THE MAI NDOMBE REDD+ PROJECT THIRD MONITORING & IMPLEMENTATION REPORT (M3)

Document Prepared by Wildlife Works Carbon

Project Title	The Mai Ndombe REDD+ Project
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Project Location	Democratic Republic of the Congo, Mai Ndombe Province
Project Proponent(s)	Wildlife Works Carbon Jeremy T. Freund jeremy@wildlifeworks.com; +1 (415) 332-8081
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Validation/Verification Body	Organization: SCS Global Services Contact Name: Christie Pollet-Young Email: CPollet-Young@scsglobalservices.com Phone: +1 (510) 993-0124
GHG Accounting/Crediting Period	14 March 2011 – 13 March 2041 30-year crediting period
Monitoring Period of this Report	01 January 2017 – 31 December 2020
History of CCB Status	Validation: 06 December 2011 Verification (m_1): 06 December 2011 Verification (m_2): 24 October 2017
Gold Level Criteria	**Climate and Biodiversity Gold Level Criteria** The Project will conserve flora and fauna within the Project Area. Protecting these 2 former logging concessions will maintain critical forested area and the ecosystem services that it provides, as well as rehabilitate habitat for endangered charismatic animals such as the Bonobo and Forest Elephant. By protecting the native forest, the Project will also increase the resilience of the ecosystem to the effects of climate change. Section GL1.4 of the CCB PDD exemplifies many additional Project Activities that will help both local communities and biodiversity to minimize and adapt to expected climate change impacts. Improved seed distribution and training on improved agricultural methods will lead to increased yields and adaptation to changes in rainfall, the timing of growing seasons, and changing temperatures. Educational activities to increase literacy and diversify livelihoods will enable communities to adapt to expected increases in

	the number of and severity of natural disasters caused by climate change, and the resulting potential for increases in food insecurity and disease. Through forest protection by providing alternatives to destructive forest pathways, the Mai Ndombe REDD+ Project will also provide habitat for the bonobo (Hominidae Pan paniscus), an IUCN red-list endangered species as well as enable the return of the forest elephant.

Acknowledgements

We extend our heartfelt thanks to the following people and organizations, without whom conservation in the Lac Mai Ndombe region would not be possible:

WWC Carbon Development Team - Burlington, VT

Jeremy Freund, Simon Bird, Geoff Whitchurch, Blaise Ebanietti, Alyssa van Doorn and Neneth Freund

WWC Headquarters - Mill Valley, CA

Mike Korchinsky

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Wildlife Works Kenya

Mwangi Githiru

ERA-WWC team in Inongo

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CN-REDD

Hassan Assani

Lastly, we extend our thanks to the communities of the Mai Ndombe REDD+ Project Zone, for it is them that this project serves, and it is due their trust, acceptance and support that the project ultimately owes its success.

Acronyms

AFOLU	Agriculture, Forestry and Other Land Use
APD	Avoided Planned Deforestation
APC	Avoided Planned Conversion
AUC	Avoided Unplanned Conversion
AUDD	Avoided Unplanned Deforestation and/or Degradation
BEM	Biomass Emission Model
CCB	Climate, Community and Biodiversity
CEPF	Critical Ecosystem Protection Fund
DNA	Designated National Authority
ER	Emissions Reductions
FAO	Food and Agricultural Organization
FCPF	Forest Carbon Partnership Facility
FPIC	Free, Prior and Informed Consent
GHG	Greenhouse Gas
GIS	Geographic Information System
HCV	High Conservation Value
IBA	Important Bird Area
KBA	Key Biodiversity Area
MNRP	The Mai Ndombe REDD+ Project
MRR	Monitoring Report Requirements for the VM0009 V2.0 VCS methodology
MRV	Measuring, Reporting and Verification
NGO	Non-Governmental Organization
NPA	Natural Protected Area
NTFP	Non-Timber Forest Products
PAA	Project Accounting Area
PD	Verified Carbon Standard and Climate, Community and Biodiversity Project Description document
REDD	Reducing Emissions from Deforestation and forest Degradation
REDD+	Reducing Emissions from Deforestation and forest Degradation, plus Conservation, Sustainable management of forests, and enhancement of forest carbon stocks
R-PP	Readiness Preparation Proposal

UNFCCC	United Nations Framework Convention on Climate Change
VCS	Verified Carbon Standard
WWC	Wildlife Works Carbon

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1 SUMMARY OF PROJECT BENEFITS

The Mai Ndombe REDD+ Project, located in western Democratic Republic of the Congo, is an ecologically rich and diverse area previously zoned for commercial timber extraction. It provides habitat to bonobos and forest elephants and includes some of the most important and endangered wetlands in the world. It is also home to some 50,000 people, most of whom live on the shores of Lake Mai Ndombe, and along the main roadway leading from the lakeshore city of Selenge towards the northwest project area boundary.

The conservation concession now contains over 3.5 million cubic meters of merchantable hardwood, highly valued by logging companies. The project addresses logging and the other leading drivers of deforestation - subsistence agricultural practices and aggressive fuel wood / charcoal use.

The Mai Ndombe REDD+ Project leverages carbon offset revenues to achieve the climate, community, and biodiversity objectives listed below. Community and biodiversity objectives, along with corresponding project activities outlined in section G3.2 in the CCB PDD, have been designed to correspond to, and address, issues identified by communities within the project zone (see section 4.3) as important to their well-being, and which have been identified as key factors contributing to present and anticipated future project area conditions in the absence of the project (baseline scenario). Project activities have been identified and implemented according to results from the theory of change (causal model) Social Impact Assessments (SIAs), which indicated the need for several initiatives. The implemented activities have stopped logging, reduced unsustainable agricultural practices, improved education, increased nutrition, enhanced infrastructure / access to markets and vastly improved health care.

Climate

- Reduce CO_2 emissions within the project area by stopping planned legal and illegal forest degradation (logging).
- Reduce local destructive forest pathways by providing alternatives to unsustainable slash and burn agriculture.

Community

- Provide access to and increase quality of education.
- Improve land-tenure status through participatory mapping.
- Promote sustainable agriculture, livestock management and fishing.
- Provide training and demonstrate improved agricultural techniques to simultaneously enhance food security, promote all-around nutrition and conserve natural resources.
- Reduce poverty by increasing access to markets, improving infrastructure and creating jobs.
- Improve access to, and quality of, health and medical response systems.

Biodiversity

- Retain intact forest habitat and ecosystem integrity at the landscape level for native flora and fauna.
- Raise local and outside awareness of the area’s intrinsic biodiversity value through education and outreach.
- Protect rare and ecologically valuable species.

1.1 Unique Project Benefits

Table 1: Unique project benefits

Outcome or Impact	Achievements during the Monitoring Period	Section Reference	Achievements during the Project Lifetime
1) Reduce CO_2 emissions through conservation management of 2 former logging concessions	• Forest monitoring / protection • Sustainable job creation • Plantations (tree nurseries) established • Logging prevention enforced	3.2	Former timber concession managed as a conservation concession and proposed legal logging extraction halted. Wood extraction greatly reduced through halting of large scale logging practices (e.g., road building, logging trails).
2) Sustainable agriculture, fishing and livestock introduced	• Agricultural intensification / diversification and demonstration gardens	2.1.1	Improved agriculture, fishing and livestock management, agroforestry systems, animal enclosure and vaccination system.
3) Improved health and social services	• Multiple schools constructed and improvements made • Mobile medical clinic established and re-stocked • Emergency medical response system established • Bridges repaired / bridge access improved • Lake transport system established	2.1.1	Educational infrastructure development, access to potable water, medical system improvements, better nutrition, improved infrastructure and access to markets.
4) Improved governance and building of local governance and administrative capacities	• Re-establishment and reinforcement of LCDs • Participatory mapping planning	2.1.1	Participatory mapping for improved land tenure, establishment and management of LCDs,

			local and provincial governance improvement.
5) Biodiversity conservation and monitoring	• Biodiversity inventories	5.3.2	Biodiversity inventories, biodiversity education and awareness raising.

1.2 Standardized Benefit Metrics

Table 2: Standardized benefit metrics

Category	Metric	Achievements during Monitoring Period	Section Reference	Achievements during the Project Lifetime
GHG emission reductions & removals	Net estimated emission removals in the project area, measured against the without-project scenario	N/A	N/A	N/A
	Net estimated emission reductions in the project area, measured against the without-project scenario	22,586,608	3.2	35,911,232
Forest[1] cover	For REDD[2] projects: Number of hectares of reduced forest loss in the project area measured against the without-project scenario	248,956	2.1.7	248,956
	For ARR[3] projects: Number of hectares of forest cover increased in the project area measured against the without-project scenario	N/A	N/A	N/A

[1] Land with woody vegetation that meets an internationally accepted definition (e.g., UNFCCC, FAO or IPCC) of what constitutes a forest, which includes threshold parameters, such as minimum forest area, tree height and level of crown cover, and may include mature, secondary, degraded and wetland forests (*VCS Program Definitions*)

[2] Reduced emissions from deforestation and forest degradation (REDD) - Activities that reduce GHG emissions by slowing or stopping conversion of forests to non-forest land and/or reduce the degradation of forest land where forest biomass is lost (*VCS Program Definitions*)

[3] Afforestation, reforestation and revegetation (ARR) - Activities that increase carbon stocks in woody biomass (and in some cases soils) by establishing, increasing and/or restoring vegetative cover through the planting, sowing and/or human-assisted natural regeneration of woody vegetation (*VCS Program Definitions*)

Category	Metric	Achievements during Monitoring Period	Section Reference	Achievements during the Project Lifetime
Improved land management	Number of hectares of existing production forest land in which IFM[4] practices have occurred as a result of the project's activities, measured against the without-project scenario	N/A	N/A	N/A
	Number of hectares of non-forest land in which improved land management has occurred as a result of the project's activities, measured against the without-project scenario	N/A	N/A	N/A
Training	Total number of community members who have improved skills and/or knowledge resulting from training provided as part of project activities	9,030	4.3.2	17,097
	Number of female community members who have improved skills and/or knowledge resulting from training provided as part of project activities	303	4.3.2	303 (Data is not available for periods before the M3 monitoring period)
Employment	Total number of people employed in project activities,[5] expressed as number of full time employees[6]	259	4.3.2	371
	Number of women employed in project activities, expressed as number of full time employees	16	4.3.2	31

[4] Improved forest management (IFM) - Activities that change forest management practices and increase carbon stock on forest lands managed for wood products such as saw timber, pulpwood and fuelwood (*VCS Program Definitions*)

[5] Employed in project activities means people directly working on project activities in return for compensation (financial or otherwise), including employees, contracted workers, sub-contracted workers and community members that are paid to carry out project-related work.

[6] Full time equivalency is calculated as the total number of hours worked (by full-time, part-time, temporary and/or seasonal staff) divided by the average number of hours worked in full-time jobs within the country, region or economic territory (adapted from UN System of National Accounts (1993) paragraphs 17.14[15.102];[17.28])

Category	Metric	Achievements during Monitoring Period	Section Reference	Achievements during the Project Lifetime
Livelihoods	Total number of people with improved livelihoods[7] or income generated as a result of project activities	1,112	4.3.2	1,706
	Number of women with improved livelihoods or income generated as a result of project activities	603	4.3.2	603 (Data is not available for periods before the M3 monitoring period)
Health	Total number of people for whom health services were improved as a result of project activities, measured against the without-project scenario	3,624	4.3.2	6,612
	Number of women for whom health services were improved as a result of project activities, measured against the without-project scenario	2,114	4.3.2	2,114 (Data is not available for periods before the M3 monitoring period)
Education	Total number of people for whom access to, or quality of, education was improved as a result of project activities, measured against the without-project scenario	3,672	4.3.2	4,632
	Number of women and girls for whom access to, or quality of, education was improved as a result of project activities, measured against the without-project scenario	1,034	4.3.2	1,354
Water	Total number of people who experienced increased water quality and/or improved access to drinking water as a result of project activities,	231	4.3.2	231

[7] Livelihoods are the capabilities, assets (including material and social resources) and activities required for a means of living (Krantz, Lasse, 2001. *The Sustainable Livelihood Approach to Poverty Reduction*. SIDA). Livelihood benefits may include benefits reported in the Employment metrics of this table.

Category	Metric	Achievements during Monitoring Period	Section Reference	Achievements during the Project Lifetime
	measured against the without-project scenario			
	Number of women who experienced increased water quality and/or improved access to drinking water as a result of project activities, measured against the without-project scenario	125	4.3.2	125
Well-being	Total number of community members whose well-being[8] was improved as a result of project activities	27,153	4.3.2	38,189
	Number of women whose well-being was improved as a result of project activities	12,342	4.3.2	12,342 (Data is not available for periods before the M3 monitoring period)
Biodiversity conservation	Change in the number of hectares significantly better managed by the project for biodiversity conservation,[9] measured against the without-project scenario	299,645	2.1.1	299,645

[8] Well-being is people's experience of the quality of their lives. Well-being benefits may include benefits reported in other metrics of this table (e.g. Training, Employment, Health, Education, Water, etc.), but could also include other benefits such as empowerment of community groups, strengthened legal rights to resources, conservation of access to areas of cultural significance, etc.

[9] Biodiversity conservation in this context means areas where specific management measures are being implemented as a part of project activities with an objective of enhancing biodiversity conservation.

Category	Metric	Achievements during Monitoring Period	Section Reference	Achievements during the Project Lifetime
	Number of globally Critically Endangered or Endangered species[10] benefiting from reduced threats as a result of project activities,[11] measured against the without-project scenario	2	5.3.4	2

[10] Per IUCN's Red List of Threatened Species

[11] In the absence of direct population or occupancy measures, measurement of reduced threats may be used as evidence of benefit

2 GENERAL

2.1 Project Description

2.1.1 Implementation Description

During this third monitoring period (m_3), the Mai Ndombe REDD+ Project has continued to implement project activities and conservation effort throughout the Project Area. The primary project activity has been the reduction of CO_2 emissions within the Project Accounting Area (PAA) by halting planned legal and unplanned illegal logging, charcoal production and slash and burn agriculture. This has been accomplished through the measures implemented by the Project Proponent. Please refer to the MNRP PD Section 1.8 and the Concession Contract under the Social Clause (Cahier de Charge) for the complete list of proposed Project Activities along with their descriptions. Project activities that have been active during the third monitoring period (m_3) were the following: school construction, repair and supply; community engagement – Local Development Committees (CLDs); health care improvements - Mobile Medical Clinic and Emergency Response System; agroforestry and demonstration gardens; the continuation of participatory mapping, with workshops planned for Lobeke and Mbale; bridge repair and road clearing was performed along two main routes in the Project Area; and improved lake transportation for local communities. A total of seven schools were completed during the reporting period in the following villages; Lobeke, Bokebene, Inunu, Ilee, Mankaba, Ikita and Nsongo. In addition, school buildings have started in Nselenge (two school campuses) and Bosongo. During this monitoring period, the project operated three main activities to improve agricultural methods, including introducing improved cassava varieties, operating demonstration gardens and establishing agriculture villages. Please refer to Section 4.3 for more detailed descriptions on the implemented Project Activities. During this monitoring period, these Project Activities all demonstrated good measures of success, with high levels of engagement from the Project communities and positive outcomes observed.

Furthermore, both habitat and biodiversity surveys and forest monitoring continue to be conducted in the project area. Fauna biodiversity was monitored during m_3 throughout the Project Area using line transects and camera trap techniques, focusing on estimating density of large mammals. The HCV species observed in the PAA include: Loxodonta cyclotis (Forest elephant) Critically endangered, Pan paniscus (Bonobo) Endangered, Smutsia gigantea (Giant Ground Pangolin) Endangered, and Phataginus tetradactyla (Black-bellied or Long-tailed Pangolin) Vulnerable. Market surveys were also conducted at two major ports and the grand market in Inongo to investigate poaching and endangered animal trading in the area. Please refer to Section 0 for a more detailed description on biodiversity benefit implementation.

The MNRP reduced 22,586,608 tonnes of CO_2e throughout the PAA during m_3. 175 forest biomass plots were measured in the PAA during m_3. It is important to note that due to operational challenges resulting from COVID-19, 100% remeasurement of the project sample plots within five years was not achieved. However, this deviation in monitoring did not significantly affect the Project's ability to monitor changes in carbon stocks (Section 2.2.4). Disturbance monitoring for m_3 was performed, as required by the VCS monitoring plan, utilizing a temporal remote sensing evaluation of deforestation in the PAA and Project emissions were deducted from overall NERs accordingly. Non-permanence risk factors are monitored through the Project's climate monitoring and disturbance monitoring procedures, as described in Section 3.1.3. As is discussed in section 3.3.1 and Section 3.3.2 of the MNRP VCS PD, neither activity shifting leakage or market leakage are applicable to this project.

2.1.2 Project Category and Activity Type

The Mai Ndombe REDD+ Project (hereafter referred to as "MNRP") falls under VCS sectoral scope 14 - Agriculture, Forestry and Other Land Uses (AFOLU), under project category Reduced Emissions from Deforestation and Degradation (REDD) and most specifically under the activity Avoiding Planned Deforestation (APD). The project falls into this category by the definition provided in the VCS AFOLU Requirements Document Version 4.1 published 22 April 2021, because it prevents emissions that otherwise would have taken place under a legally commissioned logging concession.

The MNRP is not a grouped project under the VCS standard or the CCB programmatic approach.

2.1.3 Project Proponent(s)

Table 3: Project proponent

Organization name	Wildlife Works Carbon LLC
Contact person	Jeremy T. Freund
Title	Vice President, Carbon Development
Address	242 Redwood Highway, Mill Valley, CA 94941
Telephone	415-332-8081
Email	jeremy@wildlifeworks.com

2.1.4 Other Entities Involved in the Project

Table 4: Other project entities

Organization name	ERA Congo, a subsidiary of Wildlife Works Carbon LLC
Role in the project	Project implementation, operation and management
Contact person	Jean-Robert Bwangoy Bankanza Bolambée
Title	Administrateur Gérant (A.G.)
Address	32B Ave Colonel Lukusa, Kinshasa-Gombe, DR Congo
Telephone	+243 822 877 712
Email	jrbwangoy@wildlifeworks.com

2.1.5 Project Start Date (G3.4)

MRR.2 The Project Start Date

The project start date is 14 March 2011. This is the date that the Carbon Rights Agreement was signed between ERA and the Government of the DRC, and REDD+ monitoring activities began according to the VCS methodology VM0009.

2.1.6 Project Crediting Period (G3.4)

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

The Project crediting period is 14 March 2011 – 13 March 2041. The crediting period is 30 years in length.

2.1.7 Project Location (G3.3)

The MNRP area is located in the central part of the Congo River basin of the Democratic Republic of Congo (DRC, formerly Zaire). Administratively, it is located in the province of Mai Ndombe (formerly Bandundu Province), District of Lake Mai Ndombe, and the territory of Inongo, and encompasses three sectors: Ntomba, Baselenge, and Bolia. The conservation concession covers 299,645 hectares (ha) of terra firma forest (upland non-inundated forests), swamp forest (inundated and seasonally inundated forests), savanna, and inundated grassland (see section G1.2 of the MNRP VCS PD for further definition of these land cover types). The concession is located approximately 395 km northeast of the national capital, Kinshasa. It can be accessed from Kinshasa by air via the town of Inongo, by boat along the Congo and Fimi rivers, or by land via a recently repaired road that runs from the village of Selenge southward through Bandundu province to Kinshasa. The concession runs along the western shore of Lake Mai Ndombe (formerly Lac Leopold II), with the nearest major population center of Inongo (pop 110,000) situated 20 km across the lake and accessible to the concession by boat. There have been no changes made to the project area since the project's validation.

The project area is located on the West shore (to the East) of Lake Mai Ndombe, between the lake itself and the Bolipa Mpe (Boruampe) River to the West, and between the Lokeke River to the South and the Bolog'o Lule River to the North. The project area is bound between 1°43' S, 17°50' E (NW corner), 1°43' S, 18°00' E (NE corner), 2°23'S, 18°15' E (SE corner), and 2°22'E, 18°00' E (SW corner).

Table 5: Project location and administrative jurisdictions

Conservation concession area:	**299,645 ha**
Province	Mai Ndombe
District	Mai Ndombe
Territory (Territoire)	Inongo
Sectors (Secteurs)	Bolia, Basengele, Inongo
Groupments (Groupements*)	Bolia (Lokanga), Ngongo (Basengele), Ntomba-Nzale (Inongo)

** The Groupement is the traditional, smallest level of government in the DRC. Groupements are governed by traditional "Chefs des Terres" (Heads of the Land).*

Please refer to the MNRP PD for a more detailed description of the project location, including the geology, geomorphology, climate, and the vegetation.

Additionally, Project location maps containing the VCS methodology (VM0009 V2.0) Monitoring Report Requirements (MRR) listed below are provided in the following appendices. **Appendix A** –Project Area, **Appendix B** – Topography, **Appendix C**, Infrastructure – roads and water bodies, and **Appendix D** – land use / vegetation Cover.

According to VM0009 V2.0 MRRs, the geographic / physical boundaries of the project area must be clearly delineated and include, at minimum, the following:

- Project area name (compartment or allotment number, local name)

- Digital maps of the area, including geographic coordinates of Project area vertices
- Total Project area and Project accounting land areas
- Details of ownership, including user rights and/or land tenure
- Project area topography
- Roads
- Major rivers and perennial streams
- Land use / vegetation type classification

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

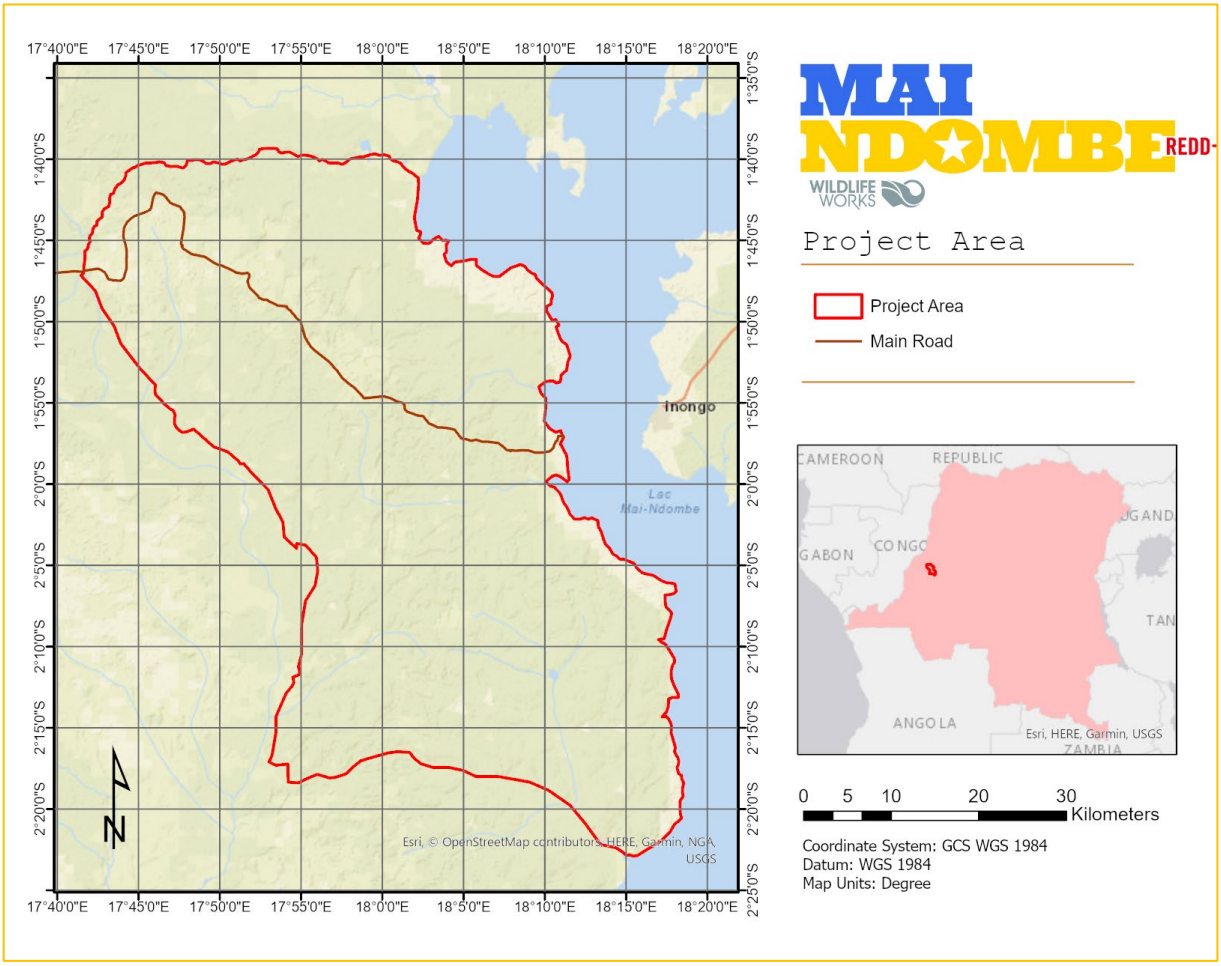

Figure 1: The Mai Ndombe REDD+ Project Area

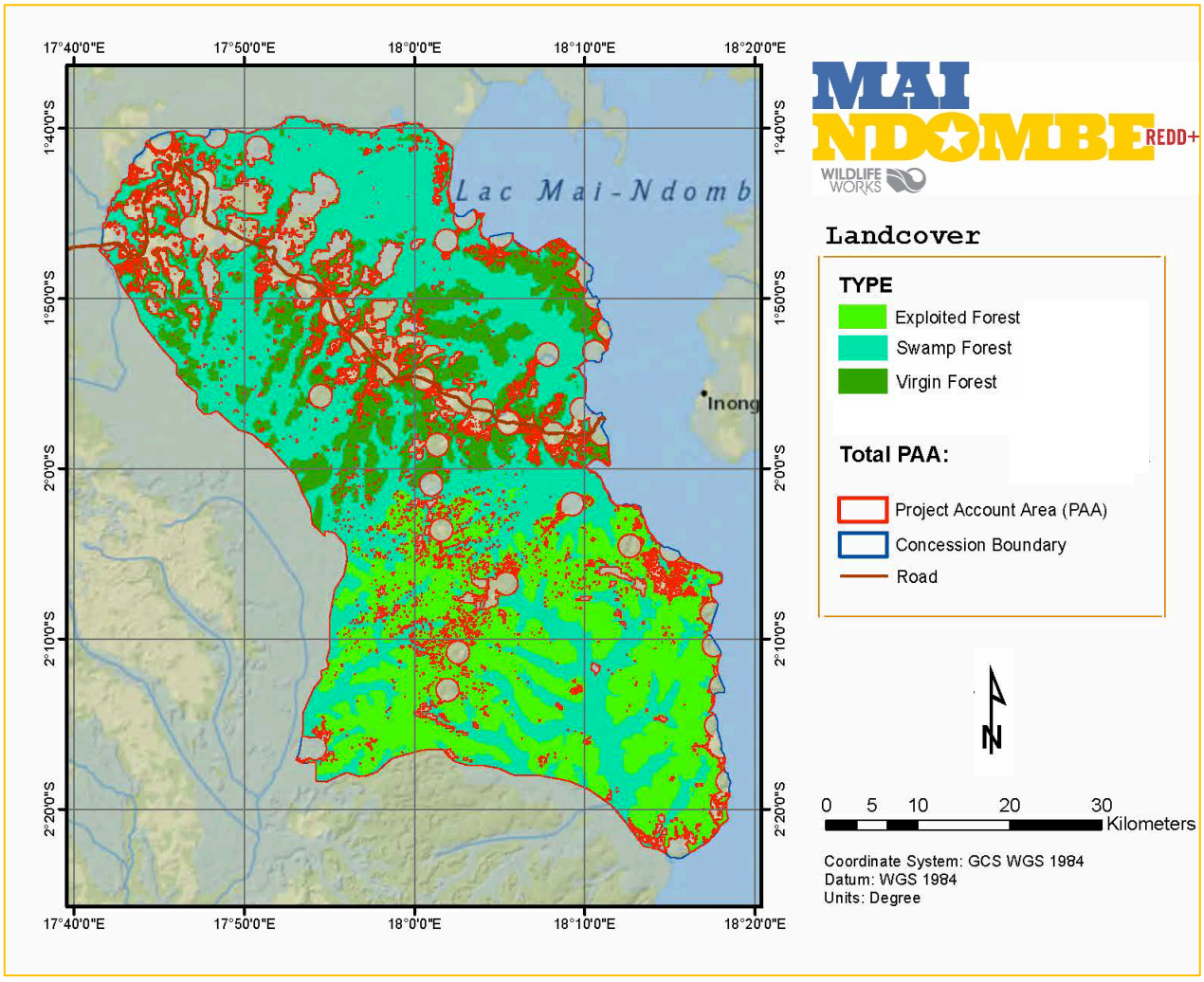

Figure 2: The Lac Mai Ndombe REDD+ Project Accounting Area and land cover classes.

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

2.1.7.1 Project Area Boundaries

The MNRP replaced two timber concessions and was re-gazetted as a single conservation concession. The Project Area consists of the terra-firma forested parts of the two former logging concessions, now forestry certificate (permit) numbers 004/84 and 014/2004 shown in Figure 3. The Project Area is located on the west shore of Lake Mai Ndombe.

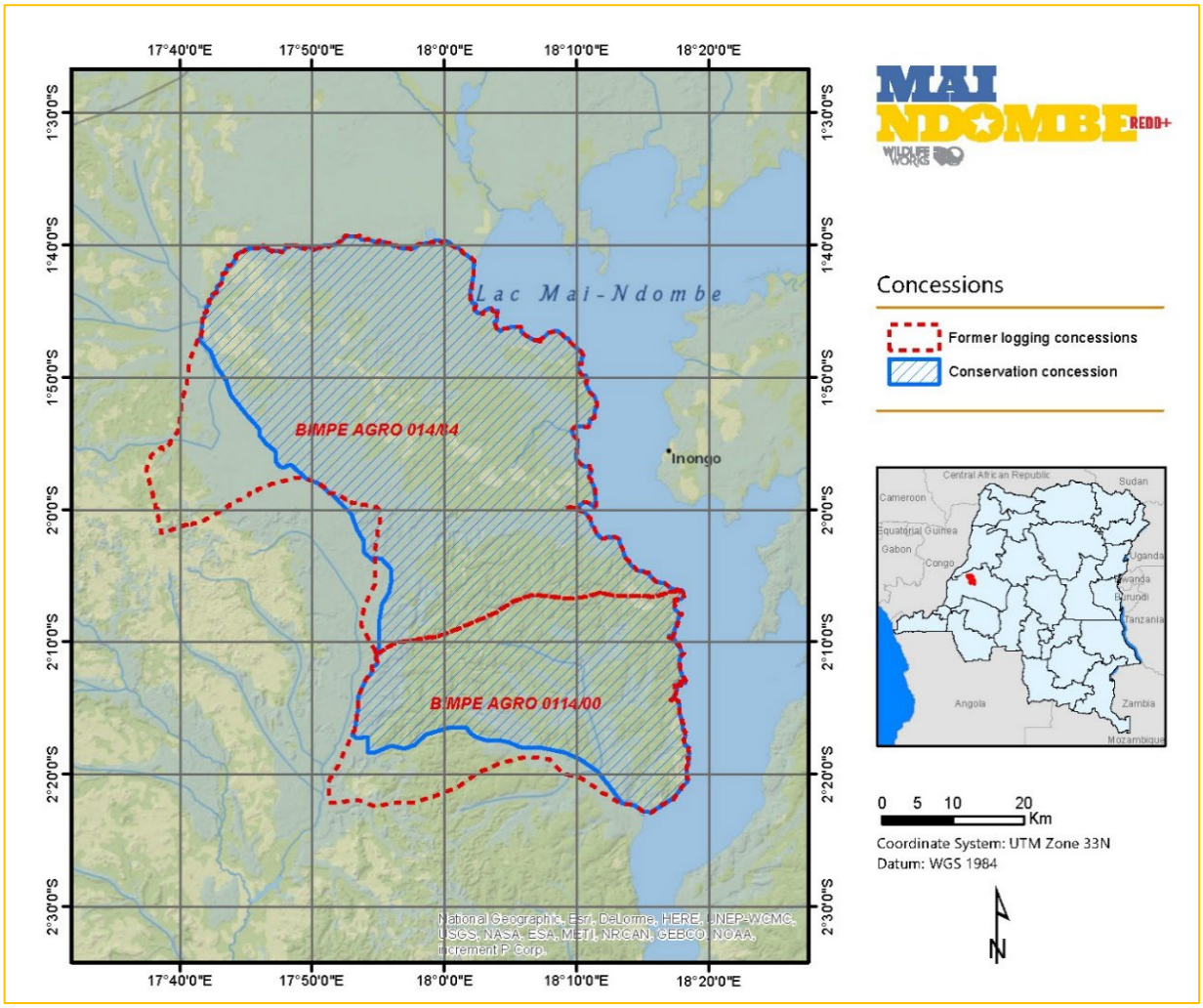

Figure 3: Lac Mai Ndombe REDD+ Project Area and the 2 former logging concessions it replaced

Table 6: Project Area boundaries

Boundary	Location
Northern Boundary	Olong'O Lule River
Northern Extent	Lat 1°39'2.87" S Long 17°52'9.95" E
Southern Boundary	Lobeke River
Southern Extent	Lat 2°22'52.04" S Long 18°15'28.95" E
Eastern Boundary	Lake Mai Ndombe
Eastern Extent	Lat 2°19'21.90"S Long 18°18'36.78"E
Western Boundary	Montaba River (which becomes) Boruampe River
Western Extent	Lat 1°45'50.43" S Long 17°41'45.20" E

2.1.7.2 Project Zone Boundaries

The project area is bordered by rivers or the lake for most boundaries; however, a number of villages were identified to be included in project activities and therefore selected for inclusion in the Project Zone. Table 7 lists reasons for inclusion in and a map of the Project Zone is shown below in Figure 4.

Table 7: Project Zone boundaries and justification

Boundary	Location	Justification for Inclusion or Exclusion
Northern Boundary	Olong'O Lule River	Runs along the north of the project area.
Northern Villages Included	Lukanga, Ikita, Nsongo, Belee1, Belee2, Ndonga	Lokanga is the seat of authority for the Lokanga Groupement. Ikita is a Pygmy village located between the project area boundary and Lukanga. Some project activities will be located in these villages and some migration in and out of the project area may occur.
Southern Boundary	Lobeke River	Runs along the south of the project area.
Southern Villages Included	Bosenge, Mbuba	Much of the Lobeke River is a government-recognized administrative boundary between two secteurs as well as the boundary between two tribes. The villages included in the project zone are the southernmost villages of the Ntomba Groupement.
Eastern Boundary	Lake Mai Ndombe	Eastern boundary of project area.
Eastern Villages Included	Inongo	A city of over 100,000 residents, and trading hub as well as the location of the Mai Ndombe project head office.
Western Boundary	Montaba River which becomes Boruampe River	Runs along western boundary of project area.
Western Villages Included	Villages within 15 km on the road running to the northwest out of the project area	Most of the communities outside of the project area are isolated by distance and lack of infrastructure. However, communities located on or near the roads heading northwest out of the project area will be included up to 15 km (estimated as a day's walk).

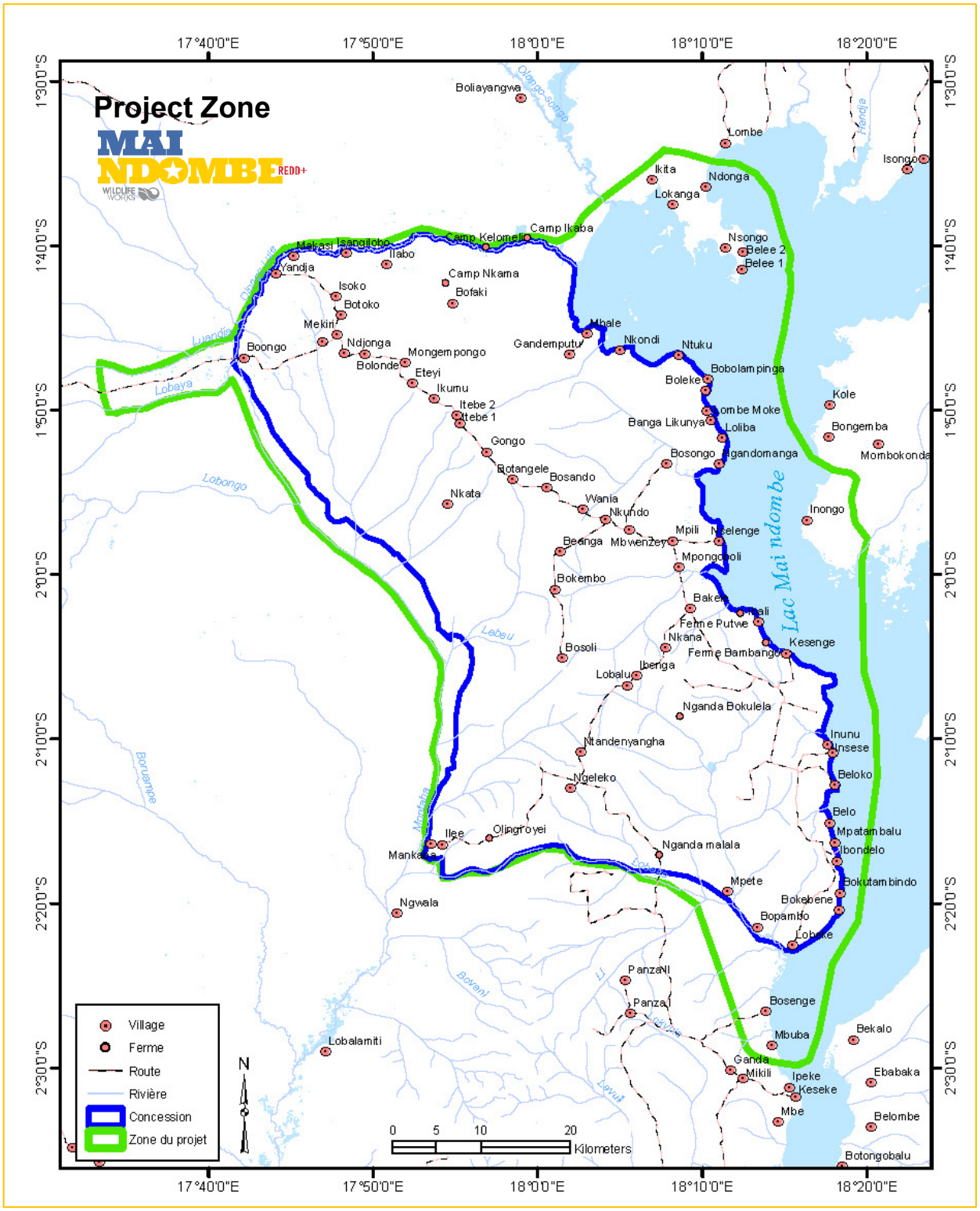

Figure 4: The Lac Mai Ndombe REDD+ Project Zone

2.1.8 Title and Reference of Methodology

The MNRP utilizes the VCS VM0009 V2.0 Methodology for Avoided Ecosystem Conversion, version 2.0. This methodology quantifies greenhouse gas emission reductions generated from avoiding either planned or unplanned (or both) deforestation as well as protection from native grassland conversion as initiated by a variety of agents and drivers. For the assessment of additionality, the Project utilized the VCS "Tool for the Demonstration and Assessment of Additionality in VCS Agriculture, Forestry and Other Land Use (AFOLU) Project Activities," VT0001 Version 3.0. The VCS "AFOLU Non-Permanence Risk Tool," V3.3 was used to determine the Project's non-permanence risk and Project buffer withholding rate.

2.1.9 Other Programs (CL1.5)

Mai Ndombe province was accepted into the World Bank Forest Carbon Partnership Facility's Carbon Fund (FCPF-CF) Program. It is intended that the MNRP will be nested into the ER Program and the project has been allocated a nested REL against which emissions will be measured, and emission reductions calculated for that Program. The intended start date for the FCPF program is January 1 2019, however, to date, this program has not been finalized and is not yet operational. When the FCPF program becomes operational and the MNRP is nested into it the Project is committed to working with Verra to ensure that there is no double counting of VERs

2.1.10 Sustainable Development

The overall project goal is to address sustainable development indicator themes (poverty, governance, health, education, demographics, natural hazards, atmosphere, land, freshwater, biodiversity, economic development, global economic partnership, consumption and production patterns).

1. Extreme Poverty

The project area is among the poorest on earth, with approximately 100,000 people living off subsistence agriculture and with less than 1$ per household per day; and lacking everything of their basic needs while the potential and desire for economic development clearly exist. Health and nutrition status is extremely poor in the area and have deteriorated over the past decades. Over one-third of under-five years old children are chronically malnourished (stunting), and 16% suffer from acute malnutrition (wasting), reflecting wide vulnerability to short-term crises according to a report from the local public health authorities.

The national strategy document for poverty reduction identified focus areas for poverty alleviation. Enhancing agriculture production and providing clean water in villages and improving health are among the main actions to be undertaken in this regard. The project is promoting sustainable development through advancement of sustainable agriculture through agriculture intensification. Improving agricultural production and producing economically viable crops is one of the most effective ways to improve community economic situation and livelihood. During this monitoring period, 13 demonstration gardens have been created in different villages and qualified agronomists have been working with community members across the entire project area for commercial crop production (e.g. onion and tomatoes). These agronomists have also trained 27 members of the community who are going to oversee agricultural activities and agroforestry.

