THE MAI NDOMBE REDD+ PROJECT

DEMOCRATIC REPUBLIC OF THE CONGO (DRC)

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Contribution

Wildlife Works

Wildlife Works is a Carbon Development company located in San Francisco, CA and near Voi, Kenya, near Tsavo East National Park. Wildlife Works has successfully leveraged expertise in biodiversity conservation, environmental science and sales/marketing to create an organization that utilizes the emerging carbon market to alleviate pressures from human/wildlife conflict, poverty and over-reliance on natural resources. The company has built upon the Kasigau Corridor REDD project, the first REDD project to receive VCS/CCB validation and verification in the world, to create a portfolio of REDD+ projects throughout the world's tropical developing countries. Since the success of the Kasigau Corridor projects, Wildlife Works has become synonymous with timely, accurate and effective implementation of conservation projects, and with recent strategic investments into the company, Wildlife Works is poised to spread their brand of projects throughout the tropical world, with a medium-term goal of protecting 5 million hectares of forest, and an ultimate aim of permanently protecting biodiversity and creating prosperous, healthy, environmentally aware communities the world over.

EcoPartners

Technical components of the Mai Ndombe Project were supported by ecoPartners. ecoPartners works with project developers, forest owners and verification bodies to build successful forest carbon offset projects. ecoPartners specializes in the technical aspects of credit generation and long-term project maintenance by providing assistance with geospatial analysis, complex carbon accounting and capacity-building for project implementation. Most important, they help clients navigate carbon standards, provide consultation with project design and feasibility assessment, and help build financially sustainable carbon projects that serve local communities while providing tangible environmental benefits.

Table of Contents

1 Project Details 7
1.1 Summary Description of the Project 7
1.2 Sectoral Scope and Project Type 8
1.3 Project Proponent 8
1.4 Other Entities Involved in the Project 8
1.5 Project Start Date 8
1.6 Project Crediting Period 9
1.7 Project Scale and Estimated GHG Emission Reductions or Removals 10
1.8 Description of Project Activities 11
1.8.1 Project Activity Locations 14
1.9 Project Location 17
1.9.1 Delineating the Spatial Boundaries 17
1.10 Conditions Prior to Project Initiation 18
1.11 Compliance with Laws, Statutes and Other Regulatory Frameworks 19
1.12 Ownership and Other Programs 22
1.12.1 Proof of Title 22
1.12.2 Emissions Trading Programs and Other Binding Limits 22
1.12.3 Participation under Other GHG Programs 22
1.12.4 Other Forms of Environmental Credit 22
1.12.5 Projects Rejected by Other GHG Programs 22
1.13 Additional Information Relevant to the Project 22
1.13.1 Commercially Sensitive Information 22
1.13.2 Further Information 22
2 Application of Methodology 22
2.1 Title and Reference of Methodology 22
2.2 Applicability of Methodology 23
2.3 Project Boundary 28
2.3.1 Gases 28
2.3.2 Selected Carbon Pools 28
2.4 Baseline Scenario 30
2.4.1 Identifying the Agents and Drivers 30
2.4.2 Delineating the Project Accounting Areas 32
2.4.3 Baseline Types 33
2.4.4 Delineating Proxy Areas 34
2.4.5 Estimating the Deforestation Parameters 36
2.4.5.1 Delineating Reference Areas 36
2.4.5.2 Defining the Historic Reference Period 38
2.4.5.3 Selecting Historical Imagery 38
2.4.5.4 Determining Sample Size 39
2.4.5.5 Sampling Deforestation 39

2.4.5.6 Discarded Sample Points 40
2.4.5.7 Parameterizing α, β and θ 40
2.4.5.8 Minimizing Uncertainty 40
2.4.5.9 Estimating Uncertainty 42
2.4.6 Determining tSA 42
2.4.7 Determining tPA 43
2.4.8 Determining m 44
2.4.9 Determining γ 45
2.4.10 Determining q 45
2.4.11 The Decay Emissions Model 45
2.4.11.1 Determining λSOC 45
2.4.12 Baseline Scenarios for Selected Carbon Pools 45
2.5 Additionality 46
2.6 Methodology Deviations 48
3 Quantification of GHG Emission Reductions and Removals 48
3.1 Baseline Emissions 49
3.1.1 Calculating Baseline Emissions from Biomass 49
3.1.2 Calculating Baseline Emissions from SOC for Types P1 and P2 49
3.1.3 Calculating Carbon Not Decayed in DW 50
3.1.4 Calculating Carbon Not Decayed in BGB 50
3.1.5 Calculating Carbon Not Decayed in SOC 50
3.1.6 Calculating Cumulative Emissions from AGMT for Type P1 50
3.1.7 Determining Carbon Stored in WP 50
3.2 Project Emissions 51
3.2.1 Calculating Emissions from Changes in Project Stocks 51
3.2.2 Calculating Emissions from Burning 51
3.2.3 Determining Carbon Stored in WP 51
3.3 Leakage 51
3.3.1 Estimating Emissions from Activity-Shifting Leakage 51
3.3.2 Determining Emissions from Market-Effects Leakage 52
3.4 Summary of GHG Emission Reductions and/or Removals 52
3.4.1 Determining Reversals 52
3.4.1.1 Determining Reversals as a Result of Baseline Reevaluation 52
3.4.2 Quantifying Net Emissions Reductions for a PAA 52
3.4.2.1 Determining Deductions for Uncertainty 52
3.4.2.2 Determining Buffer Account Allocation 53
3.4.2.2.1 Tool for AFOLU Non-Permanence Risk Analysis and Buffer Determination 53
3.4.3 Quantifying Net Emissions Reductions across PAAs 54
3.4.4 *Ex-Ante* Estimation of NERs 54
3.4.5 Evaluating Project Performance 55
4 Monitoring 55
4.1 Data and Parameters Available at Validation 55

4.2 Data and Parameters Monitored....55
4.3 Description of the Monitoring Plan....56
5 Environmental Impact....56
6 Stakeholder Comments....57
7 References....57

Appendices	Title and Description
A	Map of Project Area
B	Map of DEM
B	Map of Slope
B	Map of Aspect
C	Map of Roads and Infrastructure
C	Map of Major Rivers and Streams
D	Map of Project Area Land Cover / Vegetation Cover
E	Reference Area Map of Point Interpretation for Biomass Emission Model (BEM)
F	Map of Double Coverage in the Reference Area
G	Map of Project Accounting Area (PAA)
H	Map of Project Accounting Area (2001 Imagery)
I	Landsat Imagery Demonstrating Presence of Forest in Leakage Area
J	Reference Area Sampling Locations

Annexes	Title and Description
A	Carbon Right Agreement (CRA)
B	Cahier de Charges
C	Tarif de Cubage 1.3
D	Approval of Concession Exchange
E	Reference Area Logging Concession
F	Site Visit Report
G	Standard Image Interpretation Protocol
H	Deforestation Parameter Calculations
I	Suspension of Bimpe Agro Concessions
J	Project Proponent Request for Concession
K	Provincial Assembly Petition
L	Award of Management Rights
M	VCS Additionality Tool
N	Calculation of NERs
O	Data and Parameters Available at Validation
P	Data and Parameters Monitored
Q	Forest Measurement Protocol
R	VCS Non-Permanence Risk Worksheet
S	DRC Political Risk Worksheet
T	Quality Control Procedure
U	Ministers EIA
V	Letter from Frédéric Djengo Bosulu
W	DRC Political Risk Worksheet

X	Quality Control (QC) Standard Operating Procedure (SOP)
Y	2 Letters from SOFORMA indicating their desire to give up concessions

1 Project Details

1.1 Summary Description of the Project

The Mai Ndombe REDD+ Project, located in western DRC, is an ecologically rich and diverse area previously zoned for commercial timber extraction. It is home to Chimpanzees, Bonobos and forest elephants, and includes some of the most important 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 coastal city of Selenge towards the northwest project area boundary.

In 2008, following a governmental revision of the DRC National Forest Code, 91 of 156 logging contracts were suspended in an effort to address corruption in the sector. Minimum legal and environmental standards were not being met, which resulted in severe environmental damage. Furthermore, communities in these areas were largely ignored by the logging companies, and received little or no economic benefit. Two timber concessions extending along the western shore of Lake Mai Ndombe, were among those suspended for review. In February 2010, ERA submitted a formal request to the DRC government to manage these concessions for the purpose of protecting the area from destructive logging practices, legal and illegal - using carbon revenues to promote sustainable development. In March 2011, a Memorandum of Understanding was signed between the Ministry of Environment, Conservation of Nature, and Tourism (MECNT) and ERA, in which any carbon rights resulting from the development of the project would be assigned to ERA. In August 2011, the two concession contracts were reassigned to ERA via a Forest Conservation Contract.

The concessions contain over 3.5 million cubic meters of merchantable hardwood which is highly valued by logging companies. The project aims to address logging and the other leading drivers of deforestation - subsistence agricultural practices and aggressive fuelwood/charcoal use. Project activities will consist largely of participatory community-based conservation initiatives which will reduce local incentives toward unsustainable land use, with emphasis on agricultural improvements.

The project will be developed as a REDD+ project with validation planned under the Climate, Community and Biodiversity (CCB) Standard and the Verified Carbon Standard (VCS). The VCS methodology used for this project will be Wildlife Works' VM0009 'Methodology for Avoided Deforestation' v2.0, originally validated with VCS in January, 2011 (Version 1.0) with the revised version (version 2.0) receiving validation from VCS in October, 2012.

ERA has been working closely with the villages and communities in the project area to educate, inform, listen, learn and most importantly, to understand and respect their local customs. Both ERA and Wildlife Works feel that their responsibility is to ensure all parties to this project are willing, freely and gainfully participating and benefiting from its development. The project proponents are thus engaged with each major village and/or seat of traditional authority, and initial consent to develop the project in a

participatory manner has been given by all traditional authorities. The community engagement process will continue throughout the life of the project.

1.2 Sectoral Scope and Project Type

The Mai Ndombe REDD+ Project (hereafter referred to as "the project") 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 3 published 1 February, 2012, by virtue of the fact that it prevents emissions that otherwise would have taken place under a legally commissioned logging concession.

1.3 Project Proponent

The Mai Ndombe Project is jointly operated by Wildlife Works and ERA Ecosystems.

ERA is a Canadian-based pioneer in forest restoration and conservation-based carbon offset projects. ERA specializes in both domestic and international Afforestation, Reforestation, Avoided Conversion, IFM, and REDD+ style projects. In 2005, ERA began restoring degraded old growth rainforest ecosystems in British Columbia's lower mainland. To date, ERA's Community Ecosystem Restoration Program (CERP) has generated over 1,000,000 tonnes of validated and verified Voluntary Emission Reductions (VERs) which have been supplied to the domestic and international offset markets. Today, ERA works around the world with forward-looking communities, ethical companies, and indigenous groups to restore and protect forest ecosystems, building local capacity to play a role in climate change mitigation and adaptation.

Wildlife Works 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 biodiversity. Over a 15 year history, Wildlife Works established a successful model that uses the emerging marketplace for REDD carbon offsets to protect threatened forests, wildlife and communities. The company helps local landowners in the developing world monetize their forest and biodiversity assets, whether they are governments, communities, ownership groups or private individuals. Wildlife Works is actively leveraging its experience to future REDD projects around the globe, with a goal to protect 5 million hectares from deforestation. Wildlife Works is committed to protecting wildlife, forests and biodiversity, with a direct, hands-on approach to creating alternative livelihoods.

1.4 Other Entities Involved in the Project

Technical components of the Mai Ndombe Project were supported by EcoPartners, who work with project developers, forest owners and verification bodies to build successful forest carbon offset projects.

1.5 Project Start Date

PDR.6 The project start date.

The Project start date is March 14, 2011, as 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.

1.6 Project Crediting Period

PDR.7 The project crediting period start date and length.

The project crediting period start will coincide with the project start date, March 14, 2011, and the length of the crediting period will be 30 years. Therefore, the crediting end date will be March 13, 2041.

PDR.8 The dates for mandatory baseline reevaluation after the project start date.

Per the VCS guidelines, a mandatory baseline reevaluation is to be executed at a minimum of every 10 years after project start. Therefore, there will be a mandatory baseline reevaluation on or before March 14, 2021 and on or before March 14, 2031.

PDR.9 A timeline including the first anticipated monitoring period showing when project activities will be implemented.

Date	Project Activity or Event
March 14, 2011	Project start date and project crediting period start date.
March 14, 2011	Carbon Rights Agreement signed
August 2011	Forest Concession Contract signed
August 2, 2011	Opening Ceremonies in DRC
October 2011	Beginning of school construction
February 2012	CLD Building
March-April 2012	Participatory Rural Appraisal
September 2012	Beginning of Agroforestry Demonstration Plot construction
September 15, 2012	First verification (monitoring) event
September 15, 2013	Second verification event

Table 1: Project timeline including project activities and first monitoring milestones.

PDR.10 A timeline for anticipated subsequent monitoring periods.

The following timeline depicts the Mai Ndombe REDD+ Project's monitoring periods and baseline reevaluations:

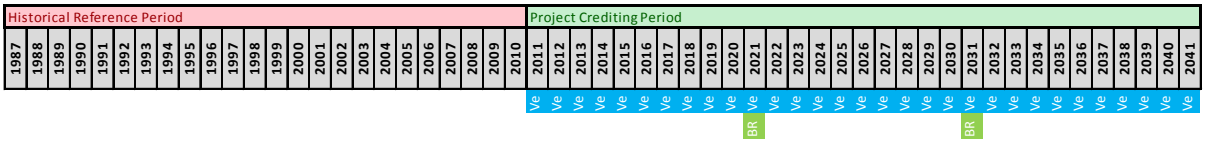


Figure 1. Project verification and baseline reevaluation timeline (Ve= Verification event; BR= Baseline Reevaluation).

1.7 Project Scale and Estimated GHG Emission Reductions or Removals

Project	
Reducing Emissions from Deforestation and Degradation (REDD)	X
Project	
Large Project (updated as of VCS Program updates, 3Q12)	X

Table 2: VCS Project Type.

The Mai Ndombe REDD+ Project is of type REDD (Reducing Emissions from Deforestation and Degradation) and as net credits exceed 300,000 / year, it is classified as a VCS "large project". The following table shows estimated credits generated by the project per vintage year. Note that credits per *vintage year* differ from credits *per monitoring event* (monitoring events do not coincide with calendar years), a table for the latter is listed later in this document.

Vintage Year	Estimated GHG emission reductions or removals (tCO2e)
2011	1,252,975
2012	1,655,859
2013	2,205,056
2014	2,749,672
2015	3,408,489
2016	4,289,009
2017	4,852,662
2018	5,712,250
2019	6,532,650
2020	7,505,356
2021	8,782,906
2022	8,700,475
2023	9,141,433
2024	9,326,618
2025	9,817,918
2026	10,890,571
2027	8,820,771
2028	8,456,963
2029	7,784,827
2030	7,831,048
2031	8,592,010

Vintage Year	Estimated GHG emission reductions or removals (tCO2e)
2032	5,306,607
2033	5,316,325
2034	5,107,408
2035	4,400,021
2036	4,999,380
2037	2,646,898
2038	2,475,530
2039	2,309,641
2040	3,307,692
2041	1,640,991
Total estimated ERs	175,820,011
# of vintage years	31
Average annual ERs	5,671,613

Table 3: NER breakdown by yearly Vintage.

1.8 Description of Project Activities

The Mai Ndombe REDD+ Project will serve the community and protect the project area from deforestation through project activities. These activities are focused on four main themes:

- Stopping planned legal and reducing unplanned illegal logging
- Agricultural improvement activities
- Village-centered capacity building through Local Development Committees (CLDs)
- Infrastructure and socio-economic development activities

Project activities will be funded through carbon financing and are designed to reduce or even eliminate deforestation in the project area, while improving the socio-economic livelihood of the surrounding community. The project activities were selected in consultation with the local communities as well as other stakeholders and officials from all levels of government. These discussions resulted in *Cahier de charge* (social responsibility commitment) that was integrated into the Forest Conservation Concession Contract, which was signed by the government of DRC Congo and ERA. Major objectives from the *Cahier de charges* signed by ERA include:

- Build a minimum of 20 schools
- Construction of health care centres in 5 villages
- Reparation and extension of secondary hospitals in 2 villages
- Assist transportation to off-concession markets for agricultural and other products
- Provide a network of rural canteens
- Improve agricultural production techniques

- Recruit employees from local communities

Project Activities	Description	Expected Impact
Management and enforcement		
Conservation management of concession	Former timber concession managed as a conservation concession and proposed legal logging extraction has been halted. Wood extraction will be greatly reduced with the allocation of the timber concession to ERA Congo, as increased access to forests that would have occurred through large scale logging practices (e.g., road building, logging trails) will not be occurring under conservation concession.	Protect existing forests; Allow regeneration of degraded forest; Conservation of biodiversity and habitat
Wood energy plantations	Plantations established in degraded areas in order to provide fuel wood to communities within the project area.	
Forest monitoring	Local administration of extraction activities and prevention of logging	
Agricultural Improvement		
Agroforestry nursery and demonstration plots	Demonstration of agroforestry techniques for use by communities in the project area. Nursery will be located in the village of Selenge; demonstration plots will be located in the villages of Inunu, Selenge, Bosongo, and Mbale.	Increased market value for crops; Reduced deforestation pressure on forests in the region.
Agricultural diversification	Demonstration garden including new crop varieties, at ERA headquarters in Inongo.	
Improved market access	Assistance to farmers in the commercialization of their products, in partnership with local NGO APEFE.	
Community-Led Capacity Building		
Local Development Committees	Establishment of Local Development Committees (CLDs in French) in the villages of Mbale, Inunu, Selenge, and Bosongo, Mpata Mbalu, Lobeke, Lokanga, Kesenge, and elsewhere.	Locally driven process for determining project activities; Increased ability to collectively and locally respond to community issues; Increased local capacity for governance, administration and problem solving
Education workshops	Topics include sustainable management of forest resources and causes and impacts of climate change.	
Social Service Infrastructure		
School construction	Construction of 20 schools built with locally sourced bricks, including two 8-room classrooms in the villages of Lokanga and Kesenge.	Improved school facilities and increased school capacity
Mobile medical clinic	Establishment of a mobile medical clinic.	Increased access to healthcare
Other public services	Skill training, including English language	Improved educational opportunities

Project Activities	Description	Expected Impact
	lessons.	

Table 4: Description of Project Activities.

1.8.1 Project Activity Locations

The following maps depict the location of project activities as well as the location of local development committees for the Mai Ndombe REDD+ Project:

