





# VCS Monitoring Report

for the first monitoring period ($m_1$)
January 1, 2005 to December 31, 2010

## The Kasigau Corridor REDD Project
## Phase I - Rukinga Sanctuary

Version 1.0
February 2nd, 2011

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## 1 Project Details

### 1.1 Summary Description of Project

Through a combination of dryland forest protection and extraordinary community sustainable development activities, this project is estimated to avoid the emission of over 6 Million metric tonnes of CO2e which would have been emitted due to slash and burn deforestation over the 30 year project life, or on average approximately 201,145 metric tonnes per year across the Carbon Pools of Above and Belowground Biomass (forest carbon), and Soil Carbon.

The Project Area is home to a fantastic diversity of mammals (over 50 species of large mammal, more than 20 species of bats), birds (over 300 species) and important populations of IUCN Red List species such as Grevy's zebra (*Equus grevyi*), Cheetah (*Acinonyx jubatus*), Lion (*Panthera leo*) as well as over 500 African elephants (*Loxidonta africana*) seasonally.

The project is clearly additional (under the project financial additionality tool ) and the Baseline far from being hypothetical is an extension of actual deforestation that was occurring aggressively in the reference region immediately adjacent to the Project Area at the time Wildlife Works came on the scene, and that has been demonstrated clearly from historic satellite image analysis.

### 1.2 Sectoral Scope and Project Type

This project falls under VCS sectoral scope 14: Agriculture, Forestry and Other Land Uses, under project activities Reduced Emissions from Deforestation and Degradation (REDD), and most specifically, Avoiding unplanned mosaic deforestation and degradation (AUMDD). This project falls into this category by the definition provided in the VCS Program Update of May 24th 2010, by virtue of the fact that > 25% of the boundary of the Project Area is within 50m of land that was anthropogenically deforested in the ten years prior to the project start date, as illustrated in the PD Template 'Kasigau Corridor Phase I VCS Template PD'. This project is not a grouped project.

### 1.3 Project Proponent

The Project Proponent for the Kasigau Corridor REDD Project – Phase I Rukinga Sanctuary is Wildlife Works Inc., a California Corporation in good standing. Wildlife Works Inc. acquired the carbon rights from the landowner, Rukinga Ranching Company Ltd. after a process of Free Prior and Informed Consent, through a Carbon Rights Agreement/Easement that was approved by a full vote at an AGM of the Shareholders at Rukinga on February 13th 2009, at which AGM the Shareholders present were given an explanation of the potential of the Carbon project, a copy of which has been provided to the Validator, and following which the Shareholders unanimously approved the pursuit of this opportunity by the Managing Director and majority shareholder of the land, Mike Korchinsky. This decision was ratified again unanimously by an extraordinary general meeting of shareholders of Rukinga Ranching Company Ltd on December 9th, 2009.

The carbon project is managed in the field in Kenya by Wildlife Works Carbon LLC, a joint venture of Wildlife Works, Inc. and Colin Wiel Investments II, in return for which Wildlife Works Carbon LLC is eligible for a share of the proceeds from the sale of the carbon credits generated by the project. Details of this arrangement are specified in the Membership Agreement of Wildlife Works Carbon LLC, which was provided to the Validator.

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### 1.4 Other Project Participants

See above (Section 1.3)

### 1.5 Project Start Date and Project Crediting Period

The Project Start Date and the Crediting Period Start Date are both January 1st, 2005. The VCS Project Crediting Period is January 1st 2005 through December 31st, 2034 (30 years). This monitoring period ($m_1$) is the first monitoring period and started on January 1st, 2005 and ends on December 31st, 2010.

### 1.6 Project Location

The Kasigau Corridor REDD Project is located in SE Kenya, in the Marungu Sublocation, Voi Division, Taita Taveta District, Coast Province, Kenya, approximately 150 kms NW of the city of Mombasa.

This Phase I PD covers all the land known as Rukinga Sanctuary which is all that 74,516 acres (30,168.66 ha) of land originally known as LR 12263, historically reduced by subdivisions 12263/1 and 12263/2 at dates prior to the start date of this project.

