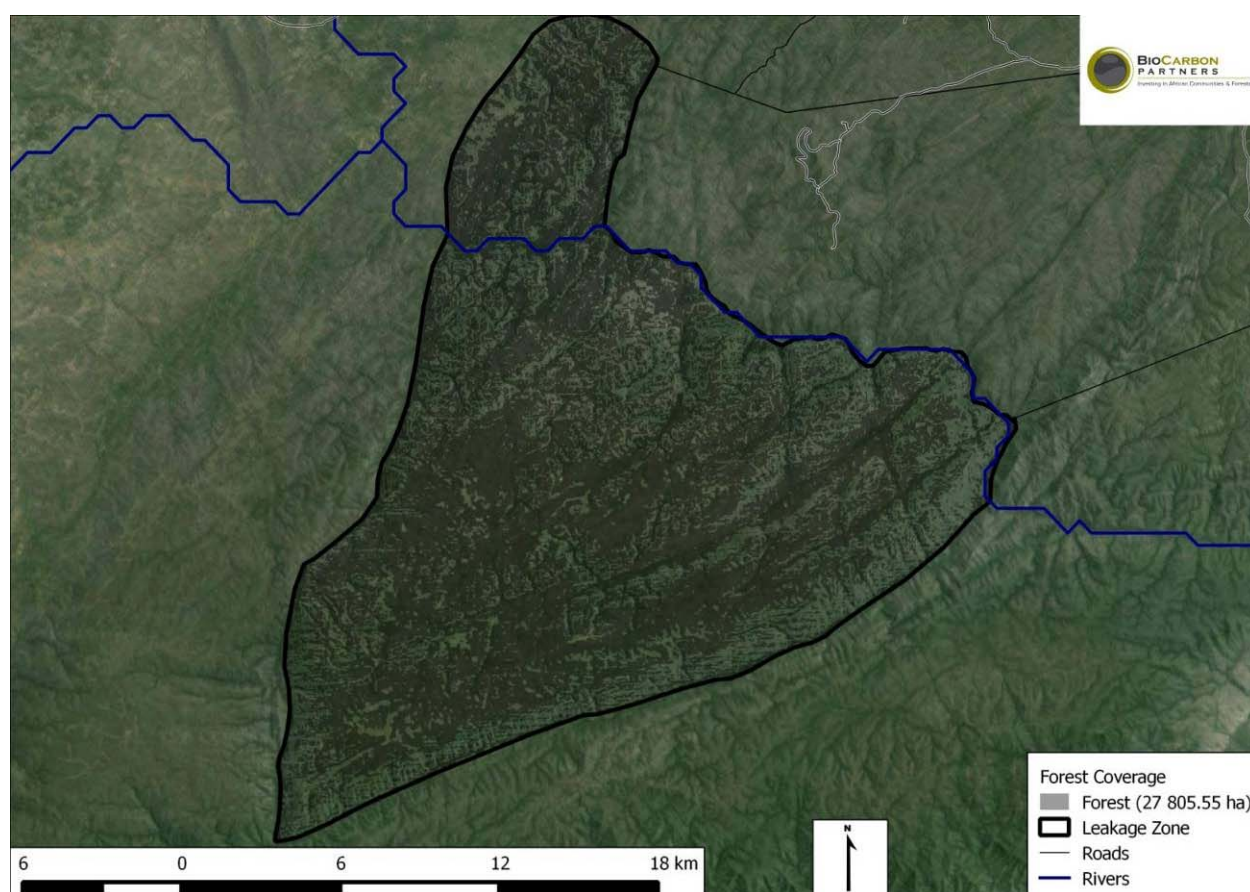


Figure 18. Forest cover of the activity shifting leakage area.

MR.52 Results of a spatial analysis to demonstrate the activity-shifting leakage area is no larger than the project accounting area .

The activity shifting leakage area that will be subjected to deforestation is 27806 ha (Appendix H).