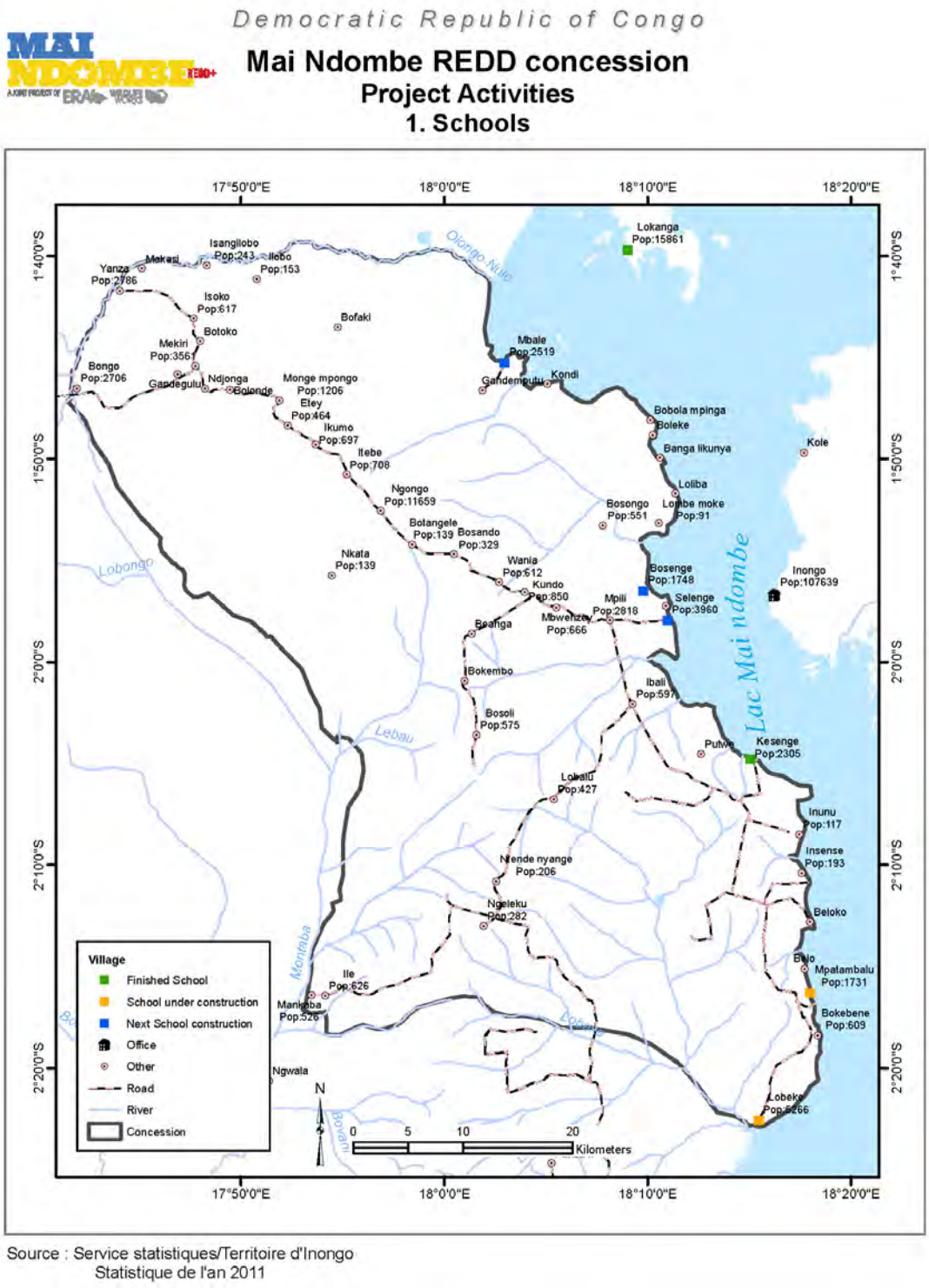
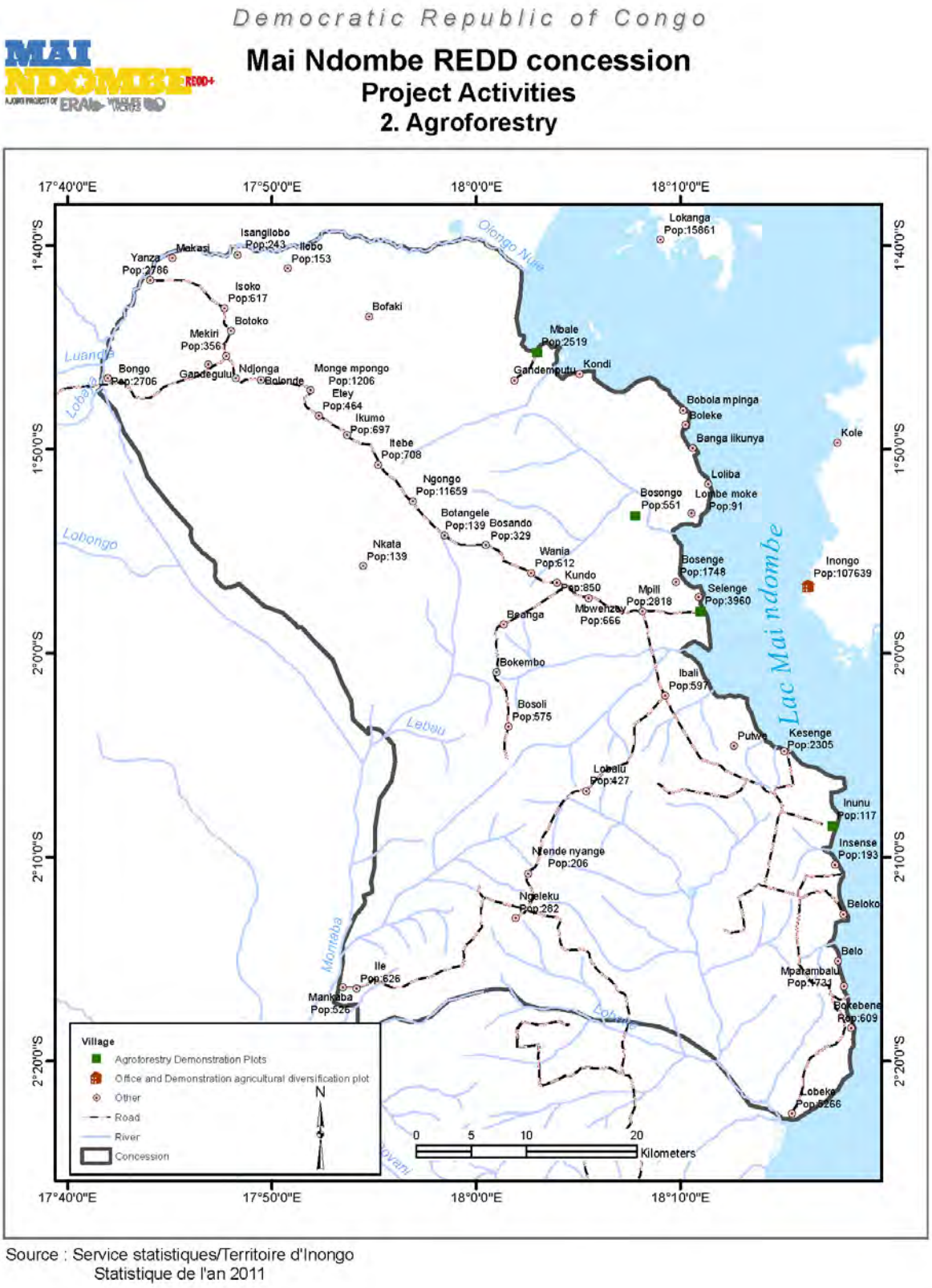
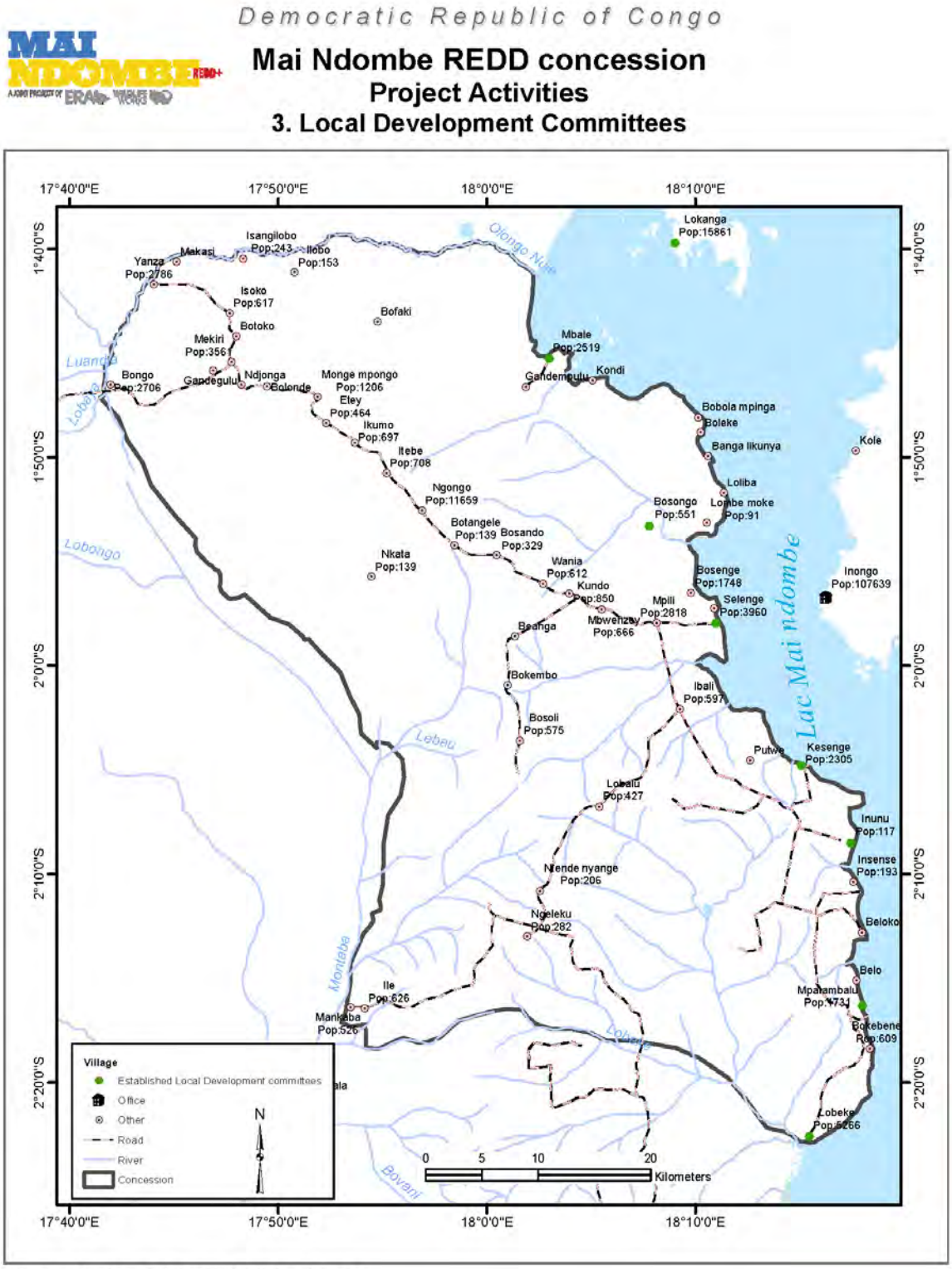


Figure 2: Location of School Building Activities within the Project Accounting Area



Source : Service statistiques/Territoire d'Inongo
Statistique de l'an 2011

Figure 3: Location of Agroforestry activities within the Project Accounting Area



Source : Service statistiques/Territoire d'Inongo
Statistique de l'an 2011

Figure 4. Location of Local Development Committees

1.9 Project Location

1.9.1 Delineating the Spatial Boundaries

The Mai Ndombe REDD+ Project area is situated in the Inongo Territory in the Mai-Ndombe Lake District in the Bandundu Province. The project 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.

Maps containing the PD Requirements listed below are provided in detail in the following appendices: Appendix A - Map of Project Area, Appendix B - Map of Topography (DEM based), Appendix C- Map of Roads and Infrastructure, as well as Major Rivers and Streams, Appendix D - Map of Land use/ Vegetation Cover:

- Name of the project area: The "Mai Ndombe REDD+ Project" consists of the terra-firma forested parts of the two former logging concessions, now forestry certificate (permit) numbers 004/84 and 014/2004.
- Digital maps of the area, including geographic coordinates of vertices
- Total land area
- Details of ownership, including user rights and/or land tenure information
- Topography
- Roads
- Major rivers and perennial streams
- Land use/vegetation type classification

PDR.4 A digital (GIS-based) map of the project area with at least the above minimum requirements for delineation of the geographic boundaries.

The following map shows the Mai Ndombe REDD+ Project Accounting Area (PAA). The REDD Accounting Area consists of the original two concessions obtained by ERA Congo, less any non-forested areas and 2.5km diameter buffers placed around each community within the concessions for the purposes of planned forest activities. As a result, the PAA resembles a concatenation of the original two ERA-obtained concessions, with some areas cut out due to non-compliance with REDD constraints. Further information about these PAA excisions can be gleaned from the map depicting Land Cover in the PAA as well as locations of communities, in appendix D and Figure 4, respectively.

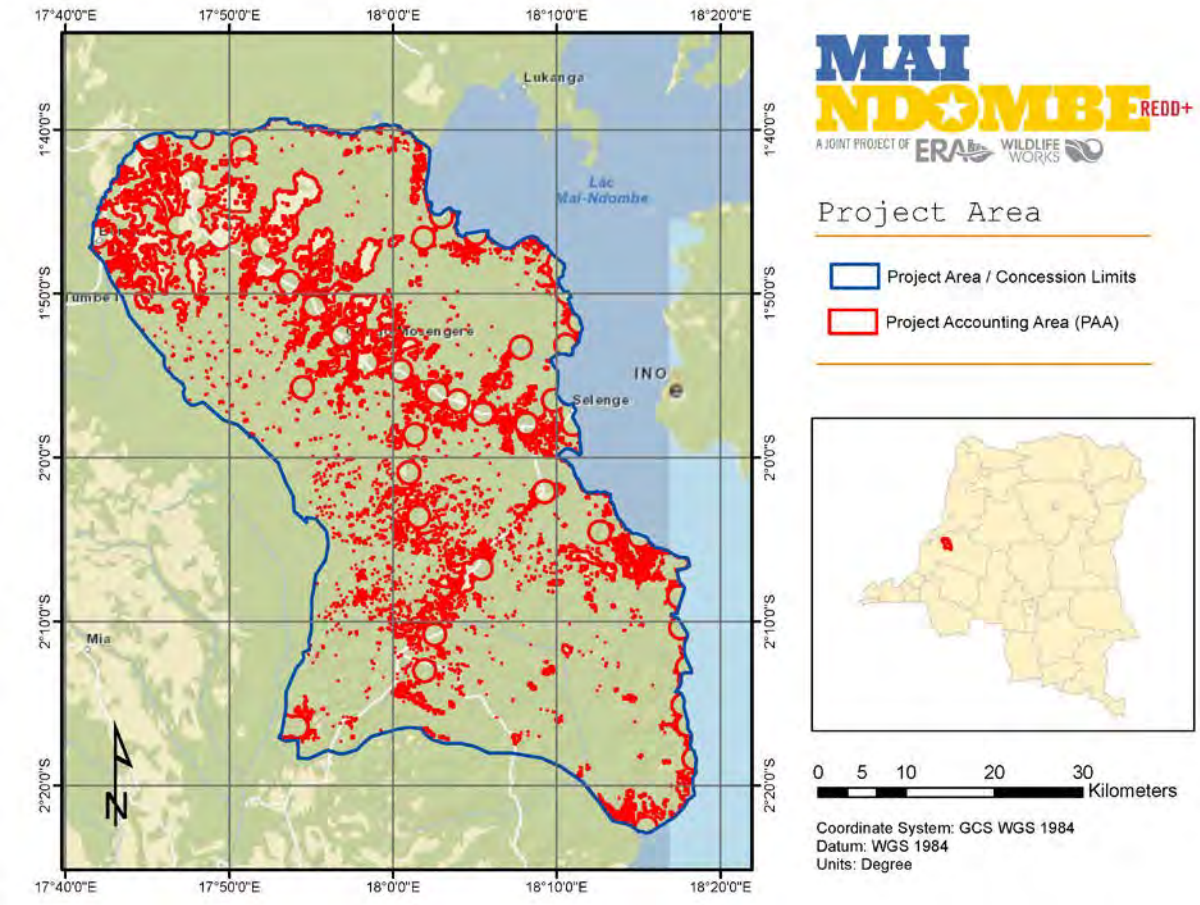


Figure 5: Project Accounting Area and Concession Boundaries

PDR.5 Credible documentation demonstrating control of the project area, or documentation that the provisos listed in the case of less than 80% project control at the time of validation delineated in this methodology are met.

See Annex A – Carbon Rights Agreement that demonstrates control of the entire project area.

1.10 Conditions Prior to Project Initiation

The project area, prior to project initiation was subject to the following constraints:

Under the DRC 1973 General Property Law (Law No. 73-021 dated July 20th, 1973), all land water, forests and minerals in the DRC are formally owned *by the state*. As such, local communities technically have no formally recognized title over the land. However customary 'usufruct' rights to access the forests and to use land for agricultural purposes are widely recognized, and in practice, customary law continues to constitute the most recognized form of land tenure. This is particularly true in the northern portions of the project area, where previous (timber harvesting) concession holders with resource management rights granted by the state have never held a strong presence, and thus the ownership of land by the state is not widely recognized or even understood by local land users. This uncertainty has led

overlapping systems of tenure, and has in fact been the cause of many disputes over resources between the state and citizenry in the DRC.

However, customary land tenure of *local communities* is clearly recognized under articles 388 and 389:

Article 388: Les terres occupées par les communautés locales sont celles que ces communautés habitent, cultivent ou exploitent d'une manière quelconque – individuelle ou collective – conformément aux coutumes et usages locaux.;

Roughly translated: "The lands occupied by local communities are those on which these communities live on, cultivate, or exploit in any way-individually or collectively-in conformity with local customs and usages."

Article 389: Les droits de jouissance régulièrement acquis sur ces terres seront réglés par une Ordonnance du Président de la République.;

Roughly Translated: "The rights of use as acquired in conformity with the precedent rules will be regulated by Ordinance of the President of the Republic."

In the case of forest concession that has been allocated to the project proponent the "Code Forestier" clearly defines local community forests [the word 'Indigenous' is pejorative in the Congo), and the rights attached to it. The right to attribute forest concessions belongs to the Ministry of the Environment. However, the concession title holder has to agree with local communities who have the right of usage (droit de jouissance) under the provision of the Land Tenure Act (Art. 388) and the Forest Code (completing Art. 389 of the Land Tenure Act). The Forest Code specifically requests the signing of an agreement known as "Cahier de Charge" between the concession Title holder and the local community representatives prior to signing the Concession Contract. In fact, the "Cahier de Charge" is part of the Concession Contract. Therefore, in the case of ERA, a "Cahier de Charges" (refer to Annex B – Cahier de Charges) was signed with representatives of local communities after the Carbon Right Agreement (CRA) (refer to Annex A – Carbon Right Agreement (CRA)) was signed, and before the Concession contract was granted to the company.

The project area concession was signed in August, 2011. Therefore, it is clear that ERA did not generate previous emissions with the intent of subsequently removing them for gain under any GHG programs. The same can be said for the reference area, where the baseline is measured. As stated in section 2.4.1 of this document, the reference area was exploited by and large by SOFORMA, and ERA has not had a presence in the area prior to the project, nor do they currently have a presence in the Mayombe area.

1.11 Compliance with Laws, Statutes and Other Regulatory Frameworks

ERA, ERA-Congo and Wildlife Works will comply with all applicable local, district and national laws, regulations and standards. Within the Project area, none of the proposed project activities violate any law. The government of the DRC owns the land in the project area. The Project Proponent owns the rights to sequestered carbon in the project area.

Laws and regulation:

Laws regulating the Forestry Conservation Contract and the REDD projects:

Forestry Code “Loi n°011/2002, August 29, 2002” and its related implementation decrees: Decree n°11/27, May 20, 2011 concerning specific rules on the allocation of Forestry Conservation Concession, determine the legal framework under which the Forestry Conservation Concession contract was allocated to ERA-Congo.

Forestry 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 grant of Forests Concessions.

This procedure was followed by ERA-Congo prior to the signature of the Forestry Conservation 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 when ERA’s REDD project 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
- notify to the Registry carbon transactions according to a recognised standard by the DRC (validation/verification reports), ERA will submit PDD and validation/verification reports in time.
- submit a yearly progress report with audited financial statement at the latest by March 31 the year following the concerned financial year.

The Forestry 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. These taxes were paid in 2011 and 2012 and will continue to be paid as due.

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 Decree March 6, 1951 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 taxes 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 wages and women working conditions, Ministerial Order n° 12/CABMIN/TPS/AR/KF/059/02,Septembre 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 relative to employees dismissal procedure.

ERA-Congo has adopted internal employment conditions regulation in conformity with these labour regulations. Wildlife Works will adapt all conditions set forth by ERA when it establishes presence at the project.

National Security Law "Loi n°75/028 September 19, 1975" modifying Decree-Law, June 29, 1961 establishing the National Social Security Institute (I.N.S.S), covering employees' pension, occupational risks and accidents and family allowances.

For the benefit of 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 I.N.S.S.

Health benefits Decree-Law 67/310 August 9, 1965 states that companies must cover the health care needs of its employees.

This obligation is reflected in the internal employment regulation (Art. 51) of ERA-Congo.

International Agreements:

Article 215 of the 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 REDD project aims the DRC to attain its objectives in term of climate change, biodiversity, fauna, flora and wetlands conservation and sustainable use of forests ecosystems. The Project is within an area listed on September 9, 2008, as Wetlands of International Importance under the Ramsar Convention.

Legal Agreements:

Carbon Rights Agreement signed on March 14, 2011 between ERA Ecosystem Restoration Associates and the DRC government by its representative the Minister of Environment.

This agreement transfers the carbon rights to ERA, and states the roles and obligations of the two parties to that agreement, the project time period, revenue sharing with the government, payment to

communities, and tax to be paid by ERA to the government, in this case only the area tax is to be paid, exempting ERA from other taxes established by the Forestry Code.

Forest Conservation Concession Contract signed on July 30, 2011 by ERA-Congo and the Ministry of Environment representatives, which allocates the conceded lands to ERA-Congo, and defines ERA-Congo's social, environmental and management obligations.

1.12 Ownership and Other Programs

1.12.1 Proof of Title

Though the Democratic Republic of Congo is the sole owner of the project area lands, per the Concession Contract ('Forest Conservation Contract') and the Letter of Understanding signed March 14, 2011, Ecosystem Restoration Associates (ERA) holds exclusive rights to sell carbon credits for carbon generated by the project area (Article 5). This contract is effect for 25 years and applies to the 299,640-ha project area. After this period, the contract may be renewed on the terms contained in Article 8 of the Concession Contract. The 25-year contract will be renewed to complete the 30-year project crediting period.

1.12.2 Emissions Trading Programs and Other Binding Limits

This project is not subject to any emission trading programs or other binding limits.

1.12.3 Participation under Other GHG Programs

This is the first and only application for this project to a GHG program.

1.12.4 Other Forms of Environmental Credit

This project will also be validated under the Climate, Community & Biodiversity (CCB) Standards (Second Edition, Gold Level).

1.12.5 Projects Rejected by Other GHG Programs

This project has neither applied for nor been rejected from any other GHG programs.

1.13 Additional Information Relevant to the Project

None.

1.13.1 Commercially Sensitive Information

Some annexes contain commercially sensitive information. All necessary supporting information shall be provided to the validator but may not be distributed publicly.

1.13.2 Further Information

None.

2 Application of Methodology

2.1 Title and Reference of Methodology

The project employs the VM0009 Methodology for Avoided Deforestation version 2.0. This methodology quantifies greenhouse gas removals generated from avoiding both planned and unplanned deforestation initiated by a variety of drivers.

2.2 Applicability of Methodology

PDR.1 For each applicability condition, a statement of whether it applies to the project. If the applicability condition does not apply to the project, justification for this conclusion.

PDR.2 Where applicability conditions apply, credible evidence in the forms of analysis, documentation or third-party reports to satisfy the condition.

1. *This methodology was developed for avoiding deforestation and assumes that degradation and deforestation occur as a result of land use conversion to non-forest. This methodology may be used if all the drivers and agents of deforestation are consistent with those described in section 6 of this methodology and the end land use in the baseline scenario is non-forest. Accordingly, the project activity must be APD or AUDD.*

VM0009 version 2.0 "Methodology for Avoided Deforestation" is applicable to this project because the baseline scenario includes agents of deforestation who carry out forest-clearing activities that result in land use conversion to non-forest. In particular, the primary agent had secured authorization to conduct sanctioned commercial harvest in the project area, demonstrating that the baseline scenario is planned commercial harvest (APD, baseline type P1 under VM0009). The planned commercial harvest enables secondary agents, including members of communities within and near the project area, to perform illegal logging using the infrastructure (e.g., roads, bridges) established by the primary agent. (Refer to section 2.4.1 for more information about agents and drivers of deforestation.)

This sequence of deforestation was confirmed to have occurred in the reference area during the reference period. As confirmed by spatial analysis, the end land use in the reference area is primarily non-forest used for agricultural production.

2. *Land in all project accounting areas has qualified as forest on average across the project accounting areas as defined by FAO 2010 or as defined by the residing designated national authority (DNA) for the project country for a minimum of 10 years prior to the project start date.*

As evidenced through the FAO Africover Land Cover dataset derived from Landsat satellite imagery acquired in 2000-2001 (www.africover.org), the Project Accounting Area (248,956 ha) was forested according to a definition of forest that is based on the FAO definition, but is modified in the following manner: The FAO definition (*i.e.*, areas greater than 0.5 ha, tree heights greater than 5 meters, and canopy cover greater than 10%) is used with the following caveat:

Areas referred to as "forêt secondaire" (secondary forest) which are described by complexes of regrowth, fallow and crops and even small villages; also known as the rural complexes dominating areas located in close proximity to villages, ports and roads with dense undergrowth and regular crown cover

(Mayaux et al., 2000; Devred 1958), are considered *non-forested*, and are not included in the Project Accounting area for this project.

There were 2 small additional discrepancies: A small area (approximately 800 ha) of forest was incorrectly labeled as water, and an area labeled "Shrub" in the Africover dataset (approx. 5,000 ha), was proven to be forested on the ground. Also, through examination of high-resolution imagery, this area was verified to be forested in recent years. It is assumed that areas which are currently core

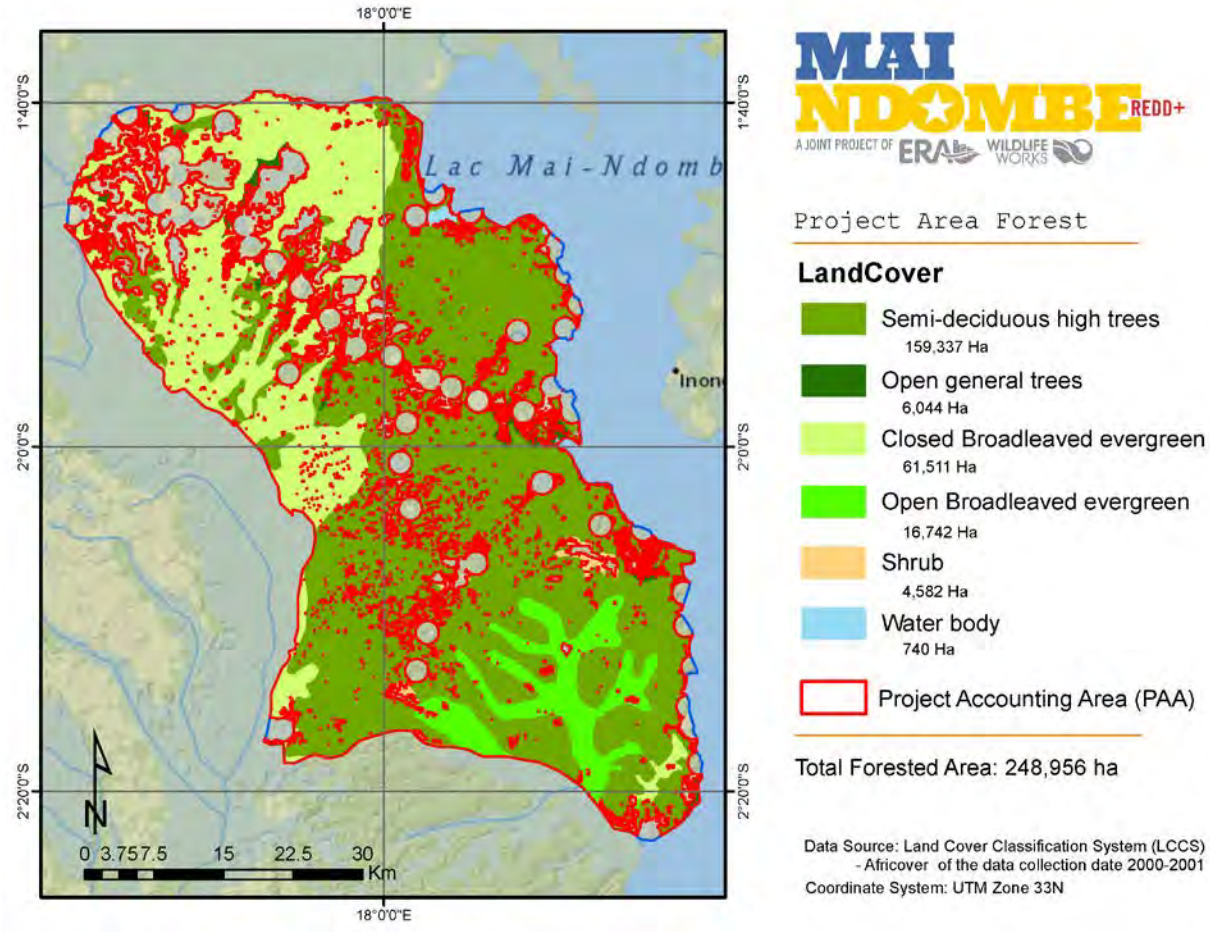


Figure 6: Map showing that the PAA meets the definition of forest in 2001 (at least 10 years prior to the Project Start Date).