2. Governance

Poor governance is an important characteristic of the government system in the Democratic Republic of the Congo. The monitoring period has seen the creation of the New Lake Mai-Ndombe Province and the

effective installation of the provincial government with 5 ministries out of an allowed and recommended 10 ministries total already in place. Lack of sufficient financial and human capabilities makes it difficult to effectively run that government. A lack of financial capabilities does not enable the local government to fulfill their basic needs. Area taxes from forest concessions are almost the only tangible asset available for the Government. The economic crisis that has contributed to slowing down timber extraction activities has led to non-payment of area taxes from most of the timber logging companies in the Mai-Ndombe. This results in a very poor management at the provincial and local levels. Our company has struggled through a difficult financial situation during this monitoring period. As our situation improves at the company level, our contribution to improving government assets will also improve, especially with improved market sale for carbon credits. However, throughout this challenging period, our company has been maintaining close collaboration with the provincial and local government agencies.

Corruption is also one of the crucial factors that holds back the country. Our company has a zero-tolerance policy for corruption at all levels and for all departments and sectors of activities.

3. Health

The health situation is still extremely poor during this monitoring period. The mortality for children under-five years old is in the range of 220 per 1,000 or greater, which is one of the highest in the world. Maternal mortality is similarly among the highest anywhere, estimated at 1,300 per 100,000 live births. However, the total fertility rate remains very high, which poses a challenge to forest and biodiversity conservation.

Malaria is the number one killer, especially for children. It is highly endemic in the area. It has been blamed for more than 40% of child deaths and a considerable proportion of mortality at all ages. Our company has been spending thousands of dollars monthly to fight malaria and save children in the area as support from local and national governments are critically lacking. Partnership with the local government has led to the implementation of a Mobile clinic aimed at fighting epidemics, supporting vaccination and providing medication for local health care facilities and improving these facilities.

4. Education

Figure 5: Children in a classroom. photograph by Filip Agoo

Recent surveys in the Democratic Republic of the Congo have linked household-level determinants of health and nutrition outcomes with mothers' education. Except for fever incidence (which is highly linked to Malaria), most studies of the determinants of many health outcomes (child mortality, malnutrition, diarrhea, and respiratory infection) show DRC-wide, that children of mothers with any education are at lower risk and that communities with more educated young people are less destructive of the forest. This is the most important reason why WWC / ERA Congo and local community focus is on building schools and in encouraging girls' primary and secondary school education.

WWC / ERA Congo has planned to build 28 schools in the project area over the life of the project. For this monitoring period, a complete school has been built in Mbale and two schools where construction began

in our first monitoring period have been completed in Lokanga and Kesenge. The company has also equipped these schools with school benches for students. To address further address extreme poverty in the project area, the company has provided students with school supplies in 2013, 2014 and 2015. Five school buildings were completed in Project Area villages during m_3. This includes schools in the villages of Lobeke, Bokebene, Inunu, Nsongo and Ikita. The high schools located in Lokanga and Mbale that have received support from the project were seen to have achieved excellent results during the national state exams.

5. Demographic situation

More than 28 villages are located within the project area and some 100,000 people live on the shores of the lake Mai Ndombe. As said in the previous section, under-five years old mortality is one of the highest in the world. However, the total fertility rate remains very high (3% per year), which poses challenges to forest and biodiversity conservation. Family planning methods exist including usage of preservatives (condoms). The project has been helping in providing these family planning tools to community members during this third monitoring period.

6. Water

Water is abundant in the project area thanks to the presence of two rainy seasons, linked to the ascendant and descendent movement of the Inter Tropical Convergence Zone (ITCZ). However, water related illness is the second leading cause of mortality in the area (after malaria). Many children die every year from disease associated with lack of access to safe drinking water. Despite the magnitude of the problem, little or no progress has been made towards solving this problem; showing sharp contrast between the abundance of water and lack of drinking water in villages. Villagers dig shallow wells or pull water out of streams that are usually contaminated by wildlife or other. currently, it is practically impossible to count how many children die each year, simply because such records are rarely kept in villages or even because those who are affected never see a doctor.

The company is exploring different approaches needed to provide solutions that are affordable, allowing communities to meet their need for potable water. The use of low-cost drilling machines has proven its usefulness and effectiveness in some parts of the African continent as a means of increasing the availability of potable water in remote villages. Hydrogeology is highly favorable for light equipment drilling and the secure water table can be reached at less than 50 meters from the surface in most of Mai Ndombe.

7. Biodiversity

Threat: The Mai-Ndombe REDD+ project area has undergone forest logging three times in the past, with the state-owned company, FORESCOM, first in the 1920's, then Bimpe Agro in the 1980's, and most recently by SOFORMA from 2003 to 2008. While logging activities do not usually directly result in total stand destruction, the removal of large trees and forest openings facilitate clearing for cassava and corn cultivation by locals. SOFORMA's logging intensity is particularly destructive as it leads to a high number of trees being removed. This creates important openings that favor extension of slash and burn agriculture, forest degradation and eventually complete deforestation (cascade of deforestation); (Figure 6).

Figure 6: Unsustainable slash and burn agriculture leading to deforestation in the project area.

This legal and illegal logging is the principal threat to the forest and biodiversity in the project area. The climax ecosystem of this area is a tropical semi-deciduous forest characterized by the dominance of deciduous species; specifically, Milletia laurentii (Wenge) in the upper canopy layer in mixture with evergreen species in the upland, while dense swamp forests dominate water-logged areas covering 42% of project area. Wenge (false Ebony) is one of the most valuable timbers in the world. Extensive conversion of primary terra firma forests has occurred mostly in the southern part of the Mai Ndombe province due to combined effects of timber extraction and population pressure through unsustainable slash and burn agriculture. This conversion has not yet reached swamp forest but evidence provided during project validation from another SOFORMA concession shows that eventually even the swamp forest is logged, as it is seasonally drained.

Addressing these deforestation drivers and biodiversity disturbance, the company has implemented a zero-tolerance policy towards illegal logging and worked with local community members to monitor poaching from people coming from outside the project area during this monitoring period. This policy has contributed to lowering the threat to the forest and to maintaining the intactness of most of the project area forest. As a result, some endangered species have made their return to the project area and some other are now approaching villages.

8. Agriculture and economic development

Unsustainable extensive slash and burn agriculture has been identified as the main deforestation driver in the area. However, this is the most reliable source of income for local communities. According to recent surveys, local community income from cassava cultivation is in the order of 400 dollars per household per year. This is not enough to sustain their livelihood and to create any economic progress for the community. As agriculture and fisheries are the only source of economic and monetary resources, the company has designed a program for agriculture intensification with a focus on effective and rational use of areas under fallows or land occupied by young secondary forests; thus, addressing the deforestation drivers while increasing the economic potential for local community members. This program has led to introduction of crops that have not been produced in the past and that are more commercially valuable

locally and nationally such as onions and beans. The company has 13 demonstration plots across the entire project area and has trained local community members to use sustainable agriculture.

2.2 Project Implementation Status

2.2.1 Implementation Schedule (G3.4)

The main project activities are described in the Concession Contract under the Social Clause (Cahier de Charge) that was signed between the Minister of the Environment and the project proponent in August 2011. These activities include:

1. Construction of 4 large school buildings in Lokanga, Kesenge, Ngongo and Lobeke to accommodate public schools (mostly unhoused) for these villages; construction of 6 medium-sized schools in 6 more villages and 10 buildings to accommodate elementary schools in small villages.
2. Improve the health care network in the project area through 1) rehabilitation of the secondary hospital of Lokanga and Ngongo and 2) construction of buildings for 1 secondary hospital in Lobeke and 5 small clinics throughout the project area.
3. Improve local community livelihood through improved, intensive and enhanced sustainable agriculture and high agriculture productivity.
4. Maintenance and capacity building for Local Development Committees (CLDs) in each village and Groupement.
5. Organize 10 sale points for manufactured goods and commodities and provide information access points (satellite television) for some villages (a special request from the Mpata Mbalu village).

Table 8: Project implementation schedule

Date	Milestone(s) in the project's development and implementation
Sept. 2009 – March 2011	Consultation for Free Prior Informed Consent (FPIC) process
14 March 2011	Signature of the Carbon Right Agreement
26 March 2011	Signing of Social Chapter by local communities
August 2011	Signature of the Forest Conservation Concession Contract
2 August 2011	Inauguration of activities (Minister of Environment) with the construction of the first school in Kesenge
October 2011	Debut of school construction in Lokanga and Kesenge
February 2012	Inauguration of the first school in Lokanga (Minister of Environment)
February 2012	Organization and capacity building for Local Development Committees in villages (Start date)
February 2012	Information, Education and Communication (EIC) program (Start date)

September 2012	Agriculture Intensification and Agroforestry (Start)
15 September 2012	First field audit
April 2012	Technical Review of the first two schools
May 2012	Acquisition of construction materials for schools in Lobeke, Mpata-Mbalu, Mbale and Ikita.
June 2012	Fabrication of blocks for schools in Mbale, Lobeke and Mpata-Mbalu
m2	Mobile medical clinic in selected villages in the project area
m2	Biodiversity monitoring reveals return of elephants in the project areas
24 October 2017	VCS and CCB m2 audit (1 November 2012 – 31 December 2016)
October 2017	School building construction
December 2017	School building construction
February 2018	School building construction
April 2018	Cassava production
August 2018	School building construction
December 2019	Health center construction
February 2020	School building construction
July 2020	Sheep and cattle breeding
October 2020	School building construction
October 2020	School building construction
November 2020	School building construction
December 2020	Drilling
November 2020	Pond construction
December 2020	Development of community fields for mothers

Sales points for manufactured goods and commodities and providing communication points for villagers

The sale point activity has not started yet due to difficult access to and from the market. The company is now partnering with local businesses who are selling manufactured goods in the Inongo market. The company provides foreign currency in Inongo in exchange for local payment in Inongo in order to avoid transferring local currency to Kinshasa using unsecure money transfer methods and to facilitate availability of foreign currency for payment.

Regarding communication access for villages, the project has provided television access point to 14 villages in the project area including satellite TV dishes and television. Most of this equipment is working properly. However, electricity is still an issue for operation. The company is discussing with a private entity now in Kinshasa that will provide with electricity from solar energy to villages at the communication access point and for charging telephone.

2.2.2 Methodology Deviations

Deviation from monitoring schedule

The methodology VM0009 V2.0 Section 9 stipulates "all plots and all strata in the project and the activity-shifting leakage areas shall be re-measured at least every five years, a process which may be accomplished on an intermittently rotating basis." During m3, 175 out of 449 total biomass plots were measured (38%), which represents a deviation from the monitoring criteria in Section 9.

The standard error for the 175 plots measured during m3 was calculated at 5.5%, well below the material threshold for VCS standard, and therefore does not affect the conservativeness of GHG emission reduction / removal quantification.

The deviation relates only to Section 9 of the methodology, "MONITORING" and therefore does not affect any other part of the methodology.

2.2.3 Minor Changes to Project Description (*Rules* 3.5.6)

Not Applicable

2.2.4 Project Description Deviations (*Rules* 3.5.7 – 3.5.10)

PD Deviations from Prior Monitoring Periods are listed below for documentation purposes:

Second Monitoring Period (m_2):

A. Modification of CCB monitoring indicators

For the MNRP, the CCB monitoring indicators as per CCB v2 were required to be validated as part of the CCB monitoring plan prior to implementation of the project activities that they describe. As part of our adaptive management plan, we evaluate the indicators themselves for appropriateness and ease of quantification. During m2, several indicators were identified as difficult / impossible to quantify and for others, the reporting frequencies were determined to be unrealistic. As such, we have opted to modify the CCB monitoring indicators as follows:

1. modify the reporting frequencies for those indicators where the frequency was observed to be inappropriate;
2. modify the reporting units for those indicators where the units were previously observed to be difficult to quantify and
3. remove those indicators that were observed as difficult / impossible to quantify.

Details for the modified or discarded indicators have been provided to the VVB.

B. Modification of the project proponent

In the Project Description of the MNRP the Project Proponent is listed as being jointly Wildlife Works Carbon and ERA Ecosystem Restorations Associates. In 2013 Wildlife Works Carbon bought out ERA's share of the project, to become the sole Project Proponent. The Deed of Partial Release was filed with the VCS on 16 December 2013.

Current (m_3) PD Deviations

Not Applicable

2.2.5 Risks to the Project (G3.5)

Civil and political instability

The Democratic Republic of the Congo is still emerging from a prolonged period of instability and civil unrest. The Lake Mai-Ndombe area, however, has been minimally affected by this war and other upheavals that have recently occurred in the country. The last four years have been relatively free of unrest throughout the country. The effective administrative subdivision of the country into 26 new provinces has translated to a new provincial government including an executive branch and a local parliament. In fact, the Mai-Ndombe and Plateau Districts have merged to form the new Mai-Ndombe province. This has added to a slight political stability in the area. However, corruption and administrative harassments have been still significant in the entire country and specifically along the transportation water ways in the Mai-Ndombe province.

Even in this challenging time, the project has provided greater benefits to the community and to the new province above and beyond benefits brought by other interests. ERA Congo / WWC has provided a robust and fair benefit sharing procedure that provides protection for both the Carbon Rights Agreement and conservation concession contract. With the ongoing project activities, community support for the project has grown as the project management team has gained experience handling and resolving conflicts and dealing with a difficult administrative system.

Land tenure

A legal land concession over 299,640 hectares of land has been granted to Wildlife Works and its subsidiary ERA Congo for conservation purposes by the DRC Government, who are the legal forest and land owners (Land Tenure Act - Loi Fonciere). To comply with the law and regulation, the Government has signed the Carbon Rights Agreement and the Forest Conservation Concession. In addition, the country has clearly shown its commitment to support forest conservation activities and specifically REDD+ programs as it is now the first country in the world to negotiate an Emission Reduction Purchase Agreement (ERPA) with the World Bank's Forest Carbon Partnership Facility. The country was among the first of 7 readiness countries and has satisfied all required conditions for entering Emission Reduction (ER) purchase negotiations. WWC and its subsidiary ERA Congo SARL have been among the leaders in supporting the DRC Government to fulfill requirements from the FCPF rules.

The Mai-Ndombe REDD+ project has been fully integrated in the program and fits into the broad national REDD+ strategy which involves access to bilateral and multilateral donors such as the World Bank and the Central African Forest Initiative (CAFI) funded through a USD $200 million grant from the Government of Norway. As part of this initiative, CAFI is funding forest conservation activities in the Mai-Ndombe which will certainly benefits the project, local communities and the provincial Government.

Local communities have customary land use rights for using local community land inside of the forest concession and for goods derived from working the land. These rights have however not been clearly articulated in the Forest Code nor have they been clarified in the recently signed Decree related to Community Forests as no specific provision relates to industrial and/or Conservation Concessions. There is clearly a duality between the Government declared ownership to the forest and the practical and on-site claim for forest and land ownership from local communities. This situation is a source of conflicts between

community members and forest projects proponents in the entire country. Free Prior and Informed consent is a way of getting community members involved in the REDD+ process. In accordance with provisions of our Concession Contract, local leadership and community members have been consulted in the process prior to the project start and consultation has been continued and will extend throughout the project life. Through the FPIC process and the process of signing Cahiers de Charges, community members have given their consent to develop a REDD+ project in their customary lands. ERA-Congo has been maintaining close contact and collaboration with these community members which has significantly minimized risks for community members to turn against the project. However, some resistance was encountered early in the project especially in the village of Mbale in the Lokanga Groupement, and Mbwenzey, Mpili and Ngongo in the Ngongo Groupement. The project has instituted a permanent dialogue with community members in these villages which have now fully accepted the project. The project is now working with community members to build a school in Mbale and on sustainable agriculture while working in Mpili and Mbwenzey for agriculture intensification and building CLD capacities.

Illegal activities

The project has been monitoring any illegal activity for the last four years. Five attempts for illegal timber logging have been detected in some villages of the project area, namely Kesenge, Bosongo, Nkondi, Mpata Mbalu and Mpi. These activities have been stopped at an early stage, thanks to a close collaboration with local communities and local authorities. This shows that working alongside community members and local authorities helps minimize risks related to illegal logging in the project area. Moreover, the company has partnered with small logging companies that hold small concessions in the area. Some have decided to embrace the conservation path as they see better opportunities and other have decided to supply the company with timber needed for school and clinic construction from their owned lands.

Small scale unsustainable wood extraction for fuelwood, charcoal and local building supply have continued on a very reduced pace outside of the project accounting area, in close proximity to villages, an area that has been agreed to as “community forest land” where agricultural activities are conducted and such timber extraction is allowed. This area has already been excluded for carbon accounting. Therefore, these activities will not affect the carbon quantification. Moreover, the ongoing agriculture intensification program will further help reduce extensive agriculture and therefore contribute to increase conservation land.

Fire, disease and other natural risks

The project area consists mostly of dense humid and semi-deciduous heterogeneous forests with a very low percentage of resinous trees. As such and because of the Congo Basin’s climatic regime which, unlike the amazon has no ENSO-like drought event these forests have inherently low susceptibility to catastrophic fire, insect disease and blow-down event.

However, as reported in the CCBA PD (see page 71), the project area experienced an exceptionally dry year in 2011 that led to important forest fires; mostly in the south-western part of the concession. That event is comparable to the amazon like burn-event extensively described by Cochrane in numerous studies (See PD page 71 for references). Rampant forest fire from neighboring savannas outside the project area spread out to the forest in the project area, after crossing a dried-out swamp forest. Other fires expanded from burned savannas to neighboring forests in the same manner as described above and led to some forest loss.

It is difficult to fully address such a stochastic and unusual event in a very efficient way. However, going through meteorological archives available in Inongo may allow for monitoring the frequency of that event. Using this data, the project proponent is trying to understand the frequency to prepare to alleviate adverse effects of such a phenomenon in the future. The main mitigation measure is to work with local community members to raise awareness of the potential damage done to the forest by fire in order to avoid forest fires during dry years. In addition, we will actively monitor fire activities using satellite data (MODIS data has been used to document this event) and take corrective measures if necessary.

2.2.6 Enhancement of High Conservation Values (G3.6)

The MNRP's activities aim to protect habitat landscape to ensure the maintenance and even enhancement of a wide array of high conservation values (HCV). We achieve this goal by protecting entire landscapes and ecosystems including wildlife and their habitats, plus reducing habitat fragmentation and improving connectivity between the project area and surrounding forests. All our project activities directly or indirectly ensure that these broad goals are achieved, including enhancing local awareness and capacity for conservation, provision of livelihood alternatives to reduce pressures on the forest (e.g., agricultural intensification), and active biodiversity monitoring.

Fulfilling these goals remains a great challenge. However, vegetation and biodiversity monitoring across the MNRP has shown a decrease in annual deforestation rate and an increase in biodiversity HCV. In fact, before and after project analysis shows important contrast in animal distribution and poaching levels. The MNRP forest is home to endangered pygmy chimpanzee (bonobo); (*Pan paniscus*). While previous biodiversity assessments reported bonobos' presence mostly distributed far from villages and away from the lake shores, recent data during m3 has revealed that they are approaching villages, mostly likely due to reduced pressure and disturbance (Figure 7).

Figure 7: Pangolin, Bonobos and Forest Elephant captured by camera traps within MNRP during m3

Similarly, prior poaching levels had contributed to an almost complete extinction of forest elephants (*Loxodontaa cyclotis*) in the MNRP. However, signs (i.e. dung and tracks) and camera trap data of demonstrates that they are returning to the area and are becoming increasing common. It is likely that the elephants may have migrated from the westernmost forest in Yumbi and Lukolela territories into our project area, demonstrating increasing connectivity with surrounding forests.

Lastly, a more endangered mammal species, the giant pangolin (*Manis gigantea*) has also been recently captured via camera trap inside of the project area. This is an extremely rare and elusive species, so detecting it with our camera traps suggest it could be returning to the project area in decent numbers. A study is currently underway to understand its migration and/or survival strategy during fragmentation and disturbance.

Finally, no change has been reported for plant species from the biomass inventory. We have sustained forest protection during this m3 monitoring period, in addition to closely monitoring flora and fauna biodiversity. The maintenance of the MNRP as a conservation concession has continued to act as the key activity that ensures the maintenance / enhancement of HCVs, by maintaining the landscape and ecosystem integrity.

Similar to the biodiversity HCVs, the following community-related HCVs were also closely monitored with their integrity assured by the protection of the vegetation and habitats within the MNRP:

- Forests critical to water catchments and forests that provide barriers to destructive fire
- Areas fundamental to meeting the basic needs of local communities: food, medicines, fuelwood, and raw material for building and crafts

- Areas critical for communities' traditional cultural identity: sacred sites, resources for artistic and traditional purposes, and importance to local worldview.

Having the MNRP as a conservation concession provides a direct mitigation strategy against deforestation, promotes water catchment protection which maintains natural fire barriers and lowers risk of uncontrolled fire events. Similarly, our project activities including agriculture intensification represent a critical step towards protecting native forest fundamental to providing life-supporting and enriching resources and services including food and fibre, medicines, fuelwood, material for building and crafts, sacred sites and providing resources for artistic and traditional purposes.

2.2.7 Benefit Permanence (G3.7)

Empowerment and the building of capacity for local communities is the best guarantee of activity / benefit permanence beyond the project lifetime. Stakeholders have identified poverty is the most important enemy of conservation. By promoting education and providing novel techniques and economic benefits through improved agriculture and fisheries, the MNRP is empowering local community members, enabling them to produce goods and services in a sustainable manner. Communities have eagerly welcomed agricultural intensification and agroforestry activities. They have enjoyed producing valuable crops in areas close to their houses rather than spending vast amounts of energy for unsustainable, extensive cropping systems far away from villages that also contribute to the destruction of their forests.

While ERA Congo / WWC may request a renewal of the conservation concession beyond the project lifetime, we believe local communities will choose to further continue these activities as they enjoy reduced hard labor and increased benefit. Conservation of biodiversity and forests of course follows as a natural biproduct of these sustainable socio-economic activities, which is of course the very aim of REDD+.

2.3 Stakeholder Engagement

2.3.1 Community Consultation (G3.8)

Consultation began in 2009 before the official project start date on a multiphase approach which includes communication of important project information to ensure full involvement of stakeholders to the project design and implementation and address grievances in the channeled process and most importantly addresses their concerns regarding the projects impact to their activities and livelihood. This process is a permanent one and last throughout the project lifetime.

The company has been providing information and education to the community and also maintained direct and constant communication with local community members and CLDs. Two main workshops on Education, Information and Communication have been organized in the Groupements of Ntomba-Nzale and Lokanga, following the successful installation of their Local Development Committees. During these workshops, community members have been provided information regarding REDD+ projects and programs and their rights pertaining thereof and the grievance policy. This has improved local knowledge and skills with respect to participatory, democratic decision-making and management-oriented processes related to community development.

The company has in addition hired and trained two local community members in each village to serve as permanent community trainers (local animateurs) in addition to 2 local agronomists helping the community for agriculture intensification and sustainable agriculture production. A total of 25 local animateurs and an additional 27 local agronomists work in each village of the Ntomba-Nzale and Lokanga Groupements to raise awareness for conservation and to assist community members on

biodiversity conservation and agriculture improvement. Short- and medium-term impacts resulting from this increase in knowledge and skills include the communities' ability to collectively and locally respond to community issues and an increased local capacity for governance, administration, and problem solving. Ultimately, as these skills are developed, assisted, and enhanced, the long-term impact will be improved community well-being especially with improved agricultural production.

During the m3 monitoring period, the following activities have been organized:

- Fish farming
- Beekeeping
- Agriculture
- Construction
- Corporate training
- Cassava production
- Sheep and cattle breeding
- School construction
- Health center construction
- Pond construction
- Administrative and logistics
- Biomass monitoring
- Biodiversity monitoring
- Community engagement

2.3.2 Public Comment Period Publicity (G3.9)

The aim of the public comment period is to allow primary stakeholders to voice their opinion of the MNRP, including any grievances or concerns. The following steps were taken to ensure all stakeholders are aware of and provided a means to comment on the documents required for the public comment period:

- Notices announcing the dates of the auditors' visit, their names and contact information was posted in English, French and Lingala at the project office in Inongo, and at the CLDs within the villages.
- The Project animateurs and the CLDs announced to community members the start of the public comment period at all recent community outreach meetings and encouraged them to file comments. Project animateurs will also make note of any verbal comments and ensure that these are transcribed and registered.
- All members of the public may visit the project office to review comprehensive project documentation, or receive verbal details re: the MNRP, the audit and public comment period and / or the public comment process. If requested, MNRP staff gladly assists any community members in submitting comments directly to the CCB standard via their website. All public comments received in writing are scanned and provided directly to the VVB and sent to the standard via email.

The public comment period ended on 14 October 2021. There were no public comments received from project stakeholders at the community level during the m3.

2.3.3 Distribution of Project Information (G3.9)

The following steps were taken to ensure all stakeholders have access to the project monitoring report document and other project documentation.

- An executive summary of the monitoring report was made available in English, French and Lingala at the project office in Inongo and through the CLDs in the villages.
- The project animateurs and the CLDs communicated to community members the start of the public comment period at all their community outreach meetings and details of the project, and other key project documents verbally during meetings.
- All members of the public may visit the project office to review comprehensive project documentation or receive verbal details for the MNRP.

2.3.4 Conflicts and Grievances (G3.10)

The MNRP has an open-door policy toward grievances related to project operation and activities. We maintain a close link with stakeholders by working actively with each and every community on a daily basis. The MNRP also offers the same policy for staff wishing to talk about issues they may be facing.

The project enacted a grievance redress procedure at validation that is designed to address grievances between stakeholders and WWC / ERA-Congo, the MNRP project proponent. The procedure provides an accessible, fair and efficient mechanism for resolving complaints and grievances, and ensuring that the process is transparent and comprehensive. The grievance redress document was provided to community members upon establishment of the CLDs. It was translated in Lingala, the local mother tongue and publicized (available at the CLDs and the project office in Inongo) to ensure accessibility for all community members. Public meetings have been organized at the CLDs to ensure broad distribution. Two types of issues are addressed in the grievance redress procedure:

- Grievances or complaints between communities in the MNRP project zone and the project proponent, WWC / ERA Congo
- Concerns regarding worker rights, work practices, and worker safety raised by WWC/ERA Congo employees or contractors

The detailed process for dealing with grievances and complaints is also comprehensively described in the CCB PDD (pg. 84).

All complaints or grievances received during this monitoring period (m3), were recorded and handled following our policy. There were no complaints or grievances submitted for this monitoring period.

2.4 Management Capacity and Best Practices

2.4.1 Required Technical Skills and Expertise (G4.2)

The MNRP is owned by Wildlife Works Carbon (WWC) and managed by ERA Congo, a wholly-owned subsidiary of WWC. WWC is a community- and conservation-focused private organization established in 1997. It is the world's leading REDD+ project development and management company, with an effective approach to applying innovative market-based solutions to the conservation of forest and biodiversity. WWC's headquarters are in Mill Valley, California, but its operations are focused in Africa, Asia and Latin America. In 2011, WWC's Kasigau Corridor REDD+ Project became the world's first dual VCS & CCB validated and verified project. WWC followed this in 2012 with the validation and verification of the MNRP in the Democratic Republic of the Congo, another first of its kind. Wildlife Works Carbon has two decades of experience in operating successful conservation projects in East and Central Africa.

The principle management team for the MNRP is comprised of both members of WWC's headquarters staff, staff from the Kinshasa office that manages project finance and administration and the MNRP local staff who manage project operations and all other activity on the ground. Most of the employees in these offices, including most of the principle management, have been involved in the MNRP since its initial

development. This has served to maintain the large amount of technical, geopolitical and socio-economic skill and expertise needed to implement and operate the MNRP. The MNRP additionally maintains robust SOPs and monitoring plans that provide detailed instruction for carbon accounting, community and biodiversity assessment. New and existing employees receive training on these SOPs and monitoring plans, ensuring that they are implemented properly and consistently.

There are no other entities involved in the development or implementation of the Mai Ndombe REDD+ Project.

2.4.2 Worker Training (G4.3)

MRR.81 Documentation of training for field crews.

Community and employee education and capacity building related to payment for ecosystem services, climate change, the carbon offset industry, measurements, and monitoring is on-going and continues in the form of meetings, workshops, and open discussion. Training mentioned below will therefore continue to benefit existing and future employees in the form of training for trainers (Table 9). Newly hired animateurs and foresters are provided training and orientation by current experienced employees in the same field during their initial employment periods. The MNRP maintains SOPs and work plans for all project activities which serve to guide training for new employees. They are modified as management practices and activities are adapted. Initial carbon inventory was administered by Jeremy Freund, WWC's VP Carbon Development and Jean-Robert B. Bwangoy-Bankanza, WWC's DRC Country manager and ERA Congo's Administrateur Gérant (Managing Director) for the MNRP. The MNRP maintains ongoing collaboration with universities for forester training. Training in forest inventory methods relating to remote sensing and Geographic Information System (GIS) was provided to the foresters by the East Lansing (Michigan State University), South Dakota State University, and the University of Kinshasa department of agronomy.

Table 9: m3 training activity

N°	Date	Activities	Training
1	03/15/2018-03/17/2018	Biodiversity	Training on elephant monitoring in the forest
2	06/20/2019-06/23/2019	Biodiversity	Training on large mammal data collection
3	1/29/2019-02/03/2019	Community Engagement	Training on the preparation of the local development plan
4	03/14/2019-03/18/2019	Community Engagement	Conflict Resolution Training
5	11/03/2020-11/06/2020	Community Engagement	Training on the Establishment of the LOKANGA Grouping Committee
6	26/1/ au 30/11/2020	Community Engagement	Training on the Establishment of the NTOMBENZALE Grouping Committee
7	03/01/20	Community Engagement	Training on participatory mapping
8	02/09/2017-09/26/2017	Biomass Monitoring	Training on the process of carbon inventory

9	1/15/2018- 04/30/2018	Biomass Monitoring	Training on forest botany and navigation
10	03/03/2019-06/24/2019	Biomass Monitoring	Training on forest botany; and taking measurements of trees
11	07/27/2019- 12/20/2019	Biomass Monitoring	Training on the use of GPS and chaining
12	1/12/2020-4/12/2020	Biomass Monitoring	Training on stratification and forest types
13	10/28/2020 au 11/17/2020	Fish Farming	The main parts of a pond
14	11/1/2020 -11/3/2020	Fish Farming	Establishment of the pond
15	11/4/2020-11/12/2020	Fish Farming	Pond construction training
16	11/12/2020-11/16/2020	Fish Farming	Fertilization and fish feed training
17	April 2018, April 2020, June 2020	Beekeeping	Beekeeping training
18	August 2017, June 2018, October 2018	Agriculture	Training on maintaining a vegetable garden
19	April 2019, June 2019, February 2020, October 2020, November 2020	Agriculture	New agricultural techniques
20	11/16/2019	General	Chikwangue making training
21	02/20/2020-2/22/2020	General	Training on women empowerment
22	02/28/2020-02/28/2020	General	Training on valuing cassava cultivation
23	3/8/2020	General	Women leadership training
24	3/12/2020	General	Training on the importance of a management committee
25	11/12/2020	General	Nutrition training
26	10/28/2017-10/29/2017	Construction	Masonry
27	03/02/2018-03/18/2018	Construction	Reinforcement
28	05/11/2019-05/21/2019	Construction	Carpentry
29	02/15/2020 -2/23/2020	Construction	Woodworking
30	September 2017, August 2020	Administration and Logistics	Sewing and cutting training
31	9/1/2017	Administration and Logistics	Human resources training
32	September 2017, March 2019, August 2020	Administration and Logistics	Driving
33	August 2020-December 2020	Administration and Logistics	Computer training
34	August 2020-September 2020	Corporate	Doctoral training in Remote Sensing in the United States
35	August 2019-September 2020	Corporate	Doctoral training in Remote Sensing in the United States

2.4.3 Community Employment Opportunities (G4.4)

As detailed in the CCB PDD, the MNRP is committed to hiring employees based on the principle of equal opportunity regardless of gender, race or religious belief. According to Social Chapter of the conservation

concession contract known in French as “Cahier de Charge”, for candidates with equal qualification, experience and test scores, preference has to be given to local candidates. In accordance with these requirements the Project has been hiring local people whenever possible for all levels of unskilled, technical, and management positions. As of now, 112 full time positions in all skill and pay levels have been offered to locals: from boat drivers and construction workers to the managing director. Of these employments, more than 53 positions are being directly held by community members in the project area, not included construction workers and forest and biodiversity inventory crew. In fact, the project has hired 25 local animateurs from different communities (two in each village of the Ntomba-Nzale and Lokanga Groupement) in addition to 27 local agronomists in the same villages. This has been a substantial contribution for the wellbeing of these communities in addition to the ongoing activities.

2.4.4 Relevant Laws and Regulations Related to Worker’s Rights (G4.5)

All employee rights and employer regulations and responsibilities in the DRC are covered by the “Code du Travail”, the Labor Law. In keeping with the code du travail, MNRP has developed and received government approval for its own internal employee policy. This policy has been distributed among all employees and is presented and explained to prospective employees. All documents concerning the adherence to the above two policies are on file at the ERA offices in DRC.

2.4.5 Occupational Safety Assessment (G4.6)

The MNRP ensures that workers’ health and safety are protected to the best of its extent at all times and across all sites. Risks are identified, mitigation strategies produced and appropriate measures adopted to minimize the risks.

Given the nature of the MNRP and its geographical surroundings, it is recognized that certain occupations inherently present a risk to the health and safety of workers, particularly those that require spending long periods in relatively remote and rugged areas. These include foresters and biomass sampling teams, local researchers and community relations officers (animateurs), who may be faced with challenging terrain as well as the risk of encountering wild animals or people involved in illegal activities such as poaching, wood cutting or illicit cultivation who could pose a risk to their safety. In addition, forest fires may also pose a safety risk if they spread rapidly and unexpectedly. The MNRP has created a comprehensive Health and Safety Plan that ensures that all workers’ health and safety is protected to the extent possible, and that all workers are fully informed about workplace risks and safe practices to mitigate those risks. These include training in safe working practices, first aid training for appropriate staff members as well as the enforcement of requirements for safe handling of equipment and other materials. This Health and Safety Plan additionally provides a comprehensive list of the measures that will be taken to inform employees of their rights, to assign roles and responsibilities to supervisors and workers and provide a safe workplace culture. This document is revisited regularly and adaptively managed as needed to ensure that it contains current information and includes all job categories and potential risks. The plan will be updated periodically to ensure that it covers all current positions and safety risks, and that it utilizes the most up-to-date safety best practices. A copy of the plan has been provided to the verifier and will be kept at the project office and be readily available for any consultation. In addition, the MNRP provides detailed orientation for new employees, ensuring that in addition to their responsibilities, they are fully aware of their rights.

2.4.6 Financial Health of Implementing Organization(s) (G4.7)

Wildlife Works Carbon LLC. is a Delaware registered Limited Liability Corporation in good standing, majority owned by Wildlife Works, Inc. and Michael A. Korchinsky.

Wildlife Works, Inc. is a US registered corporation and, as such, is governed by the corporation laws of California which ensure that, at all times, the company remain financially solvent and able to meet its liabilities.

The company is owned by independent shareholders of good standing and has a Board of Directors of 4 members. WWC is sufficiently capitalized through the sale of carbon credits and investment to ensure completion of the Project. Wildlife Works Carbon LLC has also received several high-profile investments from international corporations who support Wildlife Works' mission and believe wholly in its cause.

All project financial information is held at WWC Kinshasa, DRC office. Documents supporting these assertions are available for the VVB to analyze at their request.

2.5 Legal Status and Property Rights

2.5.1 National and Local Laws (G5.1)

The NMRP complies with all applicable local, district, and national laws, regulations, and standards. Within the Project Area, none of the project activities violates any law. The DRC government owns the land in the Project Area, and has granted permission to the project through award of the conservation concession. ERA Congo, a subsidiary of WWC, legally owns the rights to the sequestered carbon in the Project Area.

Laws Regulating the Forest Conservation Concession Contract and the Lac Mai Ndombe REDD+ Project

The Land Tenure Act (Loi Nº 73-021 du 20 juillet 1973 portant régime général de biens, régime foncier et immobilier et régime de suretés telle que modifiée et complétée par la Loi N° 80-008 du 18 juillet 1980**)**

Forest Code (Loi n°011/2002, August 29, 2002) and its related implementation decree, Decree n°11/27, May 20, 2011, concerning specific rules on the allocation of forestry conservation concessions, determine the legal framework under which the forest conservation concession contract was allocated to ERA Congo.

Forest Code and its related Ministerial Order n°024/CAB/MIN/ECN-T/15/JEB/08, August 7, 2008, establishing a procedure for public enquiry prior to the granting of forest concessions. This procedure was followed by ERA Congo prior to the signature of the forest conservation concession contract.

Ministerial Order n°004/CAB/MIN/ECN-T/012 February 15, 2012, establishing an approval procedure for REDD+ projects. This procedure didn't apply at the time the MNRP was approved (see above). Nevertheless, some of these new dispositions apply to the project (Art. 21), such as:

- Register the REDD+ project to the DRC National REDD+ Registry (the MNRP is registered).
- Notify the Registry of carbon transactions that have taken place under a standard recognized by the DRC and submit PD and validation/verification reports on time.
- Submit a yearly progress report with audited financial statement at the latest by March 31 the year following the concerned financial year.

The Forest Code and its related Inter-Ministerial Order n°006/CAB/MIN/ECN-EF/2007 and n°004/CAB/MIN/FINANCES/2007 establishes the area tax and amount to be paid by forestry concession holders yearly.

Corporate Laws

Loi n° 10/008 February 27, 2010 modifying and supplementing the King Decree February 27, 1887, relative to commercial corporations and law **Loi n° 10/009, February 27, 2010**, modifying and supplementing the March 6, 1951, decree establishing a commercial and companies register. ERA Congo is registered to the new commercial and companies register under the registered number KM3087M.

Investments Code Loi n°004/2002 of February 21, 2002, establishes the legal and taxation framework for foreign investment in the DRC. It allows some tax exemptions to ERA Congo.

Labor Laws

Employment law "Loi n°015/2002" and its related Ministerial Decree n°070/0016, August 11, 1970, on working conditions; Ministerial Decree n°68/13, May 1968, relative to women's wages and working conditions; Ministerial Order n° 12/CABMIN/TPS/AR/KF/059/02, September 27, 2002, determining implementing measures of Ministerial Order n° 080/2002 July 3, 2002, establishing a minimum wage; and Ministerial Order n°12/CAB.MIN/116/2005, October 26, 2005, relating to employee dismissal procedures. ERA Congo has adopted an internal employment conditions regulation in conformity with these labor regulations.

National Security Law Loi n°75/028 September 19, 1975, modifying Decree-Law of June 29, 1961, establishing the National Social Security Institute (INSS), covering employee pensions, occupational risks and accidents, and family allowances. Benefiting the members (employees/employers), it is a compulsory savings scheme into which the employer pays a statutory contribution for every employee who is a member. ERA Congo is being registered to the INSS.

Health Benefits Decree-Law 67/310 August 9, 1965, states that companies have to cover health care needs of their employees. This obligation is reflected in the internal employment regulation (Art. 51) of ERA Congo.

Local Laws

The 2006 Constitution of the Democratic Republic of the Congo provides for the decentralization of powers from the central government to provinces, and forests rights are to be shared between the central government and the provinces (Art. 201).

Ministerial Decree n°11/27, May 20, 2011, concerning specific rules on the allocation of Forestry Conservation Concession (Art. 7) requires that the request be submitted to the provincial governor. Though not in force at the time of ERA's request, ERA Congo obtained an approval from the provincial governor and local authorities. This authority is given with the signing of the forest conservation concession contract terms of reference (cahier de charges) between the province, district, local communities, and ERA Congo on March 26, 2011.

Ministerial Decree n°033 October 2, 2006, concerning cadaster functioning and organization (Art. 2), requests that a copy of the concession contract be sent to the provincial cadaster. Two copies were sent by ERA Congo.

International Agreements

Article 215 of the 2006 Democratic Republic of Congo Constitution, February 18, 2006, states: "Treaties and international agreements have regularly reached, from their publication, an authority superior to that of laws, provided for each treaty or agreement its implementation by other party."

DRC is party to the United Nations Convention on Biological Diversity since December 3, 1994, and signed its two related Cartagena and Nagoya Protocols on June 6, 2012, and September 9, 2011, respectively; party to the United Nations Framework Convention on Climate Change on January 9, 1995, and its related Kyoto Protocol March 23, 2005; to the Ramsar Convention on Wetlands on May 18, 1996, and party to the Treaty on the Conservation and Sustainable Management of Forest Ecosystems in Central Africa and to Establish the Central Africa Forest Commission (COMIFAC) on January 24, 2005.

The MNRP aims to assist the DRC with attaining its objectives in terms of climate change; the conservation of biodiversity, fauna, flora, and wetlands; and sustainable use of forest ecosystems. MNRP is within an area listed on September 9, 2008, as wetlands of international importance under the Ramsar Convention (also see Section G1.8).

Legal Agreements

Carbon Rights Agreement signed on March 14, 2011, between Wildlife Works Carbon LLC and the DRC government by its representative, the Minister of Environment, Conservation of Nature, and Tourism (MECNT). This agreement transfers the carbon rights to WWC / ERA Congo, and states the roles and obligations of the two parties to that agreement, the project time-period, revenue sharing with the government, payments to communities (benefit sharing), and taxes to be paid by WWC / ERA Congo to the government. In this case only, the area tax is to be paid; WWC / ERA Congo is exempt from other taxes established by the Forestry Code.