MR.53 The estimated value $\hat{P}_{LDEG}^{[m]}$ for the current monitoring period and supporting calculations.

Table 11 shows the results of leakage monitoring, the value of $\hat{P}_{LDEG}^{[m]} = 0.066667$ using equation B.9, VM0009 V.2.1. For calculations please see Appendix A.

MR.54 The calculated value $\hat{P}_{LDEG}^{[m=0]}$ calculated for the first monitoring period.

The value for $m1 = 0.086$

4.4 Net GHG Emission Reductions and Removals

MR.58 Quantified GERs (equals NER's per guidelines of VCS Monitoring Template V3.3) for the current monitoring period including references to calculations.

A summary of net GHG removals and reductions are provided in Table 13. Baseline emissions were calculated using equation F.15 of VM0009 Vers 2.1. Project Emissions were zero. Gross Emissions Reductions (equals NER's per guidelines of VCS Monitoring Template V3.3) were calculated using equation F.48 VM0009, V.2.1.

MR.59 Quantified GERs (equals NER's per guidelines of VCS Monitoring Template V3.3) for the prior monitoring period.

For $m1$ the GERs were **479,286** tCO₂e .

MR.60 A graph of GERs (equals NER's per guidelines of VCS Monitoring Template V3.3) by monitoring period for all monitoring periods to date.

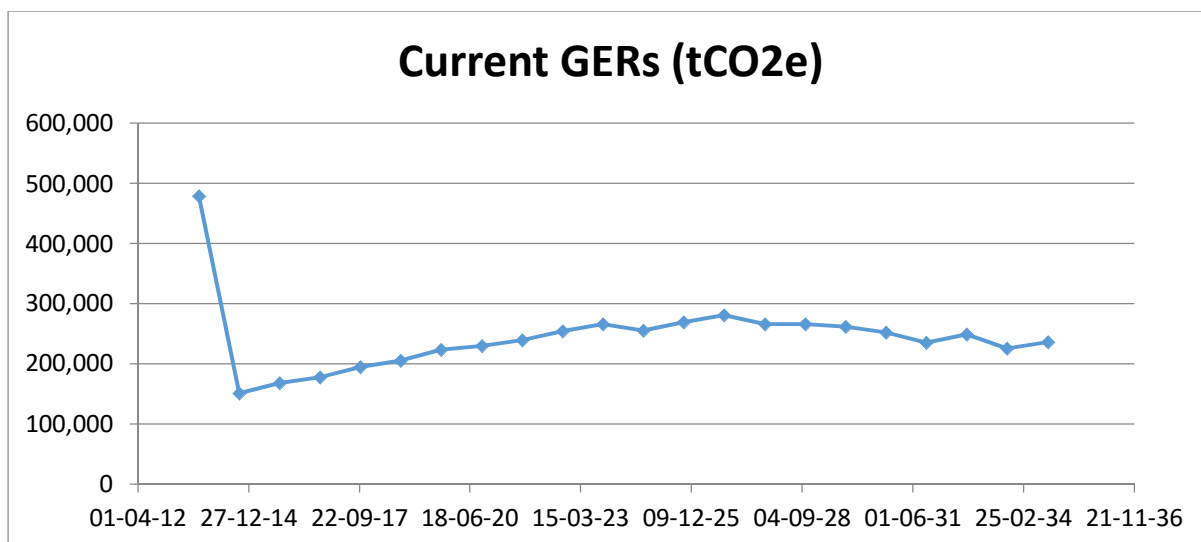


Figure 19. Current GERs (equals NER's per guidelines of VCS Monitoring Template V3.3) by monitoring period for the LZRP.

MR.61 The confidence deduction $E_u^{[m]}$ and estimated standard errors used to determine the confidence deduction.