3. *In the case of baseline types that are type U, unplanned deforestation, deforestation exists at some point within 120 meters of the perimeter of the project accounting area such that without the implementation of the project activity the project accounting area would be immediately threatened by the agent of deforestation as of the project start date.*

Baseline type U (unplanned deforestation) does not apply to this project. Refer to applicability condition 1 above.

4. *In the case of baseline type U1, at least 25% of the project area boundary is within 120 meters of deforestation and at least 25% of the project area is adjacent to the reference area.*

Baseline type U (unplanned deforestation) does not apply to this project. Refer to applicability condition 1 above.

5. *In the case of baseline type U2, at least 25% of the project area boundary is within 120 meters of deforestation.*

Baseline type U (unplanned deforestation) does not apply to this project. Refer to applicability condition 1 above.

6. *If foreign agents have been identified as an agent of deforestation, they are unlikely to shift their activities outside the activity-shifting leakage area.*

Foreign agents have not been identified as agents of deforestation in the project area. Per section 2.4.1 of this document, the primary agents of deforestation are identified to be Commercial Logging Companies, primarily including SOFORMA (Société forestière du Mayombe"). Secondary agents include local villagers, living in close proximity to the project area, who convert degraded forest into agriculture.

7. *The project accounting area(s) shall not contain peat soil.*

The Project Accounting Area contains two types of soil, according to the FAO-UNESCO World Soil Map, Feb, 1998: Xanthic Ferrasols and Eutric Gleysols neither of which are classified as Histosols (Peat). The

Project Accounting Area therefore does not contain peat soil, as shown in the map below:

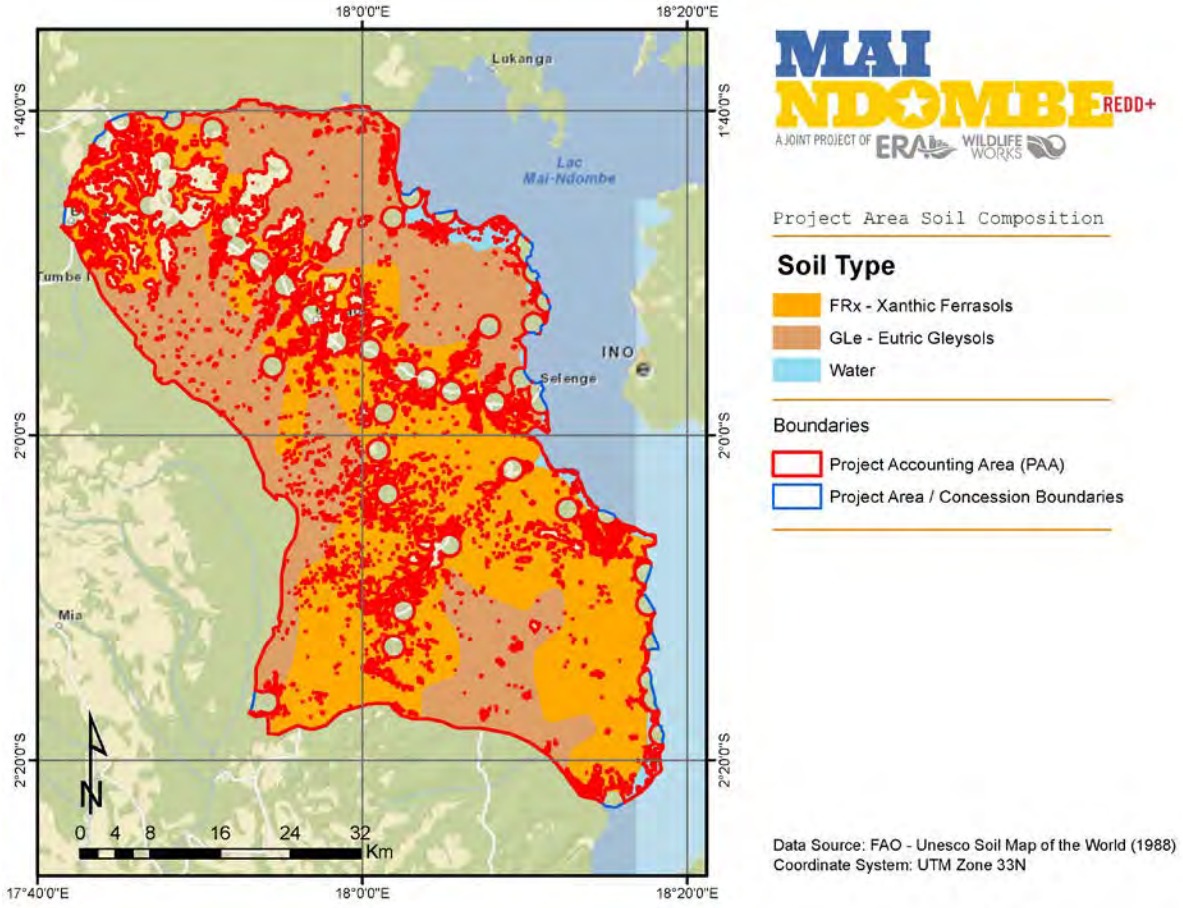


Figure 7: Map of soils in the Project Accounting Area indicating lack of Peat soil (Histosols).

8. *For each project accounting area, a reference area can be delineated for each baseline scenario that meets the requirements of section 6.7.1 of this methodology including the minimum size requirement.*

See section 2.4.5.1 regarding selection of the reference area and for results of a spatial analysis demonstrating the reference area contained as much forest as the project accounting area at some point during the historic reference period.

The reference area was chosen primarily due to the same primary agent of deforestation acting within both the Project and Reference Areas – namely, planned commercial harvest – and is also similar to the project area in terms of landscape configuration, socio-economic drivers (see section 2.4.5.1) and is furthermore equidistant from the main market –and capital of the DRC - Kinshasa . *As of the project start date, historic imagery of the reference area exists with sufficient coverage to meet the requirements of section 6.7.4 of this methodology*

- Double coverage (at least 90% of the reference area visible in at least two historic images)

Double coverage analysis showed that 98.99% of the reference area meets the double coverage requirement (see section 2.4.5.3 of this document).

- Minimum spatial imagery (30m resolution)

Point interpretation utilized Landsat imagery, which has a spatial resolution of 30 m.

- *Stationarity of time series of historic imagery*

Refer to the Historical Reference Period Line Plot in section 2.4.5.3 of this document.

- *Spatial registration: All imagery shall be spatially registered to the same coordinate system with accuracy less than 10% Root Mean-Squared Error (RMSE) as measured by the error relative to the pixel diagonal of the image being evaluated or relative to the absolute difference between the greatest error and the smallest error, on average across all images (Congalton, 1991). The accuracy of spatial registration is assessed empirically; each image is relative to other collocated images or a ground control point. Oblique imagery should be avoided to maintain accurate spatial registration.*

All Landsat images were spatially registered to the same coordinate system (WGS 1984 UTM Zone 33 N) and no additional geo-referencing was necessary.

9. *Project activities are planned or implemented to mitigate deforestation by addressing the agents and drivers of deforestation as described in section 8.3.1 of the methodology.*

Project proponents will implement activities that reduce illegal logging through local administration of extraction activities and prevention of logging. These activities are described in section 1.8 of this document.

10. *The project proponent has access to the activity-shifting leakage area(s) and proxy areas(s) to implement monitoring (see sections 8.3.2.1 and 6.4 of the methodology), or has access to monitoring data from these areas for every monitoring event.*

The project proponent demonstrated access to the proxy area by collecting data from proxy plots for determination of residual carbon stocks. An activity-shifting leakage area is not applicable to this project (see section 3.3.1 of this document).

11. *If logging is included in the baseline scenario and a market-effects leakage area is required per section 8.3, then the project proponent has access to or monitoring data from the market-effects leakage for every monitoring event (see section 8.3.3 of the methodology).*

A market-effects leakage area is not applicable to this project (see section 3.3.2 of this document).

12. *This methodology is applicable to all geographies, however if SOC is a selected carbon pool and the default value (from section 6.17.1.1 of the methodology) is selected, then the project must be located in a tropical ecosystem.*

The project is located in a tropical ecosystem in the Democrat Republic of Congo. Therefore the default value is applicable for the determination of carbon decay in soil.

PDR.3 Definition of forest used by the project proponent and its source.

The project proponent used the Food and Agricultural Organization's (FAO) definition of forest: area greater than 0.5 hectares, tree heights greater than 5 meters, and canopy cover greater than 10% (Global Forest Resources Assessment, 2010).

2.3 Project Boundary

2.3.1 Gases

PDR.11 A list of the greenhouse gases considered.

Carbon dioxide (CO_2) was determined to be the primary source of greenhouse gas emissions in the project, given the threat of deforestation from both sanctioned commercial harvest and illegal logging in the baseline scenario. Methane (CH_4) and nitrous oxide (N_2O) are conservatively excluded from the project.

Pool	Sources	Inclusion	Justification
CO_2 (Carbon Dioxide)	Flux in carbon pools	Yes	Major pool considered in the project scenario
CH_4 (Methane)	Burning of biomass	No	Conservatively excluded
N_2O (Nitrous Oxide)	Burning of biomass	No	Conservatively excluded

Table 5: Project Greenhouse Gases Considered.

2.3.2 Selected Carbon Pools

PDR.12 A list of the selected carbon pools.

Pool	Required	Included in Project?	Justification
Above-ground merchantable tree	Required	Yes	Major pool considered
Above-ground non-merchantable tree	Required	Yes	Major pool considered
Above-ground non-tree	Optional	No	Conservatively excluded
Below-ground merchantable tree	Optional	Yes	Major pool considered
Below-ground non-merchantable tree	Optional	Yes	Major pool considered
Below-ground non-tree	Optional	No	Conservatively excluded
Litter	No	No	Conservatively excluded
Dead wood	Optional	No	Conservatively excluded
Standing deadwood	Optional	No	Conservatively excluded
Lying deadwood	Optional	No	Conservatively excluded
Soil organic carbon	Optional	Yes	Major pool considered
Wood products	Required	Yes	Major pool considered

Table 6: Selected Carbon Pools.

PDR.13 The definition and evidence to support the definition of a merchantable tree if the baseline scenario or project activities include logging.

The commercial logging concession in the baseline scenario authorizes harvest of the following species:

Species	Minimum Diameter (cm)
Afzelia	60
Albizia feruginea	50
Amphimas sp	80
Aningeria robusta	80
Anthrocaryon nananii	80
Antiaris toxicaria	80
Autranella congolensis	80
Baillonella toxisperma	80
Brachystegia laurentii	80
Canarium schweinfurthi	80
Ceiba pentandra	80
Celtis sp	60
Copaifera milbraedii	80
Daniella pinaertii	80
Diospyros spp. (crassiflora, et al.)	80
Entadrophragma angolense	80
Entandrophragma cylindricum	80
Entandrophragma utile	80
Entrandrophragma candollei	80
Erythropheum suaveolens	80
Gambeya lacourtiana	80
Gilbertiodendron dewevrei	80
Gossweilerodendron balsamferum	80
Guarea spp. (cedrata, laurentii, thompsonii, et al.)	60
Guibourtia demeuseii	80
Khaya anthoteca	80
Lovoa trichilioides	80
Mammea africana	60
Miletia laurentii	60
Milicia excelsa	80
Morus mesozygia	60
Nauclea diderrichi	80
Newtonia leucocarpa	60
Ongokea gore	60
Oxystigma oxyphyllum	80

Petersianthus macrocarpus	80
Piptadeniastrum africanum	80
Pterocarpus castelsii (soyauxii)	80
Pychnanthus angolensis	80
Schorodophleus zenkeri	80
Staudtia stipitata	80
Swartzia fistuloides	80
Terminalia superba	80
Tieghemella africana	80
Tieghemella hetkelii	80

Table 7: Justification for inclusion of various carbon pools. (Refer to Annex C – Tarif de Cubage 1.3.)

Accordingly, these species and diameters are used to designate *merchantable biomass* within the project inventory.

2.4 Baseline Scenario

2.4.1 Identifying the Agents and Drivers

PDR.17 A list of the agents and drivers of deforestation, including quantitative descriptions of agent mobilities.

- **Primary Agents:** Commercial Logging Companies, including primarily SOFORMA (Société forestière du Mayombe"). Primary agent mobility is assumed to be 500-3000km, due to mechanized transport and a vast infrastructure system, as well as the capacity to harness natural infrastructure systems (rivers).
- **Secondary Agents:** local villagers who convert heavily degraded forest into agriculture for subsistence and market sale. Mobility of the secondary agents is typically limited to that which can be traveled on-foot or by crude means of transport (~5-25km) except in the case where trucks or boats are used to transport cash crops to market (~100-500km)
- **Drivers of Deforestation:**
    a. Ease of transport/travel (infrastructure)
    b. Proximity to major river
    c. Proximity to major market
    d. Access to deforestation tools

PDR.18 A narrative describing the agents and drivers of deforestation.

The primary agents of deforestation in the Mayombe Forest area, within the Bas Congo District, (The reference area) are identical to the primary agent in the project area (Mai Ndombe). They are the commercial logging conglomerate, SOFORMA. This company is a legally operating timber outfit, who has been operating in the Mayombe Forest since the beginning of the reference period and beyond.

Interviews in the reference area indicate that SOFORMA has created and maintained the vast majority of infrastructure (roads and bridges) to support logging operations. The Mayombe Forest has been systematically logged throughout the reference period to the extent that only tiny forest remnants

remain. These same interviews saw elders recounting stories of vast dense forest some 10-20 years ago. A visual and subjective estimate shows that greater than 90% of the Mayombe area has been denuded, and the main cause of this, as corroborated by local chiefs and villagers alike, is commercial logging. Primary agent range is, as expected, quite fluid and far-reaching. Most commercial logging outfits host vehicle fleets, and massive machinery capable of felling many hectares of forest in a matter of hours. Most of the timber was transported to the main hub, and capital of the DRC, Kinshasa via waterway (the Congo River). SOFORMA has ceased most operations in the area, due to scarcity of forest, but there remain some active mills in small number sawing remnant forest. The Mayombe Forest is approximately equidistant from Kinshasa as the Mai Ndombe forest (approximately 275km).

The drivers for the primary agents differ from those of the secondary agents. For primary agents, the main drivers are market-based. The overwhelmingly prevalent spatial driver that can be identified is proximity to major waterway (thus allowing access to major markets). Additionally, forest density and number/type of hardwood species drives the agents to deforest in certain specific locales. Most other drivers can be artificially manipulated by the agents, including infrastructure (roads, bridges, electricity, etc.).

The secondary agents of deforestation are these same local people, who either resided in the area previously, or moved there to work for the logging operation(s). These locals, practicing mostly subsistence farming, cite the increase in ease of access (due to logging) as the primary reason for converting the remaining land to agriculture. In fact, many interviewees claim that before SOFORMA built roads and provided access to the deep forest, it was virtually impenetrable. Acting out of necessity, these secondary agents have proceeded to denude most of the remaining heavily-degraded forest in the reference area to grow crops for their families and communities, and also for market sale. Trucks carrying plantains, cassava and maize, are clearly visible travelling the market route between Boma – Matadi and Kinshasa at present-day.

Drivers influencing the secondary agents include: proximity to road, proximity to fresh water, proximity to major market (which allows for healthcare, education, etc.) and to a smaller extent, market-based drivers such as price fluctuations.

PDR.19 Descriptions of agents and drivers including any useful statistics and their sources.

The initial investment plan by the primary agent included harvesting of 28,000 hectares of forests in the southwestern part of the project area. This included the removal of approximately 38,000 cubic meters of merchantable timber species, including *milletia laurentii* and *guarea spp.*, and would have generated approximately US$17 million in timber revenue. In the baseline scenario, it is expected that the primary agent would clear 5000 to 6000 hectares of forest per year, thus clearing most of the primary terra firma forested area over the 25 year period of the logging concession. Despite the minimum diameters prescribed in the terms of logging concessions, anecdotal evidence suggests that logging companies consistently cut many merchantable trees with smaller diameters. The following map depicts areas that were under concession and had begun logging operations in the Project Area:

Figure 8: Map showing previous logging activity by concession holders.

Small private loggers often perform illegal logging between the primary agent's first and second logging 'pass' through a given parcel within a concession. This wood is used to supply the local market and for building boats and is estimated to total approximately 30 cubic meters per month (representing a loss of approximately US$120,000 per year for the primary agent).

Secondary agents perform selective logging for charcoal production and other uses, and subsequently use slash and burn practices to prepare soils for agricultural production. Felled trees are used for the production of charcoal, most of which is transported to markets in Kinshasa.

Agriculture is prevalent in terra firma areas, where dense semi-deciduous forests are destroyed and converted to secondary forests. This occurs mostly along roads and waterways near the Lake Mai-Ndombe shore line and in areas close to villages. These secondary forests are usually referred to as "rural complexes" and are defined as patches of forest fallows and small agriculture fields. Cassava and corn are the most important crops in the vicinity of the project area. Due to low fertility in the soil, clearing and burning the forest is a method to bring more fertility from above ground biomass.

2.4.2 Delineating the Project Accounting Areas

PDR.21 A digital (GIS-based) map of the accounting areas, including aerial or satellite imagery showing that they are completely forested as of the project start date and 10 years prior to the project start date.

Analysis of the PAA using the Africover dataset (based on Landsat data acquired in 2000 and 2001) shows that the project area was forested 10 years prior to the start date (see Appendix H). A classification was performed in the Project Area, also utilizing Landsat data and ground truthing carried out in-situ. This classification was performed in 2010 by the JR Bwangoy and his team at South Dakota State University, and shows that the Project Area is primarily forested at Project Start Date (March 14, 2011). See this map in Appendix D.

PDR.22 Justification and area of the selected accounting areas.

The Project Accounting Area (PAA) differs from the 2 official forest concession boundaries (Project Area) by the following items:

1. A Land Use / Land Cover analysis of the project area indicates 2 non-forest strata, Prairie and Open Water. These 2 strata have been removed from the Project Accounting Area (PAA) and will not be included in carbon accounting for the project.
2. To support a good relationship with local communities who had been living in the Project Area prior to the Project Start Date, and to support Free, Prior and Informed Consent (FPIC) efforts by ERA Congo and Wildlife Works, a "community forestry buffer" has been placed around each of the communities within the REDD project boundaries. A 2.5-kilometer diameter circular buffer was excised from the REDD Project, and thus the Project Accounting Area, to allow for the expansion of forestry by these communities. These excisions reduced the total project area by 14,526 ha.

2.4.3 Baseline Types

PDR.23 If Type P1 or Type P2 are selected, justification for meeting the definition APD in the current VCS-approved AFOLU requirements.

The project area is composed of suspended commercial logging concessions, formerly held by the logging company SOFORMA (forfeited in 2007). A map of concessions in the DRC is available to the validator upon request. Following the VM0009 methodology (see Figure 3 in section 6.3 of the methodology), the project firstly meets the definition of "Avoided Planned Deforestation" activity defined by the VCSA in the AFOLU Requirements v3, Section 4.2.9., as the project activities "reduce GHG emissions by stopping deforestation on forest lands that are legally authorized and documented for conversion to non-forest land." In particular, the legally authorized land conversion is commercial timber harvest, indicating that the P1 baseline type applies to the project.

PDR.24 If Type P1 is selected, evidence of legally-sanctioned commercial harvest in baseline scenario.

In May 2010, the Congolese authorized an exchange of concessions that would have granted logging company SOFORMA commercial harvest rights in the project area. Refer to Annex D – Approval of Concession Exchange.

2.4.4 Delineating Proxy Areas

PDR.28 A map of the delineated boundaries.

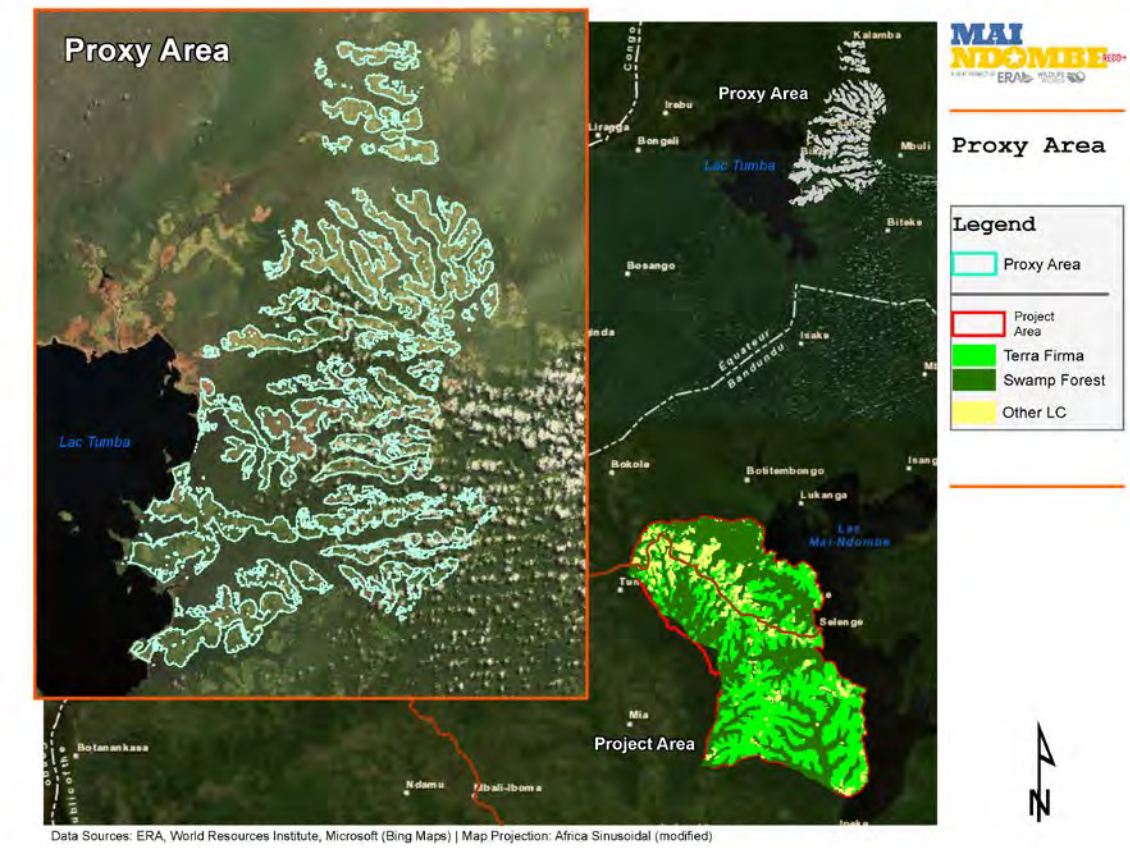


Figure 9: Location and boundaries of the Proxy Area and visual evidence of Non-forested boundaries.