The forest conservation concession contract was signed on July 30, 2011, by ERA Congo and MECNT representatives, which allocates the conceded lands to ERA Congo and defines ERA Congo's social, environmental, and management obligations.

2.5.2 Free, Prior and Informed Consent (G5.3)

The land in the project area is owned by the Government of the DRC. The project has been granted the management rights for the concessions by the Ministry of the Environment, Conservation of Nature, and Tourism (MECNT), as further described in sections G1.6, G3.8, G5.1, G5.2, and G5.6 of the CCB PDD. Communities in the project area govern resource use and access through customary laws and rights managed by local chiefs. WWC has adopted a multi phased approach to stakeholder engagement and consent which includes communication of important project information to stakeholders as it becomes available, and allows stakeholders to impact project design, air grievances, and give or withhold free prior and informed consent (FPIC) to participation in project activities. This multi phased stakeholder engagement and consent process is designed to continue throughout the project lifetime. Documented consultations are described under each phase listed below. Further details of these phases are provided in section G3.8 of the PDD. Dates, attendees, topics, and often photos of significant community meetings are available for review in the Mai Ndombe project offices.

Information sessions were held in each of the 23 major villages in the project area. In these meetings ERA Congo (subsidiary of WWC) was introduced, including its history and the concept of REDD, with a discussion of global climate change. Meetings typically lasted between 2 and 6 hours and were attended by between 20 and 100 adults. Villagers were encouraged to ask questions of ERA Congo and continued to discuss the project in community wide, traditionally held, "palabres" (deep discussions). After visiting the community a few times, would introduce a consent form and encourage stakeholders to debate the merits of consenting to project development without the company present. After at least two days had elapsed, ERA returned to each village to answer further questions, continue with information sharing, and collect consent forms if they had been signed. Consent forms were signed in 100% of communities where

they were proposed. Following these meetings, the Free Prior Informed Consent has been granted from the following clans:

Ipokyetoyi, Ikoli, Basanza, Mpama, Mpatambalu, Mpatambalu, Bomwanza, Kesenge, Bomwanza, Mpama, Ibali, Ionka, Botongambela, Lobalu, Boongo, Boliombale, Boondo II, Mpenge, Mbongo, Ndomandala, Basobe, Ilee, Nyatotonga, Mpototonga, Ngelibenga, Bangaya, Mpama, Kesenge, Bompengo, Bokolo II, Kundo, Bopombo.

These clans have been allocated USD $500 annually, as customary payment, in keeping with the Cahiers de Charge signed by ERA Congo with these communities, pending credit.

2.5.3 Property Rights Protection (G5.4)

No involuntary relocations have ever been, nor shall ever be, carried out in association of the MNRP within the MNRP project zone, within which the project area and project accounting area are entirely located. All villages that signed consent agreements have been assigned a mutually-agreed-upon 2.5 km buffer that was excluded from the protected area used to calculate carbon credits (PAA). Additionally, all secondary forest was voluntarily and conservatively removed from the protected area to provide a recognizable delineation between community use areas and intact forest (see VCS PD, Section 1.9.1). The MNRP does not practice community enforcement in any, way shape or form. Communities are not required to halt or alter their agricultural or hunting practices, but rather informed of their right to garner income from the REDD+ Project via benefit sharing should they choose to conserve their forests and the biodiversity therein. As such, any encroachment beyond the community buffers is simply measured and any emissions subsequently deducted from NERs.

2.5.4 Identification of Illegal Activity (G5.5)

Illegal activities related to the MNRP are defined as illegal and unauthorized logging, destruction of biodiversity (illegal killing of animals or destruction of vegetation cover) beyond the conditions permitted by law. The DRC Forest Code defines "local community forest." Agricultural activities are permitted in this area and, therefore, deforestation or forest degradation for agriculture and/or customary activities (i.e., fuelwood for local consumption, construction wood for the village) in these areas is not illegal. These community use areas have been excluded from the project accounting area (see above) to conform with the legal definition of community forests inside of a concession. As the local community forest boundaries are not yet defined, due to lack of a national forest management plan, the Forest Code and its related implementation decrees and rules prescribe a participatory mapping procedure to be carried out by the concession contract holder and local communities under the framework of their CLDs. The Forest Code states that "the Concession Holder has all the rights pertaining to the forest use and conservation except the usage rights of the local communities." Land usage within the conservation concession area, other than for local communities and other types of concessions (such as agriculture or forestry) awarded prior to the signing of the concession contract, is not legally permitted. Concessions granted prior to the present concession Contract have therefore been subtracted from the project area. Such concessions exist in three different areas: two concessions in the Bosongo and Mbwenzey forest, one concession in the Mbale forest at Bobola Mpinga, and a 25 km^2 agricultural rubber plantation in the triangle between Kesenge, Mpili, and Nselenge. At Bobola Mpinga, logging activities have been happening that have supplied the project with material for school construction. In recent days, the concession holder has expressed his interest in converting his concession to a conservation concession.

Hunting is illegal only during periods of hunting closure. Hunting using traditional methods is not viewed as illegal at any time as it does not significantly contribute to the depletion of animal populations.

During the present monitoring period, five attempts to illegally log inside of the project area have been stopped in Mpili, Bosongo, Kesenge, Nkondi and Mpata Mbalu, thanks to the collaboration between the company, local communities and local authorities.

3 CLIMATE

3.1 Monitoring GHG Emission Reductions and Removals

3.1.1 Data and Parameters Available at Validation

Table 10: Data and parameters available at validation

Data Unit / Parameter:	α
Data unit:	Unitless
Description:	Combined effects of β and θ at the start of the historic reference period for the Project Accounting Area
Source of data:	Reference area and historic reference period
Value applied:	0.9488756
Justification of choice of data or description of measurement methods and procedures applied:	Time and place in which the logistic model is fit
Purpose of the data	Determination of baseline scenario.
Any comment:	

Data Unit / Parameter:	β
Data unit:	Unitless
Description:	Effect of time on the cumulative proportion of conversion over time for Project Accounting Area
Source of data:	Reference area and historic reference period
Value applied:	0.0006167
Justification of choice of data or description of measurement methods and procedures applied:	Time and place in which the logistic model is fit
Purpose of the data	Determination of baseline scenario.
Any comment:	

Data Unit / 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:	-8720
Justification of choice of data or description of measurement methods and procedures applied:	Time in which the logistic model is fit. The start of the historic reference period is 29 April 1987 and the Project Start Date is 13 March, 2011.
Purpose of the data	Determination of baseline scenario.
Any comment:	

Data Unit / Parameter:	θ
Data unit:	unitless
Description:	Effect of certain covariates on the cumulative proportion of conversion over time
Source of data:	Reference area and historic reference period
Value applied:	N/A
Justification of choice of data or description of measurement methods and procedures applied:	Time and place in which the logistic model is fit
Purpose of the data	Determination of baseline scenario.
Any comment:	Parameter not used

Data Unit / Parameter:	λ_{soc}
Data unit:	proportion (unitless)
Description:	Exponential soil carbon decay parameter
Source of data:	Value from the literature. Davidson, E., and Ackerman, I. 1993. Changes in soil carbon inventories following cultivation of previously untilled soils. Biogeochemistry, 20(3), 161-193.
Value applied:	0.2
Justification of choice of data or description of measurement methods and procedures applied:	Default value from VCS methodology VM0009 V2.0
Purpose of the data	Determination of baseline emissions.

Any comment:	

Data Unit / Parameter:	$\widehat{\sigma}_{EM}$
Data unit:	standard deviation (unitless)
Description:	The estimated standard deviation of the state observations used to fit the logistic function for the Forest Project Accounting Area BEM
Source of data:	Remote sensing image interpretation
Value applied:	0.00892887
Justification of choice of data or description of measurement methods and procedures applied:	This parameter was measured in accordance of the VCS standard and AFOLU guidance, using the procedures outlined in the VCS methodology VM0009 v2 and the MNRP's standard operating procedures. All measurements were made between 2011 and 2020.
Purpose of the data	Determination of baseline emissions.
Any comment:	

Data Unit / Parameter:	$\mathcal{B}$
Data unit:	set
Description:	The set of all selected carbon pools in biomass. This is a subset of $\mathcal{C}$
Source of data:	PD
Value applied:	N/A
Justification of choice of data or description of measurement methods and procedures applied:	This parameter was measured in accordance of the VCS standard and AFOLU guidance, using the procedures outlined in the VCS methodology VM0009 and the MNRP's standard operating procedures "Standard Operating Procedure Lac Mai Ndombe - Forest Inventory". Wildlife Works was responsible for the measurement. All measurements were made between 2011 and 2020.
Purpose of the data	Determination of baseline emissions.
Any comment:	

Data Unit / Parameter:	$\mathcal{C}$
Data unit:	set
Description:	The set of all selected carbon pools
Source of data:	Monitoring records

Value applied:	N/A
Justification of choice of data or description of measurement methods and procedures applied:	This parameter was measured in accordance of the VCS standard and AFOLU guidance, using the procedures outlined in the VCS methodology VM0009 and the MNRP's standard operating procedures "Standard Operating Procedure Lac Mai Ndombe - Forest Inventory". Wildlife Works was responsible for the measurement. All measurements were made between 2011 and 2020.
Purpose of the data	Determination of baseline emissions.
Any comment:	

Data Unit / Parameter:	$\mathcal{I}$
Data unit:	set
Description:	The set of all observations of deforestation. When superscripted with a monitoring period, the conversion observations are taken for leakage analysis.
Source of data:	Remote sensing image interpretation or field observations in the leakage area.
Value applied:	N/A
Justification of choice of data or description of measurement methods and procedures applied:	N/A
Purpose of the data	Determination of baseline emissions.
Any comment:	Parameter not used.

Data Unit / Parameter:	$\mathcal{M}$
Data unit:	set
Description:	The set of all monitoring periods
Source of data:	Monitoring records
Value applied:	N/A
Justification of choice of data or description of measurement methods and procedures applied:	N/A
Purpose of the data	Determination of baseline emissions.
Any comment:	

Data Unit / Parameter:	A_{PAA}
Data unit:	ha
Description:	Area of Project Accounting Area
Source of data:	GIS analysis prior to sampling
Value applied:	248,956
Justification of choice of data or description of measurement methods and procedures applied:	This parameter was measured in accordance of the VCS standard and AFOLU guidance, using the procedures outlined in the VCS methodology VM0009 and the MNRP's standard operating procedures "Standard Operating Procedure Lac Mai Ndombe - Forest Inventory". Wildlife Works was responsible for the measurement. All measurements were made between 2011 and 2020.
Purpose of the data	Determination of baseline scenario.
Any comment:	

Data Unit / Parameter:	A_{PX}
Data unit:	ha
Description:	Area of proxy area for the Project Accounting Area
Source of data:	GIS analysis prior to sampling
Value applied:	29,361.2
Justification of choice of data or description of measurement methods and procedures applied:	This parameter was measured in accordance of the VCS standard and AFOLU guidance, using the procedures outlined in the VCS methodology VM0009 and the MNRP's standard operating procedures "Standard Operating Procedure Lac Mai Ndombe - Forest Inventory". Wildlife Works was responsible for the measurement. All measurements were made between 2011 and 2020.
Purpose of the data	Determination of baseline scenario.
Any comment:	

Data Unit / Parameter:	A_{AS}
Data unit:	ha
Description:	Area of activity-shifting leakage area
Source of data:	GIS analysis prior to sampling
Value applied:	N/A

Justification of choice of data or description of measurement methods and procedures applied:	N/A
Purpose of the data	Calculation of leakage.
Any comment:	Parameter not used, no activity-shifting leakage in project

Data Unit / Parameter:	c_{Lp}
Data unit:	tCO_2e/ha
Description:	Carbon stocks in project leakage area
Source of data:	Leakage area sampling
Value applied:	N/A
Justification of choice of data or description of measurement methods and procedures applied:	N/A
Purpose of the data	Calculation of leakage.
Any comment:	Parameter not used, no activity-shifting leakage in project

Data Unit / Parameter:	m
Data unit:	tCO_2e/ha
Description:	Average carbon in merchantable trees cut each year as a result of legally-sanctioned commercial logging
Source of data:	Timber harvest plans or measurement of carbon stocks in merchantable trees in the Project Accounting Area.
Value applied:	1,288,795.4
Justification of choice of data or description of measurement methods and procedures applied:	This parameter was measured in accordance of the VCS standard and AFOLU guidance, using the procedures outlined in the VCS methodology VM0009 and the MNRP's standard operating procedures "Standard Operating Procedure Lac Mai Ndombe - Forest Inventory". Wildlife Works was responsible for the measurement. All measurements were made between 2011 and 2020.
Purpose of the data	Calculation of baseline emissions.
Any comment:	

Data Unit / Parameter:	n_d
Data unit:	unitless
Description:	Number of spatial points in the Project Accounting Area reference area
Source of data:	Remote sensing image interpretation
Value applied:	1,572
Justification of choice of data or description of measurement methods and procedures applied:	This parameter was measured in accordance of the VCS standard and AFOLU guidance, using the procedures outlined in the VCS methodology VM0009 and the MNRP's standard operating procedures. Wildlife Works was responsible for the measurement. All measurements were made between 2011 and 2020.
Purpose of the data	Determination of baseline scenario.
Any comment:	

Data Unit / Parameter:	o_i
Data unit:	Binary (unitless)
Description:	State observation for the i^{th} sample point in the Project's reference area
Source of data:	Remote sensing image interpretation
Value applied:	See the document BEM Export Grid PAA, available on request
Justification of choice of data or description of measurement methods and procedures applied:	This parameter was measured in accordance of the VCS standard and AFOLU guidance, using the procedures outlined in the VCS methodology VM0009 and the MNRP's standard operating procedures. Wildlife Works was responsible for the measurement. All measurements were made between 2011 and 2020.
Purpose of the data	Determination of baseline scenario.
Any comment:	

Data Unit / Parameter:	$p_{L\,ME}$
Data unit:	Proportional (unitless)
Description:	Portion of leakage related to market
Source of data:	VCS methodology VM0009 V2.0 Section 8.3.3
Value applied:	N/A
Justification of choice of data or description of	N/A

measurement methods and procedures applied:	
Purpose of the data	Calculation of leakage.
Any comment:	Parameter not used, No market leakage from the Project

Data Unit / Parameter:	q
Data unit:	days
Description:	Lag between start of degradation and conversion
Source of data:	Expert knowledge, results from the PRA or reports from peer-reviewed literature
Value applied:	N/A
Justification of choice of data or description of measurement methods and procedures applied:	N/A
Purpose of the data	Determination of baseline scenario.
Any comment:	Parameter not used

Data Unit / Parameter:	$r_{CF\,b}$
Data unit:	unitless
Description:	Carbon fraction of biomass for burned wood or herbaceous material b
Source of data:	Literature estimates or direct measurement
Value applied:	N/A
Justification of choice of data or description of measurement methods and procedures applied:	No burning of wood or herbaceous material in the Project.
Purpose of the data	Calculation of project emissions.
Any comment:	Parameter not used

Data Unit / Parameter:	r_{RS}
Data unit:	unitless
Description:	Expansion factor for above-ground biomass to below-ground biomass (root/shoot ratio)

Source of data:	IPCC Guidelines for National Greenhouse Gas Inventories, 2006, Volume 4: Agriculture, Forestry and Other Land Use, Chapter 4: Forest Land, Table 4.4
Value applied:	0.37
Justification of choice of data or description of measurement methods and procedures applied:	IPCC default value for Wet Tropical Forest Ecosystems.
Purpose of the data	Calculation of baseline emissions.
Any comment:	

Data Unit / Parameter:	r_U
Data unit:	unitless
Description:	Onset proportion of conversion immediately adjacent to Project Area
Source of data:	GIS analysis and image interpretation
Value applied:	N/A
Justification of choice of data or description of measurement methods and procedures applied:	N/A
Purpose of the data	Determination of baseline scenario.
Any comment:	Parameter is not used since baseline is P1

Data Unit / Parameter:	t
Data unit:	days
Description:	Time since Project Start Date
Source of data:	Monitoring records
Value applied:	3,581
Justification of choice of data or description of measurement methods and procedures applied:	This parameter was measured in accordance of the VCS standard and AFOLU guidance, using the procedures outlined in the VCS methodology VM0009 and the MNRP's standard operating procedures. Wildlife Works was responsible for the measurement. All measurements were made between 2011 and 2020.
Purpose of the data	Determination of baseline scenario.
Any comment:	

Data Unit / 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:	See file "ExportGridsCSV_DRC_CDM2.xlsx" for value for each point.
Justification of choice of data or description of measurement methods and procedures applied:	This parameter was measured in accordance of the VCS standard and AFOLU guidance, using the procedures outlined in the VCS methodology VM0009 and the MNRP's standard operating procedures. Wildlife Works was responsible for the measurement. All measurements were made between 2011 and 2020.
Purpose of the data	Determination of baseline scenario
Any comment:	

Data Unit / Parameter:	t_{PA}
Data unit:	days
Description:	Time prior to the Project Start Date when the primary agent began commercial logging in the Project Accounting Area.
Source of data:	Harvest plans prepared for the Project Accounting Area, or by public record
Value applied:	-2,901
Justification of choice of data or description of measurement methods and procedures applied:	The parameter was determined by using the project start date (March 14, 20111) and the date when the primary agent began logging (April 1, 2003). Logging actually started in the project area well before the project start date. In a portion of the project area, commercial harvest had been performed, which commenced the cascade of degradation. The project proponent's subsequent actions to establish project activities effectively halted emissions from secondary agents.
Purpose of the data	Determination of baseline scenario.
Any comment:	

Data Unit / Parameter:	t_m
Data unit:	days
Description:	Length of project or logging in baseline scenario

Source of data:	PD
Value applied:	9,125
Justification of choice of data or description of measurement methods and procedures applied:	Due to the lack of available timber harvest plans from the primary agent, the removal of merchantable biomass from the project accounting area is assumed to be evenly distributed across 25 years (9125 days) of logging activities in the baseline scenario.
Purpose of the data	Determination of baseline scenario.
Any comment:	

Data Unit / Parameter:	t_{PL}
Data unit:	days
Description:	Length of project crediting period
Source of data:	PD
Value applied:	10,957
Justification of choice of data or description of measurement methods and procedures applied:	This parameter was measured in accordance of the VCS standard and AFOLU guidance, using the procedures outlined in the VCS methodology VM0009 and the MNRP's standard operating procedures "Standard Operating Procedure Lac Mai Ndombe - Forest Inventory". Wildlife Works was responsible for the measurement. All measurements were made between 2011 and 2020.
Purpose of the data	Determination of baseline scenario.
Any comment:	

Data Unit / Parameter:	t_{PAI}
Data unit:	days
Description:	Number of days after the Project Start Date for the start of a Project Activity instance in a grouped project.
Source of data:	PD
Value applied:	N/A
Justification of choice of data or description of measurement methods and procedures applied:	N/A
Purpose of the data	Determination of baseline scenario.
Any comment:	Parameter not used

Data Unit / Parameter:	t_{SA}
Data unit:	days
Description:	Arrival time of secondary agents after start of commercial logging.
Source of data:	Participatory rural appraisal, or expert knowledge.
Value applied:	1,825
Justification of choice of data or description of measurement methods and procedures applied:	The value of this parameter was determined utilizing information about the nature of commercial harvest and the behavior of secondary agents in the baseline scenario. The project proponent conducted community interviews to determine the length of time between commercial harvest and the emergence of secondary agents. This time-frame was corroborated by local community members throughout the reference area during interviews from the aforementioned visit.
Purpose of the data	Determination of baseline scenario.
Any comment:	

Data Unit / Parameter:	w_i
Data unit:	unitless
Description:	weight applied to the i^{th} sample point in the Forest Project Accounting Area reference area
Source of data:	Remote sensing image interpretation
Value applied:	See the document BEM Export Grid, available upon request
Justification of choice of data or description of measurement methods and procedures applied:	This parameter was measured in accordance of the VCS standard and AFOLU guidance, using the procedures outlined in the VCS methodology VM0009 and the MNRP's standard operating procedures "Standard Image Classification Protocol.pdf". Wildlife Works was responsible for the measurement. All measurements were made between 2011 and 2020.
Purpose of the data	Determination of baseline scenario.
Any comment:	

Data Unit / Parameter:	x
Data unit:	unitless
Description:	Covariate values

Source of data:	Participatory Rural Appraisal, analysis of public records, and/or expert interpretation of inventory data or remotely sensed imagery
Value applied:	N/A
Justification of choice of data or description of measurement methods and procedures applied:	N/A
Purpose of the data	Determination of baseline scenario.
Any comment:	Parameter not used

Data Unit / Parameter:	x_i
Data unit:	geographic coordinates
Description:	Latitude of the i^{th} sample point
Source of data:	Remote sensing image interpretation
Value applied:	See the document BEM Export Grid, available upon request
Justification of choice of data or description of measurement methods and procedures applied:	This parameter was measured in accordance of the VCS standard and AFOLU guidance, using the procedures outlined in the VCS methodology VM0009 and the MNRP's standard operating procedures "Standard Image Classification Protocol.pdf". Wildlife Works was responsible for the measurement. All measurements were made between 2011 and 2020.
Purpose of the data	Determination of baseline scenario.
Any comment:	

Data Unit / Parameter:	x_o
Data unit:	unitless
Description:	Covariate values as of the Project Start Date
Source of data:	Participatory Rural Appraisal, analysis of public records, and/or expert interpretation of inventory data or remotely sensed imagery
Value applied:	N/A
Justification of choice of data or description of measurement methods and procedures applied:	N/A

Purpose of the data	Determination of baseline scenario.
Any comment:	Parameter not used

Data Unit / Parameter:	x_{PAI}
Data unit:	unitless
Description:	Covariate values as of a project activity instance start date
Source of data:	Participatory Rural Appraisal, analysis of public records, and/or expert interpretation of inventory data or remotely sensed imagery
Value applied:	N/A
Justification of choice of data or description of measurement methods and procedures applied:	Should use the most accurate of the data sources if both are available
Purpose of the data	Determination of baseline scenario.
Any comment:	Parameter not used

Data Unit / Parameter:	$\boldsymbol{x_{SA}}$
Data unit:	unitless
Description:	Covariate values as of the arrival of the secondary agents
Source of data:	Participatory Rural Appraisal, analysis of public records, and/or expert interpretation of inventory data or remotely sensed imagery
Value applied:	N/A
Justification of choice of data or description of measurement methods and procedures applied:	N/A
Purpose of the data	Determination of baseline scenario.
Any comment:	Parameter not used

Data Unit / Parameter:	$\boldsymbol{y_i}$
Data unit:	geographic coordinates
Description:	Longitude of the i^{th} sample point
Source of data:	Remote sensing image interpretation

Value applied:	See the document BEM Export Grid, available upon request
Justification of choice of data or description of measurement methods and procedures applied:	This parameter was measured in accordance of the VCS standard and AFOLU guidance, using the procedures outlined in the VCS methodology VM0009 and the MNRP's standard operating procedures "Standard Image Classification Protocol.pdf". Wildlife Works was responsible for the measurement. All measurements were made between 2011 and 2020.
Purpose of the data	Determination of baseline scenario.
Any comment:	

3.1.2 Data and Parameters Monitored

MRR.78 List of parameters from VCS Methodology VM0009 V2.0 Appendix H, their values and the time last measured.

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

MRR.80 Description of the accuracy of each.

Table 11: Data and parameters monitored

Data Unit / Parameter:	$\mathcal{W}^{[m]}$
Data unit:	set
Description:	The set of all burned wood
Source of data:	Monitoring records
Description of measurement methods and procedures to be applied:	N/A
Frequency of monitoring/recording:	Every monitoring period
Value applied:	N/A
Monitoring equipment:	N/A
QA/QC procedures to be applied:	Review of monitoring records
Purpose of the data	Calculation of project emissions.
Calculation method:	N/A
Any comment:	Parameter not used

Data Unit / Parameter:	$A_{P\,1}^{[m=0]}$
Data unit:	ha

Description:	Area of Forest Project Accounting Area stratum 1 prior to first verification event – Semi-deciduous forest, Logged FORESCOM
Source of data:	GIS analysis prior to sampling
Description of measurement methods and procedures to be applied:	This parameter was measured in accordance of the VCS standard and AFOLU guidance, using the procedures outlined in the VCS methodology VM0009 section 6.2. Wildlife Works was responsible for the measurement. All measurements were made between 2011 and 2020. Accuracy level achieved is good, and is associated with the limits of ArcGIS software and quality of the shapefiles.
Frequency of monitoring/recording:	First monitoring period
Value applied:	55,244.75
Monitoring equipment:	Computer with ArcGIS software
QA/QC procedures to be applied:	QAQC procedures are in line with the requirements of VM0009 v2 and the VCS standard. This includes a review of the GIS products and visual assessments of the accuracy of the shapefiles.
Purpose of the data	Calculation of baseline emissions.
Calculation method:	GIS analysis
Any comment:	

Data Unit / Parameter:	$A_{P\,2}^{[m=0]}$
Data unit:	ha
Description:	Area of Forest Project Accounting Area stratum 2 prior to first verification event – Semi-deciduous forest, Logged SOFORMA
Source of data:	GIS analysis prior to sampling
Description of measurement methods and procedures to be applied:	This parameter was measured in accordance of the VCS standard and AFOLU guidance, using the procedures outlined in the VCS methodology VM0009 section 6.2. Wildlife Works was responsible for the measurement. All measurements were made between 2011 and 2020. Accuracy level achieved is good, and is associated with the limits of ArcGIS software and quality of the shapefiles.

Frequency of monitoring/recording:	First monitoring period
Value applied:	23,205.02
Monitoring equipment:	Computer with ArcGIS software
QA/QC procedures to be applied:	QAQC procedures are in line with the requirements of VM0009 v2 and the VCS standard. This includes a review of the GIS products and visual assessments of the accuracy of the shapefiles.
Purpose of the data	Calculation of baseline emissions.
Calculation method:	GIS analysis
Any comment:	

Data Unit / Parameter:	$A_{P3}^{[m=0]}$
Data unit:	ha
Description:	Area of Forest Project Accounting Area stratum 3 prior to first verification event – Semi-deciduous forest, Unlogged
Source of data:	GIS analysis prior to sampling
Description of measurement methods and procedures to be applied:	This parameter was measured in accordance of the VCS standard and AFOLU guidance, using the procedures outlined in the VCS methodology VM0009 section 6.2. Wildlife Works was responsible for the measurement. All measurements were made between 2011 and 2020. Accuracy level achieved is good, and is associated with the limits of ArcGIS software and quality of the shapefiles.
Frequency of monitoring/recording:	First monitoring period
Value applied:	49,476.66
Monitoring equipment:	Computer with ArcGIS software
QA/QC procedures to be applied:	QAQC procedures are in line with the requirements of VM0009 v2 and the VCS standard. This includes a review of the GIS products and visual assessments of the accuracy of the shapefiles.
Purpose of the data	Calculation of baseline emissions.
Calculation method:	GIS analysis
Any comment:	

Data Unit / Parameter:	$A_{P\,4}^{[m=0]}$
Data unit:	ha
Description:	Area of Forest Project Accounting Area stratum 4 prior to first verification event – Swamp Forest
Source of data:	GIS analysis prior to sampling
Description of measurement methods and procedures to be applied:	This parameter was measured in accordance of the VCS standard and AFOLU guidance, using the procedures outlined in the VCS methodology VM0009 section 6.2. Wildlife Works was responsible for the measurement. All measurements were made between 2011 and 2020. Accuracy level achieved is good, and is associated with the limits of ArcGIS software and quality of the shapefiles.
Frequency of monitoring/recording:	First monitoring period
Value applied:	121,030.00
Monitoring equipment:	N/A
QA/QC procedures to be applied:	QAQC procedures are in line with the requirements of VM0009 v2 and the VCS standard. This includes a review of the GIS products and visual assessments of the accuracy of the shapefiles.
Purpose of the data	Calculation of baseline emissions.
Calculation method:	GIS analysis
Any comment:	

Data Unit / Parameter:	$B_b^{[m]}$
Data unit:	tonnes
Description:	Biomass in burned wood or herbaceous material b
Source of data:	Measurements of biomass
Description of measurement methods and procedures to be applied:	Scale
Frequency of monitoring/recording:	Every monitoring period
Value applied:	N/A
Monitoring equipment:	Equipment list in Annex 20
QA/QC procedures to be applied:	Review of monitoring records

Purpose of the data	Calculation of project emissions.
Calculation method:	Summation
Any comment:	Parameter not used, no biomass burning in Project

Data Unit / Parameter:	$C_B^{[m]}$
Data unit:	tCO_2e/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:	This parameter was measured in accordance of the VCS standard and AFOLU guidance, using the procedures outlined in the VCS methodology VM0009 v2 Section 6.4 and Appendix B.2 and the MNRP's standard operating procedures "Standard Operating Procedure Lac Mai Ndombe – Forest Inventory". Wildlife Works was responsible for the measurement. All measurements were made between 2011 and 2020. Accuracy level achieved is good, and is associated with the quality of the field measurements and calculations.
Frequency of monitoring/recording:	Every time measured (≤ 5 yrs)
Value applied:	100.64
Monitoring equipment:	Equipment list in Annex 20
QA/QC procedures to be applied:	QAQC procedures are in line with the requirements of VM0009 v2 section B.4 and are outlined in the document, "Annex X-Quality Control Procedure v1.3" This includes a review of monitoring records for errors and 5% of plots being remeasured and compared to initial sample with a t-test.
Purpose of the data	Calculation of baseline emissions.
Calculation method:	Equation [B.31]
Any comment:	

Data Unit / Parameter:	$C_{B\,BGB}^{[m]}$
Data unit:	tCO_2e
Description:	Carbon not decayed in BGB at the end of the current monitoring period

Source of data:	Proxy area sampling
Description of measurement methods and procedures to be applied:	This parameter was measured in accordance of the VCS standard and AFOLU guidance, using the procedures outlined in the VCS Methodology VM0009 V2.0 Section 8.1.7. Wildlife Works was responsible for the measurement. All measurements were made between 2011 and 2020.
Frequency of monitoring/recording:	Every monitoring period
Value applied:	10,391,995
Monitoring equipment:	Equipment list in Annex 20
QA/QC procedures to be applied:	QAQC procedures are in line with the requirements of VM0009 v2 section B.4 and are outlined in the document, "Annex X-Quality Control Procedure v1.3" This includes a review of monitoring records for errors and 5% of plots being remeasured and compared to initial sample with a t-test.
Purpose of the data	Calculation of baseline emissions.
Calculation method:	Equation [F.30]
Any comment:	

Data Unit / Parameter:	$C_{B\,DW}^{[m]}$
Data unit:	tCO_2e
Description:	Carbon not decayed in DW at the end of the current monitoring period
Source of data:	Proxy area sampling
Description of measurement methods and procedures to be applied:	This parameter was measured in accordance of the VCS standard and AFOLU guidance, using the procedures outlined in the VCS Methodology VM0009 V2.0 Section 8.1.6. Wildlife Works was responsible for the measurement. All measurements were made between 2011 and 2020.
Frequency of monitoring/recording:	Every monitoring period
Value applied:	527,918
Monitoring equipment:	Equipment list in Annex 20
QA/QC procedures to be applied:	QAQC procedures are in line with the requirements of VM0009 v2 section B.4 and are outlined in the

	document, “Annex X-Quality Control Procedure v1.3” This includes a review of monitoring records for errors and 5% of plots being remeasured and compared to initial sample with a t-test.
Purpose of the data	Calculation of baseline emissions.
Calculation method:	Equation [F.34]
Any comment:	

Data Unit / Parameter:	$C_{B\,SOC}^{[m]}$
Data unit:	tCO_2e
Description:	Carbon not decayed in SOC at the end of the current monitoring period
Source of data:	Proxy area sampling
Description of measurement methods and procedures to be applied:	This parameter was measured in accordance of the VCS standard and AFOLU guidance, using the procedures outlined in the VCS Methodology VM0009 V2.0 Section 8.1.8. Wildlife Works was responsible for the measurement. All measurements were made between 2011 and 2020.
Frequency of monitoring/recording:	Every monitoring period
Value applied:	681,938
Monitoring equipment:	Equipment list in Annex 20
QA/QC procedures to be applied:	QAQC procedures are in line with the requirements of VM0009 v2 section B.4 and are outlined in the document, “Annex X-Quality Control Procedure v1.3” This includes a review of monitoring records for errors and 5% of plots being remeasured and compared to initial sample with a t-test.
Purpose of the data	Calculation of baseline emissions.
Calculation method:	Equation [F.31]
Any comment:	

Data Unit / Parameter:	$C_{B\,WP}^{[m]}$
Data unit:	tCO_2e
Description:	Carbon not decayed in wood products at the end of the current monitoring period

Source of data:	Proxy area sampling
Description of measurement methods and procedures to be applied:	This parameter was measured in accordance of the VCS standard and AFOLU guidance, using the procedures outlined in the VCS Methodology VM0009 V2.0 Section 8.1.13 and Appendix C. All measurements were made between 2011 and 2020.
Frequency of monitoring/recording:	Every monitoring period
Value applied:	957,652
Monitoring equipment:	Equipment list in Annex 20
QA/QC procedures to be applied:	QAQC procedures are in line with the requirements of VM0009 v2 section B.4 and are outlined in the document, "Annex X-Quality Control Procedure v1.3" This includes a review of monitoring records for errors and 5% of plots being remeasured and compared to initial sample with a t-test.
Purpose of the data	Calculation of baseline emissions.
Calculation method:	Equation [C.1]
Any comment:	

Data Unit / Parameter:	$C_{B\ AGMT}^{[m]}$
Data unit:	tCO_2e/ha
Description:	Baseline carbon stocks in above-ground merchantable trees at the end of the current monitoring period
Source of data:	Proxy area sampling
Description of measurement methods and procedures to be applied:	This parameter was measured in accordance of the VCS standard and AFOLU guidance, using the procedures outlined in the VCS Methodology VM0009 V2.0 Appendix B.2.1. All measurements were made between 2011 and 2020.
Frequency of monitoring/recording:	Every time measure (≤5 yrs)
Value applied:	1.52
Monitoring equipment:	Equipment list in Annex 20
QA/QC procedures to be applied:	QAQC procedures are in line with the requirements of VM0009 v2 section B.4 and are outlined in the document, "Annex X-Quality Control Procedure v1.3" This includes a review of monitoring records for errors

	and 5% of plots being remeasured and compared to initial sample with a t-test.
Purpose of the data	Calculation of baseline emissions.
Calculation method:	Weighted per ha average
Any comment:	

Data Unit / Parameter:	$C_{B\ BGMT}^{[m]}$
Data unit:	tCO_2e/ha
Description:	Baseline carbon stocks in below-ground merchantable trees at the end of the current monitoring period
Source of data:	Proxy area sampling
Description of measurement methods and procedures to be applied:	This parameter was measured in accordance of the VCS standard and AFOLU guidance, using the procedures outlined in the VCS Methodology VM0009 V2.0 Appendix B.2.3. All measurements were made between 2011 and 2020.
Frequency of monitoring/recording:	Every time measure (≤5 yrs)
Value applied:	0.56
Monitoring equipment:	Equipment list in Annex 20
QA/QC procedures to be applied:	QAQC procedures are in line with the requirements of VM0009 v2 section B.4 and are outlined in the document, “Annex X-Quality Control Procedure v1.3” This includes a review of monitoring records for errors and 5% of plots being remeasured and compared to initial sample with a t-test.
Purpose of the data	Calculation of baseline emissions.
Calculation method:	Weighted per ha average
Any comment:	

Data Unit / Parameter:	$C_{P\ AGMT}^{[m=0]}$
Data unit:	tCO_2e
Description:	Project carbon stocks in above-ground merchantable trees at Project Start

Source of data:	Project accounting area sampling
Description of measurement methods and procedures to be applied:	This parameter was measured in accordance of the VCS standard and AFOLU guidance, using the procedures outlined in the VCS Methodology VM0009 V2.0 Appendix B.2.3. All measurements were made during the first monitoring period.
Frequency of monitoring/recording:	First monitoring period
Value applied:	23,474,553.96
Monitoring equipment:	Equipment list in Annex 20
QA/QC procedures to be applied:	QAQC procedures are in line with the requirements of VM0009 v2 section B.4 and are outlined in the document, "Annex X-Quality Control Procedure v1.3" This includes a review of monitoring records for errors and 5% of plots being remeasured and compared to initial sample with a t-test.
Purpose of the data	Calculation of baseline emissions.
Calculation method:	Summation across plots
Any comment:	

Data Unit / Parameter:	$C_{P\ BGMT}^{[m=0]}$
Data unit:	tCO_2e
Description:	Project carbon stocks in below-ground merchantable trees at Project Start
Source of data:	Project accounting area sampling
Description of measurement methods and procedures to be applied:	This parameter was measured in accordance of the VCS standard and AFOLU guidance, using the procedures outlined in the VCS Methodology VM0009 V2.0 Appendix B.2.3. All measurements were made during the first monitoring period.
Frequency of monitoring/recording:	First monitoring period
Value applied:	9,159,707
Monitoring equipment:	Equipment list in Annex 11
QA/QC procedures to be applied:	QAQC procedures are in line with the requirements of VM0009 v2 section B.4 and are outlined in the document, "Annex X-Quality Control Procedure v1.3" This includes a review of monitoring records for errors

	and 5% of plots being remeasured and compared to initial sample with a t-test.
Purpose of the data	Calculation of baseline emissions.
Calculation method:	Summation across plots
Any comment:	

Data Unit / Parameter:	$c_{B\,b}^{[m]}$
Data unit:	tCO_2e/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:	This parameter was measured in accordance of the VCS standard and AFOLU guidance, using the procedures outlined in the VCS Methodology VM0009 V2.0 Appendix B.1.5 and MNRP's "Standard Operating Procedure Lac Mai Ndombe - Forest Inventory". All measurements were from 2011 to 2020. Accuracy level achieved is good, and is associated with the quality of the field measurements and calculations.
Frequency of monitoring/recording:	Monitoring period (≤5 yrs)
Value applied:	See Annex 16 – Proxy Area Carbon Model
Monitoring equipment:	Equipment list in Annex 20
QA/QC procedures to be applied:	QAQC procedures are in line with the requirements of VM0009 v2 section B.4 and are outlined in the document, "Annex X-Quality Control Procedure v1.3" This includes a review of monitoring records for errors and 5% of plots being remeasured and compared to initial sample with a t-test.
Purpose of the data	Calculation of baseline emissions.
Calculation method:	Weighted per-ha average
Any comment:	

Data Unit / Parameter:	$c_{B\,BM}^{[m]}$
Data unit:	tCO_2e/ha

Description:	Baseline carbon stocks in biomass at the end of the current monitoring period for the Project Accounting Area
Source of data:	Proxy area sampling
Description of measurement methods and procedures to be applied:	This parameter was measured in accordance of the VCS standard and AFOLU guidance, using the procedures outlined in the VCS Methodology VM0009 V2.0 Appendix B.2 and MNRP's "Standard Operating Procedure Lac Mai Ndombe - Forest Inventory". All measurements were from 2011 to 2020. Accuracy level achieved is good, and is associated with the quality of the field measurements and calculations.
Frequency of monitoring/recording:	Monitoring period (≤5 yrs)
Value applied:	100.64
Monitoring equipment:	Equipment list in Annex 11
QA/QC procedures to be applied:	QAQC procedures are in line with the requirements of VM0009 v2 section B.4 and are outlined in the document, "Annex X-Quality Control Procedure v1.3" This includes a review of monitoring records for errors and 5% of plots being remeasured and compared to initial sample with a t-test.
Purpose of the data	Calculation of baseline emissions.
Calculation method:	Equation [F.17]
Any comment:	

Data Unit / Parameter:	$c_{B\,SOC}^{[m]}$
Data unit:	tCO_2e/ha
Description:	Baseline soil carbon stocks at the end of the current monitoring period for the Project Accounting Area
Source of data:	Proxy area sampling
Description of measurement methods and procedures to be applied:	This parameter was measured in accordance of the VCS standard and AFOLU guidance, using the procedures outlined in the VCS Methodology VM0009 V2.0 Appendix B.2.6. All measurements were from 2011 to 2020. Accuracy level achieved is good, and is associated with the quality of the field measurements and calculations.
Frequency of monitoring/recording:	Monitoring period (≤5 yrs)
Value applied:	57.0

Monitoring equipment:	Equipment list in Annex 20
QA/QC procedures to be applied:	QAQC procedures are in line with the requirements of VM0009 v2 section B.4 and are outlined in the document, "Annex X-Quality Control Procedure v1.3" This includes a review of monitoring records for errors.
Purpose of the data	Calculation of baseline emissions.
Calculation method:	Equation [F.31]
Any comment:	

Data Unit / Parameter:	$c_P^{[m]}$
Data unit:	tCO_2e/ha
Description:	Project carbon stocks at the end of the current monitoring period for the Project Accounting Area
Source of data:	Project Accounting Area sampling
Description of measurement methods and procedures to be applied:	This parameter was measured in accordance of the VCS standard and AFOLU guidance, using the procedures outlined in the VCS Methodology VM0009 V2.0 Appendix B.2 and MNRP's standard operating procedures "Standard Operating Procedure Lac Mai Ndombe - Forest Inventory". Wildlife Works was responsible for the measurement. All measurements were made between 2011 and 2020. Accuracy level achieved is good, and is associated with the quality of the field measurements and calculations.
Frequency of monitoring/recording:	Monitoring period (≤5 yrs)
Value applied:	1,019.34
Monitoring equipment:	Equipment list in Annex 20
QA/QC procedures to be applied:	QAQC procedures are in line with the requirements of VM0009 v2 section B.4 and are outlined in the document, "Annex X-Quality Control Procedure v1.3" from the previous monitoring period. This includes a review of monitoring records for errors.
Purpose of the data	Calculation of baseline emissions.
Calculation method:	Equation [B.31]
Any comment:	