Rukinga is part of that land that forms a corridor of land (the Kasigau Wildlife Corridor) between the Tsavo East National Park and the Tsavo West National Parks to the East of the Marungu range. The Project Area and Reference Region are clearly delineated in Figure 1 in the PD in section 5.1, and the shape files representing the boundaries have been made available to the project validator. The land within the project boundary has been tropical dryland forest[1] for at least 20 years and has been a primary forest since recorded times[2].

### 1.7 Title and Reference of Methodology

This project uses VM0009 'Methodology for Avoided Mosaic Deforestation of Tropical Forests', approved by the VCS for sectoral scope 14 on January 11th, 2011.

## 2 Implementation Status

### 2.1 Implementation Status of the Project Activity

All project activities described in the PD are underway during this monitoring period. The following is a brief list of project activities currently underway:

[1] UN IPCC, Good Practice Guidance for LULUCF, Table 3A.1.8;
[2] Earliest record that has been located is dated 1895 which identifies the area as forested [Hobley 1895 – Upon a Visit to Tsavo and the Taita Highlands – The Geographical Journal 1895 Vol 5 No 6 pp 545-561]

Organic clothing factory, organic greenhouse / nursery, Jojoba cash-crop development, farmland co-op establishment, ranger patrol recruiting and expansion for leakage area, sustainable charcoal project, forest/biodiversity monitoring program, Ecotourism center, school construction and bursary scheme and reforestation / outplanting program.

- These extensive project activities are described in full detail in the PD, section 6.1 Baseline Scenario Overview, page 16. These project activities were designed to mitigate deforestation and human-wildlife conflict, and therefore *by default* serve to mitigate leakage and uphold project permanence.

- Leakage is directly measured for this project through the empirical measurement of forest degradation plots (see PD, section 10 Leakage). Leakage mitigation activities are thoroughly described in this section in the PD (see pg. 55). Non-permanence risk is assessed using the VCS Tool For AFOLU Non-Permanence Risk Analysis and Buffer Determination, and has been double validated by DNV and ESI. All project activities described in the PD in Section 6.1 Baseline Overview and Section 10 Leakage serve to uphold project permanence.

### 2.2 Deviations from the Monitoring Plan

There has been no major deviation from the monitoring plan described in the PD, section 13 Monitoring, or in the monitoring standard operating procedure documents: 'Standard Operating Procedure Biomass' and 'Standard Operating Procedure Soils'.

### 2.3 Grouped Project

This project is not a grouped project; this section is therefore not applicable.

## 3 Data and Parameters

### 3.1 Data and Parameters Available at Validation

The following data were measured and available at the time of validation for this monitoring period:

| POOL | Data Unit | Source | Purpose of Data | Comments |
|---|---|---|---|---|
| Above-ground large tree biomass (AGLT) | t CO2e | Woody biomass | Major pool included | |
| Below ground large tree biomass (BGLT) | t CO2e | Woody biomass | Major pool included | |
| Above-ground non-tree biomass (AGNT) | t CO2e | Woody biomass | Major pool included | |
| Below-ground non tree biomass (BGNT) | t CO2e | Woody biomass | Major pool included | |
| Soil (Soil) | t CO2e | Soil Organic Carbon | Major pool included | SOC reduction meausured |

### 3.2 Data and Parameters Monitored

| **Data Unit / Parameter:** | |
|---|---|
| Data Unit: | **AGLT** |
| Description: | Above-ground large tree biomass |
| Source of data: | Above ground woody biomass |
| Description of measurement methods and procedures to be applied: | Standard silvicultural techniques, Full measurement procedure described in 'Standard Operating Procedure Biomass' |
| Frequency of monitoring/recording: | Yearly |
| Value monitored: | Biomass / CO2e |
| Monitoring equipment: | DBH tape, compass, height stick, measuring tape |
| QA/QC procedures to be applied: | See ' QC Procedure Biomass' |
| Calculation Method: | Allometric relationships |
| Any Comment: | DBH / wet weight allometry developed with destructive harvesting techniques |