PDR.29 Maps of the landscape configuration, including:

a. **Topography (elevation, slope, aspect);**

b. **Recent land use and land cover (either a thematic map created by the project proponent or publicly available map);**

c. **Access points;**

d. **Soil class maps (if available);**

e. **Locations of important markets;**

f. **Locations of important resources like waterways or roads; and**

g. **Land ownership/tenure boundaries.**

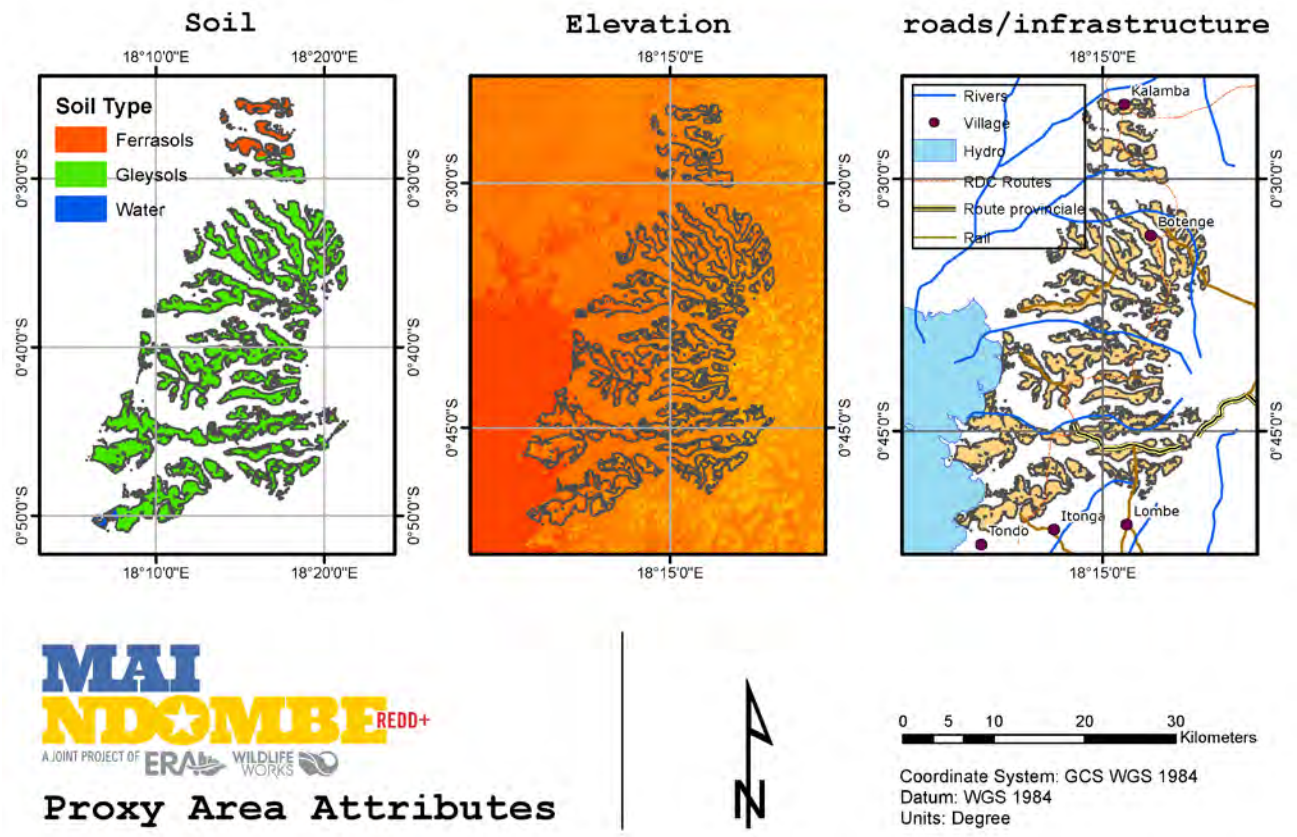


Figure 10: Attributes of the selected Proxy Area near Lac Tumba, DRC.

PDR.30 A narrative describing the rationale for selection of proxy area boundaries.

The Proxy Area was chosen primarily for its accurate representation of the likely "end state" of the baseline case for the project area. Local expertise suggested that the chosen area, adjacent to Lac Tumba (Lake Tumba), was an area that has been heavily logged and also highly converted from forest to agriculture. The proxy area is also required to be "accessible" to the project proponents, providing the ability to install permanent plots that can be re-visited on a yearly basis for the lifetime of the project. The Proxy Area provides such a situation, as clans in the Lac Tumba area have a particularly strong relationship with those in the Lac Mai Ndombe area (verified through interviews with local chiefs and expert knowledge of clan relations by JR Bwangoy). Only non-forested areas were chosen to fall within the Proxy Area polygons. This can be clearly seen using high resolution backdrop such as Google Earth, and is also demonstrated by the map above and the results of the Carbon inventory performed in the area (see Monitoring Report, Section 3.1 and PDR 31, below).

PDR.31 Results of a spatial analysis to demonstrate the proxy area is not forested, on average, as of the project start date.

Inventory data show that proxy area plots contain very little or no above-ground biomass. Further, the mean Carbon stock for all proxy plots was measured to be 95.4 tCO2-e/ha (see Monitoring Plan, Section 3.1); therefore the Proxy Area is shown to not meet the definition of forest.

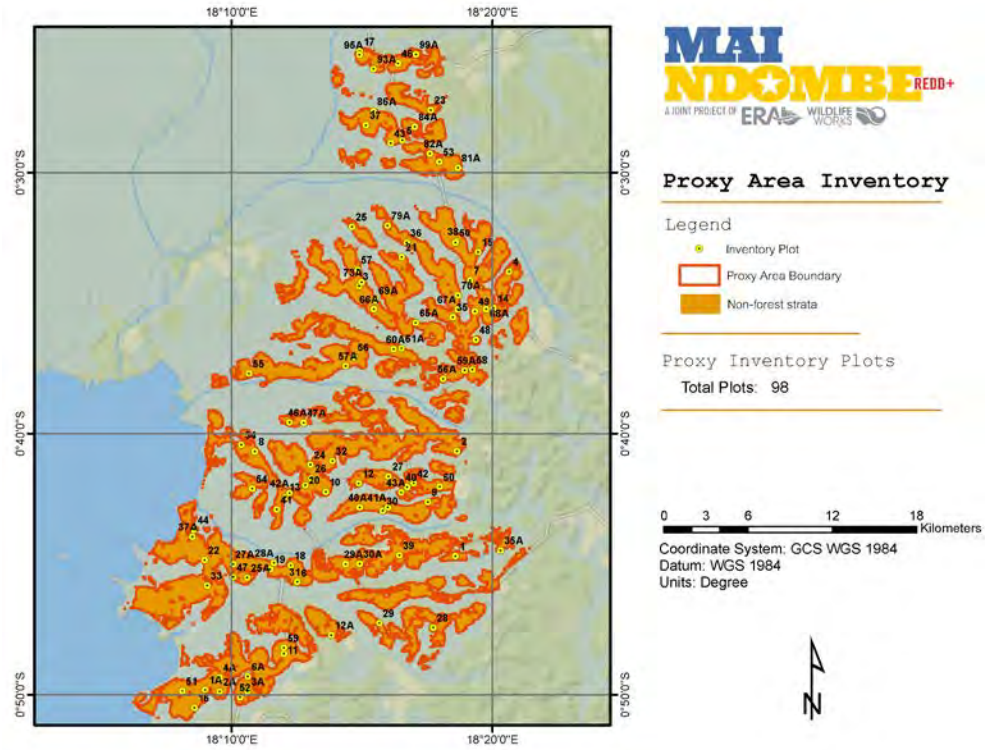


Figure 10: Proxy Area Plots in Non-forested areas.

2.4.5 Estimating the Deforestation Parameters

2.4.5.1 Delineating Reference Areas

PDR.32 A map of the delineated boundaries, demonstrating that the reference area was held by the identified baseline agent or agents and does not include the project area.

The Reference area for this project is shown in the map below.

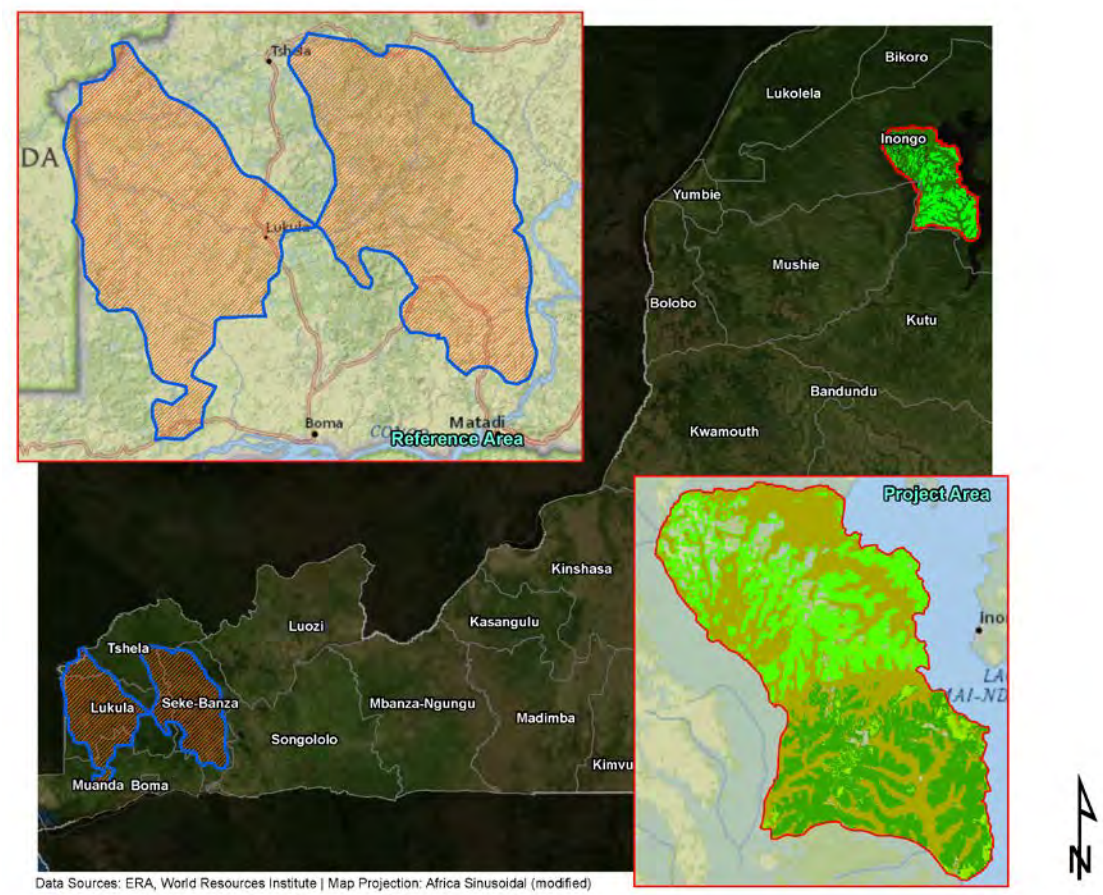


Figure 11: Reference Area in relation to national boundaries and the Project Area

The boundaries of the reference area were delineated to represent the spatial extent of the SOFORMA logging concession. The reference area does not include the project area, and is in fact equidistant from the Capital city of Kinshasa as is the Project Area.

PDR.33 Results of a spatial analysis to demonstrate the reference area had as much forest as the project accounting area at some point in time during the historic reference period.

Based on spatial analysis of Africover land cover data (www.africover.org, 2000-2001 imagery), the reference area comprised at least 388,192.6 ha of forest, which includes all land cover classes except one non-forest land cover type (comprising 2268 ha). When a land cover class included two land cover types, the area was split 60%/40% between the first and second land cover type (Dawelbait et al., 2006), and only the classes designated as forest were then counted. Thus, the reference area was demonstrated to comprise more forest than the project accounting area, which contains 248,956 ha. See Appendix I for a map showing this analysis.

PDR.34 Evidence that the forest management practices of the baseline agent in the reference area are similar to those that would have been applied to the accounting area or areas in the baseline.

The reference area was selected primarily because it was impacted by the same primary agent (logging company SOFORMA) performing the same activity (planned commercial harvest) as what would have occurred in the project accounting area in the baseline scenario. In addition to planned commercial harvest, the reference area subsequently experienced the same cascade of degradation (*e.g.*, logging followed by illegal deforestation by secondary agents) that also would have occurred in the project accounting area in the baseline scenario.

PDR.35 A description of the rationale for selection of reference area boundaries.

The reference area, approximately 600 km southwest of the project area, was selected because it experienced planned commercial harvest similar to what would have occurred in the project accounting area in the baseline scenario. In particular, the logging company SOFORMA was granted a logging concession with boundaries identical to those of the reference area, harvested the merchantable trees, and enabled a cascade of degradation (carried out by secondary agents of deforestation) that led to nearly complete deforestation of the reference area. It should be noted that SOFORMA stands for "La Société Forestière du Mayombe", and the company was originally formed for the express purpose of logging the Mayombe forest (Thompson and Adloff, 1960). In addition to the planned commercial harvest, the reference area is similar to the project area with respect to ecosystem type, landscape configuration (elevation, slope, etc.), and the socio-economic conditions of local communities. Finally, the reference area is located in the DRC, so the commercial harvest and subsequent logging are subject to the same laws and enforcement as the project area.

2.4.5.2 Defining the Historic Reference Period

PDR.40 Established reference period boundaries.

The reference period was defined as 29 April 1987 to 13 March 2011.

PDR.41 The date when the agent acquired control of the reference area or when the land management practices employed in the reference area changed.

Through analysis of historical imagery and a site visit to the reference area in May 2012, the project proponent confirmed that, although some logging occurred in the reference area in the 1930s, most forest-clearing occurred during the reference period by SOFORMA. (Refer to Annex F – Site Visit Report.)

2.4.5.3 Selecting Historical Imagery

PDR.46 A map of the reference area showing the area of "double-coverage."

Please refer to Appendix F - Map of Double Coverage.

PDR.47 Quantification of "double coverage"(greater than 90%).

Double coverage analysis showed that 98.99% of the reference area meets the double coverage requirement. 17 of 1572 points were observed fewer than two times. Please refer to Appendix F - Map of Double Coverage.

PDR.48 A line plot of the historic image dates to confirm stationarity.

Historical imagery is distributed across the entire historic reference period, as shown in the figure below. Therefore, the historic imagery appears to be stationary and the corresponding estimated time components of the image weights per equation [A.3] are unbiased.

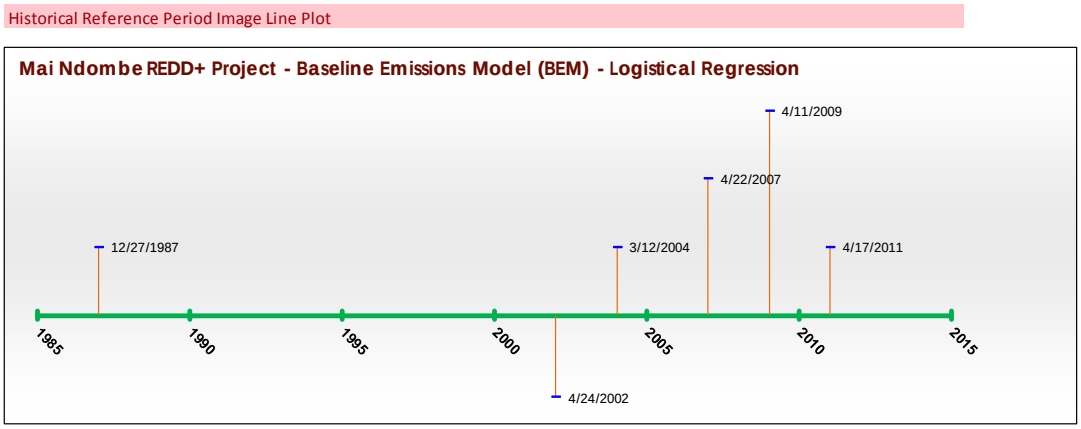


Figure 12: Historical Imagery timeline.

PDR.49 Evidence that all image pixels are not more than 30m x 30m.

The analysis of historical deforestation utilized Landsat imagery, which has a spatial resolution of 30 m.

PDR.50 Empirical evidence that imagery is registered to within 10% RMSE, on average.

All Landsat images were spatially registered to the same coordinate system. No additional geo-referencing was necessary.

2.4.5.4 Determining Sample Size

PDR.51 The sample size.

The sample size of points used for the analysis of historical deforestation in the reference area was selected so as to achieve the required precision to fit the logistic function, and estimate the deforestation parameters. A pilot sample 0f 200 interpretation points was used to estimate the population variance and sample size needed to estimate the deforestation parameters within the required 15% error. From the pilot analysis it was determined that a sample size of 1,572 points were necessary for the analysis.

2.4.5.5 Sampling Deforestation

The following table displays the results from the visual interpretation of 1,572 points for each of the 6 years analyzed.

Image Date	Forest	Non-Forest	Cloud/Shadow	Built-up	No Image	Not Classified
1987 Dec 27	30.66%	49.17%	18.83%	0%	1.34%	0%
2002 April 24	22.07%	56.93%	20.99%	0%	0%	0%
2004 March 12	21.95%	68.58%	3.12%	0%	6.36%	0%

2007 April 22	13.87%	69.08%	11.20%	0%	5.85%	0%
2009 April 11	6.81%	49.24%	37.60%	0%	6.30%	0%
2011 April 17	8.40%	58.33%	25.19%	0%	8.08%	0%

Table 8: List of imagery used in the Biomass Emission Model (BEM)

PDR.52 A map of the reference area showing the sample point locations.

Please refer to Appendix E – Reference Area Sampling Locations.

2.4.5.6 Discarded Sample Points

From the initial sample of 1,572 points used in the analysis a series of points had to be discarded. 773 were discarded from the analysis because they were initially classified as non-forest in the first year. An additional 17 points were discarded because they were observed fewer than two times. 296 points that were obscured by clouds or shadows in the first year, and 21 points that did not have image coverage were also discarded. This left a total of 465 points to be used in the analysis.

2.4.5.7 Parameterizing α, β and θ

The deforestation parameters α, β were fit using the sample deforestation data from the reference area. When fit to a logistical function, sample deforestation data yielded the following values for α and β:

Parameter	Value
$\boldsymbol{\alpha}$	0.9488756
$\boldsymbol{\beta}$	0.0006167

Table 9: Alpha and Beta Parameters (linear predictor variables) from the BEM.

2.4.5.8 Minimizing Uncertainty

PDR.57 A protocol for interpreting forest state from imagery.

Imagery from the Landsat 4, 5 and 7 satellites were used to classify forest state in the reference area. Classification was performed using false color (5, 4, 3) (with band 5 being mid-range infrared, 4 near infrared, and 3 red). The point-grid classification process was performed using the Wildlife Works Toolbar, which is an add-in tool for ESRI's ArcGIS Desktop developed specifically for the BEM process. For more detailed information about the Wildlife Works Toolbar see the Wildlife Works Toolbar User Manual: http://www.wildlifeworks.com/redd/resources.php.

A pilot sample was used to determine the ultimate sample size (points) needed to meet the desired standard error amounts (VM0009, Section 6.7.5). The Grid Generator tool was then used to place a random grid of 1,572 points over the first image and then the replicate the points over the subsequent images within the reference period. In the dot-grid modeling process, it is required that a minimum of 90% of the points are visible on at least two images (double-coverage). This is verified using the Double Coverage Analyzer, the results of which can be found in Section 2.4.5.3 as well as Appendix F. The Grid Classification tool is then used to classify each point into one of the following categories: Forest, Non-Forest, Cloud/Shadow, Built-up or No Image. The Identify Problem Points tool was then used to isolate

points that have an unlikely forest state change during the reference period. For example, this may include points that transition from forest to non-forest and back to forest within the reference period, which is assumed to be physically impossible. Each of these points is examined and updated, based on the most likely scenario by a separate technician. The process is repeated until there are zero problem points within in the model. The Export Data tool then summarizes the results from all of the grids on each image and calculates the observation weight for each point. The observation weight is dependent on the number of times each point is observed on the images and the total number of points in each grid (VM0009, Section 6.75). Additionally, this tool removes points from the analysis that were classified as "non-forest" on the earliest image and points that do not have "double-coverage."

To ensure accurate and consistent classification of points Wildlife Works created a Standard Image Interpretation Protocol. (Refer to Annex G – Standard Image Interpretation Protocol.) All image interpreters received training using this protocol and followed its principles to determine forest state. The protocol describes the thematic land cover classes used to interpret the points, common types of land cover patterns, common features that are encountered and how to use recognize thematic classes using context. Often, forest state is easily discerned on the image, either by the color of the feature or patterns in the land cover. In cases where the forest state could not be readily identified, the context of the surrounding area may be taken into account, or other sources of imagery, such as Google Earth, are used to inform the interpreter of the forest state. When forest state was still unable to be determined, photographs of different land cover types from the project area and reference area that were geo-tagged with the coordinates of the photographs position were utilized. The geo-tagged photos were then used to inform the image interpreters of the actual forest state at each coordinate to assist in the interpretation process.

To ensure consistency between the image interpreters, a quality assurance process was utilized, wherein different interpreters perform an independent analysis of the same points. Additionally, the Identify Problem Points tool in the Wildlife Works Toolbar lists points that have been classified as having unlikely land use transitions. The identified problem points are always analyzed and updated by a different interpreter than that who performed the original interpretation.

PDR.58 The results of an independent check of the interpretation.

The procedure used requires the interpretations of points on images from different years to be performed by different people. The Problem Points Tool identifies any inconsistencies or errors made in the forest state classification. A total of 11 points out of 1,572 were flagged for inconsistencies. A spreadsheet was used to evaluate and track the forest state change of the flagged points over the reference period. The images were then re-interpreted for each flagged point and the errors were documented. After the points were reclassified, the Problem Points Tool was rerun to ensure that all flagged forest state transitions had been corrected.

The following table displays the problem points that were identified by the Problem Points Tool:

PID	1987 Dec27	2002 April24	2004 March12	2007 April22	2009 April11	2011 April17	Notes
60	Forest	Cloud/Shadow	Forest	Non-Forest	Forest	Forest	2007 Non-Forest to Forest, at edge
72	Non-Forest	Non-Forest	Non-Forest	Non-Forest	Forest	Non-Forest	2009 Forest to non-forest, at edge
95	Cloud/Shadow	Cloud/Shadow	Non-Forest	Non-Forest	Non-Forest	Forest	2011 Forest to non-forest, at edge
112	Forest	Non-Forest	Forest	Non-Forest	Cloud/Shadow	Non-Forest	2002 Non-Forest to Forest, at edge
240	Forest	Non-Forest	Forest	Non-Forest	Cloud/Shadow	Non-Forest	1987 and 2004 Forest to non-forest, at edge
364	Non-Forest	Non-Forest	Non-Forest	Forest	Cloud/Shadow	Cloud/Shadow	2007 Forest to forest, at edge
747	Forest	Forest	Forest	Forest	Non-Forest	Forest	2009 Non-Forest to cloud/shadow, because of cloudy, it was blurry
781	Non-Forest	Non-Forest	Forest	Cloud/Shadow	Non-Forest	Non-Forest	2004 Forest to non-forest, at edge
884	Forest	Forest	Forest	Cloud/Shadow	Non-Forest	Forest	2009 Non-Forest to forest, at edge
1314	Non-Forest	Non-Forest	Forest	Non-Forest	No Image	No Image	2004 forest to "cloud/shadow" because it was actually covered by cloud shadow
1507	Forest	Non-Forest	Forest	Forest	Cloud/Shadow	Non-Forest	1987, 2004, and 2007 Forest to non forest, at edge

Table 10: Flagged points from the Biomass Emissions Model. All points are checked and fixed before performing the logistic regression in R.

PDR.59 Evidence that systematic errors, if any, from the independent check of the interpretation were corrected.

No systematic errors were identified. All inconsistencies identified in the table above were corrected.

2.4.5.9 Estimating Uncertainty

The standard error for $\boldsymbol{\alpha}$ and $\boldsymbol{\beta}$ are as follows:

Parameter	Value
α	6.1441129
β	0.0027828

Table 11: Standard error for the α and β parameters.

The estimated standard deviation of the observations, calculated using equation [F.13] from VM0009 v2.0, is 0.00892887. (Refer to Annex H – Deforestation Parameter Calculations.) This value is in turn used to calculate uncertainty in the logistic function.

2.4.6 Determining t_{SA}

PDR.60 The parameter $\hat{t}_{SA}$ as the number of days after the primary agent begins commercial logging until when the secondary agent of deforestation is likely to begin degrading the project accounting area.

A value of 1,825 days was used for the $\hat{t}_{SA}$ parameter.