Data Unit / Parameter:	$c_P^{[m-1]}$
Data unit:	tCO_2e/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:	This parameter was measured in accordance of the VCS standard and AFOLU guidance, using the procedures outlined in the VCS Methodology VM0009 V2.0 Appendix B.2 and MNRP's standard operating procedures "Standard Operating Procedure Lac Mai Ndombe - Forest Inventory". Wildlife Works was responsible for the measurement. All measurements were made between 2011 and 2020. Accuracy level achieved is good, and is associated with the quality of the field measurements and calculations.
Frequency of monitoring/recording:	Prior monitoring period
Value applied:	1,039.34
Monitoring equipment:	Equipment list in Annex 20
QA/QC procedures to be applied:	QAQC procedures are in line with the requirements of VM0009 v2 section B.4 and are outlined in the document, "Annex X-Quality Control Procedure v1.3" from the previous monitoring period. This includes a review of monitoring records for errors.
Purpose of the data	Calculation of baseline emissions.
Calculation method:	Equation [B.31]
Any comment:	

Data Unit / Parameter:	$c_P^{[m=0]}$
Data unit:	tCO_2e/ha
Description:	Project carbon stocks prior to first verification event for the Project Accounting Area
Source of data:	Project Accounting Area sampling
Description of measurement methods and procedures to be applied:	This parameter was measured in accordance of the VCS standard and AFOLU guidance, using the procedures outlined in the VCS Methodology VM0009 V2.0 Appendix B.2 and MNRP's standard operating procedures "Standard Operating Procedure Lac Mai Ndombe - Forest Inventory". Wildlife Works was responsible for the

	measurement. All measurements were made between 2011 and 2020. Accuracy level achieved is good, and is associated with the quality of the field measurements and calculations.
Frequency of monitoring/recording:	First monitoring period
Value applied:	1,061.1
Monitoring equipment:	Equipment list in Annex 20
QA/QC procedures to be applied:	QAQC procedures are in line with the requirements of VM0009 v2 section B.4 and are outlined in the document, "Annex X-Quality Control Procedure v1.3" from the previous monitoring period. This includes a review of monitoring records for errors.
Purpose of the data	Calculation of baseline emissions.
Calculation method:	Equation [B.31]
Any comment:	

Data Unit / Parameter:	$C_{P\,1\,BM}^{[m=0]}$
Data unit:	tCO_2e/ha
Description:	Project carbon stocks in biomass in Project Accounting Area stratum 1 at project start – Semi-deciduous forest, Logged FORESCOM
Source of data:	Project Accounting Area sampling
Description of measurement methods and procedures to be applied:	This parameter was measured in accordance of the VCS standard and AFOLU guidance, using the procedures outlined in the VCS Methodology VM0009 V2.0 Appendix B.2 and MNRP's standard operating procedures "Standard Operating Procedure Lac Mai Ndombe - Forest Inventory". Wildlife Works was responsible for the measurement. All measurements were made between 2011 and 2020. Accuracy level achieved is good, and is associated with the quality of the field measurements and calculations.
Frequency of monitoring/recording:	First monitoring period
Value applied:	1,142.82
Monitoring equipment:	Equipment list in Annex 20
QA/QC procedures to be applied:	QAQC procedures are in line with the requirements of VM0009 v2 section B.4 and are outlined in the document,

	"Annex X-Quality Control Procedure v1.3" from the previous monitoring period. This includes a review of monitoring records for errors.
Purpose of the data	Calculation of baseline emissions.
Calculation method:	Average of plot measurements in a given stratum
Any comment:	

Data Unit / Parameter:	$c_{P\,2\,BM}^{[m=0]}$
Data unit:	tCO_2e/ha
Description:	Project carbon stocks in biomass in Project Accounting Area stratum 2 at project start – Semi-deciduous forest, Logged SOFORMA
Source of data:	Project Accounting Area sampling
Description of measurement methods and procedures to be applied:	This parameter was measured in accordance of the VCS standard and AFOLU guidance, using the procedures outlined in the VCS Methodology VM0009 V2.0 Appendix B.2 and MNRP's standard operating procedures "Standard Operating Procedure Lac Mai Ndombe - Forest Inventory". Wildlife Works was responsible for the measurement. All measurements were made between 2011 and 2020. Accuracy level achieved is good, and is associated with the quality of the field measurements and calculations.
Frequency of monitoring/recording:	First monitoring period
Value applied:	944.45
Monitoring equipment:	Equipment list in Annex 20
QA/QC procedures to be applied:	QAQC procedures are in line with the requirements of VM0009 v2 section B.4 and are outlined in the document, "Annex X-Quality Control Procedure v1.3" from the previous monitoring period. This includes a review of monitoring records for errors and 5% of plots being remeasured and compared to initial sample with a t-test.
Purpose of the data	Calculation of baseline emissions.
Calculation method:	Average of plot measurements in a given stratum
Any comment:	

Data Unit / Parameter:	$c_{P\,3\,BM}^{[m=0]}$
Data unit:	tCO_2e/ha
Description:	Project carbon stocks in biomass in Project Accounting Area stratum 3 at project start – Semi-deciduous forest, Unlogged
Source of data:	Project Accounting Area sampling
Description of measurement methods and procedures to be applied:	This parameter was measured in accordance of the VCS standard and AFOLU guidance, using the procedures outlined in the VCS Methodology VM0009 V2.0 Appendix B.2 and MNRP's standard operating procedures "Standard Operating Procedure Lac Mai Ndombe - Forest Inventory". Wildlife Works was responsible for the measurement. All measurements were made between 2011 and 2020. Accuracy level achieved is good, and is associated with the quality of the field measurements and calculations.
Frequency of monitoring/recording:	First monitoring event
Value applied:	1,059.37
Monitoring equipment:	Equipment list in Annex 20
QA/QC procedures to be applied:	QAQC procedures are in line with the requirements of VM0009 v2 section B.4 and are outlined in the document, "Annex X-Quality Control Procedure v1.3" from the previous monitoring period. This includes a review of monitoring records for errors and 5% of plots being remeasured and compared to initial sample with a t-test.
Purpose of the data	Calculation of baseline emissions.
Calculation method:	Average of plot measurements in a given stratum
Any comment:	

Data Unit / Parameter:	$c_{P\,4\,BM}^{[m=0]}$
Data unit:	tCO_2e/ha
Description:	Project carbon stocks in biomass in Project Accounting Area stratum 4 at project start – Swamp Forest
Source of data:	Project Accounting Area sampling

Description of measurement methods and procedures to be applied:	This parameter was measured in accordance of the VCS standard and AFOLU guidance, using the procedures outlined in the VCS Methodology VM0009 V2.0 Appendix B.2 and MNRP's standard operating procedures "Standard Operating Procedure Lac Mai Ndombe - Forest Inventory". Wildlife Works was responsible for the measurement. All measurements were made between 2011 and 2020. Accuracy level achieved is good, and is associated with the quality of the field measurements and calculations.
Frequency of monitoring/recording:	First monitoring event
Value applied:	1,063.21
Monitoring equipment:	Equipment list in Annex 20
QA/QC procedures to be applied:	QAQC procedures are in line with the requirements of VM0009 v2 section B.4 and are outlined in the document, "Annex X-Quality Control Procedure v1.3" from the previous monitoring period. This includes a review of monitoring records for errors and 5% of plots being remeasured and compared to initial sample with a t-test.
Purpose of the data	Calculation of baseline emissions.
Calculation method:	Average of plot measurements in a given stratum
Any comment:	

Data Unit / Parameter:	$C_{P\ AGMT}^{[m=0]}$
Data unit:	tCO_2e/ha
Description:	Project carbon stocks in above-ground merchantable trees prior to first verification event
Source of data:	Project Accounting Area sampling
Description of measurement methods and procedures to be applied:	This parameter was measured in accordance with the VCS standard and AFOLU guidance, using the procedures outlined in the VCS Methodology VM0009 V2.0 Appendix B.2.1 MNRP's standard operating procedures "Standard Operating Procedure Lac Mai Ndombe - Forest Inventory". Wildlife Works was responsible for the measurement. All measurements were made between 2011 and 2020. Accuracy level achieved is good, and is associated with the quality of the field measurements and calculations.

Frequency of monitoring/recording:	First monitoring event
Value applied:	99.44
Monitoring equipment:	Equipment list in Annex 20
QA/QC procedures to be applied:	QAQC procedures are in line with the requirements of VM0009 v2 section B.4 and are outlined in the document, “Annex X-Quality Control Procedure v1.3” from the previous monitoring period. This includes a review of monitoring records for errors and 5% of plots being remeasured and compared to initial sample with a t-test.
Purpose of the data	Calculation of baseline emissions.
Calculation method:	Average of plot measurements in a given stratum
Any comment:	

Data Unit / Parameter:	$C_{P\,BM}^{[m=0]}$
Data unit:	tCO_2e
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:	This parameter was measured in accordance of the VCS standard and AFOLU guidance, using the procedures outlined in the VCS Methodology VM0009 V2.0 Appendix B.2 and MNRP’s standard operating procedures “Standard Operating Procedure Lac Mai Ndombe - Forest Inventory”. Wildlife Works was responsible for the measurement. All measurements were made between 2011 and 2020. Accuracy level achieved is good, and is associated with the quality of the field measurements and calculations.
Frequency of monitoring/recording:	First monitoring event
Value applied:	266,145,566.3
Monitoring equipment:	Equipment list in Annex 20
QA/QC procedures to be applied:	QAQC procedures are in line with the requirements of VM0009 v2 section B.4 and are outlined in the document, “Annex X-Quality Control Procedure v1.3” from the previous monitoring period. This includes a review of monitoring records for errors and 5% of plots

	being remeasured and compared to initial sample with a t-test.
Purpose of the data	Calculation of baseline emissions.
Calculation method:	Equation [F.16]
Any comment:	

Data Unit / Parameter:	$c_{P\,b}^{[m]}$
Data unit:	tCO_2e/ha
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:	This parameter was measured in accordance of the VCS standard and AFOLU guidance, using the procedures outlined in the VCS Methodology VM0009 V2.0 Appendix B.2 and MNRP's standard operating procedures "Standard Operating Procedure Lac Mai Ndombe - Forest Inventory". Wildlife Works was responsible for the measurement. All measurements were made between 2011 and 2020. Accuracy level achieved is good, and is associated with the quality of the field measurements and calculations.
Frequency of monitoring/recording:	Every time measure (≤ 5 yrs)
Value applied:	1,019.34
Monitoring equipment:	Equipment list in Annex 20
QA/QC procedures to be applied:	QAQC procedures are in line with the requirements of VM0009 v2 section B.4 and are outlined in the document, "Annex X-Quality Control Procedure v1.3" from the previous monitoring period. This includes a review of monitoring records for errors and 5% of plots being remeasured and compared to initial sample with a t-test.
Purpose of the data	Calculation of baseline emissions.
Calculation method:	Average of plot measurements in a given stratum
Any comment:	

Data Unit / Parameter:	$c_{P\,SOC}^{[m=0]}$

Data unit:	tCO_2e/ha
Description:	Project soil carbon stocks prior to first verification event in the Forest Project Accounting Area
Source of data:	Project Accounting Area sampling
Description of measurement methods and procedures to be applied:	This parameter was measured in accordance of the VCS standard and AFOLU guidance, using the procedures outlined in the VCS Methodology VM0009 V2.0 Appendix B.2.6 and MNRP's standard operating procedures "Standard Operating Procedure Lac Mai Ndombe - Forest Inventory". Wildlife Works was responsible for the measurement. All measurements were made between 2011 and 2020. Accuracy level achieved is good, and is associated with the quality of the field measurements and calculations.
Frequency of monitoring/recording:	First monitoring period
Value applied:	79.8
Monitoring equipment:	Equipment list in Annex 20
QA/QC procedures to be applied:	QAQC procedures are in line with the requirements of VM0009 v2 section B.4 and are outlined in the document, "Annex X-Quality Control Procedure v1.3" from the previous monitoring period. This includes a review of monitoring records for errors and 5% of plots being remeasured and compared to initial sample with a t-test.
Purpose of the data	Calculation of baseline emissions.
Calculation method:	Average of plot measurements in a given stratum
Any comment:	

Data Unit / Parameter:	$C_{P\Delta WP}^{[m]}$
Data unit:	tCO_2e
Description:	Project carbon stocks in wood products at the end of the current monitoring period
Source of data:	Project Accounting Area sampling
Description of measurement methods and procedures to be applied:	This parameter was measured in accordance of the VCS standard and AFOLU guidance, using the procedures outlined in the VCS Methodology VM0009 V2.0 Appendix C and MNRP's standard operating procedures "Standard Operating Procedure Lac Mai Ndombe - Forest

	Inventory". Wildlife Works was responsible for the measurement. All measurements were made between 2011 and 2020. Accuracy level achieved is good, and is associated with the quality of the field measurements and calculations.
Frequency of monitoring/recording:	Every monitoring period
Value applied:	787,163
Monitoring equipment:	Equipment list in Annex 20
QA/QC procedures to be applied:	QAQC procedures are in line with the requirements of VM0009 v2 section B.4 and are outlined in the document, "Annex X-Quality Control Procedure v1.3" from the previous monitoring period. This includes a review of monitoring records for errors and 5% of plots being remeasured and compared to initial sample with a t-test.
Purpose of the data	Calculation of baseline emissions.
Calculation method:	Equation [C.2]
Any comment:	

Data Unit / Parameter:	$E_{\Delta GER}^{[m3]}$
Data unit:	tCO_2e
Description:	GERs for the current monitoring period
Source of data:	Area measurements
Description of measurement methods and procedures to be applied:	This parameter was measured in accordance of the VCS standard and AFOLU guidance, using the procedures outlined in the VCS Methodology VM0009 V2.0 section 8.4.1 and MNRP's standard operating procedures "Standard Operating Procedure Lac Mai Ndombe - Forest Inventory". Wildlife Works was responsible for the measurement. All measurements were made between 2011 and 2020. Accuracy level achieved is good, and is associated with the quality of the field measurements and calculations.
Frequency of monitoring/recording:	Every monitoring period
Value applied:	25,096,232
Monitoring equipment:	Equipment list in Annex 20

QA/QC procedures to be applied:	QAQC procedures are in line with the requirements of VM0009 v2 section B.4 and are outlined in the document, "Annex X-Quality Control Procedure v1.3" from the previous monitoring period. This includes a review of GER calculations, monitoring records for errors and 5% of plots being remeasured and compared to initial sample with a t-test.
Purpose of the data	Calculation of baseline emissions.
Calculation method:	Equations [F.47]
Any comment:	

Data Unit / Parameter:	$E_{\Delta GER}^{[m2]}$
Data unit:	tCO_2e
Description:	GERs for monitoring period m2
Source of data:	Area measurements
Description of measurement methods and procedures to be applied:	This parameter was measured in accordance of the VCS standard and AFOLU guidance, using the procedures outlined in the VCS Methodology VM0009 V2.0 section 8.4.1 and MNRP's standard operating procedures "Standard Operating Procedure Lac Mai Ndombe - Forest Inventory". Wildlife Works was responsible for the measurement. All measurements were made between 2011 and 2020. Accuracy level achieved is good, and is associated with the quality of the field measurements and calculations.
Frequency of monitoring/recording:	Prior monitoring period
Value applied:	11,970,624
Monitoring equipment:	Equipment list in Annex 20
QA/QC procedures to be applied:	QAQC procedures are in line with the requirements of VM0009 v2 section B.4 and are outlined in the document, "Annex X-Quality Control Procedure v1.3" from the previous monitoring period. This includes a review of GER calculations, monitoring records for errors and 5% of plots being remeasured and compared to initial sample with a t-test.
Purpose of the data	Calculation of baseline emissions.
Calculation method:	Equation [F.47]

Any comment:	

Data Unit / Parameter:	$E_{\Delta NER}^{[m2]}$
Data unit:	tCO_2e
Description:	NERs for monitoring period i
Source of data:	Area measurements
Description of measurement methods and procedures to be applied:	This parameter was measured in accordance of the VCS standard and AFOLU guidance, using the procedures outlined in the VCS Methodology VM0009 V2.0 section 8.4.3 and MNRP's standard operating procedures "Standard Operating Procedure Lac Mai Ndombe - Forest Inventory". Wildlife Works was responsible for the measurement. All measurements were made between 2011 and 2020. Accuracy level achieved is good, and is associated with the quality of the field measurements and calculations.
Frequency of monitoring/recording:	prior monitoring period
Value applied:	10,773,562
Monitoring equipment:	Equipment list in Annex 20
QA/QC procedures to be applied:	QAQC procedures are in line with the requirements of VM0009 v2 section B.4 and are outlined in the document, "Annex X-Quality Control Procedure v1.3" from the previous monitoring period. This includes a review of NER calculations, monitoring records for errors and 5% of plots being remeasured and compared to initial sample with a t-test.
Purpose of the data	Calculation of baseline emissions.
Calculation method:	Equation [F.49]
Any comment:	

Data Unit / Parameter:	$E_B^{[m3]}$
Data unit:	tCO_2e
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:	This parameter was measured in accordance of the VCS standard and AFOLU guidance, using the procedures outlined in the VCS Methodology VM0009 V2.0 section 8.1 and MNRP's standard operating procedures "Standard Operating Procedure Lac Mai Ndombe - Forest Inventory". Wildlife Works was responsible for the measurement. All measurements were made between 2011 and 2020. Accuracy level achieved is good, and is associated with the quality of the field measurements and calculations.
Frequency of monitoring/recording:	Every monitoring period
Value applied:	50,870,935
Monitoring equipment:	Equipment list in Annex 20
QA/QC procedures to be applied:	QAQC procedures are in line with the requirements of VM0009 v2 section B.4 and are outlined in the document, "Annex X-Quality Control Procedure v1.3" from the previous monitoring period. This includes a review of monitoring records for errors and 5% of plots being remeasured and compared to initial sample with a t-test.
Purpose of the data	Calculation of baseline emissions.
Calculation method:	Equation [F.15]
Any comment:	

Data Unit / Parameter:	$E_B^{[m2]}$
Data unit:	tCO_2e
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:	This parameter was measured in accordance of the VCS standard and AFOLU guidance, using the procedures outlined in the VCS Methodology VM0009 V2.0 section 8.1 and MNRP's standard operating procedures "Standard Operating Procedure Lac Mai Ndombe - Forest Inventory". Wildlife Works was responsible for the measurement. All measurements were made between 2011 and 2020. Accuracy level achieved is good, and is associated with the quality of the field measurements and calculations.

Frequency of monitoring/recording:	Prior monitoring period
Value applied:	19,919,574
Monitoring equipment:	Equipment list in Annex 20
QA/QC procedures to be applied:	QAQC procedures are in line with the requirements of VM0009 v2 section B.4 and are outlined in the document, "Annex X-Quality Control Procedure v1.3" from the previous monitoring period. This includes a review of monitoring records for errors and 5% of plots being remeasured and compared to initial sample with a t-test.
Purpose of the data	Calculation of baseline emissions.
Calculation method:	Equation [F.15]
Any comment:	

Data Unit / Parameter:	$E_{B\,\Delta}^{[m]}$
Data unit:	tCO_2e
Description:	Change in baseline emissions
Source of data:	Proxy area measurements
Description of measurement methods and procedures to be applied:	This parameter was measured in accordance of the VCS standard and AFOLU guidance, using the procedures outlined in the VCS Methodology VM0009 V2.0 section 8.1 and MNRP's standard operating procedures "Standard Operating Procedure Lac Mai Ndombe - Forest Inventory". Wildlife Works was responsible for the measurement. All measurements were made between 2011 and 2020. Accuracy level achieved is good, and is associated with the quality of the field measurements and calculations.
Frequency of monitoring/recording:	Every monitoring period
Value applied:	30,951,362
Monitoring equipment:	Equipment list in Annex 20
QA/QC procedures to be applied:	QAQC procedures are in line with the requirements of VM0009 v2 section B.4 and are outlined in the document, "Annex X-Quality Control Procedure v1.3" from the previous monitoring period. This includes a

	review of monitoring records for errors and 5% of plots being remeasured and compared to initial sample with a t-test.
Purpose of the data	Calculation of baseline emissions.
Calculation method:	Equation [F.14]
Any comment:	

Data Unit / Parameter:	$E_{B\,\Delta\,BGB}^{[m2]}$
Data unit:	tCO_2e
Description:	Change in baseline emissions from below-ground biomass during previous monitoring period
Source of data:	Monitoring the proxy area
Description of measurement methods and procedures to be applied:	This parameter was measured in accordance of the VCS standard and AFOLU guidance, using the procedures outlined in the VCS Methodology VM0009 V2.0 Appendix B.2.3 and MNRP's standard operating procedures "Standard Operating Procedure Lac Mai Ndombe - Forest Inventory". Wildlife Works was responsible for the measurement. All measurements were made between 2011 and 2020. Accuracy level achieved is good, and is associated with the quality of the field measurements and calculations.
Frequency of monitoring/recording:	Prior monitoring period
Value applied:	5,704,940
Monitoring equipment:	Equipment list in Annex 20
QA/QC procedures to be applied:	QAQC procedures are in line with the requirements of VM0009 v2 section B.4 and are outlined in the document, "Annex X-Quality Control Procedure v1.3" from the previous monitoring period. This includes a review of monitoring records for errors and 5% of plots being remeasured and compared to initial sample with a t-test.
Purpose of the data	Calculation of baseline emissions.
Calculation method:	Equation [F.29]
Any comment:	

Data Unit / Parameter:	$E_{B\,\Delta\,DW}^{[m3]}$

Data unit:	tCO_2e
Description:	Baseline emissions from dead wood in monitoring period m3
Source of data:	Measurements in the proxy area
Description of measurement methods and procedures to be applied:	This parameter was measured in accordance of the VCS standard and AFOLU guidance, using the procedures outlined in the VCS Methodology VM0009 V2.0 Appendix B.2.4, B.2.5 and MNRP's standard operating procedures "Standard Operating Procedure Lac Mai Ndombe - Forest Inventory". Wildlife Works was responsible for the measurement. All measurements were made between 2011 and 2020. Accuracy level achieved is good, and is associated with the quality of the field measurements and calculations.
Frequency of monitoring/recording:	Prior monitoring period
Value applied:	398,995
Monitoring equipment:	Equipment list in Annex 20
QA/QC procedures to be applied:	QAQC procedures are in line with the requirements of VM0009 v2 section B.4 and are outlined in the document, "Annex X-Quality Control Procedure v1.3" from the previous monitoring period. This includes a review of monitoring records for errors and 5% of plots being remeasured and compared to initial sample with a t-test.
Purpose of the data	Calculation of baseline emissions.
Calculation method:	Equation [F.33]
Any comment:	

Data Unit / Parameter:	$E_{B\,\Delta\,SOC}^{[m3]}$
Data unit:	tCO_2e
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:	This parameter was measured in accordance of the VCS standard and AFOLU guidance, using the procedures outlined in the VCS Methodology VM0009 V2.0 sectios 8.1.2.1, 8.1.2.2, 8.1.2.3 and Appendix B.2.6 and MNRP's standard operating procedures "Standard Operating Procedure Lac Mai Ndombe - Forest Inventory". Wildlife

	Works was responsible for the measurement. All measurements were made between 2011 and 2020. Accuracy level achieved is good, and is associated with the quality of the field measurements and calculations.
Frequency of monitoring/recording:	Every monitoring period
Value applied:	620,209
Monitoring equipment:	Equipment list in Annex 20
QA/QC procedures to be applied:	QAQC procedures are in line with the requirements of VM0009 v2 section B.4 and are outlined in the document, “Annex X-Quality Control Procedure v1.3” from the previous monitoring period. This includes a review of monitoring records for errors and 5% of plots being remeasured and compared to initial sample with a t-test.
Purpose of the data	Calculation of baseline emissions
Calculation method:	Equation [F.25]
Any comment:	

Data Unit / Parameter:	$E_{B\,\Delta\,SOC}^{[m2]}$
Data unit:	tCO_2e
Description:	Baseline emissions from soil carbon in monitoring period m2
Source of data:	Measurements in the proxy area
Description of measurement methods and procedures to be applied:	This parameter was measured in accordance of the VCS standard and AFOLU guidance, using the procedures outlined in the VCS Methodology VM0009 V2.0 sections 8.1.2.1, 8.1.2.2, 8.1.2.3 and Appendix B.2.6 and MNRP’s standard operating procedures “Standard Operating Procedure Lac Mai Ndombe - Forest Inventory”. Wildlife Works was responsible for the measurement. All measurements were made between 2011 and 2020. Accuracy level achieved is good, and is associated with the quality of the field measurements and calculations.
Frequency of monitoring/recording:	Prior monitoring period
Value applied:	375,640
Monitoring equipment:	Equipment list in Annex 20

QA/QC procedures to be applied:	QAQC procedures are in line with the requirements of VM0009 v2 section B.4 and are outlined in the document, "Annex X-Quality Control Procedure v1.3" from the previous monitoring period. This includes a review of monitoring records for errors and 5% of plots being remeasured and compared to initial sample with a t-test.
Purpose of the data	Calculation of baseline emissions.
Calculation method:	Equation [F.25]
Any comment:	

Data Unit / Parameter:	$E_{B\ AGMT}^{[m]}$
Data unit:	tCO_2e
Description:	Cumulative baseline emissions from above-ground commercial trees 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:	This parameter was measured in accordance of the VCS standard and AFOLU guidance, using the procedures outlined in the VCS Methodology VM0009 V2.0 sections 8.1.6.1, 8.1.6.2, 8.1.6.3 and MNRP's standard operating procedures "Standard Operating Procedure Lac Mai Ndombe - Forest Inventory". Wildlife Works was responsible for the measurement. All measurements were made between 2011 and 2020. Accuracy level achieved is good, and is associated with the quality of the field measurements and calculations.
Frequency of monitoring/recording:	Every monitoring period
Value applied:	11,804,004
Monitoring equipment:	Equipment list in Annex 20
QA/QC procedures to be applied:	QAQC procedures are in line with the requirements of VM0009 v2 section B.4 and are outlined in the document, "Annex X-Quality Control Procedure v1.3" from the previous monitoring period. This includes a review of monitoring records for errors and 5% of plots being remeasured and compared to initial sample with a t-test.
Purpose of the data	Calculation of baseline emissions.
Calculation method:	Equation [F.37]

Any comment:	

Data Unit / Parameter:	$E_{B\,BGB}^{[m]}$
Data unit:	tCO_2e
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:	This parameter was measured in accordance of the VCS standard and AFOLU guidance, using the procedures outlined in the VCS Methodology VM0009 V2.0 sections 8.1.4 and MNRP's standard operating procedures "Standard Operating Procedure Lac Mai Ndombe - Forest Inventory". Wildlife Works was responsible for the measurement. All measurements were made between 2011 and 2020. Accuracy level achieved is good, and is associated with the quality of the field measurements and calculations.
Frequency of monitoring/recording:	Every monitoring period
Value applied:	16,861,897
Monitoring equipment:	Equipment list in Annex 20
QA/QC procedures to be applied:	QAQC procedures are in line with the requirements of VM0009 v2 section B.4 and are outlined in the document, "Annex X-Quality Control Procedure v1.3" from the previous monitoring period. This includes a review of monitoring records for errors and 5% of plots being remeasured and compared to initial sample with a t-test.
Purpose of the data	Calculation of baseline emissions.
Calculation method:	Equation [F.39]
Any comment:	

Data Unit / Parameter:	$E_{B\,BGB}^{[m-1]}$
Data unit:	tCO_2e
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:	This parameter was measured in accordance of the VCS standard and AFOLU guidance, using the procedures outlined in the VCS Methodology VM0009 V2.0 sections 8.1.4 and MNRP's standard operating procedures "Standard Operating Procedure Lac Mai Ndombe - Forest Inventory". Wildlife Works was responsible for the measurement. All measurements were made between 2011 and 2020. Accuracy level achieved is good, and is associated with the quality of the field measurements and calculations.
Frequency of monitoring/recording:	Prior monitoring period
Value applied:	7,036,466
Monitoring equipment:	Equipment list in Annex 20
QA/QC procedures to be applied:	QAQC procedures are in line with the requirements of VM0009 v2 section B.4 and are outlined in the document, "Annex X-Quality Control Procedure v1.3" from the previous monitoring period. This includes a review of monitoring records for errors and 5% of plots being remeasured and compared to initial sample with a t-test.
Purpose of the data	Calculation of baseline emissions.
Calculation method:	Equation [F.29]
Any comment:	

Data Unit / Parameter:	$E_{B\,BM}^{[m]}$
Data unit:	tCO_2e
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:	This parameter was measured in accordance of the VCS standard and AFOLU guidance, using the procedures outlined in the VCS Methodology VM0009 V2.0 sections 8.1.1, 8.1.5.1 and MNRP's standard operating procedures "Standard Operating Procedure Lac Mai Ndombe - Forest Inventory". Wildlife Works was responsible for the measurement. All measurements were made between 2011 and 2020. Accuracy level achieved is good, and is associated with the quality of the field measurements and calculations.
Frequency of monitoring/recording:	Every monitoring period

Value applied:	62,434,590
Monitoring equipment:	Equipment list in Annex 20
QA/QC procedures to be applied:	QAQC procedures are in line with the requirements of VM0009 v2 section B.4 and are outlined in the document, “Annex X-Quality Control Procedure v1.3” from the previous monitoring period. This includes a review of monitoring records for errors and 5% of plots being remeasured and compared to initial sample with a t-test.
Purpose of the data	Calculation of baseline emissions.
Calculation method:	Equation [F.15]
Any comment:	

Data Unit / Parameter:	$E_{B\ DW}^{[m]}$
Data unit:	tCO_2e
Description:	Cumulative baseline emissions from dead wood 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:	This parameter was measured in accordance of the VCS standard and AFOLU guidance, using the procedures outlined in the VCS Methodology VM0009 V2.0 sections 8.1.3 and MNRP’s standard operating procedures “Standard Operating Procedure Lac Mai Ndombe - Forest Inventory”. Wildlife Works was responsible for the measurement. All measurements were made between 2011 and 2020. Accuracy level achieved is good, and is associated with the quality of the field measurements and calculations.
Frequency of monitoring/recording:	Every monitoring period
Value applied:	1,068,386
Monitoring equipment:	Equipment list in Annex 20
QA/QC procedures to be applied:	QAQC procedures are in line with the requirements of VM0009 v2 section B.4 and are outlined in the document, “Annex X-Quality Control Procedure v1.3” from the previous monitoring period. This includes a review of monitoring records for errors and 5% of plots being remeasured and compared to initial sample with a t-test.
Purpose of the data	Calculation of baseline emissions.

Calculation method:	Equation [F.32]
Any comment:	

Data Unit / Parameter:	$E_{B\,DW}^{[m-1]}$
Data unit:	tCO_2e
Description:	Cumulative baseline emissions from dead wood 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:	This parameter was measured in accordance of the VCS standard and AFOLU guidance, using the procedures outlined in the VCS Methodology VM0009 V2.0 sections 8.1.3 and MNRP's standard operating procedures "Standard Operating Procedure Lac Mai Ndombe - Forest Inventory". Wildlife Works was responsible for the measurement. All measurements were made between 2011 and 2020. Accuracy level achieved is good, and is associated with the quality of the field measurements and calculations.
Frequency of monitoring/recording:	Prior monitoring period
Value applied:	669,390
Monitoring equipment:	Equipment list in Annex 20
QA/QC procedures to be applied:	QAQC procedures are in line with the requirements of VM0009 v2 section B.4 and are outlined in the document, "Annex X-Quality Control Procedure v1.3" from the previous monitoring period. This includes a review of monitoring records for errors and 5% of plots being remeasured and compared to initial sample with a t-test.
Purpose of the data	Calculation of baseline emissions.
Calculation method:	Equation [F.32]
Any comment:	

Data Unit / Parameter:	$E_{B\,SOC}^{[m]}$
Data unit:	tCO_2e
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:	This parameter was measured in accordance of the VCS standard and AFOLU guidance, using the procedures outlined in the VCS Methodology VM0009 V2.0 sections 8.1.2.1, 8.1.2.2, 8.1.2.3 and MNRP's standard operating procedures "Standard Operating Procedure Lac Mai Ndombe - Forest Inventory". Wildlife Works was responsible for the measurement. All measurements were made between 2011 and 2020. Accuracy level achieved is good, and is associated with the quality of the field measurements and calculations.
Frequency of monitoring/recording:	Every monitoring period
Value applied:	995,849
Monitoring equipment:	Equipment list in Annex 20
QA/QC procedures to be applied:	QAQC procedures are in line with the requirements of VM0009 v2 section B.4 and are outlined in the document, "Annex X-Quality Control Procedure v1.3" from the previous monitoring period. This includes a review of monitoring records for errors and 5% of plots being remeasured and compared to initial sample with a t-test.
Purpose of the data	Calculation of baseline emissions.
Calculation method:	Equation [F.27]
Any comment:	

Data Unit / Parameter:	$E_{B\,SOC}^{[m-1]}$
Data unit:	tCO_2e
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:	This parameter was measured in accordance of the VCS standard and AFOLU guidance, using the procedures outlined in the VCS Methodology VM0009 V2.0 sections 8.1.2.1, 8.1.2.2, 8.1.2.3 and MNRP's standard operating procedures "Standard Operating Procedure Lac Mai Ndombe - Forest Inventory". Wildlife Works was responsible for the measurement. All measurements were made between 2011 and 2020. Accuracy level achieved is good, and is associated with the quality of the field measurements and calculations.
Frequency of monitoring/recording:	Prior monitoring period

Value applied:	375,640
Monitoring equipment:	Equipment list in Annex 20
QA/QC procedures to be applied:	QAQC procedures are in line with the requirements of VM0009 v2 section B.4 and are outlined in the document, “Annex X-Quality Control Procedure v1.3” from the previous monitoring period. This includes a review of calculations, monitoring records for errors and 5% of plots being remeasured and compared to initial sample with a t-test.
Purpose of the data	Calculation of baseline emissions.
Calculation method:	Equation [F.27]
Any comment:	

Data Unit / Parameter:	$E_{BA}^{[m]}$
Data unit:	tCO_2e
Description:	Cumulative emissions allocated to the buffer account at the end of the current monitoring period
Source of data:	N/A
Description of measurement methods and procedures to be applied:	This parameter was measured in accordance of the VCS standard and AFOLU guidance, using the procedures outlined in the VCS Methodology VM0009 V2.0 sections 8.4.4 and MNRP’s standard operating procedures “Standard Operating Procedure Lac Mai Ndombe - Forest Inventory”. Wildlife Works was responsible for the measurement. All measurements were made between 2011 and 2020. Accuracy level achieved is good, and is associated with the quality of the field measurements and calculations.
Frequency of monitoring/recording:	Every monitoring period
Value applied:	4,273,829
Monitoring equipment:	Equipment list in Annex 20
QA/QC procedures to be applied:	QAQC procedures are in line with the requirements of VM0009 v2 section B.4 and are outlined in the document, “Annex X-Quality Control Procedure v1.3” from the previous monitoring period. This includes a review of calculations, monitoring records for errors and 5% of plots being remeasured and compared to initial sample with a t-test.
Purpose of the data	Calculation of baseline emissions.

Calculation method:	Multiplication
Any comment:	

Data Unit / Parameter:	$E_L^{[m]}$
Data unit:	tCO_2e
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:	N/A
Frequency of monitoring/recording:	N/A
Value applied:	N/A
Monitoring equipment:	Equipment list in Annex 20
QA/QC procedures to be applied:	N/A
Purpose of the data	Calculation of leakage.
Calculation method:	Equation [F.42]
Any comment:	Parameter not used

Data Unit / Parameter:	$E_L^{[m-1]}$
Data unit:	tCO_2e
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:	N/A
Frequency of monitoring/recording:	N/A
Value applied:	N/A
Monitoring equipment:	Equipment list in Annex 20
QA/QC procedures to be applied:	N/A
Purpose of the data	Calculation of leakage.
Calculation method:	Equation [F.42]
Any comment:	Parameter not used.

Data Unit / Parameter:	$E_{L\,\Delta}^{[m]}$
Data unit:	tCO_2e
Description:	Change in emissions due to leakage
Source of data:	N/A
Description of measurement methods and procedures to be applied:	N/A
Frequency of monitoring/recording:	N/A
Value applied:	N/A
Monitoring equipment:	Equipment list in Annex 20
QA/QC procedures to be applied:	Review of monitoring records
Purpose of the data	Calculation of leakage.
Calculation method:	Equation [F.41]
Any comment:	Parameter not used.

Data Unit / Parameter:	$E_{L\,AS}^{[m]}$
Data unit:	tCO_2e
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:	N/A
Frequency of monitoring/recording:	N/A
Value applied:	N/A
Monitoring equipment:	Equipment list in Annex 20
QA/QC procedures to be applied:	Review of monitoring records
Purpose of the data	Calculation of leakage.
Calculation method:	Equation [F.43]
Any comment:	Parameter not used.

Data Unit / Parameter:	$E_{L\,ME}^{[m]}$
Data unit:	tCO_2e

Description:	Cumulative emissions from market 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:	N/A
Frequency of monitoring/recording:	N/A
Value applied:	N/A
Monitoring equipment:	Equipment list in Annex 20
QA/QC procedures to be applied:	Review of monitoring records
Purpose of the data	Calculation of leakage.
Calculation method:	Equation [F.45]
Any comment:	Parameter not used.

Data Unit / Parameter:	$E_{P\Delta}^{[m]}$
Data unit:	tCO_2e
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:	This parameter was measured in accordance of the VCS standard and AFOLU guidance, using the procedures outlined in the VCS Methodology VM0009 V2.0 sections 8.2 and MNRP's standard operating procedures "Standard Operating Procedure Lac Mai Ndombe - Forest Inventory". Wildlife Works was responsible for the measurement. All measurements were made between 2011 and 2020. Accuracy level achieved is good, and is associated with the quality of the field measurements and calculations.
Frequency of monitoring/recording:	Every monitoring period
Value applied:	4,709,869.93
Monitoring equipment:	Equipment list in Annex 20
QA/QC procedures to be applied:	QAQC procedures are in line with the requirements of VM0009 v2 section B.4 and are outlined in the document, "Annex X-Quality Control Procedure v1.3" from the previous monitoring period. This includes a review of calculations, monitoring records for errors and

	5% of plots being remeasured and compared to initial sample with a t-test.
Purpose of the data	Calculation of project emissions.
Calculation method:	Equation [F.39]
Any comment:	

Data Unit / Parameter:	$E_{P\,\Delta BRN}^{[m]}$
Data unit:	tCO_2e
Description:	Cumulative project emissions due to burning at the end of the current monitoring period
Source of data:	Monitoring plots in the project
Description of measurement methods and procedures to be applied:	This parameter was measured in accordance of the VCS standard and AFOLU guidance, using the procedures outlined in the VCS Methodology VM0009 V2.0 sections 8.2.2 and MNRP's standard operating procedures "Standard Operating Procedure Lac Mai Ndombe - Forest Inventory". Wildlife Works was responsible for the measurement. All measurements were made between 2011 and 2020. Accuracy level achieved is good, and is associated with the quality of the field measurements and calculations.
Frequency of monitoring/recording:	Every monitoring period
Value applied:	0
Monitoring equipment:	Equipment list in Annex 20
QA/QC procedures to be applied:	QAQC procedures are in line with the requirements of VM0009 v2 section B.4 and are outlined in the document, "Annex X-Quality Control Procedure v1.3" from the previous monitoring period. This includes a review of calculations, monitoring records for errors and 5% of plots being remeasured and compared to initial sample with a t-test.
Purpose of the data	Calculation of project emissions.
Calculation method:	Equation [F.40]
Any comment:	

Data Unit / Parameter:	$E_{U}^{[m]}$
Data unit:	tCO_2e

Description:	Cumulative confidence deduction at the end of the current monitoring period
Source of data:	N/A
Description of measurement methods and procedures to be applied:	This parameter was measured in accordance of the VCS standard and AFOLU guidance, using the procedures outlined in the VCS Methodology VM0009 V2.0 sections 8.4.1.1 and MNRP's standard operating procedures "Standard Operating Procedure Lac Mai Ndombe - Forest Inventory". Wildlife Works was responsible for the measurement. All measurements were made between 2011 and 2020. Accuracy level achieved is good, and is associated with the quality of the field measurements and calculations.
Frequency of monitoring/recording:	Every monitoring period
Value applied:	0
Monitoring equipment:	Equipment list in Annex 20
QA/QC procedures to be applied:	QAQC procedures are in line with the requirements of VM0009 v2 section B.4 and are outlined in the document, "Annex X-Quality Control Procedure v1.3" from the previous monitoring period. This includes a review of calculations, monitoring records for errors and 5% of plots being remeasured and compared to initial sample with a t-test.
Purpose of the data	Calculation of baseline emissions.
Calculation method:	Equation [F.51]
Any comment:	

Data Unit / Parameter:	$p_{L\,DEG}^{[m]}$
Data unit:	proportion (unitless)
Description:	Portion of leakage due to degradation in forest 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:	N/A
Frequency of monitoring/recording:	N/A
Value applied:	N/A
Monitoring equipment:	Equipment list in Annex 20

QA/QC procedures to be applied:	Review of monitoring records
Purpose of the data	Calculation of leakage.
Calculation method:	Summation across leakage plots.
Any comment:	Parameter not used.