| **Data Unit / Parameter:** | |
|---|---|
| Data Unit: | **BGLT** |
| Description: | Below-ground large tree biomass |
| Source of data: | Below ground woody biomass |
| Description of measurement methods and procedures to be applied: | Standard root:shoot ratio applied |
| Frequency of monitoring/recording: | Yearly |
| Value monitored: | Biomass / CO2e |
| Monitoring equipment: | n/a |
| QA/QC procedures to be applied: | n/a |
| Calculation Method: | Root:shoot |
| Any Comment: | 0.4 for tropical shrubland (IPCC, 2006) |

| **Data Unit / Parameter:** | |
|---|---|
| Data Unit: | **AGNT** |
| Description: | Above-ground non tree biomass (shrubs) |
| Source of data: | Above ground woody biomass (shrubs) |
| Description of measurement methods and procedures to be applied: | Size class estimation. Full measurement procedure described in 'Standard Operating Procedure Biomass' |
| Frequency of monitoring/recording: | Yearly |
| Value monitored: | Biomass / CO2e |
| Monitoring equipment: | Compass, height stick |
| QA/QC procedures to be applied: | n/a |
| Calculation Method: | Size class, standard weight with stem count |
| Any Comment: | Destructive harvest performed to yield size classes, number of stems counted |

| **Data Unit / Parameter:** | |
|---|---|
| Data Unit: | **BGNT** |
| Description: | Below ground non-tree biomass |
| Source of data: | Below ground non-tree (shrub) woody biomass |
| Description of measurement methods and procedures to be applied: | Standard root:shoot ratio applied |
| Frequency of monitoring/recording: | Yearly |
| Value monitored: | Biomass / CO2e |
| Monitoring equipment: | n/a |
| QA/QC procedures to be applied: | n/a |
| Calculation Method: | Root:shoot |
| Any Comment: | 0.4 for tropical shrubland (IPCC, 2006) |

| **Data Unit / Parameter:** | |
|---|---|
| Data Unit: | **SOIL** |
| Description: | Soil Organic Carbon (SOC) |
| Source of data: | Soil pits within Rukinga Sanctuary (undisturbed) and in Shambas in the Reference Region (ag conversion) |
| Description of measurement methods and procedures to be applied: | $1m^3$ (1m x 1m x 1m) soil pits. See 'Standard Operating Procedure Soils' for detailed measurement procedure |
| Frequency of monitoring/recording: | Beginning of project |
| Value monitored: | Biomass / CO2e |
| Monitoring equipment: | Shovel, tarp, sample bags, mixing equipment |
| QA/QC procedures to be applied: | oversampling |
| Calculation Method: | Official FAO methodology for measuring Bulk Density of disturbed soil samples, performed by Crop Nutrition Services, Nairobi. |
| Any Comment: | Sampled in 2 lifts: 0-30cm and 31-100cm for research and analysis purposes. |

| **Data Unit / Parameter:** | |
|---|---|
| Data Unit: | **Leakage** |
| Description: | Represented by forest degradation (charcoal burning) |
| Source of data: | 2 square ha (145m x 145m) leakage plots monitored using walking transects. |
| Description of measurement methods and procedures to be applied: | 2 walking transects per plot to determine antropogenically clearing relative to intact forest. Specific leakage training provided to each team member. See 'Standard Operating Procedure Leakage' for detailed leakage monitoring plan. |
| Frequency of monitoring/recording: | Each monitoring period |
| Value monitored: | Degradation percentage (0% - 100%) |
| Monitoring equipment: | GPS |
| QA/QC procedures to be applied: | Measurement redundancy |
| Calculation Method: | MED equation [9] , leakage lag period, equation [33] cumulative leakage model |
| Any Comment: | Leakage data collected in this (first) monitoring |

| | |
|---|---|
| | period is used to calculate the leakage lag period, $\delta_{LF}$, and build the cumulative leakage model, against which empirical measurements of leakage will be compared. Subsequent empirical measurements of leakage are used to calculate leakage deductions. Ex-ante estimates of leakage have no bearing on actual leakage calculations. |

**3.3 Description of the Monitoring Plan**

The following is a brief overview of the monitoring plan. Wildlife Works' detailed monitoring plan is described in detail in the PD under Section 13.4 Monitoring of Carbon Stocks in the Project Area. *(Standard Operating Procedure Biomass, 1/10/2011 and Standard Operating Procedure Soils, 1/1/2011 provided to the Validator for detailed procedures)*

In order to most accurately estimate biomass in the sanctuary, with reasonable time and expense, we divided the sanctuary into three major ecosystem types, as there is a high perceived variation in average biomass across these pools, with larger trees in high density in the montane forest strata, medium to large trees and lots of shrubs in the dryland forest strata and scattered trees, very few shrubs and heavy grass cover in the savannah grassland areas. We ultimately used 9 strata, summing to the total land area, to depict homogeneous patches of landcover in Rukinga.