PDR.61 A description of how $\hat{t}_{SA}$ was obtained.

The $\hat{t}_{SA}$ 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. (Refer to Annex F – Site Visit Report.) The secondary agents repot a lack of access to logged areas until primary agents (loggers) have moved on to other areas and are no longer using the roads and bridges. The project proponent conservatively estimates that after five years of commercial harvest in a particular portion of the project area, primary agents have exhausted merchantable timber and abandoned the area, leaving the infrastructure in place for secondary agents to access non-merchantable timber. This time-frame was corroborated by local community members throughout the reference area during interviews from the aforementioned visit.

PDR.62 Harvest plans for the project accounting area under the baseline scenario, results from the PRA or analysis of the reference area to determine the parameter.

To better understand the behavior of secondary agents in the commercially logged reference area, the project proponent conducted a qualitative analysis to determine exactly how deforestation occurred in the reference area. The qualitative analysis included interviews of community members, NGO experts and a site visit in May 2012 for this particular purpose. (Refer to Annex F – Site Visit Report.) The analysis determined that secondary agents move into newly logged areas very soon –"immediately," according to community interviews – after a primary agent establishes infrastructure and harvests the merchantable trees. However, a conservative value of 5 years is used for the $\hat{t}_{SA}$ parameter.

2.4.7 Determining t_{PA}

PDR.63 The parameter $\hat{t}_{PA}$ as the number of days relative to the project start date when the primary agent began or would have begun legally-sanctioned commercial logging in the project accounting area.

A value of -2,901 days was used for the $\hat{t}_{PA}$ parameter.

PDR.64 A description of how $\hat{t}_{PA}$ was obtained.

The $\hat{t}_{PA}$ parameter was determined by using the project start date (March 14, 2011) 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.

PDR.65 Harvest plans for project accounting area under the baseline scenario or public records to support the determination of the parameter.

Logging was both planned and commenced in the Project Accounting Area before the project start date, as evidenced by the logging concession awarded to SOFORMA, a logging implementation company doing business for Bimpe Agro. The concessions comprising the Project Area are both of public record in the DRC. The SOFORMA management plan is also available, although considered to be a politically sensitive document. The concession numbers are: 004/84 and 014/2004 (see also section 1.9.1 Delineating the Spatial Boundaries). Both these concessions were active and were required to undergo formal transfer to ERA Congo, an extremely arduous and lengthy process that is documented in this report's Annexes.

2.4.8 Determining m

PDR.67 The parameter $\hat{m}$ as the average carbon in merchantable trees cut each year as a result of legally-sanctioned commercial logging.

A value of 1,288,795.4 tCO2e / yr was used for the $\hat{m}$ parameter. This was calculated using the values for total Above-ground merchantable stock in the project area $C_{AGMT}^{[m=0]}$ (99.44 tCO2e), total below-ground merchantable stock in the project area $C_{BGMT}^{[m=0]}$ (36.79 tCO2e), and the number of days in the conservation concession t_m (9125 days = 25yrs).

PDR.68 Documentation of how m was determined. This may include an analysis of carbon stocks in merchantable trees in the project accounting area, timber harvest plans for the project accounting area or reference to a publication containing the maximum allowable cut applicable to the project area. The parameter shall be greater than zero.

Because of the lack of a timber plan from the primary agents, the $\hat{m}$ parameter was determined from the measurement of carbon stocks in merchantable trees (above-ground and below-ground) in the project accounting area (as allowed by VM0009, section 6.13 in the absence of a timber plan). 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.

The value for $\hat{m}$ is designed to be a conservative estimate of the merchantable carbon harvested per year in the baseline scenario (i.e. how much carbon would have been removed from the project area in absence of a project under legally-sanctioned logging practices. For this project, a harvesting plan was not readily accessible, so the project developer chose to estimate the parameter by starting with the assumption that the primary agents would have removed all of the merchantable carbon in existing in the project area and then applying conservative discount factors, as described below.

1. It is assumed that under normal logging conditions, commercial logging companies are supposed to adhere to diameter limits, below which they are not allowed to cut. Although Wildlife Works and ERA possess anecdotal evidence that the primary agents systematically logged below these limits, we decided to respect the limits in the calculation of $\hat{m}$ because we have similarly

respected these same limits in our description of "likely baseline scenario" (PDR 92) and in our description of AGMT (PDR 84).

2. To therefore ensure that the value for $\widehat{m}$ is conservative, the project proponent has sought to employ a discount factor that offsets the likely carbon pools not extracted from the forest during the logging event (under normal logging conditions, 100% of the carbon is never removed from the forest). These pools include:
    a. Any trees that were inadvertently skipped by the logging company
    b. Any trees that were inaccessible to the logging company for any number of reasons including topography, land cover, danger, etc.
    c. Trees that were left in the forest due to deformities or other growth characteristics rendering them undesirable for commercial use.

The project proponent has chosen to impose a 5% discount factor on the calculation of $\widehat{m}$ to offset the above carbon pools that would not have been used by the commercial logging company. The project proponent contends that the discounted value therefore accurately depicts real-life practices and accounts for some carbon that would have been left in the forest.

2.4.9 Determining γ

PDR.69 The project shift parameter γ as the number of days between the beginning of the historical reference period and the project start date.

A value of -8,720 was used for the γ parameter. The historical reference period used in the analysis began on April 29th, 1987. The project start date is March 14th, 2011. Therefore the length of time from the beginning of the historical reference period to the project start date is 8,720 days.

2.4.10 Determining q

PDR.70 The parameter q as the number of days between the onset of degradation and the beginning of deforestation.

The default value of zero (0) was used in the analysis.

2.4.11 The Decay Emissions Model

2.4.11.1 Determining λ_{SOC}

The default value of 0.2 was used for the λ_{SOC} parameter, which characterizes the decay of soil organic carbon over time (Davidson, E., and Ackerman, I., 1993).

2.4.12 Baseline Scenarios for Selected Carbon Pools

PDR.84 A qualitative description of the baseline scenario for each selected carbon pool.

Above-ground merchantable trees (AGMT): AGMT is assumed to be removed and converted to long-lived wood products by commercial logging agents. Residual AGMT biomass remaining in the baseline scenario is limited to those merchantable trees which are below the minimum diameters specified in the logging concession, and which are conservatively assumed to remain standing after the logging event.

The project proponent's inventory analysis indicates that the residual AGMT biomass is equivalent to **1.52 tCO2e/ha** in the baseline scenario.

Above-ground non-merchantable trees (AGOT): AGOT are assumed to be removed, burned or converted to fuel wood in the baseline scenario. Residual AGOT biomass remaining after agents have acted upon the forest was determined using data collected from plot measurements in the proxy area. The proxy area sampling indicates that **65.56 tCO2e/ha** remains in AGOT after a deforestation event.

Below-ground merchantable trees (BGMT): BGMT are assumed to be impacted only slightly by commercial agents. Following completion of commercial activity, below-ground biomass is conservatively assumed to decay over time. The below-ground portion of residual biomass for merchantable trees in the baseline scenario was determined using a ratio of 0.37 (the IPCC default root-to-shoot ratio for wet tropical forests) of residual above-ground biomass (IPCC, 2006).

Below-ground non-merchantable trees (BGOT): The below-ground portion of residual biomass for non-merchantable trees in the baseline scenario was determined using a ratio of 0.37 (the IPCC default root-to-shoot ratio for wet tropical forests) of residual above-ground biomass (IPCC, 2006).

Soil organic carbon (SOC): SOC is assumed to deplete to **56.99 tCO2e/ha**, the SOC levels measured in the proxy area. The depletion of SOC stocks occurs according to the decay function, which employed the default value (0.2) for the λ term.

Wood Products (WP): The calculation of biomass remaining in WP is based upon the amount of AGMT harvested over time and employs the most conservative parameters as prescribed in Appendix C of the VM0009 methodology. All harvest wood is assumed to be used for sawnwood. Using a milling wood waste fraction (w) of 0.24 for developing countries, a long-lived wood fraction (l_{ty}) of 0.8 and an oxidation fraction (f_{ty}) of 0.1, the amount of tCO2e sequestered in WP after 100 years is estimated to be **668,092 tCO2e** (Winjum et al., 1998).

2.5 Additionality

PDR.91 A list of alternative land use scenarios to the project.

The most likely land use scenario is the continuation and proliferation of logging activities which had begun under the terms of the logging concession: In this scenario, a cascade of degradation would have been initiated by planned commercial harvest. The logging concession, which applies to the entire project area and was acquired by the project proponent, would have authorized harvest of 5000-6000 hectares per year in this scenario, encompassing most of the primary terra firma forested area over the 25 year period of the logging concession (2011 to 2036). The commercial harvest of merchantable trees would employ new roads and bridges that would serve to significantly increase access to the project area. As a result, secondary agents of deforestation would gain access to the project area and harvest wood for building materials and charcoal production and for preparing land for agricultural production. (This secondary deforestation would occur as characterized by the 'unplanned' baseline types described in the VM0009 methodology version 2.0.) The end-state land cover in this land use scenario is characterized by nearly complete deforestation.

PDR.92 Justification for the selected baseline scenario. This justification can include expert knowledge, results from the participatory rural appraisal and ex-ante estimates of avoided emissions.

The selected baseline scenario is based primarily on the imminent deforestation threat posed by logging concessions in the project area. The two concessions constituting the project area were suspended in 2008 as a result of a legal review of all DRC National Forest Titles. The decision to suspend the concessions, held at the time by the logging company Bimpe Agro, was made initially in October 2005 and confirmed on October 6, 2008. (Refer to Annex I – Suspension of Bimpe Agro Concessions.) Although a moratorium on new concessions had been in place since 2002 and extended by presidential decree in 2005, the possibility existed that the suspended concessions could be re-allocated to any private company for wood production by the Ministry of Environment, Conservation, Nature and Tourism (MECNT). And given the proximity to the markets of Kinshasa and the area's abundant supply of valuable tropical hardwoods, numerous logging interests were actively seeking the concessions.

In February 2010, the project proponent submitted a formal request to the MECNT to manage the two concessions representing the project area as a community-managed conservation area. (Refer to Annex J – Project Proponent Request for Concession.) However, the Minister of the MECNT approved an exchange in May 2010 that would have granted the concessions to the logging company SOFORMA. (Refer to Annex D –Approval of Concession Exchange.) Further, in October 2010, the Provincial Assembly in Bandundu petitioned the MECNT to grant the concession to the logging SOFORMA. (Refer to Annex K – Provincial Assembly Petition). Despite these efforts to secure the concessions for logging, the MECNT awarded management rights to the project proponent in March 2011. (Refer to Annex L – Award of Management Rights). Although a moratorium on logging concessions is still in effect, 16 such titles have been awarded by the DRC Inter-Ministerial Commission. In the absence of the project proponent's actions to secure the concession for conservation purposes during this period, a logging company most likely would have secured the concession. Thus, the most likely baseline scenario would have included legally sanctioned commercial harvest in the project area.

This scenario of commercial harvest would have been followed by unplanned deforestation by local agents in search of timber for charcoal, fuel, and building materials. In particular, the roads and bridges constructed in the course of commercial harvest activities would provide improved access to the project area and would even connect the project area to a main highway leading to the population center of Kinshasa, which provides much of the local demand for charcoal and wood. This unplanned deforestation would be carried out by loggers, or *scieurs de long*, who use chainsaws to cut rough-hewn lumber in situ, side by side with charcoal production.

This cascade of degradation – in which commercial harvest creates access for numerous agents to perform unplanned deforestation and ultimately results in nearly complete loss of above-ground biomass in logged areas – has been demonstrated in the analysis of historical deforestation in the reference area, where this cascade of degradation and biomass loss was confirmed to have taken place. (For more information regarding determination of the baseline scenario, refer to section 2.4.5 of this document.)

Refer to section 3.4.4 for ex-ante estimates of GHG emissions occurring as a result of the selected baseline.

PDR.93 An investment or barriers analysis proving that the project is not the most economical option

The project proponent employed an investment analysis as prescribed in the VCS Tool for the Demonstration and Assessment of Additionality (VT0001, version 3.0). (Refer to Annex M – VCS Additionality Tool.) The investment analysis (simple cost analysis – option 1 in the VCS Tool) demonstrated that the project produces no substantial benefits for project proponents other than VCS-related revenue. Although limited revenue is expected from some project activities (e.g., wood energy plantations, various agricultural improvement projects), this revenue is expected to be very small in comparison to project implementation costs and VCS-related revenue. Even though some project activities will generate revenue for local community members, they do not represent viable stand-alone sources of revenue and would not be initiated in the absence of VCS-related revenues.

Further, the NPV of logging activities in the baseline scenario are far greater than the NPV of project activities, reinforcing that it is unlikely that project activities would have occurred in the absence of VCS-related revenue.

PDR.94 A common practice analysis including a list of project activities and the drivers of deforestation that they address.

There are no activities similar to the activities proposed by this project that are underway in the geographic area of the project. Few efforts have been made in the area to develop ecologically sustainable livelihood alternatives or to improve the management of forests and other common-pool resources. As a result, the area is characterized by low living standards, little infrastructure, and a continued reliance on forest-clearing for subsistence agriculture.

PDR.95 Evident compliance with the minimum requirements of the aforementioned VCS tool. This evidence may be the same as the evidence provided to meet reporting requirements listed in section 4 of the methodology.

The project proponent has demonstrated that the project complies with the applicability conditions of the methodology (see section 2.2 of this document). Further, the project proponent has demonstrated that the project complies with all applicable laws (see section 1.11 of this document). Finally, the method for determining the baseline scenario (described in section 2.4 of this document) is consistent with that prescribed in the VM0009 methodology version 2.0. Thus, the project proponent has complied with the minimum requirements of the VCS tool.

2.6 Methodology Deviations

The project does not deviate from the methodology.

3 Quantification of GHG Emission Reductions and Removals

3.1 Baseline Emissions

The Baseline Emission Model (BEM) and the Soil Emissions Model (SEM) were used to characterize emissions in the baseline scenario. The BEM predicts cumulative emissions from biomass as a result of deforestation and degradation, and includes a linear component for emissions from planned commercial harvest and a logistic component for subsequent degradation. The SEM is based on a logistic model of deforestation and assumes that soil organic carbon begins to decay in the project accounting area when the area is cleared to non-forest. This approach dramatically simplifies baseline accounting. Complete documentation of the approach is provided in sections 6.5-6.19 and 8.1 of the VM0009 methodology version 2.0. The baseline emissions accounting for this project is provided in the documentation of monitoring events.

3.1.1 Calculating Baseline Emissions from Biomass

Cumulative baseline emissions from biomass $E_{B\,BM}^{[m]}$ are estimated using equation [F.19] of the VM0009 methodology version 2.0:

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

This estimate employs the Biomass Emissions Model (BEM) for baseline type P1 using equation [F.2] of the VM0009 methodology version 2.0:

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

where

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

3.1.2 Calculating Baseline Emissions from SOC for Types P1 and P2

Cumulative baseline emissions from SOC $E_{B\,SOC}^{[m]}$ are estimated using equation [F.25] of the VM0009 methodology version 2.0:

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

This estimate employs the Soil Emissions Model (SEM) for baseline type P1 using equation [F.6] of the VM0009 methodology version 2.0:

$$SEM_P(c_P, c_B, t, x) = \frac{A_{PAA}(c_P - c_B)}{1 + e^{-\alpha-\beta(t+\gamma-t_{PA}-t_{PAI})-\boldsymbol{\theta x}^T-\boldsymbol{x_{PAI}}}}\left[1 + \frac{1}{1 + e^{-\alpha-\beta(\gamma-t_{PA}-t_{PAI})-\boldsymbol{\theta x}_0^T-\boldsymbol{x_{PAI}}}}\right] - \frac{A_{PAA}(c_P - c_B)}{1 + e^{-\alpha-\beta(\gamma-t_{PA}-t_{PAI})-\boldsymbol{\theta x}_0^T-\boldsymbol{x_{PAI}}}}$$

3.1.3 Calculating Carbon Not Decayed in DW

Standing and lying dead wood is conservatively excluded and therefore is not included in carbon accounting.

3.1.4 Calculating Carbon Not Decayed in BGB

Carbon not decayed in BGB is estimated using equation [F.10] of the VM0009 methodology version 2.0:

$$DEM_{DW,BGB}\left(E_{B\,\Delta}^{[m]}, t, t^{[m-1]}, t^{[m]}\right) = \frac{E_{B\,\Delta}^{[m]}}{3650(1 + e^{t-365})}\left(3650 + t^{[m]} - t + \frac{t^{[m]} - t^{[m-1]}}{2}\right)$$

The Decay Emissions Model for carbon in dead wood and below-ground biomass are based on the default VCS decay models for these pools.

3.1.5 Calculating Carbon Not Decayed in SOC

Carbon not decayed in BGB is estimated using equation [F.9] of the VM0009 methodology version 2.0:

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

The Decay Emissions Model for soil carbon uses λ_{SOC}, a parameter that characterizes the decay of soil over time. λ_{SOC} can be determined one of three ways, as outlined in sections 6.17.1.1, 6.17.1.2 and 6.17.1.3 of the VM0009 methodology version 2.0.

3.1.6 Calculating Cumulative Emissions from AGMT for Type P1

Cumulative emissions from AGMT for Type P1, using equation [F.36] of the VM0009 methodology version 2.0:

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

Cumulative emissions include AGMT and BGMT; average carbon stocks are measured for the project accounting area prior first monitoring event as well as in the proxy area.

3.1.7 Determining Carbon Stored in WP

Because logging is included in the baseline scenario, carbon stored in long-lived wood products is considered. The amount of carbon stored in wood products is determined using the baseline equation [C.1] of the VM0009 methodology version 2.0:

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

$C_{B\,WP}^{[m]}$ is represented as CO2e sequestered in long-lived wood products after 100 years.

3.2 Project Emissions

Project emissions are calculated in F.40 of the VM0009 methodology version 2.0:

$$E_{P\,\Delta}^{[m]} = E_{P\,\Delta\,BRN}^{[m]} + A_{PAA}\left(c_P^{[m-1]} - c_P^{[m]}\right) - C_{P\,\Delta\,WP}^{[m]}$$

Project emissions are calculated for any monitoring period and are calculated from the events of biomass consumption through forest fire, burning, logging, or other disturbance.

3.2.1 Calculating Emissions from Changes in Project Stocks

Changes in project stocks are calculated as the difference in project stocks in each stratum between the current and prior monitoring periods:

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

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

3.2.2 Calculating Emissions from Burning

Biomass burning is not currently a planned project activity. As such it is not included in carbon accounting. However, if future project activities include this pool then project emissions from burning of biomass are calculated using equation [F.41] of the VM0009 methodology version 2.0:

$$E_{P\,\Delta\,BRN}^{[m]} = \left(\frac{44}{12}\right)0.66\sum_{b\in\mathcal{W}^{[m]}} r_{CF\,b}\,B_{b^{[m]}}$$

3.2.3 Determining Carbon Stored in WP

Project emissions from carbon stored in WP are calculated using equation [C.2] of the VM0009 methodology version 2.0:

$$C_{P\,\Delta\,WP}^{[m]} = (1-w)\sum_{ty\in\mathcal{T}} C_{P\,ty}^{[m]} l_{ty}\left(1-f_{ty}\right)^{95}$$

3.3 Leakage

3.3.1 Estimating Emissions from Activity-Shifting Leakage

Activity-shifting leakage is not applicable to this project. In the context of the project's baseline scenario, activity-shifting leakage would apply to the secondary agents of deforestation - members of communities located within or near the project area - and the extent to which there are alternative, accessible forested areas within the range of their mobility.

Without access to the project area that would have been provided by logging infrastructure, it is possible that secondary agents could be displaced to other forested areas within the range of their mobility (up to 25 km per section 2.4.1 of this document). However, such forested areas do not exist within this range of mobility. The region already has experienced significant deforestation and conversion to agricultural land use. In other words, the project area represents the last remaining forest that is accessible to the secondary agents living within or near the project area. Because there is no forested area (except for the project area) that is accessible to the secondary agents within the range of their mobility, these agents are unable shift their deforestation activity to nearby forests, and therefore activity-shifting leakage would not occur. Cumulative emissions from activity-shifting leakage are set to zero for carbon accounting purposes.

3.3.2 Determining Emissions from Market-Effects Leakage

Under Baseline scenario P1 - applicable to this project - market leakage does not apply when the primary agent is known, and the project proponent has demonstrated that there is no possibility for that agent to be awarded a further/replacement concession within the national boundary. The primary agent, SOFORMA, holds historical concessions far in excess of the DRC legal maximum concession holdings, and therefore is deemed ineligible for a replacement legal concession award. Cumulative emissions from market-effects leakage are therefore set to zero for carbon accounting purposes.

3.4 Summary of GHG Emission Reductions and/or Removals

3.4.1 Determining Reversals

The procedure for determining reversals follows the most current version of the VCS requirement. For a description of monitoring of disturbances and reversals, refer to Monitoring Plan annexed within the Monitoring Report.

3.4.1.1 Determining Reversals as a Result of Baseline Reevaluation

In the event there is a reversal due to baseline reevaluation, the project proponent will document the cause of the reversal and supporting data at the time in the appropriate monitoring report, as prescribed in section 8.4.2.1 of the VM0009.v2 methodology.

3.4.2 Quantifying Net Emissions Reductions for a PAA

NERs are calculated by subtracting the buffer allocation from the gross emissions reductions, using equation [F.50] of the VM0009 methodology version 2.0:

$$E_{\Delta\,NER}^{[m]} = E_{\Delta\,GER}^{[m]} - E_{BA}^{[m]}$$

NERs are calculated at each monitoring event.

3.4.2.1 Determining Deductions for Uncertainty

Deductions for uncertainty are determined using equation [F.53] of the VM0009 methodology version 2.0:

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

Uncertainty deductions are documented for each monitoring event.

3.4.2.2 Determining Buffer Account Allocation

Allocation to the buffer pool is determined using the AFOLU tool for non-permanence risk and buffer determination.

3.4.2.2.1 Tool for AFOLU Non-Permanence Risk Analysis and Buffer Determination

The project proponent has assessed the non-permanence risks that are applicable to this project, and judged the overall risks to the permanence of the project's benefits to be moderate. In most cases, these risks are mitigated to some extent either by the project proponent's management actions or by project activities. The assessment was conducted as prescribed in the VCS AFOLU Non-Permanence Risk Tool, version 3.1.

For the sake of brevity and because the risk of reversal assessment is subject to change for each monitoring event, the risk assessment is presented in Annex R, 'Annex R - Non-Permanence Risk Worksheet v1.1.xlsx'.

Natural Risks

- Fire: The project area is comprised mostly of wet tropical rainforest and swamp forest and the risk of reversals from natural fires is deemed to be low. Although human-caused fires are observed in the vicinity of the project area, the absence of commercial logging will dramatically decrease the extent of human access to the project area. Project activities which maintain or reduce the prevalence of human activities (e.g., forest monitoring and enforcement) mitigate the risk of human-caused fires. (Source: Amsallem 2002 (*ftp://ftp.fao.org/docrep/fao/008/Y8127e/Y8127e.pdf*)).
- Insect pests: The project area is comprised principally by dense, diverse, mostly intact, humid, primary equatorial rainforest. Because of the Congo basin's moist climatic regime and high biodiversity levels, these forests inherently have low susceptibility to catastrophic losses due to insect pests.
- Extreme weather: The risk of extreme weather affecting carbon stocks is deemed to be very low. Tropical cyclones and hurricanes do not have serious effects on the region and the majority of the project area is low slope, eliminating the risk of landslide. The most significant severe weather risk is flooding, as much of the swamp forests flood seasonally. However, this seasonal flooding poses a very low risk to carbon stocks.
- Geologic events: The risk of geologic events affecting carbon stocks is deemed to be very low. There is no volcanic activity near the project area. Major earthquakes have occurred near the eastern border of the DRC in the western African Rift Valley, and although there is a continuing small risk of earthquakes in the Mai Ndombe region, such an event poses no risk to carbon stocks. (Source: *http://earthquake.usgs.gov/earthquakes/world/africa/seismicity.php*)

Total Non-Permanence Risk

Risk Category	Score
Internal Risks	10
External Risks	14
Natural Risks	1
Total Score	25
Overall Risk Rating	**25%**

Table 15: Total non-permanence risk rating.