Data Unit / Parameter:	$p_{L\,DEG}^{[m=0]}$
Data unit:	tCO_2e
Description:	proportion (unitless)
Source of data:	N/A
Description of measurement methods and procedures to be applied:	N/A
Frequency of monitoring/recording:	First monitoring period
Value applied:	N/A
Monitoring equipment:	Equipment list in Annex 20
QA/QC procedures to be applied:	Project verification
Purpose of the data	Calculation of leakage.
Calculation method:	Summation across leakage plots.
Any comment:	Parameter not used.

Data Unit / Parameter:	$p_{SL}^{[m]}$
Data unit:	proportion (unitless)
Description:	Proportion of AGMT that is not merchantable and goes into slash estimated from inventory
Source of data:	Estimated from inventory
Description of measurement methods and procedures to be applied:	VCS Methodology VM0009 V2.0 Section 8.1.6.3
Frequency of monitoring/recording:	Every time measured (≤ 5 yrs)
Value applied:	0.0905
Monitoring equipment:	N/A
QA/QC procedures to be applied:	Review of monitoring records
Purpose of the data	Calculation of project emissions.
Calculation method:	Summation across leakage plots

Any comment:	Parameter not used

Data Unit / 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:	This parameter was measured in accordance of the VCS standard and AFOLU guidance, using the procedures outlined in the VCS Methodology VM0009 V2.0 Appendix B.2 and MNRP's standard operating procedures "Standard Operating Procedure Lac Mai Ndombe - Forest Inventory". Wildlife Works was responsible for the measurement. All measurements were made between 2011 and 2020. Accuracy level achieved is good, and is associated with the quality of the field measurements and calculations.
Frequency of monitoring/recording:	Every monitoring period
Value applied:	3,581
Monitoring equipment:	N/A
QA/QC procedures to be applied:	QAQC procedures are in line with the requirements of VM0009 v2 section B.4 and are outlined in the document, "Annex X-Quality Control Procedure v1.3" from the previous monitoring period. This includes a review of calculations, monitoring records for errors
Purpose of the data	Calculation of baseline emissions.
Calculation method:	Subtraction
Any comment:	

Data Unit / 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:	This parameter was measured in accordance of the VCS standard and AFOLU guidance, using the procedures outlined in the VCS Methodology VM0009 V2.0 Appendix B.2 and MNRP's standard operating

	procedures “Standard Operating Procedure Lac Mai Ndombe - Forest Inventory”. Wildlife Works was responsible for the measurement. All measurements were made between 2011 and 2020. Accuracy level achieved is good, and is associated with the quality of the field measurements and calculations.
Frequency of monitoring/recording:	Prior monitoring period
Value applied:	2,120
Monitoring equipment:	N/A
QA/QC procedures to be applied:	QAQC procedures are in line with the requirements of VM0009 v2 section B.4 and are outlined in the document, “Annex X-Quality Control Procedure v1.3” from the previous monitoring period. This includes a review of calculations, monitoring records for errors
Purpose of the data	Calculation of baseline emissions.
Calculation method:	Subtraction
Any comment:	

Data Unit / Parameter:	$U_B^{[m]}$
Data unit:	tCO_2e
Description:	Total uncertainty in Proxy Area carbon stock estimate
Source of data:	Monitoring records
Description of measurement methods and procedures to be applied:	This parameter was measured in accordance of the VCS standard and AFOLU guidance, using the procedures outlined in the VCS Methodology VM0009 V2.0 Appendix B.1.5 and MNRP’s standard operating procedures “Standard Operating Procedure Lac Mai Ndombe - Forest Inventory”. Wildlife Works was responsible for the measurement. All measurements were made between 2011 and 2020. Accuracy level achieved is good, and is associated with the quality of the field measurements and calculations.
Frequency of monitoring/recording:	Every monitoring period
Value applied:	15.62
Monitoring equipment:	N/A
QA/QC procedures to be applied:	QAQC procedures are in line with the requirements of VM0009 v2 section B.4 and are outlined in the document, “Annex X-Quality Control Procedure v1.3”

	from the previous monitoring period. This includes a review of calculations, monitoring records for errors
Purpose of the data	Calculation of baseline emissions.
Calculation method:	Equation [B.32]
Any comment:	

Data Unit / Parameter:	$U_{EM}^{[M]}$
Data unit:	tCO_2e/ha
Description:	Total uncertainty in Baseline Emissions Models for the Project Accounting Area
Source of data:	N/A
Description of measurement methods and procedures to be applied:	This parameter was measured in accordance of the VCS standard and AFOLU guidance, using the procedures outlined in the VCS Methodology VM0009 V2.0 section 6.8.10 and MNRP's standard operating procedures "Standard Operating Procedure Lac Mai Ndombe - Forest Inventory". Wildlife Works was responsible for the measurement. All measurements were made between 2011 and 2020. Accuracy level achieved is good, and is associated with the quality of the field measurements and calculations.
Frequency of monitoring/recording:	Every monitoring period
Value applied:	0.009
Monitoring equipment:	N/A
QA/QC procedures to be applied:	QAQC procedures are in line with the requirements of VM0009 v2 section B.4 and are outlined in the document, "Annex X-Quality Control Procedure v1.3" from the previous monitoring period. This includes a review of calculations, monitoring records for errors
Purpose of the data	Calculation of baseline emissions.
Calculation method:	Equation [F.13]
Any comment:	

Data Unit / Parameter:	$U_{P}^{[m]}$
Data unit:	tCO_2e/ha
Description:	Total uncertainty in the Project Accounting Area carbon stock estimate

Source of data:	Equation [B.32] and field measurements in the PAA
Description of measurement methods and procedures to be applied:	This parameter was measured in accordance of the VCS standard and AFOLU guidance, using the procedures outlined in the VCS Methodology VM0009 V2.0 Appendix B.1.5 and MNRP's standard operating procedures "Standard Operating Procedure Lac Mai Ndombe - Forest Inventory". Wildlife Works was responsible for the measurement. All measurements were made between 2011 and 2020. Accuracy level achieved is good, and is associated with the quality of the field measurements and calculations.
Frequency of monitoring/recording:	Every monitoring period
Value applied:	28.94
Monitoring equipment:	N/A
QA/QC procedures to be applied:	QAQC procedures are in line with the requirements of VM0009 v2 section B.4 and are outlined in the document, "Annex X-Quality Control Procedure v1.3" from the previous monitoring period. This includes a review of calculations, monitoring records for errors
Purpose of the data	Calculation of baseline emissions.
Calculation method:	Equation [F.51]
Any comment:	

Data Unit / Parameter:	$x^{[m]}$
Data unit:	varies
Description:	Covariate values
Source of data:	Participatory Rural Appraisal, analysis of public records, and/or expert interpretation of inventory data or remotely sensed imagery
Description of measurement methods and procedures to be applied:	N/A
Frequency of monitoring/recording:	Every time measured (≤ 5 yrs)
Value applied:	
Monitoring equipment:	N/A
QA/QC procedures to be applied:	Review of monitoring records
Purpose of the data	Calculation of baseline emissions.
Calculation method:	N/A

Any comment:	Parameter not used

3.1.3 Monitoring Plan

A plan has been developed to monitor the MNRP's impact on its climate related objectives, namely the reduction in the emissions of tCO2e by reducing deforestation in the Project Area. The primary objective of the monitoring plan is to ensure accurate estimates of carbon stocks and carbon emission reductions from the REDD+ Project over the crediting period of the Project. The climate monitoring plan includes three primary monitoring activities that will be performed throughout the lifetime of the MNRP. These activities, and their frequency are shown in Table 12. Please refer to Section 2.4 to view the organizational structure, responsibilities and competencies of the personnel that carried out the monitoring activities.

Table 12: The three primary monitoring activities, the frequency that they will be performed and the method to be used.

Activity	Frequency	Method
Forest Patrols and Perimeter Observation	Weekly	Patrol teams inspect perimeter of project area via ground-based assessments and by air with a helicopter.
Plot Measurements	Bi-Annually	Sampling teams visit a portion of plots in project and proxy areas
Identification of significant disturbance	Once every 2-3 years or after major disturbance event	Periodic inspection of aerial imagery or videography, with ground inspection when necessary

Descriptions of these monitoring activities are described in "Annex 4 – Mai Ndombe VCS REDD+ Monitoring Plan v1.9.pdf". In addition to these three primary Project monitoring activities several additional monitoring activities will happen at informal frequencies during the Project Partners' general operations. This includes regular patrols through the Project Area by project staff and members of the local communities, and outreaches to the communities. These additional monitoring activities will serve to identify many instances of encroachment or tree harvesting that may occur in the Project Area. The monitoring plan is meant as a guide to maintain consistency during monitoring, and also includes training and internal audit procedures for quality control. It is meant as a working document to be revised as needed during the course of the Project. When revisions are necessary they should be noted as monitoring deviations in the subsequent monitoring report prepared for a VCS and CCB verification event.

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

Per VM0009 V2.0 MR.83, the QA/QC SOP was employed during the m_3 monitoring period to re-measure 5% (11) of the biomass plots measured (175). QA/QC re-measurement was carried out by teams different than those whom originally measured the plots. A t-test is used to determine if there is a significant difference between plot-level measurements of the QA inventory and that same 5% of the original inventory. The t-test was passed (no difference exists between 1% and the paired differences between

QA and original measurements at 90% confidence level); (Table 12). This result verifies that the mean estimate of carbon from QA plots is not significantly greater than or less than the mean estimate from their counterparts in the original inventory and per the QA/QC SOP no additional training or re-measurement is required.

Table 13: QA/QC Results for 5% of m_3 biomass plots

	QC Basis	Inventory Basis
1% of Estimated Mean (tCO2e)	9.115493412	9.249466407
Estimated Mean of Paired Differences (tCO2e)	-13.39729949	-13.39729949
Standard Error of Paired Differences (tCO2e)	7.951931891	7.951931891
Difference between 1% and Paired Difference (tCO2e)	-22.5127929	-22.6467659
t Statistic	-2.831109875	-2.84795773
df	10	10
p Value (1 - alpha)	0.99109102	0.991344703
H0: No difference between 1% and Paired Difference at 90% Level	TRUE	TRUE
H1: Difference greater than or equal to 1% and Paired Difference at 90% Level	FALSE	FALSE

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

Please refer to the MNRP VCS PD Appendix A for maps of Project Area land cover stratification, and discussion of forest sample plot and soil plot allocation.

MRR.85 List of plot GPS coordinates.

Please refer to the Climate Monitoring Plan for a comprehensive list of all sample plots and their GPS coordinates.

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

A permanent circular nested plot design was used for the biomass sample plots. The tree plot radius for this project is 15 meters, which corresponds to a 0.07 ha plot area. The minimum diameter for considering an individual plant as a tree for the project is 10 cm diameter at 1.3 m above the ground (DBH). All smaller woody plants are considered shrubs. Shrubs are not an included carbon pool in the MNRP.

Table 14: Tree plot radii

Area	Plot Radius
Tree Plots in all Strata	15 meters

MRR.87 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

Please refer to Annex 6 – Development of Allometry – Mai Ndombe REDD+ Project

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

Please refer to Annex 15 – MNRP Carbon Model

MRR. 90 Deviations from the measurement methods set out in VCS Methodology VM0009 V2.0 Appendix B or the monitoring plan, per current VCS requirement.

As noted in Section 2.2.2 and 2.2.4 the project deviated from the plot remeasurement schedule as required by the methodology and the monitoring plan. Due to operational challenges due to the COVID-19 pandemic 100% remeasurement of the project sample plots within five years was not achieved. The project has measured a sufficient number of plots to meet the standard error requirements of the methodology and has utilized other monitoring methods to ensure that any significant changes in the project carbon stock have been identified.

MRR.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 five years, or after a significant event that changes stocks.

For this Monitoring Period (m_3), a total of 175 plots were measured. The MNRP had planned to remeasure 100% of the plots every 5 years. For the frequency of monitoring for the biomass plots please refer to the Climate Monitoring Plan. However, as stated in MRR.90 and Section 2.2.2 and 2.2.4, 100% remeasurement of the sample plots within 5 years was not achieved.

3.1.4 Dissemination of Monitoring Plan and Results (CL3.2)

The climate monitoring plan was established and accepted by the Project Proponent. The plan has been made available for public review at the project office and was made available to each CLD in the Project Zone during the first monitoring period (m_1). Climate monitoring calculations and results are included in this document and also publicly available for review at the Project Office (hard copy). A monitoring report summary was written and provided to communities throughout the project zone in English, French and Lingala. The monitoring report has additionally been posted to the website of the VCS and CCB for public review and comment.

3.2 Quantification of GHG Emission Reductions and Removals

3.2.1 Baseline Emissions

The Project baseline as calculated in the PD Section 3.1 was applied to the project. A summary of the calculations is provided below.

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

Baseline emissions $E_{B\Delta}^{[m]}$ from prior monitoring periods are calculated using equation [F.14] of the VCS Methodology VM0009, Version 2.0

$$E_{B\Delta}^{[m]} = E_{B}^{[m]} - E_{B}^{[m-1]}$$

Where;

$E_{B\Delta}^{[m]}$= Change in baseline emissions

$E_{B}^{[m]}$ = Cumulative baseline emissions at the end of the prior monitoring perriod

$E_{B}^{[m-1]}$=Cumulative baseline emissions at the beginning of the prior monitoring period

m_1:

$$E_{B\Delta}^{[m1]} = 3{,}401{,}416 - 0 = 3{,}401{,}416\ tCO2e$$

m_2:

$$E_{B\Delta}^{[m2]} = 19{,}919{,}574 - 3{,}401{,}416 = 16{,}518{,}158\ tCO2e$$

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

Current baseline emissions $E_{B\Delta}^{[m]}$ as of the current monitoring period are calculated using equation [F.14] of the VCS Methodology VM0009, Version 2.0:

$$E_{B\Delta}^{[m3]} = E_{B}^{[m3]} - E_{B}^{[m2]}$$

Where;

$E_{B\Delta}^{[m3]}$= Change in baseline emissions

$E_{B}^{[m3]}$ = Cumulative baseline emissions at the end of the current monitoring period

$E_{B}^{[m2]}$=Cumulative baseline emissions at the beginning of the previous monitoring period

$$E_{B\Delta}^{[m3]} = 50{,}870{,}935 - 19{,}919{,}574 = 30{,}951{,}362\ tCO2e$$

MRR.12 Calculations of cumulative baseline emissions for each selected pool (E_B BMm and EB SOCm) and undecayed carbon (CB BGB_m, CB DW_m, CB SOCm and CB WPm), as of the current monitoring period.

Cumulative baseline emissions from biomass $E_{B\ BM}^{[m]}$ are estimated for both the PAA using equation [F.19] of the VCS methodology VM0009 V2.0:

$$E_{B\ BM}^{[m3]} = BEM_{P1}\left(c_{P\ BM}^{[m=0]}, c_{B\ BM}^{[m3]}, t^{[m3]}, x^{[m3]}\right)$$

This estimate employs a Biomass Emissions Model (BEM) for baseline P1 using equation [F.2] of the VCS Methodology VM0009 V2.0:

$$BEM_{P1}(c_P, c_B, t, x) = \frac{m(t - t_{PA})}{365(1 + e^{t - t_{SA} - t_{PA} - t_{PAI}})} + \frac{A_{PAA}(c_P - c_B)e^{t - t_{SA} - t_{PA} - t_{PAI}} + \frac{HA_{P1}(c_P, c_B)t}{t_{PL} - t_{PAI}}}{(1 + e^{t - t_{SA} - t_{PA} - t_{PAI}})\left[1 + e^{\ln\left(\frac{365A_{PAA}(c_P - c_B)}{m(t_{SA} - t_{PAI})} - 1\right) - \beta(t - t_{SA} - t_{PA} - t_{PAI}) - \boldsymbol{\theta}(\boldsymbol{x} - \boldsymbol{x_{PAI}} - \boldsymbol{x_{SA}})^T}\right]} - HA_{P1}(c_P, c_B)$$

Where;

$$HA_{P1}(c_P, c_B) = \frac{m}{365(1 + e^{t - t_{SA} - t_{PA} - t_{PAI}})} + \frac{A_{PAA}(c_P - c_B)e^{t - t_{SA} - t_{PA} - t_{PAI}}}{(1 + e^{t - t_{SA} - t_{PA} - t_{PAI}})\left[1 + e^{\ln\left(\frac{365A_{PAA}(c_P - c_B)}{m(t_{SA} - t_{PAI})} - 1\right) - \beta(t - t_{SA} - t_{PA} - t_{PAI}) - \boldsymbol{\theta}(\boldsymbol{x} - \boldsymbol{x_{PAI}} - \boldsymbol{x_{SA}})^T}\right]}$$

Where;

$C_P^{[m]}$ = Project carbon stocks at the end of the current monitoring period; 1,019.34 *tCO2e · ha-1*

$C_B^{[m]}$ = Baseline scenario average carbon stock in selected carbon pools; 100.64 *tCO2e · ha-1*

m = Average carbon in merchantable trees cut each year from legal commercial logging; 1,229,797.8 *tCO2e · yr-1*

t = Time since project start date; 3,581 days

β = Effect of time on the cumulative proportion of deforestation over time; 0.0006167

θ = Effect of certain covariates of the cumulative proportion of deforestation over time; 0

t_{PA} = Time prior to the project start date when the primary agent began commercial logging in the project accounting area; 2,901 days

t_{PAI} = Number of days after the project start date for the start of a project activity instance in a grouped project; 0

t_{SA} = Arrival time of secondary agents after start of commercial logging; 1,825 days

x_{SA} = Covariate values as of the arrival of the secondary agents; 0

A_{PAA} = Area of project accounting area; 248,956 ha

t_{PL} = Length of project accrediting period; 10,957 days

Calculating Baseline Emissions from Biomass

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

As discussed above, baseline emissions are calculated as per the PD and described in the following subsections:

Cumulative baseline emission for current monitoring period (m_3):

$$BEM_{P1}(c_P, c_B, t, x) = 62{,}434{,}590\ tCO2e$$

MRR.14 Calculations of cumulative baseline emissions from biomass EB $E_{B\,BM}^{[m]}$ for all prior monitoring periods.

m1: $BEM_{P1}(c_P, c_B, t, x)$ = 26,053,941 *tCO2e*

m2: $BEM_{P1}(c_P, c_B, t, x)$ = 4,930,245 *tCO2e*

Please refer to Annex 17 – MNRP NER model

Calculating Baseline Emissions from SOC for Baseline Types P1 and P2

MRR.19 An estimate of cumulative baseline emissions from SOC $E_{\mathrm{B}\,SOC}^{[m]}$ for the current monitoring period.

Cumulative baseline emissions from SOC $E_{B\,SOC}^{[m]}$ for baseline types P1 and P2 are estimated using equation [F.24] of the VCS Methodology VM0009 V2.0:

$$E_{B\,SOC}^{[m3]} = SEM_P\left(c_{P\,SOC}^{[m=0]} c_{B\,SOC}^{[m3]}, t^{[m3]}, x^{[m3]}\right)$$

The estimate employs the Soil Emissions Model (SEM) for baseline type P1 using equation [F. 6] of the VCS Methodology VM0009 V2.0:

$$SEM_P(c_P, c_B, t, x) = \frac{A_{PAA}(c_P - c_B)}{1 + e^{-\alpha-\beta(t+\gamma-t_{PA}-t_{PAI})-\boldsymbol{\theta}(\boldsymbol{x}-\boldsymbol{x_{PAI}})^T}}\left[1 + \frac{t}{t_{PL} + t_{PL}e^{-\alpha-\beta(\gamma-t_{PA}-t_{PAI})-\boldsymbol{\theta}(\boldsymbol{x_0}-\boldsymbol{x_{PAI}})^T}}\right] - \frac{A_{PAA}(c_P - c_B)}{1 + e^{-\alpha-\beta(\gamma-t_{PA}-t_{PAI})-\boldsymbol{\theta}(\boldsymbol{x_0}-\boldsymbol{x_{PAI}})^T}}$$

Where;

$C_B^{[m3]}$= Baseline carbon stock in selected carbon pools; 57.0 *tCO2e* · *ha*$^{-1}$

$C_P^{[m3]}$= Project carbon stocks at the end of the current monitoring period; 79.8 *tCO2e* · *ha*$^{-1}$

t_{PA}= Time prior to the project start date when the primary agent began commercial logging in the project accounting area; -2,901 days

α=Combined effects of β and θ at the start of the historic reference period; 0.95

β= Effect of time on the cumulative proportion of deforestation over time; 0.00062

θ= Effect of certain covariates of the cumulative proportion of deforestation over time; 0

y= Longitude of the sample point; -8720

t=Time since project start date; 3,581 days

x=Covariate values; 0

x_0=Covariate values as of the start of the project date; 0

A_{PAA}=Area of project accounting area; 248,956 *ha*

t_{PAI}= Number of days after the project start date for the start of a project activity instance in a grouped project; 0 days

$$SEM_P(c_P, c_B, t, x) = 995{,}849\ tCO2e$$

MRR.18 An estimate of current baseline emissions from SOC $E^{[m]}_{B\,\Delta\,SOC}$ as of the current monitoring period.

Current baseline emissions from SOC $E^{[m]}_{B\,\Delta\,SOC}$ as of the current monitoring period are estimated using equation [F.25] of the VCS Methodology VM0009 V2.0:

$$E^{[m3]}_{B\Delta SOC} = E^{[m3]}_{B\,SOC} - E^{[m-1]}_{B\,SOC}$$

Where;

$E^{[m3]}_{B\,SOC}$= Cumulative baseline emissions from soil carbon at the end of the current monitoring period

$E^{[m3-1]}_{B\,SOC}$= Cumulative baseline emissions from soil carbon at the beginning of the current monitoring period

$$E^{[m3]}_{B\Delta SOC} = 995{,}849 - 375{,}640 = 620{,}209\ tCO2e$$

MRR.20 Calculations of cumulative baseline emissions from SOC $E^{[m]}_{B\,SOC}$ for all prior monitoring periods.

m_1:

$$E^{[m1]}_{B\Delta SOC} = 65{,}546 - 0 = 65{,}546\ tCO2e$$

m_2:

$$E^{[m2]}_{B\Delta SOC} = 375{,}640 - 65{,}546 = 310{,}094\ tCO2e$$

Please refer to Annex 17 – MNRP NER model

Calculating Carbon Not Decayed in DW

MRR.27 An estimate of carbon stored in non-decayed DW $C^{[m]}_{B\,DW}$ for the current monitoring period.

Cumulative carbon stored in non-decayed DW $C^{[m]}_{B\,DW}$ as of the current monitoring period are estimated using equation [F.34] of the VCS Methodology VM0009 V2.0:

$$C^{[m3]}_{B\,DW} = \sum_{i\epsilon\mathcal{M}} DEM_{DW,BGB}\left(E^{[m3]}_{B\,\Delta\,DW}, t^{[m3]}, t^{[m3-1]}\right)$$

Where;

$E^{[m3]}_{B\,\Delta\,DW}$ = Cumulative emissions from dead wood at the end of the current monitoring period; 1,068,386 *tCO2e*

$t^{[m3]}$=Time from project start date to end of current monitoring period; 3,581 days

$t^{[m3-1]}$=Time from project start date to beginning of current monitoring period; 2,120 days

$$C^{[m3]}_{B\,DW} = 527{,}918\ tCO2e$$

Please refer to Annex 17 – MNRP NER model

MRR.28 An estimate of cumulative baseline emissions from DW $E^{[m]}_{B\,DW}$ for the current monitoring period.

Cumulative baseline emissions from DW $E_{B\ DW}^{[m]}$ as of the current monitoring period are estimated using equation [F.32] of the VCS Methodology VM0009 V2.0:

$$E_{B\ DW}^{[m3]} = p_{SL}^{[m3]} \cdot E_{B\ AGMT}^{[m3]}$$

Where;

$E_{B\ AGMT}^{[m3]}$ = Cumulative baseline emissions from above- ground commercial trees at the end of the current monitoring period; 11,804,004 *tCO2e*

$p_{SL}^{[m3]}$ = Proportion of AGMT that is not merchantable and goes into slash estimated from inventory; 0.0905 *tCO2e · ha-1*

$$E_{B\ DW}^{[m3]} = 1{,}068{,}386\ tCO2e$$

Please refer to Annex 17 – MNRP NER model

MRR.30 Calculations of cumulative baseline emissions from DW $E_{B\ DW}^{[m]}$ for all prior monitoring periods.

m_1:

$E_{B\ AGMT}^{[m1]}$ = Cumulative baseline emissions from above- ground commercial trees at the end of the current monitoring period; $1{,}923{,}054\ tCO2e$

$p_{SL}^{[m1]}$ = Proportion of AGMT that is not merchantable and goes into slash estimated from inventory; $0.0905\ tCO2e \cdot ha^{-1}$

$$E_{B\ DW}^{[m1]} = 174{,}056\ tCO2e$$

m_2:

$E_{B\ AGMT}^{[m2]}$ = Cumulative baseline emissions from above- ground commercial trees at the end of the current monitoring period; 7,395,725 *tCO2e*

$p_{SL}^{[m2]}$ = Proportion of AGMT that is not merchantable and goes into slash estimated from inventory; 0.0905 *tCO2e · ha-1*

$$E_{B\ DW}^{[m2]} = 669{,}390\ tCO2e$$

Please refer to Annex 17 – MNRP NER Worksheet

Calculating Carbon Not Decayed in BGB

Carbon that has not yet decayed in the below ground biomass (BGB) carbon pool is estimated using equation [F.9] of the VCS Methodology VM0009 V2.0:

$$DEM_{DW,BGB}\left(E_{B\ \Delta}^{[m]}, t, t^{[m-1]}\right) = \frac{E_{B\ \Delta}^{[m]}}{1 + e^{t - t^{[m-1]} - 3650}}\left[1 - \frac{t - t^{[m-1]}}{3650}\right]$$

Where;

$E_{B\ \Delta}^{[m3]}$=Change in baseline emissions; 30,951,362 *tCO2e*

$t^{[m3]}$=Time from project start date to end of current monitoring period; 3,581 days

$t^{[m3-1]}$=Time from project start date to beginning of current monitoring period; 2,120 days

The Decay Emissions Model (DEM) for carbon in the BGB and deadwood (DW) carbon pools is based on the default VCS decay models for those pools.

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

Please refer to Annex 17 – MNRP NER Worksheet

Estimates of the carbon stored in non-decayed BGB for the current monitoring period are calculated using [F.30] of the VSC Methodology VM0009 V.2.0:

$$C_{\mathrm{B}\,BGB}^{[m3]} = \sum_{iEM} DEM_{DW,BGB}(E_{B\Delta BGB}^{[m3]}, t^{[m3]}, t^{[m3-1]})$$

Where;

$t^{[m3]}$=Time from project start date to end of current monitoring period; 3,581 days

$t^{[m3-1]}$=Time from project start date to beginning of monitoring period i; 2,120 days

$E_{B\Delta BGB}^{[m3]}$=Change in baseline emissions from below-ground biomass during monitoring period i; 5,704,940 *tCO2e*

M=The set of all monitoring periods

$$C_{\mathrm{B}\,BGB}^{[m3]} = 10{,}391{,}995\ tCO2e$$

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

Please refer to Annex 17 – MNRP NER Worksheet

Estimates of from BGB $E_{B\,BGB}^{[m3]}$ for the current monitoring period are calculated using equation [F.28] of the VCS Methodology VM0009 V2.0:

$$E_{B\,BGB}^{[m3]} = \frac{r_{RS} E_{B\,BM}^{[m3]}}{1 + r_{RS}}$$

Where;

r_{RS}=Expansion factor for above-ground biomass / below-ground biomass (root/shoot ratio); 0.37

$E_{B\,BM}^{[m3]}$=Cumulative baseline emissions from biomass at the end of the current monitoring period;

62,434,590 *tCO2e*

$$E_{B\,BGB}^{[m3]} = 16{,}861{,}897\ tCO2e$$

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

m_1:

$$E_{B\,BGB}^{[m1]} = \frac{r_{RS} E_{B\,BM}^{[m1]}}{1 + r_{RS}}$$

Where;

r_{RS}=Expansion factor for above-ground biomass / below-ground biomass (root/shoot ratio); 0.37

$E_{B\,BM}^{[m1]}$=Cumulative baseline emissions from biomass at the end of the current monitoring period; 4,930,246 *tCO2e*

$E_{B\,BGB}^{[m1]}$ =1,331,526 *tCO2e*

m_2:

$$E_{B\,BGB}^{[m2]} = \frac{r_{RS} E_{B\,BM}^{[m2]}}{1 + r_{RS}}$$

r_{RS}=Expansion factor for above-ground biomass / below-ground biomass (root/shoot ratio); 0.37

$E_{B\,BM}^{[m2]}$=Cumulative baseline emissions from biomass at the end of the current monitoring period; 26,053,941 *tCO2e*

$E_{B\,BGB}^{[m2]}$ =7,036,466 *tCO2e*

Calculating Carbon Not Decayed in SOC

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

Carbon that has not yet decayed in the SOC carbon pool is estimated using equation [F.31] of the VCS Methodology VM0009 V2.0:

$$C_{B\,SOC}^{[m3]} = \sum_{i \in \mathcal{M}} DEM_{SOC}\left(E_{B\,\Delta\,SOC}^{[m3]}, t^{[m3]}, t^{[m3-1]}\right)$$

Where;

$t^{[m3]}$=Time from project start date to end of current monitoring period; 3,581 days

$t^{[m3-1]}$=Time from project start date to beginning of monitoring period i; 2,120 days

$E_{B\,\Delta SOC}^{[m3]}$=Baseline change in emissions from soil carbon; 620,209 *tCO2e*

M=The set of all monitoring periods

This estimate employs the Decay Emissions Model (DEM) for carbon in the SOC for baseline type P1 using equation [F.9] of the VCS Methodology VM0009 V2.0:

$$DEM_{SOC}\left(E_{B\,\Delta}^{[m]}, t, t^{[m-1]}\right) = E_{B\,\Delta}^{[m]} - \frac{365 E_{B\,\Delta}^{[m]}}{\lambda_{SOC}(t - t^{[m-1]})}\left[\frac{\lambda_{SOC}\left(t - t^{[m-1]}\right)}{365} + e^{\frac{-\lambda_{SOC}(t - t^{[m-1]})}{365}} - 1\right]$$

Where;

$t^{[m3-1]}$= Time from project start date to beginning of monitoring period i; 2,120 days

t= Time since project start date; 3,581 days

$E_{B\,\Delta}^{[m3]}$=Change in baseline emission; 30,951,362 *tCO2e*

λ_{SOC} = Exponential soil carbon decay parameter; 0.2

$$C_{B\,SOC}^{[m3]} = 681{,}938\ tCO2e \cdot ha^{-1}$$

Calculating Cumulative Emissions from AGMT for Baseline Type P1

MRR.29 An estimate of cumulative baseline emissions from AGMT $E_{B\,AGMT}^{[m]}$ for the current monitoring period.

Please refer to Annex 17 – MNRP NER Worksheet

Cumulative baseline emissions from AGMT $E_{B\,AGMT}^{[m]}$ for the current monitoring period is calculated using equation [F.35] of the VCS Methodology VM0009 V2.0:

$$E_{B\,AGMT}^{[m3]} = BEM_{P1}(c_{P\,AGMT}^{[m=0]} + c_{P\,BGMT}^{[m=0]} + c_{B\,AGMT}^{[m3]} + c_{B\,BGMT}^{[m3]}, t^{[m3]}, x^{[m3]})(1 - \frac{r_{RS}}{1 + r_{RS}})$$

Where;

$c_{P\,AGMT}^{[m=0]}$=Project carbon stocks in above-ground merchantable trees at project start; 99.44 *tCO2e · ha-1*

$c_{P\,BGMT}^{[m=0]}$= Project carbon stocks in below-ground merchantable trees at project start; 36.79 *tCO2e · ha-1*

$c_{B\,AGMT}^{[m3]}$=Baseline carbon stocks above-ground merchantable trees at the end of the current monitoring period; 0 *tCO2e · ha-1*

$c_{B\,BGMT}^{[m3]}$= Baseline carbon stocks below-ground merchantable trees at the end of the current monitoring period; 0 *tCO2e · ha-1*

$t^{[m3]}$=Length of project or logging in baseline scenario; 9,125 days

$x^{[m3]}$= Covariate values; 0

r_{RS}= Expansion factor for above-ground biomass / below-ground biomass (root/shoot ratio); 0.37

$$E_{B\,AGMT}^{[m3]} = 11{,}804{,}004\ tCO2e$$

MRR. 31 Calculations of cumulative baseline emissions from AGMT $E_{B\,AGMT}^{[m]}$ for all prior monitoring periods.

Please refer to Annex 17 – MNRP NER Worksheet

Determining cumulative baseline emissions from AGMT $E_{B\,AGMT}^{[m]}$ for all prior monitoring periods is calculated using equation [F.35] of the VCS Methodology VM0009 V2.0:

m_1:

$$E_{B\,AGMT}^{[m1]} = BEM_{P1}(c_{P\,AGMT}^{[m=0]} + c_{P\,BGMT}^{[m=0]} + c_{B\,AGMT}^{[m1]} + c_{B\,BGMT}^{[m1]}, t^{[m1]}, x^{[m1]})(1 - \frac{r_{RS}}{1 + r_{RS}})$$

Where;

$c_{P\,AGMT}^{[m=0]}$=Project carbon stocks in above-ground merchantable trees at project start; 99.43 *tCO2e · ha-1*

$c_{P\ BGMT}^{[m=0]}$= Project carbon stocks in below-ground merchantable trees at project start; 36.79 *tCO2e · ha-1*

$c_{B\ AGMT}^{[m1]}$=Baseline carbon stocks above-ground merchantable trees at the end of the current monitoring period; 0 *tCO2e · ha-1*

$c_{B\ BGMT}^{[m1]}$= Baseline carbon stocks below-ground merchantable trees at the end of the current monitoring period; 0 *tCO2e · ha-1*

$t^{[m1]}$=Length of project or logging in baseline scenario; 9,125 days

$x^{[m1]}$=Covariate values; 0

r_{RS}= Expansion factor for above-ground biomass / below-ground biomass (root/shoot ratio); 0.37

$$E_{B\ AGMT}^{[m1]} = 1{,}923{,}054\ tCO2e$$

m2:

$$E_{B\ AGMT}^{[m2]} = BEM_{P1}(c_{P\ AGMT}^{[m=0]} + c_{P\ BGMT}^{[m=0]} + c_{B\ AGMT}^{[m2]} + c_{B\ BGMT}^{[m2]}, t^{[m2]}, x^{[m2]})(1 - \frac{r_{RS}}{1 + r_{RS}})$$

Where;

$c_{P\ AGMT}^{[m=0]}$=Project carbon stocks in above-ground merchantable trees at project start; 99.43 *tCO2e · ha-1*

$c_{P\ BGMT}^{[m=0]}$= Project carbon stocks in below-ground merchantable trees at project start; 36.79 *tCO2e · ha-1*

$c_{B\ AGMT}^{[m2]}$=Baseline carbon stocks above-ground merchantable trees at the end of the current monitoring period; 0 *tCO2e · ha-1*

$c_{B\ BGMT}^{[m2]}$= Baseline carbon stocks below-ground merchantable trees at the end of the current monitoring period; 0 *tCO2e · ha-1*

$t^{[m2]}$=Length of project or logging in baseline scenario; 9,125 days

$x^{[m2]}$=Covariate values; 0

r_{RS}= Expansion factor for above-ground biomass / below-ground biomass (root/shoot ratio); 0.37

$$E_{B\ AGMT}^{[m2]} = 7{,}395{,}725\ tCO2e$$

Determining Carbon Stored in Long Lived Wood Products

MRR.36 Carbon stored in long-lived wood products $C_{B\ WP}^{[m]}$ after 100 years.

Please refer to Annex 17 – MNRP NER Worksheet

Carbon in wood products remaining after 100 years was derived from Winjum et al. (1998):

$$C_{B\ WP}^{[m3]} = 957{,}652\ tCO2e$$

MRR.37 Calculations to determine $C_{B\ WP}^{[m]}$.

Please refer to Annex 17 – MNRP NER Worksheet

Determining carbon stored in wood products in the project $C_{B\,WP}^{[m]}$ is calculated using equation [C.1] of the VCS Methodology VM0009 V2.0, which was derived from Winjum et al. (1998):

$$C_{B\,WP}^{[m3]} = (1-w)(\,E_{B\,AGMT}^{[m3]}) \sum_{ty \in T} p_{ty}^{[m3]} l_{ty} (1-f_{ty})^{95}$$

Where;

$C_{B\,WP}^{[m3]}$= tCO2e sequestered in long-lived wood products after 100 years; 957,652 *tCO2e*

w= milling wood waste function; 0.24

ty= wood product type; sawn wood

$E_{B\,AGMT}^{[m3]}$=tCO2 sequestered in above-ground merchantable trees; 11,804,004 *tCO2e*

$p_{ty}^{[m3]}$=portion of harvested carbon in product type ty (estimated using Appendix B); 0.0909

l_{ty}=fraction of wood products in product type ty after five years; 0.8

f_{ty}=annual oxidation fraction of wood products in product type ty; 0.02

3.2.2 Project Emissions

Calculating Emissions from Changes in Project Stocks (G1.4)

Carbon stocks have been estimated using the Verified Carbon Standard (VCS) methodology VM0009 'Methodology for Avoided Ecosystem Conversion' v2.0.

For this 3rd monitoring period, which extends from 1 January 2017 to 31 December 2020, we measured 175 plots, representing 38% of the original 449 plots. Biomass plot locations measured for m_3 are depicted below in Figure 8.

Changes in project carbon stocks are calculated as the difference in project stocks in each stratum for each PAA between the current and prior monitoring periods, as determined from in-situ measurement of biomass plots:

$$A_{PAA}\left(c_P^{[m3-1]} - c_P^{[m3]}\right)$$

Carbon stocks that are lost to burning, wood products, and leakage are accounted for using the procedures and equations listed below.

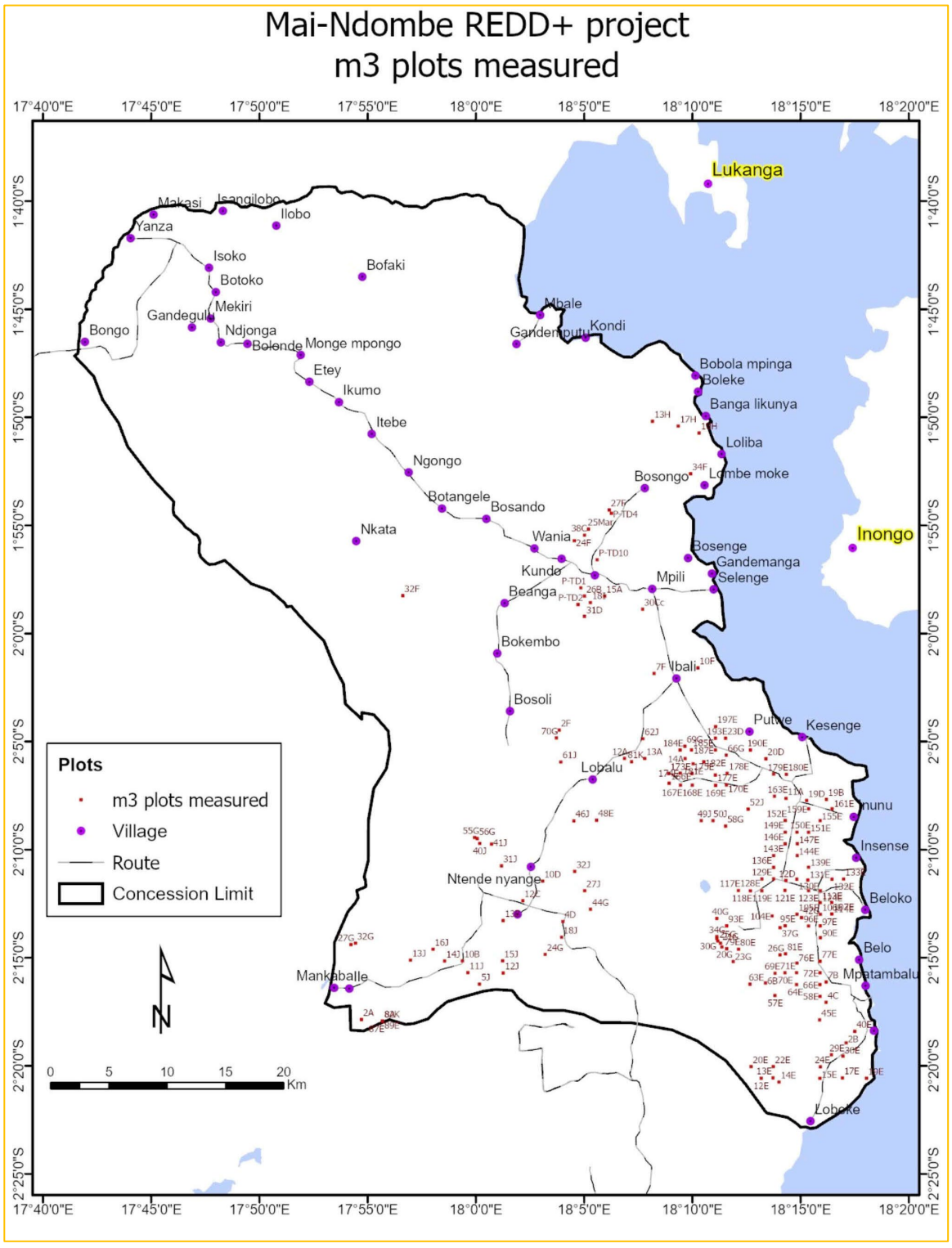

Figure 8: Biomass sample plot locations for the third monitoring period (m_3) in The Lac Mai Ndombe REDD+ Project

Table 15 depicts current measured above- and below-ground biomass carbon stocks by land cover stratum and Table 16 the soil carbon stocks by PAA within the Project Area. Values below have been calculated using the methods of carbon accounting detailed in the VCS Methodology VM0009 V2.0 and this Project's VCS / CCB validated PD.