$U_B^{[m]}$ – Total uncertainty in proxy area carbon stock estimate = 60,520 tCO₂e

$U_{EM}^{[m]}$ – Total uncertainty in Baseline Emissions Models = 5,063 tCO₂e

$U_P^{[m]}$ – Total uncertainty in project accounting area carbon stock estimate = 882,520 tCO₂e

E_u – Total uncertainty = -4,2155 tCO₂e = 0

There were no confidence deductions.

MR.62 Reference to calculations used to determine the confidence deduction.

$U_B^{[m]}$ equation B.10 VM0009 V.2.1

$U_{EM}^{[m]}$ equation F.14 VM0009 V.2.1

$U_P^{[m]}$ equation B.10 VM0009 V.2.1

E_u equation F.52 VM0009 V.2.1

Please see Appendix C for calculations.

MR.67 Quantified NERs (equals VCU's issued per guidelines of VCS Monitoring Template V3.3) for the current monitoring period including references to calculations.

The NERs (equals VCU's issued per guidelines of VCS Monitoring Template V3.3) for the current monitoring period is reported in Table 13. NERs were calculated using equation F.50, VM0009 V.2.1, for calculations please see Appendix D.

MR.68 Quantified NERs for the prior monitoring period.

For $m1$ the NERs (equals VCU's issued per guidelines of VCS Monitoring Template V3.3) were 412,185 tCO₂e (Appendix D).

MR.69 A graph of NERs (equals VCU's issued per guidelines of VCS Monitoring Template V3.3) by monitoring period for all monitoring periods to date.

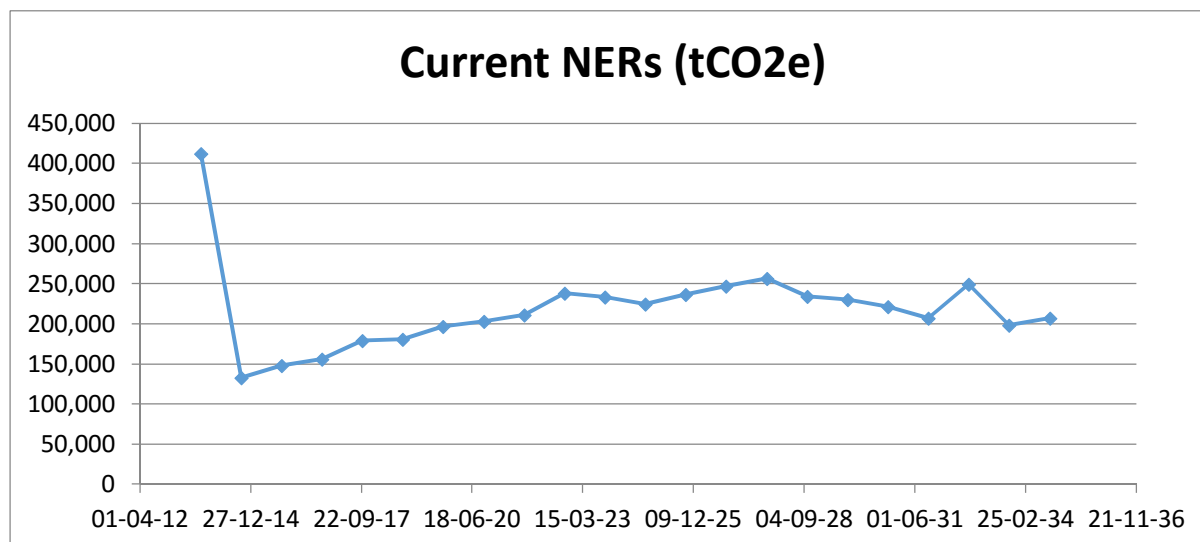


Figure 20. Graph of NERs (equals VCU's issued per guidelines of VCS Monitoring Template V3.3) for LZRP.

MR.70 Reference to the VCS requirements used to determine the buffer account allocation.

VCS Non-Permanence Risk Assessment Tool V3.2 was used to calculate buffer account allocation and calculated by GERS x Non Permanence Risk score (12%) = 18,117 tCO2e.