It should be noted that our ex-ante monitoring was conducted in February and March 2009, the dry season in this area. We believe this will yield an extremely conservative biomass estimates, as the dominant tree species enter into estervation to preserve moisture. During this season, the trees lose all leaf mass, and the perennial grasses senesce. Wildlife Works executive management supervised the data collection teams at the initial plots, to ensure proper adherence to procedure.

We determined that a systematic random plot sampling technique would be best suited, due to the high degree of perceived variation of type and density of trees and shrubs. A systematic sampling method was used to overlay a 2km x 2km grid over the sanctuary and select sample plot centers at the center point of each square. The upper left corner of the grid was randomly positioned to ensure the ultimate random nature of the individual plots.

To sample soil, coordinates were provided to the soil plot sampling teams by our GIS team, at randomly selected forest plot locations, and they sampled using the method illustrated in the 'Standard Operating Procedure Soils' document provided to the validator.

Leakage plots are assessed differently than both biomass and soil plots. Although they are permanent, they are located in the reference region, and necessarily placed in random spatial locations. They therefore cannot be conspicuously marked as are the biomass plots. The NE corner of each leakage plot is recorded in a GIS system, and the plot is evaluated by the leakage plot sampling team using two walking transects per plot. The teams have been specially trained by Jamie Hendriksen, Wildlife Works' Operations Manager to recognize and measure degradation due to charcoal burning and kilning, a phenomenon which is typical to this particular area. A detailed rendition of the degradation estimation procedure is listed in 'Standard Operating Procedure Leakage' provided to the validators.

**Organizational Structure**

Wildlife Works has 3 dedicated plot sampling teams, ultimately commanded by Rob Dodson, VP African Field Ops. Each team is directed by a team leader, who is trained in GPS operation and forest techniques, and must demonstrate proficiency in species identification, biometric estimation techniques (calculating DBH, height, measuring angle from north, etc.). These team leads have typically grown into their position with experience and proven acumen in the field, and this position is coveted within the Wildlife Works hierarchy. Current team leaders are: Joel, Mwololo and Ciprian, and they are responsible for data collection and transfer to the Rukinga office. Their names are attached to each and every soil and biomass plot; any discrepancies can be easily traced back to date and time of collection, as well as team members who collected the data.

Soil sampling teams are individually selected from the biomass sampling teams. All biomass sampling team members are trained in soil sampling, and they take turns collecting soil samples, as the work is extremely strenuous and difficult. Soil pits are dug and samples collected according to the procedure described in 'Standard Operating Procedure Soils'. Soil samples are collected in the field and then sent to Crop Nutritional Services ("Cropnuts") in Nairobi. Jeremy Cordingley, president of Cropnuts, has provided Wildlife Works and the validators with the official FAO procedure for measuring bulk density of disturbed soil samples.

As mentioned above, leakage plot teams are specially trained by the VP African Field Ops and the Operations Manager to recognize the specific type of forest degradation typical of the Kasigau Corridor. An internal audit was conducted prior to project validation to ensure consistent measurement techniques; such an audit will be carried out every monitoring period.

**Data Collection, Storage and Aggregation**

Data collected in the field is systematically translated into excel workbooks developed by Jeremy Freund, VP Carbon Development. These "carbon models" contain dropdown lists and pre-filled formulas to ensure accuracy of entry and minimize human translation error. Data is entered by dedicated office staff, Laurian Lenjo and Catherine Mwalugha, both of whom have been trained by the VP Carbon development. Data entry is cross checked internally, as well as by the Carbon Development Manager in the US, Jessie Parteno. Several programmatic, automated data checks are also run on the data.

Carbon model aggregation is ultimately the responsibility of the VP Carbon Development, and all Carbon accounting procedures were developed by him, and adhere to the MED.