Table 15: Summary of current carbon stocks within the Project Accounting Area (PAA)

Stratum	Area (ha)	Mean carbon stock (t CO_2e / ha)	Standard error (t CO_2e / ha)	Mean dbh (cm)	Average height (m)
Semi-deciduous forest, Logged FORESCOM	55,244.75	1,079.97	46.62	29.02	N/A
Semi-deciduous forest, Logged SOFORMA	23,205.02	971.61	30.77	25.77	N/A
Semi-deciduous forest, Unlogged	49,476.66	1,100.52	50.25	26.91	N/A
Swamp Forest	121,030.00	967.62	51.31	23.69	N/A

Table 16: Summary of current soil carbon stocks within the Project Accounting Area (PAA)

PAA	Soil accounting area (ha)	Mean carbon stock (t CO2e / ha)	Standard error (t CO_2e / ha)
Accounting Area	248,956.43	79.8	N/A

Calculating Emissions from Burning

Currently, no planned project activities involve the burning of biomass burning in any manner. As such, emissions from burning are not currently included in carbon accounting. However, if future Project Activities should include this emission type, project emissions from burning of biomass shall be calculated using equation [F.42] of the VM0009 V2.0 methodology.

Calculating Emissions from Disturbances

Forest loss from small-scale anthropogenic disturbances did not exceed the de minimis value of contiguous forest loss in the project monitoring plan (250 ha, contiguous) and a value exceeding a 5% reduction in carbon stock. Nonetheless, to accurately capture and account for emissions from deforestation, the project voluntarily opted to utilize Landsat imagery to capture small-scale natural and anthropogenic disturbances within the project accounting area.

Epochal Landsat mosaics consisting of radiometrically normalized composite of Landsat ETM+ (Enhanced Thematic Mapper) and OLI (Operational Land Imager) were used as inputs. These Landsat data are composited from median cloud free pixels for the year, mostly representing the end of the year (Potapov et al., 2020).

A two-step image classification was undertaken. First, a supervised random forest classification was applied to each image. Random Forest image classification supervised land cover classification approach (Wulder et al., 2018; Kashongwe et al., 2020) used to define forest, savanna, water, wetlands, cultivated areas, cloud, and shadow classes. Training data were derived by visual interpretation of both Landsat images. Care was taken to ensure that each vegetation class did not include mixed pixels (i.e. the forest training pixels did not include mixed forest and non-forest pixels) over forest edges and small forest clearings for example. Care was also taken to select training samples across the study area and to ensure that the proportion selected among the different classes reflected the visually estimated class proportions in the project area, to provide approximately similar class training portions as found by random sampling (Kashongwe et al., 2019). A total of 9000 training pixels of 30 m were collected composed of stable primary forest (50% of the pixels), secondary forest (25%), water (4%), savanna (20%), cultivated areas (1%). The classification predictor variables were defined by the Landsat-8 OLI surface reflectance for bands 3, 4, 5, 6, and 7. In addition, normalized difference band ratios, defined like the normalized difference vegetation index (NDVI), for every possible two band combination of these bands were derived. This provided a total of 11 predictor variables. These bands and ratios have been used before for Landsat land cover classification (Hansen et al., 2011).

The training data were used to develop a random forest classification tree using the default parameter settings, i.e., 500 trees were grown with each tree built using 63.2% of the training data selected randomly with replacement and three predictor variables (the square root of the number of predictor variables) randomly selected. The random forest classification was applied to the 11 predictor variables at every 30 m study area pixel. The land cover classification was checked by visual comparison with the Landsat-8 OLI images and with high resolution images.

Second, an unsupervised image classification was also undertaken using an unsupervised isodata clustering algorithm to classify each epochal composite mosaic into classes of interests, that could define deforestation (dense humid forest, secondary forest, savanna, cultivated area and water). Image differencing was performed for two subsequent years for the four time periods (i.e. 2016-2017, 2017-2018, 2018-2019 and 2019-2020). A transition map was retained to be able to follow each pixel's trajectory, to allow for false change checking. A change detection map was then derived with four change categories: forest loss, forest gain, non-forest stable and stable forest.

To check further for false changes, a highly confident wetlands map derived in Bwangoy et al.(2012) was combined with change maps to discard all changes located in wetlands. Wetlands are still undisturbed in the Lake Mai-Ndombe area. The final map was then derived and used to calculate the change areas across the entire project area and in the Project accounting area (PAA).

Emissions Calculation

Emissions for the m_3 monitoring period within the PAA were calculated by multiplying the activity data depicted below in Figure 9 by the Project emission factors. Table 17 below shows calculation of emissions for each year as well as in aggregate for m3.

Table 17: Project Emissions for m_3

Time Period	Loss (ha)	Emissions (tCO2e)
2016-2017	718	813,307
2017-2018	1,778	2,014,286
2018-2019	1,104	1,248,955
2019-2020	1,564	1,778,581
Total (2017-2020)	5,165	5,855,129.30

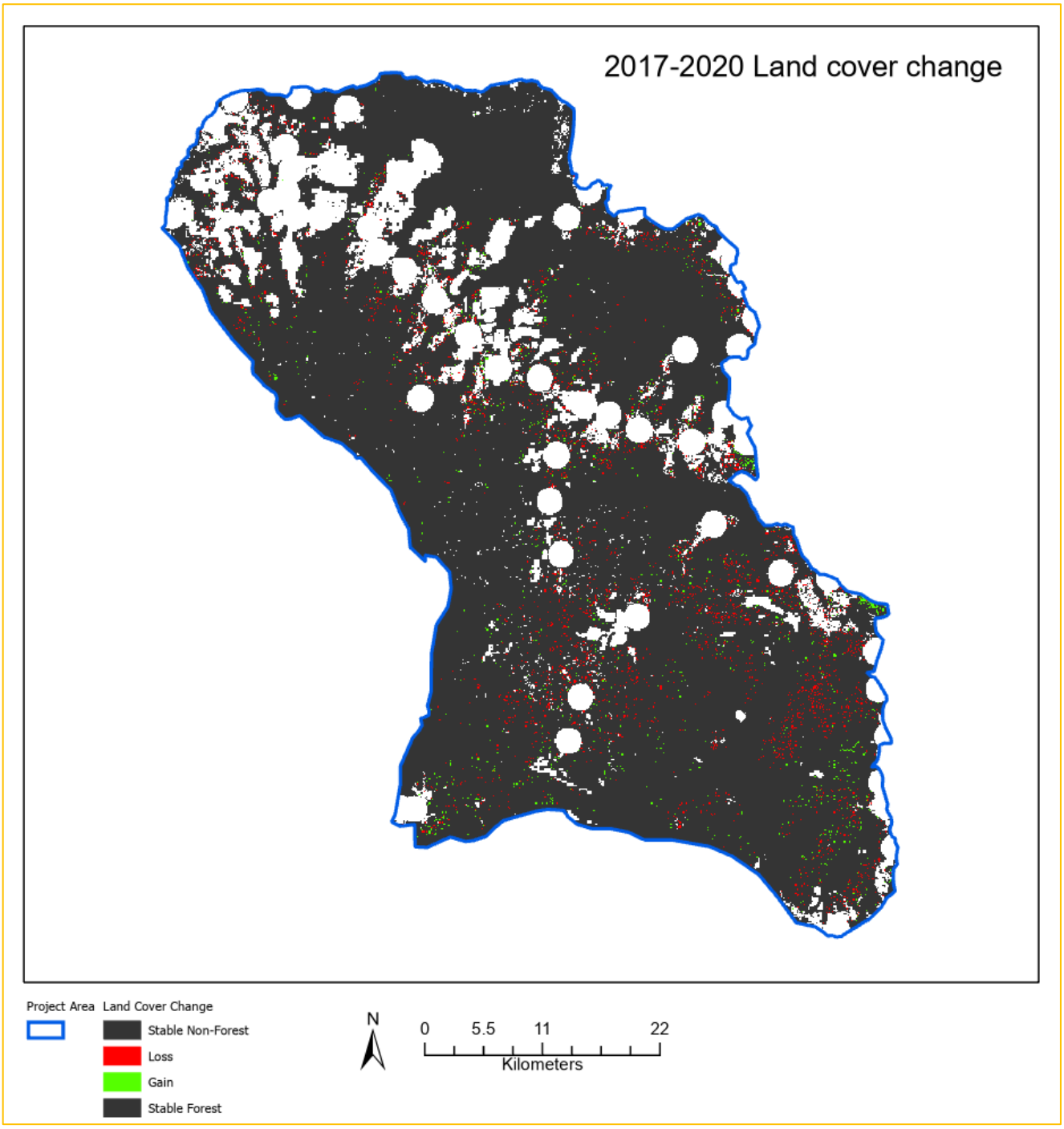

Figure 9: 2017-2020 Landcover Change for the Mai Ndombe REDD+ Project Accounting Area

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3.2.3 Leakage (CL2.1 & CL2.2)

Activity Shifting Leakage

As is discussed in section 3.3.1 of the MNRP VCS PD activity shifting leakage is not applicable to this project. Please refer to the VCS PD for more information.

Market Leakage **(CL3.1.)**

As is discussed in section 3.3.2 of the MNRP VCS PD market leakage is not applicable to this project. Please refer to the VCS PD for more information.

3.2.4 Net GHG Emission Reductions and Removals

3.2.4.1 Determining Reversals

MRR.65 A description of the reversal including which pools contributed to the reversal and reasons for its occurrence.

There have been no reversals in the MNRP during the m_3 monitoring period.

3.2.4.2 Determining Reversals as a Result of Baseline Re-evaluation

MRR.66 A description of the reversal including a summary of new data obtained in the reference area.

There have been no reversals in the MNRP during the m_3 monitoring period and the next baseline re-evaluation period will be in 2022.

3.2.4.3 Quantifying Net Emission Reductions for a PAA

3.2.4.3.1 Determining Deductions for Uncertainty

MRR.61 The confidence deduction $E_U^{[m}$ and estimated standard errors used to determine the confidence deduction.

In accordance with VM0009 V2.0, section 8.4.1.1, the confidence deduction is determined by linearly combining weighted uncertainties (standard errors) from the project accounting area, proxy area and the baseline emission model (BEM). Per VCS AFOLU Requirements, if the total combined error is above 15%, a deduction is applied as the difference between the calculated combined error and 15%. Otherwise, the confidence deduction is zero. The calculated standard errors used for the determination of the confidence deduction were:

- Uncertainty in carbon stock estimates in the project accounting area, ($\boldsymbol{U_P^{[m]}}$): 28.94 tCO2e
- Uncertainty in carbon stock estimates in the proxy area, ($\boldsymbol{U_B^{[m]}}$): 15.62 tCO2e
- Uncertainty in the baseline emissions model (BEM), ($\boldsymbol{U_{EM}^{[m]}}$): 0.009 tCO2e

For m_3, the confidence deduction, as per VM0009 V2.0 equation [F.51] was:

- Cumulative confidence deduction, $\boldsymbol{E_U^{[m]}}$: 0 tCO2e

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

The cumulative confidence deduction, $E_U^{[m]}$, was calculated using VM0009 V2.0 equation [F.51]:

$$E_U^{[m]} = E_{B\,\Delta}^{[m]} \left[\frac{1.64}{E_{B\,\Delta}^{[m]} + A_{PAA} c_P^{[m]} + A_{PX} c_B^{[m]}} \sqrt{\left(U_{EM}^{[M]}\right)^2 + \left(U_P^{[m]}\right)^2 + \left(U_B^{[m]}\right)^2} - 0.15 \right]$$

where:

$c_P^{[m]}$ is total measured carbon stock in the project accounting area; 253,771,004.4 *tCO2e · ha^{-1}*

$c_B^{[m]}$ is total proxy area carbon stock; 100.64 *tCO2e · ha^{-1}*

$E_{B\,\Delta}^{[m]}$ is total change in proxy area emissions; 0 tCO2e

$U_{EM}^{[M]}$ is the total uncertainty for the baseline emissions model (BEM); 0.009 tCO2e

$U_P^{[m]}$ is the total uncertainty in the project accounting area; 28.94 tCO2e

$U_B^{[m]}$ is the total uncertainty in the proxy area; 15.62 tCO2e

A_{PAA} is the area of the project accounting area, 248,956 ha

A_{PX} is the area of the proxy area; 29,361.2 ha

All reference calculations can be found in the PAA and Proxy Area Carbon Inventory worksheets.

3.2.4.3.2 Determining Buffer Account Allocation

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

The buffer account allocation for the MNRP is calculated according to the requirements stated in the VCS Standard Version 3.4, VCS Registration and Issuance Process Version 3.4, and the VCS Non-Permanence Risk Tool Version 3.2.

For m_3, the non-permanence risk score is 10%, as it was in m_2. The score was 25% in m_1, with the change in score mainly due to the increased community engagement achieved during m_2, as the MNRP has now been able to consult with more than 50% of households with the project area who are reliant on the project. This resulted in a change in score for total community engagement from 10 to -5. Total

external risk, which includes total community engagement, therefore dropped from 14 to 0. There was also a more modest drop in the total internal risk category due to a change in the project proponent's financial viability, which resulted in the calculated financial break-even point being closer in time to the current risk assessment (see justification details in the MNRP non-permanence risk report) and also the implementation of an adaptive management plan (SBIA / causal model) during m_2. These factors have all remained constant in m3, resulting in the risk score being maintained at 10%.

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

The non-permanence risk score is calculated using the non-permanence risk tool v3.2 (see Annex 23 – Non-Permanence Risk Tool) which combines risk ratings for internal risk, external risk and natural risk. Risk ratings per category were calculated as follows:

Internal Risk

- Project Management: -4
- Financial Viability: 0
- Opportunity Cost: 6
- Project Longevity: 5
- Total Internal Risk: 7

External Risks

- Land Tenure and Resource Access/Impacts: 0
- Community Engagement: -5
- Political Risk: 4
- Total External Risk: 0

Natural Risks

- Total Natural Risk: 1

Overall Risk Rating: 10 (the actual score is 7, but the minimum score under the tools guidance is 10)

Per VCS Registration and Issuance Process v3.4, the percentage of emission reductions equal to the overall risk rating shall be deducted from net calculated emission reductions and placed in the non-permanence buffer pool. As such, for m_3, the overall buffer credits were calculated to be 10% of gross emission reductions, 25,096,232 tCO_2e:

Overall m_3 risk of reversal buffer contribution: **2,509,624 tCO2e**

Please refer to Annex 17 – MNRP NER Worksheet for calculation details.

3.2.4.3.3 Net Emission Reductions for a PAA

MRR.67 Quantified NERs for the current monitoring period including references to calculations.

Please refer to Table 18, Annex 17 – MNRP NER Worksheet

MRR.68 Quantified NERs for the prior monitoring period.

Please refer to Table 18, Annex 17 – MNRP NER Worksheet

MRR. 69 A graph of NERs by monitoring period for all monitoring periods to date.

Please refer to Annex 17 – MNRP NER Worksheet

3.2.4.4 *Ex-Ante* Estimation of NERs (CL1.2 & 1.4)

MRR.75 Quantified NERs by vintage year for the current monitoring period including references to calculations.

Table 18: The GHG reductions, Project Emissions, Leakage Emissions and Net Emission Reductions (NERs) for the monitoring period.

Year	Baseline emissions or removals (tCO_2e)	Project emissions or removals (tCO_2e)	Leakage emissions (tCO_2e)	Project Gross Emission Reductions (tCO_2e)	Buffer Contribution emissions reductions (tCO_2e)	Net GHG emission reductions or removals (tCO_2e)
2017	5,896,091	813,307	0	5,082,784	508,279	4,574,505
2018	7,272,586	2,014,286	0	5,258,300	525,830	4,732,470
2019	8,243,440	1,248,955	0	6,994,486	699,449	6,295,037
2020	9,539,244	1,778,581	0	7,760,663	776,066	6,984,597
Total	**30,951,362**	**5,855,129**	**0**	**25,096,232**	**2,509,624**	**22,586,608**

3.2.4.5 Evaluating Project Performance

MRR.76 Comparison of NERs presented for verification relative to NERs from ex-ante estimates.

The NERs presented for the verification of the m_3 monitoring period are greater than the ex-ante estimates at m_1.

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

The NERs presented for the verification of the m_3 monitoring period are greater than the ex-ante estimates at m_1. The first reason for this is that this monitoring period covers more elapsed time than was estimated at m_1 for the m_3 monitoring period. As well, the biomass inventory plots are designed to capture both the regrowth of degraded forest and any deforestation or forest degradation that may occur within the Project Area. With the re-measurement of the plots at this monitoring period the carbon stock values were found to be a little lower than at m_1 monitoring period. This is the result of a small number of plots having been degraded by extractive activities. As well, the Project has lowered the risk rating for the project using the VCS Non-Permanence Risk Tool, as a result of stronger financial conditions and more extensive community engagement, resulting in a lower buffer pool contribution, and greater NERs. Therefore, on balance the Project is receiving more credits at this monitoring period than was predicted by the ex-ante estimates at m_1.

3.3 Optional Criterion: Climate Change Adaptation Benefits

Demonstrate that current or anticipated climate changes are having or are likely to have an impact on the well-being of communities and/or biodiversity in the project zone (GL1.3.)

Communities in Africa are widely expected to be more vulnerable to climate change than populations in other parts of the world due to the conflation of three factors: a higher than global average degree of change; high levels of dependence on natural resources and forest goods and services; and a low degree of

adaptive capacity[12]. Africa's low adaptive capacity is due largely to extreme poverty, frequent natural disasters, agriculture that is heavily dependent on rainfall, and other structural weaknesses[13].

The DRC is among the world regions with the lowest food security and the lowest ability to adapt to future changes, as indicated in the human development index[14]. This situation applies to the communities within the project area as. For example, there was long drought period in 2011 which adversely impacted crop yields.

Furthermore, human health is predicted to be adversely affected by projected climate change in Africa. In recent years, it has become clear that climate change will have direct and indirect impacts on diseases that are endemic to Africa. For example, recent data from West Africa indicate that the risk of new epizootic diseases is increasing in the region, with, for example, significant exposure to the Rift Valley Fever virus among livestock herders and wildlife rangers during the wet season[15]. In the past, this disease-related impact has been observed in the project area with an observed increase in malaria.

3.3.1 Activities and/or Processes Implemented for Adaptation (GL1.4)

The Project has implemented many project activities that will assist communities and biodiversity to adapt to the most probable impacts of climate change. The foremost of these is the protection of the forest from deforestation, degradation and fragmentation. This will protect important healthy habitat for the biodiversity, providing greater population resilience to the effects of climate change. As well this will provide the communities with greater resources, help support more sustainable hydrological systems, and help moderate the impacts of severe weather. The Project is additionally supporting the improvement to and diversification of agricultural methods. This will help support greater nutrition and better yields despite shifting climate driven weather patterns. The Project is also supporting new and diversified income generating opportunities, reducing the communities' reliance on forest resources, fishing and agriculture. With a more diversified array of income sources, they will be better able to handle any climate change related impacts to fishing and agriculture.

3.3.2 Describe measures needed and taken to assist Communities and/or biodiversity to adapt to the probable impacts of climate change based on the causal model that explains how the project activities will achieve the project's predicted adaptation benefits (GL1.4, V3: GL1.3.).

[12] Peach Brown, H.C. 2011. Gender, Climate Change and REDD+ in the Congo Basin of Central Africa. International Forestry Review 13(2):163-176.

[13] United Nations. 2009. Impact of climate change on the development prospects of the least developed countries and small island development states. UN Office of the High Representative for the Least Developed Countries.

[14] United Nations Development Programme (UNDP). 2011. Human development index. Human Development Reports. Retrieved from: http://hdr.undp.org/en/statistics/hdi/

[15] Parry, M. L., O.F. Canziani, J.P. Palutikof, P.J. van der Linden and C.E. Hanson (eds). 2007. Cambridge University Press, Cambridge, United Kingdom and New York, NY, USA.

Table 19: Climate change risks, potential effects, and potential mitigative/adaptive strategies

Climate Change Risks	Potential Effects	Potential Mitigative/Adaptive Strategies
Pockets of rain in the dry season	Could have positive effects on some agricultural species, such as banana, plantain, and cassava	Extend cultivation of appropriate species over a wider area/time
Drying of swamp forests and some watercourses	Could have a positive impact on the growing of some crops and the number of growing cycles	Expansion of production and yields
Drying of swamp forests and some watercourses	Could have a negative impact on availability of building materials (e.g., palm fronds for thatch), availability of food sources, and transportation by pirogue (a type of canoe)	Other types of roofing materials could be made available through the project, some of which would be longer lasting
Torrential rains in the rainy season	Cassava tuber rot	Seek improved seeds, relocate fields
Pockets of drought in the rainy season	Withdrawal of wildlife, reduced crop production	Reduce the pressure of illegal hunting on stressed wildlife species, protect terra firma forest, seek more tolerant crop/seed varieties
More intense and longer heat spells/dry seasons	Increase in the number of bush fires; death of seedlings planted as a project activity; fewer edible caterpillars and mushrooms and other non-timber forest products; decrease in fish stocks; animal morbidity; outbreak of diseases such as malaria and typhoid; loss or degradation of community water sources; crop failures	Raise awareness of the dangers of bush fires; plant a wider variety of species increasing percentage survival; use more drought-resistant nitrogen-fixing crops; plant caterpillar host plants; promote improved livestock-raising techniques; improve access to health care and provide education on disease prevention measures; improve access to potable water through creation of wells and other means; diversify crops and reduce monocropping; agroforestry techniques such as interplanting and use of shade trees
Low capacity of local populations to adapt to frequent natural disasters	Increase in periods of food insecurity, potential increase in disease and deaths with continuing very low health standards, potential for increasing intercommunity conflict	Increase support of local institutional structures, including the norms and rules of governance, to help develop adaptive strategies; increase literacy levels; diversify livelihood activities and income generation projects; involve women to a greater degree in decision-making processes, increase general participation in decision making at the local level
Increase in high winds	Loss of branches of multipurpose trees, damage	Plant trees around important species as wind breaks; contribute project funds to

	to poorly constructed structures	building renovation and construction using better building standards
Decreased biodiversity, loss of forest cover to drought, temperature change	Reduction in species, more species at risk	Help to maintain intact and interconnected ecosystems through protection of the primary forest; plant species more resistant to the climate change that is occurring

describes the expected climate changes in the Project zone, their effect on the communities or biodiversity and the Project's adaptive strategy. The Project is also employing adaptive management; therefore, as new climate change risks and/or effects are identified during the Project's lifetime new adaptive strategies will be developed and implemented. These strategies will also be community based and will include women representatives. The Project's casual model is shown in the PD Sections 2.1.11. These results chains demonstrate the how the Project activities will achieve the Project's stated adaptation benefits.

Table 19: Climate change risks, potential effects, and potential mitigative/adaptive strategies

Climate Change Risks	Potential Effects	Potential Mitigative/Adaptive Strategies
Pockets of rain in the dry season	Could have positive effects on some agricultural species, such as banana, plantain, and cassava	Extend cultivation of appropriate species over a wider area/time
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Drying of swamp forests and some watercourses	Could have a negative impact on availability of building materials (e.g., palm fronds for thatch), availability of food sources, and transportation by pirogue (a type of canoe)	Other types of roofing materials could be made available through the project, some of which would be longer lasting
Torrential rains in the rainy season	Cassava tuber rot	Seek improved seeds, relocate fields
Pockets of drought in the rainy season	Withdrawal of wildlife, reduced crop production	Reduce the pressure of illegal hunting on stressed wildlife species, protect terra firma forest, seek more tolerant crop/seed varieties
More intense and longer heat spells/dry seasons	Increase in the number of bush fires; death of seedlings planted as a project activity; fewer edible caterpillars and mushrooms and other non-timber forest products; decrease in fish stocks; animal morbidity; outbreak of diseases such as malaria and typhoid; loss or degradation of	Raise awareness of the dangers of bush fires; plant a wider variety of species increasing percentage survival; use more drought-resistant nitrogen-fixing crops; plant caterpillar host plants; promote improved livestock-raising techniques; improve access to health care and provide education on disease prevention measures; improve access to potable water through creation of wells and other means; diversify crops and reduce

	community water sources; crop failures	monocropping; agroforestry techniques such as interplanting and use of shade trees
Low capacity of local populations to adapt to frequent natural disasters	Increase in periods of food insecurity, potential increase in disease and deaths with continuing very low health standards, potential for increasing intercommunity conflict	Increase support of local institutional structures, including the norms and rules of governance, to help develop adaptive strategies; increase literacy levels; diversify livelihood activities and income generation projects; involve women to a greater degree in decision-making processes,[16] increase general participation in decision making at the local level
Increase in high winds	Loss of branches of multipurpose trees, damage to poorly constructed structures	Plant trees around important species as wind breaks; contribute project funds to building renovation and construction using better building standards
Decreased biodiversity, loss of forest cover to drought, temperature change	Reduction in species, more species at risk	Help to maintain intact and interconnected ecosystems through protection of the primary forest; plant species more resistant to the climate change that is occurring

3.3.3 Activities and/or Processes Implemented for Adaptation (GL1.4)

Please refer to Section 2.1.1 for a detailed description of the Project's implementation status and the Concession Contract under the Social Clause (Cahier de Charge) to view the main project activities. This section will include a brief overview of implemented project activities and how they specifically assist communities and biodiversity adapt to climate change.

Communities

The implemented activities to assist communities with the adaptation to probable impacts of climate change includes the direct employment by the Project, training on new income generating activities, training on new agricultural and fishing methods, and improved infrastructure such as bridges and lake transport. All activities will help mitigate the most probably impacts of climate change for communities, notably reduction in agricultural yield due to climatic changes and loss of income and damage from flooding.

Biodiversity

The most primary and most vital Project activity for to assist biodiversity is the protection of the Project area from deforestation and degradation. Through the maintenance of the native forest condition in a unfragmented state, it will provide the forest ecosystem with the greatest resilience against the most

[16] The Readiness Preparation Plan (R-PP) of the DRC (Ministry of Environment, Conservation of Nature, and Tourism) has pledged to make sure that gender issues are streamlined throughout the REDD+ readiness process to make sure gender dimensions are addressed in community forest management and the distribution of benefits (Peach Brown, 2011).

probable impacts of climate change. This will provide the biodiversity with continued food and water sources in a sustainable fashion, and a stable habitat.

4 COMMUNITY

4.1 Net Positive Community Impacts

4.1.1 Community Impacts (CM1.1)

Table 20: Community Impacts

Activity Area	Community Capacity Building and Social Capital
Community Group	Community in general
Impact	Improved community well-being
Type of Benefit/Cost/Risk	Long term impact
Change in Well-being	Activities under the theme of community capacity building and social capital involve building the local capacities of communities through workshops and information sessions, the establishment of CLDs, and the creation and execution of local development plans. The tangible, measurable outputs for these activities will include completed training activities, establishment of CLDs in each village, and the completion of local development plans. The Mai Ndombe REDD+ project expects that outcomes and short-term impacts resulting from these outputs will include increased local knowledge and skills with respect to participatory, democratic decision making and management-oriented processes related to community development. Short- and medium-term impacts resulting from this increase in knowledge and skills include the communities' ability to collectively and locally respond to community issues, and an increased local capacity for governance, administration, and problem solving. Ultimately, as these skills are developed, assisted, and enhanced, the long-term result will be improved community well-being.

Activity Area	Infrastructure Development, Education, and Health
Community Group	Community in general
Impact	Improved community well-being
Type of Benefit/Cost/Risk	Long term impact
Change in Well-being	Both health and education infrastructure development have been identified by the communities as high-priority focal areas

	for project activities. These infrastructure developments are expected, over the longer term, to increase the quality and accessibility of health and education. Accessibility of both education and health are key project outcomes as project activities will increase the numbers of students who have access to schools and who will graduate; more people will have access to timely medical care, rather than walking many kilometres for care or reverting to non-medically proven remedies. The expected short- to medium-term impacts of these outcomes are increased level of education and health, and, subsequently, increased local capacities and increased life expectancy. Ultimately, the long-term result of these activities is estimated to be improved community well-being.

Activity Area	Agricultural Improvement, Diversification, and Economic Opportunities
Community Group	Community in general
Impact	Improved food security and resilience; Improved family, community well-being
Type of Benefit/Cost/Risk	Long term impact
Change in Well-being	Agricultural improvement and diversification activities that increase food availability and sustain economies were identified as a key focal area by project area communities during initial consultations and CLD-building workshops. Tangible and measurable short-term outputs are the establishment of a tree nursery, agroforestry, and agriculture demonstration plots and the construction of domestic animal enclosures. The expected outcomes resulting from these outputs are the dissemination of effective agricultural techniques and other knowledge. These outcomes are intended to subsequently lead to impacts of increased quantity, diversification, and value of crops for market. As well, agricultural techniques are expected to become more sustainable and the nutritional value of harvests is expected to improve. Ultimately, these activities are estimated to have the long-term impacts of improved food security and resilience for communities, which will improve family and community well-being.

4.1.1.1 Result Chain Diagrams **(CM1.1)**

In measuring and monitoring impacts of the MNRP on the local communities, Wildlife Works applies the cause-and-effect logic and associated theories of change. A theory of change is a hypothesis about how a project intends to achieve its intended objectives. Because they are based on several assumptions

about the cause-and-effect relationships, carefully selected indicators are needed to monitor these assumptions in a causal chain analysis. The main strength of this logic lies in presenting a credible response to the challenge of attribution: indicators measure progress towards achieving the desired project outcomes and impacts from project activities and strategies. To design this, Wildlife Works holds Social and Biodiversity Impact Assessment (SBIA) community workshops to engage the community in thinking about how things would have been without the project, envisage how they may be with the project, and identify any potential risks and negative impacts.

For the MNRP, Wildlife Works held two community workshops reported in detail during m2. They identified six Focal Issues that they felt were both critical to their wellbeing and successful implementation of the REDD+ project. A result chain diagram was then produced for each issue during the workshops, which formed the basis of indicator identification and the monitoring plan (see further).

4.1.1.2 Risks and negative impact analysis (CM2.1)

At project initiation, the Mai Ndombe project team reviewed the full range of potential negative community impacts arising from REDD+ projects which center around reduced availability of land for agriculture and associated reduction to food supply, reduced availability of timber and non-timber forest products, potential conflict or disruption to traditional social or governance structures and external impacts like increased migration to the project area. The SBIA community workshop participants were also tasked with identifying possible risks to project success, plus unexpected side effect(s) from the REDD+ Project successfully realizing the desired results (based on the Focal Issues they identified and associated theories of change above). Additionally, they were also required to gauge the likelihood and magnitude of these unintentional side effects then propose possible mitigation which formed the basis of the risks and negative impact assessment from the community's perspective.

4.1.2 Net Positive Community Well-Being Impacts (CM1.1)

The community project activities undertaken and summarized under section 2.1.1.2 were all determined by the community themselves based on the outcomes of the SBIA workshops as described under section 4.1.1.1 above. Consequently, based on the theory of change logic, we argue that the MNRP is having positive impacts to the local communities by addressing the main problems they identified e.g., through water projects, school infrastructure improvement, and agricultural intensification. Whereas the impacts at household level are sometimes going to take a long time to be felt, the results chain demonstrate how these will come about from the current project activities, i.e., the theory of change elaboration. In general, the MNRP has been designed from the ground up to provide net positive community well-being impacts. The prospects for these communities in the without project scenario was evident from the condition they were in as of the project start date as further elaborated during the SBIA workshops. According to the community, most of these key social issues would deteriorate in the absence of the REDD+ project, with a few remaining unchanged. This was mostly attributed to minimal external or State investment initiatives in the area, poor or little oversight and law enforcement, lack of alternative sources of income for the communities, and lack of awareness or community sensitization, education and training opportunities.

4.1.3 Protection of High Conservation Values (CM1.2)

Section CM1.2 of the MNRP CCB PDD discusses the HCV's that have been identified for the MNRP and indicates how they are likely to be positively impacted by our project activities. Indeed, the implementation of project activities under the current monitoring period will not have any negative effects on the following three community HCVs identified for the MNRP:

1. Areas that provide basic ecosystem services in critical situations: HCVs under this category included forests critical to water catchments (ecological interconnectedness and protection of the high-priority Lake Mai Ndombe freshwater designated area, and the Tumba-Ngiri-Mai Ndombe wetland) and barriers to destructive fire (drying microclimate and increasing tropical forest fire frequency and severity). Ongoing protection of the natural forest through conversion of the land-use concession from unsustainable logging to protected status positively impacts this HCV.
2. Areas that are fundamental to meeting the basic needs of local communities: HCVs under this category are fish habitats dependent on the health of forest-riparian-supported spawning areas; non-timber forest products; and supplies of wood for cooking, and vines and poles as raw materials for building and crafts. Again, the protection of indigenous forests through conversion of the land-use concession from unsustainable logging to protected status inherently provides significantly positive effects for this HCV through retention of basic access to forests by the communities, especially for the utilization of non-timber forest products.
3. Areas that are critical for the traditional cultural identity of communities: HCVs in this category are sacred sites within the project zone's forests, including burial and spiritual sites as well as non-timber forest products frequently used for artistic and traditional purposes. Protection of forests through conversion of the land-use concession from unsustainable logging to protected status inherently provides an increased level of protection for this HCVs compared to the baseline.

4.2 Offsite Stakeholder Impacts

4.2.1 Mitigation of Negative Impacts on Other Stakeholders (CM2.2)

Please see the CCB PD section 2.2 for a detailed description of the Project's plan to mitigate negative impacts on stakeholders. The two potential offsite stakeholder impacts, namely reduction in volume of resources that are extracted from the project area and increased competition related to an increase in the quality and/or quantity of agricultural products exported from the project area are only anticipated to occur minimally, if at all. Most of the previously harvested wood was not processed anywhere in the DRC but were exported out of the country, while the supply of bush meat in the baseline scenario was non-sustainable and in severe decline due to overhunting and habitat loss, whereas project agricultural-related activities intend to improve options for protein sources. Nonetheless, our continuous monitoring activities will incorporate measures to address any potential negative offsite impacts should they become apparent.

4.4.2 Net Impacts on Other Stakeholders (CM2.3)

As described in the preceding section, the Project is unlikely to have any negative impacts on offsite stakeholders. We argue that project activities will, at the very least, do no harm to offsite stakeholders because project activities are designed to positively impact stakeholders both within and outside the project area. Besides higher revenues to government from the concession agreement itself, no activity-shifting leakage is expected as there will be no displacement of population from the project area elsewhere. Therefore, there will be no offsite impacts to humans or biodiversity.

4.3 Community Impact Monitoring

4.3.1 Community Monitoring Plan Development (CM3.3)

As indicated under sub-section 4.1.1.1, the MNRP applies the theory of change causal model to think about, formulate and justify the various project activities and strategies, as well as design and develop the project indicators and monitoring plan that tracks key project outputs and outcomes. The key social

issues raised by the MNRP project communities as being both critical to their wellbeing and successful implementation of the REDD+ project were:

1. Forest degradation, including non-compliance of forest conservation
2. Excessive exploitation, including fishing and non-compliance with environmental legislation
3. Extreme poverty, including lack of jobs
4. Unsustainable agriculture, including lack of agricultural extension and feeder roads to market
5. Poor health
6. Poor education standards

4.3.2 Community Monitoring Plan Results (CM3.1, CM3.2, GL2.5)

4.3.2.1 Project Activity m3 Implementation Status **(1 January 2017 - 31 December 2020)**

Indicators and monitoring results for community-related project activities were based on the results chains and theory of change models derived from the SBIA community workshops. As the MNRP continues into m_3, we have employed an adaptive management approach during project implementation, allowing for stakeholder feedback and suitable adaptation in response to emerging issues and/or changing circumstances on the ground (see section 2.2.4). The major community activities undertaken during the third monitoring period (m_3) are described in detail herein below (see also sub-section 2.1.1.2):

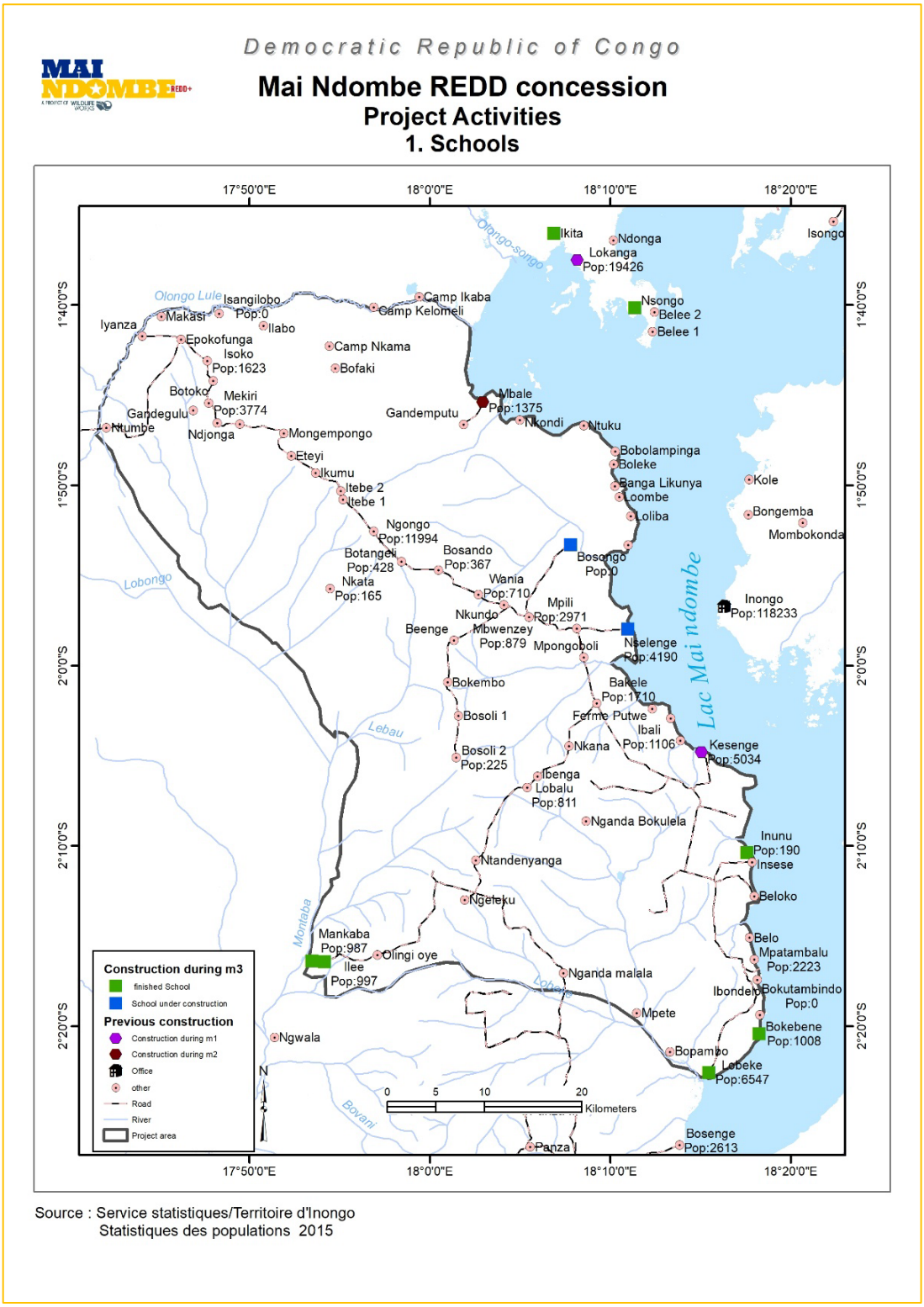
1. Schools and education support

School design and construction, being the MNRP's most significant and costly project activity, is a multi-year process. As such, design, construction, maintenance and improvement occur throughout multiple monitoring periods. Extreme conditions in the project area demand constant upkeep for the schools long after they have been built. Maintenance (painting, roof repair, etc.) as well as replenishing of supplies and school furniture are therefore part in parcel of the school design and construction process. During the third monitoring period, seven school buildings have been constructed in 7 different villages in the project area. The 7 schools were built in: Nsongo and Ikita (pygmy village) in the project zone; Bokebene, Inunu, Ilee, Lobeke and Mankaba. The school in Lobeke has been completely finalized. Due to lack of plywood, the schools in Bokebene, Ikita and Nsongo are completed but ceiling has not been completed yet. Students have been attending the constructed schools in all these villages.

Four new school building have been started in Nselenge (a campus of 2 schools) and in the villages of Bosongo. Also, due to congestion of the Ikita school with students coming from the neighbouring Bantou village of Lokanga, the community decided to build another school for the part of Lokanga village located near Ikita. Construction materials have been brought on site and the brick making process is underway for these new schools. School benches construction is an important related activity happening in the shop that has been set up in Inongo. Benches have been produced and provided to schools in Lobeke, Inunu, Mbale and Ikita. More benches are being made in Inongo for other schools in the project area.