Table 12. Buffer account allocation per vintage year.

Year	Current Baseline Emissions (tCO2e)	Current Project Emissions (tCO2e)	Current Leakage (tCO2e)	NERs (tCO2e)	Buffer account (tCO2e)	VCUs (tCO2e)
2013	38,161	0	0	38,161	4,579	33,581
2014	112,822	0	0	112,822	13,539	99,284
Total	150,982	0	0	150,982	18,117	132,865

Please see Appendix G for non-permanence risk rating calculations.

MR.71 Reference to calculations used to determine the buffer account allocation.

The non-permanence risk is 12%. Please see Appendix G for non-permanence risk calculations and references used to calculate risks.

MR.75 Quantified NERs (equals VCU's issued per guidelines of VCS Monitoring Template V3.3) by vintage year for the current monitoring period including references to calculations.

Table 13. Summary of net GHG removals and deductions for the current monitoring period by vintage year (see Annex D for calculations).

Calendar Year	Baseline emissions or removals (tCO ₂ e)	Project emissions or removals (tCO ₂ e)	Leakage emissions (tCO ₂ e)	Net GHG emission reductions or removals (tCO ₂ e)
2013	38,161	0	0	38,161
2014	112,822	0	0	112,822
Total	150,982	0	0	150,982

Vintage NERs (termed GERs in VM0009 V2.1) were allocated by year proportional to the number of calendar days in each year relative to the total number of days in the current monitoring period as per VM0009 V.2.1 (Appendix D). NERs (termed GERs in VM0009 V2.1) were quantified using equation F.48 VM0009 V2.1 (Appendix D).

MR.76 Comparison of NERs (equals VCU's issued per guidelines of VCS Monitoring Template V3.3) presented for verification relative to NERs (equals VCU's issued per guidelines of VCS Monitoring Template V3.3) from ex-ante estimates.

Due to the Project Design deviation described in Section 2.2 there was a difference between ex ante and NERs submitted after the first round of verifications.

Ex-ante NERs (equals VCU's issued per guidelines of VCS Monitoring Template V3.3) were 179,130 tCO₂e and after correcting multi-stemmed tree diameters NERs ((equals VCU's issued per guidelines of VCS Monitoring Template V3.3) were 150,982 tCO₂e.

MR.77 Description of the cause and effect of deviations from ex-ante estimates.

The cause of the difference was due to an error in the measurement of multi-stemmed trees as described in section 2.1 and 2.2 and after correction resulted in an error above the 5% materiality threshold.

5 ADDITIONAL INFORMATION

5.1 Validating previously developed allometric equations

MR.92 A list of all selected allometric equations used to estimate biomass for trees and non-trees.

Allometric equations were validated during *m1* and a description of the process can be found in the MR for this period at: [VCS Project Database](#)

6 APPENDIX

Appendix A Adaptive Management Plan. Confidential

Appendix B BCP Community Engagement SOPs and Monitoring Systems. Confidential

Appendix C Carbon Inventory. Confidential

Appendix D Emissions Reductions Calculations. Confidential

Appendix E Biomass and soil monitoring protocol. Confidential

Appendix F Leakage monitoring protocol. Confidential

Appendix G VCS Non-permanence risk assessment. Public

Appendix H Spatial Data. Confidential

7 REFERENCES

Chidumayo, E. N. (2013). Forest degradation and recovery in a miombo woodland landscape in Zambia: 22 years of observations on permanent sample plots. *Forest Ecology and Management* 291(0): 154-161.

Verplanke, E. and Zahabu, E. (2009) A field guide for assessing and monitoring reduced forest degradation and carbon sequestration by local communities, Kyoto: Think Global, Act Local Project report, Enschede, The Netherlands. Available at [Http://www.communitycarbonforestry.org](http://www.communitycarbonforestry.org).