All inventory is stored in the United States in Wildlife Works' San Francisco offices, where it is backed up. The data is also aggregated reported from this location. The Wildlife Works technical team is currently designing an online, spatially-enabled data inventory for biomass, soil and biodiversity information collected by field crews. In the future, GIS server software will be utilized to perform spatial analysis (species distribution modeling) on animal sightings, calculations of biomass and other spatially tagged events.

**Field Training**

Field training was conducted in February, 2009 for the first tree plot sampling team. This team consisted of;

- A local tree expert who was able to identify all the different acacia and commiphora species encountered in the sampling - Joel Mwandiga
- Mike Korchinsky – CEO, Wildlife Works
- Rob Dodson – VP African Field Operations
- Mwololo Muasa a Wildlife Works employee who subsequently became a permanent team lead and data recorder
- Three casuals to assist with carrying equipment into the field and marking the plots
- A driver
- A ranger for security

The Standard Operating Procedures for Biomass and Soils were produced following refinement of the field techniques by this initial team. Two additional teams have been trained using this procedure, and accompany our permanent team periodically, to ensure consistency in method. Field training is continually performed at Rukinga by Jeremy Freund, VP Carbon Development and Rob Dodson, VP African Field Ops.

### Internal Auditing

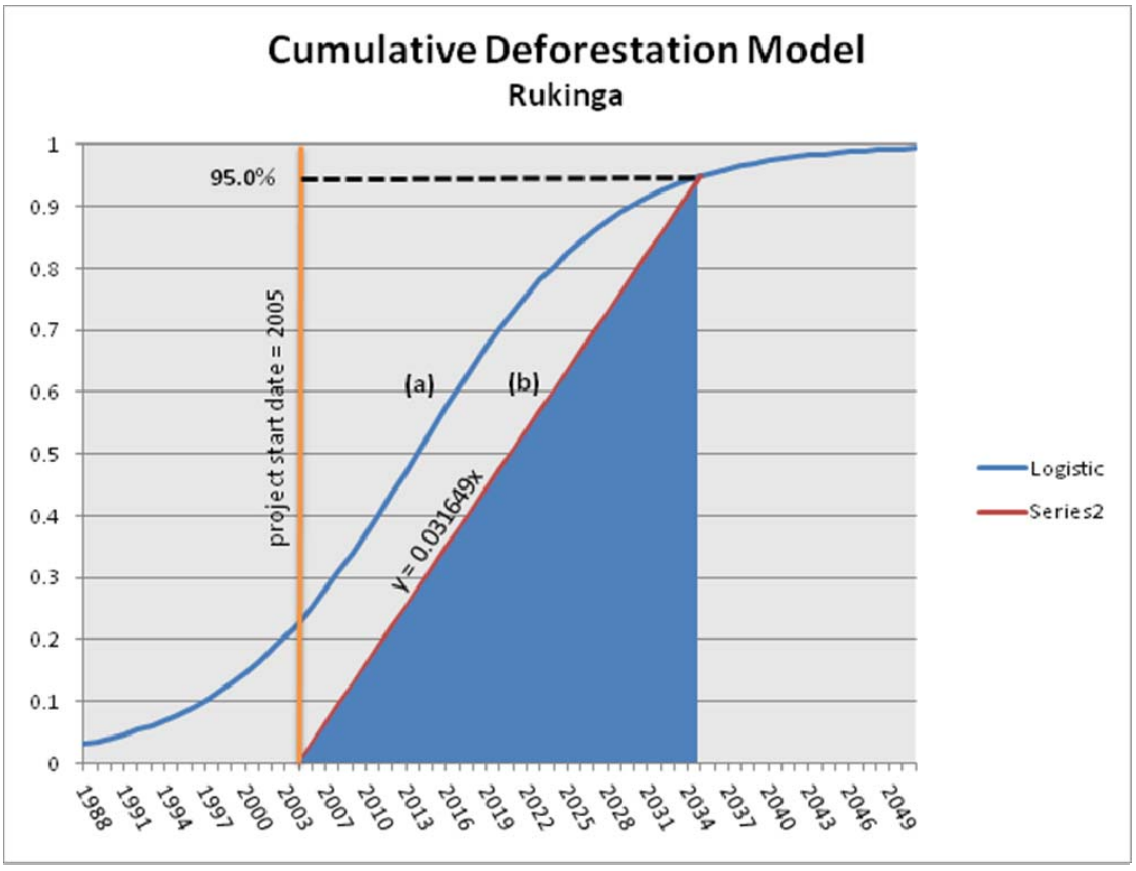
Internal checks are routinely performed on biomass, soil and leakage plots. The VP Carbon Development, VP African Field Operations and Operations Manager routinely embark on "check cruises" to evaluate the employees' work, and often, management will audit individual measurements. Wildlife Works has also instituted an official Quality Control system for biomass plots which has been reviewed by the validators (see 'QC Procedure Biomass'). As mentioned above, once the data is translated into electronic format, various internal checks are performed to eliminate errors. Wildlife Works management continually reviews the work done by other members of management. It is a company policy that no significant results may be published or submitted without at least one set of eyes (other than the author's) having viewed the work in question.