Additionally, due to inadequate support from the Government, some schools in the project area have also been supported financially by the project towards payment of teacher salaries, especially in the villages of Ikita (Elementary and Secondary school), Nsongo (primary school), Inunu (elementary school) and Bosongo (elementary school). Similarly, national exam school fees remains a significant burden for parents in the project area. Where needed, MNRP pays for these fees as recommended and determined by the respective Local Development Committees (CLDs). So far, school fees have been paid for students in Lokanga, Mbale and Lobeke. Lastly, school uniforms have also been provided to students in certain schools namely Ikita, Nsongo and Inunu, again as recommended and determined the area CLDs.

Figure 10: School activities during m3



Source : Service statistiques/Territoire d'Inongo
Statistiques des populations 2015

Figure 11: Map of schools built or under construction during the m3 monitoring period

2. Healthcare facilities

During this monitoring period, one healthcare facility was built and completed in the village of Ibali. The main structure of the building was done in 2020, whilst plastering, painting and ceiling have been completed in 2021 after a long delay due to lack of plywood in the market. Beds, mattresses and bedding sheets have been purchased for the clinic. We are now working with the national and local Governments to get a doctor and nurses appointed for the clinic. Laboratory equipment will be purchased from the US after discussion with appointed doctor/nurses and health officials on the most appropriate and required equipment.

The Lokanga secondary hospital is next to get renovated and extended. Construction materials are being bought in Kinshasa and being shipped to Inongo. Local community members are starting to collect local materials (stone and sand) as part of their contribution to the activity.

The mobile clinic is also an important activity that has been a focus of the MNRP since its inception. It was established under the MNRP in collaboration with the Territory Health Commissioner and happens at least twice a year, including during the COVID-19 epidemic. Additionally, Measles and Rubella happen periodically in the project area due to lack of vaccination for children. The most important epidemic happened in 2019 across several villages including Mpata Mbalu, Kesenge, Ibali, Mbale, Lokanga and Nsongo. The mobile clinic was successfully deployed in these villages to step up vaccinations and stop the spread of these diseases to other villages.

Figure 12: Construction phase of the health facility in Ibali

3. Agricultural intensification and diversification

a. Improved Yield Cassava: Cassava bread is the most important food in the diet of the Mai-Ndombe community. Cassava production has been recently affected by cassava root

fungus (mosaic) which has destroyed many plantations in the region. Following this situation, plant breeders have developed improved cassava varieties resistant to the fungus and providing high yield in marginal soils. MNRP has acquired these biological materials which have been successfully tested in 3 different sites in the project area. Two of the varieties have been further cultivated in the project area to provide cultivated materials to local communities. Multiplication farms have been set up in Loombe, Lokanga and Nsongo. Local community members then requested those improved yield casava sticks and created their own farms with support from our team of agronomists. The Gender Empowerment Section of the MNRP has been especially instrumental in helping women in the project area with their cassava plantations.

b. Agriculture villages: Farm animal divagation within villages is an important deforestation driver in the project area because community members avoid farming within their villages due to fear of destruction of their farms by these animals, mostly pig, goat, and sheep. The Agricultural village brings together all the animals to an enclosure in a marginal fallow next to the village. The enclosure is large enough to avoid interaction between different species. Several highly nutritious plant species are planted in certain sectors of the enclosure to feed the herbivores. This allows local community members to freely farm near their villages and to stop expanding to the primary forest. After having been successfully tested this concept in the Agricultural village of Loombe, the second agriculture village has been set up in Nkondi village located between Mbale and Loombe.
c. Demonstration gardens: these were initiated at the beginning of the project during m1. Gardens have now been set up in several villages across the project area. This activity continued during this monitoring period with the main objective of producing diverse agricultural products such as tomatoes, onions and vegetables both for local use as well as for sale, thereby avoiding having to purchase them externally, e.g., from Kinshasa. This monitoring period did not see a very high production for onions, beans and tomatoes because it was a particularly wet period, although certain communities such as in Mbale were able to produce onions. Nonetheless, yields for other crops (e.g., cucumber, eggplant, vegetables, etc.) was still high in several villages including Mbwe Nzey, Kesenge, Mpili, Nsongo, Loombe and Kesenge.

Figure 13: Agricultural intensification and diversification of yields

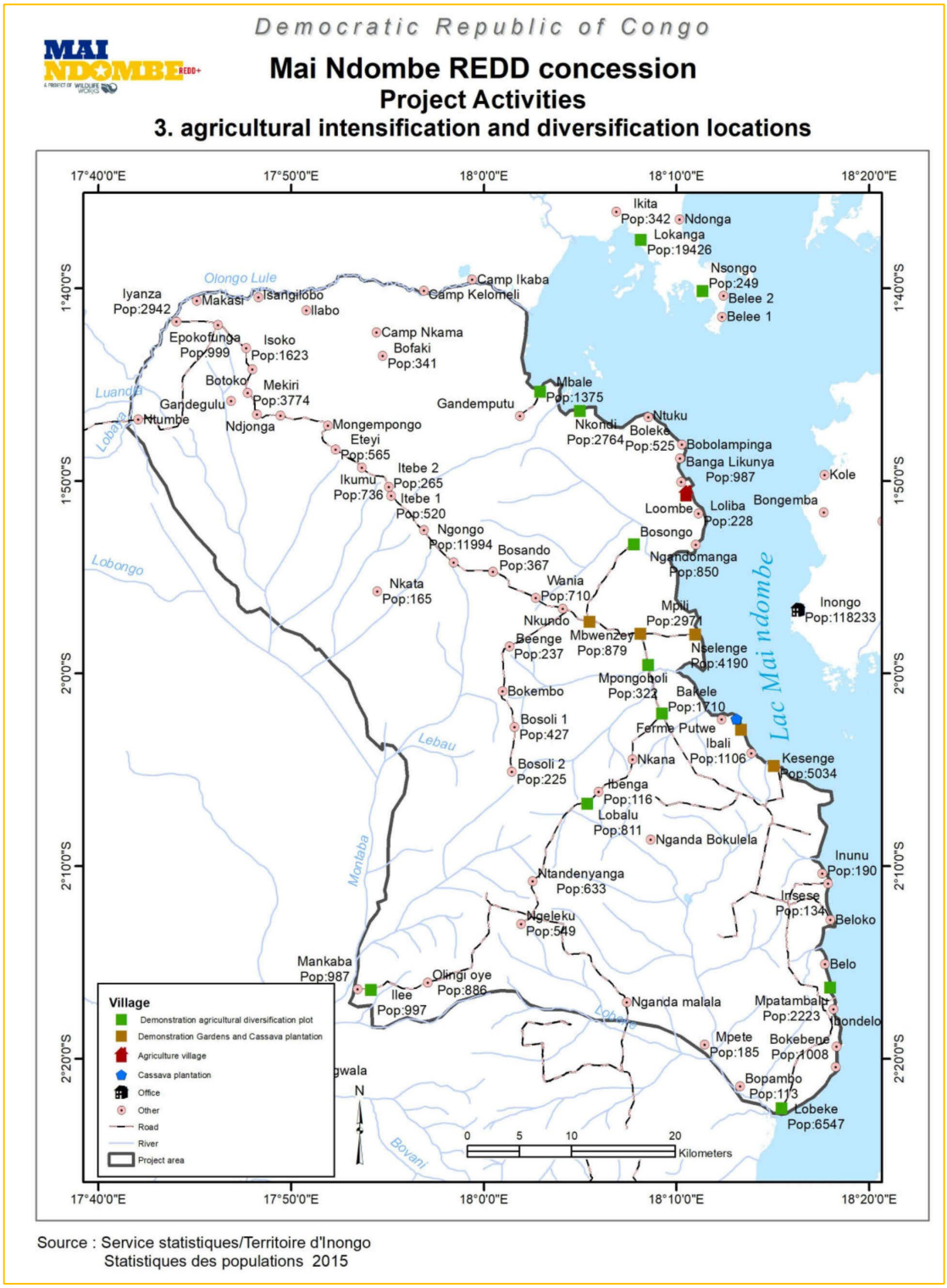


Figure 14: Agricultural intensification and diversification locations

4. Food security and nutrition

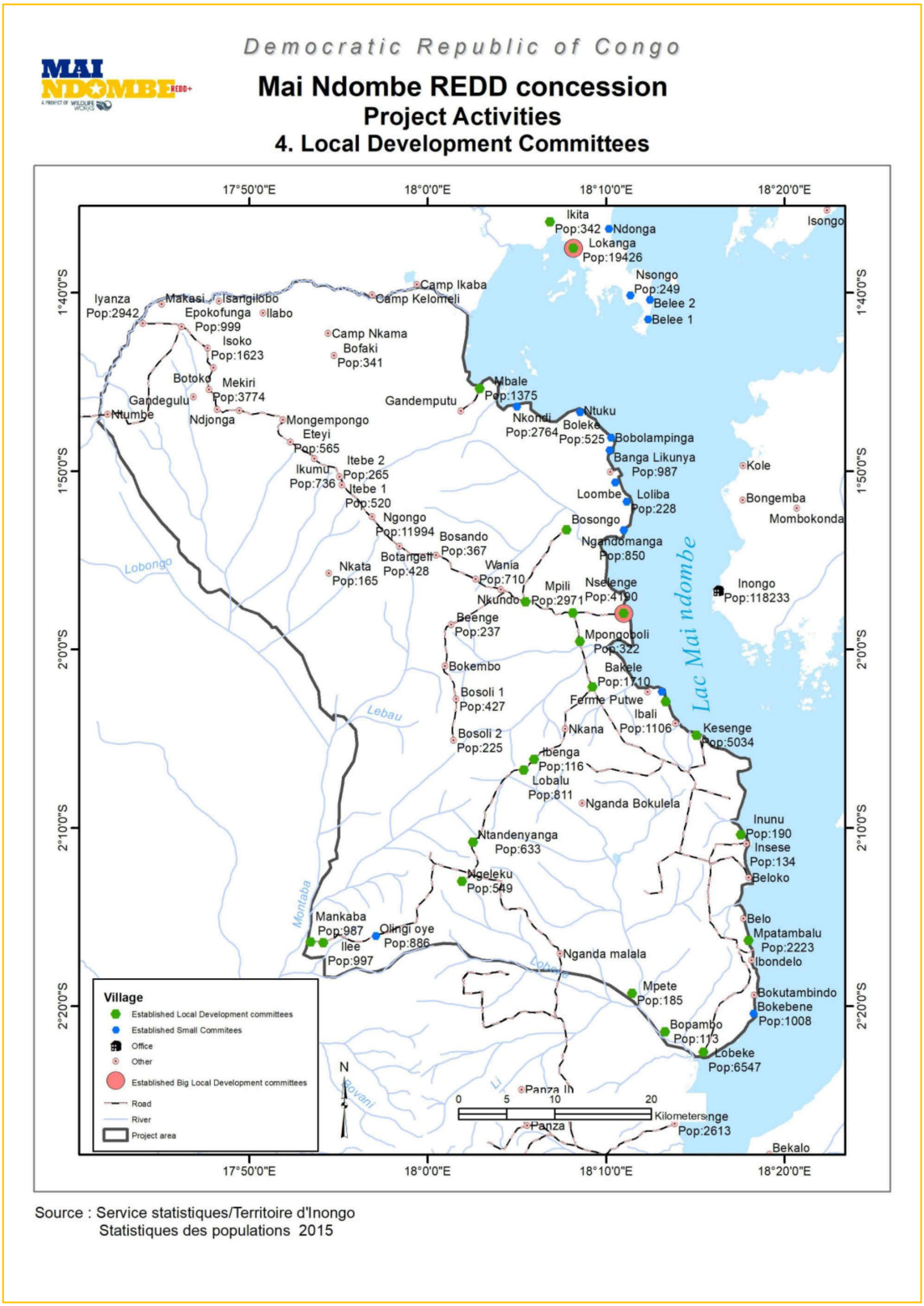
a. Fishing: The local communities living in and around the MNRP are generally below the poverty line and heavily rely on subsistence agriculture. Health and nutrition status remains extremely poor, with over a third of children under-five being chronically malnourished. Fishing used to be the most important activity for numerous people in the project area up to the coming of mosquito net for fishing in the Lake Mai-Ndombe, which has contributed to the depletion of the lake. The main objective for our fishing program is to create fish farms (ponds) which will provide food for local community and also to create a subprogram with the aim of replenishing the Lake with local fish. Seven ponds (e.g., Fig. 15) were built during m3 in the Agriculture village of Loombe as a starting point for this program. *Tilapia nilotica* and *Clarias* sp. have been successfully introduced in these ponds and are now being fed using local nutriments. The growing of these fish in the ponds allows us to project a successful activity in the coming months.
b. Potable water: To solve the problem related to water born disease, the MNRP is implementing solutions that are affordable, allowing communities to meet their need for potable water. We have acquired a low-cost drilling machine which has proven its usefulness and effectiveness in some part of the African continent and in Kinshasa, as a means of increasing the availability of potable water in remote villages. Hydrogeology is highly favorable for light equipment drilling and the secure water table can be reached on less than 50 meters from the surface in most of the project area. By bringing this low-cost water drilling rigs, we can now bring water to the more than 100,0000 people in the project area. Five wells are being built in the project area in Mbale, Lobeke, Loombe and Lokanga (Figure 16).

Figure 15: Example of fishponds under development in the MNRP

Figure 16: Initiated potable water projects across the MNRP

5. Local Development Committees

Capacity for Local Development Committees (CLD's) were renewed and reinforced across several villages in the Groupements across the MNRP (Fig. 17). These CLDs have been a vital cog in supporting all project activities on the ground as their membership represents the Groupements for all major decisions related to the MNRP. CLDs are instrumental in conveying all forms of project-related information to the communities through community meetings.



Source : Service statistiques/Territoire d'Inongo
Statistiques des populations 2015

Figure 17: Comités Local de Développement (CLDs) maintained and reinforced during m3

6. Lake transport for communities

In the Mai Ndombe region, lake transport is the main barrier to improved livelihoods, especially for access to healthcare in Inongo. Identified as a critical need in the causal model, and facing a general lack of affordable public lake transport, the MNRP has endeavored to improve the situation by offering free, safe voyages to community members in need. During this reporting period, the MNRP continued to fund and support running of two passenger boats to allow community members in crossing the lake, a “coque” and a “baleinière”.

4.3.2.2 Community monitoring plan results

The results of the community monitoring plan, including the general activity area, key objectives and corresponding indicators, and the m3 results are provided below (Table 21).

Table 21: Community monitoring plan results

Activity Area	Objective	Indicator Type	No.	Indicator	m3 Result	# Beneficiaries/ participants
1: Climate and Ecosystem Conservation Activities	Conservation of forest concession	Outcome	**SIA#1**	A signed forest conservation concession contract and supporting TOR*, MOU*	Done	NA
		Output	**SIA#2**	# awareness and sensitization meetings held	43	645
		Impact	**SIA#3**	# Net tons CO2e emissions avoided	22,586, 608	NA
2: Community Capacity Building and Social Capital	Improved local capacity for natural resource management, governance and land-use planning at individual and organizational levels	Output	**SIA#4**	# of CLDs and/or Annex Committee formed and members elected/trained	163	505
		Output	**SIA#5**	# of CGs formed and members elected/trained	2	45
	Community-based selection and implementation of project activities	Output	**SIA#6**	# of EISB (SBIA) Workshops held and participants	3	150
		Outcome	**SIA#7**	# of PLD development workshops held	9	95
	Building local capacity for forest and	Outcome	**SIA#8**	# of PLDs written and approved	2	42
		Impact	**SIA#9**	# of projects executed under the PLD	3	1341

Activity Area	Objective	Indicator Type	No.	Indicator	m3 Result	# Beneficiaries/ participants
	biodiversity monitoring	Output	**SIA#10**	# local people trained in sampling, biodiversity surveys and monitoring	80	NA
	Improved capacity and awareness towards workplace safety	Output	**SIA#11**	# OHS workshops/seminars held and people trained	3	30
		Output	**SIA#12**	# OHS procedures/manuals in-place and operational	6	NA
		Outcome	**SIA#13**	# OHS equipment sourced and installed	38	65
		Impact	**SIA#14**	# OHS-related incidents reported across all project operations	0	0
3: Infrastructure Development, incl. Education, Health and Transport	Improved quality of education including access, buildings and other education infrastructure	Output	**SIA#15**	# of schools built or renovated within the Project Zone	10	2011
		Output	**SIA#16**	# of school equipment or other infrastructure provided e.g., uniforms, desks, chairs	Information not available	NA
		Output	**SIA#17**	# new or newly-employed teachers under the MNRP working in the local schools	54	NA
		Output	**SIA#18**	# of students receiving bursaries for school fees from MNRP	Information not available	NA
	Improved attitudes towards education	Output	**SIA#19**	# community or school meetings held on education matters	20	NA
		Outcome	**SIA#20**	% enrollment of girls in schools within the Project Area	49	NA
		Outcome	**SIA#21**	# students from local community graduating with a State Diploma	203	203
	Improved healthcare Infrastructure	Output	**SIA#22**	# of new, repaired or equipped healthcare facilities	1	689

Activity Area	Objective	Indicator Type	No.	Indicator	m3 Result	# Beneficiaries/ participants
	Improved access to medical care and health	Output	**SIA#23**	# mobile clinics established, equipped or deployed	6	1994
		Output	**SIA#24**	# new potable water wells built or repaired	2	1904
	Improved transport infrastructure	Output	**SIA#25**	# km of road constructed or repaired	86	NA
		Output	**SIA#26**	# project-supported water vessels providing transportation services to community members	5	631
4: Agricultural Improvement and Economic Opportunities	Improved, sustainable and profitable agricultural practices for communities	Output	**SIA#27**	# training workshops by agricultural extension officers in project zone	56	1288
		Output	**SIA#28**	# of demonstration gardens established and functional	3	62
		Outcome	**SIA#29**	% households adopting new farming methods, crops, livestock, agroforestry	31%	NA
		Outcome	**SIA#30**	# of hectares of agroforestry fields planted	20	NA
	Job creation and improved incomes	Impact	**SIA#31**	# total jobs created under the MNRP for all operations	183	183

4.3.3 Dissemination of Monitoring Plan and Results (CM3.3)

The Community Monitoring Plan has been established and accepted by the Project Proponent. The Plan has been made available for public review at the Project Office, and was made available to each CLD in the Project Zone during the previous monitoring periods. The full results of the community monitoring are included in this project monitoring report, which is being made publicly available in the Project Area by having a hard copy available for review at the Project Office. Additionally, a monitoring report summary has been written and provided to communities throughout the Project Area in English, French and Lingala. The monitoring report has additionally been posted to the website of the VCS and CCB for public review and comment.

4.4 Optional Criterion: Exceptional Community Benefits

Not Applicable

The MNRP was not validated at the Gold Level for exceptional community benefits. This section is not applicable.

4.4.1 Barriers to Benefits (GL2.3)

The MNRP was not validated at the Gold Level for exceptional community benefits. This section is not applicable.

4.4.2 Protections for Poorer and More Vulnerable Households and Individuals (GL2.4)

The MNRP was not validated at the Gold Level for exceptional community benefits. This section is not applicable.

5 BIODIVERSITY

5.1 Net Positive Biodiversity Impacts

5.1.1 Biodiversity Changes (B1.1)

The Climate, Community and Biodiversity Alliance (CCBA) stipulates that carbon projects should generate net-positive impacts for local communities and for biodiversity. However, measuring biodiversity changes is tricky, both because of the challenge of attribution and because biodiversity impacts are long-term in nature. Wildlife Works applies the theory of change causal model to think about, formulate and justify the various project activities, strategies and outcomes. Similar to the assessment of changes to socioeconomic well-being of the local communities as outlined in the CCB PDD section CM1.1, the expected impacts of the MNRP on biodiversity were also measured and assessed using a theory of change approach, also known as the causal model. The theory of change approach provides a structured, cause-and-effect- oriented approach to project and evaluate how project activities are expected to result in specific expected outputs, which lead to outcomes and eventually to long-term impacts. As recommended by the CCBA, a participatory approach was used in the formulation and implementation of this biodiversity monitoring plan, involving the identification of stakeholders important for delivering the biodiversity outcomes for the Mai Ndombe REDD+ Project. Please see Table 22 below for a detailed description of changes in biodiversity that have been identified during this monitoring period.

Table 22: Changes in biodiversity

Change in Biodiversity	Forest elephant
Monitored Change	A steady increase in elephant populations, especially around the south-west corner of the project area. Forest elephants were among the top five most encountered species during transects.
Justification of Change	The most likely without-Project scenario would be fewer sightings across the MRNP as prior poaching levels contributed to an almost complete extinction of this species. It is speculated that current MRNP elephant populations may have migrated from the westernmost forest in Yumbi and Lukolela territories into our project area, demonstrating increasing connectivity with surrounding forests.

Change in Biodiversity	Bonobo
Monitored Change	Previous biodiversity assessments reported bonobos' presence mostly distributed far from villages and away from the lake

	shores, recent data during m3 has revealed that they are approaching villages, mostly likely due to reduced pressure and disturbance. Additionally, bonobos were encountered in 8/11 transects during this monitoring period.
Justification of Change	The most likely without-Project scenario would be fewer sightings across the MRNP

Change in Biodiversity	Giant pangolin
Monitored Change	This species has been recently captured via camera trap inside of the project area. This is an extremely rare and elusive species, so detecting it with our camera traps suggest it could be returning to the project area in decent numbers. Additionally, this species was not amongst those hunted during this monitoring period.
Justification of Change	The most likely without-Project scenario would be fewer sightings across the MRNP and higher levels of poaching.

Change in Biodiversity	Bay duiker
Monitored Change	Among the top five most encountered species during transects
Justification of Change	The most likely without-Project scenario would be fewer sightings across the MRNP

Change in Biodiversity	Red river hog
Monitored Change	Among the top five most encountered species during transects
Justification of Change	The most likely without-Project scenario would be fewer sightings across the MRNP

Change in Biodiversity	Blue duiker
Monitored Change	Among the top five most encountered species during transects
Justification of Change	The most likely without-Project scenario would be fewer sightings across the MRNP

Change in Biodiversity	Peters's duiker
Monitored Change	Among the top five most encountered species during transects

Justification of Change	The most likely without-Project scenario would be fewer sightings across the MRNP

5.1.1.1 Without-project analysis

The without-project scenario describes what would happen to biodiversity in the project area if the planned REDD+ activities are not undertaken, i.e., the conditions that would occur if the project never took place. Deforestation from the previously planned conversion of the MNRP into a logging concession, plus the ensuing forest degradation from slash-and-burn agriculture and population growth from immigration due to the infrastructural development are the major likely activities to happen, all which would affect biodiversity negatively.

To help think about the impacts of this projected scenario on biodiversity, the MNRP Biodiversity Team used desk (secondary) research and used biodiversity-related inputs derived from the community Social Impact Assessment workshops to identify the following priority issues for biodiversity in the project area:

1. Local extinction of the forest elephant
2. Declining populations of key HCV species, especially bonobos
3. Unsustainable hunting and fishing
4. Loss of habitat and ecosystem connectivity between project and surrounding forests.

5.1.1.2 Final theories of change

From this analysis, the following theories of change were developed:

i. Return of elephants into the project area: IF the regulations in relation to hunting are respected, IF wildlife habitat is protected and effective monitoring of biodiversity implemented, THEN animal movement will be free and elephants will return to the project area
ii. Increase in HCV species: IF monitoring and security is enhanced, IF wildlife habitat is improved, IF the perception of the community on the conservation of wildlife is positive, THEN there will be an increase in animal populations in the project area including HCVs
iii. Sustainable harvesting: IF wildlife monitoring and enforcement is strengthened, IF wildlife habitat is protected, IF communities have positive perceptions of wildlife conservation, and IF communities have better education and employment opportunities THEN harvesting will be more sustainable
iv. Ecosystem integrity and habitat improvement: IF deforestation is reduced, IF slash-and-burn agriculture is eliminated, and IF tree planting is enhanced, and IF charcoal production is controlled and improved, THEN there will be regeneration of native trees and healthy ecosystems.

5.1.1.3 Risks and negative impacts

Next, the MNRP biodiversity team explored the full range of potential risks to and negative impacts from successful implementation of this project. Because of the strong conservation focus for the Mai Ndombe project (i.e., shifting from a logging to conservation concession), there will be limited if any net negative changes to biodiversity within the project area that result from the proposed project activities. Continuous surveys and monitoring data will nonetheless help confirm this by capturing any negative or unforeseen impacts to biodiversity.

5.1.2 High Conservation Value Protection (B1.2)

The land cover and land use types under the MNRP concession include swamp forest, primary and secondary forest, forest flooded periodically, and grassy savanna. These mixed habitat types offer a wide range of high-value species, medicinal plants and non-timber forest products (NTFPs) to the local communities. The area also contains a wide range of biodiversity including large mammals and birds. The following High Conservation Value (HCV) species were identified based on endemism and threat levels:

- *Loxodonta cyclotis* (Forest elephant): Critically endangered[17]
- *Pan paniscus* (Bonobo): Endangered[18]
- *Smutsia gigantea* (Giant Ground Pangolin): Endangered[19]
- *Phataginus tetradactyla* (Black-bellied or Long-tailed Pangolin): Vulnerable[20]

Besides wildlife and plant resources, the MNRP landscape is considered of high conservation value because of several other qualities, including providing livelihood-supporting resources and services to the local communities, and having strong cultural values for the local community.

As indicated under section 2.2.6, in addition to the fact that the MNRP is set up entirely to protect wildlife, critical wildlife habitat and ecosystem functions, and all project activities undertaken during the reporting period directly or indirectly contributed towards the enhancement of HCVs in the MNRP including security, habitat enhancement and improved monitoring. By protecting habitats and reducing fragmentation, disturbance, and conversion of primary forest at a landscape scale, these HCVs will not have any negative impact under project compared to the 'Without Project' scenario. Consequently, based on our theory of change analysis this demonstrates that the Project's net impact on biodiversity, including HCVs, for this monitoring period was positive in comparison to the without project scenario.

[17] Gobush, K.S., Edwards, C.T.T, Maisels, F., Wittemyer, G., Balfour, D. & Taylor, R.D. 2021. Loxodonta cyclotis. The IUCN Red List of Threatened Species 2021: e.T181007989A181019888. https://dx.doi.org/10.2305/IUCN.UK.2021-1.RLTS.T181007989A181019888.en. Downloaded on 20 August 2021.

[18] Fruth, B., Hickey, J.R., André, C., Furuichi, T., Hart, J., Hart, T., Kuehl, H., Maisels, F., Nackoney, J., Reinartz, G., Sop, T., Thompson, J. & Williamson, E.A. 2016. Pan paniscus (errata version published in 2016). The IUCN Red List of Threatened Species 2016: e.T15932A102331567. https://dx.doi.org/10.2305/IUCN.UK.2016-2.RLTS.T15932A17964305.en.

[19] Nixon, S., Pietersen, D., Challender, D., Hoffmann, M., Godwill Ichu, I., Bruce, T., Ingram, D.J., Matthews, N. & Shirley, M.H. 2019. Smutsia gigantea. The IUCN Red List of Threatened Species 2019: e.T12762A123584478. https://dx.doi.org/10.2305/IUCN.UK.2019-3.RLTS.T12762A123584478.en.

[20] Ingram, D.J., Shirley, M.H., Pietersen, D., Godwill Ichu, I., Sodeinde, O., Moumbolou, C., Hoffmann, M., Gudehus, M. & Challender, D. 2019. Phataginus tetradactyla. The IUCN Red List of Threatened Species 2019: e.T12766A123586126. https://dx.doi.org/10.2305/IUCN.UK.2019-3.RLTS.T12766A123586126.en.

Besides wildlife and plant resources, the MNRP landscape is considered of high conservation value because of several other qualities, including providing livelihood-supporting resources and services to the local communities, and having strong cultural values for the local community.

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5.1.3 Invasive Species (B1.3)

Agroforestry demonstration activities undertaken under our agricultural intensification and improvement programmes utilize the following species: *Leucaena leucocephala, Acacia* sp., and *Morinda lucida*. While two of these species are not native to the DRC, they were successfully introduced to the country four decades ago for reforestation and agroforestry projects. Therefore, none of them have been imported for the purposes of the project. They have shown an ability for restoring and fertilizing marginal lands and improving yields when associated with crops. They have also shown a high level of adaptation to the environment, and they are non-invasive. It is possible that over the 30-year life span of the project, other species will be used. In no cases will these be invasive, and their use will be monitored and reported during project reporting and verification activities immediately following their introduction to the MNRP.

5.1.4 Impacts of Non-native Species (B1.4)

The species noted above were introduced to the area more than 30 years ago and to date there are no known problems with competition (displacement through invasiveness) disease introduction or facilitation. They were selected over native species due to their fast growth, nitrogen-fixing capabilities and their ability to restore fertility in marginal lands such as secondary forests. The MNRP will actively consider the use of, and will conduct trials with, native species as a priority where available.

Table 23: Species used for agroforestry activities

Species	*Leucaena leucocephala*
Justification of Use	They have shown an ability for restoring and fertilizing marginal lands and improving yields when associated with crops. They have also shown a high level of adaptation to the environment, and they are non-invasive.
Adverse Effect	The species noted above were introduced to the area more than 30 years ago and to date there are no known problems with disease introduction, facilitation or any other adverse impacts on native species.

Species	*Acacia* sp.

Justification of Use	They have shown an ability for restoring and fertilizing marginal lands and improving yields when associated with crops. They have also shown a high level of adaptation to the environment, and they are non-invasive.
Adverse Effect	The species noted above were introduced to the area more than 30 years ago and to date there are no known problems with disease introduction, facilitation or any other adverse impacts on native species.

Species	*Morinda lucida*
Justification of Use	They have shown an ability for restoring and fertilizing marginal lands and improving yields when associated with crops. They have also shown a high level of adaptation to the environment, and they are non-invasive.
Adverse Effect	The species noted above were introduced to the area more than 30 years ago and to date there are no known problems with disease introduction, facilitation or any other adverse impacts on native species.

5.1.5 GMO Exclusion (B1.5)

No GMOs will be used to generate GHG reductions or removals.

5.2 Offsite Biodiversity Impacts

5.2.1 Negative Offsite Biodiversity Impact Mitigation (B2.2)

As is discussed in Section B.2 of the MNRD CCB PDD, mitigation is not applicable for offsite impacts as there is no activity-shifting leakage.

5.2.2 Net Offsite Biodiversity Benefits (B2.3)

As there are no anticipated negative offsite impacts to biodiversity, evaluation of unmitigated offsite impacts is not applicable.

5.3 Biodiversity Impact Monitoring

5.3.1 Biodiversity Monitoring Plan Development (B3.3)

For the MNRP, we structure our theory of change logic around the Pressure-State-Response framework. The Pressure-State-Response framework relies on a causal chain whereby pressures or threats (e.g., deforestation, grazing, or hunting) negatively impact the state or status/condition of biodiversity (e.g., species abundance or habitat area), but responses or project interventions (e.g., tree planting or law enforcement) are taken to reduce pressure, which in turn is expected to improve the state of biodiversity. Most biodiversity impact assessments focus on state indicators because they most directly inform project managers of actual changes in biodiversity, hence enable measurement of project impacts. However, they are also often the hardest to measure and the slowest to change. On the other hand, response indicators are very easy to measure and can change rapidly because they measure actual interventions

that a project makes. However, they are the least informative about changes in biodiversity because it is not clear whether they will indeed reduce threats and whether reduced threats will improve the state of biodiversity. Pressure (or threat) indicators are intermediate whereby they are easier to measure that state and are often more closely related to the status of biodiversity on the ground than response.

Wildlife Works sought to formulate a biodiversity monitoring plan for the MNRP with input from all key stakeholders. For this plan, it was important to select a range of pressure, state, and response variables such that some indicators can measure and show change swiftly, while others can more directly inform project managers of ultimate biodiversity impacts. This plan would focus heavily on HCV species. In addition, this monitoring plan will be useful for developing appropriate local capacity by highlighting the key roles and requirements for the biodiversity monitoring team, and any additional training that might be needed e.g., to the eco-guards responsible for monitoring of threats and wildlife.

5.3.1.1 Key Indicators

Whilst with biodiversity monitoring the “status” of the biodiversity like presence/absence, abundance and population trends is the most important, it often takes a long time to observe and ascertain changes. As such, normally one uses other strategies (at least initially) to demonstrate whether the project could be improving the status of the wildlife, either by (i) reducing threats or pressure such as poaching, and (ii) improving conditions for wildlife like habitat protection or enhancement. For the MNRP, the following state, pressure and response variables were identified:

1. State: the wildlife
    a. Species presence, distribution and movement extrapolated from sightings and signs
    b. Population abundance and trends extrapolated from sightings and signs
2. Pressure: the threats
    a. Signs of poaching for subsistence and commercial purposes e.g., snares
    b. Poached animals seen
    c. Poaching arrests made
    d. Charcoal kilns or charcoal bags found
    e. Felled trees for construction, poles, timber etc
    f. Illegal grazing incidents and number of head of cattle and shoats
    g. Instances of human-wildlife conflict e.g., elephant crop raiding, livestock predation
    h. Encroachment into project area for agriculture or settlement.
3. Response: positive actions
    a. Number of eco-guards employed and trained
    b. Number of hours or kilometres of patrols done
    c. Community-related actions (included in the Community Monitoring Plan under 4.3.2.1)
        i. Number of tree planting or agroforestry initiatives
        ii. Number of education-related initiatives

iii. Number of local jobs created

iv. Number of awareness, advocacy and sensitisation meetings

v. Number of farms embracing new agricultural techniques like livestock enclosures

vi. Number of alternative livelihood options or income generating activities initiated.

d. Climate-related actions associated with forest conservation that enhance habitat protection and ecosystem integrity.

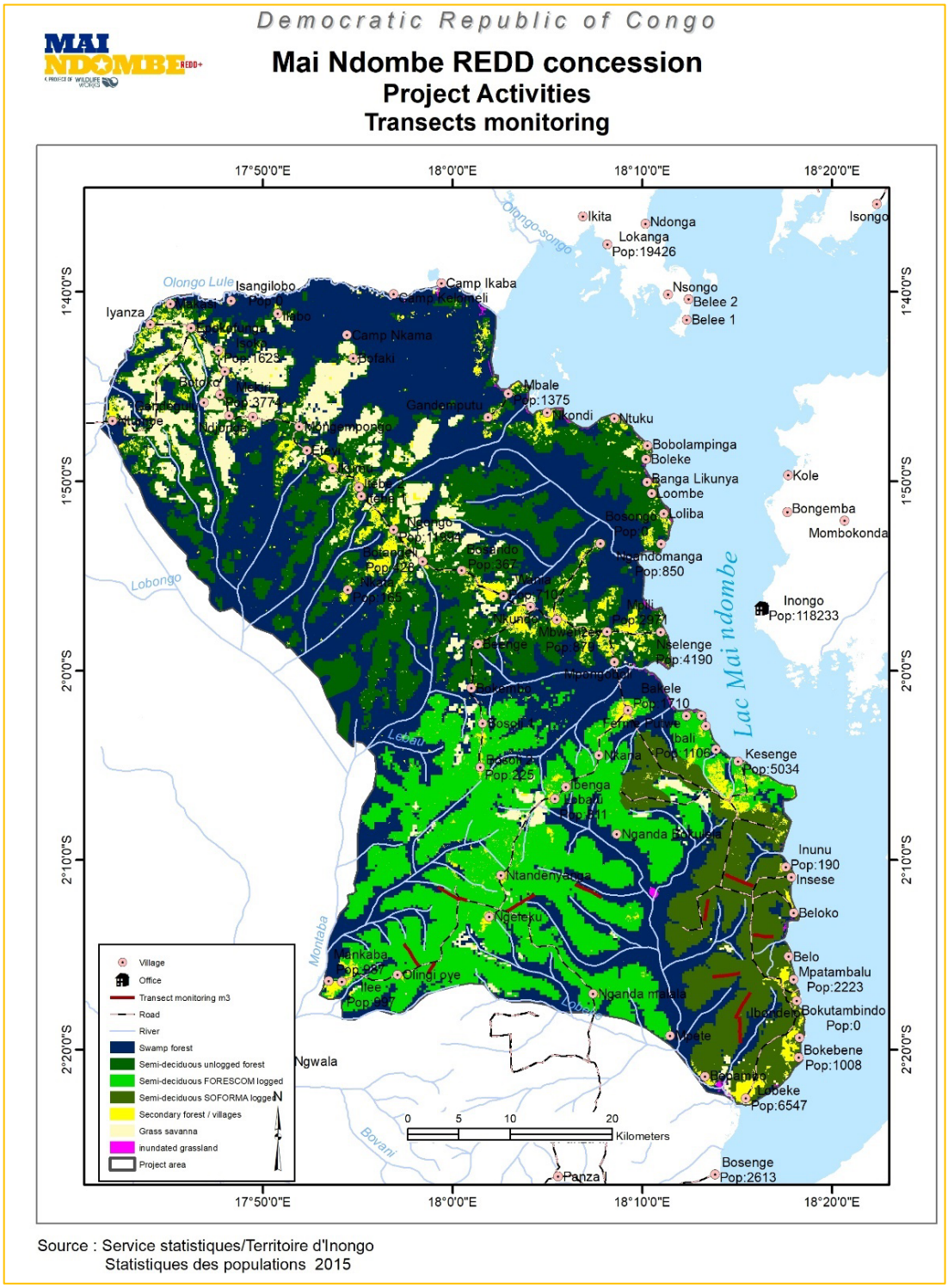
5.3.1.2 Sampling methods and strategies

The following strategies were designed and are implemented to provide the necessary data for these indicators:

- **Monitoring of large mammals, birds and human activities**: A biodiversity monitoring programme was set up for conducting surveys of large mammals, birds and human-related incidents along permanent line transects. The objective is to have good understanding of the presence and distribution of these species, estimate their populations, but also evaluate threats from human activities. Surveys are conducted during the wet and dry seasons to capture any seasonal variation. A total of 30 permanent transects were laid out across the five major forest strata (habitat types), namely: former SOFORMA logging area, former FORESCOM logging area, grassland, primary forest, and swamp forest; thus, there were 6 transects per stratum, each transect being 3 km long. A grid system was used to randomly pick the 30 points which would form the centre of a transect line (Fig. 17), and a datasheet template was designed for data collection and is being implemented.
    - Line transects involve walking straight lines while recording all the signs of large mammals, birds and humans. When recording a species or incident, it requires accurately measuring the perpendicular distance from the transect to the species or sign. These perpendicular distances are used to calculate the probability of detection curve, one of the parameters necessary to calculate the densities of the objects such as species, droppings or nests in a sampled area. Droppings of wildlife, their footprints, vocalisation and any other signs like nests are also noted during transect counts
- **Monitoring hunting activities**: this was aimed at providing data on status and trends of direct anthropogenic pressure indicators. The monitoring team collects these data through opportunistic interviews with hunters whenever they may be encountered. These interviews are conducted throughout the year.
- **Survey the market and Inongo port**: this survey was aimed at monitoring the trading activities related to bushmeat in the local market and Inongo port. This could also augment data on presence and distribution of some elusive species that may have been missed on transects. A datasheet template was designed to collect these data.
- **Camera traps**: this method was especially added to enable monitoring and taking the pictures of nocturnal and elusive species that are typically missed on diurnal transect surveys. Camera traps are opportunistically set at selected points along the permanent biodiversity monitoring transects across the MNRP area.

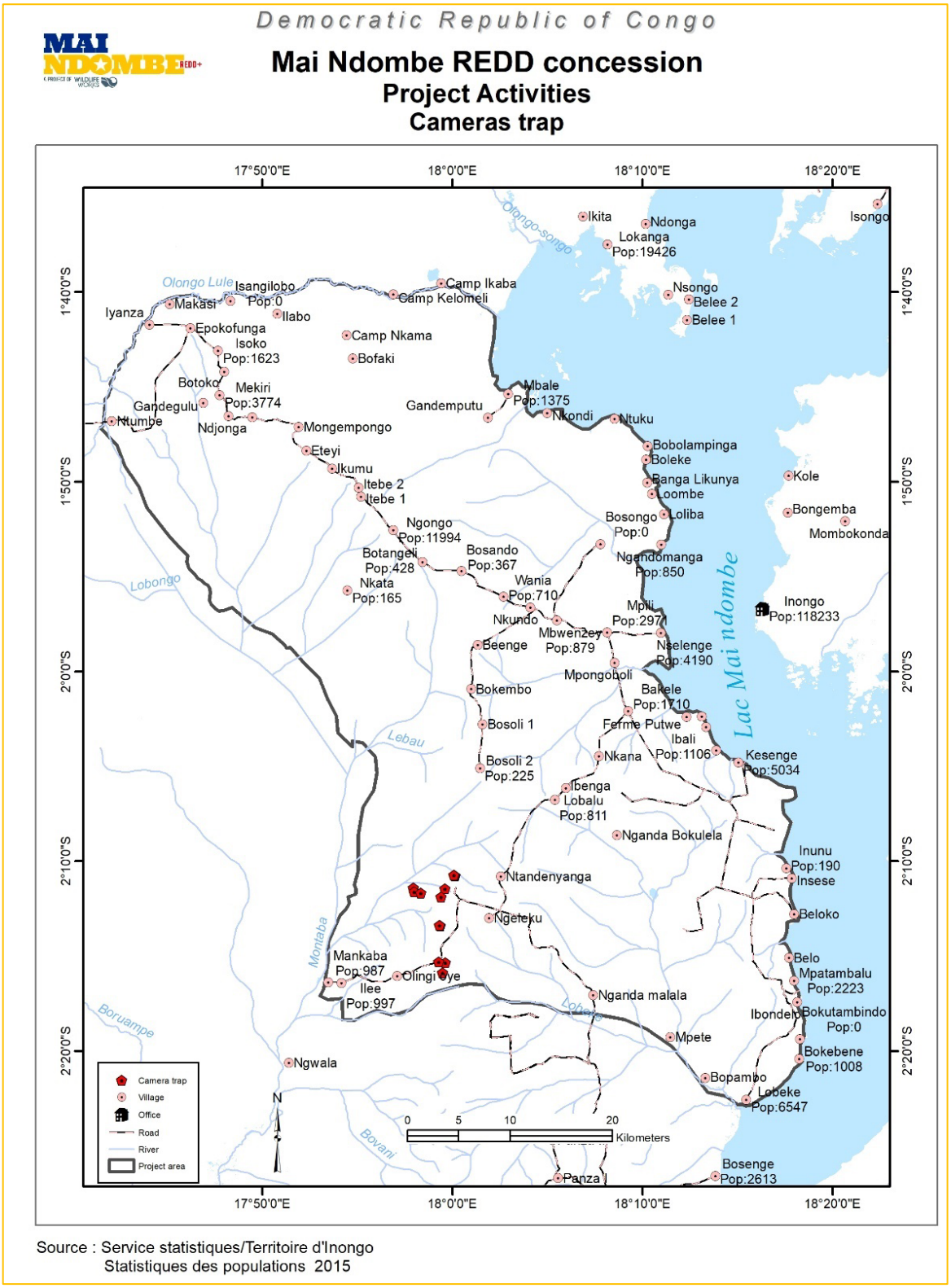
  - The camera trap is a tool to allow photographs of wildlife without human intervention and is increasingly used in the context of scientific research on discrete animals, and allows the counting of species in a given geographical area (e.g., Figure 20)

- **Recce or anecdotal wildlife sightings and human-wildlife conflict**: In addition, project staff, local assistants and all local communities opportunistically provide anecdotal information on direct observations of wildlife near villages. This allows to have an idea on presence, distribution and trends, as well as evaluate potential human pressure on wildlife and associated human-wildlife conflicts.