3.4.3 Quantifying Net Emissions Reductions across PAAs

This project contains only one project accounting area.

3.4.4 *Ex-Ante* Estimation of NERs

Ex-ante NERs are calculated in Annex N – 'Annex N - NER Worksheet 2.16.xlsx'. These *ex-ante* NERs are based on the initial inventory of the project accounting area and the parameter values identified at the time of validation. These estimates are conservative because they do not reflect forest growth in the project accounting area or further degradation of the proxy area.

In the case when ex-ante estimates are used to prove the significance of emissions sources or estimate the quantity of NERs over the project crediting period, the project description shall include the following:

PDR.110 The projected avoided baseline emissions, project emissions and leakage for each monitoring period over the lifetime of the project.

Monitoring Period	Date of Monitoring	Estimated baseline emissions or removals (tCO2e)	Estimated leakage emissions (tCO2e)	Estimated net GHG emission reductions or removals (tCO2e)
1	10/31/2012	3,398,286	0	2,548,715
2	10/31/2013	2,819,006	0	2,114,255
3	10/31/2014	3,529,795	0	2,647,346
4	10/31/2015	4,330,794	0	3,248,096
5	10/31/2016	5,279,073	0	4,201,266
6	10/31/2017	6,273,185	0	4,704,889
7	10/31/2018	7,429,948	0	5,572,461
8	10/31/2019	8,524,210	0	6,393,158
9	10/31/2020	9,642,568	0	7,231,926
10	10/31/2021	10,724,028	0	8,817,407

11	10/31/2022	11,486,467	0	8,614,850
12	10/31/2023	12,156,738	0	9,117,553
13	10/31/2024	12,377,577	0	9,283,183
14	10/31/2025	12,683,678	0	9,512,758
15	10/31/2026	13,011,345	0	11,304,342
16	10/31/2027	11,833,474	0	8,875,106
17	10/31/2028	11,439,490	0	8,579,617
18	10/31/2029	10,448,018	0	7,836,014
19	10/31/2030	10,047,330	0	7,535,497
20	10/31/2031	9,413,412	0	9,270,665
21	10/31/2032	7,067,767	0	5,300,825
22	10/31/2033	7,093,658	0	5,320,243
23	10/31/2034	7,062,984	0	5,297,238
24	10/31/2035	5,577,002	0	4,182,751
25	10/31/2036	3,839,613	0	5,473,328
26	10/31/2037	3,567,731	0	2,675,798
27	10/31/2038	3,341,502	0	2,506,127
28	10/31/2039	3,101,996	0	2,326,497
29	10/31/2040	2,978,211	0	2,233,659
30	3/13/2041	443,874	0	3,094,440
	Total	**220,922,762**	**0**	**175,820,011**

Table 16: Projected Baseline Emissions, Project Emissions and Leakage Emissions for each monitoring period of the Project.

3.4.5 Evaluating Project Performance

The project proponent plans to evaluate project performance, including any deviations from *ex-ante* NERs, at each monitoring event (*i.e.*, annually). Sources of deviation may include changes in the quality of data (e.g., literature estimates vs. carbon stock estimates), additional sampling and development of allometry, disturbance events in the project area, or baseline re-evaluation. At each monitoring period, the project proponent will compare NERs presented for verification relative to NERs from *ex-ante* estimates and will document the causes of deviation.

4 Monitoring

4.1 Data and Parameters Available at Validation

PDR.113 The value for each variable in Appendix G.

Refer to Annex O – Data and Parameters Available at Validation.

4.2 Data and Parameters Monitored

Refer to Annex P – Data and Parameters Monitored.

4.3 Description of the Monitoring Plan

The monitoring plan is provided as a self-contained Annex document accompanying the monitoring report, 'Annex A - Lac Mai Ndombe REDD+Monitoring Plan v1.9.docx'. The monitoring plan contains a plan for all MRV activities associated with the Mai Ndombe Project, including a full sampling protocol for the Project Accounting Area and Proxy Area, a soil sampling protocol, Identification of Disturbance protocol and a description of data collection, storage and QA/QC procedures. The following PDRs provide some additional specific information about particular sections within the monitoring report.

PDR.114 Summary of sampling procedures for the project accounting areas, with a copy of a sampling protocol used to carry out measurements.

Within the accounting area, 463 sample plots were randomly generated for each of the three strata. At each plot a nested circular plot of 15-m radius was used for the upper canopy, and a 5-m radius plot was used for understory vegetation (see Monitoring Report Annex Q – Forest Measurement Protocol, for a detailed description of sampling procedures). These plots will be re-measured every 5 years, with 20% of the plots visited each year (see the Monitoring Plan annexed within the Monitoring Report for a complete description of monitoring procedures).

PDR.115 Summary of sampling procedures for the proxy areas, with a copy of a sampling protocol used to carry out measurements.

Proxy plots were randomly selected throughout the non-forest stratum of the proxy area. 98 plots were selected, and the same nested circular plot design as the accounting area was used. A 15-m radius plot was used for the upper canopy and a 5-m radius plot was used for the understory vegetation). See Annex Q – Forest Measurement Protocol and the Monitoring Plan annexed within the Monitoring Report for a complete description of monitoring procedures.

PDR.116 Summary of sampling procedures for the activity-shifting leakage areas, with a copy of a sampling protocol used to carry out measurements.

As activity-shifting leakage is not applicable to this project (see section 3.3.1), no sampling procedure is necessary.

5 Environmental Impact

According to the Prime Minister's Decree N° 08/08 of April 08 2008 for the DRC (see Annex U –Ministers EIA), an Environmental Impact Assessment (EIA) is only required for "decommissioned forests", or forests transitioning from protected status to logged status. An EIA is thereby not required for the opposite case, including Conservation Concession title holders where the forest has transitioned from logged to protected status. It has been confirmed by Mr. Frédéric Djengo Bosulu, Director of Forest Management, Ministry of Environment, Conservation of Nature and Tourism, Democratic Republic of

the Congo (see Annex V – EIA Letter from Frédéric Djengo Bosulu) that an EIA is not required for forest conservation projects in the Democratic Republic of the Congo.

6 Stakeholder Comments

An extensive stakeholder consultation process was held for the Mai Ndombe Project as part of the Free, Prior and Informed Consent (FPIC) process and has been thoroughly documented in the CCB PDD. In addition to the public comment period required by the CCB standard, the Mai Ndombe proponents engaged in many activities, including Negotiation of the Terms of Reference (Cahier de Charges), a Participatory Mapping Process, the Establishment of Community Working Groups and establishment of "comités local de développement" (CLDs) to oversee funds dispersal and benefit sharing. All of these activities are described in the CCB PDD Sections G3.8, "Stakeholder Identification and Involvement in Project Design" and G3.9, "Steps to Communicate and Publicize the CCB Public Comment Period". A copy of the latest CCB PDD has been made available to the auditor upon request.

7 References

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Table of PD Requirements

<table>
<tr><th>PDR</th><th>Description</th><th>Applicability</th></tr>
<tr><td>PDR.1</td><td>For each applicability condition, a statement of whether it applies to the project. If the applicability condition does not apply to the project, justification for this conclusion.</td><td>Applicable</td></tr>
<tr><td>PDR.2</td><td>Where applicability conditions apply, credible evidence in the forms of analysis, documentation or third-party reports to satisfy the condition.</td><td>Applicable</td></tr>
<tr><td>PDR.3</td><td>Definition of forest used by the project proponent and its source.</td><td>Applicable</td></tr>
<tr><td>PDR.4</td><td>A digital (GIS-based) map of the project area with at least the above minimum requirements for delineation of the geographic boundaries.</td><td>Applicable</td></tr>
<tr><td>Figure 5: Project Accounting Area and Concession Boundaries

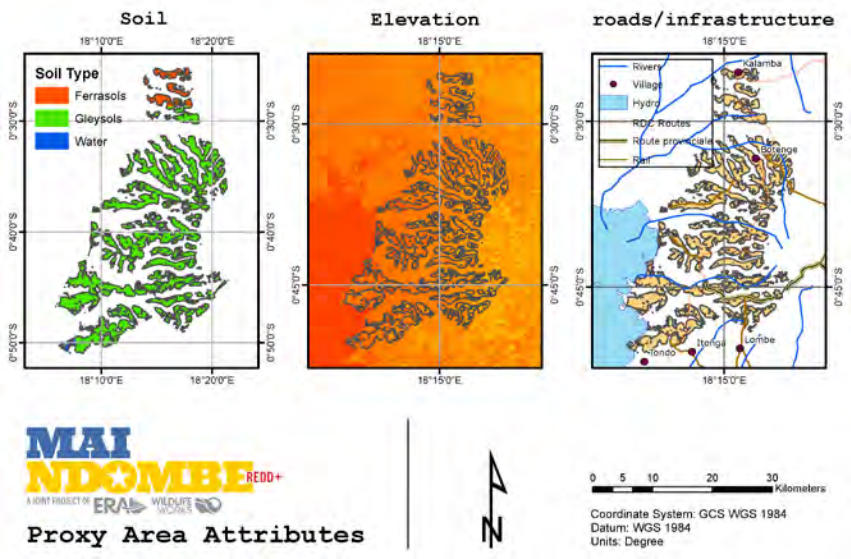
PDR.5</td><td>Credible documentation demonstrating control of the project area, or documentation that the provisos listed in the case of less than 80% project control at the time of validation delineated in this methodology are met.</td><td>Applicable</td></tr>
<tr><td>PDR.6</td><td>The project start date.</td><td>Applicable</td></tr>
<tr><td>PDR.7</td><td>The project crediting period start date and length.</td><td>Applicable</td></tr>
<tr><td>PDR.8</td><td>The dates for mandatory baseline reevaluation after the project start date.</td><td>Applicable</td></tr>
<tr><td>PDR.9</td><td>A timeline including the first anticipated monitoring period showing when project activities will be implemented.</td><td>Applicable</td></tr>
<tr><td>PDR.10<table><tr><th>Date</th><th>Project Activity or Event</th></tr><tr><td>March 14, 2011</td><td>Project start date and project crediting period start date.</td></tr><tr><td>March 14, 2011</td><td>Carbon Rights Agreement signed</td></tr></table></td><td>A timeline for anticipated subsequent monitoring periods.</td><td>Applicable</td></tr>
</table>

<table>
<tr><th>PDR</th><th>Description</th><th>Applicability</th></tr>
<tr><td>
<table>
<tr><td>August 2011</td><td>Forest Concession Contract signed</td></tr>
<tr><td>August 2, 2011</td><td>Opening Ceremonies in DRC</td></tr>
<tr><td>October 2011</td><td>Beginning of school construction</td></tr>
<tr><td>February 2012</td><td>CLD Building</td></tr>
<tr><td>March-April 2012</td><td>Participatory Rural Appraisal</td></tr>
<tr><td>September 2012</td><td>Beginning of Agroforestry Demonstration Plot construction</td></tr>
<tr><td>September 15, 2012</td><td>First verification (monitoring) event</td></tr>
<tr><td>September 15, 2013</td><td>Second verification event</td></tr>
</table>
Table 1: Project timeline including project activities and first monitoring milestones.
</td><td></td><td></td></tr>
<tr><td>PDR.11</td><td>A list of the greenhouse gases considered.</td><td>Applicable</td></tr>
<tr><td>PDR.12</td><td>A list of the selected carbon pools.</td><td>Applicable</td></tr>
<tr><td>Table 6: Selected Carbon Pools.

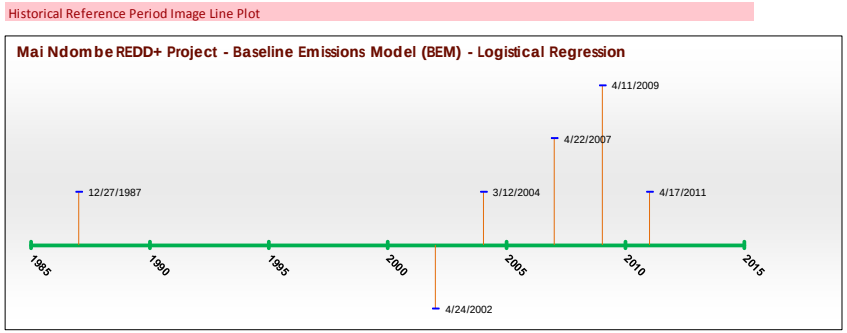
PDR.13</td><td>The definition and evidence to support the definition of a merchantable tree if the baseline scenario or project activities include logging.</td><td>Applicable</td></tr>
<tr><td>PDR.14</td><td>A list and descriptions of all instances in the group.</td><td>Not applicable. Not a grouped project.</td></tr>
<tr><td>PDR.15</td><td>A map of the locations or boundaries of all instances in the group indicating that all instances are in the same region.</td><td>Not applicable. Not a grouped project.</td></tr>
<tr><td>PDR.16</td><td>A map of the common reference area, proxy area, activity-shifting leakage area and market-effects</td><td>Not applicable.</td></tr>
</table>

PDR	Description	Applicability
	leakage area.	Not a grouped project.
PDR.17	A list of the agents and drivers of deforestation, including quantitative descriptions of agent mobilities.	Applicable
• **Primary Agents:** Commercial Logging Companies, including primarily SOFORMA (Société forestière du Mayombe"). Primary agent mobility is assumed to be 500-3000km, due to mechanized transport and a vast infrastructure system, as well as the capacity to harness natural infrastructure systems (rivers). • **Secondary Agents:** local villagers who convert heavily degraded forest into agriculture for subsistence and market sale. Mobility of the secondary agents is typically limited to that which can be traveled on-foot or by crude means of transport (~5-25km) except in the case where trucks or boats are used to transport cash crops to market (~100-500km) • **Drivers of Deforestation:** a. Ease of transport/travel (infrastructure) b. Proximity to major river c. Proximity to major market d. Access to deforestation tools PDR.18	A narrative describing the agents and drivers of deforestation.	Applicable
PDR.19	Descriptions of agents and drivers including any useful statistics and their sources.	Applicable
PDR.20	A list of external drivers (covariates) of deforestation used in the model, if any, that may be identified as part of a PRA, expert knowledge or literature (e.g. median household income, road density, rainfall).	Not applicable. No covariates were used.
PDR.21	A digital (GIS-based) map of the accounting areas,	Applicable

PDR	Description	Applicability
	including aerial or satellite imagery showing that they are completely forested as of the project start date and 10 years prior to the project start date.	
PDR.22	Justification and area of the selected accounting areas.	Applicable
PDR.23	If Type P1 or Type P2 are selected, justification for meeting the definition of APD in the current VCS-approved AFOLU requirements.	Applicable
PDR.24	If Type P1 is selected, evidence of legally-sanctioned commercial harvest in the baseline scenario.	Applicable
PDR.25	If Type U1 is selected, a spatial analysis of the project accounting area showing that at least 25% of the perimeter is within 120 meters of deforestation that occurred within 10 years prior to the project start date and showing that the reference area is adjacent to at least 25% of the project accounting area	Not applicable. Project is Type P1.
PDR.26	If Type U2 is selected, a spatial analysis of the project accounting area showing that 25% of the perimeter is within 120 meters of deforestation that occurred within 10 years of the project start date.	Not applicable. Project is Type P1.
PDR.27	If Types U1, U2 or U3 is selected, a spatial analysis of the project accounting area showing that it is within 120 meters of deforestation that occurred within 10 years prior to the project start date.	Not applicable. Project is Type P1.
PDR.28	A map of the delineated boundaries.	Applicable

PDR	Description	Applicability
PDR.29	Maps of the landscape configuration, including: a. Topography (elevation, slope, aspect); b. Recent land use and land cover (either a thematic map created by the project proponent or publically available map);c. Access points; d. Soil class maps (if available); e. Locations of important markets; f. Locations of important resources like waterways or roads; and g. Land ownership/tenure boundaries.	Applicable
 *Figure 10: Attributes of the selected Proxy Area near Lac Tumba, DRC.* PDR.30	A narrative describing the rationale for selection of proxy area boundaries.	Applicable
PDR.31	Results of a spatial analysis to demonstrate the proxy area is not forested, on average, as of the project start date.	Applicable

PDR	Description	Applicability
PDR.32	A map of the delineated boundaries, demonstrating that the reference area was held by the identified baseline agent or agents and does not include the project area.	Applicable
PDR.33	Results of a spatial analysis to demonstrate the reference area had as much forest as the project accounting area at some point in time during the historic reference period.	Applicable
See Appendix I for a map showing this analysis. PDR.34	Evidence that the forest management practices of the baseline agent in the reference area are similar to those that would have been applied to the accounting area or areas in the baseline.	Applicable
PDR.35	A description of the rationale for selection of reference area boundaries.	Applicable
PDR.40	Established reference period boundaries.	Applicable
PDR.41	The date when the agent acquired control of the reference area or when the land management practices employed in the reference area changed.	Applicable
PDR.46	A map of the reference area showing the area of "double-coverage."	Applicable
PDR.47	Quantification of "double coverage"(greater than 90%).	Applicable
PDR.48	A line plot of the historic image dates to confirm stationarity.	Applicable
Historical imagery is distributed across the entire historic reference period, as shown in the figure below. Therefore, the historic imagery appears to be stationary and the corresponding estimated time components of the image weights per equation [A.3] are unbiased.	Evidence that all image pixels are not more than 30m x 30m.	Applicable

PDR	Description	Applicability
 *Figure 12: Historical Imagery timeline.* PDR.49		
PDR.50	Empirical evidence that imagery is registered to within 10% RMSE, on average.	Applicable
PDR.51	The sample size.	Applicable
PDR.52	A map of the reference area showing the sample point locations.	Applicable
PDR.53	The covariates that were considered and their data sources.	Not applicable. No covariates were used.
PDR.54	The parameters in θ that were evaluated during model selection.	Not applicable. No covariates were used.
PDR.55	The parameters in $\hat{\theta}$ of the selected model.	Not applicable. No covariates were used.

PDR	Description	Applicability
PDR.56	The rationale used for selecting $\hat{\theta}$ including comparisons of AIC.	Not applicable. No covariates were used.
PDR.57	A protocol for interpreting forest state from imagery.	Applicable
PDR.58	The results of an independent check of the interpretation.	Applicable
PDR.59	Evidence that systematic errors, if any, from the independent check of the interpretation were corrected.	Applicable
PDR.60	The parameter t_{SA} as the number of days after the primary agent begins commercial logging until when the secondary agent of deforestation is likely to begin degrading the project accounting area.	Applicable
PDR.61	A description of how $\hat{t}_{SA}$ t_{SA} was obtained.	Applicable
PDR.62	Harvest plans for the project accounting area under the baseline scenario, results from the PRA or analysis of the reference area to determine the parameter.	Applicable
PDR.63	The parameter $\hat{t}_{PA}$ as the number of days relative to the project start date when the primary agent began or would have begun legally-sanctioned commercial logging in the project accounting area.	Applicable
PDR.64	A description of how $\hat{t}_{PA}$ was obtained.	Applicable
PDR.65	Harvest plans for the project accounting area under the baseline scenario or public records to support the determination of the parameter.	Applicable
PDR.66	A table of covariate values as of the project start dates and a description of how the values were determined including any interpolation or	Not applicable. No

PDR	Description	Applicability
	extrapolation methods.	covariates were used.
PDR.67	The parameter $\hat{m}$ as the average carbon in merchantable trees cut each day as a result of legally-sanctioned commercial logging.	Applicable
PDR.68	Documentation of how *m* was determined. This may include an analysis of carbon stocks in merchantable trees in the project accounting area, timber harvest plans for the project accounting area or reference to a publication containing the maximum allowable cut applicable to the project area. The parameter shall be greater than zero.	Applicable
PDR.69	The project shift parameter γ as the number of days between the beginning of the historical reference period and the project start date.	Applicable
PDR.70	The parameter q as the number of days between the onset of degradation and the beginning of deforestation.	Applicable
PDR.71	If the default of zero is not selected for q, then a justification for the determination of q.	Not applicable. Default value used.
PDR.75	Description of how samples from the reference area were selected including stratification, if any.	Not applicable. Default value used.
PDR.76	A map of sample locations in the reference area.	Not applicable. Default value used.
PDR.77	A table showing the conversion time for each area (farm or otherwise) from which samples were taken.	Not applicable. Default

PDR	Description	Applicability
		value used.
PDR.78	Description of and statistics for the method applied to estimate λ_{SOC}.	Not applicable. Default value used.
PDR.79	Graph of projected decay model over project lifetime.	Not applicable. Default value used.
PDR.80	Inclusion of decay model on which parameter is based	Not applicable. Default value used.
PDR.81	Explicit description of referenced literature, including project location, sampling methodology, included species, sample size, and decay parameter upon which decay is based.	Not applicable. Default value used.
PDR.82	Graph of projected decay model over project lifetime	Not applicable. Default value used.
PDR.83	If decay model is based on any other element besides carbon, defense of ability to predict carbon decay must be provided.	Not applicable. Default value used.
PDR.84	A qualitative description of the baseline scenario for each selected carbon pool.	Applicable
PDR.85	All required documentation as specified in section 3.1 for the project prior to the baseline reevaluation.	Not applicable. No baseline reevaluation .
PDR.86	All required documentation as specified in section	Not

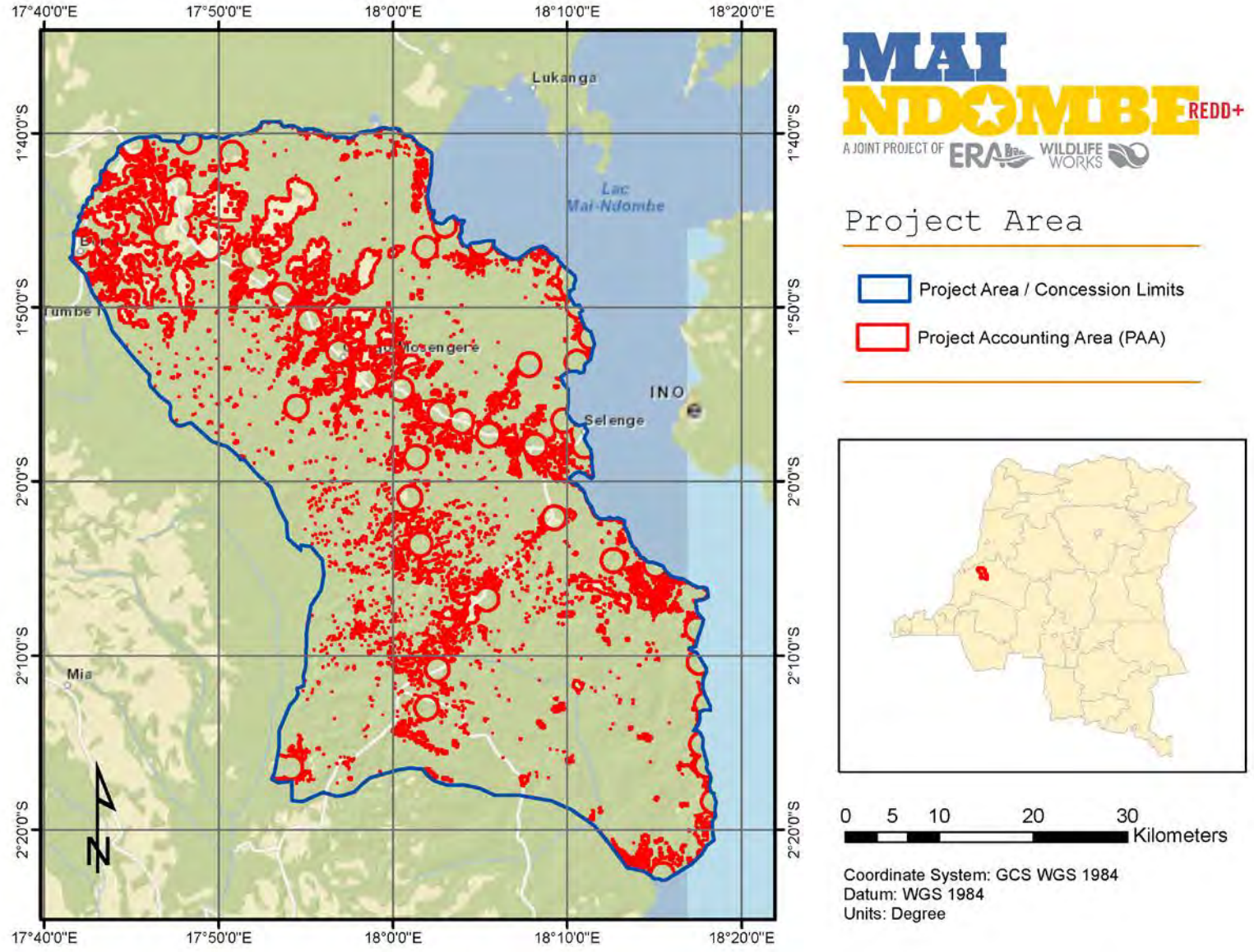
PDR	Description	Applicability
	3.1 for the project after the baseline reevaluation including the reevaluation period.	applicable. No baseline reevaluation .
PDR.87	A narrative of the reevaluation including any obstacles and how they were overcome.	Not applicable. No baseline reevaluation .
PDR.88	A map of the new reference area.	Not applicable. No baseline reevaluation .
PDR.89	Summary of new data observed in the new reference area.	Not applicable. No baseline reevaluation .
PDR.90	The re-parameterized values $\hat{\alpha}$, $\hat{\beta}$ and $\hat{\theta}$.	Not applicable. No baseline reevaluation .
PDR.91	A list of alternative land use scenarios to the project.	Applicable
PDR.92	Justification for the selected baseline scenario. This justification can include expert knowledge, results from the participatory rural appraisal and ex-ante estimates of avoided emissions (see sections 2.4.1 and 3.4.5).	Applicable
PDR.93	An investment or barriers analysis proving that the project is not the most economical option	Applicable