## 4 GHG Emission Reductions and Removals

### 4.1 Baseline Emissions

Baseline emissions for this monitoring period ($m_1$) are as follows:

Wildlife Works chose to use a conservative linear baseline prediction for emissions, which is based on past forest state observations and modeled with a logistical cumulative deforestation model:




**Cumulative Deforestation - Rukinga Sanctuary**
(a) Logistical CDM modeled from observed historical forest state data; (b) WW selected linear rate, conservatively below CDM

Using this approach, the gross emission reductions for the first monitoring period (January 1, 2005 to December 31, 2010) are as follows, by year:

| Year | 2005 | 2006 | 2007 | 2008 | 2009 | 2010 | TOTAL |
|---|---|---|---|---|---|---|---|
| **Gross NERs** | 202,774 | 238,580 | 249,290 | 252,494 | 253,452 | 253,739 | **1,450,329** |
| **Net NERs to WW, $m_1$** | **162,219** | **190,864** | **199,432** | **201,995** | **202,762** | **202,991** | **1,160,263** |
| **20% Buffer tonnes to VCS, $m_1$** | 40,555 | 47,716 | 49,858 | 50,499 | 50,690 | 50,748 | **290,066** |

### 4.2 Project Emissions

Project emissions for the Kasigau Corridor REDD Project, Phase I - Rukinga are estimated as follows:

- All carbon eligible carbon pools fell under the *de minimus* limit as described in the MED, section 9 Project Emissions and in VCS 2007.1;
- There were no sigificant fire events in this monitoring period ($m_1$);
- Burning of woody biomass (see MED section 9 Project Emissions) in the project area falls below the *de minimus* threshold for this monitoring period ($m_1$).

### 4.3 Leakage

To build the cumulative leakage model, forest degradation must be measured before the end of the first monitoring period to determine the average period of time between degradation and complete deforestation in the reference

area. During this monitoring period ($m_1$), the leakage lag period, $\delta_{LE}$, is measured using empirical leakage plot data. The leakage model is built from this data, and used to measure adjustments for leakage in subsequent monitoring periods. No deductions are applied for leakage in the first monitoring period.

### 4.4 Net GHG Emission Reductions and Removals

Net NERs for this monitoring period ($m_1$) are calculated as follows:

Net Emissions Reductions (NERs) to date are quantified from the following components (tonnes CO2e) with 290,066 and 1,160,263 tonnes CO2e to buffer pool and issuance, respectively:

| Component | Value |
|---|---|
| Estimated Baseline Emissions, $m_1$ | 1,450,329 |
| Uncertainty Deduction | 0 |
| Project Emissions, $m_1$ | 0 |
| Emissions from Leakage, $m_1$ | 0 |
| Gross Total NERs, $m_1$ | 1,450,329 |
| NERs to Buffer Pool, double validated* (20%) | 290,066 |
| Net Total NERs | 1,160,263 |

## 5 Additional Information

### Supporting documents

Biomass Carbon Stock database:
*Rukinga Carbon Trees Shrubs Grass v7*

Soil Carbon Stock Database:
*Rukinga 1m Soil Analysis*

NERs worksheet:
*Rukinga return analysis v4*