Source : Service statistiques/Territoire d'Inongo
Statistiques des populations 2015

Figure 18: Map of the transect lines and recces walked in the two strata (FORESCOM and SOFORMA) during the m3 reporting period



Source : Service statistiques/Territoire d'Inongo
Statistiques des populations 2015

Figure 19: Map of the camera trap positions during the m3 monitoring period

Figure 20: Example of bonobos captured by camera trap during m3 reporting period

Figure 21: Example of forest elephants including calves captured by camera traps during m3 reporting period

5.3.1.3 Data collection and analysis

During this reporting period, a combination of the already established permanent line transects and guided recces were used to collect data. Line transects are described above in detail, while guided recces were simply walks in the forest either as reconnaissance or in between transects where data were opportunistically collected but without the rigour of the line transect e.g., measurement of perpendicular distances and maintaining speed and direction.

5.3.2 Biodiversity Monitoring Results (B3.1, B3.2)

During this monitoring period, the changes in and impacts to biodiversity have followed the projections from our causal model. The discontinuation of logging activities due to the project, plus protection of the Project Area against unplanned deforestation, have resulted in an increase of sightings of key HCVs including forest elephants and bonobos (see further). The Project continues implementing the biodiversity monitoring plan, which will enable collection of long-term data that will provide greater clarity on the MNRP's impacts on biodiversity in future.

During this m3 reporting period, the biodiversity monitoring team have reported a steady increase in bonobo and elephant populations, especially around the south-west corner of the project area. Additionally, there has been a slow return of the Giant Pangolin and the Cuvette Centrale Eagle (Mpongo) into the project area. The monitoring team also reported the presence of leopards towards the central area of the project area, near the village of Ibali, which could be a potential concern for human-wildlife conflicts. Indeed, several incidents involving the destruction of local community's farms were reported during this monitoring period, where the affected community members have requested compensation from the project. Further, in parallel with the growing wildlife populations, the team is reporting more evidence of human incursions and poaching signs, pointing the need for eco-rangers and more patrolling teams. Up to now, it has only been the local community members reporting to the biodiversity monitoring team any poaching incidents and other illegal activities happening in the project area around their villages. During this m3 monitoring period, four incidents have been reported, one of which an unsuccessful attempted shooting of an elephant.

5.3.2.1 Transect data: By species

During the m3 reporting period, the biodiversity monitoring team sampled 11 transects and 8 recce routes (see Figure 17 above). Using a diverse array of cues, they inventoried 22 species in total over 1,003 encounters, including humans (38 encounters), birds (3 encounters) and other mammals (962 encounters). Most of the encounters were in 2017 (480), followed by 2018 (306) and 2019 (205); there were only a few encounters recorded for 2020 (12) as fieldwork was severely impeded by the restrictions and disruptions due to the COVID-19 pandemic in the DRC.

The top five most encountered species were *Cephalophus dorsalis, Loxodonta cyclotis, Potamochoerus porcus, Cephalophus monticola* and *Cephalophus callipygus* (Figure 20). The forest elephant (*L. cyclotis*) was recorded in 7 of the 8 recce routes, while the bonobo (*Pan paniscus)* was recorded in 8 of the 11 transects sampled. Only a single bird species was recorded during this period *Ceratogymna atrata* (black-casqued hornbill). Overall, this demonstrates that the MNRP remains a critical habitat for wildlife including key HCV species, although some remain uncommon.

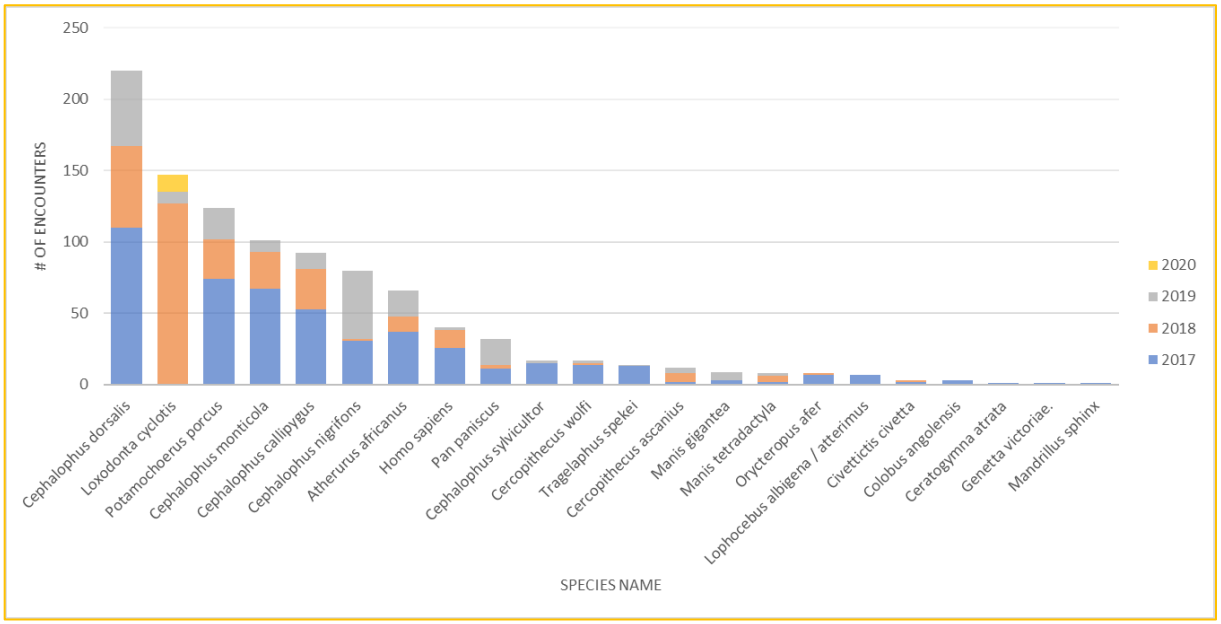


Figure 22: Frequency of all mammal, human and avian encounters during transect surveys across the MNRP during m3

5.3.2.2 Transect data: By strata

The two strata monitored during this reporting period showed some few differences both in species richness and composition including relative abundances. both SOFORMA and FORESCOM are secondary forests that are regenerating from previous logging and had similar number of encounters (568 and 435, respectively). Both had relatively high levels of species richness, perhaps indicative of a wide variety of habitats and niches in the regenerating forests (Figure 23). A key finding was that the forest elephant (*Loxodonta cyclotis*) was only encountered in the Forescom stratum and not Soforma, perhaps more indicative of geographical location than habitat condition, with the point of re-entry of elephants into the MNRP being the south-western part of the project area.

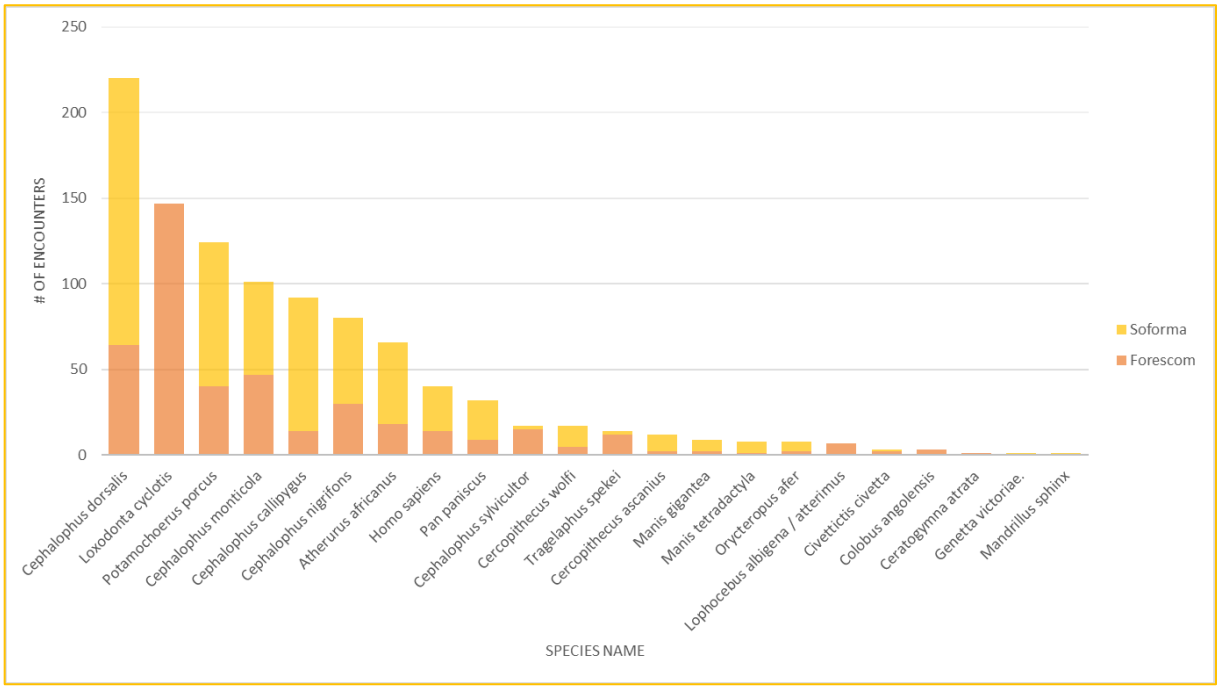


Figure 23: Frequency of all mammal, human and avian encounters in the two strata during m3 wildlife surveys across the MNRP

5.3.2.3 Transect data: Human activity

During this reporting period, Soforma (24) had more human signs compared to Forescom (14). Trails and crossings (passges) were the commonest human signs encountered by the monitoring teams in both strata, while Soforma had many more traps that Forescom (Figure 19).

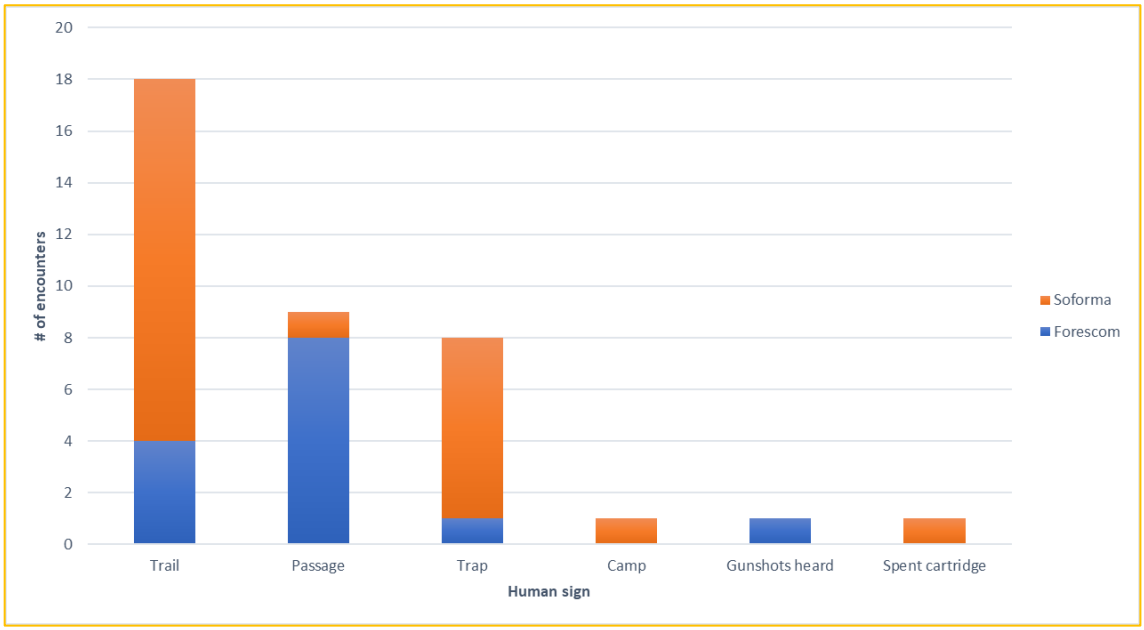


Figure 24: Encounter frequency of all human signs in the two strata sampled during m3 in the MNRP

5.3.2.4 Market survey data

During the monitoring period, surveys were conducted to count the number of wild animals that were offloaded at the two major ports (Nkolenzoba and TSF), or that were displayed at the big Inongo market (Grand marche Inongo). All surveys were conducted in the morning hours, between 07:00 and 13:00h. During the m3 period, observations were done over a total of 62 days; GM Inongo market (25 days) then Port TSF (26 days), then Nkolenzoba (10 days). A total of 201 incidents were encountered during this period, with Port TSF being busier than Nkolenzoba, although the latter was not sampled in 2017 and 2020 (Figure 25).

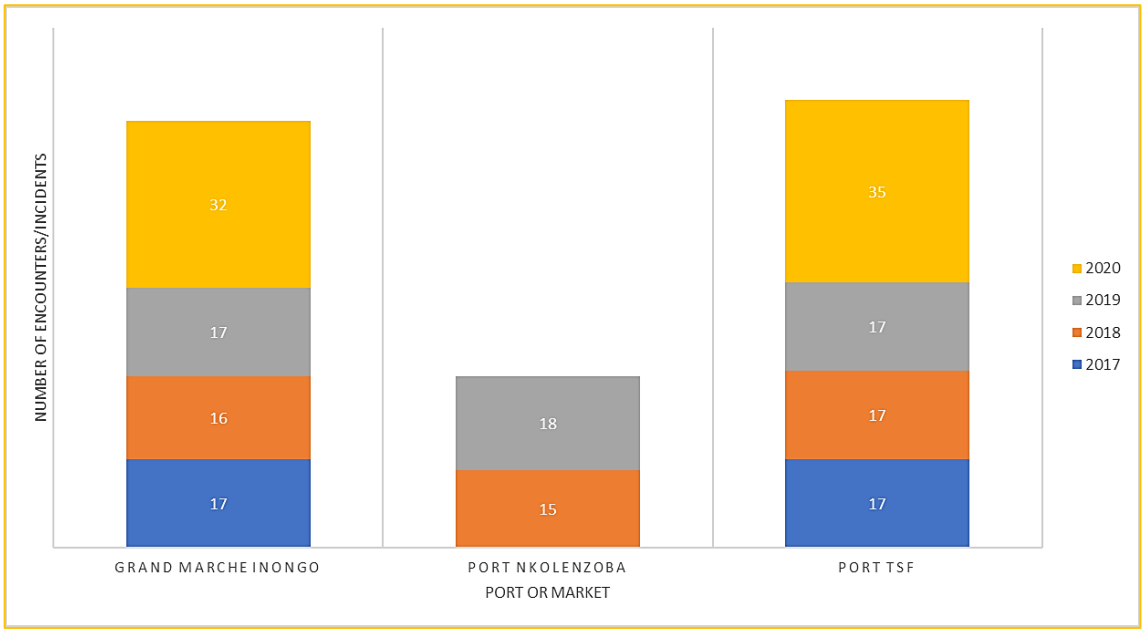


Figure 25: Number of poaching incidents encountered in each market/port during m3

Out of the 16 species recorded at the market and ports, the sitatunga (*Tragelaphus spekii*) was the most hunted species representing 17% of all incidents recorded; the rest of the top five most-hunted species were Ath*erurus africanus, Cephalophus monticola, Cercopithecus wolfi* and *Cephalophus callipygus* (Figure 27). A similar pattern was found when these trends were summarised by number of individuals recorded. Crucially, the hunted species during this period did not have either of the endangered species (bonobo *Pan paniscus* and giant pangolin *Manis gigantean*) but had long-tailed pangolin (*Manis [*or *Phataginus] tetradactyla*) which is considered Vulnerable in the IUCN Red List.

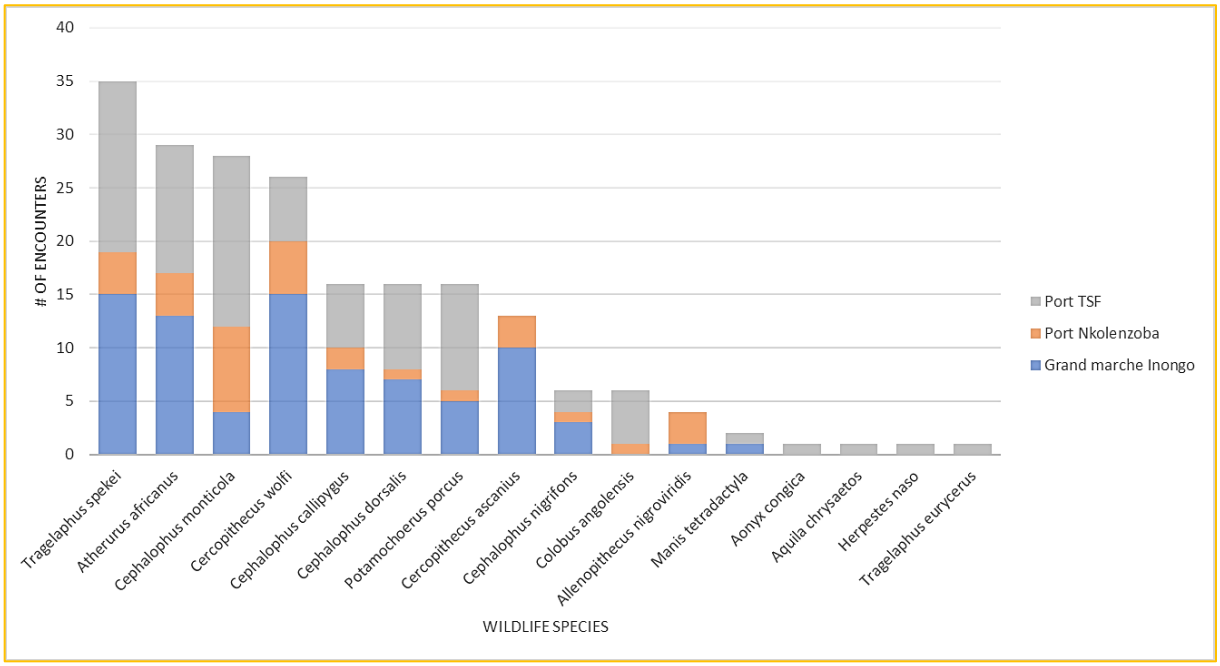


Figure 26: Composition of the species traded by market/port

Overall, the port and villages of Kesenge and Ibali were cited as the locations where most of the traded wildlife originated, but this differed by Port/Market (Figure 26). Most of the wildlife at PortTSF was from Bokebeni, whereas Nkolenzoba was mainly fed by Lokanga; wildlife traded in the Inongo market arrived from most of these sources. Lastly, the traders reported that the vast majority of the wildlife were shot (99%) while traps and snares made up only 1% of hunting methods.

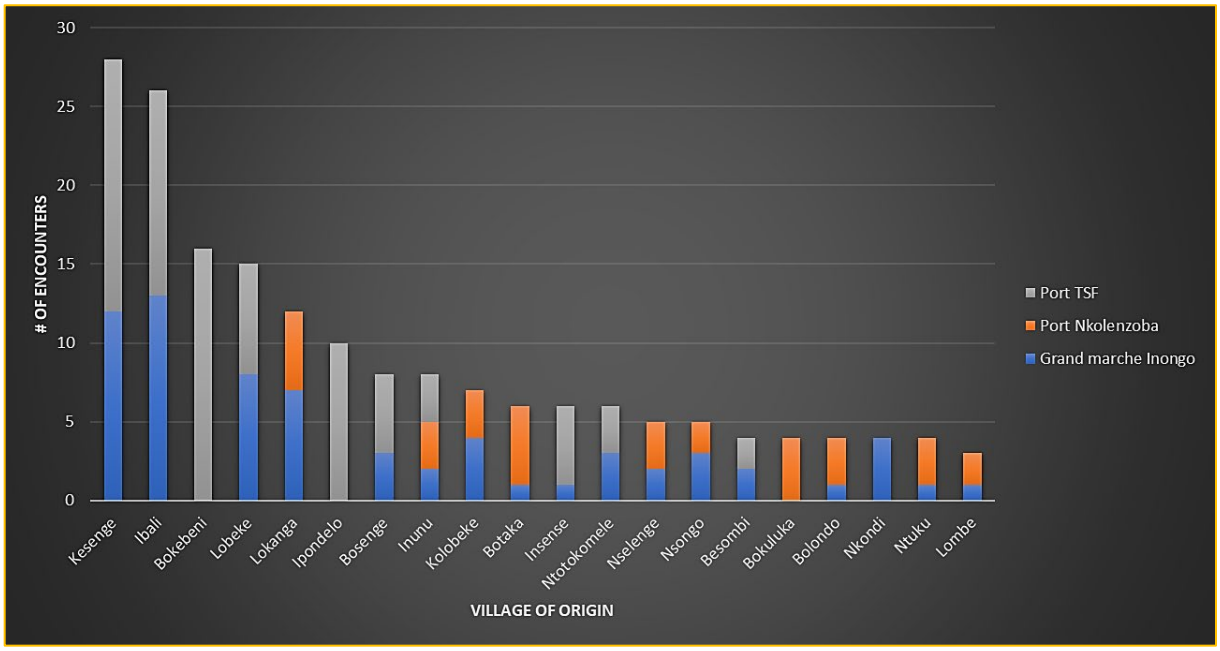


Figure 27: Sources/origins of the wildlife traded at the market/ports

5.3.2.5 eDNA campaign

An Environment DNA (eDNA) sampling campaign was organized during this monitoring period in the project area to evaluate the fish stock in the Lac Mai Ndombe and establish the surviving fish species. Sixty-seven water samples were collected in randomly stratified locations across the Lake to extract the DNA. This was matched with existing species DNA sequences in publicly available databases, and then used to establish the fish and vertebrate species still surviving in the lake and their relative abundances.

Overview of the results: Fish

- A total of 80 taxa were detected
- Average taxonomic richness was 12.85 and ranged from 1 to 40
- Most abundant sequences: a clupeid species (*Nannothrissa* sp.)
- Most commonly detected species: Mai-Ndombe dwarf sprat (*Nannothrissa stewarti*), a clupeid species (*Nannothrissa* sp.), and a catfish species (Siluriformes)
- Two species categorised as Endangered by IUCN were detected in this survey: Mai-Ndombe dwarf sprat (*Nannothrissa stewarti*[21]) was found in all except terrestrial Areas and dwarf cichlid (*Nanochromis transvestitus*[22]) was found in all Areas. Mai-Ndombe dwarf sprat (*Nannothrissa stewarti*) was found to be particularly widespread (56 samples) and overall made up 18.17% of the sequence data. Dwarf cichlid (*Nanochromis transvestitus*) was less frequently detected (19 samples) and made up 1.4% of the sequence data.

[21] https://dx.doi.org/10.2305/IUCN.UK.2010-3.RLTS.T182825A7979523.en. Downloaded on 20 August 2021.

[22] https://dx.doi.org/10.2305/IUCN.UK.2010-3.RLTS.T182295A7852784.en. Downloaded on 20 August 2021.

Overview of the results: Vertebrates

- A total of 44 taxa were detected
- Average taxonomic richness was 16.3 and ranged from 6 to 33
- Most abundant sequences: an airbreathing catfish (*Clarias gabonensis*)
- Most commonly detected species: an airbreathing catfish (*Clarias gabonensis*), an elephantfish (*Mormyridae* sp.), and a reticulated knifefish (*Papyrocranus* sp.)
- Species of note include two endangered species: a dwarf cichlid (*Nanochromis transvestitus*) and bonobo (*Pan paniscus*). (NB: bonobo and chimpanzee (*Pan troglodytes*) have identical sequences in the Vertebrate assay. Bonobo has been reported as this species is more likely to be present in the survey area (based on IUCN distribution maps and GBIF records)).

While these results suggest a depletion of species diversity and abundance of both fish and other species in the lake and its surroundings, the aim of the study is ultimately to improve the diversity and increase the fish stock of the Lac Mai-Ndombe that had been depleted by unsustainable fishing. The goal is that this stock becomes once again a key food source for the local communities, which will in turn alleviate the communities' heavy reliance on the forest and forest biodiversity by reducing bush-meat hunting and slash-and-burn agriculture. Further, the eDNA campaign will also improve our understanding of the trophic pyramid of the lake which will help better strategize our traditional aquaculture program (fishponds) in these communities.

5.3.3 Monitoring Plan and Results Dissemination (B3.3)

The Biodiversity Monitoring Plan has been established and accepted by the Project Proponent. The Plan was made available for public review at the project office and each CLD in the Project Zone. The full results of the biodiversity monitoring are included in this project monitoring report, a hard copy for which is available for review at the MNRP Project Office. A report summary has been provided to communities throughout the Project Area in English, French and Lingala. The monitoring report was posted to the VCS / CCB website as part of the 30-day public comment process. The public comment period ended on 14 October 2021.

5.3.4 Optional Criterion: Exceptional Biodiversity Benefits

Vulnerability: Critically Endangered (CR) and Endangered (EN) species - presence of at least a single individual (GL3.1)

As is discussed in the CCB PDD Section GL3.1., the Project Area is home to significant populations of bonobos (*Pan paniscus*), which is a IUCN Red List Endangered species. The Project Area additionally has small populations of forest elephant (*Loxodonta cyclotis*), a IUCN Red List Vulnerable species.

6 ADDITIONAL PROJECT IMPLEMENTATION INFORMATION

Not Applicable

7 ADDITIONAL PROJECT IMPACT INFORMATION

7.1 Allometric Equations

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

Please refer to Annex 6 - Development of Allometry.

MRR.93 For each selected allometric equation, a list of species to which it being applied and the proportion of the total carbon stocks predicted by the equation.

Please refer to Annex 6 - Development of Allometry.

MRR.94 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).

All allometric equations were first employed in the first monitoring period (M_1) in 2012.

MRR.95 For each selected allometric equation, indication of whether was validated per sections 9.3.1.1 or 9.3.1.2.

Please refer to Annex 6 - Development of Allometry.

MRR.96 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.

Please refer to Annex 6 - Development of Allometry, which includes the source in the literature as well as the region and ecosystem type in which the respective allometric equations were developed.

Specific gravities were determined primarily using data available from Simpson (1996)23 and the Global Wood Density Database.24 Species-specific values for specific gravity or wood density were identified from these two sources, with priority given to values given in Simpson (1996). An average wood density value (weighted by basal area) was derived from the project inventory was applied to all other species.

MRR.97 A list of allometric equations validated by destructive sampling.

We chose to validate the allometric equation from Chave et al. (2005):

$$ABG = e^{-1.602+(2.266\ln(DBH))+(0.136\ln(DBH)^2)+(-0.0206\ln(DBH)^3)+(0.809\ln(\rho))}$$

Where *AGB* is aboveground biomass in kg, *DBH* is diameter at breast height in cm, and *ρ* is wood density in gm/cm^3. Please see MR Annex D – Development of Allometry for detailed information on Allometry validation.

MRR.98 For each, the number of trees (or non-trees) destructively sampled and the location where the measurement were made relative to the project area.

Although 30 trees at minimum are required by VM0009 V2.0 to validate an existing allometric equation, 86 trees were measured to validate allometry for this project. A list of the trees and their locations can be found in 'MR Annex D – Development of Allometry', Table 2.

MRR.99 A field protocol used to measure destructively sampled trees (or non-trees).

Please refer to Annex 9 - Standard Operating Procedure - Measuring Trees for Biomass Estimation in the Field

[23] Simpson, William T. 1996. Method to estimate dry-kiln schedules and species groupings: Tropical and temperate hardwoods. Res. Pap. FPL–RP–548. Madison, WI: U.S. Department of Agriculture, Forest Service, Forest Products Laboratory.
[24] Global Wood Density Database: http://datadryad.org/repo/handle/10255/dryad.235.

MRR.100 Justification that the field protocol for the destructive measurement method is conservatively estimates biomass.

MRR.101 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.

7.1.1 Validating Previously Developed Allometric Equations

MRR.102 A list of allometric equations cross validated.

Please refer to Annex 9 - Standard Operating Procedure - Measuring Trees for Biomass Estimation in the Field

MRR.103 For each, the number of trees (or non-trees) destructively sampled and the location where the measurements were made relative to the project area.

Please refer to Annex 9- Standard Operating Procedure - Measuring Trees for Biomass Estimation in the Field

MRR.104 A field protocol used to measure trees (or non-trees) when developing the equation.

Please refer to Annex 9 - Standard Operating Procedure - Measuring Trees for Biomass Estimation in the Field

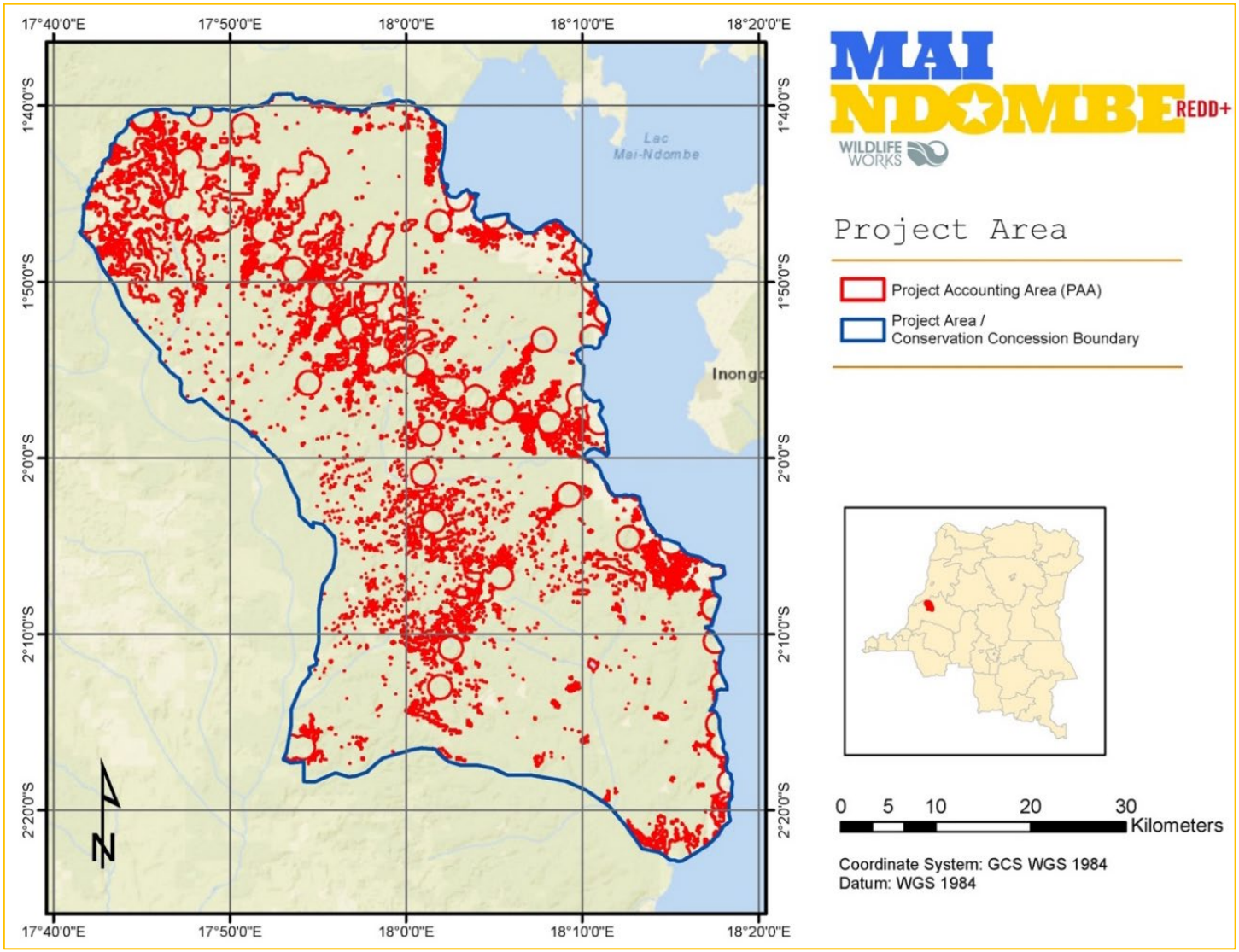
MRR.105 Justification that the field protocol for the destructive measurement method conservatively estimates biomass.

Please refer to Annex 9 - Standard Operating Procedure - Measuring Trees for Biomass Estimation in the Field.

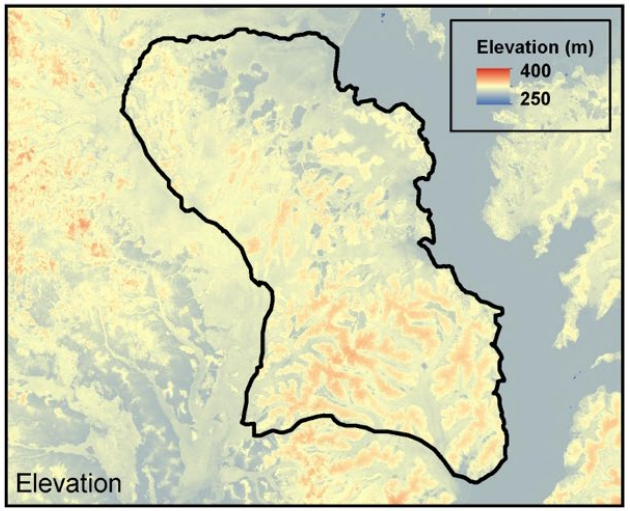
MRR.106 For each allometric equation in the list, the value of $\overline{E}$.

Please refer to Annex 9 - Standard Operating Procedure - Measuring Trees for Biomass Estimation in the Field.

APPENDIX A: PROJECT AREA



APPENDIX B: TOPOGRAPHIC MAPS



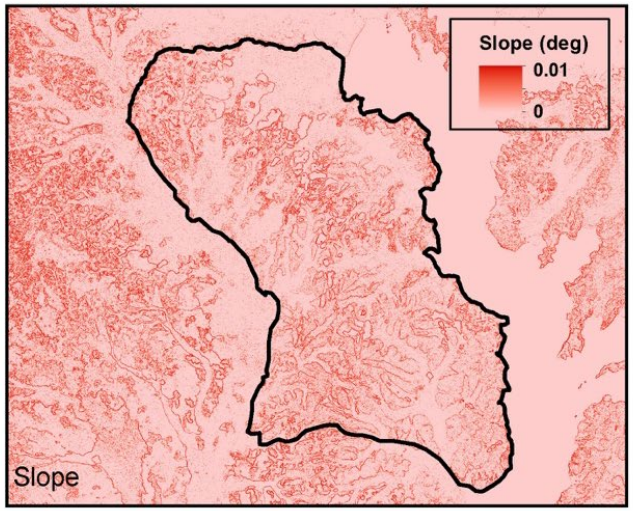
MAI NDOMBE REDD+
WILDLIFE WORKS

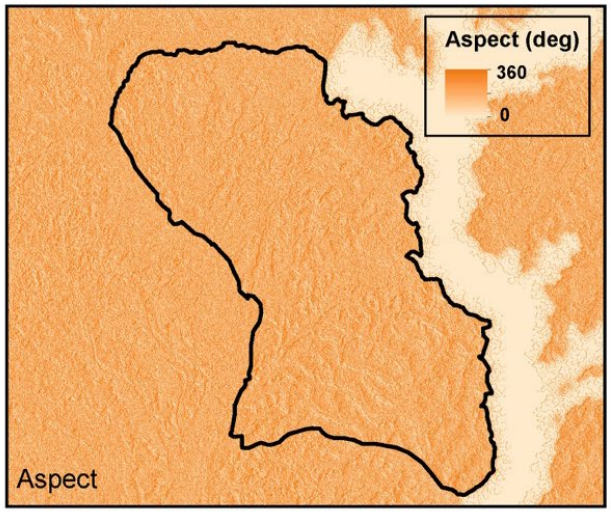
Project Area Topographic Maps

Elevation, Slope, and Aspect

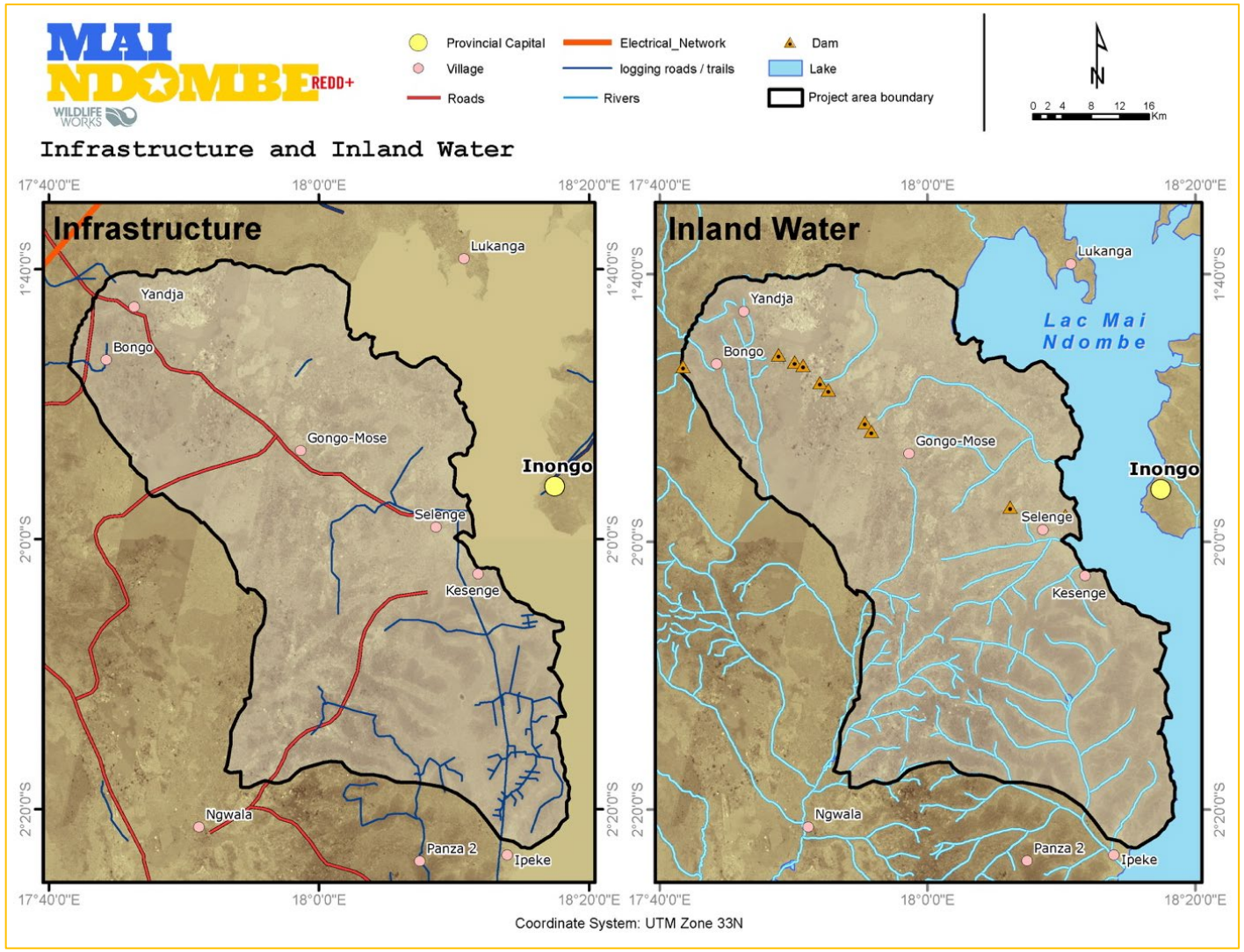
0 12.5 25 50 75 100 Km

Coordinate System: GCS WGS 1984
Datum: WGS 1984





APPENDIX C: INFRASTRUCTURE ROADS – WATER BODIES



APPENDIX D: LAND USE / FOREST COVER