PDR	Description	Applicability
PDR.94	A common practice analysis including a list of project activities and the drivers of deforestation that they address.	Applicable
PDR.95	Evident compliance with the minimum requirements of the aforementioned VCS tool. This evidence may be the same as the evidence provided to meet reporting requirements listed in section 2.2.	Applicable
PDR.96	A list of project activities designed to mitigate leakage.	Not applicable
PDR.97	A map of the delineated boundaries.	Not applicable
PDR.98	Maps of the landscape configuration, including: a. Topography (elevation, slope, aspect); b. Recent land use and land cover (either a thematic map created by the project proponent or publically available map); c. Access points; d. Soil class maps (if available); e. Locations of important markets; f. Locations of important resources like waterways or roads; and g. Land ownership/tenure boundaries.	Not applicable
PDR.99	A narrative describing the rationale for selection of activity-shifting leakage area boundaries.	Not applicable
PDR.100	Results of a spatial analysis to demonstrate the activity-shifting leakage area is entirely forested as of the project start date.	Not applicable
PDR.101	Results of a spatial analysis to demonstrate the activity-shifting leakage area is no larger than the project accounting area.	Not applicable
PDR.102	A map of the delineated boundaries.	Not applicable

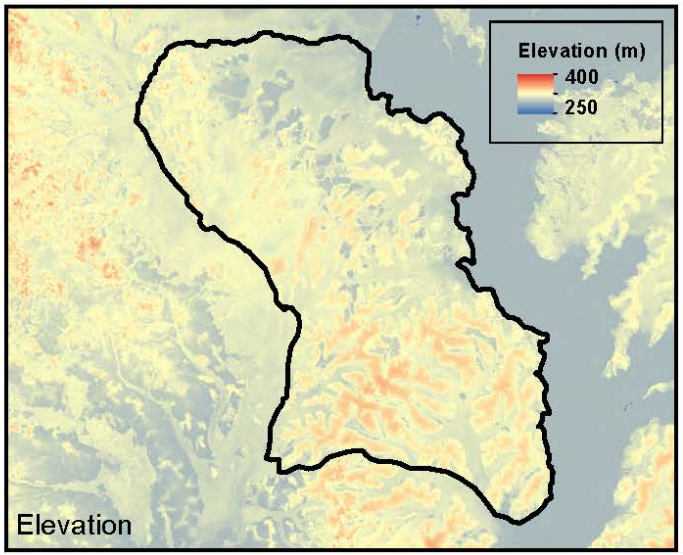
PDR	Description	Applicability
PDR.103	Maps of the landscape configuration, including: a. Topography (elevation, slope, aspect); b. Recent land use and land cover (either a thematic map created by the project proponent or publically available map);c. Access points; d. Soil class maps (if available); e. Locations of important markets; f. Locations of important resources like waterways or roads; and g. Land ownership/tenure boundaries.	Not applicable
PDR.104	A narrative describing the rationale for selection of market-effects leakage area boundaries.	Not applicable
PDR.105	Results of a spatial analysis to demonstrate the market-effects leakage area is entirely forested as of the project start date.	Not applicable
PDR.106	Results of a spatial analysis to demonstrate the market-effects leakage area is as large or larger than the effective project area.	Not applicable
PDR.107	The selected discount factor $p_{L\,ME}$.	Not applicable
PDR.108	Calculations of $c_{L\,AGMT}$ in the market-effects leakage area, including references to literature if cited.	Not applicable
PDR.109	Justification for the selection of the discount factor.	Not applicable
PDR.110	The projected avoided baseline emissions, project emissions and leakage for each monitoring period over the lifetime of the project.	Applicable
PDR.111	A narrative description of sources used to estimate the leakage rate and demonstration that the estimated rate is conservative.	Not applicable. No leakage in project.
PDR.112	If included in project activities, a description of	Not

PDR	Description	Applicability
	procedures used to estimate the rate of biomass burning and charcoal production and demonstration that these estimates are conservative.	applicable. No biomass burning or charcoal production in project activities.
PDR.113	The value for each variable in Appendix G.	Applicable
PDR.114	Summary of sampling procedures for the project accounting areas, with a copy of a sampling protocol used to carry out measurements.	Applicable
PDR.115	Summary of sampling procedures for the proxy areas, with a copy of a sampling protocol used to carry out measurements.	Applicable
PDR.116	Summary of sampling procedures for the activity-shifting leakage areas, with a copy of a sampling protocol used to carry out measurements.	Applicable

Appendix A. Map of Project Area



Appendix B. Map of Project Topography



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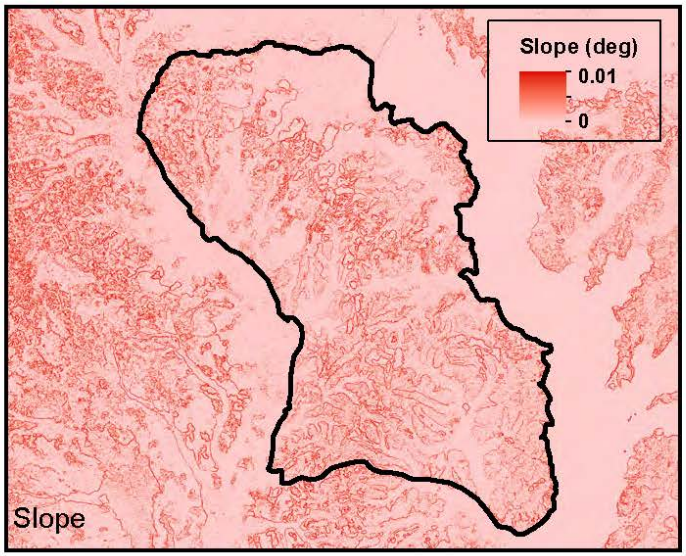
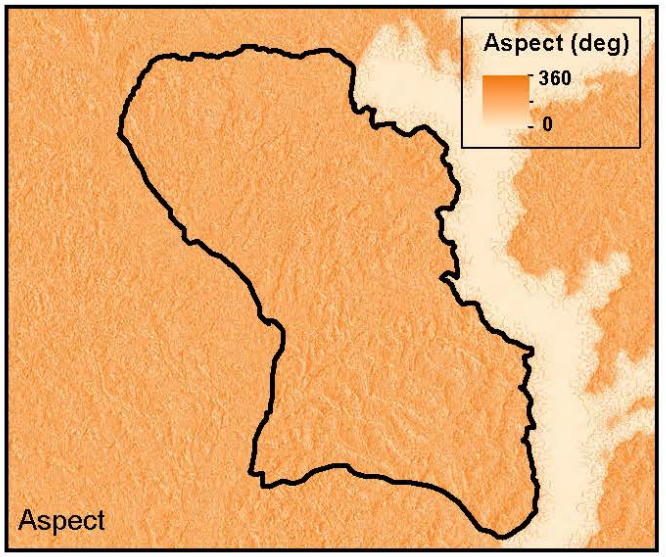
Project Area Topographic Maps

Elevation, Slope, and Aspect

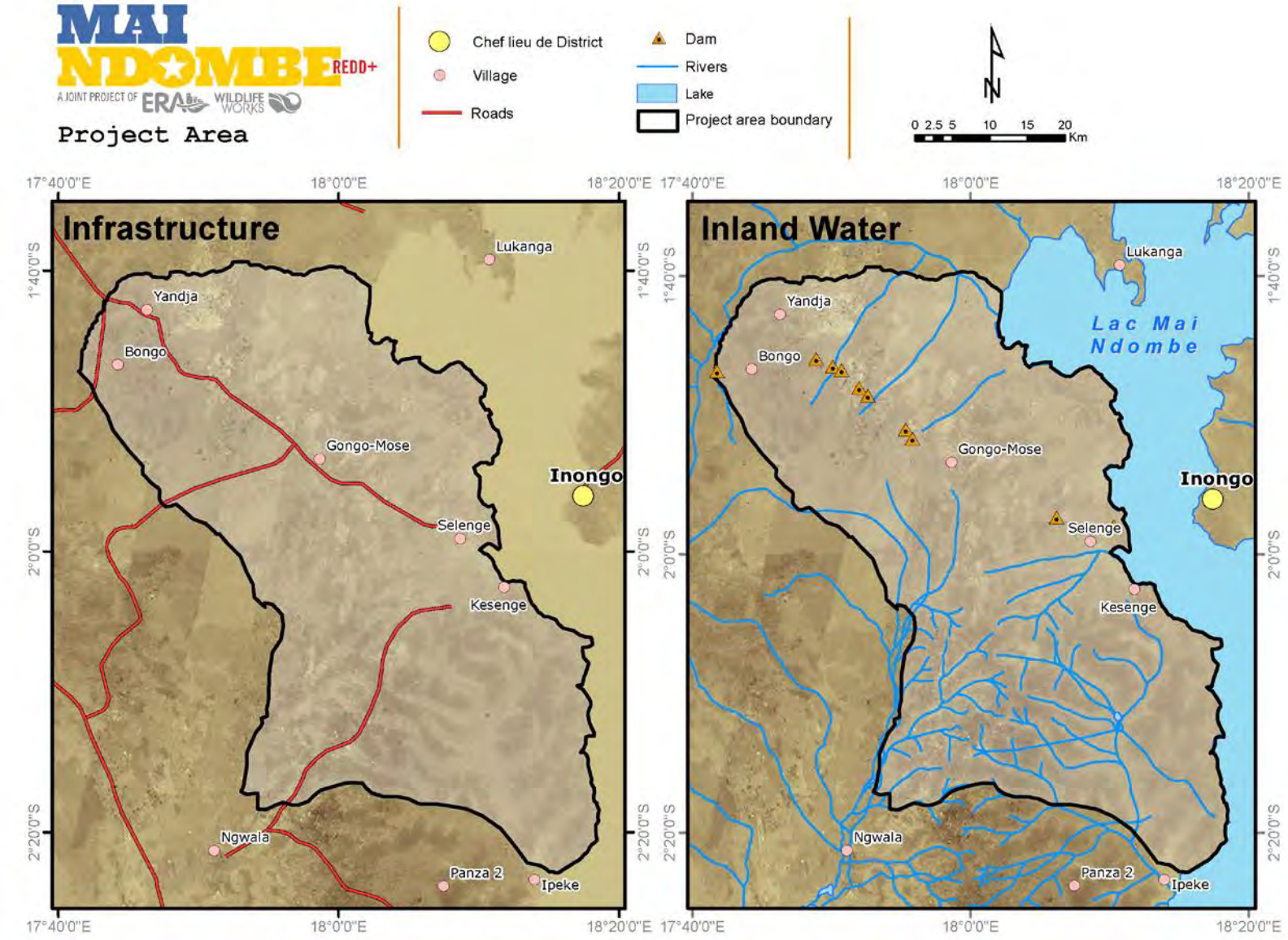
0 12.5 25 50 75 100 Km

Coordinate System: GCS WGS 1984
Datum: WGS 1984
Units: Degree

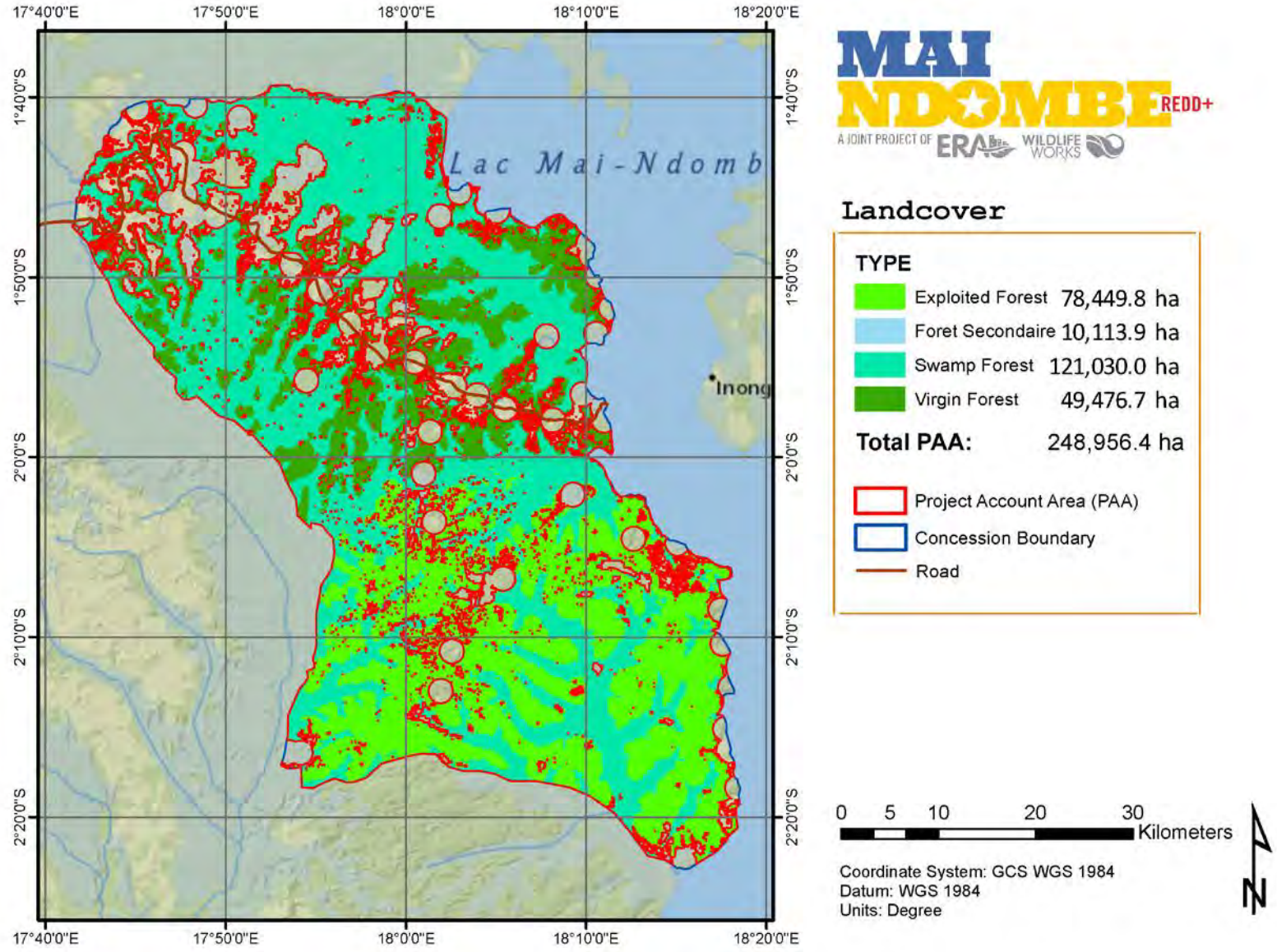




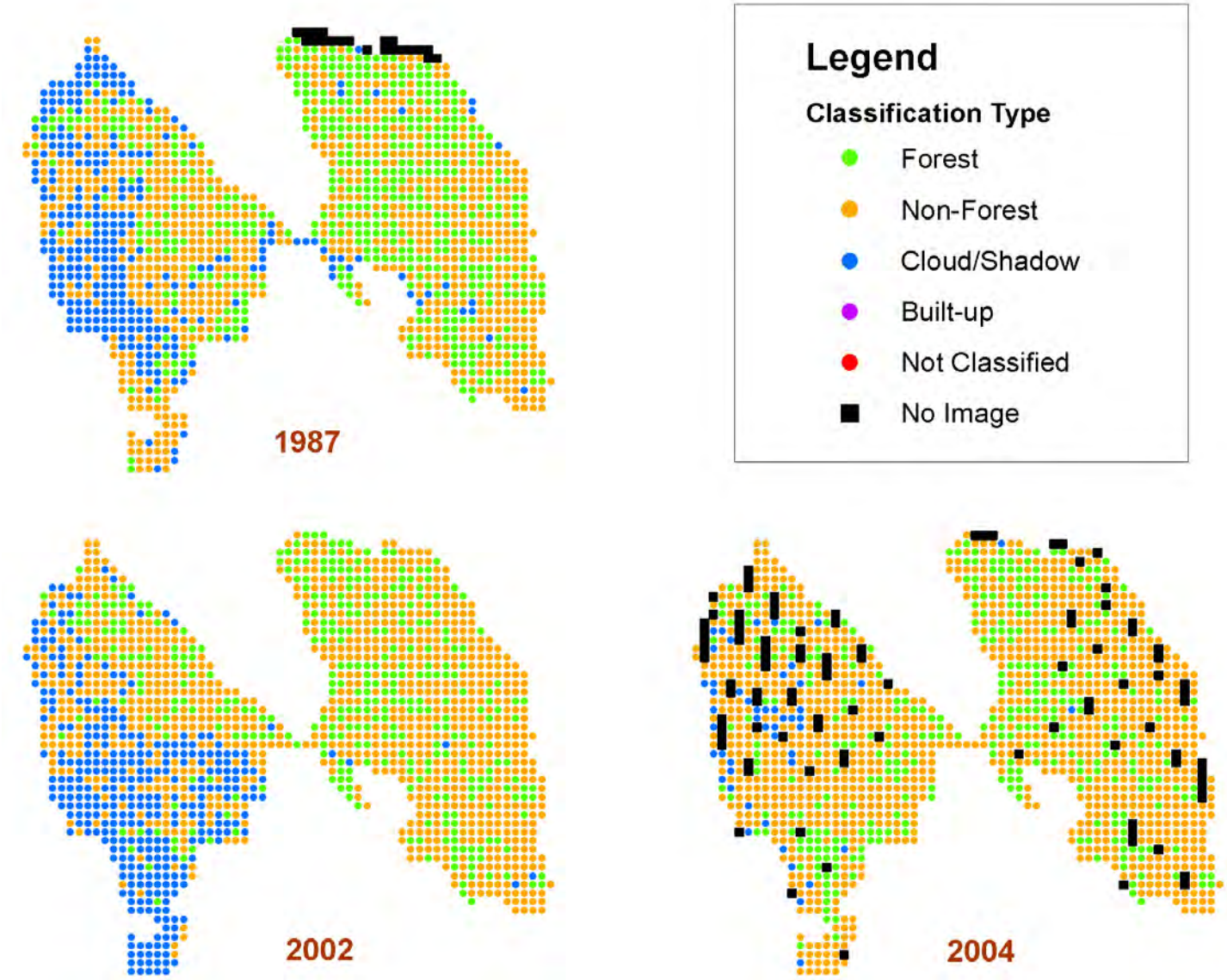
Appendix C. Map of Project Roads, Infrastructure

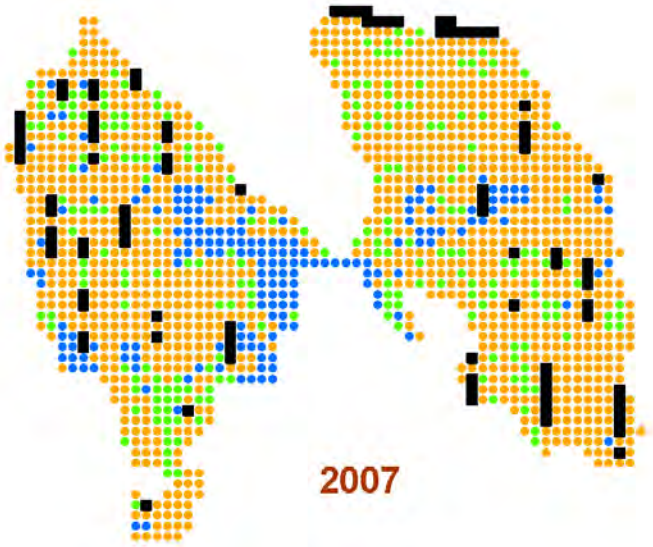


Appendix D. Map of Project Area Land Cover / Vegetation Cover

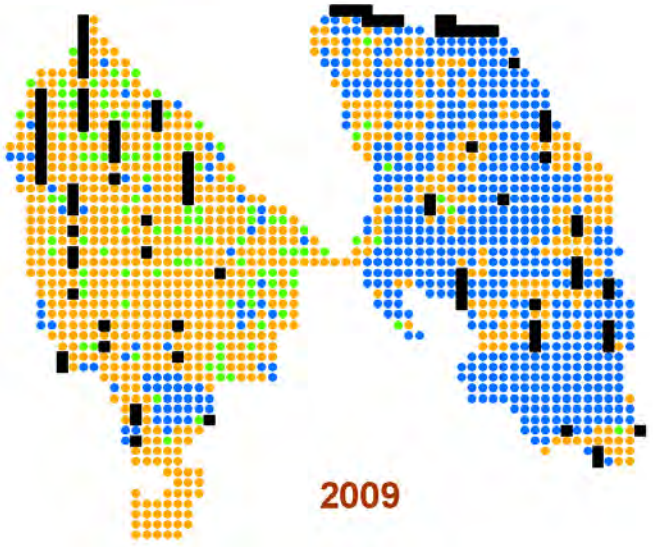


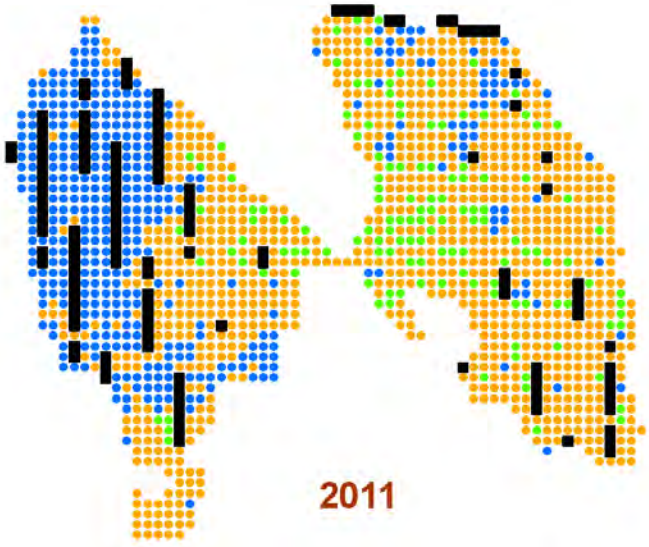
Appendix E. Reference Area Map of Point Interpretation for Biomass Emission Model (BEM)



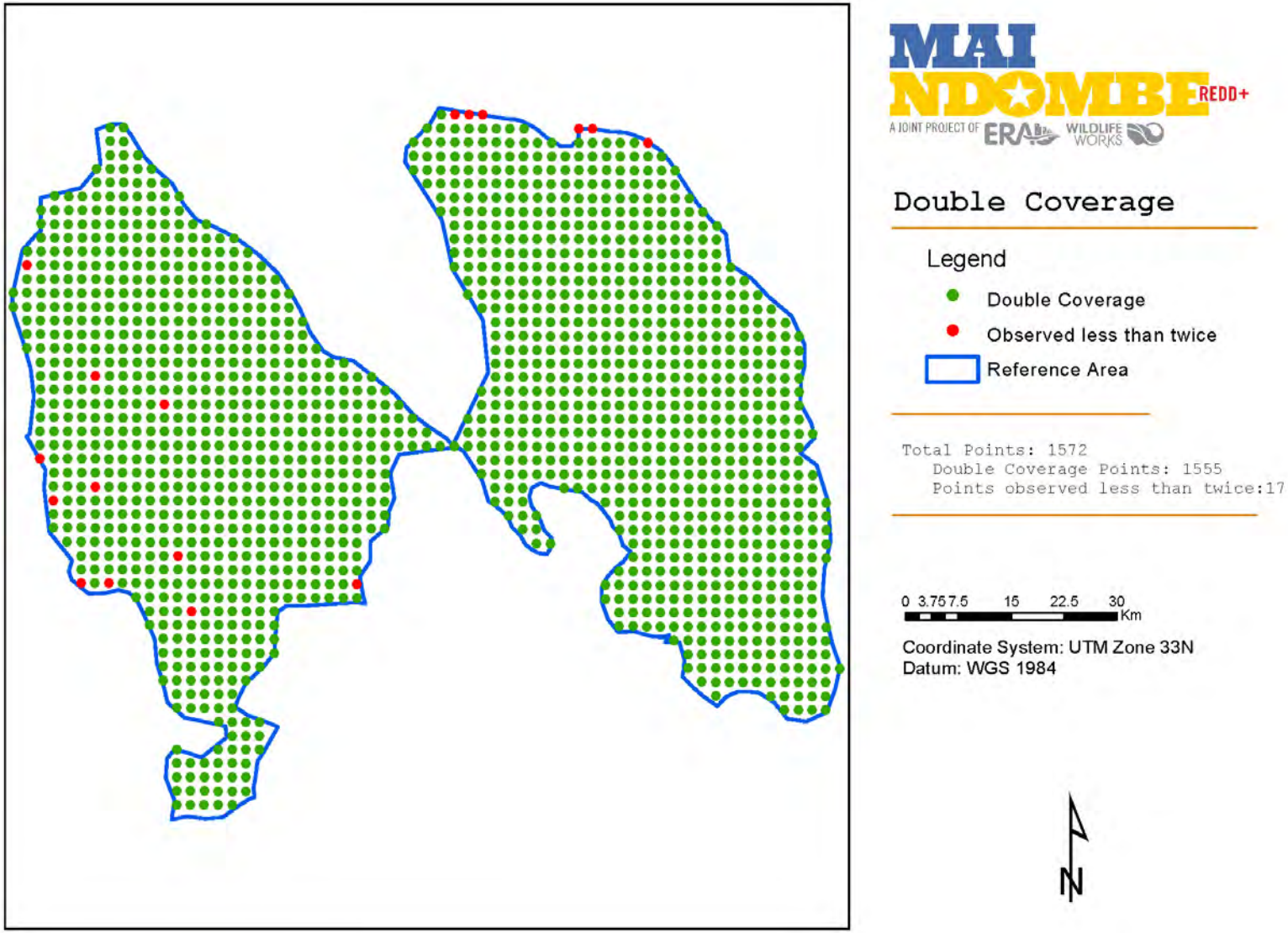

2007

Legend
Classification Type
Forest
Non-Forest
Cloud/Shadow
Built-up
Not Classified
No Image

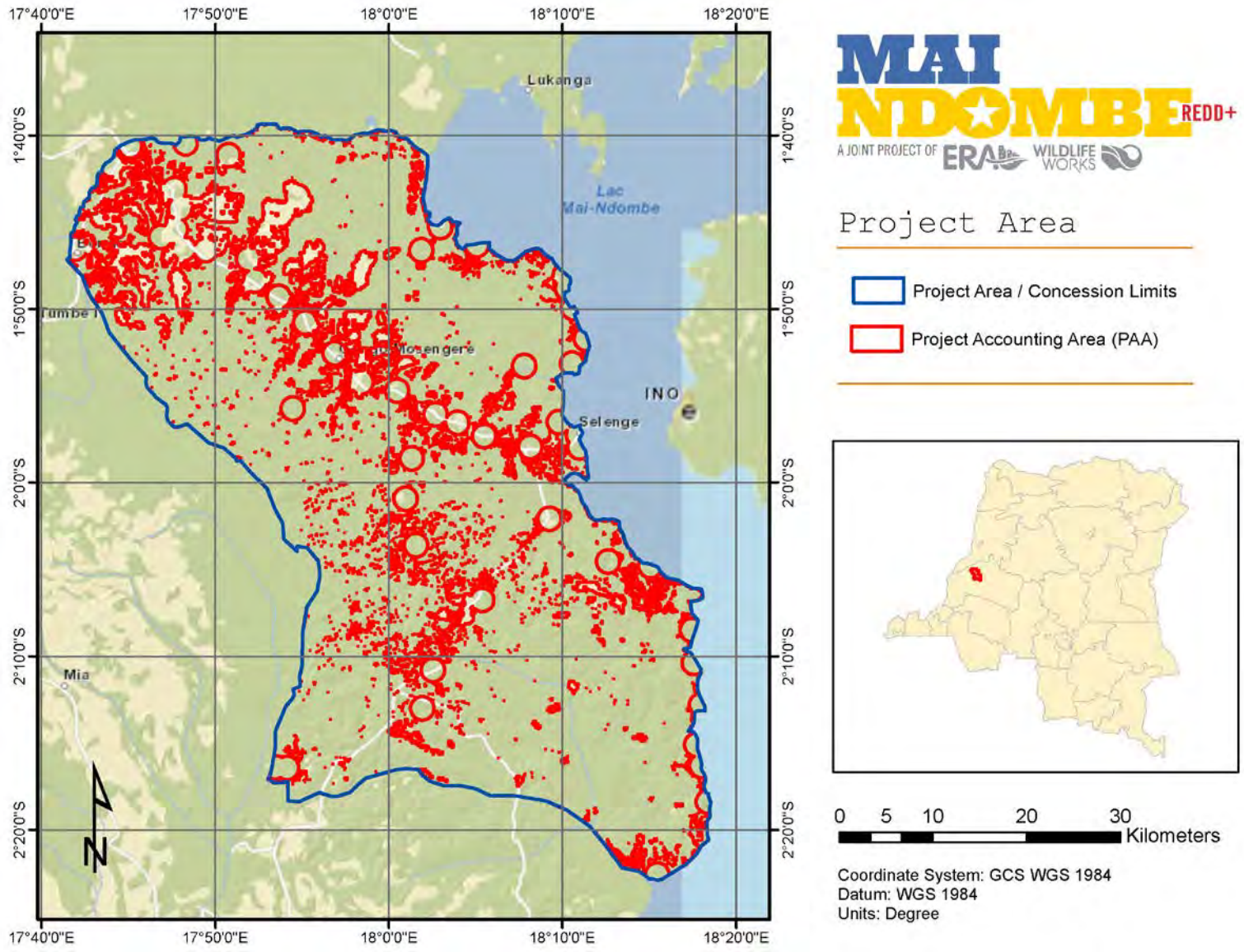

2009


2011

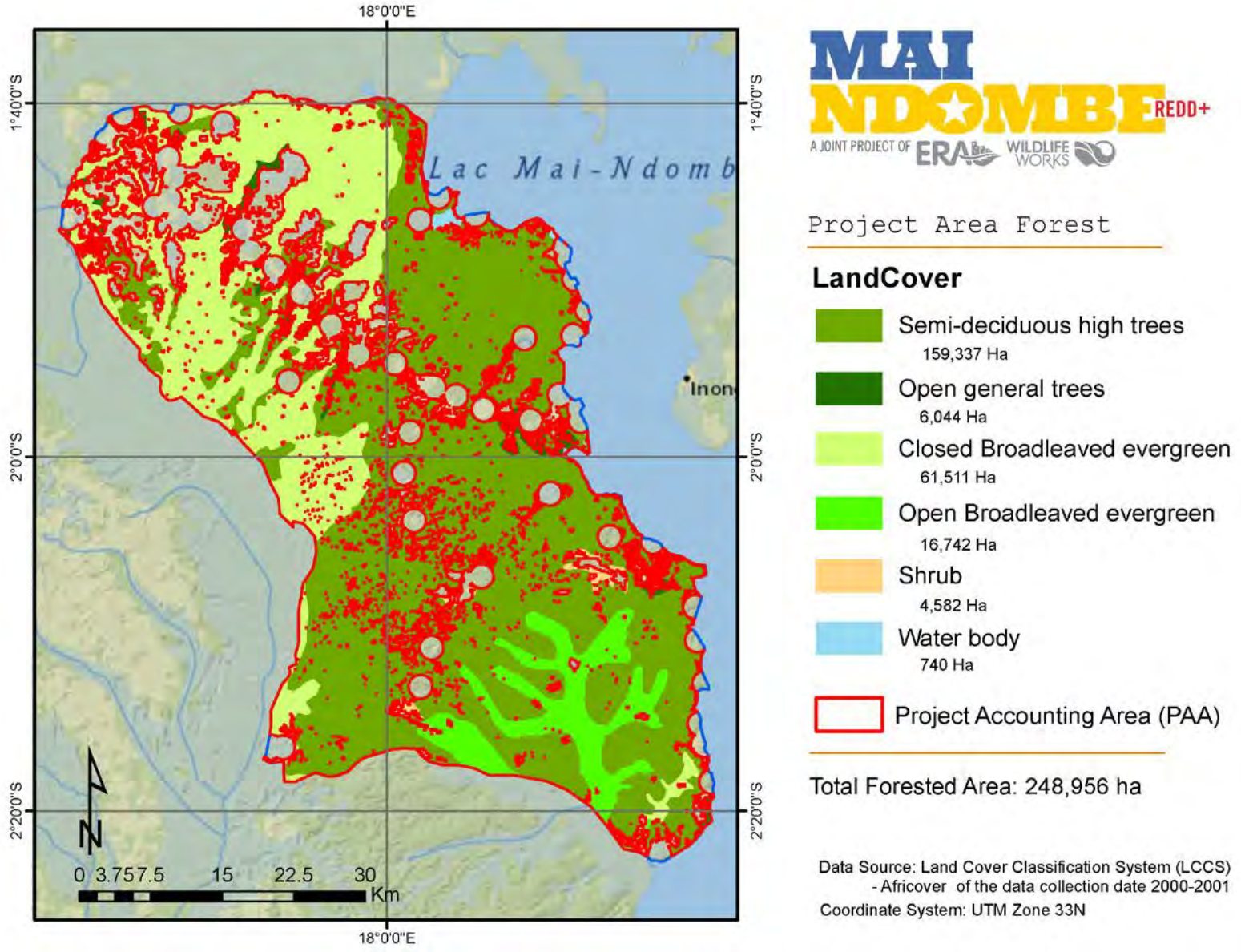
Appendix F. Double Coverage Map in the Reference Area



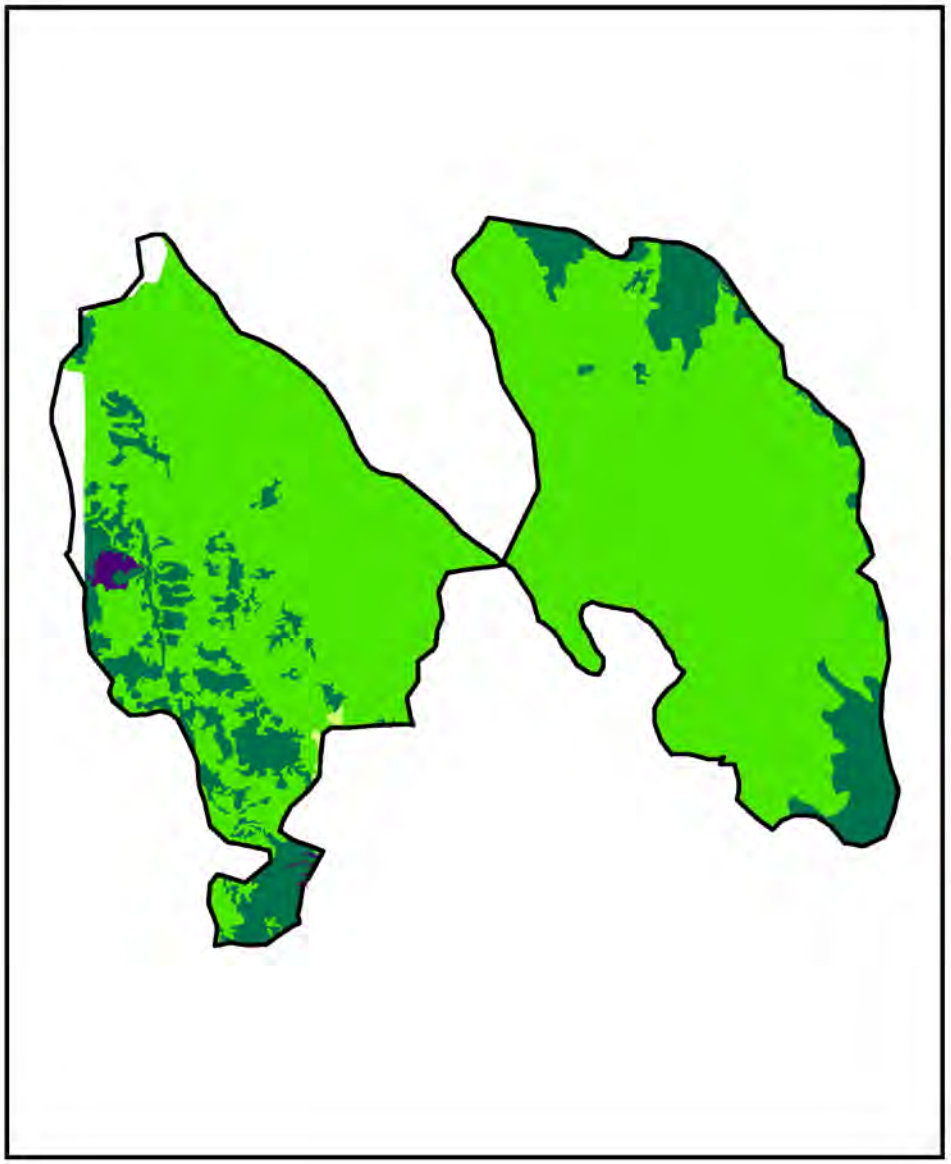
Appendix G. Map of Project Accounting Area (PAA)



Appendix H. Map Demonstrating Forested Area in 2001 within the Project Accounting Area



Appendix I. Map Demonstrating Forested Area in 2001 within the Reference Area



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Rereference Area Forest in 2001

- 40% Forested
- 60% Forested
- 100% Forested
- Non Forest
- Reference Area

Forest Area: 387,241 Ha
Non Forest: 2,671Ha

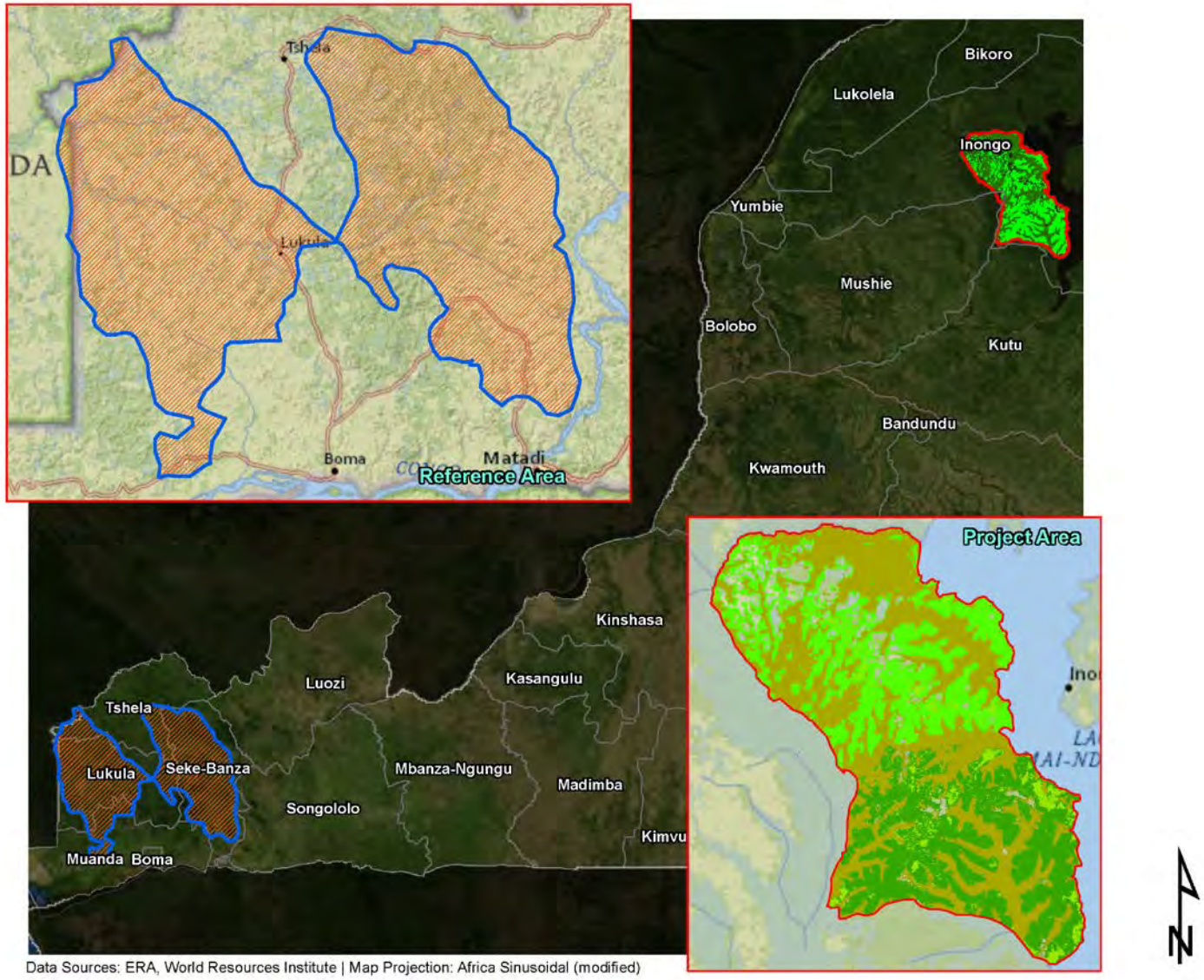
0 5 10 20 30 40 Km

N

Coordinate System: UTM Zone 33N

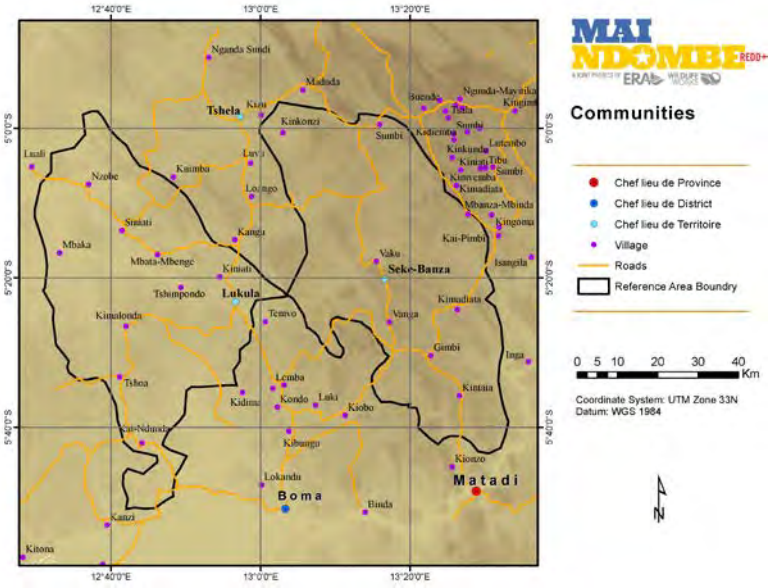
Data Source: Land Cover Classification System (LCCS) - Africover of the data collection date 2000-2001

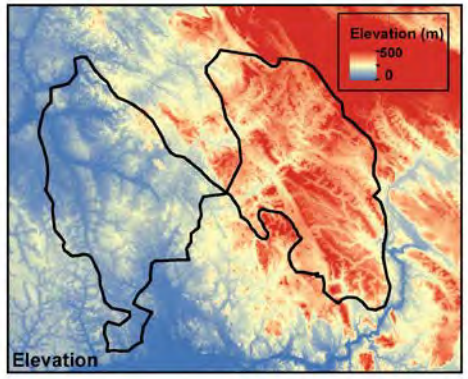
Appendix J. Reference Area

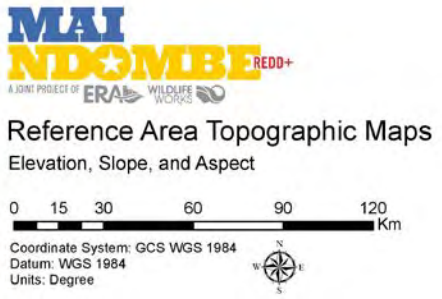


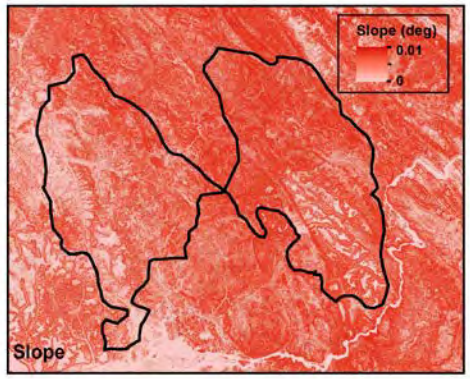
Data Sources: ERA, World Resources Institute | Map Projection: Africa Sinusoidal (modified)

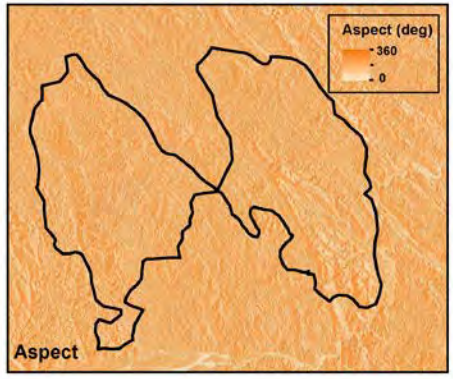
Appendix K. Reference Area – Attributes

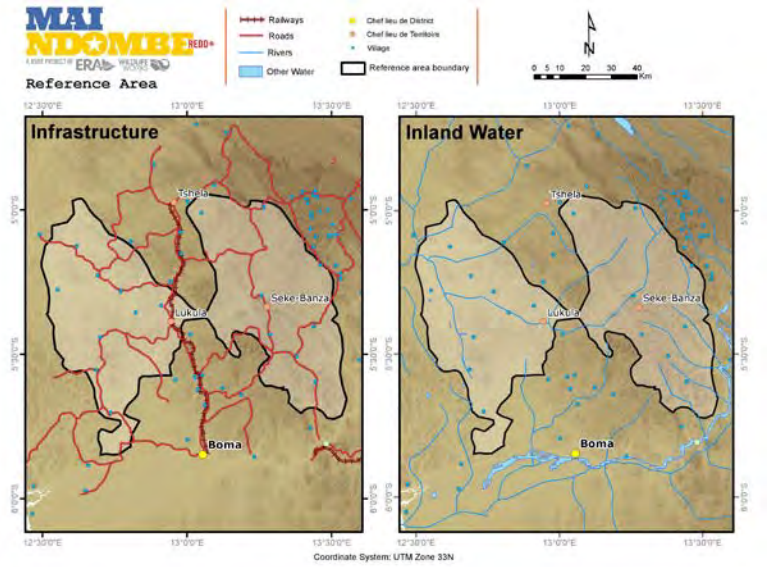












Larger maps are available upon request